(5844) L. B. asks: 1. Which requires more voltage, an induction coil having a core of one bar of soft iron, or several wires, to obtain the same results, using the core as a magnet for the circuit breaker? A. The wire-cored coil will work the best in all respects. 2. Could the "Little Giant" water wheel advertised in your paper run the hand power dynamo described in "Experimental Science," and how many eight candle power incandescent lamps could it light? A. Yes. The dynamo would run only a small lamp. 3. In how many ways can the induced currents of an induction coil be regulated? If made with a stationary core (which operates circuit breaker) would it be advisable to use a tube, or would it be advisable to have the secondary coil movable, and which is the best and quickest means of winding a coil? A. By moving one of the coils, by moving the core, by shielding the core and unshielding, by changing the current intensity, and by cutting out some of the secondary. The shielding tube method is by all means the simplest. 4. How many volts does one ½ candle power lamp require? A. 3 to 4½ volts. 5. How many volts will heat a No. 36 platinum wire ⅝ inch long? A. It depends on the temperature to which it is to be heated.

(5845) T. H. D. asks: 1. Why is it that some bricks will freeze and disintegrate and others will not? I know that what is designated as a hard brick will not break up on being frozen, and that soft brick will. Also that there is a sandy clay in some localities, especially about our sea coast, which will upon being properly burned produce hard bricks that will stand the exposure and freezing all right and yet are really softer and more porous than the soft brick made of the clay of our river bottoms; they will absorb three times the amount of water the others will, and yet not disintegrate when frozen. Why is this? A. It is a matter of chemical composition. Some clays develop a higher cementing quality, and one less affected by moisture. 2. Will you please state the per cent of loss in heat-giving properties of Tennessee bituminous coal if it is stacked out in the open air for one year? A. Possibly 10 percent.

(5846) C. E. H. asks: 1. How many and what size zinc and carbon bichromate cells will run an intensity coil of the following dimensions to its full extent? Length 8 inches, diameter of core ⅝ inch, in the primary coil 4 layers or 1 pound of No. 16 cotton-covered copper wire, secondary coil of 14 layers or 2 pounds of No. 25 cotton-covered copper wire, all wire well insulated. A. Four cells quart size. 2. What size condenser had I better use? A. Three or four square feet of tin foil. 3. What will be the voltage of the secondary coil when working to full extent? A. Divide turns of secondary by turns of primary and multiply by 4. 4. Will it give any spark, and if so, of about what length? A. Possibly one-sixteenth inch.

(5847) C. T. V. asks: 1. What becomes of a current of electricity generated by a dynamo after it has passed through a number of lamps? A. A current of electricity cannot be treated as a material that flows. As far as the analogy holds, it flows around the circuit without break. 2. Also if a number of lamps are being supplied by a dynamo and all are turned off, the generator continuing in motion, will any danger be done? And why? A. No. 3. Again, if 50 lamps are being fed from a generator, and 25 are cut off or only 1 is left burning, what would be the result and why? A. It depends on how the generator is wound. The remaining lamps if the dynamo is shunt wound get too much current, and too little if it is direct wound. If compound wound they may be but slightly affected. 4. Will you please send names of storage battery manufacturers. Also your opinion as to their practicability. A. Address the Brush Electric Company, Cleveland, O. They are very practicable.

(5848) W. T. M. asks: 1. How can I keep the fluids of a gravity battery separate without the battery being in action? A. You cannot. It is better to draw off a few inches of the upper layers with a syringe or siphon. 2. Is there any paint that will stick to an iron propeller wheel that will keep it from rusting? Would pitch, or a mixture of pitch and oil, or gas tar do? A. Use marine paint. 3. How fast could I drive a 5 by 30 launch with two 3 by 4 engines at 150 pounds pressure? A. Perhaps 6 or 8 miles an hour. 4. If an unjacketed boiler would hold with a certain fire 100 pounds steam, any valve being wide open, what might I expect if boiler was jacketed so it would be cool to touch? A. 125 pounds more or less.

