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B. W. J. will find full directions for mount ing maps on cloth on p. 91, vol. 32.-J. E. S. will find a recipe for silverplating fluid, for use without a battery, on p. 408, vol. 32. For a silver bath, for plating with a battery, see p. 362 vol. 31. For directions for polishing silver ware, see p. 251, vol. 33.-J. D.'s circle-squaring demonstration proves nothing.-J. G. R. will find rules for calculating the proportions of screw-cutting gears on p. 107 vol. 34.-W. A. will find directions for silvering looking glasses on p. 267, vol. 31.-H. E. J. must use Indian or Chinese ink for Patent Office draw ings.-A S can mold rubber by the process de scribed on p. 363, vol. 30.-J. L. W. can attach sheet rubber or leather to iron pulleys by the process described on p. 409, vol. 33.—C. M. C. can calculate the horse power of his engine by the rules laid down on p. 33, vol. 33,-F. G. R.'s instrument is a pantagraph. See p 179. vol. 28.-L. L. T. can make rubber varnish for coating canvas by following the directions on p. 11, vol. 32.-O. W. I. can purify his silver solution by the method described on p. 324, vol. 33.—The instrument that M. McC. inquires about is the pantagraph, described on p. 179, vol. 28.—E. L. G., A. R. C. W. P. T., J.B. G. W. B., E. F. C., G. S. H., F. D. D., H. J., E.G.K. and many other correspondents who ask us to recommend books on industrial and scientific subjects should address the booksellers who advertise in our columns, all of whom are trustworthy firms, for catalogues.

(1) X. B. X. asks: What shall I mix with red lead to fill joints in iron? A. Use white lead ground in oil and mixed with enough red lead (dry) to make a putty.

(2) J. N. P. says: 1. I notice on some loco motive engines small tubes running from the boiler to the center of the steam chest cover What is its use? A. They are pipes connected with oil cups in the cab. 2. What causes the deafening noise sometimes heard about a locomotive? A. We do not know to what you refer, unless it is that occasioned by the sudden action of the pop valve. 3. Is there a gage attached to the cylindrical reservoir of compressed air, used in the Westinghouse air brake, to denote the pressure of the air? A. We believe so. 4. Which is the best coal for burning in locomotives, anthracite or bituminous? A. That is an open question.

(3) W. H. D .- Your statement as to freez ing of water is not complete. Let us know all the conditions of the question, and we will beglad to give you our opinion.

(4) H. C. E. says: A friend asserts that the fly or balance wheel of an engine gives power to the engine, and that the engine would not run without. I say that the fly wheel is put there only to regulate or keep the motion steady when the engine is going over her dead centers. Which is right? A. Your idea is the more nearly correct of the two. The object of the fly wheel is to regulate the speed of the engine, not only at the centers but on all occasions where there is a change in the amount of work. That engines will work without fly wheels is very evident from the numerous examples to be found in boats.

(5) F. T. H.-We do not get from your description a clear idea of the arrangement: but if the wheel is free to move and lift, that would account for the trouble.

(6) R. F. H. says: I had a coarse half round file, 6 inches long, that had become magnetized in a peculiar way. One pole was at the top and the other 2 inches from it. Is it usual for the poles to be thus situated? If so, how is it explained? A. We cannot say that such cases are usual; but it is probable, if the file were placed in the line of the dip, that a smart rap at two inches from the tip, that is, where the second pole is situated. would tend to magnetize it in the manner repre sented.

(7) W. T. says: Please publish for the ben efit of those who contemplate running small boats by steam, carrying neither passergers, hired men nor freight, what sized boats we can use and not be amenable to the inspection law? A. The act requiring inspection and licenses for steamers applies to all steamboats, of whatever size, whether run for pleasure or profit.

(8) W. J. W. says: It is desired to use hydraulic pressure, and to run several presses with one pump, pumping into a reservoir tank from which each press will be operated. It is desired to have the reservoir large enough to hold sufficient compressed air above the water to keep the press ure nearly uniform, the pressure being used irregularly, according to the work to be done. The pressure used is as great as 1,000 lbs. to the square inch, and the air over the water (in the reservoir) is soon absorbed by the water unless provision is made to prevent it. A rubber diaphragmhas been used to separate the air from the water, but the use of the diaphragm necessitates the use of a bad form of reservoir to admit of sufficient size and strength. Cannot a reservoir in the form of a cylinder be used, with oil floating on the water to keep the air from the water? Would the water absorb the air through the oil? A. We do not know that this has ever been tried. It is customary in such cases as yours to use Sir William Armstrong's accumulator.

