Notes & Queries

HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless accompanied with the full name and address of the writer.

Names and addresses of correspondents will not be given to inquirers.

We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

Correspondents whose inquiries do not appear after a reasonable time should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them.

Persons desiring special information which is purely of a personal character, and not of general interest, should remit from $1 to $5, according to the subject, as we cannot be expected to spend time and labor to obtain such information without remuneration.

Any numbers of the SCIENTIFIC AMERICAN SUPPLEMENT referred to in these columns may be had at the office. Price 10 cents each.

Correspondents sending samples of minerals, etc., for examination, should be careful to distinctly mark or label their specimens so as to avoid error in their identification.

(1) J. W. K. writes: 1. I am thinking of building a very light wagon, to be run by an electric engine. Do you think it practical? A. It would be interesting as an experiment. 2. If so, how large an engine would it take to do the work? 3. Do you think one-half horse power large enough? Where can I get the engine? A. 2 and 3. One-half horse power would not do it. It would probably require a two horse power engine. 4. What would be the cost of a one horse power engine? A. $200 to $300. 5. Will you make an estimate of the cost of running a one horse engine per hour, the electricity to be generated by a battery? A. The cost would depend on the kind of battery and efficiency of its motor; but in any case it would be several times as much as steam.

(2) C. N. N. asks: Would the explosive force of steam and compressed air be the same, everything being equal? A. Yes; the force would be the same. It is the hot water that underlies the steam in steam boilers that is a magazine of energy and the source of the extraordinary destructiveness of exploding boilers.

(3) J. N. W. asks: 1. At what speed should small circular saws, two inches in diameter, be run for cutting brass and iron? A. For brass fifty or sixty revolutions; for iron forty, to be varied according to the size of the article cut. 2. How can I harden these saws without warping? A. Heat the saw to a good red and then place it between two masses of cold iron—the top of a cold anvil and a planed cast iron bench block are good. Unless the saw is over one-eighth of an inch thick, it will be hardened and be straight. If thicker, plunge it into water. In either case brighten it and draw to a low straw. While warm, these saws may be straightened, if warped, by judicious blows of the hammer on an anvil. 3. At what speed should iron be run in the lathe? A. Good results come from a speed of eighteen feet per minute when the iron is clean, the lathe solid, and the tool properly ground and adjusted.

(4) B. F. G. asks: 1. By what means may the human hair be dissolved and the coloring matter separated from it? A. Hair is dissolved by hydrochloric and sulphuric acids; it is also soluble in the alkalies. 2. What is the chemical composition of each of the different pigments of human hair—black, yellow, and red? A. See article on the "Color of Human Hair," p. 1464 of SCIENTIFIC AMERICAN SUPPLEMENT, No. 92.

(5) W. W. asks: 1. Will you please give receipt for varnish used by the famous Italian violin makers on their instruments? A. The following is said to produce a beautiful varnish for violins: Rectified alcohol, half gallon; add six ounces gum saudarac, three ounces gum mastic, and half pint turpentine varnish; put the above in a tin can by the stove, frequently shaking until well dissolved. Strain and keep for use. If you find it harder than you wish, thin with more turpentine varnish. 2. I have tried to make amber varnish, but I find I cannot dissolve the amber. Can you name the best mode of doing so? A. It is soluble in sulphuric acid and in pure alkalies. In making varnish, amber is generally brought into solution by heating it, then adding the oil and finally stirring in turpentine as it cools. 3. Will you also please give directions for making a practical luminous paint? A. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 249.

(6) P. H. M. writes: 1. I want to heat a building 40 x 25 ft. by the exhaust from engine; want to run pipe along both sides and across one end. Can I do it without too much back pressure on piston? A. Yes, have your pipe of ample size and fitted with a back pressure valve (safety valve) which you can load to such back pressure as you wish. 2. Please give rule for finding horse power of high pressure engines? A. See rule in SCIENTIFIC AMERICAN SUPPLEMENT, No. 253. 3. Where can I get a paper that treats mostly on steam engineering? A. There is no periodical published in this country specially devoted to steam engineering. For books on this subject see advertising columns.

(7) F. A. W. writes: If not asking too much would like you to give through your paper, diameters, foci, places of diaphragms, and distances apart of lens for making microscope with power of about 250 diameters. A. For your microscope you will require an object lens of one-fifth in. focus and a Huygbens eye piece of an equivalent of 2 in. focus, or what the opticians call a B eye piece. Ten in. from object glass to eye piece is the general practice, but any distance between 7 and 10 in. will be proper. The objective should be achromatic. In SCIENTIFIC AMERICAN SUPPLEMENT, No. 399, you will find an illustrated article upon eye pieces which will interest you. Also in SCIENTIFIC AMERICAN of June 17, 1882, p. 386, No. 9 Notes and Queries, you will find an illustrated description of two objectives as made for modern microscopes.

(8) G. J. S. asks: How can I find the height of hills above the sea? A. The measuring of the heights of hills and mountains from the level of the sea would be a difficult problem for you to manage, unless you were fairly versed in trigonometry and have a theodolite. The heights are sometimes obtained by means of a barometer; observation being taken at base and then at top of mountain, and the difference calculated. We recommend you to get a book on trigonometry, illustrating the methods for distances and heights.

(9) E. W. S. asks: What size ports to use in a cylinder 2 x 2½ in., as I am making model engine of that size? A. Steam ports ¼ x 1⅛ in. Exhaust, ⅛ x 1⅛ in.

(10) L. B. asks: What horse power is a boiler capable of developing, size of boiler being 10 feet long, 42 inches diameter, and 36 3-inch tubes, with a return flue; and would it be advisable to get an engine 4 or 5 horse power less than boiler, or what proportions would you have to work satisfactorily and economically? A. About 15 horse power. Yes, especially if there is a prospect of more power being required in the future.

(11) C. D. R. asks: Can I heat a room 60 x 20 ft., 9 ft. high, with steam from a 5 horse power boiler on the *same floor*, and in any way get the condensed steam back to feed boiler with? A. If your heating pipes are run above near the ceiling, and the boiler is 6 or 8 ft. lower, yes; otherwise you must trap the condensed water into a cistern or receiver and pump back to boiler.

(12) C. C. S. asks: 1. If there is any rule by which, knowing the stroke and the bore of the cylinder of an engine, you can tell its power? A. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 253. 2. What the relation of foot power is to horse power? We know of no direct comparison of foot power with a horse's power, but the power of 6 men is generally considered equal to 1 horse power.

(13) S. E. R. writes: We have a large cast iron rendering kettle which has a flaw and it leaks now. Will you tell us in your paper what we can do for it? Is there a cement which will stand fire?

A. Iron filings.....10 pts.
Clay.....60 "

These are worked with linseed oil into a thick paste, which is applied after some more linseed oil is added to it. It is then left to dry slowly.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined, with the results stated:

G. L. R.—The sample is pyrite (iron sulphide) in slate.

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