

Business and Personal.

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Reliable information given on all subjects relating to Mechanics, Hydraulics, Pneumatics, Steam Engines, and Boilers, by A. F. Nagle, M.E., Providence, R. I.

Notes & Queries

(1) J. B. asks how to make resin more elastic, that is, overcome the brittleness, without making it expensive? A. Try fusing it with a little oil.

(2) C. B. R. asks for the process of making carbons for battery? A. The fine dust of coke and coking coal is first put into a close iron mould of the shape required for the carbon, and exposed to the heat of the furnace. When taken out, the burned mass is porous and unfit for use, but by repeatedly soaking it in thick sirup of gaster and heating it, it at length acquires the necessary solidity and conducting power.

(3) C. J. H. asks if the Colorado or potato beetle or bug is the same as the "cantharis vittata" or potato fly? A. No. 2. Has the Colorado beetle similar properties to the cantharides? A. No.

(4) W. A. P. says: I wish a recipe for keeping cider sweet otherwise than boiling? A. Add to it salicylic acid—about 15 grains to the gallon.

(5) C. R., Appingedam, Holland, asks how lard oil is made? A. Lard oil is chiefly obtained as a secondary product in the manufacture of stearin. It is

purified first by agitation with sulphuric acid, and afterwards by steaming it and washing it with water.

(6) T. A. asks: What is the value of sawed pine shingles, as regards durability, when compared with sawed cedar? A. Under ordinary circumstances, cedar shingles are at least 100 per cent, more durable than pine.

(7) C. W. B. says that an ounce of alum, added to a pint of flour paste when making it, is an effectual and harmless remedy to preserve it, even during very warm weather.

(8) W. H. H. says: I have a porch laid of pine floor-boards, and had it painted. The heat of the sun has drawn out the pitch and turpentine in large quantities, making it almost unfit for use. Is there any way to remedy the difficulty without taking up the boards? A. Scrape off the pitch and cover the bad places with a coat of shellac varnish, then paint it over again.

(9) A. L. D. M. says: We are troubled in this country with cotton worms, and to prevent their destroying our crops we are compelled to resort to poison. Arsenic proves to be the best remedy yet introduced, but a great many people are afraid it will make the land sterile. Some say it is a fertilizer, while others say it is a sterilizer. A. We do not find that, as usually applied, it has any notable effect in either direction. It would not in any case tend to sterilize the land, unless, perhaps, applied in great excess. In some cases it would doubtless prove beneficial in aiding the plant assimilation, but we would not counsel its use except in cases of necessity—for destruction of insects, etc.

(10) H. C. B. asks: Can india rubber be restored to its original elasticity, which has become hard by several years' exposure to a warm atmosphere? A. No.

Has steam or compressed air power been applied to private carriages? A. Steam has been successfully used. Compressed air has been tried and found inconvenient, owing to the large size of the air chambers required.

(11) M. B. asks how chromo-enameled iron show cards are made? A. They are prepared by dipping the hot metal in the paper pulp, or papier maché passing through a bath of alum solution and then through one of soap, alum sized, and hot pressed in the usual manner.

(12) J. M.—Trymethylamine is produced by heating under pressure, in enameled iron vessels, rosaniline, an alcoholic solution of soda or potassa and iodide of methyl.

(13) C. M. says: Not long ago I dug up a few shells from a blue clay bank which were quite soft. After allowing them to dry thoroughly in the sun, I gave them a coat of shellac varnish. They now seem to be covered with a white mould. How can I remove it without injuring the shells, as they are valuable fossils? A. It may be impurities in the varnish, moisture in the shell, or improper mode of varnishing. You can probably remove it with strong, hot alcohol. The varnish should have been made very thin with alcohol, and applied by dipping.

(14) J. H. N. asks how to clean the glass tubes of a fountain which have become muddy on the inside by the deposit of water passing slowly through them? A. It would be better to remove the tubes, if possible, and agitate in them a little water mixed with fine shot, as the dirt would resist most solvents.

(15) C. M. H. says: Please inform me of some recipe for removing superfluous hair? A. Make a strong solution of sulphuret of barium into a paste with powdered starch. Apply immediately after being mixed and allow to remain for ten or fifteen minutes.

