Business and Personal.

The charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

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 This is for our information, and not for publication.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 1½ miles through a 12 inch main, then the main contracts to 10 inches, and continues about ¾ 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 Spons' 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 metallic 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 ½ 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, ½ ounce dragon's blood, ½ ounce cochineal, 1 ounce saffron. Steep to full strength, and strain. 2. Also a good varnish. A. For varnish, rectified spirits of wine ½ gallon, add 6 ounces gum sandarac, 3 ounces gum mastic, and ½ 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 ⅓ 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 ¼ pound jeweler's rouge with ¾ pound prepared chalk. Or, ¼ pound levigated putty powder, ½ pound burnt hartshorn, 1 pound prepared chalk, and 1 ounce rose pink. Or, ¼ pound fine chalk, 3 ounces pipe clay, 2 ounces white lead, ¾ 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 lithography 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 ¾ 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, 1·732. 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 ¾ pound of shellac and ¾ 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 2½ inches by 3 inches, ports 2¼ inches by ¾ inch, exhaust 2¾ inches by ½ inch, lap on valve ⅛ 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,