The Montreal Métro

DOCUMENTATION

Montreal Urban Community Transit Commission

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Montreal Urban Community
Transit Commission
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Foreword

This is not a technical description, but rather a brief look at the type of rapid transit adopted in Montreal and some of its features which might be of interest.

The Métro was designed, built and financed entirely by the City of Montreal. Work commenced on May 23rd 1962. The entire project of sixteen miles was completed and in operation in less than five years. The total cost was $213,700,000. completely equipped. It is operated in conjunction with the surface bus system by Montreal Urban Community Transit Commission as the direct agency of the Montreal Urban Community.

Background

The need for rapid transit in Montreal had long been recognized. Because of narrow streets, peculiar topography and severe climate, surface operations have always been difficult. Several proposals and studies for subways had been made in the past, particularly in 1953, but it was decided to explore all other measures of relief first, such as the substitution of buses for streetcars, street widening, one-way streets, improved traffic control devices, regulation of parking and all the usual things most cities have done in attacking the traffic problem. Such improvements were soon nullified however by the continued post-war influx of automobiles, and furthermore, a massive downtown renewal and building activity was commencing. It became increasingly apparent that a surface bus system alone would not suffice. Practically all streets in the central business district, suitable for buses, were being used, and no significant increase in the capacity or speed of bus service could be expected in the immediate future. Finally the civic administration, which came into power in 1960 under Mayor Jean Drapeau, had the courage and foresight to undertake the building of a subway as the major element of a civic betterment programme. Present thinking is towards the creation of a pleasant business and cultural environment, — renewal and beautification, and to avoid elevated traffic structures in the heart of the city.

