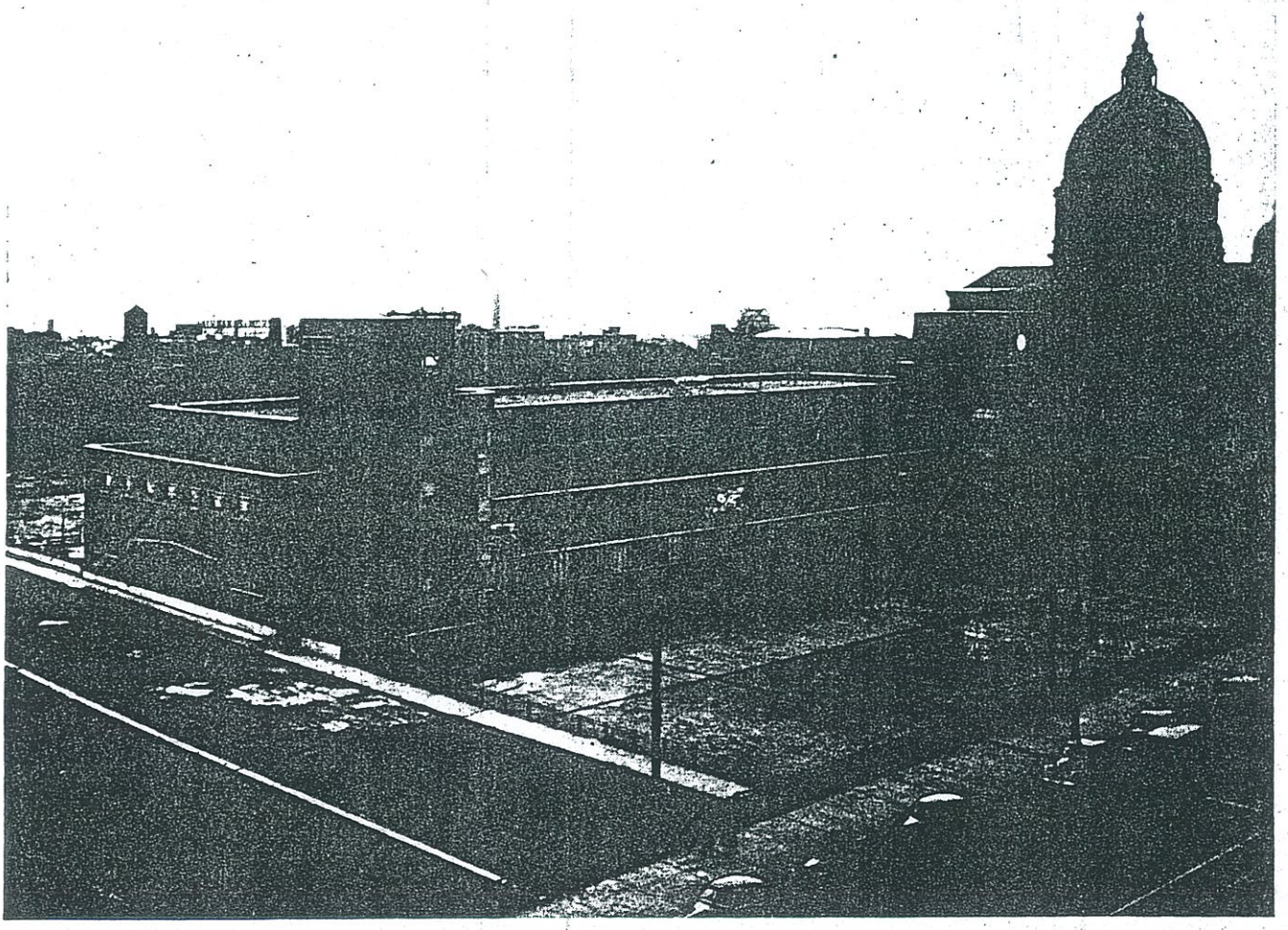
C. N.R.
MONTREAL
CENTRAL
STATION

Canadian Transportation

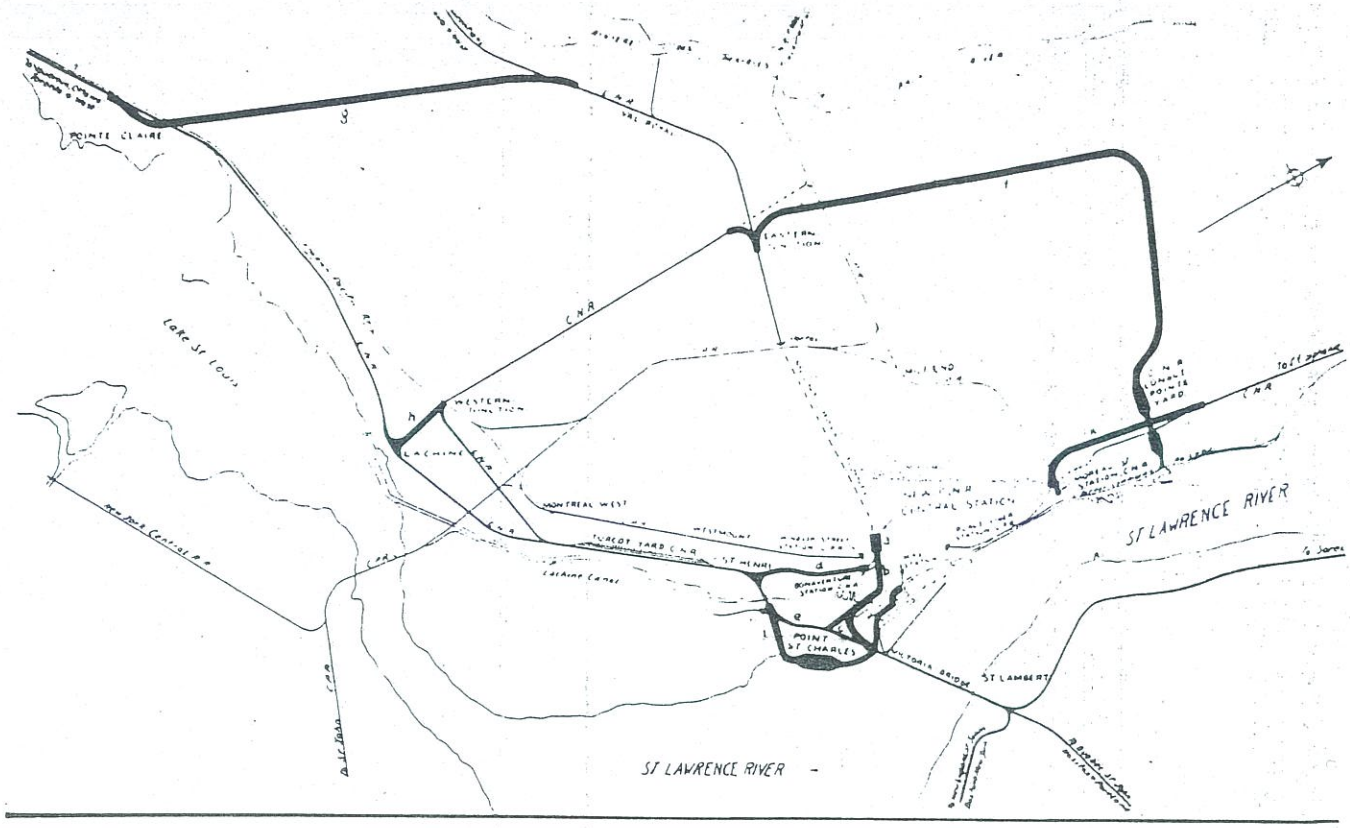
Canadian National New Montreal Terminal

On July 14 there will be opened by the Minister of Transport, the Hon. Mr. Michaud, with appropriate ceremony, the new central passenger terminal of Canadian National Rys., in Montreal. This will culminate work begun in 1929, which has already produced great benefits for Montreal by way of grade separations and associated betterments.

SINCE 1929, when the Canadian National Rys. scheme of terminal development in Montreal was embarked upon, references to it in these columns have been frequent and at times lengthy. Many readers will recall that when the work was first undertaken, it was pursued aggressively; materials were plentiful, business was good, the need for the improvements contemplated was very evident, and there was every reason to strive for completion of the improvement works as rapidly as possible. But readers will recall also, no doubt, that at the end of 1929 there was a great security market crash, economic conditions became steadily worse from month to month, credit was contracted to an almost unbelievable degree, and the incentive to rapid completion of improvement works steadily became less. The business of the railways shrank to a very large extent, and both gross and net earnings were reduced to levels far below those of 1928 and 1929. It was little wonder, then, that the Government and the Canadian National Rys. executives found themselves in agreement that the terminal development work should be suspended. The undertaking, therefore, was discontinued, and progress for the seven years preceding 1939 was of very small proportions, no work being done which did not have to be done. However, a great deal of pro-



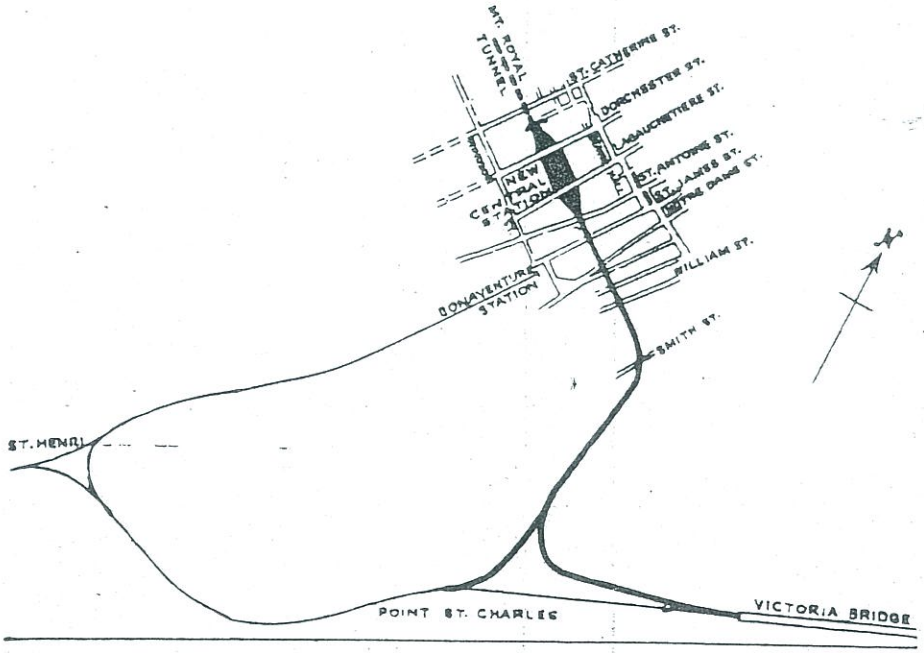
The New Canadian National Rys. Central Terminal from Dorchester and University Streets.



