THE ROYAL ALBERT BRIDGE.

I.

We publish, to-day, views showing various parts of this contemplated bridge destined, when completed, to greatly excel in magnitude any similar structure which has yet been built.

The impetus which for several years past has been given to the construction of railways on the north of the St. Lawrence and Ottawa rivers; with a continuation through to the waters of Lake Huron, to tap the lake traffic of north-western States; a more immediate connection by rail of the great lumber districts of the St. Maurice and Ottawa rivers, including their numerous tributaries, with the leading markets in the United States; the geographical position of Montreal, almost on the air line; as well as other important considerations to be glanced at, demand a second bridge over the St. Lawrence at this city, in order to effect a union of those Eastern, Northern and Western roads with the great American system on the South, and secure an easy and cheap interchange of traffic.

The Victoria Bridge, while performing the most important function in this interchange of traffic, more strictly speaking accommodates but that of the St. Lawrence Valley with such through freight as it can get. It is a close corporation, in other words under the entire control of one railway company. It is not too much to say that, in a decade or two, its capacity will be taxed to the utmost to accommodate the traffic of the Grand Trunk Railway alone. Even were its carrying capacity much greater, and in a position to be made use of by all railways on the same terms, the difficulty of access to it by the Quebec, Montreal, Ottawa, and Occidental Railway, coming in at the eastern end of the city would be almost insuperable.

It may be of interest to state that the point of crossing now determined on is nearly identical with the one pointed out many years ago for the Victoria Bridge, when it was proposed to pass the river by a span of then unheard of dimensions, from St. Helen's Island to a point east of the Market Place, and thence by arches northward to Côte à Barron.

The idea of that day is now being realized in the proposed Royal Albert Bridge, a fit mate for its Royal consort, a couple of miles farther up the river.

In combination with its railway traffic, it has also been thought desirable to accomodate that of ordinary character, such as city passenger cars with dummy engines, the various descriptions of vehicles, and also afford ample space for pedestrians.

As is well known, for about two months or more each year, this city is cut off entirely from the south shore, whence it derives its principal amount of market supplies, hay, &c.

During this period, prices go up and the additional money so paid would be no inconsiderable part of the amount required to meet the interest on the cost of the bridge. Ready access would be offered to the south shore night or day, the year round, at a very trifling cost, and at a most expeditious rate of speed, resulting in a few years in the growth of a large city, or "Southern Montreal."

The bridge will also give every required facility for reaching the St. Helen's Island Park, destined to be one of the most pleasant and beautiful of drives or resorts.

The great length of the bridge (about three miles) permits us to give views of but some of its most salient points.

Fig. 1. Represents general elevation.
Fig. 2. " bird's eye view of that portion over the navigable channel.
Fig. 3. Represents elevation of 500 ft. span.
Fig. 4. " " 300 "
Fig. 5. " end elevation of 500 ft. span.
Fig. 6. " part end elevation and part section of 500 ft. span.
Fig. 7. Represents General Plan, showing connection with the railways on the North and South shores.

The first two figures appear in our present issue; the other five will be published in a double page illustration next week.

II.

In connection with these views, the following brief description of the structure is given.

Leaving the level of the ground on the line of Sherbrooke St, it is carried as a viaduct, east of and parallel with Colborne Avenue, at a level of ninety feet above the surface of the ground, in spans varying from 150 to 200 feet each. Striking the navigable channel of the River St. Lawrence near Molson's Brewery, it passes over to St. Helen's Island with six spans.

Owing to the angle made by the axis of the bridge with the current, the piers are placed on the skew, so as to be lengthwise in line with the current, and in this manner offer the *minimum* of obstruction; while doing this service, however, it lengthens considerably the superstructure, as for instance in the case of the large span of five hundred feet between the masonry, measured at right angles, the length of superstructure span is increased to five hundred and fifty feet; and so proportionately with the four remaining spans of 300 feet each.

The bottom of the superstructure will be carried level from Sherbrooke St., to the centre of St. Helen's Island there meeting the natural surface of the ground. This will give a clear headway of 130 feet above summer water level in the harbour, or say 120 feet above winter level. (The latter figure is the height of the Britannia Bridge above mean tide level, determined by the British Admiralty as a suitable elevation for navigation purposes).

