TORONTO UNION STATION

C. H. RIFF

Toronto Union Station.—Agents of the G.T.R. are negotiating with the owners of the various properties along Front St. required for the new Union Station site. Some difficulty is being experienced with a number in arranging terms. The company has purchased the land now used by the Hendrie Cartage Co., for yard and stable purposes in connection with the new station. It is expected that it will be necessary in a number of cases to fix by arbitration the value of the land taken.

December 1905

Toronto Union Station.—The contract for clearing the site of the new Union Station has been let to Kelly and Adams, Toronto. Work was commenced June 20, and good progress is being made. The wreckage of the warehouses, etc., burned out April 19, 1904, which now cover the ground, will be utilized to fill up the G.T.R. water lot between John St. and Spadina Ave. The buildings which are at present occupied by the post office at the corner of Front and Lorne streets, and the adjoining one will have to come down, so that there is considerable work to be done before any actual building operations can be started. The plans for the new buildings, it is understood, have not been finally approved. The new buildings, terminals, etc., will cost about $2,000,000, and will be in the French style, of brick with stone dressings, having a front elevation of five stories facing Front St. (May, pg. 257).

J. D. McArthur Company, Limited, has been incorporated under the Manitoba Companies' Act, with a capital of $1,000,000 and offices at Winnipeg, for the purpose of carrying on the business of builders and contractors in any and every line of work and industry. The company is granted very extensive general powers, and may amalgamate with or take over concerns having similar powers. The provisional directors are: J. D. and D. F. McArthur, contractors; B. J. McLeod, book-keeper; W. P. McDougall, accountant; J. K. McLennan, physician, all of Winnipeg.

JULY 1906

railway may be constructed.

Superior Portland Cement Co.—Application will be made to the Provincial Secretary of Ontario early in May for a charter under th Ontario Companies' Act, to enable the S.P.C. Co. to construct and operate a street railway from the factory in Orangeville to the lake near Caledon, about 1½ miles from the Orangeville municipal boundary; from the C.P.R. at lot 20, con. 3, Amaranth tp., to lot 20, con. 2, same township. G. McIntyre is provisional Secretary of the company.

[illegible] Application is being made at

MAY 1906

ion Parliament. (July, pg. 379).

Essex Terminal Ry.—An act was passed at the recent session of the Dominion Parliament changing the location of the company's offices to Walkerville, Ont., and extending the time for the construction of the railway. The company proposes to construct a line of about 3.8 miles from the G.T.R., at a point about three-quarters of a mile east of Walkerville to the Michigan Central Rd., about half a mile south of the Tecumseh road, passing through the southerly portions of Walkerville and Windsor, and crossing the C.P.R. tracks. We are advised that the right of way for this line is being secured, a contract for construction let, and that it was expected that a start would be made on the work by the end of July. The track will be laid with 80-lb. steel. Owen McKay, Walkerville, is Chief Engineer. The company has power to extend its line along the river to Sandwich, and to connect with the various lines approaching the International boundary there. The officers and directors for the current year are: President, A. L. Colby; Treasurer, C. F. Doherty; Secretary, J. H. Coburn; other directors: G. F. Porter, G. E. Roehm. (July, pg. 379).

Fording Valley Ry.—The provisional direc-

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formal organization of the company has been completed. (July, pg. 379).

Halifax and South-Western Ry.—We were recently advised that the grading on the main line had been finished, and all the bridge substructures, except at Mersey, Jordan and Clyde Rivers, completed. At these points the work is well under way, the piers and abutments at the latter two rivers being more than half completed. The steel spans are being shipped for all the bridges west of Liverpool, N.S. Track has been laid from Liverpool to about two miles west of Shelburne, about 53 miles in all, and good progress is being made with the work towards Barrington. About six miles of the additional track have been ballasted, and two steam shovels are employed in getting out ballast. The station buildings and tanks are being erected.

The Middleton and Victoria Beach section, 39.6 miles, has been completed, and has been inspected by Inspecting Engineer Johnson of the Department of Railways. The large pier which the Department of Public Works has erected at the Victoria Beach terminus, at a cost of about $100,000, is practically completed. (July, pg. 381).

Hamilton and Guelph Junction Ry.—Following are the officers and directors elected

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quarters at the Imperial Bank Building, Montreal. He was born at Westerley, R.I., Nov. 10, 1872, is a machinist by trade, has the degree of mechanical engineer from Lehigh University, and has been in the locomotive business since 1896. S. T. Callaway, heretofore Manager at Montreal, will be transferred to the American Locomotive Co.'s New York office.

Robert W. Hunt & Co., Bureau of Inspection, etc., Chicago and Montreal, announce that they have engaged the services of E. H. Lynde, who for years was connected with the Lackawanna Steel Co., in charge of its Bessemer Steel Rail Department at Scranton, Pa. He will assume direct charge of

of the line are being delivered at Quebec by the Dominion Steel Co., Sydney, N.S. It is expected to have about 40,000 tons of rails delivered by the end of the year, and distributed along the route.

The question of the location of the terminals in Winnipeg, for the National Transcontinental Ry., and the G.T. Pacific Ry., is under consideration by the Commissioners, who arrived in Winnipeg, Oct. 18, for the purpose of discussing it with the other railway and local interests involved.

GRAND TRUNK PACIFIC RY.

The Ontario Railway and Municipal Board visited Port William, Ont., Oct. 6, for the purpose of looking into the question of the

Canadian Northern Railway Construction.

Canadian Northern Quebec Ry.—D. D. Mann, Vice-President Canadian Northern Ry., in an interview at Ottawa, Oct. 17, stated that the line would be opened from Montreal to Quebec in 1907. The construction work between Garneau Junction and Quebec is being rapidly pushed, and the contractors state that the work already done is well up to anticipations. An injunction has been obtained restraining the St. Maurice Valley Ry. Co. from carrying its tracks across the company's lines in the vicinity of Shawinigan Falls, Que., and the question is still before the courts.

Canadian Northern Ontario Ry.—Grading is reported completed from Hawkesbury westerly to Rockland, Ont., and it is expected that

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present line in the Cascade mountains, and will cross the Spokane River below Fort Wright, striking in nearly an air line for the Snake River. It will follow the valley of the Snake and the Columbia rivers to Portland. The gradient is expected not to exceed in any case 0.4%, and the curvature 3 degrees. A despatch from Tacoma, Wash., says: "J. J. Hill will build the town of St. James, on Gray's Bay, 16 miles above the mouth of the Columbia river. Mr. Hill's North Bank road, now being built down the Columbia river from Pasco to Vancouver, will be extended westward to Gray's Bay, an ocean port will be created at that point."

Halifax and Southwestern Ry.—With the completion of the connection between the H. and S. Ry. and the old Halifax and Yarmouth Ry., near Barrington, N.S., this system has a length of 370 miles, distributed as follows: Halifax to Yarmouth, 248 miles, including 1.7 miles trackage over the I.C.R.; Lunenburg branch, 7 miles; Caledonia branch, 23 miles; Middleton section to Victoria beach, 93 miles. There are altogether 155 steel bridges on the line, ranging from 25 ft. to 80 ft. spans. The system comprises the old Halifax and Yarmouth Ry. and the old Central Ry. of Nova Scotia, which were acquired by Mackenzie, Mann & Co. in connection with the construction of the Halifax and Southwestern Ry. The charter of the Middleton and Victoria Beach Ry. was also acquired, and the line completed, and the line from New Germany to Caledonia was constructed under the charter of the old Central Ry. (Oct., pg. 583).

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November 1906

Toronto Track Elevation.—The Toronto City Engineer proposes the construction of a viaduct six miles long over which all trains shall enter the new Union station, Toronto. The tracks would be given an elevation of 14 or 15 ft. above the present level, and would do away with the necessity of the erection and maintenance of a number of bridges and level crossings. The cost of the work is estimated at $5,000,000. It is proposed that the railway companies be asked to appoint engineers to go into the whole question of railway approaches to the city between the Humber River on the west, and Logan avenue on the east.

Toronto Union Station.—The G.T.R., to which company was given the order to carry out the construction of the new Union station in Toronto, has informed the city council that the delay in proceeding with the work is due in some measure to the fact that there is a difference between the three companies

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able for cab service, the east court being likewise available for transfer companies and baggage service. The main waiting-room as planned cannot conveniently be used as a thoroughfare, which will increase its efficiency and comfort. This room extends to a height of three stories, and is lighted by 14 very large windows, seven on the north and seven on the south. A gallery runs on all four sides of the same and at the height of the second story of the wings, the north gallery giving access to a series of spacious offices for the use of the employes directly in charge of the station traffic. On this floor and in the west wing is provided a spacious dining-room, serving rooms, kitchen and all accessories. In the east wing is a large hall for the segregation and handling of immigrants, with retiring rooms and toilet rooms for both sexes, and ample accommodations for the officers in charge of this service. In the story extending over the entire waiting-room and in the top of third story of the service wings accommodation about 6,000 sq. ft. in excess of those existing in the union station are provided for the offices of both railway companies. Two staircases, each with two elevators, are provided, one at the east and the other at the west end of the main waiting-room, giving access to the galleries, offices and other service.

The architectural treatment of the exterior is designed with a view of obtaining a monumental effect in a simple, dignified and reposeful manner; of expressing clearly on the exterior the function of each part of the building on the interior; thus, the main waiting-room is clearly suggested by the large windows and the solid basement treatment, the wings indicating clearly the subordinate function which they have to perform; so likewise the baggage and service buildings. The treatment will be maintained on the interior of the building on the same lines. The style of architecture is classic, and though inspired as to detail from the fine examples of the eighteenth century, is treated so as to be distinctly modern in its expression, and to clearly indicate the purpose of the building as a whole, and of each part of the building as well. It is intended to build the exterior of some light stone.

February 1907

Eastern Railway Entrance to Toronto.

The Department of Railways has under consideration an important problem affecting the interests of the G.T.R., the C.P.R. and the Canadian Northern Ontario Ry., in connection with their applications for the approval of plans for new lines east of Toronto. The G.T.R. is desirous of securing a better entrance into the city, with the object of reducing the gradient at Scarboro Heights; the C.P.R. has made surveys for a new line into the city, giving connection with the lake shore towns not now directly served by the G.T.R., and the Canadian Northern Ontario Ry. has prepared plans for its projected line from Toronto to Ottawa. In addition to the demand for additional main line accommodation, there are numerous applications for additional spur lines to accommodate the increasing numbers of factories in the eastern district of the city, and a call for the elevation of all the railway tracks in the city. Objection has been taken by residents of outside areas to so much cutting up of property for railway lines converging upon the city, and the City Council has taken up the whole question of railway accommodation in the east end of the city. The East End Business Men's Association has passed a resolution urging the construction of an independent line into the city, over which all railways be given rights. The Guild of Civic Art urges that the railways be compelled to keep their lines north of the Kingston Road. C. B. Smith, C.E., has been engaged by the city engineer to make surveys with a view of securing an alternative route so as to save Kew Beach and other of the beaches east of the city. When the question of the approval of the plans came before the Minister of Railways, Jan. 17, it was adjourned to March 18. The Minister suggested the appointment of an advisory committee of three engineers representing the municipalities, the railways and the Department, to consider the whole question with a view to minimize the injury to property, as well as to get good grades. The suggestion is being considered by the railways and the municipalities.

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The C.P.R., owning the Hull Electric Ry., has arrived at an understanding with the Hull, Que., City Council, as to various matters in dispute, and the actions entered will be withdrawn. Freight hauling is to be continued during the winter, and in the spring a loop line is to be constructed which will do away with the necessity of hauling freight over the line in future.

March 1907

Canadian Northern Ry. Earnings, etc.

Gross earnings, working expenses, net profits, increases or decreases over 1905-06, from July 1, 1906:

	Earnings.	Expenses.	Net Earnings.	Increase or Decrease.
July..	$ 603,800	$ 307,900	$ 295,900	$ 63,400+
Aug..	594,900	402,800	192,100	80,400+
Sept..	624,400	417,800	206,600	90,400+
Oct....	815,100	490,000	325,100	66,000+
Nov..	741,700	481,300	260,400	35,300+
	$3,379,900	$2,100,700	$1,189,200	$ 341,500+

Average mileage in operation 2,438, against 1,879 during same period 1905.

Approximate earnings for Dec., $556,200, against $437,800 for Dec., 1905.

C.P.R. Earnings, Expenses, etc.

Gross earnings, working expenses, net profits, increases or decreases over 1905-6, from July 1, 1906:—

	Earnings.	Expenses.	Net Profits.	Increase or Decrease.
Fly	$5,467,067.82	$3,096,136.74	$4,371,811.08	$734,033.42+
Aug.	6,170,452.27	3,707,873.07	2,462,579.20	679,933.29+
Sept.	6,152,767.15	3,714[illegible]5.52	2,437,931.63	661,921.58+
Oct..	6,046,605.38	4,161,777.97	2,584,827.31	512,756.33+
Nov.	6,234,583.28	3,971,460.34	2,263,122.04	98,188.05—
	$31,472,376.00	$19,152,103.64	$12,320,272.36	$2,479,456.57+

Approximate earnings for Dec., $5,931,000, against $6,368,000 for Dec., 1905.

DULUTH, SOUTH SHORE AND ATLANTIC RY.—Gross earnings for Nov., $255,581.42; net earnings, $72,397.79, against $249,241.63 gross and $83,014.71 net for Nov., 1905. Net earning for five months ended Nov. 30, $500,278.45 against $479,044.04 for same period, 1905. Approximate earnings for Dec., $251,276, against $213,548 for Dec., 1905.

MINERAL RANGE RY.—Approximate earnings for Dec. $04,067 against $52,104 for Dec., 1905.

MINNEAPOLIS, ST. PAUL AND SAULT STE. MARIE RY.—Gross earnings for Nov., $1,000,866.34; net earnings, $514,314.86; against $1,149,648.50 gross and $687,873.25 net for Nov., 1905. Net earnings for five months ended Nov. 30, $3,944,373.64, against $3,809,150.30 for same period 1905. Approximate earnings for Dec. $862,081 against $931,739 for Dec., 1905.

Grand Trunk Ry. Earnings, Expenses, etc.

The following figures give the earnings and expenses of the G.T.R., the Canada Atlantic Ry., the G.T. Western Ry., and the Detroit, Grand Haven and Milwaukee Ry., separately for Nov., as compared with Nov., 1905.

GRAND TRUNK RAILWAY.

	1906	1905
Earnings	$2,816,000	$2,643,000
Expenses	2,097,990	1,873,104
Net earnings	$ 718,010	$ 779,497

CANADA ATLANTIC RAILWAY.

Earnings	$ 191,858	$ 190,681
Expenses	170,720	159,473
Net earnings	$ 121,191	$ 31,208

GRAND TRUNK WESTERN RAILWAY.

Earnings	$ 511,550	$ 474,538
Expenses	402,749	368,172
Net earnings	$ 109,601	$ 106,166

DETROIT, GRAND HAVEN & MILWAUKEE RY.

Earnings	$ 142,333	$ 137,369
Expenses	106,566	106,555
Net earnings	$ 36,768	$ 30,814

Approximate earnings for Dec., $3,691,371, against $3,491,472 for Dec., 1905.

TRAFFIC RECEIPTS OF THE SYSTEM.

Aggregate from July 1 to Dec. 30.

	1906.	1905.	Increase.	Decrease.
Grand Trunk	£3,194,186	£3,293,305	£300,881	
Canada Atlantic	226,042	218,321	6,718	
G. T. Western	638,028	583,464	54,564	
D. G. H. & M.	190,681	160,786	29,295	
Total	£4,043,037	£4,261,879	£391,058	

The Board of Railway Commissioners held a session at Winnipeg, Jan. 14 and following days, for the consideration of Manitoba and other western cases.

The action of S. A. Stephens for $30,000 against the American Locomotive Co., has been dismissed, by the Quebec Courts, on the ground that the contract was made in the U.S., and that the company had no property in Canada at the time action was instituted.

New Union Station for Toronto.

The plans show that the proposed passenger station building, including baggage buildings and service plant, are to be erected on the south side of Front St. between York St. and Bay St., and will occupy the entire front between these streets. The existing express building west of York St. will be retained for the Canadian Express Co.'s service, and a new building, of similar dimensions, and with the same general relation to the passenger building, will be erected east of Bay St. for the Dominion Express Co. The northerly line of the passenger buildings is to be generally 65 ft. from the south line of Front St., leaving a plaza of this width for carriage and foot walk purposes.

The station building is generally 100 ft. wide, and between the building and the tracks there is a concourse 90 ft. wide for the general circulation of passengers.

The track layout consists of nine through tracks and two stub tracks, so arranged that there are five platforms for passengers and two platforms for the exclusive trucking of baggage and express matter. The station tracks are connected up at each end with an interlocking switching system, so that they properly join the four main tracks on the east and the two main tracks on the west, generally with double track loads, to give the greatest facility to the train movements. The passenger platforms are designed to be 1,400 ft. long, though this may be increased if found necessary, this distance being sufficient for the longest trains. They are about 20 ft. in width throughout. The new tracks at a point opposite the centre of the station will be 4 ft. higher than the present tracks, and the platforms are designed to be 8 inches above the top of the rail. This leaves a difference of about 5 ft. vertical between the grade of the platforms and the grade of Front St., which difference is overcome by three steps at the waiting-room entrance and inclined surfaces transversely on the concourse between the tracks and the station, and the plaza between the station and Front St. None of the inclined surfaces exceed a slope of three-eighths of an inch per foot. The passages for exit are without any steps whatever. By this arrangement the station and platforms are, in effect, level with the street, a condition which permits of the best possible treatment of any type of station. In order to bring about this condition it has been found necessary to provide for the removal of the York St. overhead bridge, and to substitute in lieu thereof an overhead bridge just east of Bay St. It is also suggested that this bridge easterly of Bay St. can be made to take care of the traffic at the Yonge St. grade crossing, so that the necessity of a bridge at the latter street can be avoided. Foot bridges at any necessary point of crossing can be constructed without interfering with the raising of the tracks. In order that it may not be necessary for any passenger to go upon any track at grade and to make this station absolutely safe and fully up to modern methods and requirements a subway 30 ft. wide is provided, opposite the centre of the station, so that any platform may be reached by means of easy stairways with landings, the total height of stairways for this purpose being about 10 ft. This method allows all trains to come to a stop directly opposite the centre of the station, thus making the least distance for passengers to walk to and from the station and trains.

The baggage and express trucks are to be kept as much as possible on special trucking platforms, 10 ft. wide, which extend the whole length of the station and lie adjacent to four out of the nine through tracks, upon which four tracks it is intended that trains having the bulk of express and baggage matter will be run. The baggage and express trucks cross the track area by subways beneath the tracks, and lead to the basement of the baggage and express buildings. The trucks will be raised and lowered between the subways and the platforms by means of electric lifts. There are three of these cross subways. One leading to the baggage room, one to the express building at the easterly end, and one to the express building at the westerly end of the station.

It is intended that a trainshed roof will be provided to cover the main portion of the platforms and the concourse. This shed will be 800 by 315 ft., covering about six acres. The main structure will be in three spans, and there will be a connecting roof between the trainshed and the station buildings. This roof will be a steel structure and will be well lighted and ventilated. At each end of the station concourse there are spaces for a carriage court for the accommodation of cabs, carriages and baggage transfer waggons, so that it will not be necessary to pass through the station building to get a carriage. At the extreme east end of the station a service building is provided for supplying all heat, light, steam, hot water, compressed air, refrigeration, etc., for the use of the station building and train purposes.

The general layout of the station yards and grounds, including the approach tracks, does not interfere in any way with the present freight yards of either railway.

The station building is planned primarily with a view to convenience and spaciousness and consists of a main central building with two service wings. In the main building on a level with the tracks is located the general waiting room, containing 17,242 sq. ft., which is 5,000 sq. ft. larger in area than the Grand Central Station in New York, or the present station in Toronto. Access to the waiting-room is obtained directly by three spacious openings, containing nine doors each directly from the plaza on Front St. Egress to the trains is obtained by three similar openings containing each nine doors leading to the concourse. Ticket, telegraph, and telephone booth, information bureau, news stands, ample parcel room, and other conveniences are provided along the four sides of the waiting-room, where they are easily accessible and visible. A broad passage at the east end leads directly to the baggage-room, which is located in the east service wing. The capacity of this room, including the basement and first floor, is 28,000 sq. ft., or 15,000 sq. ft. larger than the present baggage-room, and 6,000 sq. ft. larger than the baggage-room at the Grand Central Station, New York, which is one of the largest in the U.S. A similar passage at the west end of the waiting-room leads directly to the west service wing, in which are located waiting-rooms for men and women, each provided with ample toilet accommodations, the women having in addition retiring rooms. Barber shop, bootblacks and other conveniences, as well as a well-equipped, spacious lunch counter, are likewise provided in this section of building. Spacious passages running north and south are placed at each end of the waiting-room, between the waiting-room and the baggage-room on the east, and between the waiting-room and service just mentioned on the west. These passages are intended mainly for exits, so that the travelling public in arriving will pass through and out without crossing the waiting-room. Passengers departing can enter by the easterly passage, check their baggage and buy their tickets without confusion or delay. Carriage courts both east and west of the main building are avail-

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large. The total distance along the Windmill line between the western channel and the western limit of Ashbridge's Bay immediately at the foot of Parliament St., is about two miles. Of this distance a large part is occupied by railway yards, and less than one-half of it is open for development for commercial purposes. The City has established on its map and has constructed in small part a marginal street called Lake St., and has also established a line southerly of Lake St., to which improvements by piers or wharves may be carried. What should be done with the approaches to the new station necessarily has great bearing upon the water front property. An inspection of the map, even after Lake St. is completed, shows that but a small part of Toronto water front will be capable of any extensive improvement. Between the water front and the railway tracks on the Esplanade there should be sufficient space to permit the construction of manufacturing industries, warehouses, store yards or other large terminal improvements which can be served by railway connections on the one side and water connections on the other. In this respect Toronto is exceedingly favorably situated, and the full use of such situation should, it seems to us, be secured. Without attempting to go into any details of design, we have considered and recommend to you the possibility of establishing along the water front a large marginal street that should have a width of at least 125 ft., extending from, say, Cherry St. westerly to Queen's Wharf channel, connecting at that point with a proposed boulevard, which we understand is proposed to be constructed, thence to the Humber, thus furnishing a great thoroughfare the full water front of the City. If this new street were located at a distance of at least 600 ft. from the Esplanade, which would place it just southerly of the proposed location of Lake St., between Scott and Parliament Sts., there would then be a sufficient area between such street and the Esplanade for a systematic and extensive development. The water front then could be divided so as to give in the neighborhood of the foot of Yonge, Bay and York Sts., passenger accommodations for ferries and for the passenger steamers running to Hamilton, the St. Lawrence, Niagara, or to local points along the lake shore, with accommodations for the purely commercial vessels on the east, for yacht and boat clubs on the west, and connection between the railways and lake beyond, but with freedom of connection between them all. If some such plan as is here indicated were taken up and studied in detail, we believe that there would result to Toronto not only new land of great value in itself, but also a great increase in its commercial facilities that would have a far-reaching effect on all values in and business of the City. With the water front thus developed, the traffic between it and the City, not only for water-borne freight, but for freight that would be brought to the industries and warehouses by the railways themselves, will become of great importance, and its care of more concern than even that of the present existing traffic. To permit this new traffic to pass the running tracks of two great railways on level crossings, no matter how well protected by gates and watchmen, is at great cost to the company and a great burden, both in danger and delay, to the citizens. We strongly recommend to you, therefore, that steps should be taken in connection with the proposed station to so arrange the track approaches thereto that these level crossings should each and all be permanently removed. This can be done in two ways: 1. By elevating the tracks, and 2. by elevating the streets.

Both plans have their advantages, but as both of them involve certain questions of legal rights and other questions of policy as to which we are not advised, we think it better to lay before you the relative advantages of the plans, so that you may see all phases of the question. From our standpoint, however, we are of the opinion that the preponderance of advantages is in favor of the elevation of the streets. It has been suggested that the station itself be placed at such elevation as to permit the tracks running to the east to pass over all streets from Bay St. easterly, such streets to be carried beneath the tracks at their existing levels. The additional cost of the construction of the station at the higher level can be taken as negligible in amount. If the main running tracks, at least four in number (which we consider sufficient) were thus elevated and Bay St. carried beneath, a total reconstruction of the existing yards of the railway companies would, however, become necessary. The local C.P.R. freight house would have to be moved and the classification and delivery tracks connected only at the west end, instead of at both ends as at present. Along Esplanade east of Yonge St. there are at present certain tracks on the surface for car delivery and other private tracks turning into industries and warehouses. It appears, after consideration, it will be impossible to do away with these tracks. Their presence is of great importance to the business of Toronto. It has been proposed, however, that no tracks of this nature be carried across Yonge St., but we consider it necessary for the accommodation of the traffic at this point that on the north the tracks should be carried as far west as Scott St., and on the south as far as the east side of Yonge St., this latter being especially necessary to provide for the shipment of fruit which now takes place at the Yonge St. wharf. These tracks would necessarily cross all the streets east of Yonge at grade. In order to diminish the danger, it has been proposed that shifting on these tracks be limited to the night hours, or that the shifting engines be preceded by a man on foot with a flag, as the danger of running a train close to, and therefore obscured by, the masonry of a viaduct, would be exceedingly dangerous. On the other hand, if the streets are carried over the railway there need be no reconstruction of the existing yards, and there will be no interference with the industries located on the Esplanade. Crossing of all tracks at level should be absolutely eliminated, and there should even be an extension of the facilities afforded by private track delivery if the development of the water front so required it, as in our judgment it will. It would not seem necessary, in order to furnish proper connections to the water front, that every street now on the map need be connected with the marginal street. If there were four, or at the utmost five, approaches east of Yonge St., the full requirements of the case, even with the developed water front, would be met. Should a marginal street be constructed, as suggested, a distance of at least 600 ft. from the Esplanade, the gradient on the approaches crossing the tracks would not exceed 4%, which is less than the existing gradient rise from the Esplanade to Front St., at least as far east as Princess St., and such approaches would reach the grade of the marginal street on the north line without requiring curved approaches, as in the present York St. approach.

Summarizing the advantages and disadvantages of the two plans, we have for track elevation—Advantages: Every street would be carried through to the water front at its existing elevation.

(To be continued in next issue.)

The Commission appointed to investigate and report on the needs of the Georgian Bay ports will consist of M. J. Butler, Deputy Minister of Railways and Canals, and Louis Coste, of the Department of Public Works.

Too Late for Classification.

General.

It was unofficially announced in Ottawa, Aug. 29, that Hon. W. Pugsley, ex-Premier of New Brunswick, had been appointed Minister of Railways and Canals, succeeding Hon. H. R. Emmerson, resigned.

Atlantic and Pacific Ocean Marine.

The steamship companies engaged in passenger traffic with the Orient, including the C.P.R. and the Canadian-Australian lines, have decided, on account of the rise in prices of coal and general stores, to increase their rates by 10%.

Maritime Provinces and Newfoundland Marine.

The steamboat Stord from Quebec to Hudson's Bay ports, struck Mingin Island in a dense fog, Aug. 8, and strained her bow. She put in at St. John's, Nfld., for the necessary repairs to be carried out.

Express.

The barn occupied by the Canadian Ex. Co. at Stratford, Ont., was destroyed by fire Aug. 14, and two horses, with a quantity of feed, were burned.

Telegraph and Cable Matters.

The C.P.R. Telegraph Department has opened an additional telegraph office at its city ticket office, King and Yonge Sts., Toronto.

Sir H. W. Primrose, K.C.B., C.S.I., has been elected Chairman of the Pacific Cable Co., in the place of the late Sir Spencer Walpole.

W. J. Camp, Electrical Engineer C.P.R. telegraphs, reports that recently the earth currents were so severe that all the duplexes at Fort William, Ont., had to be disconnected, and at times set fire to the switchboards.

The report of the Pacific Cable Board for the year ended Mar. 31, shows a gross message revenue of £116,401, against £94,456 in 1905-06, and the entire net revenue £113,516, with an expenditure of £90,805. After providing for interest and sinking fund there is a deficiency of £54,923, against £72,556. The traffic revenue for 1906-07 is £105,088, a deficit of £69,805.

General Telephone Matters.

An arrangement has been effected by which the Dominion Government telegraph cable between Gaspe and Ellis Bay, Que., will be utilized for telephonic communication.

The Canadian Machine Telephone Co. states that it is hoped to have an automatic telephone system in operation in Brantford, Ont., by the end of the year. The company has purchased a site in the city and will erect an office building at a cost of about $8,000.

The operators engaged on the civic telephones at Fort William, Ont., were out on strike last month. They alleged many grievances, but the culminating point was the appointment of a chief operator from the U.S. She was subsequently dismissed, and the operators resumed work.

The Harrietsville Telephone Association has been incorporated under the Ontario Companies' Act, with a capital of $25,000 and offices at Harrietsville, Ont., to carry on the business of a telephone company. The provisional directors are: W. Dean, S. E. Facey, J. C. McNiven, W. B. Lane, J. Smith, W. J. Coates, North Dorchester tp., and M. Mell, Black, Springfield, Ont.

The General Industries Construction Co. has been incorporated under the Ontario Companies' Act, with a capital of $100,000 and offices at Toronto, for the purpose of carrying on the business of a general construction and development company. The provisional directors are: J. A. Paterson, K.C.; A. McKenzie, W. H. Templeton, and A. T. Davidson, Toronto.

September 1907

Toronto Union Station, Tracks, etc.

Following is the balance of the report of W. Barclay Parsons, New York; C. B. Smith, Toronto, and C. H. Rust, City Engineer of Toronto, to the Toronto City Council on this question. The first portion of the report was published in our last issue.

The disadvantages are: 1. That the raising of the station would place the tracks westerly of it at such a height as to require the abolition of the John St. bridge; 2. The existing freight yards would have to be reconstructed; 3. The shifting and delivery facilities on the Esplanade reduced; 4. Crossings of the shifting tracks on the Esplanade would still remain; 5. Greater cost. As to the separation of streets and railway by street bridges, the advantages are: 1. No interference with existing tracks; 2. Delivery facilities on the Esplanade can be increased; 3. A less cost; 4. Better appearance to persons approaching from the water. The disadvantage is: That some streets will be cut off before reaching the water. This probably will result in property owners abutting upon the Esplanade claiming damages for the closing of these streets. In discussing the advantages and disadvantages we have not alluded to the question of damages. In all probability, judging from what has happened in other cities, the property owners, in the event of a viaduct being constructed, will set up alleged claims for damages to their property. We are so firmly of the opinion that all level crossings of streets and tracks should be eliminated, that we recommend, in the event of street bridges over the railways being adopted, that the main running tracks east of Yonge St. be fenced as far as Parliament St. This will present the same facilities for unobstructed train speeds as the viaduct would. On the other hand it would abolish the private crossings from the south side of the Esplanade as efficiently as the viaduct, and [illegible] of such abolition would be

tracks would be depressed sufficiently to provide for over head bridges at intersecting streets. From Queen St. crossing at Sunnyside west to Humber it is proposed to have the track elevated, and under-crossings could be constructed into High Park, and also at the various streets west of this point, which are in the municipality of Toronto Jct. If this work were carried on with only two tracks as at present, it would probably cost not more than $500,000. The large additional cost is caused by the right-of-way that would be required for the construction of the two additional tracks. The total cost, therefore, to abolish grade crossings and to elevate the tracks throughout the city, from the west city limit at the Humber to a point east of the Queen St. crossing on the G.T.R., would be approximately $4,000,000. This does not include any amount for the reconstruction of the yards, re-laying of the tracks along the Esplanade, delays and inconvenience to travel pending the reconstruction, nor have we included any allowance for possible abuttal damages incident to the construction of a raised viaduct in the center of Esplanade St. For both projects there might be some abuttal damage to obliterate private rights crossing the tracks at grade.

The cost of five overhead bridges, including one at Yonge St., would be about $800,000. This estimate includes an allowance for the damages to abutting property.

The question as to what proportion of the cost of this work should be borne by the City is, we consider, a matter of policy to be determined by your Council, but we would point out that in the construction of the York St. bridge, the City paid one-third of the cost, and we would suggest that, if the tracks are elevated, the City should not be called upon to bear any larger amount of expense of the work than they would have to do if it were decided that overhead bridges were the best solution of the problem.

C. B. Smith has since made the following

	With Viaduct on Esplanade and Eastward	With Bridges on Esplanade
Track, yard and building reconstructions due to viaduct (estimate C. B. Smith)	500,000	
Five overhead bridges across Esplanade street.		800,000
Subway over G.T.R. at Queen street and Eastern avenue.		$ 60,000
Bridge over C.P.R. and Don River at Queen street.	$ 200,000	200,000
Total if western entrance for Four tracks...	4,800,000	2,160,000
Two tracks.	4,300,000	1,660,000

BOARD OF TRADE REPORT.

The following report has been made to the Toronto Board of Trade by R. M. Berrian, of Boston, Mass., and J. W. Moyes, of Toronto: Having regard for your instruction for a report giving a solution of the Esplanade difficulties presenting themselves in the City of Toronto, beg to say: That a close personal investigation has been made, extending from Scarboro Bluffs on the east, to the Humber on the west, and a thorough going into the merits and claims of the railway companies regarding the present location; then having in view the personal safety of the citizens, and the providing of means that would give to Toronto a much needed free use of a developed water front, as well as afford perfect facilities for the railway needs. The situation appears to be capable of solution in two ways: 1. The elevation of the streets; 2. The elevation of the railways. A concise presentation of the merits of each would perhaps present a solution and provide for a selection.

The physical features of the southern boundary of Toronto traversed by the railways is of a complex character, and must be viewed from the standpoint of what will result in the greatest good to the greatest number, while having reasonable regard to the financial aspect of such solution.

It would appear that each of the several streets, having a southerly direction from [illegible] the water front of

will present the same facilities for unobstructed train speeds as the viaduct would. On the other hand it would abolish the private crossings from the south side of the Esplanade as efficiently as the viaduct, and the cost, if any, of such abolition would be equally a charge against both projects.

We have estimated that the cost of track elevation from Bathurst St. to a point east of Queen St. on the G.T.R. would be substantially $3,000,000. This provides for a four-track viaduct from Yonge St. eastwardly to Parliament St., where the C.P. and G.T. lines separate. We have assumed that this work will be carried on a concrete-filled viaduct with bridges at every street opening 66 ft. wide. The portion east of Parliament St. on the C.P.R. would be a two-track viaduct running down to the present grade near Queen St. This would give subway crossings at Front and Tate Sts., and probably with the slight depression of the street a subway could be constructed at Eastern Ave. On the G.T.R., east of Parliament St., a two-track embankment constructed eastwardly a distance of 7,600 ft. This will provide for subway crossings at Eastern Ave and Queen St. We have also provided for elevating all the tracks south of the proposed station for a width of about 500 ft. This width going west is gradually decreased until it assumes the normal width of four tracks at John St., which width continues to Bathurst St. A ramp is provided for on the north side to reach the G.T.R. passenger coach yard on a one per cent. grade. From the diamond crossing immediately west of the Strachan Ave. bridge to the Humber River we have taken the plan and estimate prepared by J. Hobson, Chief Engineer of the G.T.R., who provides for four tracks and gives the total cost of the work at $1,000,000. This estimate does not, however, provide for a bridge at the Queen St. crossing at Sunnyside, which would cost, including land damages, about $100,000. This plan provides for the depression of the tracks commencing at the diamond crossing and running westerly to Queen St. The tracks are elevated, the City [illegible] called upon to bear any larger amount of expense of the work than they would have to do if it were decided that overhead bridges were the best solution of the problem.

