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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 This is for our information and not for publication.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.

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.

(5268) W. P. M. says: I am making a watertube boiler on the porcupine plan. Is there any objection to using pipe for the porcupine as small as half an inch, where the pipes will be two feet long? A. Half inch tubes, 2 feet in length, are too small for a porcupine boiler; the circulation will be sluggish and cause the boiler to lift its water by the accumulation of steam in the small tubes, so fast as to push the water out. The fouling of small tubes is also an objection. Not less than 1 inch tubes should be used, with as large standpipe as possible; will mak the best working boiler. 2. As regards speed, are hollow or straight water lines desirable for a steamboat? A. The concave bow and stern water lines or wave lines are the lines for speed. 3. I am using in my launch an oil-burning boiler. Oil is fed to boiler by steam, which is very objectionable for many things, especially noise. Can you tell me a simple way to make a vaporizer so that I can burn oil in the form of vapor instead of spray? A. There is no method of burning oil under a boiler better or safer than the jet spray, either air or steam. The air jet makes the clean t fire, but the combined steam and air jet is most convenient and in general use. The steam and air jet has not been considered objectionable when properly regulated; perhaps your st am nozzle is too large and carries too little air into the fire chamber; try a smaller steam nozzle combined with an annular air nozzle for the atomizer.

(5269) N. L. T. writes: 1. In an alternating transformer what will be the relative amperage and E. M. F. of current in the secondary coil as compared to that of the primary, supposing both coils being of the same length and size of wire and both wound alik upon an iron ring or continuous core? A. The relative voltage of primary and secondary is in the ratio of the number of turns of wire in the same. The same number of turns gives the same voltage. There will be a loss in amperage in this case of abont 10 per cent. 2. In what ratio does the increase of the frequency of alternations in the primary increase the E. M. F. or tension of the induced current? A. There is no connection. 3. Will a resistance in the secondary circuit have the same effect upon the primary current as if the same resistance were placed in the primary circuit? A. It will have what is practically the same effect by developing counter E.M.F. 4. Will you please explain in an analogous way the meaning of the expression self-induction and capacity? A. Self-induction is electric inertia. A current requires time to be fully started and time to cease. Capacity refers to the quantity of charge retainable at a given pressure (voltage). This is analogous to storing compressed air. 5. Can you mention any substance transparent to heat or light waves, or to both, and having some electrical conducting power and which will retain the solid form or withstand beat up to say 200° Fah.? A. There is no such substance. The general rule is that conductors of electricity are not capable of transmitting light waves.

(5270) W. H. F. says: 1. I wish to make a compass 12 inches long; can I use a commonhorse shoe magnet to magnetize the needle, and bow should I draw the needle on the magnet? A. Stroke it from end to end, always in the same direction, with one pole of the magnet, returning the magnet through the air. 2. I want to make a helix to magnetize a ⅝ steel bar, 5 inches long; what number wire must I use and how many layers on the helix, and how many gravity batteries should be used, and how must the bar be fastened in the helix? A. No. 20 wire is a convenient size. There are no fixed dimensions. Gravity batteries are of rather high resistance. The wire may be wound directly on the bar. 3. I have a zinc box in a case 12 inches deep, 10½ inches diameter, 2¼ inches wide, and carbon for same. What preparation can I use for a dry battery of same? A. For dry batteries we refer you to our SUPPLEMENT, Nos. 157, 767, and 792. 4. A few days ago a cousin of mine photographed a kite. In the negative are four perfect kites. A. We should like to see print from the negative. No judgment can be given without this.

