Business and Personal.

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

Notes & Queries

W. N. B. asks: Can I use tubes both above and below a Whitelaw or Barker wheel, and have the same percentage of power from the water which I should get if I took it only above or below? I wish to try it to counteract the pressure of water which I find when it is taken from either only. The friction on the step is so great that it will not stand, as, if taken from below, the wheel cannot be held down without great loss of power. I intend to try it under a head of 220 feet with a wheel of 4 feet diameter, with openings for discharge pipes of ½x4 inches. How many horse power can I get using 68 per cent of the water? How many revolutions will the wheel make?

P. G. asks if oyster shells, standing in a heap for a number of years, are as good as new shells for making lime for building purposes.

S. A. D. says: In eating canned fish one frequently finds the vertebræ and large bones holding their form and crushing under the teeth like wet chalk; while the smaller bones are completely absent. By what process are the small bones thus robbed of their bony structure and destroyed?

C. D. R. asks where paper or pulp is being made from palmetto leaves.

H. H. asks: What kind of varnish or paint should be used for coating the back or metallic part of covered cloth coat buttons, so that the short edge can be turned without breaking or cracking the varnish?

N. C. says: I have a great deal of trouble every year in branding my cattle. I have to lasso and throw them down, tieing them fast; then I heat an iron and burn the brand in the hide. Could not some of our scientists invent some acid that would leave a mark on the hide, preventing the growth of hair and save the torture to the animal by burning?

W. L. says: I am troubled with a hissing noise in my left ear, the result of cold caught last fall, I think. Do any of your readers know of a remedy, or of anything that will alleviate the noise?

S. N. G. would like to know the process of making crystal or sponge gold for dental purposes.

J. L. C. asks for a preparation that can be used (in liquid form) for cleaning and removing heat stains from hot finished work, such as cylinder heads, steam chests, etc.

B. F. B. asks if there is anything in the manufacture of articles made of malleable cast iron, which renders them liable to rust. "I have had trouble with things made partly of common cast iron and partly of malleable cast iron, from the malleable parts rusting."

B. F. B. says: I have tried the process given in the SCIENTIFIC AMERICAN for japanning small iron articles, by placing the articles in an iron kettle with bituminous coal and setting the kettle on a fire, and I cannot make it work. Should the cover of the vessel be luted on, and should any particular coal be used, and how long should the baking continue?

W. S. asks how best to cut glass tubing into various lengths.

W. M. McD. asks: Is there anything which will kill coal tar on wood, so that the latter can be painted in light colors without danger of the dark hue coming through again?

F. A. S. asks for directions for constructing a stove for drying fruit, etc., which will not change the color.

A. B. W. asks how to make logs durable. They are placed underground, to conduct water.

A. B. W. asks: What is the best method for hardening gold, silver, and brass pin tongues, links, and eyes for sleeve buttons, etc.?

A. J. B. asks for the best means of separating the base metals from silver and gold ores.

B. F. B. says: I find need of a portable lamp for car use, and am engaged in getting one up, but am troubled as to what to burn in it. Is there any oil except whale oil that will burn without a chimney, or is there any device for burning kerosene without a chimney, which is successful?

Answers to Correspondents

P. P., Jr., will find directions for black enamel on iron, on p. 203, vol. 28.—C. T. S. and E. B. T. will find a recipe for gold lacquer on p. 299, vol. 28.—P. B. can blue his steel articles by using the process described on p. 10, vol. 25.—J. W. will find a waterproof cement for leather described on p. 119, vol. 28.—J. C. M. will find directions for thawing out frozen water mains on p. 266, vol. 26.—C. T. S. should read the last few numbers of our journal, in which full directions for tempering steel for all purposes are given.

J. H. says: We are desirous of coating the inside of a wrought iron stand pipe, of 126 feet hight, with some material for preventing rust. The use of soluble glass has occurred to me; will it answer, for any length of time? Answer: If the pipe is subjected to changes of temperature or to sudden shocks, the glass coating would be liable to crack and break off. Probably the best coating for your pipe would be that used by the cities of New York and Brooklyn and largely employed in England. Heat coal tar pitch (from which the naphtha has been distilled, and which has the consistency of wax when cold) to a temperature of 300° Fahr., and dip the pipe into it, retaining it there until the metal has acquired the same temperature. The pipe must be free from rust and perfectly clean, before dipping. It is well to cover it with linseed oil, before coating it with the coal tar pitch.