(5849) Van B. V. asks: 1. Will you please give me a receipt for keeping flour paste from souring when it is made in large quantities? A. Add 20 grains of salicylic acid to each 12 ounces of water used. 2. Also inform me if there is not a method of making the paste without cooking it? And if so, how is it made? A. Flour paste should be cooked.

Wheaten flour	1 oz.
Powdered tragacanth	½ "
Powdered gum arabic	½ "
Salicylic acid	30 grn.
Oil of wintergreen	3 drops.
Water	12 oz.

Mix the powders and gradually add the water, then bring to the boil, allow to simmer for twenty minutes, stirring constantly. When cold add the oil. 3. Please inform me how mouth glue is made? A. Fine pale glue 1 pound, dissolve over a water bath in sufficient water, add brown sugar ¼ pound, continue the heat till amalgamation is effected, pour on a slab of slate or marble, and when cold cut into squares.

(5850) B. K. asks: 1. What is the latest and best definition for electricity, if any? A. There is no good definition. One of the most recent is: "An imponderable and invisible agent producing various manifestations of energy, and generally rendered active by some molecular disturbance, such as friction, rupture, or chemical action." This is from the "Standard Dictionary of the English Language." 2. What also is the nearest correct theory as regards the magnetism of the earth? A. Ampere's theory holds that currents of electricity circulate around it approximately parallel to the equator. 3. Could or would you refer me to which one of your issues contains the best descriptions of Brush electro dynamo? A. See our SUPPLEMENT, No. 274, and SCIENTIFIC AMERICAN, No. 19, vol. 69.

(5851) C. W. Y. asks (1) the number of gravity cells (Crowfoot) required to light a one candle power incandescent lamp. I wish to use it in a dark room lantern and for other purposes. A. 64 cells. 2. Where can I obtain carbon pencil (one-sixteenth inch diameter) for electric lamp described on pages 512 and 513 "Experimental Science"? A. Address dealers in electrical supplies. 3. Least number of gravity cells and least number of Grenet cells required to run same? A. About 20 Grenet or several hundred gravity. 4. Where can I get iron for telephone diaphragm spoken of in SCIENTIFIC AMERICAN? A. Use ferrotype plate. 5. Can I buy the carbon buttons used in Blake transmitters? A. No.

(5852) C. A. S. asks for a cheap finish for wood. A. A cheap polish to brighten hard oil-finished work after being rubbed.

Gum shellac	1 oz.
Gum arabic	¼ "
Gum copal	¼ "

Powderand sift through a piece of muslin, put them in a closely corked bottle with 1 pint alcohol, in a warm place, shaking every day till the gums are dissolved, then strain and bottle.

(5853) M. K.—To make oiled silk.—Coat your silk with boiled linseed oil to which gold size has been added. Give three coats of the oil, drying thoroughly between each coat.

(5854) W. J. B. asks: Do the electric or trolley cars affect a watch in its running? It is argued by some that it does and by others that it does not. I have a fine watch. When I go on the trolley cars I leave it home, which is a great inconvenience, for fear it would be injured by electricity. The above has caused a great deal of argument at my place. A. It is doubtful if it will to any extent, practically speaking. If afraid, carry your watch in an iron box, such as a blacking box.

(5855) W. S. M. asks: I have been told by nautical men that a vessel encounters a drag when sailing through shallow water, even though it may not be within several feet of the bed of the ocean or stream. Is this a fact, and if so, why? A. This is true. The vessel drags water after her, and the bottom wave is impeded and more energy is expended on the water than if there were more depth.

(5856) J. G. L. asks: 1. What steel can take the greatest charge of magnetism? Also if the steel has to be hard or soft? A. Use tool steel. Straw color to blue temper. 2. In charging a piece of steel in an electric circuit, what is the best way to wind the wire around it, whether diagonal or straight? A. As straight as possible.

(5857) X. Y. Z. asks: 1. Where can I get details how to make a 2 horse power motor to be run by battery? A. Our SUPPLEMENT, No. 600, gives a 1 horse power motor; our SUPPLEMENT, No. 865, a 5 horse power. These are the nearest we have. 2. How many cells of carbon acid battery will it take to run same? A. Allow 500 quart cells to one horse power. 3. What will be the amperage of 50 cells (carbon acid batteries) connected in series? A. Two amperes, about.

