

Editorial

QUEBEC BRIDGE.

The regrettable failure of some portion of the material connected with the erection of the suspended span of the Quebec Bridge, which caused the enormous structure to fall into the St. Lawrence River on Monday, September 11th, has caused national disappointment and especially keen must be the disappointment of the engineers, the contractors and all those who have been most closely allied to the task of completing the bridge.

This disappointment is accentuated when it is recalled that the method of procedure decided upon for the lifting of the span would seem to have been the right one, as it was after the scows had floated away and the hydraulic jacks had commenced to raise the enormous weight up to the desired level that the accident occurred.

Only 48 hours before the span fell a party of bridge engineers from all parts of Canada and the United States had been privileged to go over the structure, had examined carefully and critically the arrangements made for the placing into position of the span and had pronounced them adequate. But again the unexpected happened, and within sight of the linking up of the north and south arms, failure of a casting on the lifting girder at the southwest corner occurred and within a few seconds the span broke loose and lay at the bottom of the river.

While the toll of lives taken was not as great as was the case when the first bridge collapsed in 1907, it took twelve men, and to those left behind a full measure of sympathy is due.

According to several who were on the end of the north cantilever arm at the time the suspended span fell, it was confidently expected that the whole bridge was doomed, but the engineers had built wisely and well. It stood.

The strain which the collapse of the suspended span placed upon the anchor arms and the way in which these arms stood it is eloquent testimony that from a constructional point of view the bridge is all that could be desired. The accident was not due to a fault in construction so much as to a mistake in the method of erection.

The main arms of the bridge having been subjected to such unusual stresses it becomes very important that great care be taken in the examination of these to ascertain just what deflection has actually taken place.

The span which was lost is but one-twelfth of the total weight of the bridge and will speedily be replaced by another. When it is, sufficient care will be exercised in the design and manufacture of the equipment for the carrying and hoisting into position of the structure as to make a repetition of the accident impossible.

It has been stated that the casting that failed had carried the weight of the span for several weeks prior to its launching. While the span was in a reposed, quiet condition at Sillery Cove, the casting was free from the many stresses that must surely have been introduced when the structure was being towed down the river, and while it was being manoeuvred into position before the lifting pins were finally connected.

The courage of the construction company is remarkable. There is no thought of abandoning the enterprise

and doubtless greater precaution will be taken when the work of erection of the new span is reached. A greater factor of safety in lifting appliances, and a well-determined knowledge that when built the span will stand the strain of lifting, would seem to be necessary.

TORONTO-HAMILTON HIGHWAY.

Mayor Church of Toronto motored over the Toronto-Hamilton highway this summer. His Worship was severely jolted on various raised joints. Also, he noticed cracks in the concrete. As the city had contributed \$250,000 toward the cost of the work, he was naturally perturbed and properly requested Works Commissioner Harris to report on the progress and condition of the road.

Mr. Murray Stewart, the roadway engineer of Toronto, inspected the highway and submitted a report to Mr. Harris, with photographs showing a number of cracks and faulty joints.

In order to prove that the defective slabs described by Mr. Stewart form a very small portion of the work, Mr. H. S. Van Scoyoc, the chief engineer of the Toronto and Hamilton Highway Commission, forwarded a report to Mr. Gooderham which goes into considerable detail. Mr. Van Scoyoc states that out of over two thousand 35-foot slabs laid in 1915, 84.3 per cent. are uncracked, 11.8 per cent. are slightly cracked and 3.9 per cent. are cracked to an extent requiring filling. This is not a serious condition, nor is it by any means unprecedented. Every concrete road that has ever been built has shown a certain percentage of cracked slabs, and in that respect the Toronto-Hamilton highway probably compares favorably with most other concrete highways. A certain small percentage of cracks in concrete roads seem to be inevitable and is probably due to slight inequalities in the foundation and to insufficient drainage. Provided the cracking is not excessive, the openings should in themselves be readily maintained if the road has been properly constructed otherwise.

Mr. Van Scoyoc's report says that of 2,071 joints built in 1915, 93.9 per cent. are satisfactory, 4.1 per cent. need chipping and 2 per cent. need chiseling. This trouble with the joints is a more unusual matter than the cracks in the slabs, and there are undoubtedly more raised joints in the road than the engineers expected. The same difficulty, however, has developed in other concrete roads built on this continent during the year 1915.

The consensus of opinion attributes the trouble to the unusual weather conditions experienced this spring, and the bad joints seem to be confined mainly to work done late in the season.

An inspection of the Toronto-Hamilton highway shows that the work is not subject to any severe criticism provided that another spring does not bring further troubles to light. If the work that was laid this year is in as good condition two or three years from now as it is at the present time, there will be but little reason for complaint. There does appear to be careless workmanship on the joints, many of these not being truly vertical.