Q&LSJ

GREAT NORTHERN RAILWAY OF CANADA

C. H. RIFF

THE GREAT NORTHERN RAILWAY OF CANADA

Great Northern of Canada.—Col. McNaught, vice-president, says the Co. is going to build 60 miles more of its line in the immediate future, but is not ready to say just where at present. There will also be a short line connection with St. Jacques, which will make connection at the Ottawa end more direct.

The Quebec Harbor Commissioners are authorized by an act passed at the last session of the Dominion Parliament to guarantee the interest for 20 years at 3%, on bonds to be issued by the G.N.R. Co. to the extent of $200,000, to be known as the Quebec Elevator bonds, as set forth in the contract dated June 30, 1899, between the Ry. Co. and the Harbor Commissioners.

The charters of the Montreal Terminal Ry. and of the Chateauguay and Northern Ry. have been acquired by C. Magee and D. Murphy, of Ottawa, and H. Melville and Col. McNaught, some of whom are connected with the Great Northern Ry. of Canada. The first named is a street railway, and the second is a steam railway, having a Dominion charter to construct a line from Montreal to Joliette on the G. N. R., 37 miles. A Dominion subsidy of $150,000 towards the construction of bridges at Bout de l'Isle, and a subsidy of the like amount towards the cost of the railway have been given. The plan for the bridges have been approved of by the Government, and F. A. Hibbert, of Ottawa, has been engaged to superintend their construction. The bridge over the west channel is 1,504 ft. long, while that over the east channel is 1,114 ft. long. In addition to the railway tracks there will be a 10 ft. roadway on either side for carriages and foot passengers.

SUMMI

JUNE 1901

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Great Northern Ry. of Canada.—A meeting was called to be held in Quebec, July 17, to authorize construction of extensions to this railway from Grand Mere or Garneau Jct. to the Quebec and Lake St. John Ry., in the County of Port Neuf or the County of Quebec, and from Hawkesbury to South Indian, Ont.

August 1901
P 229

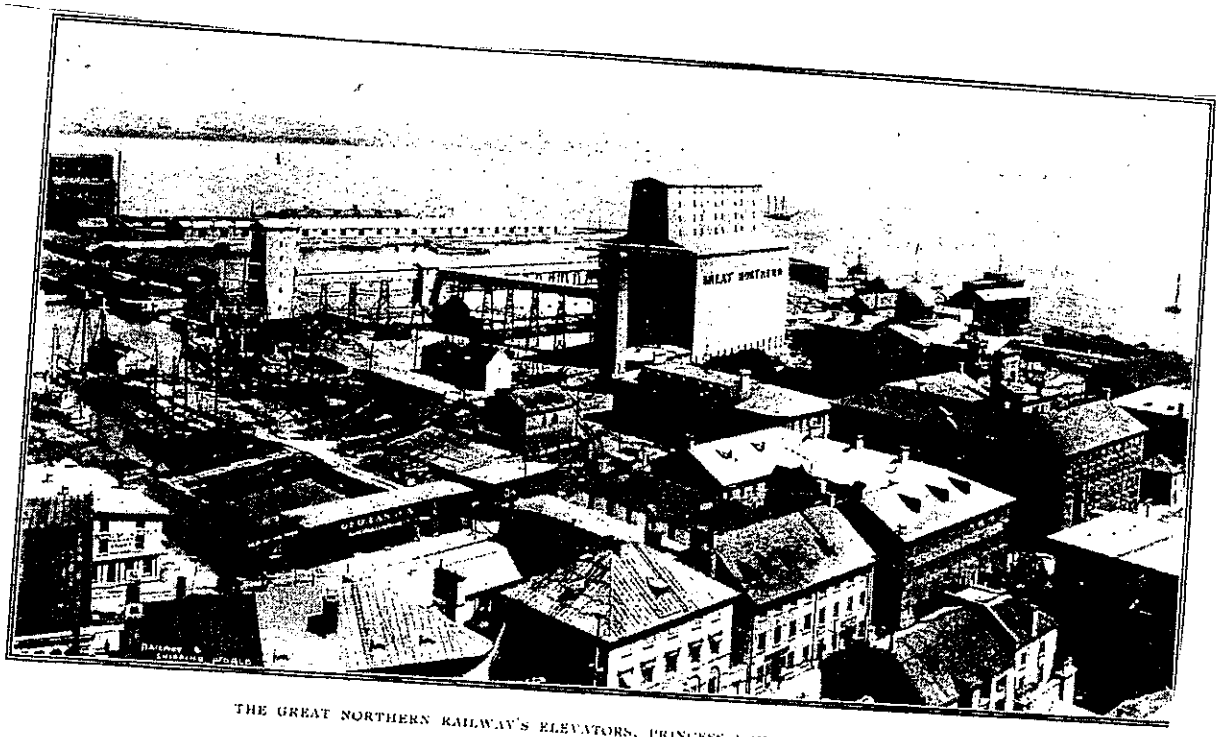
Great Northern Ry. of Canada.—The cut-off proposed to be constructed from Garneau Jct. to St. Catherines on the Quebec and Lake St. John Ry., 22 miles from Quebec, will shorten the distance into Quebec by the G.N.R. 15 miles, as compared with the present route by Riviere à Pierre. The cut-off will be 58 miles in length, and will pass through St. Stanislas, St. Casimer, St. Alban on to St. Catherines. The grades will be 0.6%, compensated opposed to eastbound traffic, and 1% compensated opposed to westbound traffic, and the maximum curvature will be 4°. Contractors have gone over the ground with a view of tendering for the work, and bridge companies have been asked to submit tenders for the superstructures of the bridges, but no contracts have been let.

At the western end of the line it is proposed to extend from Hawkesbury, via Caledonia Springs to South Indian, Ont., where a junction will be effected with the Canada Atlantic Ry., 23 miles from Ottawa. This extension will be 32 miles, the grades and curvature will be about the same as on the cut-off from Garneau Jct. to St. Catherines. A contract for this extension, we are informed, will be let shortly. (Aug., pg. 229.)

The Co. is preparing for a big fall business in grain and is laying three extra tracks into its Quebec elevator.

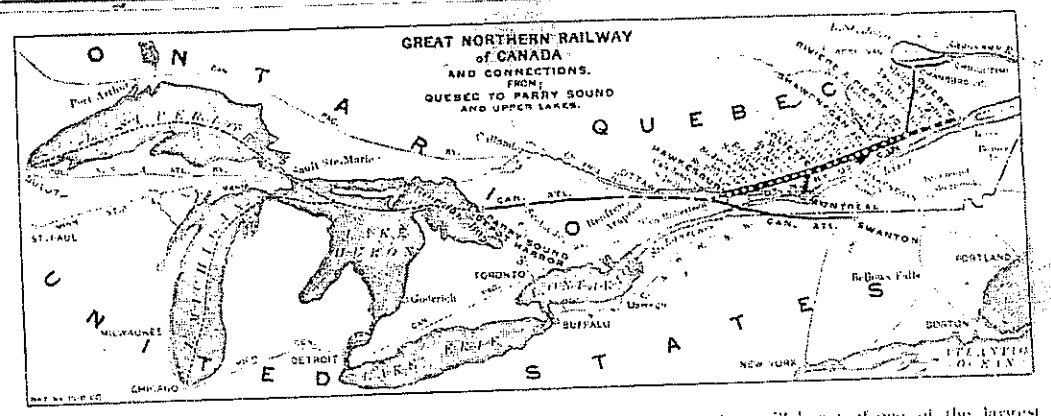
A complete description of the G.N.R. is given on pg. 259.

September 1901



THE GREAT NORTHERN RAILWAY'S ELEVATORS, PRINCESS LOUISE DOCKS, QUEBEC.

October 1901



Great Northern Railway of Canada.

This recently completed line extends 226 miles from Quebec, 22 ft. above sea level, to Hawkesbury, Que., 228 ft. above sea level. From Quebec to Riviere à Pierre, 58 miles, the Quebec and Lake St. John Ry. is utilized for the present. From Riviere à Pierre to St. Tite, 33 miles, the Great Northern bought the Lower Laurentian Ry. and operates it as part of the main line. On this portion, the railway passes through the growing towns of Notre Dame des Anges, St. Thècle, and St. Tite, other points of importance being Rousseau's Mill and Lac aux Sables. The lumber industry of these various places is very considerable; there are several brick yards, quarries, and charcoal kilns, also, the charcoal being principally used by the Radnor forges. At St. Tite the new portion of the G.N. Ry. begins, and at Garneau Jct. the railway crosses the C.P.R.'s Piles branch, which runs from Three Rivers to Grand Piles. Garneau Jct.'s importance lies in the fact that it will be the junction point of the cut-off which the G.N.R. proposes to build from St. Catherines 00 the Q. and L.S.J. Ry., 22 miles from Quebec. This cut-off will shorten the distance between Hawkesbury and Quebec by 15 miles, and the Lower Laurentian Ry. will then be used as a feeder, as it will connect the Lake St. John region with Grand Mere, Shawinigan, and all points between this and Montreal. From Shawinigan Jct. the railway gradually descends for three miles, when it crosses the St. Maurice river on a steel cantilever bridge of 250 ft. span, with two anchor spans of 74 ft. 8 in. each, and one span of 100 ft., with steel trestle approaches. From here can be seen the Grand Mere pulp mills, one of the largest mills in America. The line then gradually rises until one mile west of the bridge a junction is made with a branch one mile in length, running to the important town of Grand Mere. Three miles west of Grand Mere Jct., Shawinigan Jct., a divisional point, is reached. A branch line runs south from here 4½ miles to Shawinigan Falls, whose power, derived from the St. Maurice river, bids fair to eclipse any water power in America. This important town is making giant strides, and from a wilderness three years ago has emerged into a hive of industry, numbering 4,000 people, with churches, banks, saw mills, and an electric railway. The Pittsburg Reduction Works have here established their works for the treatment of aluminum, and the Belgo Canadian pulp mills in a very short time will boast of one of the largest plants in America. This branch railway is owned and operated by the G.N.R.

