Business and Personal.

The charge for Insertion under this head is One Dollar a 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 following week's issue

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Best Handle Mach'y. Trevor Mfg. Co., Lockport, N. Y.

Air compressors for every possible duty. Clayton Air Compressor Works, 26 Cortlandt Street, New York.

Distance Reading Thermometers.—See illus. advertisement, page 319. Ward & Doron, Rochester, N. Y.

The Improved Hydraulic Jacks, Punches, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Nickel-in-slot machines perfected and manufactured Electrical supplies, Waite Mfg. Co., Bridgeport, Conn.

Cheapest Water Power.—See top of 1st column, page 176. Also top of 2d column, page 239. Look, it will pay.

Centrifugal Pumps for paper and pulp mills. Irrigating and sand pumping plants. Irvin Van Wie, Syracuse, N. Y.

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Inventors wishing to bring their inventions to the public notice should confer with H. Pittock, Room 61, 1 Beacon St., Boston, Mass.

Split Pulleys at Low prices, and of same strength and appearance as Whole Pulleys. Yocom & Son's Shafting Works, Drinker St., Philadelphia, Pa.

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The "Olin" Gas and Gasoline Engines, from 1 to 10 horse power, for all power purposes. The Olin Gas Engine Co., 222 Chicago Street, Buffalo, N. Y.

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.

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Notes & Queries

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 This is for our information and not for publication.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.

(6054) F. L. B. says: Will you kindly give me, through your Notes and Queries, a formula for developing negatives and films, of instantaneous work, something that can be used by amateurs? A. Combined hydrokinone and eikonogen developer:

Sulphite of soda	300 gr.
Carbonate of soda	200 "
Sodium hydrate	30 "
Bromide of soda	5 "
Hydrokinone	20 "
Eikonogen	30 "
Water	10 oz.

This developer possesses the rapid action of the eikonogen combined with the sustaining energy of the hydrokmone, and keeps indefinitely. 2. In using Solio paper, what should be used on the glass to keep the prints from sticking the to when rolled out to dry? A. Answer by the Eastman Co. "The glass may be prepared with a solution of benzine 1 ounce, white wax 10 grains. This should be rubbed on freely and polished off with a chamois skin. But as the results with glass are always more or less uncertain, we prefer to use ferrotype plates, which are more easily kept clean than the glass."

(6055) W. J. S. says: Will you please decide the following controversy? One claims Easter Sunday comes the first Sunday after the full moon, after March 25. Another claims it comes after the 21st day of March. Which, if either, is correct? A. Easter day is always the first Sunday after the full moon, which happens upon or next after the 21st day of March; and if the full moon happens upon a Sunday, Easter day is the Sunday after. But note that the full moon for the purposes of the ordinary rules and tables for finding Easter is the 14th day of a lunar month, reckoned according to an ancient ecclesiastical computation, and not the real or astronomical full moon.

(6056) C. F. L. writes: 1. Is a 16 candle power 50 volt incandescent lamp more efficient than a 16 candle power 100 volt lamp of same make? If so, how much? Is any other advantage gained, aside from the higher efficiency of the lamps, by using 50 volts instead of 100 volts on secondary circuits? A. One lamp is as efficient as the other. The lower voltage lamps require larger conductors; this, as involving more cost, is a disadvantage. 2. Is there a certain voltage for which lamps of every given candle power can be made most efficient? If so, for what voltages respectively are lamps of 10, 16, 32, 50, and higher candle powers best suited? A. There is no such voltage. 3. In an alternating current lighting system, with ordinary frequency, would there be any objection, on account of impedance, or other causes, (*a*) to inclosing each wire in a separate iron pipe; (*b*) to inclosing both wires in same pipe; or (*c*) to inclosing one wire in iron pipe and using pipe as other conductor? A. All could be done without any practical harm. 4. Would same be true if pipe were made of non-magnetic metal? A. Yes.

(6057) G. C. S. asks: What are the chemical changes that take place in the Leclanche battery? After MnO_2 has parted with its oxygen, as in the Leclanche battery, is it possible to convert back to MnO_2? Can it be done by applying heat? A. The following is the general reaction: $2NH_4Cl + Zn = ZnCl_2 + 2NH_3 + 2H$. The hydrogen is oxidized by the manganese dioxide about as follows: $2H + 2MnO_2 = H_2O + M_2O_3$. You can renew the battery to a certain extent by passing a reverse current through it, as if it were a storage battery, or by pouring a strong solution of potassium permanganate into the porous cup, after draining it. Heating will not restore the binoxide.

