## A NEW AERIAL SHIP.

PREPARATIONS FOR A TRANS-ATLANTIC VOYAGE—THE AIR-SHIP "CITY OF NEW YORK."

[From the New York Daily Times.]

An experiment in scientific ballooning, greater than has yet been undertaken, is about to be tried in this city. The project of crossing the Atlantic ocean with an air-ship, long talked of but never accomplished, has taken a shape so definite that the apparatus is already prepared, and the aeronaut ready to undertake his task. Whether successful or not, the enterprise merits mention from its magnitude, and the energy and fertility of resource displayed in its prosecution.

The work has been conducted quietly, in the immediate vicinity of New York, since the opening of spring. The new air-ship, which has been christened the *City of New York*, is so nearly completed that but few essentials of detail are wanting to enable the projectors to bring it visibly before the public.

The aeronaut in charge is T. S. C. Lowe, a New Hampshire man, who has made 36 balloon ascensions. His last public appearance was at Portland, during this year's celebration of the Fourth of July. Since that time he has given his undivided attention to the perfection of the air-ship designed for his trans-atlantic voyage, and has devised various improvements in its construction, by which he claims to have overcome the more serious impediments to aerial navigation.

The dimensions of the *City of New York* so far exceed those of any balloon previously constructed that the bare fact of its existence is notable. The spot where its huge envelop is now undergoing the final process of oiling is an open piece of grass-land, four or five miles dist nt from the city. The profane have not yet been admitted to the knowledge of the mystery which surrounds the mighty heap of cloth and cord, and the jealous eye of a faithful watchman has kept at bay the inquisitive stranger. As remarkable events are prepared most carefully in the dark, so Mr. Lowe has reserved the surprise of this biggest of balloons until the last moment, when the immensity of its measurements can be palpably distinguished. Briefly, for so large a subject, the following are the dimensions:—

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| Greatest diameter, feet.................. | 130 |
| Transverse diameter...................... | 104 |
| Hight, from valve to boat............... | 350 |
| Weight, with outfit, tuns................ | 3½ |
| Lifting power (aggregate), tuns......... | 22½ |
| Capacity of gas-envelop, cubic feet.... | 725,000 |

The *City of New York*, therefore, is nearly five times larger than the largest balloon ever before built. Its form is that of the usual perpendicular gas-receiver, with basket and life-boat attached. The introduction of valuable improvements, however, leads to the conviction that its general arrangement is greatly superior. Mechanical power is to be applied; the aeronautic party will keep the cold away from their marrow by the use of a lime stove; a new arrangement of revolving fans has been devised; and the material of which the envelop is composed is covered with a peculiar varnish, the invention of Mr. Lowe.

Six thousand yards of twilled cloth have been used in the construction of the envelope. Reduced to feet, the actual measurement of this material is 54,000 feet, or nearly 11 miles. Seventeen of Wheeler & Wilson's sewing-machines have been employed to connect the pieces, and the upper extremity of the envelop, intended to receive the gas-valve, is of triple thickness, strengthened with heavy brown linen, and sewed in triple seams. The pressure being greatest at this point, extraordinary power of resistance is requisite. It is asserted that 100 women, sewing constantly for two years, could not have accomplished this work, which measures by miles. The material is stout, and the stitching stouter.

The varnish applied to this envelope is a composition, the secret of which rests with Mr. Lowe. Three or four coatings are applied, in order to prevent leakage of the gas. Mr. Lowe is daily engaged in the personal superintendence of the process of manufacture. We found him yesterday hard at work in an open field, assiduously testing the progress of certain gallons of a villainously-smelling compound, which boiled furiously at a temperature of 600°.

The netting which surrounds the envelop is a stout cord, manufactured from flax expressly for the purpose. Its aggregate strength is equal to a resistance of 160 tuns; each cord being capable of sustaining a weight of 400 or 500 pounds.

The basket, which is to be suspended immediately below the balloon, is made of rattan, is 20 feet in circumference, and four feet deep. Its form is circular, and it is surrounded by canvas. This car will carry the aeronauts. It is warmed by a lime stove, an invention of O. A. Gager, by whom it was presented to Mr. Lowe. A lime stove is a new feature in air-voyages. It is claimed that it will furnish heat without fire, and is intended for a warming apparatus only. The stove is one and a half feet high and two feet square. Mr. Lowe states that he is so well convinced of the utility of this contrivance that he conceives it to be possible to ascend to a region where water will freeze, and yet keep himself from freezing. This is to be tested.