Reaching St. Helen's Island, four spans of 240 feet each will carry the bridge to the height of land, where this first section of the structure will terminate.

From the south side of the Island the second section of the bridge will be carried over the unnavigable channel of the St. Lawrence, to the south shore by twenty-one spans of two hundred feet each, grading down with an inclination of one foot in one hundred feet. Reaching the south shore the bridge becomes again a viaduct of five additional spans of two hundred feet each, or until the superstructure has approached within such a distance of the natural surface of the ground, as to make embankment more economical; and thence proceeds with ordinary grading to a junction with the Montreal, Portland and Boston Railway, and also the Grand Trunk.

The total length of the bridge and viaduct will be fifteen thousand five hundred feet, or within a fraction of three miles; and the extreme distance covered from the point of departure from the Quebec, Montreal, Ottawa and Occidental Railway on the Mile End heights, to the junction with the line on the south side, will be five and a half miles.

A sufficient length on the natural surface of the ground on St. Helen's Island exists between the two bridges for siding purposes. Trains from opposite directions can thereby cross each other here, and so double the capacity of the bridge.

The piers to be placed in the two channels of the river will be designed on the general principle of those of the Victoria Bridge, for the purpose of allowing the ice to cut freely past.

Those in the navigable channel will be sunk in *caissons*, thereby obviating the use of cofferdams and other obstructions in the river, and rendering pumping unnecessary. In the south channel the water is very shallow, with a rock bottom, and very little expense will be incurred in putting in the foundations of the piers.

The abutments and piers on the land portion will be of simple design, the first probably partaking of the Egyptian style.

The iron superstructure from end to end will be composed of four independent longitudinal ribs, or open lattice girders, placed certain distances apart, and strongly connected laterally.

These ribs will be provided with the usual friction rollers on each alternate pier, to provide for expansion and contraction. Between the two inner girders, on the lower floor, will be a space of eighteen feet to accommodate two tracks for trains of city cars, to be drawn by dummy engines. Between the two inner girders and outside girders, on either side of the bridge, will be spaces of fourteen feet respectively, for ordinary cart and waggon traffic, passing in one direction on the western, and in the opposite direction on the eastern side of the bridge. Exterior to these two outside girders will be footwalks, firmly supported on brackets of iron, strongly attached to the side girders and floor beams; they will each possess a width of 8 feet and be provided with ornamental railing for the protection of pedestrians.

At a distance of fifteen feet above the lower floor will be placed a second one, strongly connected and braced with iron kelsons and gussets to the longitudinal girders; on this floor, between the two inner girders, will be placed a railway track with crossing arrangements for trains, as before stated, at St. Helen's Island. The spaces existing between the inner and outer girders will each possess the width corresponding to the carriage-ways below, and are intended for carriages and other vehicles requiring a higher rate of speed than carts or waggons. Should a second track ever be required for railway purposes, across the entire length of the river, a fifth girder can be erected on the up stream side of the bridge, and be supported by iron columns from the saddles of the ice-breakers, at a comparatively small cost.

The entire height of the bridge from the surface of the water will be two hundred and ten feet for the centre span, or two hundred and fifty feet from foundation.

Carriages and carts will have access to, or departure from the bridge on the level of Sherbrooke St., and possibly at some suitable points between that street and the river, by means of incline approaches.

Pedestrians or those wishing to take the city cars, will also obtain access to the bridge in this manner.

A pretty close estimate of the work may be stated under the following heads:—

Masonry, - - - - -	$2,250,000
Iron superstructure, - - -	2,250,000
Land purchase and contingencies,	500,000
Total cost of bridge, - - - -	$5,000,000

III.

Fears have been entertained that the introduction of the piers into the water would materially increase the current in the channel; that such fears are groundless will be seen from the following figures. Two lines of soundings were accurately taken, and the velocities of the current ascertained, one crossing Isle Ronde, below St. Helen's Island, the narrowest point in the channel; the second sixteen hundred feet further up the river, and crossing St. Helen's Island. The sectional area of discharge at Isle Ronde was found to be 36,670 square feet, moving with a central surface velocity of 9.2 miles per hour.

