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**Notes & Queries**

It has been our custom for thirty years past to devote a considerable space to the answering of questions by correspondents; so useful have these labors proved that the SCIENTIFIC AMERICAN office has become the factotum, or headquarters to which everybody sends, who wants special information upon any particular subject. So large is the number of our correspondents, so wide the range of their inquiries, so desirous are we to meet their wants and supply correct information, that we are obliged to employ the constant assistance of a considerable staff of experienced writers, who have the requisite knowledge or access to the latest and best sources of information. For example, questions relating to steam engines, boilers, boats, locomotives, railways, etc., are considered and answered by a professional engineer of distinguished ability and extensive practical experience. Enquiries relating to electricity are answered by one of the most able and prominent practical electricians in this country. Astronomical queries by a practical astronomer. Chemical enquiries by one of our most eminent and experienced professors of chemistry; and so on through all the various departments. In this way we are enabled to answer the thousands of questions and furnish the large mass of information which these correspondence columns present. The large number of questions sent—they pour in upon us from all parts of the world—renders it impossible for us to publish all. The editor selects from the mass those that he thinks most likely to be of general interest to the readers of the SCIENTIFIC AMERICAN. These, with the replies, are printed; the remainder go into the waste basket. Many of the rejected questions are of a primitive or personal nature, which should be answered by mail; in fact hundreds of correspondents desire a special reply by post, but very few of them are thoughtful enough to enclose so much as a postage stamp. We could in many cases send a brief reply by mail if the writer were to enclose a small fee, a dollar or more, according to the nature or importance of the case. When we cannot furnish the information, the money is promptly returned to the sender.

W. H. L. will find descriptions of steam canal boats on pp. 15, 246, vol. 27, and on p. 350, vol. 36.—R. K. will find directions for galvanizing cast iron on p. 346, vol. 31.—J. T. will find directions for renovating worn files on p. 361, vol. 31.—W. D. M. will find a description of a hydrogen lamp on p. 242, vol. 31.—G. S. will find directions for dissolving rubber on p. 119, vol. 28.—R. L. W. will find directions for making rubber stamps on p. 155, vol. 31.—A. D. will find directions for making farina (dextrin) from potatoes on p. 315, vol. 30.—J. C. W. will find directions for cleaning shells on p. 122, vol. 27.—L. W., Jr., will find directions for engraving on glass on p. 375, vol. 33.—C. A. H. will find directions for dyeing felt hats black on p. 101, vol. 30.—A. C. will find an explanation of the ball and current of air puzzle on p. 262, vol. 35.—J. W. C. will find directions for condensing milk on p. 343, vol. 30.—M. G. will find directions for drilling glass on p. 218, vol. 31.—W. H. will find the article on the penetrating power of light on p. 180, vol. 33.—F. S. will find a description of infusorial earth on p. 206, vol. 35.—J. McG. will find directions for preserving cider on p. 11, vol. 31.—E. A. D. will find directions for making a magnet helix on p. 220, vol. 35.—F. B. will find directions for utilizing sawdust on p. 276, vol. 32.—H. E. will find a description of the templet odontograph on p. 181, vol. 35.—W. H. D. will find directions for painting theatrical scenery on p. 200, vol. 28.—R. should use black Japan varnish for lettering on marble.—G. S. should consult a dentist.—W. T. B. will find directions for making hard soap on pp. 331, 370, vol. 31. For toilet soaps, see p. 286, vol. 28.—C. F. S. will find directions for purifying cistern water on p. 395, vol. 32.—F. B. will find that the best way to put bronze on paper is to draw the design in gold size, and dust on the bronze.—A. D. will find a good recipe for a white metal on p. 139, vol. 31.—W. J. E., M. F. B., F. N. P., W. G., W. F. H., R. J. B., G. S., and others who ask us to recommend books on industrial and scientific subjects, should address the booksellers who advertise in our columns, all of whom are trustworthy firms, for catalogues.

(1) D. Z. asks: How can I separate chloride of silver from sand? A. Dissolve in ammonia water, and reprecipitate the solution by the addition of an acid, or evaporate to dryness.

(2) M. G. says: I have about 35 gallons of Rhine wine which seems about to sour. How can I reclaim it? A. Heat a test portion to near the boiling point, add a little carbonate of iron, agitate briskly for a few moments, and filter. If this does not succeed, try a small quantity of lime water. Let us know how these succeed. Foul or sour wines are usually corrected by digestion with a little chalk or the white carbonate obtained from calcined oyster shells, also by agitation and digestion with charcoal or boneblack, and subsequent filtration or decantation. Salicylic acid has lately been employed to cure the rancidity or foulness of wines, and to check fermentation. In Germany varying quantities of grapesugar is added to some wines. 2. Do wines and liquors draw any copper from brass faucets? A. Many wines do exert a more or less solvent action upon copper, owing to the free acids which they contain. 3. How is H<sub>2</sub>S most conveniently prepared? A. It is obtained by the action of diluted sulphuric acid on monosulphide of iron. The gas is ordinarily dissolved in cold distilled water as it comes over.

