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All Fruit-can Tools, Ferracute Wks, Bridgeton, N. J.

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Temples and Oilcans. Draper, Hopedale, Mass.

Notes & Queries

H. H. will find a full description of jade on p. 49, vol. 34.—J. C. will find a recipe for cement for iron pipes on p. 185, vol. 33. Tempering mill-picks is described on p. 202, vol. 31.—W. H. will find on p. 347, vol. 32, a recipe for an alloy fusible below 212° Fah.—D. G. F. will find good recipes for bronzing iron on pp. 11, 85, vol. 33, and on brass on p. 51, vol. 33. "Electricity, its Theory, Sources, and Applications" is a good book on electro-plating.—H. A. H. will find on p. 139, vol. 31, a formula for the lifting power of gas. The silvery coating on iron wire, given in our recipe, will wear well with careful usage. Steel wire is best for springs that are much used.—E. B. will find a description of leather pulp on p. 296, vol. 31.—E. T. C. will find directions for cleaning brass on p. 102, vol. 25.—J. C. Jr. will find Bloxam's "Chemistry" an excellent work for students' use.—W. S. S. will find on p. 10, vol. 27, a full description of the phosphorus lamp. This also answers H. W. S.—T. E. will find on p. 11, vol. 31, a recipe for waterproof varnish, which he can apply to his bronzed work.—H. A. P. will find full directions for molding rubber on p. 283, vol. 29.—H. F. H. is informed that no boiler incrustation preventive can be recommended unless the nature of the feed water is known, as the impurities of water differ so widely in their nature.—W. F. McL. will find a recipe for marine glue on p. 42, vol. 32. Mix enough gutta percha with bisulphide of carbon to make a thick varnish.—J. S. is informed that a pump made of a tin pipe with a wooden plunger is commonly used to draw oil out of casks. Coal ashes do excellent service in earth closets.—F. K. will find a good recipe for baking powder on p. 27, vol. 31.—J. N. will find a description of soluble salicylic acid on p. 86, vol. 33.—B. F. will find a description of an apparatus for freezing water in bottles on p. 82, vol. 33.—J. W. will find a description of the Russian circular ship on p. 87, vol. 33.—F. J. C. will find a description of bisulphide of carbon on pp. 111, 233, vol. 30.—W. C. will find a recipe for cement for millstones on p. 251, vol. 31.—R. N. can ascertain the horse power of a small engine by the rules given on p. 33, vol. 33.—T. F. can harden screw plates and dies by the process described on p. 75, vol. 28.—R. J. W. can harden tallow by the process described on p. 202, vol. 24.—W. N. will find a description of the philosopher's or hydrogen lamp on p. 242, vol. 31.—W. N. K. will find, on reference, that the paper stereotyping process is described on p. 363, vol. 30.—M. P. is informed that the only way of ascertaining the power of a spring is by experiment.—J. C. W. will find directions for making spongy platinum on p. 330, vol. 25. Files can be hardened by the process described on p. 212, vol. 28.

(1) J. B. asks: 1. What is the cause of the sulphuric smell in a room where a register is used? A. Your description is too meagre; you should state the arrangements of flues, furnace, etc. 2. Can the air of a room be analyzed so as to find what gases it contains? A. It can, but it requires the tact and skill of a chemist to obtain accurate results.

(2) F. S. W. asks: Please give me a recipe for making blue and red stencil paste, which can be cast into cakes, to be used for branding flour barrels. A. Mix any of the ordinary pigments with sufficient chalk or carbonate of magnesia to form a paste of the required consistence.

(3) G. D. V. asks: What is the effect of ice on milk? I have been using a spring to prepare my milk for cartage over some fifteen miles of country roads, and find that it will churn somewhat in warm weather. I have thought of putting broken ice in the tank used for cooling, thereby lowering the temperature below that of spring water. Do you think this would be an advantage in helping the milk to withstand the shaking? A. A very low temperature, such as that obtained by a mixture of crushed ice and salt, might be of some advantage; but the only sure method is that of filling the vessels full, so that there is no possibility of shaking.

(4) D. M. C. asks: Can we use cast steel for punching machine mandrels, and will it sustain great weight and not crush in such use? A. Steel castings are far preferable to forgings, and will suit your purpose admirably.

