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(8612) A.B. writes: The primary is No. 16, silk-covered wire and is wound around an axis 1/4 inch diameter and 4 1/2 inches long. I wind about 300 turns of it. The secondary is tormed of 11 ounces of Xo. 36 silk-covered wire wound around an axis 11/4 inches. I use a bichromate cell. Please give me the number of volts, and the length of spark I can obtain from it. Also tell me if a smaller number of OUR CARRIAGES turns in the short circuit would give more E. M. F. in the long one; and also about how many turns I should use. The soft iron inside the %-inch axis is ½ inch diameter and formed of 167 wires. A. The coil may give a spark a half inch long. We are not able to determine the voltage, except as a spark of a certain length indicates it. The primary of such a oil should not have more than three layers of wire. You may need to put on more than one cell to bring out the longest spark the coil can give. Norrie's "Induction Colls," price \$1 by mail, contains data from which you can build coils of a great variety of sizes.

(8613) J. P. J. asks: Please let me know what a voltmeter would do or indicate, if connected in series with a motor or any load, if built to stand the E. M. F. of the dynamo. A. If a volumeter were connected in series with a motor, it would simply cut down the current which the motor could obtain and prevent the motor from running. A voltmeter has a very high resistance, so that very little current can pass through it. The motor cannot get any more current than can pass through the volumeter. Hence it will not run in series with a voltmeter. No harm would come to the voltmeter by connecting it to the circuit in this way. A voltmeter is always connected across the poles of a circuit, and takes the full voltage. In series with a motor it would not get the full voltage of the circuit. It would be less affected than when put across the poles of the circuit.

(8614) J. H. H. asks: 1. Will you please tell me the name of some book in which is given a clear and full description of the construction of a dynamo which also tells how the current is made? A. Swoope's "Lessons in Practical Electricity," price \$2 by mail, will probably give you the most information upon the topic of any single book. Thompson's "Dynamo-Electric Machinery." price \$6 by mail. is the most thorough book on the subject. Also a book that gives a full description of the telephone. A. Miller's "American Telephone Practice," price \$3 by mail is the book you need. 3. At the B. & O. R.R. Astion here there is a ucllow and bluck semaphore. What is it for? A. You should ask some one of the railroad men to find this out. 4. What is the steam-done on a locomotive for? A. To dry the steam. 5. In the pictures of some locomotives there is a small wheel behind the drivers. What is it called, and what is its use? A. To carry the weight of that part of the engine directly over it. 6. In the accompanying drawing, if a b were a steel pole it would evidently complete the circuit between the wire, f, and the ground. Now, if, at the same time, a person were to touch the pole at c and the ground at d, the current would still pass through the pole and not through the person. In other words, if there were two passages for the cur rent, why would it choose the pole in prefer-A. Whether a perceptible ence to the person? current will leave the pole and go through the person depends upon the voltage of the current. The body of the person acts as a shunt upon the pole. It will receive a portion of the See the calculation of shunts in Swoope, referred to above.

(8615) W. V. S. writes: Kindly give me, through your Notes and Queries column, a formula to produce the verde finish on brass, in the electroplating bath. A. Various meth ods of producing verde or green shades upon brass and other metals are to be found in "Modern Electro-Plating," price \$1 by mail.

(8616) C. A. C. asks: What is the meaning of the term cycle in engines, such as two-cycle and four-cycle gas engines? A. A is a series which returns upon itself. two-cycle is a single impulse of the piston or ignition, for two strokes or one revolution, Four-cycle is one impluse or ignition to four strokes of the pistop or two revolutions



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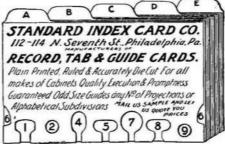
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