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 This is for our information and not for publication.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.

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.

(5477) C. A. D. writes: 1. I want to make a shocking coil strong enough to hold down three or four men. How much wire, what size, and how is it wound? Where can I get full description and mode of construction of such a machine? A. For powerful induction coils we refer you to our SUPPLEMENT, Nos. 160, 229 and 569, which give full descriptions and illustrations. 2. I have a glass battery jar with a porous cup; the cup is filled up with a black material, a carbon is in the center, there are two little holes in the surface of the black, pitch-like covering. How is said battery charged? Can I convert it into a Bunsen battery? A. The battery is a Leclanche cell. To charge, use a saturated solution of sal ammoniac. It would answer as a Bunsen if the porous cup was cleaned out and a larger amalgamated zinc substituted for the rod. 3. I have an English regimental flute with an ivory head, the ivory is cracked. Do you know of a cement that I could fill up the cracks with so as to make it look all right? A. We quote following from the "Scientific American Cyclopedia of Receipts:" Dissolve 1 part of isinglass and 2 parts of white glue in 30 parts of water, strain and evaporate to 6 parts. Add one-thirtieth part of gum mastic dissolved in ½ part of alcohol; add 1 part of zinc white. When required for use warm and shake up. B. Moisten thoroughly a small quantity of very finely powdered quicklime with white of egg to form a paste. Use at once, clamp parts firmly together and leave for 24 hours. Use as little cement as possible. 4. What is the difference between electricity generated in a battery and that generated by friction? A. The frictional discharge is of enormously high potential and of low quantity, the battery current is the reverse.

(5478) A. H. B. asks: 1. Is one-half ampere of current forced through the body sufficient to cause death? A. The fatal effects of electricity on the human system depend on the nature of the discharge. An alternating or pulsatory current from a dynamo or passed through a coil is particularly fatal, unless the frequency of the alternations is very high. Thus half an ampere may not be injurious, if from a storage battery or if of great steadiness. 2. How high does the voltage have to be to force that amount through the body? If the quantity of current is kept low enough, will a very high voltage passed through a person do any harm? A. A high voltage with a very small quantity will kill. One-half ampere would require about 500 volts to pass the body, but this may vary greatly. 3. Is electricity magnetism in motion? A. No. Magnetism is theoretically due to circular currents of electricity, the planes of the circles at right angles to the axis of magnetization. 4. Has the electric pressure on the earth ever been estimated, or in other words, how high is its voltage above the zero point? A. The earth's potential is arbitrarily taken as zero. We have no reliable figure as to its absolute potential. 5. Does gravity act as a conducting medium for the transmission of heat from the sun to the earth? A. Gravity does not act as described. 6. Does the heat we receive from the sun have any return circuit? If so, does it return in the form of heat? A. No return circuit for heat can be deduced. An equalization of temperature of all objects is the tendency of the universe.

(5479) E. H. H. asks for the method and quantity of foreign material employed in the burning of copperas for making red oxide. Also the kind of retort to be used and the manner of constructing the same. A. The following are two methods: 1. Green sulphate of iron is calcined until the water of crystallization is expelled, then roasted at a high heat until no more acid vapors escape. It is cooled, washed with water until the latter has no acid reaction, and is dried. 2. To 25 parts of green sulphate of iron 11 parts common salt are added. The mass is mixed, calcined and treated as above. For the finest product a second calcination is given. Sometimes a small quantity, 2 or 3 per cent only, of salt is added—sometimes a little sulphur. For the calcining, if the acid is to be saved, cast iron stills are sometimes used with condensers. The usual plan is to do the calcining in muffles, and the acid may be saved or allowed to escape. Several muffles may be built into one arch or chamber like coal gas retort furnaces.

