Notes and Queries

J. G. L., of N. Y., asks:—"Where a person has been manufacturing a patented article, and the patent expires, is it lawful still to continue to stamp the article 'Patent,' with date, etc. If so, can other parties beside the original manufacturer so stamp them?" Ans.—You can continue to use the stamp; others can use it also.

A. N., of C. W.—In the article on small boilers we said the materials would cost $20; the labor would cost $75 more; the profit would be $20 more, which would make the boiler cost $115. Plenty of persons in this city will make one. You have only to send the order and the funds and it will be made.

Decimal, of Va.—Your engine is of 120 horse-power, provided 50 lbs. is the mean pressure throughout the stroke; but if the initial pressure is 50 lbs., and the steam is cut off before the completion of the stroke, the engine is of less than 120 horse-power. You must multiply by the average, or mean, pressure throughout the stroke. The rule is correct.

T. B. R., of Pa.—"Silliman's Philosophy" has an excellent treatise on electricity; there is also a good one in "Miller's Chemistry," republished by John Wiley, of this city. You can get a work on mathematical instruments of Henry Carey Baird, of Philadelphia.

W. W. H., of Conn.—You will save coal by running the engine slower and carrying higher pressure. But you must increase the size of your driving pulley to keep the same velocity on the main shaft—not decrease it, as you propose. We cannot give a more definite answer without a calculation of some length You can readily try the experiment without much expense.

J. M., of C. W.—The only objection to petroleum as fuel for generating steam is its cost. One pound of petroleum will make just about as much steam as one and a half pounds of coal—petroleum, therefore, must be bought at about nine cents per gallon to be as cheap as coal at ten dollars per ton. Magnesium wire is made by the American Magnesium Co., Boston; price $6 50 per ounce. By sifting the powdered glass from out a quantity of gunpowder the explosive properties of the gunpowder are restored

MARKET FOR THE MONTH.

The prominent features in trade during the month of November are, a considerable decline in the price of cotton cloths, and a steady progress in the extension of the credit system. The changes in the prices of the leading staples are shown in the following table:—

	Price Oct. 25.	Price Nov. 28.
Coal (Anth.) ₩ 2,000 lb.	$13 00 @13 50	$13 00 @13 50
Coffee (Java) ₩ lb.	32 @ 34	28 @ 29
Copper (Am. Ingot) ₩ lb.	31¼@ 33¼	42 @ 45
Cotton (middling) ₩ lb.	57 @ 60	52 @ 54
Flour (State) ₩ bbl.	$7 80 @ 8 75	7 90 @ 9 00
Wheat ₩ bush.	2 40 @ 2 80	2 25 @ 2 85
Hay ₩ 100 lb	60 @ 65	60 @ 65
Hemp (Am. drs'd) ₩ tun.	310 00@325 00	320 00@350 00
Hides (city slaughter) ₩ lb.	11½@ 12	13
India-rubber ₩ lb.	35 @ 75	37½@ 90
Iron (American pig)	49 00 @50 00	50 00 @51 00
Iron (English and American refined bar)	125 00@130 00	125 00@130 00
Lead (Am.) ₩ 100 lb.	10 00	10 50
Nails ₩ 100 lb.	8 00	8 00 @ 8 50
Petroleum (crude) ₩ gal.	37 @ 37½	40 @ 41
Beef (mess) ₩ bbl.	11 00 @17 00	11 00 @17 00
Saltpeter ₩ lb.	22	22
Spelter (plates)	10½@ 10¾	10¾
Steel (Am. cast) ₩ lb.	13 @ 22	13 @ 22
Sugar (brown) ₩ lb	13 @ 19	12 @ 17¾
Wool (American Saxony fleece) ₩ lb.	75 @ 77	75 @ 77
Zinc ₩ lb.	15 @ 15	16
Gold	1 46	1 48¼
Interest (loans on call)	7	7

The Way to Prevent Boiler Incrustations.

The last number of *Newton's London Journal* has a long article by Lewis Thompson, M. R. C. S., which concludes as follows:—

"A few careful alalyses had convinced us that this incrustation is not due to carbonate of lime, but to sulphate of lime, by which the particles of carbonate of lime are cemented together and converted into a crust. To prevent the formation of this crust, it is necessary only to destroy the sulphate of lime, which is easily done by adding 1 lb. of common carbonate of soda (washerwoman's soda) to every 300 gallons of water supplied to the boiler. This converts the whole of the lime into carbonate, which has no tendency to agglutinate, but remains as a semi-crystalline powder, that may either be collected by placing an empty vessel in the boiler, or it may be blown out at intervals in the form of milky fluid. In both cases the conducting power of the iron boiler is preserved, which not only facilitates the development of steam, but prevents the burning or oxidizement of the boiler. That it must also prevent or diminish the number of explosions is more than probable."

