Business and Personal.

The Charge for Insertion under this head is $1 a Line.

Notes & Queries

1.—S. E. P. asks for simple directions for galvanizing cast iron.

2.—T. G. S. asks for a formula for preparing unalterable sirup of iodide of iron.

3.—H. M. H. asks how to make and apply a polish on articles made of manyanita wood.

4.—T. C. M. asks how to gild on marble, so that occasional washings will not injure the gilding?

5.—F. S. S. asks how to give tempered steel spectacle frames that beautiful even blue color, given to fine English steel spectacles. Should the frames be baked in a small furnace, and, if so, at what temperature?

6.—S. F. S. asks: How can a barn be ventilated so that it will not smell strong? It is 22x40 feet on the floor, 10 feet to the upper floor, and 17½ feet from there to the peak of the roof. There are no buildings on three sides of it. I tried disinfecting it with chloride of lime, but it takes too much and does not have the desired effect.

7.—E. F. asks for a recipe for a hair dye that is not permanent, that is, one which will disappear on the application of soap and water, ammonia, or some cheap chemical.

8.—E. F. wants a rule for rating or calculating the horse power of steam boilers, and the pressure per square inch a boiler of any given dimensions and thickness of iron is expected to bear.

9.—W. H. P. asks: In sawing off a board twenty-four inches wide, which requires the greatest power, one saw that cut just 24 inches, or two saws that cut just 12 inches each, one above the other? The saws are to be of the same gage.

10.—L. F. S. asks: Why is it that some manufacturers of machinery and other goods, in the face of all competition, maintain such excessively high prices for their productions, preferring, as it seems, to sell perhaps a sixth or a quarter of what they might rather than to reduce their prices?

11.—J. J. C. asks what material he should use for a double scull boat made for speed and durability. Of what dimensions ought it to be? Is cloth made waterproof also airproof? If not, what should I use to make it airproof

12.—R. asks what is the cheapest and quickest artificial process for seasoning timber for staves, etc. Of what material should a kiln 14x30x6 feet be constructed? How should it be heated so as to give a temperature of 115° Fah. and to season the staves in 4 days? I do not want the smoke or sparks to circulate among the staves.

13.—J. F. P. asks: How can I work aluminum bronze, so that it will be malleable and soft enough to roll or be drawn into wire? After repeated trials of melting together 10 parts aluminum and 90 parts rolled copper, I have failed; it pours and sticks to the crucible like pudding, and is as brittle as cast iron.

14.—N. H. says: I would like to turn some large wooden bowls from 8 to 16 inches diameter, and some cheese molds about 6 inches high, and from 6 to 12 inches diameter. What is the best wood for that purpose? Shall I work it green or dry? If worked green, how shall I treat it to keep it from splitting? What is the best way to hold the pieces to the lathe mandrel? Is it profitable to turn a number of the cheese molds on one piece first, before hollowing them out? Are there tools that will cut in this way several bowls out of one piece concentrically, or does that not pay? Which are the best tools for cutting them out?

15.—A. H. says: At the back of my house is a brook, which for many rods passes over a gravelly bed; and in some seasons of the year it dries up. During the night time and on very cloudy days, there may be quite a stream of water; but when the sun appears, the water disappears; and, again when the sun disappears, the water comes again. There are several theories about it, but what are the facts or true cause? 2. A small cast iron common pump was so arranged that by elevating the piston to its highest point it admitted air and allowed the water to settle down. The end of the handle, or lever, rested on a board of the well curb. On a very cold morning the lever was found broken between its fulcrum and the piston rod, near the former, leaving a piece of about a foot long and of some four or five pounds weight attached to the piston rod, but thrown entirely over it and hanging on the opposite side from that on which it would naturally have fallen. It is easy to understand how the pump could have become frozen up, and how a sound bar of iron, one inch by one and one half inches, could be broken; but how that weight of iron could be raised and thrown over, is a question. The board of the curb could have nothing to do with it, and it does not seem possible that the ice and frost in the pump barrel could affect it in that manner. The elasticity of the cast iron seems to have caused it; but will some one who can, kindly furnish a solution?

Answers to Correspondents

R. A. R. asks us to inform him why the holding a darning needle in the mouth while peeling onions will prevent the onions from affecting the eyes. Answer: It won't do it.

