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Rail-Road News.

European and American Railway.

We have received the able Report of the survey of the European and North American Railway, made under the authority of the State of Maine, by A. C. Morton, C. E. This enterprise is one of great moment, having for its object a railway through the Eastern States, New Brunswick, and Nova Scotia, to Halifax, which is intended to be made the Mail Port, having a line of steamers running to Galway, in Ireland, thence by railroad to the Channel, then across to Wales by steamboat, and off to London by Railroad. By this route, if it goes into operation, a saving of three days' time in carrying the mails to Europe, and *vice versa*, would no doubt be saved. The report is a very valuable one, and contains much important information about the population, trade, and travel on the line. The whole route has been found practicable on a distance of 420 miles, and it can be put in operation for about $13,000,000. He estimates that the annual income of the road would be about $2,000,000 per annum. We think it would amount to as much in the course of a few years, say ten. It is our opinion that Halifax will yet become such a port as Southampton is in England, and the sooner this railroad is completed, so much the sooner will this result be brought about. Railroads benefit the countries through which they pass, consequently Maine, New Brunswick, and Nova Scotia, would be greatly benefitted by this road. We say, "go ahead with your improvements."

Longest Railroad.

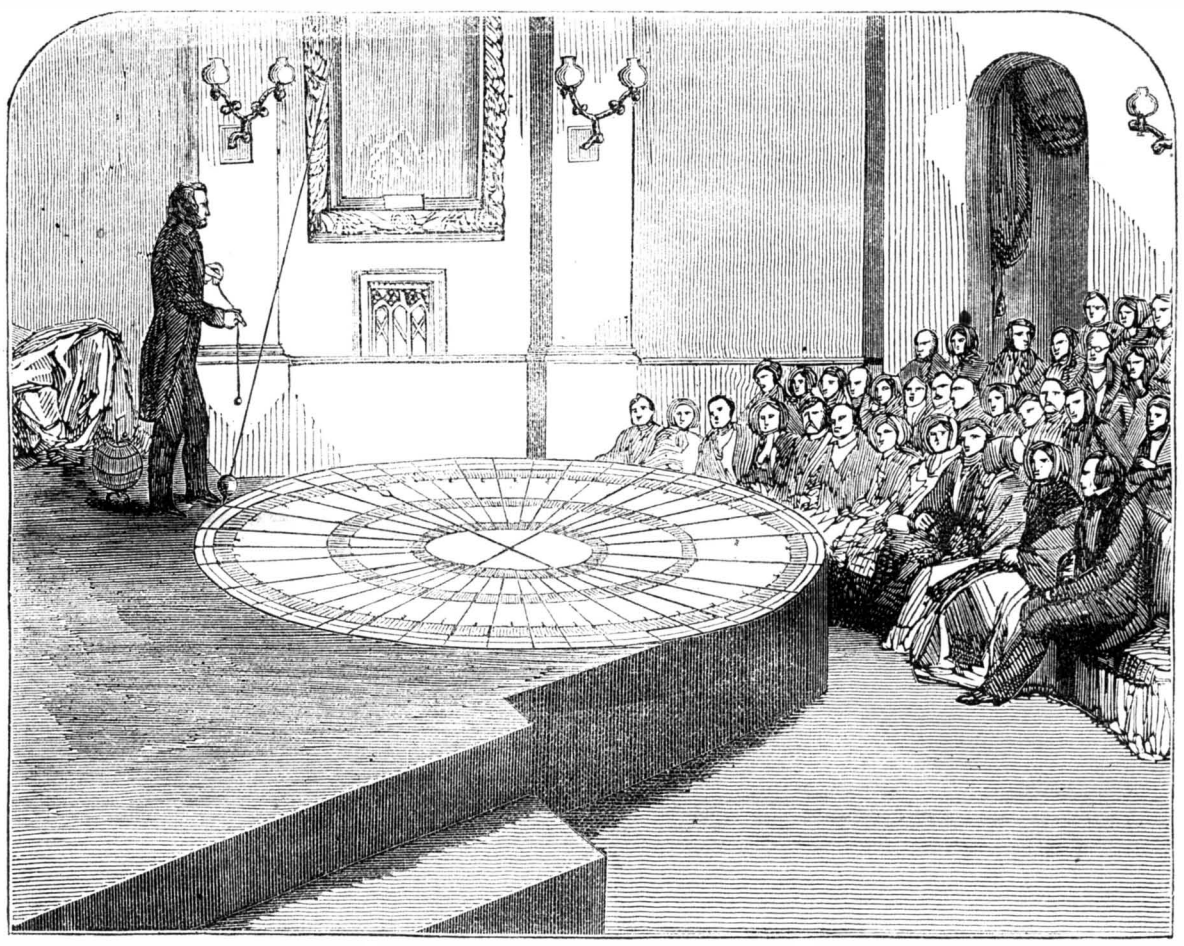
The Erie Road is the longest in the world—467 miles. That between Moscow and St. Petersburg, in Russia, is next in length, being 420 miles. The Russian government is about beginning a road from Warsaw to St. Petersburg, a distance of more than 700 miles, of which T. S. Brown, late of the Erie road, will be Chief Engineer. It is noteworthy that the American great enterprise is by a private company; the Russian is built by Government.

Great French Tunnel.

This great work, three miles in length, is on the railroad between Marseilles and Avignon. Its height is 30 feet, and width 24 fet, and its depth below the surface of the ground six hundred feet. The cost of tunneling was $2,040-000.

A petition has been presented to the Common Council, of our city for a railroad on the Second Avenue, on which it is proposed to lay a double track from One Hundred and Twenty-fifth st. to Christie st., through Christie to Grand, through Grand to Bowery, through Bowery to Chatham st., through Chatham to William, through William to Hanover-square; return single track from Hanover-square to Pearl st., through Pearl st. to Chatham st.

DEMONSTRATION OF THE EARTH'S ROTATION.



The accompanying engraving exhibits Dr. Bachhoffner, of London, at the Polytechnic Institution, London, explaining the experiment of M. Foucault, for demonstrating the rotation our globe.

Fixed to the floor is a circular table divided into 360 degrees, and of 16 feet diameter north and south, supposed to rotate with the earth; while a ball 28 lb. weight, depending from an iron girder by a wire 45 feet long, vibrates over its surface. The plane of vibration apparently never changes; but the rotation of the table is visible by the alteration of the degrees, and the removal of small portions in the centre of the table by the point of the ball in its transit. Dr. Bachhoffner professes to conduct the experiment after the manner employed at the Pantheon at Paris, and on the principles laid down by the French mathematicians, adhering strictly to the definitions of M. Foucault.

The proposition assumed in the experiment is, that a pendulum properly suspended and put in motion will vibrate always in the same absolute plane, notwithstanding the shifting of the point of suspension; whence it follows, that at the poles a complete revolution will be made in 24 hours, and that at the equator the the plane of vibration will never alter at all with respect to the meridian.

The experiment is now the subject of much controversy in England, some are stating that it is fallacious, others proving it to be the reverse. We have not had an opportunity yet of seeing or trying the experiment. We must counsel strict observation in those who are now making, or are intending to make the experiment. See that magnetism on the movable and immovable parts, has the same influence. The best account of this experiment that has been published is the communication of Prof. Horsford, of Cambridge, Mass., on page 280, Scientific American.—We have been informed that it has been voted by the directors of the Bunker Hill Monument Association to permit the interior of the monument to be used for the purpose of repeating the experiment of Foucault, with a pendulum, to demonstrate the Rotation of the earth on its axis. The privilege was granted on the application of the Massachusetts Charitable Mechanic Association, and the experiment to be made under the superintendence of Mr. Bond of the Cambridge Observatory and Prof. Horsford of the Scientific School. The pendulum to be used in this experiment will be about 216 feet in length.

The monument, from its firm and substantial character and the protection it will afford from all extraneous influences, is probably the best place in the country for repeating this curious and interesting experiment. The weight to be suspended is a cannon ball which was fired from one of the British ships during the battle of 17th June 1785, and dug up in this city some years since. The ball is to be fixed in a brass setting, with adjusting screws and a marking point—to indicate the variation, and thus render perceptible to the eye the rotation of the earth.—Any of our farmers may try the experiment in their barns. Take a wire about 30 feet long and suspend it in the way described as follows by a correspondent:

"An ordinary 50 lb. weight, suspended by means of a small wire from the rafter of a barn, formed my pendulum. It was 30 feet long, and consequently made 21 vibrations per minute. In order that it might move with as little friction as possible, and also turn freely in a horizontal direction, I took a small file, and having had one end turned up at right angles to its length, and well hardened, I made the point sharp and smooth. This I drove into the rafter, and on the point suspended a hardened ring, which had a small indentation on the inside to keep it from slipping off the point. To this ring the wire of the pendulum was fastened.

That the vibrations might be the more readily traced along the floor, a small pointed rod was attached to the centre of the underside of the weight, nearly in a line with a wire, and long enough to reach within an eighth of an inch of the floor. The point on the floor immediately under the pendulum when at rest was then ascertained, and twelve straight lines drawn through it, making with each other, angles 15 degrees each. The pendulum was now set to vibrating along one of these lines; for a short time the point of the rod seemed to be tracing the line backwards and forwards; but in less than 15 minutes it had deviated perceptibly to the left of the end next the observer. I tried it successively along several other lines running in various directions, and found in every instance that it deviated to left, and that the amount of deviation varied nearly as the time, that is, the longer the time the greater the deviation. To-day I repeated the experiment. At 11 o'clock I set it vibrating along a line running nearly east and west, and now at 2 o'clock, three hours, after, I find it moving N. W. and S. E.

According to a well known law of motion, a body once put in motion by any force, will continue to move in the direction in which that force is impressed, until acted upon by some other force tending to move it in a different direction. Now in the present instance, as we know of no force tending to change the pendulum's motion, it seems fair to infer that it still vibrates in the same absolute direction that it did three hours ago. If this be true, the barn floor must have been turning round to the eastward, making, during these three hours, one eighth of a revolution; and as the barn has the same relative position to all external objects on the surface of the earth around it, we must conclude that it is the earth that is turning round at this rate, and that it will make a complete revolution in 24 hours." The objection to these conclusions, by common practical men, is, if the point of suspension is immovable, so is the circle below

Miscellaneous.

[Special Correspondence of the Scientific American.]

LONDON, May 9th, 1851.

The exhibition is but beginning to develope itself. Entering the great building by the eastern passage, we are at once among the contributions of our country—the United States of America. A great space has been allotted for the contributions of our countrymen, and this is not so well filled as I should like to see it. The London Times has spoken somewhat satirically about our country, without taking into consideration the great distance between London and New York, and beside, it has overlooked some "gems of purest ray serene."

In the centre of the nave, opposite the space occupied by the United States, is a huge wood and iron bridge—while, as if to represent grace by the side of force, there is the beautiful *chef d'œuvre* of American art, the figure of the Greek Slave, kindly allowed to be exhibited by Mr. Grant, its owner, at the earnest request of the American Commissioners. This is the original statue, and as a work of art, it is equal to any of the old masters. If America had been represented by no other evidence of her genius, this one sample should have broken the point of malice, envy, and satire; but this is not the only testimony of our country's genius in the fine arts; beside it is the "Expiring Indian," by Powers also, which, as a work of art, is held by many to be inferior to the "Greek Slave," but still it has not a superior in the Great Exhibition. Russia occupies a space just beyond the United States Department, which is very empty looking indeed, and this along with the large space allotted to us, makes the display look thin on our side. Dick's anti-friction presses, which have been illustrated and described in the Sci. Am., are objects of marked attention to the really practical engineers and machinists, both of Britain, France, and Germany. They say, "we have nothing so good as this in Europe."

