Business and Personal.

The Charge for Insertion under this head is One Dollar a Line. If the Notices exceed Four Lines, One Dollar and a Half per Line will be charged.

Notes & Queries

A. J. W. can harden tallow by using the the recipe on p. 202, vol. 24.—J. K. can preserve wood from decay by the process detailed on p. 319, vol. 31.—A. F. will find a description of the hydrogen lamp on p. 242, vol. 31.—R. H. is referred to p. 48, vol. 29, for a formula for calculating the friction of water in pipes.

(1) J. B. asks: Is there any chemical that will cause the hair and fleshings from hides in a tannery to decompose in three months? A. Try caustic ley.

(2) W. M. D. asks: 1. Is the word ohm used to signify a unit of electric force, or is it a term applied to the resistance of electric force or measurement thereof? A. It is a unit of resistance. 2. How long will the Daniell battery work, if freely supplied with sulphate of copper, with a uniform force? A. That depends upon the size of the cell and the amount of current which it gives. For telegraph lines, these batteries generally work for about four months. 3. How long can they be used before the porous cups need to be renewed? A. The porous cup may be used, with care, for years. 4. What is the power of Daniell's compared with Lockwood's battery? A. Precisely the same. The Lockwood is only a modified form of the Daniell. 5. Does not the Daniell require the least care, and is it not the most reliable and simple for all practical purposes? A. No. There are other forms more suitable for some purposes.

(3) W. B. W. asks: What chemicals possess the property of destroying and disintegrating vegetable substances without corroding and destroying metals, as acids do? A. We think that strong potash lye in contact with steam at a high pressure will probably accomplish the desired result.

(4) G. B. R. says: I am experimenting with electricity, and I have made an electro-magnet; but passing the current through it makes both poles north or both south, according to the direction of the current. Has such a thing been done before? A. Nothing of the kind has ever been produced before to our knowledge.

(5) A. K. asks: What kind and number of wire ought I to use for a house electric telegraph, laying the wire between the bricks and plaster of the wall? A. No. 16 copper wire covered with gutta percha and enclosed in lead.

(6) W. B. B. asks: 1. Does carbonic acid gas, compressed in liquid form in a tube ¾ inch in diameter, create any damage, such as a dangerous explosion, if suddenly liberated? A. Yes. At the moment of liberation from pressure (about 600 lbs. to the square inch) one portion of the liquid rushes into the gaseous state, and, in the effort of so doing, abstracts so much heat from the remaining portion of the liquid that the temperature of the latter is reduced to such a degree as to convert it into the solid snowlike form. This sudden and extreme reduction of temperature causes a corresponding contraction of the glass tube, a contraction so nearly instantaneous, and of course unequal, that the tube is, in many cases, shattered into fragments. 2. What is the effect of heating the above tube to 300° Fah.? Does it increase the pressure in the tube? A. It would enormously increase the pressure. 3. What is the effect if the tube be placed in a cold mixture, say one of 0° Fah.? A. It would reduce the pressure. 4. What effect has carbonic acid on iron? A. Little or none if the metal be dry. 5. Will it keep its pressure in tubes for a number of years, provided they are tight? A. Yes. 6. Does it remain heated after it is compressed in tubes, or only during compression? A. Only during compression. It rapidly gains the temperature of the surrounding air.

(7) H. S. asks: What will take grease out of sheepskins after they are tanned with the wool on? A. Try digesting for a short time in bisulphide of carbon, and dry in the air. The sulphide is very volatile, and in a short time will completely evaporate, leaving no unpleasant odor behind.

(8) W. E. G. asks: 1. In a line of telegraph of about 12 miles long, worked in duplex, how much resistance will be required in resistance coils? A. About 200 ohms. 2. How many cups of battery will be required if the wire is No. 8 and has two relays, each measuring 125 ohms? A. About 24 of Daniell's cells. Four telegraph, according to your description, ought to work.

(9) H. H. asks: What produces the brilliant coloring of the autumn foliage? A. The action of organic acids upon the coloring matter of the leaves.

(10) F. asks: 1. Do the Chinese know the secret of welding copper? A. Yes. 2. Do they make copper edge tools? A. We are not informed on this point.

After kalsomining, is there any known chemical (combinable with the kalsomine) that will not wash off when water is applied? A. We do not know of anything that can be applied that would not, in some way, be objectionable.

(11) H. G. asks: What will remove grease from a tortoiseshell hair comb? A. Try steeping it in benzine or chloroform.

(12) W. H. G. asks: Can the aroma of Havana tobacco be taken from the stems? A. Yes. Crush them and digest for some time in hot water. Then decant the liquid and digest a second time with a little diluted alcohol, and finally remove the residue and carefully dry it. If it is desired to extract the nicotine, evaporate the decanted liquid to a sirupy consistence, and then agitate with twice its volume of alcohol, and allow to stand for a short time. The alcohol, under these conditions, will extract all of the nicotine salts from the aqueous solution, and rise to the top, forming a distinct layer, of a dark color. Decant this upper layer, concentrate by evaporation, mix with a small quantity of solution of potash, and briskly agitate with ether. The ether dissolves the nicotine and some fatty matter which the potash has liberated, and rises to the top when the mixture is left at rest. In order to separate the nicotine from its solvents, the etherial solution is decanted into a retort provided with means of transmitting dry hydrogen through it. Heat is now applied, and the ether is driven off. When the ether vapor ceases to come over, the temperature is raised to 356°, when the nicotine itself distils over and is collected.

