

(10) L. B. asks: What can I use that will render a paper butter or lard tray grease and brine proof, and at the same time be non-poisonous? A. Coat the paper tray with paraffine, or else cover the article with an ordinary varnish.

(11) H. C. inquires of what metal those bright red or blue caps are made which are on many of the French bottles of medicines, etc. It is very thin, and I should like to know how it is colored. A. The caps referred to are composed of tin mixed with more or less lead, then coated with more or less shellac varnish, colored with aniline dyes according to fancy.

(12) J. G. B. asks how to temper thin sheet steel, size 10 by 14 inches, and keep it straight. A. The saw-makers temper steel saws by dipping in oil edgewise to harden, then draw in hot oil bath and hammer to straighten. The hammering involves much experience, and is considered a high art among saw-makers. You can make a fair experiment in hammering by a trial upon a piece of sheet iron that is warped. Hardening sheet steel by pressure between cold plates of iron, but we do not know with what success.

(13) J. S. W. asks: 1. How to mend an ivory penstock which was broken square across? A. Ivory cement. Dissolve 1 part of isinglass and 2 of white glue in 80 of water; strain, and evaporate to 6 parts. Add one-thirtieth part of gum mastic, dissolved in one-half a part of alcohol; add 1 part of zinc white. When required for use, warm and shake up. 2. How is aniline prepared from coal tar? A. See SCIENTIFIC AMERICAN SUPPLEMENTS, 57 and 68. 3. Would a bullet from a rifle go through an ordinary book, one-half inch thick, bound in boards, placed at a distance of 200 yards? A. It depends upon the caliber of the gun, the amount of powder used, and the manner in which the book is supported. Under favorable conditions the bullet would pass through a book one-half inch thick.

(14) R. A. T. asks: 1. What is the difference between "draught pounds" and "avoirdupois pounds"? A. "Draught pounds," as we understand it, is the "pull" in pounds by the horse on the vehicle or load. Avoirdupois pounds are the ordinary pounds of commerce. 2. What is the difference between the distances the power is from the draught (in foot lengths)—i. e., if a team of horses are hitched at a distance of 3 feet at one time and 5 feet at another from the draught, what is the difference of "draughtpounds"? A. None. 3. What is meant by "draught pounds," and what by "foot pounds"? A. The m-aining of the term "foot pounds" is the weight in pounds multiplied by the distance it is lifted in feet in one minute of time. The difference between "draught" and "foot" pounds is that the former takes no account of the movement of the load, and the latter does.

(15) C. E. A. writes: I notice in your issue for January 13, page 25, an article upon the formation of sulphuric acid and a method of absorbing the same by means of a zinc plate. Is the acid mentioned formed when gasoline is used? A. If the gas from gasoline is properly prepared and absorbed, it should not contain any sulphuric acid.

(16) W. H. D. asks: What is the per cent of potash in pine wood ashes? A. Red pine, 5-2 per cent potash; white pine, 15-5 per cent potash.

(17) J. W. F. asks: 1. What is the best book to buy for the use of analyses? A. Fresenius' "Manual of Quantitative Chemical Analyses." 2. Also, a book on fertilizers, how to manufacture, etc.? A. "On Artificial Manures, their Chemical Selection, and Scientific Application to Agriculture," by M. G. Ville, translated and edited by Wm. Crookes.

(18) M. T. S. asks: 1. At about what temperature would pure oxygen attack copper, producing combustion or fusion? Or would it so act at any temperature short of fusion? A. It would begin at low red heat before fusion. 2. Please give best method of obtaining oxygen (absolute purity not essential) cheaply and rapidly. A. Consult SCIENTIFIC AMERICAN SUPPLEMENT, No. 313, p. 4994. The method is there given in full.

(19) A. B. asks: Can you tell me if there is any quick method of transferring the film and image of an albumen photograph on to glass, linen, etc.? A. There is no satisfactory method for transferring the film and image of an albumen photograph on to glass, linen, etc. The best method would be to photograph direct.