The American daguerreotypes are very fine, and do honor to our country. They have not their equals in light or shade. There are better colored daguerreotypes in Paris and even London, but none of such a rich and full tone perfection in *chiara oscuro*; but I may say more about these again. The gold of California is here, and some of the London papers are beginning to wake up, and find out under the canopy of Paxton's glass roof, that the yellow dust is no humbug after all to wheedle emigrants to the West to people our newly acquired territories.

At the east end of the nave is a fine specimen of zinc ore, from New Jersey, weighing 16,400 lbs., taken from a short distance below the surface in Sussex county.

As regards our agricultural implements, the Times of yesterday speaks sensibly as follows:—

The most prominent feature of the American division, it is true, is a large display of patent revolvers, on a new and more portable principle; but the genius of the nation shows itself in the means of maintaining life, as well as in those for destroying it. We cannot, indeed, encourage our farmers to expect that it will ever answer to dig, to plough, or to harrow by steam, much less to traverse large farms underground by steam pipes, conveying steam power to the most outlaying fields. but making due allowance for the extravagances of inventors, we have no doubt that the British farmer may learn a great deal by a visit to the northeast angle of the building. He will learn at least this—that the United States are not, after all, in that paradisaical state of virgin soil, ten feet thick, and climate equally propitious, which is said to dispense with labor and money. The Americans have to work for their bread as much as we have."

The extravagances of inventors alluded to does not mean the American Inventors, but the British, steam power having been at a ridiculously great expense recently tried in plowing.

In the machinery department, the British display great skill, power, and ingenuity. Never have I seen anything like it. There are locomotives of a monster size. One of the largest is the Lord of the Isles, belonging to the Great Western Co. Its cylinders are 18 inches diameter, and of 24 inch stroke. Its weight, with the *tender* is 52 tons 13 cwt. The driving wheels are 8 feet diameter, and it has carried a train of 120 tons at the rate of 60 miles per hour. Its power, with 120 lbs. of steam is 750 horse-power, and it is a common class engine for this railroad. It is built on Crampton's patent which was granted in 1846 and embraces sixteen different points, some of which are good, others are of no use. It would take up too much space to describe these peculiarities, therefore I will just state that one very essential improvement is the plan of constructing the slides and steam chambers, so as to balance the pressure of the steam upon the slides, and thus relieve the slide from back surface pressure. Along with this huge locomotive, there is the tiny one by Mr. Adams, the gentleman who first introduced light locomotives in England for light trains. It is only a little over a ton weight, but it can carry 7 persons, and go at the rate of 30 miles per hour, burning only 2½ lbs. of coke per mile. There is a small light traffic locomotive named the "Little England," for light trains. It almost looks like a toy beside its mammoth compeers, but it "can go" at no small rate. The working model of the first locomotive ever built is here, from Soho. It was built, I believe, in 1786 by Mr. Murdock, from the specification of James Watt. This Mr. Murdock was James Watt's foreman,—the inventor of gas lighting, and a man of remarkable genius. I cannot say more at present about engines, only to observe the railway carriages exhibited are all made of hard wood covered with a coat of varnish. They look well, as some of the wood is of the most beautiful description.

This is the department in which I like to revel. It is worth while to come from New York to see it alone. Oh how I like to look upon those mighty iron arms heaving up and down or moving backwards and forwards at every heave of the steam giant's breast. What an army of iron Titans is here assembled, how obedient they are to their commander, and how faithful to the shout of his trumpet, Here each is lying quiet as the slumbering babe on its mother's breast, in another moment the voice of the steam boiler comes silently through yonder long iron tunnel, and then look at the change. The slumbering leviathans start like giants refreshed with wine, and throw their irresistible arms from side to side with terrific grandeur; the scene to me is a sublime one, I never saw anything like it before, and never was I so impressed with any like it before, except a storm at sea: but more anon.

EXCELSIOR.

Respect for Mr. Lawrence, Chief Clerk of the Patent Office.

When Mr. Lawrence resigned his office of Chief Clerk in the Patent Office, a universal feeling of regret was manifested by all his colaborers, who gave expression to the same as follows:—

PATENT OFFICE, April 22, 1851.

D. W. C. LAWRENCE—Dear Sir:—We have learned with regret your resignation of the office of Chief Clerk in this Bureau. The ability with which you have discharged its duties, and the kindness and courtesy manifested towards us in our official intercourse, alike entitle you to our respect and esteem. In parting, permit us to tender our best wishes for your happiness and prosperity.

Chas. G. Page,	W. P. N. Fitzgerald,
Henry B. Renwick.	L. D. Gale,
S. H. Lane,	James Cooper,
T. R. Peale,	Thos. T. Everett.

U. S. PATENT OFFICE, April 25, 1851.

D. W. C. LAWRENCE—Dear Sir:—Your resignation of the office of Chief Clerk in this Bureau is much regretted by the undersigned, for the ability, courtesy and impartiality with which you have discharged its arduous and responsible duties, have won our respect and confidence; and in parting we tender our best wishes for your success in business and happiness. We remain very respectfully your obedient servants,—Saml. P. Bell, Thomas Gadsden, Arthur L. McIntire, (and 13 others.)

As hundreds of cases from our office have passed through the hands of Mr. Lawrence, we can add to the above testimonials, that in no instance has an inventor's interest been neglected on his account. Courtesy, promptness, and correctness in every particular, have distinguished all his dealings with us.

Patent Decision.

On the 19th inst., before Judge Kane, in the U. S. Circuit Court, Philadelphia, a very interesting patent case was decided, which had been on trial for about a week. The parties were Dyott vs. Sickel and Shaw, for infringement of a patent for a lamp. Before the verdict was rendered in this case, Judge Kane observed to the jury that it had been intimated to him, since the adjournment, that some of the observations which fell from the Court, in its charge upon this case, were supposed to convey an imputation against the personal character or standing of one or other of the defendants. There was nothing in the evidence, he said, which could support such an imputation, and it never was the purpose of the Judge to refer to anything which was not judicially before him. He added, that in this particular case he had received such representations of the character of the particular parties as would make it a special subject of regret to him if he could believe that his language had been justly interpreted to their prejudice. Verdict for plaintiff in the sum of $300 75.

How to Make Vinegar.

There are many great notions entertained among our farmers about making vinegar. The grand old plan was to put out cider, or water and molasses in a cask, to the sun and expose it to the luminary with a bottle in the bung hole. There are still as many ideas entertained about making cider, as there are about making soft soap, and *luck* is frequently held to be the umpire who decides whether it will be vinegar or no vinegar.

The reason why cider or other fluid mixtures change their nature and become vinegar, is owing to a transformation of the particles and then a separation of one or more, and a combination of others. The oxygen of the atmosphere, although it is not now as was once believed to be, the only acidifier, still it is the great one, and vinegar is formed by the cider parting with its carbonic acid gas, which it cannot do without absorbing oxygen. The reasonable way, then, to make vinegar rapidly and surely is to expose the cider as much as possible to the atmosphere. The new way, and what is supposed by many to be a patent way to make vinegar, is to let the cider percolate over a very exposed surface. This is the way they make it in the vinegar manufactory. The apartment where it is made is freely exposed to the air and is kept at a temperature of about 60°. The cider is left to run in small streams into troughs with bottoms full of small holes, then from that over very fine wood shavings, such as soft maple, and let these be fully exposed to the air and resting on a slatted bottom made of clean bows or lathes, below which the vessel for receiving it should be placed; vinegar can be made from mollasses and water, grapes, corn stalks, beet roots, and many other substances by this process in a few days. Cider, however, makes the best vinegar. Many modifications (for cheapness) of the above plan may be resorted to, the grand secret being the exposure of the liquids to be changed into vinegar, in layers or strata to the oxygen of the atmosphere. There is not a farmer but with a cask, an old tub, and a few shavings could make good vinegar in one fifth of the period now required by the common plans in use for that purpose. In those vinegar factories introduced here by Frenchmen, the plans adopted are those we have narrated.

Steamships.

NEW STEAMSHIP "MARION."—The new steamship "Marion," for the New York and Charleston line, is a fine vessel of 1,400 tons burden, with cylinders of 70 inch diameter, and 8 feet stroke. Her hull was built by Jacob Bell, and her engines by Messrs. Stillman & Allen, of the Novelty Works. She is a fine vessel, and will, no doubt, do credit to her builders and engineers.

We perceive by the "Glasgow Daily Mail" that a new iron steamer (paddle wheels) named the Santiago, has been launched from the yard of Robert Napier, for the Pacific navigation Co., and is intended for carrying mails, passengers, &c., along the west coast of South America, between Panama and Valparaiso. Her length is 8½ times the breadth, and the propelling power nominally 400 horses. She is 1,101 tons burden.

Manufacture of Soaps.

Soap is a chemical compound of fatty substances with alkalies, these substances thus treated undergoing remakable changes, and being converted into three acids, called the margaric, stearic, and oleic; these uniting with the alkali form the neutral compound known as soap, and which is hard or soft, according to the materials employed; the former being produced by the action of soda, the latter by that of potash.

Hard White or Curd Soap.

The fat of this may be either tallow or coarse oil. The crude soda or barilla is ground, and placed in cylindrical vats, with alternate layers of quicklime. Water being poured upon the whole, it passes through the mass, and dissolves the soda, at the same time that the lime absorbs the carbonic acid. This caustic liquid being drawn off, 200 gallons of it, of the specific gravity of 1·040, are added to a ton of tallow; heat is applied, and after a very gentle ebullition of about four hours, the fat will be found to be completely saponified, by immersing in it a knife, for the fluid lye will begin to separate at once upon the steel blade from the soapy paste. When thus perfected it is thus poured into square frames, where it is suffered to cool; when cool it is cut in the required and usual form of long square cakes, and is ready for sale as soon as the cakes have been exposed to the air for a few days to harden.

Hard Mottled Soap.

Mottling is usually given in the London soap works by introducing into the nearly-finished soap, in the pan, a certain quantity of the strong lye of crude soda, without lime, through the rose spout of a common watering can. This lye contains much sulphur, and in descending through the pasty mass occasions the marbled appearance. In France a small quantity of solution of sulphate of iron, sprinkled over in like manner, is more commonly employed. The alkali seizes the acid of the sulphate, and sets the protoxide of iron free, to mingle with the paste, to absorb more or less oxygen, and thus to occasion a variety of colors. When the oxide passes into the red state, it gives the tint called *mantau Isabelle*. Three pounds of olive oil will afford five pounds of marbled Marseilles soap of good quality, and only 4½ of white soap, showing that more water is retained by the former than by the latter. Thus for washing, &c., white soap at 6c. per lb. is as cheap as mottled soap at 5c.

Yellow or Rosin Soap.

Resinous substances, (except one or two,) are not converted into acids by the action of alkalis; hence they do not of themselves form soaps, but when united with an equal quantity or more than this of grease, the whole blends together, and forms the ordinary yellow soap of the shops. A hard and very common soap is made, as just described, and in the last stage of the boiling process the adequate quantity of pounded rosin is added. The union of this, however, with the alkali is not perfect, consequently the soap when used is more decomposed by the hot water, and the alkali to some degree liberated. This, therefore, acts directly upon the grease dirt of foul clothing, &c., and removes it with greater facility; for which reason this soap is much used in manufactures, and is also preferred by laundresses, who not content with the detergent properties of the soap are accustomed to add carbonate of soda to the water employed.

