man has won an extensive fame by his researches in this special line. The merit and value of the book depends largely on his original investigations. Afterthe subject of the equilibrium of machines is disposed of, the subject of friction and hurtful resistances occupies much of the space. Rolling, sliding, journal, tooth, and chain friction, usually complicated subjects, are here disposed of by the wonderfully practical methods of Professor Herrman's graphics. Belt gearing and practical examples with some concluding remarks complete the text. The translator's work is well done, and some notes by him add to the clearness of the text. Eight folding sheets of plates are used to illustrate the problems.

PRACTICAL ELECTRIC LIGHTING. By A. Bromley Holmes. London and New York: E. & F. N. Spon. Pp. 183. $1.

This book presents in simple form a good many of the most interesting facts touching the especial department of electrical work to which it is devoted, the final chapters discussing the motive power and the cost of electric lighting.

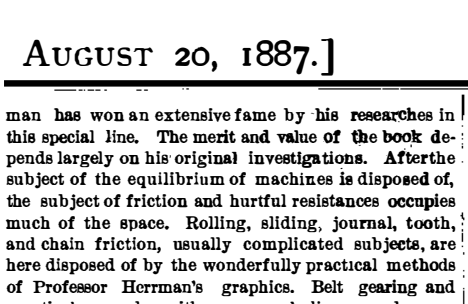
* * Any of the above books may be purchased through this office. Send for new catalogue just published. Address Munn & Co., 361 Broadway, N. Y.

## 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 This is for our information, and not for publication.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.

(1) F. W. (Vermont) asks (1) the best way to make a sun dial, to fasten on the side of the house. A. The dial must have its plane due east and west, and perfectly vertical by plumb line. The style should correspond with the polar axis of the earth, and for your latitude (44° 50′) the style should be nclined to the face of the dial 45° 10′. The hour lines should be laid off with a protractor from the side of the style each way, as per sketch, in which Fig. 1 represents




a plan and Fig. 2 a section through style. Such a dial keeps only mean time, and you will have to consult almanac as to when the sun is fast and slow. 2. The best cement to mend rubber coats and boots. A. For mending rubber goods, use rubber cement, which can be obtained from the dealers in rubber goods. See SUPPLEMENT, No. 158, for numerous cements.

(2) Carter wishes to know how to free his pond from the little plant called "duckmeat." A. It would be a difficult matter, if not an impossibility, to free the pond entirely from these plants without the addition to the water of some substance that would destroy all plant life. The "duckmeats" are constituted for living in ponds that sometimes dry up, and hence have great vitality, and will revive on the application of moisture after being apparently dried up for some time. They are propagated by lateral buds that form new plants, and hence multiply very rapidly. There is no better method of keeping the plants in subjection than the one that you have used. If you have ducks, give them access to the pond, and they will aid in the work of destruction, since they are very fond of the plant, and this circumstance gives the latter its common name. In the case of a fish pond, the presence of the duckmeats is rather beneficial than otherwise, since they become a depository for the larvæ of insects to an extent almost incredible, and thus afford an abundant supply of food for fish.

(3) D. W. F. desires a good receipt to polish pianos. A. Add to 1 pint of shellac varnish 2 tablespoonfuls of boiled oil; the two to be thoroughly mixed. If you want the work dark, add a little burnt umber; or you can give the work any desired shade by mixing with the shellac the proper pigment in the dry state. Apply the shellac, thus prepared, with a small bunch of rags held between your fingers. In applying it, be careful in getting it on smooth and even, leaving no thick places or blotches. Repeat the process continually until the grain is filled and the work has received sufficient body. Let it stand a few hours to harden, and then rub your work lightly with ground pumice stone and oil, applied with a rag. A very little rubbing is necessary, and this is to be followed by the cleaning of the work with rags as dry as possible. With a piece of muslin wet with alcohol go over the work two or three times for the purpose of killing the oil. Have ready ¼ pound of pure gum shellac dissolved in one pint of alcohol (95 per cent). With this saturate a pad made of soft cotton covered with white muslin, and with this pad go over the work several times.

(4) J. H. D. asks: 1. What was the first railroad built in the United States, and in what year was it built? A. The first American railroad was built in 1825–26, and used for the purpose of transporting granite from the quarries near Quincy, Mass., to tide water. 2. How to clean buckskin riding trousers? A. Make a solution of weak soda and warm water, rub plenty of soft soda into the leather and allow it to soak for two hours and then rub it well until it is quite clean. Afterward rinse thoroughly in a weak solution of warm water, soda and yellow soap. When completely rinsed, dry well and quickly in a rough towel, then pull it about and brush it well. It will never, however, be as soft and good as it was at first.

