## 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 This is for our information and not for publication.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.

**Buyers** wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.

**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.

(5531) C. D. A. desires to know what chemicals and what proportion of each are used in a preparation called chemical ink eraser. A. Take chloride of lime 1 pound, thoroughly pulverized, and 4 quarts soft water. The above must be thoroughly shaken when first put together. It is required to stand twenty-four hours, to dissolve the chloride of lime; then strain through a cotton cloth, after which add a teaspoonful of acetic acid (No. 8 commercial) to every ounce of the chloride of lime water. The eraser is used by reversing the penholder in the hand, dipping the end of the penholder in the fluid, and applying it, without rubbing, to the word, figure, or blot required to be erased. When the ink has disappeared, absorb the fluid with a blotter.

(5532) M. S. Y. asks: 1. Is that end of the magnetic needle which points toward the north pole of the earth the north pole of the needle? A. It is generally so termed, but the earth's N. magnetism is the opposite of that of the N. end of the needle, otherwise there would be repulsion instead of attraction. 2. What is the object in having the zinc in the gravity battery shaped like a crowfoot? Would not a square or circular plate give as great E. M. F.? A. The E. M. F. has nothing to do with shape. The crowfoot shape facilitates cleaning. 3. Is the gravity battery suitable for an open circuit? How many cells would be required to ring a small door bell? A. No. Three cells are ample as long as in condition. 4. I have a bichromate four-cell battery, which gives a powerful current for about an hour, then stops action. After cleaning elements and amalgamating zincs it works as well as before. What is the matter, and is there any way of preventing the sediment accumulating on the elements? A. Your battery should not accumulate such a sediment. Perhaps your solution is wrongly made. The battery probably becomes exhausted. This is of course inevitable. Larger jars will, by holding more solution, give the battery more durability. 5. How to clean rust from nickel plating? A. Use electro-silicon or putz pomade. You will wear the nickel, but that is unavoidable.

(5533) S. C. H. writes: 1. Can you tell me the easiest and best way to patch rubber, as the inner tube of pneumatic bicycle tires? Have some trouble to make ordinary "tire tape" adhere to the tube, and rubber dissolved in benzine, while it forms a film, does not unite with the tube fabric. A. Rub the inner tube with emery cloth or sandpaper at the place to be patched. Put on some *good* rubber solution. Prepare your patch in like manner with rubber solution. It is well after the solution is dry, in fifteen minutes or more, to repeat the application, not using the emery cloth, however. Then, after the solution has dried completely, put the patch on and rub it well down. Dust on some talc, or chalk it well, before replacing. For an emergency use one application only. The great point is to have the surface dry before putting on the patch. Use only the best rubber cement or solution. Do not try to make it yourself. It is well also to apply benzine before putting on the solution. 2. Is there any good work on the care, filing, and scientifically practical use of saws? A. We can supply, by mail, Worssam's "Mechanical Saws," $2.50; Holley's "Saw Filing," 75 cents; Grimshaw's "Saw Filing," $1; Oldham's "Why Band Saws Break," $1. 3. Can I arrange an electric call bell to operate in connection with and over same wire with an acoustic telephone wire, all out of doors and about 300 feet long? A. If you see that the wire is properly insulated at the points of support, you can use it as described.

(5534) R. C. B. asks: Will you be kind enough to let me know if any railroad train or engine has ever covered ninety miles in one hour? I don't mean run at the rate of ninety miles an hour, but has gone from one given point to another which were ninety miles apart in one hour. A. We think there is no record of any train time nearly as great as you state for a distance of ninety miles.