Number two, or adopted line, gives a sectional area of 51,448 feet with a central surface velocity of 6.9 English miles per hour. If from this sectional area be deducted that required for the piers, 4,248 square feet, there will yet remain 47,200 square feet, or 10,530 square feet in excess of the entire channel at Isle Ronde. The increased velocity arising from the obstructing piers, will be 0.8 of a mile in 150 feet, or the length of the pier; making a total current for this distance of 7.7 miles per hour, or 1.5 miles less than at Isle Ronde in its present condition. The declivity generated by this obstruction will be but 5½ inches in the length of the pier. From the foregoing it will be seen that the channel opposite Isle Ronde will be in reality the sticking point, and not the site selected for the Royal Albert Bridge.

But apart from all this, the slight addition to the current for so short a distance would have no appreciable effect upon the speed of an ocean or river steamer; while in the case of ships the present admirable arrangement of a steam chain-tug made use of by the Harbour Commission, will easily overcome the difficulty. The piers presenting a sharp angular sloping surface, on the up stream side, to the approaching current, will permit the water to glide past with the least possible disturbance.

The superstructure has been designed for carrying the following live load under a coefficient or factor of safety of 6; in other words, the weight of live load to be presently mentioned, including the weight of the bridge itself is but one-sixth of the ultimate strength, or actual breaking weight of the structure.

1st. A train made up of locomotive engines, running 30 miles per hour, equal per lineal foot to.....	2,500 lbs.
2nd. Two trains of city cars with dummy engines loaded with passengers, going six miles an hour, say.....	2,500 "
3rd. Carriage ways and foot-walks, loaded at 100 lbs. per square foot.....	7,500 "

Making a total of 12,500 lbs. per running foot, or divided into the four girders will make each one carry, in addition to its own weight, about 3,100 lbs. per running foot. Many bridges have already been built carrying even greater live loads.

The following comparison is made between the two rival bridges.

ROYAL ALBERT.	VICTORIA.
1 Span 550 feet skew.	24 Spans 242 feet each.
4 " 330 " "	1 " 330 "
4 " 240 " square	
5 " 230 " "	
4 Approaches, 400 ft. each.	
With abutments, piers, &c., making a making about 15,500 lineal feet of iron superstructure.	With piers, &c., making a little over 7,000 lineal feet of iron superstructure.
Greatest clear height above water, 130 ft.	Greatest clear height above water, 100 ft.
Height of centre span above water, 210 ft.	Height of centre span above water, 82 ft.
Greatest depth of water, 40 feet.	Greatest depth of water, 22 feet.
Strength of current, 6.9 miles.	Strength of current, 7 miles.
Estimated cost, $5,000,000.	Actual cost, $6,300,000.

The Victoria Bridge required six years in its erection. It is thought the Royal Albert can be built in three.

IV.

It is proposed that the bridge be under the control of no one railway company, but be free and open to all on equal terms: that the schedule of tolls for crossing shall be determined by Directors to be appointed by the different governments and corporations interested in the work, subjected to the supervision, if required, of the Governor in Council.

That as the Dominion Government and that of the Province of Quebec, are interested in obtaining a winter outlet for the roads they are now building, to the seaboard and into the neighbouring country, for the interchange of traffic, and that as many of the American lines both East and South, are also deeply interested in passing over this new air line from Montreal to Lake Huron, and eventually to Sault Ste. Marie, to join lines in the West, the government and representatives of those railways be invited to assist, by giving guarantees on Bonds to be issued.

To the city of Montreal the work will be of almost incalculable value. Some years ago, the city contributed $1,000,000 to the M. N. C. R. In return from this she will get the railway, and the $1,000,000, or more, returned in the Barrack property, which the city now owns. Montreal might under these circumstances give liberal aid to the bridge, which will add so largely to her prosperity and growth.

A meeting of railway men will be held in this city, this month, to consider the subject. In the meantime, application has been made to the Dominion Legislature for a charter.

Mr. Chas. Legge, C. E., is the Engineer.

THE LATE JOHN A. PERKINS.

