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**Notes and Queries.**

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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 This is for our information and not for publication.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. Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same. 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.

(8551) E. F. asks: 1. What fraction of a horse power, approximately, is expended in driving a bicycle along at a moderate rate of speed on a level road? A. A man is thought to be able to exert about one-tenth of a horse power. For an article upon the subject with data see **SCIENTIFIC AMERICAN SUPPLEMENT** for January 9, 1897, price ten cents. 2. What is the approximate maximum of power that can be exerted by a rather strong boy in driving a bicycle? A. A rather strong boy will turn off about as much work as a man. 3. Please explain why an increased load on an electric motor increases the consumption of current. A. The greater the load, the more power required to perform it. 4. What are the advantages of series and shunt-wound dynamos over each other? A. The series dynamo is useful where the current is approximately constant, as in series arc lighting, and in motors for railway service. Shunt machines are used where it is important to maintain a constant potential. These are the differences in a brief general statement. For full information see Hawkins and Wallis' **Dynamo**, price \$3 by mail. 5. What is meant by the terms applied to a dynamo while charging a storage battery, "reverse the polarity" and "killing itself"? A. If a series-wound dynamo were charging an accumulator and its E. M. F. were allowed to fall below that of the battery, the battery would send a reversed current through the dynamo. This would reverse the magnetism of the fields and the poles of the dynamo. 6. Why cannot a series dynamo do electro-plating? A. For the reason that its electromotive force varies with the current. 7. Please give the amperage and the ampere hours of the Mesco dry cell and the newest form of Muller battery. A. A dry cell can hardly be said to have any ampere hours. Long before an hour of steady service was past the cell would cease to give any amperes at all, through polarization. 8. Would it be practicable to test the power of a small motor with 20 or 30 dry batteries? A. No. 9. How long would they last without decreasing in output very much? A. Perhaps five to fifteen minutes.

(8552) J. C. C. asks: 1. Would two such motors as described on page 497 of "Experimental Science" run a small automobile with an occupant weighing 140 pounds? The gearing on motor is 1 inch diameter, while that on wheel is 12 inches diameter. A. Probably not. 2. Would 10 cells of the Werner lead-zinc cadmium type run both motors at full speed? (I refer to batteries as described in **SUPPLEMENT 1195**). A. We think so. 3. Suppose ten cells of a certain size give 20 volts and 4 amperes. Would ten cells twice as large give 20 volts and 8 amperes? A. Yes; if the area of the plates were twice as great. 4. Suppose a dynamo gave a voltage of 12 volts and 2 amperes. Would the dynamo light four 1/2-ampere, 12-volt electric lights? A. Yes; with the lamps in multiple. 5. When a single cell is said to give 3 amperes and 1 1/2 volts, would five cells give 15 amperes and 5 volts? A. No. If the cells are arranged in series, they will give 3 amperes at 5 volts at the binding post; if arranged in multiple, they will give 15 amperes at 1 volt. One cell in this case can furnish 3 watts. The five cells will give 15 watts. This may be 3 amperes times 5 volts, or 15 amperes times 1 volt.

(8553) D. C. E. asks: 1. Which is the correct way to place a fuse block—outside or inside the cut-out switch? I have seen fuse blocks put outside the switch, but doubt its being right. A. Switches are placed so that the handles turn down when opened. They cannot then drop by gravity and close themselves. This is much more important than the position of the fuse. 2. Tell me the best oil to use on commutators. A. Use some one of the commutator compounds prepared for this especial purpose.

(8554) H. B. asks: What in your opinion is the best material or substance to cut off or take away the power of the magnet? For instance, a magnet will draw steel toward itself; what can be placed between the piece of steel and the magnet to take away the power of the magnet to draw the steel? A. Iron of considerable thickness is the only screen against the lines of magnetic force.

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