(13) W. J. S. asks: Would it be beneficial to force linseed oil into the pores of the spokes and hubs of buggy wheels, after the spokes are driven, to prevent the natural shrinkage, which even the best seasoned timber is subject to in this climate? A. Your plan is a good one. Try it.

(14) W. M. B. asks: Is there a liquid preparation made that a spring, when heated to a cherry red, may be thrown in, and will come out of a good spring temper? A. We know of no such liquid, nor of any better plan than hardening the spring in water and blazing off in oil in the usual manner.

(15) E. W. H. says: 1. How is the dial of a galvanometer graduated? A. It is usual to graduate the dial into 360 equal parts. 2. What sizes of wire are used for the coils? A. The size of wire should be selected with regard to the currents to be measured. No. 18 or 20 will be found convenient we think. 3. Are there not 2 coils of different sizes of wire? A. Some galvanometers are made with several coils of wire, so that they can be used in a large range of measurements, but each coil should be arranged so that it may be separately included in circuit. The principle shown in your sketch applies to the induction coil, and not at all to the galvanometer.

(16) G. A. B. asks: What is the object of making soldering irons square instead of round? A. To increase the amount of contact.

(17) N. W. asks: What do you consider the most nearly correct theory of the earth's daily revolution on its axis? Whence comes the motive power? A. The earth persists in its motion for the same reason that a stone does after its leaving the hand which throws it, or as a railroad train will run several miles, by the motion acquired, after the steam has been shut off; and even after the engine has been reversed and the brakes applied, the train cannot be stopped in a less distance than half a mile, after running at a high speed. The motion was given to the earth during the period of its creation, and it is simply the momentum of its huge mass, combined with its astounding velocity and the absence of resisting obstructions, which keeps the motion up.

(18) J. B. F. asks: Of what ingredients should a composition be, for the ornaments for stove plate and similar light patterns? A. Use a soft alloy. See p. 91, vol. 30.

(19) J. T. M. asks: Would a small tube made of canvas dipped in hot paraffin answer as a flexible pipe to convey hot and cold water? A. No. 2. What would answer better? A. Leather hose.

(20) J. P. asks: What is the generally accepted explanation of the reflection of a ray of light from the inner surfaces of glass, diamonds, drops of water, and other transparent substances, causing the brilliancy of the diamond, the formation of the rainbow, etc.? A. The reflection from the inner surface of a transparent medium is similar to that from the outer surface. Observation and experiment have proved that it is a universal law that, when light passes from a dense into a rare medium, or *vice versa*, a part of the light is reflected in such a direction that the angles of reflection and incidence are equal. When, therefore, the surface between the two media is perfectly even, it acts like a mirror, and the smooth surface of still water is as good a reflecting mirror for the fishes under it as for men above, of which fact you may easily satisfy yourself by observing an aquarium. A piece of plate glass will also convince you of this by two reflections, one from the front and one from the back or interior surface, giving you two reflected images, which will coincide when the light falls perpendicularly, but become separated when the light is made to fall obliquely. The colors shown by diamonds or raindrops in the rainbow are not due to this reflection, but to the refraction of the rays when they enter and leave the diamonds or water drops; for the explanation of this we refer you to any modern text book on natural philosophy.

(21) J. H. asks: What difference will it make in the power of an engine to give the valve sufficient throw to allow a full opening of the ports? At present the valve opens the ports exactly one half. A. She will take a larger supply of steam at the beginning of the stroke, and develope a corresponding amount of extra power.

(22) E. P. W. asks: Do you know of any chemical that can be used to permeate or saturate hard or soft wood, to render it impervious to water, and prevent swelling when submerged therein? An exterior coating is not desirable. A. Boil the wood in paraffin.

(23) M. asks: How fast should the edge of a circular sheet iron disk run, for cutting wrought iron? A. Ten or twelve thousand feet per minute. 2. Can cast iron be cut in the same way? A. Yes.

Should the flues of a boiler be caulked when there is water in the boiler? A. No.

(24) W. B. D. says: I have used black oil in boilers, and found it very good to remove scales. Has it any bad effect on the iron? A. No.