(9) M. V. A., of Brunswick, Australia says: There is a dispute about the power required to lift water by the common suction pump. A asserts that it does not take any more power to lift water 2 feet than it does for 1 foot. B. maintains that the power required will be as the vertical hight to which the water is raised. What is the fact? A. The idea of power is incomplete I thinkyou are extravagant in your amount of is made as follows: Dissolve 3 parts earbonate of without the element of time; and on this fact B. heating surface for a factory. My experience has potash and 10 parts borax in hot water; then

much power to raise 1 lb. water through a hight of 20 feet in a minute, as it does to raise 1 lb. through a hight of 1 foot in the same time.

(10) J. H. P. says: In your last issue C. W. J. asks why it is easier to lift the upper millstone by the regulating screw while it is in motion, than when it is at rest. You ask if it is a fact. Take an illustration: Suppose a wagon wheel be suspended by a horizontal bar passing through the hub. To slide the wheel bodily on the bar would require considerable force. Now set the wheel revolving; and the slightest pressure against the wheel will cause it to move (slowly) along the bar. If you can explain this, you will have a clew to the other difficulty. When the wheel is in motion. the center of gravity or weight seems to move in a sort of spiral or inclined plane, and the friction is more easily overcome than when the wheel is at So of the millstone: The friction of the shaft through the lower stone and the friction of the upper bearing is more easily overcome when the stone is in motion than when it is a trest. The friction (call it a weight, if you please) moves up an ascending inclined plane, instead of perpendicularly; the general jarring caused by the motion of the wheel causes the regulating screw to move more uniformly instead of by fits and starts. A. We must suggest to you, as we did to C. W. T, that if you have any experimental data in support of your statement we would be glad to receive it before attempting an explanation.

(11) W. J. W. asks: What size of engine will it take to run a boat 16 feet long and 41/2 wide at 5 miles an hour? I have an engine 2 x 31/2 inch. s,and a boiler (upright tubular) 22 inches high and 9 inches in diameter? Are the engine and boiler large enough? A. The engine might possibly do (although it is rather small) with a boiler of sufficient size. We do not think your boiler would give very satisfactory results. For a boat of the size you mention, the diameter should be from 20 to 24 inches, and hight from 3 to 31/2 feet.

(12) R. K. asks: 1. Would 8 or 9 lbs. of zinc be enough to put in a steam boiler to remove hard lime scale? A. So far as we know the principal action of zinc is rather to prevent corrosion. As to the experience of correspondents with zinc as a scale preventive, see p. 369, vol. 31, and p. 36, vol. 32. 2. Is it proper to blow off the water from a steam boiler with a pressure of 40 lbs., 4 hours after the engine stops, with the fire all raked out and the drafts turned off from the boiler? A.It is better to et the water remain in the boiler over night, until it becomes comparatively cool; and then allow it to run out, and clean the boiler at once, washing the parts inaccessible by hand with water from a

(13) G. W. M. says: I have an engine 3 x 31/2 inches; what size of propeller will it drive, to propel a boat 16 feet long by 5 feet beam? A. You can make a propeller 20 inches in diameter, 21/2 feet pitch. 2. What size of boiler will it take to run the engine at 300 strokes per minute? A. Use a vertical boiler 24 inches in diameter and 31/2 feet high.

(14) W. P. H. asks: 1. How can the amount of air drawn into the firebox of a loco motive be measured? A. By measuring its velocity and the sectional area of the inlet. 2. What means can be adopted to measure suction in the fire box, and compare it with the suction in the smoke box (the difference being mostly due to the friction of gases in the flues)? A. Two delicate gages might be used, such as bent tubes, containing fluids. 3. It has been stated that a vertical boiler of two thirds the capacity of a horizontalone, will furnish the same amount of steam Is this so? A. We would hesitate to endorse such a sweeping assertion.

(15) S. C. N. asks: What is the least amount of water pressure that would feed a boiler carrying 90 lbs. of steam per squareinch? A. We could not answer this question definitely, without knowing size and arrangement of connections and amount of feed; but in general it would be well to have a pressure of water of from 3 to 5 lbs. greater than that in the boiler.

