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NEW YORK, SATURDAY, OCTOBER 19, 1901.

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.

DELAYED NAVAL CONSTRUCTION IN PRIVATE YARDS.

On perusal of the report of the Naval Bureau of Construction, recently made public, we note with much regret that the private yards have, as yet, done no work whatever upon six of the most important vessels of our navy, although the contracts for the same were let as long ago as last winter. The six vessels include the four battleships "Virginia," "Nebraska," "New Jersey," and "Rhode Island," each of 15,320 tons and 19 knots' speed, and the two armored cruisers "South Dakota" and "California," of 14,000 tons and 22 knots' speed. Moreover, one of the new battleships, "Georgia," of the same class as the "Virginia," let at the same time, is in practically the same condition, only 1 per cent of the work being done, while of the armored cruisers of the same class as the two mentioned above, the "Colorado" is only 7 per cent completed, the "Pennsylvania" 4 per cent, the "West Virginia" and the "Maryland" 1 per cent. The blame for this delay is certainly not to be laid at the door of the Construction Department, to whose credit it may be said that its work in the preparation of plans has always been far ahead in expeditiousness of the contractors who undertake to build the vessels. The record of naval construction in private yards during the past ten years has shown very clearly that the government work is regarded, at least in some of these yards, merely as a kind of stop-gap to fill in the slack times between the execution of private orders.

It is a notorious fact that warship construction in the United States drags out to a weary length, and that ships are delivered in some cases years behind the contract date for completion. It is neither expedient nor patriotic that this should be the case. How can the country be expected to vote the required appropriations for warship construction when the builders give practical evidence that these appropriations are made years in advance of the capacity of the private shipbuilding yards to complete the vessels? In the case of the ten important vessels referred to above, at the present rate of construction the types will have become not a little out of date before the ships can be set afloat.

This indifference on the part of the private shipbuilders to the interests of the country is a significant commentary upon the fact that the bitter opposition which has prevented the construction of warships in government yards has found its source and support chiefly in and around the shipbuilding centers. The shameful state of things shown in the Construction Department's report should prove to the country, once for all, that the desire of our naval constructors to have some of our warships built in the government yards is prompted by the very best motives. Whatever may have been the case in the '80's and early '90's, the most completely equipped of our navy yards, particularly the New York yard at Brooklyn, can now build just as cheaply and certainly as well as the best of the private yards, and there is no question that a decision of the government to give some of the future ships to the navy yards would put a stop to the inexcusable dilatoriness which, particularly of late years, has marked the construction of new ships for the United States navy.

THE AFTERMATH OF THE "AMERICA" CUP RACES.

The American public sympathizes with Sir Thomas Lipton, both in the natural disappointment which he must feel in having the coveted "America" cup slip through his grasp by such a narrow margin, and also in his sportsmanlike determination to leave his very capable boat on this side of the water for the purpose of sailing her next season against the best of our 90-footers. Although he does not carry away the cup, the owner of "Shamrock II." has at least the satisfaction of knowing that his handsome craft has pushed the American cup-defender as never any of her predecessors was pushed before; and he may also carry with him the assurance that the most excellent impression which he made on his first attempt of two seasons ago has been abundantly confirmed by the extremely pleasant spirit that has pervaded the present races, a spirit to which the Irish knight has contributed a most generous share.

It has too often been the case that the year succeeding a series of "America" cup races has been a very dull one in yachting circles; but, thanks to the decision of Sir Thomas to leave the "Shamrock" on this side of the water, there is every prospect that the season of 1902 will be the most exciting in the history of American yachting. With "Shamrock," "Columbia," "Constitution" and "Independence" fighting it out for the weather berth and the winning gun, not amid the flukes and chances of the three brief races of an international cup contest, but throughout the long four months of a yachting season, there will be witnessed a series of contests that will be worth going far to see.

A veteran skipper, who sailed three previous cup-defenders to victory, is credited with the remark that, although the owner of "Shamrock II." did not lift the cup, he has "set it rocking." He certainly has; and his statement that, failing a challenge from any other British yachtsman he will himself make another attempt, will be good news to his friends, among whom may safely be included the whole American public.

DETERIORATION OF THE BROOKLYN BRIDGE.

The report of the engineers appointed by District Attorney Philbin, after the recent partial collapse of the Brooklyn Bridge, to make a thorough survey of that structure and ascertain its present condition, has just been made public, and will be found in the current issues of the SUPPLEMENT. The shameful condition of neglect which was revealed by that accident, a full account of which was given in the SCIENTIFIC AMERICAN of August 3, 1901, fully justified the District Attorney in ordering an investigation. The conclusions of the report show that the neglect of the bridge, which was only accidentally discovered through the failure of certain details, is more or less general throughout the whole of this costly and magnificent structure.

While it was due in part to neglect, we had hoped that the failure was precipitated merely by local conditions inherent in the design and construction of the bridge at the point of failure; and that on a general examination of the structure it would be found that although other parts of the bridge had been neglected no serious results had followed. The report before us, however, shows that, as far as inspection and upkeep are concerned, the whole main span, including the saddles on the towers, is in an unsatisfactory condition; and after perusing the careful findings of the engineers one is impressed with the fact that the Brooklyn Bridge, which, because of its size and importance, should have received the most minute and careful inspection, has actually been left in a state of neglect which would be unpardonable even in an out-of-the-way and little-used county bridge.

