treated. A list of authorities quoted, and of "manufacturers represented in the illustrations" (meaning, we presume, manufacturers' machines and appliances, as we see no portraits) are commendable features. A peculiarly full index closes the work.

ELECTRICITY AND ITS USES. By J. Munro. London: The Religious Tract Society. Fleming H. Revell Company, New York and Chicago, sole agents. 1890. Pp. xv, 208. Price $1.40.

The oft-trod ground of popular description of electrical appliances is traversed in this attractive volume. Its neat shape and numerous illustrations make it a contribution of some value, although in so crowded a field.

PRACTICAL DIRECTIONS FOR ARMATURE AND FIELD MAGNET WINDING. By Edward Trevert. Lynn, Mass.: Bubier Publishing Co. 1892. Pp. 113. Illustrated. Price $1.50. No index.

This book is of interest now when so many amateur electricians are experimenting with motors. The directions for winding, while not going very deeply into the subjects of sizes for given power, etc., are clear and simple, and so expressed as to be understood easily. The last portion of the work, a little less than one half, is devoted to an outline of the principles of commercial motors and dynamos, and contains a few useful tables.

PRACTICAL CENTERING. By Owen B. Maginnis. New York: William T. Comstock. 1891. Pp. 80. Illustrated. Price $1.50. No index.

The hand of the practical builder and constructor appears in the pages of this book. The thoroughly practical cast of its text and the many useful hints scattered through it make it useful reading for all who are engaged in the class of engineering work of which it treats. The concluding chapters on house carpentry are excellently conceived and put before the reader.

The Shoe and Leather Reporter Annual for 1892 is a volume of nearly 750 pages. The main portion of the book is a directory of the boot and shoe manufacturers, tanners, dealers in leather and findings, hides, furs, etc., and manchinery manufacturers, in the United States and Canada, with names of prominent firms in other parts of the world. It also has particulars as to the organization of a number of trade bodies in different cities, and various other matters of interest in the shoe and leather trades. Published by the *Shoe and Leather Reporter*, New York.

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.

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.
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.

INDEX OF NOTES AND QUERIES.

(4116) F. E. H. asks (1) Is there any way to oxidize nickel? A. To oxidize nickel give it a thin coating of silver and oxidize with sodium sulphide solution, or try dipping the nickel into a solution of mercurous nitrate and then treating with sodium sulphate solution. 2. How is etching done on souvenir spoons? A. For silver etching we refer you to the SCIENTIFIC AMERICAN, No. 15, vol. 65, query 3445.

(4117) P. B. W. asks: 1. Will you publish how to cure a cigarette habit? I have been a slave to it for the last 5 years. A. Quit the dirty habit at once and forever. 2. What is good to take the pain out of my breast that the nicotine has made? A. Stop smoking. 3. Is there a substance that you can put in your tobacco that will kill the nicotine? A. No.

(4118) W. R. B. asks: 1. What size wire should I use for a telegraph relay magnet? A. Use No. 32 or 34. 2. Of what sized iron should I make my iron core? A. ⅜ inch diameter and 1¼ inch long. 3. How long and thick should the wire coils on the relay cores be? A. The length of the core and 1¼ inch outside diameter. 4. Please state some way of softening cores? A. Heat them to a cherry red and bury them in ashes overnight. 5. What kind of iron should I use? A. The softest wrought iron. 6. What size wire and coils should I use on my sounder to work on short circuit, on a circuit of two or three miles? A. No. 24 for local and No. 32 for line. 7. If I made the parts of my instrument of iron, would it be better to temper the iron or leave it soft, to give the best sound? A. If you use iron, leave it soft. For all parts except the magnet cores, yoke and armature, brass is preferable to iron.

(4119) T. C. S. writes: 1. What chemical could I put into a glass and let dry and in a little while, by pouring water or some other chemical into glass, turn it (the water or chemical) black or any different color? A. For black add a little nut galls and iron sulphate, both in powder. For blue use ferridcyanide of potassium in place of the nut galls. Excellent effects may be produced with aniline colors in very small quantity. 2. Would a 40 ohm telegraph sounder work with two batteries on a line of ten or fifteen feet? If not how could I remedy it? A. Yes; but it should have more battery. 3. How do you make the solution of a gravity battery? A. Use pure water, and drop the crystals of copper sulphate into the bottom. A few teaspoonfuls of salt or of sodium sulphate may be dissolved in water and added to start the battery.

(4120) J. M. writes: I desire to learn of some absorbent that can be used in connection with the storage of certain perishable products, such as eggs. I want to find something that will absorb gases and odors, without giving off any odor itself. You are aware, no doubt, that in machine storage, it seems necessary to keep rooms tight, and consequently any gases given off are confined in the rooms. It is this I want to get rid of, as it seems to affect the articles of the more delicate kind of perishable merchandise. A. We would suggest the use of a strong solution of potassium permanganate exposed in shallow vessels. Bone charcoal would also have a good effect.

