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## Notes &amp; Queries

T. F. D., Jr., will find on p. 315, vol. 29, directions for tempering edge tools. Back numbers of this journal are sold for 10 cents each. See publishers' notice on the second page of this issue.—E. R. does not send sufficient data as to his boat, engine, and boiler.—S. W. H. will find directions for coloring brickwork on pp. 235, 236, vol. 36.—T. P. P. will find something on changing the color of the hair on p. 220, vol. 35.—E. will find a recipe for cologne on p. 75, vol. 31.—C. P. G. will find a full description of the Great Eastern steamship on p. 346, vol. 31.—A. S. will find directions for making crucibles on p. 330, vol. 32.—O. A. P. will find directions for recovering tin from tinned plate scrap on p. 319, vol. 31.—F. v. J. will find a recipe for a gold-plating solution on p. 116, vol. 33.—W. H. H. will find a recipe for a silver-plating solution on p. 299, vol. 31.—W. C. will find a recipe for a stain to imitate black walnut on p. 90, vol. 32.—L. G. L. will find on p. 379, vol. 31, a good recipe for a paint for smoke stacks, boilers, etc.—J. H. B. will find on p. 130, vol. 35, directions for making imitation marble.—C. M. can drill glass by following the directions on p. 116, vol. 31. A cement for fastening glass to wood is described on p. 143, vol. 33.—E. F. M. will find a recipe for Vienna bread on p. 185, vol. 33.—N. E. L. will find an article on sending the time by telegraph on p. 358, vol. 30.—M. G. will find directions for ridding fruit trees of insects on p. 200, vol. 36.—G. H. P. will find an answer to his query as to the surface of a brake on p. 273, vol. 31.—W. R. W. can make his glass windows opaque by following the directions on p. 264, vol. 30.—E. H. will find something on parhelia and halos on pp. 132, 171, vol. 28.—C. W. B. will find a recipe for a liquid dressing for shoes on p. 107, vol. 36. For a recipe for writing fluid, see p. 92, vol. 33.—S. A. S. will find directions for dyeing crimson on p. 235, vol. 36.—J. A. will find directions for mending rubber boots on p. 203, vol. 30.—H. J. M. will find directions for making potato starch on p. 315, vol. 30.—J. R. will find directions for making rubber hand stamps on p. 156, vol. 31.—E. P. will find descriptions of emery wheels and their uses on p. 22, vol. 29.—E. W. will find directions for ridding a house of cockroaches on p. 43, vol. 31. As to bedbugs, see p. 378, vol. 24.—R. H. M. will find directions for glazing earthenware on p. 353, vol. 35.—W. H. T. can fasten rubber rollers to their spindles with glue. For wringing machines, marine glue would be best. See p. 43, vol. 32.—L. S. B. will find something on endurance of life in an airtight place on p. 202, vol. 32. To make oxygen, see p. 299, vol. 33.—L. C. will find a recipe for cement for stopping leaks in boilers on p. 202, vol. 34.—E. H. P. will find a recipe for invisible ink on p. 267, vol. 34.—J. A. T. can calculate the power of his engine by the rules given on p. 33, vol. 33.—W. C. J. will find directions for removing freckles on p. 187, vol. 32.—J. H. will find on p. 298, vol. 30, a recipe for cement that will fasten metals to glass.—J. A. McC. can blue his gun barrels by the process described on p. 123, vol. 31.—J. C. K. should trap his moles. See p. 223, vol. 26.—J. R. J. will find directions for making an eolian harp on p. 330, vol. 26.—A. M. N. will find directions for drilling holes in glass on p. 218, vol. 31. Hydrofluoric acid will dissolve glass. See p. 203, vol. 33.—C. W. H. will find on p. 171, vol. 36, a recipe for a cement that will fasten paper to stone or iron.—A. S. will find a recipe for waterproof glue on p. 43, vol. 32.—G. I. M. will find a full description of the East River bridge on p. 99, vol. 35.

(1) A. McG. asks: Why do frost crystals form on windows? A. If ice water be introduced into a glass vessel in a warm room, it speedily determines the precipitation of the moisture from the surrounding air, which forms as beads of dew upon the exterior surface of the vessel. If instead of cold water a mixture of pounded ice and salt be introduced, the condensed moisture will be frozen as it forms into hoar-frost, which is composed of minute crystals of ice. This precipitation and congelation is precisely analogous to that which takes place upon window panes in cold weather. All frozen water is crystalline.