(5480) L. A. writes: I have now been a reader of your valuable papers, the SCIENTIFIC AMERICAN and SUPPLEMENT, for over 15 years, and I read in them occasionally of a new formula for platinotype printing process, as in SUPPLEMENT, No. 927. I have never been able yet to find an easy way of producing potassium chloro-platinite. A. Platinous chloride is first made by heating platinic chloride to about 200° C. (392° Fah.) or by passing sulphurous acid gas through a solution of platinic chloride. Platinous chloride is insoluble in water but soluble in hydrochloric acid. To its solution in the latter acid is added potassium chloride in solution. For 196·7 parts of metallic platinum or for 338·7 parts of platinic chloride 149·2 parts at least of potassium chloride are needed. On mixture, the double salt potassium chloro-platinite is deposited. See Fownes' "Chemistry," p. p. 466, 467.

(5481) F. P. R. writes: I have a store window about 11 feet high and 6 feet wide, which during the winter is covered with frost. I want an application which will keep my window clear. A. The cause of frost on windows should be removed, either by keeping the air in the store so dry that its moisture will not condense upon the cold glass or entirely inclose the window from the inside air and give the inclosed space a free ventilation from the outside by means of two or more pipes at bottom and top so arranged with hoods as to keep out rain and dust. In freezing weather the ventilation will allow the dry outside air, to circulate behind the glass, and thus prevent the precipitation of moisture by contact with a colder surface. In moderate weather the ventilators may be closed to keep out dust.

(5482) L. H. asks the process of making the ware called copper oxide. What I mean by copper oxide (I am not positive if that is the right name) is a kind of deep colored red or polish which is put on copper wares, such as lamp bodies, fancy vases, etc. A. The copper coloring is termed royal copper from its intense red color. It is produced by dipping in a solution of 2 drachms sulphide of antimony, 1 ounce pearlash to 1 pint of water, or by boiling the copper articles for 15 minutes in a strong solution of tartar and water.

(5483) L. E. L. writes: If a 1 horse power electric motor requires 50 cells of a zinc carbon battery, will a 3 horse power motor require three times as many cells, or will the zincs and carbons in the fifty cells have to be enlarged, or both? A. The battery must be enlarged as suggested, and the result can be reached in either way spoken of, according to the winding of the motors. But if the plates are much enlarged, the cells should be also, as more liquid will be required to maintain the action for a given time.

(5484) A. F. H. informs us that the article on the German search light which appeared in No. 10 of the current volume of the SCIENTIFIC AMERICAN is in error in stating that the current was not furnished to all of the lights. He states that all four of the lights were in operation most of the time, and that two more were added, which were also supplied with a current when needed.

(5485) T. C. K. asks: 1. How many cubic feet are necessary for a balloon which should ascend in the air to the height of about 300 feet with 250 pounds weight? For the balloon there is no gas used, but hot air. How much heat is necessary? What is the best fuel? A. Balloon should contain 12,000 cubic feet, in which the air should average 250° Fah. with the atmosphere at 70°. Alcohol is the best for heating the air as it makes no smoke. See also SCIENTIFIC AMERICAN, Vol. 65, No. 10.