From Shawinigan Jct. to St. Boniface, the line is uniformly level, and passes near the villages of St. Flore and Burrill's siding, where are situated important saw mills. From St. Boniface to Joliette, the country, though level, is broken here and there by deep ravines, which are crossed by steel trestles built to the latest Government specifications. The towns tapped on this portion are Charrettes, St. Pauline, St. Ursule, St. Justin, St. Barthelemi, St. Cuthbert, St. Norbert, St. Elizabeth, all growing settlements, populated by an industrious people who live most comfortably from the products of their farms. This portion is one of the very best hay growing sections in Canada. At Joliette, the G. N.R. crosses the C.P.R., and Joliette is the point from where the G.N.R. will deviate, in order to have its line direct into Montreal. This line is now being built by the Chateauguay and Northern Ry. Co., and will be taken over by the G.N.R. as soon as built. From Joliette to St. Jerome the land is again level, with easy grades and curvature, and passes through Montcalm, St. Jaques, whose tobacco trade is now very considerable and gaining in importance every year. St. Alexis, Ste. Julienne, St. Lin, New Glasgow, Ste. Sophie, and Paisley. St. Jerome town is reached from the main line by a branch of 1½ miles, and is a very important point for both the G. N. and C.P. railways. The G.N.R. again crosses the C.P.R., passes through St. Canut and on to Lachute, where the last crossing of the C. P. R. is made. After passing Stonefield, St. Philippe and Grenville, where the Carillon and Grenville Ry. is crossed, the Ottawa river is reached, and crossed on a steel bridge consisting of seven spans of 210 ft. each. It is a single track deck bridge approached on either side by trestles which will eventually be filled in, and is one of the most substantial bridges of its kind in Canada. Some 2,600 ft. west of the

September [90]

shipped from Quebec is here delivered by the C.A.R. to the G.N.R.

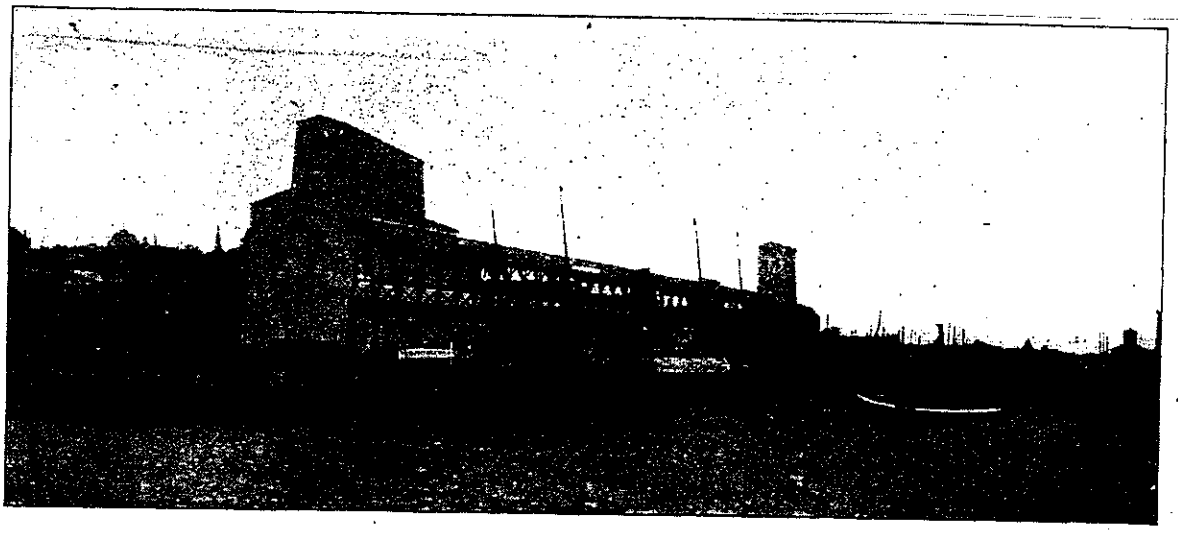
The summit between Riviere à Pierre and Hawkesbury occurs at St. Paulin, 120 miles from Quebec, the elevation being 555 ft. above sea level. From Riviere à Pierre to St. Tite, the maximum grades are 2% and maximum curvature 7°, but the proposed line from St. Catherines on the Q. & L.S.J.R., to Garneau Jct. on the G.N.R., will cut out all these grades and curvature and substitute instead 6/10's grades compensated opposed to east bound traffic and 1% compensated opposed to west bound traffic with a maximum curvature of 4°. From St. Tite to Hawkesbury, with the exception of 1½ miles near Grand Mere where 1.25 grades are used, the maximum gradient is 1% and maximum curvature 6°. With very little expense and by making use of momentum speed, the heavy locomotives now in use on the G.N.R. will be able to haul 1,750 tons per train from Hawkesbury to Quebec, with the exception of the short distance at Grand Mere, where a pusher will have to be resorted to. The embankments are all substantially built, the excavations taken out wide, the drainage is in good condition and when the ballasting, The Joliette station is built of stone and brick and would be considered a first-class station on any road. When the improvements, now under way, or contemplated, are done, the G.N.R. from Quebec to Montreal will be slightly longer than the C.P.R., but it will have the advantage of being the shortest line between Quebec and Ottawa by several miles.

The G.N.R. is in its infancy as yet, but it is gradually spreading in a quiet, unobtrusive way, and will at no distant day form one of the important railway systems of Canada. It has an elevator and up-to-date car shops at Quebec. From its elevator are loaded and despatched weekly steamers of the Leyland line, which has not been backward in recognizing the importance of the port of Quebec, which is fed by the Quebec and Lake St. John, Great Northern, Canadian Pacific, Grand Trunk, Intercolonial and Quebec Central railways. It will be but a very short time before several lines of steamers will doubtless follow the example set by the Leyland line in taking advantage of the natural port of the St. Lawrence, which, in addition to its unrivalled water facilities, also enjoys a much longer season than other ports of the

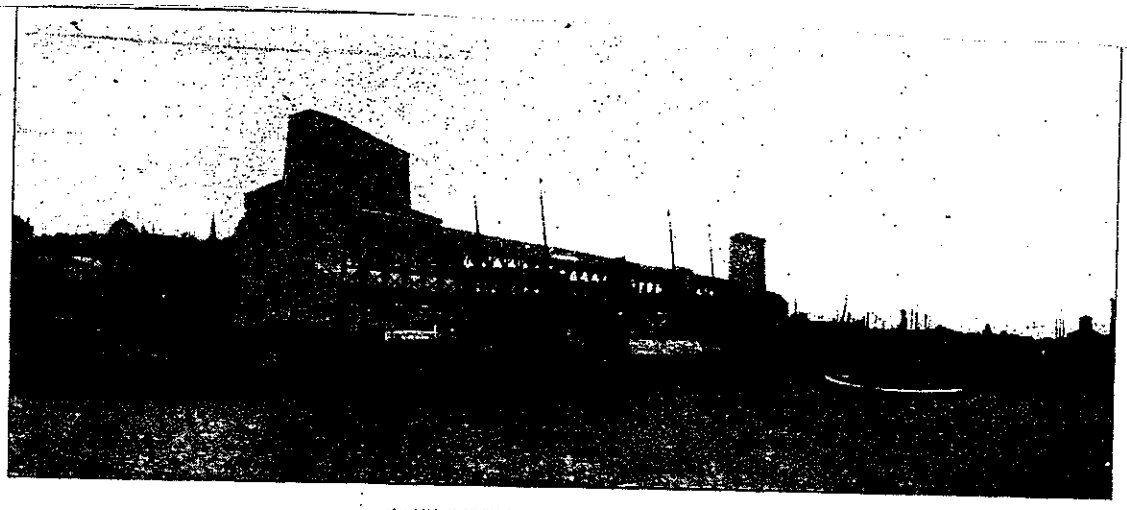
clutches are provided to enable the machinery to start or stop while the shafting is in motion. The vessels now load on the outer portion of the Louise basin, but it is intended very shortly to build another conveyer from the eastern end of the elevator to enable the Co. to load two vessels at the same time.

We are indebted to Chief Engineer Doucet for the facts above mentioned.

The illustration of the Co.'s Quebec elevator below shows the S.S. Indian, 11,500 tons, of the Leyland line, at the wharf on May 31, loaded with what is said to have been the largest cargo of grain and general merchandise ever taken by the St. Lawrence route. It comprised 217,304 bush. wheat, 44,290 bush. oats, 2,405 bales wood pulp, 922 cases match splints, 80 cases leather, 42 cases boots and shoes, 8,542 bundles, 205 bags and 8,784 pieces chair stock, 18,403 sacks flour, 255 bags oatmeal, 420 tcs. oleo oil, 7,000 pails lard, 25 boxes meat, 50¼ standard birch planks and 615 standard deals.



S.S. INDIAN AT QUEBEC.



GREAT NORTHERN ELEVATOR AT QUEBEC.

now being attended to, is finished, the G.N.R. will have one of the best ballasted roads in Canada. The bridges are all built of steel to Government specifications on masonry. Where ravines are crossed, which cannot be filled in, steel trestles, of 30 and 60 ft. spans are used. The culverts are built of cedar, but it is intended to replace these with stone or cement arches as repairs are needed. The fencing is mostly with cedar posts. The ties are of black spruce, cedar or tamarac, and the older portion of the road is being entirely re-tied this year. The rails from Riviere à Pierre to St. Boniface are 56 lbs. except at Grand Mere where six miles have been relaid with 70 lbs. From St. Boniface to Montcalm the rails are 70 lbs., from Montcalm to St. Jerome 56 lbs., and from St. Jerome to Hawkesbury 70 lbs. The 70-lb. section is of English make and very similar to the section known as the Canadian Society of Civil Engineers' section, but with a wider base and with angle bars having a substantial bearing on the ties. The telegraph line is operated by the G.N.W.T. Co., which has two wires strung. The sidings are generally 1,600 ft. in length and equal in character to the main line. The stations are substantially built of wood and combine elegance with comfort.

St. Lawrence. The elevator has a capacity of 1,000,000 bush., is thoroughly equipped with all the modern conveniences for handling export grain, and is provided with a marine leg to enable vessels and barges to have their grain unloaded and stored in the elevator. The elevator is of wood covered with corrugated iron; the engine house is of brick. The foundations of both elevator and engine house are of stone built on pile foundations. The elevator contains two tracks capable of holding eight cars which can be unloaded in 12 minutes, and the unloading capacity is 12,000 bush. an hour, but this amount has been exceeded on trial, as 13,000 bush. an hour have already been loaded. The power is derived from a battery of four boilers and one horizontal Corliss engine of 500 h.p. The elevator is supplied with a fire pump of 750 gallons a minute and is equipped throughout with electric light and electric bells. The Quebec Harbour Commissioners have erected a freight shed in connection with the elevator, 500 ft. in length, over which is built a conveyer so that the loading spouts can be moved from one hatch of the vessel to the other, thus enabling vessels to take in their cargo without changing their moorings. All power is transmitted by means of rope drives, and friction

The Master Car and Locomotive Painters' Association of the U.S. and Canada will hold its annual convention at Buffalo, N.Y., Sept. 10 to 14.