V. W. K. asks: Will a machine have the same power if driven by a 10 inch pulley that it now has, being driven by a 20 inch pulley, face speed of both pulleys being the same? Answer: Yes, if the belt does not slip any more, after the change is made, than it did formerly.

G. Van H. says: I have a bored well 200 feet deep, 5 inches in diameter, which has 50 feet water in it. I propose putting in a pipe 1¼ inches in diameter with a cylinder 3 inches in diameter. I shall use a wind mill to raise the water. Now how deep shall I place the cylinder in the well to get the best result? Answer: Put your pump within 20 feet of the level at which you are always sure to have water.

S. asks: Are there any glasses made which will enable a short-sighted eye, now able to read ordinary type at a distance of 3 inches without glasses, to read at 2 feet or more? Can such glasses be used in spectacle frames? Answer: You can probably get such glasses from a good optician. They could be used in spectacle frames, but if they were very thick, the ordinary frames would not answer, and a special form would be required.

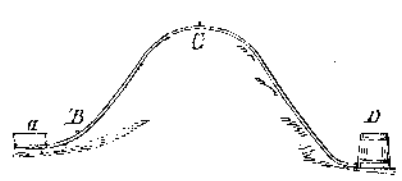
E B. asks: Can you inform me how I can rid a house of cockroaches? Answer: Arsenic in the form of Paris green, placed in the crevices of the floors near the sinks, is much used for the purpose. It is sure death to the roaches—and other members of the family who swallow it.

C. B. U. asks: Can you inform me of any method or liquid to dissolve or clean hard polish, such as piano varnish, from carvings, without sand papering or otherwise scratching the wood? Answer: Try alcohol, or a mixture of alcohol with chloroform or ether.

J. N. J. asks: Why is it that farms on the lakes that were high and dry fifty years ago are now abandoned, and water standing on them? Does the water rise higher now than it did then? Answer: Careful observations of the coast line for a series of years have shown that there is a regular depression of the land going on in one section, and a steady elevation in another. The cause of this is ascribed by many to the internal cooling of the earth, causing expansions and contractions.

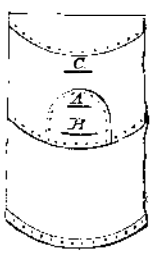
J. E. says: I have a cistern from which the water is pumped through a leaden pipe running to the bottom of the cistern. What can be attached to the end of the pipe in the cistern to act as a filter? The water at certain seasons tastes badly; can this be remedied by any thing used to pass the water through? Answer: Put the end of the pipe into a barrel filled with charcoal. This will filter the water very well; and unless the water is unusually dirty, it will work for two or three months, when it will require to be cleaned out.

A. W. S. asks: Will you please explain the cause of the following? A line of pipe for the purpose of transporting oil is laid from a, a pumping station, over



an elevation of 300 feet, at C, to the iron tank at D. The pump at a has a 12 inch steam cylinder, and a 4 inch oil cylinder, and 24 inch stroke. It is driven by a boiler of 50 horse power, which carries 80 lbs. of steam. The pipe is made of wrought iron, with a lap weld, and has an inside diameter of 2 inches. When pumping at the rate of 100 barrels per hour, the pressure at B, as shown by the gage, is 800 lbs., while that at C is 400 lbs.; and yet the pipe frequently bursts at the highest point of elevation, and seldom shows a leak at the point where gage shows highest pressure. Please explain this seeming paradox. Answer: The pipe is split by the impact of the oil. If the pump is stopped, the oil will fall away at either side from the highest point. On starting up, the oil may separate at the highest point, creating a vacuum there. The following oil will rush in with great velocity, and, its motion being suddenly arrested, will react upon the pipe, either splitting it at once, or weakening it so much that it will afterwards break. Water pipes in houses are frequently burst in a similar manner, the motion of the water being arrested by suddenly closing the supply cock.