(16) D. H. D. says: I want enough hydraulic cement, or some cement that will harden or stop out water under water, to cement a space of about 8 feet in diameter in the bottom of my cistern. What is best to use? A. Portland cement is the best you can use, and you will find it advertised in our columns. If you can make the bottom of your cistern concave, it will present a greater resistance to the action of the water beneath.

(17) G. C. asks: How can I filter dust out of atmospheric air? A. It is claimed that a shield placed against an opening will cause the particles of dust in the current of air striking against it to fall below, where, if a pan of water is placed, said dust will be retained, and the purified air may enter below the shield, passing over the surface of

(18) L. H. P. says: 1. Does E. H. R., in anwer to H. F. R., No. 49, February 19, mean one fifth as much heating surface in the boiler as he has of radiating surface, or does he measure the entire surface of the boiler, including the tubes? A. He probably has reference to the effective heat ing surface in the boiler, which is usually taken as only one half the entire surface, meaning that which comes in contact with the fire. 2. What is the rule for finding the size of supply pipes for coils where exhaust steam is used, also for live steam? A. For exhaust steam the pipe should be large enough not to make an obstruction by friction within it, and no smaller than the pipe where it leaves the cylinder. There is no rule other than custom for live steam, which has most usually adopted 1 inch pipe. 3. In your answer to A. S.

is right. For example, it takes twenty times as been that one superficial foot of heating surface to 100 to 125 feet of air for the first floor, 150 for the second, 175 for the third, and 200 for the fourth (where there are stairways and hatchways) is sufficient, even with exhaust steam. With live steam less will answer. The exposure and construction of the buildings should also be considered. A. All systems of heating should be adapted for zero weather; it is easy to turn down the steam to grade it for milder weather. For factories, however, where well protected, your quantities would

> (19) S. & P. M. Co. say: We are engaged in the manufacture of attificial stone. What could we use for coating the stone with to render it weatherproof? A. Stone itself is not weatherproof; and the manufacturers of artificial stone have not yet succeeded in discovering an application that will make their imitation stone quite equal to the real. Pure Portland cement probably affords the best surface for unbuint ware, and guazing is the best for that which is passed through the kiln.

> (20) O. A. L. asks: What is the rule for finding the length of a perlin post of a building, when it is set at a right angle to the rafter, for the following pitches: $\frac{1}{8}$, $\frac{1}{6}$, $\frac{1}{6}$, $\frac{3}{6}$, $\frac{2}{6}$? Let the width of the building be 36 feet, pitch $\frac{1}{16}$. Then the hightis 12 feet and the length of the rafter is 21 633 feet. What would be the length of the perlin post? A. Multiply the hight by half the length of the rafter, and divide the product by half the span; the quotient will be the length of the purlin post. This is general rule for any pitch. But unless you provide a post or wall to support the point in the span on which the purlin post rests, this is a very faulty construction, subjecting the tie beam to a cross strain; the proper position for the purlin post or brace is directly from the center of the span to the middle of the rafter, the center of span being held up by the suspension post or rod.

> 1. What is the average power of a horse in foot lbs.? A. The ordinary work of a horse has been estimated at 22,500 lbs. raised 1 foot in a minute for hours a day. 2. A map of a certain town says that one dam in the river is of 30 horse power and another is 115 horse power. Please explain the term as there used. A. ltindicates that the volume of water and the hight of the fall are suffi cient to give that amount of power at each dam spectively

> What is the quickest time made by any steam essel between New York and Liverpool? See p. 97, vol. 34. As the Liverpool steamers generally stop at Queenstown, the time is usually given from the latter port. The steamer City of Berlin made the trip from New York to Queenstown in 7 days, 15 hours, and 48 minutes.

> (21) N. S. J. asks: Please give me the rule for determining the power of a screw press, having given the diameter, weight, and velocity of the balance wheel, the size and pitch of screw, the friction, and any other elements entering into the problem. A. It would take a very extensive investigation, and a great deal of calculation, to enable us to answer these questions. You will find considerable information on the subject in Nystrom's "Elements of Mechanics."