The late John Adams Perkins, Esquire, M.A., B. C. L., advocate, was born at the city of Montreal, the 27th day of September 1840. He was educated at the High School and subsequently at the University of McGill College, from which he obtained the degrees of Master of Arts and Bachelor of Civil Law, in 1860 and 1861 respectively. He was articled as a student at law to the Messrs. Laflamme, and so rapid was his progress and so great his assiduity as a student, that in 1861, when called to the Bar, he rapidly formed the *nucleus* of a large and lucrative practice. In a few years he had acquired a larger *clientèle* than ordinarily falls to old practitioners. When scarcely half a dozen years at the Bar he had given abundant proofs of his astuteness as a pleader, and received retainers as one of the counsel for the defense in the trial of the Rev. Mr. Babie and in the celebrated Connolly case, as one of the counsel for plaintiffs. Both cases terminated successfully, and his position among the first rank practitioners at the Bar was secured and maintained from 1867 until his death. His professional career was an ovation of success. He was said to be a "lucky" practitioner—but the secret of his success was the power acquired by the development of fine natural talents. He was preeminently a hard worker and singularly devoted to his profession. He was considered by his confreres a "born lawyer," but his industry had considerably implemented the gift of nature. He excelled in fertility of resource. A master in expedients he accepted "a tight place" with complacency, and his reassuring manner was an unfailing comfort to many a distressed client. He spoke with fluency and, as a clear and concise reasoner, he had few equals at the Bar.

He was a member of the Council of the Bar at the time of his death, and had previously for two years held the office of Syndic, the position at the Bar next to that of President. He was also Professor of Commercial Law in Victoria University while that institution maintained a faculty in this city.

In politics Mr. Perkins was a Liberal and enjoyed the confidence of his party. In 1873, at the time of the retirement of the Hon. Mr. Holton from the Local Legislature, Mr. Perkins received the nomination of the Reform association of Montreal Centre, which he declined. His name was also prominently mentioned in connection with the Chief Justiceship of Manitoba.

Of courteous and engaging manners he had a host of personal friends, not merely in Canada, but in the United States where he was well known to the profession.

The late Mr. Perkins died on the 22nd December last of typhoid fever combined with congestion of the lungs, after an illness of about three days. The suddeness of the death threw a cloud over the entire community. The Bar assembled at once and passed resolutions of condolence with the relatives of the deceased. His funeral was largely attended by the Bar and by the public generally.

We sincerely regret the sad event that has deprived the family of the deceased and the country of one who by ability and industry had won for himself a high place in our community.

THE NEW WALL OF CHINA.

The cartoon on our front page will be accepted as a timely one. It was suggested to us by one of the principal manufacturers of this city and the Dominion. The idea is that, according to the present tariff arrangements, the Canadian manufacturer and exporter is faced in his operations by a high perpendicular wall which effectually prevents him from getting any of his goods over it, while the American manufacturer and exporter runs his goods into Canada along an easy incline. The artist has reproduced this conception with considerable spirit. The Canadian—in the traditional costume of Jean Baptiste—stands idly at the foot of the high wall, painfully aware of his inability to raise his barrel up the steep escarpment, and he looks with envy at brother Jonathan who has rolled *his* barrel with facility up the inclined plan and is about to dump it over into Baptiste's yard. The Canadian's *tuque*, hide boots, serge coat and other primitive trappings tell plainly of retrogressive hard times, while the American's surrounding of warehouses, trucks and piled-up goods demonstrate his prosperity at our expense. The pictorial lesson is suggestive, because so unfortunately true. This abnormal state of things has lasted long enough. Canadians have borne their burden with almost too much patience. It is to be hoped that no later than the next session of Parliament an effectual remedy will be devised.

FISHING BY MEANS OF THE SUBMARINE LAMP.

The following is the manner in which this species of fishing is carried on. The fishing boat, of ordinary shape, supports a pontoon, on which is placed a pneumatic pump serving to feed the lamp. This lamp is lowered into the sea, to a depth varying from twelve to forty five feet. The net is round and suspended by cords. It is thrown into the sea alongside of the lamp, a little downwards, so that the mouth of the net reaches the level of the lamp flame. The fish, attracted by the light, troop forward at once, and dazzled precipitate themselves against the sides of the glass which contains the light, then plunge downward. It is then that the net receives them and rises rapidly. Only six or seven fish are caught at a time, but by a frequent lowering of the net a large yield is effected in a comparatively short space.

MILITARY MASS NEAR CASTRES.

We publish this sketch as a curious representation of the perfect circles an army corps can form for special purposes. The picture deserves to be studied as a model of effective grouping.