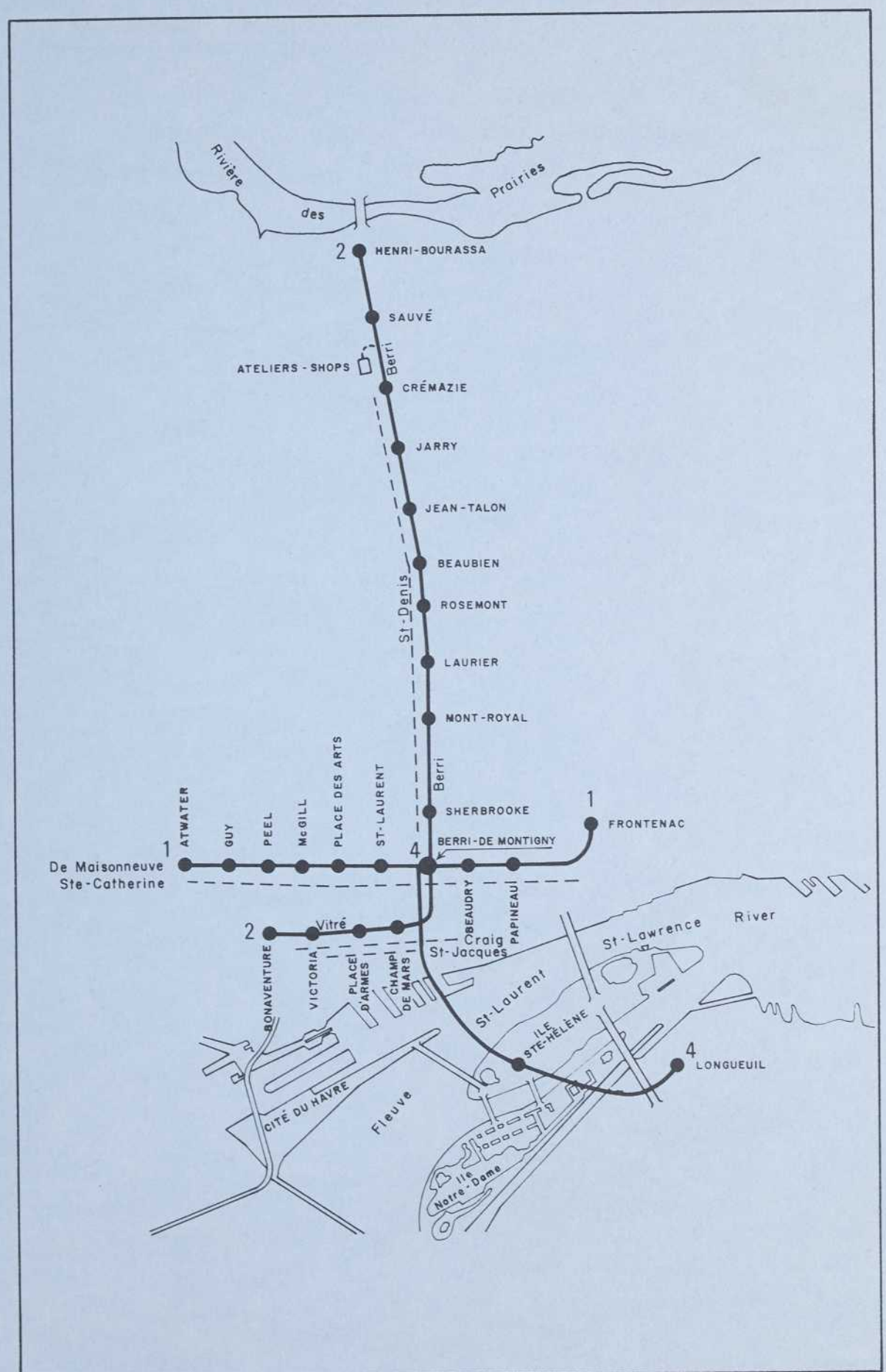
Location of Initial Rapid Transit Lines

Previous rapid transit studies had all indicated that the initial lines should be located within the corridors of greatest population density and commercial activity, namely: a north-south band of territory lying just east of Mount Royal; an east-west segment centered on the St. Catherine Street commercial axis; and another east-west element in the lower downtown area. The lines as presently built, Nos. 1 and 2, conform to this pattern, as indicated on Plan A, but the significant feature lies in the fact that the subway alignment does not follow the main traffic and business arteries in these corridors, but instead is along adjacent or intermediate streets. This policy was adopted to enable the city to widen and improve the character of these narrow streets and revitalize these older, and in some sections rather rundown areas. Particularly in the central business district, where much of the subway had to be close to the surface and built by cut and cover methods, it was an excellent opportunity to expropriate and demolish old structures and get the benefits of urban renewal and surface traffic improvements in the most economical manner. Of course a calculated risk had to be taken in moving the subway away from the main streets. A longer walk is imposed on a large number of passengers, but the attraction of the subway does not seem to have suffered much on this account. There is no question, however, that the Montreal concept has demonstrated the use of fixed underground transit facilities as a powerful instrument in reshaping and improving the business district.

When the site for the 1967 International and Universal Exhibition was established on islands in the St. Lawrence River, the need for high capacity public transportation to the Expo site was immediately apparent. Consequently a third line, designated as line No. 4 was included in the project, passing under the river and serving also the growing communities on the South Shore. This convenient facility for crossing the river is relieving traffic on the bridges as it reduces the number of automobiles coming into the centre of Montreal from this heavily populated region.

All three lines intersect at the Berri-de Montigny Station, which is the focal point of the system. No. 1 line is 3.7 miles long and has ten stations. No. 2 line is 7.4 miles and has fifteen stations and No. 4 line is 2.6 miles with three stations.

This, then, is the nucleus of what is hoped should be a continually expanding network.


Rivière des Prairies
2
HENRI-BOURASSA
SAUVÉ
ATELIERS - SHOPS
Berri
CRÉMAZIE
JARRY
JEAN-TALON
BEAUBIEN
St-Denis
ROSEMONT
LAURIER
MONT-ROYAL
Berri
SHERBROOKE
1
FRONTENAC
4
BERRI-DE MONTIGNY
1
De Maisonneuve
Ste-Catherine
ATWATER
GUY
PEEL
McGILL
PLACE DES ARTS
ST-LAURENT
BEAUDRY
PAPINEAU
2
Vitré
Craig
St-Jacques
BONAVENTURE
VICTORIA
PLACE D'ARMES
CHAMP DE MARS
St-Laurent
St-Lawrence
River
ILE STE-HÉLÈNE
4
LONGUEUIL
CITÉ DU HAVRE
Fleuve
Ile Notre-Dame

