

German silver wire will have about 1 ohm resistance. It will be an approximation only, as every sample of wire varies more or less.

(3) C. C. wants to know how many coats of lacquer should be put on gas fixtures, for ten years' wear, and how to make the different colors. Can it be put on hot? If so, what is the process? A. Only heat the articles to about 200° Fah. before lacquering. For the process and how to make lacquer, see "Techno-Chemical Receipt Book," which we can mail for \$2.

(4) C. B. P.—The crank pin of an engine is supposed to travel with an even motion or as nearly so as the fly wheel can control, considering the unequal pressure upon the piston in the first and second half of its stroke. The impulse given during the first half of the piston stroke slightly accelerates the crank velocity. It is the piston itself that has a variable motion under the regulating influence of the fly wheel, so that from the dead center to the first quarter revolution of the crank, the piston travels farther than for the second quarter, or to the next dead point; the difference being greater for a short connecting rod.

(5) H. W. S., Jr., writes: I have a cistern from which a lead pipe connects with a pump in the kitchen. The water is of a yellowish cast and very foul. The water drawn from the neck of the cistern with a bucket is of good taste and void of odor. Can you give me a remedy. A. The surface water of your cistern is purified by absorption of air. There is no circulation by which the water at the bottom is brought to the surface. The oxygen or air that is carried into the cistern, combined with the water, is soon absorbed in oxidizing the vegetable and other matter in the water. When no more oxygen is available a putrid decomposition sets in, which is the trouble that you complain of. The only remedy is thorough and often cleaning of the cistern, or forcing air down to the bottom, allowing it to bubble up through the water. A small force pump will answer the purpose. A bag of charcoal pushed down to the bottom, and held there, may improve the water.

(6) F. G. B.—You can remove most of the old varnish from your guitar by rubbing the scratched parts with 95 per cent alcohol on a clean rag until the color appears even, then varnish with a mastic varnish, using a flat camel's hair brush, going over the work quickly. You may make the mastic varnish by dissolving 12 parts sandarac, 6 parts shellac, 6 parts mastic, and 3 parts elemi in 150 parts 95 per cent alcohol. Put the whole in a bottle and warm in a water bath until the gums are dissolved, then add 6 parts of Venice turpentine and thoroughly shake up warm. If too thick to spread freely, add alcohol to suit the requirement.—For hardening small tools, rub soap upon the surface, and in the threads of taps and dies, then heat to a cherry red and immerse in salt water, a handful of salt to half a pail of water.

(7) B. W.—For a good cup grease melt and thoroughly mix while hot equal parts fresh clarified tallow and heavy petroleum oil or engine oil. For axle grease add to the above 15 per cent by weight of ground plumbago. Stir well while cooling, to make the mixture perfect.

(8) C. H. C. asks a receipt for the cleansing of oil drippings, such as caught in the pans under the bearings of shaftings, so that the oil can be used again. A. The purification of such oil drippings by chemical processes is entirely unsuited to ordinary shop work. We can only recommend settling the oil in a large open can and dipping from the surface. If this does not make it clear enough for use, fill the can half full of water, or filter the settled oil through a sponge stuffed in the bottom of a can.

(9) F. M. desires a formula for making dark mahogany stain from aniline for furniture and chairs, one that will not fade. A. We would recommend the following in preference to aniline. Boil half pound madder and 2 ounces logwood chips in 1 gallon water and brush well over while hot. When dry go over with pearlash solution, 2 drachms to the quart. By using it strong or weak, the color can be varied.

(10) A. P. Y. desires (1) a formula for bleaching hair. A. For bleaching the hair use a three per cent solution of peroxide of hydrogen, concerning which, its preparation and application, see the article on that subject in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 339 and 545. 2. Also same for the menthol pencil for headache. A. Menthol having a melting point of 42° C. is fused and then poured into metal moulds. Usually, however, the menthol is diluted by mixture with varying proportion of wax, stearine, or paraffine.

