

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 This is for our information, and not for publication.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) R. M. A. asks how to harden small work, such as used in watches, so that it will come out clean and white, or how to remove the black scale, provided it does not come out clean. A. Put soap on the pieces before heating. Use muriatic acid 1 part, water 2 parts, for cleaning the pieces when made black by hardening.

(2) G. Y.—For information on incubators and regulators, see SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 54, 380, 425.

(3) H. H. asks: 1. All other things being equal, what makes the strongest electro-magnet—one composed of three pieces, two cores and back, or one composed of a single bar of iron bent in "horse-shoe" form? A. The single piece of iron would be rather the stronger. 2. How must I wrap this magnet—with wire in sections, or in one winding? A. Sectional winding may be useful as a matter of convenience. We should not recommend it as increasing the power. 3. In the Holtz machine described in SUPPLEMENT, No. 278, are both inductors applied to their respective windows on the same face of the eye glass, or is an inductor first applied, and then the plate of glass turned over so as to lie on its opposite face, and the other inductor then applied? When both plates are in position on the machine, are the inductors—if both are on the same face of the glass—on the face farthest away from the revolving plate, or on the side nearest to it? A. The inductors in the Holtz machine are on the same side of the glass plate—the side furthest from the revolving plate. 4. Will a magneto machine run an induction coil? If so, must a current interrupter be used? A. A magneto machine will run an induction coil without an interrupter.

(4) Wm. asks: Was there ever a time in the last 100 years when a double eagle meant \$100? A. No, but the double eagle of 1849 sells to-day for \$300, on account of its rarity.

(5) F. K. desires a receipt to make beef wine, and iron, as made and sold by the apothecaries. A. Liebig's extract of beef 1/2 ounce av., ammonio citrate of iron 256 grains, spirit of orange 1/2 fl. oz., distilled water 1 1/2 fl. oz., sherry wine sufficient to make 16 fl. oz. Dissolve the ammonio citrate of iron in the water, dissolve the extract of beef in the sherry wine, add the spirit of orange, and mix the solutions.

(6) W. C. asks: What is the difference between a dynamo-electric machine and a magneto-electric machine? A. The dynamo has its magnetic field established by an electro magnet; the magneto, by a permanent magnet.

(7) C. B. N. asks about the "Legion of Honor" of France. A. It is an order founded by Napoleon, May 19, 1802, as an especially honorary recompense for services rendered to the state. The decoration consists of a five rayed star, bearing the imperial effigy and eagle and surmounted by the imperial crown.

(8) W. H. R. asks: 1. What is the speed of Ericsson's Destroyer? A. We believe the trials thus far have not settled this question. 2. Which is considered the best—the Armstrong, Krupp, De Bange, or Whitworth system of artillery? A. Each of these systems has its peculiar advantages. We do not yet know which is to take the lead. 3. What is the rule for calculating the range of a gun, when the velocity and weight of the projectile are known? A. The problems pertaining to projectiles are rather complex, but fully given, with examples, in "A Treatise on Practical Mathematics," Chambers' Educational Course, \$1.50, which we can furnish. The formulas are:

h=Height due to velocity of projection. v=Velocity of projection in feet per second. r=The range required. e=Angle of elevation. g=Gravity=32.2. Then h = -r^2 = 2h sin, 2e

For example: A ball discharged at a velocity of 1,500 feet per second, at an elevation of 24° 36', required the range.

1,500^2 = 2,250,000 = 34,938 = h, and 2 x 32.2

69,376 x 0.756995 = 52,896 feet, or 10 miles. Use the table of natural sines. 4. Have mortars been improved as much in the last twenty years as cannon? A. Mortars are out of date, both shells and solid projectiles being fired from the great guns now made. 5. What is the name of the most powerful war ship at present afloat? A. There is considerable doubt as to which of some three or four of the European war ships would be the most powerful in actual battle, which would give the only practical test. 6. I have a microscope of the Student class. The body and draw tube are not blackened inside. Should this be done? The definition of this microscope is good in the day time, but bad by lamp light. What is the cause? A. The microscope should be black inside. Probably you do not understand the management of the light. We can send you a book, "How to Use the Microscope," by J. Phin, 75 cents.

