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 sectionol 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 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 4,100 lbs. per running foot. Many bridges have already been built carrying even greater live loads.

The following comparision is made between the two rival bridges.

ROYAL ALBERT.	VICTORIA.
1 Span 550 feet skew. 4 " 330 " " 4 " 240 " square 51 " 200 " " 4 Approaches, 400 feet each.	24 Spans 242 feet each. 1 " 330 "
With abutments, piers, &c., making about 15,500 lineal feet of iron superstructure.	With piers, &c., making a little over 7,00 lineal feet of iron superstructure.
Greatest clear heigth above water 130 ft.	Greatest clear height above water, 60 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, $6,000,000.

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 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 or 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.

The bill for obtaining a charter for the undertaking, is now before the House and is an advanced stage.

SOCIETY OF ENGINEERS.

SCREW PROPELLERS SHAFTS AND FITTINGS.

(See page 108.)

(Continued from page 70, March number.)

The author now invites the attention of members to diagram No. 15A, which illustrates one of the most recent arrangements for feathering the blades of a screw. It is the invention of Mr. R. R. Bevis, of Messrs. Laird Bros., Birkenhead. The leading feature in the contrivance is that a portion of the shaft is hollow, and within is a rod riveted in the screw boss with cranks upon the blade shanks, and united at the other with a screw collar on the shaft, and by this arrangement Mr. Bevis is enabled to feather the screw from the engine room — a matter of advantage in war ships, by placing all below the water line. The thing has been successfully tried in Mr. Brassey's yatch, the Kathleen, and after twelve month's service, was found in good order.

Turning now from the forms and performances of screws in actual practice, the author invites the attenion of the members of the Society to a different and more theoretical or experimental branch of screw propeller action, and he gives the following abstract of certain experiments instituted by Professor Osborne Reynolds, to investigate the causes of the phenomena of racing observable with the screw when at work. In a paper read by Professor Reynolds on this topic before the Institution of Naval Architects, in April, 1873, he remarks that the tendency which the screws of steamships have under some circumstances to lose their hold of the water, appears to have its causes enveloped in mystery, for although the circumstances under which this racing occurs are such as appear, *prima facie*, to afford an explanation of it as being due for instance to the pitching of the vessel, exposing the screw at certain intervals, yet a closer examination by lowering the screw to an angle with the ship's keel when in deep water, the connection with the engine shaft being made with a somewhat peculiar universal joint. When in shallow water the screw is raised so that the tip of the lower