(5271) N. L. M. asks how to preserve bird skins. A. Make an incision from the breastbone to the vent with a small piece of wood work the skin from the flesh. When the leg is reached, cut through the knee joint and clear the shank as far as possible, then wind a bit of cotton wool on which some arsenical soap has been put round the bone; do the same with the other leg. Now divide spine from root of tail, taking care not to cut too near the tail feathers, or they will come out. Next skin the wings are far as possible and cut off. The skin will now be entirely clear of the body. The skin must now be turned inside out and the neck and skin gently pulled in opposite directions till the eyeballs are fully exposed. The whole of the back of the head may be cut off and the eyes and brains taken out and their places filled with cotton wool. The whole skin should be rubbed well with arsenical soap or plain arsenic, and the neck returned to its natural position, when, after filling the body with a little dry grass or wool, the job is done. It is very easy, and the skin of a bird is much tougher than one would suppose, though of course they vary, the night jar being very thin, while humming birds are fairly tough. All the apparatus required is a sharp knife and a pair of scissors, or, for large birds, a strong pair of nippers to divide the bones. From the "Scientific American Cyclopedia of Receipts, Notes and Queries."

(5272) W. L. C. writes: To settle a dispute between myself, a city editor, and a learned gentleman, I wish you would answer this: Is the Pacific Ocean along the coas from Lower California to Puget Sound rougher sea, harder to sail on, and more liable to angry waves than the eastern or Atlantic coas of the United States? If so, why? Are the California, Oregon, and Washington ports harder to enter by reason of rough sea than from Maine to Florida? A. The prevailing winds along the Pacific coas of the United States are westerly, or on-shore winds, while the prevailing winds on the eastern coast are also westerly, or off-shore winds. An on-shore prevailing wind makes a rough sea along a coast and at the entrance of harbors, especially so where there are bars at the entrance. An off-shore wind insures a comparatively smooth sea along a coast and easy access to harbors. The storm winds temporarily change this condition, but it is the prevailing winds that give the peculiar character o the two coasts as regards the roughness of the sea and the difficulty of navigation along the coasts and entrance to shallow harbors. The month of the Columbia with its bars is a noted example on the Pacific coast.

(5273) D. H. asks how to clean ornamental bronze door knobs and plates, light finish, also how to keep them bright. A. The finish of this class of work is done by dipping in strong nitric acid or compounds of dipping acids, then washed in clean hot water and dried. The bright parts are then burnished and the articles lacquered with various colored lacquers for the required shade. Such work should never be cleaned; it destroys the lacquer coat and the recesses of the ornamentation become foul. It should be sent to a finisher of such work for renewal of the lacquered surface.

(5274) A. A. P.—To smooth parchment which has become wrinkled, place the parchment face downward upon clean blotting paper. Beat up to a clear froth, with a few drops of clove oil, the whites of several fresh eggs, and with the fingers spread this over the back of the sheet and rub it in until the parchment becomes smooth and yielding. Then spread it ont as smooth as possible, cover with oil silk and press for a day. Then remove the silk and cover with a linen cloth and press with a warm iron.

(5275) L. D. S. asks how to make the tin tree. A. 1. Chloride tin, 3 drm. 2. Nitric acid, 10 drops. 3. Piece of zinc attached to copper wire. Put No. 1 into a glass vessel with sufficient water to 8 parts fill, then add No. 2, shake well until dissolved. Now place No. 3 through a cork and insert in solution, so that no part shall touch top, bottom or side of glass vessel. Let the whole rest quietly for a short time. The tree will grow and have a very lustrous appearance.

(5276) J. M. H. asks where the worms we see on sidewalks after a rain come from. I have heard it stated that they fall with the rain, but to my ears that explanation seems hardly plausible. Are there any well authenticated accounts of rains of frogs, etc.? A. The worms and frogs or toads come from their holes or hiding places in the soil during rain, either driven out by the water filling their holes, or perhaps for a bath. There are no authentic accounts of the falling of worms, fishes, or toads from the atmosphere, unless as the result of a tornado.