(5486) P. H. W., Sandy Hill, writes: Please tell me whether it is safe to turn slops and waste water from kitchen sinks into wells near residences. Our people have formerly used wells to supply our families with water, but we have water brought into the village of good quality, and many parties have discarded the use of their wells and have the village water brought into their houses, and turned the waste from their sinks into the wells. These wells are covered up. Will the natural currents through these wells carry off or purify these slops, or will the water in them be contaminated and send up through the waste pipes a bad stench, subjecting the family to diphtheria and other diseases not pleasant to contemplate? In my case the well is covered down some 8 feet below the surface. We find living water at 6 to 8 feet. Our wells are sunk to about 12 or 14 feet, soil is sandy and porous, water usually very good, but our hydrant water is cheap and of first quality, so we are making the change in general. Now, can I turn waste from my sink into the well with impunity? Object is to get rid of frost. The land is so level it is difficult to get rid of the waste. Water stands on the top of the ground in low places in wet seasons for weeks at a time. Usually when digging to set fence posts in early spring we find living water. A. The discharge of house waste or sewage into the wells of a town is a most dangerous expedient in the change of the method of water supply. What would be a convenience to one household might be poison to a neighbor, or a scourge of typhoid fever or diphtheria. The well water belongs to a subterranean circulating system in which the water is in constant movement toward a lower level or toward the streams of a valley. The soluble matter of sewage is carried along with the subterranean current crossing the wells of neighbors and contaminating their water. This effect would be strongly developed in the sandy subsoil of your town, and has been proved by analysis to infect large districts on the drainage side of towns. The increased use of water induced by a water works largely increases the sewage, and a town soil where no provision is made for sewers, soon becomes saturated with sewage and its malarial miasma. This is no fancy idea, but a stern reality in many towns and cities that, after epidemics have afflicted them, have reluctantly adopted a sewerage system. We advise you to keep your sewage in shallow cesspools until all have discarded the use of wells, then if necessary use the wells until a sewerage can be made.

(5487) G. M. B. asks a method of finding the circumference of an ellipse, given the major and minor axes, also to find the major and minor axes, given the circumference and the ratio of the two axes. A. For the circumference of an ellipse, multiply the square root of half the sum of the squares of two diameters by 3·1416. For example an ellipse of diameters 4 inches and 2 inches, then $\frac{4^2+2^2}{2}=10$, and $\sqrt{10}=3{\cdot}16+$, and $3{\cdot}16+\times 3{\cdot}14=9{\cdot}9224''+$. By reversing the process as above for obtaining the diameters with a fixed ratio, the formula will be illustrated as follows:

$$\frac{9{\cdot}9224}{3{\cdot}14}=3{\cdot}16+,$$ and $3{\cdot}16^2+=10\times 2=20$, which is the sum of the squares of the two diameters. The ratio being 2, its square is 4. Then $20-2^2=16$, the square root of which is one of the diameters. Then $20-16=4$, the square root of which is 2, the other diameter. In the same way various elliptic diameters for a given circumference may be assigned between the limit of a circle and a straight line of one half length of the circumference.

(5488) J. McB., Pa., asks: Please describe this bug, found in our bed. It stung both my wife and me. There has not been a bed bug in this house for ten years. A. Reply by Professor C. V. Riley.—The insect sent is one of the tortoise beetles commonly known as the mottled tortoise beetle (Coptocycla guttata). This insect feeds in all stages upon the sweet potato and also upon the morning glory and other allied plants. Its larva is a peculiar oval, flattened, spiny creature, possessing, in common with those of other members of the family Cassidae, two long spines which are recurved over the back and carry the excrement, disguising it so that it would hardly be taken for an insect. In common with many other small beetles, this little fellow can pinch the skin of human beings with its jaws, and will do so under exceptional circumstances, but it possesses no poison glands and its extremely rare bite is perfectly harmless. It is probable that morning glory vines grow in the immediate neighborhood and that this little beetle sought the house for warm and comfortable hibernating quarters. The tortoise beetles are characterized not only by their having the general form of a tortoise, but by the brilliant golden and metallic coloring which they often present.

(5489) C. S. E. writes: 1. I wish to light a room about three nights in a week and about three hours each night, with a four candle power ruby colored incandescent lamp. Will you please tell me through your valuable paper which would be the cheapest. To run it with gravity batteries (if so, how many cells?) or to run it with a storage battery charged with gravities; and if the latter is the cheapest, how many cells of storage battery would it require, each cell having but two plates eight inches by twelve, and the number of cells of gravity per cell of storage? A. If you use a battery, a storage battery is the only suitable one. Four cells would answer of size stated. For charging use at least ten gravity cells in series. If these were paralleled by one or two more sets of ten, the charging would be much quicker. 2. Also where above lamp can be obtained? A. Address the Edison Lamp Company, Harrison, N. J. 3. Can the amperage of a battery be found by measuring the amount of water it will electrolyze in a given time? A. Yes. 4. Is the amount electrolyzed affected by the conductivity of the water? A. The amount for given E. M. F. is so affected because increase of conductivity increases the amperage. The same quantity per ampere is always electrolyzed.