(5858) E. B. S. asks: 1. Can a 50 volt motor be made to run on a 500 volt street car circuit? Can it be done by introducing a large amount of resistance in circuit? The motor can, if required, stand 75 volts. A. By winding with very fine wire or by introducing a resistance in series, about nine times that of the motor. 2. Also, what size fuse wire will protect a No. 22 copper wire, American gauge? A. Use a piece of No. 23 wire.

(5859) C. D. M. asks: 1. How many storage batteries and what size plates shall I have to use to run a two candle power lamp about two hours each day? A. Three cells in series, with 24 square inches of positive plate in each cell. 2. How many gravity cells, and how long will it take to charge them? A. Eight gravity cells in series would require several days. By putting 18 in parallel and 8 in series you could charge in 10 hours. 3. How long would it take to charge 2 storage batteries with 5 gravity cells? The plates of the storage batteries are to be coated with red lead. A. It depends on the size of the plates.

(5860) A. B. C. asks: 1. Please tell me through the columns of Notes and Queries what SUPPLEMENT you have that will tell how to make a small dynamo that will light two 16 candle power lamps (incandescent). A. See SUPPLEMENT, No. 844, for nearest approach to your size. 2. What would be the voltage of a dynamoone-half the size of the one described in SUPPLEMENT, No. 600? A. It depends on the winding. For calculations see Sloane's "Arithmetic of Electricity," $1 by mail. 3. What is the cause of the shadows seen on a frosty window at night when there is a strong light, as an arc light, opposite the windows? A. It may be due to network around the globe or to stains in and deposits on the glass of the globe.

(5861) E. C. D. asks: 1. What amperage would a storage battery give that has two positives and three negative plates 7 x 8½ of the pasted kind? A. 4 to 5 amperes. 2. How long will a storage battery of three cells connected in series, the plates 3 x 5 and two plates to each cell, burn a two candle power lamp continually, before the battery has to be recharged? A. The battery will not do the work. For other queries address the author of the book referred to.

(5862) W. A. H. asks: A grocer uses a false weight of 15 ounces instead of a pound. What per cent does he gain by his dishonesty? What per cent do his customers lose? A. 6⅔ and 6¼ per cent respectively. Your other query is insufficiently stated.

(5863) C. S. W. says: Will you please tell me if there is a premium on a large copper cent dated 1841? A. Yes. The coin is worth 5 cents, if in good condition.

(5864) B. D.—Aluminum is about as elastic as silver; it does not compare well with steel as regards elasticity.

(5865) W. J. S.—The dimensions of a hole made in a block of metal would be increased on heating the block.

(5866) C. W. — Use maple for violin bridges.

(5867) A. C. F.—A good red ink is as follows: Pure carmine, 12 grains; water of ammonia, 3 ounces; dissolve, then add powdered gum, 18 grains; ½ drachm powdered drop lake may be substituted for the carmine where expense is an object.

(5868) J. B., Alaska, asks why the streams of water in that country freeze at the bottom; it is a common occurrence here in the creeks and flumes or ditches to see from two inches to one foot of ice on the bottom and a strong flow of water on top of it, in fact the water often overflowing the banks; after a time the ice will become loose and lifting gravel and bowlders will float down the stream. This generally occurs in the early winter, October and November, after which time it does not occur. A. The freezing of water at the bottom of streams in severely cold weather is the anchor ice so well known to millmen and in the quick-running streams of the northern United States and Canada. It is well known that quick-running water or water in agitation does not commence to freeze at a temperature just below the freezing point, but may reach a temperature even lower than 25° before ice crystals begin to form. A quick-running stream at this temperature may not freeze at the surface from agitation, but will cool the bed of the stream or the projecting stones to its own temperature, at which temperature the thin film of water in contact with the stones or bottom freezes to the surface and continues to keep the icy surface at the temperature of the running water, and so accumulating the icy coating at the bottom until a change in temperature changes these peculiar conditions. The thickness of the anchor ice in time ceases to convey the freezing temperature to its point of contact with the stones or ground, and the earth heat melts the contact surface and the buoyancy of the ice raises it from the bottom.

