

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 1/2 x 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 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 silicic 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. 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.