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A. K. will find directions for polishing meerschmum 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 galvanized? 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 1/3 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 battery.

(4) H. P. R. asks: Does the conductivity of a lightning rod depend upon the surface of the rod or the cross section, that is, will a rod 1/2 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 burglar alarm (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 Leclanché battery. The wire is to be put up before the plastering, and is, of course, covered by the plaster. 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 discovered the identity of lightning and electricity. Its properties are the production of heat, magnetism, chemical decomposition, shocks, light, and polarization.

(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? A. 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 x 13 feet, with seventy-one 3/4 inch flues, in order to get the greatest benefit of fuel used? A. Make the area of the flue about the same as the collective cross area of the tubes.

(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 points to 5 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 1 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 cotton 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 cotton 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

it makes a tighter joint than hemp and white lead, 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 it.

(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 4x4 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 sunset.

(20) J. M. L. asks: 1. Is any advantage likely to be derived from attempting to bleach or clarify crude mineral oils, 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 fluor spar 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 same 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 3/4 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 silicate.

(23) R. L. asks: Can you explain the fact that flies, resting on the wall, or any perpendicular fixture or furniture, if alive will rest with their heads downwards? If dead, they will be found with the heads upwards. 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.

(24) C. M. says: 1. I am told by good authority 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 smoking lamp it ceases to smoke, the lamp wick being at same height 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

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 animals, such as fish, alligators, and snakes, live for years, 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? A. Yes.

(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 FeS will require 11 1/4 lbs. of H2 S O4. 2. What is the amount of sulphuretted hydrogen and sulphate of iron thereby formed? A. This reaction will give you 3 lbs. of H2 S and 17 1/4 lbs. of Fe S O4.

(31) P. and B. say: We occupy a business room which is roofed with tin from each end to center, with gutter in the middle, through which the water from five other rooms passes. This gutter occasions us a great deal of trouble by leakage. The contraction opens the seams in the tin, especially during cold weather. If we put in a gutter of one continuous sheet of tin the whole length, 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 sheet of 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 right angles to its length, there would be no danger of its breaking 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 height.

(34) H. A. asks: At how many revolutions per minute must I run an engine, cylinder 4x4 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 450.

(35) P. H. W. says: A steamer is 42 1/2 feet long by 7 feet 5 inches beam, and 2 feet 10 inches deep below guard. The engine is 5 1/2 inches in diameter by 7 inches stroke. The screw is of 38 inches diameter, 12 inches width of blade at point, and 5 feet pitch. The engine makes 280 revolutions per minute, with 80 lbs. pressure. We make about 10 miles per hour. We have run 22 miles (conveying 18 passengers) in 2 1/4 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 sufficient."

(37) J. McC. says: Let a body of air be compressed 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