New Brunswick Ry.—At the annual meeting at St. John, N.B., Aug 1, the following directors were elected: Lord Strathcona, R. Meighen, J. Turnbull, J. Hardisty, Montreal; J. S. Kennedy, S. Thorne, J. K. Tod, D. W. James, New York; E. R. Burpee, Bangor; H. H. McLean, J. McMillan, St John.

Canadian Transfer Co.—G. W. Verral, who has been Superintendent of this Co. for Toronto and Hamilton, with office at Toronto, since he sold out the Verral Transfer Co.'s business in Toronto and Hamilton to the C. T. Co. about a year ago, has resigned, and will in future devote himself to his other interests comprising the Dominion Livery Co., on York St., Toronto, the Verral Storage Co., on Bay St., Toronto, and the Canadian agency for Dunville's Irish Whiskey. He has been succeeded as Superintendent of the C. T. Co. at Toronto and Western agencies by J. Thomson, recently chief clerk of the C. P. R.'s general baggage department at Montreal, and formerly baggage master at Toronto Union Station.

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September 1901

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Inspecting the Great Northern Ry.—Messrs. Morley, McLeod, a son-in-law of Jno. Wannamaker, Hulm, Gowen & Beale, Philadelphia financiers, made a trip over the G.N.R. of Canada, on Oct. 22, in the private Pullman car Acantha, accompanied by Guy Tombs, G.F. & P.A. of the line. Good time was made, Hawkesbury to Joliette, 66 miles, taking 90 minutes, and Joliette to Shawenegan Junction, 55 miles, 60 minutes. Three stops were made after leaving Joliette, making the actual running time 55 minutes. The party inspected the Co.'s elevators and docks at Quebec, and then went to Montreal to look over the proposed terminals there. They expressed themselves well pleased with the line and its prospects.

November 1901

P339

Great Northern Ry. of Canada.—Work is reported to have been commenced on the doubling of the terminal facilities at Quebec, in order to accommodate the increasing freight business which the G.N.R. is bringing in for shipment to Great Britain. Increased equipment has been provided for the elevator, and the discharging of barges and other vessels having cargoes of western grain can now be carried on by means of a marine leg simultaneously with the elevating of grain from railway cars. All the available storage on the wharves is taken up, and new sheds, one being already completed, 850 ft. long by 80 ft. wide, are being constructed to provide for the handling of the business. Four vessels are being operated in connection with the G.N.R., by the Leyland line instead of two, as was arranged at the beginning of the season, and it is expected that these will be run until Jan.

Bids are asked for bridges as follows: 160 ft. span over River Ste. Anne; 100-ft. deck span over Blanche river; 100-ft. span over Moine river; one span 200 ft., one span 100 ft. and 2 spans each 50 ft. for bridge over Batiscan river; 3 0-ft. span over River des Envies, and 125-ft. span over Charest river. Also for four viaducts, 325 ft., 330 ft., 400 ft., 560 ft. long, composed of 30, 40 and 60 ft. spans. All steel to be built to class 1, Dominion Government specifications. Tenders are to be sent to A. E. Doucet, Chief Engineer, Quebec.

We were recently officially informed that contracts had not been awarded for the cut-offs between Garneau Jct. and St. Catherines, Que., and between Hawkesbury and South Indian, Ont. (Sep., pg. 273.)

November 1901

Great Northern Ry. of Canada.—A number of Philadelphia bankers and capitalists visited Quebec recently, and were given a special trip over the line. It is said they propose building a large hotel in Quebec for tourists.

It is reported that E. C. Loss, of Chicago, who is in charge of the construction of the Chateauguay and Northern Ry., has been given a contract for the construction of the cut-off from Garneau Jct. to St. Catherines. On this cut-off there will be 1,400 ft. of steel viaducts, one span of 200 ft., one of 600 ft., one of 125 ft., three of 100 ft. each, two of 50 ft. each, and one of 30 ft. The contract calls for the completion of the work by July, 1902. (Nov., pg. 335.)

Great Northern Ry. (U.S.) The [illegible]

December 1901

Great Northern Ry. of Canada.—Work on the cut off from Garneau Jct. to St. Catherines, which will give a direct route into Quebec, will be commenced as early as possible by E. C. Loss, contractor, and it is expected that it will be completed by July. The new route will be 15 miles shorter than the present one over the Quebec and Lake St. John Ry. from Rivière à Pierre. (Dec., 1901, pg. 354.)

January 1902

The Great Northern Ry. of Canada has let the contract for the construction of the cut-off from St. Catherines, Que., to Garneau Jct., 58 miles, and clearing will be done during the winter. The whole work is expected to be completed by Nov. The cut-off will save 17 miles in the distance between Quebec and Montreal on the Co.'s line.

A branch line is projected from Ste. Julienne to Rawdon, a distance of 8 miles, and another from St. Theele to La Tuque. (Jan., pg. 3.)

February 1902 p 56

THE

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The Construction of the Great Northern Railway of Canada.

By J. M. Shanly, M.Can.Soc.C.E.

The first portion of this article was published in our last issue.

Eleven miles west of the Maskinonge is the Chicot—a small stream flowing through a deep valley. It is crossed by a steel viaduct of two 40 ft. towers and three 60 ft. intermediate spans resting on eight pedestals and two abutments. The total length is 260 ft., and the extreme height from cap to base of rail 57 ft. The pedestals were founded on rock, and the abutments on hard gray clay. Owing to the great height of these trestles it was impracticable to so design them that the windward legs would never be in tension, therefore resistance to overturning had to be provided by anchoring them securely to masonry and making the pedes- sufficiently large and heavy to withstand the lifting force due to the extreme wind pressure. In order to ensure the necessary holding power the anchor bolts required to be very long, and it was therefore necessary to build them into the masonry. This was a very difficult matter to do, and at the same time keep the heads in exactly the proper position to receive the shoes, as a very slight displacement would cause a misfit between them and the iron work of the towers. To overcome this, the following method was adopted: The position of the bolts was first fixed accurately on the foundations, and a round stick 6 to 8 ins. in diameter, and long enough to project above the level of the coping, slightly tapering downwards, was set up perpendicularly over the point and firmly fixed in position; the masonry was then built up around the stick as high as the under side of the cap; the sticks were then withdrawn and the cap placed in position. The position of the anchor bolts was then again located and marked on the caps, and holes of proper size drilled through them into the space below to admit the anchor bolts. When the time came to set the anchorages, these holes and the space below were filled with grout and the bolts dropped into place. This method worked very well, though in a few cases the holes in the shoe plates had to be slightly enlarged, a- in one or two cases the bolts had to be drawn and reset. When the iron was p... on, a few bolts were found to be loose, owing probably to some inferiority in the grouting; it was deemed prudent, therefore, to test them all, and any that were found loose were withdrawn and reset. It seems to the writer that this method of anchorage, which depends entirely on the holding power of a threaded rod set in cement, might be improved upon. If the cement is good, and the work well done, it is no doubt absolutely safe, but such work is always liable to careless handling, and where so much depends on the anchorages, no chances should be taken. The next river is the Bayonne, about 7 miles further west. It is crossed by a through lattice span of 100 ft. on masonry abutments. The foundations were carried down through stiff clay to the rock, which

J. C. M. BUNTZEN,
General Manager British Columbia Electric Ry. Co.

was found at about 7 ft. below low water. About seven miles further west is the L'Assomption river, at Joliette. This is crossed by a single span of 176 ft. through pin connected truss on masonry abutments founded on piles and timber grillage. This is the last bridge on the eastern division. On the western division there are only two iron bridges, apart from that at Hawkesbury, and five small timber trestles. These bridges are both at Lachute—the first one across the North river is a single through pin connected span of 204 ft., and the other across the West river, a single through lattice truss of 103 ft. span. They are both on masonry abutments founded on piles and timber grillage.

The Hawkesbury bridge is made up as follows:—Commencing at the east end there is a through lattice pony truss of 114 ft. span across the Grenville canal, with flanking spans of 55 ft. deck plate girders at either end; these spans rest on an abutment, and three piers of masonry founded on solid rock, which is here close to the surface of the ground. There is a clearance of 42 ft. between the lowest member of this bridge and the water surface of the canal. Next comes 315 ft. of wooden trestle, and then the main bridge, which consists of seven spans pin connected deck trusses of 206½ ft. each, on stone piers. The floor being placed between the upper chords and the base of rail, 3 ft. 3 ins. below their top. Piers 1 and 8 are built with square ends, and the rest with cutwaters. The shore piers are founded on the rock, which is here almost bare at low water. The depth of water at the other piers varied from 6 to 16 ft. at extreme low water. Pier 2, counting from the Hawkesbury side, was the only one that gave any serious trouble in getting in the foundation. When the original soundings were made, the bottom at this pier was found to be covered with boulders, but what appeared to be solid rock was found to be only a foot or two lower down, and the coffer dam was put in on the supposition that this was correct. However, when the excavation was under way, it turned out that the supposed rock was only boulders, and a new coffer dam had to be built outside the first one. The excavation was carried down 9 ft. before a suitable foundation was found, through a mass of boulders and stones mixed with sawdust, slabs, etc., which had been no doubt accumulating for years. At the other piers there was comparatively little excavation, but some large boulders had to be removed from most of them before the caissons could be finally placed. The method of putting in the foundations was by means of a coffer dam for piers 2, 3 and 4, and for piers 5, 6 and 7 by bottomless caissons fitted to the rock, which had been previously cleared of boulders and loose material. The excavated space, inside the coffer dams, and the caissons were then partly filled with concrete mixed in the proportions of 1 cement, 2 sand and 5 broken stone. This was deposited under water by means of a box holding about 1 cubic yard, and after the concrete was set the water was pumped out, and the masonry commenced. Masonry was started in each pier at 3 ft. below low water. Portland cement was used

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NEXT ANNUAL MEETING at Washington, D.C., in 1902, probably in Oct.
OFFICIAL ORGAN.—THE RAILWAY & SHIPPING WORLD, Toronto.