(5535) G. D. C., Conn., says: I mail you a twig cut from a tulip tree in my yard. In the early part of the season the tree was infested with green lice and later by this—whatever it is. Will you kindly give me the name of the insect and a remedy for it. The tree is quite a large one and I do not like to lose it. Some of the branches are now devoid of leaves and seem to be dying. Reply by Professor Riley.—The tulip twig sent has upon it a number of common tulip scale insects, *Lecanium tulipiferæ*, Cook. This insect, like others of its class, is protected by a scale, a resinous excrescence over the surface of the body, which in this species is brown and very convex above, and has on the underside a cotton-like secretion common to all members of the genus, which serves to inclose and protect the eggs. In general form this scale is not unlike a turtle in appearance when mature. The numerous small yellow eggs are deposited beneath the scale, and, after hatching, escape and disperse to all parts of the tree, fixing themselves and ultimately developing protecting scales of their own, beneath which they extract the juices of the plant by means of a long proboscis. An interesting fact in connection with this scale insect is the secretion by it of a quantity of sweet liquid, the "honey dew" of the Aphides, which, in the case of scale insects, is rarely produced in very great quantity. With this species, however, it is so abundant that they are frequented by honey bees in large numbers and a great deal of inferior honey is stored up wherever this insect is abundant. This honey, like the honey produced from Aphides, in addition to its very inferior quality, is objectionable in that it candies almost immediately after being stored up by the bees in their cells. The remedy for this scale insect consists in the use of kerosene emulsion at the time of the hatching of the young, as hitherto recommended for similar cases in these columns. It is doubtful whether the trees will die, however, even without treatment, as the parasites of the coccid prevent its continuance in destructive numbers.

(5536) T. H. C. says: There is a method of making a light glow light by means of phosphorus and sweet oil, sufficient to make out the hands of a watch at night. A. Phosphureted oil is the best means of exhibiting the luminous properties of phosphorus. A small piece of dry phosphorus, about the size of a pea, is placed in a test tube with a little pure olive oil. The test tube is held in the water bath until the oil becomes heated and the phosphorus liquefies. It is then shaken until the oil will take up no more phosphorus, and after allowing the oil to become clear, it is poured off into a small glass vial provided with a glass stopper. Only a small quantity of this oil in the bottom of the vial is necessary. When it is shaken about so as to coat the sides of the vessel, and the stopper is removed so as to let the air get in, the oil-coated sides of the glass become at once luminous, and continue so as long as the stopper remains out. Characters written on paper with oil thus prepared (freshly) appear in the dark very brightly. Phosphureted ether is prepared by digesting phosphorus in ether for some days in a tightly stoppered bottle. A piece of sugar dipped into this ethereal solution and then thrown into water makes the surface of the latter appear quite luminous in the dark. Young experimenters must remember that phosphorus is very dangerous to handle when out of water, and often inflames spontaneously when exposed dry in the air. 2. Also the formula for soldering fluid, made of muriatic acid and zinc with muriate of ammonia? A. This liquid, which causes no rust on iron or steel, is prepared by cutting zinc into small pieces, dissolving in hydrochloric acid until the acid ceases to bubble. Add about ¼ part of the solution of ammonia, which neutralizes the acid. Dilute the whole quantity of liquid with an equal quantity of water. The information given above is from the "Scientific American Cyclopedia of Receipts, Notes and Queries."

(5537) S. J. S. asks: 1. In either a gentle breeze or a violent storm, where is the power that propels the air—in front or in the rear? A. The gentle breeze is the natural drift of the air, either toward a region of low pressure or it may belong to the general circulation of the atmosphere due to equatorial heat lifting the air to flow off toward the poles. In the first case the cause of motion is in front, while in the second case it is in the rear of the course of the wind. Storm winds are largely local, sometimes blowing toward a center of heat rarefaction, which carries the central portion upward and draws the surface air toward the center. 2. What gives to a cyclone its whirling motion, and where is the power that propels it—in front or in the rear? A. Storms of a whirling character, as some of the great storms originating in equatorial regions and tornadoes, are generally started by an upward central flow due to excessive heat, which draws the air violently toward a central region and sets the wind into a whirl—the direction of the whirl being controlled by the resultant of the motion of the earth's surface in its revolution and the direction of the antitrade current in the upper atmosphere. The propelling power that moves the cyclone along its path is probably behind it and in the great body of the antitrade wind. The power that produces the whirl is probably central and in front. 3. What causes clouds to move in any given direction? Is the power that moves them in front of them or behind them? A. The clouds' movement is with the wind in which they are suspended, and they have the same cause of motion as the wind. See a most interesting work on physical geography by Houston, $1.25 by mail.

