Notes & Queries

G. D. T. will find a recipe for waterproof glue on p. 43, vol. 32.—A. C. G. should use Indian ink for architectural drawings.—C. A. W. can French polish beechwood. See p. 11, vol. 32. To mend a rubber band, put a piece in with the cement described on p. 203, vol. 30.—F. S. will find directions for making baking powder on p. 123, vol. 31.—F. E. H. will find directions for transferring engravings to glass on p. 298, vol. 31.—G. S. should consult a dentist.—W. T. B. will find directions for making hard soap on pp. 331, 379, vol. 31.—W. O. G. will find directions for cleaning shells on p. 122, vol. 27.—S. N. C. will find directions for browning gun barrels on p. 11, vol. 32.—C. P. can blue steel work by the process described on p. 123, vol. 31.—W. M. will find directions for silvering mirrors on p. 267, vol. 31.—W. P. will find directions for making a weather glass on p. 75, vol. 30.—P. K. D. will find that the pretended plated diamond is an imposition.—F. H. M. will find directions for softening iron for electro-magnets on p. 123, vol. 31.—H. S. B. will find directions for making Babbitt metal on p. 364, vol. 29.—C. A. H. will find a recipe for a hair restorer on p. 363, vol. 31.—D. A. H. will find complete instruction in the art of mechanical drawing in the SCIENTIFIC AMERICAN SUPPLEMENT.—E. R. G.'s plan for striking the curve of a segment of circle, the chord and altitude being given, is very old.—E. S., W. L. B. J.H., H. C. S., and others 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) A. W. says: 1. I have an achromatic object glass of 30 inches focus and 1½ inches aperture. I wish to know what eyepiece to use. A. You can use the one described on p. 315, vol. 34, or the one described on p. 203, vol. 35. 2. What advantage has an eyepiece with four glasses over one with only three? A. An eyepiece with four glasses can be better corrected.

(2) A. G. C. asks: 1. What power is necessary to drive two circular saws (1 cross cut and 1 rip) of 12 inches in diameter, in 2 inch pine lumps? A. About 4 or 5 horse power. 2. What size of boiler would be necessary to furnish steam for an engine 3x6 inches, running at 250 revolutions per minute, cutting off at about ⅞ stroke. A. One with about 75 feet, superficial measure, of heating surface.—J. E. E., of Pa.

(3) A. E.R. says: What would be the dimensions of an air pump to work from an eccentric to give 80 lbs. pressure to the square inch in the shortest time? A. If you have plenty of power to drive the pump, you can get 80 lbs. pressure with a large pump as quickly as with a small one, if the action is direct. And in proportioning the size, you need only look to the total pressure which you wish to exert.

(4) E. D. G. asks: 1. If a balloon has, when filled with gas, a lifting capacity of 100 lbs., would it not have double that lifting capacity if twice the volume of gas could be compressed within its sphere? A. It would have less. 2. A balloon will ascend until it reaches equilibrium, or, in other words, until it reaches an elevation at which the gas and atmosphere are of the same weight. If by a safe process the gas could be heated, would not the balloon attain a greater elevation? A. Yes, if the balloon could expand.

(5) O. J. B. says: Please give me a method of producing the logarithmic spiral, and also state its use in mechanics. A. Draw a circle, divide its circumference into any number of equal parts, and draw radii from these points to the center of the circle. Then divide one of the radii into the same number of parts, increasing the length of the successive divisions, from the center, in geometrical progression. Transfer the points so determined to the successive radii, thus determining points of the spiral.

(6) R. M. B. says: Can a ladle or suitable vessel be made for melting 2 lbs. of iron in a common blacksmith's forge? If so, of what and how shall it be made? A. There are small plumbago crucibles made for this purpose. Metal ladles would not serve your purpose.

(7) J.N.W. asks: 1. Who first applied steam power to the propulsion of boats, and is the inventor of steam navigation? A. The Marquis de Jouffroy, of France, used a steam engine in a vessel some years before Fulton. 2. Who first applied steam power to a locomotive on an experimental track, and is entitled to the credit of the invention of railroading? A. It is generally supposed that the first locomotive was built by Cugnot, in France, in 1769. 3. Who made the first rifled cannon? A. Rifled cannon were first brought into use in 1857. Doubtless many had been invented, and numerous experiments had been made, before that time. We cannot, however, state definitely who was the first inventor. Possibly some of our readers can answer the question. 4. Was not the Merrimac the first ironclad vessel ever used or invented? A. Ironclads were used by the French in the Russian war. In this country Captain Eads constructed several, which were in use before the Merrimac appeared.

(8) H. S. G. says: Suppose I sour a piece of cloth with 1 lb. sulphuric acid to 40 gallons water for the space of 3 minutes: if I use 80 gallons of water with 2 lbs. sulphuric acid, would the cloth absorb any more of the acid in the same time? A. If we understand you, no.