(5490) J. H. T. asks: 1. Can water confined in a glass vessel be charged with electricity? A. An electric charge resides on the surface of a conductor only. The water may be charged as regards its surface both next to glass and the upper air-water surface. 2. If so, how much electricity will one gallon of water receive and how long retain it? A. This depends on shape of containing vessel and on specific inductive capacity of the dielectric, on its thickness, and on the relation of the charged surface to the oppositely charged. How can I do it? If with galvanic battery, of what size? A. Paste a strip of tin foil around the outside of the vessel. Connect one wire to this, the other to the water. The charge will be exceedingly slight; with a galvanic battery it will be hardly recognizable. 4. What are the best publications on electric therapeutics and electric baths? A. We recommend and can supply you with the following books relating to the subject you refer to: Morgan's "Electro-Therapeutics and Physiology," price $6,50; Hayes' "Electro-Thermal Baths," price $1.50; Hayne's "Electro-Therapeutics," price $2.50 mailed.

(5491) M. W. H. says: Will you be so kind as to tell me the origin of the idea that a dog trotting over a bridge will do it (the bridge) more harm than a regiment of soldiers marching over it? Is there any foundation for that idea? If so, why? I see no reason why it should be the case, but have heard public speakers use it to point a moral. A. The idea of the dog trot in sympathy with the vibration of bridges is very old, and came from the observed fact that a dog trotting on an unbraced or light bridge sets the whole bridge to vibrating, which is a source of danger. A body of soldiers does the same when marching to time, but the military rule is to break step when crossing a bridge; then there is no synchronal relation between the irregular steps and the rhythm of the bridge. The moral is very slender, and only points to great effects from small causes.

(5492) I. V. R. writes: In October 14 issue you say in reply to question 5424 that 6 storage cells will run a ⅙ horse power motor 6 hours per day. 1. What are the dimensions, weight, and the cost of one of those cells? A. The general dimensions of a single cell of such batteries as we referred to are: Floor space 8½×11 inches, height 16½ inches, weight 125 pounds. You can use perhaps a slightly smaller cell. For cost and fuller particulars address the Brush Electric Company, Cleveland, Ohio. 2. Could the motor be used in any way to recharge the storage cell? If so, what time would be required to charge the 6 cells with ½ horse power motor for a 6 hours' run? A. If the motor has cast iron fields, or if the fields retain enough residual magnetism to charge themselves, you may run the motor as a dynamo and recharge the cells in about six hours. If the motor run as a dynamo does not give enough voltage, charge the cells 3 at a time in series.

(5493) A. R. S. writes: If a boat 16 feet long, 54 inches beam, weighing 400 pounds, carrying six persons, makes 7 miles an hour, using a gasoline engine, what is the highest speed that a boat 16 feet long, 40 inches beam, weighing 250 pounds, carrying 3 or 4 persons, using the same engine but increasing the pitch of screw to absorb the full power? How much increase in pitch of the screw would the difference in the boats allow? If I start with the light boat from Omaha, Neb., down the Missouri river and Mississippi, up the Ohio, through the canal, down the Maumee, through Lake Erie, down Niagara River to the St. Lawrence, how many locks would I pass and do they charge to go through them? If so, how much? Would they object to my carrying the boat around the locks? Would I receive a license to make the trip? The company says no licenses are required with their engine. A. By increasing the pitch of the screw about 25 per cent in the lighter boat, you may possibly make between 8 and 9 miles per hour. You require no license. We do not know the number of locks or toll.

