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NEW YORK, SATURDAY, DECEMBER 24, 1887.

The next issue closes another volume, and if those subscribers to this paper—and there are several thousand of them—whose term ends with the year will remit for a continuance of the paper before the year closes, it will save the removal of a large number of names from our subscription list, and insure the continuance of the paper without interruption. By so doing the subscriber will be benefited and our subscription clerks greatly relieved.

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SCIENTIFIC AMERICAN SUPPLEMENT

No. 625.

For the Week Ending December 24, 1887.

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THE EADS SHIP RAILROAD.

We elsewhere illustrate and give the description of a recent achievement in the land transportation of war vessels. At the present time it is an event of some importance. The French nation, characterized by its enterprise in engineering and scientific fields, has executed an interesting feat. A torpedo boat was to be taken from Toulon to Cherbourg. Such vessels have proved anything but comfortable, or even safe, sea boats. Strength, seaworthiness, and accommodation, all are put aside in their construction in order to attain the highest speed. The land route, therefore, was tried, and the trial was a complete success. Without the least damage, the transportation was accomplished. The delicate sides, less than an eighth of an inch in thickness, were uninjured. The vessel rested on a simple cradle, and was taken on the regular railroad. We cite this experiment as of special interest at the present time. Less than a year ago we were called upon to note the death of James Buchanan Eads. Independent of the personal sorrow that this event occasioned, a sincere feeling of regret found origin in the fact that he had died without witnessing the successful accomplishment of his greatest project—the Tehuantepec ship railroad. By his resistless energy, which had overcome so many obstacles, natural and personal, that stood in the way of his other achievements, he had brought the work well forward. The engineering details had all been fully executed. The company had been formed, and the route selected. All that he waited for was the congressional action necessary for his enterprise, which is of international character. He died before Congress took the desired cognizance of his great plan.

All is as he left it. A new Congress has assembled. The Tehuantepec Ship Railroad Company is now in the field, ready to undertake the enterprise and still awaiting the action of the legislature. From every point of view the United States should encourage the promoters.

The plan is eminently practical. The use of marine railways for hauling vessels out of the water for repairs is old. Thousands of steamers and craft of every description are thus treated every year. Among them are the weakest kind of structures. River steamers, with their longitudinal trussing or hog-frames, ready to receive every strain, and show its effects, ascend the inclined road without injury. The devices used for cradling them are of the crudest description. No attempt is made to adopt any such improved system as that applied in the Eads plan. Thus, in the harbor of New York the daily proof of its practicability may be seen by all. For if it is possible to haul ships, with imperfect appliances, up an inclined railroad three hundred yards in length, *a fortiori* it must be easier to draw them upon a special railroad, carrying a perfected cradle, supporting the ship at every point.

The transportation of the French vessel proves it most forcibly. Here a large torpedo boat was carried on a simple cradle on ordinary railroads many miles through France. It crossed other roads and went around curves without trouble and sometimes at the rate of twenty-five miles an hour. No condition was in its favor. The vessel was of the most fragile character, and was barely seaworthy. The journey was nevertheless performed without incident, and a distance of about eight hundred and fifty miles was covered. Compared with this distance, the Tehuantepec route, about one hundred and fifty miles, seems short.

It is now considered that this method can be used for torpedo boats. The establishment of the fact, however, goes for much more than this. It proves the sound judgment of the best American and English engineers. By such the Eads railroad has been critically examined and discussed. Their opinions have been given emphatically in its favor.

A ship at sea is exposed to far more severe strains than she would ever meet on the railroad. A wave running lengthwise carries with it an upward strain of many tons, followed and preceded by downward strains of equal or greater extent. As a ship pitches and rolls, the most complicated and severe stresses are applied to her plating and frames. Longitudinal and torsional strains, the latter aggravated by her masts and ballast and general dead weight, are continually at work upon her structure. Yet all is withstood. A ship is built upon the lines of the most advantageous distribution of material. The hollow hull, with its curving contour, represents the perfection of the tubular structure. When iron ships were first proposed, one of their prominent advocates said that a properly built iron vessel could be held suspended by her bow and stem without serious flexure and without injury.

It is not too much to say that, substantially, this very thing has been done in the tubular bridges. In them a relatively light iron tube is held by its ends with its center quite unsupported. Not only does this suffice to carry its own weight, but it constitutes one of the stiffest and strongest bridges known for railroad traffic.