Functional Concept

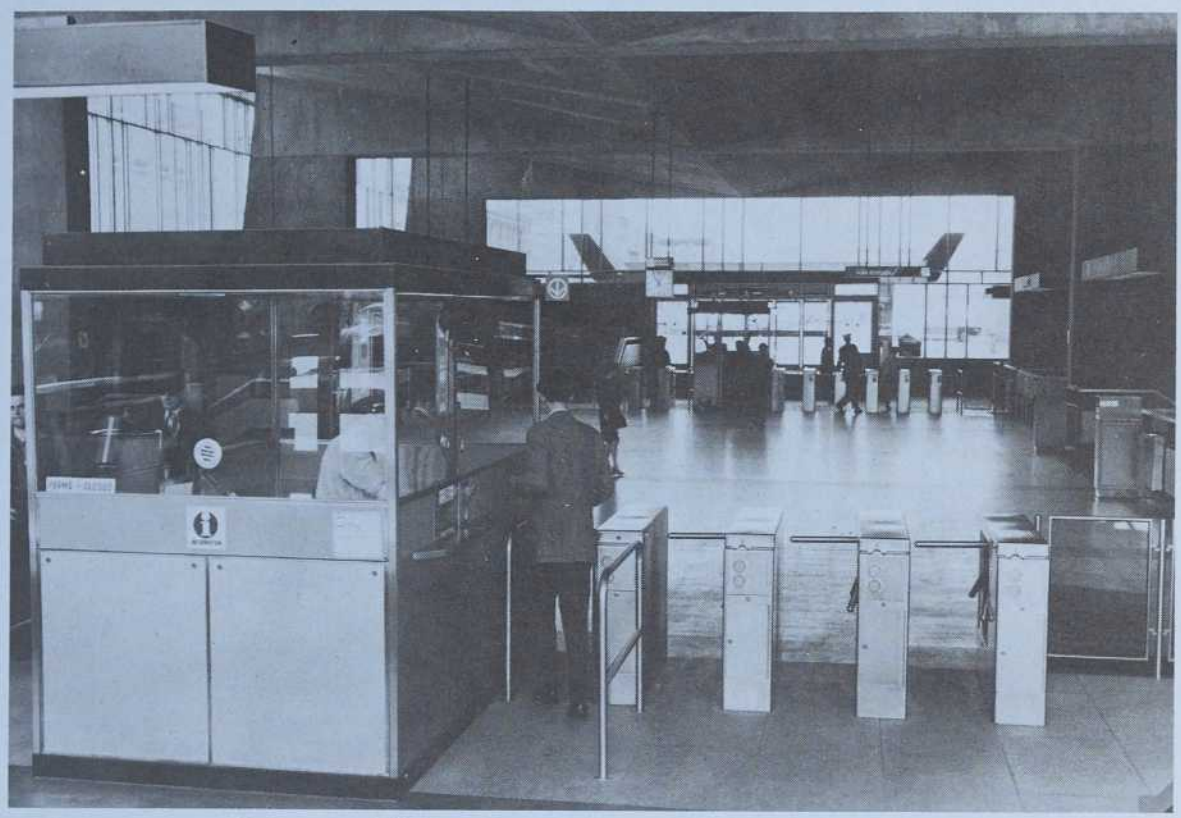
It should be explained that the Montreal Métro is in no sense intended to function as a suburban or commuter facility. The objective was to create a network of rapid transit lines for high-volume, close headway working within the densely built central area of the metropolitan region. In effect, the rapid transit system and the bus system function as a single unified urban network, on which a single flat fare is charged with free transfer between the buses and métro and vice versa. The aim is to make the métro easy to use, and to bring the advantages of rapid travel to as many citizens as possible, — even for part of their journeys, — without extra charge.

This concept presumes that the requirements of long distance commuter type services are sufficiently different from those of urban transit, to warrant a distinct separation as to type of rolling stock, operating methods and fare structure.

