Notes and Queries

A., of Md.—Carbolic acid is composed of carbon, hydrogen, and oxygen with the formula according to the old atomic weights—

$$C_{12}\ H_6\ O_2.$$

which gives the proportion carbon 62 pounds, to hydrogen 6, and oxygen 16. It is one of the constituents of coal tar, and is separated first by fractional distillation, then by agitating the oil which comes over between 300 deg. and 400 deg. with a solution of potash, and saturating the watery portion with hydrochloric acid.

C. R. J., of N. Y.—The notion that there is any more power in a long screwdriver than in a short one—the handles of the two being of the same size—is the result of careless observation.

E. K. C., of Me.—An index plate for a small gear cutter can be purchased in this city for about $12.

G., Ind.—Machinists' tools can be had in all tool stores.

H. O., of——.—Recipes for dressing furs cheaply and quickly, can be found on page 326 Vol. XI.

L. S. B., of S. C.—Your notion that the attraction of the earth is due to magnetism instead of gravitation would be overthrown by a consideration of some obvious facts—for instance of the fact that the earth attracts all bodies alike in proportion to their mass, while magnetism does not attract any two substances with the same force, and some it does not attract at all. If you try the experiment you will find that a coin weighs more than a feather in a vacuum.

A. & G. W., of Pa.—The officers of the Government usually express the amount of the public debt in figures, leaving readers to call the amount thousands of millions or billions, to suit their own fancy.

A. A. R., of Pa.—The picture that you send us is a wood cut printed from three blocks. One block is cut to print the blue, another to print the yellow, and a third the purple; and the paper is pressed successively on each block.

A. G. M., of Min. To get the circumference of a circle multiply it diameter by 3·1416. Multiply the circumference of a reel by its revolutions per minute, and you will have the length of line that it will wind in a minute.

D. R. T., of Va.—The sketch of the governor you send us is novel, but there are others so much better that we do not advise you to proceed with it. You will find directions for making artificial ivory on page 198 Vol. X.

H. B. S., of Pa.—We never heard that the injector had any effect whatever on the slide valve. Your question is so put that no other answer will apply to

H. R., of Ohio.—There is no cement that will hold vulcanized rubber to iron so that it will not come off.

G. S., of Pa.—If there is no pressure from below, you must calculate the pressure on the whole upper area of the valve. The address of the party you require is New York City.

W. F. S., of Md.—Your case is that of many others. You have an invention and wish to bring it before the public, but have no friends to whom you could confide the secret of it to introduce for you. Your only course is to take out a patent for it, when if it is really useful you will find plenty of persons who will buy it.

F. Olneyville, Box 129.—We have no idea what the question was that you sent us $1 for and that you only received "a three cent book for." If you will send your question again we will endeavor to answer it satisfactorily.

B. W. R., says:—"I am the manufacturer of a known chemical combination, but having made several improvements in it lately, have as yet taken no patent. Should I die could my heirs take a patent out for the same?"—Yes.

H. A G., of N. Y.—The "shiny black paint" used on fancy iron castings, is japan varnish sold by all wholesale paint dealers. It is applied cold, and baked in an oven at a moderate heat for some hours.

T. R. N. Y.—You require to know whether the recipe for welding cast steel, recently published in the Scientific American, will unite wrought iron and steel. It seems that you might put a piece of each in your fire and try it, and so find out in the most satisfactory manner. No water must be added to sal ammoniac in melting it. It is the water of crystallization that is to be driven off.

B. & Co., Ohio.—In philosophical terms, a pulley on a vertical shaft rotates in a horizontal plane; in popular language it may said to run horizontally.

H. C. B., N. H.—Our information in regard to the state of the cabinet business in Iowa, is at present so limited that we could not advise you with any degree of accuracy.

Worcester Rule Co.—We have never had the pleasure of reading your pamphlet, but will give attention to any article you may forward us.

C. W., N. Y.—The eccentric on a horizontal engine is nearly at right angles with the crank; whatever the lap and lead is will change the angle that a line through the center of the eccentric forms with a line drawn through the center of the crank. If the engine runs backward, that is, toward the cylinder and the connection is direct from the eccentric to the valve stem, the eccentric will be on the upper side when the crank is on the forward center. Agents who sell our paper have no right to collect postage, they get their papers by express.