(5) J. M. S. says: One cool Monday morning our fireman, while firing up, burst the globe of the main valve and a quarter turn in the main steam pipe running from the boiler to the engine. The pipe was 20 feet in length and 4 inches in diameter, and took one turn downward; it was probably partly filled with water, the drip cocks not having been opened. Experts here explain that steam, thus let on to confined water, exerts ten times as much force as if the pipes were free from water, bursting the pipes on account of the non-elasticity of water. Is this so? A. There was probably ice in your pipes, and they burst from unequal expansion.

(6) R. S. B. M. says: I have often observed men riveting steel plates together with soft iron rivets. Will the resistance of the plates to the contraction of the rivet, as the latter cools off, lengthen the time occupied in cooling? A. Theoretically, yes.

(7) A. M. B. says: I put a set of tubes into a boiler, and in less than a year one of them gave out. They have been going out one at a time until 8 have given out. There are small holes in them, that look as though they had been drilled. I use nothing but rain water in the boiler, but the condensed steam drips back to the cistern of a condenser, and I use tallow in the cylinder. Can you tell me a remedy? A. There are possibly chemical impurities in the tallow. Try purifying it by the process given on p. 182, vol. 29.

(8) C. C. R. asks: Is there any objection to using the common expansion valve (on the back of the slide valve), worked by another pair of eccentrics and link, in order to have the exhaust independent, for locomotives? A. It would give no advantage.

(9) T. C. says: I have built a small steam engine with cylinder 1½ x 3 inches, and have an upright boiler 12 x 16 inches, with one ¾ inch flue in the middle. Boiler and flue are made of copper, of No. 18 wire gage. What is a safe pressure? A. Safe working pressure 30 lbs. per inch. 2. Will the boiler run two such engines? A. No. 3. What books would you advise me to study, to get a thorough knowledge of land, marine, and locomotive engines and boilers? A. Bourne's "Handbook" and "Catechism of the Steam Engine," Forney's "Catechism of the Locomotive," and Colburn's work on the "Steam Engine."

(10) W. A. B. asks: Which of the following oils are best for shafting and printing machinery: Black lubricating oil, lubricating castor oil, or light engine oil? A. Lubricating castor oil.

(11) E. H. R. says: Last year I had trial gages to my steam boiler of a kind that worked with a hinge by raising the handle end. These handle ends, if raised too high, would drop out, letting the steam escape (if above the water level) until readjusted. One day I noticed, when the handle had become detached and a full head of steam was on, that, although there was the usual hissing by the escape steam (or what I thought should be escape steam) there was no steam visible, although the escaping gas was through an open door and with sufficient force to prevent, for some minutes, the readjustment of the handle. My curiosity was then excited, and I inquired of the engineer what was the reason that no steam was visible, only what appeared to be hot air or gas? He said he did not know. He only knew that, when mud was in the gage pipe, no steam was visible. When the pipe was clean, steam would issue. Now if this mud filtered all the steam out or decomposed the steam, what was this escaping gas, that seemed to have lost no force but to have entirely changed from steam to hot air or gas? The escaped gas did not deposit any moisture upon cooling. A. We have heard of many similar cases, and can afford no satisfactory solution of the question. We shall be glad to hear from any of our correspondents having had any experience in this matter.

(12) J. H. asks: Is there anything with which a horseshoe magnet could be covered so as to stop its influence or attracting force, a wax or paint of any kind, for instance? A. No.

(13) C. D. P. F. asks: 1. Is it practicable to heat a house 40 by 50 feet, three stories high, a greenhouse 16 by 100 feet, a stable, and two small cottages by steam from one boiler? A. Yes. 2. How large should the boiler be, the buildings being within a circle of 500 feet radius, and a separate steam pipe leading from the boiler to each building? A. You do not give the height of stories of the buildings, from which the cubic feet of air to be heated might be computed, and upon which the size of the boiler should be predicated. Assuming the stories to be of about the usual height, the boiler would require to have about 185 feet of heating surface, or about 14 horse power. There should be two pipes leading to each building in order to secure a circulation—one for the return; and these may be about 2½ inches in diameter. They should be packed with a cement of asbestos and cattle hair to about one inch in thickness, to save steam by preventing the radiation of heat. 3. How deep should the pipes be buried in the earth? A. At least three feet, and the boiler should be set in a cellar or vault low enough to receive the return pipe above the bottom thereof. The greenhouse could be warmed to a more uniform and safe temperature by means of a hot water apparatus of its own.