(11) T. B. asks: 1. Is there any substance or method by which froth on a saccharine liquid could be avoided or killed, for instance in aerated mineral waters? A. A little vapor of ether will tend to do it. A drop of ether in each bottle would answer. 2. Could you give me a good and cheap recipe for peppermint cordial? A. To 40 gallons proof spirit add 4 ounces essence of peppermint dissolved in 95 per cent alcohol. Color with 1/4 pound powder of turmeric infused in 1 gallon spirit 95 per cent.

(12) M. M. H. writes: At the recent eclipse of the moon, the earth's shadow appeared as a thin veil over the surface of the moon, the light shining through with a dull reddish hue. If the moon at this time of her opposition was exactly in her node, consequently totally eclipsed, why was any light visible? It seemed different in this respect from any previous total eclipse. A. The moon was nearer to the earth in this eclipse than in others less remarkable. The light on the moon during totality was derived from the sun rays refracted by the outer or thin portion of the earth's atmosphere. The outer atmosphere being a globe of very low density, acted as a lens, drawing the sun's rays in and crossing the earth's dark shadow.

(13) G. G. writes: I have been using asphalt varnish to renew the gloss on rubber boots and shoes, which in a degree is a success. Can you suggest any addition to perfect the same, also to kill the fume of the asphalt? A. Asphalt varnish is the only article that we know of that can be used for the purpose mentioned, and we can only suggest, as there are various grades of that varnish, that you secure the best.

(14) J. B. writes: Can you furnish me a recipe for making "papyrograph writing paper," like the piece inclosed? A. The paper is saturated with a resinous varnish, and you will find in Spon's "Workshop Receipts," second series (which we can send you post paid for \$2), a description of its treatment. Try paper brushed over with boiled oil in which a little shellac has been carefully dissolved over a slow fire, then suspend on a line till dry.

(15) C. F. S.—S is right. The hydrostatic pressure is the power that discharges the water. It is always equal for equal heights without reference to the area of surface.

(16) A. E. S. asks: Which possesses the greater strength when placed horizontal, standing on highest edge—a piece of timber 40 feet long, 12x18 inches, or piece same length, but 14x16 inches? A. The 12x18 inches is the strongest, its moment of inertia being 5,832, while the moment of inertia of the 14x16 beam is only 4,778, and their safe load at center 6,026 pounds and 5,555 pounds.

(17) F. C. M. asks how to make the ordinary torpedoes, such as cost about five cents a package. A. They consist simply of a few grains of coarse sand twisted in pieces of paper containing a small quantity of fulminate of mercury.

(18) H. J.—The surface of the earth in one geographical mile "falls away" or departs from a straight line 804 inches.

(19) H. S. T. asks: The process of dyeing in colors sheep skins that have been tanned with wool on. A. To dye the hair on the leather, use receipts similar to those employed in dyeing ordinary wool. Anilines for instance can be used, but in order to avoid spoiling the fur, you had better consult some of the text books on dyeing.