C. B. Smith has since made the following supplemental report: In reference to the report re separation of grades in connection with the railways along the waterfront, signed by Messrs. Parsons, Rust and myself, my attention has been called to what may appear to be an ambiguity in statement, and, as it is, I consider very desirable that there should be an understanding on the matter of cost of a system of separation of grades, either by subways and bridges, or subways and viaduct, I beg to append the following comparative table showing the approximate cost of grade separation by either method. In our joint report reference was made to the fact that our estimate did not include an amount for the reconstruction of the yards, relaying the tracks along the Esplanade, etc., and although such an estimate must of necessity be approximate, I consider that it is only fair that you should be advised of the possible magnitude of the same, and I have accordingly added in the table my personal estimate of what this will amount to, viz., $500,000. This amount, you will understand, does not include any sum for damages or for inconvenience to railways or the public.

Table of comparative estimated costs of separation of grades in Toronto, extending from Swansea on the west to and including Queen street crossings of the C.P.R. and G.T.R. on the east:

	With Viaduct on Esplanade and Eastward	With Bridges on Esplanade
Track depressions through Parkdale, Sunnyside bridge and track elevations at High Park, Four tracks	$1,100,000	$1,100,000
Two tracks.	600,000	600,000
Four track viaduct, etc., Bathurst street to, and including subway at Queen street east.	3,000,000	

[illegible] result in the greatest good to the greatest number, while having reasonable regard to the financial aspect of such solution.

It would appear that each of the several streets, having a southerly direction from Queen St., have access to the water front of the City, and these rights must be assumed to be maintained for the citizens in any treatment of the question. Having this in mind, then, let us see what may be done by the elevation of the highways over the railway tracks now situate on the Esplanade. A reasonable assumption would be that each of these streets have a right to the free access spoken of. In that event, then, a bridge and approaches thereto would be necessary. Commencing at the western end, say York St., we find between that and Cherry St., inclusive, 10 bridges would be necessary to reasonably serve the apparent rights now enjoyed by the citizens, but which the danger of crossing the network of railways at grade prevents their using. As the demand for a 22-ft. clearance over the rail is imperative for the operation of the railway under a street elevated over these railways, the portion of the bridge prepared for traffic would be in the neighborhood of 25 to 26 ft. above the level of the rail and surrounding ground. Assuming that a 4% grade on these approaches would be a reasonable one for vehicular operation, we are confronted by the necessity for an approach of between 600 and 700 ft. From the northerly limit of the railway tracks at Sherbourne Street the approach thereto would commence at a point north of Front and south of King St. The natural rise of ground at the highest point, Yonge St., would not entail the necessity for the approaches reaching beyond Front and Yonge St. but in each event the necessity for carrying a bridge approach to the south would mean the extension of the existing shore line some distance out towards, or even up to, the new Windmill line. If, on the other hand, the approaches to the bridges were carried at right angles, then

October 1907

The Toronto Viaduct Question.

The arguments of counsel upon the question of the power of the Board of Railway Commissioners to order the railway companies to join with the city council in the construction of a viaduct along the water front of Toronto, were concluded June 6, and on June 10 Chief Commissioner Mabee gave judgment against the companies, which was concurred in by Commissioner Mills as follows:

"No objection is taken to the jurisdiction of the Board to order the elevation of the railway company's tracks along the Toronto waterfront. The railway tracks are along the Esplanade, and that is a street, a highway. Under sec. 227, if the company applies for leave to construct the railway along a highway it must file a plan and profile with the Board, showing the location of the highway affected, and upon the application the Board is expressly empowered to make provision for the protection, safety and convenience of the public, and has authority to require all such measures to be taken, as under the circumstances appear to the Board best adapted to remove or diminish the danger or obstruction existing or likely to arise from the construction of the railway along the highway.

"Now, if this were an application of the companies for leave to locate and construct their lines along the Esplanade, I think it is perfectly clear that the Board could impose as a term of granting such leave that the track should be elevated or carried upon a viaduct. If I am right in holding that the Board has power upon an original location to require elevation of tracks, it seems to me clear it has the like power notwithstanding the railway is already constructed along the highway.

"Sec. 30 provides that 'the Board may make orders . . . with respect to the . . . structures and works to be used upon the railway so as to provide means for the due protection of . . . the public.'

"Sec. 3 of the Railway Act is as follows:

"'This act shall, subject to the provisions thereof, be construed as incorporate with any special act, and unless otherwise expressly provided in the act where the provisions of this act, and of any special act passed by the Parliament of Canada, relate to the same subject matter, the provisions of the special act shall, in so far as is necessary to give effect to such special act, be [illegible]

or advanced to take away the authority of Parliament to confer upon this Board authority and jurisdiction to deal with the subject matter of this application, and that such authority has been conferred, and in saying this I am not overlooking the authorities under which the railway titles upon the Esplanade from time to time developed. On April 22, 1905, the city entered into an agreement with the G.T.R. which by an Act of the Ontario Legislature of the same year was declared valid and binding, for the construction by the railway company of a new union passenger station and yards. This agreement is based entirely upon the operation of the railway tracks upon the level; it provides for the city closing certain streets, a foot bridge from Front St. to Lake St. over the tracks, changes and repairs to York St. bridge, and many other provisions, entirely inconsistent with track elevation as now proposed. Upon this agreement the G.T.R. has acted, and in good faith expended enormous sums of money. Application for the order for the construction of the Yonge St. bridge was made by the city, the validity of the order has since been upheld by the Court of Appeal, it is still held by the city and under it the railways are required to construct a bridge over the tracks.

"I mention these matters because it was strongly argued that the city had estopped itself from making the present application; that the policy adopted, the contracts entered into, the work done and money expended by both city and railways upon the lines of protection by overhead bridges upon the well-known legal doctrine of estoppel, prevented the city departing from that mode of grade separation, and making application now for an entirely different system. I am of opinion that this argument would be entitled in a court of law to prevail, and that the course taken by the city in the past would absolutely prevent this application from succeeding, but this Board is not a court of law, and no doctrine of estoppel is applicable or binding.

"The paramount object of the sections under consideration, that which overshadows all and before which everything must give way, is the protection, safety and convenience of the public in the matter of grade separation, and no town or city council by any sort of municipal mismanagement, folly or ignorance can estop itself or prevent the Board taking any step or making any order, otherwise within its jurisdiction, for the protection, safety and convenience

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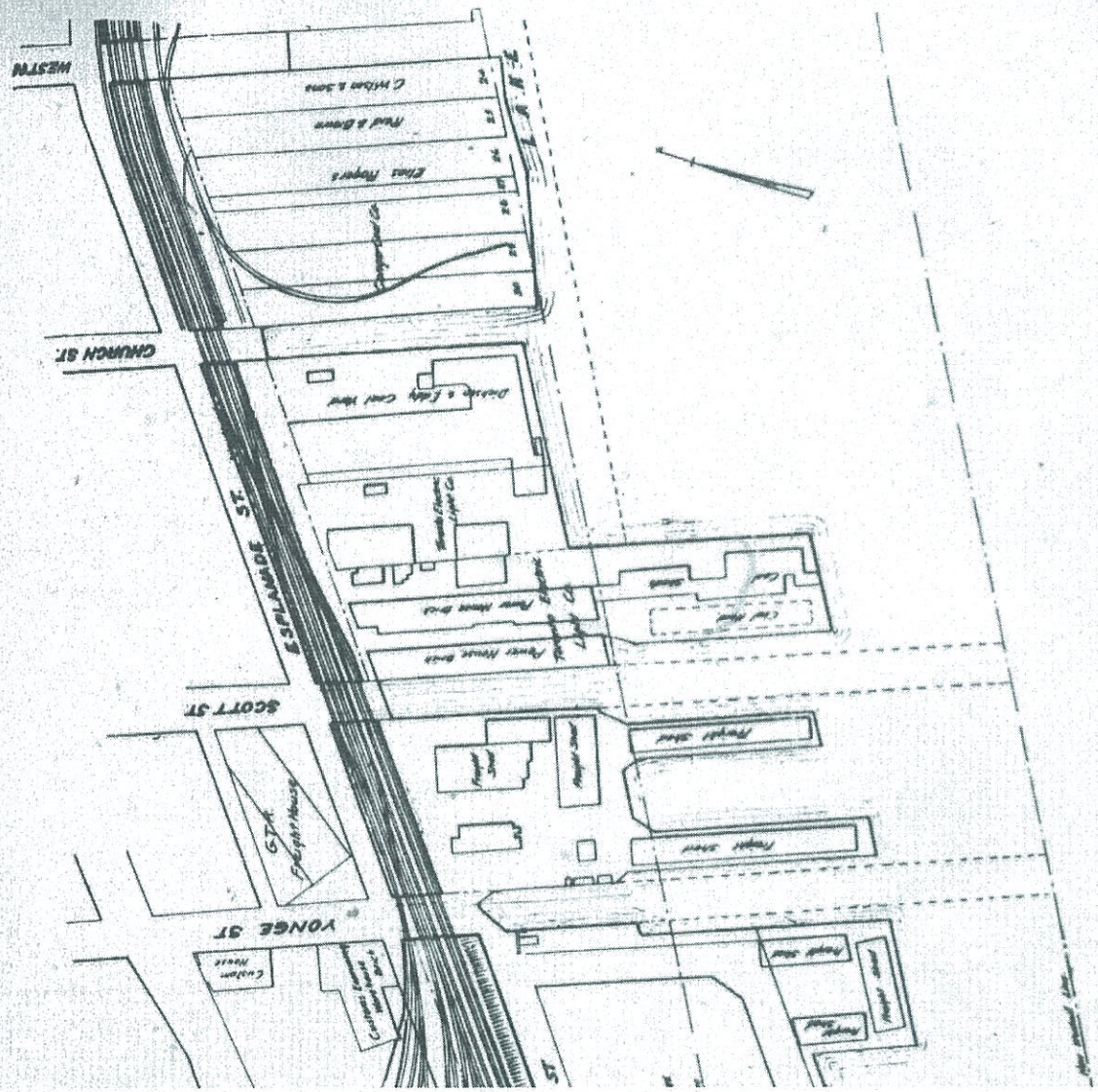
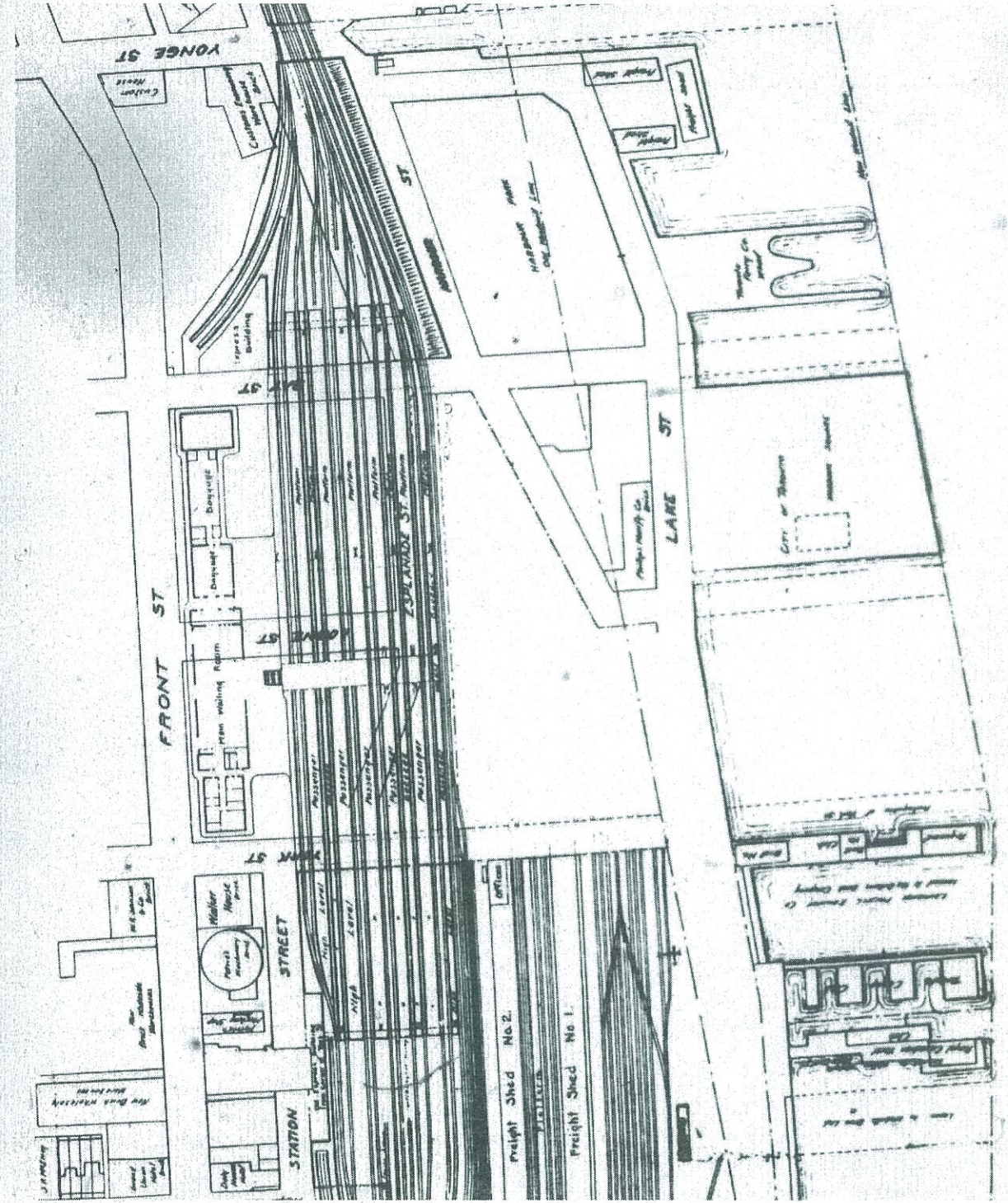


such approaches could only be constructed with serious invasion of the acquired rights of property holders in that neighborhood. In the event of construction, giving a straight approach for these bridges, being decided on, then the completion of a bridge scheme, providing for access to the water front of Toronto, must, of necessity, be deferred for many years to come. The comfort of the citizens would be seriously interfered with, not only by the ascent and descent of the approaches, but also by the inconvenience caused by smoke, and trains passing under these bridges, to both pedestrians and vehicular traffic. There is a serious feature in the bridge question affecting Toronto's commercial welfare, as the lifting of water-borne traffic over these bridges must add to the cost of transportation, by a sum of money per ton, that would militate seriously against Toronto's welfare, and this phase must become more acute as the years go by, and Toronto's magnificent water front opportunities from Ashbridge's Bay west, are developed in a proper manner.

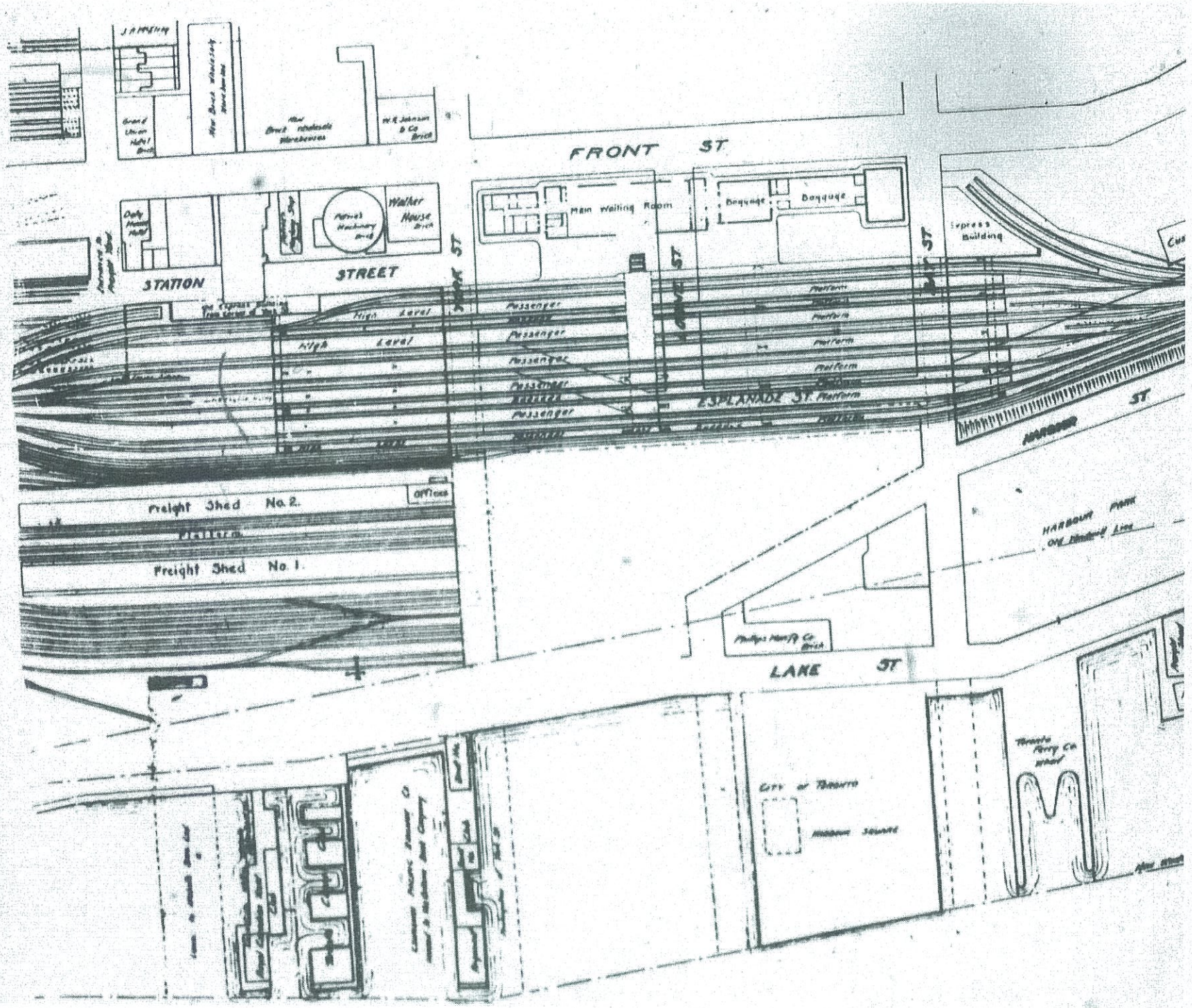
Another solution of the situation is to be found in a viaduct plan which would commence immediately east of Bathurst St. and terminate east of Cherry St. near the River Don in the east end. Under a viaduct arrangement of the Esplanade all trains passing through Toronto would be carried at an elevation and thereby provide free access at every street on the whole of the water front on the existing natural level, there being no need of legal imposition on vehicular, pedestrial or street car traffic as obtains with railway traffic; the altitude of the structure would be very considerably less than that of a bridge, providing for surface operation of railways on the Esplanade. Such a structure would invade no right along the entire



on the existing natural level, there being no need of legal imposition on vehicular, pedestrial or street car traffic as obtains with railway traffic; the altitude of the structure would be very considerably less than that of a bridge, providing for surface operation of railways on the Esplanade. Such a structure would invade no right along the entire Esplanade, providing a street were laid out immediately south of the proposed viaduct. A viaduct would be available for the use and protection of the citizens, and the aiding of Toronto's commercial interests, at a much earlier date, than the suggested bridge plan. Its first cost would be practically all the charge that would be against it, and a solution for all time to come of these frontage difficulties, which have continually beset Toronto's best interests in the past. You will notice from an inspection of the plan that no private or other interests on the Esplanade proper will be affected; all existing switches and easements thereto are conserved by a surface track maintained east of Church and south and north of the proposed viaduct for their sole benefit and use. Practice has demonstrated that traffic of this nature can be maintained, under proper regulation, with every safety. Having in mind the least possibilities for damage costs in connection with the bridge scheme, for the reasons before given, an average of $200,000 each would be a very modest estimate of the cost of the bridges, but the interest account covering the fixed charge for cost must be augmented by a yearly sum covering maintenance and renewal accounts.

A viaduct between the limits previously set out, would be slightly under $2,000,000, the details of which sum accompany this.

A summary of the two plans here outlined would then present the following features: Bridge plan covering 10 streets from York St. eastward to the Don (estimated cost) $2,000,000; Viaduct plan, providing for every street having access to water front at existing street level (estimated as per detail) $2,000,000 The interest account on cost would be practically the same in each case. The maintenance and renewals account, necessitated by a bridge plan at, say 2½%,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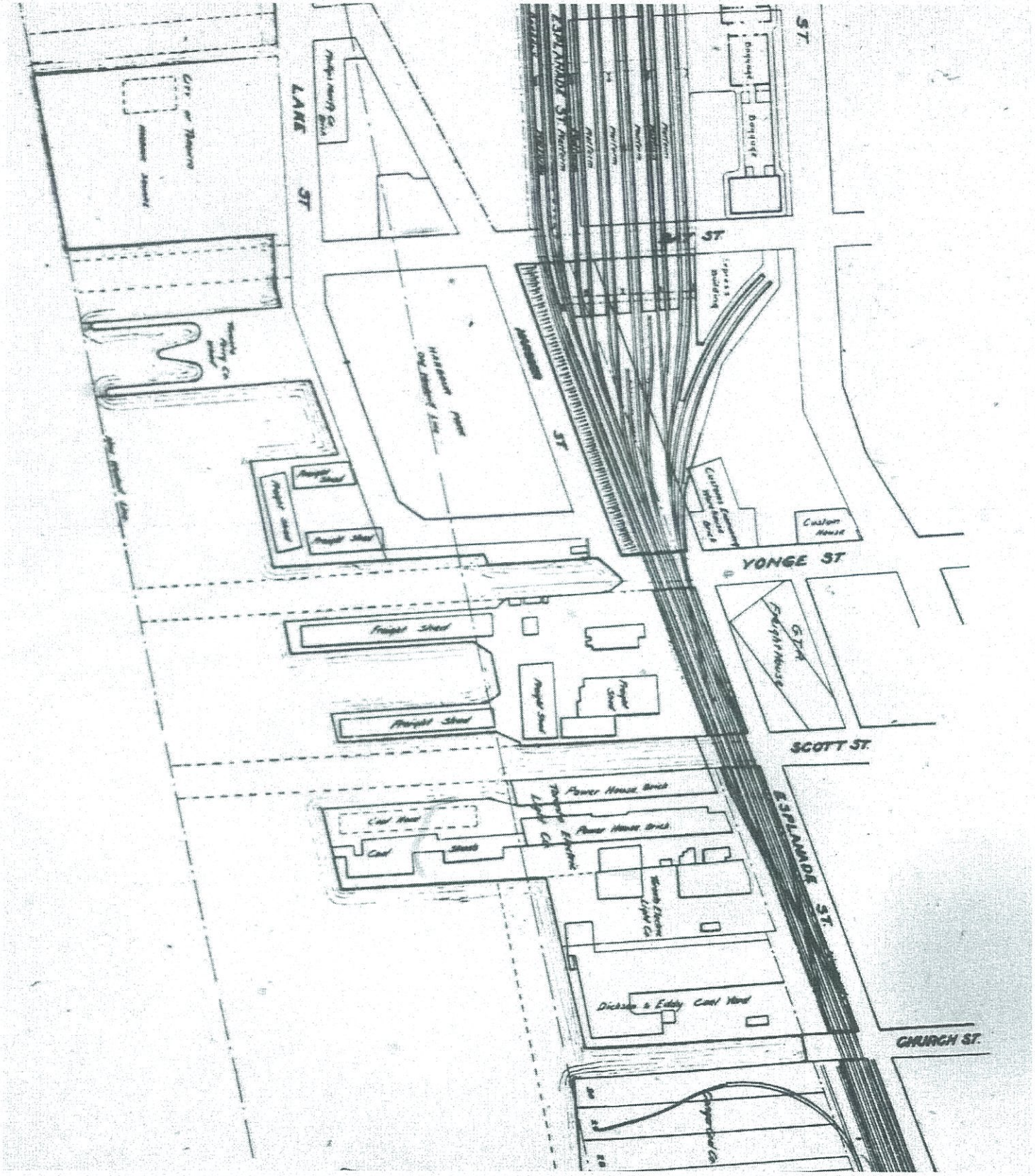
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Coal Shed
Coal
Dickson & Eddy Coal Yard
Custom House

a bridge, p[illegible] railways on the Esplanade. Such a structure would invade no right along the entire Esplanade, providing a street were laid out immediately south of the proposed viaduct. A viaduct would be available for the use and protection of the citizens, and the aiding of Toronto's commercial interests, at a much earlier date, than the suggested bridge plan. Its first cost would be practically all the charge that would be against it, and a solution for all time to come of these frontage difficulties, which have continually beset Toronto's best interests in the past. You will notice from an inspection of the plan that no private or other interests on the Esplanade proper will be affected; all existing switches and easements thereto are conserved by a surface track maintained east of Church and south and north of the proposed viaduct for their sole benefit and use. Practice has demonstrated that traffic of this nature can be maintained, under proper regulation, with every safety. Having in mind the least possibilities for damage costs in connection with the bridge scheme, for the reasons before given, an average of $200,000 each would be a very modest estimate of the cost of the bridges, but the interest account covering the fixed charge for cost must be augmented by a yearly sum covering maintenance and renewal accounts.

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October 1907

the south side, would add seriously to the above figures for a general bridge plan of the Esplanade. Careful study of every feature in connection with the Esplanade situation, of which the foregoing is a summary, leads to no other conclusion than that a viaduct is the preferable solution, giving immediate and permanent relief from the dangers besetting the citizens as well as aiding Toronto's growing commerce and making railway operation more free and much faster. With a viaduct, the question of providing a railway station suitable for the present and growing needs of Toronto becomes simplified. Such a station would be situate between York and Bay Sts. immediately south of Front, and would provide for all passenger trains from the east and west depositing their passengers on commodious terminal platforms leading to a central concourse slightly above the street level of Front St. Provision is also made in the accompanying plan for easy and rapid movement of all through trains, as well as making liberal provision for accelerating the movement of freight. The adoption of a viaduct and station plan as here presented would permit of a suburban railway train development that is not attainable otherwise, and that is one of the growing necessities of Toronto. In connection with this plan the extension of the viaduct easterly, providing for the entrance of the G.T., C.P. and Canadian Northern Railways across Queen St., can be carried out on the exact lines of the plans now presented. West of where the viaduct ends, near Bathurst St., the submerging of the railways would begin and be carried westerly towards Sunnyside, and out to the Humber, giving safe crossings at Sunnyside and into the Park. In connection with these suggested additions we desire to point out that not a single dollar of expendi-

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railway operation more free and much faster. With a viaduct, the question of providing a railway station suitable for the present and growing needs of Toronto becomes simplified. Such a station would be situate between York and Bay Sts. immediately south of Front, and would provide for all passenger trains from the east and west depositing their passengers on commodious terminal platforms leading to a central concourse slightly above the street level of Front St. Provision is also made in the accompanying plan for easy and rapid movement of all through trains, as well as making liberal provision for accelerating the movement of freight. The adoption of a viaduct and station plan as here presented would permit of a suburban railway train development that is not attainable otherwise, and that is one of the growing necessities of Toronto. In connection with this plan the extension of the viaduct easterly, providing for the entrance of the G.T., C.P. and Canadian Northern Railways across Queen St., can be carried out on the exact lines of the plans now presented. West of where the viaduct ends, near Bathurst St., the submerging of the railways would begin and be carried westerly towards Sunnyside, and out to the Humber, giving safe crossings at Sunnyside and into the Park. In connection with these suggested additions we desire to point out that not a single dollar of expenditure on the proposed viaduct, as submitted to you would be lost, as this plan has been prepared with a thorough belief that the eastern street traffic approaching the city must be protected, at no distant day, in the same manner and for the same cause as the proposed improvement of the Esplanade is now suggested. The plan shown on page 721, the original of which accompanied Messrs. Berrian, and Moyes' report, shows the district between Church and York Sts., where they propose the elimination of all tracks on the level.

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October 1907

Toronto Union Station Lands Purchase.—In the Supreme Court at Ottawa, Oct. 30, judgment was rendered on the motion made in the case of the G.T.R. against the C.P.R., the latter asking to have the minutes of judgment as settled varied as to the payment of interest by the C.P.R. only for the period between May 6, 1903, the date on which the G.T.R. paid the purchase money to the Crown for the Toronto station lands, and June 3, 1903, when the C.P.R. tendered half of such purchase money to the G.T.R., which was refused by the latter. The motion was granted with costs, and it was ordered that the minutes should be amended in the terms

December 1907

Toronto Union Station, Tracks, etc.

The following report has been made to the Toronto City Council by W. Barclay Parsons, New York; C. B. Smith, Toronto; and C. H. Rust, City Engineer of Toronto: In compliance with the resolution of Council, dated Jan. 28, 1907, in which the City Engineer was authorized to retain the services of consulting engineers to act with him, to report upon the whole question of railway transportation facilities along the entire front of the City, extending from the Humber River on the west to the extreme limits of the City on the east, together with consideration of the plans submitted by the railway companies of the proposed new union station, the various schemes of trackage and other arrangements incidental thereto, he engaged the services of W. Barclay Parsons of New York, and C. B. Smith of Toronto, and the Commission thus appointed submits the following report:

As soon as the formation of the Commission was determined upon, we held meetings in Toronto and jointly made an examination of the railways from the Humber River east, of the various proposed sites for the new passenger station, of the water front and streets, and the other physical conditions of Toronto, in so far as they bore upon the problems contemplated by your resolution. Subsequently Mr. Parsons had conferences with Mr. Berrian, who had been appointed by the Board of Trade to report to them on the same matters; with Mr. Francis, the Chief Engineer of Westinghouse, Church, Kerr & Co., who had been retained by the G.T.R. Co. to prepare plans for the new union station, and on May 16 a meeting was held in Mr. Parsons' office, which was attended by the Mayor, Messrs. Berrian, Steele and Moyes, representing the Board of Trade; Messrs. Kerr and Francis, Mr. Carrere, architect for the railway, and the members of the Commission.

The questions submitted to the Commission by the Council cover several different problems, which are not related to the extent that a decision on one concludes a decision on the others. For your convenience and for the better understanding of the matters involved, it would seem well that these various questions should be set forth and considered separately. In general they can be stated to be as follows: 1. The Passenger Station. 2. The approaches thereto from the diamond crossing on the west to Parliament St. on the east; 3. The disposition of the tracks from the River Humber to the diamond crossing; 4. Disposition of the tracks from Parliament St. to and beyond Queen St.

1.—Passenger Station.

The railway companies and the City, on April 22, 1905, entered into a general agreement as to the location of a new passenger station. In accordance with the terms of this agreement the railway company has made voluminous studies through its engineers and architects. All such studies and plans have been submitted to the Commission and explained by their designers. In general, the station as proposed is of the through type, with 10 parallel tracks. Facing Front St., and extending from York St. to Bay St., is the station building of exceedingly handsome design, and with extensive accommodations for passengers, baggage and freight. To get access to the inter-track platforms from the station building, without crossing the tracks on the level, various plans have been prepared, some based on overhead bridges, others on subways. All the tracks and platforms are to be covered by a train shed. In some of the plans the train shed is shown as requiring the closing of York St., and the doing away with the existing bridge, substituting in place thereof a new bridge to be located between Bay and Yonge Sts.

The officers of the Board of Trade, actuated by the desire to secure for the City the best and most convenient station, have urged upon your Commission the consideration of a head-on station, in which all the tracks shall terminate, to be located on the Government House property and abutting on King St. At the request of the Board of Trade, Mr. Berrian, their engineer, has prepared full and elaborate plans for a station of the head-on type, as described above. These plans have been submitted to the Commission and have been discussed by the Commission and Mr. Berrian jointly. We have considered at great length the advantages and disadvantages of both plans, and we are of the unanimous opinion that it would be better to locate the station itself substantially in the position as proposed by the G.T.R. Co., and already accepted by the City, but with certain modifications of details. We believe that Mr. Berrian has made the best possible solution of the problem for a head-on station submitted by him, reflecting great credit on his ingenuity; but even in spite of this solution the head-on station is, in principle, open to such very serious objections as to warrant its rejection. While the bulk of travel to and from Toronto is travel that terminates or originates in Toronto, there is, notwithstanding, a large portion of travel that is through traffic. A head-on station involves the necessity of every through train reversing its direction at the station or being backed in one direction while loaded with passengers across a series of junction switches and frogs, involving not only danger but a very serious delay to every train. Toronto, while being the most important city in Canada west of Montreal, is, nevertheless, not located on the shortest line between the western and eastern limits of the Dominion. The natural tendency of traffic is to seek the shortest route and line of least resistance, which in this case, from geographical reasons, would be around Toronto. Any bar that is placed in the way of the running of trains through Toronto would naturally incline the railways to send their through trains by some other route. For the proper development of Toronto's railway facilities and the encouragement of through traffic, obstacles should be removed and not imposed, and it would seem to us to be a wise policy on the part of those charged with Toronto's welfare to encourage in every way possible the passing of traffic through the City, and in the most commodious and economical manner. We believe that a head-on station is not the best type of station for Toronto for the above and following reasons: 1. Delay in through traffic; 2. The passing of all trains, some of them loaded with passengers, across a complicated system of crossings and frogs, and at times passing such trains in reverse direction. 3. Placing an absolute limit upon any increase in the size of the station, as no additional tracks could be added to the station unless the abutting streets on the east and the west of the terminal grounds were acquired. 4. Great expense, both in the construction and the acquisition of land and the displacement or re-arrangement, with attending cost, of the existing freight delivery and other yards of the G.T. and C.P. Railways.

Reverting to the plans of the G.T.R. Co., as submitted to the Commission, we would recommend that, while approving the location and general type of the building as proposed, instead of having all the tracks connected through the station, the seven tracks next to Front St. should be cut in the center of the station and for a distance sufficient to give a wide and commodious passageway. There would then be seven head-on or terminal tracks from both the east and west, or 14 such tracks in all, with three through tracks on the southerly side. A passenger going from the station to the trains, or vice versa, would then pass on a level without the inconvenience either of ascending or descending steps to any of the local tracks or to the first of the through tracks, or without crossing any track. From the northerly side of the first of the through tracks there could then be constructed a short subway beneath such track leading to the platform between the second and third of the through tracks, such subway to be used only at the time when the first of the through tracks was occupied by a standing train, which condition would rarely occur. If this modification of the G.T.R.'s plans were adopted, Toronto would have all the advantages claimed for a head-on station, namely, a terminus for local trains, direct access to platforms, and ample room for working. In fact there could really be two head-on stations separating east and west bound traffic, with a third or through train station in connection, and in which passengers would proceed directly from the station to their trains, and with practically no longer walk than would be had with the head-on station, as above described. In fact, at times the walk might be shorter, because with the more limited track accommodations in the King St. station there might be occasion when two trains might have to stand one in front of the other on a single track, whereas with the greater number of tracks with the other station this contingency would probably never occur. Another advantage of the station as proposed, especially with the modifications here recommended, would be that the station capacity would not be limited to the present construction. The station building itself is one of very large capacity, the waiting room being actually larger than the waiting room in the present Grand Central Station in New York, which has sufficed for the traffic of the New York Central, New York & Harlem and the New England Railroad systems. Should more track accommodation be needed, it is a simple matter to add on the southerly side as many new tracks as may be needed. If such new tracks are required for through traffic, the subway connecting them could be extended; if they were required for local traffic, then the existing through tracks would be cut in the middle and the level concourse extended to the south. The type of station that the Commission has in mind and which is here recommended is somewhat similar to the station at Providence, R.I., on the New York, New Haven & Hartford Rd. Providence is a city of about the size of Toronto; in the center, however, of a much more densely populated county, with about the same number of tracks as is proposed for the Toronto station, but already doing a business about double the existing traffic at Toronto, and with the full capacity of the station never reached. Whatever type of station is adopted, the Commission is of the firm belief that York St. should not be severed, but that traffic be carried from Front St. to the water front unobstructed, and that a similar connection be made at Yonge St., a construction bridge between Bay St. and Yonge St., to take the place of a connection at Yonge St., and the present bridge at York St., being wholly insufficient. In fact, to supply additional facilities we believe that the arrangement already made between your Board and the G.T.R. Co. for a foot bridge at Bay St. should be carried into effect. We might suggest that this foot bridge be constructed of ample width to accommodate the large number of people that reach the ferries by this street.