(14) C. H. A. asks: How can I silver the inside of glass globes? A. Make a reducing solution of one fourth, and a silvering solution of one tenth, the strength as published in No. 22, vol. 33, SCIENTIFIC AMERICAN, and fill the globe with equal parts of each solution.

(15) G. A. A. asks: 1. What should be the length of focus of the pair of 4 inch plano-convex condensing lenses for a magic lantern? A. The crossing (or smallest) point of the beam of light when in use may be ten or twelve inches from the condensers. 2. What should be the diameter and power of the pair of magnifiers corresponding to the 4 inch condensers? A. The quarter size photographic portrait tube, of 1¼ inch aperture and 6 or 7 inches focus, works very well. 3. What is the advantage of having the condensing lens made up of two glasses? A. That the focus may be made sufficiently short, and not lose too much light by reflection.

(16) J. F. asks: What kind of ammonia is used in a nickel bath to keep it neutral? A. The sulphate is preferable.

(17) C. C. M. asks: 1. Can I use a small telegraph machine for striking bells in different portions of my factory with simply the use of two wires? A. If you mean what telegraphers call a sounder, yes. 2. Will it be necessary to have a coil below the bell, so as to make the bell a magnet? A. No.

(18) J. D. B. says: The teacher of our astronomy class says that, were it not for the reflecting power of the atmosphere, we could see nothing not in direct sunlight. I claim that the reflection from the earth and adjacent objects would be sufficient to enable us to see many things not in the direct rays of the sun. Am I not right? A. Yes.

(19) W. H. A. asks: Has electricity been used in deep sea soundings? A. We do not recall any instance where it has been used for this purpose.

(20) J. A. S. says: If we had a material which was a non-conductor of magnetism, wrought into thin slips, which could be used as an interposer to cut off magnetic influence suddenly, and at regular intervals, would we then be able to propel light machinery by the power derived from common steel magnets of good quality, that is, could we utilize the power in magnets? A. Certainly, but if such a substance existed no economical advantage would result; work must be done to operate it, and this would more than overbalance any power which it would give.

(21) D. J. C. asks: Is it possible to make an aqueous solution of rosin? A. No.

(22) A. H. T. says: 1. I have constructed a Jamin magnet, but was unable to magnetize it on account of its peculiar shape and form. I was unsuccessful in the attempt, because I could not apply the electro-magnet to the surface of the steel ribbons. How should I proceed to make a magnet of great power? A. You ought to be able to magnetize it with an electro-magnet of the bar or curved form. Use one wound with No. 14 or 16 copper wire, and charged with two or three Grove cells.

(23) R. J. S. asks: How can I settle rain water taken from a pond, so as to make it clear for culinary purposes? A. Mix with a small amount of lime water, and allow to settle until clear.

(24) L. L. asks: 1. Which is the best way to make a stereoscope? A. For what purpose is it to be used? 2. What lenses are the best? A. Double convex, with one side thicker than the other. 3. How many times should they magnify? A. About twice. 5. What should be the distance between the lenses and the picture? A. About six or seven inches, for ordinary eyes. 5. How are the endless chains to hold the pictures in revolving stereoscopes made? A. Formerly they were made of either cloth, leather, or rubber belts, as wide as the picture is long. Across them were fastened narrow strips of wood, with wires at each end for holding the views. The latest improvement is a hinged metal band, but the principle is the same in each case.

(25) P. D. S. asks: How can I make bichromated gelatin? A. Make a hot saturated solution of bichromate of potash in water, and in another vessel make a strong solution of gelatin. Then pour them together, stir well, and allow to cool. Or flow your plate with gelatin in the usual way, and then place it in a bath of bichromate of potash for a short time.

(26) F. C. S. says: Please give me directions for nickel-plating apparatus. A. Take a wooden box and line the inside with sheet lead, having about one quarter of an inch between the box and lead. About midway between the ends place two upright copper poles, and across these lay a copper wire, upon which hang the articles which are to be plated. Insulate the copper wire or rod from the lead cell and connect it to the zinc pole of the battery. The positive pole should terminate in a nickel anode placed in the solution.