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ROOMS, 94 King St. West, Toronto.

Great Lakes and St. Lawrence River Rate Committee.

CHAIRMAN, W. J. Brown, Detroit, Mich.
SECRETARY, G. C. Wells, Montreal.
NEXT MEETING, at Detroit, Mich., probably in Jan. or Feb., 1903.

National Association Marine Engineers of Canada.

PRESIDENT, T. J. S. Milne, Kingston, Ont.; VICE-PRESIDENT, O. L. Marchand, Montreal; SEC.-TREAS., J. A. Morrison, St. John, N.B.; CONDUCTOR, F. S. Henning, Toronto; AUDITORS, R. Craig, Toronto, and Jos. Gillie, Kingston, Ont.
NEXT ANNUAL MEETING of the Grand Council in Montreal, Jan. 1903.

Niagara Frontier Summer Rate Committee.

CHAIRMAN, J. M. Lyons, Moncton, N.B.
SECRETARY, G. C. Wells, Montreal.
NEXT MEETING, at New York, probably in Jan., 1903.

Track Supply Association.

PRESIDENT.—F. E. Came, Montreal.
FIRST VICE-PRESIDENT.—R. J. Davidson, Hilburn, N. Y.
SECOND VICE-PRESIDENT.—A. O. Norton, Coaticook, Que.
HON. SECRETARY-TREASURER.—Acton Burrows, 33 Melinda Street, Toronto.

for concrete, and for the masonry. Piers 6 and 7 were in the main channel in 14 and 16 ft. of water respectively, and as the bridge was just at the foot of the Grenville rapids and the current very strong, it required great care and careful handling to get them set accurately in place. The substructure was begun in July, 1899, as soon as the water fell sufficiently to allow of it, and the whole of the masonry and foundations were completed before Christmas of that year. The stone was quarried and cut about eight miles up the river, near L'Orignal, and was brought down to within a short distance of the work on scows, and then hauled by teams from there. There were 2,323 cubic yards of masonry, and 799 cubic yards of concrete in the main river bridge. The western approach consisted of a timber trestle 1,320 ft. long, commencing with a height of 54 ft., three decks, and descending on a 1% grade till a height of about 20 ft. was reached. The main street of Hawkesbury is crossed by two I beam spans of 20 ft. each, supported at the ends on timber bents, and in the middle by a steel one. From the end of the trestle a short embankment leads to the Hawkesbury yard, beyond which is situated the junction with the Hawkesbury branch of the Canada Atlantic Ry. The total weight of steel in the Hawkesbury bridge is 1,727 tons.

The station buildings are generally frame structures on cedar posts in two stories, with dwelling for the agent, and freight shed under the same roof. The station at Joliette is a much finer building than the others, built of pressed brick on a stone foundation, with a separate freight shed of wood. Five tanks were erected on the 88 miles of new line, of 40,000 gallons capacity each, with steam pumps under the tanks, except in the case of the one at Joliette, which is supplied from the town waterworks. The foundation at Joliette was of rubble masonry with cut stone caps, but the others were of concrete, which proved to be cheaper and just as good. There is a four-stall wooden engine house at Hawkesbury with a turntable in front, and the tank is set on 24 ft. posts so as to give sufficient head to supply the engine house with water for washing engines, etc. The turntable is 65 ft. in length. It is on roller bearings, and is so balanced that a heavy engine can be readily turned by one man. The pivot foundation is a block of concrete set well below the frost into hard boulder clay; the track approaches are of cribwork filled with stone. There are four level crossings with other railways on the line. The first of these is with the C.P.R. St. Gabriel branch, near Joliette; the next with the Labelle branch near St. Jerome, and the 3rd with the C.P.R. north shore main line near Lachute. These crossings are protected by interlocking and derailing apparatus. The fourth crossing is with the Carillon and Grenville Ry., near Grenville. This railway is an antiquated line of 5 ft. 6 in. gauge, operated, in the summer only, in connection with the Ottawa river boats. The crossing is protected by four interlocking distant signals, but has no derails nor home signals. The general arrangement of signals, etc., at these crossings is the same, viz., derails 500 ft. from the diamond, home signals 50 ft. farther on, and distant signals 1,200 ft. from the home signals, or 1,750 ft. from the crossing. A guard rail of 56 lbs. steel is laid from each derail for a distance of 400 ft. towards the diamond to prevent derailed trains from running off the ties and being ditched. Sidings averaging about 1,500 ft. in length were put in at all stations, with additional freight sidings at the more important points. The track was laid with 70 lb. rails of Am. Soc. C.E. section laid broken joints, with 24 in. angle bars and 4 bolts to the joint. These angle bars weighed 48 lbs. a pair, and the bolts and nuts 17 ozs. each. The spikes were

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TORONTO, CANADA, APRIL, 1902.

[illegible] A COPY. [illegible] A YEAR.

The Construction of the Great Northern Railway of Canada.

By J. M. Shanly, M.Can.Soc.C.E.

The first portion of this article was published in our last issue.

Eleven miles west of St. Maskinonge is the [illegible], a small stream flowing through a [illegible] valley. It is crossed by a steel viaduct [illegible] towers and three [illegible] intermediate spans resting on eight pedestals and [illegible] abutments. The total length is [illegible] and the extreme height from [illegible] to base of rail 87 ft. The pedestals were founded on rock, and the [illegible] on hard gray clay. Owing to the great length of these trestles it was impracticable to so design them that the winds and legs would never be in tension, therefore resistance to overturning had to be provided by anchoring them securely to the masonry and making the pedestals [illegible] large [illegible] to withstand the lifting force due to the [illegible] pressure. In order to [illegible] the necessary holding power the [illegible] bolts required to be very long, and it was therefore necessary to build them into the masonry. This [illegible] a difficult matter to do, and [illegible] keep the heads in [illegible] the proper position to receive the shoes, as a very slight displacement would cause a misfit between them and the iron work of the towers. To overcome this, the following method was adopted: The position of the bolts was first fixed accurately on the foundations, and a round stick [illegible] long enough to project above the level of the coping, slightly tapering downwards, was set up perpendicularly over the point and firmly fixed in position; the masonry was then built up around the stick as high as the under side of the cap; the sticks were then withdrawn and the cap placed in position. The position of the anchor bolts was then again located and marked on the caps, and holes of proper size drilled through them into the space below to admit the anchor bolts. When the time came to set the anchor bolts these holes and the space below were filled with grout and the bolts dropped into place. This method worked very well, though in a few cases the holes in the shoe plates had to be slightly enlarged, and in one or two cases the bolts had to be withdrawn and reset. When the iron was put on, a few bolts were found to be loose, owing probably to some inferiority in the grouting; it was deemed prudent, therefore, to test them all, and any that were found loose were withdrawn and reset. It seems to the writer that this method of anchorage, which depends entirely on the holding power of a tube [illegible] rod set in cement, might be improved upon. If the cement is good, and the work well done, it is no doubt absolutely safe, but such work is always liable to careless handling, and where so much depends on the anchorages, no chances should be taken. The next river is the Bayonne, about 7 miles farther west. It is crossed by a through lattice span of 110 ft. on masonry abutments. The foundations were carried down through stiff clay to the rock, which [illegible]

[illegible] MACKENZIE.

[illegible]

was found at about [illegible] below low water. About [illegible] miles farther west is the L'Assomption River, at [illegible]. This is crossed by a single span of [illegible] through pin connected truss on masonry abutments founded [illegible] on piles and timber grillage. This is the largest bridge on the eastern division. On the western division there are only two iron bridges, apart from that at Hawkesbury, and two small timber trestles. These bridges are both at Lachute, the first one across the North river is a single through pin connected span of [illegible] ft., and the other, across the West river, a single through lattice truss of [illegible] ft. span. They are both on masonry abutments founded on piles and timber grillage.

The Hawkesbury bridge is made up as follows: Commencing at the east end there is a through lattice pony truss of [illegible] ft. span across the Grenville canal, with flanking spans of 55 ft. deck plate girders at either end; these spans rest on an abutment, and three piers of masonry founded on solid rock, which is here close to the surface of the ground. There is a clearance of [illegible] ft. between the lowest member of this bridge and the water surface of the canal. Next comes [illegible] ft. of wooden trestle, and then the main bridge, which consists of seven spans pin connected deck trusses of [illegible] ft. each, on stone piers. The floor being placed between the upper chords and the base of rail [illegible] below their top. Piers [illegible] and 8 are built with square ends, and the rest with cutwaters. The shore piers are founded on the rock, which is here almost bare at low water. The depth of water at the other piers varied from [illegible] ft. at extreme low water. Pier [illegible] counting from the Hawkesbury side, was the only one that gave any serious trouble in getting in the foundation. When the original soundings were made, the bottom at this pier was found to be covered with boulders, but what appeared to be solid rock was found to be only a foot or two lower down, and the coffer dam was put in on the supposition that this was correct. However, when the excavation was under way, it turned out that the supposed rock was only boulders, and a new coffer dam had to be built outside the first one. The excavation was carried down [illegible] ft. before a suitable foundation was found, through a mass of boulders and stones mixed with sawdust, slabs, etc., which had been [illegible] accumulating for years. At the other piers there was comparatively little excavation, but some large boulders had to be removed from most of them before the caissons could be finally placed. The method of putting in the foundations was by means of a coffer dam for piers [illegible] and [illegible], and [illegible] piers [illegible] and 7 by bottomless caissons fitted to the rock, which had been previously cleared of boulders and loose material. The excavated spaces inside the coffer dams, and the caissons were then partly filled with concrete [illegible] of proportions of [illegible] cement, [illegible] sand and [illegible] broken stone. This was deposited under water by means of a box, holding about a cubic yard, and after the concrete was set the water was pumped out and the masonry commenced. Masonry was started on each pier at [illegible] ft. below low water. Portland cement was used

