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versal Wood Workers, address Bentel, Margedant & Co. Hamilton, Ohio,

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schaum on p. 155, vol. 31.-A. J. B. will find directions for cleansing greasy waste on p. 202, vol. 31. -R. J. will find directions for gilding picture frames on p. 90, vol. 30.-F. J. will find directions for adjusting a level on p. 218, vol 31.—J. N. will find a recipe for sulpho-cyanide of potassium on p. 219, vol. 31.

(1) G. F. asks: How is telegraph wire galvan ized? A. Galvanized wire is simply a wire covered with a coating of zinc. The wire is first immersed in acid, and then run through a vat of melted zinc.

(2) W. H. G. asks: How many cells of the Callaud battery will it take to run a small foot lathe on light work, with an engine to match? A. It depends upon how much power you require. You can get $\frac{1}{90}$ of a horse power by using 100 cells of very large size.

(3) A. J. asks: Can I get porous cups made at a pottery? A. Yes. 2. Would a gallon battery, consisting of a jar with copper cylinder, inside of which is a porous cup with zinc, the inside jar being filled with sulphuric acid and water, and the porous cup being filled with salt water, do for plating watches? A. It would not be a very good

(4) H. P. R. asks: Does the conductibility of a lightning rod dependupon the surface of the rod or the cross section, that is, will a rod 1/6 inch in diameter, round, be as good a conductor as the same amount of metal, flat and with a large surface? A. It depends upon the quantity of metal, irrespective of the shape.

(5) M. L. B. says: I propose to construct a burglaralarm (to be attached to doors and windows of my house) as follows: I use line wire No. 20, of copper, put up on brick work with shingle nails, the wires being 4 inches apart; longest circuit is 120 feet; bell magnet has No. 23 wire, to be operated by one cell of Léclanché battery. The wire is to be put up before the plastering, and is, of course, covered by the plasterer. The wire is common copper wire not insulated, but all joints are to be soldered. Will it work? A. Use copper wire insulated with gutta percha or kerite.

(6) E. E. R asks: Has any person discovered the properties of lightning? A. Franklin discovercd the identity of lightning and electricity. Its properties are the production of heat, magnetism, chemical decomposition, shocks, light, and polari-

(7) D. B. B. asks: 1. Where can I get a hard rubber plate for a Holtz electrical machine? A. At the rubber factories. 2. Would the ordinary hard rubber in sheets answer the purpose? Yes. 3. Is the effectiveness of a machine increased by a higher polish of the rubber? Yes.

(8) V. F. P. M. C. asks: How large a flue ought we to have in a stack 75 feet high, other things being in proportion and the surroundings favorable, for a boiler 5 feet×13 feet, with seven ty-one 3½ inch flues, in order to get the greatest benefit of fuel used? A. Make the area of the fluc about the same as the collective cross area of the

(9) L. H. M. asks: What fluid would be the best to use for changing the weight from one end of a tube to the other at will, in a certain stated time, by letting it pass slowly through a small opening, the same as in an hour glass? A. Dry sand, such as is sold by stationers will answer Perhaps mercury would be better. We could not tell without knowing more particulars.

(10) J. C. says: My steam gage poi lbs. when everything is cold. Is it reliable? A Possibly it has water pressure on it. You should have it tested, however, as soon as possible.

(11) J. R. N. asks: If there is an iron vessel of sufficient strength to stand a pressure of 250 lbs to the square inch, and of sufficient capacity to hold I gallon of cold water, can there be any more water forced into the vessel? A. Yes, since water is slightly compressible.

(12) J. T. R. asks: 1. How can I inflate a cot ton balloon with hot air? A. Soak a sponge in alcohol, set fire to it, and hold it under the balloon. It is well to put the sponge in a barrel or deep vessel. 2. Please give a recipe for varnishing cot ton balloons. A. See p. 136, vol. 28.

(13) W. B. asks: Has the screw ever been applied to car brakes instead of the chain, as a means whereby to work them? A. Yes.

Does any substance projected into space return with the same velocity as that with which it ascended? A. No, if your question refers to initial and final velocities.

