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 indentification.

(1) W. M. asks: Is there any advantage in having a large number of notches in the quadrant for a locomotive reversing lever? Why would not nine or even seven do as well as fifteen, and the quantity of steam regulated by the throttle lever instead of altering the traverse of the valve? A. Of course working steam expansively, to the extent that the work required will permit, is more economical than "throttling," and the greater number of notches are used to adapt the expansion more accurately to the work.

(2) W. M. L. asks whether there is any difference in the effect on the health between the heat of a wrought and that of a cast iron furnace. A. We suppose there is no difference, if the temperature of the radiating surface is the same in both cases. But wrought iron heated by steam is better than cast iron at a red heat.

(3) W. W. writes: Am I likely to damage a steam boiler (8 horse) by painting it outside with coal tar? A. No; not injurious, but better heat it before use, to drive off the higher constituents.

(4) O. H. R. asks how to keep an engine boiler when the engine is not running. A. If the boiler is laid off for a length of time, after cleaning thoroughly fill entirely full of fresh water and close all openings; a little lime thrown into the water will be beneficial. Outside remove all the masonry where it touches the boiler, and paint as well as possible with fish oil.

(5) J. S. writes: 1. I have a lot of sewing machines to redecorate. I use a rubber stamp. Turpentine and all oily substances rot rubber. Could you give me the formula of a size to hold the gold leaf on said machines? They have been japanned and baked. A. A good gold size japan should not act injuriously upon a well vulcanized stamp. 2. Would it require a high temperature to do a good job of japanning? A. Yes. 3. Are there different grades of japan which should require different degrees of heat? Yes. The heat varies with the different grades and makes. 4. What kind of thermometer must I ask for? It must rate over 300 degrees. A. A good thermometer of Fahrenheit's scale, from 32 degrees to 400 degrees, with metal back and well guarded to prevent breaking by the hear. 5. Could you send me the address of an importer of French metal? A. We are not familiar with the term French metal. What is it used for?

(6) F. M. F. asks: 1. Of what is Professor Crookes' radiometer made? A. It consists of a fly or vane having four aluminum arms, to the extremities of which are fixed thin disks of mica blackened upon one side. This fly is poised upon a very fine needle point, and inclosed in an exhausted glass bulb. 2. In what SUPPLEMENT are directions given for making a dynamo electric machine? A. In SUPPLEMENT No. 161. 3. About how much would it cost, how much power would be required to run it, and how many arc lights would it run? A. It would cost about $35, would require ¼ horse power, and it might run one very small arc lamp.

(7) A. G. A. writes: 1. I have made a small induction coil. Will you please tell me through your valuable paper how to make a magnet for the coil by which I can regulate the shock? A. Bind the bundle of wires together with fine iron wire, or inclose it in a thin sheet iron cylinder, and vary the strength of the current by changing the depth to which the bundle is inserted in the coil. 2. Will a solid iron bar do in place of a bundle of iron wires? A. It will not be so efficient as the bundle of wires.

(8) F. T. H. asks: 1. Would it be lawful to make and use a telephone exactly like the one described in SUPPLEMENT, No. 142? 2. Would it be lawful to sell such a telephone? A. 1 and 2. See advertisement relating to telephones in another column of this paper. 3. Will this telephone work 1½ miles? A. Yes. 4. Has the resistance of the telephone bobbin anything to do with the length of the line? A. Within certain limits it makes practically no difference. 5. I understand that the resistance of a telegraph instrument must equal the resistance of the line and battery. When two are used, should the resistance be divided? A. The circuit produced by the telephone is of great intensity, and capable of operating through great resistance. 6. How is it with three or more instruments? A. Three or more instruments may be used in the telephone circuit. 7. Where can I get directions, working draughts, etc., for making a galvanometer? A. In Frick's "Physical Technics," Ganot's "Physics," or any of the moderu elementary works on electricity. You will also find much information on the subject in the SCIENTIFIC AMERICAN SUPPLEMENT. 8. How shall I prepare a carbon plate, in order to solder a metallic connector to it? A. Copper them. This you can readily do in any of the forms of sulphate of copper battery. 9. Would vulcanite be as good as wood for the tube in the center of the induction coil described in SUPPLEMENT, No. 160? A. Probably better. 10. If this coil were excited by the dynamo described in SUPPLEMENT, No. 161, and connected with a 5-strand barb wire fence 600 feet long, would an unpleasant shock be given any one touching the fence in dry weather? A. If the wires were well insulated, yes. 11. Suppose the dynamo described in SUPPLEMENT, No. 161, should be made twice as high, and of double width and thickness, would the proportions be correct? A. Yes. 12. If double magnets were used as in Weston's machine, would the armature have to be enlarged, and, if so, how much? A. If you desire to make a large machine, you would do well to examine the Weston, Edison, or Siemens machine. The armature of these machines are different from that described in the SUPPLEMENT referred to, and are necessarily somewhat larger. 13. What number wire should I wind the magnets and armature with for incandescent lighting, and how many lamps would it light? A. For a machine twice the size of that in SUPPLEMENT, No. 161, wind the armature with No. 16 wire and the magnets with No. 12. It would probably run two or three Edison lamps. 14. Can I get any better design than this for a dynamo, one sufficient for 15 incandescent lights, and if so, please let me know where to procure it? A. See answer to No. 12. 15. What size ports should a 2⅜ x 3½ inch engine have, 60 pounds pressure, 200 revolutions per minute? A. Supply ports ⅞ x 1½ inches; exhaust 5/16 x 1½ inches. 16. At what fraction of its stroke should the steam be cut off to secure the best results? A. Two-thirds. 17. A gasometer rises and falls irregularly, with a 40 foot stroke—how can its altitude be recorded in an office 6,000 feet away? Is there anything in the market for this purpose? A. There is no easy way of doing this. The distance is so great that no mechanical device, unless very well made, and strong, would be accurate. An electrical device something on the burglar alarm principle might be used, contact pieces being placed at intervals on the side of the gasometer.