(9) H. K. B. asks: What size and length of wire would be best to use in constructing the Deprez galvanometer (described in your issue of December 4). If a single magnet of good strength, and 7 inches high, 1/4 inch thick, 1 inch between the poles, and each pole piece or arm of the magnet is 1 1/2 inch in width, be used, could it be made to work well with such a magnet? The galvanometer is to be used in circuits of medium resistance, and to test the relative strength of different battery cells. Is it absolutely necessary to use silver wire to suspend the coil by, and will the deflections be directly proportional to the current strength? Also what is the soft iron cylinder for, and must the iron be very soft? A. The best way is not to depart from the dimensions given, which represent the results of good practice. Your magnet would probably answer. Adhere to the sizes of wire given for the coil. You can only use it on extremely weak currents or as a volt meter. Any attempt to use it directly as an ammeter will destroy it unless the current is very slight. Silver wire is far the best for suspending it. The soft iron cylinder becomes polarized and increases the intensity of the field. It should be good quality wrought iron. The deflections will only be proportional to the current strength when used by the discharge method, and it is not very reliable for this work.

(10) B. F. S. asks: What is the best, but simplest, method of tempering mill picks? Please give us two or three ways of doing same. The smiths here do not have success, and we want a method of doing it ourselves. A. The tempering of mill picks is more a matter of care and observation than any special material used in the process. More picks are spoiled by burning or overheating the corners than by any other part of their manufacture. A slow fire and heating back from the point is an essential feature. Do not draw the edge thin. Leave it a little blunt and grind for the proper edge. Heat to a cherry red, no more at the corners than in the middle. Dip in clear water, and draw the temper to a full straw color. Brighten the edge surface on a grindstone or with emery paper before tempering. See valuable articles on Hardening and Tempering Tools, by J. Rose, in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 95, 103, 105.

(11) C. S. S.—Wood steeped in a solution of copperas becomes harder and more indestructible.

(12) J. F. D. desires (1) a receipt for cheap paint for old shingle roofs. A. Coal tar paint would be the cheapest thing you can use. See a "Recipe for Roofing Paint," in SCIENTIFIC AMERICAN SUPPLEMENT, No. 113. 2. What chemical will make water and coal tar mix? A. You cannot make a perfect mixture of them.

(13) W. L. J. asks best material to put on ropes used in water (fresh), such as boom ropes. Also on ropes used in hauling logs out of boom. A. Immersing the cordage in a solution of 50 or 60 parts water and 1 part corrosive sublimate will tend to preserve the rope. As to use of tar, the best rope is not tarred.

(14) T. J. C. asks: What material is used for a matrix in casting celluloid stereotypes? A. Celluloid should not be cast, but becomes sufficiently soft at 165° Fah. to assume desired forms by pressing, which should be done in a brass mould, also heated beforehand, the article to be cooled off in the mould by cold water. When articles can be punched or pressed from the material, it should be heated in warm water to 100° Fah., to prevent tearing and splintering.

(15) D. P. B.—A mixture of coal tar and plumbago, thinned with turpentine or benzine, makes the best paint for an iron smokestack.

(16) P. M. asks for a paste not liable to be affected by liquids, vinegar, etc., for fastening a small glass disk in a metal cap. A. Boil 3 parts resin with 1 part of caustic soda and 5 parts of water, thus making a kind of soap which is mixed with half its weight of plaster of Paris.