2.—The Approaches to the Station.

In any consideration as to what should be done to the approaches to the station, it seems to the Commission that the water front of the City and its development is of paramount importance, and that the disposition and treatment of the tracks be considered primarily from that point of view. The limits of the water front of the City within the present harbor protection are none too

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large. The total distance along the Windmill line between the western channel and the western limit of Ashbridge's Bay immediately at the foot of Parliament St., is about two miles. Of this distance a large part is occupied by railway yards, and less than one-half of it is open for development for commercial purposes. The City has established on its map and has constructed in small part a marginal street called Lake St., and has also established a line southerly of Lake St., to which improvements by piers or wharves may be carried. What should be done with the approaches to the new station necessarily has great bearing upon the water front property. An inspection of the map, even after Lake St. is completed, shows that but a small part of Toronto water front will be capable of any extensive improvement. Between the water front and the railway tracks on the Esplanade there should be sufficient space to permit the construction of manufacturing industries, warehouses, store yards or other large terminal improvements which can be served by railway connections on the one side and water connections on the other. In this respect Toronto is exceedingly favorably situated, and the full use of such situation should, it seems to us, be secured. Without attempting to go into any details of design, we have considered and recommend to you the possibility of establishing along the water front a large marginal street that should have a width of at least 125 ft., extending from, say, Cherry St. westerly to Queen's Wharf channel, connecting at that point with a proposed boulevard, which we understand is proposed to be constructed, thence to the Humber, thus furnishing a great thoroughfare the full water front of the City. If this new street were located at a distance of at least 600 ft. from the Esplanade, which would place it just southerly of the proposed location of Lake St., between Scott and Parliament Sts., there would then be a sufficient area between such street and the Esplanade for a systematic and extensive development. The water front then could be divided so as to give in the neighborhood of the foot of Yonge, Bay and York Sts., passenger accommodations for ferries and for the passenger steamers running to Hamilton, the St. Lawrence, Niagara, or to local points along the lake shore, with accommodations for the purely commercial vessels on the east, for yacht and boat clubs on the west, and connection between the railways and lake beyond, but with freedom of connection between them all. If some such plan as is here indicated were taken up and studied in detail, we believe that there would result to Toronto not only new land of great value in itself, but also a great increase in its commercial facilities that would have a far-reaching effect on all values in and business of the City. With the water front thus developed, the traffic between it and the City, not only for water-borne freight, but for freight that would be brought to the industries and warehouses by the railways themselves, will become of great importance, and its care of more concern than even that of the present existing traffic. To permit this new traffic to pass the running tracks of two great railways on level crossings, no matter how well protected by gates and watchmen, is at great cost to the company and a great burden, both in danger and delay, to the citizens. We strongly recommend to you, therefore, that steps should be taken in connection with the proposed station to so arrange the track approaches thereto that these level crossings should each and all be permanently removed. This can be done in two ways: 1. By elevating the tracks, and 2, by elevating the streets.

Both plans have their advantages, but as both of them involve certain questions of legal rights and other questions of policy as to which we are not advised, we think it better to lay before you the relative advantages of the plans, so that you may see all phases of the question. From our standpoint, however, we are of the opinion that the preponderance of advantages is in favor of the elevation of the streets. It has been suggested that the station itself be placed at such elevation as to permit the tracks running to the east to pass over all streets from Bay St. easterly, such streets to be carried beneath the tracks at their existing levels. The additional cost of the construction of the station at the higher level can be taken as negligible in amount. If the main running tracks, at least four in number (which we consider sufficient) were thus elevated and Bay St. carried beneath, a total reconstruction of the existing yards of the railway companies would, however, become necessary. The local C.P.R. freight house would have to be moved and the classification and delivery tracks connected only at the west end, instead of at both ends as at present. Along Esplanade east of Yonge St. there are at present certain tracks on the surface for car delivery and other private tracks running into industries and warehouses. It appears, after consideration, it will be impossible to do away with these tracks. Their presence is of great importance to the business of Toronto. It has been proposed, however, that no tracks of this nature be carried across Yonge St., but we consider it necessary for the accommodation of the traffic at this point that on the north the tracks should be carried as far west as Scott St., and on the south as far as the east side of Yonge St., this latter being especially necessary to provide for the shipment of fruit which now takes place at the Yonge St. wharf. These tracks would necessarily cross all the streets east of Yonge at grade. In order to diminish the danger, it has been proposed that shifting on these tracks be limited to the night hours, or that the shifting engines be preceded by a man on foot with a flag, as the danger of running a train close to, and therefore obscured by, the masonry of a viaduct, would be exceedingly dangerous. On the other hand, if the streets are carried over the railway there need be no reconstruction of the existing yards, and there will be no interference with the industries located on the Esplanade. Crossing of all tracks at level should be absolutely eliminated, and there should even be an extension of the facilities afforded by private track delivery if the development of the water front so required it, as in our judgment it will. It would not seem necessary, in order to furnish proper connections to the water front, that every street now on the map need be connected with the marginal street. If there were four, or at the utmost five, approaches east of Yonge St., the full requirements of the case, even with the developed water front, would be met. Should a marginal street be constructed, as suggested, a distance of at least 600 ft. from the Esplanade, the gradient on the approaches crossing the tracks would not exceed 4%, which is less than the existing gradient rise from the Esplanade to Front St., at least as far east as Princess St., and such approaches would reach the grade of the marginal street on the north line without requiring curved approaches, as in the present York St. approach.

Summarizing the advantages and disadvantages of the two plans, we have for track elevation—Advantages: Every street would be carried through to the water front at its existing elevation.

(To be continued on next page.)

The Commission appointed to investigate and report on the needs of the Georgian Bay ports will consist of M. J. Butler, Deputy Minister of Railways and Canals, and Louis Coste, of the Department of Public Works.

Too Late for Classification.

General.

It was unofficially announced in Ottawa, Aug. 29, that Hon. W. Pugsley, ex-Premier of New Brunswick, had been appointed Minister of Railways and Canals, succeeding Hon. H. R. Emmerson, resigned.

Atlantic and Pacific Ocean Marine.

The steamship companies engaged in passenger traffic with the Orient, including the C.P.R. and the Canadian-Australian lines, have decided, on account of the rise in prices of coal and general stores, to increase their rates by 10%.

Maritime Provinces and Newfoundland Marine.

The steamboat Stord from Quebec to Hudson's Bay ports, struck Mingan Island in a dense fog, Aug. 8, and strained her bow. She put in at St. John's, Nfld., for the necessary repairs to be carried out.

Express.

The barn occupied by the Canadian Ex. Co. at Stratford, Ont., was destroyed by fire Aug. 14, and two horses, with a quantity of feed, were burned.

Telegraph and Cable Matters.

The C.P.R. Telegraph Department has opened an additional telegraph office at its city ticket office, King and Yonge Sts., Toronto.

Sir H. W. Primrose, K.C.B., C.S.I., has been elected Chairman of the Pacific Cable Co., in the place of the late Sir Spencer Walpole.

W. J. Camp, Electrical Engineer C.P.R. telegraphs, reports that recently the earth currents were so severe that all the duplexes at Fort William, Ont., had to be disconnected, and at times set fire to the switchboards.

The report of the Pacific Cable Board for the year ended Mar. 31, shows a gross message revenue of £116,401, against £94,456 in 1905-06, and the entire net revenue £113,516, with an expenditure of £90,800. After providing for interest and sinking fund there is a deficiency of £54,923, against £72,556. The traffic revenue for 1906-07 is £103,000, a deficit of £88,308.

General Telephone Matters.

An arrangement has been effected by which the Dominion Government telegraph cable between Gaspe and Ellis Bay, Que., will be utilized for telephone communication.

The Canadian Machine Telephone Co. states that it is hoped to have an automatic telephone system in operation in Brantford, Ont., by the end of the year. The company has purchased a site in the city and will erect an office building at a cost of about $8,000.

The operators engaged on the civic telephones at Fort William, Ont., were out on strike last month. Their alleged many grievances, but the culminating point was the appointment of a chief operator from the U.S. She was subsequently dismissed, and the operators resumed work.

The Harrietsville Telephone Association has been incorporated under the Ontario Companies' Act, with a capital of $25,000 and offices at Harrietsville, Ont., to carry on the business of a telephone company. The provisional directors are: W. Dean, S. F. Facey, J. C. McNiven, W. B. Lane, J. Smith, W. J. Coates, North Dorchester tp., and M. Mell, Black, Springfield, Ont.

The General Industries Construction Co. has been incorporated under the Ontario Companies' Act, with a capital of $100,000 and offices at Toronto, for the purpose of carrying on the business of a general construction and development company. The provisional directors are: J. A. Paterson, K.C.; A. McKenzie, W. B. Templeton, and A. T. Davidson, Toronto.

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Toronto Union Station, Tracks, etc.

Following is the balance of the report of W. Barclay Parsons, New York; C. B. Smith, Toronto, and C. H. Rust, City Engineer of Toronto, to the Toronto City Council on this question. The first portion of the report was published in our last issue.

The disadvantages are: 1. That the raising of the station would place the tracks westerly of it at such a height as to require the abolition of the John St. bridge. 2. The existing freight yards would have to be reconstructed. 3. The shifting and delivery facilities on the Esplanade reduced. 4. Crossings of the shifting tracks on the Esplanade would still remain; 5. Greater cost. As to the separation of streets and railway by street bridges, the advantages are: 1. No interference with existing tracks; 2. Delivery facilities on the Esplanade can be increased; 3. A less cost; 4. Better appearance to persons approaching from the water. The disadvantage is: That some streets will be cut off before reaching the water. This probably will result in property owners abutting upon the Esplanade claiming damages for the closing of these streets. In discussing the advantages and disadvantages we have not alluded to the question of damages. In all probability, judging from what has happened in other cities, the property owners, in the event of a viaduct being constructed, will set up alleged claims for damages to their property. We are so firmly of the opinion that all level crossings of streets and tracks should be eliminated, that we recommend, in the event of street bridges over the railways being adopted, that the main running tracks east of Yonge St. be fenced as far as Parliament St. This will present the same facilities for unobstructed tram speeds as the viaduct would. On the other hand it would abolish the private crossings from the south side of the Esplanade as efficiently as the viaduct, and the cost, if any, of such abolition would be equally a charge against both projects.

We have estimated that the cost of track elevation from Bathurst St. to a point east of Queen St. on the G.T.R. would be substantially $3,000,000. This provides for a four-track viaduct from Yonge St. eastwardly to Parliament St., where the C.P. and G.T. lines separate. We have assumed that this work will be carried on a concrete-filled viaduct with bridges at every street opening 66 ft. wide. The portion east of Parliament St. on the C.P.R. would be a two-track viaduct running down to the present grade near Queen St. This would give subway crossings at Front and Tate Sts., and probably with the slight depression of the street a subway could be constructed at Eastern Ave. On the G.T.R., east of Parliament St., a two-track embankment constructed eastwardly a distance of 7,000 ft. This will provide for subway crossings at Eastern Ave. and Queen St. We have also provided for elevating all the tracks south of the proposed station for a width of about 500 ft. This width going west is gradually decreased until it assumes the normal width of four tracks at John St., which width continues to Bathurst St. A ramp is provided for on the north side to reach the G.T.R. passenger coach yard on a one per cent. grade. From the diamond crossing immediately west of the Strachan Ave. bridge to the Humber River we have taken the plan and estimate prepared by J. Holgson, Chief Engineer of the G.T.R., who provides for four tracks and gives the total cost of the work at $1,000,000. This estimate does not, however, provide for a bridge at the Queen St. crossing at Sunnyside, which would cost, including land damages, about $100,000. This plan provides for the depression of the tracks commencing at the diamond crossing and running westerly to Queen St. The tracks would be depressed sufficiently to provide for over head bridges at intersecting streets. From Queen St. crossing at Sunnyside west to Humber it is proposed to have the track elevated, and under-crossings could be constructed into High Park, and also at the various streets west of this point, which are in the municipality of Toronto Jct. If this work were carried on with only two tracks as at present, it would probably cost not more than $500,000. The large additional cost is caused by the right-of-way that would be required for the construction of the two additional tracks. The total cost, therefore, to abolish grade crossings and to elevate the tracks throughout the city, from the west city limit at the Humber to a point east of the Queen St. crossing on the G.T.R., would be approximately $4,000,000. This does not include any amount for the reconstruction of the yards, re-laying of the tracks along the Esplanade, delays and inconvenience to travel pending the reconstruction, nor have we included any allowance for possible abuttal damages incident to the construction of a raised viaduct in the center of Esplanade St. For both projects there might be some abuttal damage to obliterate private rights crossing the tracks at grade.

The cost of five overhead bridges, including one at Yonge St., would be about $500,000. This estimate includes an allowance for the damages to abutting property.

The question as to what proportion of the cost of this work should be borne by the City is, we consider, a matter of policy to be determined by your Council, but we would point out that in the construction of the York St. bridge, the City paid one-third of the cost, and we would suggest that, if the tracks are elevated, the City should not be called upon to bear any larger amount of expense of the work than they would have to do if it were decided that overhead bridges were the best solution of the problem.

C. B. Smith has since made the following supplemental report: In reference to the report re separation of grades in connection with the railways along the waterfront, signed by Messrs. Parsons, Rust and myself, my attention has been called to what may appear to be an ambiguity in statement, and, as it is, I consider very desirable that there should be an understanding on the matter of cost of a system of separation of grades, either by subways and bridges, or subways and viaduct. I beg to append the following comparative table showing the approximate cost of grade separation by either method. In our joint report reference was made to the fact that our estimate did not include an amount for the reconstruction of the yards, relaying the tracks along the Esplanade, etc., and although such an estimate must of necessity be approximate, I consider that it is only fair that you should be advised of the possible magnitude of the same, and I have accordingly added in the table my personal estimate of what this will amount to, viz., $300,000. This amount, you will understand, does not include any suits for damages or for inconvenience to railways or the public.

Table of comparative estimated costs of separation of grades in Toronto, extending from Swansea on the west to and including Queen street crossings of the C.P.R. and G.T.R. on the east.

	With Viaduct on Esplanade and East ward	With Bridges on Esplanade
Track depressions through Parkdale, Sunnyside bridge and track elevation at High Park. Four tracks	$2,100,000	$1,000,000
Two tracks	500,000	500,000
Four tracks viaduct, etc., Bathurst street to, and including subway at Queen street east	1,000,000	
Track, yard and building reconstructions due to viaduct (estimate C. B. Smith)	500,000	
Five overhead bridges across Esplanade street		400,000
Subway over G.T.R. at Queen street and Bowery avenue		50,000
Bridge over C.P.R. and Don River at Queen street	200,000	200,000
Total if western entrance for Four tracks	4,300,000	2,150,000
Two tracks	3,300,000	1,650,000

BOARD OF TRADE REPORT.

The following report has been made to the Toronto Board of Trade by R. M. Ferrian, of Boston, Mass., and J. W. Noyes, of Toronto: Having regard for your instruction for a report giving a solution of the Esplanade difficulties presenting themselves in the City of Toronto, beg to say: That a close personal investigation has been made, extending from Scarboro Bluffs on the east, to the Humber on the west, and a thorough going into the merits and claims of the railway companies regarding the present location, then having in view the personal safety of the citizens, and the providing of means that would give to Toronto a much needed free use of a developed waterfront, as well as afford perfect facilities for the railway needs. The situation appears to be capable of solution in two ways. 1. The elevation of the streets. 2. The elevation of the railways. A concise presentation of the merits of each would perhaps present a solution and provide for a selection.

The physical features of the southern boundary of Toronto traversed by the railways is of a complex character, and must be viewed from the standpoint of what will result in the greatest good to the greatest number, while having reasonable regard to the financial aspect of such solution.

It would appear that each of the several streets, having a southerly direction from Queen St., have access to the water front of the City, and these rights must be assumed to be maintained for the citizens in any treatment of the question. Having this in mind, then, let us see what may be done by the elevation of the highways over the railway tracks now situate on the Esplanade. A reasonable assumption would be that each of these streets have a right to the free access spoken of. In that event, then, a bridge and approaches thereto would be necessary. Commencing at the western end, say, York St., we find between that and Cherry St., inclusive, 10 bridges would be necessary to reasonably serve the approved rights now enjoyed by the citizens, but subject the danger of crossing the network of railways at grade presents there using. As the demand for a 22 ft. clearance over the rail is imperative for the operation of the railway under a street elevated over those railways, the portion of the bridge prepared for traffic would be in the neighborhood of 25 to 26 ft. above the level of the rail and surrounding ground. Assuming that a 4% grade on these approaches would be a reasonable one for vehicular operation, we are confronted by the necessity for an approach of between 600 and 700 ft. From the northerly limit of the railway tracks at Sherbourne Street the approach thereto would commence at a point north of Front and south of King St. The natural rise of ground at the highest point, Yonge St., would not entail the necessity for the approaches reaching beyond Front and Yonge St. but in each event the necessity for carrying a bridge approach to the south would mean the extension of the existing shore line some distance out towards, or even up to, the new Windmill line. If, on the other hand, the approaches to the bridges were carried at right angles, then

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has a resident engineer, and as regards officials or office hands at Ottawa, there is no scarcity, and more can be got if required.

"The net result of the present system will likely be that two or three, or, at the most, a half a dozen wealthy men or corporations will get the whole at higher prices than would otherwise prevail if the work was let in smaller portions, as it should be. The above is not written in an antagonistic spirit to the Dominion Government or the Transcontinental Commission, but with the idea and hope of an improvement."

Toronto Union Station, Tracks, Etc.

A conference was held in Toronto, Feb. 4, between representatives of the C.P.R. and G.T.R., and of the City Council and Board of Trade, on the question of tracks, etc., in connection with the proposed Union Station. The following report, signed by F. P. Gutelius, Assistant Chief Engineer C.P.R.; H. G. Kelley, Chief Engineer G.T.R., and E. Wragge, Consulting Engineer, was presented, with the endorsation of Sir Thos. G. Shaughnessy and C. M. Hays, for the two railway companies:

"The undersigned have considered the question involved in the separation of grades between the streets and the railway lines along the water front of the city of Toronto, and the report thereon of Messrs. Berrian and Moyes, engineers, as presented to the Toronto Board of Trade, and would observe thereon:

For example, the bridge at the foot of John St. leading to the city water works, as is admitted, must be removed. Under this arrangement no method of crossing the railway tracks at this point is practicable. A grade of about 8% is required from the top of the present bridge at the foot of Spadina Ave. to the proposed subway under the viaduct, allowing a headway of 12½ ft.

"Dealing with the general principle of track elevation as applied to the existing conditions in the district under consideration, we can see no practicable method of separating grades by means of a viaduct as suggested. If the sidings or team tracks on the Esplanade are elevated, their usefulness is completely destroyed, as they are used for the delivery and receipt of carload freight by teams.

"Under the provisions of the Windmill Line agreement the city is obliged to complete the building of Lake St. easterly from Yonge St., and fill in the extension of the several streets leading thereto from the south side of the Esplanade to Lake St. during 1908. This provides sufficient room south of the Esplanade to admit of the construction of overhead bridges with easy grade leading from Front St. over the railway tracks between Parliament St. and Yonge St.

"We have given careful consideration to the various questions involved in the separation of grades along the water front from the Don River on the east to the Humber River on the west, and we are of the opinion that the following general plan is the best solution

crossing, provision being made for the necessary tracks thereon, and Dufferin St., Dunn Ave., Jameson Ave., and Dowling Ave., carried overhead by means of bridges. From the same point 1,000 ft. east of Sunnyside crossing to the Humber River, the present tracks to be elevated upon an embankment, subways to be provided for the following highways: Sunnyside crossing, Indian Road, with access to High Park, High Park crossing between mileposts 34½ and 35, and Windermere Ave. All other crossings to be closed.

"In the general plan above outlined our conclusions are supported by the recommendations contained in the report of W. B. Parsons, C. H. Rust and C. B. Smith, presented to the Mayor and Council of the city."

In a communication accompanying the above report the C.P.R. and G.T.R. officials said: "Our companies are prepared to undertake this work in accordance with the recommendations of our engineers, the cost of the whole undertaking between Bathurst St. and the Humber River to be apportioned between the city and the G.T.R., each paying one-half. We would also suggest, as is usual in such cases, that no compensation or damages for lands taken or injuriously affected by any of the proposed work be claimed by any of the parties against the other, or others of them. We propose that the overhead bridges above mentioned shall be constructed by the railway companies on such terms and conditions and with such provisions as to cost as the Board of Railway Commissioners, after

the Union Station tracks, should be elevated along the water front from Bathurst St. Jct. to Cherry and Vine Sts., near the Don River, and that certain service tracks should remain on the present level on both sides of the proposed elevated tracks or viaduct, is open to the objection that the operation of such service tracks will be attended with more danger than the operation of all tracks as at present constructed, owing to the impossibility of any one passing through the subway under the viaduct seeing an engine or cars approaching the crossing on the other side of the viaduct until danger of collision is imminent.

"To reach such service tracks, all train movements of both companies between the main distributing yards and the Esplanade district will require to be made as far east as the Don River, and return through subways under the viaduct. This will involve the movement of all cars over a distance of from 3½ to 3¾ miles and return as compared with one mile and return under present conditions. Assuming that 40,000 cars are handled per annum by both companies, the extra engine and car mileage involved by the proposed change will be 200,000 miles. Owing to the curtailment of the switching facilities and the magnitude of the operations involved, we consider it impracticable to handle even the present business transacted on the Esplanade under the proposed arrangement. These objections apply to the district east of Church St.

"West of Church, as far as York St., on the Esplanade, and southerly, all tracks on the level leading to the wharves and existing industries are eliminated. A subway substituted for the York St. bridge and the eastern portion of the C.P.R. yards is taken away, almost destroying its usefulness, the yard being transformed from a double-ended yard to a stub-end yard. We can see no practical way by which this damage to the C.P.R. yard can be lessened if the viaduct plan is adopted. We have not attempted here to criticize their report in detail, although we find many serious objections and difficulties to which attention has not been given. River to about Yonge St. and carry the following streets over these tracks by means of steel bridges, viz. Parliament or Berkeley, Sherbourne, Jarvis, Church and Yonge. Eliminate the present level crossings on the Esplanade between the foot of Yonge St. and the foot of Parliament St., and extend Harbor St. parallel with and south of the tracks so as to give the property owners south of the Esplanade free and safe access both easterly and westerly to and from their properties. The rights of the public, if any, to cross the tracks at street extensions where not occupied by bridges to be eliminated and the remaining portions of these street extensions to remain open southerly as far as Lake St., thereby affording access to the bridges over the Esplanade. From Yonge St. west to Simcoe St., it is intended to construct the new Union Station, the tracks diverging from the west side of the Yonge St. bridge and to be slightly elevated to provide for the subway in the new station. This necessitates the removal of the York St. bridge and the erection instead thereof of one at Bay St. of similar construction to that at Yonge St. The substitution of the bridge at Bay St. for the one at York St. will enable the railway tracks to be carried over Yonge St., along Lake St., and back again to Front St. by way of Bay St., thus giving the most convenient access both from the east and from the west to the steamer wharves in that neighborhood. None of these bridges will have an approach exceeding 5%, and several of them will have a grade of 4% or less, this question depending on what is eventually considered to be most desirable for all interests involved as to the headway for railways to be allowed under the several bridges. The present bridge at the foot of John St. to be retained, and the bridge at Spadina Ave. to be extended to cross over the passenger tracks. The present overhead bridges at Bathurst St. and Strachan Ave. to be retained. Commencing at the crossing of the G.T.R. tracks by the C.P.R. branch leading to the Queen's wharf, the present roadway of the G.T.R. to be depressed to a point about 1,000 ft. east of the Sunnyside

resentatives insisting on the construction of a viaduct, to which the railways are entirely opposed. The Mayor, having communicated with the Board of Railway Commissioners, has been advised that they will sit in Toronto at an early date to consider the whole question. In the meantime, C. H. Rust, City Engineer, in consultation with I. Randolph, of Chicago, is preparing plans, estimates, etc., for viaduct construction to be submitted to the Commission.

United-States Canadian Through Rates.

In our Feb. issue we gave on page 117 a decision by the U.S. Interstate Commerce Commission, which was published Jan. 17. There was not time to verify it before going to press, but we sent a copy of the paragraph to Washington, and have been favored with a letter from E. E. Clark, one of the Commissioners, as follows:

"Recently the Commission was asked whether it would be lawful for a certain carrier engaged in the transportation of passengers and property between points in the U.S. and points in Canada, to place its tickets on sale with an agent at a point in the U.S. at the rate of 1c. per mile, such tickets to be valid from the first station in Canada across the border and only to be sold to such persons as produce a certificate of the immigration agent of the Canadian Government. This letter of inquiry was brought to the attention of the Commission, as a whole, and it was its view that if such sale of tickets disregarded in any way the terms or rates of any joint tariff, the practice would be unlawful and discriminatory. The newspaper clipping purports to be a quotation, but it is a very liberal and incorrect paraphrase of the Commission's reply to the inquiry. The records of the Commission show that reply was directed to the effect that if they have joint rates from St. Paul to points on their lines they may not depart from those rates by this device and so discriminate, but if they have no such joint through rates, we have no jurisdiction of the fares in Canada."

Toronto Union Station.—The arbitrators appointed in connection with the appropriation of the Eckardt Casket Co.'s premises in the burnt-out district of Toronto, has given that company $16,000. The G.T.R. offered $5,000, and the Eckardt Co. claimed approximately $100,000. The arbitrators have not included any compensation for the value of the right of renewal of the lease. It is considered likely that there will be an appeal.

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Toronto Union Station.—The G.T.R., to which company was given the order to carry out the construction of the new Union station in Toronto, has informed the city council that the delay in proceeding with the work is due in some measure to the fact that there is a difference between the three companies —the G.T.R., the C.P.R. and the Canadian Northern Ontario Ry.—as to the plans. The latter two companies do not approve of the plans as approved by the G.T.R., and negotiations are in progress for the adjustment of the differences. At a meeting of the Toronto Board of Control, Dec. 7, a resolution was passed to notify the railways to proceed with the erection of the new union station without delay, and that in the event of nothing being done to comply with the request, to apply to the courts to have the order of the Board of Railway Commissioners to the G.T.R. made mandatory. (Aug., 1906, pg. 457.)

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New Union Station for Toronto.

The plans show that the proposed passenger station building, including baggage buildings and service plant, are to be erected on the south side of Front St. between York St. and Bay St., and will occupy the entire front between these streets. The existing express building west of York St. will be retained for the Canadian Express Co.'s service, and a new building, of similar dimensions, and with the same general relation to the passenger building, will be erected east of Bay St. for the Dominion Express Co. The northerly line of the passenger buildings is to be generally 65 ft. from the south line of Front St., leaving a plaza of this width for carriage and foot walk purposes.

The station building is generally 100 ft. wide, and between the building and the tracks there is a concourse 90 ft. wide for the general circulation of passengers.

The track layout consists of nine through tracks and two stub tracks, so arranged that there are five platforms for passengers and two platforms for the exclusive trucking of baggage and express matter. The station tracks are connected up at each end with an interlocking switching system, so that they properly join the four main tracks on the east and the two main tracks on the west, generally with double track loads, to give the greatest facility to the train movements. The passenger platforms are designed to be 1,400 ft. long, though this may be increased if found necessary, this distance being sufficient for the longest trains. They are about 20 ft. in width throughout. The new tracks at a point opposite the centre of the station will be 4 ft. higher than the present tracks, and the platforms are designed to be 8 inches above the top of the rail. This leaves a difference of about 5 ft. vertical between the grade of the platforms and the grade of Front St., which difference is overcome by three steps at the waiting-room entrance and inclined surfaces transversely on the concourse between the tracks and the station, and the plaza between the station and Front St. None of the inclined surfaces exceed a slope of three-eighths of an inch per foot. The passages for exit are without any steps whatever. By this arrangement the station and platforms are, in effect, level with the street, a condition which permits of the best possible treatment of any type of station. In order to bring about this condition it has been found necessary to provide for the removal of the York St. overhead bridge, and to substitute in lieu thereof an overhead bridge just east of Bay St. It is also suggested that this bridge easterly of Bay St. can be made to take care of the traffic at the Yonge St. grade crossing, so that the necessity of a bridge at the latter street can be avoided. Foot bridges at any necessary point of crossing can be constructed without interfering with the raising of the tracks. In order that it may not be necessary for any passenger to go upon any track at grade and to make this station absolutely safe and fully up to modern meth

which four tracks it is intended that trains having the bulk of express and baggage matter will be run. The baggage and express trucks cross the track area by subways beneath the tracks, and lead to the basement of the baggage and express buildings. The trucks will be raised and lowered between the subways and the platforms by means of electric lifts. There are three of these cross subways. One leading to the baggage room, one to the express building at the easterly end, and one to the express building at the westerly end of the station.

It is intended that a trainshed roof will be provided to cover the main portion of the platforms and the concourse. This shed will be 800 by 315 ft., covering about six acres. The main structure will be in three spans, and there will be a connecting roof between the trainshed and the station buildings. This roof will be a steel structure and will be well lighted and ventilated. At each end of the station concourse there are spaces for a carriage court for the accommodation of cabs, carriages and baggage transfer waggons, so that it will not be necessary to pass through the station building to get a carriage. At the extreme east end of the station a service building is provided for supplying all heat, light, steam, hot water, compressed air, refrigeration, etc., for the use of the station building and train purposes.

The general layout of the station yards and grounds, including the approach tracks, does not interfere in any way with the present freight yards of either railway.

The station building is planned primarily with a view to convenience and spaciousness and consists of a main central building with two service wings. In the main building on a level with the tracks is located the general waiting room, containing 17,242 sq. ft., which is 5,000 sq. ft. larger in area than the Grand Central Station in New York, or the present station in Toronto. Access to the waiting-room is obtained directly by three spacious openings, containing nine doors each directly from the plaza on Front St. Egress to the trains is obtained by three similar openings containing each nine doors leading to the concourse. Ticket, telegraph, and telephone booth, information bureau, news stands, ample parcel room, and other conveniences are provided along the four sides of the waiting-room, where they are easily accessible and visible. A broad passage at the east end leads directly to the baggage-room, which is located in the east service wing. The capacity of this room, including the basement and first floor, is 28,000 sq. ft., or 15,000 sq. ft. larger than the present baggage-room, and 6,000 sq. ft. larger than the baggage-room at the Grand Central Station, New York, which is one of the largest in the U.S. A similar passage at the west end of the waiting-room leads directly to the west service wing, in which are located waiting-rooms for men and women, each provided with ample toilet accommodations, the women having in addition retiring rooms. Barber shop, boot blacks and other conveniences, as well as a [illegible] lunch counter, are

Toronto Union Station, Tracks, etc.

Following is the balance of the report of W. Barclay Parsons, New York; C. B. Smith, Toronto, and C. H. Rust, City Engineer of Toronto, to the Toronto City Council on this question. The first portion of the report was published in our last issue.

The disadvantages are: 1. That the raising of the station would place the tracks westerly of it at such a height as to require the abolition of the John St. bridge; 2. The existing freight yards would have to be reconstructed; 3. The shifting and delivery facilities on the Esplanade reduced; 4. Crossings of the shifting tracks on the Esplanade would still remain; 5. Greater cost. As to the separation of streets and railway by street bridges, the advantages are: 1. No interference with existing tracks; 2. Delivery facilities on the Esplanade can be increased; 3. A less cost; 4. Better appearance to persons approaching from the water. The disadvantage is: That some streets will be cut off before reaching the water. This probably will result in property owners abutting upon the Esplanade claiming damages for the closing of these streets. In discussing the advantages and disadvantages we have not alluded to the question of damages. In all probability, judging from what has happened in other cities, the property owners, in the event of a viaduct being constructed, will set up alleged claims for damages to their property. We are so firmly of the opinion that all level crossings of streets and tracks should be eliminated, that we recommend, in the event of street bridges over the railways being adopted, that the main running tracks east of Yonge St. be fenced as far as Parliament St. This will present the same facilities for unobstructed train speeds as the viaduct would. On the other hand it would abolish the private crossings from the south side of the Esplanade as efficiently as the viaduct, and the cost, if any, of such abolition would be equally a charge against both projects.

We have estimated that the cost of track elevation from Bathurst St. to a point east of Queen St. on the G.T.R. would be substantially $3,000,000. This provides for a four-track viaduct from Yonge St. eastwardly to Parliament St., where the C.P. and G.T. lines separate. We have assumed that this work will be carried on a concrete-filled viaduct with bridges at every street opening 66 ft. wide. The portion east of Parliament St. on the C.P.R. would be a two-track viaduct running down to the present grade near Queen St. This would give subway crossings at Front and Tate Sts., and probably with the slight depression of the street a subway could be constructed at Eastern Ave. On the G.T.R., east of Parliament St., a two-track embankment constructed eastwardly a distance of 7,600 ft. This will provide for subway crossings at Eastern Ave and Queen St. We have also provided for elevating all the tracks south of the proposed station for a width of about 500 ft. This width going west is gradually decreased until it assumes the normal width of four tracks at John St., which width continues to Bathurst St. A ramp is provided for on the north side to reach the G.T.R. passenger coach yard on a one per cent. grade. From the diamond crossing immediately west of the Strachan Ave. bridge to the Humber River we have taken the plan and estimate prepared by J. Hobson, Chief Engineer of the G.T.R., who provides for four tracks and gives the total cost of the work at $1,000,000. This estimate does not, however, provide for a bridge at the Queen St. crossing at Sunnyside, which would cost, including land damages, about $100,000. This plan provides for the depression of the tracks commencing at the diamond crossing and running westerly to Queen St. The tracks would be depressed sufficiently to provide for over head bridges at intersecting streets. From Queen St. crossing at Sunnyside west to Humber it is proposed to have the track elevated, and under-crossings could be constructed into High Park, and also at the various streets west of this point, which are in the municipality of Toronto Jct. If this work were carried on with only two tracks as at present, it would probably cost not more than $500,000. The large additional cost is caused by the right-of-way that would be required for the construction of the two additional tracks. The total cost, therefore, to abolish grade crossings and to elevate the tracks throughout the city, from the west city limit at the Humber to a point east of the Queen St. crossing on the G.T.R., would be approximately $4,000,000. This does not include any amount for the reconstruction of the yards, re-laying of the tracks along the Esplanade, delays and inconvenience to travel pending the reconstruction, nor have we included any allowance for possible abuttal damages incident to the construction of a raised viaduct in the center of Esplanade St. For both projects there might be some abuttal damage to obliterate private rights crossing the tracks at grade.