(9) Perham writes: We have occasion to mark a great number of cotton flour sacks for shipment. Pencil and colored chalk obliterate too freely before reaching destination. Can you recommend something to use for this purpose, and where can it be obtained? A. Try the following: Melt together six parts of tallow soap and six parts of beeswax; when thoroughly melted and mixed add one part of lamp black or Prussian blue. Run into moulds to form crayons of suitable size.

(10) S. T. writes: In SUPPLEMENT, No. 407, page 6,495—the Electric Furnace—how is the electric arc applied to the various crucibles to be effective? A. One of the electrodes is made in the form of a crucible.

(11) P. W. asks: 1. I would like to know what is the best metal to use for insulating electric wire, and how applied? A. Metals are not insulators; gutta-percha, India rubber, and various gums are insulators. 2. What has the size of wire to do with the conductive power, and what metal is best? A. The resistance of a wire is inversely in proportion to its sectional area. Silver is the best conductor. Copper is next. 3. Is lead non-conductor or partial? Lead is a poor conductor. 4. Does the atmosphere absorb any of the electric current passing over wires (in all kinds of weather)? A. Yes. 5. If so, would a perfect insulator prevent it? A perfect insulator would prevent it, but such a thing is not known.

(12) C. R. asks for a good formula for porcelain collodion for transparencies? A. The following from Dr. Vogel's book will probably suit you:

A. Pyroxylin.....1 gramme.
Ether .....40 cu. cent.
Transparent alcohol.....40 "
Left to settle.

B. Magnesium chloride. .....1 gramme.
Alcohol..... .....10 c. c.
To be filtered.

C. Silver nitrate, 20 grammes, dissolved in water, 30 c. c., to which is added alcohol, 70 c. c.
To be filtered.

D. Citric acid, powdered, 18 grammes, dissolved in boiling water, 18 c. c., to which is added alcohol, 162 c. c.
To be filtered.

Six hundred cubic centimeters of solution *A* are poured into a bottle of yellow glass; 50 c. c. of *B* are added and well shaken; next 60 c. c. of *C* are poured in and shaken for five minutes; finally 40 c. c. of solution *D* are added, and the whole is left eight to ten days, when it will be fit for use.

(13) E. H. S. asks for a receipt for a varnish for boots. There is no waterproof varnish that I know of that does not injure the leather.

A. Beeswax.....18 parts.
Spermaceti .....6 "
Oil of turpentine.....66 "
Asphalt varnish .....5 "
Powdered borax.....1 "
Vine twig, black.....5 "
Prussian blue.....2 "
Nitro benzol.....1 "

Melt the wax, add powdered borax, and stir till a kind of jelly has formed. In another pan melt the spermaceti, add the asphalt varnish, previously mixed with oil of turpentine; stir well, and add the wax. Lastly, add the color, previously rubbed smooth with a little of the wax. Perfume with nitro benzol. Apply in small quantities, wipe with a cloth, and brush.

(14) J. W. H. asks: 1. How is nitrate of antimony made? A. According to Ad. Wurtz, the neutral antimony nitrate is not known, but a basic nitrate is obtained by dissolving the antimony protoxide in fuming nitric acid. 2. How is the potassium bichromate solution prepared that is used in the two fluid cells, *i. e.*, bichromate solution in the glass jar with the carbon and dilute sulphuric acid in the porous cup with the zinc? A. Potassium bichromate, 2 parts, dissolved in water, 20 parts, to which is added sulphuric acid, 1 part. 3. Please give me the composition of the cell used in medical batteries? A. Mercuric chloride.

(15) L. S. asks how to prevent steel springs from rusting. Whatever is applied must not crack in bending. A. You do not mention the kind of spring. Oiling might answer in some cases. A thin coat of fine japan baked on would prevent rust. The springs might be coppered.