Type of Rapid Transit Chosen for Montreal

As is generally known, the type of rapid transit chosen by the City of Montreal is the pneumatic tired concept developed by La Régie Autonome des Transports Parisiens for the Paris Métro. In building an entirely new system it was possible to introduce advances in rolling stock, track and other features which are more in keeping with North American standards.

Metro entrances are easy to find.



Space and light are main features of the stations.

This system was considered to be well suited to Montreal's requirements. It is entirely underground — an important consideration in this climate, yet we must not think of it in terms of a railroad placed underground. It is a specialized urban transit facility which might be better described as electric buses operating in multiple unit trains. The cars are 56 feet long but only 8′-3″ wide, which permits both tracks to be placed in a single tunnel 23′-4″ wide. This arrangement not only reduced tunnelling costs but provides a more spacious environment, and being well lighted, gives the impression of travelling on an underground street, rather than through a tube.

The cars, 369 in all, were manufactured by Canadian Vickers Ltd. Two hundred and forty-six are motor cars and 123 unmotored cars. Each operating element is composed of three semi-permanently coupled cars, — two motor cars with a trailer car between them. Two coupled elements therefore make a train of six cars and three elements provide the maximum length train of nine cars, 500 feet long. Control is manual. Dynamic braking is not used.

As mentioned earlier, functional requirements call for high-volume but relatively short distance riding. Emphasis is therefore placed on rapid loading and unloading and to this end each car has four doors

to a side. As a consequence the seating capacity is only 40, but as the average ride is under twenty minutes, the sacrifice of seats is not serious. With 36 doors on a 500 ft. train, the stopped time is remarkably short, — rarely exceeding ten seconds, even at rush hours at most stations.

Seventy per cent of the system was constructed by tunnelling in solid rock, — the remainder by cut and cover methods mostly in the downtown area. Because of the excellent and uniform adhesion of rubber on concrete, grades of up to 6.3% are quite acceptable, thus allowing considerable freedom in adjusting the profile to find the best boring conditions.

The track consists of three elements:

a) Standard gauge steel rails, which come into use only in case of a tire deflation, but serve at all times as the negative return conductor.

b) Just outside the steel rails are the concrete traction rails consisting of precast segments 18 feet in length.

c) Finally on both sides are the guidance bars against which the small horizontal pneumatic wheels roll.

Traction power is picked up from the guide bars by sliding shoes.

The weight of the cars is borne by the rubber tired traction wheels at all times, even on the switches. Guidance through the switches is provided by the deep flanges on the steel wheels.

Each line is an independent operating unit, so that the only switching required is at the cross-over behind each terminal station. There are no storage yards. The trains are stored on tail tracks in the tunnel beyond each terminal station where servicing, cleaning and minor repairs are carried out. They come to the shops on the surface only periodically for washing and major maintenance.

Traction power is 750 volts D.C. supplied from 18 substations located between the passenger stations. These are surface structures containing also the forced ventilation equipment.

The signal system is the conventional block system with wayside indications.

Operation

At present, 9-car trains are operated throughout the day on each line. During the winter season, 6-car trains are operated on line 4. Basic weekday headway is 6 minutes, on lines 1 and 2, and 10 minutes on line 4. Rush headways are 3 minutes, 2.3 minutes and 6 minutes respectively. Commercial speeds

are 21.5, 22.5 and 32.5 M.P.H. respectively for lines 1, 2 and 4.

Trains carry a two-man crew at all times, both qualified as operators. They are stationed at each end of the train, and without changing their positions, function alternately as motorman and guard each half trip. They can communicate with each other by telephone and also speak with the Control Centre as well as make announcements to passengers. There are no platform attendants but each station is manned at all times by at least one agent.

Supervisory headquarters and Control Centre are located in a building near the Berri-de Montigny station. The movement and identity of trains can be observed on panels in the control room, and corrective measures taken in case of trouble.

Passenger traffic on the métro has exceeded expectations. Over

Trains were designed for attractiveness, comfort and speed.

