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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.**

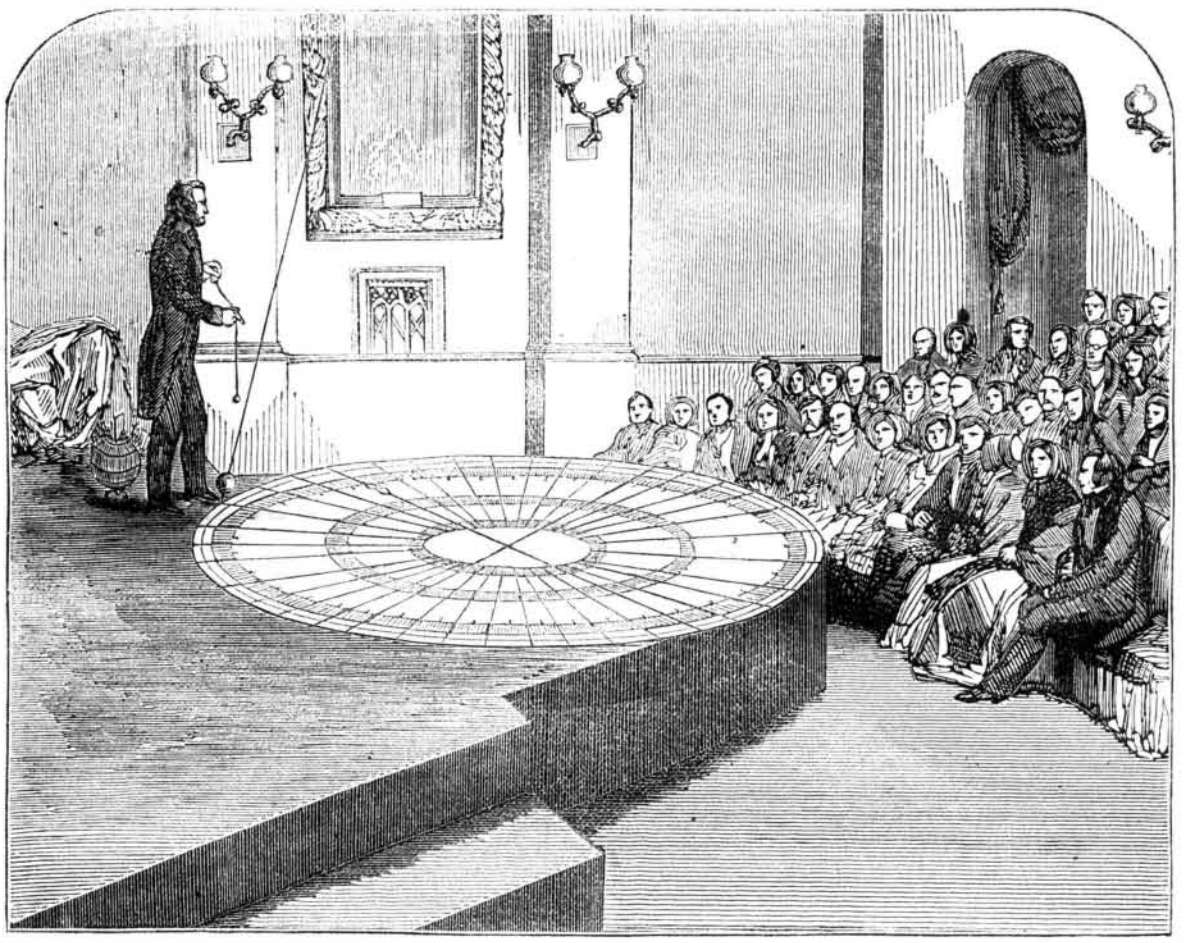
The Erie Road is the longest in the world—467 miles. That between Moscow and St. Petersburg, in Russia, is next in length, being 420 miles. The Russian government is about beginning a road from Warsaw to St. Petersburg, a distance of more than 700 miles, of which T. S. Brown, late of the Erie road, will 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 co-laborers, 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.

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|---|---|
| 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.