

shake off the loose water, and gently stretch out and tack on a board, flesh side up. Then sprinkle with a mixture of powdered alum and salt, about two-thirds alum and one-third salt, enough to just cover every part. As the skin dries it takes up the mixture, but if any be left on the surface the second day, sprinkle on a little more water, otherwise put on more alum and salt, and sprinkle. Two to three days should be sufficient for such small skins, the idea being to give the skin all of the alum and salt it will take up, while in a moist condition. This tawing process makes the hair firm, a gentle rubbing and beating softens the flesh side, and it is preserved from decay, although tawed skins are never calculated to stand much wetting. This process is well adapted for all small skins, although those which are heavier require more time, and the flesh sides are sometimes folded together, and the skins rolled up. When the skins are freshly taken off, no soaking is needed, but more care is then called for in thoroughly washing off and cleaning them, and the first application of salt and alum should be in the proportions of one-half each. It requires the judgment of a tanner to deal with skins in a dry state which may have become partly damaged before drying, and it requires special knowledge also to tell whether a dry skin is so damaged.

(3) A. T. G. asks what is the process of fastening rubber rolls on clothes wringer. A. Clean shaft thoroughly between the shoulders or washers, where the rubber goes on. 2. Give the shaft a coat of copal varnish, between the shoulders, and let it dry. 3. Give shaft coat of varnish and wind shaft tightly as possible with five ply jute twine at once, while varnish is green, and let it dry for about six hours. 4. Give shaft over the twine a coat of rubber cement, and let it dry for about six hours. 5. Give shaft over the twine a second coat of rubber cement, and let it dry for about six hours. 6. Remove washer on the short end of shaft, also the cogwheel if the shaft has cogs on both ends. 7. See that the rubber rolls are always longer than the space between the washers where the rubber goes on, as they shrink or take up a little in putting on the shaft. 8. Clean out the hole or inside of roll with benzine, using a small brush or swab. 9. Put the thimble or pointer on the end of shaft that the washer has been removed from, and give shaft over the twine and thimble another coat of cement, and stand same upright in a vise. 10. Give the inside or hole of roll a coat of cement with a small rod or stick. 11. Pull or force the roll on the shaft as quickly as possible with a jerk, then rivet the washer on with a cold chisel. 12. Let roll stand and get dry for two or three days before using same. Cement for use should be so thick that it will run freely; if it gets too thick, thin it with benzine or naphtha.

(4) W. H. H. asks the best known receipt for purifying the best sweet oil sufficiently for watch oil. A. Put thin sheet lead into olive oil in a bottle, expose it to the sun for a few weeks, and pour off the clear liquid.

(5) J. R. S. asks (1) the composition of a cheap paint suitable for rough work. A. Grind powdered charcoal, oxide of iron, or any convenient pigment in linseed oil with sufficient litharge as drier, and thin for use with well boiled linseed oil. You will find it, however, cheaper to purchase a ready made paint from some reputable dealer. 2. A good work on the manufacture of paper from wood. A. See "Technology of Paper Trade," in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 109, 110, 116, 117, 118, and 123.

(6) A. R. H. asks the receipt for making the Soudont tooth powder. A. Take of potassium carbonate 1/2 ounce, honey 4 ounces, alcohol 2 ounces, water 10 ounces, oil wintergreen and oil rose sufficient for flavor. 2. A good stove polish. A. Take of black lead pulverized 1 pound, turpentine 1 gill, water 1 gill, sugar 1 ounce.

(7) S. G. asks: Is there any way to mark white dishes permanently? A. We know of, no means except by grinding suitable pigments in proper vehicle, painting the china, and then burning it in.

(8) L. S. B. desires a receipt for making a good black lacquer. A. Take of burnt umber 8 ounces, true asphaltum 3 or 4 ounces, boiled linseed oil 1 gallon; grind the umber with a little of the oil; add it to the asphaltum, previously dissolved in a small quantity of the oil by heat; mix, add the remainder of the oil, boil, cool, and thin with a sufficient quantity of oil of turpentine.

(9) D. W. McD. asks how to restore rancid butter so that it will taste and smell well. A. Wash well first with some good new milk, and next with cold spring water.

(10) A. H. W. writes: I want to have twelve triangles made from bar steel, each one to be of a different tone from the other. What sizes should each be, and what sizes of steel should each be made of, to make the best sounds? A. As you cannot depend upon getting steel of small and exact variations in size, your only course is to make a trial of a bar, and make a second trial with a shorter bar for the next note. Then make a trial on the next size steel. Commercial steel varies enough from its normal size to prevent any computation of lengths for chimes or chords or single notes.