> (22) M. D. L. R. says: I am building a ortable engine. The boiler is vertical, of 26 inches inside diameter and hight 5 feet. It is set in a smoke box that runs down and forms the fire box. There are 30 tubes of 2 inches inside diameter; di rection of draft is up between the smoke box and boiler, also through the vertical tubes. Will it do to have the fire to go between boiler and smoke box, thereby heating the outside of boiler shell? A. It will not improve your boiler. 2. How high shall I keep the water level in said boiler? A. About 4 feet. 3. Have I too many tubes for the size of shell? A. No.

> (23) J. B. asks: How can I paste silk on to wood without spoiling the silk? A. Good flour paste has given satisfaction for this purpose

> (24) J. D. P. says: Please inform me of something reliable that will cure corns and warts. A. If the corn has attained a large size, removal by cutting or ligature will be necessary. If it hangs by a small neck, the latter method is preferable. It is done by tying a silk thread around the corn, and, on its removal next day, another still tighter, and so on until completely removed. When the base is broad, a cautious dissection of the corn from the surrounding parts by means of a sharp knife or razor is necessary. This is done by paring gently till the whole is removed. In all cases of cutting corns, the feet ought to be previously washed, as in case of making a wound in the the great danger may result from want of cleanlinessin this respect. Mortification has been the result in some cases of this neglect. For the eradication of warts, the proper application of caustic potassa (stick) is highly recommended.

> (25) J. M. and others ask: How can we dissolve shellac in alcohol, aqueous solutions of borax, etc. ? A. Dissolve 5 parts borax in 25 parts hot water, and add 41/2 parts of shellac in fine powder. Boil until solution is effected. Shellac does not form transparent, alcoholic solutions.

> (26) M. A says: 1. How can I bleach felt hats? A. Hat felt may be bleached by means of sulphurous acid gas. Felt hats are dyed by alternate immersion in a hot aqueous solution of logwood 38 parts, 3 parts green vitriol, and 2 parts of verdigris, and exposure to the air (each part of this process having a duration of about 10 or 15 minutes). This dipping and draining is sometimes repeated as many as 13 or 14 times, or until a bright glossy black is obtained. The aniline colors may also be used for this purpose. Felt is much more difficult to thoroughly dye than ordinary woven woolen goods. 2. How can I make the stiffening for felt hats? A. A good stiffening

add 50 parts shellac, and boil until solution is effected. The stiffening may be applied (to the inside of the hat) by means of a brush. As soon as this is done, the hat should be immediately immersed in very dilute oil of vitriol in order to neutralize any excess of alkali, and to properly fix

(27) A. N. asks: Is there any danger of lead poisoning, or other serious consequences, from the use of sugar of lead as a wash for sores? A The danger depends upon the strength of the solution used and the frequence of the application Colic sometimes results from the very free use of solutions of acetate of lead. Pereira states that paralysis is caused by using acetate of lead.

(28) J. E. K. says: You gave the following recipe for a liquid for mixing rocket stars: Alco hol ¾ oz., camphor ¼ oz., isinglass ¼ oz. How can the isinglass be dissolved in alcohol? A. It cannot. The quantity of alcohol given is just sufficient to render the camphor capable of being properly incorporated with the other ingredients by maceration. Do not add the gelatin untitall the other ingredients have been uniformly intermixed by gentle trituration in a mortar.

(29) S. B. asks: In crushing highly sulphurous ores with Cornish rollers at 120 revolu tions per minute, will the sulphur have any effect on the iron or face of the rolls so as to injure its texture? A. We think not.

(30) A. B. asks: 1. Of what is Indian in composed? A. Indian or Chinese ink is formed of carefully purified lampblack and size, or animal glue, with the addition of perfumes, not ne cessary, however, to its use as an ink. 2. In what substance is lampblack soluble? A. Commercial lampblack always contains more or less resinous and tarry matters, that are soluble in oil of turpentine, benzine, naphtha, etc.; but the purified lampblack (carbon) is itself insoluble in any men

(31) C. K. asks: What metal or alloy expands the most and quickest at a temperature with in 300° Fah.? A. Zinc. Taken at 32° Fah., a rod of zinc 25 feet 4 inches long will have a linear expansion at 212° of about one inch.