Dropping below the basket is a metallic life-boat, in which is placed an Ericsson engine. Capt. Ericsson's invention is therefore to be tried in mid-air. Its particular purpose is the control of a propeller, rigged upon the principle of the screw, by which it is proposed to obtain a regulating power. The application of the mechanical power is ingeniously devised. The propeller is fixed in the bow of the life-boat, projecting at an angle of about 45 degrees. From a wheel at the extremity, twenty fans radiate. Each of these fans is five feet in length, widening gradually from the point of contact with the screw to the extremity, where the width of each is 1½ feet. Mr. Lowe claims that by the application of these mechanical contrivances, his air-ship can be readily raised or lowered, to seek different currents of air; that they will give him ample steerage-way, and they will prevent the rotary motion of the machine. In applying the principle of the fan, he does not claim any new discovery, but simply a practical development of the theory advanced by other aeronauts, and partially reduced to practice by Charles Greene, the celebrated English aeronaut. Mr. Lowe contends that the application of machinery to aerial navigation has been long enough a mere theory. He proposes to reduce the theory to practice, and see what will come of it. It is estimated that the raising and lowering power of the machinery will be equal to a weight of 300 pounds; the fans being so adjusted as to admit of very rapid motion upward or downward. As the loss of three or four pounds only is sufficient to enable a balloon to rise rapidly, and as the escape of a very small portion of the gas suffices to reduce its attitude, Mr. Lowe regards this systematic regulator quite sufficient to enable him to control his movements, and to keep at any altitude he desires. It is his intention to ascend to a hight of three or four miles at the start, but this altitude will not be permanently sustained. He prefers, he says, to keep within a respectable distance of mundane things, where he "can see folks." It is to be hoped his machinery will perform all that he anticipates from it. It is a novel affair through out, and a variety of new applications remain to be tested. Mr. Lowe, expressing the utmost confidence in all the appointments of his apparatus, assured us that he would certainly go; and, as certainly, would go into the ocean or deliver a copy of Monday's *Times* in London on the following Wednesday. He proposes to effect a landing in England or France, and will take a course north of east. A due easterly course would land him in Spain; but to that course he objects. He hopes to make the trip from this city to London in 48 hours; certainly in 64 hours. He scouts the idea of danger, goes about his preparations deliberately, and promises himself a good time. As the upper currents, setting due east, will not permit his return by the same route, he proposes to pack up the *City of New York* and return home.

The air-ship will carry weight. Its cubical contents of 725,000 feet of gas suffices to lift a weight of 22½ tuns. With outfit complete its own weight will be 3½ tuns. With this weight 19 tuns of lifting-power remain, and there is accordingly room for as many passengers as will care to take the venture. We understand, however, that the company is limited to eight or ten. Mr. Lowe provides sand for ballast, regards his chances of salvation as exceedingly favorable, places implicit faith in the strength of his netting, the power of his machinery, and the buoyancy of his life-boat, and altogether considers himself secure from the hazard of disaster. If he accomplish his voyage in safety, he will have done more than any air-navigator has yet ventured to undertake. If he fail, the enterprise sinks the snug sum of $20,000. Wealthy men, who are his backers, sharing his own enthusiasm, declare failure impossible, and invite a patient public to wait and see.

The precise time for the ascension has not been fixed. The ship is so near completion that the event will not probably be delayed beyond three or four weeks. Proper notice of the time and place will be given.

## PRESERVING RAILROAD TIMBER.

Our attention has been directed to this very important question by a pamphlet sent to us by its author, Mr. F. Hewson, C. E. It is stated in this pamphlet that the renewal of the timbers of bridges and other superstructures of railroad tracks, is the most expensive item of repairs. The life of a "sill" seldom extends beyond eight years, and the rate of annual depreciation on bridges and other structures equally exposed to atmospheric influences, amounts to 12½ per cent. Upon 25,000 miles of railroad track in the United States, it is estimated that 3,125 miles of timber superstructure are renewed annually at an expense of no less than $3,500,000. The great question is, can this rapid depreciation be prevented by so treating railroad timbers that they will acquire the property of greater durability, and thus effect a great saving, not only in the cost of timber, but for the labor necessarily involved in removing the decayed, and putting in the new materials? The chief obstacle to the attainment of such a result is stated in Mr. Hewson's pamphlet to be the great outlay required in the outset, for the apparatus which is usually employed for such purposes. Thus in practicing the processes for treating timber, at Lowell, Mass., as described on page 93, Vol. XII, Scientific American, it is stated to be so inconvenient for railroads as to preclude its use. The apparatus for this process consists of a large iron tank, like a steam boiler, in which the timber to be impregnated is placed, the air exhausted by a pump, and the preservative solution then forced in under pressure. In the Kyanizing, Burnetizing, and Bethelizing processes, (so-called) similar apparatus may be employed; the above names are merely derived from those of the persons who patented certain solutions for treating the timber. Thus, Mr. Kyan used corrosive sublimate; Sir Wm. Burnet, chloride of zinc; and Mr. Bethel, pyrolignite of iron. Railroad timbers impregnated with any of these substances are used on most of the railroads in England, with very satisfactory results.

