

result. What these schools are to Massachusetts, this school ought to be to this State, and it will be, if the friends of education and the guardians of the public welfare give it their cordial support.

—The *Congrès International de Bienfaisance*, which met for the first time last year in Brussels, was convened in September last at Frankfurt on the Main, under the presidency of Mr. Bethman-Holweg. Public Charity, Education and Penitentiary Reform were the several heads of debate. A long and animated discussion on the best principle of State Education, ended in a vote favorable to a compulsory system and adverse to the gratuitous or free school system.

—The several great municipal bodies of France have, this year, passed resolutions in favour of an increase in the salaries of primary school teachers, and also to the effect that a piece of ground for a garden near the school house should be given free to each teacher.

—Cardinal Patrizi has made in the name of His Holiness the Pope, a great distribution of books and clothes, as prizes to the pupils of the evening classes for mechanics in Rome.

LITERARY INTELLIGENCE.

—Macaulay, it is said, has given up the idea of continuing his "History of England down to a period within the memory of living men," as at first announced. If such is the case, it is great wisdom in the able historian. "Memoirs of my own time" will do very well; but "history" must be that of another age.

—Mr. Alexandre, Inspector-General of the University of France, has been elected to replace the late Mr. Buissonade in the "Académie des Inscriptions et Belles Lettres."

—The first volume of the great historical dictionary of the French language, which has been so long preparing and was the text of so many *plaisanteries* against the *Académie Française*, is about to be published. The first part of it will contain 400 pages in-4o, and will not be one-fortieth of the letter A!!

SCIENTIFIC INTELLIGENCE.

—The Victoria Bridge has been, not inappropriately, designated the greatest engineering work of modern times. It is tubular, and is built on the principle of the Britannia Bridge, which spans the Menai Straits, near Bangor.

It will, we believe, be, when finished, the longest bridge in the world—its length from bank to bank being only 176 feet less than two miles.

The Menai Bridge is 1,880 feet long. The Victoria Bridge is, therefore, nearly five and a half times longer; or to illustrate its length by an example familiar to most English persons—Waterloo Bridge, London: This structure is 1,362 feet long. It would, consequently, require a little more than seven and a half times its length to measure distance with its Canadian brother.

The place where it crosses the St. Lawrence is about half a mile to the westward of Montreal, a short distance below the "Lachine" Rapids, and about nine (*) miles from St. Anne's, the place immortalised in Moore's Canadian Boat Song.

There will be twenty-four piers, which, with the two abutments, will leave twenty-five spaces or spans for the tubes. The centre span will be 330 feet wide, and each of the other spans will be 242 feet. The width of each of the piers, except the two at the centre, will be fifteen feet. The two centre piers will each be eighteen feet wide. This difference is very evident in the beautiful model of the bridge, which now forms a prominent object of attraction in the Canadian department of the Crystal Palace at Sydenham. This model (the length of which is thirty-two feet) has been made in every part exactly to scale; it is, therefore, a truthful representation, in miniature, of the actual structure.

The western faces of the piers—that is, those towards the current (which flows here at a rate varying from seven to ten miles an hour)—terminate in a sharp-pointed edge, and the fore-part of each pier presents two beautifully smooth bevelled-off surfaces. They are so shaped in order that the least possible resistance may be offered to the avalanches of ice that come along at the departure of winter, and that would hurl away every impediment, less solid than massive rock, that might be opposed to their progress. For it should be remembered that, not only is the whole length of the St. Lawrence, from its first receipt of lake water at Kingston to tidal water at Quebec—a distance of 360 miles—solidly frozen over in winter; but the 2,000 miles of Lake and upper river, together with the tributaries of the St. Lawrence (one of which—the Ottawa—has herself tributaries, several of which exceed the Thames in length, depth, and in volume of water), likewise send down their defiant masses, all to aggregate in the immediate vicinity of Montreal. The "piling" of the ice is sometimes as high as thirty, forty, and even fifty feet, and on several occasions great damage has been done by it to the massive stone buildings which line the quays, and form the noble river front for which this city is celebrated.

The stone used in the construction of the piers and abutments is a dense blue limestone, partly obtained from a quarry at Pointe Claire, fifteen miles above Montreal, and partly on the borders of Vermont, United States, about forty miles from Montreal. The piers close

to the abutments will each contain about 6,000 tons of masonry. Those to support the centre tube will contain about 8,000 tons each.

The total amount of masonry in the bridge will be about 3,000,000 cubic feet, which, at thirteen and a half feet to the ton, gives a total weight of about 222,000 tons.

