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 This is for our information, and not for publication.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) F. M. asks why a large quantity of leaf tobacco wet with fresh water gets hotter than the same quantity will, wet with strong solution of salt water. A, Salt is an antiseptic, and retards fermentation. Fermentation is the cause of the heating.

(2) H. V. J. asks: What is the ratio of the length of a vibrating reed, rigidly fixed at one end, to its rate of vibration? For instance, a strip of elastic metal, the length of which is *n*, vibrates 50 times per second. What will be the length of a strip of the same material, and cross section, to vibrate 200 times per second? A. The rate of vibration varies inversely as the length. In the instance given, the length for 200 vibrations should be $\frac{n}{4}$.

(3) J. K. asks if there is any way to take pieces of plank apart, after they are glued together. A. Immerse in boiling water or expose to steaming.

(4) W. F. N. asks: 1. What is the temperature of water at its greatest density? A. 4° C. or 39.1° Fah. 2. What is the weight of a cubic foot of water at its greatest density? A. 62·425 pounds avoirdupois. 3. How much is it expanded in heating it to 62° Fah.? A. 100,000 volumes at 32° Fah. become 100.095 volumes at 62° Fah. 4. The current of a battery having an E.M.F. of 1 volt working through a resistance of 1 ohm gives 1 ampere. Now, if the resistance be doubled, what effect will it have on the current? A. Calling the external resistance R. and the resistance of the battery R, and the E.M.F. E (in your case equal to 1 volt), the current is equal to $\frac{E}{R+R}$ If R+R=1, then the current is equal to 1 ampere. If R+R=2, the current is equal to ½ ampere. Your question is not clearly stated, as you do not say whether the 1 ohm resistance includes the battery or not. The resistance of the battery cannot be left out of account.

(5) G. W. asks how liquid cherry stain is made, such as furniture manufacturers use. A. Take 3 quarts water, annatto 4 ounces; boil in a copper kettle till the annatto is dissolved, then put in a piece of potash the size of a walnut. Keep it on the fire about half an hour longer, and it is ready to bottle for use.

(6) J. H. T. wants a receipt for making a liquid blacking, that will make a good shine and a quick one. A. Take of gum shellac 2 ounces, and dissolve in 3 quarts alcohol, then add 1½ ounces camphor, and 2 ounces lamp black.

(7) W. C. asks (1) what to use for removing kerosene from an ingrain carpet. The oil is about 115° test. A. Use ether, chloroform, turpentine, or carbon disulphide as a solvent. 2. What is the steam pressure usually used on high and low pressure engines? A. Engines are now built in such variety that it is not possible to give a definite answer. From 30 to 50 pounds would generally be considered a low pressure, and above 70 pounds might be considered high pressure, although many compound engines use steam at a pressure or 150 pounds and over. 3. Can you tell me where I can get a good chemistry? A. Fownes' Chemistry, revised by Watts, which we mail for $3.75, or Bloxam's sixth edition (just out), which we mail for $4.50, are probably as good chemistries as can be obtained for the money. They each treat of both inorganic and organic chemistry in a way to be comprehended by any intelligent person, while being very comprehensive in their scope.

(8) B. A. asks how oil-cloth cloths, commonly called oil skins, are made. A. Dissolve together white resin, pulverized, 8 ounces, bleached linseed oil 6 ounces, white beeswax 1½ ounces, then add sufficient turpentine. Apply to both sides of the cloth while it is stretched tight.

(9) A. S. P. asks: Which would be the easiest on a steam pump filling a tank—to discharge the water into the bottom or top of the tank? A. There is less pressure in the flow pipe when feeding into the bottom of a tank. The difference is too small to be perceptible in ordinary pumping, it being only 0·43 of a pound for each foot that the top flow pipe is above the water in the tank.

(10) W. D. W. asks a receipt for the prepartion used for blacking brass work, such as the finger buttons of a writting machine. A. Dip the buttons in a solution of chloride of platinum, and heat gently to dry. Two or three dips will give them a black surface.

(11) D. F. F. asks the best method of engraving on brass, by a solution that will not, as nitric acid does, make the letters or design run. A. Probably you make the acid too strong. Try it weaker, and mix ¼ acetic acid with it for your biting liquid. Also see that you have good wax for ground. Pure asphalt melted with beeswax, equal parts, and put on the warm plate with a pad, makes the best ground.

(12) M. G. W. writes: I notice in a steel rolling mill, salt is thrown on the plates while being rolled, for the purpose of removing scale, etc. What chemical action takes place, and does it not have a deleterious effect on the rolls? A. The action is chemical and mechanical. The salt melts and becomes a flux on the surface of the metal, and in that way assists in making the plate smooth by preventing oxidation. It also used mixed with sand for flux in weld furnaces.