Sketch Map 1—The Various Sections of the C.N.R. Montreal Terminal Development Scheme as Originally Planned.

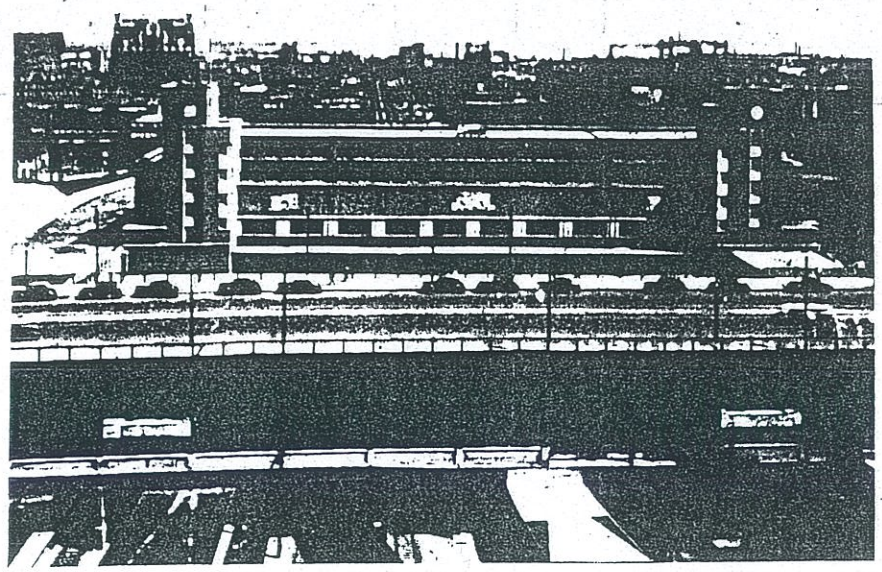
gress was made before work was shut down. Much grade separation was carried out by subway and bridge construction; the viaduct to carry elevated tracks between the site of the proposed new terminal station at Lagauchetiere and Dorchester Streets, and the city end of the Victoria Bridge over the St. Lawrence River, was partially completed. Also, a large excavation for the proposed new terminal station building was made, about one million cu. yds. of material having been removed.

Scheme Modified in 1939—However, when work on the terminal improvement project was resumed in 1939, it was on a considerably modified scale. The various projects provided for by the 1929 programme have been proceeded with only in part, and while the opening of the new station marks the successful termination of a large improvement undertaking of great value to the city and the railway alike, it is a fact that many of the projects included within the 1929 programme remain to be gone ahead with at some future time. Readers who are not familiar with the details of the original scheme, and with the modified scheme of 1939 on which work has been proceeding, will do well to study the two accompanying sketch maps, one of which provides information as to the projects embraced within the 1929 programme, and the other of which depicts the modified scheme on which work has been proceeding since resumption in 1939.



Sketch Map 2—General Layout, Montreal Terminals Scheme as Modified.

The Original Scheme—It is impossible, in the space available, to describe in detail all of the projects contemplated in the original C.N.R. Montreal terminal improvement programme, but sufficient information can be presented to enable the reader to discern the difference between the original and modified undertakings. The accompanying sketch map 1 refers to the original scheme. The location of the new central passenger terminal, at the portal of the tunnel under Mount Royal, is indicated by the letter "a", while the elevated track structure running from the terminal to the city end of the Victoria Bridge is indicated by the letter "b". The central passenger station was planned to accommodate 95% of all C.N.R. trains entering or leaving Montreal, and ultimately the full 100%. It was planned to have the station facilities almost entirely below ground, thus leaving a large proportion of the surface area available for long term leases for those wishing to build hotels, theatres, stores or office buildings. A feature of the original plan was the construction of a double tube vehicular subway under McGill College Avenue, extending from south of Cathcart



Looking over the New Station towards Victoria Bridge.

Street to a short distance north of St. Catherine Street.

The elevated track structure extending from the south end of the proposed new passenger terminal to Victoria Bridge, was necessary to permit passenger trains running over Victoria Bridge to reach the proposed new terminal. The topography of the area was very favorable to the construction of such a line, in that the elevation of the tracks at the city end of Victoria Bridge is almost the same as that of the tracks at the C.N.R. tunnel station, with a level line between these points ranging from 18 to 28 ft. above the elevations of the streets crossed, thus providing ideal conditions for grade separation. This part of the undertaking has been carried out as originally proposed. The viaduct portion of the elevated track structure has been constructed of reinforced concrete, with steel spans over the numerous streets crossed, and this construction was largely completed before the suspension of work. The structure is of pleasing design and adds to, rather than detracts from, the appearance of the locality. Within the structure, much warehouse, garage and office space is provided. From the south end of the reinforced concrete viaduct structure, at Ottawa Street, the tracks are carried on embankment, with the exception of reinforced concrete and structural steel structures over streets, low level tracks and the Lachine Canal. The provision of this elevated structure removes, from the ground level route heretofore used, a large percentage of the C.N.R. passenger traffic entering and leaving Montreal, with great benefit to city traffic resulting from the separation of railway and street grades. At the time the original plans were drawn up, it was recognized that the removal of passenger traffic from the Bonaventure Station area would permit of the development of this area for freight purposes. This is a very important freight terminal, and one of great convenience for merchants, permitting speedy delivery of goods and prompt transfer to stores and warehouses. The locality is also a well established center of the City of Montreal fruit and vegetable trade. The removal of passenger service to the new terminal will allow for great improvements to the freight service in the Bonaventure area.

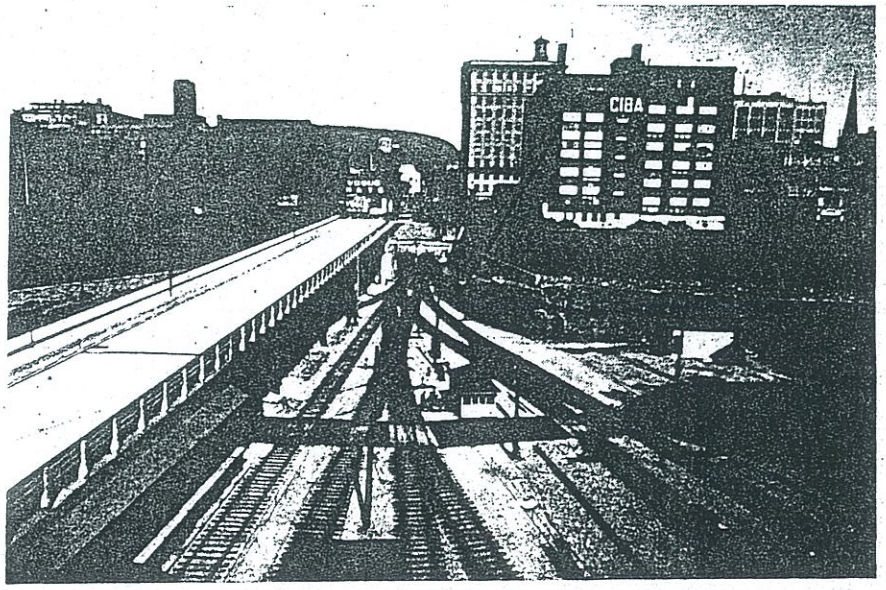
Another feature of the original scheme, shown by the letter "g" on sketch map 1, was a line proposed to be built from Pointe Claire to Val Royal, to bring passenger trains from the west into the proposed new passenger terminal via the tunnel route. It was proposed to build this new line of about six miles, and to provide grade separation at all points where reasonably required. This portion of the scheme is not being proceeded with now, and, under the modified scheme, passenger trains from Toronto and other western points, which have been using the old Bonaventure Station, will leave the main line at St. Henri, and, running via Point St. Charles, will enter the new central terminal over the elevated track structure.

Another improvement contemplated by the original scheme was the building of a line, about ten miles long, running from Longue Pointe to Eastern Junction, this being indicated by the letter "f" on sketch map 1. This was to eliminate the necessity for grade separation between Moreau St. Station and Longue Pte. and provide a needed connection between the various yards and trackage situated in the eastern portion of the city, and those located in the north, western and southern portions. This line was planned as essentially a freight facility, but its construction would have made it possible to operate passenger trains now using Moreau Street Station to and from the new central passenger terminal via the tunned. Additionally, the building of this line would have made possible the development of large areas of the city not now provided with railway facilities. However, construction of this line is not included in the modified scheme.

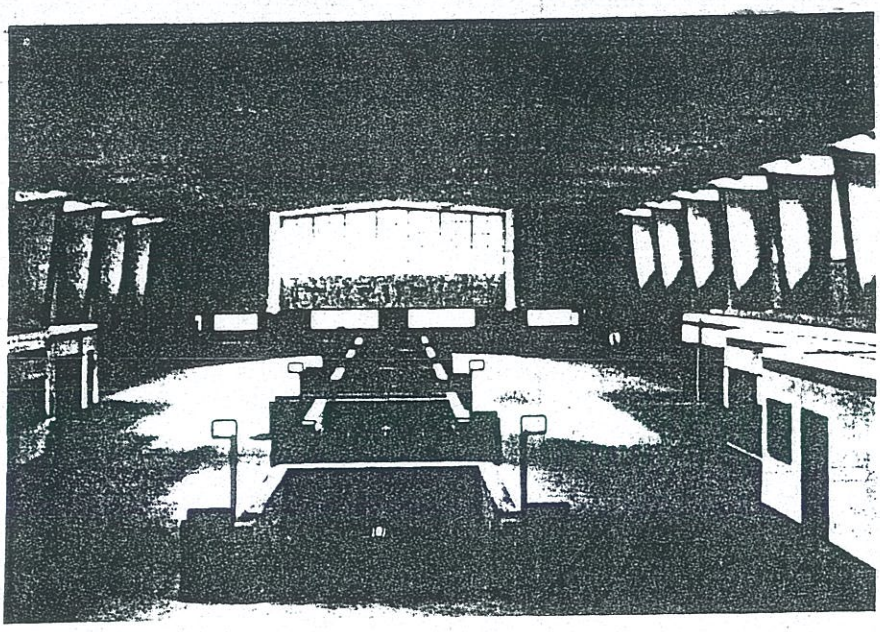
Along the line marked "d" in sketch map 1, over-track bridges have been built at Mountain and Guy Streets, and a number of streets in the Bonaventure area have been closed. Between Turcot and Pt. St. Charles, grade separations have been built at St. Remi St., St. Marguerite St., Notre Dame St., D'Argenson St., Charlevoix St. and Hibernia St. The construction of these bridges and subways has contributed greatly to the safety and to the expeditious movement of Montreal street traffic.

