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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.

VALUE OF TRANSATLANTIC SPEED.

The "Lusitania," whose advent to the port of New York has created a furor, for which one must go back several decades to the day on which that other giant ship, the "Great Eastern," entered this port, signalized her arrival by breaking the record from Queenstown to Sandy Hook and by having maintained the fastest average speed ever made on a maiden transatlantic trip. The best previous record over this course was that of the "Lucania," which in 1894 covered the distance from Queenstown to New York in five days, seven hours and twenty-three minutes. The "Lusitania" lowered the "Lucania's" figures by six hours and twenty-nine minutes, making the run across in five days and fifty-four minutes. Her average speed over the course of 2,782 miles from Queenstown to Sandy Hook was 23.01 knots. The best speed ever made on a westward passage was that of the "Kaiser Wilhelm II.," which averaged 23.58 knots over the distance of 3,050 miles between Cherbourg and New York, making the trip in five days and eighteen hours.

It is very suggestive of the high state of development reached by transatlantic steamship travel, that the schedule of the arrival and departure of the "Lusitania" on this, her maiden trip, should have been determined upon almost to the very hour, several weeks before she started from the other side. In response to the wishes of Mr. Vernon H. Brown, the general agent in this city, the Cunard Company decided to run the ship across at a speed which would bring her to the bar outside Sandy Hook at eight o'clock on Friday morning on a rising tide; and it is significant that in spite of several delays through fog, the reserve of speed of the "Lusitania" enabled the captain to bring the vessel to the bar at 8:05 on the morning designated. No attempt whatever was made to push the ship beyond a 23-knot average. We are informed by the captain and chief engineer that the vessel has proved during the trip that she is in every respect a perfect success. She is exceptionally free from vibration; and the whole of the elaborate motive power operated without the slightest mishap.

The question will naturally be asked: If a speed of 23 knots will bring the "Lusitania" to New York on Friday morning, why has she been crowded with additional boilers and engine power to enable her to steam 2½ knots faster than this? The answer is that when the ship has "found herself," that is to say, when all wearing parts have settled down to their perfect adjustment, and the whole of the boiler-room and engine-room staff of several hundred men are thoroughly familiarized with their duties, the "Lusitania" will be pushed to her full speed of 25.5 knots an hour, and will be in her dock by seven o'clock on Thursday evenings. This is the confident expectation of the officers of the ship, based upon the ease with which she made 23 knots when using about 75 per cent of her full power. This is a reasonable expectation; for the "Lusitania" has averaged 25½ knots on a trial trip of over 1,000 miles, and has made 26½ knots over shorter courses. During this her first voyage, the vessel was tried out for stretches of several miles, and logged a speed of over 26 knots.

The incidental advantages of high speed are that even though a ship may not make use of it throughout a whole voyage, it gives a reserve which can be utilized to make up for time lost through fog or heavy weather. Thus, because of her great size and power and lofty freeboard, the "Lusitania" would be able not only to maintain an average speed of 20 or 21 knots against heavy winds and seas, but when the storm had blown over, by utilizing her full engine power, she could readily pull up the average to the speed which would bring her into port on schedule time.

MOVING PLATFORMS FOR THE BROOKLYN BRIDGE.

Soon after the Public Service Commission began its active duties, the Board appointed a special committee to study the problem of adjusting traffic on the Brooklyn Bridge; and in the course of its investigations this committee has been giving serious consideration to the question of installing a moving platform, as affording the earliest and most effective relief. It is proposed to replace the surface and elevated cars with continuous moving platforms. If such a change is to be made, the time is opportune, as the lease of the bridge to the Brooklyn Rapid Transit has expired, and the question of its renewal is now before the Board of Estimate, which alone has authority in the matter. The final decision as to the lease will be made during the present autumn, and in the meantime the traction company is operating its cars over the bridge on an extension of the old lease. In its investigation of the bridge crowding, the special committee of the Utilities Board has secured a large amount of data, based upon observation at all hours of the day, and particularly during the rush hours of morning and evening travel; and it has come to the conclusion that, although on the completion of the new terminal and a rearrangement of the schedules, a certain degree of relief will be obtained, no permanent relief will be possible while the bridge is operated by the present mode of conveyance. In spite of the opening of the Battery tunnel, which of course will afford temporary relief by drawing away from the bridge a considerable amount of traffic, the growth of Brooklyn, and of travel thereto, is so rapid, that it would only be a question of time before the bridge would again be overcrowded. It is generally admitted that the provision of moving platforms would increase the carrying capacity of the bridge far beyond any possible maximum which could be secured by the proposed alterations in the trolley car and bridge railway service.

Should the platforms be adopted, the question naturally arises as to whether it would not be advisable to extend the moving platforms to the connecting loop, which is now being constructed between the Brooklyn and Williamsburg bridges. Should this plan be adopted, the question of providing platforms on the Williamsburg and the new Manhattan bridges will also come up for consideration. Even the most strenuous opponents of the proposed system have not attempted to deny that the moving platform provides a far greater capacity of travel in a given time than any other known form of conveyance. This capacity is so great, that it is reasonable to suppose that it would be sufficient to take care of all future increase in travel over the routes that would be covered.

There is one very strong argument against the substitution of platforms for car service, to be found in the fact that it would prevent the future institution of through car service, either by street trolleys or elevated cars, between Brooklyn and Manhattan Island by way of the bridges. The advantages of such service are too obvious to call for any explanation; and it is quite a question whether the carrying of passengers direct from any point in Brooklyn to any point in Manhattan, in other words the treatment of the bridges as part of the continuous thoroughfares of Greater New York, with the abolition of terminal congestion, would not be the most effective way to prevent, once and for all, the present crowding.