Scarcely a block of stone used in the piers is less than seven tons weight, and many of these exposed to the force of the breaking-up ice weigh fully ten tons. The blocks are bound together, not only by the use of the best water cement, but each stone is clamped to its neighbours, in several places, by massive iron rivets, bored several inches into each block, and the interstices between the rivet and the block are made one solid mass by means of molten lead.

At the present time fourteen of the piers are completed; eight (including the two centre ones) will be finished next year, leaving only two to erect in 1859.

The piers hitherto constructed have stood firm as a rock." Had it been otherwise, and that the mighty St. Lawrence had conquered the combined appliances above stated, there would then, indeed, have been an end to all mechanical resistances.

Each of the abutments is 242 feet long and ninety feet wide. The north shore of the St. Lawrence is connected with the northern abutment by an embanked causeway, faced with solid masonry towards the current, 1,400 feet in length. The causeway, from the south bank of the river to the southern abutment, will be 700 feet long. The distance between this outer or river end of one abutment to the outer end of the other is 8,000 feet.

The clear height of the ordinary summer level of the St. Lawrence above the undersurface of the centre tube will be sixty feet, and the 8th will diminish towards either side with a gradient at the rate of 1 in 130, or forty feet in the mile, so that at the outer or river edge of each abutment the height will be only thirty-six feet above the summer level.

The navigation of the river through the Lachine Rapids is limited to steam vessels only, and they will pass exclusively between the two centre piers, as the river is unsuited for navigation at the site of the bridge, except between these two points.

The tubes will be nineteen feet high at each end, whence they will gradually increase to twenty-two feet six inches in the centre. The width of each tube is to be sixteen feet, or nine feet six inches wider than the rail track, which is five feet six inches—the national railway gauge of Canada.

The total weight of iron in the tubes will be 10,400 tons. They will be bound and riveted together precisely in the same manner and with the same machinery as at the Britannia Bridge. The tube connecting the northern abutment with pier No. 1 is now completed. The material for the second tube has reached Canada, and preparations are in progress for the despatch, from England, of eight more tubes early next year, so as to insure their erection during the summer.

Mr. Robert Stephenson and Mr. A. M. Ross are the engineers of this great work. The latter gentleman, having completed his duty as Engineer-in-Chief of the Grand Trunk Railway, now directs his skill and attention exclusively to this structure. The contractors are Messrs. Peto, Brassey, and Betts. The bridge will cost about 1,250,000l.

As regards the commercial importance of the Victoria Bridge, Mr. Robert Stephenson, in a report addressed to the directors in May, 1854, says:—

"The great object, however, of the Canadian system of railways is not to compete with the River St. Lawrence, which will continue to accommodate a certain portion of the traffic of the country, but to bring those rich provinces into direct and easy connection with all the ports on the east coast of the Atlantic, from Halifax to Boston, and even New York, and consequently through these ports, nearer to Europe.

If the line of railway communication be permitted to remain severed by the St. Lawrence, it is obvious that the benefits which the system is calculated to confer upon Canada must remain, in a great extent, nugatory and of a local character.

The province will be comparatively insulated and cut off from that coast to which her commerce naturally tends; the traffic from the West must either continue to adopt the water communication; or, what is more probable,—nay, I should say certain—it would cross into the United States by those lines nearly completed to Buffalo, crossing the river near Niagara.

There can be no doubt that without the Victoria Bridge the large and comprehensive traffic system involved in the construction of the Grand Trunk Railway could only be partially and, by comparison, ineffectually carried out at a very great cost. Montreal is the terminal point of the ocean navigation, and is connected with the Lower St. Lawrence and the ocean on one side, and with the great Canadian and American lakes—extending 2,000 miles into the heart of the continent—on the other. It is also, the centre from which lines of railway now radiate to Portland, Boston, and New York, and to which lines will converge from the Ottawa and the other rich, though as yet only partially developed districts of Canada. It is, therefore, the conviction of those persons most capable of forming a sound judgment on the question, that, great as is the cost of the bridge, by means of it a better, more rapid, and cheaper communication will be afforded for the produce of the magnificent districts of Western Canada and of the North-Western States of America, including Michigan, Illinois, Wisconsin, Minnesota, Iowa, &c., to the Atlantic seaboard, and for the supply of these districts with imported goods, than by any other route on the American continent.—*Canadian News*.

(*) St. Anne's, *Dont de l'Isle*, is about 20 miles above Montreal.