Correspondence

The "Algonquin" and "Winooski" Trial.

MESSRS. EDITORS:—It struck me this morning, on reading your editorial remarks on this trial, page 243 of your last issue, that you could not have reflected on the fact that the Chief of the Bureau of Steam Enginery had pronounced the use of steam expansively as used by the following firms to be a delusion, viz: Maudslay & Sons, John Penn & Sons, Randolph & Elder, R. Napier & Son, Rowan & Co., and other celebrated European engineers, also the Allaire Works, Novelty Works, Morgan Works, Etna Works, Delamater Works, Messrs. Merrick & Sons on the Atlantic Board, and, in fact, all other prominent engineers in this country, *except when building screw engines for our navy from Mr. Isherwood's designs.*

Now, Mr. Editor, I think when you remember that the cylinders of our screw vessels, planned by Isherwood (which in reality comprised nearly the whole of the non-plated navy), are proportioned in accordance with this gentleman's belief on the expansion question, viz: of such a small size that the steam must follow the piston *seven-tenths* of its stroke, so that the steam the boilers will make can be worked off, you will agree with me, that it is a great point that the truth of Mr. Isherwood's theory has been tested by these trials.

No one will deny but that in the late trial the *Algonquin*, as long as she worked, made as many turns with the same wheel as the *Winooski*, with the same consumption of coal; this being assumed, (although I know the *Algonquin* did much better), as the *Algonquin* cuts off at ·11 and the *Winooski* at ·47, according to the previous report of the Board, and the cut-off has not been changed since—in fact, according to her diagrams it is .4—and, as Mr. Isherwood has stated in the summation of his Erie trials, "that if the point of cut-off be lessened to four forty-fifths of the stroke, the loss of the economy in fuel alone reaches the enormous amount of 44 per cent of the cost of the power when cutting off at seven-tenths," (see his report); it is quite clear that these trials, justly incomplete as you stated them to be, have completely overturned the theory on which he has planned the screw navy.

The more so, as the *Algonquin* worked against several drawbacks which did not exist in the much-better constructed engine of the *Winooski;* for it has been calculated that twenty per cent of the water evaporated in the *Algonquin's* boiler passed through her independent circulating engine, and that she lost 50 horse-power by a back pressure of above 3 pounds per square inch more than in the *Winooski's* cylinder; beside, her boilers are not near so efficient in point of economic evaporation as those of her rival, as operated on the late trial. All these losses—losses due to ignorant engineering—the *Algonquin* made up by Nature's law, from which there is no appeal, of the gain by expansion.

NAVAL ENGINEER.

[It is astonishing to how small an extent the first principles of investigation are understood. The writer of the above communication is a young engineer of considerable intelligence and capacity, but, in common with the mass of the public who profess no knowledge of steam engines, he swallows these ridiculous experiments of the *Winooski* and *Algonquin* as settling the question of expansion. These experiments are exactly parallel to a series—an account of which was recently forwarded to the Farmer's Club—for testing the value of salt as a fertilizer. They were conducted by a cultivator of more than ordinary intelligence, in a very elaborate manner, and a record was carefully made of the result; but, in every case in which the man applied his salt, he mixed it with guano. This is manifestly absurd, but is no more absurd than trying to settle the value of expansion by working steam in two engines, with the pressure in one at 70 lbs., and in the other at 19.

One of the fundamental principles in making an experiment to test any mooted fact or property is to have the conditions precisely alike in the two trials, except in the point to be tested. It was the perception of this principle that made the investigations of Louis in therapeutics so immeasurably superior to those of all previous observers; that has given their value to the experiments of Fairbairn; and that has stamped with the character of established truth the investigations of Faraday, Henry, Agassiz and all the eminent masters of science. Were it not for the abundant evidence to the contrary, it would seem that this principle ought to be apparent to the common sense of all mankind.—EDS.

Effects of Pure Air.

MESSRS. EDITORS:—When the air is pure we breathe more of it than when impure.