The cost of five overhead bridges, including one at Yonge St., would be about $800,000. This estimate includes an allowance for the damages to abutting property.

The question as to what proportion of the cost of this work should be borne by the City is, we consider, a matter of policy to be determined by your Council, but we would point out that in the construction of the York St. bridge, the City paid one-third of the cost, and we would suggest that, if the tracks are elevated, the City should not be called upon to bear any larger amount of expense of the work than they would have to do if it were decided that overhead bridges were the best solution of the problem.

C. B. Smith has since made the following supplemental report: In reference to the report re separation of grades in connection with the railways along the waterfront, signed by Messrs. Parsons, Rust and myself, my attention has been called to what may appear to be an ambiguity in statement, and, as it is, I consider very desirable that there should be an understanding on the matter of cost of a system of separation of grades, either by subways and bridges, or subways and viaduct, I beg to append the following comparative table showing the approximate cost of grade separation by either method. In our joint report reference was made to the fact that our estimate did not include an amount for the reconstruction of the yards, relaying the tracks along the Esplanade, etc., and although such an estimate must of necessity be approximate, I consider that it is only fair that you should be advised of the possible magnitude of the same, and I have accordingly added in the table my personal estimate of what this will amount to, viz., $500,000. This amount, you will understand, does not include any sum for damages or for inconvenience to railways or the public.

Table of comparative estimated costs of separation of grades in Toronto, extending from Swansea on the west to and including Queen street crossings of the C.P.R. and G.T.R. on the east:

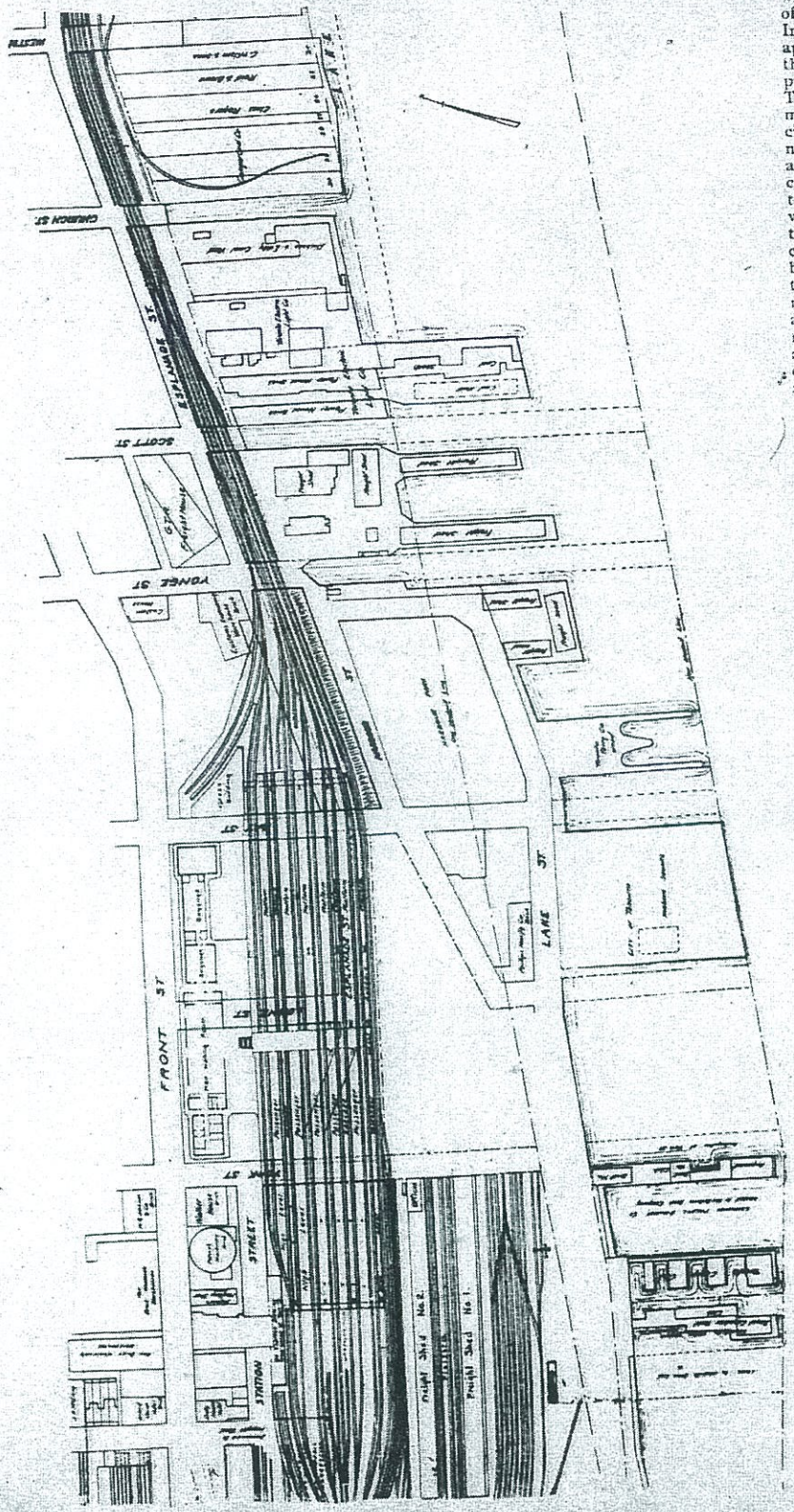
	With Viaduct on Esplanade and Eastward	With Bridges on Esplanade
Track depressions through Parkdale, Sunnyside bridge and track elevations at High Park. Four tracks	$1,100,000	$1,100,000
Two tracks	600,000	600,000
Four track viaduct, etc., Bathurst Street to, and including subway at Queen street east	3,000,000	
Track, yard and building reconstructions due to viaduct (estimate C. B. Smith)	500,000	
Five overhead bridges across Esplanade street		800,000
Subway over G.T.R. at Queen street and Eastern avenue		$ 60,000
Bridge over C.P.R. and Don River at Queen street	$ 200,000	200,000
Total if western entrance for Four tracks	4,800,000	2,160,000
Two tracks	4,300,000	1,660,000

BOARD OF TRADE REPORT.

The following report has been made to the Toronto Board of Trade by R. M. Berrian, of Boston, Mass., and J. W. Moyes, of Toronto: Having regard for your instruction for a report giving a solution of the Esplanade difficulties presenting themselves in the City of Toronto, beg to say: That a close personal investigation has been made, extending from Scarboro Bluffs on the east, to the Humber on the west, and a thorough going into the merits and claims of the railway companies regarding the present location; then having in view the personal safety of the citizens, and the providing of means that would give to Toronto a much needed free use of a developed water front, as well as afford perfect facilities for the railway needs. The situation appears to be capable of solution in two ways: 1. The elevation of the streets; 2. The elevation of the railways. A concise presentation of the merits of each would perhaps present a solution and provide for a selection.

The physical features of the southern boundary of Toronto traversed by the railways is of a complex character, and must be viewed from the standpoint of what will result in the greatest good to the greatest number, while having reasonable regard to the financial aspect of such solution.

It would appear that each of the several streets, having a southerly direction from Queen St., have access to the water front of the City, and these rights must be assumed to be maintained for the citizens in any treatment of the question. Having this in mind, then, let us see what may be done by the elevation of the highways over the railway tracks now situate on the Esplanade. A reasonable assumption would be that each of these streets have a right to the free access spoken of. In that event, then, a bridge and approaches thereto would be necessary. Commencing at the western end, say York St., we find between that and Cherry St., inclusive, 10 bridges would be necessary to reasonably serve the apparent rights now enjoyed by the citizens, but which the danger of crossing the network of railways at grade prevents their using. As the demand for a 22-ft. clearance over the rail is imperative for the operation of the railway under a street elevated over these railways, the portion of the bridge prepared for traffic would be in the neighborhood of 25 to 26 ft. above the level of the rail and surrounding ground. Assuming that a 4% grade on these approaches would be a reasonable one for vehicular operation, we are confronted by the necessity for an approach of between 600 and 700 ft. From the northerly limit of the railway tracks at Sherbourne Street the approach thereto would commence at a point north of Front and south of King St. The natural rise of ground at the highest point, Yonge St., would not entail the necessity for the approaches reaching beyond Front and Yonge St. but in each event the necessity for carrying a bridge approach to the south would mean the extension of the existing shore line some distance out towards, or even up to, the new Windmill line. If, on the other hand, the approaches to the bridges were carried at right angles, then



such approaches could only be constructed with serious invasion of the acquired rights of property holders in that neighborhood. In the event of construction, giving a straight approach for these bridges, being decided on, then the completion of a bridge scheme, providing for access to the water front of Toronto, must, of necessity, be deferred for many years to come. The comfort of the citizens would be seriously interfered with, not only by the ascent and descent of the approaches, but also by the inconvenience caused by smoke, and trains passing under these bridges, to both pedestrians and vehicular traffic. There is a serious feature in the bridge question affecting Toronto's commercial welfare, as the lifting of water-borne traffic over these bridges must add to the cost of transportation, by a sum of money per ton, that would militate seriously against Toronto's welfare, and this phase must become more acute as the years go by, and Toronto's magnificent water front opportunities from Ashbridge's Bay west, are developed in a proper manner.

Another solution of the situation is to be found in a viaduct plan which would commence immediately east of Bathurst St. and terminate east of Cherry St. near the River Don in the east end. Under a viaduct arrangement of the Esplanade all trains passing through Toronto would be carried at an elevation and thereby provide free access at every street on the whole of the water front on the existing natural level, there being no need of legal imposition on vehicular, pedestrial or street car traffic as obtains with railway traffic; the altitude of the structure would be very considerably less than that of a bridge, providing for surface operation of railways on the Esplanade. Such a structure would invade no right along the entire Esplanade, providing a street were laid out immediately south of the proposed viaduct. A viaduct would be available for the use and protection of the citizens, and the aiding of Toronto's commercial interests, at a much earlier date, than the suggested bridge plan. Its first cost would be practically all the charge that would be against it, and a solution for all time to come of these frontage difficulties, which have continually beset Toronto's best interests in the past. You will notice from an inspection of the plan that no private or other interests on the Esplanade proper will be affected; all existing switches and easements thereto are conserved by a surface track maintained east of Church and south and north of the proposed viaduct for their sole benefit and use. Practice has demonstrated that traffic of this nature can be maintained, under proper regulation, with every safety. Having in mind the least possibilities for damage costs in connection with the bridge scheme, for the reasons before given, an average of $200,000 each would be a very modest estimate of the cost of the bridges, but the interest account covering the fixed charge for cost must be augmented by a yearly sum covering maintenance and renewal accounts.

A viaduct between the limits previously set out, would be slightly under $2,000,000, the details of which sum accompany this.

A summary of the two plans here outlined would then present the following features: Bridge plan covering 10 streets from York St. eastward to the Don (estimated cost) $2,000,000; Viaduct plan, providing for every street having access to water front at existing street level (estimated as per detail) $2,000,000 The interest account on cost would be practically the same in each case. The maintenance and renewals account, necessitated by a bridge plan at, say 2½%, would be $50,000 a year, and would be totally absent in the case of a viaduct. The cost of extending to the Windmill line, if a straight approach to the bridges were demanded, on

the south side, would add seriously to the above figures for a general bridge plan of the Esplanade. Careful study of every feature in connection with the Esplanade situation, of which the foregoing is a summary, leads to no other conclusion than that a viaduct is the preferable solution, giving immediate and permanent relief from the dangers besetting the citizens as well as aiding Toronto's growing commerce and making railway operation more free and much faster. With a viaduct, the question of providing a railway station suitable for the present and growing needs of Toronto becomes simplified. Such a station would be situate between York and Bay Sts. immediately south of Front, and would provide for all passenger trains from the east and west depositing their passengers on commodious terminal platforms leading to a central concourse slightly above the street level of Front St. Provision is also made in the accompanying plan for easy and rapid movement of all through trains, as well as making liberal provision for accelerating the movement of freight. The adoption of a viaduct and station plan as here presented would permit of a suburban railway train development that is not attainable otherwise, and that is one of the growing necessities of Toronto. In connection with this plan the extension of the viaduct easterly, providing for the entrance of the G.T., C.P. and Canadian Northern Railways across Queen St., can be carried out on the exact lines of the plans now presented. West of where the viaduct ends, near Bathurst St., the submerging of the railways would begin and be carried westerly towards Sunnyside, and out to the Humber, giving safe crossings at Sunnyside and into the Park. In connection with these suggested additions we desire to point out that not a single dollar of expenditure on the proposed viaduct, as submitted to you would be lost, as this plan has been prepared with a thorough belief that the eastern street traffic approaching the city must be protected, at no distant day, in the same manner and for the same cause as the proposed improvement of the Esplanade is now suggested. The plan shown on page 721, the original of which accompanied Messrs. Berrian and Moyes' report, shows the district between Church and York Sts., where they propose the elimination of all tracks on the level.

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Esplanade reduced; 4. Crossings of the shifting tracks on the Esplanade would still remain; 5. Greater cost. As to the separation of streets and railway by street bridges, the advantages are: 1. No interference with existing tracks; 2. Delivery facilities on the Esplanade can be increased; 3. A less cost; 4. Better appearance to persons approaching from the water. The disadvantage is: That some streets will be cut off before reaching the water. This probably will result in property owners abutting upon the Esplanade claiming damages for the closing of these streets. In discussing the advantages and disadvantages we have not alluded to the question of damages. In all probability, judging from what has happened in other cities, the property owners, in the event of a viaduct being constructed, will set up alleged claims for damages to their property. We are so firmly of the opinion that all level crossings of streets and tracks should be eliminated, that we recommend, in the event of street bridges over the railways being adopted, that the main running tracks east of Yonge St. be fenced as far as Parliament St. This will present the same facilities for unobstructed train speeds as the viaduct would. On the other hand it would abolish the private crossings from the south side of the Esplanade as efficiently as the viaduct, and the cost, if any, of such abolition would be equally a charge against both projects.

We have estimated that the cost of track elevation from Bathurst St. to a point east of Queen St. on the G.T.R. would be substantially $3,000,000. This provides for a four-track viaduct from Yonge St. eastwardly to Parliament St., where the C.P. and G.T. lines separate. We have assumed that this work will be carried on a concrete-filled viaduct with bridges at every street opening 66 ft. wide. The portion east of Parliament St. on the C.P.R. would be a two-track viaduct running down to the present grade near Queen St. This would give subway crossings at Front and Tate Sts., and probably with the slight depression of the street a subway could be constructed at Eastern Ave. On the G.T.R., east of Parliament St., a two-track embankment constructed eastwardly a distance of 7,000 ft. This will provide for subway crossings at Eastern Ave and Queen St. We have also provided for elevating all the tracks south of the proposed station for a width of about 500 ft. This width going west is gradually decreased until it assumes the normal width of four tracks at John St., which width continues to Bathurst St. A ramp is provided for on the north side to reach the G.T.R. passenger coach yard on a one per cent. grade. From the diamond crossing immediately west of the Strachan Ave. bridge to the Humber River we have taken the plan and estimate prepared by J. Hobson, Chief Engineer of the G.T.R., who provides for four tracks and gives the total cost of the work at $1,000,000. This estimate does not, however, provide for a bridge at the Queen St. crossing at Sunnyside, which would cost, including land damages, about $100,000. This plan provides for the depression of the tracks commencing at the diamond crossing and running westerly to Queen St. The [illegible] elevate the tracks throughout the city, from the west city limit at the Humber to a point east of the Queen St. crossing on the G.T.R., would be approximately $4,000,000. This does not include any amount for the reconstruction of the yards, re-laying of the tracks along the Esplanade, delays and inconvenience to travel pending the reconstruction, nor have we included any allowance for possible abuttal damages incident to the construction of a raised viaduct in the center of Esplanade St. For both projects there might be some abuttal damage to obliterate private rights crossing the tracks at grade.

The cost of five overhead bridges, including one at Yonge St., would be about $800,000. This estimate includes an allowance for the damages to abutting property.

The question as to what proportion of the cost of this work should be borne by the City is, we consider, a matter of policy to be determined by your Council, but we would point out that in the construction of the York St. bridge, the City paid one-third of the cost, and we would suggest that, if the tracks are elevated, the City should not be called upon to bear any larger amount of expense of the work than they would have to do if it were decided that overhead bridges were the best solution of the problem.

C. B. Smith has since made the following supplemental report: In reference to the report re separation of grades in connection with the railways along the waterfront, signed by Messrs. Parsons, Rust and myself, my attention has been called to what may appear to be an ambiguity in statement, and, as it is, I consider very desirable that there should be an understanding on the matter of cost of a system of separation of grades, either by subways and bridges, or subways and viaduct, I beg to append the following comparative table showing the approximate cost of grade separation by either method. In our joint report reference was made to the fact that our estimate did not include an amount for the reconstruction of the yards, relaying the tracks along the Esplanade, etc., and although such an estimate must of necessity be approximate, I consider that it is only fair that you should be advised of the possible magnitude of the same, and I have accordingly added in the table my personal estimate of what this will amount to, viz., $500,000. This amount, you will understand, does not include any sum for damages or for inconvenience to railways or the public.

Table of comparative estimated costs of separation of grades in Toronto, extending from Swansea on the west to and including Queen street crossings of the C.P.R. and G.T.R. on the east.

	With Viaduct on Esplanade and Eastward	With Bridges on Esplanade
Track depressions through Parkdale, Sunnyside bridge and track elevations at High Park, Four tracks	$1,100,000	$1,100,000
Two tracks	600,000	600,000
Four track viaduct, etc., Bathurst street to and including subway at Queen street east	3,000,000	

The following report has been made to the Toronto Board of Trade by R. M. Berrian, of Boston, Mass., and J. W. Moyes, of Toronto: Having regard for your instruction for a report giving a solution of the Esplanade difficulties presenting themselves in the City of Toronto, beg to say: That a close personal investigation has been made, extending from Scarboro Bluffs on the east, to the Humber on the west, and a thorough going into the merits and claims of the railway companies regarding the present location; then having in view the personal safety of the citizens, and the providing of means that would give to Toronto a much needed free use of a developed water front, as well as afford perfect facilities for the railway needs. The situation appears to be capable of solution in two ways: 1. The elevation of the streets; 2. The elevation of the railways. A concise presentation of the merits of each would perhaps present a solution and provide for a selection.

The physical features of the southern boundary of Toronto traversed by the railways is of a complex character, and must be viewed from the standpoint of what will result in the greatest good to the greatest number, while having reasonable regard to the financial aspect of such solution.

It would appear that each of the several streets, having a southerly direction from Queen St., have access to the water front of the City, and these rights must be assumed to be maintained for the citizens in any treatment of the question. Having this in mind, then, let us see what may be done by the elevation of the highways over the railway tracks now situate on the Esplanade. A reasonable assumption would be that each of these streets have a right to the free access spoken of. In that event, then, a bridge and approaches thereto would be necessary. Commencing at the western end, say York St., we find between that and Cherry St., inclusive, 10 bridges would be necessary to reasonably serve the apparent rights now enjoyed by the citizens, but which the danger of crossing the network of railways at grade prevents their using. As the demand for a 22-ft. clearance over the rail is imperative for the operation of the railway under a street elevated over these railways, the portion of the bridge prepared for traffic would be in the neighborhood of 25 to 26 ft. above the level of the rail and surrounding ground. Assuming that a 4% grade on these approaches would be a reasonable one for vehicular operation, we are confronted by the necessity for an approach of between 600 and 700 ft. From the northerly limit of the railway tracks at Sherbourne Street the approach thereto would commence at a point north of Front and south of King St. The natural rise of ground at the highest point, Yonge St., would not entail the necessity for the approaches reaching beyond Front and Yonge St. but in each event the necessity for carrying a bridge approach to the south would mean the extension of the existing shore line some distance out towards, or even up to, the new Windmill line. If, on the other hand, the approaches to the bridges were carried at right angles, then

Toronto Union Station, Tracks, Etc.

A conference was held in Toronto, Feb. 4, between representatives of the C.P.R. and G.T.R., and of the City Council and Board of Trade, on the question of tracks, etc., in connection with the proposed Union Station. The following report, signed by F. P. Gutelius, Assistant Chief Engineer C.P.R.; H. G. Kelley, Chief Engineer G.T.R., and E. Wragge, Consulting Engineer, was presented, with the endorsation of Sir Thos. G. Shaughnessy and C. M. Hays, for the two railway companies:

"The undersigned have considered the question involved in the separation of grades between the streets and the railway lines along the water front of the city of Toronto, and the report thereon of Messrs. Berrian and Moyes, engineers, as presented to the Toronto Board of Trade, and would observe thereon:

"Dealing with the report of Messrs. Berrian and Moyes (as published in THE RAILWAY AND MARINE WORLD of Oct., 1907), the suggestion that four tracks only, except the Union Station tracks, should be elevated along the water front from Bathurst St. Jct. to Cherry and Vine Sts., near the Don River, and that certain service tracks should remain on the present level on both sides of the proposed elevated tracks or viaduct, is open to the objection that the operation of such service tracks will be attended with more danger than the operation of all tracks as at present constructed, owing to the impossibility of any one passing through the subway under the viaduct seeing an engine or cars approaching the crossing on the other side of the viaduct until danger of collision is imminent.

"To reach such service tracks, all train movements of both companies between the main distributing yards and the Esplanade district will require to be made as far east as the Don River, and return through subways under the viaduct. This will involve the movement of all cars over a distance of from 3¼ to 3¾ miles and return as compared with one mile and return under present conditions. Assuming that 40,000 cars are handled per annum by both companies, the extra engine and car mileage involved by the proposed change will be 200,000 miles. Owing to the curtailment of the switching facilities and the magnitude of the operations involved, we consider it impracticable to handle even the present business transacted on the Esplanade under the proposed arrangement. These objections apply to the district east of Church St.

"West of Church, as far as York St., on the Esplanade, and southerly, all tracks on the level leading to the wharves and existing industries are eliminated. A subway substituted for the York St. bridge and the eastern portion of the C.P.R. yards is taken away, almost destroying its usefulness, the yard being transformed from a double-ended yard to a stub-end yard. We can see no practical way by which this damage to the C.P.R. yard can be lessened if the viaduct plan is adopted. We have not attempted here to criticize their report in detail, although we find many serious objections and difficulties to which attention has not been given. For example, the bridge at the foot of John St. leading to the city water works, as is admitted, must be removed. Under this arrangement no method of crossing the railway tracks at this point is practicable. A grade of about 8% is required from the top of the present bridge at the foot of Spadina Ave. to the proposed subway under the viaduct, allowing a headway of 12½ ft.

"Dealing with the general principle of track elevation as applied to the existing conditions in the district under consideration, we can see no practicable method of separating grades by means of a viaduct as suggested. If the sidings or team tracks on the Esplanade are elevated, their usefulness is completely destroyed, as they are used for the delivery and receipt of carload freight by teams.

"Under the provisions of the Windmill Line agreement the city is obliged to complete the building of Lake St. easterly from Yonge St., and fill in the extension of the several streets leading thereto from the south side of the Esplanade to Lake St. during 1908. This provides sufficient room south of the Esplanade to admit of the construction of overhead bridges with easy grade leading from Front St. over the railway tracks between Parliament St. and Yonge St.

"We have given careful consideration to the various questions involved in the separation of grades along the water front from the Don River on the east to the Humber River on the west, and we are of the opinion that the following general plan is the best solution possible to provide both for the present and future interests of the public and for the necessities of the railways: Retain" the tracks at the present level from the Don River to about Yonge St. and carry the following streets over these tracks by means of steel bridges, viz. Parliament or Berkeley, Sherbourne, Jarvis, Church and Yonge. Eliminate the present level crossings on the Esplanade between the foot of Yonge St. and the foot of Parliament St., and extend Harbor St. parallel with and south of the tracks so as to give the property owners south of the Esplanade free and safe access both easterly and westerly to and from their properties. The rights of the public, if any, to cross the tracks at street extensions where not occupied by bridges to be eliminated and the remaining portions of these street extensions to remain open southerly as far as Lake St., thereby affording access to the bridges over the Esplanade. From Yonge St. west to Simcoe St., it is intended to construct the new Union Station, the tracks diverging from the west side of the Yonge St. bridge and to be slightly elevated to provide for the subway in the new station. This necessitates the removal of the York St. bridge and the erection instead thereof of one at Bay St. of similar construction to that at Yonge St. The substitution of the bridge at Bay St. for the one at York St. will enable the railway tracks to be carried over Yonge St., along Lake St., and back again to Front St. by way of Bay St., thus giving the most convenient access both from the east and from the west to the steamer wharves in that neighborhood. None of these bridges will have an approach exceeding 5%, and several of them will have a grade of 4% or less, this question depending on what is eventually considered to be most desirable for all interests involved as to the headway for railways to be allowed under the everal bridges. The present bridge at the foot of John St. to be retained, and the bridge at Spadina Ave. to be extended to cross over the passenger tracks. The present overhead bridges at Bathurst St. and Strachan Ave. to be retained. Commencing at the crossing of the G.T.R. tracks by the C.P.R. branch leading to the Queen's wharf, the present roadway of the G.T.R. to be depressed to a point about 1,000 ft. east of the Sunnyside crossing, provision being made for the necessary tracks thereon, and Dufferin St., Dunn Ave., Jameson Ave., and Dowling Ave., carried overhead by means of bridges. From the same point 1,000 ft. east of Sunnyside crossing to the Humber River, the present tracks to be elevated upon an embankment, subways to be provided for the following highways: Sunnyside crossing, Indian Road, with access to High Park, High Park crossing between mileposts 34½ and 35, and Windermere Ave. All other crossings to be closed.

"In the general plan above outlined our conclusions are supported by the recommendations contained in the report of W. B. Parsons, C. H. Rust and C. B. Smith, presented to the Mayor and Council of the city."

In a communication accompanying the above report the C.P.R. and G.T.R. officials said: "Our companies are prepared to undertake this work in accordance with the recommendations of our engineers, the cost of the whole undertaking between Bathurst St. and the Humber River to be apportioned between the city and the G.T.R., each paying one-half. We would also suggest, as is usual in such cases, that no compensation or damages for lands taken or injuriously affected by any of the proposed work be claimed by any of the parties against the other, or others of them. We propose that the overhead bridges above mentioned shall be constructed by the railway companies on such terms and conditions and with such provisions as to cost as the Board of Railway Commissioners, after hearing the parties interested, namely, the city and the railway companies, may order."

The conference, which lasted for several hours did not end in an agreement, the city representatives insisting on the construction of a viaduct, to which the railways are entirely opposed. The Mayor, having communicated with the Board of Railway Commissioners, has been advised that they will sit in Toronto at an early date to consider the whole question. In the meantime, C. H. Rust, City Engineer, in consultation with I. Randolph, of Chicago, is preparing plans, estimates, etc., for viaduct construction to be submitted to the Commission.

The Toronto Viaduct Question.

e arguments of counsel upon the ques- of the power of the Board of Railway missioners to order the railway com- es to join with the city council in the truction of a viaduct along the water of Toronto, were concluded June 6, on June 10 Chief Commissioner Mabee judgment against the companies, ch was concurred in by Commissioner is as follows:

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or advanced to take away the authority of Parliament to confer upon this Board authority and jurisdiction to deal with the subject matter of this application, and that such authority has been conferred, and in saying this I am not overlooking the authorities under which the railway titles upon the Esplanade from time to time developed. On April 22, 1905, the city entered into an agreement with the G.T.R. which by an Act of the Ontario Legislature of the same year was declared valid and binding, for the construction by the railway company of a new union passenger station and yards. This agreement is based entirely upon the operation of the railway tracks upon the level; it provides for the city closing certain streets, a foot bridge from Front St. to Lake St. over the tracks, changes and repairs to York St. bridge, and many other provisions, entirely inconsistent with track elevation as now proposed. Upon this agreement the G.T.R. has acted, and in good faith expended enormous sums of money. Application for the order for the construction of the Yonge St. bridge was made by the city, the validity of the order has since been upheld by the Court of Appeal, it is still held by the city—and under it the railways are required to construct a bridge over the tracks.

"I mention these matters because it was strongly argued that the city had estopped itself from making the present application; that the policy adopted, the contracts entered into, the work done and money expended by both city and railways upon the lines of protection by overhead bridges upon the well-known legal doctrine of estoppel, prevented the city departing from that mode of grade separation, and making application now for an entirely different system. I am of opinion that this argument would be entitled in a court of law to prevail, and that the course taken by the city in the past would absolutely prevent this application from succeeding, but this Board is not a court of law, and no doctrine of estoppel is applicable or binding.

"The paramount object of the sections under consideration, that which overshadows all and before which everything must give way, is the protection, safety and convenience of the public in the matter of grade separation, and no town or city council by any sort of municipal mismanagement, folly or ignorance can estop itself or prevent the Board taking any step or making any order, otherwise within its jurisdiction, for the protection, safety and convenience

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"Sec. 30 provides that 'the Board may make orders . . . with respect to the . . . structures and works to be used upon the railway so as to provide means for the due protection of . . . the public.'

"Sec. 3 of the Railway Act is as follows:

"'This act shall, subject to the provisions thereof, be construed as incorporate with the special act, and unless otherwise expressly provided in the act where the provisions of this act, and of any special act passed by the Parliament of Canada, relate to the same subject matter, the provisions of the special act shall, in so far as is necessary to give effect to such special act, be taken to over ride the provisions of this act.'

"Now, is there a 'special act' in existence, relating to 'the same subject matter' as that dealt with in secs. 237 and 238, viz., protection, safety and convenience of the public; if there is, then it is said that the provisions of the special act over-ride those of the general act.

"It seems to me, reading the whole of sec. 28 that the fair meaning of the words 'with special reference to such railway' is with respect to the 'construction or operation' of the railway dealt with earlier in the same clause, and that an act merely declaring an agreement to be in force is not necessarily an act dealing with the construction or operation of the railway merely because some of the many clauses of the agreement deal with the matters above indicated. It appears to me that if this tripartite agreement still remains a private contract, it cannot be regarded as a special act for the wide and far-reaching purposes for which the argument is advanced.

"The early history of the waterfront and the growth of the foothold of the railways there was elaborately argued before the Board. I have read the arguments since the hearing, and am of the opinion that there is nothing in all that has been said over the tracks.

"I mention these matters because it was strongly argued that the city had estopped itself from making the present application; that the policy adopted, the contracts entered into, the work done and money expended by both city and railways upon the lines of protection by overhead bridges upon the well-known legal doctrine of estoppel, prevented the city departing from that mode of grade separation, and making application now for an entirely different system. I am of opinion that this argument would be entitled in a court of law to prevail, and that the course taken by the city in the past would absolutely prevent this application from succeeding, but this Board is not a court of law, and no doctrine of estoppel is applicable or binding.

"The paramount object of the sections under consideration, that which overshadows all and before which everything must give way, is the protection, safety and convenience of the public in the matter of grade separation, and no town or city council by any sort of municipal mismanagement, folly or ignorance can estop itself or prevent the Board taking any step or making any order, otherwise within its jurisdiction, for the protection, safety and convenience of the public. The question of whether the separation of grade along the waterfront is to be accomplished by viaduct or overhead bridges is not now being considered; it is that of jurisdiction only if after all the evidence has been given, every interest considered, and all sides heard, the Board deems the interests of the public require departure from the policy adopted by the city upon this matter; it has it in its power to entirely protect the railway interests, and doubtless will have full regard to all expenditures made by the railways upon the faith of contracts with the city, so that no injustice will be done to, or loss fall upon, the railways by reason of variation of plans made, structures or buildings erected, lands purchased or money expended, which would be of no avail consequent upon a changed policy.

"I have given full consideration to the argument that there are no streets running to the waterfront. The Court of Appeal has held the contrary as to Yonge St., and I have no doubt most, if not all, the other passages to the water are highways within s.s. 11 of sec. 2 of the act, where a highway is declared to include any way of public communication.

July 1908

"The Board will continue the hearing of this matter at once if the parties so desire, or await the result of an appeal from this opinion to the Supreme Court, if that course is decided upon."

Prior to the conclusion of the case the city council put in, at the suggestion of the Chief Commissioner, a formal application for an order to compel the city to construct the viaduct. There has been a great deal of discussion upon the question not only in railway, but in business circles, the railway companies taking the position that a viaduct would be unnecessarily expensive, and C. M. Hays, Second Vice-President and General Manager G.T.R., says the application is altogether unreasonable.

The question of the viaduct came up in the House of Commons June 11, when the Minister of Railways said: The Mayor of Toronto waited on him and asked that the law might be so amended that the Board of Railway Commissioners would have power to order the construction of a viaduct. He replied that he was assured that the Board already had the power to do almost anything with railways. A great many people were of opinion that Parliament had already given the Commission too much power. If Parliament adopted all the amendments to the act which were asked for the Board would have power to do almost anything that any person could conceive of, with reference to railways. The Chairman of the Commission, after hearing all the arguments, decided that the Commission was a tribunal established for the purpose of settling differences, and consequently it had a right to deal with the question of viaducts.

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The arguments of counsel upon the question of the power of the Board of Railway Commissioners to order the railway companies to join with the city council in the construction of a viaduct along the water front of Toronto, were concluded June 6, and on June 10 Chief Commissioner Mabee gave judgment against the companies, which was concurred in by Commissioner Mills as follows:

"No objection is taken to the jurisdiction of the Board to order the elevation of the railway company's tracks along the Toronto waterfront. The railway tracks are along the Esplanade, and that is a street, a highway. Under sec. 227, if the company applies for leave to construct the railway along a highway it must file a plan and profile with the Board, showing the location of the highway affected, and upon such application the Board is expressly empowered to make provision for the protection, safety and convenience of the public, and has authority to require all such measures to be taken, as under the circumstances appear to the Board best adapted to remove or diminish the danger or obstruction existing or likely to arise from the construction of the railway along the highway.

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"It seems to me, reading the whole of ... 28 that the fair meaning of the words ...th special reference to such railway' is ...h respect to the 'construction or oper...on' of the railway dealt with earlier in ... same clause, and that an act merely ...laring an agreement to be in force is not ...essarily an act dealing with the construc...n or operation of the railway merely be...se some of the many clauses of the agree...nt deal with the matters above indicated. ...appears to me that if this tripartite agree...nt still remains a private contract, it ...not be regarded as a special act for the ...le and far-reaching purposes for which ... argument is advanced.

"The early history of the waterfront and ... growth of the foothold of the railways ...e was elaborately argued before the ...rd. I have read the arguments since ... hearing, and am of the opinion that ...ere is nothing in all that has been said ...over the tracks.

"I mention these matters because it was strongly argued that the city had estopped itself from making the present application; that the policy adopted, the contracts entered into, the work done and money expended by both city and railways upon the lines of protection by overhead bridges upon the well-known legal doctrine of estoppel, prevented the city departing from that mode of grade separation, and making application now for an entirely different system. I am of opinion that this argument would be entitled in a court of law to prevail, and that the course taken by the city in the past would absolutely prevent this application from succeeding, but this Board is not a court of law, and no doctrine of estoppel is applicable or binding.