(2) J. R. L. asks: How can I give shirt bosoms the polish and stiffness obtained by shirt manufacturers? A. Rub 1 oz. best potato starch up with a little cold water, so as to reduce all the lumps; add a tablespoonful of best loaf sugar, an equal quantity of dextrin, a little soluble indigo, and a lump of pure paraffin about the size of a nutmeg. Then add a pint of boiling water, and boil, with occasional stirring, for half an hour (not less). The starch should be strained through a linen cloth before using.

(3) D. F. H. asks: What is used on the end of magnets to keep the wire in place? Will iron or brass do? A. Brass or bone rubber.

(4) J. A. H. asks: 1. In an electromagnet made of 25 feet of No. 18 copper wire, of what length and size should the core (composed of small soft iron wires) be, to give the greatest inductive effect to a secondary coil? A. Of 7½ or 8 inches length and ¾ inch diameter. 2. Which will give the most magnetic power, a single coil 1 foot in length, or 4 layers 3 inches long, and should the iron cores be the same size in each case? A. The single coil, with proper battery? 3. What is the rule regulating the proportionate lengths of helices to their diameters and to the diameter of the iron core? A. About 8 or 10 to 1 is a good proportion. 4. What rule regulates the size of the wire of which the helix is composed? A. The wire should be of such size that, when filling the proposed space, its resistance about equals that of the battery.

(5) W. S. asks: 1. Please give a description of how a good vibrator is made, and how is it applied on electrical apparatus? A. Connect one end of the coil of an electromagnet to the armature of the same; the other end, to one pole of a battery; and the opposite pole of the battery to an adjustable spring against which the armature presses when not attracted. The points of contact of armature and spring should be made of platinum. 2. Can you mention a good work on experimental electricity and magnetism? A. Read Davis' "Manual of Magnetism," Pynchon's "Chemical Physics," or Tyndall's "Lectures on Electricity."

(6) G. M. F. asks: Will 60 feet silk-covered copper wire, ¼ of an inch in diameter, for the primary coil, which is 6 inches long, and 1,200 feet of silk-covered copper wire, ⅛ of an inch in diameter, for the secondary coil, give a severe shock? A. Yes.

(7) H. F. G. says: 1. I am making a small horizontal steam engine; the cylinder is of brass, cast, with a 1 inch bore and two inches stroke. How large and heavy must I make the balance wheel? A. Make it 9 inches in diameter, to weigh 4 lbs. 2. How large must I make a boiler of sheet copper, and how much pressure will it stand? How large must I make a boiler of sheet iron, and also what pressure will it stand? A. Boiler should be 8 inches diameter and 15 inches high. Copper should be ⅝ thick, iron ¾ thick, for a working pressure of from 50 to 60 lbs. per square inch.

(8) H. P. asks: 1. Would steam at low pressure mingled with compressed air at a higher pressure moisten the air and increase the pressure? A. Yes. 2. What thickness should I make my air tank to stand a pressure of 150 lbs., the diameter being 19 inches? A. About ⅝, if it is wrought iron.

(9) S. A. H. says: 1. I bought a telegraph sounder having about No. 32 wire on it; and I have made another instrument using No. 18 wire—about 175 feet in coil. When working it alone, it works well; but when I attempt to work the two instruments together in a short line, I find only one of them will work, the one which has the fine wire on it. What is the difficulty? A. The resistance of the fine wire is too much for the circuit, both instruments should be wound with the same size wire. 2. Please publish a recipe for a varnish or composition to be used on wire as an insulator in place of the silk covering generally used. A. Shellac and alcohol is sometimes used for the purpose. 3. Can you publish a process for making hard rubber? A. See p. 123, vol. 32.

(10) G. M. G. asks: Has an electromagnet more attraction on an armature approaching directly upon it than it has on one approaching in an oblique direction toward the poles of the magnet? A. Yes.

(11) A. E. T. asks: Of what are the zinc plates made that are used in medical batteries, so that they do not need to be amalgamated, but can be used until they are worn out? I refer to the kind used in a bichromate solution. A. A very small amount of mercury is sometimes put in the molten zinc before casting. Please give me details of the process of tempering steel springs? A. See pp. 27, 363, vol. 32.