(17) A. J. K. asks (1) a transparent ruby and a yellow colored varnish to cover glass with for photographic purposes. A. Use aniline colors mixed with collodion. 2. How to make a good negative varnish? A. Sandarac 4 ounces, alcohol 28 ounces, oil of lavender 3 ounces, chloroform 5 drachms. 3. What is the best process of intensifying a negative, and how done? A. Bichloride of mercury, saturated solution, in cold water. The negative should be placed in alum a short time before treatment. Wash negative well, and immediately pour on mercury solution; do not keep it on too long unless the negative is very thin. Wash well and immerse in a bath of water 10 ounces and ammonia 10 drops. Leave plate in this solution until the black color goes quite through the film. Wash well. If the mercury solution makes the negative too dense, dilute with water.

(18) E. R. S. writes: I have a "weeping sinew" between my first and second knuckles on my right hand. What will cure it? A. Paint it with iodine.

(19) Stencil Cutter, Ironton, O., asks: What is the best mixture to stencil name on stoneware, using a thin copper stencil, before burning? A. Cobalt oxide mixed to suitable consistency with linseed oil and japan.

(20) C. L. asks: What oil can I use to rub into my shoes at night, so that I can polish them in the morning by using ordinary shoe blacking? A. You cannot polish well over leather thus recently treated to soften it. The city bootblacks always find it hard work to get a "shine" on new boots or shoes. A mixture of neatfoot oil and tallow, about one-half each, makes the best dressing for such use, and the leather should be slightly moist, but not wet, when treated.

(21) H. D. G. writes: 1. Cuff buttons worn on celluloid cuffs color them. What will remove the coloring without injury to the cuff? A. The spots can be removed by washing with sapollo or other suitable soap. 2. Why do cuff buttons color or stain celluloid cuffs, and not linen? A. It depends on the composition of the cuff buttons. Linen cuffs are often stained by their gold stems.

(22) M. B. L. asks: What kind of ink or crayon will resist acid on copper or zinc? A. Use a black asphaltum varnish, procurable at any first class paint store.

(23) H. O. T. asks for the best mode of finding or tracing trichine in pork by means of a microscope. A. Cut a very thin longitudinal slice of the muscle by means of a very sharp knife or razor. Press it between two glass slips, and examine by transmitted light. The coiled trichine may be readily distinguished from the muscle fiber.

(24) S. S. asks whether frictional electricity can be generated on a damp, rainy day. If so, in what proportion to a dry, clear day? A. Practically speaking it cannot, as moisture in the air conducts it away; in many cotton factories, arrangements are made by spraying to impart some moisture to the air, in order to dissipate the electricity generated by the motion of the machinery.

(25) T. L. R. asks about the relative buoyancy of deep and shallow water, stating that a vessel drawing 12 feet will touch the bottom in passing over a shoal that is more than 12 feet in depth. A. There is no difference in the buoyancy of the water, but the swell caused by the vessel's motion has its corresponding depression, to which the vessel must settle, and this swell is greater in shallow than in deep water.

(26) Curiosity asks: 1. Will the government's new cruisers, in course of completion, be illustrated in your paper? A. We have illustrated some—see SUPPLEMENT, No. 555—and shall continue as hitherto to do so. 2. Has the government enough heavy armament, viz., 54 ton guns, to equip all of the new vessels? A. No; many new guns have yet to be built. 3. Suppose an enemy's vessel carrying 100 ton guns should fire a shell at long range, and explode same within a very few feet of the vessel which is to carry the pneumatic guns and 12,000 pounds nitro-glycerine, would there be any danger of the concussion exploding the nitro-glycerine? A. The concussion from an exploding shell would not be enough to explode explosive gelatine. Lieut. Zalinski has made exhaustive experiments on this point, and has proved its absolute safety from explosion by aerial concussion of gunpowder, fulminate, or other explosive. 4. Please give relative strength of France and Germany, both on sea and land, at present time.

Table with 2 columns: Country (France, Germany) and Military/Naval Statistics (Army, Navy, Vessels, Men).

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For which Letters Patent of the United States were Granted,

April 26, 1887,

AND EACH BEARING THAT DATE.

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