"The paramount object of the sections under consideration, that which overshadows all and before which everything must give way, is the protection, safety and convenience of the public in the matter of grade separation, and no town or city council by any sort of municipal mismanagement, folly or ignorance can estop itself or prevent the Board taking any step or making any order, otherwise within its jurisdiction, for the protection, safety and convenience of the public. The question of whether the separation of grade along the waterfront is to be accomplished by viaduct or overhead bridges is not now being considered; it is that of jurisdiction only if after all the evidence has been given, every interest considered, and all sides heard, the Board deems the interests of the public require departure from the policy adopted by the city upon this matter; it has it in its power to entirely protect the railway interests, and doubtless will have full regard to all expenditures made by the railways upon the faith of contracts with the city, so that no injustice will be done to, or loss fall upon, the railways by reason of variation of plans made, structures or buildings erected, lands purchased or money expended, which would be of no avail consequent upon a changed policy.

"I have given full consideration to the argument that there are no streets running to the waterfront. The Court of Appeal has held the contrary as to Yonge St., and I have no doubt most, if not all, the other passages to the water are highways within s.s. 11 of sec. 2 of the act, where a highway is declared to include any way of public communication.

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on of the railway along the highway.

"Now, if this were an application of the companies for leave to locate and construct their lines along the Esplanade, I think it perfectly clear that the Board could impose as a term of granting such leave that the track should be elevated or carried upon viaduct. If I am right in holding that the Board has power upon an original location to require elevation of tracks, it seems to me clear it has the like power notwithstanding the railway is already constructed along the highway.

"Sec. 30 provides that 'the Board may make orders . . . with respect to the . . . structures and works to be used upon the railway so as to provide means for the due protection of . . . the public.'

"Sec. 3 of the Railway Act is as follows:

"'This act shall, subject to the provisions thereof, be construed as incorporate with the special act, and unless otherwise expressly provided in the act where the provisions of this act, and of any special act passed by the Parliament of Canada, relate to the same subject matter, the provisions of the special act shall, in so far as is necessary to give effect to such special act, be taken to over ride the provisions of this act.'

"Now, is there a 'special act' in existence, relating to 'the same subject matter' as that dealt with in secs. 237 and 238, viz., protection, safety and convenience of the public; if there is, then it is said that the provisions of the special act over-ride those of the general act.

"It seems to me, reading the whole of sec. 28 that the fair meaning of the words 'with special reference to such railway' is with respect to the 'construction or operation' of the railway dealt with earlier in the same clause, and that an act merely declaring an agreement to be in force is not necessarily an act dealing with the construction or operation of the railway merely because some of the many clauses of the agreement deal with the matters above indicated. It appears to me that if this tripartite agreement still remains a private contract, it cannot be regarded as a special act for the wide and far-reaching purposes for which the argument is advanced.

"The early history of the waterfront and the growth of the foothold of the railways there was elaborately argued before the Board. I have read the arguments since the hearing, and am of the opinion that there is nothing in all that has been said over the tracks.

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July 1908

Canadian Pacific Express Co. Toronto Terminal Facilities.

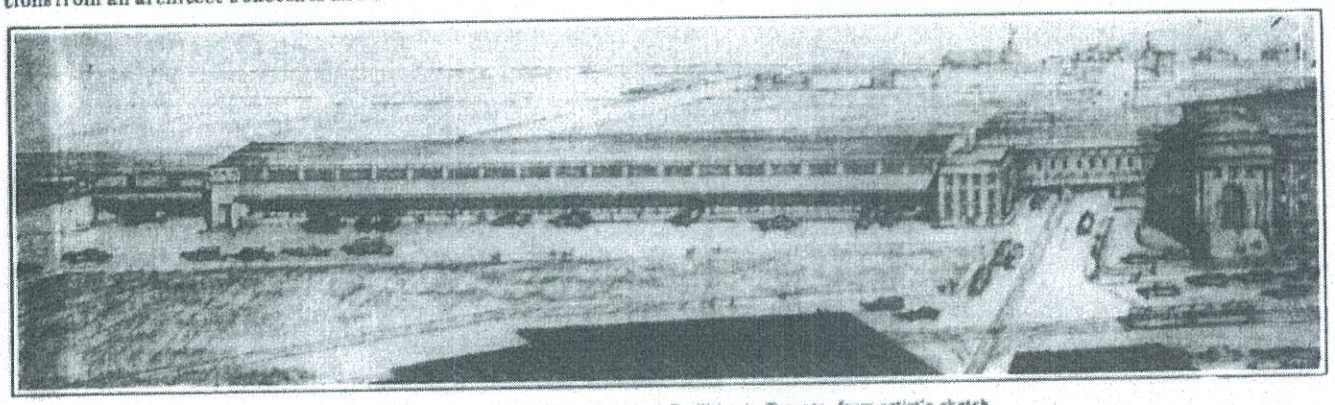
The Canadian Pacific Express Co. new terminal facilities in Toronto, east of the union station and between Bay and Yonge Sts., preliminary descriptions of which were given in Canadian Railway and Marine World for May 1929, pg. 261, and July 1929, pg. 452, have been practically completed, and were occupied by the terminal staff on Jan. 18. The layout is shown in the accompanying reproductions from an architect's sketches and drawing showing plan and cross sectional views. In the former, the east or postal wing of the union station is shown at the right; adjacent is the subway carrying Bay St. under the steam railway tracks, over which is the easterly extension of the train shed, completed recently, which covers the station tracks. Immediately to the east, or left, of the entrance to the subway is the express facilities 3-story office, and adjoining it to the east is the express handling space, with the Yonge St. subway at the extreme east. The express facilities are served by 3 tracks, led off from a main line track some distance east crete construction and 83 ft. wide, from which 6 automatic elevators operate to the track platforms above, to give access to all station tracks. The arrangement is such that passengers and express trucks do not use the same platforms. A complete description of the way in which the elevators operate was given in Canadian Railway and Marine World for July 1929, pg. 452.

In addition to the elevators, provision is made for automatic conveyors to carry containers of packages between the different levels without rehandling. The platform through which passes the two elevators operating from the warehouse or express handling room, and the additional platform shown at the right in the cross sectional view, are of such height as to bring their tops even with car floors.

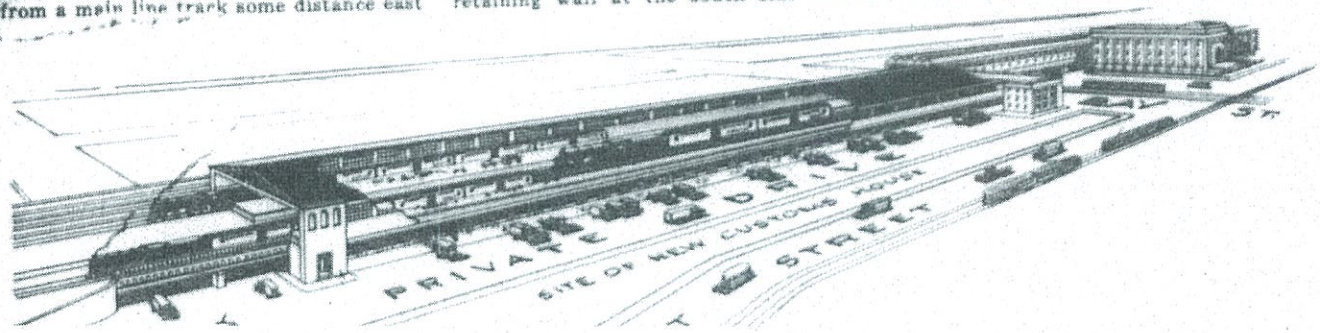
The roof slab carrying the tracks is of strongly reinforced concrete construction, and the massive supporting columns, also of concrete with steel reinforcement, have their concrete footings sunk to rock. The retaining wall at the south side of the the foreground in the sketches is Front St., and the space between it and the trucking space is to be occupied by a Dominion Customs Department building, excavation for the foundations of which has begun.

The 3-story office building is 60 x 40 ft., has structural steel frame and is faced with stone, its exterior conforming architecturally with the union station and other buildings in the vicinity. The main floor, with entrance from Bay St., contains the public space, depot agent's office, vehicle service office with switchboard, money order service office, and general office and space for the clerical staff. The cashier's department space is in the express warehouse, immediately adjoining the office lower floor. The second floor of the office portion is divided into offices for the General Agent and his staff, and the General Agent, Foreign Department, and his staff. The third floor is devoted to a lunch room and accompanying facilities.

The placing in operation of the new facilities did not require any removal from the company's headquarters and general



Canadian Pacific Express Co.'s Terminal Facilities in Toronto, from artist's sketch.



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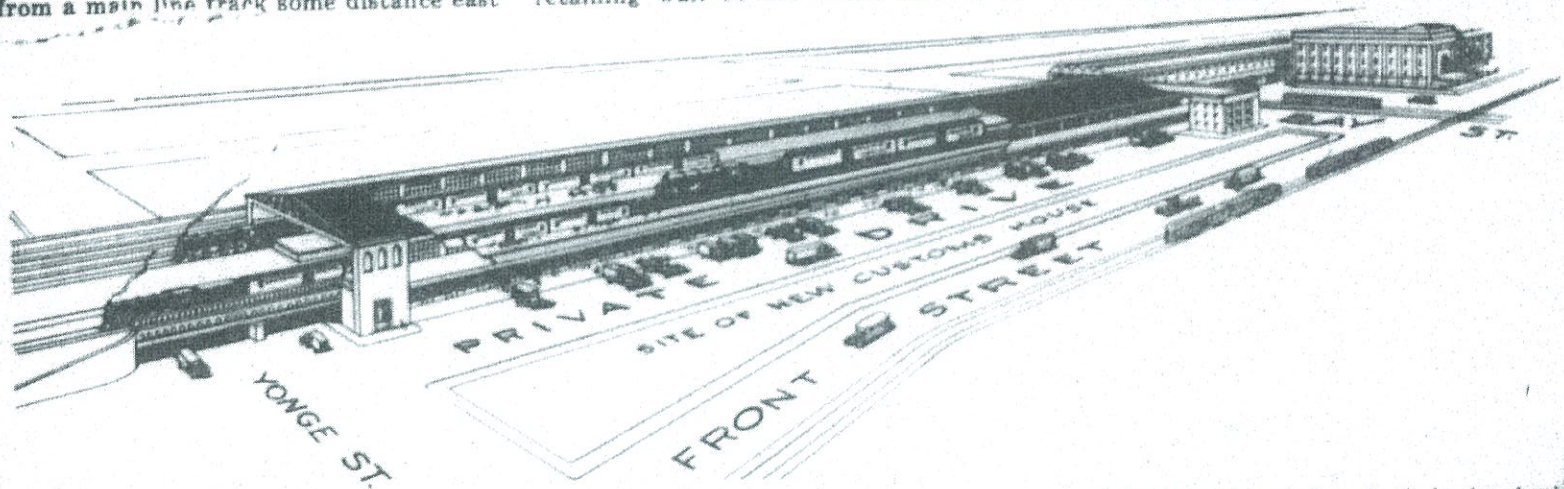

Canadian Pacific Express Co.'s Terminal Facilities in Toronto, from architect's drawing, with portion of roof removed to show interior of track shed, also showing portion of Union Station at extreme right.

of the union station. The base of rail for the tracks is about 28 ft. above Lake Ontario mean level; the express warehouse or handling space is below the tracks, express matter being handled from the warehouse or lower floor to the platforms on the upper level by automatic elevators. The 3 tracks have a total capacity of 27 cars. The total area occupied by the facilities, including the office space and the 10-ft. trucking platform at the north side, is 560 x 83 ft. The 2 elevators, each 18 x 6 ft., and each with lifting capacity of 8,000 lb., pass through the larger of the 2 track platforms shown in the cross sectional view. Leading south from the express handling space, adjacent to the office, is a trucking subway, of con-

warehouse space, which is about 18 ft. high above the lower floor level, is also of reinforced concrete construction. A great deal of concrete and steel was used in the construction of the warehouse structure, and, in general, the type of construction employed was similar to that used in the union station concourse and track structure, described in these columns previously.

The trucking space at the north side of the warehouse extends from Bay St. to Yonge St., being about 40 ft. wide at the former street and about 80 ft. at the latter, this space providing, in addition to plenty of room for placing and turning of trucks, adequate room for parking motor vehicles at its north side. The street shown in

offices at King and Simcoe Sts., b[y] did involve removal of the General A[gent] and General Agent, Foreign Depart[ment] and their staffs, from their former offic[es] in the Canadian Pacific Ry. building a[t] King and Yonge Sts., and also, of course, of the depot agent, cashier, etc., and their staffs, from the temporary terminal quarters in the baggage space on the lower floor of the union station, at the west end.

The site for these facilities, adjacent to the foot of Yonge St., Toronto's main north and south thoroughfare, to the union station, and to the Customs Department building to be erected, could not be improved upon, and the wide private driveway to which attention has been

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called will not only serve to accelerate the company's vehicle movement, but will also provide easy access for trucks and for motorists who wish to ship or obtain express packages, buy travellers' cheques or money orders, or transact any other express business. The layout of the facilities is the result of several years of study of express terminals in Canada and the United States, and it is felt that the conveniences provided constitute the last word in express terminal facilities, and which have been provided without frills or unnecessary expense.

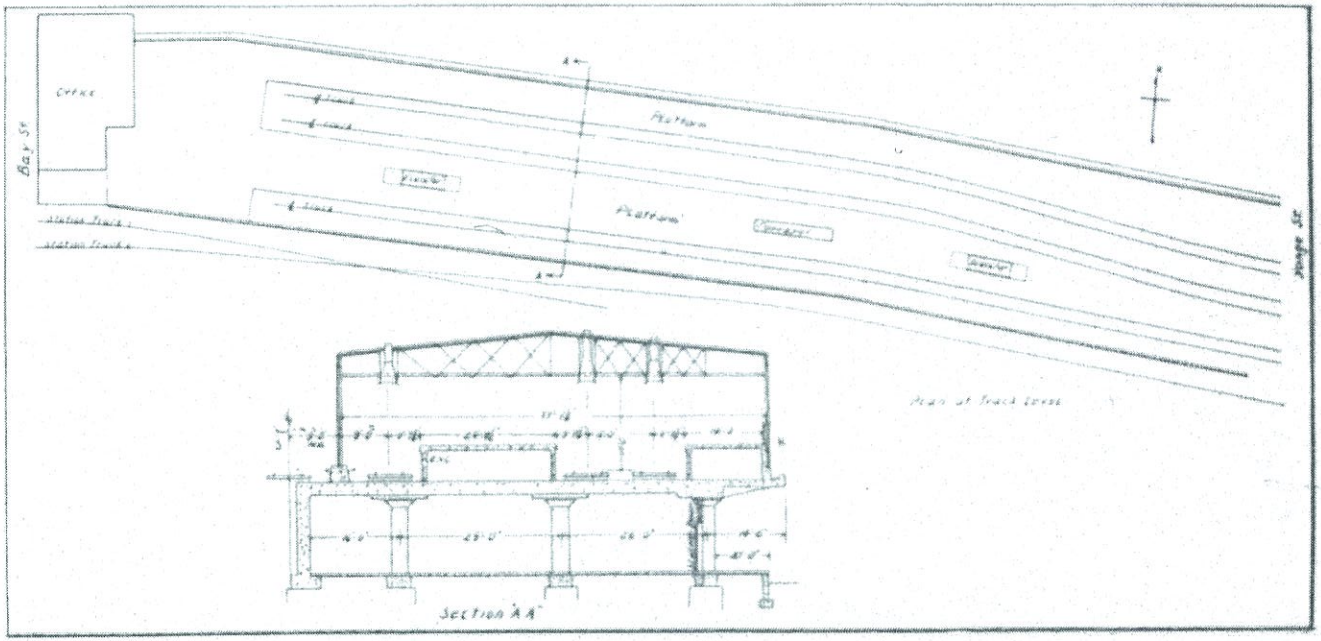
The designs for the terminal were prepared under the direction of J. M. R. Fairbairn, Chief Engineer, Canadian Pacific Ry., by P. B. Motley, Engineer of Bridges, and A. R. Ketterson, Assistant Engineer of Bridges. Construction was carried out by Toronto Terminals Ry. Co., of which U. E. Gillen is General Manager, J. R. W. Ambrose, Chief Engineer, and E. Duncan, Assistant Engineer, the general contractor having been P. Lyall and Sons Construction Co.

Sleeping Car Living Accommodation for Shriners in Toronto.

The Canadian National and Canadian Pacific Rys. will, we are advised officially, not only furnish a great deal of passenger transportation service in connection with the 56th annual meeting of the Imperial Council, Ancient Arabic Order, Nobles of the Mystic Shrine, to be held in Toronto, June 9-12, but will also provide 650 sleeping cars, parked in yards located conveniently to the headquarters for the meetings, for living accommodation for visiting shriners and their wives during the meeting.

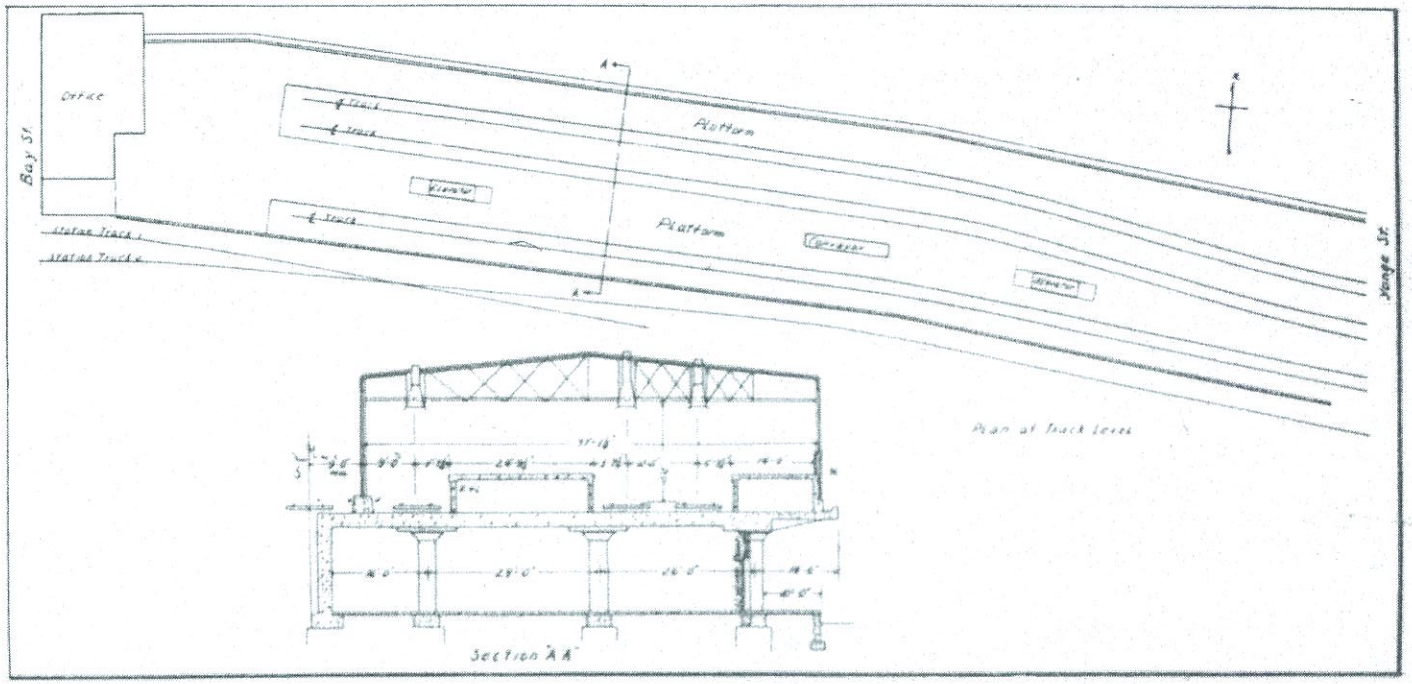
The Canadian National will use its passenger car yard at the west side of Spadina Ave., adjoining Fleet St., and, during the session, regular passenger car storage will be looked after in other Toronto yards. In the yard mentioned, which has been named Temple Park for the occasion, 350 sleeping cars will be parked, and arrangements are being made for heating, lighting and watering of the cars, and for porter and sanitation service. In the passenger car commissary building adjoining the east end of the yard, 150 shower baths, a barber shop, telegraph and telephone facilities, a

Bathurst and Fleet Sts., west of Bathurst St. and north of Fleet St., between the latter and the main line tracks; it will have capacity for 300 passenger cars. There will be 32 tracks, with wooden platforms between them; through the center of the yard, from east to west, will extend a driveway, with macadam surface, and about 65 ft. wide; in addition, a driveway 20 ft. wide, also with macadam surface, will extend through the yard centrally from south to north. These driveways will connect with Fleet St., to permit automobiles and trucks being taken right to the car doors. The yard will be floodlighted, all the cars will be fitted with all conveniences, and large tents will be erected, to provide for shower baths, telephone booths and telegraph office, police service headquarters, information center, hospital, etc., and nothing is being left undone to make the accommodation complete in every detail. The property on which the yard is being established has been occupied, at the north side, by a few freight spurs, which are being incorporated into the new track layout. The site is ideal from the visiting Shriners' viewpoint, being practically adjacent to the Canadian National Exhibition grounds, and only a



Canadian Pacific Express Co.'s Terminal Facilities in Toronto. Layout of tracks and typical cross section.

Transportation for Chibougamau District.—A company has been formed to provide a transportation service between



Canadian Pacific Express Co.'s Terminal Facilities in Toronto. Layout of tracks and typical cross section.

Transportation for Chibougamau District.—A company has been formed to provide a transportation service between St. Felicien, Que., and the Chibougamau and Lake Opemiska mining fields, utilizing for winter hauling a road which has been about completed, and to the construction of which government assistance has been extended. Machinery and supplies will be hauled by tractor, a method of transportation well tested in Manitoba last winter. Freight rates will be lower than heretofore, and facilities will be provided to handle all traffic offering. The company has plans for the development of a water and airplane transport system from Oskelaneo, on the Oskelaneo Subdivision, Cochrane Division, Quebec District, Canadian National Rys., to Chibougamau, which may later be developed into a combination water and overland route. (Montreal press report.)

The Canadian Brotherhood of Railroad Employes, of which A. R. Mosher is President, organized 42 new divisions during 1929, making the number of local branches over 240, located across Canada from Sydney, N.S., to Vancouver, B.C. It has been decided to erect a building at Ottawa as offices for the grand division.

and sanitation service. In the passenger car commissary building adjoining the east end of the yard, 150 shower baths, a barber shop, telegraph and telephone facilities, a beauty parlor, rest room, and hospital service will be installed. The headquarters for the Shriners' meeting will be the Coliseum, in the Canadian National Exhibition grounds; between it and the yard where the sleeping cars will be parked, Gray Coach Lines, Ltd., Toronto Transportation Commission motor coach operating subsidiary, will operate a motor coach service; the one-way trip will occupy about 10 minutes. The cost to the visitors of the sleeping car living accommodation will not exceed that which would be incurred were they staying at hotels. It is calculated that about 7,000 will be furnished living accommodation in the cars, an average of 20 per car. W. J. Moffatt, Assistant General Passenger Agent, Central Region, C.N.R., who is a Shriner and chairman of the local council's transportation committee, is in charge of the arrangements.

The Canadian Pacific arrangements, in charge of Wm. Fulton, Assistant General Passenger Agent, Toronto, include the building of an entire new passenger car yard, work on which has been begun at into the new track layout. The site is ideal from the visiting Shriners' viewpoint, being practically adjacent to the Canadian National Exhibition grounds, and only a short distance from the Coliseum. The yard will, it is expected, be completed a month or two before the meeting starts.

Alberta Coal for Canadian Pacific Ry.—In order to encourage coal mining in Alberta, and to keep as many miners employed as possible during the winter, the C.P.R. has decided not to touch any of its coal dumps in the province but to order coal direct from the collieries in Alberta so that the mines may be kept in operation during the winter. The Alberta Minister of Labor stated recently that this decision had materially improved the employment situation in the Crowsnest Pass coal mining district. (Press report.)

Saskatoon Hotel, Canadian National Rys.—A contract for the excavation and foundation work has been given to J. McDiarmid Co., Winnipeg. Tenders for the structural steel work were received by John S. Archibald, architect, and John Schofield, associate architect, Montreal, up to Jan. 27.

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TORONTO 2, CANADA, FEBRUARY, 1930.

PRINCIPAL CONTENTS.

High Level Operation of Toronto Union Station.

Important forward steps in the progress of the Toronto waterfront grade separation work were taken recently. On Jan. 20 a test was made of the completed north half of the union station train concourse carrying 6 elevated tracks, and on Jan. 21 passenger trains were operated into and out of the station on the elevated tracks, for the first time.

The test of the concourse structure was made by the operation, over the elevated tracks, of Canadian National Rys. Santa Fe locomotive 4100, which has a weight, locomotive and tender combined, of 655,040 lb., weight on drivers being 321,780 lb., with driver wheelbase 21 ft. 8 in., and total wheelbase, locomotive and tender, 80 ft. 9¾ in. During the test, the locomotive hauled a passenger car containing railway officials and press representatives, among the former being U. E. Gillen, General Manager, J. R. W. Ambrose, Chief Engineer, and E. Duncan, Assistant Engineer, Toronto Terminals Ry. Co., and several Canadian National Rys. officials, including W. A. Kingsland, General Manager, Central Region; C. R. Moore, General Superintendent of Transportation, Central Region; T. C. Hudson, General Superintendent, Southern Ontario District; C. F. Needham, Assistant to General Manager, Central Region; and D. J. McCuaig, Superintendent of Motive Power, Southern Ontario District.

On Jan. 21, the 6 northerly high level tracks were placed in operation by the simultaneous arrival, at 10.25 a.m., of Canadian Pacific Ry. passenger train 601, from Havelock, hauled by locomotive 3100, and Canadian National Rys. train 28, from Goderich, hauled by locomotive 6121. The arrival of the first regular trains to use the high level station tracks was awaited by a large number of railway officials, and many others who attended on invitation of U. E. Gillen, General Manager, Toronto Terminals Ry. Co., those present including Mayor Wemp, of Toronto, and other members of the city council, civic officials, and representatives of the Toronto Harbor Commission, the Canadian Manufacturers' Association, other commercial and industrial organizations, and the press, the total attendance being about 300. As the Canadian Pacific train from the east entered the recently completed trainshed over the elevated tracks, the locomotive man opened the whistle valve, and kept the whistle blowing until his train came to a stop, and the locomotive man on the Canadian National train from the west did the same.

Shortly after the trains stopped, the Mayor congratulated Mr. Gillen on the J. R. W. Ambrose, who has been Chief Engineer, Toronto Terminals Ry. Co., since it assumed active direction of the undertaking.

Mayor Wemp stated that all Toronto civic officers, and no doubt all its population, have a deep appreciation of the contribution to the city's welfare and progress made by the Canadian Pacific and Canadian National Rys. and the Toronto Terminals Ry. Co. in the work being carried out along the waterfront. He said that the union station is a great asset to the city, as are also the subways provided to permit easy access to the Lake Ontario waterfront. On behalf of the citizens, he thanked Mr. Gillen for the efficient manner in which the terminal improvement work had been carried out, and expressed gratification on the receipt of a letter in which Mr. Gillen stated that the Bay St. subway under the steam railway tracks will be completed by April 30, the Yonge St. subway by Aug. 15, and the York St. subway by Sept. 15.

The first trains to leave the station, using the high level tracks, were Canadian National Rys. no. 33, for Sarnia, hauled by locomotive 5610, which left at 12.55 p.m. on Jan. 21, and Canadian Pacific train 38, for Ottawa, hauled by locomotive 2237, which left 5 minutes later. The station was in complete high level operation, with 6 tracks, by Jan. 29.

The temporary scheme of operation for the station with low level tracks necessitated passengers leaving the train concourse by ascending stairs, passing south along a covered passageway, and descending one of several flights of stairs leading to the platforms between the station tracks. Now, with the station tracks laid on top of the train concourse structure and with the trains waiting overhead, outgoing passengers simply walk up the flights of stairs leading from the concourse to the station track platforms. A complete description of the layout, including details of the baggage space and modern elevators for handling baggage, and showing how incoming and outgoing passengers are kept separated, was given in an article describing the station, in Canadian Railway and Marine World for Oct. 1927, beginning on pg. 567.

No time is to be lost in building the south half of the station concourse structure, which is to carry an additional 6 elevated tracks. The work is to be done by the liquidator for the P. Lyall and Sons Construction Co., which built the north half, and construction is to begin at once.

Freight Car Condition and Supply.—The

Periodicals Association, Canadian Press Association.

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Shortly after the trains stopped, the Mayor congratulated Mr. Gillen on the success being made of the terminals undertaking and on the large forward step marked by the placing of the union station into high level operation; a few photographs were taken, and the assemblage then proceeded to the union station dining room, where sandwiches and coffee were served. Mr. Gillen, after thanking those who had congratulated him on the progress being made with the terminal development and grade separation work, outlined, briefly, the origin of the scheme for a union station and for railway and street grade separation along the waterfront, and traced the progress of the work. He mentioned the names of railway presidents and vice presidents, chairmen of the Board of Railway Commissioners, Ministers of the Railways and Canals Department, Toronto civic officials, and engineers, who had been connected with the grade separation and terminal development work since it commenced. He paid a tribute to the engineers who had contributed to the work's progress, mentioning particularly

subway by Aug. 15, and the York St. subway by Sept. 15.

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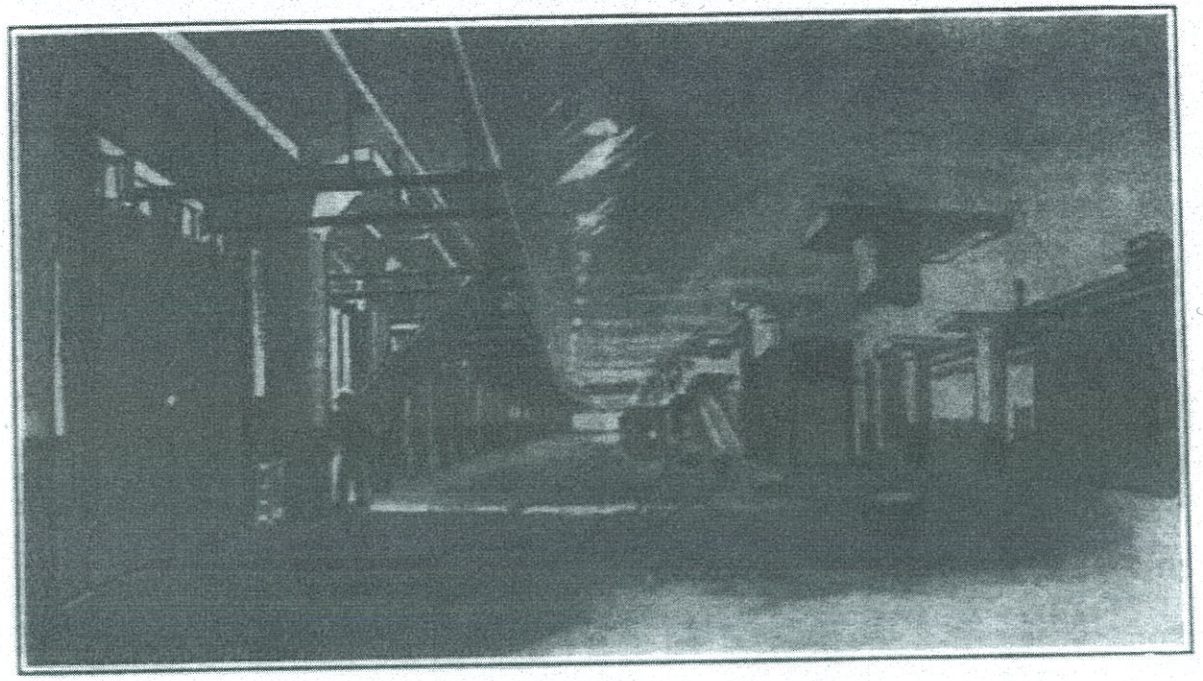
The temporary scheme of operation for the station with low level tracks necessitated passengers leaving the train concourse by ascending stairs, passing south along a covered passageway, and descending one of several flights of stairs leading to the platforms between the station tracks. Now, with the station tracks laid on top of the train concourse structure and with the trains waiting overhead, outgoing passengers simply walk up the flights of stairs leading from the concourse to the station track platforms. A complete description of the layout, including details of the baggage space and modern elevators for handling baggage, and showing how incoming and outgoing passengers are kept separated, was given in an article describing the station, in Canadian Railway and Marine World for Oct. 1927, beginning on pg. 567.

No time is to be lost in building the south half of the station concourse structure, which is to carry an additional 6 elevated tracks. The work is to be done by the liquidator for the P. Lyall and Sons Construction Co., which built the north half, and construction is to begin at once.

Freight Car Condition and Supply.—The Railway Association of Canada reports that on Jan. 1 there were 202,694 freight cars on Canadian lines, compared with 202,268 on Dec. 1, 1929, of which 12,100, or 6%, were in bad order, compared with 12,464, or 6.2%, on Dec. 1, and that there were 32,835 surplus cars on hand, compared with 23,415. The American Railway Association's Car Service Division reports that on Dec. 15, 1929, there were 2,221,591 freight cars on U.S.A. class 1 lines, of which 122,552, or 5.5%, were awaiting or undergoing repairs. Out of 1,034,375 box, automobile and furniture cars, 56,926, or 5.5%; out of 38,474 refrigerator cars, 2,164, or 5.6%; out of 929,208 gondola, coal and coke cars, 52,733, or 5.7%; out of 83,470 stock cars, 3,618, or 4.3%, and out of 92,480 flat cars, 5,006, or 5.4%, were awaiting or undergoing repairs. On Dec. 31, 1929, there were 447,141 surplus freight cars on U.S.A. class 1 lines, of which 246,982 were box, 78,212 gondolas, and 66,141 hopper.

Canadian Pacific Express Co.'s Toronto Terminal Facilities.

The illustration on this page shows the interior of the lower portion of the Canadian Pacific Express Co.'s new terminal facilities between Bay and Yonge Sts., Toronto, adjacent to and connected with the high level tracks put in use recently



Lower Floor, Canadian Pacific Express Co.'s Toronto Terminal Facilities.

at the union station, which were fully described and illustrated in Canadian Railway and Marine World for February, pg. 76. The illustration shows the large extent of the building, 500 ft., where goods are handled at street level, the automatic elevators, and, in the center, the escalator, on which loaded trucks are carried up and down between the lower floor and the one above, where three railway tracks, at the grade elevation level, carry the express cars, under cover, alongside the loading platforms. A battery of scales is placed conveniently at about the center of the room. These, as well as the elevators and other facilities, are of the latest pattern and include many features, especially designed from suggestions by the company's officers and officials, which greatly expedite the work of passing goods through the terminal. For instance, when a man with a truckload of goods goes to the elevator, the door opens to admit him, closes behind him and his truck, the car goes up, the upper door opens and closes behind him, without any manipulation on his part. The car then goes back to the lower floor ready for another load. If the stream of traffic happens to be from the upper to the lower floor the reverse operations are carried out, entirely automatically. In the illustration the supporting pillars have been

ment, and the Sherbrooke Ry. and Power Co., have been asked to provide the remainder of the cost. Lennoxville Municipality does not consider that it is liable in any way for the projected widening. (Press report.)

Drummondville Subdivision Bridge.—The Board of Railway Commissioners has authorized the rebuilding of bridge 52.2, Drummondville Subdivision, Que., over Black River.