(5) P. C. desires (1) a good receipt for a black bright varnish for harness. A. Grind ivory black into a quick-drying body varnish. 2. How yolks of eggs can be preserved for tawing purposes. A. Drive the moisture off by evaporating them *in vacuo*, same as the white of egg is prepared. 3. How vegeto-animal court plaster is made? A. The Pharmacopœia gives many receipts for the different varieties.

(6) W. B. P. asks: 1. Are wall papers containing arsenic usually considered deleterious to health? A. They are. 2. How are they supposed to affect or act on the human system? A. Dyspepsia, neuralgia, pains in the bones and joints simulating chronic rheumatism, headache, general debility, etc., are symptoms which attend chronic arsenical poisoning. See Taylor's "Medical Jurisprudence." 3. Are the dark and olive greens usually prepared with arsenic or arsenite of copper? A. Not generally, but occasionally; analysis is always necessary to determine the presence of arsenic. 4. Is the usual test—dissolving the color from the paper with aqua ammonia, and testing with a crystal of nitrate of silver—considered practically correct? A. It is an inferior test.

(7) F. D. H.—The whole amount of wheat produced in the world in 1885, calculated in bushels of 60 pounds, was 1,998,997,635 bushels. The United States wheat crop for three years past has been between 450 and 495 million bushels each year.

(8) B. M. L. asks how typewriter ribbons are made, such as are used on the Remington and other such machines. A. Take vaseline of high boiling point, melt it in a water bath or slow fire, and incorporate by constant stirring as much lamp black or powdered drop black as it will take up without becoming granular. If the fat remains in excess, the print is liable to have a greasy outline; if the color is in excess, the print will not be clear. Remove the mixture from the fire, and while it is cooling mix equal parts of petroleum benzine and rectified oil of turpentine, in which dissolve the fatty ink, introduced in small portions, by constant agitation. To apply, wind the ribbon on a piece of cardboard, spread on a table several layers of newspapers, then unwind the ribbon into convenient length, and with a soft brush rub the ink, after agitation, well into the interstices of the ribbon with a stiff tooth brush.

(9) A. D. asks how tracing cloth is made and the composition of the varnish put on its tissue. A. Linen is first provided with a coating of starch and then with an application of benzine and linseed oil. It is finished by being smoothed between polished rollers.

(10) N. D. asks: How is the velocity of the cannon ball at the muzzle of the gun ascertained? A. By an electric apparatus, the ball breaking a circuit at different distances, and thus recording the time of passing through certain spaces. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 177, for description and illustrations.

(11) F. B. desires a receipt to make green paint for Venetian blinds that will stand the heat of the sun without blistering. A. Rub 2 parts of white lead and 1 of verdigris with nut oil or linseed oil varnish, mixed with oil of turpentine, and dilute both colors with ordinary drying oil.

(12) F. M. W. asks: 1. Is a brake block pressing against three feet of the tire of a wagon wheel practically any better than one pressing against two feet? A. There is nothing gained, except there is a difference in wear by using a long brake block. The friction for a given pressure is the same, whether the block is one foot or three feet long. 2. Suppose a 20 foot bar of iron lying on the ground. A lifts one end up three feet, B then goes to other end and raises it level with first end. Which man lifts most, and why? A. The thrust of the bar against its ground bearing makes the lift of B a little heavier at starting to raise the bar.

(13) M. & S. desire a receipt for making papier mache and cellulose. A. There are two modes of making papier mache—either by gluing or pasting different thicknesses of paper together, or by mixing the substance of the paper into a pulp, and then pressing it into shape by moulds. Cellulose is woody fiber, and is the basis of paper.

(14) A. C. L. desires (1) good receipt for making plaster Paris casts, in imitation of bronze. A. See answer to query 1 in SCIENTIFIC AMERICAN of April 9, 1887. 2. Please explain the cause of rock salt throwing off water as it does. A. It is due to the chloride of magnesium, which attracts moisture and drains away.

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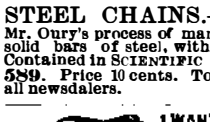
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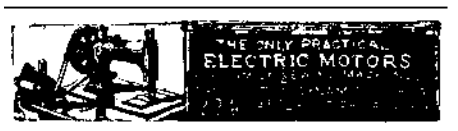



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