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P. D. R. and several other correspondents will find full descriptions of lightning rods on the edi-torial pages of this issue.—H. D. E. will find directions for making an æolian harp on p. 330, vol. 26.—S. H. C. will find explicit directions for bronzing fron castings on p. 107, vol. 30,-G. M. E. will find directions for mak ing asphalt pavement on p. 858, vol. 24.

G. W. B asks: How can I polish meer chaum? A. Soak first in molten tallo white wax, and then rub with a dry rag.

W. C. D. asks: Is there any difficulty in using a colled pipe, of 1% or 2 inches diameter, as a water heater in a furnace? The fire pot is 30 inches in diameter; and I want to use from 10 to 15 turns or coils of pipe placed within the fire pot, the pipe passing out and connecting with a hot water radiator in an air chamber outside, the water passing back from radiator and entering bottom of coil, so as to keep up a continuous circulation. I am told that steam will format points in the coil and choke the pipe, preventing a free and steady circulation. Is this so? What size of pipe ought I to use, and what is the best form of hot water radiator? Is there anything better than a simple manifold of plain pipe? A. A much larger pipe will be necessary to enable you to secure circulation with the arrangement that you propose. The manifold will answervery well for the hot water radiator.

B. B. B. asks: In a three mile boat race would it take any longer to turn a stake boat at the end of the first mile and a half and return, than it would to row the three miles straight ahead? A. Yes.

J. G. asks: In what part of the world was the Garden of Eden? A. No one knows.

If the Earth goes round on its axis, why do we not get to the partwhere there is no frost or snow, or to the part where there is no summer? A If you will consult any elementary work on astronomy, you will readily perceive the reason.

Is there anything produced that will keep coal dust cemented together so that it will stand burning to ashes before it will part? A. There are numerous patents for this purpose, many of which have been described in the SCIENTIFIC AMERICAN.

J. H. K. asks: I am engaged in an experiment that requires the use of a series of small believe. It will be necessary they should be absolutely airtight and, as they will be exposed (probably) to water, it is equally important they should be waterproof. Will you tell me what material to use, and how to construct them to gain these ends? Will gum cloth answer? If so, how shall I fasten it to the heads, and should those heads be of wood or leather? A. We think you can obtainrubber bottles or syringes that will be cheaper and more satisfactory than the arrangement that you pro-

W. S. P. asks: If a piston were let fall 25 feet in such a manner that it would enter an airtight cylinder, would the sudden compression heat the air within the cylinder? If so, would the expansion of that heated air be great enough to throw the piston as high as the point it fell from? A. There would be some power consumed in overcoming friction, and some of the heat of compression would be dissipated, so that the useful effect would not be as great as the power exerted.

What would be the pressure of air per square inch on the inside of a hollow casting one foot square, it being heated to a red heat after being filled with cold air at atmospheric pressure? A. Professor Thurston has pub lished a table of the temperatures and pressures of air. Youcan obtain it from D. Van Nostrand. Your other question is of a business character.

W. S. F. asks: When is the transit of Venus to take place? When was the last? When will be the next, or how often do such phenomena occur? A. Transits of Venus always take place in June or December. Thereare two transits, eight years apart, and then more than a century elapses, afterwhich there are two more transits, eight years apart. A transit was predicted by Kepler, in 1631, but was not observed. The transit of 1639 was observed by Horrox and Crabtree, in England. The last two transits occurred on June 6, 1761, and June 4.1769, the latterbeing observed from various stations. widely separated. The next transit will take place on December 9, 1874, and preparations have been made for very complete observations. The last transit during the present century will occur on December 6, 1882. J T B says · I have moved into a large

frame house, which rests upon pillars four feet Li with lattice work between them, so that there is a free circulation of air; the house is lathed and plastered throughout; yet, in a few days, articles of clothing, shoes, etc., will mold if put in the closets. Please tell me the cause, and if there is a remedy for it. A. A succession of rains and damp weather will sometimes produce moldiness in closets, but in your case it is caused most probably by the fresh plastering of the house. Plaster absorbs moisture from the atmosphere for some time perature will give it off in large drops and streams. It is for this reason that new walls cannot be safely painted. We remember a case in point, where the newly plastered walls of the class rooms in a school building were painted and their surfaces prepared artificially to serve as slate, to be used for writing upon in place of the ordinary blackboards. They were finished very handsomely, and the imitation was perfect; but in one week's time the paint began to run in such streams as to trickle down across the white base, and lie in black puddles on the floor. Your remedy is to keep your closets open, and let the wind blow through the house in the middle of the day.