J. E. G. sends two mineral specimens and asks what they are. Answer: The specimens are red jasper, a stone which takes a fine polish and is used in mosaic work, but is not counted among the "precious" stones.

M. B. sends a specimen, which melts readily with little loss, and it is suggested that it may be tin. Answer: It is a chloride of lead with a small percentage of copper, a mineral of rare occurrence in the United States.

T. H. C. asks: What are the ingredients and proportions of Babbitt's metal? Answer: To make Babbitt's metal, melt 4 lbs. copper, add by degrees 12 lbs. best tin, 8 lbs. regulus of antimony and then 12 lbs. more tin. After the last four or five pounds of tin have been added, reduce the heat to a dull red and then add the remainder of the tin.

G. E. H. says: Please inform me of a process to take the impressions of tree and plant leaves, if possible in some chemical manner, to retain their color in the impression, which is to be preserved in book form for future reference. Answer: Impressions can be very neatly taken, in many cases, by means of the impression paper which is sold by the stationers. In some instances, we have seen photography used to obtain permanent representations of leaves. We know no means by which colors can be either transferred or automatically reproduced.

E. N. says: I have heard it stated that one square foot of heating surface in a fire box of a boiler was equal to five square feet of flue or tube surface for steam purposes. What difference is generally allowed in practice; and what difference, if any, is there between vertical and horizontal tubes for steam purposes? Answer: The estimates of the power of a steam boiler are usually based upon the total area of heating surface. As a rule, the best fire-tubular boilers have about 30 square feet of heating surface to the square foot of grate, and water tube boilers are given nearly a proportion of 35 to 1.

D. M. A. asks: What causes foaming in an engine boiler? Is it dangerous or apt to cause an explosion of boiler? Does steam ever descend under the water in a boiler and force the water up and then take its place? Answer: Foaming is caused by the generation of steam more rapidly than it can disengage itself from the mass of water within which it is formed. It may give rise to inconvenience, and even danger, either by carrying water out of the boiler more rapidly than the feed pump can replace it, or by entering the steam cylinder of the engine and creating a liability to accident, when the piston strikes upon it, at the end of its stroke, by breaking crank pin, connecting rod or cylinder head. Steam does not get under the water but is sometimes so rapidly disengaged, at points on the heating surface under water, as to almost or quite displace the water.

J. H. L. asks: Will you please inform me (1) how much coal a large ocean steamship consumes in 24 hours when under full steam; and (2) how much is usually consumed in a trip from Liverpool to New York and *vice versa*? 3. Also state the total tunnage of an ocean steamer including fuel. 4. Also give me the tunnage of the Great Eastern, and what coal she consumes in 24 hours under full steam. 5. Is steam used all the time in making the trip, or is sail used part of the time alone, or are both steam and sail are used together? Answers: An ocean steamer frequently burns from 75 to 100 tuns of coal in 24 hours. There are vessels in the British Navy which, under full power, will burn about 300 tuns in 24 hours. 2. Probably an average of 1000 tuns for the whole run. 3. From 2,500 to 3,500 tuns registered and up to 4,500 tuns displacement. 4. The Great Eastern has a registered tunnage of 18,000 and an actual displacement when down to her maximum draft, of 26,000 tuns. We are not certain what amount of coal she now uses. It was formerly not far from 15 tuns an hour. 5. We do not think that she is ever under sail alone.

