

TREE MANAGEMENT IN MONTREAL¹

by Pierre Bourque

Montreal takes pride in its exceptionally fine heritage of green spaces. The numerous recognitions of international renown granted thus far, such as the "Green survival city" awarded in 1982 by the American Association of Nurserymen, and the "Gold Leaf Award" by the International Society of Arboriculture in 1983, reveal the emphasis which Montreal places on trees. Such recognitions have crowned 30 years of effort and work in the promotion of trees in the urban environment (Fig. 1).

The Years of Development, 1950-1975

As a typical North American city, Montreal has been the scene of rapid urban growth since the early fifties. As the neighboring towns gradually gave up their autonomy and joined the Montreal urban community, much of the surrounding unused land filled with growing suburbs. Today one can affirm that most residential areas of Montreal are provided with tree alignments forming wide green arches above houses (Fig. 2).

The quality of these plantings largely depends on the size of lawns where the trees are planted and the selection of well adapted species that offer diversity of colors and shapes. Prior to their installation in the city, the trees are grown at the municipal nursery where, by proper pruning, they are trained to develop supporting structural branches.

The presence of trees is a key factor in the establishment of quality of life in residential areas. With 25 years in promoting the tree on the urban scene, the living quarters of the city have come to acquire a personality of their own which inspires tranquility and well-being.

Along the same lines, vast multipurpose parks well provided with trees have been set up to meet the leisure and escape needs of the population. A birds-eye view of these areas projects an image of vast green avenues that show few if any paved

surfaces or buildings. All the work put forth to promote greenery, while very valuable, would seem incomplete today had there been no further efforts beyond 1970 to affirm the presence of trees in the very heart of the city (Fig. 3).

The Years of Consolidation, 1975 to Today

The lack of green spaces and trees in downtown areas and the older districts of large urban centers is a well known phenomenon. An heritage of the early industrial society of this past century, this reality was typical of Montreal, just as it was for most large European and American cities. Giving a new birth to old quarters requires strong political will and considerable means of intervening. Today, Montreal's consolidation period is well underway. Vast programs of restoration have already taken place; several more are yet to come. I would like to briefly cover some of these recent programs and emphasize the role which trees have played in them.

Renovations of older districts. Regiving birth to old quarters and downtown sections of cities is one of the most serious problems facing municipal leaders in both Europe and America. Montreal is well ahead in this area; 13 programs leading to action in older sections of town have taken place here. These are gradually shaping the personality of the city. They are aimed at helping the city to eventually recover its original beauty, that which has been lost through time and carelessness. The programs aim at restoring old houses left by our heritage and at ensuring traditional architecture for new constructions in such areas; the architectural side of the program is left for public and private firms to take care of.

Along the same lines, the city is remodelling its urban furniture together with the installation of a new municipal substructure (aqueduct, rain and sanitary sewers, gas, underground electrical docks). The walkways are widened to allow for

1. Presented at the annual conference of the International Society of Arboriculture in Quebec City, Canada in August 1984.

easier planting of trees and for the installation of more attractive furniture. A new lighting, both safe and ornamental, completes the arrangement. Undesirable through traffic is discouraged as it disturbs the peace and quiet of the neighborhood. Henceforth, original beauty and harmony are recovered, giving back to the residents their legitimate pride to inhabit their city.

The choice of trees are low growing varieties or those having conical or fastigate shapes. Traditionally bare and treeless, the old city quarters involved in such renovation programs come to enjoy a standard of living that is comparable to that of peripheral residential areas. That program, at work now for the last 4-5 years, will ensure each house in our city with the presence of a tree by 1990. Moreover, pedestrian walkways and a set of parks and small multipurpose parks are being set up to strengthen the sites suitability and to establish appropriate grounds where the citizens can live together in harmony.

Reviving Commercial Arteries. Another very ambitious program has aimed at reviving Montreal's commercial arteries. Some 20 commercial arteries, each roughly 1 km in length and located in traditional quarters, have been completely restored (Fig. 4). These arteries, which over the last 25 years have barely survived the competition of shopping centers in the city's outskirts, have undergone radical changes thru the city's intervention which will bring back essential basic commercial and cultural activities.

In order to reach this objective, each artery has been subjected to a serious analysis conducted

by a multidisciplinary group of engineers and landscape architects from the city's Public Works Department. The key elements of this project include tree plantings, the installation of specific urban furniture such as benches, waste baskets, tubs for trees and flowers, along with a widening of sidewalks and an addition of ornamental lighting. These renovating operations have been carried out with the cooperation of merchants' associations. They have revived and considerably brightened the urban scene and at once, have been followed by merchants investments in their own business. Combined actions of the city and the merchants have resulted in increasing business by 25%. They have also set out new activity centers appropriate for meeting and socializing.