American Association for the Advancement of Science.

This very respectable Association met at Cincinnati on the 5th, and adjourned on the 10th inst. The people of Cincinnati exhibited to the members the noblest hospitality: we hope the people of Albany, N. Y., where the next meeting of the Association is to be held, will not forget this. Prof. Bache, of Washington, presided. The meeting was opened with a prayer by our friend, the Rev. Mr. Fisher, and there was a goodly attendance of members. A great number of valuable papers were read, which will be published in their "Transactions." Among the many curious papers read was an address by Prof. Pierce, of Harvard, respecting the *Ring* of the planet Saturn. It was based upon a memoir on the subject, by Mr. G. P. Bond, asserting Saturn's ring not to be solid, but fluid.

He said, "Adopting as the basis of the calculations, the mass of the ring which was determined by Bessel, the thickness from Bond, and the other dimensions from Struve, the density of the ring will be found to be about one-fourth greater than that of water. The ring of Saturn is then a stream or streams of fluid, rather denser than water, flowing about the primary." Mr. Bond undertook a series of very curious and novel computations, in order to determine from theoretical considerations alone, whether the ring was one or many, and arrived at the remarkable result that neither hypothesis could be maintained. He is, therefore, disposed to reconcile the discrepancies of observation in this respect, by supposing the constitution of the ring to be variable; and that, although the principal division, which has been always observed, is permanent, the other divisions are constantly annihilated by the mutual concussion of the rings, and again re-produced by some process which he does not undertake to define. This bold and ingenious theory, Prof. Pierce stated, was fully sustained by his own observation, which went a step farther and exhibited how this was done.

Magnetic Observations.—A. D. Bache, Superintendant of the United States Coast Survey, addressed the Association relative to a "comparison of curves, showing the hourly changes of magnetic declination at Philadelphia, Toronto, and Hobart Town."

Prof. Bache explained the nature of the observations made at the magnetic observatories, and which are now in action with the most satisfactory results. Any theory of magnetic declination now proposed, must stand the test of numbers; it must include quantity as well as direction, to be worthy of consideration. To this point, these observations, extended on the globe, have brought the subject. The several diagrams should be the average hourly changes of the magnetic variation, during the day, at Toronto, Hobart Town, and Philadelphia. They were for the five months when the sun is north of the equator, for the five when it is south, and separately for the two months, during which the sun is in part north and in part south of the equator. The sources from which the diagrams were taken, were stated. The curves for Toronto and Philadelphia present a remarkable accordance in times of maximum and minimum, and in the motion of the needle between the times, the slight difference being in part apparent only, and resulting from the fact that the observations at Toronto were made hourly, and those at Philadelphia bi-hourly. All the conclusions in regard to effect of seasons, and the like, which have been drawn by Col. Sabin from the Toronto observations, are deducible from those at Philadelphia. The relation of the motions of the needle at Hobart Town, in south latitude nearly the same as the north latitude of Philadelphia, was pointed out.

Turbine Wheels.—Prof. Pierce read an able paper from Mr. J. Chase, of Mass., on the Turbine Wheel.

In computing the experiments which were made at Lowell in the present year by Mr. Francis, it was found that when the gate was fully open, the quantity of water discharged through the guides was 70 per cent. of the theoretical discharge. The effect of the wheel during these experiments was 81¼ per cent. of the power expended, but when the gate was half open the effect was 67 per cent of the power, while the discharge through the guides was 11 per cent. more than the theoretical discharge. But when the opening of the gate was still further reduced to one-fourth of the full opening, the effect was also reduced to 45 per cent. of the power, while the discharging velocity was raised to 49 per cent. more than that given by theory. In the first of these experiments the fall was 12 8-10, in the second 12 28-100 feet, and in the third 13 43-100 feet, and the quantity of water used upon the wheel with the full gate was 135 cubic feet per second.

Prof. Pierce remarked that if in the last of these experiments the wheel were removed and the water suffered to run through the guides without obstruction, the head which would be required to give a velocity of discharge equal to that actually observed, would be about 37½ feet.

New Astronomical Instrument.—A committee consisting of Prof. Pierce, C. Wilkes, U. S. N., Prof. St. John, Ohio, Sears C. and J. R. C. Walker, were appointed to examine Prof Mitchel's apparatus for right ascensions and declinations by magnetism. The report concluded with the following tribute to the merits of the invention. "The committe were not aware that the history of astronomical science exhibits a more astonishing instance of great results produced with what would seem to be wholly inadequate means. With the ordinary tools of a mechanic, and with an insignificant pecuniary outlay, an isolated individual has aspired to rival the highest efforts of the most richly endowed institutions upon which sovereigns and governments have showered their inexhaustible patronage, and his aspirations have been crowned with success. The committee are persuaded that under more propitious circumstances and with more generous opportunities, Prof. Mitchel's plans of apparatus will lead to still more admirable results, and contribute yet further to the advancement of astronomical science."

Coral Reefs of Florida.—Prof. Agassiz read a most interesting paper on the Coral Reefs of Florida, which he had been exploring last winter. He found them different from the coral reefs of other parts of the world. The coral reefs of Florida extend in several parallel ridges between the main land of Florida and the Gulf-Stream, in a westerly course; diverging more and more from the main land, until near Cape Sable, they are forty miles distant; stretching like a broad arm into the Gulf of Mexico, and extending in a southerly directioninto the rapid current of the Gulf Stream. The Pacific ocean reefs, on the contrary, grew in the open sea, and differ essentially in character from those of Florida.

The principal reef of diving corals in Florida occurs between the main Keys and the rapid sea current which runs between Cuba and the islands encircling the main land of Florida, but other coral deposits of a peculiar nature are found to exist around, upon, and between the keys and the main land. The combined action of the tides and currents produces eddies in which fine sand and even mud is deposited around the reefs. These materials Prof. Agassiz considers to be minute fragments, or an impalpable powder, held in suspension by the water, which is rendered milky white by their presence. At a short distance beyond it the water becomes clear.

In Florida we have no barren reef, but a series of concentric reefs, enclosing parallel channels, formed without the slightest indication of submergence or upheaval. There are the Outer Reef, the Florida Keys, and the Shore Bluffs, with the main channel south of the Keys; the mud-flats between the Keys and the main land, with a slight depth of water, often not more than two feet; and flat, low islands, on which there is an extensive growth of mangroves. The Keys rise from ten to twelve, seldom thirteen feet, above the level of the ocean. Near the shore, there are mud and coral-sand accumulations, which are evidently the results of the decomposition of the solid parts of the corals themselves.

By the Keys the channel is from five to six fathoms deep and seldom more. Its boundaries are frequently indicated by small islands or shoals, some of which form very dangerous reefs, such as Carisford reef. It is within this channel that the wreckers take up their abode, being safely sheltered from the strong gales which blow frequently outside, behind the walls of the Outer Reef and the bar islands rising for a few feet above the level of the ocean. No coast said Prof. A., is more secure and safefor navigation than this, if it be properly understood; every twenty miles there is the broadest and safest harbor to run into. But at present, it is perhaps more dangerous to know of these harbors than to be ignorant of their existence; for the lights and signals along the shore are located without reference to using these places of refuge.

On the Outer Reef, from Cape Florida to Key West, in from ten to twelve fathoms up to the surface of the water, living corals are found.

Dr. T. W. Harris, of Harvard read a most interesting and instructive paper on the history and names of some common vegetables. Mr. Redfield, of New York, read an excellent paper on geological observations in the State of New Jersey, and Lieut. Wilkes, U. S. N., described a belt of heated water which encircled our globe.

The valuable original papers read by Mr. Rainey, the local secretary, Dr. King of St. Louis, Dr. Yandel, of Louisville, Ky., and Dr. Owen, together with many others, will appear in the printed transactions of the Association. The citizens of Cincinnati, with their usual liberality have already subscribed largely for the publication of the proceedings, which, when they are fully printed we will notice again, as the transactions of this body are of great value to our country.

On Probable Means of Augmenting the Ascensive Power of Locomotives.

It is well known that numerous accurate experiments on friction have established the law, that within the limits of abrasion, the friction is as the insistent weight, and not as the surface of contact. These experiments, though they have formed the basis of many calculations of the various frictions of railways, and have been valuable in this department of mechanical science, in establishing minimum results, do not meet the practical acquirements of railway motions, because in those motions invariably when maximum effects are produced, the limit of abrasion is always reached and passed. Of the friction of moving metals in contact, when abrading each other, we have no experiments whatever. Hence we have no means of calculating beforehand, the bite of a locomotive slipping her wheels upon a rail, because then both wheels and rails abrade. We know that the maximum adhesion of engines upon dry rails, exceeds all results of calculation based upon the ordinary laws of friction, and hence some have been inclined to doubt the accuracy of those laws that are undoubtedly true, within the limits taken by the initial experiments upon which they were founded. When engines slip their wheels on railways, both wheels and rails abrade, the law of friction changes, and we enter at once upon a new field, in which we have no exact results recorded, and of which we only know that the co-efficient of friction is greatly increased.

It is upon this outline of facts, (which might be much extended if the authorities were at hand,) that the writer, from the observation of years in his professional avocations, has formed the opinion, that beyond the limits of abrasion, the law of friction, as applicable to break blocks and the slip of wheels on rails, changes entirely, and that the bite or adhesion is in some degree proportionate to the surface of contact as well as to the weight imposed. The writer believes this to be especially the cause in the ascension of heavy gradients by locomotives, where the sand box is always used. In such cases it is highly probable that a mere increase of breadth of the rail, or surfacegained, will augment very materially the bite or adhesion of the driving wheels, though the weight remains the same. The usual surface of contact of wheel and rail has a breadth of only two inches, while the wheels themselves have a breadth of nearly four inches. If then, beyond the limit of abrasion, the friction increases in the same ratio to the surface, (as the writer believes,) then upon high gradients, all we have to do is to lay down broad headed rails, conforming to the tire of the wheels, and thus increase at once the adhesion.

This, of course, supposes engineers to have surplus steam power; and such is usually the case with modern locomotives, which, in fact, as now in practice always do, or ought to, arrive at the foot of a steep grade with full head of steam; then the sand box freely used upon a four inch rail, it seems highly probable, will augment so much of the bite of the wheels, as to render high gradients less formidable than they are now.

To the above considerations, the writer respectfully invites the attention of his professional brethren, in the hope that some of the companies they serve may at once put this important matter to the test, and lay a few hundred yards of rails, four inches broad, upon the high gradients of some railway doing heavy freight business. A few months' use, and a few correct experiments would soon settle the question definitely, and the writer knows scarcely any other, of more moment to some railways.

[The above is by Elwood Morris, C. E., and communicated to the Franklin Journal. It is well worthy of attention, although we are strong advocates of digging deep and making level; steep gradients cause great tear and wear, and, in the long run, are very expensive.

Manufacture of Paper Mache.

There is a great deal of fine articles of paper mache now manufactured in this city. A few years ago there were not any.

The article obtains its name from the prepared paper which forms the principal material in its composition. This paper which is cut into the required size and shape, is made of the consistency of the hardest wood by steeping in oil, after which it is left to dry in an oven. When the required time has elapsed, it is removed, and left in the open air for some minutes, when a coat of refined black varnish is laid over the surface. Before this varnish has become dry, pieces of pearl cut in the form of leaves, roses, and other flowers, as the fancy of the artist may dictate, or the character of the article may require, are laid on the paper, to which they adhere, and which is again placed in the oven. When it has been removed the second time, another coat of varnish is applied on the surface of the pearl and paper indiscriminately. The varnish, when it has had sufficient time to dry, is scraped off the pearl, and the same process is repeated several times, until all parts of the surface are made quite even. This gives the pearl the appearance of having been inlaid. The article, which is still in an unfinished state, after a thorough polish, has to be submitted to the hands of an artist, upon whose skill its beauty in a great degree depends.