(14) M. M. says: 1. Some of our engineers use old india rubber hose to make joints on the hand hole plates of their boilers; they claim that

but I think the gum corrodes the iron around the joint. Am I correct? A. No. The practice is very common, and generally approved. 2. Please give a rule for putting gage cocks in locomotive boilers. A. Place one 3 or 4 inches above crown sheet, and the others the same distance apart over

(15) C. T. O. says: I have been making some tests of a plain slide valve engine. I have taken the following data every half hour: Revolutions, indicator card, pressure of steam and atmosphere, and the temperature of outside of engine and in boiler room, injected water, and steam. I put a plug in the steam dome and in the water pipe, and filled it with mercury; but I do not get within 20° of the temperature due to that pressure. Could you tell me the reason? A. It would seem that either your pressure gage or thermometer is incorrect; but you do not send enough data to enable us to form a very definite opinion. We would be glad to receive from you an account of the trial, giving data and results, with description of manner of conducting the experiment. You need not be afraid of making it too full.

(16) N. C. F. Sr., says: I wish to build a small steamship about 3 feet long after the model of the Cunarders, to be driven by a screw. How large an engine would be required to move it rapidly? A. Make everything about on the scale of the original. We imagine that in Boston you can pick up more in a ship yard, in a short time, than you can learn from the most elaborate treatises.

(17) A. M. Z. asks: Will a flat bottomed boat 15 feet long, 28 inches wide, and 12 inches deep, sail as fast and stand as much as a round bottomed boat of the same dimensions? A. With a center board, it will do very well.

(18) A. D. H. says: 1. I am building a boat 25 feet long by 6 feet beam, drawing 2 feet of water. I wish to put in an engine 4×4 inches, and a boiler 2 feet in diameter by 4 feet high, having 28 two inch tubes. Will boiler and cylinder be in proportion, and will they be large enough for the boat? A. The machinery will answer very well. 2. What size of screw should I use, and what pitch? A. Use a propeller 2 feet in diameter, and of 3 feet pitch.

(19) C. R. says: Suppose we are standing on the upper side of the globe; when it has made a half revolution, and we are then standing with our heads downward, why are we not conscious of it? A. We are, to a considerable extent, if we take account of such incidents as sunrise and

(20) J. M. L. asks: 1. Is any advantage likely to be derived from attempting to bleach or clarify crude mineral olls, by bringing them in contact with bleaching gases, such as sulphurous acid or chlorine, or even only by hot air or steam, by some process similar to that used in Louisiana for bleaching sugar cane juice? A. No. Agitate the oil with one sixth of its bulk of oil of vitriol for some time; wash with water, and repeat the acid treatment a second time if necessary. 2. Could not chlorine be made at such a low price as to allow of using it instead of sulphurous acid in bleaching sugars? A. Chlorine gas may be obtained cheaply and in large quantities from chloride of lime (bleaching powder) by treating it with a little oil of vitriol.

(21) H. asks: What kind of acid is used to frost glass? A. Hydrofluoric acid is used for this purpose, and is obtained in the gaseous form by subjecting powdered fluorspar to the action of strong oil of vitriol in a leaden tray. This should be placed in a warm place, and the glass to be frosted placed over it as a cover. The sand blast has lately been substituted for this tedious and expensive process, with very satisfactory results.

(22) J. F. G. asks: 1. What material is best to coat paper with to render it waterproof? A. Dissolve 8 ozs. of alum and 334 ozs. of white soap in 4 pints of water; in another vessel dissolve 2 ozs. of gum arabic and 4 ozs. of glue in 4 pints of water. Mix the two solutions and make the mixture hot. Immerse the paper in the mixture, and hang it up to dry, or pass it between steam-heated cylinders. 2. Is it practicable to coat paper with porcelain enamel, such as pots and kettles are lined with? A. It is not possible to enamel paper with a sili-

(23) R. L. asks: Can you explain the fact that flies, resting on the wall, or any perpendicu-lar fixture or furniture, if alive will rest with their heads downwards? If dead, they will be found with the heads unwards. A. Our observations do not sustain yours. We find that, of flies resting upon the wall, etc., some have their heads pointing upwards and some downwards.

thority that muriate of soda will prevent coal oil from exploding. Will it do it? A. No, if we understand your question. 2. What is the reason that, the moment you place a chimney over a moking lamp it ceases to smoke, the lamp wick being at same hight in both cases? A. The shape of the chimney causes a greater supply of air to the flame, and consequently of oxygen; and the result is simply a more perfect combustion.