E. A. W., Ohio.—Green hide is generally applied as a cushion to receive the edges of knives in straw cutters. On paper cutters a piece of maple wood is used.

Correspondence

Machine Taps--Steam in Cemented Cisterns.

Messrs. Editors:—In a recent number of the Scientific American, "Apprentice" asks for some information about the best mode of filing taps. Your answer to him is correct, and agrees with my experience, as far as the filing of the flutes is concerned. I call the attention of your readers, however, to another very important point which is generally overlooked by mechanics making the taps.

Taps for use in machines are now made almost universally straight; that means, the part on which the thread is cut is turned of even diameter, and after the thread is chased, a portion of it is turned off tapering toward the end. To make a tap of this kind to cut free and without much heating, the tail stock of the lathe should be set to on side, enough to turn the tap on the end which enters the nut first, about 0 15 larger, then the required finished size of the other end of the thread; on large taps even ·02 is not too much.

Taps, particularly thin ones, will spring considerably in turning, and more so by chasing (unless a steady rest is used), which causes the tap to be of a larger diameter toward the left end of the thread. It is evident from the nature or curve of the thread, that the sides of the same cannot cut and present a smooth surface to the iron in contact with them. It is further evident that the friction on the sides causes the tap to expand, and also the nut; if the tap is larger toward the finishing part, the friction is greatly increased, and heating and breaking of the taps is generally the consequence. On the other hand, a tap made according to the above direction will always cut free and without perceptible heating. The tapered part forms a series of cutters, and none will cut more than its projection above another; the expansion of the nut will always correspond with the diminished size of the tap, so will the strain and power required for cutting as the width of the cutting edge decreases.

The taps in use at the place I have charge of, have all three semicircular flutes, the thread on the tapered-off portion is slightly filed off to the edge, to reduce the friction, and to allow the teeth to cut free, and not to squeeze Our 1·25 tap is 14 inches long, the thread part 4 inches, the tapered part 3 inches. The machine is not stopped for taking off nuts, the tap is simply taken out of the socket into which the shank is fitted. The shank is turned down to the bottom of the thread the whole length, which gives room for 7 nuts to remain on it. Our $\frac{3}{8}$ tap is 7 inches long, thread part 2 inches, tapered part 1·5. These taps have been used for five successive hours, without heating materially, if oil is regularly supplied. Such taps, if dull, can be sharpened up very easily on the grindstone.

In your "Notes and Queries" you express the wish of learning the result of exhausting steam into a cemented cistern. We have one at this place, into which the steam of a 65 horse-power engine is exhausted during winter only, for the last 10 years, and we never experienced any difficulty. Yet I am of opinion that it will injure the cistern sooner or later. Another very serious objection against this practice is, it keeps the water in constant agitation, and prevents the settling of its impurities, and as we draw our feed water from this cistern, dirt will be deposited in the boilers. There is one reason, however, why we continue to do it; rain water falling on all our large buildings in the yard is conducted through pipes into this cistern, and the hot steam keeps these pipes and conductors all the time open and prevents them from freezing in cold weather. The water gets very hot, particularly when the supply gets low, and under such circumstances we find it it very injurious to the packing of the feed-water pump. M. N.

Alleghany, Pa., March 22, 1866.

[We cannot agree with our correspondent about the feasibility of grinding taps. Few grindstones run true enough to do it properly, and few men, especially bolt cutters, have skill enough to grind a tap without some rest. It would pay in all machine shops to have a solid emery wheel of fine grade to sharpen special tools on, together with rests suited to different work.—Eds.

Projectiles Used During the Crimean War

Messrs. Editors:—I take great pleasure in communicating to you the following extract from official documents in my possession, and which may be read with interest by your numerous readers:—

Number of projectiles used:—French, 29,460.363; English, 15,000,000; Piedmontese, 50,000; Turks, 50,000; Naval Forces (Allied), 35,000; Russian, 45,000,000. Total, 89,595,363.

Killed and wounded by these projectiles:—French, 50,836; English, 91,038; Piedmontese, 183; Turks, 1,000; Naval Forces (Allied), 2,000; Russian, 100-000. Total, 175,057. Lionel d'Epineuil.

Philadelphia, March 21, 1866.

[It will be seen that only one projectile in 512 did any execution.—Eds.

A Crystalline Car Axle.

