

(4131) E. N. H. writes: I intend making a motor like the one described in "Experimental Science" on pages 497-509 reducing it one-half. I am going to have castings made for the field magnet and the armature. Could not the armature be cast with wedge like projections to facilitate the winding? A. Cast iron should not be used for the core of the armature. 2. What size wire should the field magnet and the armature be wound with? (In making it  $\frac{1}{2}$  size.) A. It depends upon the source of the current and the E. M. F. Probably No. 22 or No. 24 would answer for a battery current. 3. Should I put the same number of layers and convolutions as in making it full size? A. Yes. 4. If it is not a good plan to have the armature cast, could I not cut out some pieces of the shape described from Russia iron? A. Yes.

(4132) S. M. S. says: Can you give me a formula for sensitizing albumen paper that does not need fuming with ammonia? One of my friends can make a sensitizing bath that works nice, do not need to fume the paper. A. Try this:

Water..... 1 oz.  
Nitrate of silver..... 40 grs.  
Nitrate of ammonia..... 30 grs.  
Liquid ammonia..... 3 min.

Floater paper for 3 minutes. The hydrometer should register from 54 to 56. Very important to keep bath alkaline.

(4133) X. Y. Z. says: I have a negative from which I have been making silver prints, and the silver from the paper has got on to the negative, on account of dampness, I expect, and spoiled it for printing. Can you tell me of any method of removing it? A. If the negative is varnished, remove the latter by soaking in alcohol for a few minutes, then apply the following to the stained part:

A. Sulpho cyanide of ammonia.....  $\frac{1}{2}$  dram.  
Water..... 1 oz.  
B. Nitric acid.....  $\frac{1}{2}$  dram.  
Water..... 1 oz.

Mix A and B and apply. A fresh solution should be made for each negative. Follow by washing and applying a saturated solution of chrome alum.

(4134) W. H. W. asks: 1. What would be the result if a motor or dynamo were constructed the same in every respect, that is in the "Experimental Science," Fig. 485, with the exception of the armature core, or in other words, if the wire of the armature were wound on a wooden core (the shaft being also wood) and everything else being the same as in Fig. 485? How much current would such a machine give, run as a dynamo, and how much current would it take as a motor to run it? A. The result of the construction described by you would be to produce a very slight current when used as a dynamo, and as a motor it would possibly rotate itself, but it would not be a success. 2. What would be the result if I wound the armature and put all the wire on the outside of the core, made as directions, winding back and forth over pins in the sides of the core, bringing all the wire of the section on one side? A. The result would be a machine incapable of being used either as a motor or a dynamo, as the currents in the different portions of the winding would counteract each other.

(4135) D. P. sends us diagrams showing two halos concentric with the sun and four sun dogs or parhelia on a horizontal line with the sun at the intersection with the halos, and asks explanation. Both halos are surmounted by inverted colored halos tangent to each of the white halos. The phenomena is attributed to the existence in the upper atmosphere, in the region of the cirrus clouds, of snowflakes thinly dispersed through the air, which reflect and refract the light of the sun at certain angles. As the snowflakes are crystallized in a great variety of forms, the reflections and refractions from their surfaces and through their angular forms seem to account for all the known variation in halos, coronas, sun dogs or parhelia and prismatic colors of the inverted halos.

(4136) E. L. says: Noticing your directions for coloring photos, in SCIENTIFIC AMERICAN of February 20, 1892, page 119, I beg to ask: 1. Will not the solution render the oil colors soft and flow over the other part of the paper when rubbed with the finger? A. We think not, since the color is first thoroughly dried. 2. Are the effects permanent, and for how long? A. Probably for several years.

(4137) T. W. K. asks for the ingredients that compose luminous paint, to make numbers that can be seen in the dark. A. Barium and calcium sulphides formed by ignition are characteristic ingredients. See our SUPPLEMENT, Nos. 229, 197, 249, 539.