Under his hands the piece of pearl, but roughly formed, is soon converted into a full blown flower, surrounded by its leaves and buds. The branches are first traced out with a camel's hair pencil, dipped in size, upon which gold leaf is afterwards laid. Then follows the painting of the flowers and leaves, the colors of which are rendered almost indelible by the application of a second coat of refined white varnish. Persons who have seen paper mache articles have no doubt been struck with the natural appearance of the leaves and flowers by the pearl, the brilliancy of which endures an incredible length of time.

Interesting to Telegraphers.

For some time the line between Breadstown and Quincy, Ill., has been working very badly, and lately it was found impossible to get a despatch through at all. The difficulty was at length discovered, the wire had caught in a large Lombardy poplar tree at Jacksonville, where it was crushed by a new growth of woody matter, the wire oxidized entirely in two, and the two ends so completely enveloped by the new-grown wood as to be pulled out with much difficulty.

New Inventions.

Improved Hoisting Machine.

Mr. Perry Dickson, of Blooming Valley, Crawford Co., Pa., has taken measures to secure an improvement on machinery for hoisting, which will effect a great saving in labor, for loading and unloading ships, raising hogsheads up into stores, &c. Two treaddles for a person to act on with his feet, like operating a hand turning lathe, move gear wheels by pall and ratchet, so as to turn a windlass barrel and elevate by rope any bale or bag secured to the same. The weight of the person operating it is applied instead of the muscular action of the arms only.

Improved Spike Machine.

Mr. Mark M. Ison, of Etowah, Cass Co., Geo., has taken measures to secure a patent for improvements in machinery for making spikes and nails. This invention is different from the roller spike machines, and the vertical reciprocating cutting nail machines. There is a horizontal table nearly the form of the segment of a circle, having a hollow space within it, in which works a revolving cam on a shaft concentric to the table. The iron plate to be made into spikes, is fed in along the upper surface of the table, and is cut off in strips, of suitable size, across the edge of an opening in the top of the table, by a vibrating shear arm working above, and these are pointed afterwards between the said shear arm and the table. The cam spoken of has an intermittent motion, and is made to carry the spike within the hollow space of the table, and allow it to stop under a holding die which receives it, when a heading tool comes down and completes the operation.

Improved Plow.

Mr. George Sheldon, of Millersburg, Holmes Co., Ohio, has taken measures to secure a patent for an improvement in plows which he has recently invented. The improvement consists in applying a series of conical rollers so arranged as to throw off the mould on the land side of the plow instead of employing the ordinary mould board. The conical rollers revolve while the plow is in motion, consequently there is less friction on the said rollers, than on the rigid "mould board.

New Planing Machine.

On our list of patents this week there is one granted to Mr. George W. Beardslee, of Buffalo, which has received the name of the "Elastic Cutter Planning Machine," and is said to be a valuable improvement. It is claimed for it that its operation will produce work superior to the hand plane, and that its ordinary speed will be one hundred and fifty feet per minute, or 9,000 feet per hour, and that it can be increased to 200 or 300 feet per minute, without any danger to the machine. We will not say any more about it at present, as we hope to be able to present engravings of it at an early date.

New Steam Drill.

The Boston papers state that Mr. Henry Golding, of that city, has invented an improved drilling machine, which is highly spoken of as being capable of drilling in any position at any angle of a wall, consequently it is set forth as being the very thing for perforating the Hoosac Tunnel through the Green Mountains. It is to be operated by steam power, and the chisel is struck by a hammer, —that is as we understand it.

Machine for Flocking Cloth.

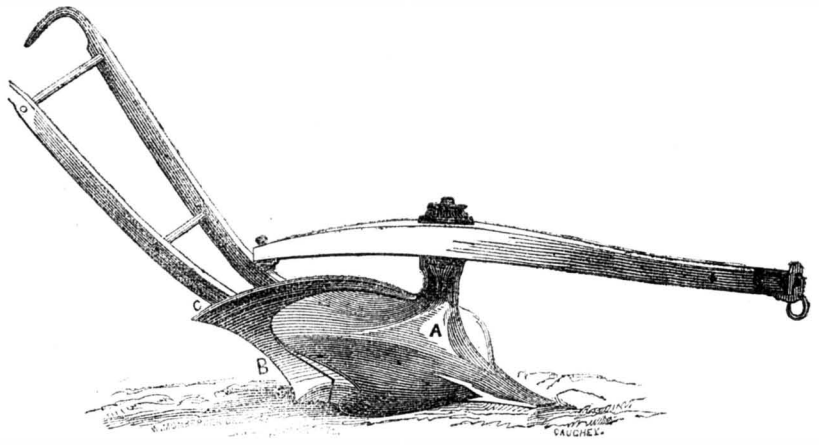
Messrs. D. & R. Pratt, of Elmira, Chemung Co., N. Y., have invented a machine whereby they will be enabled to use *flocks* in woolen cloth, and to work them into the cloth before it goes to the fulling stocks. This will be a saving in wool, as the flocks are so much cheaper. Measures have been taken to secure a patent.

If about seven or eight pounds of leather currier's shavings are put into a steam boiler every week, it is said that no incrustations will be formed, however *hard* the water may be that is used.

IMPROVEMENT IN PLOWS.

The accompanying engraving is a perspective view of an improvement in plows by Mr. J. C. Cloud, of May's Landing, Atlantic Co., N. J. for which a patent was granted on the 6th of last February. The improvement relates especially to what is termed "an auxiliary furrow side."

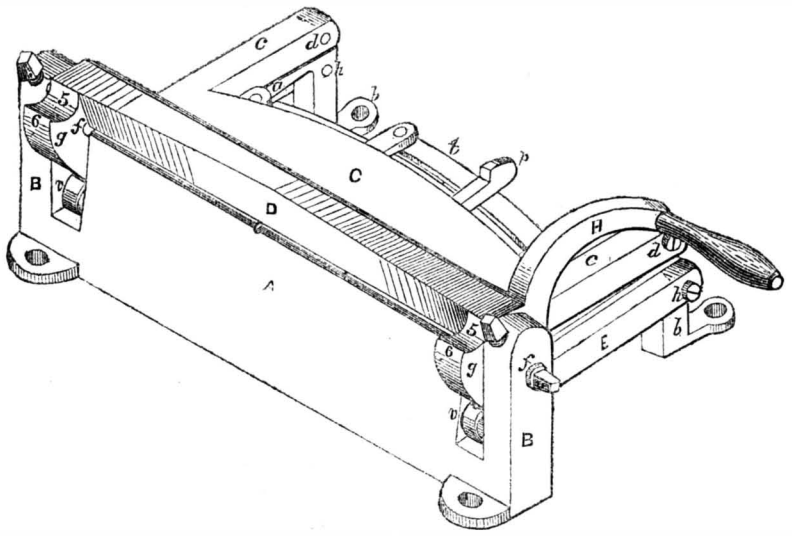
A is the mould board; B is the auxiliary furrrow side with a curved concave shear, C. This shear is a section bell shape, with its upper edge projecting over and forwards so as to act upon the surface of the mould that is turned over. It is well known that the perfection of plowing consists in turning over, perfectly the moulds so as to turn under the sward, or otherwise what was the exposed surface. This "auxiliary furrow side" forms a broad bearing at the heel of the mould-board, and so acts upon the surface as to turn it under if any is exposed, while at the same time, it breaks it nearly like a harrow. This auxiliary piece is fastened by bolts and loops, or it



may be cast in one piece if desired along with the mould board. The cutter extends down on the land side to the bottom of the plow, and is fastened by a mortise through it, which receives a tenon on the wrought iron plate bolted to the mould board. The plow point and share is fastened to the plate which has a tenon thereon, and an ordinary screw bolt. The methods of fastening are not represented, but it is believed they will be sufficiently understood. More information may be obtained by letter addressed to Mr. Cloud.

WALKER'S PATENT IMPROVED SHEET METAL FOLDER.

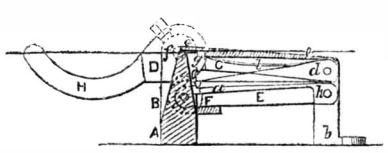
Figure 1.



This improvement is the invention of Mr. Jabez Walker, of East Bloomfield, Ontario Co., N. Y., and a patent was granted for it on the 1st of last April. Figure 1 is an isometrical view, and figure 2 is a vertical section. The same letters refer to like parts.

The nature of this invention consists in the employment, in connection with the movable or clamping jaw and folding tumbler, of devices for holding down the jaw and securing the plate during the process of folding, and for throwing up the jaw and releasing the plate after the folding is performed.

Fig. 2.



A is the bed of the machine; B B are standards; these parts may be of cast-iron with the top edge of the bed steeled or chilled. *a a* are two bars on the back of the bed, the back ends of which are supported by feet, *b b*. C is a movable swinging jaw of cast-iron. It is supported by two arms, *c c*, the ends of which are jointed by pins, *d d*, to the back part of the bars, *a a*. The lip, *e*, of the movable jaw is very thin and made of steel. Its front edge is flush with the front edge of the face of the bed and is of the same length. There is a small spring, *l*, on each bar under the arm, *c*, which has a tendency to raise the jaw when not otherwise depressed. D is the tumbler consisting of a strong bar having its faces chilled; it is provided at its ends with pivots, *f f*, which fit in bearings in the standards; B; it is also provided at each end with a cam, *g*, part of whose face is part of a circle described around the axis, and part is recessed at 5. (One is provided with a handle, H). E E are levers or arms hung on pivots, *h h*, their front ends are provided with friction rollers, *v v*, which are always under the cams, *g g*, between the ends of the bed and the standards. F is a bar spring which is placed across below the arms, E E, and secured to the jaw, C, by screws, and rests on the ends of pins. There is a gauge plate sliding under the lip, *e*, with its face turned towards the bed, A. It has two lugs bent under the jaw, C, and held by a spring, between which spring and the jaw they slide. The two lugs are connected by pins to two cranks levers, *p*, (not seen) and *p'*, having fixed fulcra secured in the jaw; these crank levers are connected at equal distances from their fulcra at a bar, and the lever, *p*, is prolonged beyond the fixed bar, *l*, upon which there may be an index for setting the gauge. By moving the end of the lever, *p*, the gauge may be moved nearer to or further from the edge of the lip, *e*, the distance from the gauge to the edge of the lip, forming the depth of the lock.

The gauge is first set, and the handle, H, turned in front, one face of the tumbler bar, D, is then level with the upper edge or face of the bed, A, and is kept in that position by resting against the front of the bed; the recessed part, 5, of the cams, *g g*, is then over the friction rollers, *v v*, and the levers, E E, not being depressed, the jaw, C, is thrown up by the springs, *l*, and the lip, *c*, is consequently open or raised. The plate or sheet of metal to be folded, represented by a line, is then put in at the front, between the lip and the bed, and pushed up to the gauge, the handle is then thrown back, and as soon as the projections, 6, on the cams come in contact with the friction rollers, *v v*, they press down the levers, E E, which, by means of the bar spring, F, and screws, pull down the jaw, C, and compress the plate tightly between the lip, *e*, and the bed, preventing its being drawn back while being folded; as the tumbler is thrown over, the circular parts of the cams continue to bear on the friction rollers and keep the plate secure, the plate being bent backwards until the tumbler reaches the back position, by which time the fold is complete. When the lever, H, is thrown back to its original position as at first described, the jaw, C, will be raised by the springs, *l*, and the plate may be removed, the fold or lock being perfectly formed.