(16) E. H. R. asks: Is the following a good recipe for making a good ink, and will it retain its color on books: Copperas ¼ lb., brown sugar ¼ lb., gum arabic ¼ lb., powdered nutgalls ¼ lb., rain water 2 gallons? A. Use less sugar and about a third less water. This will afford an excellent black ink if properly made.

(17) B. B. asks: What cement can I put on a leaky piazza roof to make it tight? A. Take 4 lbs. rosin, 1 pint linseed oil, 2 ozs. red lead, stir in fine sand until the proper consistency is secured, and apply warm. This cement becomes hard, and yet possesses considerable elasticity, is durable and waterproof.

(18) C. F. says: I have a lot of books and papers, bound and unbound, into which bedbugs have got. How can I exterminate them? A. A liberal application of insect powder will no doubt prove effectual or place the papers on a rack in a large close box, and on the bottom of the box place a dish in which burn a small quantity of brimstone.

(19) W. N. R. asks for the solution used for etching on steel and brass? A. For steel, iodine 1 oz., iron filings ½ drachm, water 4 ozs. Digest till the iron is dissolved. For brass, aqua fortis 2 ozs., water 5 ozs.

Is oil of vitriol injurious to leather when used in blacking? A. The amount used is too small to seriously injure the leather.

(20) P. R. H. and C. & Son ask for a japan that will give a good hard black finish on wood? A. Use common black baking japan, to be obtained of the varnish dealers, and when thickly coated on the work bake or dry in an oven or kiln the same as when this japan is put on iron or metal work.

(21) M. C. M. asks: Why is it that a small steam boiler will carry more pressure than a large one? A. Because it is generally stronger.

What simple rule is there for finding the relative value of dollars and pounds sterling? A. Multiply the amount in pounds sterling by 4/3, and the answer is in dollars. Divide dollars by this amount and the result will be pounds sterling. For accurate reduction the rate of foreign exchange and premium on gold over United States currency must be allowed for, for which see early financial quotations in the newspapers.

What is carbolic acid, and how is it made? A. It is a product of coal tar, obtained by distillation.

What is the best filtering material to put in a small

house filter for drinking purposes? A. A sponge answers very well.

(22) G. T. says: We have put up peaches and other fruit in cans which were sealed by soldering. After a few days most of the cans burst open. What was the reason of their bursting? A. The rupture of the cans may have been due either to the fermentation of the fruit, or by the formation of a partial vacuum within through contraction of contained vapor and air on cooling.

(23) W. P. M. says: 1. What length and number of cotton-covered wire shall I use to cover the armature of an electromotor with? A. You may use about 150 feet of No. 16 covered wire. 2. If, after winding one core, shall I continue the wire to the next arm and coil it, or make six separate coils? A. It is better to make separate coils. 3. Is it necessary that the circuit breaker should be insulated from the shaft which is in metallic contact with the magnet cores? Will such an engine, with 10 Grove cells, run a sewing machine? A. Yes.

(24) B. V. H. asks: What can I add to common plaster to make it set quick and hard and be very brittle? A. There is nothing possessed of all these requisite properties. Perhaps soluble alkaline silicates (water glass) may answer your purpose. Plaster made up with alum water instead of water alone, sets very hard, but not quickly.

(25) E. F. asks how to fasten photographs on glass without leaving air bubbles and not have them cleave off? Also how to make them transparent? A. If you refer to a photograph on paper, smooth and dry it perfectly, and coat the face uniformly with a thin hal-sam. Warm the plate and curl on the paper, letting the middle touch first, and immediately bring down the ends. Or attach one end of the paper and pass a small roller over it so as to place it in smooth contact at one motion. Finally, give the back of the picture a smooth flowing coat of good negative varnish.

How was the bread made that was used at the "dairy" on the Centennial ground? The loaves were about 2 feet long and 3 or 4 inches in diameter. A. See p. 240, vol. 34, of SCIENTIFIC AMERICAN.

(26) J. H. R. says, in answer to W. E. S., paragraph (18): The fulcrum is below the water line, and more or less near it as the ship has less or more ballast. If she is heavily ballasted and unladen the fulcrum will be near the bottom. If her load is near the water line and she has no ballast, the fulcrum will be near the water line.