It is often remarked by chemists, that when an attempt is made to breathe carbonic acid gas, undiluted with air, the lungs refuse to receive it. In spite of every effort, the air passages close against it, and if enveloped in it, the person is strangled to death as suddenly as if choked with a halter. When there is as much as ten per cent of this gas in the air the person inhaling it breathes less and less, grows cold, and soon the lamp of life goes gradually out. The more impure the air, the less the person inhales, the more clothing is required, or the more the person suffers from cold. On the contrary, the purer the air the more the person inhales. This fact may also at any time be strikingly shown with my air purifyer. The moment a person who has been for some time confined to the air of the city or village, or been breathing damp, warm air, commences breathing the air that has been properly filtered and purified in this apparatus, he perceives an involuntary heaving of the chest. He inhales almost twice as much air for a few breaths as he did before. So beautifully and wisely have our bodies been constructed and arranged, and so perfectly have the laws of nature been adapted for our good, that when even a little child while asleep begins to inhale the air that has left its impurities in this apparatus, it at once takes several deep, long-drawn breaths. It has been suffering more or less for the want of pure air, it has found it now, and though, asleep, by instinct, greedily devours it and is rapidly purified, stimulated, and strengthened, and its lungs are expanded by it. As it breathed much less when in very impure air, so now it breathes much more. The little chest, that was formerly collapsing gradually, many of the cells in its lungs perhaps closing up, as if for the last time, is now rapidly expanding; those closed cells again opening and enlarging. I have seen not only little ones very low with summer complaint and dysentery placed under its influence and restored in a single night as if by magic, but I have seen the little child with weak, narrow chest, after sleeping under it only three or four months, exhibiting a remarkably large, full, and healthy chest. Its general effects are the same on old or young—it simply purifies, stimulates, and strengthens the whole system and expands the chest, increases the appetite, and improves the health. The best authorities substantiate the truth of the assertion, and no intelligent person who has slept a few nights under this air purifying apparatus, properly supplied, will doubt it that by simply breathing pure air during the hours of repose, families in cities who are now so generally growing weaker and rapidly running out, would rather grow stronger, and not only would there be an immense saving of life, as well as increase in numbers, but the race would be greatly improved physically, mentally, and, other circumstances being the same, even morally, with each succeeding generation. A. S. LYMAN.

No. 212 Second avenue, New York.

A Woman's Question.

MESSRS. EDITORS:—As you seem to know a little of everything, will you excuse me if I ask what may seem to you a foolish question?

My husband is not a grumbler, but he says our corned beef is as dry as a chip when it is cold, and I should like to know the reason of it. I put it in cold water as the cook book says, and let it boil slowly and take it out when it is done, but, for all that, I have no luck. Do help me and receive a woman's thanks. CHARLOTTE S.

Hartford, Conn., Nov. 20, 1865.

[Who could withstand such a pathetic appeal as this. The trouble lies with the cook book. It is a false light. The directions are quite wrong. If you put corned beef in cold water it lies an hour in

tepid brine, which is the best possible way to extract all the animal juices, and thus render it insipid. Have your water boiling hot, then, as the beef is cold when put in, it will bring the temperature down, but the outside of the beef will be suddenly shrunk and thus inclose all that is worth retaining. Moreover, you must not take the beef out of the pot when done, but leave it till cold, for in taking it out when hot the moisture evaporates and leaves the beef literally as dry as a chip. Try this plan, and your husband will rise up and call you blessed.—Eds.

Smoke-consuming Stoves.

Messrs. Editors:—A better plan than that suggested by W. H. B., in the Scientific American, would be to have the top of the grate or stove closed as at the bottom, by bars—both top and bottom to be alike—a grated frame on hinges, self-closing, or capable of being securely buckled; the ends of the grate, and sides of the stove to be furnished with something like trunnions, and mounted so as to turn. We have, then, an ordinary grate with back bars and an upper covering, the latter raised, and fastened against the back jam, or, if made detachable, taken off. The fire requires poking and replenishing; this is done in the usual manner by a stratum of fresh coal on the top. The upper part is then closed, and the whole turned bottom upward. By this process, the hottest part of the fire is in immediate contact with the fresh bitumen, from which a dense smoke must pass through and be consumed by the glowing embers, now made the upper portion, with the previous bottom raised, and the surface aglow with an intense flame.

