Notes & Queries

S. A. T. will find a description of making plaster molds on p. 58, vol. 24.—E. L. will find directions for making colored paper for manifold writing on p. 363, vol. 31.—E. L. will find a correct rule for ascertaining the curvature of the earth on p. 395, vol. 31.—S. H. M. will find directions for preparing bones for manure on p. 75, vol. 31.—J. W. R. will find a recipe for a gold wash on p. 43, vol. 30.—C. R. B. will find a recipe for fine blacking on p. 283, vol. 31.—W. S. R. will find directions for making a pot for melting metals on p. 235, vol. 32. Plaster of Paris is the best material for making molds for small castings.—J. E. M. can repair the silvering on looking glasses by following the directions on p. 203, vol. 31.—J. S. H. will find full directions for mounting chromos on p. 91, vol. 31.—C. E. will find a good recipe for axle grease for heavy bearings on p. 90, vol. 31.—W. H. T. will find a recipe for waterproof cement for aquariums on p. 202, vol. 38.—A. A. will find a recipe for bronze for use on brass on p. 283, vol. 31.—E. F. can make his tent waterproof by using the varnish described on p. 347, vol. 31.—L. K. Y. will find a description of water glass on p. 154, vol. 32. Furniture polish is described on p. 315, vol. 30. Muriate of ammonia can be bought for a small fraction of what it would cost an amateur to make it.—L. J. B. will find a description of the manufacture of rubber stamps on p. 156, vol. 31.—J. P. A. will find a formula for the proportions of a safety valve on p. 197, vol. 31.—W. W. H. will find a description of sailing faster than the wind on p. 176, vol. 28.—E. W. will find directions for waterproofing muslin on p. 347, vol. 31.—C. M. B. will find that etching on glass is described on p. 409, vol. 31.—J. R. M. will find directions for calculating the diameter of the driven pulley on pp. 26, 73, vol. 25.—C. D. will find directions for making colored lights on pp. 58, 154, vol. 30, and pp. 90, 219, vol. 31.—S. F. S. will find an answer to his queries as to lime light in our reply to J. H. S., p. 218, vol. 32.—C. C. will find directions for casehardening plow mold boards on p. 202, vol. 31.—C. L. and W. B. A. will find directions for imitating bronze on gun barrels on p. 171, vol. 32.—W. B. A. will find that iron can be softened by following the directions on p. 123, vol. 31, for steel.—C. L. D. will find directions for laying out a sun dial on p. 409, vol. 29.—H. D. E. will find a recipe for waterproof blacking on p. 155, vol. 26.

(1) F. D. D. asks: Why is it that oscillating engines are not used on steamboats or by manufacturers? A. They are, to some extent.

(2) H. C asks: What degree of angularity can be given to a wedge of cast iron, finished smooth and thoroughly lubricated, without its being forced back by the compression of wood into which it is driven? A. It must not exceed twice the angle of friction between the wedge and the surface. An average value of the angle of friction is 5¾°, so that, for such a case, the angle of the wedge should not be greater than 11½°.

(3) T. J. A. & Co. ask: What is the process of cupellation? A. The principle depends upon the property which lead possesses of absorbing oxygen at a high temperature, and of forming with it an easily fusible oxide, which imparts oxygen with facility to all those metals which yield oxides which are not reducible by heat alone. Most of the oxides thus formed unite with the oxide of lead, and produce a fusible glass, which is easily absorbed by a porous crucible made of burnt bone, termed a cupel; while any silver that the mixture contains is left behind in a bright globule, which admits of being accurately weighed. The cupels are prepared from bone ash (burnt to whiteness, and ground to a fine powder), by moistening it with water; a suitable quantity of the mixture is placed in a mold, and the required form and coherence is given to it by the blow of a mallet or of a press; the cupels are allowed to dry thoroughly before they are used. The method of cupellation you can find described in any good book on chemistry.

(4) J. & D. N. say: You mention a large magnet, weighing half a tun, that can raise twenty times its weight. At what distance would a magnet of that strength, being stationary, draw another magnet of the same strength not stationary? A. We can give you no general rule for determining magnetic attraction of this description. Much depends upon the quantity of current flowing through the helices.

(5) G. W. S. says: I am running an engine, 12x24 inches stroke, with a common slide valve set to cut off ⅝ stroke, making, with throttle wide open, about 63 revolutions. If I shut my throttle to reduce the speed to about 55 or 56 revolutions, with no load on, I have no back lash, neither have I back lash when load is on; but as soon as load comes off, I have back lash, and in consequence I must slow down my engine. Why have I back lash without load, and none with? A. It appears probable, from your statement, that the governor does not control the engine properly; so that when the work is removed, the speed of the engine is changed. It would be impossible, however, for us to give a definite opinion without further knowledge of the situation.