More information may be obtained by letter addressed to Mr. Walker.

Noiseless Wheels.

In this instance the invention consists in the application of a solid band of vulcanized india rubber over the iron tire of the wheel. The india rubber is held in its place by the tire having a raised rim on both sides, and by its own elasticity. The band of an ordinary carriage wheel is about an inch to an inch and a half in thickness, and, unless on close inspection, no difference from the common iron-shod wheel is perceptible. We have driven some distance in a carriage with the wheels so shod, and were struck, not only with its noiselessness, but at the perfect smoothness of the motion—the wheels being, in fact, springs, and, by their elasticity, giving a lighter draught than with the iron tire. We have seen one set of wheels which have been driven 4,000 miles, they have here and there a trifling cut but show no appearance of being worn out, and seem quite capable of another three or four thousand. An iron tire is generally worn out in 3,000 miles, so that the india rubber tire has so far proved itself the more lasting. It is certainly a great addition to the luxury of a carriage to have it run without jar or noise; and it would be a universal comfort to have the streets of cities without the present incessant rattle of carriages, omnibuses, etc.

To Make Artificial Marble and Stone.

The following is the condensed specification of a patent granted to Selim R. St. Clair Massiah and published in the May number of "Newton's London Journal and Repertory of Inventions." The material of which the artificial stone is made is plaster of Paris. After it has been prepared and of the right shape, it is dried in a room at about 80°. When completely dry, it is immersed in a warm solution of borax and glauber salts, prepared by dissolving 1 lb. of borax and a quarter of an ounce of the salts in one gallon of water, as a ratio. After the casting is thoroughly wet in this, it is removed to the drying room and exposed to a heat of 250° Fahr., until all the watery parts are thrown off. It is then permitted to get nearly cold, when it is immersed in strong hot solution of borax, to which has been added one ounce of strong nitric acid for every gallon of the borax solution. This solution is kept quite warm, and the castings kept in it until they are completely saturated, when they are taken out and dried and found to have acquired a marble like hardness. A day or two after this operation the castings are slightly heated and covered over with a thin coat of Canada balsam dissolved in turpentine, after which they are kept warm until the turpentine is driven off. Various colored substances may be used along with the materials specified to color the artificial marble, such as indigo for blue and other substances for other colors. The marble may also be streaked and beautifully variegated.

Scientific American

NEW YORK, MAY 31, 1851.

America at the Great Exhibition.

By all accounts from London, the American Department of the Exhibition is but meagerly occupied; even Jules Janin, the celebrated French letter writer, in writing to the "Journal des Debats," speaks unfavorably of the show we make there. Our branch, he says, "is complete, and order reigns, but it is open to one objection—the want of objects to exhibit!" The London "Times," has spoken slightingly of the poor show we make, and a number of letter writers to papers at home speak in the same strain. We are sorry, and yet we are not sorry; it will teach us two useful lessons, we hope—one to employ the right means and adopt the right measures to sustain the honor of our country abroad; and the other is, not to think so much of ourselves generally as to undervalue those of other nations. The latter fault is characteristic of every nation, but we want to see it removed from America, because we believe it would tend to advance and benefit us as a nation and people in every department of useful knowledge, art, and science. Men who have never travelled imagine their own peculiar neighborhood to be the greatest in the world; Iceland is a *great* country to its natives, but what is it to the world. The English papers, in commenting upon our department at the Exhibition, do not deal justly and sensibly with us. It surely could not be expected that America could send as many articles to the Great Fair as France. All our articles had to be carried 3,000 miles over the ocean; we have little more than half the population of France, and our people are spread over an area of greater extent than Austria, France, Germany, Italy, and England combined. We do not make the excuse that "our country is new." Why, suppose it is, are the people new? have we not started with the same civilization as the nations of Europe, and have we not European artisans here? and can we not do the same things here that are done there? Yes. Well, then, what is the reason we are so poorly represented at the great Exhibition? There is more than one reason: one is, if America was only 25 miles from England, like France, a different face would have been put upon the affair. Another is the bad management—political-twaddle management of the whole commission at home, in preparing for the Exhibition. England displays beautiful locomotives—so could we, but we do not. We could also have stood well beside her in marine engines, but we do not. In river steamboat engines we would have stood unequalled. And so it is with a great deal of our manufactures; we are not represented at all. The expenses were too much for our people, and no measure such as a general subscription was resorted to for the purpose of appearing well there.

The American Department appears fully as well as we expected, for the gentlemen composing the Committee appointed for this State, to examine articles for the Exhibition, were not competent judges, nor did they take pains to encourage our people in the rivalry:—the whole business was managed contemptibly: it was saddled and bridled along with some old sleeping gentlemen connected with the American Institute. Nobody knew where to find them: "they met, 'twas"—not in a crowd, but, "in a cloud," and were Fished from the depths of the most unmechanised faculty of men in our goodly city. They were appointed by Gov. Fish, and if any one wants to know who they were, let him look on page 74 of the present Volume of the Scientific American. There was not a single good mechanician among them; other States may have been equally unfortunate.

Many, no doubt, went to the Exhibition expecting from what they were told, that their machines would surely outshine all others. Our people are very ingenious—our backwoodsmen have it in them by *natur*'; but we have travelled in Europe, we have been in the machine shops of England, her factories, &c., and we must tell our people, there is nothing like travelling for rubbing off the rust of prejudice. Here is what the Washington "Republic says about American inventive and tasteful qualities:—

"In building ships and steamboats, in the manufacture of all kinds of labor-saving machinery, in cultivating the soil, constructing bridges, railroads, and canals, and in making agricultural implements, no people can excel us. But in the grace, the elegancies, the ornamentations of art manufacture, we are sadly, shamefully, and needlessly behind all others."

Here is what "Observer," the correspondent of the Philadelphia Ledger, says:

"In about twenty years from now Europe will be just civilized enough and educated enough to furnish competent critics for the great works with which America will astonish the world."

We do not agree in opinion with those first quoted: America has produced and has her eminent artists; we are not behind in the ornamental arts, for in furniture and all kinds of wood work, the artists of no nation equal—yes equal—ours. In constructing bridges and railroads, and in cultivating the soil, in some respects we are not on a level with the English. Our hand implements are better and more convenient, but we think the English farmers excel in large machines. The extract from the Ledger is incomprehensible.

In twenty years from the present moment there will be less of national inventions, but none the less of *inventions* and improvements: the genius of man is now becoming more cosmopolite—it has a world-wide influence. A valuable improvement made in Illinois this week, is known in London within two weeks more; and so it is here with those in Europe. The World's Fair will tend to advance science and art throughout the world—to make it less national but more human.

Our artists, our mechanicians and tradesmen are just as talented, skillful, and competent to produce works of art as those of any other nation; and in saying this we award the same meed of praise to the artists, &c., of other civilized nations. We have one hope of yet excelling all other nations, and that hope is based upon our superior national advantages. Talent is in proportion to the mass, and the greater the means of developing it—bringing it out—so will there be a greater display of it. We have better means of developing it—our population is increasing more rapidly than that of other nations, consequently we must rise—we have the men,—the hour will soon be at hand.

VROOMAN'S PATENT LASTING, CRIMPING AND STRETCHING MACHINE.

Fig 1.

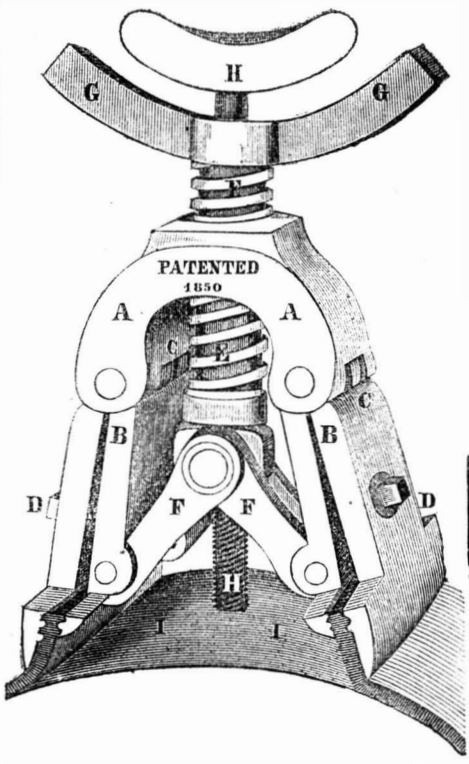
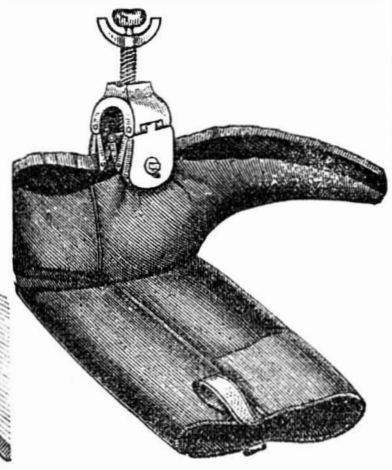


Fig. 2.



The accompanying engravings represent applications of a new machine invented by Mr. Henry S. Vrooman, of Springfield, Mass., and recently secured to him by patent. Fig. 1 is a perspective view of a small machine for performing the labor of belting or girding emery wheels, or for obtaining any degree of tension on a flexible substance drawn round a circle, bringing the ends in close contact, performing the work with great ease and perfection, besides being a much more expeditious manner of accomplishing said operation.

The representation shows the machine attached to the covering of an emery wheel, and indicates its position prior to the leather being strained or brought together preparatory to tacking. A represents the circle or base of the structure, to each end of which is attached a pair of jaws, B B, connected at C C, by a hinge like joint; each pair being thrown open to receive the girding substance, by coiled springs, and closed by the screw bolts, D D, they being operated by a movable thumb wrench. E is a hollow screw passing through the centre of, and acting upon the arch, A.

F F are straps, there being two on each side, the ends of the jaws with the lower end of the hollow screw, E, working in a joint at both ends, thereby giving the screw, E, entire control over the ends of the jaws, expanding or contracting them when the screw is operated by means of the arms, G G. H is a screw rod running through the entire length of E, and takes effect on its inner surface, and passes, as will be seen, down to the face of the wheel, I I, and rests upon it; its office being to control the motion of the whole machine towards or from the wheel when such separate motion is required.

The following is the operation or movements of the machine when used. Let the jaws, B B, be thrown apart by turning the screw to the right; each pair is then opened, and the leather or girding substance adjusted and secured beween them, the screw rod, H, is then turned to the right, moving the whole machine from the wheel, producing any desired tension of the girding substance; H and E are turned to the left simultaneously, giving a compound movement to the jaws, both bringing them together or contracting them, and settling down to the wheel, or the object on which the machine rests, thereby bringing the ends of the girding substance in close contact and covering the entire face of the wheel with a uniform pressure on its parts, the leather being first prepared and glazed on its whole surface ready for use.

The same machine of suitable size but differently formed jaws is used with complete success in the lasting of boots in the shank; its application and form being seen in fig. 2.

