

## QUEBEC BRIDGE BOOKLET

**A**N attractive booklet of sixteen pages and cover, entitled "The Quebec Bridge," has been issued as an advertisement by the Canadian Government Railways, and can be had free of charge upon application to the general manager, C. A. Hayes, Moncton, N.B.

The centre two pages are devoted to a reproduction in several colors of the painting of the bridge recently finished by Frederick Rummell. There are also colored illustrations of the central span being towed into position and of the raising of the central span.

### History of the Bridge

Most of the following information, which is reprinted from the booklet, appeared in the September 20th, 1917, or previous issues of *The Canadian Engineer*, but in view of the fact that the bridge has just been finally tested and taken over by the government, its repetition now may not be untimely:—

"The idea of a railway bridge across the St. Lawrence at Quebec originated as far back as 1853, at which date there was no other bridge across the river at any point. A New York engineer, named Serrell, made surveys and prepared plans for a railway bridge on the suspension principle, to be located somewhere near the site of the present bridge. The estimated cost was \$3,000,000. Whether the cost was considered too great an obstacle, or whether it was a lack of courage on the part of engineers, nothing further was done, and the first bridge erected across the St. Lawrence was built at Montreal. This was the Victoria tubular bridge, opened for traffic in 1860, and built by Robert Stephenson on the model of one he had previously erected over the Menai Straits, on the line to Holyhead, Wales.

"The project for building a bridge at Quebec to connect that city with the south shore of the St. Lawrence lay dormant until 1882, when M. W. Baby obtained a charter to erect a bridge. He had associated with him A. L. Light, a well-known engineer, who interested some of the engineers of the then newly completed Forth Bridge in the undertaking. The idea then advanced was to erect a bridge on the cantilever plan, which the erection of the Forth Bridge had demonstrated to be the last word in big bridge designing. This second proposal also failed to get beyond the project stage.

### The Collapse in 1907

"The third attempt was made in 1887, when the Dominion Parliament incorporated the Quebec Bridge Co. with an authorized capital of \$1,000,000. The company's powers were extended in 1891, and in 1897 they were revived and confirmed, new interests, led by S. N. Parent, then mayor of Quebec, and afterwards premier of the province, having obtained control of the company. U. Barthe became secretary of the company, and United States capitalists were interested. A New York engineer undertook the designing of the bridge, and E. A. Hoare was chief engineer in charge of all local work. The same site on which the present bridge is built was selected, work was started on the substructure in August, 1900, and was completed at the end of 1902. From that time forward the erection of the steel work went on apace, and was carried on without interruption until August 29th, 1907, when the south cantilever arm collapsed.

"The Dominion Government then appointed a commission to investigate the cause of the catastrophe, with the result that the government undertook to complete

the bridge as a Dominion Government work, and in 1908 appointed a board of three engineers to prepare plans.

"The board made very exhaustive studies of various possible designs, both suspension and cantilever. Tenders were called on cantilever designs, with invitation to submit alternative tenders on the bidders' own designs. One German, one English, and one American firm bid on the board's designs, but the St. Lawrence Bridge Company bid only on their own alternative K-truss designs, and received the contract.

### Only One Canadian Tender

"The government had invited both the Dominion and Canadian bridge companies to tender on the new Quebec bridge, but it was thought that if the Canadian bridge companies were to present a solid front in the bidding—in other words, to pool their organizations, experience and facilities—that Canada would have a better chance of being successful in the bidding, and the Canadian Bridge Company, therefore, joined with the Dominion Bridge Company as joint owners of the capital stock of the St. Lawrence Bridge Company, and the only bids made by any Canadian firm were submitted in the name of the St. Lawrence Bridge Company.

"Work was started promptly by the contractors, both for the substructure and for the superstructure, and everything went on so successfully that the St. Lawrence Bridge Company expected to complete its work at the end of 1916—earlier than was estimated. September 11th, 1916, was set for floating out the suspended portion,—the centre span. The centre span was erected at Sillery, about three miles below the bridge site. After it had been completely assembled and riveted up, the span was placed on specially constructed scows, and thence, guided by tugs, was floated into position under the cantilever arms of the bridge. Many simple spans have been lifted into place where they could be handled from barges with ordinary derrick cars, but the Quebec Bridge span was by long odds the largest span of any kind that had been constructed. It was the first attempt that was ever made at hoisting a span of such an immense weight and size by hydraulic hoists.

### The Accident in 1916

"The first part of this work had been successfully completed, and the 640-ft. long span had been raised several feet when, owing, as was afterwards ascertained, to the failure of a portion of one of the castings in the hoisting apparatus, the span slipped, crumpled up and fell to the bottom of the river. The fullest investigation was made in the matter, and it was found that there was no defect in the span or in the plan, and that the other sections of the bridge had received no damage from the accident. The company immediately put in hand the fabrication of the steel for a new span and began to prepare for its being placed into position. This was done, and the new span was ready for erection at the time of the September high tides, 1917. The method of erection was not changed except that extra precautions were taken in connection with the manufacture and getting in place of the hoisting apparatus. The hoisting proceeded steadily and the lift was completed September 20th.

"The length of the clear span is greater than the distance between St. Catherine and Craig Streets, Montreal. The length of the suspended span exceeds the distance between St. Catherine and Dorchester Streets, Montreal, and would almost cover the Champ de Mars. The width of the bridge is 28 feet greater than the width