much finer building than the others, built of pressed brick on a stone foundation, with a separate freight shed of wood. Five tanks were erected on the 88 miles of new line, of 40,000 gallons capacity each, with steam pumps under the tanks, except in the case of the one at Joliette, which is supplied from the town waterworks. The foundation at Joliette was of rubble masonry with cut stone caps, but the others were of concrete, which proved to be cheaper and just as good. There is a four-stall wooden engine house at Hawkesbury with a turntable in front, and the tank is set on 24 ft. posts so as to give sufficient head to supply the engine house with water for washing engines, etc. The turntable is 65 ft. in length. It is on roller bearings, and is so balanced that a heavy engine can be readily turned by one man. The pivot foundation is a block of concrete set well below the frost into hard boulder clay; the track approaches are of cribwork filled with stone. There are four level crossings with other railways on the line. The first of these is with the C.P.R. St. Gabriel branch, near Joliette; the next with the Labelle branch near St. Jerome, and the 3rd with the C.P.R. north shore main line near Lachute. These crossings are protected by interlocking and derailing apparatus. The fourth crossing is with the Carillon and Grenville Ry., near Grenville. This railway is an antiquated line of 5 ft. 6 in. gauge, operated in the summer only, in connection with the Ottawa river boats. The crossing is protected by four interlocking distant signals, but has no derails nor home signals. The general arrangement of signals, etc., at these crossings is the same, viz., derails 500 ft. from the diamond, home signals 50 ft. farther on, and distant signals 1,200 ft. from the home signals, or 1,750 ft. from the crossing. A guard rail of 56 lbs. steel is laid from each derail for a distance of 400 ft. towards the diamond to prevent derailed trains from running off the ties and being ditched. Sidings averaging about 1,500 ft. in length were put in at all stations, with additional freight sidings at the more important points. The track was laid with 70 lb. rails of Am. Soc. C.E. section laid broken joints, with 24 in. angle bars and 4 bolts to the joint. These angle bars weighed 48 lbs. a pair, and the bolts and nuts 17 ozs. each. The spikes were

there was erected. Track was also laid during the fall from St. Boniface to the East Yamachiche, and from Montcalm to Joliette, where a temporary trestle was put in and the track connected across the river; a ballast pit was also opened at Joliette, and the work of ballasting carried on until the winter set in. In Nov. the track laying gang was moved up on to the western division, and track laid from St. Jerome to the North river at Lachute, about 20 miles, and considerable train filling was done during the early part of the winter.

Early in the spring of 1900 track-laying was resumed at both ends on the eastern division, and pushed on until the River du Loup and the Maskinonge gully respectively were reached, and the work of ballasting went on until the bridges were finished at these points, when the track was completed through and the ballasting finished. Track laying on the western division was also resumed early in the summer, temporary bridges having been put in at Lachute and pushed through to Grenville, the work of ballasting following up as closely as possible. Track had been laid during the previous summer from the Canada Atlantic Ry. junction to the west end of the Hawkesbury bridge, so that as soon as the last span of that structure was in place the rails were connected across, and all that remained to be done was to ballast and complete the short piece on the Ontario side of the river. Ballast averaged about 3,000 cubic yards per mile. On the eastern division some very good gravel pits were opened, but on the western, although the country was searched for miles, nothing could be found but sand, and that of a poor quality.

About the end of Oct. the first train from Quebec crossed the Ottawa on its way to Parry Sound, and a few days later the first cargo of grain came through from the west for shipment from the former port, where a million bushel elevator had been built to handle such cargoes.

In reply to an enquiry as to the ruling gradients on the G.N.R., A. E. Doucet, Chief Engineer, informs us that they are, or rather will be, 6-10ths compensated opposed to east bound traffic, and 1% compensated opposed to west bound traffic. The exception will be

Great Lakes Ry. Co.—See Ontario Ship Ry. Co.

Great Northern Ry. of Canada.—Some differences arose with the firm to whom the contract for the construction of the cut-off from Garneau Jct. to St. Catharines was let, and arrangements with another firm are in progress. Work will be started at the earliest possible moment. When the cut-off is completed a saving of 171 miles will be effected on the main line. The present line will not be abandoned but will be used as a feeder, as it taps a country full of pulpwood. (Feb., pg. 56.)

Two branch lines have been surveyed and construction will probably be proceeded with on them in the spring if the usual subsidies are voted by the Dominion and Provincial governments. One branch will be from Ste. Julienne to Rawdon, about 8 miles. Rawdon is at present without railway accommodation, although as far back as 1850 a charter was obtained for the incorporation of the Rawdon

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Eleven miles west of the Maskinonge is the Chicot, a small stream flowing through a deep valley. It is crossed by a steel viaduct of two 50 ft. towers and three 80 ft. intermediate spans resting on eight pedestals and two abutments. The total length is 290 ft., and the extreme height from top to base of rail 87 ft. The pedestals were founded on rock, and the abutments on hard grey clay. Owing to the great height of these trestles it was impracticable to so design them that the windward legs would never be in tension, therefore resistance by overturning had to be provided by anchoring them securely to the masonry and making the pedestals sufficiently large and heavy to withstand the lifting force due to the extreme wind pressure. In order to ensure the necessary holding power the anchor bolts required to be very long, and it was therefore necessary to build them into the masonry. This was a very difficult matter to do, and at the same time keep the heads in exactly the proper position to receive the shoes, as a very slight displacement would cause a misfit between them and the iron work of the towers. To overcome this, the following method was adopted: The position of the bolts was first fixed accurately on the foundations, and a round stick 6 to 8 ins. in diameter, and long enough to project above the level of the coping, slightly tapering downwards, was set up perpendicularly over the point and firmly fixed in position; the masonry was then built up around the stick as high as the under side of the cap; the sticks were then withdrawn and the cap placed in position. The position of the anchor bolts was then again located and marked on the caps, and holes of proper size drilled through them into the space below to receive the anchor bolts. When the time came to set the anchorages, these holes and the space below were filled with grout and the bolts dropped into place. This method worked very well, though in a few cases the holes in the shoe plates had to be slightly enlarged, and in one of two cases the bolts had to be withdrawn and reset. When the iron was

R. C. M. BLAIZES,
General Manager British Columbia Electric Ry. Co.

of anchorage, which depends entirely on the holding power of a threaded rod set in cement, might be improved upon. If the cement is good, and the work well done, it is no doubt absolutely safe, but such work is always liable to careless handling, and where so much depends on the anchorages, no chances should be taken. The next river is the Bayonne, about 7 miles further west. It is crossed by a through lattice span of 100 ft. on masonry abutments. The foundations were carried down through stiff clay to the rock, which was found at about 7 ft. below low water. About seven miles further west is the L'Assomption river, at Joliette. This is crossed by a single span of 150 ft. Through pin connected trusses on masonry abutments founded on piles and timber grillages. This is the last bridge on the eastern division. On the western division there are only two iron bridges, viz., a single through lattice truss of 165 ft. span. They are both on masonry abutments founded on piles and timber grillage.

The Hawkesbury bridge is made up as follows: Commencing at the east end there is a through lattice pony truss of 114 ft. span across the Grenville canal, with flanking spans of 55 ft. deck plate girders at either end; these spans rest on an abutment, and three piers of masonry founded on solid rock which is here close to the surface of the ground. There is a clearance of 42 ft. between the lowest member of this bridge and the water surface of the canal. Next comes 365 ft. of wooden trestle, and then the main bridge, which consists of seven spans pin connected deck trusses of 200 ft. each on stone piers. The floor being placed between the upper chords and the bays of only 3 ft. 5 ins. below their tops. Piers 1 and 8 are built with square ends, and the rest with cutwaters. The shore piers are founded on the rock, which is here almost bare at low water. The depth of water at the other piers varies from 9 to 10 ft. at extreme low water. Pier 27 counting from the Hawkesbury side, was the only one that gave any serious trouble in getting to the foundation. When the original soundings were made, the bottom at this pier was found to be covered with boulders, but what appeared to be solid rock was found to be only a foot or two lower down, and the coffer dam was put in on the supposition that this was correct. However, when the excavation was under way, a turnout on that the supposed rock was only boulders, and a new coffer dam had to be built outside the first ones. The excavation was carried down 9 ft. before a suitable foundation was found, through a mass of boulders and stones mixed with sawdust, slabs, etc., which had been no doubt accumulating for years. At the other piers there was comparatively little excavation, but some large boulders had to be removed from most of them before the caissons could be finally placed. The method of putting in the foundations was by means of either dam or piers 2, 3 and 4; and for piers 5, 6 and 7 by bottomless caissons fitted to the rock, which had been previously cleared of boulders and loose material. The excavated space inside the coffer dams, and the caissons were then partly filled with concrete, mixed in the proportions of 1 cement, 2 sand and 5 broken stone. This was deposited under water by means of a box holding about 1 cubic yard,

for concrete, and for the masonry. Piers 6 and 7 were in the main channel in 14 and 16 ft. of water respectively, and as the bridge was just at the foot of the Grenville rapids and the current very strong, it required great care and careful handling to get them set accurately in place. The substructure was begun in July, 1899, as soon as the water fell sufficiently to allow of it, and the whole of the masonry and foundations were completed before Christmas of that year. The stone was quarried and cut about eight miles up the river, near L'Orignal, and was brought down to within a short distance of the work on scows, and then hauled by teams from there. There were 2,323 cubic yards of masonry, and 799 cubic yards of concrete in the main river bridge. The western approach consisted of a timber trestle 1,320 ft. long, commencing with a height of 54 ft., three decks, and descending on a 1% grade till a height of about 20 ft. was reached. The main street of Hawkesbury is crossed by two I-beam spans of 20 ft. each, supported at the ends on timber bents and in the middle by a steel one. From the end of the trestle a short embankment leads to the Hawkesbury yard, beyond which is situated the junction with the Hawkesbury branch of the Canada Atlantic Ry. The total weight of steel in the Hawkesbury bridge is 1,727 tons.