Montreal Subway.—Montreal City Council received tenders Feb. 3, for the construction of a subway under the railway tracks at Delorimier Ave., for which $225,000 was voted by the executive committee, Dec. 31, 1929. The tenders received were:—Quebec Paving Co., $177,387; Alphonse Gratton and Sons, Ltd., $186,727; Duranceau and Duranceau, $198,355; C. V. Baillie, $199,901; G. S. Mills and Sons, $226,374; Robertson and Janin Contracting Co., $208,900. They were referred to the City Engineer, and it was stated, Feb. 13, that a contract had been let. (Press report.)

Windsor Tunnel.—A United States Commerce Department report stated recently that the C.P.R. intended to build a passenger station at the Windsor-Detroit tunnel, Windsor, Ont. We are advised officially that the report was incorrect.

Durham Station Burned.—The frame station at Durham, Ont., on the branch line from Saugeen to Walkerton, was destroyed by fire, Feb. 4. Office papers not in the safe were destroyed, but furs in the baggage room, valued at about $4,000, were saved. (Press report.)

Regina Yards, etc.—In connection with the proposal which has been under con-

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Trainshed, Toronto Union Station.

The trainshed, illustrated herewith, over the 6 northerly high level tracks at the south side of Toronto union station, was placed under construction late in Sept. 1929 and completed early in January this year. It is 1,200 ft. long, and extends from 90 ft. west of York St., at the west end, to 90 ft. east of Bay St. at the east end. It is a steel frame structure; details of the framing are shown in the accompanying plan and the steelwork is shown in the illustration of the interior. The roof is of the mill type, laid with 2 x 3 in. red pine placed transversely, 2 in. wide and 3 in. deep, the material having been treated previously with zinc chloride by Canada Creosoting Co. It is covered

Trainshed, Toronto Union Station.

have been provided at suitable intervals.

The northerly vertical supporting members for the trainshed roof are 11 ft. 7 in. from the center line of the union station southerly columns. The transverse distance between the vertical supporting members varies at different points in the trainshed; the span over tracks 1 and 2 varies from 40 ft. 10 in. to 43 ft. 1 in., that over tracks 3 and 4 varies from 51 ft. 5 in. to 53 ft. 8 in. The span over tracks 5 and 6 is constant throughout the length of the shed, being 51 ft. 5½ in. between centers of vertical supporting members. The layout of the track platforms is shown in the accompanying plan, which relates only to the portion of the shed

outgoing passengers ascend from the concourse below the elevated tracks to the track platforms, and by which incoming passengers descend from the track platforms, was described in Canadian Railway and Marine World for Oct. 1927, pg. 567, in a detailed description of the whole station. Serving the portion of the concourse now built, and the platforms of the 6 tracks now in high level operation and covered by the trainshed, there are 16 sets of stairs, 8 for incoming and 8 for outgoing passengers, there being 4 sets for incoming and 4 for outgoing passengers at each side of the train concourse. The openings through the platforms for the stairs for the outgoing passengers are

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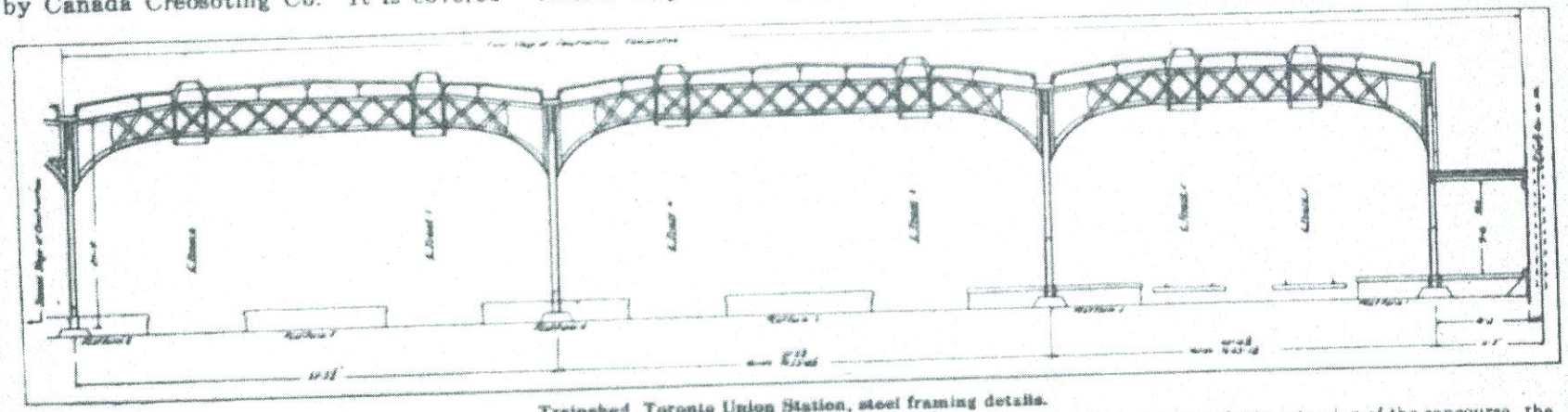
end. It is a steel frame structure; details of the framing are shown in the accompanying plan and the steelwork is shown in the illustration of the interior. The roof is of the mill type, laid with 2 x 3 in. red pine placed transversely, 2 in. wide and 3 in. deep, the material having been treated previously with zinc chloride by Canada Creosoting Co. It is covered with 3-ply asphalt-asbestos roof paper. The smoke ducts, over the center line of each of the 6 tracks covered, are of concrete, two of them being shown in the interior illustration. They were precast, in lengths varying up to 27 ft. In their installation, complete precautions against ignition of any part of the structure by sparks from locomotives were taken. As the contour of the roof trusses shows, drainage is to gutters at the vertical supporting members, and downspouts at these varies from 40 ft. 10 in. to 43 ft. 1 in., that over tracks 3 and 4 varies from 51 ft. 5 in. to 53 ft. 8 in. The span over tracks 5 and 6 is constant throughout the length of the shed, being 51 ft. 5½ in. between centers of vertical supporting members. The layout of the track platforms is shown in the accompanying plan, which relates only to the portion of the shed which is completed, and which is that over the northerly 6 elevated tracks. As explained in these columns previously, the station track plans provide for the extension of the station concourse (the structure carrying the elevated tracks) southward, to provide for an additional 6 elevated tracks, the northerly four (tracks 7, 8, 9 and 10) to be covered by a southerly extension of the shed, but the fifth and sixth not to be covered.

The arrangement of stairs by which course now built, and the platforms of the 6 tracks now in high level operation and covered by the trainshed, there are 16 sets of stairs, 8 for incoming and 8 for outgoing passengers, there being 4 sets for incoming and 4 for outgoing passengers at each side of the train concourse. The openings through the platforms for the stairs for the outgoing passengers are located centrally with relation to those for the stairs for the incoming passengers, i.e., the incoming stairs are the east and west ones, while the outgoing ones are between them. The stairs serve platforms 1, 2, 4 and 6, as shown on the accompanying plan. The platforms are of concrete construction, as are also the stairs, the latter having a special finish.

In addition to stairs, the track platforms are served by automatic elevators, 4 for express matter, in the Canadian National



Trainshed, Toronto Union Station, steel framing details.

The three spans shown cover only the 6 tracks laid on the portion of the train concourse already built. On completion of the southerly extension of the concourse, the trainshed will be extended south to cover 4 additional tracks.

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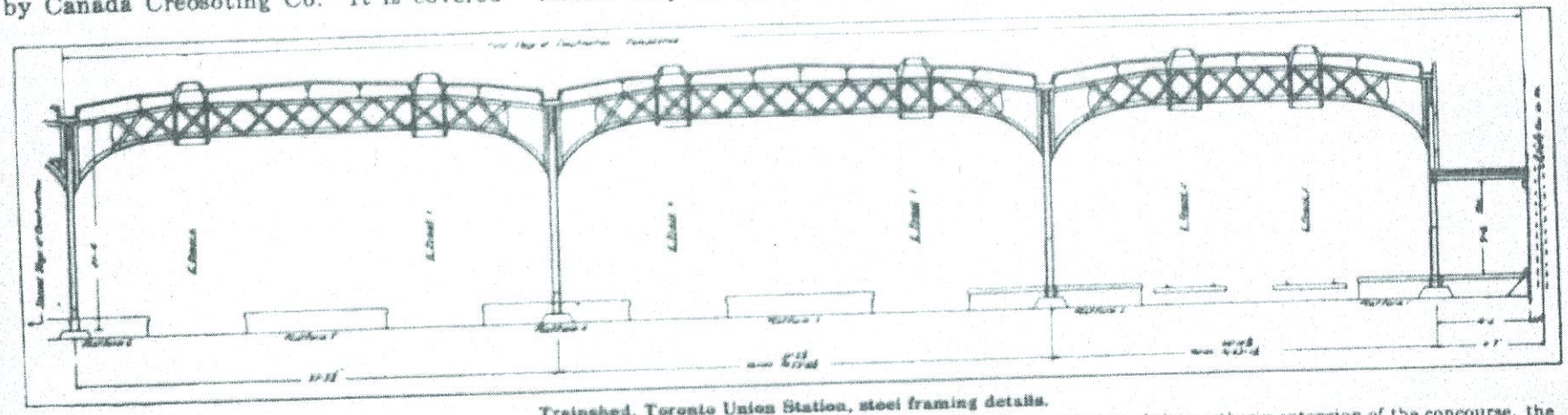

Trainshed, Toronto Union Station, steel framing details.

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Rys. express and trucking area at the west end of the station layout, 4 in the baggage area (the baggage room being in the west end of the concourse, below the tracks), 3 serving the postal wing at the east end, and 3 serving the Canadian Pacific Express Co. express and trucking area. There are 2 elevators in platform 1, and 4 each in platforms 2, 3 and 4. In addition, there are 2 elevators serving the Canadian Pacific Express Co. facilities proper.

The station tracks, in the concourse and trainshed area, have slight curves, to accommodate varying platform widths. The platforms vary in width from 13 ft. to 18½ ft., widening out at the elevator openings, this being necessary to permit the operation of trucks past the elevator housings. The trainshed overhead clearance is 17¼ ft. from top of rail to bottom edge of smoke duct. In the southerly portion of the shed, to be erected after the southerly extension of the concourse is built, the span over tracks 7 and 8, and that over tracks 9 and 10, will be the same as that over tracks 5 and 6, viz., 51 ft. 5½ in., and will not vary throughout the length of the shed.

One of the most outstanding features of the trainshed is the lighting scheme which has been employed. Many trainsheds have long been identified in the public mind as dark, gloomy, cavernous places, but this one furnishes a startling exception. There are 720 electric lighting outlets in the portion now built, this figure not including additional ones along the station tracks beyond the shed's east and west extremities. Instead of using the ordinary reflectors which have been employed formerly in lighting structures of this character, and which cast all light downward and leave upper and side places comparatively dark, Holophane units, which diffuse the light in all directions, have been used. In the spring, the whole interior of the structure will be painted with aluminum paint, which will undoubtedly increase the intensity of illumination and make the interior even brighter than it is now. The lamps used are 100-watt, and are arranged in two circuits, the idea being to promote economy in current consumption, there being many periods when half the lamps suffice to illuminate the structure, and to ensure that some light will be available in case of the failure of either circuit. The lamps are controlled by remote switches, placed at the top of the exit stairs and at the foot of the entrance stairs connecting the platforms with the concourse interior. The lighting units have been placed at a height which experiment proved the most suitable for best illumination of track platforms, and the interior generally. The current supplied is 115 volts, 25 cycle, it being stepped down from 13,200 volt a.c. in the station transformer room in the concourse sub-basement.

A temporary wooden wall has been provided at the south side of the trainshed, and will remain until the southerly extensions of the concourse and trainshed are built. Preparations for going ahead with the southerly extension of the concourse are being made.

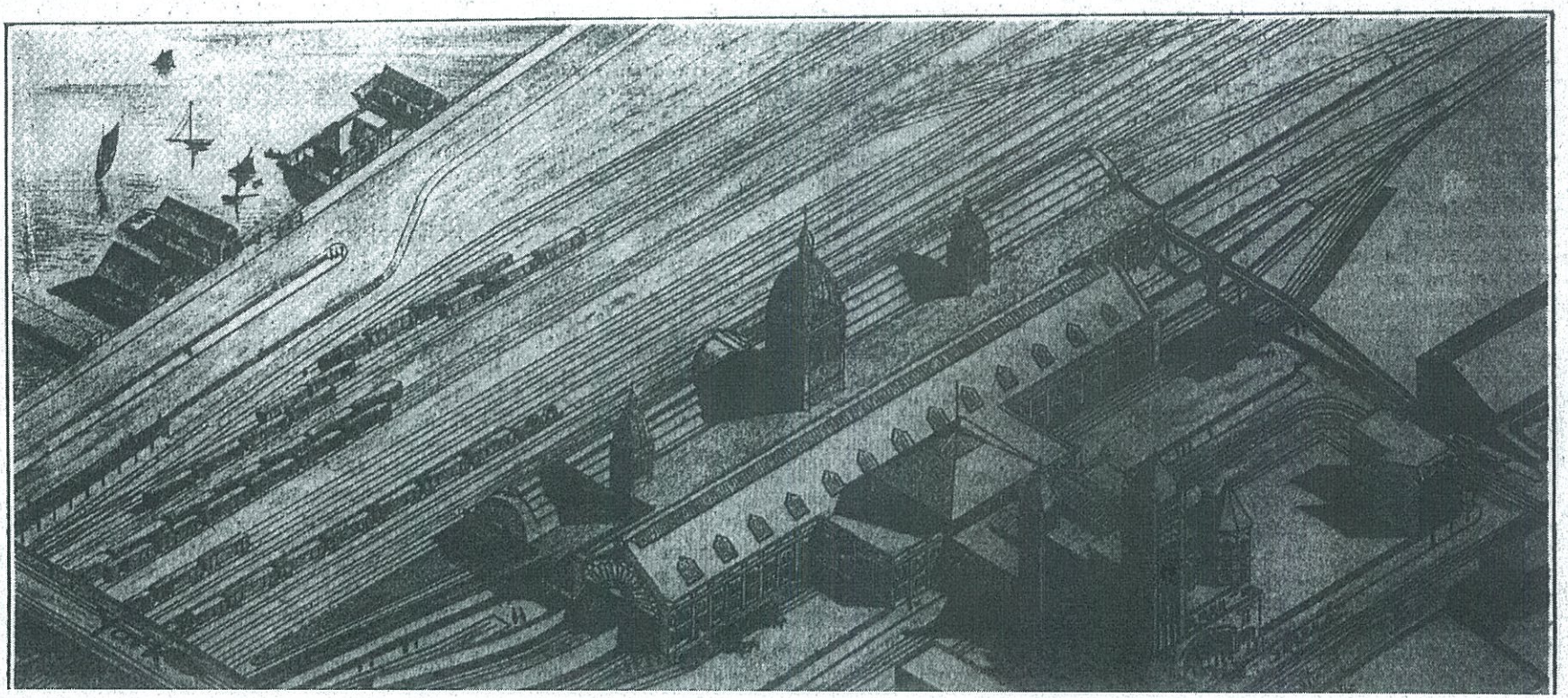
The trainshed was built under contract from the Toronto Terminals Ry. Co. by P. Lyall and Sons Construction Co., the work being done under the supervision of the latter company's liquidator. The steel was supplied and erected under contract from Toronto Terminals Ry. Co. The roof was built by W. Moffatt, Toronto, under sub-contract from Canadian Johns-Manville Co. Construction was in charge of Toronto Terminals Ry. Co., of which U. E. Gillen is General Manager, and J. R. W. Ambrose, Chief Engineer, A. R. Ketterson, Assistant Bridge Engineer, Canadian Pacific Ry., being in charge of steel work and other engineering details.

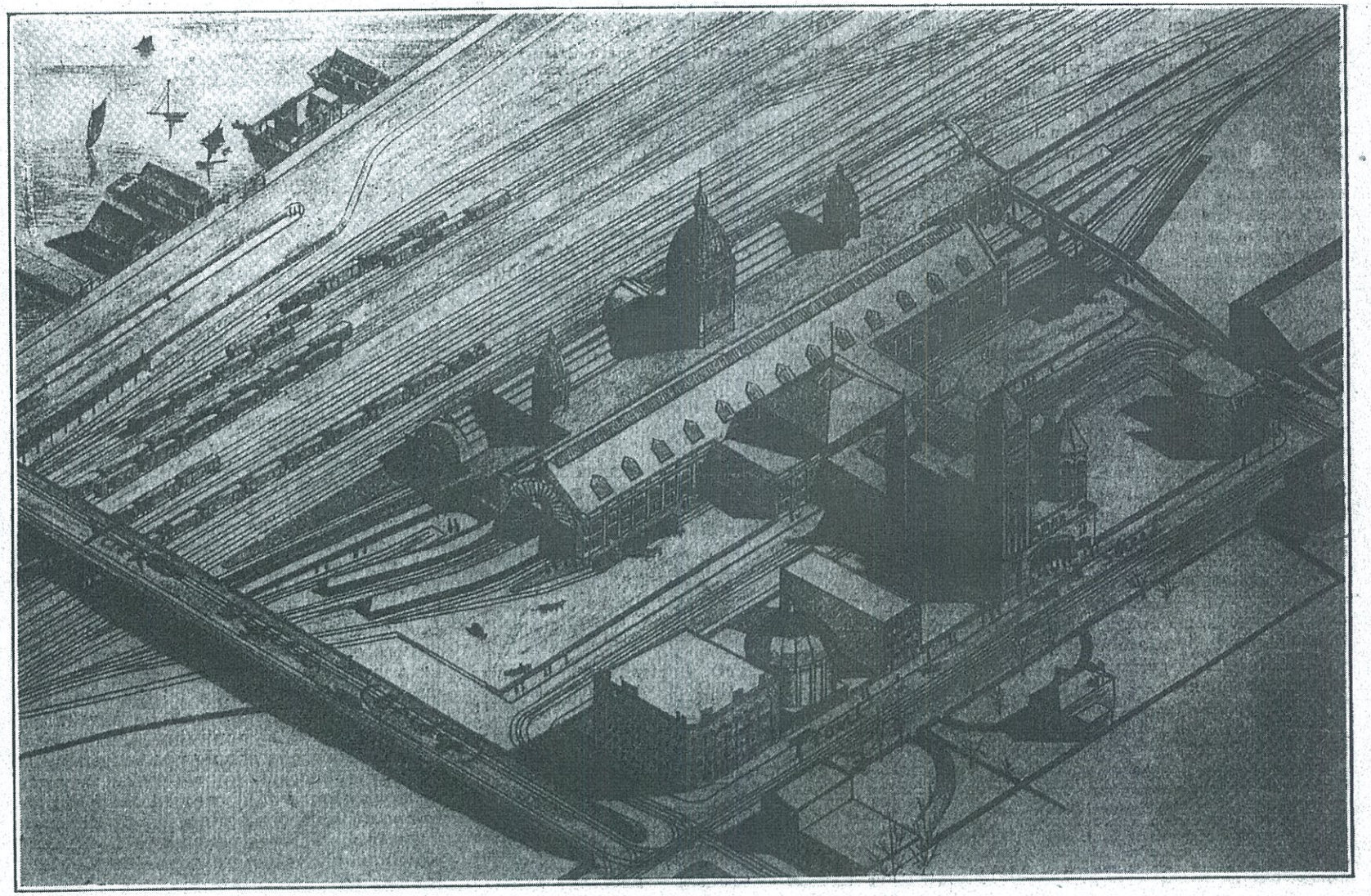
Prairie Provinces Grain Crop Movement.

Toronto's Former Union Station to be Demolished.

Toronto Terminals Ry. Co. has, we are advised officially, given a contract to Frankel Bros., Toronto, for demolition of the remaining portion of the former Toronto union station, on the south side of Front St., between York and Simcoe Sts. With the tearing down of that structure, there will pass into oblivion a landmark of interest not only to Toronto citizens, but to thousands of people from all parts of the world who have passed through its portals. Built in 1895 as a Grand Trunk Ry. undertaking, as a result of an agreement entered into between that railway and the Canadian Pacific, and connected to the original a sketch made in the early nineties, when the Grand Trunk and Canadian Pacific Ry. Cos. were entering into an agreement for joint use of the station facing Front St. now about to be demolished. The previous station, finished in 1873, is indicated by the three towers at the south (Lake Ontario) side of the group of buildings shown. To get to it, passengers proceeded south on York St., and then followed a road to the right, or west, to the station. In 1895, the union station, facing Front St., shown in the illustration in the right foreground, with the large arched entrance from Front St., was completed, and the

An interesting feature of the accompanying illustration is the bridge by which York St. was carried over the railway yards to the waterfront. This street is now carried under the tracks in a subway, being one of several giving access to the waterfront in that manner, as a part of the Toronto waterfront track elevation scheme, which has been practically brought to completion. The other buildings shown in the illustration, viz., the three on the south side of, and facing, Front St., east of the station, the one at the southeast corner of Front and Simcoe Sts. and those on the north side of Front St., were not railway facilities.





Toronto's former Union Station and surrounding buildings and bridges. From a sketch made in the 'nineties.

Grand Trunk Ry. station at the south by a long trainshed, the facility served the travelling public continuously until the present handsome union station was placed in operation, following its formal opening by the Prince of Wales on Aug. 6, 1927.

Historical information in regard to Toronto railway stations was given in an article in Canadian Railway and Marine World for Oct., 1927, beginning on pg. long trainshed at its rear was also built, connecting it with the former station. The illustration shows the Lake Ontario waterfront as it was when the north or Front St. part of the assembly was built in 1895. When the original station was completed, in 1873, the waterfront was much further north, there being room between the south elevation of the original station and the water for only the station platform, the driveway, and

Competition for Paper on Transportation Subject.—The Canadian Railway Club, Montreal, has invited members of the Club, and employes of any transportation company in Canada holding positions under that of general foreman, or chief clerk, to submit papers on any phase of transportation, or transportation equipment, by Feb. 28. The prize offered is a course at Scranton Correspondence School, suitable to the successful candidate's occasion, or at his op-

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Historical information in regard to Toronto railway stations was given in an article in Canadian Railway and Marine World for Oct., 1927, beginning on pg. 567, in connection with a description of the present union station. As there mentioned, the Grand Trunk Ry., after having demolished in 1871 a station which had been built in 1858, began construction of one to replace it, west of York St. and south of Front St. That station was completed in 1873, and was, at the time, considered an architectural triumph. An illustration of it accompanied the article in our Oct., 1927, issue. Its three towers are shown in the accompanying illustration, prepared from long trainshed at its rear was also built, connecting it with the former station. The illustration shows the Lake Ontario waterfront as it was when the north or Front St. part of the assembly was built in 1895. When the original station was completed, in 1873, the waterfront was much further north, there being room between the south elevation of the original station and the water for only the station platform, the driveway, and three tracks, as shown in the illustration in our Oct., 1927, issue. Now the waterfront is considerably further south than shown in the accompanying illustration. The southerly trainshed was demolished in 1927, some months previous to the opening of the present union station, and the northerly trainshed was removed early in 1928, by Frankel Bros. No decision has been arrived at to the time of writing as to the use to be made of the land to be made available by the demolition of the old station.

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Railway Labor Representation in Governments.—Railway labor interests are now represented in both the Canadian and United States governments, Senator Gideon Robertson, Vice President of the Order of Railroad Telegraphers, being Dominion Minister of Labor, and Hon. W. N. Doak, National Legislative Representative of the Brotherhood of Railroad Trainmen, being United States Secretary of Labor.

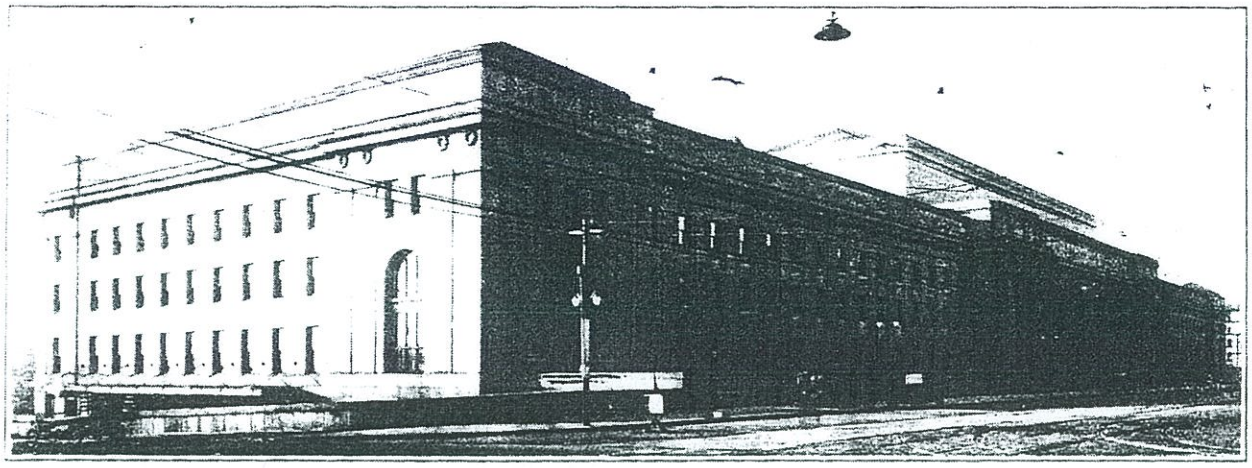
Canadian Railway and Marine World

October, 1927

Toronto Union Station, History, Description, Etc.

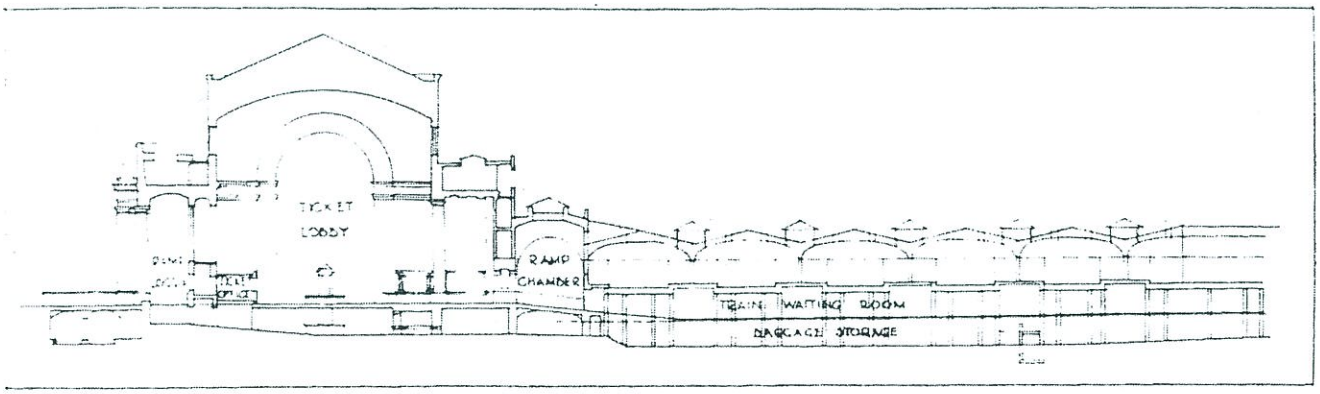
Canadian Railway and Marine World for September described the opening for traffic, by the Prince of Wales, on Aug. 6, of the union station facing Front St., between Bay and York Sts., Toronto, together with an explanation of the manner in which the station is being operated pending the completion of track elevation tracks, providing for a through movement, instead of on station tracks branching off the main line tracks and going to a dead end.

The station building, of classic design, with the Grecian influence predominating, and which, as the accompanying illustrations show, possesses impressive proportions and a pleasing symmetry of outline, has a frontage of 752 ft. on Front St., and, with the depressed areas at its east and west ends, takes up the entire space between Bay and York Sts., a city block considerably longer than usual. The Bay and York St. frontages are each 164 ft., and the extreme depth of the structure, from Front St. to the southerly wall of the train concourse, will, when the second half of the latter is completed, be 494 ft. The layers of sandstone and compact gray shale, with occasional bands of limestone, overlain generally by a varying thickness of stony glacial clay. The foundations throughout are of concrete, carried down to solid rock in open caissons, and all structural steel columns, and beams in exterior walls, are protected with poured concrete. The heavy traffic basement and main station floors are of concrete, and most of the other floors, fire-proofing and partitions are of hollow tile. The baggage room floors are mastic, and composition floors are the rule in the offices. The bulk of the public room flooring is in Tennessee marble, with some important exceptions, which will be described further on in dealing with individual rooms. No cinder concrete was allowed in contact with pipe work in



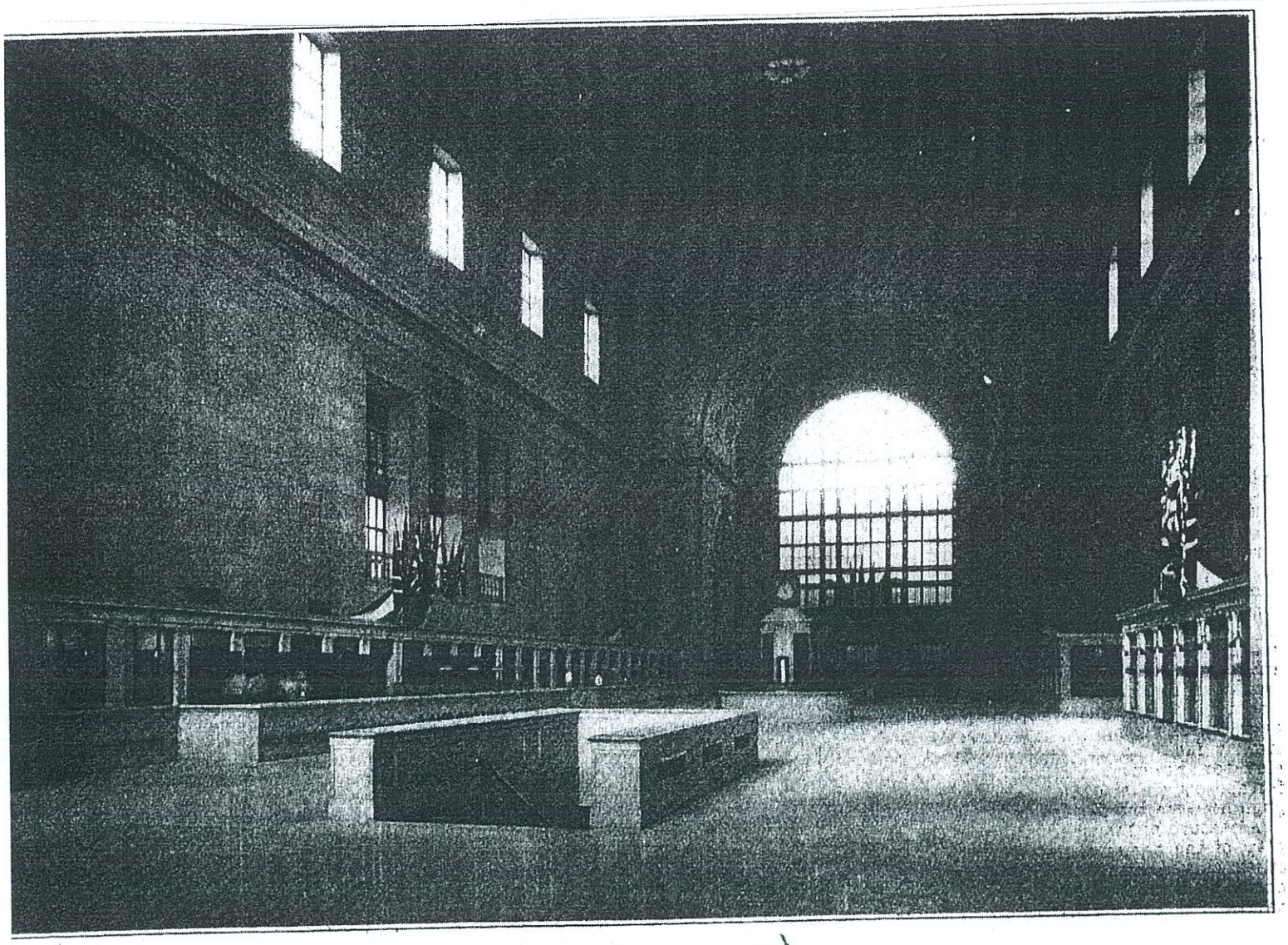
Toronto Union Station, from the Northeast.

its vicinity. The structure, the contract for the building of which was let in 1914, construction being started in the following year, and completed, with the exception of some interior finishing, in 1921, has been the subject of a number of articles in Canadian Railway and Marine World, the first, in our June 1914 issue, describing the structure in detail from the plans, which were changed considerably before construction began, and subsequent ones

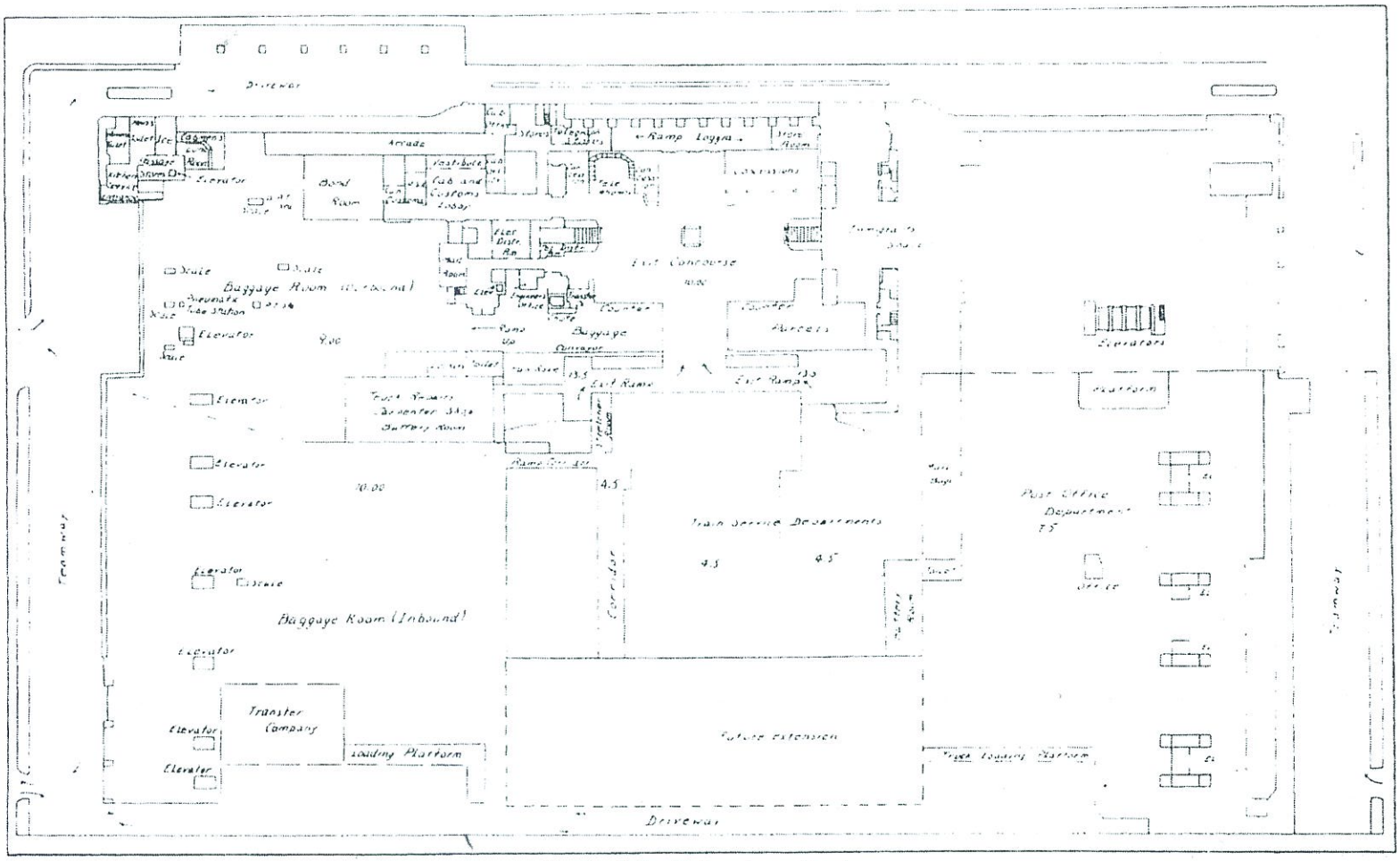


Toronto Union Station. Diagrammatic Transverse Section.

