the disk to the wire from the battery and the inside terminal to the wire from the meter that the needle would deflect one way, and by connecting them just the opposite the needle was deflected just the opposite as to what it did before, just the same as it would had I changed the direction of the current through the meter, which I did not do. I made several tests, with the same result each time. I have never heard of anything like it before, and do not know whether I am in the wrong or not about the matter, but can see no reason for the needle to change. Will you kindly explain, if it is worth an explanation? A. In the second mode of connecting the coil to the battery and galvanometer the current flows through the coil in the opposite direction from which it flowed the first time. The poles of the coil are therefore reversed. It may be that the coil is so near to the galvanometer that its needle is deflected by the coil. We do not see any other way in which the deflection of the needle should be reversed.

(8117) G. G. A. E. asks: 1. How can you determine the size of wire to be used in different circuits? Is it according to the capacity of the wire and the requirements of the instruments or to some other rules? If so, give the principal rules. A. The wiring of a circuit is determined by the current it is to carry, the drop to be allowed in it, etc. The tables of the Underwriters are the general guide for size of wire. You will find Cushing's "Wiring Handbook," price $1, by mail, a good book on the subject. The edition for 1901 is just out. 2. How many candle power can a 75 watt dynamo, capable at 1,400 revolutions of producing 15 to 20 volts, and at 2,000 revolutions 40 to 50 volts, furnish? Also, how the candle power could be divided up into seven different lamps in order to get best results? A. Two and a half to four watts are to be allowed per candle with small lamps. With 75 watts you can have 20 to 30 candle power. If you have 7 lamps on 20 volts, you will have about 3 volts for a lamp, and you will need 1 candle power lamps, 7 in a series. At 50 volts you can use 7-volt lamps, and can have 2 candle power lamps, in series. 3. Which do you think is the better for both general and accumulator use—the series or the shunt-wound dynamo? A. A series dynamo is not adapted to the work of charging storage cells. Use a shunt-wound machine. 4. Can dry batteries, when exhausted, be used for accumulators; and, if so, how many would be required for the above dynamo? A. We know of no way to use dry cells as accumulators.

(8118) J. K. asks: 1. How can I make a core for an induction coil, for medical use or igniting use? A. The core of an induction coil for any purpose consists of a bundle of iron wires, covered with paraffined paper or other insulation. Upon this the primary coil is wound. Full instructions for winding a medical coil are given in Bottone's "Electrical Instrument-Making," price 50 cents, by mail. 2. Can an incandescent light be produced without a dynamo; and, if so, how? A. Yes: a small lamp may be lighted by a primary battery. 3. How can I construct a small electric motor for running small machinery? A. Follow the directions given in the SCIENTIFIC AMERICAN SUPPLEMENT, 641, 759, or 1210, price 10 cents each.

(8119) A. McD. asks: Is there a water motor used to run a dynamo? Is it a success? A. A dynamo can be run by water power as well as by steam. It is necessary to secure steady motion by a steady pressure of the water. For water motors see our advertising columns.

(8120) B. G. J. asks: 1. To change an alternating current that now has a pressure of 50 volts to one of 115 volts, what effect would the increased pressure have on conductor and the rubber insulation, the present conductor having the capacity of 10 amperes? A. No appreciable effect. The difference between the voltages is too small to make any difference. 2. Would it be necessary to increase the size of the conductor? A. No; the conductor could be diminished if any change were to be made in it for the same current. The higher the voltage the smaller the conductor needed to carry a given amount of electricity. 3. Are transformers made to step down 5,500 volts to 115 volts? A. Yes; such transformers would be supplied by any company furnishing current at this pressure.

(8121) A. W. P. asks: 1. What is the object in having a vacuum in coherer tubes? A. It is not necessary to have a vacuum in the coherer tube for wireless telegraphy. 2. What kind of burner should be used with acetylene gas to obtain a hot blue flame for laboratory work? A. A party claims to have a jet which will produce a colorless flame with acetylene and burn safely so long as it is properly used. It is unnecessary to say that mixtures of air and acetylene are explosive, and unsafe. We are not informed how the burner in question is constructed. 3. How do the following rank as insulators: Hard rubber, paraffin wax, paraffin oil, dry shellacked wood, glass? A. We are not able to give any exact figures of relative resistance of the various insulators. Much depends upon the temperature and condition of the substance. All become fairly good conductors as soon as chemical change begins. Glass conducts as an electrolyte as soon as it softens. 4. If the terminals of a 3-inch spark coil be brought close up to opposite sides of a large cake of paraffin wax 1 inch thick, would there be any appreciable flow of current through the paraffin? A. No. 5. In experimenting with wireless telegraphy and electric wave radiation, could wooden balls, covered with tinfoil, be used in the oscillator in place of the brass spheres usually employed for such purpose? A. It was at first thought that the surface of the balls must be most highly polished for use as transmitters, but this is no longer done. Whether so rough a body as tinfoil would transmit at all or not we cannot say. You can make experiments and find out the result. 6. To what extent will zinc sulphide fluoresce under the influence of Roentgen rays, as compared with calcium tungstate? A. We are not aware that zinc sulphide has been used at all for fluorescent screens. If it is serviceable for that purpose it would drive out calcium tungstate, since it is very much cheaper.

(8122) C. J. B. asks: Is it possible to enlarge a photograph by projection? By this I mean to insert a negative in the camera, behind which there is a source of light, in place of a plate and project the image on a piece of rapid paper. I tried this several times and could get nothing more than reduced silver on the paper. A. It is possible to make an enlargement in the manner described, if properly arranged. The operation must be performed in a room entirely dark, so that no light can strike the paper except that which passes through the negative. The light must be in a box from which no light can escape into the room. A ground glass, or opal glass, or oiled paper must be put between the light and the negative to diffuse the light and prevent a flare spot from forming in the focus of the lens. If a perfectly distinct and sharp image of the negative can be seen on the paper a photographic positive can be made on the paper by giving the proper exposure. An exposure much longer than to daylight will be required, of course, since any artificial light is weaker than daylight. Bromide enlargements are made very often in this way. The best way, however, to make an enlargement is to use a camera with two bellows, with the lens in the middle between the bellows, with a holder for the negative at one end and the plate holder at the other end. The bellows are longer than they are in ordinary cameras, to give room for making enlargements of various sizes. Such cameras are sold under the name of Copying Cameras. An ingenious person can make an attachment for an ordinary camera which will answer the same purpose.

(8123) L. P. R. writes: I wish you would publish through your paper the several causes of knocking in rail joints. A. The knocking at rail joints is caused by the wheels striking a depression at the joint of the rails, made by a separation and the wear made by the wheels rolling over the joints. An additional cause may also come from loose fish-plates, which allow a slight depression of the end of the rail that the wheels are passing off, when the wheels will strike the elevated end of the next rail, and thus make a slight depression at the joint.

(8124) H. D. W. asks: 1. Can you give me any formula for an induction coil suitable for running a wireless telegraph? A. A coil is described in SUPPLEMENT 1124, price 10 cents. The coil is put to its strongest spark by adding cells of battery. Six or eight cells should be sufficient for the coil named above. 2. Is it known how Tesla gets his 100-foot spark. A. We presume by one of his oscillators. 3. Would it be any cheaper to make an apparatus like his or to make an induction coil (for 10-inch spark)? A. The coil is much cheaper. A coil giving a 10-inch spark is described in Bonney's "Induction Coils," price $1, by mail. 4. Can you tell me of any explanatory or descriptive articles on wireless telegraphy? A. See Fahie's "History of Wireless Telegraphy," price $2, by mail.

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