H. A. W. says: You have been calling attention to the importance of educating the left side of the body and brain. Is it not a fact that more persons are paralyzed on the right side than the left, and may it not be accounted for by the fact that the right side is overtaxed by giving it too large a proportion of the work to be done? A. You evidently have forgotten that the left side of the brain is the index of the right side of the body. If you maintain that the left side of the brain and left side of the body are both paralyzed. It would show that the whole system was under that in fluence, the nervous force on the right side and the muscular system on the left side being the sufferers.

ID. C. P. asks: Which will use the most coal, two high pressure engines, compounded, 12x8 inches, each cut off at half stroke, with 70 lbs. steam, with 150 revolutions per minute geared to a main shaft its pinion being 21 inches in diameter, and the engine's pinion 12 inches: or a low pressure condensing engine of dimensions equal to the task, with a good generator A. The second would be the most economical, with the same grade of expansion as the first.

Where could I learn the millwright's trade? A. Ther are numerous good shops scattered over the country. It would be well for you to enter one of them as an ap prentice, or in such capacity as you could arrange with the proprietor.

How can anyone enter the Bureau of Steam Engineer ing at Washington? We do not understand exactly what position you want. Write your wishes definitely to the Chief of the Bureau of Steam Engineering, and you will probably obtain a reply. If there is still a difaculty, you might address the Member of Congress from

C. C. A.—The instrument you describe is simplya pneumatic syringe. It is not a novelty, having been shown in courses of experiments, under the sub ject of heat, in ourschools for years.

J. A. H. asks: Why does a glass bottle burst, when you expose it to the air and lay it on red hot coals? A. It is owing to the unequal expansion of the glass when placed upon the coals.

What is the telescope principle used for? A. Your questionis very indefinite. The telescope is composed of several lenses so arranged as to bring at the point of sight, objects magnified several diameters. Consult an elementary text book upon optics.

H. S. asks: My finger nails are very brittle, in fact, the least pressure causes them to break. Is there any remedy? If so, what is it? A. Bathe the nails with oil; glycerin will not answer; keep the nails cut close. If very sore, you must keep them bathed

J. M. B. says: Please give a formula for calculating the proper dimensions of a fly wheel, dimensions and speed of engine being known. A. You will findrules on the subject on pp. 177 and 288, vol. 28.

J. W. M.-Your idea for an electro-magnetic engine is not a new one, and is impracticable, little or nothing being gained by its use; and instead of replacing the battery, you only lessen the reliability by complicating its machinery.

E. H. H. asks: Is there any machinery for cutting files in use, that is working successfully, and what has been the principal trouble with machine-cut files? A. There are several of such machines, machine cut files being in common use. They are not, however equal to hand-cut files, either in the regularity of the cut or in the quality of the cutting edge of the teeth.

G. S. asks: How can I harden thin brass wire, about the thickness of a common sewing needle orapin, so as to make a spiral spring, by winding it overs mandrel the thickness of a common penholder? A. Harden your brass wire by hammering it lightly while it is on the mandrel after it has been wound.

What kind of glue can I use to glue thick leather on wooden rollers about an inch in diameter? A. Any kind of superior glue.

To what color must I heat a watch spring to tempe it, and must it not be well hardened before tempering A. To harden such a spring, heat it to a red heat and im merseitin oil till cold. Then fry it in equal parts of old and tallow until the mixture will blaze on the spring. When the mixture blazes, keep dipping the spring into it, and then holding it in the flame so that the spring will blaze of itself when held away from the flame After blazing freely, allow the spring to cool of itself.

W. G. R. asks: Will immersion in a solution of sulphate of soda be sufficient to test the effects of frost upon a sample of artificial stone? A. We hardly think it will. Try a mixture of ice and salt; this will lower the temperature to —4° Fah.