(27) F. W. B. asks: What metal will most cheaply and effectually resist the action of phosphoric or phosphorous acid, and the vapor arising from the oxidation of phosphorus? A. Gold or platinum.

(28) W. T. says: I have a quantity of butter from 3 to 5 years old, which is of no use except for grease. How can I get the oil out of it, to use for lubricating purposes? A. Butter is a mixture of several fats. You can obtain these free from salt and other impurities by digesting for a short time in hot water, and then allowing to cool. We do not know of any method by which these fatty bodies may be economically separated.

(29) W. M. M. asks: What chemical preparation can be burnt to produce a dense smoke? A. Try pastilles.

(30) E. B. asks: What is the best solvent for gum copal? A. Copal dissolves in turpentine, which is the usual solvent employed for the gum. Oil of rosemary is said to be one of the best solvents; ether is probably the best solvent, but it evaporates so rapidly that the varnish cannot be equally spread. The oils of spruce and lavender have also been used as solvents. It is almost insoluble in alcohol.

(31) C. asks: In speaking of the 81 tun English gun, is the tun 2,000 or 2,240 lbs? A. 2,240 lbs.

(32) S. G. C. asks: How can I remedy a trouble with a large stationary pot in a furnace? It was used for washing, making lard, etc., without the least trouble; now it is unfit to use, as it makes the water black. How can it be cleaned? A. We are as much at a loss to explain the strange action as yourself. You should have stated whether the pot is of iron or other metal, and if there is any incrustation, in which case please send a sample. State whether or not the water

used is from the same source as formerly; and if so, whether it may not have suffered some change. If the latter is at all probable, send us a small sample of the water also.

(33) J. B. J. says: In your issue of December 11, 1875, you give a recipe for mucilage, requiring 30 grains sulphate of aluminum. Will common alum (in equal quantity) do? The latter contains sulphate of potash and water in addition to the sulphate of alumina. A. Probably not so well. Try the experiment for yourself.

(34) F. P. L. C. asks: Is there any chemical composition that may be used for darkening the skin without injury? A. We know of none. Dyes can be applied, but they always affect the normal condition of the cuticle, and for this reason cannot be recommended. Organic solutions cannot be made use of, as they are readily taken up by the system, and most solutions of the metals have a very injurious effect upon the adjacent muscles, etc.

(35) A. M. asks: Is water having a limey taste injurious to the system, when used for drinking and cooking? A. Generally speaking, it is not injurious. On persons unused to drinking such waters, it sometimes acts, producing temporary derangement of the bowels.

(36) J. A. asks: What will remove ink stains from parchment? A. It would be necessary to know what kind of ink, in order to give a definite answer. Try a little pure diluted muriatic acid or cyanide of potassium.

(37) S. L. G. asks: Is water which has burnt gunpowder and tar in it dangerous or unwholesome to drink, or to use for cookery? A. It is not dangerous, but it is less wholesome than common rain or river water.

(38) C. F. asks: Can you give me a good recipe for making and polishing artificial malachite? A. Send a specimen of the malachite which you are confident is artificial, and we shall make the requisite examination.

(39) L. H. says: I tried your recipe for green black writing ink, published in your issue of October 23, 1875. The color is all right, but the stands and pens get all covered with a hard substance (see inclosed). What is the matter? A. This ink should be used with a gold or quill pen. The white powder is sulphate of iron.

(40) I. F. B. asks: Can potatoes be used for manufacturing purposes? A. Yes. They are used on a great scale in the manufacture of starch.

(41) R. B. W. asks: Is alumina fusible before the oxyhydrogen blowpipe, or by any other known heat? A. Alumina (Al_2O_3) melts into a colorless glass when exposed to the oxyhydrogen blowpipe flame; and when thus ignited it is found to be soluble in acids with great difficulty.

(42) H. M. asks: Why does a magnetized needle float on water? A. Any needle will float on water if it be carefully laid on the surface. A certain amount of impact is necessary to break the surface of the water, and then the needle will sink, whether it be magnetized or not.

(43) G. R., Groningen, Holland asks: 1. What is canary seed (*phalaris canariensis*) used for? A. To feed canaries and other small birds. 2. What is caraway seed (*carum carui*) used for? A. For flavoring cakes and other articles of cookery. It is also used for preparing a liqueur, called in Germany *kummel*.

