Notes & Queries

B. W. J. will find full directions for mounting 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 drawings.—A S. can mold rubber by the process described 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. B. 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 locomotive 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 freezing of water is not complete. Let us know all the conditions of the question, and we will be glad 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 represented.

(7) W. T. says: Please publish for the benefit of those who contemplate running small boats by steam, carrying neither passengers, 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 pressure 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 diaphragm has 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 without the element of time; and on this fact B. is right. For example, it takes twenty times as 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 rest. 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 at rest. 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 4½ wide, at 5 miles an hour? I have an engine 2 x 3½ inches, 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 3½ 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 dratts turned off from the boiler? A. It is better to let 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 hose.

(13) G. W. M. says: I have an engine 3 x 3½ 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, 2½ 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 3½ feet high.

(14) W. P. H. asks: 1. How can the amount of air drawn into the firebox of a locomotive 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 horizontal one, 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 square inch? 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 the water.

(18) L. H. P. says: 1. Does E. H. R., in answer 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 heating 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., I think you are extravagant in your amount of heating surface for a factory. My experience has 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 suffice.

(19) S. & P. M. Co. say: We are engaged in the manufacture of artificial 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 unburnt ware, and glazing 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: ⅛, ⅕, ¼, ⅓, ⅜? Let the width of the building be 36 feet, pitch ⅓. Then the hight is 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 a 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 8 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. It indicates that the volume of water and the hight of the fall are sufficient to give that amount of power at each dam respectively.

What is the quickest time made by any steam vessel between New York and Liverpool? A. 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 portable 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; direction 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 cleanliness in 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 4½ 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 is made as follows: Dissolve 3 parts carbonate of potash and 10 parts borax in hot water; then