In situation the ship railroad has everything in its favor. It is several hundreds of miles nearer the United States than the canal routes. Its completion by an American company will place one favorite method of isthmus transit in the hands of Americans. It will compete with the canal, or canals, when they are completed. If started now, it will be finished long before either of them, and will be in successful operation, carrying ships through the semi-tropical forests, while the dredges and excavators are wearily removing countless tons of earth from the projected canal routes.

The sanction of Congress is asked, and should not be withheld. The apparent boldness of the project, coupled with its national origin, should recommend it to the legislature.

A committee of the Senate has reported in its favor. The distinguished engineer who conceived the project has left it complete and worked up to the last detail. To the fiftieth Congress is left the honor of erecting a suitable monument to the greatest engineer of his day. The Tehuantepec railroad will be his best memorial, and we cannot but believe that all desired congressional action will be freely taken.

In the transport of the French torpedo boat it is not too much to say that the far reaching influence of the American engineer is discernible. For it is highly probable that the project so successfully carried out had its original suggestion in Captain Eads' ship railroad.

A GREAT RAFT OF LUMBER.

A giant raft of timber is now expected at this port. It left Nova Scotia on December 8, in tow of the steamship Miranda. The launch took place near Port Joggis, on an inlet of the Bay of Fundy.

The leading features of its construction, which form the subject of a patent, are as follows. In general shape, it is a pointed cylindroid of elliptical section. It is composed of logs chained together, their attachment being re-enforced, and the structure consolidated by interwoven withes and small branches. Through the center a 2½ inch chain is carried, which is inclosed in a solid boxing. In total length, this chain is one thousand feet, leaving about four hundred feet free for anchoring or towing. The central cross section is an irregular ellipse, 65 feet wide and 39 feet deep. For four hundred feet of its central portions the sides are parallel; then they taper at bow and stern to a section 25 feet wide. This is the extent of the pointing. The total length is 585 feet. It was put together in a substantial cradle that was built in permanent shape, as it is proposed to build in it other rafts. The logs were laid longitudinally, and after each course was in place, branches and withes were laid across them, and their free ends were turned in over the next course. Every seven feet marks the point of attachment of two lateral chains that run out horizontally through the mass of logs. These connect with other chains that surround the whole mass. The latter are tightened by hydraulic jacks. The central chain, upon which the pull comes in towing, tends to still further bind together the logs, as it draws upon the surrounding bindings. The chains weigh two hundred tons.

In the center around the central cable, the hard wood is stowed, while the softer and less valuable timber forms the outer layers. It contains 25,500 sticks of timber for spars and piling, and one half a million board feet of maple, beech, and birch.

The launch was executed with great success. The great structure as it ran down the ways occupied 32 seconds in going 1,600 feet. It is estimated to weigh 11,000 tons, or 2½ times as much the Great Eastern. The lumber it contains would fill seventy schooners. If the venture proves successful, it will tend to make quite a revolution in the lumber trade.

Mr. James D. Leary, of this city, is the owner of the raft, and is a firm believer in the capabilities of the system.

PATENT "INNOCENTS" AGAIN IN CONGRESS.

A lively discussion lately took place in the United States Senate, when the Hon. J. Z. George, of Mississippi, introduced his bill (S. 787) to protect "innocent purchasers," and asked that it be referred to the Judiciary Committee, instead of to the Patent Committee, where it properly belongs.

The following is the text of the bill:

"A bill to protect innocent purchasers of patented articles, and for other purposes (S. 787).

"Be it enacted, etc., That it shall be a valid defense to any action for an infringement of any patent, or any suit or proceeding to enjoin any person from the use of a patented article, that the defendant therein, or his assignor, purchased the patented article for use or consumption, and not for sale or exchange, in good faith and in the usual course of trade, without notice that the same was covered by a patent, or without notice that the seller had no right to sell such article; and in all such cases notice received after such purchase shall not have the effect to impair in any way the right of such purchaser as absolute owner.

"Sec. 2. That all patents for any discovery or invention hereafter granted by the United States shall be subject to purchase by Congress, for the use of the people of the United States, at such reasonable valuation, and on such terms, and in such mode, as may be provided for by law; and all such patents shall be consid-