The exterior



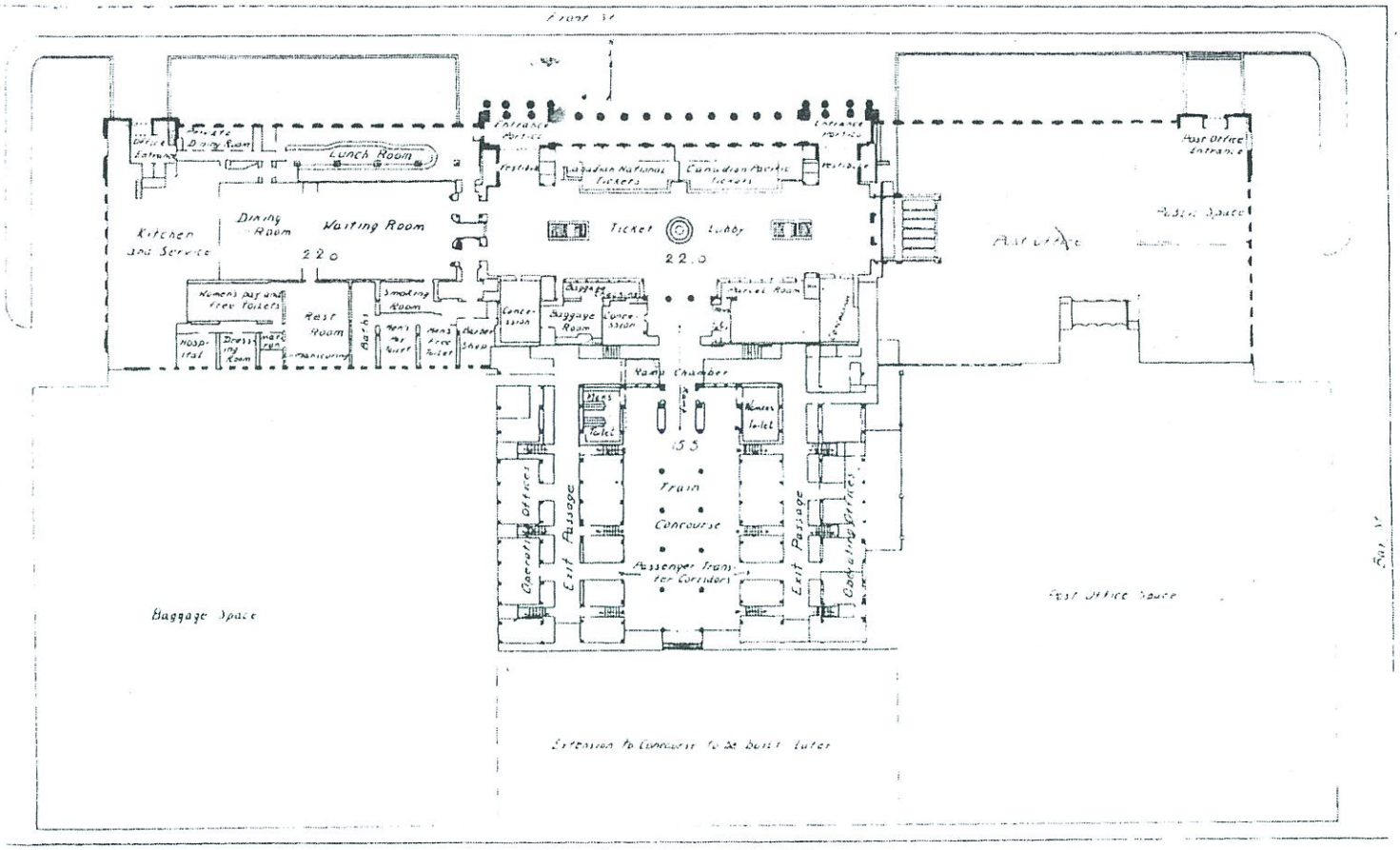
Ticket Lobby, etc., Toronto Union Station.



Toronto Union Station, Lower Level.

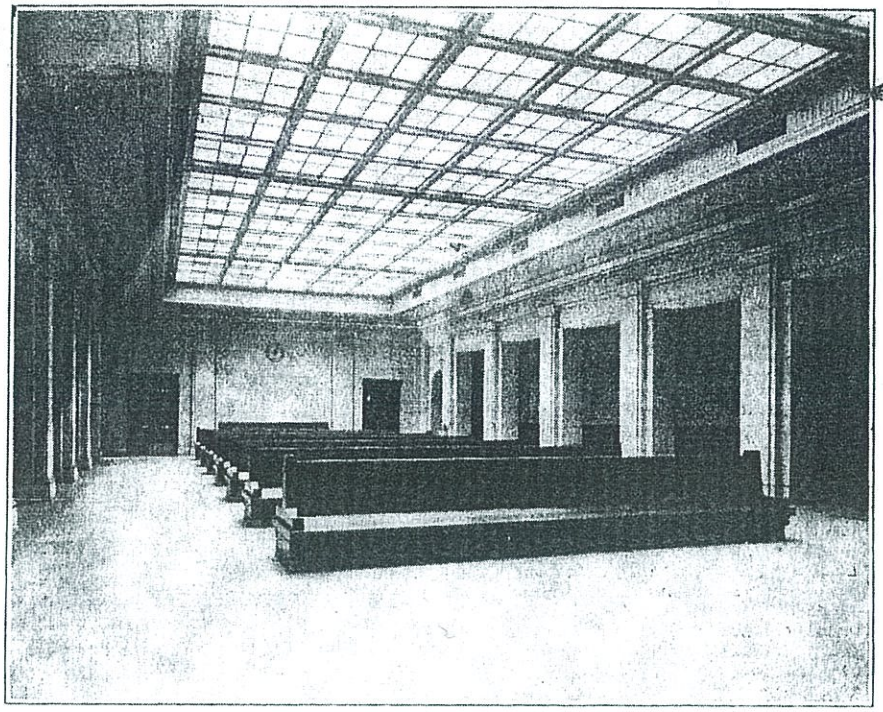
The depressed driveway, with paved ad, between the front of the building and ont St., is 25½ ft. wide, and connects at e east and west ends with the depressed eas flanking Bay and York Sts. Baggage handled in the York St. depressed area, ail matter in the Bay St. one, and the driveway along the front is for taxicabs, with one-way traffic only permitted, the direction of movement being from west to east.

A number of alternate plans for track platform access were considered before the one adopted, and described herein, was chosen, a most desirable feature of it being that complete separation of outgoing and incoming passengers is provided for. The areas available in the different parts of the building were decided upon only after a very careful study of the relation of space to business handled at other terminals



Toronto Union Station, Ground Floor.

doing a similar business. The daily business at the recently abandoned station, for the year 1913, when the new station was planned, was approximately as follows:—through trains, in and out, 130; loaded cars, 1,000; baggage, pieces, 10,000; parcels, 1,500. The Pennsylvania station, New York, 1921 figures showed 181 through trains a day, and the New York Central Grand Central terminal figures for the same year showed 133 through trains a day, exclusive of suburban traffic in both cases. The baggage business through the Toronto station is somewhat heavier than at either of the New York stations mentioned. While the suburban business using the Toronto station is of negligible proportions, the peak passenger business each year in connection with the Canadian National Exhibition is very heavy, and made necessary the provision of large station areas, this factor also making desirable the complete separation of the streams of passengers moving in opposing directions. The effort in planning was, so far as possible, to arrange all portions of the station in such sequence as to allow passengers to transact their business and pass to or from trains with a minimum of cross-traffic current, or retracing of steps, and to place the various parts so that the indicating signs can be read from any part of the ticket lobby, and more particularly the information booth. The sequence for outgoing passengers is: through entrance doors from Front St. into ticket lobby; ticket office; information booth, parcel claim counter; baggage checking counter; train concourse, and ticket examination space at the foot of each platform stair. This is, of course, varied for passengers who have to wait for trains, they finding the general waiting rooms, dining and lunch rooms, lavatories and other facilities at the west end of the ticket lobby. Incoming passengers, when the tracks are elevated, will leave the train platforms by separate exit stairs and passages and pass through the low level concourse, continuing through the ramp loggia to the depressed driveway



Waiting Room, Toronto Union Station.

ed by taxicabs, or ascending either of the airs to the ticket lobby and emerging ience to Front St. Transfer passengers, e., those coming into the station on one ain and going out on another soon after, ach the outgoing portion of the station by ie stairs mentioned, while for close connecon transfer passengers, a controlled comunication from the exit passages to the ain concourse is provided, this feature eing of special value in handling a large roup of people, such as immigrants. The ow level facilities are laid out so that all ncoming passengers enter the exit conourse at one point, where they may be met y waiting friends.

The ticket lobby, 260 ft. long and 86 ft. ide, with ceiling 88 ft. above the floor, nusually high even for a room of its area, entered through two porticos from Front t., at its east and west ends, an illustration f the room and of the interior of one of the orticos being given herewith. The ceiling, f the arched type, is of Gustavino tile, ith panels in 3 colors. At both the north nd south sides are 5 large plain glass indows, with 12 lights in each, and at the nds, the upper two-thirds of the walls are indow area, with ornamental iron grilling. he walls are of Zumbro stone, and the oor of Tennessee marble. In the center is large circular information booth, with the entral column surmounted by a large lock. Wide stairs near each end lead own to the exit concourse. Artificial lumination is provided by a large octagonl ball fixture, 12 ft. high and 8 ft. diam., uspended from the ceiling, at the center, ogether with trough fixtures at the orners. At the east end of the room are shops, which are being operated by conession holders, while, at the west end, a oor in the center opens on stairs leading own to the Customs Department baggage xamination space and taxicab lobby, with he doors on either side opening on the assage fronting the waiting room, this assage leading, to the north, to the estaurant and lunch rooms, and, to the outh, to the lavatories, baths, barber hop, etc., as shown on the accompanying nain level plan.

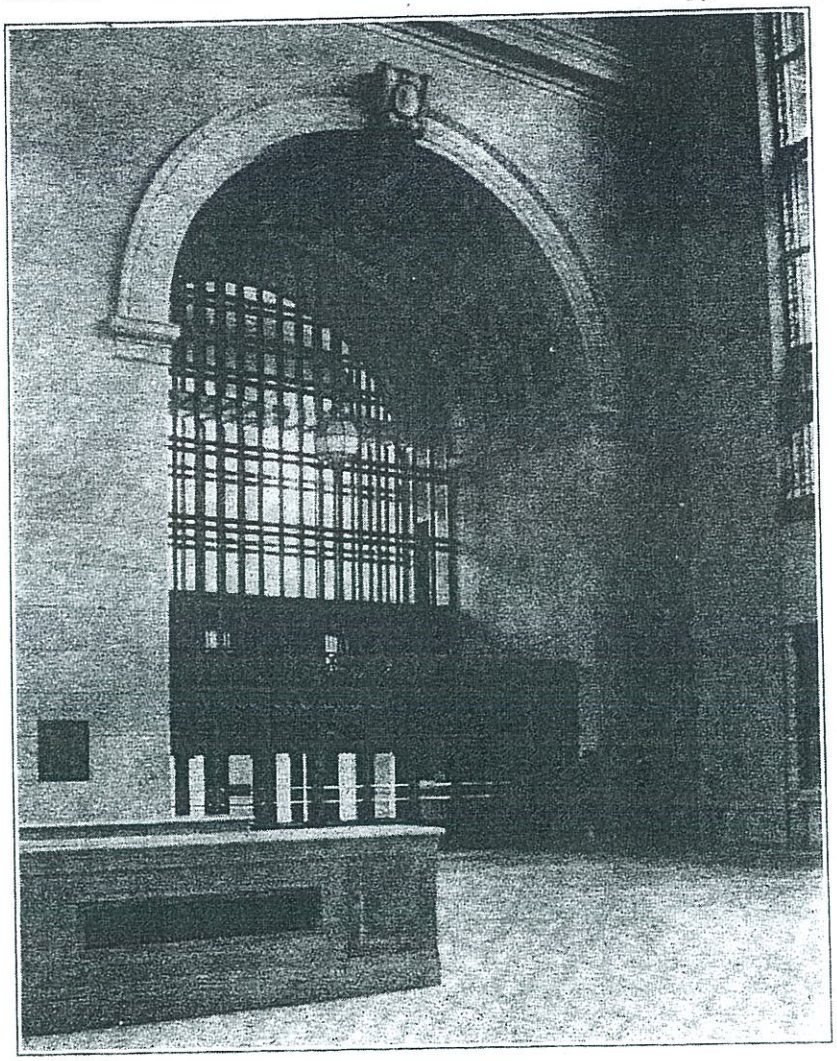
The ticket selling space is along the orth side of the room, the Canadian acific facilities at the east end and the anadian National at the west. The riginal plans contemplated the provision f separate booths or cages, but the installaion as made is of counters behind which re modern double cases, the same frontage eing available to 2 men by one keeping his ickets in one side of the case and the ther in the reverse side. The ticket ounter fronts are marble, the counters and ll metal work being bronze. The informaion booth and stair balustrades are also narble, with bronze trim.

The opening to the ramp chamber leading to the train concourse is at the south ide of the room, in the center, the entrance eing flanked by 2 large columns of Zumbro tone. Along the south side of the room, ast of the entrance to the ramp chamber, s the parcel checking room, with marble ront and bronze counter and trim, and west of the entrance to the ramp chamber

Montreal, Hamilton, Windsor, Sault Ste. Marie, Sudbury, Fort William, Regina, Moose Jaw, Calgary and Vancouver, and at the north side those of Halifax, Moncton, Levis, Sherbrooke, Ottawa, Toronto, London, Sarnia, North Bay, Port Arthur, Winnipeg, Saskatoon, Edmonton and Prince Rupert.

As the foregoing description and the accompanying illustrations indicate, the ticket lobby is not only a noteworthy accomplishment in architectural beauty, but is also arranged to give the maximum in utility. The 2 wide entrances from Front St. provide means of getting into and out of the lobby without crowding, while the wide entrance to the ramp information booth, the lobby floor is unencumbered with obstructions to the free flow of traffic.

The ramp chamber at the south side of the ticket lobby, with its marble floor and Zumbro stone walls, the entrance to which was referred to above, and which is shown on the main level plan, contains a gently sloped ramp falling to the south, with a total drop of 6½ ft., which opens into the train waiting room, or, as it is more generally termed, the train concourse. The reinforced concrete columns in this concourse, necessarily thick because they will directly support the weight of trains when the tracks are elevated, have Lombardic tile finish, the walls being of the same

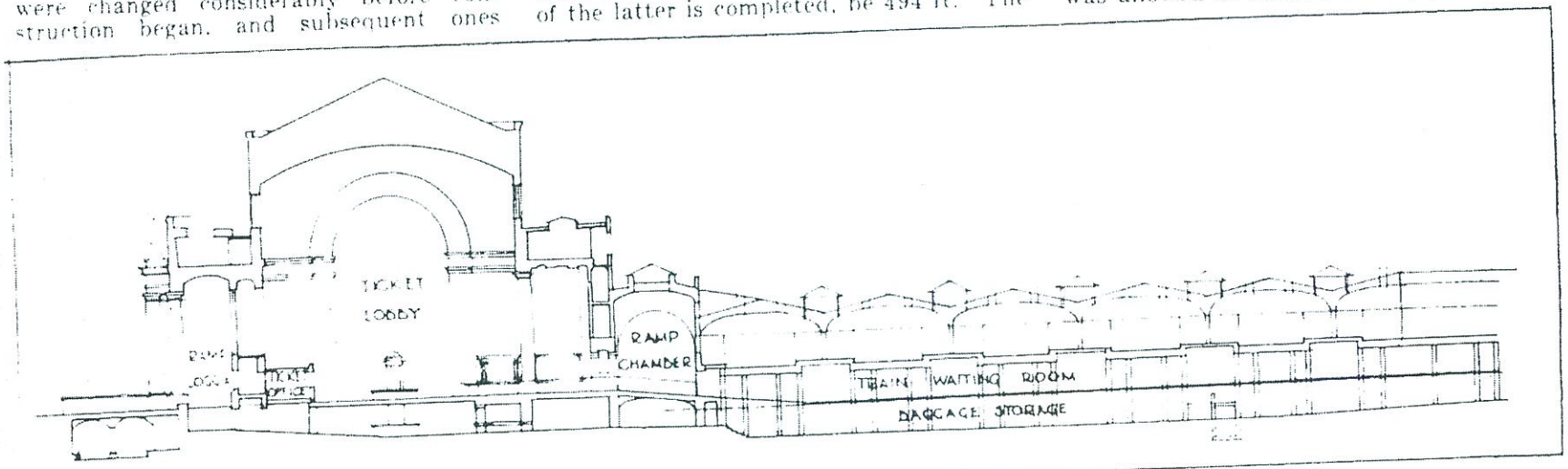


Northeast Exit from Ticket Lobby, Toronto Union Station.

Toronto Union Station, from the Northeast.

in its vicinity. The structure, the contract for the building of which was let in 1914, construction being started in the following year, and completed, with the exception of some interior finishing, in 1921, has been the subject of a number of articles in Canadian Railway and Marine World, the first, in our June 1914 issue, describing the structure in detail from the plans, which were changed considerably before construction began, and subsequent ones describing the changes and various details of the work as it progressed. As explained in the article in our September issue, the terminal undertaking is not completed yet, as only the first half of the train concourse structure, on which the elevated tracks will be carried, has been built, and as tracks have not been laid on the half already built, operation of the station being for the time, necessarily, at the low level. The terminal layout is a through track one, in contradistinction to a stub end one, i.e., trains enter and leave the station on station tracks which are parallel to the main line tions and a pleasing "symmetry" of outline. has a frontage of 752 ft. on Front St., and, with the depressed areas at its east and west ends, takes up the entire space between Bay and York Sts., a city block considerably longer than usual. The Bay and York St. frontages are each 164 ft., and the extreme depth of the structure, from Front St. to the southerly wall of the train concourse, will, when the second half of the latter is completed, be 494 ft. The highest point of the central portion of the building is 122 ft. above the street level. The east and west wings each have 3 floors above the ground floor. Front St. was widened 25 ft. in connection with the construction of the building. The ground floor level throughout is about 1 ft. higher than the street level. The station tracks, when elevated, will be 8 ft. above street level.

The land on which the station is built was determined, by borings, to be representative of the Lorraine formation underlying Toronto, consisting of alternating concrete. The heavy traffic basement and main station floors are of concrete, and most of the other floors, fire-proofing and partitions are of hollow tile. The baggage room floors are mastic, and composition floors are the rule in the offices. The bulk of the public room flooring is in Tennessee marble, with some important exceptions, which will be described further on in dealing with individual rooms. No cinder concrete was allowed in contact with pipe work in any part of the undertaking. The exterior wall facing is mixed Indiana limestone, rubbed finish. The exterior stone column footings and piers are circular, varying from 4 to 6½ ft. in diameter. The double hung windows throughout are of wood, the larger openings having iron frames and steel sash. Pitched roofs are of copper. Metal work in the large openings is painted grey, contrasting with the stone color. Interior metal work within 15 ft. from the floors, with the exception of bronze wickets and all parts subject to wear, is of cast iron, painted and glazed to imitate bronze.



Toronto Union Station. Diagrammatic Transverse Section.

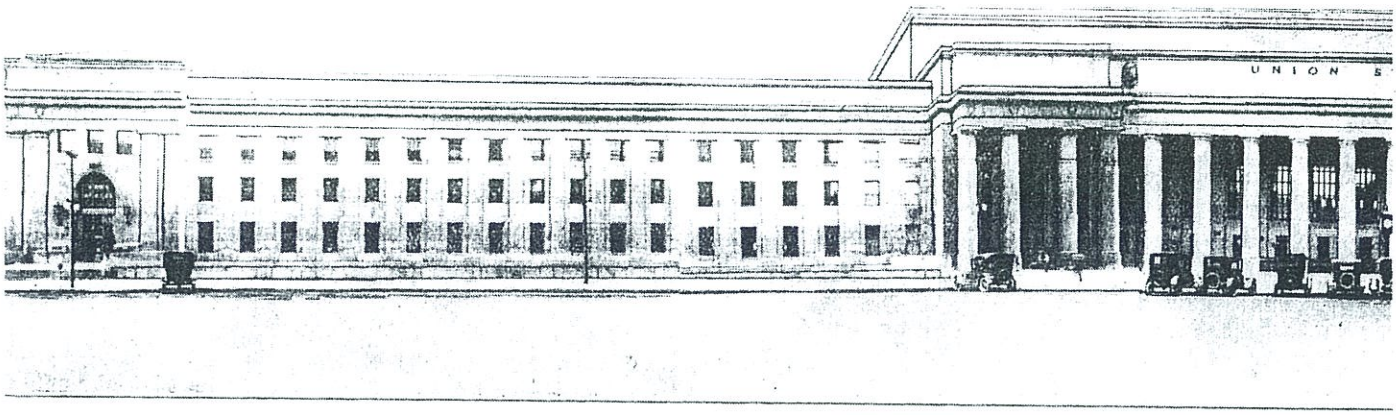
and two platforms for the exclusive trucking of baggage and express matter. The station tracks are connected up at each end with an interlocking switching system, so that they properly join the four main tracks on the east and the two main tracks on the west, generally with double track loads, to give the greatest facility to the train movements. The passenger platforms are designed to be 1,400 ft. long, though this may be increased if found necessary, this distance being sufficient for the longest trains. They are about 20 ft. in width throughout. The new tracks at a point opposite the centre of the station will be 4 ft. higher than the present tracks, and the platforms are designed to be 8 inches above the top of the rail. This leaves a difference of about 5 ft. vertical between the grade of the platforms and the grade of Front St., which difference is overcome by three steps at the waiting-room entrance and inclined surfaces transversely on the concourse between the tracks and the station, and the plaza between the station and Front St. None of the inclined surfaces exceed a slope of three-eighths of an inch per foot. The passages for exit are without any steps whatever. By this arrangement the station and platforms are, in effect, level with the street, a condition which permits of the best possible treatment of any type of station. In order to bring about this condition it has been found necessary to provide for the removal of the York St. overhead bridge, and to substitute in lieu thereof an overhead bridge just east of Bay St. It is also suggested that this bridge easterly of Bay St. can be made to take care of the traffic at the Yonge St. grade crossing, so that the necessity of a bridge at the latter street can be avoided. Foot bridges at any necessary point of crossing can be constructed without interfering with the raising of the tracks. In order that it may not be necessary for any passenger to go upon any track at grade and to make this station absolutely safe and fully up to modern meth ods and requirements a subway 50 ft. wide is provided, opposite the centre of the station, so that any platform may be reached by means of easy stairways with landings, the total height of stairways for this purpose being about 10 ft. This method allows all trains to come to a stop directly opposite the centre of the station, thus making the least distance for passengers to walk to and from the station and trains.

The baggage and express trucks are to be kept as much as possible on special trucking platforms, 10 ft. wide, which extend the whole length of the station and lie adjacent to four out of the nine through tracks, upon

gage transfer waggons, [illegible] necessary to pass through the station building to get a carriage. At the extreme east end of the station a service building is provided for supplying all heat, light, steam, hot water, compressed air, refrigeration, etc., for the use of the station building and train purposes.

The general layout of the station yards and grounds, including the approach tracks, does not interfere in any way with the present freight yards of either railway.

The station building is planned primarily with a view to convenience and spaciousness and consists of a main central building with two service wings. In the main building on a level with the tracks is located the general waiting room, containing 17,242 sq. ft., which is 5,000 sq. ft. larger in area than the Grand Central Station in New York, or the present station in Toronto. Access to the waiting-room is obtained directly by three spacious openings, containing nine doors each directly from the plaza on Front St. Egress to the trains is obtained by three similar openings containing each nine doors leading to the concourse. Ticket, telegraph, and telephone booth, information bureau, news stands, ample parcel room, and other conveniences are provided along the four sides of the waiting-room, where they are easily accessible and visible. A broad passage at the east end leads directly to the baggage-room, which is located in the east service wing. The capacity of this room, including the basement and first floor, is 28,000 sq. ft., or 15,000 sq. ft. larger than the present baggage-room, and 6,000 sq. ft. larger than the baggage-room at the Grand Central Station, New York, which is one of the largest in the U.S. A similar passage at the west end of the waiting-room leads directly to the west service wing, in which are located waiting-rooms for men and women, each provided with ample toilet accommodations, the women having in addition retiring rooms. Barber shop, boot-blacks and other conveniences, as well as a well-equipped, spacious lunch counter, are likewise provided in this section of building. Spacious passages running north and south are placed at each end of the waiting-room, between the waiting-room and the baggage-room on the east, and between the waiting-room and service just mentioned on the west. These passages are intended mainly for exits, so that the travelling public in arriving will pass through and out without crossing the waiting-room. Passengers departing can enter by the easterly passage, check their baggage and buy their tickets without confusion or delay. Carriage courts both east and west of the main building are avail-



Toronto Union Station. See also opposite page.

Power for fans, pumps, elevators, etc., is :eived at 250-550 volts d.c., for the post ice wing, and, in the main part of the ilding at 230 volts d.c. for elevator vice, and 12,000 volts, 3 phase, 25 cycle, ., reduced to 550 volts through trans- mers, for all other purposes. The main wer switchboards are located in relation the main lighing switchboards so as to m one continuous board. As in the case lighting, provision is made for 2 separ- and independent services for each e of power.

Elevators.—In the main part of the ilding there are 4 passenger elevators, 3 ight elevators, an inclined baggage vator and a baggage chute; in the post ce wing there are 2 passenger elevators, reight elevators and 3 dumb waiters, d the elevated track layout, when com- ted, will include 20 baggage lifts. The senger elevators, with one exception, of the worm gear double screw drum e, with car and drum counterweights, signed for loads of 3,000 lb. at 300 ft. a nute, and are equipped with full electric gnet controller with operating switches car. The other passenger elevator is of worm gear single screw drum type with m counterweights, with full electric gnet controllers, and with push buttons car and at all landings, to operate it. is designed for a load of 2,000 lb. at 100 a minute. The 4 freight elevators in the t office wing are designed for a load of 00 lb. at 100 ft. a minute, and the 3 in main part of the building for loads of 00, 2,000 and 750 lb. respectively, at ft. a minute. The dumb waiters in the t office wing are designed for loads of lb. at 100 ft. a minute. The inclined gage elevator in the main part of the lding, for conveying hand baggage from basement to the ticket lobby floor, is through the station. There are 35 miles of pipe installed, of which 4 miles is brass. Approximately 160 tons of sheet metal was used in connection with the indirect heating and supply and exhaust ventilation. There are 135 electric motors in the building, ranging from ⅛ to 35 h.p., 45 of them being in the post office wing. There are 3,500 ceiling lighting outlets, 100 bracket lighting outlets, 650 base plugs and 900 switches. There are 75 miles of electric conduit and 125 miles of wire, not including that installed by the railways in connection with their telegraph and telephone facilities. There are 55,000 sq. ft. of direct radiation and 21,500 sq. ft. of indirect radiation, and 950 radiators. The total annual consumption of steam, on completion of the train concourse, will be about 93,750,000 lb., and total maximum demand of steam per hour will be about 54,000 lb., about 9,700 lb. per hour being for the post office wing. In the main part of the building and spaces in connection with the track development, the estimated quantity of hot water for domestic purposes is 200,000 gall. a week, with maximum demand 3,000 gall. an hour. Estimated total kilowatt hours a year of electrical energy for the main building and track structure is 3,275,000. Estimated maximum total load in kilowatts for motors, other than electric elevators, is 347, for electric elevators 75, and for lighting 225. For the post office wing the total estimated kilowatt hours a year for all purposes is 750,000. The general waiting room has an area of 6,064 sq. ft. and seats for 338 people. The smoking room area is 617 sq. ft. The women's rest room area is 2,184 sq. ft. with seating capacity for 100. The main dining room has an area of 3,276 sq. ft. and will accommodate 150 people. There are 103 seats at the counter in the

was built for it by Toronto Terminals Ry. Co. The contract for the construction of the entire building, east wing, central portion and west wing, was awarded in 1914. The exterior walls and columns were completed in 1918, and in 1920 the Post Office Department occupied the east wing and the railway staffs occupied the offices in the west wing. The contract for the train concourse structure was awarded in May 1926, and the first half of it, all that can be built under present conditions, as explained previously, was completed in July this year.

The Toronto Terminals Ry. Co., in which the Canadian Pacific Ry., and the Canadian National Ry., as successor of the Grand Trunk Ry., are jointly interested financially, operates the station and all the incidental facilities, exclusive of the east wing.

Shortly before construction of the station started, J. W. Leonard, who was Assistant to the Vice President, Canadian Pacific Ry., was appointed General Manager, Toronto Terminals Ry. Co., and continued in that position until his death in the summer of 1919. He was succeeded by U. E. Gillen, formerly Vice President, Transportation, Grand Trunk Ry., during whose occupancy of the position of General Manager, which continues to the present time, the station was completed. J. R. W. Ambrose, Chief Engineer, Toronto Terminals Ry. Co., has occupied that position since the plans for the station were begun, and has been in charge of all the engineering features of construction throughout. The architects for the building were Ross and Macdonald, and Hugh C. Jones, Montreal, with whom John M. Lyle, Toronto, was associate. The general contractor for the building was P. Lyall and Sons Construction Co., Montreal.

The stone work in the building is of

more than usual interest, on account of both quantity and quality. The contractor for all interior and exterior stone cutting, and the greater part of the marble work, was George Oakley and Son, Ltd., Toronto. The Indiana limestone used was imported in rough blocks, and special lathes were built to handle the columns, bases, etc. There are 22 columns of 3 sections each, the individual stones weighing in the rough from 26 to 30 tons, and, finished, from 15 to 21 tons. It was stated at the time that this was the largest stone cutting contract ever carried out in the British Empire, all the work being done by Canadian workmen.

The contractors for ornamental iron work on the entrances, large windows at both ends of the ticket lobby, elevator fronts, and parcel and baggage room and concession fronts were Architectural Bronze and Iron Works, Toronto, which also supplied the bronze hand rails and doors for the west wing. The waterproofing in connection with the train concourse, ramp chamber and exit concourse was done by Canadian Johns Manville Co.

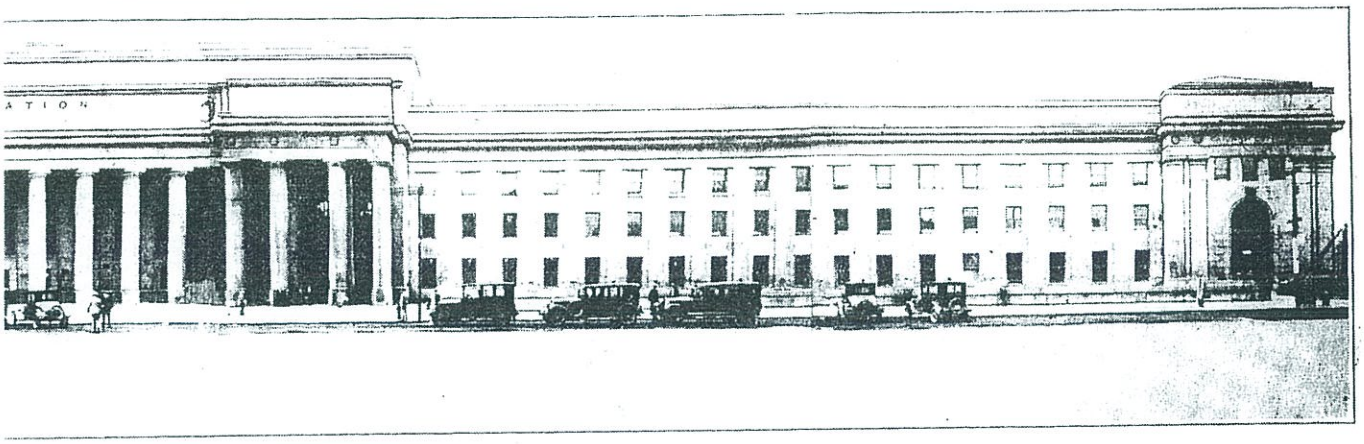
In the work which has been proceeding during the past 2 years, the building of the first half of the concourse, interior finishing, etc., Mr. Ambrose has been assisted by E. Duncan, Resident Engineer, Toronto Terminals Ry. Co. The design and installation of plumbing, heating and ventilating equipment during this period has been under the supervision of E. B. Plant, of the Canadian Pacific Ry. Engineering Department; concourse design and construction under supervision of P. B. Motley, Engineer of Bridges, Canadian Pacific Ry., assisted by A. Ketterson; and electrical installation under supervision of J. A. Shaw, General Electrical Engineer, Canadian Pacific Ry., assisted by Mr. [illegible]

Sts., which was replaced by a frame building, completed in 1858, and which was Toronto's first union station, being used by the Grand Trunk and the Great Western Rys. In 1866, the Great Western, which was opened for traffic between Toronto and Hamilton on Dec. 3, 1855, built a station at Esplanade and Yonge Sts., which is still standing and is now used as a fruit market. When the Great Western transferred to its new station, the name "union station" was continued for the Grand Trunk Ry. station. Illustrations of the Grand Trunk station of 1858 and the Great Western station of 1866 are given herewith. The Great Western Ry. was amalgamated with the Grand Trunk Ry. on Aug. 11, 1882, after which the Grand Trunk Ry. station was used.

The Northern Ry., the construction of which was bonused by Toronto as early as 1852, and which entered the city about the same time as the Grand Trunk, had its first station, a small wooden building, on Front St., near the site of the present union station, opposite the Queen's Hotel, but shortly after built a station on the land below an embankment at the foot of Spadina Ave., then Brock St. One record states that the Northern used the Grand Trunk station built in 1858, along with the G.T.R. and the Great Western, for a while, but our advice is that it always used its own terminal facilities. In 1868, it established a station at the foot of West Market St., adjoining the old city hall, and called the city hall station, which continued to be used until the road was amalgamated with the Grand Trunk, in 1888, after which it disappeared. The station at the foot of Spadina Ave. was not abandoned at once after the station built in 1868 was placed in operation, but was used for some time after.