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9x9-16 ins. Seventy pound rails were provided for the sidings also, but it was afterwards decided to replace seven miles of the 56 lb. rails on the old line east of St. Jerome with 70 lbs., and use the 56 lbs. for the sidings. Ties were mostly of hemlock and black spruce, with a few cedar and other woods. The standard size was 6 ins. x 6 ins. x 8 ft., and they averaged 15 to the 30 ft. rail. There was practically no timber along the line fit for making ties, so that the question of supplying them was quite a serious one. The greater part of them came from the mountains north of St. Jerome, along the Labelle branch C.P.R. and the Montfort and Gatineau Ry., while some were brought from the south shore of the St. Lawrence, coming by water to Three Rivers, and thence over the C.P.R. to destination. The question of track-laying was complicated by the number of bridges which could not be put in until they could be reached by rail; where possible to do so temporary structures were put in, but this was, of course, impossible with the large ravines. The original intention had been to do the work with a track-laying machine, but this was abandoned and the laying done by hand. The first track-laying was done in June, 1899, commencing at the crossing of the St. Gabriel branch of the C.P.R., near Joliette, and extending eastwards. The object of this was to furnish storage ground for track and other materials that were then beginning to come in, but once started the work was kept going until the River Chicot was reached, when it was stopped until the bridge there was erected. Track was also laid during the fall from St. Boniface to the East Yamachiche, and from Montcalm to Joliette, where a temporary trestle was put in and the track connected across the river; a ballast pit was also opened at Joliette, and the work of ballasting carried on until the winter set in. In Nov. the track-laying gang was moved up on to the western division, and track laid from St. Jerome to the North river at Lachute, about 20 miles, and considerable train filling was done during the early part of the winter. Early in the spring of 1900 track-laying was resumed at both ends on the eastern division, and pushed on until the River du Loup and the Maskinonge gully respectively were reached, and the work of ballasting went on until the bridges were finished at these points, when the track was completed through and the ballasting finished. Track-laying on the western division was also resumed early in the summer, temporary bridges having been put in at Lachute and pushed through to Grenville, the work of ballasting following up as closely as possible. Track had been laid during the previous summer from the Canada Atlantic Ry. junction to the west end of the Hawkesbury bridge, so that as soon as the last span of that structure was in place the rails were connected across, and all that remained to be done was to ballast and complete the short piece on the Ontario side of the river. Ballast ... about 3,000 cubic yards per

between Grand Mere and Garneau Jct., two miles, where the gradients in either direction will be 1.25%, and where pushers will have to be used. As the G.N.R. was built in ..., the ruling gradients, as at present ..., were not sufficiently looked after ... changes can easily be made, and will be done in the near future. The 7° reversed curve at New Glasgow will be taken out in the spring. On all new portions of the line, which are now under contract, the curvature is limited to 4°, with ruling gradients as above.

White Pass and Yukon Ry. Finances.

The Railway Share Trust and Agency Co. of London, Eng., recently offered at par £255,555 of 6% debentures of the White Pass and Yukon Ry. Co., repayable at par Jan. 1, 1912, or earlier, at the option of the Co., on six months' notice. Following are extracts from the prospectus:

The W.P. and Y. Ry. Co. was incorporated in 1898 under the companies acts, to carry out and develop certain charter rights and concessions for (inter alia) the construction and equipment of a railway extending about 325 miles from Skagway harbor, at the head of the Lynn canal, an inlet of the Pacific ocean, to Fort Selkirk on the Yukon river. The charter rights and concessions under which the W.P. and Y. Ry. from Skagway to Whitehorse (some 111 miles) has been constructed, are vested in three local companies, namely:

	Capital stocks and shares issued	Bonds
The Pacific and Arctic Ry. and Navigation Co.	[illegible]	[illegible]
The British Columbia Yukon Ry. Co.	[illegible]	[illegible]
The British Yukon Ry. Co.		[illegible]
		[illegible]

In the spring of last year the W.P. and Y. Ry. Co. purchased the business and assets of the Canadian Development Co., Ltd., which carried on the chief transport trade on the Yukon river between Whitehorse and Dawson, and in payment issued to the latter company £255,555 of 6% debentures. The property purchased was transferred to a new local company, called the British Yukon Navigation Co., Ltd., which was incorporated according to the laws of British Columbia for the purpose of owning the purchased business and operating the fleet of steamers acquired with it upon the terms of the railway company, receiving in exchange the capital stock and a bond or bonds for £255,555 of the local company.

In addition, as one of the terms of sale, the Canadian Development Co. provided the purchasing company with £25,000, to enable it to acquire new steamers and to effect other improvements in connection with the purchased business, and out of this three new steamers have been acquired and equipped.

The capital stock of the British Yukon ... The whole of

Great Northern Ry. of Canada.—It was recently reported that W. Seward Webb and those associated with him were in treaty for the purchase of the G. N. Ry. Some of the people who had been active in the purchase of the Canada Atlantic Ry., and the South Shore Ry., made a trip over the G. N. Ry. and inspected the terminals at Quebec, but the statement that they were negotiating a purchase is not credited, the more reasonable cause of their visit being to see to arrangements for handling the grain to be brought over the Canada Atlantic Ry. during the season of navigation. The G. N. Ry. has decided to add another conveyer at the Quebec elevator. (April, pg. 123.) See also Chateauguay and Northern Ry.

JUNE 1902

Great Northern Ry. of Canada. A report is current in New York that at the time of the collapse of the Webb-Meyer stocks, an arrangement had been concluded for the trans-

July 1902

Chateaugnay and Northern Ry.—The line from Bout de l'Isle to Joliette, Que., will be constructed by the C. and N. Ry. Co., subject to the approval of the Great Northern Ry. and not by the latter Co. No decision had been arrived at up to July 17 as to when work would be started. (June, pg. 189.)

August 1902

Great Northern Ry. of Canada.—We were recently advised that no decision had been reached respecting the construction of a branch from Lachute to St. Philippe, or the projected branch to the granite quarries in Argenteuil county.

fer of the bonds and a large proportion of the stock of the G.N. Ry. to a syndicate closely allied with the Dominion Securities Co. of New York, and that the G.N.R. directors declined to go any further with the proposed sale. They have since announced that it proposes to remain an independent line.

July 1902

Great Northern Ry. of Canada.—Following are particulars of the new work done at the Co.'s elevator at Quebec: The belt conveyor gallery runs from the elevator to Pointe A. Carey wharf, some 500 ft., and from the end of this gallery, where a distributing tower is located, a conveyor gallery runs in each direction along the face of the wharf, one of these galleries being 225 ft. long, and the other 275 ft. The belts in these galleries are 3 ft. wide, and have a carrying capacity of about 15,000 bush. an hour. Vessels are loaded by means of 10 dock spouts, erected on the conveyor gallery running along the face of the wharf. This conveyor is driven by an electric motor. The conveyor galleries are all covered with galvanized corrugated steel. Some changes, necessitated by the erection of the conveyor, have been made in the present marine tower and other parts of the elevator. John S. Metcalf Co., Chicago, are the engineers in charge.

We were advised, Oct. 11, that no details had been arranged for the construction of a projected branch from Lachute to Ste. Philippe, and for an extension to tap the granite quarries of Argenteuil county. (June, pg. 191.)

NOVEMBER 1902

Great Northern Ry. of Canada.—A meeting of the shareholders was called for Nov. 14 to ratify an agreement for the purchase of the Montford and Gatineau Colonization Ry., which extends from Montford Jct., on the C.P.R., to Arundel, Que., 33 miles, all of which and .42 miles of sidings is laid with 56 lb. steel rails. It has a paid up capital of $18,317, bonded debt of $231,000, and a floating indebtedness of $287,748.76, on which the interest charges are 7%. From subsidies $167,440 was paid by the Dominion Parliament and $168,395.80 by the Quebec Legislature. The total cost of the line and rolling stock was $533,731.16. The rolling stock comprises 4 locomotives, 2 first class cars, 1 baggage, mail and express car, 2 cattle and box cars, 18 platform cars, 1 conductor's van, 1 snow plough, and 1 flanger. Operations for the year ended June 30, 1901.—Train mileage—passenger, 21,034; freight, 31,204; pas-

December 1902

Great Northern Ry. of Canada.—We were recently advised that no decision had been reached respecting the construction of a branch from Lachute to St. Philippe, or the projected branch to the granite quarries in

JANUARY 1903

The acquisition of the Montford and Gatineau Ry. rendered it necessary to construct a line connecting it with the G.N. Ry. A line about 10 miles in length has been surveyed from St. Sauveur, 3 miles from the starting point of the line at Montford Jct., on the C.P.R. branch, to Labelle, to a junction with the Co.'s main line about 1½ miles south of St. Jerome. It is intended to extend this line from St. Jerome, about 25 miles, to a junction with the Chateauguay and Northern Ry., for the construction of which a contract is reported let. The line from St. Saveur to St. Jerome is fairly heavy but does not present very great difficulties. There will be an average grade of 1%, and a maximum curvature of 6°. It is said construction of this line will be gone on with in the spring. (Nov., 1902, pg. 381.)

JANUARY 1903

The Great Northern Ry. of Canada has under survey the following branches: from St. Jerome to St. Sauveur, Que., on the Montford and Gatineau Ry., recently acquired by the G.N.Ry., 13 miles; from St. Catherines to Garneau Jct., Que., 58 miles; from Hawkesbury to South Indian, Ont., 38 miles. (Jan., pg. 21.)

February 1903

P 39

Great Northern Ry. of Canada.

Press reports since the end of Jan. have been current to the effect that Mackenzie, Mann & Co. have purchased the Great Northern Ry. of Canada outright, or that they have acquired a controlling interest in the line, by the purchase of the shares held by Col. J. McNaught, 1st Vice-President; H. H. Melville, 2nd Vice-President, and their associates in the U.S. D. B. Hanna, 3rd Vice-President of the Canadian Northern Ry., was in Quebec, in consultation with G.N. Ry. officials at the end of Jan., and D.D. Mann, Vice-President, joined him on Feb. 7 at Quebec. Whatever arrangement may have been under consideration has not been definitely concluded, but there is no doubt that Mackenzie, Mann & Co. are negotiating in the interests of the Canadian Northern Ry. for a controlling interest in the G.N. Ry.

The passing of the G.N. Ry. under the control of Mackenzie, Mann & Co. would have an important effect on the transportation of grain from Manitoba and the Northwest Territories over the Canadian Northern Ry. at the opening of navigation. In 1902 the

G.N.R. carried grain to its elevator at Port Arthur, from which point it was shipped by lake carriers to eastern points, and reached the ocean-going vessels over different routes. In Oct. the Canadian Lake and Ocean Navigation Co., in which Mackenzie, Mann & Co. are interested, put four steamers of the turret type on the upper lakes to carry grain from Port Arthur to Georgian bay ports. By making Depot Harbor the Georgian bay terminal of the steamship line on the opening of navigation this year, the grain could be handed over to the Canada Atlantic Ry., with which the G.N.R. has a traffic arrangement, and carried to Hawkesbury, Ont., where it would be handed over to the G.N.R. carried to Quebec, and shipped to Great Britain by the steamers of the Leyland line, one of the lines owned by the International Mercantile Marine Co. of New York, which has contract arrangements with the G.N.R. Or the grain might be handed over at Quebec to the Canadian Lake and Ocean Navigation Co., in which Mackenzie, Mann & Co. are interested, and which it is understood will add ocean-going vessels to its fleet this year.