(44) F. W. A. H. says: Can you tell me of a remedy for itching, not suppurating, chilblains? A. Take oil of turpentine 2 ozs., camphor 3 drachms, and oil of cajuput 1 drachm. Mix, and rub in with gentle friction.

(45) W. L. asks: Can you give me a recipe for a black ink powder that can be mixed up with water for immediate use? A. Take Aleppo galls 3 lbs., copperas 1 lb., gum arabic $\frac{1}{2}$ lb., white sugar $\frac{1}{2}$ lb.; powder and mix. Put 1 pint boiling water on 2 ozs. of this mixture, and your ink will soon be ready for use.

(46) R. M. asks: How is licorice paste made? A. Dissolve common stick licorice in water, strain the solution, and add a little refined sugar. Then evaporate till a stiff paste is obtained, and press into shape.

(47) T. H. C. asks: 1. Is copper now in use anywhere for edge tools? A. Yes, in China and elsewhere. 2. Would the discovery of the art of hardening copper, so as to make it suitable for tools, be of any great value to the world? A. Not unless steel becomes unattainable.

(48) W. & S. ask: 1. How can we detect the presence of lime in drinking water? A. By blowing into the water through a straw. If the water becomes cloudy, lime is present. 2. How can we make a filter for drinking water? A. Make a wooden cistern, with a false bottom a few inches above the base, and screw a faucet into the cistern to draw the water from the intervening space. Bore some holes in the false bottom, and put in some coarse gravel, then some fine gravel, then some sand, then some crushed charcoal, and your filter is ready for use.

(49) P. S. asks: What is the weight of a cubic foot of gold? A. 1204.1284 lbs. avoirdupois.

(50) G. M. R. asks: How can I anneal cast iron? A. Malleable iron castings are enclosed in iron boxes filled up with pounded ironstone or common lime. The boxes are then luted, rolled into the oven or furnace, submitted to a good heat for about five days, and allowed to cool in the furnace.

(51) C. F. asks: How can I make *eau de Cologne*? A. Take oil of lavender 4 ozs., purified benzoin and oil of rosemary each 2 ozs.; dissolve these in stronger alcohol 9 gallons. Add succes-

sively oil of neroli, oil of young orange (called by the French *huile de petits grains*), oil of lemons, each 10.4 ozs.; oil of sweet orange, oil of lime, and oil of bergamot, each 20.8 ozs., and a little tincture of the flower of rose geranium. This is a good imitation of the *eau de Cologne* prepared by the Farinas, and is said by some to be that of the original formula.

(52) J. E. asks: How can I color fancy soaps? A. For red, use tincture of orchil; for yellow, tincture of turmeric or annatto; for brown, burnt sugar or umber. Other colors can be produced by using simple vegetable pigments.

(53) N. S. asks: Will the elasticity and strength of the following spring be nearly permanent? The spring is 15 inches long, 2 inches wide, and of 17 B. W. G. It is used to push the bodies of scalded hogs, so that they protrude 4 or 5 inches within the circle of a revolving spring, about 60 times a minute for 10 hours a day. A. Your spring is too light for the duty, and hence is liable to set.

In the arrangement of a sliding shaft through a hub under pressure, which presents the least friction, a feather in the shaft and slot on hub, or pin through shaft and slot through hub? A. A feather in the shaft.

(54) J. R. B. asks: What solution will clean brass or iron after brazing, while hot? A. We know of none.

Can a governor be made to regulate the speed of an engine, 2x4 inches? A. Yes. Of how many horse power should an engine be to give power equal to 10 horses in driving a thrashing machine? A. Twelve.

(55) H. M. W. says: I want to divide a circle into 9 parts; these 9 parts are to be subdivided by 10, and again by 10, making in all 900 divisions. Is there a rule by which I can divide a circle in this way? A. The necessary instructions would occupy too much space. The subject will shortly be treated in "Practical Mechanism."

(56) L. S. says: I have been firing a 30 or 32 ton Baldwin locomotive, which always had a thumping on the left hand hind driver. The engineer made some experiments by setting the driving box wedges and wrist pin brasses, but could not stop the thumping. Lately the engine was taken out of shop; the driving boxes were paralleled; brasses, wedges, drivers, and wrist pins were all turned off, and now the thumping is on the opposite side. It can be heard when running either slowly or fast, but mostly when she is drawing a heavy load. Can you explain it? A. Not without examining the engine.