(12) J. D. J. asks: 1. Is there anything that will neutralize the attraction of a lodestone? A. Its attraction can be neutralized by placing an equal magnetic force of the same polarity in juxtaposition with it. 2. Has a lodestone ever been used as a light motor power? A. No.

(13) D. W. L. asks: 1. Will a small magneto-electric machine, such as is used for medical purposes, be sufficient to charge a small magnet? A. No. 2. Has electricity in this form ever been used for telegraphing? A. Yes.

Is the exhaust steam of an ordinary engine heated to above 212° Fah.? A. Yes.

(14) A. S. asks: Does it take more time to send one letter by telegraph over a continuous line of 10,000 miles than over a line of 1,000 miles? A. Yes, one hundred times more.

(15) C. S. M. says: Some time ago I purchased a second hand galvanic battery; and when I added the solution and tried to run it, I could only feel the very slightest current, and that only lasted a few minutes. How can I remedy it? A. We cannot tell you, unless you state what the battery is composed of.

(16) J. F. D. asks: Can I run by foot power a magneto-electric machine capable of heating a ½ inch steel rod to a red heat? A. No.

(17) W. R. B. says: In making vinegar, I use a common German generator containing corncocks soaked in vinegar. When I let a stream of cider flow in, the temperature rose to 110° Fah.; but when it flowed out at the bottom, it was flat, like warm water. I have made strong vinegar in this way before, and with the same apparatus. Can you tell me what is the difficulty? A. Add a little vinegar to the cider and let it ferment a short time before running through the acetifer; or return the liquid to the same, and let it trickle slowly through it a second time, and even a third time, if necessary.

(18) F. W. J. says: Can you give me a recipe for a gold wash for watch chains, etc.? A. Clean the articles perfectly, and wash them in a strong neutral bath of chloride of gold in warm water. Then dip for a moment into moderately strong solution of copperas, dry, and polish. Or use an ethereal solution of chloride of gold, dry, and reduce by contact with hydrogen gas (coal gas will answer) in a tight apartment. Or dip in the gold solution first mentioned, and then in a hot solution of caustic alkali.

(19) G. S. says: 1. I wish to make a collection of marine animals, such as sponges, anemones, and algae. Which is the best time to commence it, spring or summer? A. We believe the latter part of the summer is generally chosen for such collections. 2. Would such animals live in water mixed with common salt in the same proportion as salt or sea water? A. Experience has shown that genuine sea water is best. 3. Do you think it would improve the health of these animals to have the light of the sun filtered through yellow paper or glass? Professor Draper, of New York, says: "The yellow ray of the sunlight is that portion which is the peculiar stimulus of the chemistry of the leaves and plants." I doubt not but that it would have some influence on the *polypt*, but I would like to have your opinion. A. Dim, diffused sunlight is best.

(20) J. B. H. asks: How can I best make a cement that will stand fire and not wash or crumble out? I have a boiler in two parts, and a space between the two has to be stopped with a V-shaped piece of iron. The cement that I have used dries and crumbles out. A. Use a cement made as follows: Cast iron borings 10 lbs., red lead 1 lb., alum ½ lb., lime 5 lbs., sal ammoniac 2 ozs. Dissolve the alum and sal ammoniac in a small quantity of hot water, and mix in the other ingredients.

(21) J. H. H. asks: Can you give me a recipe for cement with which I can fasten thicknesses of paper together, which, on application, will cause no enlargement (expansion or contraction) or alteration in shape or size? A. We do not know of such a preparation.

(22) J. C. C. asks: 1. How can I make stearic acid without an hydraulic press, or the use of costly chemicals? A. It is not practicable. 2. How can beeswax candles be prevented from guttering? A. Add about 10 per cent of stearic acid to the wax. 3. How is paraffin wax made? A. The mode of obtaining paraffin differs according to its being an educt or product; an educt as from petroleum, neat-gil, ozokent, etc., and a product of the dry distillation of brown coal, peat, and bituminous shale. It is usually obtained from petroleum, by distilling the residues after the separation of the lighter oils, with steam at a temperature of from 300° to 400°. It is separated from the liquid distillate by artificial cold and the centrifugal machine, purified by treatment with oil of vitriol and steam, and neutralized with lime water. It is then rapidly redistilled, and treated in the hydraulic press, as in the preparation of stearic acid.