(27) Subscriber asks: What ought to be the weight of a balance wheel for a foot lathe to turn wood? A. From 80 to 100 lbs.

(28) A. G. W. asks: Would it not be better to ventilate a stable from the top by extending a tube from the ceiling to the peak of the barn for the foul air to escape? Extend another one from some cold room or hayloft above down to within about one foot of the stable floor. Through this second tube the cold air will descend, as being heavier than the warmer foul air of the stable, it will take the lowest place, and drive the bad air up through the first tube. A. If the room above, from which the fresh air is to be drawn, is tight, the air cannot be supplied from it to a sufficient extent. The varying pressure of the atmosphere, arising from the winds and from barometric changes, would provide a more efficient ventilation in this case, which could be tempered and graduated as experience should dictate; the openings could be provided with graduated registers, or fixed blinds outside of sliding shutters.

(29) B. S. says: I want to paint the joints of some brickwork black. I would like to know what is mixed with the mortar in preparing it for use? A. Coal dust and English drop black are used for coloring. Prepare the mortar and mix in the color until black enough to suit.

(30) Novice, London, Canada, asks how to lay a tile pavement? A. Make a bed for the pavement of broken stones pounded together, over which spread a layer of cement. When dry, spread over this a layer of cement in which the tiles are carefully set.

(31) J. G., of Montreal, asks for a recipe to stiffen felt hats, and how prepared? A. Mix 18 lbs. of shellac with 1½ lbs. salt of tartar (carbonate of potash) and 5½ gallons of water. Put in a kettle and boil gradually until the shellac is dissolved, when the liquid will be clear as water. When cold dip the hats, and when nearly dry dip in a weak solution of acetic or sulphuric acid in order to neutralize the potash and cause the shellac to set.

(32) D. B. H. asks: Does it require battery power to work a telephone on a short line, say half a mile? A. No battery is required. The telephone contains a small electrical device on which the force of the voice acts and produces an electrical current.

(33) C. M. K. asks if there is any difference in testing gas pipe with a mercury gauge, whether mercury or water be used in the gauge? A. Water can be used, but mercury is ordinarily more convenient in the case of an open gauge.

(34) T. P. B. says he has a lot of 1 inch steam pipe, and a four horse engine, and wishes to use the pipe in some way to make steam to run the engine? A. We know of no practical way to use pipe so small to make a serviceable boiler or steam generator.

(35) C. H. W. says: I want a method to prevent scale forming upon polished steel and iron while heating? A. If your steel is sufficiently heated it will scale when exposed to the air. If you wish to merely soften the work, you may prevent scaling by heating it enclosed in a box or tube filled with steel turnings, luting the box or tube with clay, and allowing the steel to cool before removing it.

(36) D. F. asks for information on bleaching hair, human or yak hair? A. Gaseous chlorine is the most effectual agent in bleaching. Clean the hair with a warm solution of soda, and wash thoroughly with warm water. While the hair is moist, put in an earthen jar and introduce the chlorine until the jar is

filled with the greenish gas. Allow to stand for twenty-four hours and repeat the operation if necessary.

(37) B. B. O. says: The waste pipe from my bathtub, located on the second floor, leads down to the basement, where it unites with the waste from the kitchen sink, and both pass out together into a terra cotta pipe, which after running some thirty feet from the house empties itself into a blind ditch about 2 feet or more below the surface. The ditch is made of stones laid in the bottom of the trench to a depth of 8 inches, then comes a layer of rye straw, and on top the earth. A rain spout leads into the terra cotta pipe, and both waste pipes are trapped before they unite. Is the arrangement a safe one against the escape of noxious gases? A. An accumulation of sediment is likely to take place at the blind ditch. It would be advisable to provide a large cesspool there with a movable cover below frost, and so built as to trap and overflow into the ditch—this can be conveniently cleaned out when necessary. The rain water pipe should act as a sufficient ventilator to your drain pipe.

(38) D. C. W. asks for a recipe for the varnish or lacquer which is used on gun barrels? A. Dissolve 1 oz. of shellac and 2 drachms of dragon's blood in 1 quart of alcohol. Filter through blotting paper and keep closely corked in a bottle. When put upon the barrel, and after becoming perfectly dry, rub with a burnisher to make it firm and glossy.