Another undertaking contemplated in the original scheme was the construction of an engine house and other terminal facilities near Mount Royal, but this has not been gone ahead with under the modified scheme. These facilities would have been for the accommodation of locomotives and trains, now taken care of at Turcot and which, under the original scheme, would have been diverted to the new central passenger terminal by the tunnel under Mount Royal and the connection between Val Royal and Point Claire.

The original scheme also contem-



The Portal of the Tunnel under Mount Royal.



The Concourse, Looking East.

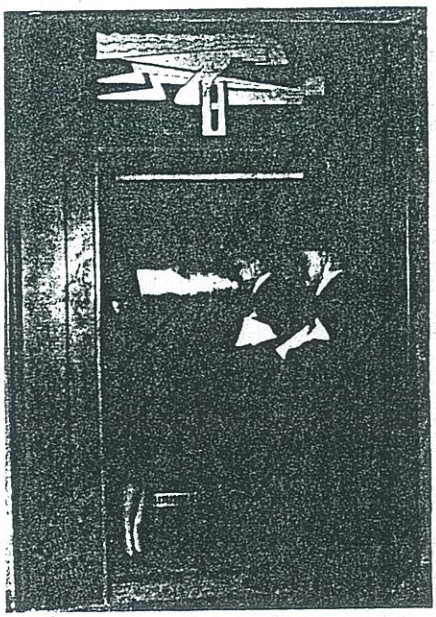
plated the construction of a passenger car yard at Point St. Charles, adjacent to the large repair shops, power house and general stores there. This has been constructed as a part of the modified plan.

Also, the original scheme called for the construction of a new interchange freight yard at Point St. Charles; this was to have been a joint undertaking with the Canadian Pacific Ry. and the Harbour Commission, the arrangement having been for the C.N.R. to grant the C.P.R. running rights, to provide access to the new yard, which was to have been located on the river bank, in Point St. Charles. Also, the plans provided for the construction by the Montreal Harbour authorities, of a double track railway line extending from existing harbour trackage, to connect with the east end of the new yard.

The original scheme also contemplated the provision of sufficient office accommodation at the new central passenger terminal to permit of the concentration, there, of the C.N.R. official and clerical staff, which at the time was housed in 17 different buildings in Montreal. While the plans for office accommodation were modified to considerable extent, the fact is that the new passenger terminal provides a large amount of office space, and the occupancy of that space is dealt with in detail hereinafter.

The Modified Scheme

To the end of 1938, the total expenditure on the entire project was $16,651,345.62, and full details of the progress made to that time were published in Canadian Transportation for April, 1939, beginning on page 161, where it was noted that a Parliamentary return, dealing with proposed activity in 1939, said:—"Funds for 1939 will be required in connection with the use of the various works which have been constructed, for taxes, for adjustment of outstanding accounts and for settlement of compensation for properties expropriated, awards of the courts and claims and damages. For these purposes, it is estimated that, during 1939, $100,000 will be required. Work looking to the completion of the terminal on a modified plan has been undertaken. The work which is contemplated in the calendar year 1939 consists of the construction of certain subtrack space at the station site, portions of the viaduct, elevated railway and grade separations between the station area at Dorchester Street and Victoria Bridge, and works in Point St. Charles. For this purpose, an amount of $2,320,000 has been included in the Canadian National Rys. budget for 1939. . . ." The record went on to state that the plans for proceeding with the work were along lines which were modified considerably. The intention, it was said, was to provide for completion of the central passenger terminal, in the tunnel station vicinity, by stages. Generally, the essential features of the original plans for the terminal were retained, and the station which has resulted would do credit to any railway. The name "Bonaventure", associated since 1847 with the railway terminal in Montreal, is to be transferred to the new station, and, after use of the old station is terminated, at a future date, it will be known as the C.N.R. Bonaventure station. The new terminal, described hereinafter, is a six-level layout; above the track level, are those of the concourse floor and the two office floors, while below the track level is that of the express, baggage and mail facilities, and, below that again, the level at which the various services are arranged, for the distribution of power, heat and water, and for drainage.



R. C. Vaughan, Chairman and President, and N. B. Walton, Vice President, Operation, Maintenance and Construction, C.N.R.

The modified plans called for completion of the elevated track structure from the new terminal to the Victoria Bridge over the St. Lawrence, with the Y shown in the accompanying sketch map 2, the west leg of the Y representing tracks leading to the Turcot area. As explained, in the original scheme the intention was to bring trains from the west into the new terminal via the Pointe Claire-Val Royal cut-off, Eastern Junction and the tunnel under Mount Royal, but this proposed feature of operation was dropped in the modified scheme; instead, trains from Toronto and other western points leave the main line at St. Henri, and, proceeding via Point St. Charles, enter the terminal via the elevated track structure connecting Victoria Bridge and the terminal. Trains which used the tunnel station before this work was started will continue to use the tunnel and the new central terminal.

Soon after announcement was made of the modified scheme, activities were proceeded with, and early in 1939 tenders were asked for the construction of a subway to carry the C.N.R. tracks over Bridge Street; also, for the construction of the Ottawa Street subway, and a retaining wall between Ottawa Street and Smith Street, both works being located in the elevated track structure between the new station and Victoria Bridge. These works were gone ahead with, and numerous other contracts were awarded, principally in connection with the new central terminal, covering such items as grading, the building of bridges, the construction of approaches and of the terminal building itself.

Primarily a Grade Separation Project

Having thus briefly reviewed the 1929 plan of C.N.R. terminal development in Montreal, the economic difficulties which prevented that plan from being proceeded with in its entirety, and the adoption of the modified plan of development, it might be well to point out here that the whole scheme of terminal development in Montreal is primarily one of separation of railway and street grades. Plans for such grade separation in the city date back a great many years; even as far back as 1886, elimination of level crossings

in Montreal had been discussed with the Grand Trunk Ry. Co. management, by the Montreal Board of Trade, and there is reason to believe that the Canadian Northern Ry., when it entered Montreal, had in view an eventual co-ordination of its terminal facilities with those of the Grand Trunk. The tunnel which the Canadian Northern bored through the mountain reaches the city at a level which is different by only inches from that of Victoria Bridge. If this was a coincidence, it was a happy one, because, years later, it became a factor in the selection of the tunnel terminal site as the logical location of the new central passenger station.

It was not until 1922, when amalgamation brought the Canadian National Rys. into being, that the problem of grade separation in Montreal could be studied as a single subject correlated with the possibilities of integrating the various lines and termini of the company in the city. Studies were begun almost immediately and continued over the years.

In May, 1927, the Board of Railway Commissioners instructed the Canadian National to show cause why it should not separate the grades west of Bonaventure to St. Henri and Point St. Charles, and east of Moreau Street. Hearings were held, and the Chief Engineer of the Board was ordered to examine the whole situation and to make a report to the Board.

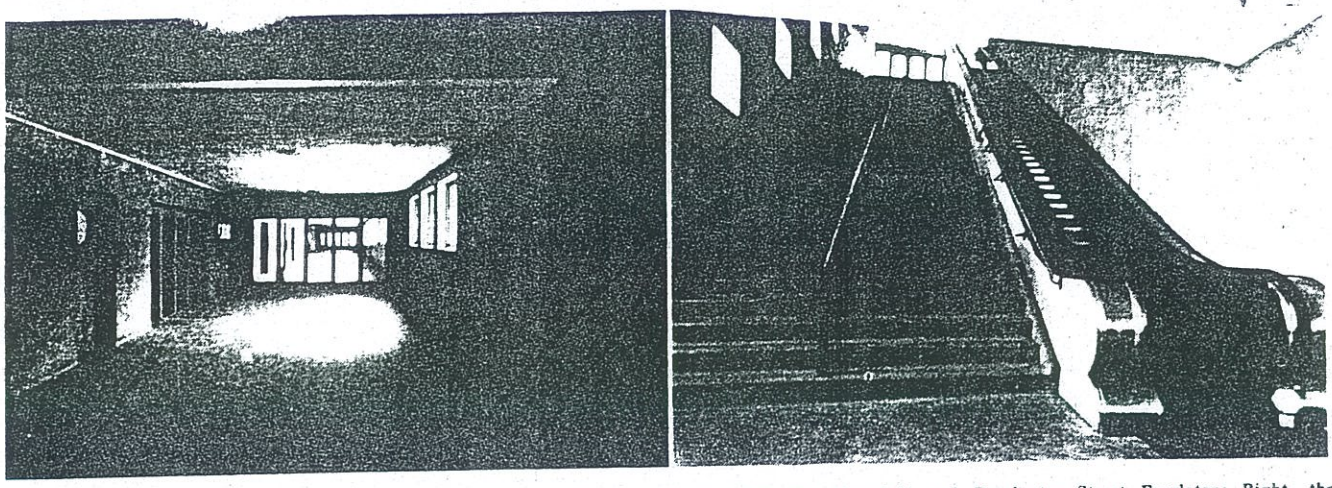
Because of the long series of studies which it had made, the company was able to outline a plan for grade separation and terminal integration when it was asked by the engineering department of the Board if it had anything to propose. Later the plans were submitted in detail to the government. Because of the magnitude of the work involved, the government felt it necessary to secure an independent expert opinion and in 1928 it invited Sir Frederick Palmer, eminent British engineer, to study the project and report upon it to the government.

Sir Frederick spent some months studying the proposals and in January, 1929, he submitted a favorable report to the government. In June, 1929, Parliament passed an act authorizing the construction and providing the money. Work was started immediately on several pieces of grade separation and later in the year on the excavation for the station site. Then, with economic depression steadily making itself more evident throughout the world, work on the whole project was suspended in 1931, and very little was done during the following seven years.

Much Work Accomplished with Great Benefit to City

Altogether apart from the completion of the splendid new passenger terminal which the C.N.R. management will throw open to public use in July, a great deal of terminal development work of outstanding value has been completed. In fact, when one considers that the original project was scarcely under way when Canada and the entire world were plunged into one of the greatest periods of financial stringency and economic deterioration ever recorded, one is astonished that such great progress has been made. Although difficulty and uncertainty handicapped the work until a new start was made under the modified plan, much of value was accomplished. Specifically, 15 level crossings have been abolished, several new streets have been created, and the way has been paved for the development of at least two wide arterial thoroughfares by the completion of the central terminal. As a matter of fact, while the new passenger station is by far the most impressive of the new facilities provided, most of the time and money which have been expended have been devoted to the provision of improved terminal facilities at many points. The terminal development work as a whole includes the provision of a wide combination of facilities, including grade separation structures, yard trackage, railway electrification and equipment, industrial and storage sites, etc. When all of the work now planned is completed, the city of Montreal will have opportunity to create, in its terminals, one of the most highly intensified areas on the continent; at the same time, city planners will have opportunity to place in effect schemes for municipal improvement which otherwise would have been long delayed.