(6) S. H. M. says: I have a small steam chest which is cracked near one of the bolt holes. What will make a perfect steam joint? The chest is of cast iron. A. If it cannot be brazed, you might apply a patch with tap bolts, either driving a rust joint or using a piece of sheet rubber for packing.

(7) H. F. R. asks: 1. What should be the thickness of shell for boiler of one horse power, to bear 135 lbs. with perfect safety? A. We have no idea of the size of a one horse power boiler. 2. What power would each of two engines give, the one 1½x4 and the other 2x6 inches, with 100 lbs. boiler pressure? A. The power would depend upon the piston speed, which you have not stated: but you will find numerous rules in back numbers by which you can make the necessary calculations. 3. What are the addresses of the Cooper Institute and Cornell University? A. Cooper Institute, New York city; Cornell University, Ithaca, N. Y. The tuition is free at the Cooper Institute. By addressing the presidents of the institutions named, you can doubtless obtain full information in regard to their relative advantages. 4. Has there been any contrivance patented to light the gas in any part of a residence by electricity, each jet to light independently of all others, but all getting the spark from one battery? A. We think that something of this kind has been introduced. 5. Is there a portable forge made of boiler iron, arranged to use all the extra or lost heat to generate steam to run a small blower, or the steam from several such forges to drive a light steam hammer? A. We have never seen anything of the kind.

(8) B. asks: Will pine wood ignite by coming in contact with a pipe through which live steam is passing? A. Not unless the steam is greatly superheated.

(9) M. E. C. says: 1. I have a small boat with upright boiler two feet in diameter. I have 4 or 5 feet of common one inch iron dipe in the firebox, connected to the crown sheet and side of firebox, and of course there is a good circulation. A friend says that these pipes will burn out very quickly if I use the boat in salt water. Is this so? A. The pipes would soon burn out if scale were formed in them, which would be very likely to occur by the use of salt water. 2. If I wish to take this boat to Florida by inland navigation, would the boat have to be inspected? A. Yes. Apply to the inspector in your district.

(10) W. R. J. asks: Are there any Barker's centrifugal mills now in use? A. We believe there are some turbines constructed in such a manner that they are virtually Barker mills. They do not meet with much favor, however, since the Barker mill is by no means an efficient machine.

(11) A. H. C. asks: 1. At what power would you rate an engine that is 8 inches bore by 15 inches stroke, running at 120 revolutions a minute and using steam at 80 lbs.? A. About 12 horse power. 2. Do you think steam-riveted boilers are as good as hand-riveted? A. Yes, if a good machine is used. 3. Do you think double rivets along the side seams of a boiler make it any stronger? A. Yes.

(12) O'B. & D. asks: 1. What size of wire rope will be strong enough to draw 7,000 lbs. up an inclined plane of one foot rise in three? A. From ⅝ to ¾ of an inch in diameter. 2. Will the wire rope work satisfactorily on a wooden drum 15 inches in diameter? A. No. It would be better to make the diameter of the drum from 24 to 30 inches.

(13) C. D. says: On p. 36 of your current volume, it is stated, that five minutes before a certain explosion occurred, the water stood at 3 inches above the flues. By a long experience with steam boilers, I have become convinced that the water at such times is converted into foam, and entirely fills the boiler. Upon pressing the gage the water has the appearance of being flush, while in reality the boiler was nearly dry. A. We would be glad to receive some facts in corroboration of your statement.

(14) W. S. S. asks: How is burnishing done, with the use of a burnisher? A. By rubbing the tool rapidly over the work.

What kind of briar roots are pipes made of? A. They are made of knotty roots of the common heath, which is found abundantly in Europe, and to some extent in this country.

The cone pulley on my lathe has 3 sizes for change of speed, 2½, 4¼, and 7¾ inches. I want to make a treadle wheel so that one band will suit the three sizes. What rule can I work by? A. We hope soon to publish a simple explanation of the method.

I wish to make some stamps for marking clothing. I have the printer's types, and I wish to make the impression of the types in something that I can run the old types in after being melted. What will answer? A. Plaster of Paris.

(15) W. L. asks: 1. Which will stand the greater pressure, a pipe one inch in diameter or a pipe six inches in diameter, provided both pipes are of the same material and of the same thickness? A. The former. 2. In a boiler with steam up, is the pressure greater or less below the water level than above? A. Greater.

(16) S. says: A train of cars is going round a curve. The outside wheel must go a greater distance than the inside one, yet they are geared together. Please explain it. A. If the wheels are not coned, one must slide. If the wheels are coned, the one on the outer rail will be larger than the other, so that it is possible there may be no slipping. Of course this can only occur when everything is rightly proportioned; and in general there is some slip even with coned wheels, though it is usually reduced by coning.

(17) G. G. C. says: I have a foot lathe on which the belt does not run true, but runs ¼ inch off of both large wheel and pulley wheel. Is this because the shaft and lathe bed are not parallel? A. It is either on that account or because the pulleys are not round or are not centered properly. You can make the adjustments, if required, by measurements.