J. B. E. says: Suppose that car oil is fired under an old boiler of poor iron, and the boiler springs two leaks [see diagram] A B, in the second sheet, shortly after the oil is fired; and suppose that the boiler runs (during more than a year) sometimes for seven weeks without cleaning. The iron was apparently all right one evening, and the night man allowed steam to run down to 10 lbs. and then fired car oil to get up steam. The next day, when extra fire was necessary, the boiler sprung a leak at C. The boiler had been cleaned two weeks before, but scraping and brushing the rivets and edge of sheet around the first patch was not done. This edge always leaked considerably after brushing out all the corners. 1. Was it the mud or the firing of the oil that caused the leak? 2. Is it true that, as long as the fire agitates the water in a boiler, the mud is almost equally distributed throughout the boiler, leaving the bottom as clear as any other part under water? Thus, if a boiler runs for four weeks and more, one fifty-sixth of the water is blown out twice a day, and there will always be nearly the same amount of mud in the boiler, excepting the scale which adheres to the bottom. In twenty minutes after blowing off steam, pulling out the fire, and opening the manhole, the water is settled as clear as it appeared before entering. Is it a positive fact that mud settles on a leak after it is sprung, or does mud settle to a certain place as long as the iron is solid and the temperature even and high enough to agitate the water? Answers: 1. We do not know what our correspondent means by car oil, unless it is one of the hydrocarbons; but whatever it is, it could scarcely cause the leak, which must be attributed to the mud or scale. 2. Unless the circulation is unusually good in a boiler, or unless the boiler primes, most of the mud will be at the bottom. When a boiler leaks, a current is created in the direction of the leak, and the mud will be drawn to that point.



H. B. asks (1) which will require the most power to saw a board 12 inches wide, a circular saw just large enough to reach through it, or one large enough to saw 24 inches with the same feed. 2. Will a 54 inch saw with 40 teeth require any more power than one of the same size with 28 teeth? Answers: 1. A saw just large enough to cut through a board will require less power than a saw larger, the number of teeth, speed and the thickness being equal in each. 2. The more teeth, the more power, provided the thickness, speed and feed are equal. There is, however, a limit, or a point where a few teeth will not answer the place of a larger number. The thinner the saw, the more teeth will be required to carry an equal amount of feed to each revolution of the saw, but always at the expense of power.—J. E. E. of Pa.

A. C. S. asks: Which is the strongest bevel gear: 6 feet 6 inches diameter, with 8½ inches pitch and 12 inches face, or 6 feet diameter with 4 inches pitch and 10 inches face? The pinions in each case are nearly 1 to 2. Answer: If the pinions have the same relative size in each case, and the power applied is the same in both cases, the larger gear will be the stronger.

P. P. Jr., asks how to dissolve india rubber so as to run it in a mold and then harden it, and if plaster of Paris would answer to make a mold with. Is there any other material that would answer the same purpose as india rubber and be equally elastic? 2. Is there any convenient way of taking the fluid contents out of a barrel and putting the same into a can without using a pump, supposing the barrel to lie on the floor and the top of the can to be about 7 feet from the floor? Answers: See answer to S. J. N. in No. 24 of our volume XXVIII. 2. There are several kinds of lifting pumps made for this purpose. If you want to take out only a small quantity at a time, say a quart or less, you can take a piece of tin leader or tubing and have it made to taper almost to a point at each end. On putting it into the cask it will fill up to the level of the surface of the liquid; then stop the upper end with your thumb and you can safely lift out the tube and contents. Small apparatus of this kind made of glass are used by chemists under the name of *pipettes*, and are so graduated as to act as measures at the same time.

E. J. M. says: There is a difference of opinion as to which side of a gum belt, the inside or outside (as usually put up in coils) should be next the pulley. The minority holds to the outside plan, the majority to the inside. "Our army swore terribly in Flanders;" had the SCIENTIFIC AMERICAN been in existence then, "our army," I opine, would have done as we of Texas do, swear by it. Answer: This seems to be one of those rare cases in which both majority and minority are right. As ordinarily made, the outside and inside of a rubber belt are precisely alike, so that it can make no difference which side is next to the pulley. We are much obliged for our correspondent's good opinion of the paper, which is only one of the many kind testimonials we are constantly receiving.