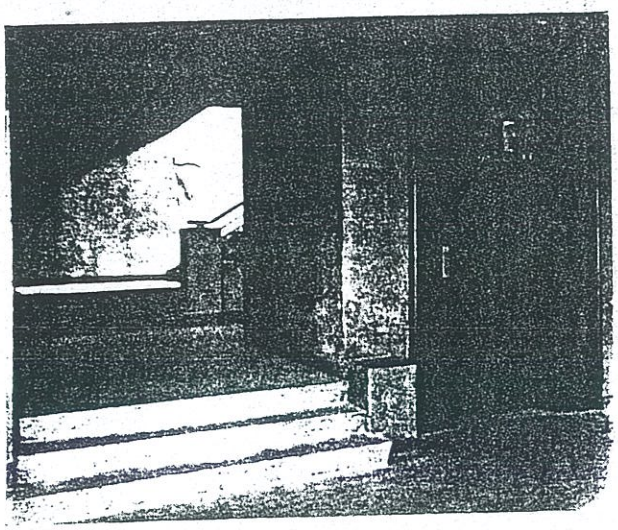
C. B. Brown, Consulting Engineer, C.N.R., the man who has been most responsible for, and most intimately connected with, the carrying out of the terminal development work since its inception, recently reviewed the individual developments completed to date, with some reference to plans for the immediate future. Between the heart of the city, Point St. Charles and St. Henri, many grade separation projects have been completed, Mr. Brown said, and he pointed out that when main line passenger trains begin to operate from the new station, work can be started upon the development of a modern retarded hump yard in the Turcot area. Such a yard would be of great benefit to shippers and manufacturers because it would permit the railway to make



Left, Passage Leading from the West End of the Concourse to Cathcart Street Ramp and Mansfield and Dorchester Street Escalator; Right, the Escalator to the Corner of Mansfield and Dorchester Streets.

rapid classification of incoming and outgoing freight cars, thus speeding up traffic and reducing time and costs in handling. The construction of the short connecting line through Point St. Charles with the Montreal Harbour authorities' tracks would provide a swifter and more direct link between the industrial east and west ends of the city, as well as with the harbour front itself. The way for these improvements has been prepared by what has already been constructed.

All rail entrances to the new passenger station are free of street level crossings from Victoria Bridge and Point St. Charles, covering rail traffic from south, east and west, and north from Mount Royal. Included in the grade crossing eliminations now constructed are those in the southwest at St. Remi Street, St. Marguerite Street and across Notre Dame at St. Ferdinand, the building of which has established great freedom in the movement of all traffic in a large area, at once industrial and residential. Carrying the railway across Notre Dame Street in St. Henry Ward has been a great time-saver, because, with the tremendous increase in wartime freight traffic necessitating numerous train movements at this point, a crossing at grade would mean many delays to vehicular and pedestrian traffic during business hours. In a similar manner, subways at Charlevoix and Hibernia Streets, in what is generally termed the



Northwest Elevator and Stairs in the New Station.

Point St. Charles district, and the reconstruction and enlargement of the subway at D'Argenson Street, approaching busy Verdun, have further improved the speed and mobility of traffic in areas essential to Montreal's industrial development.

Other important grade crossing separation works, which have been in effect long enough to be accepted as normal to Montreal traffic, are the overhead bridges carrying Mountain and Guy Street traffic across the tracks leading to old Bonaventure Station. These bridges, built by the C.N.R., are taken as quite matter of fact, as the traffic volume now flows easily from the higher uptown level to the business and industrial areas below. Prior to the building of the bridges, crossing the railway tracks at street level was slow because of the numerous train movements in and out of the station.

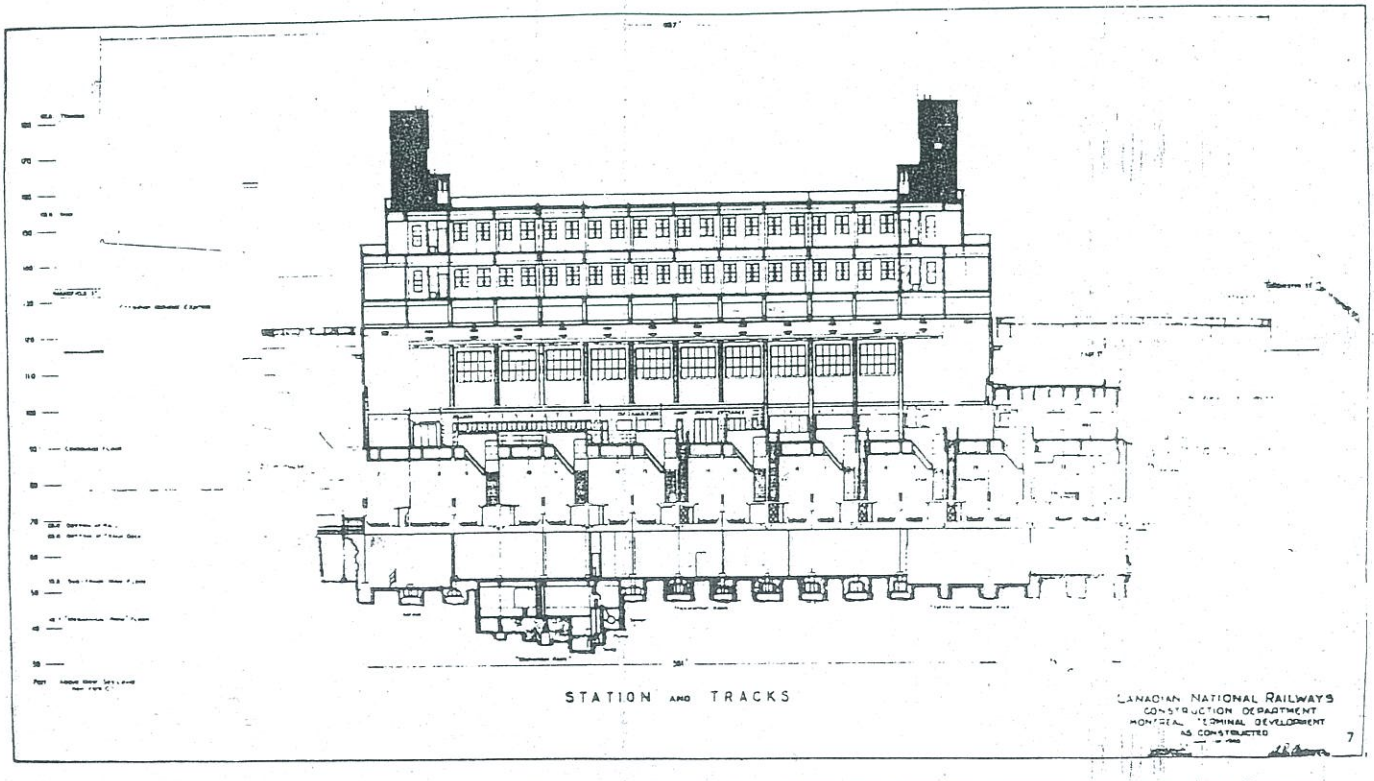
The New Central Station

While, as indicated in the foregoing, the name "Bonaventure" will ultimately be transferred from the old to the new station, it is the desire of the C.N.R. management that the latter be referred to, for the time being, as simply "the new C.N.R. central station", to avoid confusion. For a time, the C.N.R. will be operating suburban trains and certain special traffic into and out of the old Bonaventure station, and it is felt that if the new facility is designated as the new central station while the old station is in operation, misunderstanding will be avoided. The old Bonaventure station, which occupies a site used as a railway terminal since 1847, will be named the "St. James St. Station"; it is remaining in use because of the difficulty in securing, under present conditions, sufficient electric locomotives to handle all traffic into and out of the new station. However, all main line, long distance traffic, with the exception of that handled at the Moreau St. station, in the east end of Montreal, will be operated into and out of the new terminal.

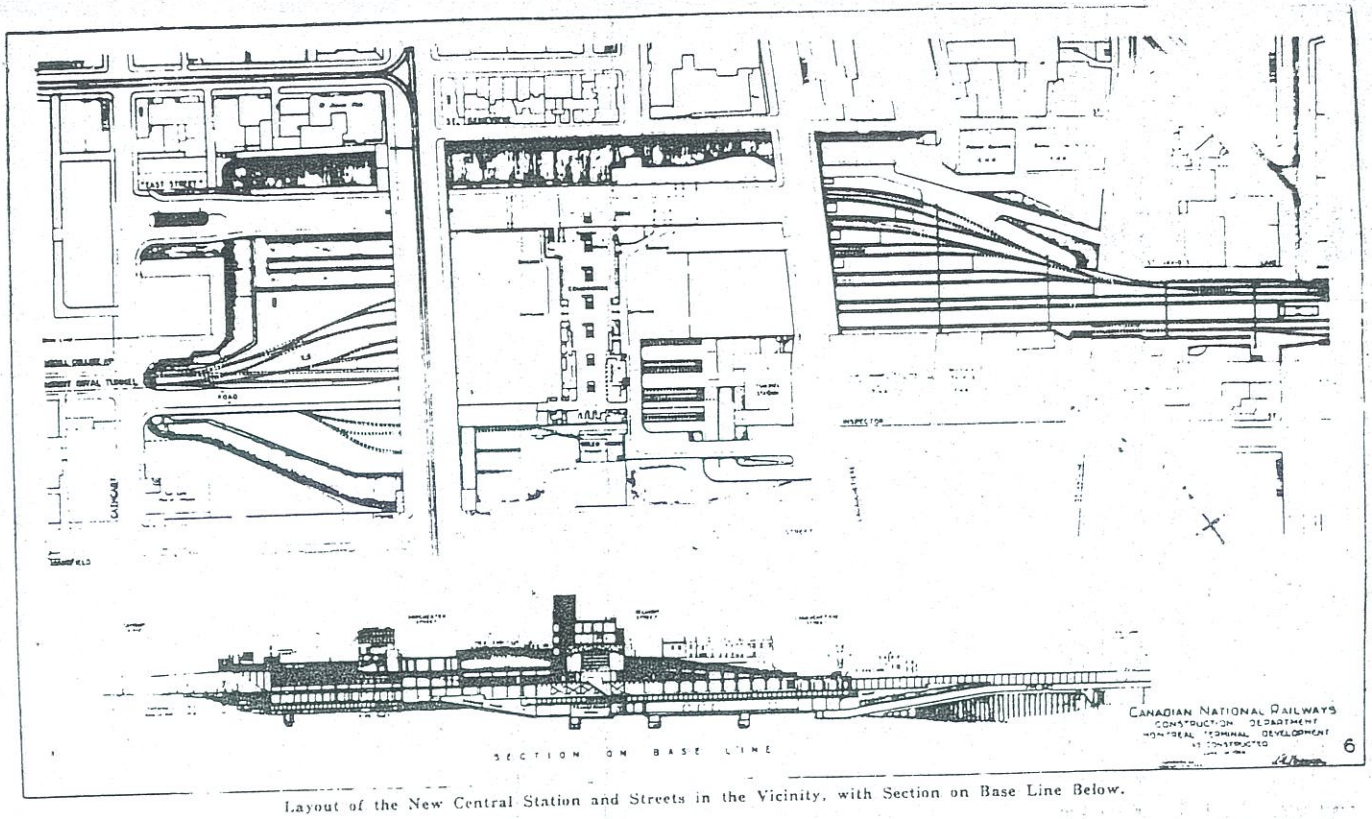
The new station is of the part through, as opposed to the stub-end, type; that is to say, some of the main line tracks are continuous through the station area, with the additional station tracks arranged as sidings, as compared with the stub-end arrangement, wherein the main line tracks terminate at the station, with no provision for through movement. The approach from the north is from the tunnel under Mount Royal, while that from the south is from the elevated track structure extending from Victoria Bridge.