(5869) B. M. asks: What portion of its traveling distance will the piston of a steam engine travel over at a quarter stroke of the crank? A. At quarter stroke the crank is at 45°, the versed sine of which is the travel of the crank pin in the central line of motion of the piston. Calling the crank one, or one foot, the sine of 45° is 0·7071 +, the versed sine is 1—0·7071=0·2928 + which as the total piston travel is twice the length of the crank makes $\frac{0{\cdot}2928+}{2}$=0·1464 + of the total stroke due to the crank position. To this must be added the gain by the position of the connecting rod, which if of six times the length of the crank, then the square root of the square of the length of the connecting rod minus the square of the sine of the crank radius, subtracted from the length of the connecting rod, is equal to the versed sine of the connecting rod as radius, or as above the $\sqrt{6^2-0{\cdot}7071^2}$=5·995, and 6—5·995=0·005 + 0·1464=0·1514 in proportion to the whole stroke. Or for an engine of 2 foot stroke with a 6 foot connecting rod the piston will have advanced 3·63 inches when the crank is at 45°.

(5870) F. M. G. asks: How can an engineer find the water level in a boiler when the water is foaming? A. If the glass water gauge is properly connected by the use of a stand pipe connected with the top and bottom of the boiler, the mean of the oscillation of the water in the gauge will indicate the solid water level in the boiler. If there is no water gauge, the gange cocks should give a safe indication of the solid water level by a slight opening and noticing the character of the discharge. The bottom gauge cock should show less sputter than the top one. The difference is easily noticed and with a little experience may be relied on.

(5871) "Reader," Yarmouth, N. S., writes: Pipe improperly laid from source of supply weakens our water pressure. It is proposed to improve it by pumping and storage. One proposal is to put up a two million gallon reservoir, the water level of which would be 150 feet above high tide, or no higher than highest points of town. This would, however, improve pressure in lower parts of town, and in case of fire an electrically worked gate would divert steam pumps from the reservoir directly on to the main. The second proposal is to put up a steel or iron standpipe, to store 600,000 gallons, the highest level of which would be 100 feet higher than reservoir, also to be kept full by pumping. Both proposals are advocated by experienced men. Would reservoir or standpipe be best, under circumstances described, for both fire and domestic purposes in town of 8,000? Is lack of durability in standpipes compared with reservoirs a good reason for condemning standpipes? A. The highest part of the town does not explain the desired point required as to the merits of the reservoir or standpipe plan. If it means the street level, the standpipe offers the only way of supplying the houses in the upper part of the town. If the house top level, is meant, the reservoir plan is the most desirable, as great pressure is not desirable on account of the plumbing work in the lower part of the town. With the standpipe 100 feet higher than the reservoir would, as we understand you, make a pressure of over 200 feet head in the lower part of the town, which would be a cause of danger to the plumbing work. If a standpipe is adopted it should not be over 50 feet above the house tops of the upper part of the town, which should be sufficient for fire service. The reservoir offers the safest and most satisfactory plan, if it will supply the houses in the upper part of the town by gravity, on account of the large surface storage with its ready and ample supply for a fire department.

(5872) F. S., Winnipeg, asks: What is the latest improved and best equipped system of heating, ventilation and water closets for public schools? A. For your climate steam heating by the duplex system is most satisfactory. The severity of the long winters requires direct radiation in the exposed parts of the school rooms or under the windows. Coils of pipe along the walls being preferable to radiators as a better distributor of heat, and of about half the quantity to properly heat the rooms. The balance of heat should come through hot air flues from basement coil heaters for ventilating the rooms. Water closets should receive heat through air flues from basement coils only, with a special view to ventilation. All rooms should have ventilating flues on each side, as far as possible from the hot air flues, with registers at both top and bottom of the rooms. The bottom registers only to be used in extremely cold weather.

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