(25) C. B. H. asks: 1. How can I get rid of the peach borer in peach trees? A. The following plan, proposed by Harris, has been found very successful: Remove the earth around the base of the tree, crush and destroy the cocoons and borers which may be found in it and under the bark, cover the wounded parts with common clay composition, and surround the trunk with a strip of sheathing paper eight or nine inches wide, which should extend two inches below the level of the soil and be secured with strings of matting above. Fresh mortar should then be placed around the root, so as to confine the paper and prevent access beneath it, and the remaining cavity may be filled with new or unexhausted loam. This operation should be performed in the spring, or during the month of

it makes a tighter joint than hemp and white lead, June. In the winter the strings may be removed, and in the following spring the trees should again be examined for any borers that may have escaped search before, and the protecting applications should be renewed. 2. Will boiling water around the roots kill the trees? A. Yes.

> (26) H. R. asks: 1. Is an engine 2 x 4 inches large enough to run a boat 20 feet long? A. The engine is too small to give much speed. 2. Please give me the proportions of a boiler suitable for this engine to work at 200 lbs. pressure. A. Make an upright boiler with about 50 square feet of heating surface. 3. Please tell me the proper diameter and pitch of screw. A. Use a propeller 20 inches in diameter, and of 28 or 30 inches pitch. 4. How fast will she run? A. Ascertain this by experiment.

(27) R. L. S. asks: Will cold-blooded ani mals, such as fish, alligators, and snakes, live for rears, grow, and fatten, without food? A. No.

1. Are any of those stones known as Indian arrow points found in Europe, or anywhere else than America? A. In Europe. Consult Harper's Magazine of June and July, 1875, on an article entitled 'The Stone Age in Europe." 2. Were they in use by the Indians in America when it was discovered, or since? A. Before.

(28) C. J. G. asks: 1. Will phosphorus shine in the dark when put into a hermetically closed bottle? A. Yes, if the bottle contain air. 2. Will it consume itself therein? A. If not ignited by friction or otherwise, it will not. 3. Must it be put in water, even when hermetically closed?

(29) E. F. asks: 1. How would you advise me to use cotton seed as a food for cattle? A. You should remove as much of the oil as possible first. 2. In what condition should it be given, raw or cooked? A. Either way will answer; but with regard to the latter method, we find no account of it having been prepared. 3. Should it be given alone, or mixed with other food? A. The latter is perhaps the better method. 4. Will it give an oily taste to the meat? A. No. 5. Will cotton seed answer the purpose as well as corn, etc.? A. No

(30) J. T. asks: 1. What is the exact quantity of the ordinary commercial sulphuric acid required to decompose a given amount of protosulphide of iron? A. Ten pounds of Fe S will require 11:24!bs. of H₂ S O₄. 2. What is the amount of sulphuretted hydrogen and sulphate of iron thereby formed? A. This reaction will give you 38 lbs. of H₂ S and 17.4 lbs. of Fe S O₄.

(31) P. and B. say: We occupy a business coom which is roofed with tin from each end to center, with gutter in the middle, through which the waterfrom five otherrooms passes. This gutter occasions us a great deal of trouble by leakage. The contraction opens the scams in the tin, especially during cold weather. If we put in a gutter of one continuous sheet of tin the whole leagth, will the contraction be sufficient to break it? A. You do not say how long the gutter is; but in any case you will not be able to find a sheetof tin long enough to make the whole gutter in one piece. If you take galvanized sheet iron, and make in it some slight corrugations crossing it at rightangles to its length, there would be no danger of its reaking from contraction; and the corrugations would make no material impediment to the flow of the water.

(32) C. T. H. asks: Will worn-out printer's type make good Babbitt metal? A. No.

(33) R. G. says: 1. We have a stream of water here (the Wabash river) which is estimated to furnish 10,560 cubic feet of water per minute, having 10 feet fall. I estimate the power at 160 horse power; other parties who ought to know put it at less than 100. Will you give me your estimate? A. About 200 horse power could be obtained from the water if all the power were utilized. 2. What percentage of the water could be raised 80 feet by using the remainder as power? A. With good apparatus, you might expect to obtain an efficiency of from 60 to 70 per cent of the power of the water, from which it will be easy to determine the proportion of water raised to any hight.