The station building is of structural steel frame, fire proofed with concrete, with the wide span, 106 ft., over the concourse, steel rigid frame. The exterior walls, 13 in. thick, are brick, with 4 in. terra cotta lining, with exterior trim in Montreal limestone. The large exterior concourse windows are of bronze, while the windows of the upper floors are of wood, double glazed. The concourse floor is of terrazzo of various colors and patterns, made with Canadian marble chips divided by strips of slate or marble. The lunch room and women's rest room have floors of linoleum, with inserts.

The concourse walls are lined to a height of 9 ft. with terrazzo, finished with a plaster band at the top and covered with Dutch metal leaf. The



Cross-Section through the New Central Station, Showing the Sub-track Area, Tracks and Platforms, Concourse, and Offices above Concourse. In this drawing, the vertical scale has been enlarged to emphasize the different levels.



Layout of the New Central Station and Streets in the Vicinity, with Section on Base Line Below.

rigid frame piers are covered throughout their entire 27 ft. of height with terrazzo. The enclosures to the platform stairs are covered with terrazzo, while the concourse walls, above the terrazzo, are finished with specially made plaster, integrally colored. The same material was also cast in slabs and carved to form the sculptured decoration on the east and west walls of the room. All woodwork in the concourse, including the doors, is of straight grained white oak. The entire concourse ceiling is suspended and finished with acoustic tile.

The walls of the general waiting room, which form an extension of the concourse below the new East Street, are lined with Ilco buff marble, and the ceiling is lined with acoustic tile.

The lighting of both the concourse and general waiting room is by built-in lensed fixtures practically flush with the ceiling. The vestibules have terrazzo floors and walls, and cork tile ceilings. In the women's rest room, the walls are lined from floor to ceiling with straight grained white oak, with decorative linoleum floor and cork tile ceiling. In the men's and women's toilets, the walls are lined with vitrolite slabs, with different color schemes in both rooms, and the floors are of terrazzo, with marble dividing strips.

In the restaurant, the walls are white oak dado, with painted plaster above. The floor in the public space is linoleum, with colored inserts. The lunch counter is marble front and top, with leather covered stools. The ceiling is treated with an acoustical material. The auxiliary dining rooms also have birch dado, painted plaster walls and acoustic ceilings.

The offices on the second and third floors have all plaster walls, and certain offices are treated with acoustical ceilings. The floors in the offices are all of linoleum, laid directly on the cement floor. Lighting throughout the offices is of the fluorescent type. The corridors have terrazzo floors, as also have the toilets, the walls of which are lined with Canadian marble slabs. All the trim, fittings and woodwork on the upper floors are light finished Canadian birch. The partitions are specially built movable type.

The Station Concourse—The concourse of the new station has been designed so that everything will be made as easy as possible for passengers and for their friends who come to greet them or to see them off. As far as is possible, all the facilities which the public uses are laid out so that they may be found at a glance and quickly reached.

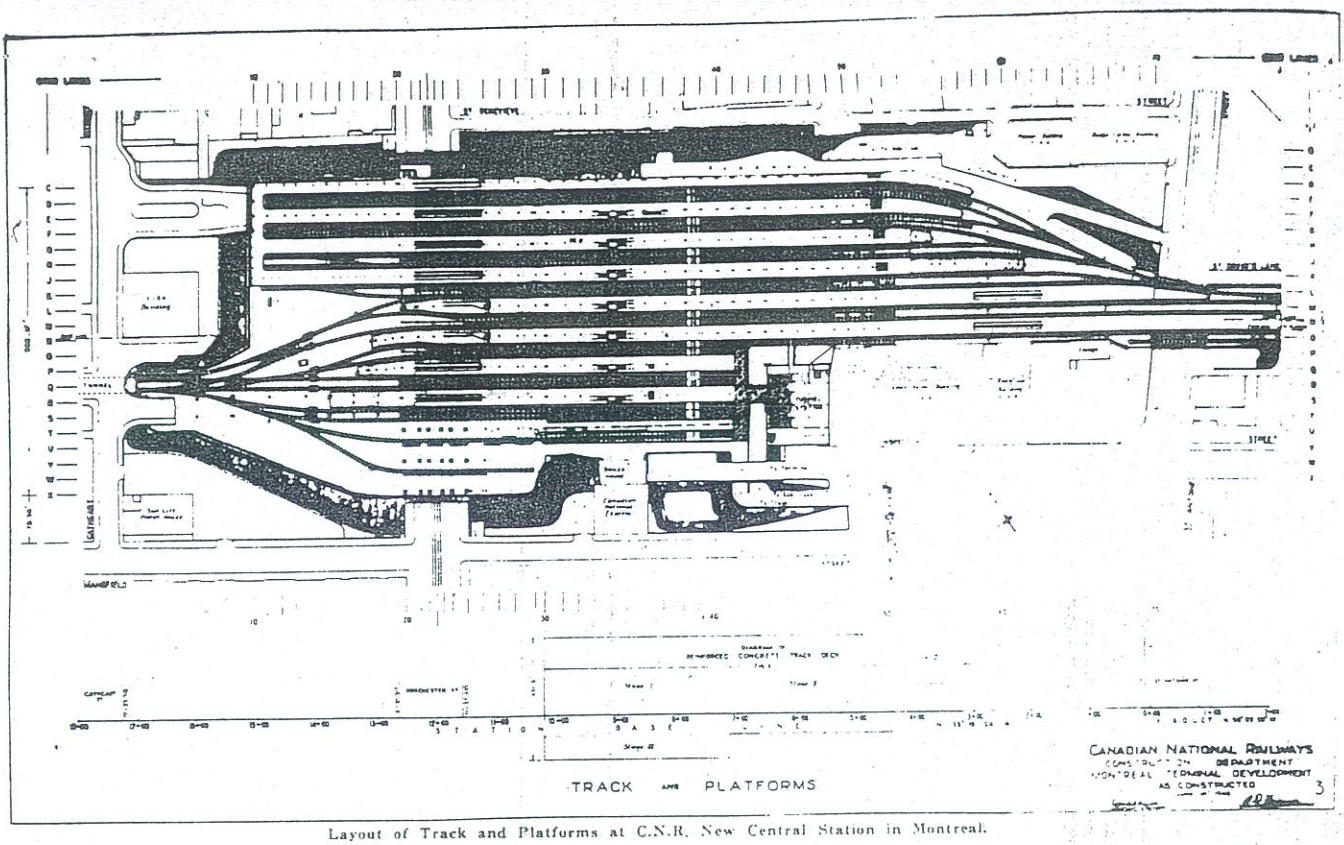
In accordance with the modern concept of direct expression, we find here no proper architecture of the "museum or monumental" type; instead, on entering, the first glimpse is of a great sweep of acoustic tile ceiling 33 feet above the floor. Satisfying to the eye with its color range in tones of buff, it would seem to be simplicity itself; only a few projections in its 350 feet of length protrude, and these are the outlets of a public address system. Two clocks, suspended from the ceiling, take nothing away from the simplicity. The concourse is peaked to the center and follows the constructional form of what are technically known as rigid frames, the great supporting members tieing floor, wall and ceiling over the 104 foot width. These rigid frames project from the walls at 25 foot intervals in the form of piers, tapering from the ceiling to the floor. The repetition of the piers, clothed in a soft blue terrazzo and tapering from a slight projection at the floor to a wide support for the band of mottled blue connecting them along the length of the ceiling, produces an impressive effect of dignity and strength without obstructing available floor space.

The eye follows the line of piers to either east or west end, where huge plain glass windows let in a flood of daylight. Flanking these windows are two projecting corners, supported at the outer corner on circular columns. These corners form great 25-foot reveals to the window, and are tied together with a 7-foot frieze under the window. The corners and the frieze are faced with low relief murals, adding greatly to the richness of the room. This is the co-ordinated work of sculptors, artists and architects.

The floor is a great area of marble terrazzo, predominantly reddish in tone. Along the center of the length, at 50-foot intervals, are the parapets enclosing the stair and escalators leading to the train platforms. There are seven of these stairways, and grouped with four of them are escalators or moving stairways. A fifth escalator is placed on the side of the concourse. War conditions have delayed the installation of these escalators, and the result is that they will not be in operation until after the opening. They are reversible in operation, and can be made to move upwards or downwards in accordance with the flow of traffic.

The general impression of the vast concourse is spacious without being wasteful of space, attractive without being ornate.

The concourse lies almost due east and west. The west end might be termed the business end, for there is situated, on the north side, the ticket



Layout of Track and Platforms at C.N.R. New Central Station in Montreal.

wickets and sleeping car wickets, travel bureau, information counter, telegraph office and travelling passenger agent's offices, on the south side, the hand-baggage and parcel checking counters, transfer office, newsstand and public telephone room. At the extreme west end, across the width of the concourse, is the restaurant. The placing of these facilities at the west end takes advantage of the lesser need for congregating space, since at this end are situated the suburban tracks to the north. Suburban passengers are noted for their moderate use of the many railway facilities, their path being the shortest possible route to and from trains, in and out of the station.