(32) V. C. T. says: I have a lot of thin malleable iron castings, which I am havingground, polished, and nickel plated, but they all have a dull leaden appearance after being plated. They tell me the fault is in the casting, that the malleable iron was burnt. Can this be true? A. Malleable iron may be readily nickel plated if the work be first properly finished. If the castings are burnt, it will be necessary to refinish them before a satisfactory deposit can be obtained.

(33) E. S. T. asks: Why do preserves, that are in perfectly airtight jars, mold? A. If the preserves be placed in the jars while hot, so as to completely fill the jar and expel the air, the preserves will not mold.

(34) E. S. H. asks: How can I make colored fires? A. Try the following: For light blue 61 per cent of chlorate of potash, 16 of sulphur, 23 of strongly calcined alum. Fordark blue, 60 per cent of chlorate of potash, 16 of sulphur, 22 of carbonate of copper, 12 of alum. For deep blue, use 54 per cent of chlorate of potash, 18:5 of charcoal and 27.5 of ammoniacal sulphate of copper. It is hardly necessary to mention that great care is re quired in mixing these materials, and that each ingredient should be pulverized separately. For red fire use 29 7 parts chlorate of potash, sulphur 17.9, charcoal 1.7, nitrate of strontia 45.7, black sulphuret of antimony 5.7. For green, chlorate of potash 32.7, sulphur 9.8, charcoal 5.2, nitrate of baryta 52.3. For yellow, sulphur 23.6, charcoal 3.8 nitrate of soda 9.8, saltpeter 62.8.

(35) T. L. asks: Is a large deposit of soda such as is generally deposited from soda springs of any value? A. Yes. It might be profitably used as a flux in reducing ores

(36) R. S. asks: How should bodies of cel lular structure, being saturated with nitrate of silver to become conductors of electricity, be treated with hydrogen gas? A. Enclose in an atmosphere of pure hydrogen and heat to redness. Solutions of copper are preferable to silver, as they are much cheaper.

How is the double sulphate of nickel and ammoniaprepared? A. See p. 139, vol. 29.

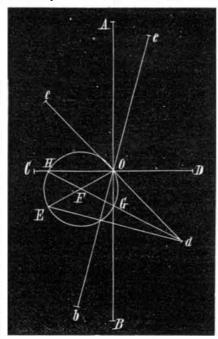
(37) G. S. says: I have a drum head that has lettering on it, done in black. How can I take should have stated, if possible, the character of the pigment employed in the lettering. The folwhere this is not known: Water, ether, ether and alcohol, benzole, naphtha, chloroform, bisulphide of carbon, caustic alkalies, diluted acids, solution of cyanide of potassium. They should be applied consecutively in the order given. It must be borne in mind that many of the abovementioned solvents are extremely injurious to the material of the drum head, and care should be exercised to pre vent any unnecessary contact.

(38) J. H. B. asks: How can I renovate a sponge mattrass that has become hard by use and dampness? A. This has not been satisfactorily accomplished.

(39) C. & Co. ask: 1. In the manufacture of fluid magnesia, to what pressure would you charge the fountain with carbonic acid gas? To 12 ozs. water add ¾ oz. magnesia and add citric acid to slightly acid reaction. Such acidity is generally found more palatable than a neutral solution. Sweeten, add a few drops oil of lemon to fla vor, and 18 grains potassa bicarbonate. This is the proper fluid magnesia. Many sell a spurious article made of tartrate of soda with a little soda bicarbonate flavored with lemon. 2. How is the magnesia bottled? A. Bottle in the ordinary way not using the carbonic acid apparatus.

(40) E. B. J. says: I desire to make a mucal instrument, the sound being produced by striking wooden strips, of uniform thickness and varying length. Supposing the shortest strip is 4 inches long, what will be the length of the others down to 2 octaves below the note sounded by that one? What is the best material for the hammers, and what kind of wood gives the best sound? A. The relative lengths of the pieces, for an octave on the natural scale, are as follows: $1, \frac{8}{9}, \frac{4}{6}, \frac{3}{4}, \frac{2}{8}, \frac{8}{5}, \frac{3}{8}, \frac{2}{1}$. This progression is upward, the $\frac{1}{12}$ length sounding a note one octave above the 1. Another octave upwards can be formed by halving the figures, thus: $\frac{4}{3}$, $\frac{3}{5}$, $\frac{3}{8}$, $\frac{1}{8}$, $\frac{3}{1}$, $\frac{1}{10}$, $\frac{4}{15}$, $\frac{1}{4}$, and so on as long as desired. We believe they are generally laid on straw, and struck with wooden hammers. Some of our readers, however, may be familiar with the use of the instrument, and will correct us if in