(9) J. T. P. says: I visited the Girard College, Philadelphia. An attendant told me that the spiral stone steps were almost self-supporting, or brace themselves about the same as an arch of a bridge. I have spoken about them to a number of friends; they say that the steps run in the wall about 3 feet, while the attendant said that they rested in the wall only about 2 or 3 inches? Was he right? A. The steps are supported essentially on the principle of the arch. They have, in addition, a direct support upon the front edge and on one end of each step; a single step cannot fall without turning over backwards, but this is prevented by the weight of the wall upon one end of it. A very little compressive strain, therefore, upon the arch joints, which are at right angles to the under side or soffit, is sufficient to hold it firmly. See Nicholson's "New Director," edition of 1854, plate XIV, for a similar stairs. The steps are also doweled together with iron dowels, which bind the whole together.

(10) B. F. T. says: Are principles established which show the exact or geometric trisection of any angle (except a right angle) to be impossible? A. The construction can be made for any angle, but the strictly geometrical solution is said to be impossible, because the construction cannot be made by the aid of straight lines and circular arcs alone.

(11) L. C. asks: How can I secure dry walls in the basement of my house? The plastering does not dry. A. It is caused probably by the plastering having been put upon the brick or stone wall without the intervention of furring. It is usual and necessary in such cases to plaster upon lathing nailed to wooden strips placed vertically upon the face of the wall at every 12 inches. This secures the plastering, both from any dampness that may come out of the brick or stone wall, and (by preventing the brick from reducing its temperature) from the condensation of water out of the air of the room upon its surface, either of which is sufficient to destroy it. We cannot suggest any remedy short of the replastering upon lath as here described.

(12) C. F. S. asks: How large a boiler will it require to run a 3½ inch stroke boat engine? How large a wheel and how long a boat will be required? How fast would the boat go? A. It is impossible to answer this question definitely, as you do not state the diameter of cylinder. This answer applies to several other queries.

(13) H. & B. say: In our cooling room, temperature is 42°; when the door is open, it will rise to 50° and fall again. We complain of wet walls, dripping of ceiling, cold damp air, and melting of ice. How can we obtain a cold dry air? A. The dampness arises from the precipitation of water from the air in cooling, and there may be some leakage from the ice melting above. A more free circulation of air would reduce the dampness, but at the same time increase the temperature. The ice would keep better in a compact body; but we must allow that the air can be cooled only by a sacrifice of the ice. A good cooling room is made under the mass of ice and with an air passage around the sides; in this case the doors are not opposite one another, but open upon the passage at different points. When the ice is used also for other purposes, 12 feet cube is a good size for the body of ice. In this case it will keep for two years.

(14) W. T. says: The length of a pendulum which vibrates once an hour is very nearly the diameter of the earth. Does a similar relation exist on other planets? A. No.

(15) G. W. B. says: We wish to build a house 30 x 34 feet, of 3 stories, 26 feet high in all. How shall we construct hollow walls so as to make them damp-proof, and what thickness shall we make the walls? A. Make the wall 14 inches thick, that is to say, the inside wall upon which the door joists rest 8 inches thick, the outside wall 4 inches thick, and the vacant space between them 2 inches wide. These two divisions of the wall should be tied together with anchors made of hoop iron or other light iron, or with cross ties of the brick itself, at about every 4 feet in hight of the wall, and say 5 feet apart, set in rows and alternating one above the other.

(16) W. E. S. asks: Can I construct a horseshoe or U-shaped electro-magnet, by tempering so that it will keep its magnetism after the circuit has been broken for about a half or a minute, more or less, as desired? A. If you make your magnet so that it will retain magnetism for half a minute after the circuit is broken, it will retain the magnetism permanently. There is no halfway work about it. It either holds its magnetism permanently, or gives it up immediately the circuit is broken.

(17) E. P. S. asks: How can I make a cheap telescope, which will show the rings of Saturn? A. Take a plano-convex lens of 1½ inches aperture and about 5 feet focus: place the flat side against the end of a tube a little less than 5 feet in length, into which slides another tube. To the end of the small tube fasten the eyepiece, which may be either a double convex or double concave lens of about 1 inch focus. The double convex lens gives the largest field, with the image inverted; the other shows the object erect and gives better definition.

(18) W. G. W. says: 1. A body weighs more at the poles than at the equator. Is any part of the increase in weight due to its being nearer the center of the earth? A. Yes. 2. I think that a person starting at the north pole, and going in any direction, must go south. Is this so? A. If it were a true pole, and his course were limited to the surface, we think your proposition would hold.

(19) H. H. M. says: 1. I wish to ask some questions as to the ice house described on p. 251, vol. 31. "Provide a good drain in your icehouse to carry off the water." If I build my icehouse on level clay ground, will a dry well suffice for drainage, and if so, how large and deep should it be? A. Yes, if located outside of the building. Make it 6 feet in diameter and 6 feet deep, conical, with base at bottom. Provide an opening at top, covered with a stone, so that you can empty it when necessary. 2. "Put a high-pitched roof over the ceiling." Are the ceiling and roof to extend over the exterior wall, and is the roof to join said wall so as to exclude the air from the space between the interior and exterior walls? A. Yes; the roof is to cover every part of the building, and should project well over the eaves. 3. "Make doors lined with canvas." Do you mean that canvas is to be substituted for boards on inside and outside of doors, and why? A. The doors are to be made as thick as the walls in which they are placed by being padded out upon the inside with canvas filled with sawdust; this is to make them lighter for use than boarding would be. 4. In a space 6 feet square and 8½ feet high, how can you have "a cube of ice of 7 feet?" A. This was an error of the types; you will find it corrected in No. 41, p. 188, vol. 35.