(5494) H. A. W. says: I wish to make a mixture for inhaling for catarrh and bronchial trouble, to contain oil of tar, camphor, etc. Can you give me the proper proportions, and if there is some other ingredient that will be good? A. Mix together ½ fluid ounce tincture of cubebs and 20 drops liquid cabolic acid. Add the mixture to ½ pint of hot water in an inhaler. Or heat tar with a little carbonate of potash over a spirit lamp.

(5495) H. E. M. says: I have frequently noticed a fine thread similar to a cobweb attached to points in close proximity. They are more noticeable in the morning and when a dew has fallen. I have seen them along the rails of the railroad fastened to the upper and lower flanges. They appear to be the work of an animal, as guy threads are attached. We also see similar threads flying through the air more during the fall of the year. Can you please explain? A. The floating fibers in the air and the fibers on fences, rails, and bushes are the product of spiders, made more apparent by the falling dew attaching to and enlarging the appearance of the fibers by its vesicular form.

(5496) W. E. S. writes: I have a well 22 feet deep and 100 feet from my barn. I have a 1 inch pipe laid from well to barn connected with a single action force pump, but I fail to get water. Will you please tell me what the trouble is? A. Your suction pipe should be perfectly air tight; have a foot valve and strainer on the end of the pipe in the well. The pipe should be charged with water at the highest point or through the pump, which if a good one with moderately tight piston and valves should pull the water easily, supposing that the pipe is laid straight or without undulation that would retain air, which by its cushioning would make the pump draw on an elastic air cushion instead of solid water.

(5497) M. S. E. writes: Is there any cheap method of bronzing or otherwise preventing steel tools, such as gauges, straightedges, etc., from rusting in this moist climate? A. Bronzing tools in a manner to prevent rust is not practicable with the users of tools. A good method of treatment is to warm the tools so as to be free from moisture and varnish with boiled linseed oil and thoroughly dry in the sun or an oven not hot enough to draw the temper. The varnish will only wear off in spots where the tools are handled. Another way, if desirable to keep the tools bright, is to wipe them often with vaseline.

(5498) E. P. G. says: The bright star Capella in Auriga appeared to change from a bright yellow or bronze to a violet. One could see the change in the light. The star would look half bright yellow and the other violet. Colors seemed to pass off on the side next to the pole. It was the plainest from the horizon to about one-fifth of the way to the zenith. Is there any regularity in the change of color? A. The changeable colors of the stars as you state is due to chromatic aberration in your telescope.

(5499) H. R. E. asks: What degree of heat will be required to melt pure aluminum? What degree of heat will be required to melt silicate of alumina, chemically combined as follows: Hygroscopic water 0·74; combined water, 16·42; silica, 40·80; alumina, 35·37; ferrous oxide, 3·07; lime, 0·30; magnesia, trace; potash, 0·56; soda, 0·46. A. Pure aluminum melts at 600° according to Pictet and at 850° according to Van der Weyde, authorities not agreeing upon the exact melting point. The composition stated nearly resembles pure fire clay, which requires about 3500° Fah. to melt.

(5500) Amateur writes: I wish to silver plate with a battery, and from motives of economy could use some silver solder cuttings 80 to 90 per cent pure to make the cyanide, only I fear the result would not be good. A friend says if I use a pure silver anode at the positive pole, only pure silver will be eliminated and deposited at the negative. Failing this being the case, how can I purify the silver quickest, and wet or dry? A. Dissolve in nitric acid. Add just enough sulphuric acid to precipitate the lead as sulphate. Filter or decant after standing and treat by the regular process.

(5501) Library Harvard College: Can you tell us the composition and method of employment of a cement for joining glass, that is not affected by acids or alcohol? Such a cement is used in Germany in making boxes of plate glass. A. Use Canada balsam; heat the glass slightly before applying. If the balsam is too thick, thin with benzole. Tie the pieces together or apply clamps so that there will be firm pressure until the cement has set.