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A THIRTY-FIVE FOOT CHANNEL FOR NEW YORK HARBOR.

It begins to look as though the much needed improvement of the entrance to New York Harbor was at last to be carried out, by providing a channel proportionate in depth and width to the traffic of this port, which, if it is not already, soon will be the most important in the world. As matters now stand, the main channel is both tortuous and shallow. After leaving the Narrows, and rounding Norton's Point at the southwestern extremity of Coney Island, it does not turn eastward toward the open sea, but keeps due south for several miles until it is well inside of Sandy Hook, and then makes a sharp turn of 90 degrees to the eastward, access to deep water being finally had by way of the Gedney Channel.

At the first blush it looks like perversion of the truth to designate as shallow a channel having a depth of 30 feet of water, which is the present depth of the New York entrance; but in matters nautical the term is a strictly relative one, and water that might be ample for one class of harbor and traffic can easily be shallow for another. So also it is true that a channel depth that might be sufficient in one decade may be quite insufficient to meet the requirements of the decade that follows. A few years ago, when 28 feet was the maximum draught of a few of the largest liners, the present channel was equal to accommodating the traffic, at least as far as the depth was concerned; but so rapid has been the growth in the dimensions of freight and passenger steamers, that there are ships afloat that leave the harbor drawing over 32 feet; and ships are being built that may easily draw 34 feet when fully loaded. At present such vessels, if they wish to carry out a full cargo, must wait for high water, an impediment that cannot fail to be injurious to the interests of the harbor.

But the present channel is not only shallow for modern traffic, but by reason of its tortuous character and restricted width it is difficult to navigate. This is proved by the large number of steamships that get aground in making the turns or in passing each other within the channel's narrow limits. As we have said, the main channel makes one turn of 90 degrees, and there are others of less magnitude to navigate before deep water is gained. The difficulty arising from this cause is increasing with the increase in the length of ocean liners. The "City of New York," which made her appearance only ten years ago, was considered an abnormally long vessel, her over all dimensions being 560 feet. Since her day we have seen the advent of the "Campania," 620 feet, and the "Kaiser Wilhelm der Grosse," 649 feet in length, to this port, while in the coming season the White Star Line will place on the route a mammoth vessel, the "Oceanic," whose extreme length will be 704 feet.

The proposed changes will provide for the improvement of all existing channels; but by far the most important recommendation is that included in General Ludlow's report. The Ludlow survey recommends the abandonment of the main channel and the substitution of the present East Channel as the principal waterway for large vessels. To give it the necessary capacity, it is to be dredged out to a minimum depth of 35 feet and a minimum width of 1,500 feet. This would shorten the distance to the open sea by about five miles, and would provide a straight channel in place of the present circuitous and difficult route. The largest vessels now under construction would be able to enter and leave the harbor at any hour, irrespective of the state of the tide, and at their fullest draught, which in the case of several ships is likely to be fully 34 feet.

The estimated cost of the work is between $3,500,000 and $4,000,000, and in view of the great importance of the harbor and the great benefit that the improvement would confer, we do not think the cost is by any means excessive. The matter will come up at an early date for the consideration of Congress, and it is sincerely to be hoped that a scheme which has such obvious merit will be met with unanimous approval.

AMERICAN LOCOMOTIVES FOR AN ENGLISH RAILWAY.

The introduction of American locomotives on English railways was merely a matter of time, and it only needed the accident of English locomotive builders being overstocked with orders to open the door.

It seems that the prosperity which marks the shipbuilding trade in Great Britain is being shared by the locomotive trade, and when the Midland Railway wished to place a "rush" order for twenty freight locomotives, they were compelled to come to this country to get it filled. The present activity is in part accounted for by the fact that the recent strike in the engineering trades has thrown the locomotive works in arrears. Ten of the engines are to be built by the Baldwin and ten by the Schenectady works. They are to be of the American Mogul type, with cylinders 18 inches in diameter by 24 inches stroke, and with such modifications in details as are required to conform to British practice.

The introduction of these engines in regular service on an English road will be watched with the greatest interest. They are not of abnormal dimensions, being smaller than the average freight engines now being built for use on our own roads but of the standard size of the freight engines in use on the Midland Railway. This is fortunate, as giving for the first time an opportunity to test the English and American types under identical conditions of service. The cost of the engines, even should the customary English copper fire-box and other specialties be called for, will probably be from twenty-five to thirty per cent less than if they were of home manufacture; and if they render equally efficient service, as we do not doubt they will, the result cannot fail to have an important bearing on the locomotive trade in that country.

The Midland Railway has always been the most progressive of the English roads. It was this company that led the way in the introduction of American cars into Great Britain, and nearly a quarter of a century ago a "dining car train," including, if we remember rightly, two Pullman cars, was running daily between London and Leeds.

THE GATLING CAST STEEL GUN.

Great interest attaches to the government tests of the 8-inch cast steel gun designed by Dr. Gatling of machine gun fame. It is the object of Dr. Gatling to produce a gun which shall possess all the ballistic qualities of the prevailing type of hooped or built-up gun without its excessive cost. The present built-up system is founded upon the method introduced by our General Rodman during the Civil War, who, in order to compress the interior metal of the gun, cooled the gun from the inside, thus causing the exterior layers to shrink with tremendous gripping effect upon the bore. The same effect is secured in forged steel guns by shrinking successive hoops of steel upon an interior tube. Rodman's method was cheap and rapid; the present method is slow and very costly.