The upper leather should be first drawn tightly over the toe and balls of the last; the machine is then attached to each side of the upper in the shank; the hollow screw is then turned to the left until the jaws commence contracting; the centre screw (which passes through the hollow screw) is then turned to the right, until the upper is brought sufficiently down over the instep; both screws are then turned together to the left, producing a compound movement of the jaws, both contracting and running them down to the inner sole; the machine is then moved towards or from the boot (if such motion is required) by turning the centre screw to the right or left; or, where an upper does not last very hard in the shank, it is more expeditious to take the centre screw entirely out of the machine and use it in that way; the upper being then drawn down over the instep at the same time it is brought in the shank, by using the whole machine as a lever, first drawing down one side of the upper and then the lower, alternately, as the hollow screw is being turned to the left to produce contraction. Those machines having long centre screws, are adapted to crimping, and are used the same as any common hand article, made expressly for that purpose.

The great variety of uses to which this invention is capable of being applied, renders it valuable beyond the first estimate of a casual observer. Judging from the skill embraced in its combination it cannot fail to be appreciated as a new and very useful invention.

More information abouts rights, sales, &c. may be obtained by letter addressed to Vrooman, Harris, & Co., at Springfield.

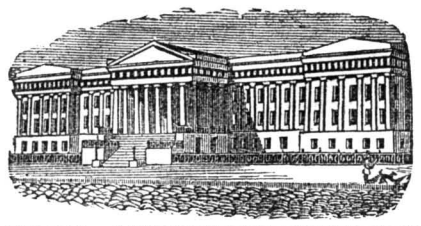
New Clipper-Ship "Flying Cloud."

A new ship built by Donald Mackay, of Boston, for Grinnel, Minturn & Co., of this city, for the California trade, has been the subject of much comment and observation since she has been in our city. She was built we believe without any restriction by the owners—the naval architect had it all his own way, and we have been informed that she is warranted to be the fastest sailer afloat. Her registered tonnage is 1,782 48·95, which exceeds that of any American sailing vessel afloat. She is expected to carry from 2,000 to 2,500 tons freight. Her length on the keel is 208 feet; on deck 225; and over all, from the knight heads to taffrail, 236. Her extreme breadth of beam is 41 feet; depth of hold 21½. Her keel is 27 inches clear of garboards; her dead rise, at half floor, 30 inches. Her bow below the plankshеer, is slightly concave. At 18 feet from the apron, inside, on the level with the between decks, she is only 11 feet wide. She has the sharpest bow we ever saw on any ship, although 10 inches fuller on the floor than most of the modern built clippers. She has three depths of midship kelsons, which, combined, are moulded 45 inches, and are sided from 17 to 15, making her with her keel, which is in three depths, nearly 9 feet through the backbone. She has also two depths of sister kelsons, the first 16 by 10, and the second 14 by 10, cross-bolted diagonally and at right angles through the naval timbers.

Some have praised and some have found fault with her form. One old shipwright said in our hearing "I am cheated if she can sail in a heavy sea, she is too hollow towards midships, otherwise she is perfect." Time, we say, will tell all better far than tongue can tell. She is full rigged and her masts rake 1¼ inch to the foot. Take her all in all, she is the finest ship that we ever saw with the exception, it may be, of the N. P. Palmer, which is smaller, to be sure, but none the less beautiful and graceful on that account.

The Presidential Tour.

The President and his Cabinet have been making the tour of New York State. It must appear not a little singular to him, in being so waited upon and honored because he is President, in those places where, a few months ago, few would have gone to their doors to see him. Cannons have been fired, bells rung, and trumpets sounded, to honor the office. Our city received him with all honors, and so have various cities throughout our State He has been thus honored because he is President.



☞Reported expressly for the Scientific American, from the Patent Office Records. Patentees will find it for their interest to have their inventions illustrated in the Scientific American, as it has by far a larger circulation than any other journal of its class in America, and is the only source to which the public are accustomed to refer for the latest improvements. No charge is made except for the execution of the engravings, which belong to the patentee after publication.

LIST OF PATENT CLAIMS
Issued from the United States Patent Office.

FOR THE WEEK ENDING MAY 20, 1851.

To Frederick Leypoldt, of Philadelphia, Pa., for improvements in Scarificators.

I claim the use of the said hollow pivot, lever, and slide racks, combined and arranged as described, secured in their proper places by the plate and screws, and operating in connection with the trigger and springs, substantially as herein before specified.

To J. W. Osgood, of Columbus, Ohio, for improved Compound Coupling for Hose or Pipes.

I claim the manner, if desired, of keeping the several threads or screws always in contact, whether the coupling be formed or disconnected, for obtaining the advantages set forth, by the employment of an interior box, situate in an outer box, and having a loose ring or collar, or its equivalent, on it, in combination with a washer, connecting nut, and box, formed with lips for locking the coupling, the several parts constructed, fitting, and operating together, substantially as shown and described.

[This is one of the most unique couplings we have ever seen, and has some absolute advantages not before attained.]

To Nelson Platt, of Ottawa, Ill., for improvement in Smut Machines.

I claim, first, in connection with a close case surrounding the machine, the arrangement of the fan, as herein described, in the annular space surrounding the beaters, between the outer case and the fluted cylinder; and at the entrance of the pipe through which the dust is discharged, so that the currents of air will set into the machine through any cracks or openings in the same, from the room in which it is placed, by which means the escape of pulverized dust or smut, into the room, is effectually prevented.

Secondly, I claim the arrangement of the air chamber, having currents of air passing through and across it, between the upper part of the beater and the space through which the descending current of air passes to the fan, for the purpose of collecting any portion of the grain, accidentally thrown out of the scouring cylinder by the blast or beaters, and returning the same, so that it may pass through the machine with the rest of the grain in the proper direction.

Third, I claim the conical ring, or shield, for the purpose of protecting the conical screen below it from abrasion by the descending grain, and at the same time keeping the pores of the screen open, for a free passage of air through it into the fluted cylinder.

Fourth, I claim the tube or passage for discharging the cleaned grain as set forth, and also for receiving and transmitting air to and through the tube, as described.

To G. W. Beardslee, of Buffalo, N. Y., for improvement in Planing Machines.

Having thus fully described my invention, I claim the yielding stock and cutter, when made to yield upon an axle, the centre of which is in line with the cutting edge of the knife. And this I claim whether the socket bolt, hinged bar and nut are or are not used, for the purpose of graduating and adjusting the cutters as herein set forth.

To H. H. Day, of Jersey City, N. J., for improvement in India Rubber Shoes.

I claim the manufacture of india rubber boots and shoes, without cloth, being made of separate pieces of different degrees of elasticity, and each piece having its peculiar and requisite degree. The shoe, to possess different degrees of elasticity in different parts and uniform elasticity in each different part, and having no part without some elasticity in every direction, by the means herein described, or any other substantially the same; whereby I lessen the cost, obtain a shoe not liable to break, which can be kept clean, stretched in every direction, at the same time easier to the foot, adjustable to large boots and yet not rendered useless to wear over smaller, light and elegant, and retain permanently their shape.

To Lawton J. Ware, of Warren R. I., for Coupling for Cars.

I claim the use of half couplings, each of similar shape and construction, formed with lips, having slots into which projecting hooks fit, having notches serving for the bolts to enter and lock the coupling, or constructed and operating fsr the purposes shown, in any manner substantially the same.

[We have seen this improvement and believe it to be a very excellent one.]

To Robt. Jobson, near Dudley, England, for improvement in Reflecting Fire Places.

I claim the extension of the curved reflector entirely around the fire grate, in combination with having an opening through it, immediately under the fire grate, for the passage of the ashes, as specified.

And in combination with the fire grate and the extension of the reflector under or below the grate, essentially as explained, I claim the ash guard, the same being applied in the manner and for the purpose as set forth.

And in combination with the reflector, and its sustaining frame, I claim the hinged slide and the sustaining rollers or their mechanical equivalent, the same being applied so as to enable the reflector to be moved outwards for the purpose of providing easy access to the chimney for convenience of removing the ashes, whenever such may be deemed necessary.

To Luther Boardman, of East Haddam Ct., for improvement in the manufacture of Wire-strengthened Spoons, &c.

[By this arrangement block tin ware spoons are made so as to conceal the wire entirely.]

I claim the manner, substantially as herein shown and specified, of enclosing a wire of the required exact length within the handle, by supporting it on pivots secured to the moulds, and projecting midway or partly into the form.

To Chas. M. Guild & John Brown, of New York, N. Y., for improvement in Steam Traps.

We do not claim to be the first to remove the water of condensation from steam warming or other apparatus, by means of a float and valve or cock, but we do not know of any means by which this water of condensation is taken off through the float by a cock; but we claim the construction and application of the float, with its mouth, opening, pipe, and barrel, on the plug, with two openings for the purpose of retaining the steam in warming apparatuses, or in other steam pipes, and passing out the water of condensation through the float near the bottom, substantially as described and shown.

To Samuel Pierce, of Troy, N. Y., for improvement in Hot Air Furnaces.

I claim the arrangement substantially as herein described, of the heating chambers, in connection with the furnace, when this is combined with the method substantially as described, of connecting the heating chambers with each other with the furnace and with the exit pipe leading to the chimney, whereby the gaseous products of combustion are carried into and through, and made to spread out in thin films in the said heating chambers, and therein retained to give out heat, without seriously impeding the draught, substantially as described.

To Levi Bissell, of New York, N. Y., for improvement in Carriage Springs.

I claim the constructing of springs, whether of wood or part wood and part metal, or other elastic or non-elastic substances, as adapted and applicable to carriage springs and springs for other purposes, in the manner substantially as herein described.

To Albert Hebbard, of Worcester, Mass., for improvement in Cast-iron Car Wheels.

I claim the above described improvement or wheel, made with a chilled rim, either a solid hub, or one divided cross-wise of its axis, two plates or discs united in a serpentine curve at their outer peripheries, a third plate not only made serpentine concentrically with the hub, but curved in radial directions, as described, all cast or founded and combined together in one piece, substantially in the manner herein specified.

To Purnel Jefferson, of Bridgeton, N. J., for improved gauging and heading movement for Spike Machines.

I claim the combination of the spring gauge and catch, constructed as described, with the dies and with the header, for the double purpose of gauging the length of the spikes or nails, and aiding in forming the heads thereon, substantially as set forth.

To Isaac Van Kuran, of Boston, Mass., for improvement in Cast-iron Car Wheels.

Having thus explained my invention, I claim a cast iron railroad wheel, constructed with a solid hub and a tube, the tube being united to the hub by a curved plate, with curved projecting braces on it, and connected to the tread by a curved plate, with the curved braces on it; the whole being constructed substantially as described, for the purpose set forth.

[This is the second patent which Mr. Van Kuran has secured on very valuable improvements on Railroad Car Wheels.]

To Henry Ruttan, of Coburg, Canada West, for improvement in Ventilating Furnaces. Ante-dated Jan. 31, 1851.

I claim the arrangement and mode of operating the valves in reference to the air-heating space around the stove, by which the amount of air from within and without is graduated by a single movement.

I claim also the arrangement of the horizontal air-heating trunk, the vertical leading thereto, and its valve, in combination with the air-heating space.

[Mr. Ruttan has expended a great amount of time in perfecting his Ventilating Furnace, besides paying our Government $500 as Patent fees. Next week we shall present a length article on Mr. Ruttan's system, accompanied with numerous engravings illustrative of his theory.]

To Wm. Watson, of Chicago, Ill., & E. S. Renwick & P. H. Watson, of Washington, D. C., for improvement in Grain Harvesters and Binders.

We claim, first, the method of raking and binding grain at one operation, by the mechanism herein specified, or its equivalent, substantially as herein set forth.

Second, we claim the arms, in combination with the levers, by means of which the rake teeth are alternately raised and depressed, as the rake is moved alternately in opposite directions, by endless rake chains, which move continually in the same direction.