Given a set of conjugate diameters of an ellipse, how can the axes be found so that the curve can te conveniently constructed? A. Let e b and cd te



the given conjugate diameters. From d draw a line perpendicular to e b, and make its length, d E, equal to e O. Join the points, O and E, by a straight line, and upon O E, as a diameter; describe a circle. Draw a straight line, dH, through dand F, the center of this circle. G and H, where the line cuts the circle, are points in the principal axes, and Gd, Hd, are the lengths of the semi axes, so that A B and C D are the axes required.

(41) J. B. asks: How can I produce a gloss on hard rubber? A. Ebonite may be worked, in all respects, like any hard wood. Pumice powder and rottenstone are commonly employed as finish-

(42) E. P. J. asks: 1. What is the precise diameter of the piston of a reciprocating engine, presenting 144 square inches of area? A. Calling π the ratio of the circumference of a circle to a diameter, the diameter in question is equal to 24 divided by the square root of π . As, however, the value of π cannot be precisely expressed in numbers, it is impossible to give the precise diameter of the piston. 2. What would be the horse power of such an engine with 2 feet stroke, running with 100 lbs, boilerpressure to the square inch at 100 revolutions per minute, and cutting off at 1 foot, or 1/2 troke? A.The data sent are insufficient for an accurate calculation. See p.33, vol. 63. 3. Whatis the calculation as to the percentage of power lost by friction in the reciprocating engine? A. It varies in different engines from 10 to 40 per cent, From 20 to 25 per cent would possibly present a fair average. 4. What would be the increase of power in the above named engine if the steam both before and after the cut-off, were always operating at 1 foot leverage from the center of the shaft, as it now is at the half stroke, without commencing near one dead center and losing its expansion in the other? A. The mean leverage throughout a revolution is about 0.6366 of the length of the crank, and the center of the crank pin moves 1.5708 times as far as the piston in a revolution: so that the whole power exerted by the the marks off without injuring the head? A.You piston is transmitted to the crank, except what is lost by friction. It would seem impossible to do more than this, whatever the leverage might be. lowing is a list of the solvents commonly employed 5. With what speed would a 1 inch square column of water, with 15 feet head, enter a vacuum, with out regard to friction in the tube? A. At a rate of a little more than 56 feet per second. 6. Is it true that air enters a vacuum at the rate of 1,300 feet per second? A. This is an average approxi

(43) H. E. E. asks: 1. What is squaring the circle? Is it finding a square with an area equal to the area of a circle of given diameter? A. Yes. 2. If so, does not the whole trouble lie in finding the area of a circle? A. Yes. 3. Does not geometry demonstrate the process beyond the possibility of error? A. No.

(44) H. D. P. asks: How is the bronze made that is used for bronzing statuary, etc.? Bronze statuary does not require the application of any bronze. Make your castings of: Copper 88 parts, tin 9 parts, zinc 2 parts, lead 1 part. You can then polish the castings to suit your taste.

(45) T. H. says: I saw in a recent issue of your paper a statement that man appeared on the earth 150,000 or 200,000 years ago. Will you refer me to the evidence of the existence of pre-adamite men? A. Sir Charles Lyell's work on "The Aniquity of Man" is a complete resumé of the whol tubject, which is too extensive for our columns.

(46) P. S. says: I saw a meteor in Kansas on December 27, 1875, and I wish to know of what kind of matter such bodies are composed. A.Mateoric bodies are of two classes. Some are composed of entirely combustible, while others are of combustible and incombustible, matter. They revolve around the sun in orbits more elliptical than the orbit of the earth, so that parts of their orbits are internal and parts are external to the earth's orbit. When the earth and the meteoric bodies come near enough together so as to bring the latter within the earth's atmosphere, they are ignited by the resistance, and are either wholly or partially consumed. If their course and the attraction of the earth would bring them to the earth's surface, then the combustible ones would probably be wholly consumed before reaching it, while the others fall in the form of iron, etc. At times they only pass through the upper portion of the atmosphere, and, after receiving a very warm reception for a few moments, are allowed to go on, but not in their old paths.