The laudable object of Mr. Hewson's pamphlet is to bring to the notice of railroad companies a very simple, inexpensive and convenient method of treating their timbers with antiseptic substances. It consists in placing them (railroad sill, for example) with their butt ends down in an open rectangular wooden tank, then filling it up to the top with a solution of the pyrolignite of iron. For sills seven feet long, a column of liquor of this depth expels the sap of the wood, and the preserving solution takes its place. A tank for treating 100 sills costs only $70, and it weighs but two tuns. It can therefore be easily transported from one station to another on a railway, whereas another expensive apparatus is fixed, and all the timber has to be taken to one locality for treatment. A number of experiments conducted in this manner have given satisfactory results. By immersing white, red, rock, and black oak, and chestnut and hemlock sills, for seven days, in a solution of one part of pyrolignite of iron to one of water, the average gain of the six specimens was 3·3 lbs. per cubic foot. Some specimens absorb their solutions more slowly than others, chestnut and hemlock require much longer steeping than oak. Some kinds of timber also absorb different substances in variable proportions. Thus while a stick of white oak gained 6·8 per cent in weight while steeped in a solution of chloride of zinc, 7·9 per cent in a liquid of blue vitriol, and 10·7 in pyrolignite of iron, a hemlock stick gained 9·7 in the chloride of zinc, 10·1 in the blue vitriol, and 7·6 in the pyrolignite solution. Heavy timbers, for bridges, were also treated in this manner, in a tank 27 feet deep, sunk in the ground, a hoisting crane being used to put in and take out the sticks. Timber freshly cut absorbed the solution readily, the sap being pressed out by the column of the pyrolignite. The process of Mr. Boucherie, illustrated on page 336, Vol. XII, Scientific American, is also illustrated in this pamphlet and favorably noticed, but it is principally designed for treating newly-felled trees in the forest, and is not so convenient for railroad purposes.

The expense of impregnating railroad timbers by the method advocated by Mr. Hewson is quite small, but it is not claimed for it that the timber is superior to that treated by other methods. As it has been practically demonstrated that timbers charged with the antiseptic substances described, have had their durability increased to double the number of years of similar timbers in an unprepared condition, this question is one which deserves the earnest attention of all persons connected with railroads. The great reason why so many of our railroads have proved failures, so far as payment of dividends on the original stock is concerned, is owing to the vast amount involved in wear and tear of the materials, and for paying the working-expenses. One great item of expense is the rapidly-decaying timbers; therefore every dollar saved in this department by treating them as described above, will tend to advance the interests and increase the prosperity of the railroads.

## OUR RAILROADS.

The progress and condition of our railroads forms an instructive chapter in *Stow's Capitalists' Guide and Railway Annual.* It would appear that in nine years, or from 1850 to 1859, the railroads of the United States increased from 7,355 to 27,944 miles in length. In this period the increase in the New England States amounted to 62.74 per cent, while in the eight of the western States the increase was 2,201.41 per cent. At the same time the former gained in population 16.12 per cent, and the latter 46.22. The total cost of the roads, up to 1859, amounted to $365,451,070, of which large sum it is supposed one-third had been wasted in construction; yet by their influence, lands have been advanced in value and the speed of internal communication greatly augmented, and the whole country benefited. There are at this time 28,000 miles of finished roads in the United States, and about 16,000 miles either under construction or projected, requiring $400,000,000 for their completion. It is estimated, however, that many years must elapse before sufficient capital can be diverted from other objects to carry them through. In the meantime, many projected in a spirit of rivalry to other roads will be abandoned. It is calculated that 20,000 miles of railroad are sufficient to do all the business of the country at the present time, and that 8,000 miles have been constructed, in part, in rivalry to other roads, which have proved a dead loss to stockholders, and in the main will pass into the hands of the bondholders. The average cost of railways per mile has been $36,328. In the middle States, $40,919; in the southern States, $22,906; and in the western States, $36,333.

