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The editor is always glad to receive for examination illustrated articles on subjects of timely interest. If the photographs are *sharp*, the articles *short*, and the facts *authentic*, the contributions will receive special attention. Accepted articles will be paid for at regular space rates.

THE RAILROADS AND THE NEW EAST RIVER BRIDGE.

In a few months' time the East River Bridge will be completed and at the disposal of the traveling public, to meet whose pressing needs this great structure was projected. Like all our public works, it is years behind the time set for its completion, and, therefore, its long-delayed opening would, under ordinary circumstances, be doubly welcome. Unfortunately, however, the question of the utility of the bridge is ultimately dependent upon the co-operation of the street and surface railroads, both in Manhattan and Brooklyn, for whose accommodation the greater part of the space on the bridge has been reserved. No bridge with a floor space approaching that of the new East River Bridge has ever been built, and there is provision for four street railroad tracks and two elevated railroad tracks; this provision being made under the very natural expectation that long before the bridge was completed the various railroad companies would make application to the city for the right to use these tracks at a stated rental. Nothing of the kind, however, has occurred, and to-day the companies are as mute upon this question as though they were unaware that a new East River bridge had been even so much as suggested; or if the matter is mentioned, the railroad companies seem indisposed to make connections across the bridge except at a rental which is purely nominal, and an altogether inadequate return for the great advantages to be derived by the company from this means of interborough connection.

There is a growing conviction among the city officials and the general New York public that the railroads are purposely holding back in the expectation that the city, weary of waiting, and prompted by the urgency for improved communication, will allow the railroads to use the bridge for practically no rental whatever. In view of the large number of valuable franchises that have been practically given away during the past fifty years of the city's life, franchises which to-day should be yielding a princely revenue to the city itself, it goes without saying that a firm stand should be taken in the present case; and we think that the very successful manner in which the city operated its own railroad across the Brooklyn Bridge will fully justify it in laying its own tracks across the bridge and operating them by a system of electric cars run upon the shuttle or the loop system. In the case of the Brooklyn Bridge the city ran the bridge cable roads itself, and was able to show an annual profit on the operation. By laying four tracks across the bridge, the city would be able to put the bridge in full operation on the day on which it is open, and could to that extent be independent of any attempt on the part of the railroad companies to force its hand. It is true that the tracks that are all laid down Delancey Street belong to one of the transportation companies, but there is nothing to prevent the city from laying its own tracks parallel with these upon that portion of the street which is available when the widening of Delancey Street has been accomplished.

PAINTING BY THE ACRE.

Only those who are directly concerned in the operation of a line of steamships have any idea of the enormous total cost of operation of even a single ship, and of the extraordinary variety of the sources from which expense bills are made up. Of course, the main items of expense are perfectly familiar even to the person who takes but a languid interest in a steamship; we all know that the coal bill is a big one, and that on a great passenger steamer the single item of wages runs up to very large figures, while, of course, the bill for provisions and general stores is also a considerable item. Outside of these, however, there are other less-considered sources of expense, one of which, the painting of a ship, is very cleverly treated in an article which we publish in the current issue of the SUPPLEMENT, showing that this single item in the maintenance of the fleet of one corporation runs annually into hundreds of thousands of dollars. So great is the size of a modern transatlantic liner that the total area to be covered every time she is painted runs up into the acres. Thus we learn that to entirely paint the top sides of a big steamship from water line to rail calls for enough paint to cover about an acre of surface. About as much more is required to paint the upper works, while the big smokestacks call for over half an acre of paint, and in the case of the German steamships with four smokestacks, the total area must be nearer three-quarters of an acre. Since the great ships of the first-class companies are painted every voyage, the calculation shows that to keep the one hundred or so vessels of the International Mercantile Marine Company in first-class shape requires the painting of some 2,250 acres each year at a cost of between one-quarter and one-half million of dollars. A curious fact in this connection, which is a direct compliment to our climate on this side of the water, is that on account of the larger number of fine days on the eastern seaboard of the United States, the painting of the vessels is almost invariably done on this side of the water, even in cases where the headquarters of the company are in some English or Continental port.

RAILROAD TIES AND OUR FOREST SUPPLY.

The renewal of wooden railroad ties on the 200,000 miles of railroad track in the United States causes an enormous drain upon the forest resources of this country. The hardwood ties used in the Eastern States of a road with fairly heavy traffic have a life of only a few years, and the softwood fir ties used on the middle, western, and southern roads have a useful life lasting only half as long. When we remember that the average number of ties to each 30-foot rail is sixteen, it is easy to compute that the total number of ties on all the railroads is about 35,000,000, and that if the average life of the tie is five years, there must be needed for renewals about 7,000,000 ties yearly. The average size of the tie is about 6 inches in depth by 8 inches in breadth and 9 feet in length, and consequently in each tie there is about 36 linear feet of timber. Hence the total annual renewals throughout the United States must call for the delivery of over 250,000,000 feet of sawed or hewed timber. Allowing one-third for waste, there must be some 330,000,000 linear feet of timber cut annually from our forests to supply this one item of railroad ties.