(47) J. C. C. asks: What are the ingredients and proportions of the wax used by electrotypers for taking impressions of type? A. Yellow beeswax will do very well

(48) L. & G. M. Co. ask: What preparation can be applied, with a pen, to mark numbers on the surface of tin plate? A. Squeeze the juice of a lemon into a cup, and put in a bit of copper, of the size of a cent. Let it stand for a day or two then use it with a quill pen.

(49) J. H. savs: I have a material containing free sulphur. By applying heat I drive the sulphur off in the form of gas. How can I condense those fumes, so as to obtain flowers of sulphur? A. It is necessary that the sulphur vapor should not come in contact with the air, otherwise a portion of it will be oxidized and converted into sulphurous acid gas. Sulphur may be volatilized or sublimed at a temperature of 792° Fab If it then be condensed in suitable vessels, we have the substance commonly known as flowers of sulphur. This is done, says the United States Dispensatory, by allowing the fumes to condense on the walls of a brick chamber.

(50) R. E. says: J. H. P. states on p. 114, current volume, that no chimney burners are safe on account of the shortness of the wick tube, and he expects to do better with a tube 4 inches long instead of 11/2. He is certainly mistaken. Every coal oil burner should, and most of them do, contain a little flat tube, which serves for the escape of gas formed by heated oil. With this tube a nochimney burner is just as safe, if not safer, than a burner with chimney. Lamps with chimneys get a great deal hotter than those without, for two reasons: The chimney, producing a better draft, causes a more perfect combustion of the oil, and consequently a whiter light and more heat from the same amount of oil burnt; and the chimney, being always near the flame, gets a great deal hot ter than the constantly changing air would without a chimney, and will consequently radiate heat to all the surrounding objects, of which the oil reservoir gets its share. If J. H. P. wants to use a wick tube 21/4 inches longer than generally used, he will find that oil of 150 gravity, as the law now requires in most of the States, will not rise at all so high in sufficient quantity to feed the flame: his wick will therefore get charred, and he will be obliged to burn lighter oil, and so increase the danger of ex-

(51) J. M. S. says: In a recent issue you commended strips of plank to be used beneath the window sash for the purpose of ventilation. have used the same, but for applying or removing expeditiously I hinged them at the center, and covered them above and below with felting or rubber to keep out the cold.

(52) M. W. L. says, in reply to C., who asks as to the weight of the 20 and 15 inch guns: They weigh respectively 115,200 and 49,100 lbs.

(53) J. J. B. says, in answer to a correspond ent who complained of heating of millstones: To avoid hot grinding, reduce the speed of your millstones and grind slower; and in staffing the stone put in a piece of writing paper, and let the stone be just so lightly fixed that the paper will slip out from under the staff, near the eye of the stone.

(54) J.J. B. says: Tooil a mill spindle at the bush, bore a % inch hole through the wood block in bush, next to spindle. Take a piece of % inch iron gas pipe, bend, and insert it, bringing under the stone up through the floor, outside of the curb. Let the outside end be the highest. Use castor oil in oiling, as it never congeals, and you need never have any trouble in oiling millstones in the coldest weather

(55) W. L. S. says, in reply to an inquiry as to why a telegraph sounder connected with the bell of analarm clock does not work : Every telegrapher knows that a quick tap on the key, no matter how hard, will not affect the sounder, as it does not give time for the magnet to work. The stroke of the alarm striker is exactly of this nature, and therefore cannot repeat itself on the

(56) J. C. says, in reply to L. S. C.'s queries as to the effect of dampness on unused boiler furnaces: Into a closed vessel place 5 to 10 gallons heavy oil (petroleum paraffin); place the vessel at a safe distance, with a pipe to lead the vapor of the oil under the boilers. Close up every crack or crevice by luting, put a fire under the vessel, and evaporate the oil. The whole of the fire surface and even where the brick is in contact with the boiler, will be sweated or covered with the condensed vapor of the oil. To protect the inside of the boller, first dry it by a very light fire under it; then put a few gallons petroleum in each boller and evaporate it by a light fire under the boiler. As the oil vapor condenses, the whole inside of the boiler will be coated with a rust-proof coat of

(57) D. F. J. says, in reply to J. A. H., who says that the carrying boards of his reels are flat, and that the flour sticks on them: If you give your carrying boards enough pitch, keep your stones in good order, and do not grind hot, you will not have any further trouble in that line. Sandpaper the boards and then put shellac on them.