(5277) F. A. says: We send you a bug for examination, found on our featherbeds. We are thinking it is more troublesome to a man than the mosquitoes or bedbug, and we would like to know its nature. Answer by C. L. Marlott, Acting Entomologist.—The insect mentioned as occurring in featherbeds is one of the common snapping beetles or spring beetles known as *Athous fossularis* Lec. Its appearance on the bed was simply accidental, as it was undoubtedly attracted to the room by light.

(5278) F. K. J. asks: How can I get the rust out of wrought iron water pipes? They are in the ground about four years, and the water runs through them about half as strong as at first. A. The pipe cannot be cleaned while in the ground; it must be taken up and the rust cleaned out with an iron rod, or lay new galvanized iron pipe, which does not rust.

(5279) R. L. S.—About 166 feet of gas can be made from a gallon of gasoline?

(5280) F. A. K. writes: Please settle a dispute by answering the following in your Notes and Queries: A holds that when a person in Australia or any other place south of the equator is looking at the sun at noon he will be facing north; or in other words, the north side of the street is the shady side at noon. B holds that sun is always south of a person at noon, no matter what part of the earth he is on. Who is right? A. A is partially right and B is wrong. To a person south of the tropic of Capricorn, or in southern Australia, the sun is always north of his zenith and casts his shadow to the south; and if he is north of the tropic of Cancer, the sun is always south, and casts his shadow toward the north at noon. To a person within the tropics the sun's shadow may be north or south, according to the sun's declination from his zenith.

(5281) C. K. asks: How long will it take a storage battery current to decompose a pint of water into its gases? How many volts are required to separate it in five minutes? What is the most convenient form of apparatus to do this work? A. To decompose water it is well to allow two volts difference of potential. An ampere for five minutes is 300 coulombs, which will decompose 0·86 grain of water. The number of cells required to decompose a pint of water must be deduced from their amperage as given by the makers of the cell. For apparatus use copper or iron electrodes and a dilute solution of caustic alkali as electrolyte.

(5282) W. H. C. says: Will you please explain the way that nails are graded, just what is meant by a tenpenny, a ninepenny nail, also what is the relation between the length and name of nail? A. We give the name, size, and weight of nails as follows:

Threepenny	1·25 in. long	420 per lb.
Fourpenny	1·8 " "	270 " "
Fivepenny	1·75 " "	220 " "
Sixpenny	2· " "	175 " "
Eightpenny	2·5 " "	100 " "
Tenpenny	3· " "	65 " "
Twelvepenny	3·25 " "	52 " "
Twentypenny	3·5 " "	28 " "

The lengths are standard for all kinds, but the number to a pound varies with different makers and for the different kinds, as ordinary, light, and finishing nails.

(5283) W. L. R. says: We have a horizontal tubular boiler 10 feet long, 36 inches in diameter, with 30 fines 3 inches in diameter. Also a 20 horse power engine, 9×12 cylinder, making 200 revolutions per minute. How many pounds pressure of steam are necessary to develop the full 20 horse power? A. The boiler is nominally 20 horse power. Its effective horse power may be much larger with high pressure. The required boiler pressure for 20 indicated horse power of the engine will be governed by the point of cut-off, which if ⅓ will require 45 pounds boiler pressure. If ⅜ cut-off, 40 pounds pressure. If ½ cut-off, 35 pounds pressure.

(5284) R. S. asks: If there are fifty incandescent lamps connected up in series, voltage 110, amperes 6-10 for each, resistance in ohms 168 for each lamp, will the last lamp burn as bright as the first one, and what is the cause? A. Yes; because each passes the same current. The current effects the heating of the filaments.

(5285) P. H. H. writes: I have two ammeters, and when I connect them together they do not register the same. Is there any way of adjusting them without having a standard instrument to go by? A. If you can secure an absolutely constant current, then you can determine its amperage by a silver ampere-meter. The method, a very simple one, is given in Ayrton's "Practical Electricity," which we can supply for $2.50. Such a current can be used to standardize your ammeters.

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August 8, 1893,

AND EACH BEARING THAT DATE.

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