(18) C. asks: Who first invented the dial steam gage, Eastman, Bourdon, or a German engineer? A. We believe that the Magdeburg gage was the first. Perhaps some of our readers have definite information on the subject.

(19) C. A. C. asks: 1. What can I use to fill up blow holes in some small steam cylinders, subjected to 100 lbs. pressure? A. Braze plugs in the holes. 2. Will a steel boiler be better than an iron one for a two horse engine? A. The steel boiler can be made lighter than an iron one of the same strength. We do not know that it would have any other advantage.

(20) D. E. B. asks: Can a common slide or rock valve be set to work expansively? A. Yes.

What were the seven wonders of the world? A. The pyramids of Egypt, the tomb of Mausolus, the temple of Diana, the walls and hanging gardens of Babylon, the Colossus of Rhodes, the statue of Jupiter, the watch tower built by Ptolemy.

(21) W. H. B. says: L. O. S. says that the same power will do the same work with a 60 inch as with a 30 inch saw. I do not see how it is possible for an equal power to move (through a log) a 60 inch saw. Of course the 60 inch has double the leverage from center to verge, consequently the power to drive such a saw successfully would do twice the work of the smaller saw. But I cannot see how he gets away with the short lever in favor of the small saw. Admitting the verge of each to travel at same speed, of course there must be an increase of speed only at the expense of power. A. In the case of the large saw, the pressure on the engine piston must be doubled, but the piston only moves half as fast.

(22) L. C. W. says: My water pipe, leading from main in street to house, is frozen. Some two or three hundred fellow townsmen are in the same fix. Some few have dug up the street and sidewalk and thawed the pipes out, but this is very expensive and difficult, owing to the frozen condition of the earth. Is there any plan by which they could be thawed out from the inside of the house? A. It can often be done by forcing steam into a pipe from a small boiler.

(23) G. A. McL. asks: What is agate, used for making buttons, etc.? A. It is a variegated chalcedony. It is supposed to have been formed by a deposit of silica from solutions intermittently supplied, and deriving their concentric waving courses from the irregularity in the rocky walls of the cavity in which they were formed. The colors are due to traces of organic matter, or of oxides of iron, manganese, or titanium.

(24) J. C. K. asks: What kind of a locomotive is the Fairlie narrow gage engine, with smoke stack at each end? Is the boiler solid throughout? A. Yes; it is all one boiler, and the two trucks, with the engines, are each pivoted so that they can swing.

(25) W. S. C. says: Can steam power be used in place of horse power in threshing wheat with the same machine? A. Yes.

If two boilers are supplying a third one with steam, will the third one have double the amount of pressure of the other two, or will steam be of equal pressure in all? A. The pressure will be equal in the three boilers.

How should a whiffletree be made so as to hitch 2 horses against one, giving equal advantage to all? My notion is that the middle hitch should be made so as to give the single horse ⅔ of the lever, and the 2 horses just ⅓ of it. Am I right? A. Yes.

Will pewter or lead do to make a cylinder head for a small steam engine 1x2 inches? A. Yes, but it will not be very serviceable.

(26) J. E. R. says: I have an 18 inch circular saw for sawing stove wood. I have it set to double the thickness of saw, and it is perfectly straight. I have run it at different speeds; yet when it is a few inches in the wood it blackens the wood on both sides, though I can see through all the time on either side. A. The bends in the teeth are probably too far from the point. Have the bend in the teeth on a true curve to the extreme cutting point, so that no part of the tooth can touch against the timber except the extreme cutting point, and you will obviate the trouble. The teeth of your saw probably wedge and bind in the kerf, about one third the length of the tooth from the point.—J. E. E., of Pa.

(27) E. F. F. asks: 1. What will be the effect of inserting teeth two gages thicker than the saw? Will not the teeth be likely to expand the saw more than the light teeth? A. If properly fitted, the thick teeth would have no more tendency to expand the saw than those of the same thickness as the saw plate. 2. Would such a saw stand to saw frozen beech, if the blade is properly hammered, using such teeth on ¾ or 1¼ feed? A. Such a saw, if properly made and kept in order, will stand to saw any kind of frozen timber. But in a saw for ordinary use, there is no advantage in having the teeth thicker than the plate of the saw at the rim.—J. E. E., of Pa.

(28) S. A. H. asks: With a column of water of a given hight, and a tube leading out from its base, turning up and opening at a level with the base, and all the proper conditions of free passage secured, to what hight, proportional to the columns, will the jet of water spurt? A. From 50 to 75 per cent.

(29) D. A. R. says: I want to make a magic lantern. I have two lenses 2½ inches in diameter and of 8 inches focus. Will these do? A. Place a reflector and a light in the focus of the fixed condensing lens, then the slide in the focus of the objective, the latter in a sliding tube, both with plane side to light.