(5538) F. J. M. asks: 1. What is the best way to nickel plate zinc? A. For the nickel bath for zinc: To 6 gallons water add 2 pounds double sulphate of nickel and ammonium, 7 ounces sulphate of ammonium, dissolve by boiling. Cool and test for acid with blue litmus paper; if found, neutralize with hydrochlorate of ammonia. 2. What is the best way to silver plate steel knives? A. For the silver bath for cutlery, for 1 gallon water dissolve 5¼ ounces nitrate of silver; add gradually in solution, 8 ounces cyanide of potassium. 3. Will you give me the best method for tin plating or tin dipping for knives and forks? What I mean is dipping in molten tin and have them come out smooth, or if anything can be put in the tin to make it come out smooth. Also will you give me a formula for a good copper plating solution, also a brass solution. A. For the tinning process, dip the clean articles in a hot solution of muriate of tin, dry quickly, and dip in the melted tin bath. All the various processes and receipts for nickel, silver, and tin plating, as also for copper and brass plating by the electric and dipping methods, are detailed in the "Scientific American Cyclopedia of Receipts," $5 by mail.

(5539) J. R. R. asks (1) how the proportions of large induction coils are calculated. A. The general rule for induction coils is to make the ratio of turns of secondary and primary proportional to the increase of voltage desired. To increase from the voltage, in the primary to one thousand times as great voltage, one thousand times as many turns are given the secondary as are in the primary. This rule is, however, far from perfect. 2. Must the secondary wire be silk wound? A. No. Bare wire is often used, wound carefully, so that successive layers will not touch. 3. What is the capacity of condensers to be used for them? A. Do not calculate, but follow proportions of some successful coil. See our SUPPLEMENT, Nos. 160, 569, 229, 166, also SCIENTIFIC AMERICAN, No. 14, vol. 66, for coils and apparatus connected therewith. The whole subject is usually treated rather empirically.

(5540) W. J. L. asks: 1. Can a motor be run by gravity battery? If so, how many cells would it take to run motor described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 641? A. A gravity battery is not suited for the purpose, on account of its high resistance; try plunge battery described in SUPPLEMENT No. 792. 2. Does increasing length of wire in armature coils increase or decrease voltage of a dynamo, and to what extent? A. It increases it if the field is kept excited to the same extent as before. Yet it is possible that increase of length of armature wire may reduce the current so as to interfere with the excitement of the field and so cut down the lines of force sufficiently to reduce the voltage.

(5541) J. G. Von H. writes: 1. It is said that there are only two kinds of electricity—static and dynamic. Is the induced electricity from an induction coil static? If not, what is the difference between static and induced electricity? A. There is really only one kind. Static electricity is used to express electricity at rest; dynamic electricity to express electricity in motion, or re-establishing equilibrium of potential. In the popular conception very high tension phenomena are generally referred to static electricity. 2. What is the most injurious to mankind, 500 volts ½ ampere, or 500 volts 10 amperes? A. The discharge last named is practically an impossibility. High and rapidly changing voltage is the most injurious type.

(5542) F. J. S. says: I have a double steeple compound condensing engine, two high pressure cylinders, 3 inches diameter, two low pressure cylinders, 6 inches diameter, by 4 inches stroke. With 100 pounds steam, what size and pitch of propeller should I have? A. The double compound engine at the pressure stated will run a propeller wheel 36 inches diameter, 48 inch pitch.



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