(39) J. J. R. R. asks: What is the greatest pressure per square inch that can be applied to a steel pivot or step turning on a steel surface or bearing, without destroying lubrication? A. About 2,200 lbs. 2. Does friction in turning or sliding surfaces increase with the pressure, and what is the ratio of increase of friction to increase of pressure? A. Some of the latest experiments are described on p. 1200 of the SCIENTIFIC AMERICAN SUPPLEMENT.

(40) F. E. P. says: I have an engine cylinder 2 x 4 inches, also a boiler shell 14 x 24 inches. Will the shell furnish steam for my cylinder? The shell is of ¼ inch iron heavily riveted. Can I with safety put in cast heads? How many ½ inch gas pipe flues will I need in said boiler, using it as an upright boiler? A. It will be better to use wrought iron heads. Place the tubes from 2½ to 3 inches between centers.

(41) A. I. P. says: We use a band saw for sawing cane seat chair bottoms. The lumber is seasoned hard wood 1½ inches thick. The shaft makes 475 revolutions. The saw pulleys are iron, leather covered, 30 inches diameter. Saw frame all iron. Sometimes the saws break five times a day, at other times they will run two or three days without breaking. We have tried ¼ inch, ⅜ and ½ inch saws of different makes, but with no better results. A sudden change in the speed of the saw, or great variations in the quality of the timber, is probably the cause of the breakages.

(42) C. K. W. says: I have a small music box in which there are small bristles on the under side of the comb to stop the vibration of the same before it is reached by another tooth on the cylinder. What kind of cement can I use to make these bristles stick to the steel comb? A. You can attach them with shellac varnish.

(43) W. F. M. asks: How are chromos mounted? A. It is generally more convenient to attach the cloth to the frame after the picture is mounted. First stretch the cloth tightly on a board, securing it by tacks. Use common flour paste, and saturate the cloth with it. Cover the back of the chromo with paste, and apply it to the cloth, a little at a time, laying it smooth by gentle pressure.

(44) A. F. B. says: Would it be practicable to run a set of wheels and pinions with a weight, as follows: Five wheels of 6 inches diameter, gearing into 4 pinions of ½ the diameter of the wheels, and the fifth 6 inch wheel gearing into a 3 inch wheel, which would thus revolve 2,592 times for each revolution of the first 6 inch wheel? By applying a weight for motor to this first 6 inch wheel, of 400 lbs., what power would I have left for work? A. The loss from friction will depend upon the accuracy of workmanship. With nicely cut gear you may get an efficiency of from 60 to 70 per cent of the applied power.

(45) F. L. S. says: A friend makes the statement that the English Government has a gun capable of throwing a projectile from Dover to Calais. 1. What is the distance in a direct line between the cities? A. Twenty-six miles. 2. What is the greatest distance yet attained by any gun in throwing its projectile? A. About 6 miles.

(46) W. L. F. asks: 1. What is the proper breadth of beam and depth of a boat 16 feet long, clinker built? A. Beam 4 feet and depth 18 inches. 2. How high above the boiler will I have to place a cistern to overcome a pressure of 40 lbs. in order to feed the same by hydraulic pressure? A. About 93 feet.

(47) W. S. says: Supposing a locomotive engine, having one side unconnected, and the crank on the other side at right angles to the dead centers, and at the nearest point to the rails; when steam is admitted into the cylinder, why does the engine go forward when the force is applied in a backward direction? A. Because the rail cannot move backward.

(48) L. M. S. says: How can I make a preparation something like varnish, to dip pencil drawings in to give them a fine appearance and to preserve the paper? A. Dissolve 6 ozs. Canada balsam and 6 ozs. white resin in 1 quart of oil of turpentine.

(49) F. W. K. asks: I have a room 80x30 by 9 feet high, and wish to know about how much pipe it will require to heat it properly? A. The amount of radiating surface depends upon the character of building, number and size of windows, etc. Such a room as you speak of would need under ordinary circumstances from 150 to 175 square feet of radiating surface.

(50) K. Bros. say: Suppose there are 3 cast iron shafts 14 feet long and 8 inches diameter, one having a hole of 6 inches through the middle, the other be-