(4121) J. B. says: 1. He has been trying aristotype paper, and succeeds well except when mounting. After printing and toning I throw the prints into cold water and wash in several waters for two or three hours. I use starch paste new made, but perfectly cold and thick enough to be stiff when cold. I take the print from the water and lay face down on glass and put blotting paper on it, and that takes away all water. I then brush paste over the print carefully, taking care to cover every part of it. I then lay the print on the mount and squeeze it down perfectly flat. I generally wipe off with wet white cloth. I often use a handkerchief, wringing it as dry as possible before using. It is now all right to all appearance. If I place them between blotters to dry, the paper makes them woolly, for it sticks to the blotting paper. If I lay them out on a table to dry, they get along all right till they get pretty dry, then the corners begin to turn up, and sometimes the sides leave the mount too. The man I buy my paper from says to treat the paper as albumen paper. I have tried it every way, and I have lots of trouble with it, and am a little doubtful about it. Please send me a good formula for toning aristo paper, also directions for mounting and burnishing. A. A better mounting paste than starch for aristotype prints is:

Nelson's No. 1 photo. gelatine	4 ozs.
Water	16 ozs.
Glycerine	1 oz.
Alcohol	5 ozs.

Dissolve the gelatine in warm water, then add the glycerine, and lastly the alcohol. This is said to prevent cockling. Alum should be used in the toning and fixing solution to harden the surface. A combined toning and fixing solution is made up as follows:

1. Hypo	10 ozs.
Add water to make	36 ozs.

When dissolved add 4 ozs. of powdered alum.

2. A. Sulphocyanide of ammonia, c. p.	1 oz.
Dissolved in water	2 ozs.
B. Dry chloride of gold, c. p	15 grains.
Chloride of ammonia	60 grains.
Dissolve in water	2 ozs.

Add B to A in small portions, shaking after each addition till the precipitate formed is redissolved, then filter. This solution should be clear and colorless and be kept in a yellow bottle.

3. Nitrate of lead	90 grains.
Water	2 ozs.

Different tones can be made by various combinations of the three solutions.

Warm tones.	No. 1	8 ozs.
	No. 2	2 ozs.
	No. 3	2 drachms.
	Water	6 ozs.
Purple tones.	No. 1	8 ozs.
	No. 2	3 ozs.
	No. 3	4 drachms.
	Water	5 ozs.
Cold tones.	No. 1	8 ozs.
	No. 2	4 ozs.
	No. 3	4 drachms.
	Water	4 ozs.

The bulk of the solution may be lessened by using one-half or one-quarter the proportions above stated. After the prints are dry, and before burnishing, rub the following lubricator over the surface:

Cetaceum (spermaceti)	10 grammes.
Castile soap	10 grammes.
Alcohol	1 kilogramme.

This will give a good gloss. 2. Are the roller burnishers ahead of the other kind? A. They are considered superior. 3. The other day I sensitized some albumen paper with nitrate of silver, and after printing and toning I found it all covered with little blisters about the size of a pin head; at least they seemed to me to be blisters. The paper looked like pebbled leather. Was it my fault or the fault of the paper? A. Blisters generally occur when the solutions are of uneven temperature. All solutions should be between 70° and 80° F. Make the fixing bath one ounce of hypo. to eight of water, and to each gallon of this add two ounces of alcohol and two drachms of ammonia 0·880°. This is said to prevent blisters.

(4122) Young Electrician asks: 1. What number of the SUPPLEMENT contains the construction of the electroplating outfit? A. See SUPPLEMENT, No. 310. 2. What becomes of the energy that is employed in splashing water in a churn? A. It is dissipated in the form of heat. 3. How are storage batteries constructed, and how many cells would it take to light eight 16 candle power lamps through an evening, the plates in the cells to be 10 in. by 8 in. by ⅛ in.? A. Consult SUPPLEMENT, Nos. 322, 677, 685, 342, 426, 455. It will require 11 cells for 20 volt lamps.

(4123) H. S., A. L. S., and others ask how to restore a meerschaum pipe which has been burnt. A. Place corks in both the bowl and stem hole of the pipe, and place for one minute in boiling milk, if the pipe is to be slowly colored and hard, and for the same length of time in boiling beeswax, if the pipe is to be colored quickly.

(4124) G. D. C. asks: 1. Can the simple electric motor described on page 498, "Experimental Science," be run by the gravity battery? If so, how many cells would it require to run the motor at 500 revolutions per minute? If the gravity battery will not run the motor, how many cells of Dr. Gassner's dry battery will it take to run the motor, or will it run it at all? A. Neither the gravity nor the dry battery is suitable for running the simple motor. The motor has very low resistance and requires a battery of low resistance. 2. If the motor be connected up as a dynamo, or as the motor should be and run at about 500 or 1,000 revolutions per minute by foot power, would it give a current of electricity which could be felt by any one, without an induction coil? A. The motor does not act well as a dynamo. It generates only a very slight current. For a dynamo, wind the armature and field magnet with finer wire and use soft cast iron in the field magnets.