Messrs. Editors:—The accompanying metal, just as it is, was taken off a broken axle of a freight car on the Pittsburg and Erie R. R. on March 20, 1866. The axle was broken near the hub of the wheel and both parts had the same appearance. The yellow is not rust as there is no crack in the axle to let moisture in, and it is in the same condition as when I broke it off. Being a passenger train and being detained by this break is the manner in which I got it. Sizer & Co. was on the wheel, but nothing else, no location or any thing to know where it was made.

I may not be a judge of iron for car axles, but it seems to me this is very poor material.

G. M. M.

Oil City, Pa., March 26, 1866.

[The specimen is a mixture, in about equal proportions, of peroxide of iron and bright crystals of iron. It is manifestly very brittle, and wholly unfit for use as a car axle.—Eds.

The Cascade of Light in Boston, Mass.

Messrs. Editors:—In remarking upon an article in your paper of the 24th inst., entitled "Light in a Bowl of Water," you say, "One of the most brilliant experiments ever exhibited in a lecture room, is the throwing of the electric light upon a column of falling water." Never was a remark more true, as all can testify who were so fortunate as to be present at Prof. Lovering's lecture in this city last Friday evening, before the Lowell Institute.

With the aid of a very powerful Rumkoff coil, a stream of falling water was made to produce, as you say, "precisely the effect of a cascade of light."

The object of this note is, with your permission, to say that, "this dazzling experiment has been exhibited" most successfully in this country as well as in England. J. A. D.

Boston, March 26, 1866.

Electricity from Combing the Hair.

Messrs. Editors:—I would like very much to see explained in your interesting paper, the following fact that occurred to me some nights ago. While I was combing my hair, using an india-rubber comb, I remarked that every time that I passed the comb through my hair, there was a crackling noise like the explosion of sparks of electricity. Rather astonished at this, I put out the gas light, and effectively I perceived in the looking glass before me, the bright sparks shining and disappearing in the obscurity.

As I am not acquainted with the mysterious ways of electricity, I would feel obliged to you for an explanation. A Subscriber.

New York, March 30, 1866.

[A common phenomenon. Electricity is produced by friction, and one of the very best electrics is hard india rubber.—Eds.

Strength of Ice.

Messrs. Editors:—Your statement in your last number, as to the strength of ice, is calculated to mislead, and any officer trusting to it in moving a body of men would be very apt to give them a cold bath. Two inches of good ice will bear a man, but not a number of men. In deep water it will always crack a little even with one man's weight, and would very soon be weakened. Four inches will scarcely bear a horse. You could not invent a more perfect ice breaker than a horse's sharp shoe. All his weight

son two feet, and the sharp caulkers do not give one inch surface for it. Ice also is very different in its strength when formed in excessively cold weather; it is then flinty and brittle, cracks easily and requires some days of milder weather to make it bear well. This is one of the mysteries of the formation of ice. I have resided many years on Newburgh bay, and the matter of crossing it in winter either for business or pleasure is of some importance. Six inches of good ice is safe for a tun load on a sleigh, and for a few days safe for a wagon. A valuable team of horses was lost last winter with a load of 1,500 lbs. of coal on a wagon. The ice was six and one-half inches. A drove of cattle running too much together broke through ice measuring ten and one-fourth inches, in 1864. In very cold weather the water, where ice is formed, goes down to thirty-two and one-fourth degrees and is the same temperature at any depth. This year I have not seen it lower than thirty-two and one-half. When it rises to thirty-three the ice melts rapidly. Many years since a heavy gun was run over from West Point to Cold Spring, and the thickness of ice was published, I think, in the *Franklin Journal*. I have made many experiments on the ice and temperature of the water, and if interesting to your readers, will be pleased to give them to you. W. H. Denning.

Fishkill, N. Y., March 27, 1866.

[Definite information like this is always acceptable to us, and we are obliged to our correspondent. As the maximum density of water is 39·2°, we think it must be in exceptional cases only that it will be found at 32·25° at all depths.—Eds.

The Cigar Steamer.

Messrs. Editors:—In No. 13, current volume, of the Scientific American, you comment upon the form of Winan's cigar steamer as follows:—"If the vessel was to be wholly submerged, the form would be excellent; but as she is to float at the surface, the submerged portion only will act upon the water, and it seems to us that the form of that portion is very badly calculated to overcome the resistance of the water."