At the east end are the general waiting room and other facilities which are likely to be used by passengers who have time on their hands. These include, on the north side, the women's waiting and retiring rooms, travellers' aid, army and navy information bureau, R.C.A.F. staff headquarters, service men's room; on the south side, the men's room, barber shop, drugstore and soda bar, and, further south the immigration rooms.

The general waiting room is a wide, airy, well-lit room, which is open to the concourse. This is one of the most practical features of the station plan, since passengers can be seated out of the way and yet within sight of the life and movement in the concourse. It has a low, sound-resistant ceiling which deadens extraneous noises and permits of conversation in a normal tone of voice.

The women's waiting and retiring rooms are stationed immediately north of the general waiting room. The waiting room is panelled in oak and furnished with benches, tables and chairs, for the convenience of the passengers. Features of the women's quarters are, a "quiet room" for women who must rest, and a nursery en suite with the medical department, where a trained nurse is in attendance. The toilets and bath rooms are attractively decorated in shell pink and black vitrolite.

The men's rooms, south of the general waiting room, are attractive with pearl grey vitrolite walls and black vitrolite stalls, and are in step with the most modern principles of sanitation. A feature of the men's quarters is the large number of baths and showers. The barber shop is located between the bathroom and the concourse and is entered from either.

Off the hallway, extending south from the general waiting room, are located the waiting room and offices of the immigration services of the Canadian and the United States Governments, the office of the station master, the railway police department and the office of the colonization and immigration department of the railway.

Northward from the general waiting room, a wide passageway leads to Dorchester Street; off this passageway, a large room has been set aside for the use of the armed forces; it is operated by the Canadian Legion, and is fitted as a lounge, reading and writing room. The room is equipped with a kitchen.

The main restaurant has been laid out in conformity with popular trends for rapid service; the main service is of the low horseshoe counter type, with four separate bays. A feature of this counter which will appeal to the women is the provision of a shelf under the counter where they can place their handbags. There are also a number of individual tables and these, together with the counter, provide accommodation for about 100 people at a sitting. Immediately north of the restaurant there are three private dining rooms, each 33 feet long by 22 feet wide, supplied from a service kitchen. These rooms are separated by folding partitions which can be rolled back to allow the three rooms to be turned into two rooms or one room, as desired. This space will accommodate at least 165 people at a sitting. The dining room and restaurant facilities are operated by the dining car department of the C.N.R., and the same high quality of food and service for which the dining cars of the System are noted, will feature the management and cuisine of the station restaurant.

The concourse is scientifically ventilated, so that it will be pleasantly cool in summer and agreeably warm in winter.

A modern public-address system has been installed in the concourse and in all public rooms, and over it, without shouting, announcements of interest to the public will be made.

Station Entrances and Exits—The station is well provided with entrances and exits. For taxicabs and cars there is one main entrance and one main exit. Taxis and private cars carrying outgoing passengers to the station reach the concourse by driving down the ramp off Cathcart Street, almost due south of McGill College Avenue. This three-lane ramp descends to the plaza in front of the station. The main taxi entrance is situated at the center of the concourse. Returning, these taxis and cars make a circuit of the plaza from west to east, and

then proceed northward up the ramp to Cathcart Street and McGill College Avenue. Immediately north of the plaza, underneath Dorchester Street Bridge, there is a covered parking space. This, along with other parking areas on the plaza, will accommodate 250 cars. This parking space will be appreciated by private parties bringing friends to the station in their own cars.

Incoming passengers, who intend to proceed by taxi or car, will leave the station by the main exit in the center of the south side of the concourse. This opens upon a wide plaza with a spacious taxi parking area south of it. Taxis draw up to the station door, facing west, and, on leaving, move west and south along the station roadway to Lagauchetiere Street. Taxis proceeding north or east may, if they wish, do so by swinging east on Lagauchetiere Street, and north up new East Street to Cathcart Street.

For pedestrians there are many ways in and out of the station. The main entrance from the north or St. Catherine Street is via McGill College Avenue to the southwest corner of Cathcart Street, whence a sidewalk parallels the taxi roadway. This roadway and sidewalk descend, by an easy grade, to the cover of Dorchester Street Bridge, at the concourse level. From this point under the bridge, the passenger may enter the wide corridor, which joins the concourse at its western end beside the restaurant, or may continue by sidewalk to the taxi entrance at the center of the concourse. From this corridor an elevator and stairway lead to the offices over the concourse.

Another entrance from the north is via University, Cathcart and new East Street. At the north stair tower, there is an entrance leading to a wide flight of stairs arriving at the end end of the concourse. This entrance on new East Street is also one of the entrances to the offices on the upper floors.

Approaching from the west, at Dorchester Street level, there is an entrance at the southwest end of Dorchester Street Bridge, where a covered stairway leads to the wide corridor mentioned in the approach from Cathcart Street. For outgoing passengers an escalator is provided alongside the stair from the concourse level to Dorchester Street level.

At the northwest corner of Dorchester Street Bridge, an open stairway descends to the concourse level. Those using this stairway pass under the bridge, where they may enter the covered passage or take the sidewalk as described for the entrance from Cathcart Street.

Approaching from the east, at the northeast corner of Dorchester Street Bridge, adjoining the St. James's Club, there is another covered stair and escalator. This stairway descends to the concourse level, and passengers may proceed by the east corridor to the waiting room end of the concourse. From the south, off Lagauchetiere Street, there are three combined entrances and exits. One reaches the concourse beside the drugstore. Another entrance is in the center of the concourse and is the one which incoming passengers use when they want taxis. The third is located at the southwest corner of the building and enters the concourse by a short passageway beside the restaurant.

Citizens who have business to transact with the occupants of the railway offices, above the concourse, may use the elevator or stair adjoining the restaurant at the west end; or the elevator and stair at the northeast corner of the concourse. This latter stair is also the public stair leading to new East Street.

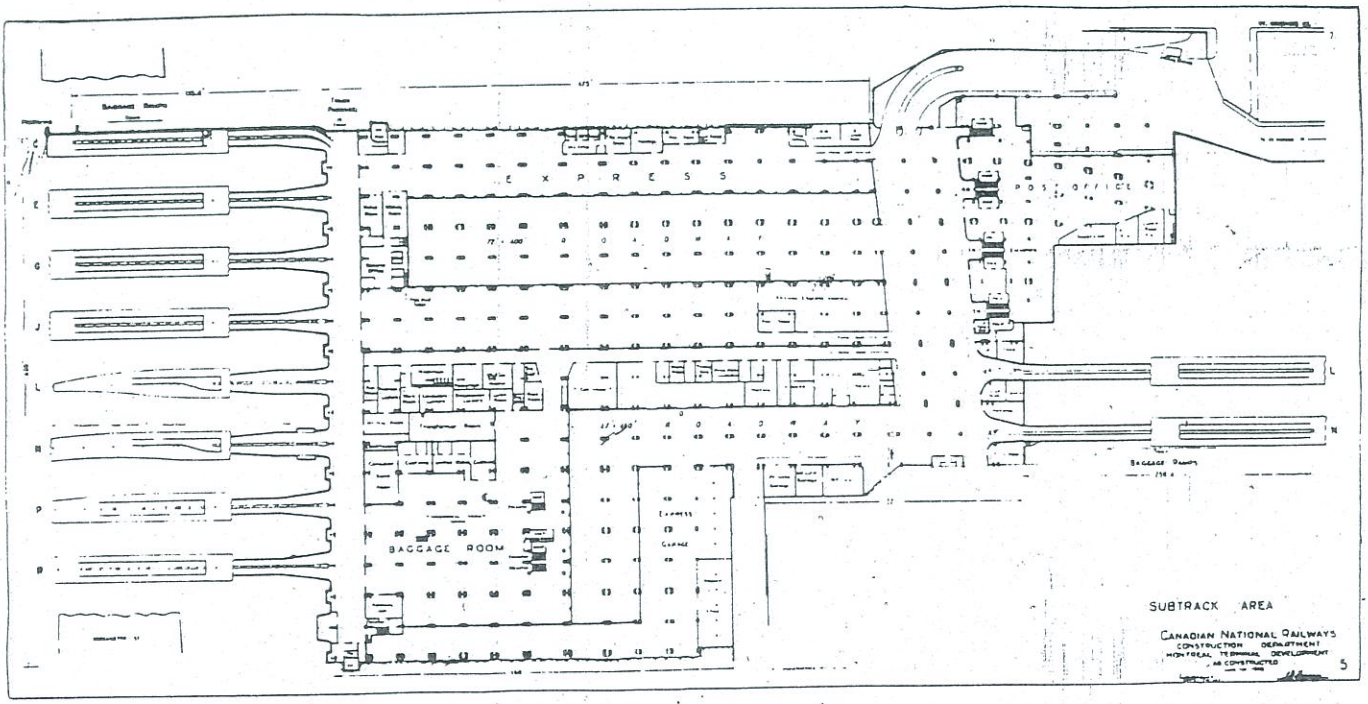
The offices above the concourse are for the district and divisional operating offices of the railway and include general superintendent, superintendents, general and district passenger agents, division and district freight agents, sleeping and dining car departments, etc.

The offices above the concourse are on two floors, connected with the concourse by elevators and stairways located at the east and west ends of the building. The offices have been specially designed for the purposes for which they are to be used and they vary in size and shape, according to the requirements of the departments by which they will be occupied. They are finished in a gray green color with linoleum floors to match. The wood trim, counters, benches, etc., are of light birch and the effect is one of lightness and airiness. Fluorescent lighting is used throughout the offices.

