

under different pressures? I find it stated that 1 cubic inch of water at 70° Fah. under the ordinary atmospheric pressure weighs 0.578 ounce. What is the weight of same when under a pressure of 75 pounds as indicated by a Crosby water gauge? A. Water is very slightly compressible. For one atmosphere of pressure (14.7 pounds), it is compressed 0.00005 of its original volume. For 75 pounds above the atmosphere therefore it would increase in weight about 0.00025, giving 0.57814 ounce instead of 0.578 ounce. The above rule is approximately correct.

(5612) E. G. R. asks: 1. Will the No. 2 water motor described in SCIENTIFIC AMERICAN of October 14, page 244, run the hand power dynamo described in "Experimental Science"? A. Yes, if there is sufficient head of water. 2. How large a lamp would the above dynamo run when the field magnets are separately excited with six or eight Bunsen cells? A. Three to five six-candle power lamps, without any cells; with the cells twice as many, especially if you use a drum armature. 3. When field magnets are separately excited as above, would the dynamo charge two storage cells? A. Yes. 4. What horse power has the No. 2 water motor? A. Address the manufacturers for particulars.

(5613) F. E. K. asks: 1. Can a plastered wall in a house be blackened so as to be used as a crayon board? If so, how can I prepare a paint to be used to paint it? A. For a wall blackboard: to 1 pint shellac varnish add 6 drachms lampblack, 1 drachm of ultramarine blue, 3 ounces ground pumice stone, 2 ounces rottenstone ground. If not thin enough to spread easily with a brush, add enough alcohol; two or three coats will be needed for a plastered wall. 2. How far is New York City from the deep ocean, and the length of Broadway in the same city? A. About 12 miles in a direct line. Broadway is about 5 miles long. 3. What is the size and weight of the Capstone on Washington monument? A. The capstone of the Washington monument weighs 3,300 pounds. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 476, for an interesting account of its setting. 4. What is the size of the smallest boat that has crossed the Atlantic Ocean? A. About 18 feet in length.

(5614) H. L. B. asks: 1. What is the safe carrying capacity in amperes of a copper wire, No. 14 gauge, B. and S. and how is the carrying capacity of any wire to be found? A. 6.4 amperes. See Sloane's "Arithmetic of Electricity." Allow 2,000 amperes per square inch of section. 2. Is there any book published giving directions for concealed incandescent wiring? A. We can supply Badt or Davis on "Electric Wiring," \$1 each by mail. 3. Is there any instrument on the market for recording the height of water in a tank located some distance from the station supplying it? Could not a common low pressure water gauge be used? A. A pressure gauge could be connected to do this.

(5615) A. E. N. writes: In the SCIENTIFIC AMERICAN SUPPLEMENTS already received from you I find a Wimshurst electric machine (glass friction) advised for the generation of ozone by electricity. But having better opportunities to use other sources of electricity, I should like to know: 1. Whether a galvanic battery or a magneto-electric machine could be substituted for the Wimshurst? A. No. 2. What is the strength of a Wimshurst electric machine (taking as a standard the Daniell cell=about 1 volt) compared to other electric machines, viz., 1, Daniell battery; 2, Davis & Kidder magneto-electric machine; 3, Gaiffe's pocket electro-medical machine? A. It may run up into millions of volts. The electro-medical machines probably do not run higher than two or three hundred volts.

(5616) W. F. R. writes: 1. Have you any literature relating to the manufacture of copper oxide plates as used in Edison Lalande battery? A. We have no literature on this. We could supply you with the patents at 25 cents each. 2. Can you inform me as to the best and cheapest method of preparing copper oxide (black)? A. Ignite copper borings to redness in the air. 3. Do you think it would be possible for me to make a box of blacklead for heating above plates? If so, how should I proceed to prepare such a crucible? A. Use a mixture of clay and plumbago made into a paste with water.

(5617) T. G. S.—The photograph sent by you shows a fresh water lizard, probably Triton tigrinus, Green. It is an aquatic species not rare, and well known. The horns you mention are branchial appendages which grow out and are shed. See N. Y. Natural History Survey, Zoology, Fishes and Reptiles, page 83; in illustrations, plate 15, Fig. 32.

(5618) C. C. N. writes: How many storage batteries of a given size would it take to run a 40 horse power motor? How long would it take to charge them with a 10 horse power dynamo, and also a 2 horse power dynamo? How long would it take to discharge them? Also, is the power being used up when not running? A. You may allow 425 cells to run the motor 10 hours. It will take four and a quarter times and twenty-five times the period of running to charge with the 10 horse power and 2 horse power dynamo respectively. It will very slowly lose its charge when not working.

(5619) A. R. K. asks: 1. What do electricians call a multiplier, and in what capacity is it used? A. A galvanometer is sometimes called a multiplier. 2. Is there a multiplier, so called, that can increase the efficiency of a dynamo from 75 to 100 per cent? A. No. This would be in the line of perpetual motion. There is room, however, for inventions in increasing the efficiency of dynamos.