May I trouble you for an answer to a question, relative to the same? If that form of hull is excellent when submerged, and subject to increased resistance from the water, why should it not be excellent when only half submerged with less resistance?

All aquatic fowls when swimming have an unequal immersion of body. No person will deny that their buoyancy is perfect, and speed very great, comparatively. R. B. S.

Sing Sing, N. Y., March 22, 1866.

[If the cigar steamer was cut in two at the surface of the water, is it not plain that the lower slice—the submerged portion—would have a form entirely different from that of the whole vessel? If this submerged portion had a square house built on it, or a cabin with vertical sides, or any other form of superstructure, its power, in a smooth sea, of overcoming the resistance of the water, would be just the same as with its present spindle-shaped upper works. The best form for pushing the water aside is a wedge with a vertical edge; and the sharper the wedge the better. In the cigar model the several wedges that make up the bow under water, have rounded ends, and they are not so acute in proportion to the relative length and width of the vessel as in ships of ordinary construction.—Eds.

Cold Cast Iron on Melted Cast Iron.

Messrs. Editors:—I have noticed the question repeatedly, why cold cast iron will float in liquid or melted cast iron.

I tried one experiment on the same by taking probably a pound, filed it bright, and removed all the sand and scale, and it sank like a stone in water. Shrinkage is about an eighth of an inch per foot, consequently sand and scale is buoyant enough on small castings to float. Daniel Zuern.

Shamokin, Pa., March 28, 1866.

[Was not the piece of iron dropped from a considerable hight, so that the momentum carried it under, and did it not rise immediately to the surface? Dr. Parmelee, of this city, tried a piece weiging thirty pounds, made perfectly clean, and it floated. —Eds.

Lottery and Gift Swindles.

Messrs. Editors:—Does it not become your duty, through your widely-circulating journal, to give the public warning against the fraud and deception now being perpetrated by a company or companies of lottery dealers in your city? Honest, hard-working, poor men are becoming the dupes of their nefarious swindling. The agents of these lottery managers send out their circulars and list of prizes to be drawn in their "scheme," to individuals whom they designate as chosen by them to aid in their enterprise, offering them a carefully selected package for ten dollars, and binding themselves to pay two thousand dollars to the individual should his prizes fail to draw that amount. Who would refuse so good an offer from responsible men doing an honest business? The writer has received such a circular and proposition, but has not yet sent the ten dollars. Shall I send?

Respectfully, J. C. R.

Grand Rapids, Mich., April 2, 1866.

[We answer, yes—send on your ten dollars. If you have not good sense enough to discover the cheat, after you have sent the ten dollars you will find out by experience what you may never learn from the advice of others.

We are constantly receiving inquiries similar to the above, and with a view to see what could be done to break up such frauds upon honest and unsuspecting people we called upon Mayor Hoffman, who assured us that he had done all in his power to suppress them, and had warned the public through the newspapers to take no notice of such circulars when received. In spite, however, of every effort these lottery and gift swindles still flourish, and always will flourish until people learn the common-sense fact that when an advertiser promises to return two dollars for one, he simply means to swindle. If people will be gulled by such transparent frauds, there is no hope of our enlightening them upon the subject. The carefully-selected package to which our correspondent refers as being offered for ten dollars, in all probability could be purchased for a dollar of any honest tradesman, of which class there are thousands in this city. But swindles take better with some people than honest dealing, there seems to be a sort of charm about these bogus operations.—Eds.

A Sawyer Answered.

Messrs. Editors:—Having had some experience in making and running circular sawmills, I should answer the questions of "F. M. E." in the following manner:—Place the saw from the center forward parallel with the carriage, provided that does not throw it off more than one-thirty-second of an inch on the back side. Give the mandrel one-sixteenth-inch end play, and do not try to run the saw at a speed much above what you can maintain through the log, carrying from three-fourths to one and one-half inch feed. Place the guides as high as they can be. Now take hold of the pulley and pull the mandrel endwise until the collar strikes the box; then set up the guide on that side so as to crowd the saw a little; then pull the mandrel the other way, and set up the other guide the same. Have the play between the guides less than the end play of the mandrel. To joint the saw use a piece of grindstone, and run the saw fast; then it will not saw into the grindstone. I always leave just a shade of this jointing on the points of the saw teeth. File the teeth about one and three-fourth inch long on the under side, and have that side on a line that would cut off one-fifth of the saw. File the top of the tooth one and three-fourth inch from the point on a line to strike the point of the next tooth behind. I use an upsetting tooth to bring out the corners of the teeth as they wear off. Each side of the saw needs to be exactly alike, both as to set and angle of filing. Do most of the filing on the under side, and never turn a feather edge; better leave the tooth a little dull; the saw will not run so long, and soon gets out of round. Push the file the whole length with a straight and strong but slow motion. Any cutting edge on hardened steel cannot stand much speed. Taylor D. Lakin.