(34) H. A. asks: At how many revolutions per minute must I run an engine, cylinder 4×4 inches, to obtain 4 or 5 horse power, with boiler pressure at 80 lbs., and a boiler large enough to generate all the steam required? A. From 400 to

(35) P. H. W. says: A steamer is 42½ feet long by 7 feet 5 inches beam, and 2 feet 10 inches deep below guard. The engine is 51/2 inches in diameter by 7 inches stroke. The screw is of 38 inches diameter, 12 inches width of blade at point, and 5 g upwards and some downwards.

(24) C. M. says: 1. I am told by good auminute, with 80 lbs. pressure. We make about 10 miles per hour. We have run 22 miles (conveying 18 passengers) in 21/4 hours, steam pressure averaging 87 lbs. With a view of increasing speed, I put on a steel plated screw of similar dimensions to the old one, except that the blades are 18 inches wide at point, tapering back to center. Each screw had two blades. With this screw the engine made 225 revolutions per minute; but it required 45 minutes to make 7 miles, which with the old screw would take 40 minutes. How much more power will I require? A. More than double the power used at present.

> (36) F. L. B. asks: Can you make clear the workings of what is known as planchette? A. It never works, if no one touches it, as far as we have heard. "A word to the wise is sumcient."

> (37) J. McC. says: Let a body of air be com pressed in a cylinder, and let it remain so until it cools. Then, if allowed to expand, it will be minus a force equal to the heat it has lost. If, now, the same air be immediately recompressed into the same space, it will not, according to my idea, lose any more heat, and therefore give back as much power as it receives, except what is lost in friction. Am I right? A. This is what will take place

If the air, on being compressed, is allowed to cool, its pressure will be decreased. Then, if it expands, and does work, its temperature will fall; and if it is recompressed, without loss from radiation, its temperature and pressure will again be increased. All this is expressed in the simple statement that, if there is no loss of heat by conduction or radiation, the air that is compressed is capable of exerting as much power, in expanding, as was employed to compress it.

(38) A. A. P. says: Suppose I take a cylinder of iron that will hold a gallon of water, more or less: Can I increase the power of a press in using all the water at once, without introducing the water gradually into the cylinder? A. Yes.

(39) S. B. asks: How long can a man live in a submerged boat, the air capacity of which is 200 gallons? A. With proper arrangements, the vessel would contain a supply of air sufficient for between 1 and 2 hours.

(40) G. W. S. says: I tried to extract potash from corn cobs by burning the cobs to ashes, and leaching them with water. I then boiled the leachings to dryness, and the potash which was the result would attract moisture from the atmosphere and turn to a strong lye. How can I prevent this? A. The product you obtained was, undoubtedly, pearlash, an impure carbonate of potash. This should be calcined in a suitable furnace and packed in airtight casks, as it is very hygroscopic.

(41) C. M. R. asks: How can I coat some small castings, made of Babbitt metal or pewter, with tin or some white metal to keep them white? A. Make your castings of Babbitt metal; and they will wear well and keep as clean and bright as

(42) G. A. M. L. asks: What is the composition and process of manufacture of common white shirt buttons? A. Some varieties of these buttons are made as follows: Finely powdered steatie is saturated with soluble glass, dried, and repulverized, and the powder thus obtained is pressed into molds by suitable machinery. They are then baked or fired in ovens, again dipped in solution of soluble glass, and subjected a second time to the firing process. When cool, they are polished by being placed in a rotating cask with water, dried, and again polished by rotation in a similar cask with soapstone powder.

(43) J. A. H. asks: Where is the Pennsylvanian soapstonedug or quarried? A. At Texas, Nottingham, Unionville; in South Mountain, ten miles from Carlisle; and at Chestnut Hill, on the Schuylkill.

(44) A. L. S. asks: How can I perfume soft wood in pieces three inches long? A. The wood might doubtless be impregnated, by means of hydraulic pressure, with any of the essential oils, etc., but we know of no substance the perfume of which might be considered as permanent or inexhaustible.