We are very largely the creatures of habit, even in matters of such vast import as the handling of the traffic of our great cities. In the matter of transportation over our bridges we have acquired what might be called the "terminal" habit. Because the first great bridge connecting Manhattan and Long Island was provided with terminals, and treated as a distinct and separate element in the transportation facilities, we grew into the way of thinking that not only this but all bridges should be so treated; and yet, if we look at the question broadly, there is no more reason for terminals at each end of the Brooklyn and Williamsburg bridges than there is for placing terminals say at Union Square and Madison Square on the Broadway lines. The true function of these bridges should be to serve as integral parts of continuous lines of travel, whether on foot, by vehicle, by trolley car, or elevated car, and it does seem to us that the sooner we recognize this fact; abolish the bridge terminal altogether; and establish unimpeded travel between Manhattan Island and Long Island, the sooner we shall arrive at the true solution of our bridge traffic problems.

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COMPRESSION MEMBERS IN BRIDGES

At the present writing, the progress of the investigation of the Quebec Bridge disaster seems to point with increasing emphasis to the failure of one of the compression members as the cause of the collapse of the whole bridge. This is the view taken by our esteemed contemporary, Engineering News, whose candid admission of the serious bearing of the disaster upon the prestige of the profession cannot be too highly commended. It is of the greatest importance that the point of failure should be located beyond all question of doubt, for otherwise the whole system of design as applied to the largest bridges would be thrown under suspicion. Thus far the evidence seems to be conclusive that there was no failure of the tension members. If they also had given way, confidence in bridge design would have received an even ruder shock, and the whole fabric of the theory of framed structures of great dimensions would have tumbled to the ground. The eye-bar, however, as made to-day, is considered, and rightly so, to be the most reliable element in a bridge. Formerly, when the eyes were made separately and welded on, they were always regarded with more or less distrust, and, under test, frequently failed at the weld. Of late years, the eyes have been formed by upsetting the end of the bar and forming the eye, without the necessity of raising the metal to welding heat with all the risks of burning which that implied. Properly forged eye-bars are now as strong, if not stronger, in the eyes than in the body, and it is a simple matter to assemble a sufficient number of bars to afford the requisite section of metal to keep the unit stress, or stress per square inch, down to the desired safe figure.

It is in the compression members that a grave element of doubt presents itself, especially when these members grow to the size of those which were used, or should have been used, in the Quebec Bridge. Compression members fail by buckling. In American practice they are built up, usually by assembling in parallel planes a certain number of webs or ribs of sufficient depth to prevent buckling in the plane of the webs. The member is secured against distortion or buckling transverse to the webs, by latticing them together with a system of triangulated angle-irons or flat bars, riveted along the top and bottom faces of the webs. Now, it is in the nature of things impossible to estimate with accuracy what strength of latticing is necessary to hold the compression member in line. If the whole member as thus built up is mathematically straight, that is, if the webs lie absolutely in their true planes, there is theoretically no stress upon this latticework; but if, through unpreventable variations in manufacture, or, as in the present case, through careless handling, the member should be ever so slightly out of line, heavy stresses are set up in the latticework, these stresses increasing in proportion to the amount that the compression member is out of line. The work of holding a compression member in line when it is thus distorted falls almost entirely upon the lattice riveting; and it can be readily seen that, since the buckling stresses increase in a multiplying ratio with the increase of distortion, the point must soon be reached where the rivets of the latticing will be sheared and complete failure take place.

The failure of the bottom chord member of the Quebec Bridge will have the greatly-to-be-desired result of opening the whole question of the design of large compression members. We confess that for many years past we have regarded with no little anxiety the tendency among bridge builders to cheapen construction by using latticed stiffening, where solid and continuous covering plates and internal plate diaphragms would seem to be demanded to insure absolutely safe work. Furthermore, the tendency to reduce the diameter of compression members, with a view to facilitating shop work, field work and general erection, has led to the adoption of diameters altogether too slight. The compression member which seemed to have failed measured only 4½ feet by 5½ feet. In the Forth Bridge the corresponding member is 12 feet in diameter and, being circular, is an inherently stiffer section. Even in the new railroad bridge over the East River at Hell Gate, which is of only 1,000 feet span as against the 1,800 feet span of the Quebec Bridge, the main bottom chord members measure 6 feet by 9 feet in section.

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NEW COMPOUNDS.

Some new compounds of iron and boron have been obtained by Binet de Jassoneix, of Paris. Prof. Moissan showed that amorphous boron when pure will combine with iron, and in the electric furnace he obtained specimens of iron combined with boron, up to the value of 20 per cent of the latter. He was able to separate a compound having a definite formula, $Fe\,Bo$. In the present researches M. Jassoneix produces a compound which has a lower percentage of boron. He mixes iron and boron in various proportions and compresses the mixture in tablets, placing these in pure magnesia troughs within a porcelain tube traversed by a current of hydrogen. In other cases the mixture is heated in magnesia crucibles in the electric furnace. In the first case an air furnace is used, and the resulting cast metal has a crystalline structure which is easily visible. The broken section shows long prismatic needle crystals which can be isolated by treating with acids. These are found to consist of a definite compound of iron and boron having the formula $Fe_2\,Bo$. Above 7 per cent of boron the crystals lose their definite character. As to the properties of the new compound, it appears in long prismatic crystals having a steel gray color and a