The G.N. Ry. owns 100.38 miles of main line from Hawkesbury, Ont., on a branch of the Canada Atlantic Ry., to Riviere à Pierre, on the Quebec and Lake St. John Ry., with 5.72 miles of branch lines; it has running powers over the Quebec and Lake St. John Ry. from Riviere à Pierre to Quebec, 58 miles; and own an elevator and other terminal facilities on the Louise basin, Quebec. It has lately acquired the Montford and Gatineau Colonization Ry. from Montford Jct. to Arundel, Que., 33 miles, which it is proposed to connect with the main line by an extension from St. Sauveur to St. Jerome, 13 miles; and will operate the Chateauguay and Northern Ry., now under construction from Bout de l'Isle to Joliette, 38 miles, which will provide an entrance and terminal facilities in Montreal. Surveys have been made for a cut-off from Garneau Jct. to St. Catherines, Que., 58 miles, and for an extension from Hawkesbury to South Indian, Ont., on the main line of the Canada Atlantic, 38 miles. The subscribed and paid-up capital of the G.N.R. was on June 30, 1901, the date of the last Government report, ordinary shares, $4,175,000; preferred stock, $581,625; bonds, $4,084,000; the Dominion, Provincial, and municipal subsidies paid amounted to $2,066,244 77, and there was a floating debt of $138,196.17. The Co.'s annual report for the year ended June 30, 1902, showed gross earnings, $524,763; operating expenses, $316,801; net earnings, $207,963; 5% bonds outstanding, $4,030,000; equipment bonds outstanding, $300,000, the interest and sinking fund for which is provided out of a special fund. The Montford and Gatineau Colonization Ry. had on June 30, 1901, a paid-up capital of $18,317, a bonded debt of $231,000, and a floating debt of $287,748.76.

When this was written, on Feb. 25, the negotiations had not been closed, and the matter was being held open pending the return from England of W. Mackenzie, who was expected to reach Toronto about Mar. 1.

MARCH 1903

rout Northern Ry. of Canada.—Con-
ient on Mackenzie, Mann & Co., having
ined control of this line, a number of
nges in the officials are imminent. As
is written (Mar. 28), D. B. Hanna, Third
President of the Canadian Northern
is in Quebec, in connection with the
ter. It is likely that some of the present
ials will be replaced by Canadian North-
men and some of the officials' headquar-
may be removed to Toronto.

J. Goric, now Superintendent of the
R. at Port Arthur, Ont., is mentioned as
kely to take charge of G.N.R. oper-
s.

April 1903
p126

Great Northern Ry. of Canada.—The re-
irs to the Grand Mere bridge, which was
stroyed by fire early in May, have been
mpleted and through traffic resumed. Dur-
g the reconstruction of the bridge passen-
rs were transferred across the river in a
ry, a train being run to the bridge on
her side of the river.
We were recently advised that nothing de-
ite had been decided as to the construction
additional lines or projected branches for
: current season. (Feb., pg. 39.)

July 1903

Great Northern Ry. of Canada.—The workshops of the G.N.Ry. on Louise embankment, Quebec, were burned out recently, the loss being estimated at about $70,000. The machine shop was totally destroyed, and a number of cars, which were undergoing repairs, were burned. The site has been cleared, and the directors have decided to rebuild the shops on a larger scale. The buildings, however, will not be gone on with this year. (July, pg. 235.)

October 1903

Great Northern Ry. of Canada. We are advised that survey parties are in the field locating the projected direct line into Quebec. It is proposed that the cut-off will run from the present line near St. Catharines direct into Quebec, but no details of the route have been decided on. (Jan., pg. 25.)

MARCH 1904

Great Northern Ry. of Canada.—Nothing definite has been announced in regard to construction of the connection between the Montford and Gatineau Ry., at either St. Sauveur or St. Morin flats, and the G.N.R. at St. Jerome, Que., about 20 miles. (See Montford and Gatineau Ry.)

The Dominion Parliament at its last session voted the usual subsidy of $3,200 a mile towards the construction of a line from Hawkesbury to South Indian, Ont., not exceeding 35 miles, in lieu of a subsidy granted in 1890, and for a line from Garneau Jct. to Quebec bridge, not exceeding 70 miles. Surveys were made in 1901 for the proposed extension from Hawkesbury to South Indian, and for a cut off from Garneau Junction to St. Catherines, Que., 55 miles. No work was done on either of these pieces of line. The new subsidy for the line from Garneau is for an extension into Quebec, thus providing a direct entrance into that city for the G.N. Ry. independent of the Quebec and Lake St. John [illegible] which is now utilized from Riviere à

Great Northern Ry. of Canada.—Nothing definite has been announced in regard to construction of the connection between the Montford and Gatineau Ry., at either St. Sauveur or St. Morin flats, and the G.N.R. at St. Jerome, Que., about 20 miles. (See Montford and Gatineau Ry.)

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January 1904

mation of the G.N. Ry., and the Chateauguay and Northern Ry., recently completed between Montreal and Joliette, Que., which is operated under lease by the G.N. Ry. The plan of the amalgamation provides for paying off the floating indebtedness of the G.N. Ry., the construction of a direct entrance of the G.N. Ry. into Quebec, and the construction of a 10-mile section connecting the main line from Hawkesbury, Ont., with the Montford and Gatineau Colonization Ry.; provides for the paying off of all outstanding equipment bonds; all liens on terminals, and leaves about $600,000 in the treasury. The security will be an absolute first mortgage of the railway, equipment and franchises without any prior liens.

August 1904

January 1904

A recent order-in-council cancels the order of Sept. 7, authorizing the remission of duty on certain materials of Canadian manufacture used without change of form in the construction abroad of locomotives for railways in Canada. The remission of duty will cover parts exported for locomotives ordered prior to Oct. 26, and not yet delivered.

The Chateauguay and Northern Ry. from Montreal to Joliette, Que., was opened for traffic Dec. 15, by the Great Northern Ry. of Canada, which has leased the line. A special train, on which the directors, the Premier of Canada, and others were passengers, went over the line. The bridge over the two branches of the Ottawa river at Bout de L'Isle, was named the Laurier bridge by Lady Laurier, wife of the Premier.

ly acquired by the G.N.Ry., at Morin Flats, about 16 miles. The Dominion subsidy, voted last session, for a line between these two points, is for a line not exceeding 22 miles. The next line which will be gone on with will be a line from Garneau Jct. to Quebec, for which the Dominion Parliament has voted a subsidy covering 70 miles. This line will give the G.N.Ry. an entrance into Quebec independent of the Quebec and Lake St. John Ry. (Dec., 1903, pg. 423, and Montford and Gatineau Colonization Ry., Dec., 1903, pg. 425.)

JANUARY 1904

Great Northern Ry. of Canada.—It is intended to start work first thing in the spring on a branch from near L'Epiphanie, on the Chateauguay and Northern Ry., to near St. Jacques l'Achigan, about 10 miles. A Dominion subsidy was voted last session for a line between these points not exceeding 16 miles. It is also expected to start work early in the spring on the construction of a line from St. Jerome, on the G.N.Ry., to connect with the Montford and Gatineau Ry., recent-

January 1904

Great Northern Ry. of Canada.— In a re-
cent interview D. B. Hanna, President, is re-
ported as saying that it was intended to gain
an independent entrance into Quebec by the
construction of a line from near Shawinigan.
It was formerly intended to construct a cut-off
from Garneau to St. Catherines, Que., but
this was abandoned, a more favorable line
having been located from Shawinigan. It
was also contemplated to construct a new line
from Morin Flats, the present southern ter-
minal of the Montford and Gatineau Ry., to
St. Jerome, and thence in a straight line to
Charlemagne, from which point the entrance
into Montreal would be over the Bout de L'Ile
bridge of the Chateauguay and Northern Ry.
This would enable the Company to operate its
trains between Montreal and Quebec without
going round by Joliette as at present. When
the time comes, added Mr. Hanna, to extend
the line further west than Hawkesbury it will
be constructed up through the Ottawa district
to Ottawa. We were advised [illegible]

JUNE 1904

Great Northern Ry. of Canada.—The Quebec Legislature at its last session voted $6,000 for debentures subscribed by the municipality of Ste. Sophie and the village of New Glasgow, Que., to aid the construction of the G.N. Ry. between St. Jerome and New Glasgow.

The Central Trust Co., New York, announced July 1 that it had not received any funds for the payment of the July coupons on the 5% 1st mortgage bonds. Under the terms of the mortgage the company has six months in which to make good the default before proceedings for foreclosure can be taken. There has been issued $3,000,000 of common stock, and there is authority to issue $450,000 of preference stock and $3,000,000 of debentures. The funded indebtedness of the company consists of $4,002,000 of 5% 1st mortgage bonds due Jan., 1950; $274,000 of 6% Car Trust bonds due 1902-05, and $118,000 of 5% Quebec Terminal mortgage bonds. Negotiations are in progress for the amalga-

August 1904

mation of the G.N. Ry., and the Chateauguay and Northern Ry., recently completed between Montreal and Joliette, Que., which is operated under lease by the G.N. Ry. The plan of the amalgamation provides for paying off the floating indebtedness of the G.N. Ry., the construction of a direct entrance of the G.N. Ry. into Quebec, and the construction of a 10-mile section connecting the main line from Hawkesbury, Ont., with the Montford and Gatineau Colonization Ry.; provides for the paying off of all outstanding equipment bonds; all liens on terminals, and leaves about $600,000 in the treasury. The security will be an absolute first mortgage of the railway, equipment and franchises without any prior liens.

AUGUST
1904

Great Northern Ry. of Canada.—At the last session of the Dominion Parliament a subsidy of $3,200 a mile, with provision for an increase to $6,400 a mile, was voted for the construction of a line, not exceeding 30 miles in length, from Arundel, the present terminal of the Montford and Gatineau Ry., to a point in the united townships of Preston and Hartwell, Que. A subsidy for a similar line was voted to the M. and G. Ry., in 1903, but that company has since been taken over by the G.N.Ry. of Canada.