Of late years several attempts have been made to dispense with the hooped construction and produce a steel gun of one integral forging or casting. In 1895 Maxim made a 5-inch gun of a single forging and cooled it from the inside by running a stream of coal oil through the bore. In the firing test his gun showed a velocity of 2,200 feet per second with a pressure of 33,600 pounds to the square inch, and withstood a maximum pressure of 50,400 pounds without injury. In January of this year a single-forging steel gun, designed by Capt. F. E. Hobbs, of the Ordnance Department, United States Army, was tested at Sandy Hook with excellent results, a velocity of 2,700 feet being attained with a pressure of 50.000 pounds to the square inch.

Dr. Gatling is endeavoring to go one step further and cheapen gun construction by dispensing as far as possible with forging processes and casting his gun direct from the cupola. It is evident that if a reliable cast steel gun can be manufactured, the cost and time consumed in heavy gun construction will be greatly reduced—according to Gatling, fully 50 per cent. The metal used is a special steel alloy, and the gun is cast in a vertical position, muzzle downward. An attempt is made to impart a fibrous character to the casting by giving a swirling motion to the steel as it enters the mould, and Dr. Gatling states that a certain amount of forging of the interior is effected by the use of a rotary mandrel when the gun is red hot in the annealing furnace. The desired compression and tension are secured by cooling from the interior. In the preliminary tests the gun has withstood a pressure of 37,000 pounds to the square inch. This is satisfactory as far as it goes, but with the records of 50.400 and 50,000 pounds pressure in the Maxim and Hobbs guns and 82,850 pounds pressure in the Brown wire gun ahead of it, the cast steel gun has a long road to travel before it eclipses its predecessors. If it equals these pressures and survives the 300 rounds to which the government officials will subject it, Dr. Gatling will have made an invaluable contribution to the science and art of heavy gun construction, and it will only remain to overcome the undoubted prejudice which modern artillerists entertain against cast as compared with forged or wire-wound ordnance.

ENLARGING THE CAPACITY OF THE BROOKLYN BRIDGE.

The present Mayor of New York is no doubt a better lawyer than engineer; for after throwing out the city's obviously most urgent engineering work, the Rapid Transit tunnel, he wishes to have under construction across the East River three great bridges whose aggregate cost will greatly exceed that of the rejected tunnel scheme, and whose construction will take three or four times as long to complete. In addition to the new East River bridge, whose construction is not much more than fairly under way, he would build another at Blackwell's Island and a third midway between the new bridge and the present New York and Brooklyn structure.

The Blackwell's Island bridge would be a distinct benefit; but the other structure would be quite superfluous. And for this reason: that it would be possible, as we have pointed out more than once in these columns, so to strengthen and enlarge the present bridge as to practically double its capacity. We should thus obtain practically all the advantages of Mayor Van Wyck's proposed new bridge for about one-fifth or one-sixth the cost.

Mr. William H. Hildenbrand, the engineer to whom Mr. Roebling intrusted the task of making all the calculations as to strength, stability, etc., of the Brooklyn bridge at the time of its erection, states that he has prepared a plan for doubling the capacity of the structure at a maximum cost of $2,500,000. He would raise the height of the towers some 10 or 12 feet, and suspend four auxiliary cables above and in the same plane as the present cables. The present stiffening trusses, six in all, would be replaced by new and deeper trusses of a common depth, and upon their upper chords, on either side of the footway, would be an upper floor reaching across the present railroad tracks and roadway. This would double the capacity of the bridge for wagon and car traffic. The footway is sufficient for all probable increase in the number of foot passengers. The pull of the new cables would be taken by additional anchorages placed behind the present anchorages.

Mr. Hildenbrand's name is a guarantee that the scheme is feasible, for he has recently made a similar enlargement of the old Cincinnati bridge, built thirty years ago, the strength of the new construction being double that of the original bridge. Now this is an improvement which has everything to recommend it to the Mayor, the Bridge Commissioners, and every other person who is desirous of improving transit facilities between New York and Brooklyn. For an expenditure of $2,500,000 we not only remove all anxiety as to the serviceableness of the present structure, but we practically secure a new bridge between the two islands.

THE FORESTS OF THE WORLD.

Mr. D. E. Hutchins, Conservator of Forests at the Cape, recently read before the Cape Town Philosophical Society a paper showing the need and value of extending the area in the colony at present under forest. Cape Colony stands far below other countries in its proportion of forest, though the climate of the country is such that it ought to have a percentage under forest at least equal to Germany. The following table shows the area under forest in the colony compared with that in some other countries:

Countries.	Area under forest in acres.	Percentage under forest of total area of country.
Russia in Europe	527,427,000	42
Sweden	42,366,000	42
Austria	46,>56.000	31
Germany	34,350,000	26
Norway	18.920,000	25
India	140,000,000	25
France	20,750,000	16
Portugal	1,666,000	5
Great Britain and Ireland	2,790,000	4
Cape Colony	353.280	0·29

Mr. Hutchins suggests that plantations should be formed in districts within minimum rainfall limits of 15 or 20 inches per annum. The argument which will perhaps appeal most forcibly to Cape agriculturists is that, while the total value of the fruit produced in Cape Colony is £100,000, no less than £269,349 have been paid for wood imported into the colony during the last two years, nearly the whole of which would be produced in national forests covering an area of about 50,000 acres. That forests can thrive where agriculture is difficult or impossible, is shown by the steep richly wooded slopes of the lofty Amatolas, the similarly beautiful forest with its gigantic yellow-wood trees in the barren Knysna country, and, perhaps most striking of all, the cedar trees of Clanwilliam, growing on the absolutely bare rocks of the stupendous Cedarberg Range; while at Glenadendal an introduced tree, the cluster pine, hardier than any of the indigenous trees, is spreading itself self-sown up the rocky mountain side, in spite of fires, drought, hot winds, and climatic vicissitudes, that are too often the despair of the agriculturist.