(11) W. H. R. asks: 1. How can I construct a simple hygrometer to ascertain the moisture of a room when steam vapor is used? A. You may make a very good hygrometer by hanging a piece of well twisted catgut, that has not been oiled, to a hook with a disk or pointer attached to the lower end just heavy enough to straighten the catgut, using an eye of wire to keep it from swinging. The whole may be fastened to a small strip of wood, to hang upon the wall. The catgut may be a few inches or a foot or two long, according to the amount of twist. The index will swing with the hygrometric changes, and may be adjusted to proportional parts by comparison with a "Mason's hygrometer." SUPPLEMENTS 571, 334, 14, 379, 155. 2. Give me the best recipe you can for a casehardening compound, to be used on open fires. A. Casehardening in the open fire is a very poor and superficial process. We know of nothing better than a mixture of cyanide of potassium and hoof shavings thoroughly pulverized

and mixed. 3. What is the best welding compound for working steel? A. There are a great many welding compounds in use, with as many claims to superiority. We have found nothing better than borax with a little sal ammoniac—about 10 per cent—all pulverized together.

(12) O. A. B. asks for a preparation or composition used to bleach hair. A. Use hydrogen peroxide, a description of which and its method of manufacture is given in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 184 and 239. Wash the hair thoroughly, and when perfectly dry, apply the bleach with a small sponge, rubbing well into the roots of the hair. Use as often as may be necessary to obtain the desired shade.

(13) J. T. C. asks (1) a receipt to bleach sponges. A. Soak in diluted muriatic acid 10 or 12 hours, then wash with water and immerse in a solution of hyposulphite of soda to which a small quantity of diluted muriatic acid has been added, and wash out. 2. How to kill ringworm or barber's itch? A. Wash the part affected with a little lemon juice; then rub in with the finger a little gunpowder which has been bruised in a porcelain mortar. Do this gently about twice a day. Be very careful not to make the skin sore. 3. A good receipt for hair dye? A. Take of silver nitrate 1 ounce, copper nitrate 1 drachm, distilled water 2 ounces. Dissolve the salts in the water, and add water of ammonia to the solution until the liquid becomes of a clear blue color.

(14) M. A. M. writes: I wish to preserve a portion of a polished steel surface and etch or eat away the remainder to a depth sufficient to receive a thick electro plate of silver, so that when plated, and the plating polished, it will be even with the preserved steel surface, so the whole surface will be even, but a portion steel and a portion silver plated. A. This is what is called electro inlaying, and is only successfully practiced by experts in this style of art. The etching process is the same as for engraving steel plates. The protecting material is asphalt varnish, which may be used with pencil brushes for ornamental work or for stopping off any parts not required to be acted upon by the acid. Asphalt, resin, and beeswax about equal parts, varied for hardness to suit the temperature, is suitable to cover the surface, warmed by dabbing with a small pad. This allows of the figure being scratched in with a point. Nitric acid 1 part, water 2 to 4 parts, is generally used for biting in the figures. This, followed by a dilute muriatic acid dip for removing oxide and cleaning the surface, will probably prepare the piece for electro plating. If not, you will have to make a study of chemicals that will clear the surface so as to take the silver; possibly a few trials cyanide of silver or potassio-cyanide may give you success. For electroplating, see details in SUPPLEMENT, No. 310.

(15) F. S. S. asks whether the last drops of a liquid dropped from a bottle are larger than the first, and why? A. The size of drops depends on the shape of the surface on which they form and on the rapidity of delivery. Hence they may be either larger or smaller when a bottle is nearly empty than when it is full, generally we think larger, because the flat surface of the mouth or lip is then the forming surface.

(16) J. G. asks (1) how to make a good cheap varnish for furniture. A. Melt 120 parts of yellow wax and a little pulverized resin, and compound this with 60 parts of warm oil of turpentine or spirits of turpentine. Rub the furniture with this by means of a woolen rag. 2. A receipt for cleaning window glass. A. Tie up some finely powdered whiting in a small piece of muslin. Dab it over the glass thoroughly. The dirtier the glass, the more whiting will adhere to it. Next smear it evenly with adamp rag, and let it remain until perfectly dry; then rub it off with a leather.

(17) W. G. S. asks: How is the bisulphide of tin amalgam prepared for frictional electric machines? A. It is not an amalgam. Powdered bisulphide of tin is spread over the greased cushions. An amalgam of one part of zinc, one of tin, and two of mercury is highly recommended.

(18) Lux asks: Is there any solution in which I can soak paper to make it a conductor of electricity when dry, also a method of putting an electrically conductive surface on paper? A. The electrically conducting solutions depend generally on the moisture they retain for their efficacy. For a surface, Dutch leaf or some metallic bronze powder is available.