"Let the sun shine in" program (*landscaping alleys*). Another project encourages the elimination of old sheds and neglected unused buildings in the older districts, and the transformation of alleys and courtyards into attractive areas (Fig. 5). Some 70 alleys have thus been transformed, removing several thousand old sheds and creating many new private gardens well supplied with trees and shrubs. Once the sheds are torn down by their owners, the city sets out to design complete arrangements for the freed surfaces which will eventually include trees, shrubs, conifers and lawns, thus transforming them into pleasing areas for rest and leisure. In addition the alleys are supplied with lighting that is both safe and decorative. Often access to such lanes is closed to traffic, thus turning them into pedestrian malls scattered

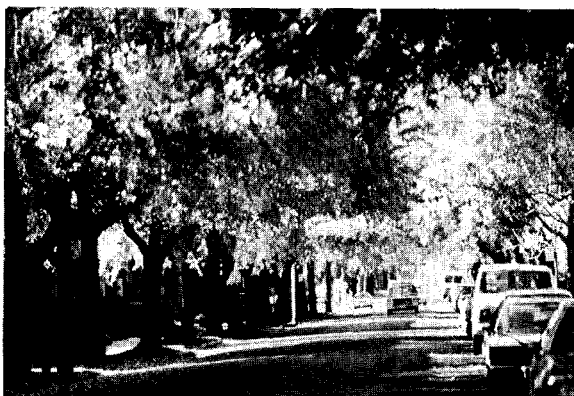


Fig. 1. Montreal: "Green Survival City"

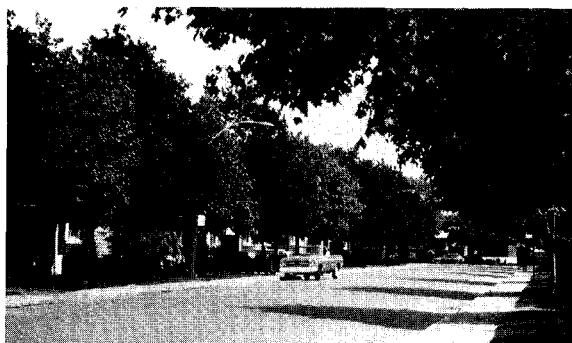


Fig. 2. Tree alignments. Most residential areas of Montreal are provided with tree alignments forming wide green arches above houses.

with public places and rest oases. All of these interventions bring about a consolidation of the urban network, and awareness among residents of their environment and a decrease in fires and violence. The program will have also resulted in the planting of thousands of trees and shrubs, greatly increasing our city's green heritage.

Parking lots: Parking lots usually add an ugly touch to cities. Their hard dull surfaces and their very presence all over the city makes them rather unpleasant. The City of Montreal has proceeded to improve the appearance of most of its parking lots and to regulate private lots. In order to achieve this, by-laws have been established, and, from now on, require that parking lots observe minimum appearance standards and that they be surrounded by a green strip of trees, shrubs and conifers. This program has resulted in the elimination of several parking lots and in considerable improvement in the visual quality of lots in general.

The City's Green Heritage

The City of Montreal presently owns a green heritage of exceptional quality and diversity. It includes a production nursery for trees and shrubs of 135 hectares, of which 65 are under cultivation. It produces 7,000 adult trees and 20,000 shrubs a year. The range comprises some 70 species and varieties. The number of trees being grown is estimated at 200,000 units. The tree inventory of Montreal reaches 320,000 of which more than 100,000 are planted along city streets. The municipality comprises 548 parks and green spaces.



Fig. 3. Renovations of older districts. The presence of trees in the very heart of the city.

The wealth of such heritage, however, does hold potential for some serious problems which can keep managers quite busy. The advantages for the citizens, resulting in the presence of trees in a city, are obvious and increasingly appreciated by the population. Nevertheless, trees are living organisms, and as such, are not less subject to the severe constraints imposed by the urban environment than man is.

Tree Management

Diseases and insects. The struggle against diseases and harmful insects in the urban environment has evolved to a level of sophistication over the last several years. Chemical treatments, increasingly contested, are finding more and more limitations to their use. The choice of trees, therefore, is particularly important and one must, more than ever, avoid planting species that are easily attacked by parasites.

For this reason Montreal has stopped planting the American elm because of its sensitivity to Dutch Elm disease (Fig. 6). Over the past 20 years, this disease has destroyed about 90% of the American elms in Montreal. The arrival of the European beetle some 10 years ago has considerably increased the virulence of this disease. The analysis and research undertaken at the Botanical Garden, together with Canadian government researchers, leave us little hope for a quick victory over this pest. The prohibitive cost of fungicide treatments of the Arbotect, added to the relative success noted, urges us to limit the treatments to the Botanical Garden's elms. In ad-



Fig. 4. Reviving commercial arteries by tree plantings and installation of specific urban furniture.

dition, a general weakening is noted in treated elms a few years after the treatment. Our only concrete action consists in cutting down the city's diseased elms as promptly as possible.

Another serious problem is brought about by the "honeydew" on European linden (*Tilia cordata*). Well-known to arboriculturists, this phenomenon takes considerable importance during dry periods. Sap leakage caused by the presence of aphids leads to damages and major inconveniences to private property owners, causing much anger and frustration. This has considerably halted planting of this magnificent tree in residential areas. Preventive treatments with Sevin, as well as systematic pruning of lindens to reduce their crowns are for the moment our only means of intervening.