What fulminate is used in pistol cartridges, and how is it put in? A. We believe the mercury fulminate is generally employed. Percussion mix-

tures, of chlorate of potash, sulphide of antimony, sulphur, and gunpowder, and chlorate of potassa and amorphous phosphorus, are used to a limited extent.

(3) D. W. asks: How many lbs. pressure will it require to break a cast iron beam in the center supported at each end? The beam is 38 inches long, 13 inches deep, and 1 inch thick. A. About 100,000 lbs.

(4) C. E. E. says: I have a pleasure boat propelled by an engine 6 inches in diameter by 6 inches stroke, which makes 200 revolutions per minute, using steam at 100 lbs. pressure in the boiler, cut off at one half stroke. I wish to attach a surface condenser to it; please inform me of what size it should be, etc.? A. Make the condenser with from 1/2 to 3/4 as much cooling surface as your boiler has heating surface. Use small tubes, quite thin, full particulars of which you can obtain from a manufacturer. If you only wish to condense the steam to use as feed water, you can discharge it into a pipe immersed in the water, and use a small air pump. By this arrangement, which is in use on several small steamers, you do not require a circulating pump.

(5) A. M. asks: If I have a cylinder of 2 inches bore, with an airtight piston in it, how much pressure do I get by compressing the air into any fractional part of the cylinder? A. If the temperature of the air is kept the same, the pressure varies inversely as the volume. For the case in which there is no gain or loss of heat, see answer No. 28, October 7, 1876.

(6) J. F. asks: How can I make a paste or paint for marking flour sacks? A. The aniline colors are perhaps the best materials you could use for the purpose. There are, of course, many other marking fluids that might give proper satisfaction as to application, durability, etc.; but they are all more or less difficult to extract from the fabric after application. The aniline colors may be removed completely and with facility by the addition to the washing water of a small percentage of spirit of wine or wood spirit.

(7) E. M. C. says: By what process can I soften plaster of Paris which fastens the brass burners to lamps? A. Use plenty of water and mechanical exertion.

(8) F. A. H. says: I have seen the idea advanced of lubricating sewing machines and other light machinery with glycerin. What do you think of it? A. It has been used, we believe, with very good results. Dilute it with water.

1. What is the difference between writing ink and writing fluid? A. In ordinary ink the iron salts and other ingredients are merely in mechanical mixture, being prevented from settling to the bottom by the addition of gums, etc. In the writing fluids, so-called, the ingredients are all in true solution. 2. What is copying ink? A. Copying inks contain sugar; in other respects they differ but little from ordinary inks.

(9) A. M. asks: 1. How can faded silver-plated ware be restored? A. Have it replated. This is the cheapest and best method. 2. I have tried mercury dissolved in nitric acid, applied with a cotton rag; and though this solution gives a splendid appearance, yet it does not stick long. Is it hurtful to use spoons or forks thus silvered? A. The mercury is very poisonous.

(10) E. A. asks: Can you give your readers any more details concerning the recipe in your No. 17, vol. 30, for making compressed yeast? A. The precise mode of preparing this ferment is more or less a trade secret. Make the mash in the ordinary way, of 1 part of bruised barley malt with 3 parts of bruised rye, the mash being cooled with the fluid portion of the wash. Add sufficient yeast to start a brisk fermentation, gather the newly formed yeast as it rises to the surface, wash well with water, and place in a stout canvas bag under a press, by which means it may be obtained as a stiff clayey dough. It is better to mix the yeast with from 10 to 20 per cent of potato starch. Many of your questions you can best answer for yourself, by experiment.

(11) T. R. A. asks: 1. What substance is the worst conductor of heat? A. The poorest heat conductors are found among organic substances: feathers, cotton, wool, straw, bran, wood, etc. 2. How may it be formed into a paste, to be baked and glazed as pottery ware is done? A. This is impracticable.

(12) T. A. J. asks: How can I collect mercury after it has been dissolved with nitric acid and diluted with water? A. Precipitate the mercury as oxide by the addition in excess of a strong solution of caustic potash or soda (caustic alkali), decant the supernatant liquid, dry the precipitate, place it in an iron retort, the beak of which or its connection just dips below the surface of cold water in a suitable vessel, and heat the retort strongly over a good coal fire until the pure mercury is all distilled over. It is advisable to wash the precipitated oxide of mercury well with water before drying it, previously to placing it in the retort.

How can I make a good carbon battery that will be strong and cheap? A. Place a suitable porous cup of unglazed porcelain in a glass or earthenware jar, and surround it with a thick piece of zinc. Fill the outer jar to within about 2 inches of the top of the porous cup with water, to which add about 2 ozs. of strong oil of vitriol. Place the plate of carbon in the porous cell, and surround it with a solution made as follows: In a pint of water dissolve 1 oz. of bichromate of potash, and add to this 2 ozs. of strong oil of vitriol; allow to cool before using. If the end of a copper wire of any length be connected, one with the carbon and the other with the zinc, the current will run through it from the carbon end to the zinc.