(20) B. C. M. asks: 1. How the non-erasable lines are put on slated paper? A. The lines are ruled with zinc, after which one coat of the silicate coating is put over the slate. 2. Would varnish prevent the fading of an outline taken by the gelatine transfer process? A. Use bleach shellac and alcohol as a varnish, as it will prevent fading.

(21) T. G. H. asks for a receipt for manufacturing the "hectograph," or gelatine pad, now much used in office and clerical work. It is imperfect and unsatisfactory in its present condition, and can, I think, be improved. A. The following is a composition by Lebacque:

- Gelatine..... 100 parts.
Water..... 375 "
Glycerine..... 375 "
Kaolin..... 50 "
Also one by W. Wartha:
Gelatine..... 100 parts.
Dextrine..... 100 "
Glycerine..... 1,000 "
Barium sulphate..... q. s.

(22) F. T. H. asks: 1. If ordinary school crayon is just chalk, or of what is it composed, and in about what proportions? A. Washed pipe clay and washed chalk, equal parts; mix them into a paste with sweet ale made hot, and with a chip or two of isinglass dissolved in it. 2. Are the crayons cut into shape, or are the materials made in solution and let settle into moulds? A. The paste is rolled out with a rolling pin, then cut into slips, and then rolled into cylinders by the aid of a little flat piece of wood, then cut to the length of three inches each, and placed in a slow oven or drying stove until hard.

(23) L. R. A. asks: 1. Where can I obtain directions for making a simple and efficient telephone transmitter, in which carbon is used? A. See SUPPLEMENTS, 250 and 163. 2. Please give the formula for computing the power of a celestial refracting telescope? Also, for determining the focal distance of a two-lens eyepiece? A. To compute the magnifying power of a telescope, divide the focal length of the object-glass in inches by the focal length of the eyepiece, or its equivalent in inches. The quotient is the magnifying power. To get the focal value of a Huyghens eyepiece, multiply together the focal lengths of the two lenses in inches, and this product by the distance from face to face of their plane sides, also in inches. Divide this product by the sum of the focal lengths of the two lenses in inches. The quotient will be the focal length of an equivalent lens in inches. To illustrate: Take two lenses, respectively 3 inches and 1 inch focus, distance apart, 2 inches. Then 3' x 1' x 2' = 6' = 1 1/2", or the focus of an equivalent lens. Suppose that your object glass is 40 inches focus, then 40 / 1 1/2 = 26 2/3 magnifying power.

A crude way practiced with small telescopes is to observe a distant and distinct object with one eye through the telescope and with the other eye direct, both eyes seeing the object at the same time. A little practice will enable one to approximate to the power. This is often done with terrestrial or erecting eyepieces which are sometimes a little complicated in the arrangement of the lenses. 3. In the secondary battery described on page 406 of vol. xlv., SCIENTIFIC AMERICAN, could the lead foil that covers the insides of tea chests be advantageously used as plates, or is it too thin? Canton flannel and blotting paper is soon destroyed by the sulphuric acid. What other cheap stuffs can be used instead? A. The foil would be too thin. Better cast your plates with holes in them, and fill the holes with the lead oxide. 4. I have an induction coil 8 inches long; wire core, seven-eighths inch in diameter. The primary coil consists of four layers No. 16 cotton-covered copper wire, and the secondary of 2 1/2 pounds No. 32 cotton-covered wire. Even with a battery of four Bunsen cells only a mere trace of an induced current is perceptible. Please give me a clue to the fault. A. It is probable your insulation is imperfect. You cannot obtain results without the most careful insulation. Try doubling or trebling the quantity of fine wire. See SUPPLEMENT, 160.

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

J. P. G.—The mineral is a slate containing pyrites.—J. E. H.—The mineral is a carboniferous shale.

COMMUNICATIONS RECEIVED.

On Fire Escapes. By A. C. A.
On Flight. By F. P. H.

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