(20) H. D. T. says: A friend of mine, in attempting to alight from a moving train, stumbled, fell, and received some bruises about the face; the latter healed up, but left dark spots caused by coal dust. He was advised to blister, and did so, keeping the blisters open for a week. All this did not improve the appearance perceptibly. Can anything further be done in this case? A. Probably nothing short of a surgical operation will remove the spots.

(21) J. O'B. asks: How can I keep oroide of gold from being discolored? A. The so-called oroide gold is a variety of brass. If kept well lacquered, it will not discolor.

(22) O. R. asks: If a piece of Babbitt metal, weighing 25 or 30 lbs. and containing antimony, be placed in a well, would it hurt the water for house use and drinking purposes? A. Under certain circumstances, it would prove injurious.

(23) F. W. W. asks: Why, when alcohol and aqua ammonia are mixed in about equal parts, does the liquid turn a light red? A. If the reagents are pure, this change does not occur.

(24) M. V. W. asks: How can I clear sirup of sorghum and molasses? A. The sirup is neutralized with a little lime water and filtered while hot through bone black, which clarifies it perfectly.

(25) W. C. B. asks: How can I remove verdigris from apple butter? A. You cannot remove it without injury to the butter.

(26) W. asks: How is benzine, such as is sold for cleaning clothes, prepared? A. It is one of the direct products of the distillation of petroleum (specific gravity 60° to 70° B.) It is an intermediate between naphtha and kerosene.

(27) O. J. C. says: A case of poisoning by Paris green happened a few days ago, and there is some controversy among the physicians as regards the proper antidotes which should have been applied. A. Give recently precipitated moist ferric hydrate, best administered in the form of a solution of perchloride of iron with magnesia. Emetics should also be given, and the stomach pump applied. Carbonate of soda is sometimes made to replace the magnesia wholly or in part. 2. What is Paris green made of? What are its proportionate ingredients? A. Paris green (Schweinfurt green) is the aceto-arsenite of copper: $\left.\begin{matrix}(C_2H_3O)_2\\ Cu\end{matrix}\right\} O_2 + 3(CuO, As_2O_3)$. In 100 parts oxide of copper=31·29; arsenious acid=58·65: acetic acid=10·06. 3. In what respect does Paris green differ from Scheele's green? A. Scheele's green is the arsenite of copper, CuO, As_2O_3.

(28) W. H. asks: At what speed ought I to run my water wheel, which is an overshot of 18 feet diameter and 5 feet face, economy of water being the desired object? A. At between 6 and 7 revolutions per minute.

(29) E. L. G. asks: 1. Can copper be nickel plated? A. Yes. 2. How can I plate a rim about the size of a pail hoop? A. Use nickel salts and insert the rim to be plated in the bath and proceed as in plating with other metals.

(30) J. B. asks: 1. Will electricity, passing through a magnet, change its poles? A. It can be made to do so. 2. Take 100 magnetic needles, fasten each to a piece of small wire, say 2 feet long, and these with the magnets attached to a single wire 5 feet long; now will a strong current of electricity, passing through this wire, change the poles of all these magnets? A. No.

31) J. C. W. says: We have had a discussion on the merits and demerits of upright and horizontal engines and boilers. Is there much difference as to the durability and efficiency of either when the same care is taken of them? A. Not much, but it is a little in favor of the horizontal engine. 2. What kind, upright or horizontal, would you advise for six horse power? A. A horizontal one.

(32) H. A. P. asks: Are cast iron turnings as good for a ground connection for a lightning rod as wrought or scrap iron? A. Yes. You cannot err by having too much surface exposed to the wet ground; and the more iron turnings you use, the better.

(33) E. M. asks: 1. What size and how much of silk-covered wire do I need to make an electro-magnet capable of lifting a weight of 1 oz.? The cores are ⅛ inch in diameter and ⅝ inch long. A. Cover your core with No. 20 cotton-covered copper wire to the thickness of ¾ of an inch. 2. What kind of a battery, and how large, must it be? A. Use two cells of Lockwood's battery.

(34) E. S. asks: Can you give me a formula for reducing the area of a pipe in feet to its diameter in inches and decimals of inches: that is to say, if the area of the pipe is 0·063 feet, then what is its diameter in inches? A. Divide the area in square feet by 0·7854, extract the square root of the quotient, and multiply the result by 12.

(35) C. asks: What pressure per square inch will first class steel pipes stand, ⅝ inch outside diameter, ⅛ inch thick, making ⅜ inch inside diameter? A. The bursting strain per square inch would be about two fifths of the tensile strength of the material.

(36) A. D. S. asks: If the ancients believed that the world was flat, why is Atlas always represented as carrying a globular world? A. According to some legends, Atlas was a great philosopher who was the first to teach that heaven was in the form of a globe.