(13) H. G. W. asks: Why is it that, if we make a small hole through a piece of paper and hold it up before the eye at a distance of about 1

inch, and pass a needle down over the hole on the side next to the eye, the light appears to be cut off from the bottom first? A. As the images of all objects are inverted in the eye, when any object goes down, the image in the eye goes up; and as the rays of light cross in passing through small holes, the going down on one side is equivalent to going up on the other.

(14) I. G. O. asks: What is the best method to extract the oil from belts that have got saturated therewith? A. Wash with soap and warm water.

(15) E. F. asks: What acid can I use to clean dirty, already used benzine, to fit it for use again? A. It is easiest purified by distillation.

(16) W. J. says: I notice that the connecting rods of most of the small American engines are connected with their straps by means of bolts and one key. What advantage is there in using these bolts? Is not the gib and key just as good? A. If a connecting rod strap is held to the rod by a gib and key, the brasses must meet at the joint so that the key can be driven tightly home, thus locking the strap. If the joint of the brasses is left open so that driving in the key will take up the wear without having to file off any of the face of the brasses at the joint, the key in no way acts to lock the strap at all. If the strap is locked to the strap by bolts, it is no matter whether the joint faces of the brasses are left open or not; the strap will always be held securely in position, and its wear will be considerably less. The bolts hold the straps more securely and enable us to keep the length of the rod as nearly correct as possible by putting the key at one end inside and at the other end outside of the brasses, as shown on p. 490, vol. 2, of the SCIENTIFIC AMERICAN SUPPLEMENT.

(17) S. L. S. says: Does the use of coal oil on a mechanic's oilstone harden or soften it? A. It hardens stones of most kinds.

(18) S. N. M. asks: Is there not an error in the numbers given on p. 185, vol. 35, under title of "New Arrangement of the Spectroscope?" A. We have addressed Professor Young on the subject, and his reply is as follows: "The numbers are both given wrong. Calculation assigns for the velocity of the sun's surface 1246 miles per second. My observed velocity deduced from spectroscopic observations was 142 miles. At Buffalo I gave the number as 136, but I had neglected to apply a correction for the latitude of the point on the sun's limb at which the observation was taken, and this made a little more difference than I expected."

(19) C. S. asks: What metal or combination of metals would be best suited to take a sharp cast? The metal commonly used to take casts from paper molds scorches the paper, and I want something that melts at a much less temperature. A. Try the following fusible alloy, which fuses below the boiling point of water, at 201° Fah: Two parts of bismuth, one of lead, and one of tin.

(20) B. M. R. asks: When two shadows are brought near to each other, why do they seem to protrude toward each other and touch? A. The edges of shadows are not sharp, and when they are brought near together the edges overlap and become visible. When single, they were not visible.

How does thunder turn milk sour? A. It is done by the electricity in the atmosphere, which will coagulate the albumen in the milk; and it renders the sensitized gelatin, used in the carbon photo process, insoluble.

Do the trees of Australia turn their leaves edge-ways to the sun? A. There are some instances in which they do, but not generally. The native trees are all evergreens. Some shed their bark and not their leaves. There are in Australia plums with the stones on the outside. There does not appear to be any general law governing the growth of vegetation there.

What is the cause of equinoctial storms? A. Observations extending over a large number of years show that we have more storms when the sun crosses the equator than at any other time.

What people of ancient Greece spoke the language now called Greek? A. None.

(21) H. S. G. asks: Do you know of any acids or any process that will eat off common solder from a gold watch case? A. If the solder is what you say, strong nitric acid will remove it without injury to gold; but before you try the experiment, be sure that the watch case is of gold.

(22) C. A. W. says: I am building a rustic fence of cedar poles, keeping the bark on; but I find that after a time the bark begins to fall off, which of course disfigures it very much. Is there anything in the way of a varnish, etc., which would prevent this? A. The usual course is to remove the bark in the first place as neatly as possible, so as to preserve the smooth surface of the cedar intact. With a little care, this can still be done with your fence, and will save you further trouble in this respect.

(23) D. H. says: I am wearing a plaster with one zinc and one copper plate connected by a wire. Will the verdigris which is formed, the skin being in contact with the copper, produce injurious effects? A. Possibly not verdigris, but other copper salts may be formed that are objectionable and injurious.

(24) A. F. T. asks: 1. How can I dispel the bad odor arising from a damp wall indoors? A. If the wall is now papered, the bad odor may arise from the decay of the paper and paste. Strip off the paper and wash out the paste, etc. 2. How could this wall be best repaired, so that wall paper would stick and would not become discolored? The dampness was caused by water escaping into the cellar, which has since been filled up with yel-