(58; J. B. J. says, in reply to H. M.'s query as to the line of the magnetic meridian: Since the latitude and longitude of the place are not given, the question may be considered under two hypotheses: 1. The line may be in Maine or thereabouts, where the declination of the magnetic needle from the meridian has varied from 14° to 17° during the last 40 years. 2. It may be in some of the Western States, where an equal declination, but opposite in direction, has existed during the same period. If the first supposition be true, then the first surveyor made due allowance for the declination, and located substantially a true meridian. The subsequent surveyors, neglecting the declination, located a magnetic meridian, which is constantly and indefinitely fluctuating. If the line in question is west of the Alleghanies, it would seem that the first surveyor ran the line parallel with this needle, disregarding declination: hence it would not be a true meridian, the two subsequent surveyors being in this case approximately cor-The amount and direction of the discrepancy between these two latter appear to favor the first hypothesis; it is readily accounted for, however, under the second, when it is remembered that the deviation of the magnetic needle from the true meridian is a constantly varying quan-

(59) D. C. R. says: S. H. B. and many others lesire information as to building boats. In the first place, make the keel of required length and about 114 inches thick and 4 inches wide, with a abbet to receive the edge of garboard Put on stem and stern as required, and fasten them on some good support about 2 feet from floor; then place molds of the shape required, in about 5 sections, across the keel and secure them. and cut the first strake to fit keel and stem and stern. Nail on, and continue to cut and nail on until of the depth required: then bend in ribs and put in seats and other inside finish.

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

J. M. M.-It is ramie fiber.-T. T. R.-It is sulphide of lead (galena) accompanied by sulphate of baryta (heavy spar).-W. P. T.-It is sulphuret of iron, irised by a superficial oxidation.—J. L.—It is iron pyrites, at present not of much commercial value.—W. A. J.—It is bituminous shale, impregnated with sulphuret of iron, to which the glistening metallic appearance is due.—G D. M.—It is impossible to make an analysis of any value on 2 ozs. of water. One gallon is needed, carefully sealed up in a perfectly clean bottle of white glass. -G. J.-No. 1 is alunogen, a variety of native alum consisting of sulphuric acid, water, alumina, a little iron, etc. It may be purified by solution in water, and then, by saturation with alkali and crystallization, be converted into common alum. No. 2 is blende or sulphide of zinc. No. 3 is black argillaceous shale. No. 4 is ferruginous quartz.— M. R.—There appears to be no market in New York for sand of this character which has to be transported any distance.—J. R. M.—It is calcite or crystallized carbonate of lime.—C. E. G.—The metal is lead: the mineral is muscovite (potash

J. W. S. says: I am taking a carbolate of iodine inhalant for catarrh, and it scents my clothes with an unpleasant odor. Can you tell me of something to mix with it to produce a pleasant odor?-W. McD. says: How can I get a smooth surface on planished copperplates?-T. J. asks: How are the inches, etc., put on wooden rules?-W. S. says: R. W. R. states that he is carrying 20 horse power by a cotton rope. How does he maintain the proper tension during damp or dry

COMMUNICATIONS RECEIVED.

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

On Thermometrical Tables. By J. B. G. On the Sargasso Sea, etc. By M. On Bored Wells. By L. L. On Windmills. By A. McL. On a Registering Barometer. By W. A. B. On Projectiles. By R. H.

On Spacing Circles. By G.

Also inquiries and answers from the following: H, C. N. -J. D, M. -O. A. -C. F. E. -E. W. -L. H. Q. -L. D. D, -A. N. W. -W. M. R. -W. S. R. -J. M. -D. M. H. -A. G. -A. W. -C. M. -F. B. -J. E. -F. W.

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 eclines 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; butwe generally take pleasure in answering briefly by mail, if the writer's address is given.

Hundreds of inquiries analogous to the following are sent: "Whose is the best smut mill for wheat? Who sells incubators? Who makes fuses for blasting? Who makes small copper tubing? Who sells crushers for treating copper ores? Who sells railroad spike machines? Who sells ear trumpets? Who makeselectrical musical reporters?" All such