(6058) M. S. Powell asks: 1. When the motor described in SUPPLEMENT, 641, is provided with a cast iron field magnet, can it be run as a dynamo to charge storage batteries? A. While the motor in question could be run as a dynamo, we do not recommend it. 2. If so, how many will it charge? A. It might charge two cells. 3. Which is the best form of storage battery to run small electric lamps—one with plates or made as described in SCIENTIFIC AMERICAN, vol. lxii, page 148? A. We advise the purchase of storage batteries rather than attempting to make them at home. The one you refer to is not suited for lampwork. 4. How many six candle power lamps will six cells of storage battery made like those described in SCIENTIFIC AMERICAN, vol. lxii., page 148, run, and for how long a time? A. Allow one square foot of immersed positive plate for four candle power for ten hours.

(6059) F. W. B. writes: Having been a subscriber to your valuable paper, the SCIENTIFIC AMERICAN, for the past fifteen years, permit me to ask for solution of following, through your columns for that purpose: We have a stand pipe here one hundred feet high and twenty feet in diameter. I wish to know how many horse power I may expect from a six inch pipe at bottom of stand pipe, provided same is filled with water the whole 100 feet. Please give your method of figuring the same for different sizes of feed pipe. A. The spouting velocity of water under a 100 foot head is 4,812 feet per minute. If the total power from a 6 inch pipe near the stand pipe is required (no length of pipe or method of developing power being stated), the 6 inch short pipe will deliver 944 cubic feet of water per minute and will empty the stand pipe in 69 minutes. If the stand pipe is kept full, you will have 150 horse power from the flow; or you will have 75 horse power for 69 minutes if there is no inflowing water. This shows the necessity of definite statement on the part of inquirers as to what they want. 0·16 of a cubic foot of water discharged per minute under a 100 foot head is equal to 1 horse power. The volume of discharge and equivalent horse power are as the squares of the diameters of pipe or nozzle, so that a 3 inch nozzle on the 6 inch pipe will discharge 238 cubic feet of water per minute with 37 horse power. A 2 inch nozzle will discharge 104 cubic feet per minute with 16 horse power, or by dividing any required horse power by the decimal 0·16 gives the quantity of water in cubic feet per minute. To ascertain the size of nozzle for any horse power, divide the spouting velocity per minute by the quantity of water required in cubic feet per minute. Divide 144 by this product, which will give the area of the nozzle in square inches.

(6060) W. S. asks: 1. What is the chemical composition of sea water, and what is its electric action in relation to earth electricity? A. Principally water and sodium chloride. The following is the analysis of water from the British Channel:

Water	964·745
Sodium chloride	27·059
Potassium chloride, etc.	8·196
	1000·000

By itself it has no electric action. 2. Will the air pressure be the same upon a hollow or a solid body of identical shape and dimensions if a vacuum is created in the former, as, for instance, an exhausted electric lamp bulb or a solid piece of glass of same shape and size? A. Yes. 3. Taking a cylindrical box, open at one end, with a well fitting piston closing the opening, and exhausting air in box, I get the full atmospheric pressure on outside of piston, do I not? A. Yes. 4. What is the air pressure at sea level per square inch? A. About 14·7 pounds per square inch, varying continually. 5. Will a vacuum vessel, if immersed in water, have to overcome more resistance than if it were filled with air at atmospheric pressure? A. No.

(6061) M. A. McG. writes: Is impure air heavier than pure air, and why? The point in question is, where is the proper place to open a ventilation flue into a room for the purpose of carrying out the foul air? A. Impure air, owing to the presence of carbon dioxide gas, is often a little heavier than pure air at the same temperature. But as impure air in rooms is apt to be heated, by being exhaled from the lungs or by being produced from gas flames, it is lighter generally than the pure and colder air. Consequently, it accummulates near the ceiling and is quickest removed by a ventilator placed there. But here another trouble comes in. A ventilator near the ceiling may cause a draught through the room and leave much of the contents ventilated imperfectly. We suggest Billings' "Ventilation and Heating," $6.

(6062) X. Y. Z. asks: 1. Would it make any difference if you were to put the parts of a battery, *i. e.* the carbon and zinc, into a large tank or into the glass jar which belongs to the battery, each having the same solution in proportion? A. It would make no difference. 2. And would it make any difference if the carbon and zinc were placed as far as possible away from each other? A. It would increase the resistance up to a certain distance after which the resistance would be constant. 3. What would be the resistance of a regular bell wire about one-sixteenth of an inch in diameter and 100 feet long? A. About 0·16 ohm.

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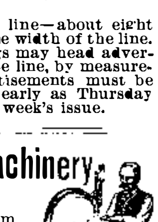

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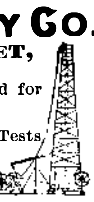

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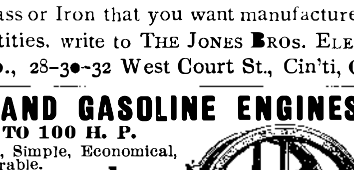

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