P. J. H. asks: What is the effect of a daily application of rain water and ammonia to the hair? A. If the solution of ammonia is according to the regular formula, there will be no injurious effects. Inhaling the vapor of ammonia is injurious. It is in no way detrimental to the hair.

N. D. T. asks: Is there any better substance for removing the organic impurities from cistern (rain) water than the permanganate of potash? If not, what amount should be used in purifying a tun of water, and what manipulations are required? A. Sulphate of alumina is used topurifywater. If you use permanganate of potash, 4 tablespoonfuls of a saturated solution of the permanganate will be found sufficient for one tun of water; if the waterretains a pink hue, put a stick or chip in it, when the color will shortly disappear. You will find a new method fully treated on page 414, Science Record. 1874.

D. W. S. asks: 1. Will the copper lightning od on my house injure the water in the well in which it terminates? A. Yes. 2. The galvanized rod on my barn terminates in a half hogshead of running water. safe? No. 3. Would it be safer if it penetrated the ground eight feet? A. Yes, and it would be still safer if you deposited a cart load or more of well burned charcoal at the bottom of the rod, surrounding the rod for a length of several feet with the charcoal.

C. M. asks: In your issue of July 18, in answerto D. Q. C., you have not stated how much liter to to be used. A. In formula mentioned, niter to 10 parts. What is meant by smalt? A. Smalt is pulverized co-

What is peroxide of lead, and is it known by any more common name? A. Peroxide of lead is a heavy brown powder consisting of oxygen and lead.

Is anything mixed with the sulphur in which matches are dipped, to thin it? A. No.

J. E. S. asks: Is it a fact that the water 150 miles from the mouth of the Amazon river is suitable for drinking, or does it mix with the ocean and become brackish or salt? A. It is brackish.

What number of emery and what grade is most suitable for grinding molding tools? I make my tools on emery wheels from blanks made as planer knives are, that is, with steel faces and from backing; and I find that wheels that manufacturers recommend are all right to cut the steel, but the fron will glaze the wheels. I want them for fast cutting. A. We advise you to consult a reliable dealer.

What would be the actual horse power of a locomo tive, with two 18x26 inch cylinders, at 130 lbs. per inch. and 4 feet 6 inch drivers, making 20 miles per hour? A. The mean effective pressure of steam in cylinders is re quiredfor the solution of this problem.

G. G. McC. asks: What degree of heat is necessary for the incubation or hatching of the agg of the commonbarnyard fowl? A. From 102° to 104° Fah. | werld.

J. P. A. asks: What is pip among chickens? Is it injurious to the fowls? What is the hard substance on the endof chickens'tongues? A. "The pip by some is considered a catarrhal disease producing a thickened state of the membrane lining the nostrils mouth, and tongue; others consider that the disorder originates in a small vesicle formed on the tip of the tongue, the contents of which, being absorbed, lead to the inflammation and the thickening of the skin. The common and well known symptom is a white scale o norny substance growing upon the tip of the tongue, by which the breathing becomes partly impeded; the beak is frequently held open as if gasping for breath, and be comes yellow at its base, while the feathers on the head appearruffled or disordered. The tongue is also very ry; and while the appetite is not much impaired disordered fowl can eat only with considerable difficulty, and sits in corners, pining away. The most effectua cure we have ever employed, and that, when the disease has not proceeded too far, was to tear off the scale with the nails of our forefinger and thumb; and it is not difficult, as it is not adhesive; and then Boswell recommends to fill the mouth and push down the throat a large lump of fresh butter, which has previously been well mixed with Scotch snuff. 'This,' says Boswell, is a recipe which we conscientiously and confidently recommend; and again we beg to repeat, that, in our experience, we have never known it to fail, except from our own negligence in the delay of its application.' American Poulterer's Companion.

E. A. F. T. says: I have constructed a gal-vanic battery as follows: One cup of copper, 8 inches high and 6 inches in diameter, is made of very thick sheetcopper. This yessel I charge with 1 part sulphuric acid to 10 parts of water. Then I insert a glass cylin der (3 inches in diameter), closed at the lower end with blottingpaper. In this I insert a cylinder of rolled up sheet zinc. 1% inches diameter, and charge it with 1 part of muriatic acid and 10 parts water. The battery works very well for sliver plating; would it also do for nickel plating? A. Several cells of this description may be used for nickel as well as sliver plating on a small scale. How should nickel salts be prepared for plating? A. You will find a recipe on p. 51, vol. 30.