(16) S. S. asks for the most economical method for using a hydraulic pressure pump to produce the required pressure for a washstand? A. The best method to produce the effect of a city water works is to put a tank in the attic and use the pump for keeping up the supply. If your building is low, so that an elevated tank is not available, you may have an air tight tank upon the same floor and use a force pump for putting water into the tank and an air pump for keeping up the pressure. A pump could be constructed for pumping both air and water.

(17) F. X. A. asks for a good, cheap way to manufacture emery paper. A. In large manufacturing establishments emery paper is made by feeding the paper into a machine, where the glue is rolled upon the paper, and the emery is distributed automatically. The old way is to brush the glue on by hand, then hold the sheet over the emery box and pour the emery over the paper with a shallow pan. The paper must be previously moistened so as not to curl.

(18) O. G. asks whether the beet sugar industry is carried on to any extent in this country, or, if not, whether any experiments have been made in this direction. A. There have been many trials to make beet sugar in this country. They have not been successful. The beets seem to lack the sweetness or sugar principle necessary to satisfy the requirements of the American market. Experiments have been made in Illinois, Wisconsin, and California, which proved unprofitable, also in Delaware and Maine. Address the Commissioner of Agriculture, Washington, D. C., for reports upon the beet sugar interest in the United States.

(19) C. H. M. asks how large and where the largest engine is in this country. A. We believe in the steamer Pilgrim—110 inches diameter of cylinder and 14 feet stroke.

(20) H. A.—Use eight or ten cells of plunging bichromate battery for running a small incandescent electric light. Use twenty or more cells for the arc light.

(21) G. A. L.—At the close of 1882 there were in the United States 15,551 passenger cars, 5,366 baggage, mail, and express cars, 710,451 freight cars of all classes.

(22) J. P. B. asks: What would best dissolve thin paint skins, so as to make them suitable to apply to leaky roofs or around chimneys? A. Dissolve half a pound sal soda in 1 gallon rain water, cover the paint skins with this solution, and then soak them for a couple of days in the mixture. Finally heat them, adding oil to reduce the mixture to a proper consistency for painting, and strain. Benzine may also be used to dissolve the skins.

(23) W. L. T. writes: In SCIENTIFIC AMERICAN, October 27, 1883, is an article in regard to catechu for dissolving boiler incrustation. I wish to know how much catechu to put in a ten horse power traction engine; how to get it in the boiler, and how often would you advise one to use it. A. Dissolve in water and send it through feed pump. The whole process is described in article referred to. 2. Also what is good to keep a boiler from foaming? A. We cannot give you a remedy for foaming till we know the causes; foaming has various causes. 3. How do they tell the horse power of an engine, say an 8 inch bore, 12 inch stroke, 200 revolutions per minute? A. Refer to rule in SCIENTIFIC AMERICAN SUPPLEMENT, No. 253.

(24) H. C. A.—Use ordinary copal varnish, or picture varnish. See answer to query No. 7, SCIENTIFIC AMERICAN for July 7, 1883.

(25) J. V. R. asks: What proportion of gallic acid and sulphate of iron to a quart of water would constitute a good writing fluid? A. The proportion of iron sulphate is generally about one-third that of the galls, and the solid ingredients about one-fourth that of the water. Thus:

	Superior ink.	Inferior ink.
Tinct. of galls	225	62
Iron sulphate	75	31
Gum.	25	31
Water	1000	1000

(26) R. S. writes: I am building an engine 3x3 for a 20 foot steam launch. I intend using an upright tubular boiler, and want to use oil as fuel if possible. Please let me know what size boiler I require, and also the amount of square feet of heating surface, to run my engine at 500 revolutions a minute. Is burning oil practical? And if so, how should lamp be arranged? A. We think you should have a boiler with not less than 50 to 60 feet fire surface, for burning oil. 2. Burning oil has been practiced successfully in the "Oil Region" and on locomotives. 3. The arrangements are varied, but generally the oil is sent into the furnace by a current of steam through an injector, the oil and steam mixing as they pass into the furnace. Steam must be first got up in the usual way.

(27) A. D. B. asks: 1. What size boat will the 4½ horse power engine made by James Leffel & Co. drive up a river? A. Boat 24 feet keel by 6 feet beam by 3 feet 6 inches hold. 2. What would be the size of a screw wheel for the same boat? A. Propeller about 34 inches or 36 inches diameter and 3 feet pitch. 3. How many pounds would the boat carry, and at what rate of speed? A. With engine making 250 revolutions per minute, should make about 8½ or 9 miles per hour in still water, and carry 2¼ to 3 tons according to model and weight of boat.

(28) H. D. asks how many Bunsen cells (two quarts each) will be required to run an incandescent electric light. A. 40.

(29) J. A. K.—First telephone was invented and made by Phillipp Reis, in 1860.

(30) J. L. writes: Could you furnish me with a receipt for making a good sticking gum, similar to that used for envelopes of letters? A. Use the following:

Dextrine... .... 2 ounces.
Acetic acid... .... 1 "
Water..... .... 5 "
Alcohol..... ..... 1 "

Add the alcohol to the other ingredients when the dextrine is completely dissolved.

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