(19) F. H. asks: 1. Will the micro-téléphone, Fig. 5, described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 163, work on telephone described in SUPPLEMENT, No. 142 where no battery is used? A. The micro-telephone requires a battery. 2. Can a telephone made with permanent magnet be used with battery? A. It can. 3. Will it do to make bobbins of permanent magnet telephone of metal instead of wood? A. Metal is quite objectionable, as tending to shield or mask the current effects. Use wood or ebonite.

(20) E. B. asks: 1. Could water be heated to a temperature of twelve hundred degrees, that is, could a boiler be constructed strong enough, and a fire of ordinary coal be made hot enough to produce a temperature of twelve hundred degrees, no steam to be used, but simply to see how hot the water could be made? A. Water could be heated to any temperature short of dissociation. No boiler and fire could be constructed that would stand the pressure. 2. What would be the pressure per square inch on the boiler in above question? A. The pressure would be enormous. If steam space existed, it would be in the neighborhood of three hundred thousand pounds to the square inch (by Weisbach's formula). If it were solid water, the pressure would be still greater. 3. Would a tuning fork vibrate as long under an air pressure of ten atmospheres as it would under a pressure of one atmosphere? A. A tuning fork would vibrate longer in a vacuum than in air, and longer in one atmosphere than in ten.

(21) D. A. B. asks a receipt for dissolving mica, such as is used in stoves? A. Mica cannot be dissolved without complete decomposition. 2. In what way is rubber polished after vulcanizing, in the manufacture of combs and other rubber goods? A. By the ordinary finest grade of polishing powders, such as

glass flour, emery, or rotten stone, and the use of cloth buffs or hand appliances to do the work. 3. Is there any method of preparation that can be used for coating plaster of Paris models that will leave the rubber smooth and bright after vulcanizing? A. Oil and blacklead and soapstone powder are recommended as facing for moulds. The SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 249, 251, 252, which we can send you for ten cents apiece, treat the subject exhaustively, more especially the last number.

(22) B. F. R. asks: Can you add any harmless substance to milk that would make a copious and permanent foam on being beaten with an egg beater? A. You might take the following, which is used with soda water: To each gallon add from two to four ounces of gum arabic dissolved in its own weight of water; or use the following: Quillaya bark 4 ounces, alcohol 4 ounces, glycerine 4 ounces, and water 8 ounces. Exhaust by percolation to make 1 pint of tincture. Two to five drachms of this tincture to be used to every gallon of fluid.

(23) G. F. asks why the planet Mercury is so much more flattened at the poles than the earth. A. There is no flattening of the poles of Mercury that has ever been measured, except at its transits, and then it is not observable in common telescopes. What you have probably seen is the gibbous phase due to its position in relation to the sun and earth. This might appear like an extreme flattening in a poor telescope.

(24) C. B. writes: I intend to make a dynamo three times larger than the one described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 161, and wish to know its capacity in furnishing a current for incandescent lamps (without battery). How many lamps of 20 candle power will it run, how many lamps of 25 candle power will it run, and how many lamps of 32 candle power will it run? Also please quote the additional lamps of 20, 24, and 32 candle power it will run with 6 medium sized Bunsen cells additional? A. A dynamo three times the size of that described in SUPPLEMENT, No. 161, would probably not run more than two or three 20 candle lamps. The six Bunsen cells would help it a little if used to charge the field. We do not recommend this dynamo for practical, every day use. We hope soon to describe a larger dynamo.

(25) B. L. R. asks how the ribbons used on writing machines, daters, etc., are made, that is, what material is used for making the different colors, how they are compounded, and how the ribbons are prepared. A. Take vaseline (petrolatum) of high boiling point, melt it on a water bath or slow fire, and incorporate by constant stirring as much lampblack or powdered drop black as it will take up without becoming granular. If the fat remains in excess, the print is liable to have a greasy outline; if the color is in excess, the print will not be clear. Remove the mixture from the fire, and while it is cooling mix equal parts of petroleum, benzine, and rectified oil of turpentine, in which dissolve the fatty ink, introduced in small portions by constant agitation. The volatile solvents should be in such quantity that the fluid ink is of the consistency of fresh oil paint. One secret of success lies in the proper application of the ink to the ribbon. Wind the ribbon on a piece of cardboard, spread on a table several layers of newspaper, then unwind the ribbon in such lengths as may be most convenient, and lay it flat on the paper. Apply the ink, after agitation, by means of a soft brush, and rub it well into the interstices of the ribbon with a tooth brush. Hardly any ink should remain visible on the surface. For colored inks, use Prussian blue, red lead, etc.

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