(4125) Tel. writes: I am making telescope as described in "Experimental Science." I have an acromatic objective glass 2¼ in. diameter, 44 in. focus. The other glasses are eye lens, ¾ in. focus, field lens 2 in. focus. Should I have tube 40 in. long? I had already made the tube before I got glasses, and it is 32 in. long. Will that do as well? A. The 32 in. tube will answer. You can make out the length of the tube by means of a draw tube.

(4126) M. D. writes: 1. I am making the motor described in SUPPLEMENT, No. 641, and would like to know if the core of the armature could be made of a coil of sheet iron instead of the wire? Would it give as good results? A. Sheet iron will not answer as well as wire. 2. Would this same armature do for other motors with field magnets of solid iron instead of Russia iron? A. Yes. 3. How many cells of storage battery would it require to run this motor, and how many gravity cells will be required to charge the storage battery? A. Two cells of storage battery. The gravity battery is not suitable for running the motor, but will answer for charging the storage battery. 4. What is the least number of volts required to run this motor? A. Four. 5. What size dynamo would this motor run? About how many lamps would the dynamo light, each about ten candle power? A. A very small one. So small in fact, that it would not be of much account practically. It is poor policy to run a dynamo by an electric motor driven by batteries. Better make use of the battery current, which is much greater than you could produce in the manner suggested. You might possibly run one or two lamps of smallest size. 6. Would this motor run a 16 ft. canvas boat? How could the speed be regulated? A. Yes; slowly. You would hardly need a speed regulator. The regulation, however, can be effected by introducing more or less resistance in the circuit. 7. Could this motor be made more powerful by increasing dimensions? A. Yes; but we do not advise basing the calculations for a larger motor on the dimensions and proportions of this. 8. In what number of SCIENTIFIC AMERICAN SUPPLEMENT would I find a description for simple dynamo? A. Nos. 161 and 600. 9. How could the battery be fixed to keep it from splashing out by the movements of a boat? A. The battery may be provided with a close fitting cover having a small vent tube.

(4127) H. M. T. asks: Can you give instructions for making a Ruhmkorff coil? A. Consult SUPPLEMENT, No. 160.

(4128) W. A. H. writes: 1. I have a glazed earthenware vessel, the right size for a porous cup, but know of no way to take off the enamel. Could you suggest one? A. The glaze cannot be removed. Better purchase your porous cells. They cost very little. 2. I have a single fluid four-cell battery, each cell consisting of a number of electric light carbons with a leaden ring cast around one end and a rod of zinc, well amalgamated in the middle; inside is solution of salt and water. After being worked through a door bell a few days the current diminishes, but the difficulty is removed by cleaning the zincs. Even then the current does not exceed two and one-half volts. A film seems to come over the zincs. Could you tell me of any way to get more current without so much trouble? Have tried sal-ammoniac, but the current does not increase. Is the zinc surface too small? A. Convert you battery into a Fuller battery by placing the zinc in a porous cell having mercury in the bottom, into which the zinc dips. Place bichromate solution outside the cell and water inside. The carbons will, of course, be immersed in the bichromate solution. A current is measured by amperes, not by volts, hence your characterization of your current is meaningless.

(4129) H. A. A. asks: 1. Why is the induction coil described in "Experimental Science" wound as two coils? A. To prevent the passage of sparks from one end of the coil to the other. 2. I want to make an induction coil about 4 inches long by 2 inches in diameter; will a ½ inch core be large enough? A. The core will do. 3. How much and what size wire will I require? A. Use two layers of No. 18 in the primary, and fill the spool with No. 36. 4. I saw a core made inside of a brass tube, and to decrease the current the tube and core were both pulled out. Was this right or should not the core be stationary? A. It is right to have both the brass tube and the core movable. The brass tube may be omitted if the core is movable. 5. How can I splice some pieces of No. 26 wire together to use on an induction coil? A. Twist it together neatly and solder with soft solder, taking care to wash off all traces of soldering fluid to prevent corrosion. 6. Is there a SUPPLEMENT through which I can get some hints on making an induction coil like the above? A. None that gives other information than that contained in "Experimental Science." 7. Please make the following from "Experimental Science," page 550, clearer. A piece of quite thin brass should be bent together in a U form, and the wire should be allowed to pass through the channel thus formed. A. The U shaped piece of metal is designed as a guide. It rests on the coil while the winding progresses and the thickness of the metal determines the space between the convolutions.

(4130) J. J. O'D. asks: How to work Mushett steel to the best advantage, and how to temper it. A. Work Mushett steel in the same manner, and with the same care, as high tool steel. Must not be heated beyond a full red. Requires no tempering. When the tool is finished under the hammer, lay it down to cool. Sharpen as other tools on the grindstone or wet emery wheel.