(4138) G. A. L. says: Please let me know through your paper what direction the north star is from the north pole? A. The pole star is now about  $1\frac{1}{2}^\circ$  from the true pole. When the middle one of the three stars in the handle of the dipper (Mizar) is on the meridian below the pole star, the true pole is  $1\frac{1}{4}^\circ$  below the pole star. In any position of the line between the two stars the true pole is  $1\frac{1}{4}^\circ$  from the north star toward Mizar.

(4139) C. E. D. asks how to find the altitude of a triangle when the base and the sum of the altitude and the hypotenuse is given. A. Altitude = sum of altitude and hypotenuse squared minus base squared, the whole divided by twice the sum of hypotenuse and altitude.

(4140) W. W. asks: 1. How can I explode a cannon with electric battery? Will you please let me know how to proceed, what kind of battery to use, etc.? A. You can explode the charge in a cannon by means of an electric fuse having a small platinum wire surrounded by fine powder. A current from a Grenet battery heats the wire to redness, and explodes the powder, the latter igniting the charge of powder in the cannon. 2. Is cast iron preferable to soft iron for the field magnet of a dynamo? A. No; soft iron is preferable. 3. Which is right? A says that if an article like tooth powder or face powder is put up and sold, that its sale can be stopped by law if it is not patented, while B says, if it is beneficial and harmless, its sale cannot be stopped and that a patent is only to protect it? A.

Taking out a patent does not oblige the patentee to sell, nor does the mere fact that a patent is not taken out prevent selling an article unless it infringes an existing patent. 4. Also what is the meaning when they say such an article (face powder, etc.) is liable to stamp? A. It probably refers to the internal revenue stamp. The application of a stamp to articles of merchandise is not now required on articles of the class named.

(4141) J. F. L., Jr., asks: 1. What is a 10 per cent solution? I have been told the following:

1. 1 oz. solid substance (480 grs.) 10 fl. oz. water.  
2. 6 grs. " " " " " " " " " " " "  
3. 6 grs. " " " " " " " " " " " "

A. A solution containing one-tenth its weight of the substance dissolved. This corresponds with your third formula. The second is altogether wrong. 2. How may I put up a formula as follows:

Dextrin..... 2 parts.  
Acetic acid..... 1 "  
Water..... 5 "  
Alcohol..... 1 "

A. Weigh all parts. 3. Can you give me a formula for the fastest developer you know of for fast gelatin-bromide dry plates?

A. Eikonogen..... 1 oz.  
Sodium sulphite C. P..... 2 "  
Warm water..... 30 "

When cool add

Carbonate of potash.....  $\frac{1}{2}$  "

If this develops too slowly add more carbonate of potash. 4. Can you tell me briefly how to form artificial crystals of alum, copperas, salt, sugar, etc., on a thread for crystallographic purposes? A. Simply make a strong solution and while hot immerse the threads. After crystallization place more solution in the vessel. Always let it cool a little before adding.

(4142) A. M. asks for the name of the acid used for stencil work on glass plates and how to use it? A. Hydrofluoric acid is used in etching glass. It can be purchased from wholesale druggists in New York prepared for use, or you can prepare it yourself by pouring sulphuric acid upon fluorspar. A lead dish is required for this operation. The glass is protected with wax, paraffine or varnish. Where lines are required the protecting coating is removed with a needle or scraper. The glass is placed over the lead dish and the hydrofluoric fumes rising from the dish attack the glass where it is exposed. Care must be taken to not inhale these fumes and to avoid getting the acid on the skin, as it is very corrosive and poisonous.

(4143) P. T. L. asks: What volume and fall of water will it require to furnish power to maintain 68 arc lights 2,000 candle power and 5,000 incandescent lights 16 candle power? What will first cost be in comparison with a steam plant of say 600 horse power? Will cost of maintenance be less? Is there less danger of stoppages? What is the life of a turbine working 16 hours per day? A. Your installation will require about 600 horse power actual from the water power motor. If a turbine of good make is used, the waterfall should be equal to 700 horse power, as this depends upon two elements viz., height of fall and quantity of flow. We must necessarily refer you to SCIENTIFIC AMERICAN SUPPLEMENT, No. 788, for illustrated description of the method of measuring a water power. The first cost of a turbine and head flume is much less than a steam plant, and in favorable places the dam and complete power plant may be brought within the cost of a steam plant. The economy of running expenses depends upon the cost of coal, but is no doubt much less than steam. With any degree of care against floods there is little or no danger of delays, far less than with the dynamos. Turbines run for many years without interruption.

