Inquiry No. 803.—For dealers in small bevel gear wheels in large quantities and of special dimensions.

Inquiry No. 804.—For a boiler run by crude petroleum, gas or gasoline.

Inquiry No. 805.—For manufacturers of novelties.

Inquiry No. 806.—For machinery for the manufacture of macaroni.

Inquiry No. 807.—For a machine for automatically cutting and shaping sticks.

Inquiry No. 808.—For dealers in powdered mica.

Inquiry No. 809.—For manufacturers of second-hand core drills.

Inquiry No. 810.—For bluing in dry paper form in quantities.

Inquiry No. 811.—For manufacturers of water regulators attached to the meter to control pressure.

Inquiry No. 812.—For manufacturers of can labeling machines,

Inquiry No. 813.—For manufacturers of sponge in sheets or shapes to order,

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 This is for our information and not for publication.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.

(8199) J. E. H. asks: 1. How to tin a soldering iron. A. File the bolt clean over the part to which the tinning is to be applied. Wet this part with soldering fluid. Heat the bolt till it is hot enough for use and rub it into solder placed upon a piece of tin. If this does not secure an even coating, heat the bolt again and attend to the bare spots in the same manner as before. If you use a soldering pot, you can keep sal-ammoniac on top of the solder, and dip the iron into the solder through the liquid. 2. How to magnetize steel so as to use it as a tack hammer. A. Forge the hammer of good tool steel and harden the ends. Then magnetize by a dynamo or by another magnet in any of the modes which have recently been described several times in this column. 3. Some process for hardening steel and also be tough. I want to know this, as I use chisels in my work. A. We fear you are asking an impossibility. Woodworking chisels are tempered so high that they are of necessity brittle. If they were tempered low, they would be too soft to hold an edge.

(8200) E. T. asks: 1. In any form of magnet does it increase the magnetism to any practical extent by winding near the poles, all conditions being equal? A. All conditions being the same, the magnetizing force is proportional to the number of ampere turns, without reference to the arrangement of the turns. But the length of the circuit affects the number of lines of force inversely. The longer the circuit the fewer the number of lines. The form of the magnet must be determined by the space at one's disposal, and the circumstances. 2. Does it increase the magnetism by spreading the winding over a larger area than by winding in a bunch? A. A turn of wire near the core is very much shorter than one further away. Hence it requires less copper if the magnet is made longer. Here a balance must be struck between length and diameter, according to the particular case. 3. How can I make a depolarizing salt cell? A. All closed circuit cells have depolarizers; the Daniell's or the gravity are the most constant of these. See SUPPLEMENTS Nos. 157, 158, 159, price ten cents each. Sulphate of copper is the depolarizer used in these cells. 4. Can the speed of a motor be controlled by allowing the current to pass through part of the winding on the field and switching on the rest as required? A. To a certain extent.

(8201) F. M. asks: Can you inform me how to make a good dry battery, or where I can get a book on the same? A. Consult SUPPLEMENTS Nos. 792 and 1001, price ten cents each.

(8202) A. B. C. asks: Where and at what price can I get a book treating in scientific fashion such recent advances in electricity as wireless telegraphy? If the book also contains such matters as the X-ray, so much the better. A. We can send you Fahie's "History of Wireless Telegraphy," price $2 by mail; Tottone's "Radiography," price $1 by mail; Meadowcroft's "A B C of the X-ray," price $1 by mail; "Experimental Science," $4.

(8203) C. D. C. writes: In the making of a barometer I have tried your suggestion of placing wax in the bottom of the mercury cistern for the purpose of excluding air from the tube at the instant of inverting it. My tube having a bore of 1/8 inch or less, the wax plugged it up entirely. I would suggest cutting a small square of leather from a kid glove, of a size to amply cover the end of the tube. With a heated table knife melt beeswax into this patch until it is saturated, leaving no excess of wax on the surfaces. Stick this patch on the end of the tube, turn the empty cistern down over it so that the patch shall be safely held between the tube and the bottom of the cistern. Hold securely and reverse carefully. When in the upright position pour mercury into the cistern until it is one-third or one-half full; then, with a needle, get hold of a corner of the kid, and by careful manipulation get it from its place on the tube. There is no difficulty in this method. The filling of a barometer tube is a rather troublesome operation by any ordinary process. I have found the following method quite simple and convenient: Provide first a perfectly straight iron (not brass or copper) wire somewhat longer than the tube, and much smaller than the bore of the tube. Next roll up a small funnel of stiff writing paper and pin it together. Make the small end fit closely around the tube, then with a heated table (or other smaller) knife seal the lap of the paper with beeswax and fill between the paper and the glass with the wax. If this work is done near a stove or radiator the wax will work better and adhere more surely. By placing a teaspoonful of mercury at a time in the funnel, and then using the wire as a plunger within the tube, the air gets out and the mercury in without trouble or loss. A. These suggestions are very practical. We would add that it is usual to attach to the bottom of the iron wire a piece of soft leather or cloth to act as a scraper and detach the air bubbles from the glass as the plunger is drawn up. Thus the air is almost completely removed as the tube is filled. There is, however, no method of getting rid of air completely and with certainty except to boil the mercury in the tube itself. The trouble with the wax could be avoided by using harder wax.