Third, we claim the method of adapting the binding apparatus to the length of the cut grain by varying the respective positions of the cutting and binding apparatus, substantially as herein set forth, that is to say, by moving the front of the platform with the cutting apparatus, backward or forward, or by moving the binding apparatus nearer to or farther from the front of the platform, in such a manner that the sheaf may be bound near the middle of its length, whether it be long or short.

Fourth, the method of binding grain by the mechanical devices herein specified, or their equivalents, acting in connection, and automatically by motion derived from or dependent upon the movement of the machine to which they are attached.

Fifth, we claim the cord finger operating substantially as herein set forth, by the aid of which the grain is encircled by the binding cord.

Sixth, we claim the tying forceps or the equivalent thereof, operating in connection with mechanism for encircling the grain with cord or band, substantially as herein set forth.

DESIGNS.

To James Wager, David Pratt & Volney Richmond, Troy. N. Y., for Design for Stoves.

To P. M. Hutton, of Troy, N. Y., for Design for Bedsteads.

(For the Scientific American.)

Practical Remarks on Illuminating Gas.

[Continued from page 286.]

Water Rosin Gas.—Much excitement has been caused in this country as well as in England recently by the statements which have been brought forward, tending to show the immense advantages derived, in point of economy, quantity, and great superiority in quality of the manufacture of an illuminating gas from rosin combined with water. This new gas was sustained by many people, and like all new and speculative projects, gained converts rapidly. A company was supposed to have been formed in a neighboring city to carry this new scheme into effect; many of the unwary were brought into the association; large amounts of money were said to have been subscribed for this project, and I have understood that an apparatus designed for experiment was erected. The supposed company have, however, relinquished the undertaking. This gas is generated in a similar apparatus to the rosin gas, and is in fact the same thing; but in addition to the rosin a quantity of water is also allowed to enter into the retort, and by the admixture of the hydrogen contained in it, with the rosin gas, it is maintained that it adds to the quantity, improves the quality, and reduces the expense. But if we look at the effect for a moment we think it must be seen that, as the hydrogen has no illuminating power in itself, and as the quantity contained in the rosin is ample when combined with its carbon, to form a gas suitable for illuminating purposes, that by adding more hydrogen, we only decrease the illuminating power and thereby deteriorate the quality of the gas. That people should embark upon an enterprise, which, even at the outset, must seem most absurdly enveloped with inconsistency, is not easily to be accounted for.

Dr. Andrew Fife, Professor of Chemistry at Kings College University has investigated this subject very fully, and his able report, which appeared in the Journal of the Franklin Institute for October and November, 1850, has placed this matter in its true position; an extract of which I will take the liberty to append to this article. He says, with regard to the gas referred to, and which is stated to be hydro-carbon gas, that is (water and rosin gas) "I maintain that it did not contain a particle of water gas; it was not even rosin gas; it was procured from a mixture of resin and fat, the latter I have no hesitation in saying, in by far the largest proportion. Strange that gas, said to be water rosin gas, should be of specific gravity ·936, contain 28 parts of olifient gas, and have durability 82′ 40″; while gas which I saw prepared by the same apparatus from a mixture of equal parts of rosin and fat, should be only of specific gravity ·716, have 13·5 of olifient gas and durability only 54′. Does not this show that I am correct in saying, that the gas thus emblazoned forth as water and rosin gas, was prepared from fat and rosin only, the former in very large proportion.

There is only one other circumstance to which I would advert, also stated in the papers referred to. It is often said that the most important part of a letter is contained in a postscript, and in one of the printed papers issued by Mr. White [Mr. White here alluded to is the inventor of this new gas] there is a P. S. which is certainly very important, because it is contradictory of a previous statement, and seems to let out the secret regarding the enormous quantity of gas obtained. He there states 'one cwt. of rosin yields, by my system, if wrought up, 2,000 feet of gas or more, possessing an illuminating power 26 per cent. superior to Manchester gas. I find it, however, more economical not to convert the whole of the resinous matter into gas.' 'It may be found more profitable not to push the quantity of gas beyond 2,000 feet from each cwt., of rosin, although at the works erected by me at Bristol they regularly obtain 3,500 to 4,000 feet from the same quantity, by fully working up the residuum." In a P.S. it is said, 'Some may not understand me, why I obtain only 2,000 feet from each cwt. of rosin, while at Bristol 3,500 to 4,000 feet is produced from the same quantity. This is easily explained: the gas at Southport is 26½ per cent. superior to that of Manchester, by therefore merely adding that additional percentage of my water gas (and they add still more at Bristol) you have about 3,500 feet, equal still to Manchester gas.'" J. B. B.

TO CORRESPONDENTS.

G. F. X., of N. Y.—From your letter we cannot learn much about your "pans," as the description is vague, but you will not infringe on any in use, we believe.

F. D. M., of La.—You will find an engraving and full description of Gen. Semplar's Prairie Steam Car in Vol. 1, No. 26, Sci. Am. We think Mr. Semplar's plan impracticable, although we are of the opinion that cars may be easily constructed to be operated on prairies by a stationary engine.

L. H., of Mass.—Your letter has been forwarded to Messrs. Couch & Alcott, who will give you attention.

H. W., of N. Y. City.—We have seen the notice you speak of in the "Farmer and Mechanic;" the improvement is no doubt a good one; you will find an engraving of it on page 377 Vol. 4, Sci. Am., Col. Steams resides in Dover N. H.

A. D., of S. C.—There is a difference between your Cotton Gin and the one patented by John Du Bois, as you will see upon reference to page 404, Vol. 4, Sci. Am.

A. M., of Ct.—We shall be glad to hear from you often; you will see that we are engaged upon the subject now, and all additional facts connected therewith are of value to us. You understand the subject.

A. B., of N. Y.—We pay particular attention to securing patents in France, and have located in Paris one of the most able and active gentlemen connected with the profession. We are ready to attend to your case immediately.

J. W. C., of Ind.—Mahan's work on Civil Engineering is an excellent one; price $3. $4 received and credited for two subscriptions, for which we are much obliged.

W. S., of Ohio.—Mr. John A. Etzler resided in Philadelphia at the time his patent was issued.

J. B. R., of Ala.—We do not see how we could effect such an exchange as you propose. The supply of patented pumps is much beyond the demand in this section. We would do so with much pleasure if we could.

R. E. F., of F. C.—The point you bring to our notice is a very old one and could not be secured by a patent. John White, of New York, obtained a patent in 1835 for coffins of artificial stone or marble, and we believe it has never been introduced to any great extent. The metallic sarcophagi made by Raymond & Fisk, of this city, are of a more convenient and beautiful arrangement, and have been much used in transporting dead bodies from one place to another.

H. M., of Vt.—We shall keep your matter in mind, and may publish an engraving before long.

H. C. E., of Va.—In case of an application for a patent for additional improvements the claim in the original patent is subject to a re-examination, and if it shall appear that any part of the claim was not original at the time of granting the patent, a disclaimer must be filed for said part, or the claims restricted.

J. S. H., of N. Y.—There is no new process for stereotyping practiced: the old system is still pursued in all our foundries, and we believe it will be difficult to supplant it because it is so simple.

A. B., of Conn.—Your plan of the electro-magnet will certainly accomplish the object, but it is the same as Bain uses for his Electric Clock. We have seen two or three plans proposed to accomplish the object. You, we have no doubt, can devise a plan, but we do not believe that it would be of any pecuniary benefit.

O. C., of N. Y.—The great object and use of the plow is to turn over the land completely, covering the surface under. Your invention would defeat the object desired. A vertical revolving cylinder is not new in the plow. We have a model of one in our office. Your letter is O. K.

J. T. A., of Va.—A tub wheel we would not use, and we do not know who makes it. Parker's is good—none better. Did you write to Philadelphia? If you don't get an answer you must apply at some other place. Write to Mr. Finlay, at Cold Spring, Dutchess Co., N. Y., for his wheel, it is good and cheap.

C. A., of Pa.—Your engravings were forwarded to Mr. Dean, at Boston, by Express last Friday.

J. G. F., of Ill.—There were nine numbers of Duggan's work published before the work ceased, and sets of those can be furnished at $6,75 each set, or 75 cents per number for any part desired.

B. S., of N. Y.—We should be glad to benefit you in regard to the bridge, if possible, but do not know of any concern at present who would undertake it. If we chance to hear of any you shall be informed.

R. B., of Phila.—Caveats are confidential papers, and no one outside of the office, except the inventor, can give such information as you ask. No caveat of this kind has passed through our office. This is all we can say about it. The fee is $20.

H. C. B., of O.—Your letters are received, and the drawing which you enclosed are in progress of execution on wood. $10 received.

T. E. W., of N. Y.; W. B., of O., and G. L. H., of Conn.—It was our intention to have forwarded your patent papers for execution last week, but owing to the illness of the examiner under whose supervision that class of inventions comes to which yours belong, the cases have been necessarily delayed until this week.

N. B., of N. Y.—An engraving of your invention in the Scientific American is what you should get as soon as possible, that is, if you have a true sense of that which would benefit yourself, and at the same time extend the area of useful knowledge.

S. K. J., of Mass.—It is not expected of you that you will be able to define all the applications of your inventions in a caveat, but it is best, for many reasons, to be as full as possible.

C. M. D., of Ala.—We will endeavor to get up engravings of a good hydraulic ram, and present as much information on the subject as we possibly can.

E. A. W., of O.—Your rail is new, but it would certainly be more expensive than any now in use, and the same advantages are gained by placing the posts of sleepers in elastic felt, as is now done on some of the English railways. The rail is patentable, it is for you to judge of its payability.

E. S. H., of N. Y.—Your plan for the draught of chimneys is already the subject of a patent.

T. A., of Illinois.—The best cement you can use for your belts, is a strong solution of good isinglass. When you write for information always have the goodness to pay the postage. When you send money to pay for the papers we will send them.

H. M., of C.—We know of no Plane like yours; it appears to be new and useful. In getting up the engravings of any machine, we prefer to take our drawings from a model, otherwise, in every respect, the the inventor must take all the responsibility.

J. C. D., of Pa.—We are about as much perplexed as you; we have not yet seen an experiment.

Money received on account of Patent Office business since May 20:

A. W. J., of Del., $30; M. H., of Pa., $30; M. & G. of S. C., $1,000; A. F., of Mass., $30; L. L., of Mass., $30; T. E. W., of N. Y., $50; L. C., of Ct., $20; H. W., of Pa., $30; R. McC., of Pa., $50; G. H. R., of Ill., $12,50.

Specifications and drawings of inventions belonging to parties with the following initials, have been forwarded to the Patent Office since May 20:

G. W., of Ky.; A. W. J., of Del.; S. W. K., of Pa.

Back Numbers and Volumes.

In reply to many interrogatories as to what back numbers and volumes of the Scientific American can be furnished, we make the following statement:

Of Volumes 1, 2, and 3—none.
Of Volume 4, about 20 Nos., price 50 cts.
Of Volume 5, all, price, in sheets, $2; bound, $2,75.
Of Volume 6, all back Nos., at subscription price.

New Edition of the Patent Laws.

We have just issued another edition of the American Patent Laws, which was delayed until after the adjournment of the last Congress, on account of an expected modification in them. The pamphlet contains not only the laws but all information touching the rules and regulations of the Patent Office We shall continue to furnish them for 12 1-2 cts. per copy.

Patent Claims.

Persons desiring the claims of any invention which has been patented within fourteen years can obtain a copy by addressing a letter to this office; stating the name of the patentee, and enclosing one dollar as fee for copying.