Guelph and Goderich Ry.—Contracts have been let for the construction of this line in ten-mile sections. Sections 1, 4, 5 and 6 have been awarded to S. B. Campbell, of Strathroy, and sections 2, 3, 7 and 8 have been awarded to M. A. Pigott. The first section is the 10 miles immediately outside of

September 1904

Chateauguay and Northern Ry.—The Dominion Parliament at its last session voted subsidies at the rate of $3,200 a mile, with provision for an increase to $6,400 a mile, under certain conditions, for the following lines: from Hochelaga Ward, Montreal to Joliette, Que., passing through L'Assomption, and for a spur line in L'Assomption, not exceeding 42 miles in all. This is a variation of the terms of the subsidy voted in 1900, and is in favor of a line which was completed and opened in 1903. The Governor-in-Council is also authorized under the terms of the act voting the subsidies to grant the balance of a subsidy not exceeding $51,000 for the railway bridge over the river from Bout de L'Ile to Charlemagne, built in connection with the first mentioned line. A subsidy of similar amount to the first was also voted for the construction of a line from Charlemagne to a junction with the Montford and Gatineau Colonization Ry. at Morin Flats, not exceeding 22 miles. A subsidy for this line was voted in 1903 in favor of the Montford and Gatineau Ry., which is now part of the Great Northern Ry. of Canada, operating the C. and N. Ry. under lease. (Dec., 1902, pg. 410.)

September
1904

1165

Canadian Northern Ry. Construction.

The C.N. Ry. Co. has given notice that it will apply next session of the Dominion Parliament for an act extending the time fixed for the construction of the uncompleted portions of its railway, and authorizing it to lease or acquire running powers over the Great Northern Ry. of Canada, the Chateauguay and Northern Ry., the Irondale, Bancroft and Ottawa Ry., the Quebec, New Brunswick and Nova Scotia Ry., and the James Bay Ry., or any of them, or to purchase such lines or any of them, or to amalgamate with such lines or any of them.

The Great Northern Ry. of Canada will apply next session of the Dominion Parliament for an act authorizing it to lease or otherwise acquire the lines of the Chateauguay and Northern Ry., the Quebec, New Brunswick and Nova Scotia Ry., or either of them; and also empowering it to lease its lines to the Canadian Northern Ry., or to the James Bay Ry., or to give either of these companies running powers over its lines; also for the purpose of confirming an issue of consolidated bonds of the company; and authorizing the construction of a line from near Grand Mere, Que., to its terminals in Quebec city, and a branch to the Quebec Bridge.

The James Bay Ry. Co. has given notice that it will apply next session of the Dominion Parliament for an act authorizing it to change its name, and empowering it to acquire the lines of the Quebec, New Brunswick and Nova Scotia Ry.; also to extend and define the powers of the company with respect to the issue of bonds, debentures, and other securities; also empowering the company to lease its lines or leased lines, and to give the company running powers thereover; also to construct the following additional lines, from the line now under construction, south of Lake Muskoka, easterly to Montreal, passing through or near Ottawa, with branches to Ottawa and Hawkesbury, Ont.; from or near French River easterly to Montreal, passing through or near Ottawa, with branches to Ottawa and Hawkesbury, Ont., from the company's line at or near Sudbury, thence westerly and south of Lake Nepigon to the C.N.R., west of Port Arthur, passing through or near Port Arthur, with a branch to Port Arthur

Ry. Co., on its own account, with the aid of a guarantee of bonds by the Dominion. There is not a section or clause of this latter act giving the Government or any Commissioners power to construct any railway whatever; and the only power which the Government or its Commissioners have to construct any railway is by virtue of its agreement with the G.T.P. Ry. Co., under which a contract is made to construct the Eastern Division of the line which the G.T.P. Ry. Co. was incorporated to build. It will, therefore, be seen that there is a projected Grand Trunk Pacific Ry., to extend from Moncton to the Pacific coast, the eastern section of which, by agreement, is to be constructed by and at the cost of the Dominion of Canada, and the western section by the company. The ordinary custom of naming a railway after the corporation building it will not very well apply here, although during the construction period it may be convenient to use the name Grand Trunk Pacific Ry. for the Western Division, and the National Transcontinental Ry. for the Eastern Division.

The whole is to be operated as a single line by the G.T.P. Ry. Co., which the Globe describes as "a corporation which has entered into a contract with the Dominion Government to build the Western Division of the National Transcontinental Ry., and to operate both the Western and the Eastern Divisions as a single line." Again, to follow the usual practice of naming railways, a line, including leased lines and lines otherwise acquired, takes the name of the operating company. In this case the name would be the Grand Trunk Pacific Ry., and not the National Transcontinental Ry. Under any circumstances the latter name would be unsuitable, because the line to be constructed will neither be national or transcontinental, "from ocean to ocean," as mentioned in the act. It will not be national either in construction or operation, and it cannot be transcontinental, "from ocean to ocean," as the point of commencement, Moncton, is some miles from the shore of Northumberland Strait, in one direction, and is some miles up the Petitcodiac River, which runs into Shepody Bay, which is an inlet off Chebucto Bay, which is at the head of the Bay of Fundy, an inlet off the Atlantic ocean

over the Louise bridge. (June, pg. [illegible])

Great Northern Ry. of Canada.—Following are particulars of the new work done at the Co.'s elevator at Quebec: The belt conveyor gallery runs from the elevator to Pointe A. Carey wharf, some 500 ft., and from the end of this gallery, where a distributing tower is located, a conveyor gallery runs in each direction along the face of the wharf, one of these galleries being 225 ft. long, and the other 275 ft. The belts in these galleries are 3 ft. wide, and have a carrying capacity of about 15,000 bush. an hour. Vessels are loaded by means of 10 dock spouts, erected on the conveyor gallery running along the face of the wharf. This conveyor is driven by an electric motor. The conveyor galleries are all covered with galvanized corrugated steel. Some changes, necessitated by the erection of the conveyor, have been made in the present marine tower and other parts of the elevator. John S. Metcalf Co., Chicago, are the engineers in charge.

We were advised, Oct. 11, that no details had been arranged for the construction of a projected branch from Lachute to Ste. Philippe, and for an extension to tap the granite quarries of Argenteuil county. (June, pg. 191.)

Great Northern Railway of Canada.

This recently completed line extends 226 miles from Quebec, 22 ft. above sea level, to Hawkesbury, Que., 228 ft. above sea level. From Quebec to Rivière à Pierre, 58 miles, the Quebec and Lake St. John Ry. is utilized for the present. From Riviere à Pierre to St. Tite, 33 miles, the Great Northern bought the Lower Laurentian Ry. and operates it as part of the main line. On this portion, the railway passes through the growing towns of Notre Dame des Anges, St. Thècle, and St. Tite, other points of importance being Rousseau's Mill and Lac aux Sables. The lumber industry of these various places is very considerable; there are several brick yards, quarries, and charcoal kilns, also, the charcoal being principally used by the Radnor forges. At St. Tite the new portion of the G.N. Ry. begins, and at Garneau Jct. the railway crosses Hawkesbury and Quebec by 45 miles, and the Lower Laurentian Ry. will then be used as a feeder, as it will connect the Lake St. John region with Grand Mere, Shawinigan, and all points between this and Montreal. From Shawinigan Jct. the railway gradually descends for three miles, when it crosses the St. Maurice river on a steel cantilever bridge of 250 ft. span, with two anchor spans of 74 ft. 8 in. each, and one span of 100 ft., with steel trestle approaches. From here can be seen the Grand Mere pulp mills, one of the largest mills in America. The line then gradually rises until one mile west of the bridge a junction is made with a branch one mile in length, running to the important town of Grand Mere. Three miles west of Grand Mere Jct., Shawinigan Jct., a divisional point, is reached. A branch line runs south from here 4½ miles to Shawinigan Falls, whose power, derived from the St. Maurice river, bids fair to eclipse any water power in America. This important town is making giant strides, and from a wilderness three years ago has emerged into a hive of industry, numbering 4,000 people, with churches, banks, saw mills, and an electric railway. The Pittsburg Reduction Works have here established their works for the treatment of aluminum, and the Belgo Canadian pulp mills in a very level, is broken here and there by ravines, which are crossed by steel tres built to the latest Government specificatio The towns tapped on this portion are Cha tes, St. Pauline, St. Ursule, St. Justin, Barthelemi, St. Cuthbert, St. Norbert, Elizabeth, all growing settlements, popula by an industrious people who live most c fortably from the products of their far This portion is one of the very best hay gr ing sections in Canada. At Joliette, the N.R. crosses the C.P.R., and Joliette is point from where the G.N.R. will deviate order to have its line direct into Montr This line is now being built by the Chate guay and Northern Ry. Co., and will be ta over by the G.N.R. as soon as built. F Joliette to St. Jerome the land is again le with easy grades and curvature, and pa through Montcalm, St. Jaques, whose tobo trade is now very considerable, and gain in importance every year, St. Alexis, Julienne, St. Lin, New Glasgow, Ste. Sop and Paisley. St. Jerome town is reac from the main line by a branch of 1½ m and is a very important point for both th N. and C.P. railways. The G.N.R. a crosses the C.P.R., passes through St. C and on to Lachute, where the last cros of the C. P is made.

Chateauguay and Northern Ry. A contract has been let to C. E. Loss, of New York, for the grading, bridging, etc., of 38 miles from Montreal to Joliette, Que., on the Great Northern Ry. A sub-contract for the substructure of the bridge at Bout de l'Isle has been let by C. E. Loss to Shearer & Co. The material for the superstructure is being constructed by the Dominion Bridge Co., Montreal. The whole work is required to be completed by Oct. 1. L. R. Ord is Chief Engineer in charge of construction. (Jan., pg. 20.)

February 1903

Chateauguay and Northern Ry.—During the past year the line from Montreal to Joliette, Que., 36 miles, has been re-ballasted, and a branch from L'Epiphanie to St. Jacques L'Achigan, Que., a distance of eight miles, has been partially constructed. In Montreal the terminal buildings on St. Catherine St. have been considerably improved and a new turntable and roundhouse erected. (See also Canadian Northern Ry., pg. 27.)

January 1905