Business and Personal.

The charge for insertion under this head is One Dollar line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in the follow

Marine Iron Works. Chicago. Catalogue free For hoisting engines. J. S. Mundy, Newark, N. J. "U. S." Metal Polish. Indianapolis. Samples free. Gasoline Brazing Forge, Turner Brass Works, Chicago. Yankee Notions. Waterbury Button Co., Waterb'y, Ct. Small Accumulators. A new book. Illus. Cloth, 50c. Spon & Chamberlain, 12 Cortlandt St., New York,

750 new and second hand iron working tools in stock Garvin Machine Company, Spring and Varick Streets New York.

The celebrated "Hornsby-Akroyd" Patent Safety Oil Engine is built by the De La Vergne Refrigerating Machine Company. Foct of East 138th Street, New York.

The best book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins. By mail, \$4. Munn & Co., publishers, 361 Broadway, N. Y.

Roche's "New Standard" Electric Necktie Pin. Works like a charm. Midget Battery. The electric light is a beauty and a wonder. Sent postpaid for \$1.00. Agents wanted. Wm. Roche, 259 Greenwich St., New

and other Books for sale by Munn & Co., 361 Broadway. New York. Free on application.



HINTS TO CORRESPONDENTS.

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 This is for our information and not for publication.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.

(7633) J. N. D. asks: 1. About what would be the required dimensions of the glass plate in simple electric machine, to charge a small Leyden jar? A. Holtz machines are made with plates as small as 12 inches in diameter. These will charge Leyden jars and perform many experiments. We should advise you to purchase the Scientific American Supplement, Nos. 279, 282, price 10 cents each, in which many experiments are described. 2. At what speed should it be revolved? A. The speed of the plates of a Holtz machine is only limited by the strength of the glass, 3. Where should a body be placed, to be affected most by the earth's attraction? A. A body is affected most by the earth's at traction at the surface of the carth, that is, bodies weigh most at the surface; less, both above and below the surface of the earth. 4. State three proofs that the earth is an oblate spheroid. A. One method of determining the form of the earth is by measuring arcs of meridians in different latitudes. A second is by taking the times of vibration of a pendulum at different points on the earth and from these are calculated the intensity of gravity at those points. See Young's "General Astronomy," pages 99 to 107, price \$2.50 by mail. We do not know any third mode of finding the form of the earth.

(7634) F. V. writes: While experimentally testing the efficiency of a ground wire of a telephone line from Winsted to the railroad station at Lester Prairie, six miles south of here, the ground wire of the telephone at that point was connected with the telegraph wire. A great improvement was found in the transmitter and also in the receiver at Lester Prairie; and while still commenting on this, the operator at New Germany, a station on the Great Northern four miles east of Lester Prairie, called and told the operator at Lester Prairie, by telegraph, that he had heard the whole conversation, and even recognized the voice of the speaker at Winsted, which was later actually verified, more than once. The remarkable feature of this, however, is that there is no telephone of any kind at or near the station or even in the town of New Germany. Tesla and Marconi may send their messages without wire, but they must have their instruments. But here we have an instance of receiving messages without any apparent instruments over ire a distance of ten miles. [A. We regret to say that this matter is neither new nor strange, though doubtless your observation of it was entirely original with yourself. The SCIENTIFIC AMERICAN as long ago as 1881 contained an account of using a telegraph key as a transmitter and a sounder as a receiver of articulate speech. So far from your having no wires, you had a direct connection of your telephone wire to the telegraph line. All the rest was plain. The telephone message then went over the telegraph line, and the operator heard it at his sounder, which chanced to be well situated and adjusted for the purpose.-ED.]

(7635) P. N. writes: I am interested in a scientific problem on which I desire the evidence of or decision of a second party, and would ask you to answer the following: Suppose a man weighing 150 pounds will require to expend a force of 50) foot pounds (or a certain amount of force) to walk a certain distance can the same man travel the same distance over the same road on a modern bicycle of 20 pounds weight with less force expended? The man is supposed to lift himself 2 inches at every step, the road is supposed to be perfectly level and smooth, time not being taken in consideration. By the above you may judge the simple question to answer. Is the human body a mechanism that.

in its natural way of locomotion-walking-is superior in economy of force to one seated on a bicycle and impart ing the force to the wheel? A. The bicycle is a great conservator of animal power. A man on a bicycle who can only exert one-eighth of a horse power for a few hours is more than a match for a horse in the long run. He can outdo his own walking power on a good road at least four times. If the weight of the bicycle is taken into account, the proportional conservation of energy will be somewhat greater.

(7636) J. K. asks the difference between a marine, field, and night glass. A. Marine glasses are also termed night glasses when they have a large diameter object glass, which is used at full area at night and reduced area by day, by placing a diaphragm cap over the object glass. A field glass may be a terrestrial telescope of the same combination of lenses with a very short focus, or a pair mounted for each eye. For the lower powers for field glasses, the opera glass form is used, only made longer than an opera glass, the object glass and eye lens being achromatic.

(7637) E. S. asks for the formula for a compost to imitate marble, which will be very hard and will take a high finish, and how to polish the same. It seems to be a secret; there are only a few men in this city that can mix it. A. Reduce marble dust or white limestone to a very fine powder by grinding and sifting, mix with it intimately about 1/4 its weight of zinc oxide (zinc white) and 1/4 its weight of Portland cement, and mix thoroughly into a thick paste with a sufficient quantity of a hot aqueous solution of waterglass, containing about 40 per cent of the glass. Mould the paste under pressure while warm, and expose the mouided form for a week or ten days to warm dry air, before fin-

TO INVENTORS.

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MARCH 28, 1899.

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