Of the two engineers who made the investigation, one is considered to be the most expert authority on long-span suspension bridges in the world. The examination consisted of a thorough inspection of every part of the main span, and a careful computation of the stresses to which the bridge is subjected under the increased dead and live loads which have been put upon it since it was first designed. As the result of this increased loading the engineers find that the present margin of safety is so reduced that the necessity for repairs is urgent, and they suggest means by which the safety can be largely increased without materially interfering with the traffic and at a comparatively small cost. They further state that the present methods of supervision, inspection and maintenance are very faulty, and are not such as will with any certainty maintain the bridge in a safe condition.

Referring to the accident of July 24, 1901, they state that transverse bending was the cause of the breaking of the suspender rods, part of this being due to the absence of lubrication in the trunnion-blocks, and part of it to the fact that there was no provision for the side-play resulting from the pressure of the wind. They consider that this wind pressure was the immediate cause of the fracture, and that the suspender rods broke transversely to the bridge. We do not agree with this decision, as our investigation, made on the spot while the broken suspender rods were being taken out, showed that the fracture of the rods was due to an alternate bending strain in a plane parallel with the stiffening trusses, this strain resulting from the unlubricated and rusted condition of the trunnion-blocks.

Next to the failure of the suspender rods and the shameful condition of neglect in which these parts were found, most serious evidences of neglect were found in no less important a portion of the bridge than the saddles supporting the cables on the tops of the towers. These saddles are placed on rollers to allow a certain amount of longitudinal movement of the cables as they adjust themselves to the varying stresses upon the bridge. Like the trunnion-blocks and the suspender rods, the saddle bearings should have been regularly lubricated and all dust and foreign substances removed. To learn from the report that these saddles have been so far neglected that the inspection "shows no efforts whatever in this direction, ridges of rust, paint, and dirt being found on the bed-plates along the outer rollers," will come as a shock to all engineers who appreciate the necessity of living up to the principles on which the bridge was designed. Other evidences of neglect are that many of the diagonal bars and sway rods have been allowed to wear by rubbing against each other, and many of the suspender ropes by rubbing against the floor of the promenade; that water and mud have been allowed to collect and remain in portions of the bottom chords, and road sweepings in the bottom of the floor beams around the suspender stirrups; while a number of the stirrup rods of the wire suspenders were found to be improperly adjusted. We are entirely in accord with the report when it says that "the method of inspection in vogue on this bridge is at direct variance with the methods in general use on good American railroads." The safety of the bridge demands that the present methods of inspection by mechanics should be changed at once to that which is generally recognized as best, namely, an inspection by engineers in person at frequent, stated intervals, the results being recorded on printed forms. With the bridge in its present condition, the engineers consider that some parts of it should be inspected daily, others weekly, and every part of it at least monthly.

The investigation of the actual stresses to which the bridge is subjected has been gone into at great length, and is of extreme interest. We can merely summarize a few of the important findings. With regard to the main cables, it was found that under the increased loading which has been placed upon the bridge the maximum stress imposed is 75,400 pounds to the square inch. If it be admitted that the stays take a certain part of the load, the stresses in the cables may be put at 71,000 pounds per square inch, or 18 per cent in excess of the permissible working stress of 60,000 pounds to the square inch, the 71,000 pounds, however, being increased by the wind pressures, but to what extent is not now known. The masonry of the towers is also greatly overstrained. The maximum pressure in the towers with the saddles, thanks to gross neglect, rusted to the foundation plates, is at least 39.6 tons per square foot, whereas the working stress of the masonry should not be more than 20 tons per square foot. The report suggests a means by which this pressure can be reduced to about 25 tons per square foot. The floor system, as was to be expected, is subjected to excessive stress. The intermediate floor beams of the railroad tracks should be subjected to only 14,000 pounds to the square inch, yet the actual stress is 27,000 pounds. The intermediate floor beams of the road are also subjected to 25,000 pounds, as against a lawful stress of 14,000 pounds to the square inch. The wooden stringers of the railroad tracks should have a stress of only 1,300 pounds, whereas the actual stress is 1,750 pounds to the square inch. The anchorages are estimated to be perfectly safe, their factor of safety against sliding being 2.45, whereas ordinary practice requires only a factor of safety of 2. It is estimated that the alterations and improvements to bring the bridge up to the desired standard of strength can be made for between $500,000 and $750,000.

Whatever action may be taken upon this report, there is one lesson that should be immediately laid to heart by the people of the city, namely, that the bridge has been shamefully and willfully neglected, and that if the process of deterioration is not to continue they must see to it that the care of the structure is committed to those who are technically qualified to exercise a conscientious and systematic inspection of the kind suggested by the report.

THE LATEST TRANSATLANTIC RECORD BREAKER.

In all the history of the transatlantic steamship, there has been nothing quite so remarkable as the consistency with which the Vulcan Works at Stettin, Germany, have produced in each transatlantic steamer that leaves that yard a vessel that is appreciably faster than its predecessor. Some three years ago this firm built for the North German Lloyd Company the "Kaiser Wilhelm der Grosse," 649 feet in length and of 30,000 horse power, the largest and fastest ocean steamer of her time. She made the quickest maiden trip on record, and steadily added to her speed until, last year, she covered the eastward passage at an average speed of 22.8 knots per hour. She was followed in 1900 by the "Deutschland" of the Hamburg-American Company. This magnificent ship was an enlarged "Kaiser Wilhelm der Grosse," her length being 686 feet and her contract horse power 33,000. She also broke the record on her maiden trip to the eastward, the time being five days, sixteen hours and fifteen