(57) I. D. H. says: We have some heating stove patterns that are too light. We want to thicken them up, so as to enable us to take off another set of patterns of proper thickness. Is there any material that can be painted or smeared on the patterns, so that, by repeated applications, they could be thickened up evenly and neatly? A. No.

(58) W. W. McK. & S. asks: Can you inform us how to soften our scrap iron in the cupola, so that it can be bored and turned without using pig iron? Some shops use nothing but scrap, and soften it by putting in certain materials. What are they? A. We think you are mistaken as to scrap iron being softened by anything but the addition of new soft iron.

How can we make a good arrangement for vibrating castings? A. A shallow tank, sunk in the ground, covered with a movable lid, and placed near a water supply, is all you require to wash castings.

(59) H. G. asks: Can you tell what is used to stop boilers from priming or foaming? A. Plenty of boiler power and steam space is the best general remedy we know of.

(60) J. M. M. G. Jr. says: We have an engine of 20 horse power which last year ran two gin stands very well with 30 lbs. steam. We stopped it in the spring, and did not run it any more until this fall, and now it takes 50 lbs. to run it, and that very slowly. It is clean and well oiled. We got a machinist to examine it, and it was in perfect order. I am afraid to raise more than 60 lbs. steam on boiler, as we have had it 22 years. It has been repaired and a new head put in at one end. What is the matter? A. It would be impossible to say without an examination of the engine.

(61) C. C. G. asks: Does it take more power to run a saw on a long mandrel than on a short one, not counting the extra weight? A. Yes, because of its vibration.

(62) H. C. asks: Is there any practical difficulty in running two engines on the same shaft, in a steamboat, under the following conditions? One cylinder is 14 inches x 30, the other 15 inches x 36. They are to be connected by link motion. A. No, unless the other conditions (situation of engine, etc.) prevent.

(63) J. S. asks: How can I temper butcher's steels for sharpening knives, without injuring the silver color? A. It cannot be done.

(64) A. L. O. says: We have been troubled with the bad working of our furnaces. It is impossible to keep one room comfortable. If we opened two registers, a cold stream would rush down one, while a feeble current of warm air would be coming up the other, and *vice versa*. The weather was very cold, accompanied with a high wind from the north and west. What is the remedy? A. When the air is heated in your furnace, it expands and produces a pressure; the register being open, it finds less resistance in the rarefied air of the rooms than in the dense cold air at the mouth of the cold air box; it therefore rushes out of the registers into the rooms, displacing the air in the rooms by driving it out through the joints and crevices or the doors, windows, etc.

Now, if it is supplied to two rooms on opposite sides of the house, when the wind is blowing upon one side it interposes a certain pressure from without upon the joints and crevices, and so prevents the air in the room upon that side from being displaced. The result is that, the usual outlet being closed, no warm air can be forced into the room; but on the leeward side, the pressure from without being entirely removed, the warm air enters with increased rapidity. This difficulty might be alleviated by providing weather strips on your doors and windows, and by ventilating by your chimney flue, having a weather cowl upon the top of it.

(65) J. Y. asks: What is a good architectural book, with plans, specifications, and elevations? A. Woodward's "National Architect" fulfils the conditions you require. "Wooden and Brick Buildings" is a more extensive and later work, but does not include specifications. You can probably obtain both or either by addressing A. J. Bicknell & Co., No. 27 Warren street, N. Y.

(66) W. B. M. asks: I have a $5\frac{1}{2} \times 8$ inches vertical engine; at what speed ought it to drive a boat 38 feet in length by 7 feet 4 inches beam? Would this boat be rightly proportioned for that size of engine? Would a vertical boiler 6 feet high by 30 inches in diameter, with 33 two inch tubes, 4 feet long, be of proper size for engine? Would a screw propeller, 36 inches in diameter, of 5 feet pitch, be proportioned to the above? A. The boiler is rather small, and the other proportions are very fair. You should realize a speed of 6 miles an hour.

By what chemicals can you detect the presence of carbonate of lime in water? A. Add lime water, which will precipitate carbonate of lime, giving the water under test a milky appearance.