R. L. asks: 1. Can you supply me with any information respecting the application of compressed air, as a motor for manufacturing purposes? In other words: Suppose I have a water power within half or quarter of a mile of a navigable stream where I have saw logs that I desire to cut up, and that it is costly and inconvenient to take the logs from this stream to the waterfall, and the same to conduct the water to the logs; would it be practicable or economical to use the power of the fall to compress air, and convey it by pipe to the river where my logs are? What is the best sort of pump or cylinder for compressing air, and what diameter of tube would be required, taking the relation of distance and horse power into account? What kind of engine would be needed? What amount of power would be lost by friction, in using the compressed air in lieu of the water? 2. Suppose my waterfall admits an overshot wheel of 24 feet diameter, will I gain power by putting up two wheels of 12 feet diameter each, one above the other, and using the water twice, than if I use the water only once on my 24 feet wheel? Or again, will two horses of equal strength draw a greater weight, by attaching each one to a wagon with wheels of only three feet in diameter, than one of these horses will if attached to a wagon that has wheels six feet in diameter? Answers: 1. We should anticipate greater expense both in first cost and in maintenance by the plan proposed than by the adoption of the "telo-dynamic" method of transmission which our readers have seen described in the back numbers of the SCIENTIFIC AMERICAN. A light line of wire rope, travelling at high speed over pulleys of large diameter, will give a better effect, in such cases, than will any other means of transmission of power to great distances. Find a well informed mechanical engineer and obtain plans of details from him. 2. We should use the larger wheel under such a fall, if we were compelled to use an overshot rather than a good turbine wheel. 3. The experiments of Mr. Joseph Coe, at Seaconnet, R. I., have shown a large gain by the use of wheels six feet diameter, approximating that indicated by the laws of friction, but not, we think, to the degree indicated by the question, to which we reply: The larger wheels are, necessarily, of themselves, so heavy as to make an important addition to the resistance. Under theoretical conditions of merely rolling friction, we should reply to this question in the negative. Wheels should always be as large as practicable.

G. S. N. asks: In using a light lubricating oil, made from petroleum, to remove the scale in steam boilers, would there be any danger of the gas, that would arise from the heated oil, exploding? We have two tubular boilers in our mill, and they are badly incrusted with lime. We saw recommended in your paper the use of crude petroleum for removing scale in boilers. We put in our boilers two gallons of lubricating oil made from petroleum, and there was such a gas and smoke made from the burnt oil that we were afraid the gas would ignite and explode the boilers. If there is no danger, we would like to continue the use of the oil, for we think it is doing more good than all the anti-incrustants we have used before. Answer: No explosion can occur where the vapor is unmixed with the proper proportion of air or oxygen. There is no danger except from vapor escaping into the boiler or engine room, and we should presume that such escape would not be likely to occur to a hazardous extent. The boilers themselves are not in the slightest danger.

J. L. B. asks: Why will not a glass fruit jar break if allowed to rest its bottom on a wet cloth when hot liquids are poured into the jar? The wet cloth should be a few times folded, and the cloth may be wet with cold water. The fruit or liquids may be boiling hot; not one jar in fifty will break, and the operation does not seem to require care. This plan of putting up fruit in jars is now altogether practiced by those who know the fact, and it saves the trouble of heating the jars; and with even this precaution a larger percentage will be broken than by the other unexplained or phenomenal process. Answer: The statement of our correspondent is interesting and will probably afford a valuable piece of housekeeping information to our readers. We presume that Professor Tyndall will be able to give us the information asked, when he reads the request in our columns. We should prefer to make an experimental investigation of the subject before presenting our own opinion.

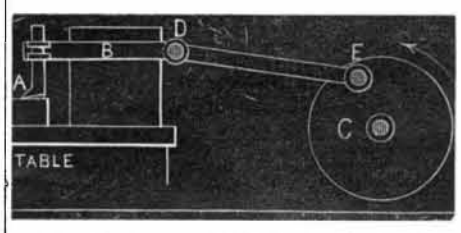
A. S. asks: How does a railway train turn a sharp curve, where the outer rails is considerably longer than the inner, all the wheels being of the same diameter and keyed to axle? And J. H. asks: How the outside wheel of a locomotive or car (on a curve) keeps pace with the inside wheel, on account of the distance to travel being greater, both wheels being fast on the axle? Answers: With wheels of equal size and having cylindrical bearing surfaces, one or both must slip on the rail. The wheels of the cars on railroads are "coned" to avoid this difficulty, their diameter on the outer edge of their bearing or "tread" being less than that of the portion of the tread next the flange. In turning a curve, the wheels ride toward the outer rail, and thus, to some extent, if not wholly, this tendency to slip is prevented.

R. D. and others who ask for information on the setting of slide valves and position of eccentrics are referred to pages 123, 234, 250 of volume XXVII.