The reason assigned for the cheapness of construction of railroads at the south is that they were built on the cash plan. Among the net earnings, the Panama shows the largest returns, being $29,564 per mile; and those earning the least, or nothing to stockholders, were found in Maine, Vermont, Mississippi, Missouri, Iowa, Illinois, New York, &c. The list of dividend-paying roads comprises 78; among which, two pay annual dividends of 12 per cent; nine, 10 per cent; two, 9 per cent; ten, 8 per cent; six, 7 per cent; thirty, 6 per cent; five, 5 per cent; one, 4 per cent; one, 2½ per cent; and one, 2 per cent. The list of delinquent companies on stock or bonds amounts to 33. The total bonded debts of the American railroads, all of which mature between 1859 and 1874, amount to $411,199,702.

## STEAM-ENGINES FOR CITY RAILROADS.

We learn by the Philadelphia *Ledger* that the directors of one of the railroads in that city are now making arrangements for running their cars with a steam-engine. For this purpose one of four horse-power is being built by A. L. Archambault, and is nearly ready. It will be 10 feet long, 4 feet 8 inches wide and weigh about 2 tuns. It is intended to drive the truck of the engine by a belt passing round the pulley on the engine-shaft, thence around another on the hind axle of the truck. It is purposed to throw the wheels in and out of gear with the engine by a shipper, so that, when the signal is given to stop, the belt may be thrown off and the engine still kept in motion, and *vice versa.* At present we do not see the advantages of this roundabout arrangement, but probably it may have merits which have been carefully studied out by its projector. The railroad company are having a handsome car made to run with this engine, and its practicability will be fully tested.

## MAGNETISM ON RAILROADS.

Messrs. Editors.—In your valuable paper of the 3d inst. (page 153, present volume of the Scientific American) you kindly noticed my efforts to introduce a substantial improvement in our railroad economy, for which accept my acknowledgements. You made one remark however, which it is perhaps well to refer to. You say: "The increased adhesion of a magnetized locomotive wheel is caused by inducing polarity in the rail, and it must take as much power to break the magnetic contact between the wheel and the rail as that which induced their mutual attraction. According to this view, whatever is gained by increased adhesion is at the expense of steam-power."

You are perfectly right in this, that whatever adhesive force exists must take a corresponding power to neutralize it. But as this is produced by chemical decomposition in the battery, it is not at the expense of the steam power of the engine. Again, whatever increase of adhesion there may be, it is concentrated at the point of contact between the wheel and rail by the curved form of the helices, and there operates continuously, and the contact has not to be made and broken as you evidently suppose, and therefore the forces are balanced exactly; although it requires much more force to lift or to *slip* the wheel when magnetized than when it is not, it requires no more to *roll* it in one case than the other, which has been determined on a four and a half-feet diameter wheel, the rationale of which you will readily see. A weight of 20 pounds at either end of a scale-beam may be vibrated as easily as 10 pounds similarly placed, if the fulcrum is not crushed, excepting the power necessary to overcome the inertia, and as the magnetic attraction is equally in front and behind, the point of greatest magnetic effect, which coincides with the point of contact between the wheel and rail, and as their is no appreciable inertia or vis-inertia in magnetism, it follows that the wheel will roll as easily when magnetized as when it is not, provided the point of maximum magnetic effect is continued at that point where the wheel and rail touch, whether at rest or in motion, which is the case with the arrangement of mechanism under discussion. The whole idea is concisely comprised in this: magnetic teeth to the wheel, and cogs to the rail.

Edward W. Serrell.

Greenfield, Mass., Sept. 5, 1859.

The following is another letter on this subject:—

Messrs. Editors:—I have been much edified by reading your able article in the edition of September 3d, on the subject of magnetizing the driving-wheels of locomotives; but I have ventured to address you again (as briefly as possible) as I believe you have overlooked the point upon which the value of the application of that power depends, both as regards my theory, and the results of Mr. Serrell's experiments, which latter go to show a gain of 75 per cent in tractive powers by the employment of an imponderable agent. An engine weighing 20 tuns, with the wheels magnetized will draw as much freight with the same amount of steam, as an engine weighing 35 tuns, can draw without magnetism; in other words, we obtain 15 tuns adhesion, by using an influence weighing nothing, and, it must appear obvious, that, if the depreciation of railroad structure be $26,000,000 annually, and caused principally by the use of heavy locomotives, a reduction of 75 per cent in their weight, without detracting from their efficiency or increasing their running expenses, must necessarily diminish this $26,000,000 in the same proportion. In my former letter, I stated it was my belief, that the slop and mess of coils and batteries could be dispensed with, by a peculiar construction of the driving wheels, rendering them powerful permanent magnets.