It must be evident to any one accustomed to bituminous coal fires, that combustion would soon pervade the mass below, and when the fire again required renewing, the same process of filling at the top, fastening down the upper grating, turning the whole over on the axial pivots or trunnions, and raising the now upturned bottom could be again repeated, with the result of greatly increased heat and perfect consumption of smoke. The details of adapting this rotary grate or stove it is not necessary to advert to in a communication like this. J. J. W.

Philadelphia, 11th mo., 23d, 1865.

Challenge Accepted.

Messrs. Editors:—In the columns of your valuable paper I find a proposition from H. Van De Water, of Buffalo, N. Y., offering to match his turbine water wheel for the sum of $500 against any patent turbine wheel in the United States.

Now, as I am engaged in the manufacture of a wheel of that class, which I am confident has no equal, I most readily and cheerfully accept the challenge; but, instead of $500, I desire the consideration to be from $1,000 to $5,000, at the option of Mr. Van De Water.

The trial or test of the wheels I desire to be made at Fairmount Water Works, Philadelphia, where there are ample facilities for a most accurate and reliable test. I most cordially accede to the gentleman's request to place the money in your hands or with any responsible party. I would respectfully solicit through your columns an immediate reply.

James Leffel.

Springfield, Ohio, Nov. 20, 1865.

Brass in a Petroleum Lamp Flame.

Messrs. Editors:—Having for a long time subscribed for your valuable sheet, and observed the clear and satisfactory manner in which you have solved many interesting and practical problems, I take the liberty of addressing you for the object of procuring a solution of the mystery involving the principle of the common kerosene lamp. I cannot understand why a thin and peculiar-shaped piece of sheet brass thrust into and over the fiery vein should be so instrumental in producing this mild and beautiful light so universally adopted in our country homes, and of which our city friends are not entirely oblivious. A scientific explanation of this will confer a great favor. D. G.

North Andover Depot, Mass., Nov. 16, 1865.

[Gases, however highly heated, emit very little light, but all solids, when heated to a temperature of about 977°, begin to glow with red light, and, as the temperature rises, the light passes through orange and yellow to white, and rapidly increases in amount. Petroleum is composed of hydrogen and carbon chemically combined. When burned in a lamp, the liquid is first evaporated, then the hydrogen is burned, and, lastly, the carbon. The carbon, on being separated from the hydrogen, takes the solid form, and is intensely heated by the heat generated in the burning of the hydrogen. Nearly all the light comes from this solid carbon in the brief interval after it is highly heated, and before it is burned.

If our correspondent means by "a strip of brass" the cap of the burner, we suppose its office is to confine air near the blaze till it is highly heated, and then to direct this heated air against the ascending petroleum vapor in order to effect complete combustion.—Eds.

To Weld Cast Steel.

Messrs. Editors:—I am a machinist, and have worked for the last twelve years at the business, in this and several other States, and in a number of shops, and have often heard the question of welding two pieces of cast steel together without injury to the steel, or using iron in the process—I refer to large pieces, say from one inch upward—but as yet I have never seen it done, or known it to have been done. My shopmates and myself are very curious to know, and I write to you as the best authority that I know of for information. E. S. Jackson.

Jamestown, N. Y., Nov. 23, 1865.

[Cast steel may be welded as easily as iron by using the following flux: sixteen parts of borax and one of sal ammoniac, melted and kept boiling over a slow fire for one hour, and, when cold, pulverized. The steel must then be heated as hot as you dare without burning, the powder strewed over the scarf, and proceed as with any other weld.—Eds.

Preventive for Boiler Incrustation.

Messrs. Editors:—Reading that useful little French journal, *Le Technologiste*, I noticed an account of experiments on the value of chloride of barium for the prevention and removal of scale from boilers, where it consists principally of the salts of lime. For fine boilers the use of the scaling hammer will be found most economical, but in tubular boilers this substance will often be found of great value, and, for the benefit of your many engine-driving readers, I have deduced the following from the article referred to:—

To ascertain the amount of the chloride of barium required in any boiler, note, when an opportunity offers, the amount to which scale has collected and the time during which the deposit had been gathering; multiply its thickness in sixteenths of an inch by three-sixteenths of the heating surface of the boiler; and this product, multiplied by 1·65, will give the weight in pounds required to be used during a period equal to that during which the scale was collecting, and will be sufficient to prevent further deposit, and gradually to remove that already formed.