(23) M. J. B. asks: What is an east and west line? Is it a parallel of latitude or a line running at right angles to a meridian? A. It is a parallel of latitude.

(24) E. A. H. says: 1. What is the pressure of water freezing in an airtight cylinder? A. About 30,000 lbs. per square inch. 2. What is the strength of cast iron and sheet iron, of ½ inch and ¾ thick respectively, to resist water pressure? A. Cast iron 18,000, and sheet iron 35,000 per square inch. 3. Which plan would be best for strength of resistance to the hammer in riveting, a bar 5 feet in length one end not supported, or a 10 feet bar with both ends supported? A. There might be no difference, if the bars were sufficiently rigid. Steel or wrought iron would answer for the bar.

(25) J. B. O. asks: Is it possible to build an electro-magnetic engine of one-half horse power? A. Yes. 2. If so, what size of magnet will be required? A. It requires a combination of magnets to get continuous work. 3. Will a cast iron magnet answer as well as a wrought iron magnet? A. Wrought iron is best.

(26) G. G. says: A little while ago I made a simple telephone, to be used without the electrical current. I tried a thin sheet of brass in place of a membrane as a cover to the mouthpiece for receiving and for transmitting the vibrations made by the voice to the connecting line. I found that the brass would not answer. If a sheet of iron or other metal is used, what is the shape, and how is it held in position? A. The transmitting instrument consists of a simple electromagnet, in front of which is a tightly stretched membrane of skin; just opposite the poles of the magnet, on the membrane, is a small permanent magnet which vibrates with the former when set in motion by the air. The receiving instrument is a tubular electromagnet formed of a single helix with an external soft iron case, into the top of which is loosely fitted a light iron plate which is thrown into vibrations by the action of the magnetizing helix. 2. Does it require a circuit to transmit the electrical current? A. Yes. The helices of both electromagnets are included in one circuit, which may also include a battery.

(27) J. A. T. says: I have an engine 1¼ by 4 inches. What power will it give with a horizontal boiler 18 inches x 12½ inches with tubes 1½ inches in diameter? A. Possibly you may realize ½ a horse power.

(28) J. A. C. asks: What is the easiest method by which a conducting surface can be imparted to cloth, leather, etc., for the purpose of electro-plating? I have tried plumbago, but it will not do for my purpose. A. Try the following: Immerse the object in a solution of nitrate of silver in wood naphtha. When partially dried, treat with ammonia. After being thoroughly dried, the object should be exposed to the vapor of mercury, when its surface will become completely metallized in a few moments; transfer to bath immediately. Great care must be taken not to breathe the mercury fumes.

(29) D. C. W. asks: 1. Which solution in a Bunsen battery requires to be changed, and how often? A. The nitric acid requires to be changed first, but the frequency of change depends upon the work done. The best rule is to change whenever the battery becomes too weak to do the work. 2. How can I make an electrolyte of an autograph? A. You must photo-engrave it first. See p. 272, vol. 32.

(30) F. D. H. asks: If I connect one cell of a carbon and one cell of a Leclanché battery, for either quantity or intensity, do I utilize the entire energy of both, or is there a waste owing to the elements being dissimilar? A. It is a bad plan to connect batteries differing in electro-motive force, for quantity; connected in series, the resulting electro-motive force is equal to the sum of all the electro-motive forces of the different cells.

(31) C. E. J. says: Inclosed find sample of battery wire. The wires have been in use in an hotel for two years. About 6 months ago, a portion of the house telegraph ceased working. Upon examination, I found the battery wire corroded and eaten off; since then I have had the same trouble about a dozen times, and in every case was the battery wire eaten off, as in the sample. The floor is double, with cement in between. The wires run in a groove cut in the cement; the battery wire is precisely the same as the room wires, and runs in the same channel. In most cases, the battery wire would be in the middle of the other wires; but I failed to find that any of the other wires were affected. A. If the wires are in a damp place, the action of the battery probably causes the corrosion. Better use kerite covered wire, and be sure the covering is perfect.

(32) T. J. L. asks: Is there such a word in the nomenclature of telegraphy as "telehiro" or "telehier"? A. No.

(33) E. W. W. asks: What form of battery will be the best to work a set of alarm bells (four large gongs and six small gongs) all controlled by one large vibrator on a circuit of about 500 feet length? The main requisites in the battery are to be strength of action