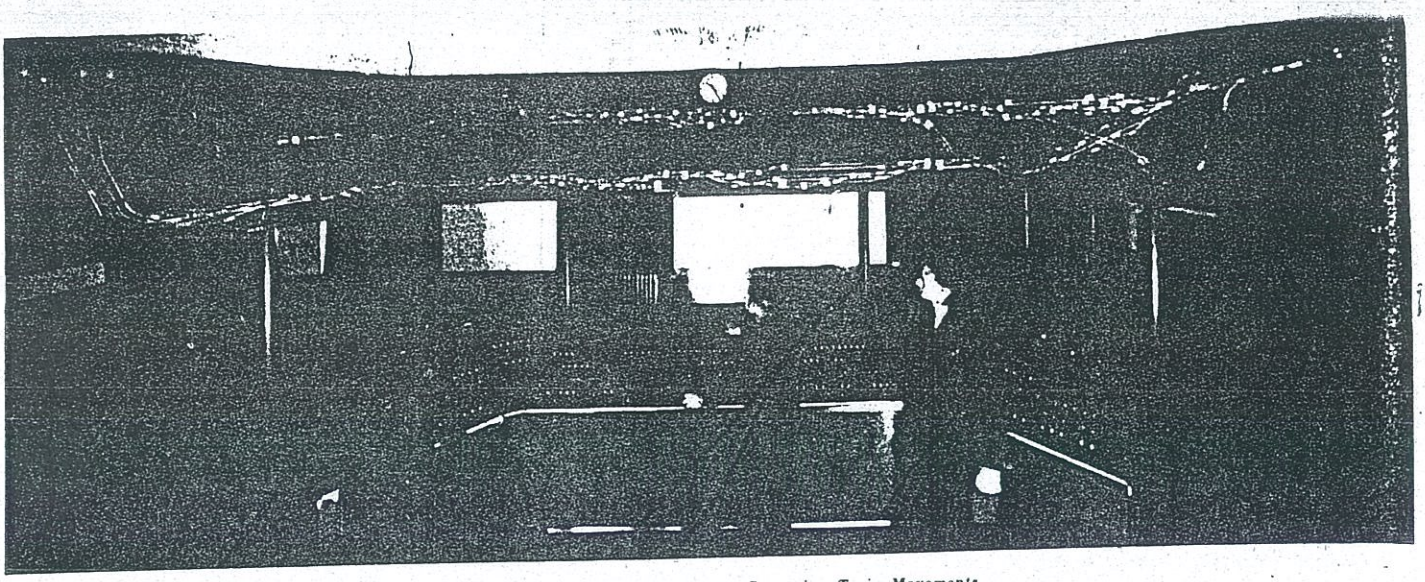
Occupancy of Offices—Following are particulars of the occupancy of the first floor and second floor offices, above the concourse. In addition to the staff lunch room, and the railway offices specified, on the first floor, this floor accommodates also the offices of Defence Communications, Ltd., the Pullman Co. (for agents and inspectors), and the Canada Railway News Co.

1st Floor—
- Industrial Agent—M. W. Kiel.
- Conference and Lecture Room.
- General Passenger Agent and Staff—O. A. Trudeau.
- District Passenger Agent and Staff—A. V Hamilton.
- S. & D. Car Supt. and offices—Y. Moody.
- Division Freight Agent and Staff—S. E. Leger.
- District Freight Agent and Staff—E. C. Champ.
- Staff Lunch Room.

2nd Floor—
- Gen. Supt. offices and staff—R. C. Johnston.
- Supt. Transportation—R. A. McQuade.
- Supt. St. Lawrence Division—H. M. Gain.
- Assistants—E. H. Locke, A. M. Shea.
- Supt. Montreal Terminals—J. F. Connolly.
- Assistants and Staff—O. A. Boivin, R. M. MacDonald, J. A. Nobert.
- Supt. Motive Power and Car Equipment and Staff—J. H. McAlpine.
- District Car Foreman—D. J. Thorley.
- District Engineer and Staff—W. Walker.



Plan of Express, Baggage and Postal Sections of the Sub-track Area of the New Central Station.



Electrical Control Apparatus for Governing Train Movements.
Every train movement in the central terminal area is electrically recorded and controlled by operating officials working at huge wall diagram boards. Electric lights show every move on the trackage from approximately 150 ft. inside the tunnel portal to the tenth span of Victoria Bridge, and Turcot Center.

Assistant—H. W. Fleming.
Division Engineer and M. of W. Staff—H. MacNeil (St. Lawrence).
Division Engineer and M. of W. Staff—H. K. Morrison (Terminals).
Plan Room and Blue Print Room.
Chief dispatcher and dispatchers for divisions of Montreal area—R. J. H. Wood (St. Lawrence), J. A. McEachran (Terminals).

Platform and Sub-track Levels—The platforms are reached by the passengers from the seven stairs in the centre of the concourse floor; they serve fourteen passenger train tracks. These are high platforms, flush with the level of the passenger car vestibules, so that no climbing up or down of passenger car steps is necessary.

A further and equally important feature of these platforms is that for the greater part of their length they are reserved for passengers. All baggage, express and mail is moved to and from trains by ramps situated near to the ends of the platforms. For some of the platforms at the south end, elevators are used instead of ramps.

In addition to the fourteen regular passenger train tracks, there are three others. One of them is reserved for express, mail, etc.; the remaining two are auxiliary tracks which can be used for storage of cars handling express, etc., to road trucks, parking or other purposes—special trains, for example. The total of fourteen passenger tracks provides the largest trackage operating into any station in the City of Montreal. The comparative figures are 11 at Windsor Street Station and 11 at old Bonaventure. In passenger car capacity, the comparison is 150 cars for the new terminal as against 81 for old Bonaventure, not taking into account accommodation for 36 cars for tunnel suburban service and also for 33 cars on express, mail and auxiliary tracks.

Below the track and platform level is the sub-track level, which is on the same elevation as St. Antoine Street. On this level is situated, "behind the scenes", the operating staff of the station. From the standpoint of train operation it competes with the signal tower and the dispatcher's offices for the title of the heart of the terminal. The area is a virtual maze of rooms, offices and other facilities, only a few of which require description here. It contains the transformer room from which flows the current operating trains and lighting systems.

There are two entrances to the sub-track level; one is by roadway from St. Antoine Street, just west of St. Genevieve; the other is off Lagauchetiere Street, just west of the old Tunnel Station. From these roadways the sub-track area is entered through doors which operate automatically when cars pass over a magnetic control located about thirty feet from the entrances inside and outside of the building.

The Post Office occupies a large portion of the southeast section of the sub-track level. This is used for the handling of inward and outward bound mail.

The Canadian National Express and Railway Express Agency facilities occupy, almost exclusively, the eastern section of the area. In connection with the express facilities there is a pick-up service operated at the old Tunnel Station on Lagauchetiere Street. There is a stair and elevator connecting the express facilities in the old Tunnel Station to the sub-track level, provided particularly for the convenience of clients of the Railway Express Agency who have to do business with the U.S. Customs authorities; it will, of course, serve all other departments having business in the sub-track.

The baggage room, where trucks and other inward and outward bound heavy baggage is handled, is situated in the northwest section of the area. Off the baggage room, the offices of the Canadian and United States Customs services are located. The baggage and express facilities can be reached by motor roadway leading from the St. Antoine and Lagauchetiere Street entrances. Two elevators in the baggage room deliver hand-baggage to and from the baggage checking room in the concourse. For passengers who want to reach the sub-track level baggage room direct, or who want to have baggage passed by the United States Customs, an automatic passenger elevator has been provided to give direct connection between the concourse and the baggage room in the sub-track area.

In addition to these large facilities, the basement also contains numbers of rooms and offices for the transaction of purely interdepartmental railway business; garage facilities for from 90 to 100 express trucks; sleeping and dining car facilities, and space for Canada Railway News Co.

The floors in the sub-track area, in which are housed the express sheds, baggage room, post office, express garage, etc., are of cement throughout, with a ground trap rock finish. The trucking roadways have walls faced with pressed brick on the lower part and white sand line brick on the upper part. The partition walls are generally of concrete block. The ceilings are exposed concrete slab, painted, and the slabs in the working offices are covered with acoustic board.

Heating—The main concourse and the sub-track area are heated by forced steam-heated filtered hot air systems, while the offices and other areas are heated by direct steam radiation.

Ventilation—Mechanical ventilation is furnished in all areas, and filtered fresh air is supplied by 15 supply fans with total capacity of 130,000 cfm. Used air is exhausted by 17 fans with total capacity of 170,000 cfm.

Lighting—All office areas are equipped with flourescent lighting, providing illumination intensity of approximately 35 ft. candles. The main lobby and waiting rooms, and east and west passageways, as well as the stairs and escalators from the street level to the concourse and from the concourse to the train platforms, are lighted by means of flush mounted lens lights. The roadways in the sub-track area are provided with non-glare, evenly distributed light through the use of prismatic refractor lights.

The baggage and express areas are effectively illuminated through the use

of base inside-frosted lamps, with the light reflected in all directions by the white ceilings and walls. Miscellaneous areas, including the toilets, are lighted by enclosing opal glassware fixtures.

Provision for Overhead Buildings

In the station area all new construction has been so designed and executed that areas not occupied by streets are available for the construction of buildings overlying railway station tracks and facilities. In order to insure that no vibration from trains or from street traffic will be transmitted into any future overhead buildings, provisions have been made so that each of the structures will rest directly on solid rock and will be completely insulated and isolated from structures carrying railway trains and street traffic.

The concourse of the new station is located over the top of the structure carrying railway tracks, but the columns supporting the concourse are carried down through the track structure to solid rock, and these columns are completely insulated from the track structure. Similarly, the waiting rooms, lavatories and various other facilities are in a piece of isolated structure located between the underlying track structure and an overlying street deck.

The Concourse Murals — Captain Charles F. Comfort, R.C.A., of Toronto; now on active service overseas as an Official War Artist, created the murals in the concourse. Bearing in mind the medium through which his vision was to be presented, the setting and the necessarily large scale of dimensions, he worked in ample, summary forms; but while his figures are formalized and symbolic, they are vigorous and human. They are stripped to broad essentials, yet detail is used where it will be most effective in the design, to accent theme or point up character—here a star, there a maple leaf, somewhere else a note of music—and some of them in the great sweep of the impressive panorama, having a charming tincture of humor, as the gopher in the shade of the gigantic grain elevator and the slingshot rampant beside the boy and his dog in the family group.

The artist has not given us an historical pageant; this has been done often enough; he shows, instead, the drama of The Present, of Canadian life now. In his own words, "The work is an effort to formalize the contemporary life of Canadians; their industry, their recreation, their culture, their hopes and aspirations, and to some extent to suggest their environment." This has been done by dividing the Dominion according to the cardinal points of the compass and presenting one at each corner of the concourse. Friezes, not localized but embodying, in general terms, culture, on the one hand, and social institutions, on the other, run along the east and west walls. The points North and East are named in French, Nord and Est, and South and West are in English. Along the base of the design, lines from "O Canada" appear in French and English.

Officials in Charge of Work

As stated above, C. B. Brown has been in charge of all engineering and construction features of the terminal development work since it was begun. Associated with him on the station building proper have been John Schofield, Chief Architect, C.N.R. and Trans-Canada Air Lines; George F. Drummond, Assistant Chief Architect, C.N.R., and A. D. Ferguson, Engineer of Construction, C.N.R. Brief biographical information, in regard to each, follows.

C. B. Brown, Consulting Engineer, C.N.R., was born in Ithaca, N.Y., in 1879, receiving his education in that city's Public and High schools and Cornell University, from which he received the degree of Civil Engineer in 1901.