(5620) H. S. S. asks for (1) a recipe for a tin electroplating solution for plating on copper. A. We quote the following from the "Scientific American Cyclopedia of Receipts, Notes, and Queries": "Deposition of Tin by Simple Immersion or Dipping.—For this purpose a saturated solution of cream of tartar is made with boiling water; in this solution small brass or copper articles, such as brass pins for example, are placed between sheets of grain tin and the liquid is boiled until the desired result is obtained—a beautifully white coating of tin upon the brass or copper surfaces. Ordinary brass pins are coated in this way. A little chloride of tin may be added to the bath to facilitate the whitening. The articles are afterward washed in clean water and brightened by being shaken in a leathern bag with bran." 2.

Please describe the machine Nikola Tesla uses to produce high alternating currents. What is its armature made like? A. We refer you to SCIENTIFIC AMERICAN, Nos. 9, 11, and 13, vol. 66; also SUPPLEMENT, Nos. 792, 902, 831, 692, 847, 855. 3. What is the highest number alternations in a magneto-dynamo, such as is used for shocking purposes? A. From a few hundred up to two thousand or more a minute. There is no "highest number." 4. Suppose an electric battery be made by making a lead tray 6 x 6 and 4 inches deep. In the bottom is put sulphate of copper 1 inch deep, and over that 1 inch sawdust. A zinc plate on the sawdust as positive pole; binding screw on tray and one on zinc. Solution used, water. What voltage and amperage would it give? Would it give continuous current? How long would such a battery last (if used every day of twenty-four hours) before becoming exhausted? A. About one volt. The continuous current will be, perhaps, half an ampere. Its period of running would depend on the resistance of the outer circuit. 5. Will a bichromate battery, with porous cup filled with bichromate potash and outside vessel filled with a solution of common salt, continue in action for a greater number of hours than the ordinary one-solution bichromate battery? A. It might run longer, but would give a far less total of electric energy.

(5621) A. H. writes: 1. One of my zincs of a Daniell gravity cell has been almost destroyed, while the other two are not affected in the least. There has been no solution in the jars for about one month, and during this time the zincs were covered with a copper-like substance, which had formed while the battery was in action. How was it that one zinc was destroyed and the other two were not affected? A. It seems probable that the destroyed zinc was more attacked than the others before you laid up the battery. Corrosion would be slow, if the zinc was not in the solution. 2. How much wire on the field magnets of the hand power dynamo, No. 161, and also how many feet on the armature, as near as you can judge? A. Five pounds wire for magnets, 100 feet for armature; if drum wound, about 200 feet. 3. Do not the brushes have to touch one commutator segment before it leaves the other? A. No. 4. Can a Porter's motor, No. 1, be used as a dynamo? A. You will not get much result, we think. We have no figures as to its voltage and amperage.

(5622) N. T. asks: Of the various kinds of batteries, such as storage cell and plunger, which is the strongest? A. Storage batteries are far the strongest. How to make them is told in SUPPLEMENT, No. 845. Other batteries, 157, 158, 159, and 792. Also see storage batteries in SUPPLEMENT, No. 838. These we can supply for 10 cents each.

(5623) E. A. E. writes: I would like to build an induction coil that will produce a 4 or 5 inch spark. Can I follow directions as given in SUPPLEMENT, No. 160, and are there any changes I can make that will be a benefit to it? What is the object of the insulation of resin and wax between the two sections of the secondary coil? Also, have you any books or papers from which I can get information on this subject? A. You will find it quite difficult to make a successful 5 inch spark induction coil. The object of the disk is to separate portions of the secondary which differ greatly in relative potential. For a large coil, 6 or 8 such disks should be used. For other coils, see our SUPPLEMENT, Nos. 229 and 569, and SCIENTIFIC AMERICAN, No. 14, vol. 66, all of which we can supply for 30 cents. Also, "Induction Coils—How Made and How Used," price 50 cents; also Bonney's "Induction Coils," price \$1 mailed.

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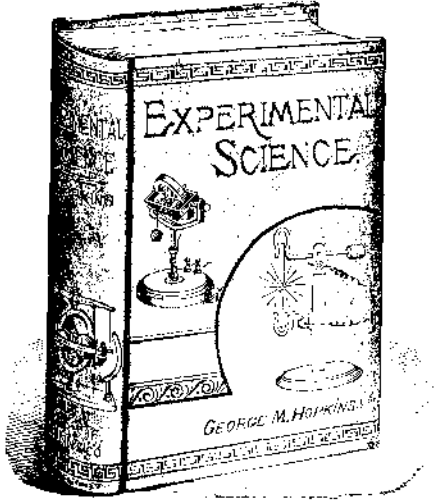
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