As an example, suppose sufficient impurities in the water used in any boiler to deposit one-sixteenth of an inch of scale in six months, the heating surface to amount to 1,000 square feet—

$$1 \times 1{,}000 \times 3\text{-}16 \times 1{\cdot}65 = 309{,}375.$$

Or, supposing one hundred and fifty running days during the six months—about two pounds per day.

As this material has been used very little in the United States, if at all, it is to be hoped that any engineers who may try it will state the result in the columns of your valuable paper.

The druggists inform me that the chloride of barium may be bought now at about thirty cents per pound in quantities of a hundred pounds or more.

R. H. T.

Providence, R. I., Nov. 24, 1865.

[The value of this substance for the purpose indicated, was pointed out many months ago in these columns, but we are obliged for the attention of our correspondent.—Eds.

Faults in Wood-working Tools.

Messrs. Editors:—I have been very much interested in the articles in the Scientific American on tools for the machine shop. I wish some capable person would correct some of the faults in the old wood-working hand tools which are not yet done away with. One fault is in making a bevil on the face of chisels and plane irons; for the reason, I suppose, that a kind of an edge can be set a little more quickly. When "Basil Face" uses a chisel he raises it ten degrees or more above the line; and as soon as it begins to cut down goes the handle, then up and down, with the varying direction of the grain, while a true face, moved steadily in the direction of the line to be trimmed, takes a thin, neat shaving, even when cutting in cross-grained places.

I should like to know if any one has a better way for tuning handsaws than to joint straight, set the least that will work freely, and have the teeth all of a size and form—made so by working the file at an angle of about 50° or 60°, for pine, and 30° or 40° for hard wood, down toward the back, and also toward the handle, from a line square across the edge of the saw.

I should like to ask, if thin boilers transmit heat most readily, why do the riveted joints in sheet-iron sugar pans boil first; ebullition can be traced their whole length before the sap boils elsewhere.

E. Alger.

Coos, N. H., Nov. 20, 1865.

Quartz Crusher and Pulverizer.

Messrs. Editors:—In referring to your paper of October 21, 1865, I find a notice of the centrifugal pulverizer of the Boston Milling and Manufacturing Company, clients of mine, who have requested me to call your attention to some errors in your article.

In the first place, please understand that the Milling and Manufacturing Co. make two classes of machines—one of them a crusher and the other a pulverizer. The first acts by percussion—the acquired momentum of their vast fly-wheel, the whirling table, striking the quartz, shivers it into atoms by vibrations set up in the quartz itself, the sides of the case acting simply as a sieve to separate what is fine enough to pulverize from that which needs crushing.

This machine I presume you have seen, and will remember it as very different from the pulverizer. The other class of machine is the pulverizer. This does its work not by percussion or concussion, but by creating vortices of air by the rapid revolution of the paddles, in which the materials, previously crushed by the whirling table to about the size of fine gravel, are set in motion, and, by attrition among the particles, like the stones on the sea shore or the sands of the desert, are reduced to fine dust. Every particle of material pulverized by this machine is rounded, not angular, like crushed work, and by having a central exhaust and current of air blowing through the machine, the light particles of dust are blown out, while the larger gravelly and sandy material remains under the action of the whirls of air generated by the beaters or fans, and continues to grind itself to powder. Experience shows us that the finer the material fed, the better yield of flour we have, and the lighter can be the machinery. The only reason at present for making the paddles so heavy and strong is to avoid danger from extraneous substances getting into the machine. An ordinary fan blower will do the work, if by no accident broken by substances too large getting into the cylinder in which it revolves. It is the improvement in principle that has rendered this successful, not merely the use of Franklinite, although that is very valuable in crushers and for any wearing parts.

By making the correction indicated you will much oblige Thos. Wm. Clarke.

Boston, Mass., Nov. 24, 1865.

Spiral Blower.

Messrs. Editors:—Allow me to ask, through your paper, if a turbine water wheel would be suitable to force air when driven at the necessary speed?

J. S., an English subscriber.

London, 9 Shauran Place, Maida Vale, W., Nov. 11, 1865.

[Spiral blowers will force a current of air against a moderate pressure; but, for any considerable pressure, no substitute has yet been found for the piston air pump. Several years ago a man in this country conceived the idea of making a pump for water by hanging a screw in a pipe, but, when the screw was made to revolve with high velocity, the water, instead of being forced along in a continuous current, was beaten into foam.—Eds.