(13) H. W. F.—Images of any material, such as clay, plaster of Paris, or wax, may be coated with copper, and the copper bronzed. The coating will necessarily be very thin, to prevent roughness. Clay and plaster images should be thoroughly waxed on the surface, to give adhesion to the plumbago surface which is necessary for the electro deposit. By care and a slow action of the battery, and proper management of the solution, a sufficient thickness of copper may be obtained to allow of the wax being melted out and the cavity filled with solder, which melts at a much lower temperature than lead, or fusible alloy, or type metal. This has been used experimentally, but we do not know that it is practiced to any extent in the arts. Images and ornaments cast in zinc and electrotyped with copper, and then bronzed, are largely a trade in Europe and the United States.

(14) J. H. G. writes: I see street dealers using a soldering substance in their work which is melted by an ordinary candle and is used without the aid of resin, acid, or ammoniac, and appears to do good work. Can you tell me anything as to its composition? A. It is bismuth solder. Composition 50 parts tin, 25 parts lead, 25 parts bismuth by weight.

(15) T. P. H. asks: Is there any chemical mixture that will sharpen old files? A. Boil the files in strong soda and water to clean off all grease, oil, or gum. Then dip for a few minutes in a bath of nitric acid 1 part, water 4 parts; the length of time being less on fine files, as your experience may suggest.

(16) G. E. M.—The tides in all parts of the world vary according to the contour of the coasts. The Bay of Fundy is a striking example of an ordinary tide sweeping into a funnel-shaped bay, at the head of which the tide is 70 feet. On the north coast of South America is a fair example of the retarding effect of islands and reefs; the Windward Islands so obstructing the Atlantic tidal wave as to reduce it to from 1 to 1½ feet, while the broad Pacific Ocean sweeps into the recessed bay of Panama a tidal wave of 24 feet. The same effect takes place in Long Island Sound, the tides being less at Martha's Vineyard than at Bridgeport, the narrowing of the sound causing the tide to accumulate at its western end.

(17) J. M. B. asks why it is that it takes so much longer for water to boil or food to cook in a new tin vessel than in an old one. A. Because the new tin is bright and smooth, and thereby reflects the heat instead of transmitting it. Old tin is dark and rough, absorbing heat quickly.

(18) A. H. W. asks if it will require more or less fuel (coal) at a high altitude than at a low one to furnish the same pressure of steam in a boiler, and if there is a difference, what is the ratio. A. The same amount of fuel will be required in either case stated.

(19) L. O. S.—To make a camera obscura see SCIENTIFIC AMERICAN SUPPLEMENT, No. 158, containing illustrations.

(20) J. W. L. writes: I have a horse shoe magnet made of ⅜ by ¾ inch steel, and 2½ by 4½ inches, the poles of which do not fit the connecting bar. Will it injure the magnetic properties to file or grind it to fit? If so, how shall I renew it? I have for several years been sending yearly packages of my SCIENTIFIC AMERICAN to the Light House Board, to distribute to the light keepers. Is that the best disposition to make of it? A. Your magnet will undoubtedly suffer in grinding the ends. Your disposition of the SCIENTIFIC AMERICAN is commendable.

(21) W. J. H. writes: 1. I have about 700 lb. of fine brass filings and brass dust. What is the best way to melt the dust without burning, etc.? A. Pack the filings and brass dust in a crucible as tightly as possible, and place a little charcoal dust on top. Melt in a brass furnace and pour into an ingot. Better sell it to a brass founder.—It would be a tedious and uncertain computation to obtain the amount of force with which a 2 in. gas pipe will strike the bottom of a bored well containing 1,600 feet in depth of water, and 2,100 feet deep.

(22) A. W. M.—The speed and pitch of propellers for best effect depend largely upon the relative areas of midship section, its form, and the lines of immersion; the whole displacement and area of circumference of propeller being also factors in the computation. Ordinary propeller wheels are made for a speed of from 150 to 300 turns per minute. A speed of 95 feet per second on the periphery of a propeller wheel will cause a partial vacuum, depending upon the speed of the wheel and vessel ahead. Thus a wheel turned with great speed when the boat is fast at a dock loses much of its power by the vacuum sucking the air under the wheel. Wheels are usually of 2 or 3 blades, and for bulky boats have a pitch about equal to their diameter. With boats having fine lines, the pitch may be extended to twice the diameter of the wheel. See SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 101, 278, 15, 208, for interesting illustrated articles on screw propellers.

(23) T. P.—The pressure per square inch of surface for all boilers is alike for similar pressures by the gauge, but the strain on the cylindrical shells of boilers is in proportion to their diameters. Thus the absolute strain tending to split the shell of a boiler 4 feet in diameter is twice as much as in a boiler of 2 feet in diameter and may be illustrated by laying a stick 24 in. long on two bearings at the end, and one also 48 in. long in a like position. If you place a pound weight on each inch of each stick, you will find that one is carrying twice the strain on its bearings that the other does. Its bearings represent the shells of the boilers This agrees with actual experiments on boilers.

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AND EACH BEARING THAT DATE.

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