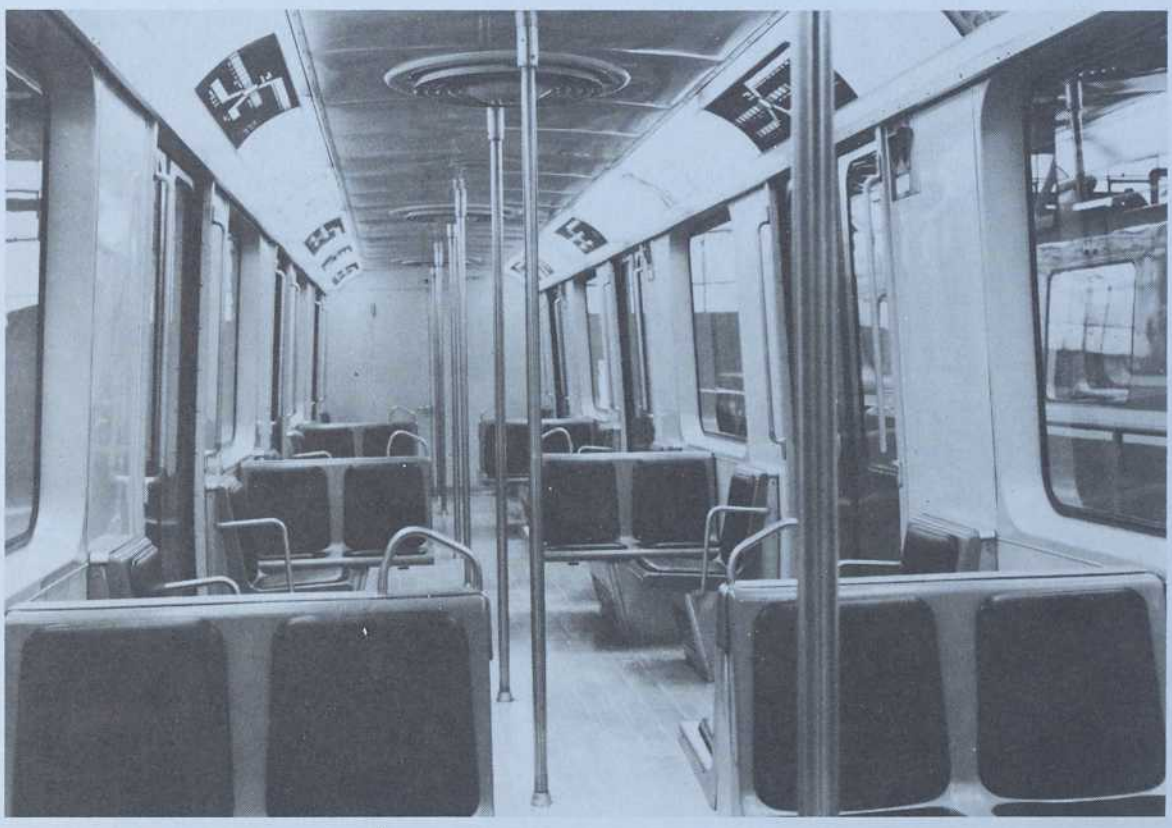
400,000 passengers are using the métro for all, or part of their journeys each weekday. Maximum hour loading in one direction at the maximum load point is 22,800 on Line 1 and 29,100 on Line 2.

The Stations

There are twenty-six stations, at an average spacing of a little over one-half mile, — the maximum being 8,250 feet and the minimum 1,473 feet. All stations are of the side platform type with the concourse above. Train platforms are 500 feet long and 13 feet wide.

Escalators are generally installed wherever the rise from one level to another is more than twelve feet. At one station a moving ramp is used. At the Berri-de Montigny station where the three lines intersect there are actually four levels all below ground and 26 escalators.

No two stations are alike. Each has its own distinctive architectural design and decorative treatment. The aim was to create a



Seating arrangement and interior lay-out are meant to speed loading and unloading of the cars.

pleasing, tasteful and spacious environment for métro passengers. In this respect, the architects and builders have succeeded admirably, and the City should be commended for paying particular at-

tention to this aspect of the project, so important in making transit a socially accepted mode of travel. Some seats are provided on each train platform, a gesture which is much appreciated. Concessions for the sale of goods in the concourses have been limited to one or two small installations for the sale of newspapers, candy and smokers' supplies. There are no public toilets in the stations.