(67) R. H. M. asks: 1. How long must my rafters be for a house 18 feet wide, to have a Gothic pitch? A. There is no set pitch of roof in the Gothic style of architecture. The pitch is generally steeper than in the other styles. 2. What is half Gothic pitch? A. The term is evidently a provincial one among builders. 3. How much must I raise the roof in the center so that it will be a Gothic pitch? A. Make the length of your rafter equal to the width of your house, and you will have a pitch that will be suitable for the Gothic style.

(68) W. H. S. says: In a trunk or flume are placed four 20 inch turbine water wheels, 7 feet apart, the whole being under a head of 33 feet. The power drives at present a $20\frac{1}{2}$ feet overshot water wheel, 3 feet wide in the clear. Can I derive more power by using the water on 4 wheels than I could by applying it all to one wheel at the bottom of flume, the wheel being also 20 inches in diameter? Could I in either case obtain more power than I can with an overshot wheel? A. If you have a good overshot wheel, we do not think you will gain any material advantage by making such a change.

(69) F. M. R. asks: Given 1,000 cubic feet of atmospheric air at a temperature of 30° Fah., how much in volume would it be increased if heated 20° , and again by steps of 20° each to 250° Fah.? A. It can be determined by the following rule: Let p =pressure of air at temperature 32° , v =volume of air at temperature 32° , P =pressure of air at temperature T , V =volume of air at temperature T . Then $P \times V = p \times v \times [1 + (T - 32) \times 0.002076]$. If T is greater than 32 the plus sign is to be used, and the minus sign is to be taken when T is less than 32 .

(70) M. H. T & Co. ask: 1. Does it impair the strength of an iron chain to galvanize it? A. No. 2. Does it impair the strength of hooks to galvanize them? A. No. 3. We make hooks in two ways: Out of round iron, pointed and bent to shape, and out of square iron, drawn and bent to form the eye, then welding the ends of iron together, and bending to shape. Which is the best way to make them for strength? And which would you prefer to use, a hook made entirely by hand or one made under a trip hammer? A. We think these two questions could be better decided by experiment.

Does air from over salt water rust metals more than air from over fresh water? A. Yes.

(71) H. E. W. asks: What is the best method to kill the sound or echo in a hall or church? A. On p. 356, vol. 29, you will find an illustrated article on this subject, and on p. 324, vol. 30, there is a communication from Mr. J. M. Allen, of Hartford, Conn., which gives a careful statement of experiments, resulting in the discovery of a successful remedy for the echo in churches.

(72) J. H. L. J. asks: What is the reason that Portland or Roman cement cannot be made to answer the purpose of so many worthless compositions for a good roof? A. The reason is to be found partly in the unstable nature of the boarding upon which roof coverings are usually laid, and partly in the friable nature of the cement itself, which is not impervious to water unless laid in large blocks, impracticable for roofing generally.

(73) W. M. B. says, in reply to D. S. C.'s query as to discoloration of aniline: The darkening of the aniline is due to the turpentine in the varnish. I have been experimenting on these most fugacious colors. If some one will tell me of a varnish that will not kill aniline red, I will make my fortune.

(74) C. W. J. says: The upper rock being the runner (the weight being the same when at rest as when in motion) why is it that the runner is more easily raised by the regulating screw when the mill is in motion? This question may appear to you as absurd, but I have failed to convince an opponent that gravitation is not destroyed by motion, and that any speed may be given the runner in question without its being lifted, in conse-

quence of speed, from the spindle on which it rests. A. We would like to be assured that this is a fact before attempting to explain it. If you have ever made any experiments to verify it please send us a record.

(75) H. M. W. says, in reply to I. G. S.'s query as to cracks in the skin: A good application is: Tincture aloes $\frac{1}{2}$ drachm, glycerin 4 ozs. The alcohol should be evaporated from the tincture before mixing.