The Toronto and Nipissing Ry., of

inscribed "1872. E. P. Hannaford, C.E., Chief Engineer. John Shedden, Builder," was in use continuously from 1873 until a few weeks ago. When it was placed in use, the city's population was about 65,000. It served the needs of the Grand Trunk, and the railways absorbed by that company during the 80's, the Toronto, Grey and Bruce (originally a 3½-ft. gauge line which had running rights over the Grand Trunk from near Weston into Toronto, with a third rail on the Grand Trunk), and the Credit Valley Ry., until about 1890, when it was found that additional facilities were needed. The Canadian Pacific had then made its influence felt. It had acquired the Toronto, Grey and Bruce and the Credit Valley, and its Ontario and Quebec Ry., from Montreal, was running into North Toronto. The Canadian Pacific wanted to get the latter line into the central part of the city, and projected its present line down the Don River valley. After considerable negotiation, an agreement was made with the Grand Trunk in 1893, for joint use of the union station by the Grand Trunk and Canadian Pacific. A year or two before that, however, the Grand Trunk management, foreseeing traffic expansion, decided to extend the station as completed in 1873 by erecting a building, facing on Front St., to contain ticket offices, waiting rooms, railway offices, etc., and to be connected with the original building by a train shed. This addition was completed in 1896; an illustration of the complete building, showing both the 1873 and 1896 structures, with connecting train shed, and the train shed to the south of the original structure, is given herewith. The south train shed was removed some months ago. The 1873 building and the intermediate train shed are to be demolished in the near future, but the 1896 building is to be retained for [illegible] at least for the time being.



Toronto Union Station. See also opposite page.

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eadows of his staff. The architect during
is recent work has been Hugh C. Jones,
ontreal, with J. W. Wood as assistant,
r. Wood having been engaged in work in
nnection with the terminal, in that
pacity, since the first designs were
epared. P. Lyall and Sons Construction
o. is the general contractor on the con-
ourse work, in addition to having been
eneral contractor for the main building.
. N. Morgan has been General Superin-
ndent for the general contractor on the
ork since the concourse construction
arted.

Previous Toronto Stations.

Toronto has had, practically since the
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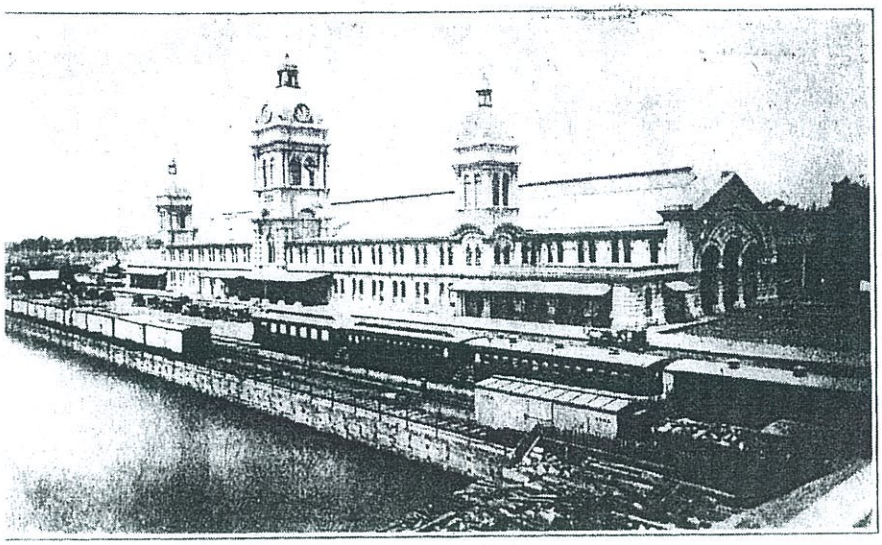
The Toronto and Nipissing Ry., of 3½-ft. gauge, which entered Toronto in 1869, had a station near Front and Berkeley Sts., in the east part of the city. The records show that it was built in 1871, and was used until the road was absorbed by the Grand Trunk Ry., and was afterwards taken down.

The Grand Trunk station built in 1858 was used until 1871, when it was demolished. A temporary shed, erected at the west side of Simcoe St., served as a station during the construction of another west of York St. and below Front St., which was opened July 1, 1873. This building, an illustration of which is given herewith, was considered, at the time, one of the most modern and handsome stations on the continent, and was quite an imposing structure. This building, on the central tower on the south side of which is a tablet line into the central part of the city, and projected its present line down the Don River valley. After considerable negotiation, an agreement was made with the Grand Trunk in 1893, for joint use of the union station by the Grand Trunk and Canadian Pacific. A year or two before that, however, the Grand Trunk management, foreseeing traffic expansion, decided to extend the station as completed in 1873 by erecting a building, facing on Front St., to contain ticket offices, waiting rooms, railway offices, etc., and to be connected with the original building by a train shed. This addition was completed in 1896; an illustration of the complete building, showing both the 1873 and 1896 structures, with connecting train shed, and the train shed to the south of the original structure, is given herewith. The south train shed was removed some months ago. The 1873 building and the intermediate train shed are to be demolished in the near future, but the 1896 building is to be retained for railway offices, at least for the time being.

Toronto was never very proud of its union station after the addition to the original building was completed. It is improbable that anyone ever considered the dual structure an architectural success, and the expression of quite the contrary opinion has been the rule during the past 30 years, so it was with no great regret that the people of Toronto, the population of which is now nearing 700,000, saw the structure abandoned and the handsome new edifice between Bay and York Sts. placed in operation.

Canadian Railway and Marine World is indebted to Messrs. Gillen, Ambrose, Jones and Wood, whose names are mentioned in the preceding matter, for furnishing information on which the description of the new station is based, also for photographs

ures in these varying from around atmospheric to as high as 80 lb. Steam flow meters are provided for measuring the total quantity of steam delivered, and also the amount delivered to the post office wing.



Grand Trunk Station, Toronto, in 1880, built in 1873.
From photograph loaned by T. A. Reed, Secretary, Toronto University Athletic Association.

Condensation from the steam is used in the various plumbing fixtures requiring hot water. The condensation is delivered to a receiver in each section of the building, from which it is pumped to storage tanks at the top of the building. It passes by gravity from these through domestic water heaters, which, by means of thermostats, provides water at the fixtures at any desired pre-determined temperature. Auxiliary equipment is provided so that only such quantities of the condensation is pumped to the tanks as can be used, and the equipment is also such that if at any time there is not enough condensation to supply the requirements, water from the city supply is automatically provided to supply the deficiency.

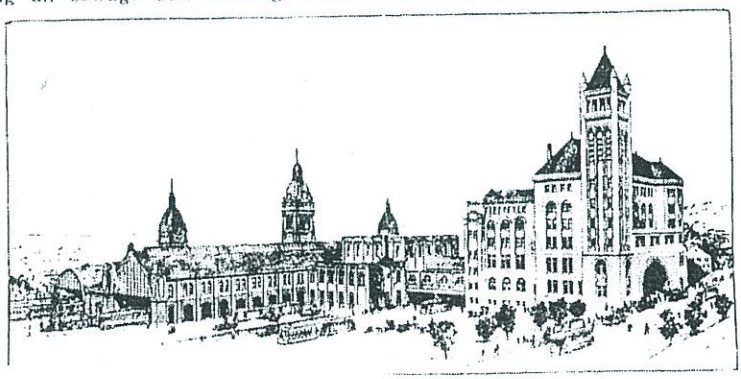
In the forced hot water direct heating system, the water is heated in converters by low pressure steam, and forced through the pipes and radiators by turbine driven pumps, the converters and pumps being provided in duplicate and placed in the basement level. The temperature of the water circulated through the radiators is controlled automatically, thermostatically. In the indirect heating system, the air is brought from the top of the building through shafts to the fan rooms on the basement level, and is passed through heating coils capable of handling 180,000 cu. ft. of air a minute.

Drainage and sewerage.—All clear water drainage is separated from the sewage, 2 systems of lines being provided. The sewage lines are connected to the city trunk sewer in Front St. at 2 points, one for the post office wing and the other for the main building. The clear water drainage lines connect with a trunk line along the south side of the building, which connects in turn with the city storm sewer in Bay St. As the basement level is so near the level of the city sewers, and as the capacity of the sewers is somewhat taxed during heavy storms, partly due to being located so near to the Lake Ontario level, it was necessary to provide sewerage ejectors for pumping all sewage and drainage from office wing. For cooling drinking water, small refrigerating machines are provided, and are motor driven and automatically controlled by thermostats, so that the water may be maintained at any predetermined temperature. Drinking fountains are provided throughout the building.

Fire protection is provided by stand pipes running up through the building at various locations, with hose outlets and hose arranged on each floor so that every portion can be reached by a hose. At each outlet a 75-ft. length of 1½ in. hose with nozzle is provided, connected to the standpipes through 1½ in. valves, and in addition 2½ in. valves with nipples threaded for city fire hose are installed. Connection is made with the cold water storage tanks at the top of the building, through check valves, so that in case of failure of the city water supply the water in the tanks will be available for fire fighting.

The refrigeration plant mentioned previously in connection with the description of the kitchen, etc., is a compression plant, using ammonia for the refrigerant. There are two 8-ton vertical single acting enclosed twin cylinder type compressors, motor driven through turbo type reducing gears; a 2-section double pipe condenser; a combined brine storage and cooler, with brine circulating pumps, brine distributing mains and cooling coils in boxes, and ammonia piping. Capacity is equivalent to the melting of 16 tons of ice every 24 hours.

Pneumatic tubes are installed in the main portion of the building, there being 2 systems of them. One, of 6 tubes, 4 in. diam., independent vacuum power control type, operates between the baggage checking room in the ticket lobby and sending and receiving stations in the baggage room in the basement, and is used for carriage of baggage and cartage checks. The other, of four 2¼ in. tubes, operates between the ticket offices in the ticket lobby and the Canadian Pacific Ry. telegraph office on the third floor and the Canadian National Ry. telegraph office on the fourth floor, and



Grand Trunk Station, Toronto, in 1880, built in 1873.
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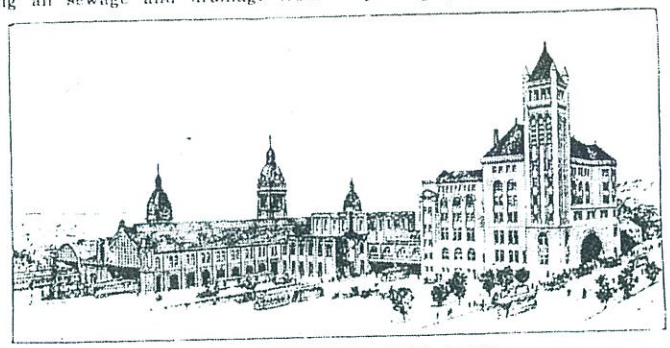
The water supply for the whole building is taken from the city main in Front St., at a pressure of 100 lb., and distributed throughout at a pressure of 60 lb. The supply mains are run up through the building to storage tanks at the top. Pressure filters are installed in the main portion of the building. There are 2 storage tanks in the main portion of the building, one for hot and one for cold water, with similar equipment for the post

using ammonia for the refrigerant. There are two 8-ton vertical single acting enclosed twin cylinder type compressors, motor driven through turbo type reducing gears; a 2-section double pipe condenser; a combined brine storage and cooler, with brine circulating pumps, brine distributing mains and cooling coils in boxes, and ammonia piping. Capacity is equivalent to the melting of 16 tons of ice every 24 hours.

Pneumatic tubes are installed in the main portion of the building, there being 2 systems of them. One, of 6 tubes, 4 in. diam., independent vacuum power control type, operates between the baggage checking room in the ticket lobby and sending and receiving stations in the baggage room in the basement, and is used for carriage of baggage and cartage checks. The other, of four 2¼ in. tubes, operates between the ticket offices in the ticket lobby and the Canadian Pacific Ry. telegraph office on the third floor and the Canadian National Ry. telegraph office on the fourth floor, and



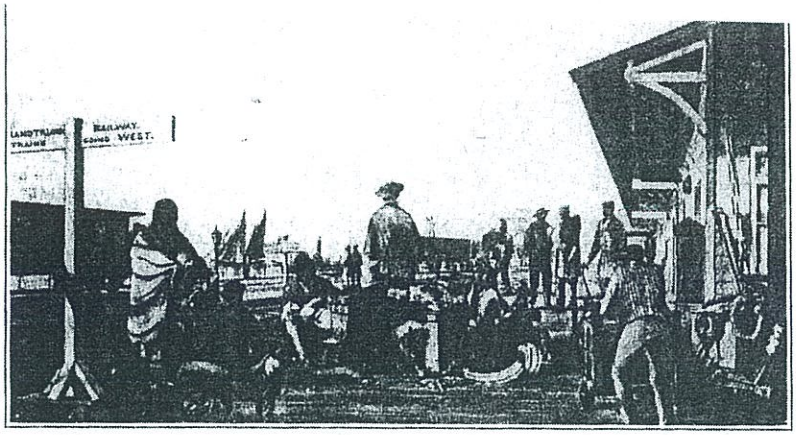
Toronto Union Station, as added to in 1895.

carries telegrams. As in the other system, the carriers are actuated by a displacement blower.

Scales are provided in the post office wing for weighing mail and parcels, and in the west wing for weighing baggage. There are 2 in the post office wing, each 10,000 lb. capacity, with platforms 12 x 6 ft., and 5 in the west wing, 4 of 2,000 lb. capacity with platforms 4 ft. square, and the fifth of 10,000 lb. capacity with platform 12 x 6 ft.

Gas supply in the main building is provided for the kitchen and lunch rooms, and for emergency lighting in the main switchboard and transformer rooms. In the post office wing, gas is provided for emergency lighting throughout, each alternate electric lighting outlet being provided with a gas outlet.

Lighting.—Current for lighting in the



The First Grand Trunk Station in Toronto, built about 1858.
From painting by Wm. Armstrong, C.E. Photograph loaned by T. A. Reed, Secretary, Toronto University Athletic Association.

The exit concourse, in the lower level, has a central information booth, and, on its north side, adjoining on both sides the exit to the taxicab driveway, are spaces for retail shops, and telephone booths, while north of them, at either end of the ramp loggia, are storage rooms. At the south side of the exit concourse, the baggage checking space is to the west of the passage from the trains, and the parcel check room to the east, these facilities being immediately below similar ones on the ticket lobby floor, as explained previously. As the plans show, the two north and south exit passages converge before the exit concourse is entered, and it is at the point where the wide passage enters the exit concourse that passengers from trains may be met, with certainty that they will pass that way. The space in the basement level under the train concourse is utilized for sleeping and dining car stores for the railways, Canada Railway News Co. stores, conductors' and trainmen's lockers, lamp storage, and kit rooms.

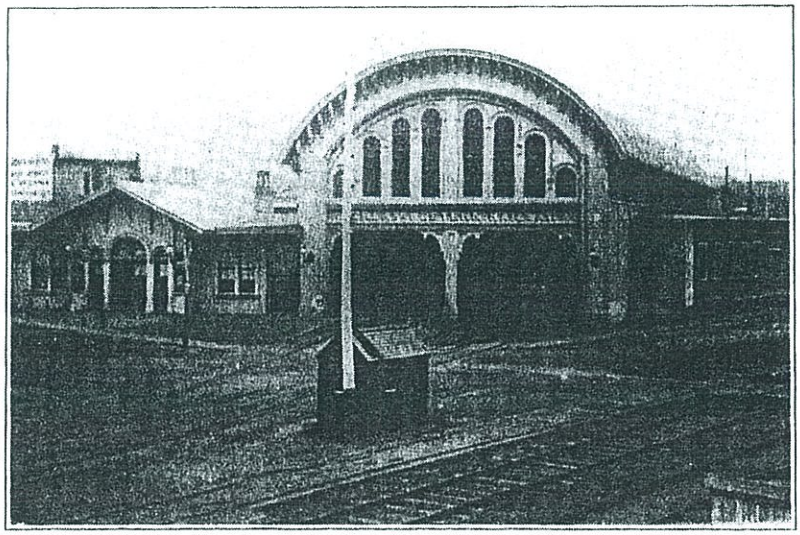
Immediately east of the exit concourse is a large space for the accommodation of large bodies of immigrants who may come in by one train and have to wait for another. This space includes Government Immigration Department offices, and immediately west of the exit concourse is a series of offices and store rooms, including engineer's office, telegraph distribution room, electrical distribution room, railway mail office, and baggage transfer company's office. To the north of these, and reached by the stairs leading down from the west end of the ticket lobby, are the Canadian and U.S.A. customs inspectors' offices, taxicab office, customs lobby, and bond room. All of the remainder of the floor space on this level, toward the west side of the building, with the exception of the kitchen facilities in the northwest corner, is taken up by baggage handling facilities, baggage destined to trains being received from the west side of the building, the trucks unloading to platforms at the east side of the depressed area fronting York St., while that from trains is received over the platforms at the south side of 250 ft. wide from east to west.

At the time of writing, interior finishing work on the lower level in the area between the baggage space on the west and the Post Office Department wing basement is nearing completion. Provision is being made for train dispatchers' and other operating offices, a signal and control room, electrical repair shop, equipment store room, etc.

The Post Office Department, or east, wing is well equipped for the handling of mail, on all floors. A system of conveyors is provided for carrying letters from the drops at the front to the second floor stamping tables. There are 3 conveyors, two 24 in. wide, of the belt type, and horizontal, being at the basement ceiling, [illegible] 30 in. wide, of the inclined letters to the special delivery room on the second floor. This carrier is equipped with 4 cars. A double spiral chute is provided to carry parcels, books and newspapers from the drops at the main entrance to the receiving tables in the basement, the curvature being such that all parcels, etc., irrespective of weight, are delivered on the table at the same speed. There are 2 vertical mail chutes in the main part of the station building, running from the fourth floor to mail boxes on the first floor. The chutes have letter drops on the second and third floors also.

The heating and ventilating of the ticket lobby, exit concourse, immigrants' waiting room, general waiting room, dining room and lavatories throughout the building are entirely by blower and exhaust fan system. All other portions of the building are direct steam heated, with air supply and exhaust in some cases and in others exhaust only. No power generating or steam raising plants are included in the layout, electric current and steam being bought from outside sources. As the Post Office Department portion of the building, the east wing, and the railway portion are to all intents and purposes independent of each other, as regards ownership, operation and maintenance, it was necessary to make the heating and power facilities for each separate and independent, thus introducing a certain amount of duplication.

Steam for all purposes is taken to the buildings by 2 steam lines, an 8 in. one, the winter line, and a 4 in. one, the summer line. It is delivered at pressures ranging from 125 to 175 lb. per sq. in., and passes through reducing valves set for 100 lb., then entering 2 high pressure distributing lines, also classified as winter and summer lines. From these, branches, through reducing valves, run as low pressure lines from which connections are taken to converters, indirect heaters, domestic water



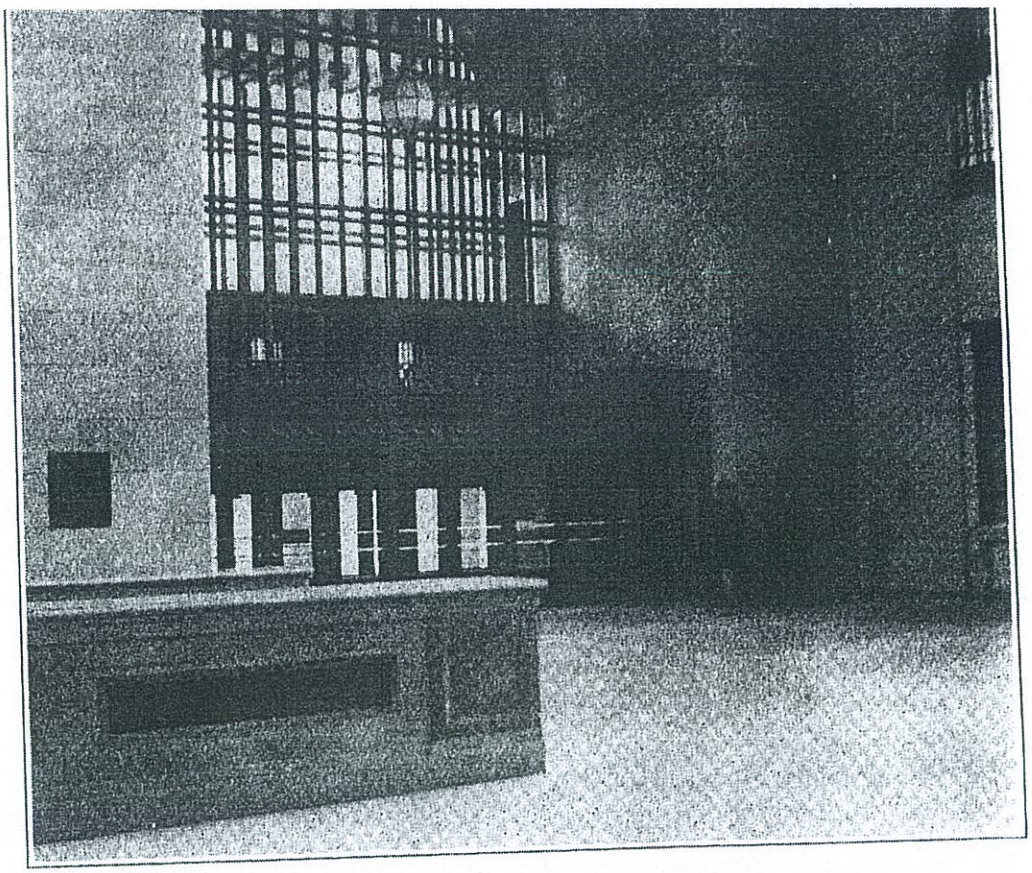
Great Western Railway Station in Toronto, built in 1866.
From photograph loaned by T. A. Reed, Secretary, Toronto University Athletic Association.

arge circular information booth, with the
ntral column surmounted by a large
ck. Wide stairs near each end lead
wn to the exit concourse. Artificial
umination is provided by a large octagon-
ball fixture, 12 ft. high and 8 ft. diam.,
spended from the ceiling, at the center,
gether with trough fixtures at the
rners. At the east end of the room are
hops, which are being operated by con-
ssion holders, while, at the west end, a
or in the center opens on stairs leading
wn to the Customs Department baggage
amination space and taxicab lobby, with
e doors on either side opening on the
ssage fronting the waiting room, this
ssage leading, to the north, to the
staurant and lunch rooms, and, to the
uth, to the lavatories, baths, barber
op, etc., as shown on the accompanying
ain level plan.

The ticket selling space is along the
rth side of the room, the Canadian
acific facilities at the east end and the
anadian National at the west. The
iginal plans contemplated the provision
separate booths or cages, but the installa-
on as made is of counters behind which
re modern double cases, the same frontage
eing available to 2 men by one keeping his
ckets in one side of the case and the
ther in the reverse side. The ticket
ounter fronts are marble, the counters and
ll metal work being bronze. The informa-
ion booth and stair balustrades are also
arble, with bronze trim.

The opening to the ramp chamber lead-
ng to the train concourse is at the south
ide of the room, in the center, the entrance
eing flanked by 2 large columns of Zumbro
tone. Along the south side of the room,
ast of the entrance to the ramp chamber,
s the parcel checking room, with marble
ront and bronze counter and trim, and
vest of the entrance to the ramp chamber
s the baggage checking space, also with
arble and bronze front. Both of these
paces are flanked by concession areas,
as shown by the plan. The parcel room,
and the baggage room adjoining the bag-
gage checking space, are directly over
similar facilities on the lower level, and
elevator and dumb waiter service provides
for speedy movement of parcels and bag-
gage between the two levels.

A feature of the ticket lobby is the dis-
play of the names of numerous Canadian
cities, carved in the stone of the south and
north walls. At the south side are the
names St. John, Fredericton, Quebec,



Northeast Exit from Ticket Lobby, Toronto Union Station.

but is also arranged to give the maximum in utility. The 2 wide entrances from Front St. provide means of getting into and out of the lobby without crowding, while the wide entrance to the ramp chamber at the south side provides similarly for outgoing passengers proceeding to their trains without congestion. The long ticket counters make possible the employment of a large number of ticket clerks, obviating undue delay in securing transportation. The information booth in the center is in plain view of all the doors, stairs, etc., to which travellers may be directed; the parcel and baggage checking facilities are both ample and conveniently located, and the stairs leading down to the exit concourse are very wide. With the exception of the stair balustrades and the inforced concrete columns in this concourse, necessarily thick because they will directly support the weight of trains when the tracks are elevated, have Lombardic tile finish, the walls being of the same material. The concourse floor is of non-slip terrazzo. Men's and women's lavatories are provided at the north end of the concourse, and between the flights of stairs leading up to the track platforms, at either side, the space is divided off for retail stores of various kinds. The most northerly of the stairs to the train platforms are at the north side of the ramp chamber, and, as the plan of the main level shows, there are 3 flights leading up from each side of the half of the train concourse already built, only this half being shown on the plan. The stairs by which incoming pas-

main floor of the whole building, but the train concourse floor is at elevation 15.5. The elevations of the floors in the most important divisions of the lower level are marked on the plan.

The First Grand Trunk Station in Toronto, built about 1858.
From painting by Wm. Armstrong, C.E. Photograph loaned by T. A. Reed, Secretary, Toronto University Athletic Association.

The exit concourse, in the lower level, has a central information booth, and, on its north side, adjoining on both sides the exit to the taxicab driveway, are spaces for retail shops, and telephone booths, while north of them, at either end of the ramp loggia, are storage rooms. At the south side of the exit concourse, the baggage checking space is to the west of the passage from the trains, and the parcel check room to the east, these facilities being immediout of Toronto, as mentioned above, is very heavy, and a large area was provided for handling it, the baggage space on the lower level being the full width of the building from north to south and being 250 ft. wide from east to west.

At the time of writing, interior finishing work on the lower level in the area between the baggage space on the west and the Post Office Department wing basement is nearing completion. Provision is being

the second floor. A steel friction chute delivers letters from the main floor drops to the conveyors, or to the receiving table in the basement. It is provided with a lever-actuated counter-balanced hinged section, which in one position delivers mail on the conveyor and in the other to the receiving table in the basement. A pick-up and delivery carrier, motor operated, is provided for handling special delivery letters to the special delivery room on the second floor. This carrier is equipped with 4 cars. A double spiral chute is provided to carry parcels, books and newspapers from the drops at the main entrance to the receiving tables in the basement, the curvature being such that all parcels, etc., irrespective of weight, are delivered on the table at the same speed. There are 2 vertical mail chutes in the main part of the station building, running from the fourth floor to mail boxes on the first floor. The chutes have letter drops on the second and third floors also.

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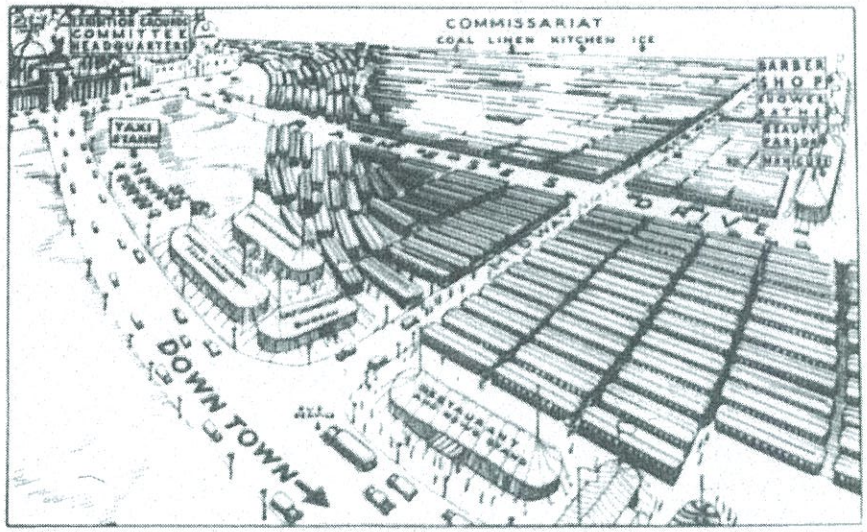
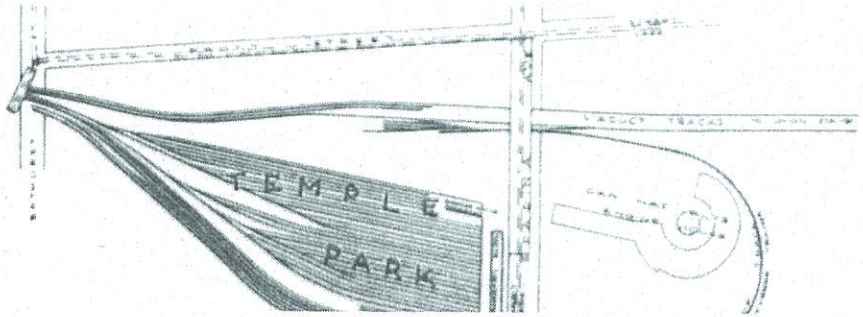
Sleeping Car Accommodation for Shriners in Toronto.

A description of the preparations being made by the two transcontinental railways for the accommodation of delegates attending the 56th annual meeting of the Imperial Council, Ancient Arabic Order, Nobles of the Mystic Shrine, to be held in Toronto, June 9-12, was given in Canadian Railway and Marine World for February, pg. 77, where it was stated that, in addition to furnishing a great deal of transportation to and from Toronto in connection with the gathering, the railways will also provide about 650 sleeping cars to be used as temporary homes by the visitors. The Canadian National Rys. will utilize its passenger car yard at the west side of Spadina Ave., adjoining Fleet St., in which to park about 350 sleeping cars, which will provide living accommodation for about 7,000 people. It has named the yard parked sleeping cars. In addition to floodlights, strings of lights will be installed throughout the yard. The loop track around the locomotive house at the east side of Spadina Ave. will be of great assistance in the terminal movements of the trains handling the Shriners, as it will be possible to turn whole trains by simply running them around the loop. All of the tracks shown are permanent ones, no new construction having been necessary in connection with the Shrine traffic.



Fez City—Canadian Pacific Ry. Yard in Toronto, with sleeping cars for accommodation of visiting Shriners.

The Canadian Pacific will utilize a yard which is under construction at Bathurst and Fleet Sts., adjacent to the Canadian National Exhibition grounds, which contain the Coliseum, the headquarters of the Shriners' meeting. In this yard, which has been named Fez City for



end with Fleet St., permitting trucks and automobiles to proceed from any point in the city to the middle of the yard. The whole yard will be floodlighted. A beginning on construction of the yard, which will include within it a few freight spurs previously existing at the north side of the property, was made late in February.

Hudson Bay Ry.—The driving of the last spike at Churchill, Man., will probably be done on July 1, by Right Hon. G. P. Graham who, as Minister of Railways and Canals, turned the first sod on the starting of construction at The Pas, Man., in 1910. A Churchill report, of Jan. 14, stated that with the exception of 30 men and one woman the entire population at Churchill had moved south for the winter. Settlement of the townsite is expected to be started in the spring; applications for sites for three banks, and a number of business establishments, have already been received by the government. At the annual meeting of the On-to-the-Bay Association at Winnipeg recently, R. W. Paterson was re-elected President; the other officers and committeemen represent various sections of Manitoba and Saskatchewan. A resolution was passed reiterating the desirability of Churchill being developed to the fullest possible extent, stating that it is desirable that all commercial centers in western Canada be linked up with the port by the least railway mileage possible, and expressing satisfaction with the efforts of the Canadian National Rys. and the Canadian Pacific Ry. to provide such connections.

Electric Railway Notes.

The question of the operation of one-man cars by British Columbia Electric Ry. in Vancouver has again been raised and the matter was discussed at a meeting of the city council's finance committee recently. W. G. Murrin, President, represented the company, and Trades and Labor Council representatives were present. The committee referred the question to the committee dealing with electric railway matters.

In connection with a new traffic bylaw in Vancouver, 17 center-suspended traffic signals have been put in operation. They have green and red flashing lights lettered "Stop" and "Go" respectively. It is stated that their use has demonstrated the need of double loading platforms for railway traffic.

Hamilton, Ont., City Council's works committee decided on Feb. 5 to employ a number of men to check up matters in connection with Hamilton St. Ry.'s operation, in order to arrive at a conclusion as to the manner in which the company is

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Fez City—Canadian Pacific Ry. Yard in Toronto, with sleeping cars for accommodation of visiting Shriners.

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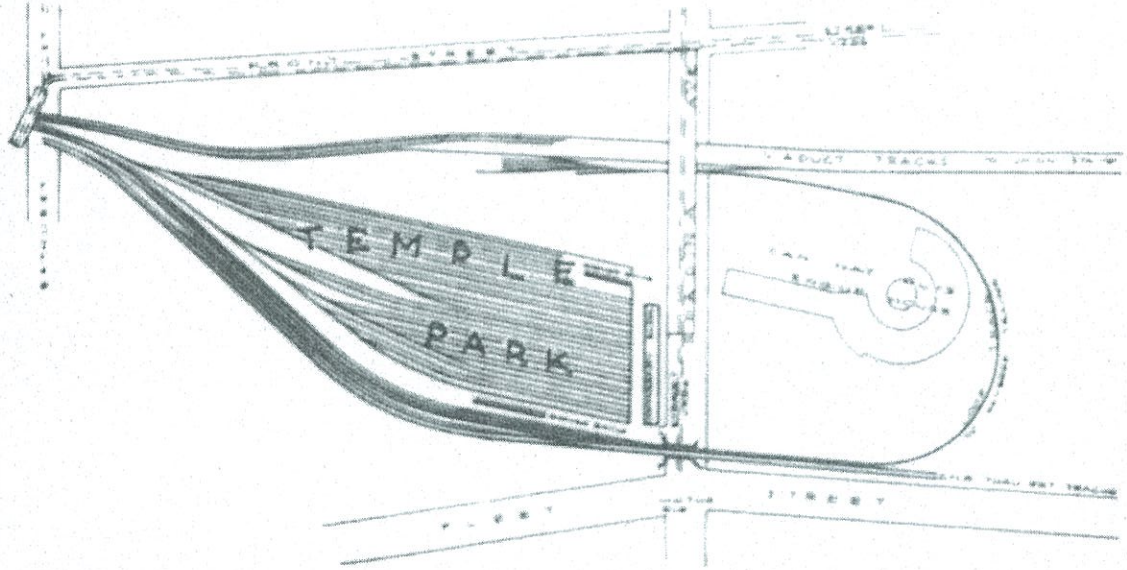
The Canadian Pacific will utilize a yard which is under construction at Bathurst and Fleet Sts., adjacent to the Canadian National Exhibition grounds, which contain the Coliseum, the headquarters of the Shriners' meeting. In this yard, which has been named Fez City for the occasion, about 300 sleeping cars will be parked, and the same character of conveniences as are being established by the Canadian National at Temple Park will be provided. A sketch showing the layout of the Canadian Pacific yard is given herewith. The avenue running from east to west through the yard, and which has been named Rameses Drive, will be about 65 ft. wide and surfaced with macadam. A north and south driveway, to be known as the Midway, will also be provided; it will be about 20 ft. wide, surfaced with macadam, and connected at the south



Temple Park—Canadian National Yard in Toronto, to be used for sleeping cars for visiting Shriners.

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British Columbia Electric Ry. Co. is reported to have bought the Chilliwack Electric Co.'s electric light plant and distribution system in Kent municipality, which supplies the town of Agassiz and adjacent district.

Winnipeg Electric Co. has proposed to make certain changes in the regulations respecting transfers on its car lines, which are being considered by the City Council's transportation committee.

Edmonton Radial Ry. has transferred its operating office from a building at the intersection of Jasper Ave. and 101st Street to new offices in the Selkirk. The old building has been removed.

Quebec Ry. Light and Power Co. has been ordered by the Board of Railway Commissioners to place 2 more cars in service on its St. Francois d'Assise circuit.