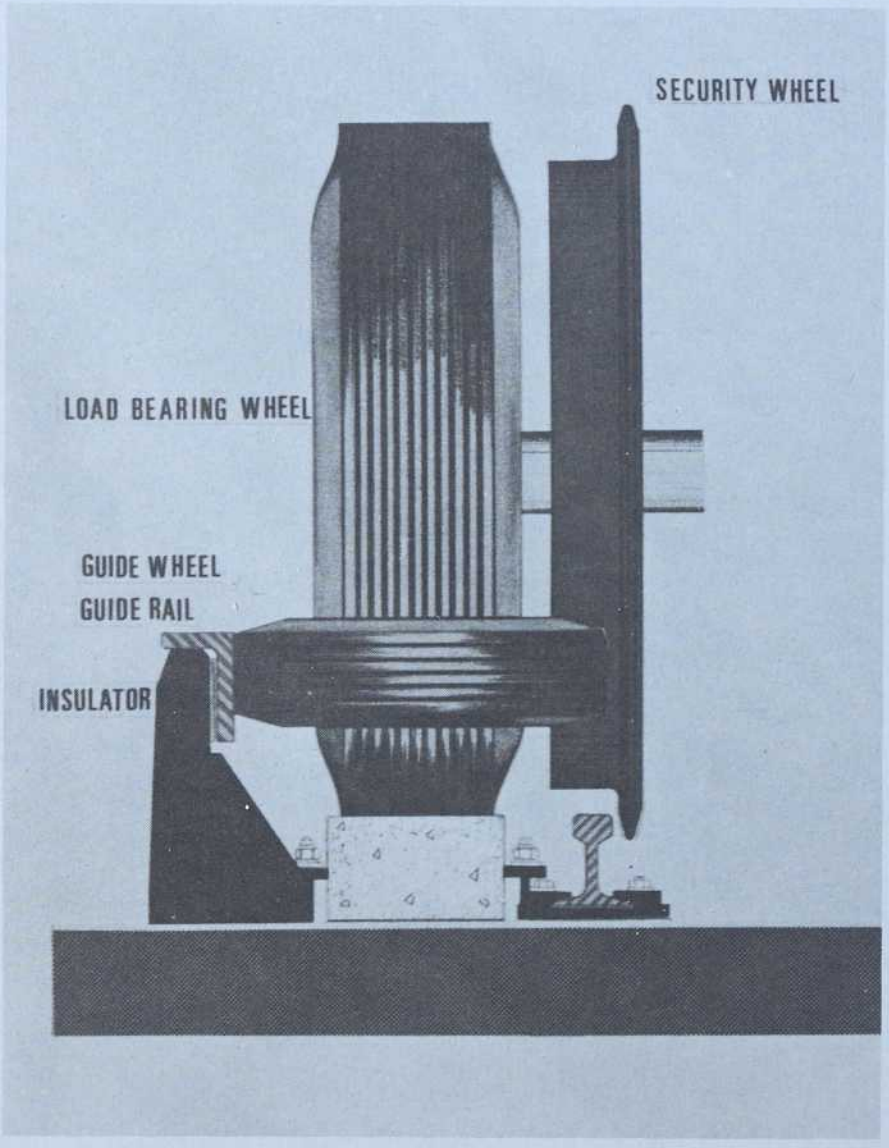
An unusual feature of the Montreal métro is the absence of entry and exit stairways on the sidewalks. Access to stations is through attractive off-street structures, or within existing commercial buildings or new buildings. While the general narrowness of Montreal sidewalks dictated this policy, it also affords a cleaner and safer entrance than sidewalk stairs, particularly in winter.