After obtaining considerable experience in railway construction and engineering in various sections of this country, he was appointed Chief Engineer of the Canadian Government Railways in 1913, with headquarters at Moncton. As the Great War was reaching the turning point in 1917 he was assigned extra duties as Assistant General Manager of Eastern Lines. With the amalgamation of the component lines now forming the Canadian National System, Mr. Brown was appointed Engineering Assistant to the Vice President with headquarters in Toronto, which position he held from 1920 to 1923. In the latter year he became Chief Engineer, Operating Department, with headquarters at Montreal, and on August 31st, 1939, he was appointed Consulting Engineer to supervise the completion of the terminal.

John Schofield, Chief Architect, C.N.R. and Trans-Canada Air Lines, Montreal, was apprenticed to his profession in his native Ireland; he practised in Dublin and came to Western Canada in 1904. In 1907 he was made assistant architect with the Canadian Northern Railway and, in 1923, moved to Montreal as architect of Canadian National Railways upon amalgamation of the constituent roads.

Few men have such wide experience in planning and construction. He has designed such widely varying facilities as hotels, stations, arline hangars and huge railway erecting shops.

One of his tasks has been the remodelling of C.N.R. passenger equipment and developing new interior decoration. Mr. Schofield was consultant on decoration of the Royal Train used during the visit of Their Majesties to Canada in 1939.

C. B. Brown,
Consulting Engineer, Canadian National Rys., and in charge of the terminal development work at Montreal since its beginning.

George F. Drummond, Assistant Chief Architect, C.N.R., has had wide experience in architectural design and construction. He has been associated for the past fourteen years with all the major building projects of the Canadian National, both stations and hotels. He received his architectural training in the Old Country, being a graduate of the Royal Technical College and Glasgow School of Art, and is a member of the Quebec Association of Architects and the Royal Architectural Institute of Canada. For many years he was the chief designer for one of the largest architectural firms in Montreal and is responsible for the design of many important buildings throughout Canada, particularly banks from Coast to Coast, and also many commercial buildings in the Montreal district, and the larger type of residence. After service overseas with the Canadian Field Artillery, he practised in Montreal, but since his association with the architectural department of the Canadian National Railways, he has had occasion to carry out work on their behalf all over the Dominion and is well known to the architectural and building trades throughout the country. Mr. Drummond is also assistant chief architect for Trans-Canada Air Lines.

A. D. Ferguson, Engineer of Construction, C.N.R., is a native of Cardiff, Wales, and a graduate of the Universities of Oxford and Wales. Upon the completion of his courses he came to Canada and in 1911 entered the service of the Grand Trunk Pacific, being employed in the construction of the Tofield-Calgary line. Afterwards he joined the Canadian Northern Railway (Ontario Lines) and worked on the construction of the Nipigon-Orient Bay section. His next employment was on the construction of the Hudson Bay Railway working into Nelson, the original terminus of the route.

In November, 1926, Mr. Ferguson joined the Canadian National Railways as engineer in the Bureau of Economics, and with the resumption of work on the Montreal Terminal development in 1939 was appointed construction engineer on that undertaking. In September, 1940, he was appointed engineer of construction for the National System.

H. L. Currie, recently appointed Office Engineer, C.N.R., with headquarters at Montreal, is another man who has been prominently identified with the terminal development work in that city, and who has been in charge

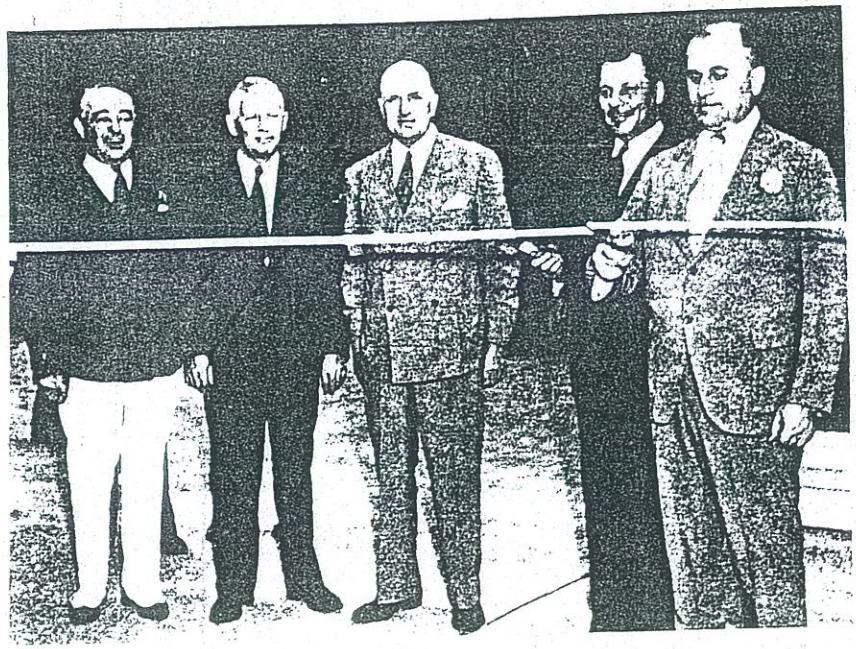
C.N.R. New Montreal Station Opened

With appropriate ceremony, the Canadian National central terminal station in Montreal was officially opened for service on July 14, by the Dominion Minister of Transport, Hon. J. E. Michaud.

THE Canadian National Rys. new central terminal station in Montreal, which was fully described and illustrated in Canadian Transportation for July, was opened officially on July 14, when the Dominion Minister of Transport, Hon. J. E. Michaud, cut a white silk ribbon stretched across the doors opening off the north plaza, with a pair of suitably inscribed scissors, with gold-plated handles, presented to him by Wilfrid Gagnon, a Canadian National Ry. Co. director, who was master of ceremonies for the occasion. Also marking the entry into service of the new structure and its facilities was the unlocking of the main entrance to the concourse by Mayor A. Raynault, of Montreal, with a gold-plated key presented to him by Mr. Gagnon. The ceremonies were viewed by some 1,200 invited guests, for whom seats were provided in the north plaza, and by a large number of Montreal citizens, who lined the Dorchester Street bridge or viewed proceedings from other vantage points. The speakers' platform was arranged to the north of the main station entrance, and was flanked by members of the flag patrol of the Vimy Branch of the Canadian Legion, carrying flags of the United Nations; the Vimy Branch is largely composed of C.N.R. employees.

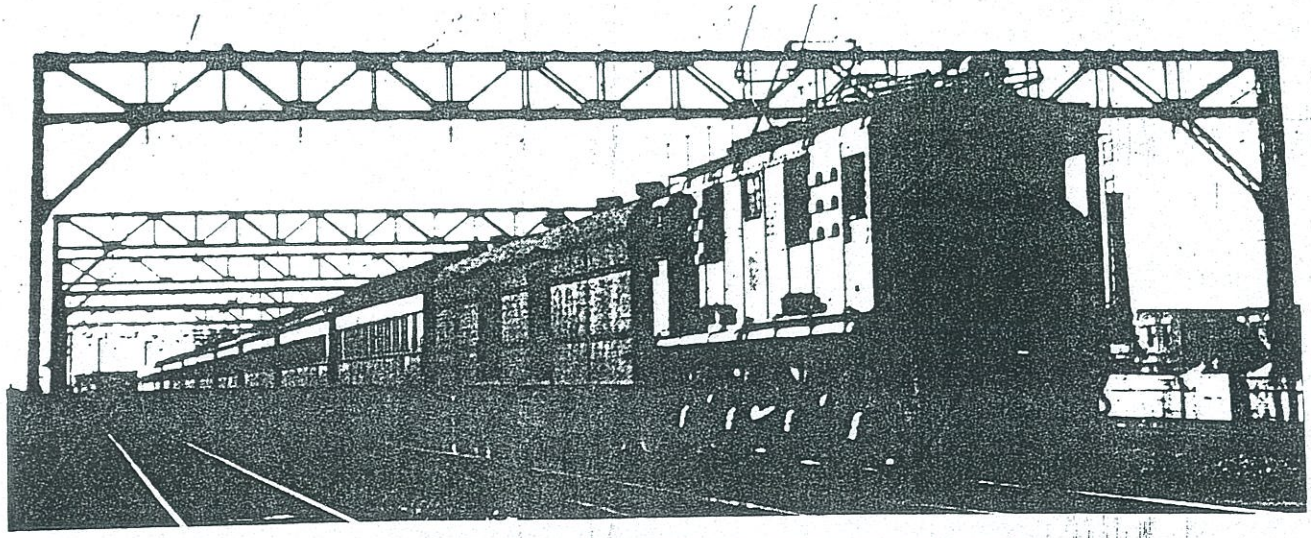
In addition to Mr. Michaud, Mr. Gagnon and R. C. Vaughan, Chairman and President, C.N.R., and Mayor Raynault gave addresses. Others on the speakers' platform included the Dominion Minister of Fisheries, Hon. E. Bertrand; J. A. Northey, Toronto, a C.N.R. director; the Quebec Minister of Roads, Hon. T. D. Bouchard; H. J. Symington, K.C., a C.N.R. director and President, Trans-Canada Air Lines; B. L. Daly, E. J. Young and C. H. Read, C.N.R. directors; W. S. Thompson, Director of Public Relations, C.N.R.; Hon. A. Giroux, of the Quebec Legislative Council; J. O. Asselin, Chairman of the Montreal City Council Executive Committee, and R. L. Marix, C.B., D.S.O., Officer Commanding No. 45 Transport Group. Among those who witnessed the ceremony were S. J. Hungerford, President, National Railways Munitions, Ltd., and formerly President, C.N.R., and Wm. B. Powell, the oldest pensioner of the C.N.R. in point of service, and who is now 88 years old, and spent 64 years of his life in the service of the C.N.R. or predecessor companies.

Mr. Michaud, in his address, called attention to the fact that the new station is only one feature in the whole scheme of terminal development in Montreal, and that, similarly, it repre-



At the Opening of the C.N.R. New Central Station, Montreal.

The Dominion Minister of Transport, Hon. J. E. Michaud, is cutting the silk ribbon with a pair of golden scissors. From left to right, the others are Hon. Ernest Bertrand, Dominion Minister of Fisheries; J. A. Northey, a C.N.R. director; R. C. Vaughan, Chairman and President, C.N.R., and Mayor Raynault of Montreal.



First Regular Passenger Train into the C.N.R. New Central Terminal in Montreal.

This is train No. 16, from Toronto, hauled by electric locomotive 9186. All of the trackage in the central terminal area is electrified, with every train movement electrically controlled by dispatchers at their control boards, as described in the leading article in our July issue. The electrical control apparatus for the governing of train movements was illustrated on page 342 of the July issue.