C. W. G. says: I have discovered (near the waters of Hickory Creek, Texas), some bones of enormous size; they were cropping out of the bank. One bone measured27inches in circumference, 1% inches from surface of bone to the marrow. One of the upper jaw teeth measured llinches in length and 4% inches in width. The side of the jaw from which these teeth were taken weighed 25 lbs., the teeth being, seemingly all connected together. About 5½ feet away, I found the rest of the upper jaw, somewhat decomposed, though the teeth were in a good state of preservation. Can you give me the name from this description? A. No. We might, if you sent on some of the teeth. If you can obtain more data in regard to the size of the skeleton, length of body, legs, neck, etc., we might be able to answer you fully,

M. E. P. says: Please inform me how to prepare pickles so that they will keep good and retain their green color? A. Small cucumbers, but not too young, are wipedclean with a dry cloth. put into a jar, and boiling vinegar, with a handful of salt, poured on them. Boil up the vinegar every three days, and pour it on them, till they become green; then add ginger and pepper, and tie them up close for use. A permanent green color cannot be obtained without the presence of copper, and picklesso prepared are injurious.

What will prevent insects from eating wall paper? A You do not state what the insects are. Some can only be driven away by putting polson in the paste when put-ting the paper on the wall.

How can I preserve citron to have it like the dried citron we buy? A. Take citron and sugar, pound for pound, and simmer until tender. Allow to dry in the sun, keeping it covered with sirup during the process.

C. C. M., Jr., says: I have just completed an electric machine, but it will not work, although every thing appears to be it good order. Rubbers are made of wood and chamois. sin, covered or coated well with amalgam of mercury, zing, and tin. The prime conductor is made of insulated wood, covered with tin foil which acts or should act as a good conductor of the electricity, if any were developed. The negative con-ductor is not insulated as most are, but is made of wood connected with the base. Perhaps I may have made a mistake in making the machine as I did. If so, you will greatly oblige me by stating it. The glass is insulated from the atmosphere by oiled slik. A. Your negative conductor, namely, the chain attached to the rubbers should be placed in connection with the earth, if the positive fluid is desired; and if the negative spark is required, the chain should be placed in connection with the prime conductor and the earth. One of the conductors must always be in connection with the earth otherwise the machine will not work.

A. C. H. asks: 1. A tank full of water has 4 outlets. If a is open, it takes 15 minutes to empty the tank, b 30, c 45, and d 60. How longwill it take if all four are opened at once? A. It will take about 71/2 minutes. 2. Has the amount of water anything to do with pressure of the different sizes? A. Under the same pressure, a large tube will discharge more water proportionally than a small tube.

Which is the real American eagle, the one with a white head, or a brown one? A. The one with a white head commonly called the baid eagle.

How can I prepare leaves of plants so as to leave the veins only, all the soft green mass being taken off? sired to be removed are nearly decomposed. The length of time will depend upon the kind of plant. Remove the desired parts with a camel's hair brush and dryin sheets of blotting paper. Then bleach by a preparation sold in the market for the purpose. If this cannot be btained, use chloride of lime

What is osmic acid? A. "The tetroxide of osmium Os O4, commonly called osmic acid, is the volatile strong smelling compound formed when osmium or either of its lower oxides is heated in the air, or treated with nitric or nitro-muriatic acid. It may be prepared by heating osmium in a current of oxygen gas, and condenses in the cool part of the apparatus in colorless transparent crystals. It melts below 212° Fah., and boils at a temperature a little above its melting point Its vapor has an intolerably pungent odor: attacks the eyes strongly and painfully, and is excessively poisonous. Osmic acidis dissolved slowly, but in considerable quantity, by water, forming an acid solution. It is a powerful oxidizing agent, decolorizing indigo solution, separating iodine from potassium iodide, converting alcohol into aldehyde and acetic acid," etc. (Fowne's 'Chemistry.") Recently some osmic acid was presented o the French Academy; though but a small amount, it was calculated that it was enough to poison the who