An interesting by-product of the métro is the extensive network of underground passageways which link some of the downtown stations with existing connections between railway stations, hotels, office buildings, etc., as well as underground shopping and entertainment facilities. Some of the interconnections between office building complexes are slated for the future, but one can see, emerging, a rather comprehensive under-

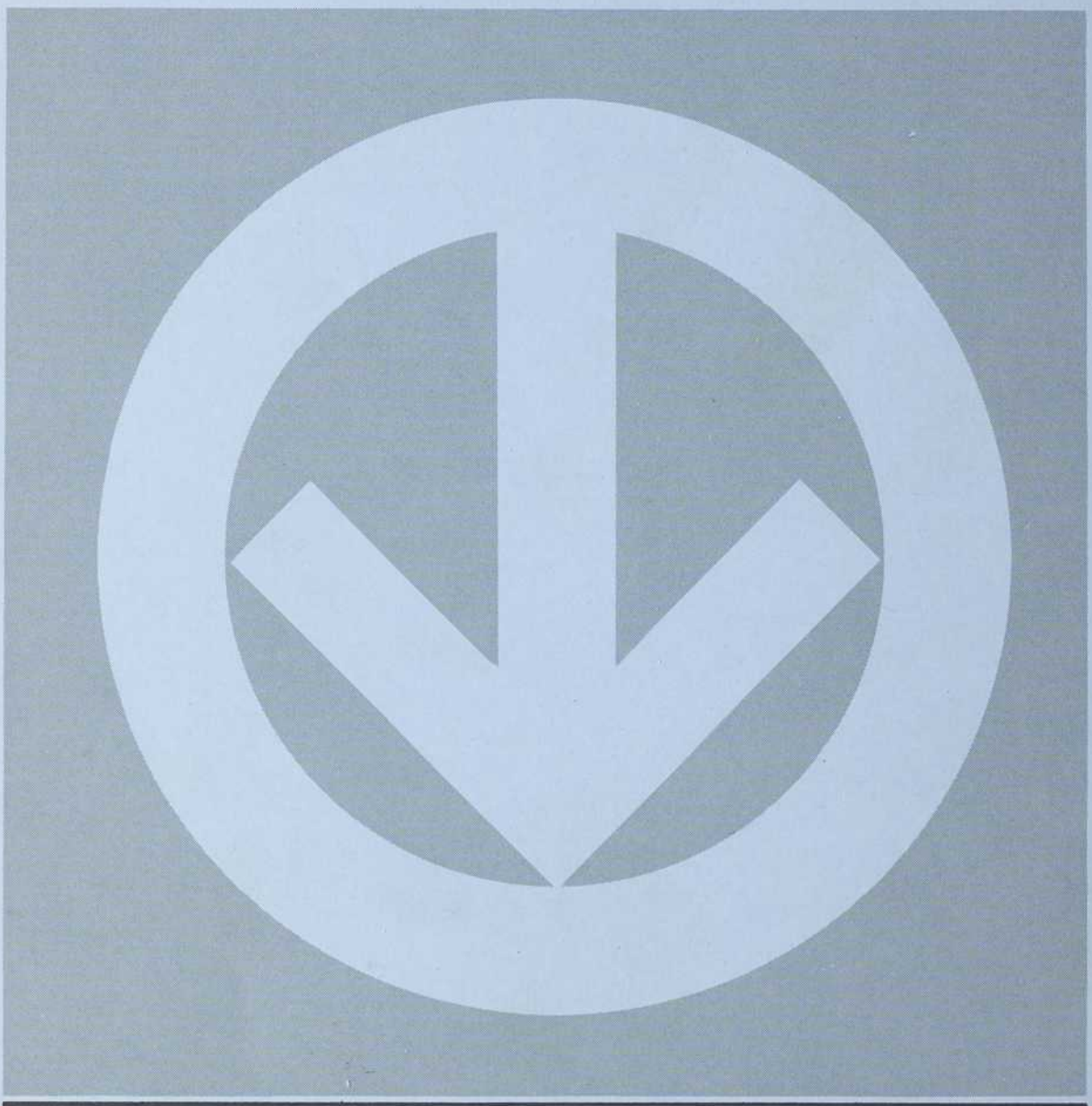
One has the impression of travelling on an underground street.

ground pedestrian network reaching most of the major mid-town buildings. This underground "city" is much appreciated in winter weather, and, at the same time, reduces pedestrian traffic on the surface streets.

One cannot escape the conclusion that the introduction of fixed underground transit facilities into a city's structure has profound and far reaching effects in reshaping and improving the central business district.



Montreal, September 1972



MÉTRO

LITHO-CANADA THÉRIEN FRÈRES (1960) LIMITÉE, MONTRÉAL