(8204) A. K. D. asks: 1. Can I learn what kind of wire, what size, and how much of it should be used to make a very high resistance, say to carry 15 or 18 milliamperes, suitable for battery purposes, from 2 to 8 volts? A. To obtain the current which you wish at the pressures you specify will require resistance as follows:

18 milliamperes at 2 volts...111 ohms.
15 milliamperes at 2 volts...133 ohms.
18 milliamperes at 8 volts...444 ohms.
15 milliamperes at 8 volts...533 ohms.

This does not take into account the resistance of the external circuit, outside the resistance box, an element which we do not know. You can allow for this and deduct from the resistances given above. Probably No. 34 German silver wire will carry the current without overheating. This has about 0.3 foot per ohm. About 180 feet may be taken and made into a variable resistance with, say, 10 points. You will then have the range you desire, with a finer adjustment than you specify. SUPPLEMENT No. 1210, price ten cents, describes such a construction of rheostat. 2. In answer to query 8088, March 9, 1901, in reference to lightning rods, you say: "They act as a path from the earth up into the clouds to neutralize electricity before lightning strikes." Would not rods do that part better if run up much higher than they usually are on buildings? Also if rods were thickly distributed over the country sufficiently high, could not thunder storms be altogether avoided or prevented? A. With reference to preventing thunderstorms by numerous lofty lightning rods, we fear you cannot succeed. The suggestion has been made to dissipate tornadoes in this way, but it is not possible to provide points enough to carry sufficient electricity into the upper air to accomplish the result. Nature's dynamos can generate faster than man's rods can neutralize the product.

(8205) W. H. W. writes: In one of your late issues of the SCIENTIFIC AMERICAN, under "Notes and Queries," it was stated in effect that pure water was a non-conductor of electricity, although even a trace of acid might make it otherwise. So I take the liberty of handing you herewith an account of a recent fire in our city, in the Edison Electric Light Company's power house, wherein it states that "knowing well the conductive features of a stream of water, which is a perfect pathway for an electric current, the firemen elected to fight it with their chemical apparatus," etc. A. The firemen did quite right to take no chances in subduing the fire in the lighting station. Common water is far too good a conductor for their use of it in such a place. The slightest trace of impurity renders it so, whatever the character of the impurity. Yet there is no water which is a "perfect pathway for the electric current." No electrician could have written that statement. Water is often used as a resistance: but it is usually necessary to add salt to the water in order to reduce its resistance still further before it can be so used. This would not be done if water were even a good pathway for electricity, and if water were a perfect pathway for electricity it would not be possible to use it for a rheostat, since it would offer no resistance at all. Perhaps it would be right to say that water does not offer resistance to lightning, since the voltage of lightning is so enormous that any ordinary resistance is as nothing before it. To all ordinary voltages, however, water, chemically pure water, is a non-conductor, and by that term we do not mean water good enough to drink, but water containing nothing else but H_2O, water in the sense in which a chemist uses the term, pure water. Thompson, in his "Elementary Lessons in Electricity," gives the resistance of "pure water" as 26,500,000,000, when the same quantity of copper would have a resistance of 1.57. If pure water is not a non-conductor, what is it?

NEW BOOKS, ETC.

PRACTICAL ELECTRO-CHEMISTRY. By Bertram Blount. New York: The Macmillan Company. Westminster: Archibald Constable & Company, Limited. 1900. Pp. 373.

This volume, as its title indicates, deals with the practical side of one of the youngest and most promising of modern industries—electro-chemistry—and shows the advantages gained in many instances by its use. An introductory chapter on the general principles of the science is followed by chapters on electro-chemical processes which have been already or are likely soon to be turned to industrial use. A review is made of the electro-chemistry of the different metals and a comparison given with the old processes. A chapter is devoted to the reduction of metals in the electric furnace as practised to-day. Another chapter is given up to the electrolytic manufacture of organic compounds and fine chemicals, and the book concludes with a discussion of the efficiency of the existing methods of producing electrical power, in which the carbon and gas cells are described.

This work will be found of much interest to any one interested in the science, and will also be of use as a guide to those engaged in the practical application of electricity to chemistry for industrial purposes.

EXPERIMENTAL PHYSICS. By Eugene Lommel. Translated from the German by G. W. Myers. London: Kegan Paul, Trench, Trübner & Company, Limited. Philadelphia: J. B. Lippincott Company. 1900. Pp. 664. With 430 figures in the text.

This work, by Prof. Lommel, of Munich, is the outcome of a series of experimental lectures on physics, and is noteworthy for the clear, concise exposition of the principles of the science and their constant application to practical everyday uses. It is this practical application of principles that renders this work especially valuable to the beginner, as the principle is firmly fixed in the reader's mind by its practical application. Numerous simple experiments illustrative of principles involved are also given. The subject is presented in its historical sequence as far as possible; and this edition, which is the third, contains a discussion of the Roentgen rays, and a new plate showing the spectra of the sun and of several of the elements. The book contains numerous notes in fine print which still further develop the subject and make it useful as a book of reference for advanced students.

THE CHEMIST'S POCKET MANUAL. By Richard K. Meade, B.S. Easton, Pa.: The Chemical Publishing Company. 1900. 16mo tuck. Pp. 204. Price $2.

A practical handbook containing formulas, calculations, physical and analytical methods for the use of chemists, assayers, metallurgists, manufacturers and students. It is a most valuable book, it is a time saver and is eminently practical. We strongly commend it.

SUR LES NIDS DE LA VESPA CRABRO. Ordre d'apparition des premiers alvéoles. Par Charles Janet.

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