In view of these facts particular interest attaches to the statement that the Great Northern Railroad has adopted in place of the ordinary 6x8 tie of rectangular cross section, a tie of triangular section with a face 12 inches in width and a depth to the apex of 7 inches; for in the first place it is evident that there will be a great economy of material in using a tie of a section so much smaller; and it will be seen that there is also an economy due to the use of a tie with a broader face, since a smaller number will be required to the rail. The ordinary 6 x 8 tie has a total cross-sectional area of 48 square inches, whereas the sectional area of the triangular tie is 42 square inches, which in itself means a saving of 4½ linear feet in each tie. One of the most important functions of the tie is to increase the ultimate bearing surface of the track system upon the ballasted roadbed, and, of course, the increase in the width of the tie from 8 to 12 inches means an increase of bearing surface of exactly 50 per cent. Consequently the number of ties per mile may be reduced over one-third without any loss of total bearing surface. Probably no such reduction as this will be made, for the reason that the transverse strength of the triangular tie is not equal to that of the square tie, and the transverse strength has, of course, to be considered. There is a further and incidental advantage in the triangular section, due to the fact that there is a wedging action of the tie when it is under load, tending to make it embed itself more securely in the ballast. In other words, it is to a certain extent self-tamping, adjusting itself in the ballast automatically, and saving a certain amount of oversight and labor on the part of the section gangs. It seems that the new type of tie has passed the experimental stage, since it has been in use in the terminal yards of the Great Northern Railway at St. Paul for several years past, where it is claimed that it has shown itself to be more effective under heavy service than the conventional type. If the same results are shown in main line service under fast and heavy traffic, this very simple expedient will prove to be one of the most radical and beneficial that has been introduced into American railroad practice for many years past.

THE NEW 13,000-TON BATTLESHIPS.

The plans of the two new 13,000-ton battleships, the "Idaho" and "Mississippi," recently authorized by Congress, which have been approved by the Secretary of the Navy, call for two very powerful but relatively slow vessels, the trial speed being placed at from 16½ to 17 knots. This is several knots slower than the battleship speed adopted for some of the newest warships building for other navies, a disparity of which we shall have something further to say later on. The sacrifice of speed has enabled the Naval Board of Construction to give these battleships armor and armament but slighlly inferior to that of the big 16,000-ton "Connecticut" and "Louisiana." They will carry four 12-inch guns, in turrets forward and aft; eight 8-inch guns in four turrets at the corners of the central battery, ten of the new 7-inch guns mounted in broadside within this battery, and twelve 3-inch, six 3-pounders, four 1-pounders, besides ten smaller guns. In order to carry this heavy armament other sacrifices besides those of speed had to be made. Thus the after military mast is dispensed with, and the freeboard aft is reduced by 8 feet, the outboard profile of the vessels corresponding very closely to that of the battleship "Maine." The side armor, moreover, is only 9 inches in thickness and the coal supply is limited. Of course, the adoption of these plans was not arrived at in the Naval Board on Construction without the usual controversy between the Bureau of Steam Engineering and the Bureaus of Ordnance and Construction. Admiral Melville has always been a strong advocate for high speed both in battleships and cruisers, and although this may be attributed in part to the natural desire of any particular Bureau in the Board on Construction to secure as large an allotment of displacement as possible, still we cannot but feel that, judged on the broader grounds of national expediency, it is a mistake in designing such powerful and costly ships to limit their efficiency by a return to the battleship speeds of ten or twelve years ago. We have no doubt that the compromise was considered to be the best possible under the limitations of cost imposed by Congress, and we suggest that the best way out of the difficulty would be for the next Congress to increase the appropriation for these two ships sufficiently to allow of an increase in displacement to admit of engines and boilers capable of giving them a speed of not less than 18 knots an hour. When the appropriation for these vessels was first made, it was proposed to make them conform in design to the "Maine" class so that they would form a part of a homogeneous fleet of five vessels. Now, however, they conform neither to the "Maine" class nor to the "Louisiana" and "Connecticut." By an increase of a knot in the speed, these ships could at once be brought closely up to the standard of the "Louisiana," and with the three 16,000-ton battleships "Minnesota," "Kansas," and "Vermont," contracts for which have just been let, they would form a splendid fleet of seven battleships of practically similar speed and power.

"SHAMROCK III." IN DRYDOCK.

When the underbody of "Shamrock III." was revealed in drydock at the Erie Basin, it was evident that she corresponded very closely with the description furnished by our Glasgow correspondent at the time of her launch. Of course, the view then had of the yacht was obscured considerably by the double pontoons in which she was launched, and it was not until one had an opportunity to look her over in drydock that a just appreciation of the undeniable beauty of the boat could be had.

"Shamrock III." is a marked departure, in some respects, from any challenger that has been sent over from the other side for many years past. We have to go back to "Valkyrie II." to find a midship section that bears any similarity to the easy bilges and full garboards that distinguish "Shamrock III." so sharply from any of her immediate predecessors, and in this respect she is the most "wholesome" yacht of any of the existing challengers and defenders of the 90-foot class. Having said this much, it has to be admitted that all the other characteristic features of the boat are marked by the extremes of beam, draft, and over-all length to which designers have been driven in their attempt to carry a maximum amount of sail under a rule which, unfortunately, puts no limit whatever upon sail area—an unfortunate omission, to which more than anything else is to be attributed the absurdly exaggerated proportions of the modern racing 90-footer. The over-all length of "Shamrock" is close to 140 feet, the water-line length slightly under 90 feet; beam about 25 feet, 6 inches—not 22 feet, 6 inches, as reported by a cablegram sent out by the builders of the boat; draft in racing trim 21 feet, and her displacement in the neighborhood of 150 tons. Although her midship section is large, the lines, which have been carried out with the skill that characterizes all the Fife boats, are so sweet and fair that she looks at first glance more like a 70-footer than a boat built up to the full 90-foot limit. The sections throughout are round and fair, free from sudden changes of curve or "humps." "Round as a barrel" is a term that may justly be applied to "Shamrock III." She should show small initial stability—a valuable feature when the wind is light and the sea troubled—while her deep and easy bilges will give her great sail-carrying power when