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

A. A. D.—It is a variety of clay. The white-wash can hardly be as durable as if made of lime.—J. J. N.—If the specimen referred to was in a small round box, it is yellow hematite, an ore of iron.—E. L. C.—It is a fine earth, apparently of infusorial origin.—G. D.—They are andalusite, composed of silicate of alumina, found in many places in the United States.—J. F.—It is a variety of indurated clay, not especially valuable.—W. H. O.—No. 1 is impure hydrated sesquioxide of iron, with silicic acid and alumina. It is not worth assaying. No. 2 is blue clay, and exists in great quantities in many localities.—C. N. G.—Your description is too incomplete to enable us to identify the specimen.—J. M.—It is galena or sulphuret of lead.—F. M. J.—It is decomposed mica.—J. H. S.—It is quartz containing some silicate of copper or chrysocola.—C. W. McC.—Nos. 1 and 3 are water-worn siliceous pebbles. No. 2 is ferruginous quartz. No. 4 is water-worn silic. No. 5 is pink quartz. No. 6 is blue quartz. No. 7 is drusy quartz.—J. W.—Ordinary spelter is cast zinc. One of the specimens consists of copper and zinc. The black powder is black oxide of copper, formed by oxidation aided by heat. Your plan of cleansing is good.—U. H.—It is sulphuret of iron, and is injurious rather than otherwise to the coal.—V. P. E.—It is green mica, along with iron pyrites. It is of no value.—A. O. F.—It is white quartz with scales of mica. No metal.—C. H. G.—No. 1 is clay containing hydrated sesquioxide of iron. No. 2 is silicate of alumina with silicic acid. No. 3 is arenaceous sand rock. No. 4 is magnetic iron sand. No. 5 is clay with anhydrous oxide of iron. No. 6 is a gold-bearing quartz.

C. asks: 1. What is the weight of the 20 inch gun that was made some years since, at Pittsburgh, I believe? 2. What do the 15 inch guns weigh?—A. H. asks: What is the best way of preparing burnt cork for the face, for theatrical purposes, so that it will easily rub off?—P. A. K. asks: Who got up the first railroad sleeping car, and put it into practical use, and when?—T. H. R. asks: Can you tell me of a cure for kleptomania in a child?—W. G. A. asks: What is the deepest penetration, by the best shot guns that are made, with No. 4 shot, in a white pine board at 35 yards range?—L. C. asks: What is the capacity of the largest flouring mill in the United States?—A. M. M. says: I notice in your issue of January 1 an article on the weight that the threads on $\frac{3}{8}$, $\frac{1}{2}$, and $\frac{3}{4}$ inch wrought iron pipe will sustain. Can any one tell me the weights that different sizes from $\frac{1}{2}$ inch pipe to 10 inch pipe will sustain?

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges, with much pleasure, the receipt of original papers and contributions upon the following subjects:

- On Cold Vapor. By R. M. O.
- On Crime Cure. By F. S.
- On Acadie. By A. A. B.
- On Railway Signals. By L. S. W.
- On Home Science. By J. J. B.
- On Precession. By J. M.
- On Belts. By T. F. B.
- On a Centennial Problem. By J. L. A.
- On Trisecting an Angle. By E. C.
- On Life-Saving Appliances. By H. R.
- On Bees. By L. E. C.
- On the Etheric Force. By J. R.
- On Vaccine Virus. By B.
- On Dullness of Trade. By B. M.
- On Some Electrical Experiments. By M. B.
- On Boiling Down. By C. J. T.
- On Raising Sheep. By H. G. O.
- On Snowfalls in Colorado. By S. H.

Also inquiries and answers from the following: S. W.—S.—A. O. W.—H. S.—S. P. B.—J. W. S.—A. S.—C. T. S.—E. L. C.—G. S.

HINTS TO CORRESPONDENTS.

Correspondents whose inquiries fail to appear should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them. The address of the writer should always be given.

Enquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published here. All such questions, when initials only are given, are thrown into the waste basket, as it would fill half of our paper to print them all; but we generally take pleasure in answering briefly by mail, if the writer's address is given.

Hundreds of inquiries analogous to the following are sent: "Who does photo-lithography and heliotype? Whose is the best steam threshing machinery? Who makes traction engines in America? Who makes small ice machines? Who puts up lightning rods? Who makes loom shuttles? Who sells tools for marking wood rules? Who makes gutta serena plates for electrical machines? Who makes lathes for turning curtain rollers, etc.?" All such personal inquiries are printed, as will be observed, in the column of "Business and Personal," which is specially set apart for that purpose, subject to the charge mentioned at the head of that column. Almost any desired information can in this way be expeditiously obtained.