(20) J. A. H. asks: 1. How to make the menthol or "Japanese headache cures," not hard as they are, but in a liquid or semi-liquid state, as a salve or liniment, to be rubbed on different parts of the body, etc. A. Menthol cones are made by mixing menthol with various waxes. It is the proximate principle in oil of peppermint, and can be obtained by cooling the oil to 15° C., whereupon the menthol crystallizes out of the oil. 2. A grape-sirup, not an artificial sirup, or one for fountain use, but a sirup from the fruit, for domestic or table use, etc. A. Take 20 lb. ripe freshly picked and selected tame grapes, put them into a stone jar and pour over them 6 quarts of boiling soft water; when sufficiently cool to allow it, well squeeze them thoroughly with the hand, after which allow them to stand 3 days on the furnace with a cloth thrown over the jar, then squeeze out the juice and add 10 lb. of crushed sugar; let it remain a week longer in the jar; then take off the scum, strain and bottle, leaving a vent until done fermenting, when strain again and bottle tight, and lay the bottles on the side in a cool place. 3. A decoction, infusion, or tea of malt and hops, to be used as a tonic drink, what to add to preserve it, if anything. A. Take extract of malt 4 fluid oz.; phosphate of iron U. S. P. 1880, 128 grains; water 1 fluid oz.; fragrant elixir enough to make 1 pint. Dissolve the phosphate of iron in the water with the aid of heat, add the extract of malt and sufficient fragrant elixir to make one pint; allow the whole to stand 24 hours and then filter. 4. What quantity of what substances (bicarbonate soda, etc.) to charge water with gas in bottles or siphons, to imitate fountain soda (without marble dust and acid), to gain the time necessary to cork bottle. I thought to place powders in separate gelatine capsules, etc. A. To one gallon of water add 5 lb. of loaf sugar, one ounce Epsom salts, one ounce cream tartar, and 5 oz. tartaric acid. Boil the preparation well, skimming off the refuse matter accumulating upon the surface. After cooling set it away in bottles in a cool place. When drinks are desired, put 2 or 3 tablespoonfuls of this sirup into a tumbler two-thirds full of water, add one-fourth of a teaspoonful of bicarbonate of soda, stir briskly, and the effervescence will be equal to that from fountain soda. 5. To make "Sozodont" or a close imitation of the same, or something similar and as good. A. Take of potassium carbonate 1/4 oz.; honey 4 oz.; alcohol 2 oz.; water 10 oz.; oil of wintergreen and oil of rose sufficient to flavor. 6. I have some suppositories made of quinine and cocoa butter; how can I find out how much quinine there is in each? Can I do this myself? Or how much cost to have this done? A. If you are an analytical chemist, the determination of the quinine can be made by known processes for which consult the usual text books. Otherwise refer the matter to an analyst, whose charges will depend upon his reputation.

(21) H. M. writes: We have a set of black hair cloth furniture that has been flooded. How can we clean it? A. The cloth can be cleaned by using the preparations recommended in SCIENTIFIC AMERICAN SUPPLEMENT, No. 158, for cleansing fabrics from spots and stains, and the woodwork should be rubbed down with furniture polish.

(22) C. B. M. asks: 1. How long will a common horseshoe magnet retain its power of attraction? A. If an armature is kept in contact with its ends, it will last for many years. 2. How are they charged? A. By stroking in one direction with another magnet, or by placing the limbs within coils of wire and passing strong currents through the coils. 3. Can the power of the same be increased or diminished without increasing or diminishing the size of the magnet? A. Their power varies greatly, and below the maximum, without regard to size. 4. Of what is loadstone composed? And where is it obtained? A. Loadstone is an oxide of iron, Fe3O4, and is found in a great many localities, in Sweden, in the Ural Mountains, and elsewhere.

(23) C. S. A. writes: What kind of a wash can I use to remove tobacco stains from new pine floors? I have just finished a new house, and the mechanics have left tobacco stains upon the floors, which sal soda and hot water does not entirely remove. A. Take one part calcined soda and allow it to stand 1/4 hour in 1 part slaked lime, then add 15 parts water and boil. Spread the solution thus obtained upon the

floor with a rag, and after drying rub with hard brush and fine sand and water. A solution of 1 part concentrated sulphuric acid and 8 parts water will enliven the wood after above application. When dry, wash and wax the floor.

(24) I. E. P. asks: 1. How to make extract of carnation pink? A. See the article on "Perfumes and Formulas for their Manufacture," in SCIENTIFIC AMERICAN SUPPLEMENT, No. 472. 2. A receipt for making a disinfectant which, after evaporating, leaves a pleasant odor like mint. A. Take 1 part rectified oil of turpentine, 7 parts of benzine, with the addition of 5 drops of oil of verbenia to each ounce of the mixture. Almost all essential oils act as disinfectants, but their value is slight.

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