(4144) E. W. H. says: I have a long fence with  $\frac{1}{2}$  inches by  $\frac{1}{2}$  inches Oregon fir posts set 3 feet in the ground. Fence has only been in position one year, yet the portion of the posts in the ground show considerable rot on the surface when dug down on. The posts were green when set. I do not want to take up the post, yet, at present rate, it would appear that they would rot off in three or four years. Would it do any good to bore into the posts, just above the ground, in a standing direction, and fill the holes with some mineral salt? If so, how large should the holes be and what should they be charged with? A. We do know that the plan proposed will fully preserve the posts, but will no doubt add several years to their life. Soaking the ends of posts in a strong solution of sulphate of iron or sulphate of copper for a day has been tried and found efficient for several times the life of posts without any application of preservative. We think it will pay to bore a  $\frac{1}{2}$  hole in as slanting a position as convenient, from 4 inches above ground, say at  $45^\circ$ , three-fourths through the post, and fill it with a saturated solution of sulphate of iron. In a few weeks again fill the holes and plug with wood or a cork.

(4145) W. W. M. asks: 1. Can you give a description in the SCIENTIFIC AMERICAN of the ginseng of Washington, Oregon, and Idaho, where found, and illustrate if you can? A. We refer you for articles on ginseng in general to the SCIENTIFIC AMERICAN, vol. 65, p. 104, vol. 64, pp. 19, 69, 309. 2. I send specimen of ash of burned flax. Can you explain what gives the color, etc.? A. The colors are due undoubtedly to the presence of iron, and possibly some carbonaceous matter.

(4146) J. K. M. — For the information you require regarding brazing and japanning, we refer you to "Scientific American Encyclopedia of Receipts, Notes and Queries, price by mail \$5.

(4147) C. M. T. asks: 1. Have you a good book on induction coils? If so, what price? A. SUPPLEMENT, Nos. 160, 166, 229, and 569, also Dyer's "Induction Coil," 50 cents. 2. How many electric light carbons will it take to give E.M.F. of one volt? (About 5 inches of carbon in fluid.) How much zinc? A. One carbon and one rod of zinc of any size will give an E.M.F. of nearly two volts. 3. I have a telegraph sounder that seems to have residual magnetism in the cores to such an extent that it affects the free movement of the armature. Is there any way to remove the magnetism? A. Remove the magnet cores, heat them red hot and bury them in ashes overnight, or until cool.

(4148) R. P. asks: Why do the English believe the occasional finding of a horseshoe to be a good omen? A. There is no reasonable explanation of the horseshoe superstition. There is no scientific connection between the finding of a horseshoe and good luck, excepting possibly the fact that one who picks up a horseshoe or anything else of slight value and saves or makes use of it is apt to have good luck. Possibly some of our readers may be able to give the origin of this peculiar notion.

(4149) C. H. B. writes: 1. I have been contemplating trying to use water glass as a substitute for glue in sizing spirits of turpentine barrels. I have been informed that it can be used for this. A. We think it would answer your purposes. 2. How is it prepared and used? A. It is made by dissolving silica in caustic soda solution under pressure. Apply with a stiff brush.

(4150) A. T. M. — The word "typewriter" does not indicate either sex, and is correctly applied to both; "typewriting" is an offensive eccentricity. "Cosmopolitan" is correctly used as a noun, and more frequently than "cosmopolite," though there is no objection to the latter if you prefer it. The word "macadamized" is usually employed as an adjective, accent on second syllable.

(4151) J. V. D. asks: Would a five horse power electric motor (500 volts, 10 amperes) afford sufficient power to drive a 10 in. circular saw for cutting cordwood? A. Five horse power would be ample for driving a 10 in. cross cut saw.

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AND EACH BEARING THAT DATE.

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