Hancock, N. H., April 2, 1866.

[What is the object of giving end play to the mandrel? Where it is done the saw has to do what the shoulders of the mandrel should.—Eds.

A Magnetic Safe.

Messrs. Editors:—Please explain the following phenomena, and thereby arrest an argument, which the parties seem determined to fight out all summer.

Take a mariner's compass in one hand, a bar of iron in the other. Hold the bar vertical on the north of the compass. Bring the two in contact at the upper end of the bar. Gradually push the compass down to the lower end, and note how the needle has been reversed. Reverse the bar, put the compass on the north, hold the bar horizontal, and account for the various positions taken by the needle.

Try the experiment on the iron safe which is in your office, with this modification. Do not hold it in your hand. R. B. Stuart.

Ossining, N. Y., March 30, 1866.

[The north pole of one magnet will attract the south pole of another. Almost any bar or mass of iron that is kept for a long time in a vertical position, or in a north and south position, becomes a magnet; and then one end will attract the north pole of a mariner's compass, and the other the south pole. We have repeatedly tried shovels, tongs, safes, and other pieces of old iron with a compass, and we have never found one that was not a magnet. Of course, if such a bar of iron could be poised with sufficient delicacy, it would point north and south, and thus serve as a compass.—Eds.

Melting-pots.

Messrs Editors:—A branch of the government may require melting-pots made of crucible clay. Should any maker advertise in your paper, I will write to him and will order through the proper office. D. C.

Washington, March 28, 1866.

To Prevent the Loss of Aroma in Roasting Coffee.

The berries of coffee once roasted, lose every hour somewhat of their aroma, in consequence of the influence of the oxygen of the air, which owing to the porosity of the roasted berries, it can easily penetrate.

This pernicious change may best be avoided by strewing over the berries, when the roasting is completed, and while the vessel in which it has been done is still hot some powdered white or brown sugar (half an ounce to one pound of coffee is sufficient). The sugar melts immediately, and by well shaking or turning the roaster quickly, it spreads over all the berries and gives each one a fine glaze, impervious to the atmosphere. They have then a shining appearance, as though covered with a varnish, and they in consequence lose their smell entirely, which, however, returns in a high degree as soon as they are ground.

After this operation, they are to be shaken out rapidly from the roaster and spread out on a cold plate of iron, so that they may cool as soon as possible. If the hot berries are allowed to remain heaped together, they begin to sweat, and when the quantity is large, the heating process, by the influence of air, increases to such a degree that at last they take fire spontaneously. The roasted and glazed berries should be kept in a dry place, because the covering of sugar attracts moisture.

For special cases, such as journeys and marches, where it is impossible to be burdened with the necessary machines for roasting and grinding, coffee may be carried in a powdered form, and its aromatic properties preserved by the following process:—One pound of the roasted berries are reduced to powder, and immediately wetted with a sirup of sugar, obtained by pouring on three ounces of sugar two ounces of water, letting them stand a few minutes. When the powder is thoroughly wetted with the sirup, two ounces of finely-powdered sugar are to be added, mixed well with it, and the whole is then to be spread out in the air to dry. The sugar locks up the volatile parts of the coffee, so that when it is dry they cannot escape. If coffee is now to be made, cold water is to be poured over a certain quantity of the powder, and made to boil. Ground coffee prepared in this way, and which lay exposed to the air for one month, yielded on being boiled, as good a beverage as one made of freshly-roasted berries.—*Liebig*.

Mr. O. C. Crane, of No. 330 Delancy street, has shown us a long cut taken from a piece of round steel, two and one half inches diameter, which is sixty-eight feet long in one continuous piece.