C. J. McC. asks for directions for dissolving horn, which he will find on page 91 of our current volume.

J. J. O'F. asks: What would be the cost per spindle (say for 100 spindles) for all the machinery (power excepted) necessary to manufacture cotton yarn out of lint cotton? Answer: From $8.50 to $10.50 per spindle, according to quality and number of spindles, power and buildings not included.

W. F. C. S. asks: 1. Suppose a builder of engines has a contract to build an engine for a certain sized machine shop or manufactory; how does he ascertain the size of the engine that will do the work? Suppose there were 20 lathes, 3 planers, 2 drills, a line of shafting, counter shafts, etc.: how is the number of horse power required to do the work found? What rule applies to all sized shops? 2. How is the device constructed that produces the fast and slow motion on a compound planer, slow while the tool is cutting and fast while it is returning? 3. I have seen in books on philosophy that a bar, balanced at the middle point, would balance in any direction. I have not been able to do so on a pair of druggist's scales. Why is such a thing stated when it cannot be practically demonstrated? Answers: 1. There can be no general rule for determining power required to drive machine shops. The kinds of machinery and character of the work are so variable that it requires the exercise of experienced judgment in each case. An experienced engine builder should be able to tell at once, upon inspection, what power he must calculate for. 2. The simplest device for the fast and slow motion of reciprocating tools is this, where A is the tool,



carried by the piece B which is driven by the wheel C by means of the link D E. The center, C, is below the level of D. As the driving wheel turns, it throws the tool forward at the proper cutting speed and draws it back more rapidly in proportion as the wheel C is larger. Another device is that of elliptical gearing, but it is more expensive. 3. The proposition that a bar balanced in the horizontal position will balance in any other is not true except when it is supported exactly at its center of gravity Bodies of any shape, supported at their centers of gravity, will remain at rest in any position. Take a perfectly straight bar and draw a line through the middle of the two sides and either cut a notch up to the line or drive a pin through, so that the bar may be supported at the middle of the line, *exactly*; the bar will then be in equilibrium in any position. Scales are purposely made with the centers of gravity *below* the points of suspension, so that they may return to the horizontal when unloaded.

W. A. G. says: In the packing room of a dry goods store, the goods coming from the salesroom are lowered by means of a Beekman rotary engine (300 revolutions per minute) which is supplied with steam from a boiler distant 100 feet diagonally across the packing room; the steam pipe running immediately under the ceiling. This pipe seems to conduct the sound of the engine in such a manner that the entry clerks cannot hear the caller off, on account of the noise. What coating or covering will prevent the conducting and radiation of this sound in the packing room? Answer: The steam pipe should be covered to prevent loss of heat and consequent waste in using wet steam, as well as to prevent the annoyance referred to. Try making two or three joints in the length of the pipe, or at boiler and engine, with flanges and thick gum packing. For small pipes, covering with felting and canvas is usual.

E. S. B. asks: 1. What are the relative merits of the locomotive and the horizontal stationary boilers? 2. What is the best plan for taking the sap from green wood so that it may be worked immediately? Is it to be boiled or steamed, and how long would it take for a block four inches square and twelve in length? Answers: 1. The locomotive form of boiler is compact, powerful, and, when properly proportioned to its work, very economical. It is more costly than simpler forms of boiler and, in consequence of the difficulty of removing scale from its tubes, cannot be used when the feed water is liable to produce incrustation. The plain cylinder boiler is of least first cost and easiest to free from scale, but is the least economical in the use of fuel. Other forms of boiler, intermediate between these, usually share their advantages and defects as they more or less resemble the one or the other. Some of the "sectional" boilers have special advantages over either of the above named, in addition to their greater safety. 2. Boil four hours, then dry slowly at a temperature not exceeding 200° Fahr.

E. J. L. asks: Will you give me a rule for calculating the pressure on steam boilers, by the lever and weight? I have searched several works on the steam engine, but have not found two rules alike for calculating the pressure on boilers. Answer: E. J. L. will find his question already answered in our reply to an earlier and similar request.

A. S. asks: 1. Where is the point of suspension in the arms of a regulator? Is it the center of pin where the arms are suspended or where the line of the arms would cross in the center? 2. How can I find out the horse power of a boiler of a given size, say 14 feet long and 5 feet diameter? Answer: 1. The hight of regulator for use in estimating the time of revolution is measured from the plane in which the balls are to revolve