(45) A. C. W. asks: What preparation will make gutta percha stick to wood? A. Melt together equal parts of pitch and gutta percha. Ap-

(46) E. H. asks: 1. What influence has vegetable charcoal on the system? The dose is a teaspoonful in water. A. Its antiseptic properties Buckle, lever, S. Wales....... 167,041 render it a valuable medicine in some affections. Is there any cure for catarrh of the throat and nose? A. The following has been highly recommended: Carbolic acid 10 drops, tincture of lodine and chloroform, each 7.5 drops. A few drops of the mixture should be heated over a classification of the mixture should be a classification of the mixture should be classified as a classification of the mixture should be classified as a c drops of the mixture should be neated over a spirit lamp in a small test tube, the mouth of which should be applied to the nostrils as volatilization is effected. The operation should be repeated in about two minutes, when, after the patient sneezes a number of times, the troublesome car, lumber, J. Raddin 166,937 (Car coupling, P. Harper 166,937 (Car coupling, W. H. Ward 167,043 (Car, lumber, J. D. Ridgely, Jr 167,119 (Car, lumber, J. D. Ridgely, Jr 167,121 (Car, lumber, J. D. Ridgely, Jr 167,121 (Car, lumber, J. D. Ridgely, Jr 167,122 (Car, lumber, J. D. Ridgely, Jr 167,122 (Car, lumber, J. D. Ridgely, Jr 167,122 (Car, lumber, J. Ridgely, Jr 167,122 (Car, lumber, J. D. Ridgely, Jr 167,122 (Car, lumber, Jr 167,122 (symptoms rapidly disappear.

How can I make paraffin varnish? A. Paraffin is soluble in benzine, benzole, bisulphide of carbon, etc., and may be recovered from such solutions on evaporation of the solvent.

(47) W. H. W. asks: How is compressed yeast made? A. It consists usually of beer lees. flour moistened with beer, and other fermented : matter, the superfluous moisture having been removed by pressure. As a general rule, however, the recipes for the so-called yeast cakes, etc., are not made public.

(48) E. D. R. says: J. D. can clarify his cider by adding to each barrel of it 1 pint boiling milk; if the cider contains enough free acid to coagulate the milk, the coagulum, in precipitating, carries down with it all impurities held in suspension in the cider; this process has the effect of decolorizing the cider in some degree.

I have succeeded with shellac, sandarac, copal, etc., but have not yet been able to bleach a solution of dark gum arabic. Do you know of any process by which gum arabic in solution may be bleached, without injuring the adhesiveness of the mucil age? A. Try filtering the dilute solution through a stratum of animal charcoal: and then concentrate by evaporation over a water bath. This, we think, will render your mucilage perfectly clear.

(50) H. C. asks: How long does it take the moon to make a revolution around the earth? A The moon makes the tour of the heavens in a mean or average period of 27d., 5h., 43m., 11.5s., returning, in that time, to a position among the stars nee by coincident with that it had before.

COMMUNICATIONS RECEIVED.

The Editor of the Scientific American acknowledges, with much pleasure, the receipt of original papers and contributions upon the follow

On the Qualities of Sounds. By W. J. S.

On Industrial Expedients. By On Fog Signals. By W. B. T.

On Aerial Navigation. By E.M.B. On Northern Lights. By L. B. On a Solar Chronometer. By H. C. P. On Advice to Engineers. By C. C. J. On Repairing Bells. By J. E. E., and by J. H. B. Also inquiries and answers from the following: J. G.-B. A. P.-J. M. P.-J. J. M.-R. J. F.-H. B. J. J.-N. R.-W. B. W.-E. T. H.-T. E. C.-J. T. N.

HINTS TO CORRESPONDENTS.

Correspondents whose inquiries fail to appear shouldrepeat 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 sells the best photographic chem-Who makes the best brick-pressing machine? Who sells piano wire, in lengths of a mile and upwards? Whose is the best printing press for illustrated book work?" All such personal inquiries are printed, as will be observed, in the column of "Busifess 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.

[OFFICIAL.]

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5,116.—L. Payette, Montreal, P. Q. Pontoon for raising sunken vessels. August 27, 1875.

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5,118.-O. J. Sickles et al., Canton, N. Y., U. S. Milk cooler. August 30, 1875.

,119.-J. D. Heebner, Norritonville, Pa., U. S., et al. Governor for borse powers. August 30, 1875. 1,120.—E. G. Scovil, Simonds, N. B., et al. Piling iron. August 30, 1875.

5,121,5122.—G. N. Sanders, Jr., New York city. Spike. August 30, 1875.

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