

removal of obstructions to navigation of the Hudson River which existed for twenty miles below Albany, which consisted of numerous shoals, along a very crooked channel. These were a serious impediment to navigation. Jetties, on the plan proposed by him, were constructed that in one season straightened and deepened the channel in such a manner that where there had been only six feet of depth at low water, in an uncertain channel, a constant depth of fourteen feet, in a straight channel, was obtained at a cost of about \$100,000.

This was the pioneer work on this side of the Atlantic, and the success which was there obtained was followed up by Captain Eads with the jetties at the mouth of the Mississippi River, where the use of the same principles succeeded in obtaining a deep water channel where shoals had, theretofore, obstructed the navigation.

The need of better facilities for suburban passenger traffic west of the city of New York was next presented to his attention by several citizens, with the request that he find a solution of the difficulties; whereupon he made surveys, obtained franchises, and, with his associates, accomplished the task. In the course of this work, he projected and carried through the biggest railway cutting in the world. It was made through successive layers of glacial drift, quicksand and rock. This was a tough proposition to tackle, but the outcome fully justified it, because it is now one of the busiest lines of railway in America. There were steam drills, pumping, hoisting and locomotive engines, also steam shovels, making a total of twenty-two steam engines, of various types, and hundreds of men, employed upon this work, which was pushed day and night for two years.

About this time, at the request of the Secretary of the Navy, he made a report on the methods to be pursued in cutting the Darien Canal, which had then been recently surveyed.

Not long afterwards he projected a line of swift, light-draft steamships, to be devoted to carrying cabin passengers, the mails and valuable parcels between Canada and Ireland, in which eighty per cent. of the daily trips, each way, were to be made in four days and ten per cent. in five days. He succeeded in obtaining the support of the Canadian and the United States Post Office departments, but the British Postmaster-General, Lord John Manners, negatived the proposition.

When Lord Carnarvon, the Colonial Minister, was asked to interpose he promised to do so, if requested by the Dominion Government. But as this was at a period when the Mackenzie Administration wanted other things from the Home Government, they could not interfere in that way, although strongly in favor of the project—which had strong support among experts and financiers.

Afterwards he went to Russia, where he was consulted about the transcontinental railway, which was then under consideration. He advocated the southern route, through Turkestan. This was regarded with so much favor, that the biggest bridge in the world was built, upon his advice: