BURRARD INLET RAILWAY BRIDGE

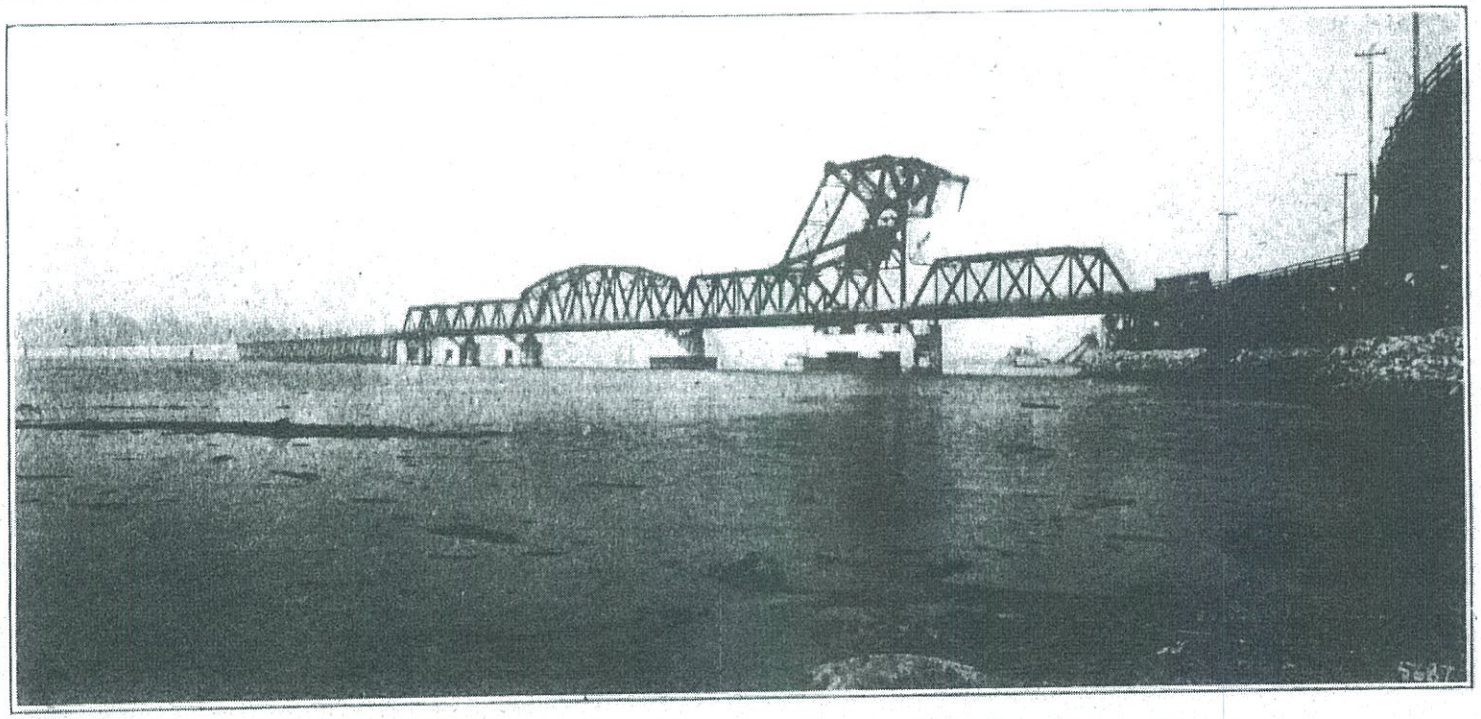
Burrard Inlet Railway and Highway Bridge.

From time to time, prior to and during its construction, Canadian Railway and Marine World has given general information respecting the railway and highway bridge built across the second narrows of Burrard Inlet, at Vancouver, B.C., by the local municipalities, aided by the Dominion and British Columbia Governments. Lieut. E. H. James, who was resident engineer in charge of construction, read a paper on the bridge recently before the Engineering Institute of Canada's Montreal Branch, which is summarised as follows:—The building of a bridge across Burrard Inlet at the second narrows had been discussed for about 40 years, but difficulties had always been found in financing the project. The Vancouver, Westminster and Yukon Ry. Co. for many years held a charter to build a bridge, but there is no authentic information concern-

185-ft. bascule span between piers 2 and 3; a 54-ft. tower span between piers 3 and 4; a 150-ft. fixed span between piers 4A and 5, and a trestle approach from pier 5 to the south shore. The bridge carries a single track standard gauge railway, between the main trusses, a 10-ft. highway outside the truss on the west side, and a 10-ft. highway and a 3-ft. 6-in. sidewalk outside the truss on the east side. The two highways come together in a single 20-ft. roadway at each end of the bridge proper, so that it is necessary for highway traffic to cross the railway at grade once in either direction. The railway loading is Coopers E30, and the highways are designed for a uniform live load of 100 lb. per sq. ft. all members being in addition capable of carrying 15-ton trucks. The whole of the steel work is in accordance with the Canadian Engineering Standards Association's standard speci-

on the north side.

Construction was started in Oct. 1923, with the gravel embankment carrying the rail and roadway from the north end of the bridge to Lynn Creek, across which a 150-ft. span was erected on plain mass concrete piers. Work on the railway trestle was started in Jan. 1924, and on the piers a little later. A start was made on March 6, 1925, to float the steel fixed spans into position and this was completed successfully on Aug. 26, 1925. The last part of the structure to be completed was the bascule leaf, which was erected in an upright position. The concrete counterweight for this span weighs approximately 1,000 tons. The span is operated by two 440-volt, 3-phase, 60-cycle alternating current motors of 100 h.p. each, capable of opening or closing the span in 1 min. 15 sec.; with a 70-h.p., 4-cylinder gas engine



Burrard Inlet Tunnel & Bridge Co.'s Bridge over Second Narrows of Burrard Inlet, Vancouver, B.C.

railway and highway as a standby. The span is adequately

Burrard Inlet Tunnel & Bridge Co.'s Bridge over Second Narrows of Burrard Inlet, Vancouver, B.C.

ing actual plans earlier than 1909, in December of which year the Burrard Inlet Tunnel and Bridge Co. was formed; in April 1910 a charter of incorporation was granted, with power to build a bridge, and the British Columbia Government gave its assent to the project May 4, 1910. From then forward efforts were made to get the project started but it was not until Jan. 1914 that tenders were actually called for on plans prepared by the late Sir John Wolfe-Barry, of London, England. Financial difficulties again presented themselves, and any further progress was put an end to by the outbreak of war in Aug. 1914.

Interest in the project was revived in 1922, and, after about 6 months' negotiations, an agreement was entered into between the company and the Northern Construction Co. and J. W. Stewart, under which an investigation was made of the proposed site by their engineers, and by A. D. Swan of Montreal, consulting engineer to the bridge company. After this investigation plans were prepared jointly by the construction company's engineers and Mr. Swan, and a contract was entered into for the construction of a bridge for a lump sum. The plan as finally approved by the Dominion and British Columbia Governments, called for the erection of a trestle on the north shore to pier 1; a 300-ft. fixed span from pier 1 to pier 2; a fications for steel railway and highway bridges. The spans are carried on reinforced concrete piers, either built up on groups of cylinders bolted together and capped for piers 1, 4 A and5; or built up on penumatic caissons for the other piers. Details as to the construction and placing of these piers, together with information as to the depth to which they were sunk in the bed of the inlet were given in full in the paper.

While the piers were under construction some objections were made by lumber and marine interests to the construction of the bridge, and after an investigation authorized by the Minister of Public Works it was decided to raise the height of the bridge 5 ft. and to replace the trestle work at the north shore end by two 150-ft. spans, the cost of which work was met by the Dominion Government directly or through the Vancouver Harbor Commission. This raising of the piers necessitated their being strengthened and the construction of 2 additional cylinder-type piers, to carry the 150-ft. spans which replaced trestle work. The additional height gives a clearance of 22.2 ft. at high water. The railway connection extends from the Canadian Pacific Ry. tracks, on the south, to the bridge across Lynn Creek, while the roadway extends from Cariboo St., on the south, to the west boundary of the Indian Reserve as a standby. The span is adequately lighted for navigation purposes and an efficient system of signalling with ships passing through is arranged. Roadways and sidewalks on both sides of the bridge have been laid out by the municipalities to connect the bridge with the streets and highways, the two North Vancouver municipalities building a 212-ft. span bridge across Lynn Creek to carry the new roadway. The bridge was opened by the British Columbia Minister of Public Works, Nov. 7, 1925, and during the first month afterwards about 45,000 automobiles and 125,000 persons passed across it. The railway connection from the south end of the bridge will be provided by the Vancouver Harbor Commission, and connection will be made with the Pacific Great Eastern Ry. at North Vancouver.

The construction was financed mainly by bond issues guaranteed by North Vancouver City, North Vancouver District; by $170,000 from the City of Vancouver; a grant of $100,000 from the Dominion Government, and a grant of $120,000 from the British Columbia Government. The extra cost of raising the height of the spans, and the replacing of certain trestle work by steel spans, was met as stated previously. The general contractors were the Northern Construction Co. and J. W. Stewart for whom W. Small

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was Chief Engineer, and C. A. Leighton was Superintendent. A. D. Swan represented the bridge company as consulting engineer, the work being under the personal supervision of Lieut. E. H. James, as Resident Engineer, with T. W. W. Parker and A. L. Harvey as assistants. The contractor for the steel superstructure was the Dominion Bridge Co., Lachine, Que., part of the fabrication being done by Vulcan Iron Works Co., Vancouver; the machine work on the bascule was done by Vancouver Engineering Works; the electrical work on the bascule by the C. H. E. Williams Co., Vancouver, and the lighting and signalling systems were installed by Frew and Dyer Ltd., Vancouver.

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Railway Projects, S

Burrard Inlet Tunnel and Bridge Co.—Vancouver, B.C., City Council's board of works has asked the company to replace the fill at the north end of the new bridge across the second narrows with piers, to rectify tidal conditions affecting navigation. The question of tides was considered by the bridge engineers, who made certain suggestions which, the City Engineer stated, were rejected by the council.

Dominion Atlantic Ry.—We are advised

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JUNE 1926

Railway Projects, Surveys, Construction, Betterments, Etc.

Burrard Inlet Tunnel and Bridge Co.—Vancouver, B.C., City Council's board of works has asked the company to replace the fill at the north end of the new bridge across the second narrows with piers, to rectify tidal conditions affecting navigation. The question of tides was considered by the bridge engineers, who made certain suggestions which, the City Engineer stated, were rejected by the council.

Dominion Atlantic Ry.—We are advised officially that the following betterments will be made this year. Twenty more miles of heavy steel rails will be laid, which will provide heavy rails from Windsor Jct. to Digby. Considerable ballasting will be done between Digby and Yarmouth. The Kentville locomotive house will be enlarged. A standard water tank will be erected at Aylesford. The station at Canning, which is becoming an important point in traffic development, will be improved and enlarged. A station at Scotch Village will be built to replace the structure destroyed by fire some time ago. Considerable work will be done on the erection of timber cribs for further protection of banks adjacent to tidal water. Work will be commenced on the filling in a number of wooden bridges. Additional fire protection will be provided for the shops, locomotive house, stores, etc., at Kentville. Considerable work will be done in improving right of way fencing. Repairs, painting, etc., will be done at the Cornwallis Inn, Kentville, and the Pines at Digby. Considerable work will be done at Grand Pre in beautifying the park, placing more and improved signs, etc. Seven thousand persons registered at the park in 1925, and at least 10,000 are expected this year.

Hudson Bay Ry.—As stated previously, the estimates for the year ending March 31, 1927, submitted to the House of Commons, contain an item of $3,000,000 towards the completion of the railway. While the amount comes under the general votes for the Railway and Canals Department, the work will be done by the Canadian National Ry. management. The first work to be done will be on the reconditioning of the line from Pas, to mile 332, near the second crossing of the Saskatchewan River, at the Kettle Rapids; and then work will be gone on with to complete the remaining 90 miles to Port Nelson. Only two-twelfths of the $3,000,000 had been voted up to May 4, which enabled the season's work to be started. The item of $3,000,000 is to complete the line to Kettle Rapids, and to provide divisional point facilities, and the work is to be sufficient to bring the line up to prairie branch line standard. Divisional points are to be provided at Pas, at mile 136 and mile 196 under the present vote. An additional $3,000,000 will, it is said, be

A press report states that plans have been prepared for a general overhaul of the line from Squamish to Quesnel, the work to be spread over several years. The engineer's report is stated to show that while the trestle work along the line is in a safe condition for traffic, many of the trestles are reaching the age when they must be renewed. The first portion of the work to be put in hand will be in the vicinity of Lillooet, where an old trestle will be removed, the roadbed cut into the mountain side and carried forward with a large gravel fill, thus making a permanent job. Other work will be done in the vicinity, at a total estimated cost of $200,000. Tenders are being invited for the work by the Minister of Railways.

R. A. Thompson, consulting engineer, San Francisco, Cal., went over the line recently from Squamish to Quesnel, with T. Kilpatrick, General Manager, on a gasoline speeder, and then on to Prince George by automobile. It is stated that the trip was for the purpose of making a report on the railway and its possibilities to United States financial interests which had approached the Government with a view of buying the line. D. Thomas, who returned recently to Vancouver from England, is reported to have stated that a group of British financial men were considering the buying of the line, and that it was expected they would send men to make investigations at an early date.

Pelican Lake Tramway.—Track has been laid on the grade at the portage at the north end of Pelican Lake, Ont., 2,000 ft., and motor boats, canoes, etc., are being transported over it, thus making a connected water route from Sioux Lookout, Ont., to the Red Lake mining area. (May, pg. 233.)

Pembina Valley Ry.—The Alberta Legislature has passed an act authorizing the Government to build a railway from the Edmonton, Dunvegan and British Columbia Ry. in Tps. 57, 58 or 59, Ranges 26 or 27, west of 4th Meridian, generally westerly or northwesterly to Tp. 58 or 59, Range 4, west of 5th Meridian, and to enter into agreements with any railway for the operation of the line. The Government was also authorized to raise $775,000 for the construction of 27 miles of the railway, of which $100,000 may be advanced to the Minister of Railways, to pay for surveys and other work prior to the preparation of progress estimates. The Railways Department sent an engineering party early in April to locate the line, which will branch off from the E.D. and B.C. Ry., near Busby (about 16 miles northerly from Carbondale), westerly across the Pembina River, in the direction of Fort Assiniboine. A reconnaisance survey was made for this branch by the T. D. McArthur interests.

Quebec and Chibougamou Ry. Co.—Quebec press report of May 12, states th an English syndicate has bought the char rights of this company, which has author to build a railway from Quebec to Chic timi; thence to Lake Chibougamou; line from the Mistassini River in Alba Tp. to the James Bay Ry. in Demen Tp., 20 miles; and a line from Garnier T to the Canadian National Ry. in Laba Tp. The company was given an extensi of time to start construction of its line the end of 1928, by the Quebec Legislatu The incorporators included H. C. Thon son, London, England, who was said represent English financial interests. (M pg. 233.)

Roberval-Saguenay Ry.—We are vised officially in connection with the Bo of Railway Commissioner's order 37, of April 10, authorizing the erection bridge across the Saguenay River, tha will be built about 9,000 ft. up stream fr the mouth of the Shipshaw River, and mile north of Kenogami, station 303- at the north end, and station 299-24, the south end on the Shipshaw branch, n under construction. The width of river at the bridge site is 400 ft. at ma mum high water, and 200 ft. at low wa The bridge is to be built about th quarters of a mile below Chute-a-Car where the Chute-a-Caron Power Co. carry on developments in building u power plant of 800,000 h.p. capacity. new bridge will be 404½ ft. long face face of back walls, and will consist c steel spans, carried on 2 piers and 2 ab ments of reinforced concrete, the base rail being about 19 ft. above maximum h water level. The north span will con of a deck plate girder 69 ft. 5 in. cente centre of bearings; the south span will a through truss span 100 ft. 2½ in. lo and the central span will be a through t span 225 ft. 11½ in. long. The bridge designed by D. C. Tennant, Struct Engineer, Dominion Bridge Co., which been given a contract for its fabrica and erection. The branch line of 5.2 m was put under contract in Sept. 1925. is now practically completed with the ex tion of some ballasting. The contract Gorman and Peckham, Montreal, building an additional 3 miles of line the north side of the Saguenay Ri leading to Chute-a-Caron. (May, pg. 2

Spruce Falls Pulp and Paper Co., has been incorporated under the Ont Companies Act, to take over the asse the Spruce Falls Co. Ltd., organize 1920. The Kimberley-Clarke Co. Neenah, Wis., holds all the stock of last named company, which has cu rights over 4,500 square miles of tir limits; development rights over w powers at Smoky Falls and Devil Ra