O. H. Needham, M.D.

New York, September 7, 1859.

[In our article referred to, we gave some reasons why the economy of magnetized wheels may not be so great as has been estimated; we want more experiments to test them under different conditions of speed, load carried, the expenditure for fuel, &c. The steel tires of driving wheels may be so contructed as to be made into permanent magnets, but we could not expect any benefit from their use; nevertheless we go for testing all these things by experiments.—Eds.

## LEVER POWER IN PLACE OF STEAM OR WATER.

"Mr. E. Harris, of Princeton, in this State, who is one of the most ingenious and successful inventors in the West, has recently obtained a patent for a new contrivance for the propulsion of machinery, which, if successful, is destined to supercede steam or water power. It is lever power, operated by means of a heavy, swinging weight, attached to a pendulum that is fastened above to each end of a horizontal iron beam resting on a cylinder, which, by means of cog-wheel 'dogs,' operates a great overshot wheel that connects with and operates the general machinery. This is the entire arrangement, simple and apparently effective. Mr. Harris has his invention only in model form as yet, but designs to apply it practically as soon as possible. He feels confident of its practicability, and we see no difficulty in the way. The invention will be of the utmost importance if successfully put into practice, inasmuch as it can be as easily applied to steamboats, railroad cars, and common carriages as to saw-mills or any other kind of mills or machinery. We shall expect to hear of its entire success."

The *Wisconsin Cultivator* copies this from an "exchange," name not given. The writer of the extract is evidently not acquainted with mechanics. Levers are mere mechanical devices for applying steam, water, and animal power; they possess no vital energy for moving machinery, because they are machines themselves. It would just be as sensible to say, Mr. Harris has invented a machine to drive a machine, as to say this is "a new contrivance for the propulsion of machinery." For want of a very little accurate knowledge of mechanics, many men have spent years in contriving useless machines for affecting an impossible result, namely, gaining power by levers.

Molding Paraffine Candles.—If paraffine is run into molds and heated in the usual way for making candles like those of wax, it becomes cloudy, mottled on the surface and full of cracks and indentations. An improved method of rendering paraffine candles smooth on the surface and semi-pellucid in appearance, was patented by Horatio Leonard, on the 8th of February last. The invention consists in first heating the molds to 212° Fah., then pouring in melted paraffine at this temperature into them, then dipping them into cold water at about 34° in which they are kept for seven minutes. After this they are placed in a chamber containing cool air (varying from 32° to 40°) until they are quite cold, when they are removed in the usual way from the molds, which are of the trip-matrix kind. It is when the paraffine is passing from the liquid to the solid state, that it is liable to become cloudy and full of fissures. The cooling of it quickly in the mold by cold water prevents the cracks and indentations being formed on the surface, and the cooling of it gradually afterwards in the air-chamber renders the candle beautiful and clear in appearance, free from cracks and mottled blemishes. The inventor resides at New Bedford, Mass.

To Examine a Deep Tank or a Well.—It is scarcely possible to see the bottom of a well by looking down in the common manner, but it is perfectly practical to do so with a reflector. When the sun is shining brightly, hold a mirror so that the reflected rays of light will fall into the water. A bright spot will be seen at the bottom, so light as to show the smallest object very plainly. In the same way one can examine the bottom of ponds and rivers, if the water be somewhat clear, and not agitated by winds or rapid motion. If a well or cistern be under cover, or shaded by buildings, so that the sunlight will not fall near the opening, it is only necessary to employ two mirrors, using one to reflect the light to the opening and another to send it down perpendicularly into the water. Light may be thrown fifty or a hundred yards to the precise spot desired, and then reflected downwards.

Oiling Harness Leather.—Oils, when applied to dry leather, invariably injure it, and if to leather containing too much water, the oil cannot enter. Wet the harness over night, cover it with a blanket, and in the morning it will be damp and supple; then apply neats-foot oil in small quantities, and with so much elbow grease as will insure its disseminating itself throughout the leather. A soft pliant harness is easy to handle, and lasts longer than a neglected one. Never use vegetable oils on leather, and among the animal oils, neats-foot is the best.