Scientific Museum.

A New Substance Made From Cannel Coal.

By our cotemporaries, the London Patent Journal and the Mechanics' Magazine, we learn that Mr. James Young, of Manchester, England, has taken out a patent in England for a new discovery in the treatment of coal, which deserves great attention, and which we hope will attract the notice of our friends in Virginia and in the bituminous coal regions of our country. The improvement consists in a peculiar method of treating bituminous coal, and obtaining *parafine oil.* The best coal is the cannel, and clear bituminous, (parott). The principle of the discovery is to submit the coal to the lowest possible heat that will effect decomposition and produce the oil. The coal is broken into small egg sized pieces and placed in a common gas retort. This retort is connected with a worm tube passing into a cooler kept at 55° by means of cold water. The retort is gradually brought to a low red heat, which causes the crude oil containing the parafine to be formed, and to pass off volatilized into a condenser, from which it drops into a suitable receiving vessel. When the oil ceases to drop from the condenser, the operation of that part is terminated, and the coke may be withdrawn from the retort, and a new supply placed in it. A portion of permanent gas is made during the operation; it may pass away or be collected in an ometer. There are a number of impurities combined with the oil which is purified as follows:

The oil is submitted for sometime to the action of heat at 150°, and kept still for three or four hours to drive off some watery matters. It is then poured into an iron still, and distilled over at a low heat, the products passing into a condenser, from which it is removed to a lead vesel where it is subjected to the action of the oil of vitriol, 1 gallon of it, to five of the parafine. These are thoroughly stirred for half an hour, then poured off into another vessel, (leaving the sediment) and ten pounds of soda are added to neutralize the excess of acid. The mass is then left to stand for eight hours, and the clear is re-distilled. After re-distilling a large quantity of volatile fluid—a hydro carbon—is formed, which can only be separated by adding water and re-distilling and condensing the vapor, when the volatile fluid will be found floating on the top, when it may be poured off. It is a clear fluid, and burns finely in a lamp. The water may be driven off in the state of steam by boiling the parafine remaining behind. It is then drawn off into a leaden vessel the second time and acted upon as before described; only ½ of the acid however, is used. After this some lime mixed to a creamy consistence with water is added, and the whole stirred and left for eight hours, should it contain any sulphurous acids, more lime should be added, when it must stand a week, and the parafine oil then be poured off, leaving a sediment of an impure sulphate of lime. The parafine thus produced is laid upon cloth and the superfluous oil drains off leaving the crystalized parafine, when it is submitted to a pressure. This parafine is very valuable for lubricating purposes. Its whole purification can be accomplished by repeated baths of sulphurous acid and alkali as described. This is certainly a new process, and shows how our coal fields may be turned into oil &c. It is, however, too expensive to compete with our other oils at present prices.

Ice Mountain in Virginia.

Near Romoney, in Virginia, in the vicinity of North River, there is a mountain about 500 feet high, in which ice is to be found in all seasons of the year. It is surrounded with hills which rise about 300 feet higher; it is subject to the rays of the sun from 9 A. M. until evening.

The ice is imbedded in the rock, and in some of the crevices snow, friable and crystalline as when newly fallen, is often found even in the month of August. As might be expected, the waters flowing from the mountain are by seven degrees colder than those in the neighborhood.

The rocks are sandstone of a very porous nature and are very poor conductors of heat. One side of the mountain consists of a massive wall, many hundred feet in thickness, and heaped up against this, as an abutment, is a mass of rock containing several thousand cubic feet. As the mountain has a general direction from northeast to southwest, the talus heap containing the ice has a northwest exposure. The cavernous nature of this heap would admit the free entrance of atmospheric waters, which during winter would form ice in the interior of the mass. The ice thus situated would be protected from external heat by the surrounding rocks, as ice in a refrigerator is isolated and protected from the external temperature by the non-conducting sides of the refrigerator. The mountain is, in fact, a huge sandstone refrigerator, whose increased and usual effects, beyond those of the ordinary refrigerator, are due to the increased collection of poor conducting material which forms its sides.

For the Scientific American.

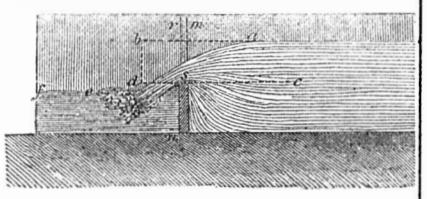
Hydraulics.

(Continued from page 288.)

The height of the fall is the perpendicular distance which the level of the surface of the water in the upper part of the fall, is above the level of the surface of the water in the tail-race or under part of the fall.

The quantity of water which runs over a fall in a minute may at any time be determined by the following method:—Search for a portion of the stream where its velocity is not great, and fix a thin board, *m n*, cut or notched out in the manner shown in figures 51 and 52, in a perpendicular position, and at right angles, across the stream, so that the whole of the water will flow through the notched part marked *r s* in these figures. After this is done, measure the perpendicular distance in inches between the horizontal edge at *s* of the notch, and the dotted line, *a b*, which latter

Fig. 51.



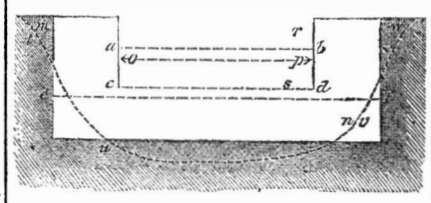
represents the level of the surface of the water above the board, and find a number the same as that of the inches, in column first of the following table; then, in the same line, but in the second column of the table, you will find a number which, if it is multiplied by, *o p*, the width of the notch in inches, will give the quantity of water in cubic feet per minute running along the stream. The perpendicular distance betwixt the edge of the notch at *s*, and the line, *a b*, is represented by *b d*, the dotted line, *c d*, in fig. 51 being on a level with the edge of the notch at *s*, and the line, *c d*, in fig. 52 shows this edge of the notch.

Depth of the upper edge of the waste board below the surface in inches.	Cubic feet of water discharged in a minute by every inch of the waste-board, according to Du Buat's formula.
1	0.403
2	1·140
3	2·095
4	3·225
5	4.507
6	5·925
7	7·466
8	9·122
9	10·884
10	12·748
11	14·707
12	16·758
13	18·895
14	21·117
15	23·419
16	25·800
17	28·258
18	30·786

Let *b d*, the depth, be 10 inches, and *o p*, the breadth of the notch, 47 inches, then opposite 10, in column first of the table, is 12·748 in the second column, and this latter number multiplied by 47 gives 599·156; therefore, 599·156 cubic feet per minute is the quantity of water running past the fall.

A weir is somewhat different from a notch. A weir is a wall built generally of solid masonry running at right angles to the direction of the stream from one side to the other, with a parallel plank fixed on edge along the top of the building, which is horizontal the whole way across. The plank is called the waste-board, and the water flows over it as it does

Fig. 52.



over the level edge of the notch at *s* in figs. 51 and 52. A notch is, as will be already understood, a rectangular opening reaching to the top, and in the centre of the length of a board which is fixed on edge at right angles across the stream, in such a manner that the whole of the water will flow through the opening. The above table was calculated for weirs, and not for notches. Now, a weir will in most cases discharge a greater quantity of water in a given time than a notch, the pressure of water being the same, and the width the same in both, as there is no contraction of the stream at the ends of the former. However, the second column of the table agrees remarkably with the experiments of Smeaton on notches, when the width *o p* is equal to twice the depth that the edge at *s* is below *a b*, and the third column of the table agrees with the same experiments, when *o p*, the width, is twelve times as great as *b d*, the depth: therefore the most accurate results will be obtained from the second column of the table when *b d* is one-half of *o p*.

To Make Copying or Transfer Paper.

A correspondent sends us a letter enclosing some black copying paper, used for "Manifold Writers," and wishes to be informed how *it* is made, also the various colored kinds for copying and transferring leaves, &c. We have never made any of the paper, but we have no doubt from an examination of the sample sent us, it can be made very easily as follows:—Take and melt some clean fresh butter in a clean glazed ware vessel, dip the paper in it, take it out, let it drip for a few minutes, and then rub it well on both sides with black lead. To make it perfectly jet in the color, it is necessary to rub some fine lamp black over it after the black lead, and then hang up the paper on cords around the room to dry. It will never dry perfectly, but will do so, to answer quite well for the purpose intended. Red transfer paper can be made the same way, only use red lead for the coloring matter. Green and blue may be made the same way, by using any of the green paint powders for the one, and Prussian blue for the other.

Good Summer Bread.

It is a very common custom, during warm weather, to dispense with yeast and *raise* domestic bread by the short process of saleratus. About two years ago, a little sulphuric acid and saleratus was stated to make superior bread to that produced by yeast. We believed, from the many representations which had been made to us, that this was really true, but a number of fair experiments have convinced us of its utter incorrectness. No good bread can be produced unless it goes (the whole of the dough) through the process of fermentation. Properly fermented bread has a sweetness of taste, which all the short process bread lacks. The act of fermentation generates what is termed grape sugar in the bread, whereas the acid and alkali, (sulphuric acid, or cream of tartar and saleratus), when they combine together, form a bitter salt by their combination The carbonic acid that makes the bread light is generated, but the salt, without the sugar, is left.

Coal of Pennsylvania.

It is estimated that there will be 3,700,000 tons of anthracite coal sent to market this year, which along with the bituminious coal will show a valuation of $17,800,000. The product of Pennsylvania coal has been doubled about every seven years.

Petition for an Extension of Patent.

United States Patent Office, May 6th, 1851. —Administrator &c., of Edgar M. Titcomb, deceased, formerly of Andover, Mass., on the petition of Charles H. Titcomb, of Lowell, Mass., praying for the extension of a patent granted to said Edgar M. Titcomb, for an improvement in machine for spinning woolen roving, for seven years from the expiration of said patent, which takes place on the 29th day of July, 1851. It is ordered that the said petition be heard at the Patent Office on Monday the 21st day of July next, at 12 M., and all persons are notified to appear and show cause, if any they have, why said petition ought not to be granted. Persons opposing the extension are required to file in the Patent Office their objections, specifically set forth in writing, at least 20 days before the day of hearing; all testimony filed by either party to be used at the said hearing must be taken and transmitted in accordance with the rules of the office, which will be furnished on application. Thos. Ewbank, Commissioner of Patents.

Literary Notices.

Hugh Miller's First Impressions of England. —This is a re-publication of an excellent work, by Gould & Lincoln, of Boston, a firm distinguished by the excellency of the books which they publish. The author of this book was once a workingman—a worker in a stone quarry, but is now the Editor of the "Witness," one of the most respectable religious papers in Scotland. and he is the author of some of the best works on Geology ever published. He states that in the pursuit of health he took a journey into England to see the working people and study their manners, morals, and qualities. His observations are distinguished for shrewdness, and comparative qualities of the highest order. Those who desire to obtain a good knowledge of many things not treated of in any other work in the world, about the difference in the religions, manners, and customs of the Scotch and English, should read this book. There are some very strange and striking points in it. It is no common-place book.

We have received from Messrs. Dewitt & Davenport the June numbers of Graham's and Sartain's Magazines. They are both finely embellished with steel and wood engravings executed in the highest style of the art, and embrace a great variety of choice literature from our most prominent authors. Terms of each $3 per annum. This number closes the Volume.

Book of the Telegraph.—This is the title of a very well written and useful little work, by Mr. D. Davis, of Boston, and sold by Dewitt & Davenport of this city; it gives a brief but very able history of the Electric Telegraph, and explains with diagrams the various kinds in use in this and other countries.