(25) W. H. says: In your issue of October 16 are figured several boring tools. These forms would be admirable if used with short shanks and for shallow holes; but as no tool is certain never to be required in a deep and proportionately small hole, I see no excuse for making such tools, save habit and example. The common form of boring tool affords an example, almost unique, of universal perversity and failure to recognize a very simple situation. Those tools, if properly formed, might have eight times the strength of shank and still enter a hole equally small. It is simply necessary to form the tool so that the cutting edge is on a level with the axis or center of the shank or bar. I send three wooden models of boring tools, one a thread tool. A. Were either of the sample tools sent by our correspondent put to the full amount of duty obtainable from a tool of its size, it would break off at the cutting end. This defect might be obviated by lowering the temper, which would, however, reduce the cutting capability. The fault in the sample in each case is that, in the endeavor to get a large shank, the cutting part is ground away, so that one whose width should be ½ inch is but some $\frac{3}{16}$ in thickness, while another whose width should be ¾ is but little more than $\frac{5}{16}$ inch thick. The whole subject is explained, with engravings, in No. 3 of "Practical Mechanism."

(26) J. B. L. says: We have a rowboat 38 feet long, made of very light timber. How can we caulk it to make it tight? A. If it is well built, you may be able to make it watertight by filling the joints with white lead.

(27) J. O. B. asks: Why is it that a lifting pump for cold water will not lift hot water, at 400° or 500° Fah.? A. Because when the piston rises, the water boils, and the pump barrel is filled with vapor.

Why is lead given to a valve on the steam engine? A. Generally, in order to make the reciprocating parts move smoothly and without noise, or thumping, as it is usually termed.

(28) N. S. asks: I have a boat 30 feet long long and of 6 feet beam, displacing about 100 feet of water. I have 36 two inch steam pipes 39 inches long, connected by a 3 way piece so that the water can have a free circulation. Can I make them into a boiler to propel the boat, the pipes being cased inside of a stove frame with two returns for the heat? Will such a boiler be large enough for two 3x6 engines running on quarters? What speed may be obtained from such a boat? A. The boiler seems to be rather small, but it may answer for a moderate speed.

(29) C. C. says: I have a small boat 19 feet long, 4 feet 4 inches wide, sharp at both ends, and 18 inches deep; and I intend to put another 12 inches on it in depth, making it 30 inches deep. It is a clinker-built boat. I intend to put in an engine and boiler. The engine is 5 inches stroke by 3½ bore, upright, and cuts off at ¾ stroke. The boiler is horizontal, 4 feet long (besides the bonnets); it is of ¼ inch iron, with a dome 22 inches high and 1 foot in diameter. It has one flue 12 inches in diameter, in which the fire is built; and there are 6 return tubes varying from 2 inches to 3 inches in diameter. If I use coal, I intend to make the grate 2½ feet long and as wide as the flue will allow. 1. How large a screw wheel do I want, and what should the pitch and number of blades be? A. Use a propeller 24 inches in diameter, of 3 feet pitch, with either 3 or 4 blades. 2. What speed would it make with steam at 80 lbs. pressure? A. We think you may realize a speed of 6 miles an hour.

(30) G. E. P. asks. Will a rubber packing do for a piston head and piston valve rods? A. Yes.

(31) B. L. says: A friend of mine says that in ringing a bell, he has frequently got it into such a position that he cannot move it with his dead weight, and that, by holding the rope and raising his body with his arms, he can bring it down. I say that whatever power he gains beyond the weight of his body is due to the resistance which the inertia of his body gives to being raised. He says that this is not so, as he moves his body too slowly. Will you please settle this question? A. We think you have the right idea, as we understand your statement.

What is the meaning of nominal power of a steam engine? A. It is power rated by an arbitrary standard, not dependent on the actual conditions.

(32) F. B. says: I. I intend making a four-oar rowing boat of canvas, to fold together, and to be about 30 feet long, with extended rowlocks. How narrow can I make it to be safe from tipping? A. To be perfectly safe from tipping, it will require to be very broad. If you want to make it as narrow as convenient, you will find good examples in racing shells. 2. What must I use to make it waterproof? The canvas must not crack when the boat is folded up. A. Probably the experience of some of our readers will furnish the information you require; and if so, we would be glad to hear from them.

(33) J. C. G. asks: 1. Which engine will consume the most steam in doing the same amount of work, one with a long stroke or one with a short stroke? A. This is a contested point, and must be settled by taking into account the nature of the work. 2. Which is the best, a short cylinder with a long diameter, or a long cylinder with a short diameter? A. The reply to your first question answers this also.

(34) F. K. says: Our main water pipes are 2½ inches inside, and our fire plug 2 inches. What size of hose should I have to throw a stream of water to best advantage? Would you advise me to have gum or leather hose? A. Use 2½ inch hose. We think you will find rubber satisfactory.

(35) E. J. asks: 1. How many cups and of what size of Bunsen's battery will it require to put the first slight coating of nickel on 1 square foot of surface on cast iron? A. Two or three ordinary Bunsen cells. 2. What size of Smee's cell will it require to finish the plating on the same surface a A. One large Smee. 3. How long does it take to get a good deposit? A. Possibly 4 or 5 hours.

(36) R. F. B asks: 1. How many cables touch Canadian territory? A. Five. 2. What cables are they and where do they touch? A. See p. 120, vol. 32. Four of them land at North Sydney, and one at Tor Bay, Nova Scotia. 3. Where can I get information in reference to the depths of the seas and oceans? A. See the United States coast survey charts.