X. Y. Z. asks why it is that large files are cut coarser than small ones. "I will say that they would be much better if cut fine, as they would do more work and do it better. 2. Would it not benefit a large class for industrial fairs to give premiums for the best method of filing saws, the saws to be filed to do the best work with the least power? I find it rare for even a first class workman to know anything about the principle of filing a saw to do nice work. In twenty years experience, I do not recollect seeing more than two or three that could do it, and I see no reason why this should be so." Answers: 1. It is more difficult to cut a large file finely than a small one; though if there was much demand for the kind of files mentioned by our correspondent, they would probably be manufactured. 2. The idea of offering a premium for the best method of filing saws is a good one, and would be productive of useful results, if carried out. Perhaps those of our readers who are experienced in saw filing will favor us with communications.

A. B. W. asks what is the best mode of fastening lamp globes to the burners? Answer: Cement with plaster of Paris.

J. L. G. says: Some time since a gentleman buried a large amount of gold in this neighborhood, and went away. While absent he died; but before dying, he gave a description of the place, the amount, and the manner in which it was buried. We have made several ineffectual efforts to discover it according to the description of the place and directions furnished by the deceased. We feel sure that it is buried there, and desire to ascertain of you whether there is any scientific mode by which it may be discovered, or that would aid us in the search, and at what cost, and where it may be procured. Answer: Dig until you find it. Science shows no royal road to golden treasures.

G. B. M. says: 1. Please give some method for preserving leaves and flowers in their natural colors 2. What is the capacity of the Croton aqueduct and the estimated water supply to the city of New York? 3. What are the standard works on mineralogy and where can they be obtained? Answers: 1. Flowers can be preserved by dipping them in melted paraffin. This applies however, better to white than colored flowers. For colored ones, the paraffin should be suitably colored. 2. The Croton aqueduct is capable of conveying 120,000,000 to 130,000,000 gallons of water per day. The amount consumed is about 90,000,000 per day, or over 90 gallons to each man, woman, and child. The largest reservoir in the Central Park has a capacity of 1,000,000,000 gallons; the old reservoir near it contains 150,000,000 gallons, and the miniature distributing reservoir at 42nd street holds only 20,000,000 gallons, or enough to last about 6 hours. 3. Dana's "Mineralogy" is the very best work extant. It sells for $10. There are smaller works, such as Professor Eggleston's "Lecture Notes," which are convenient for reference; but "Dana" is the best.

G. L. R. asks for the best authorities on the subject of preservation of timber, and the effects of chemicals on wood generally. Answer: You will find an excellent article on this subject in Wagner's "Handbook of Chemical Technology," translated by Crookes. Several exhaustive articles on this subject, by Dr. A. Ott, appeared in the *Engineering and Mining Journal*, November 22, 1870, and *Journal of Applied Chemistry*, October and November, 1870. Colonel J. T. Crane, United States Corps of Engineers, made a report, on the 9th of September, 1870, to the Chief of Engineers, United States Army. This was published in the *American Chemist* for February, 1872. In this report, tabular results are given showing the comparative time which ties, etc., lasted when treated in different ways, more especially relating to creasoting.

J. H. asks for our opinion on the following matters: 1. I am using an engine 7x30, running at 60 revolutions per minute. The boiler is nearly new, of 30 inches diameter, with 26 tubes 9 feet long and 3 inches diameter. The steam pipe from boiler to engine is 28 feet long and of 2 inches internal diameter. When all our works are on, 30 lbs. on the boiler more than drives our engine at full speed. How much power should that pressure give? The pipe and the engine are left bare. 2. I am using, for this amount of power, an enormous quantity of coal, and I want to know if I cover the steam dome pipe to engine, the engine, and the feed water pipe from steam heater to boiler (24 feet), how much saving of coal would there be? 3. Would it not be well to slow the engine nearly half, driving the shaft same as now; then I could get about 50 lbs. to the inch on my engine before the governor would close, instead of 20, 25, or 30 lbs. as at present? 4. How much coal