Other problems requiring vigilance and quick action of our maintenance crew include the carpenter worm on silver maple, the legionaire or tent caterpillar which reaches epidemic levels on fruit trees, the cytospora canker on poplar, and many other insects and diseases.

Pruning and cutting trees. Pruning of city's trees is a main preoccupation since a large proportion reach adult sizes. A systematic approach is developed: we prune one street after another, district by district, and we keep teams available for emergencies. Pruning includes trimming branches of the crown hanging over private properties, shoring up the base and clearing branches that have approached electrical wiring. Mechanizing the operations (using hydraulic gondolas and pneumatic pruning shears) enables us to reach 10

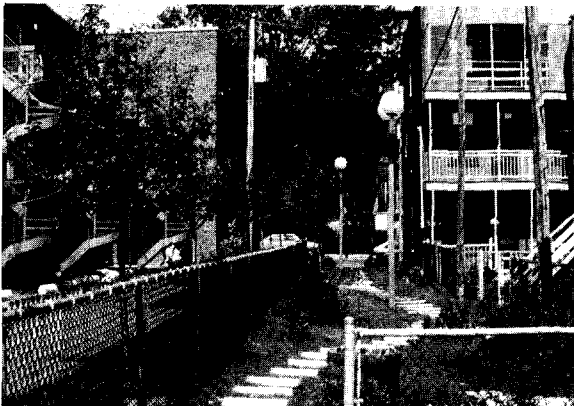


Fig. 5. "Let the sun shine in" program (landscaping alleys)

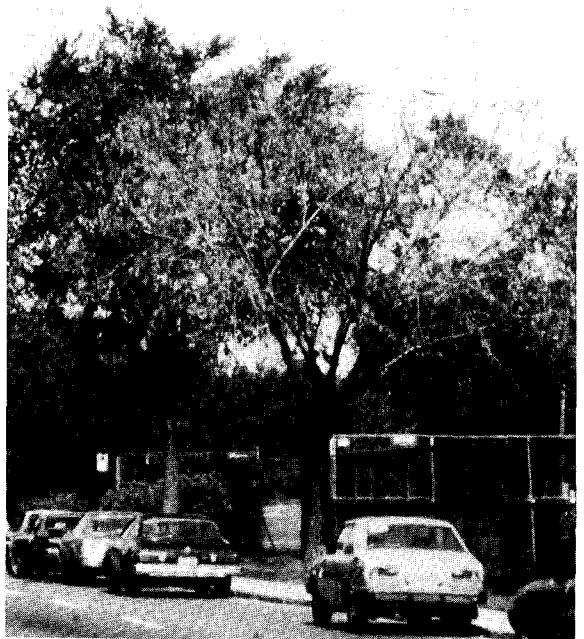


Fig. 6. Dutch Elm disease

to 12 adult trees per day with a 3-person crew. The City is now calling upon private enterprise to test and measure the performance of their crews.

Pollution, stress and salt. Problems stemming from pollution and stress are extremely important in an artificial environment such as a city. Trees most affected are those planted along expressways, overpasses and along the city's main arteries (Fig. 7). The choice of trees for such areas, a proper timing for planting, and the subsequent care given are all key factors in reaching satisfactory results.

Because the city is such an artificial environment, trees are forced to undergo sudden variations in temperature as well as prolonged dry periods which lead to withering and eventually death. This phenomenon is most pronounced in March, April and May of each year once the snow cover is gone. The combined action of drying winds and the absence of soil moisture causes freezing of young branches and of the trunk. Trees will not start vegetative growth until the end of May with axillary buds sprouting late. Then poor growth during the summer, and late hardening in

the fall, will leave them defenseless to face the rigors of the following winter.

The massive use of sodium and calcium chlorides (80 tons per kilometer), necessary in a city like Montreal to ensure the safety of the citizens and motorists, leads to a major increase in soil salinity and causes severe stress and burns the trees, often leading to fatal conditions in the spring.

The absence of abundant rain, which would otherwise help in dissolving these salts, often magnifies this phenomenon. For example, concentrations reaching 2,000 ppm have been observed on certain avenues. This figure is beyond the 500 ppm tolerance limit for plants. To fight these toxic effects, several measures have been applied. Planting trees on the City of Montreal's main arteries and along expressways is now only carried out in the spring, and only with species that are most tolerant to salt (Phellodendron, Siberian elm, fevertree, honeylocust). Generous watering of these plants is repeated every spring until the trees reach adult sizes.

Vandalism and mechanical damage. Vandalism and mechanical damage are a major cause of tree loss in the urban environment. It is estimated that they cause 5% of tree losses. Trees less than 5 cm in diameter are most susceptible to vandalism and injury (Fig. 8).

Several means of protection, ranging from wire or nylon nets and winter protection fences, to wooden enclosures have been tried to reduce damage. The problem takes on alarming proportions during snowy winters when the young trees along curbs are subjected to the assaults of snow plows. Severe penalties are now included in snow-removal contracts which stipulate that a 1



Fig. 7. Pollution, stress and salt affect trees planted along expressways, overpasses and along the city's main arteries.

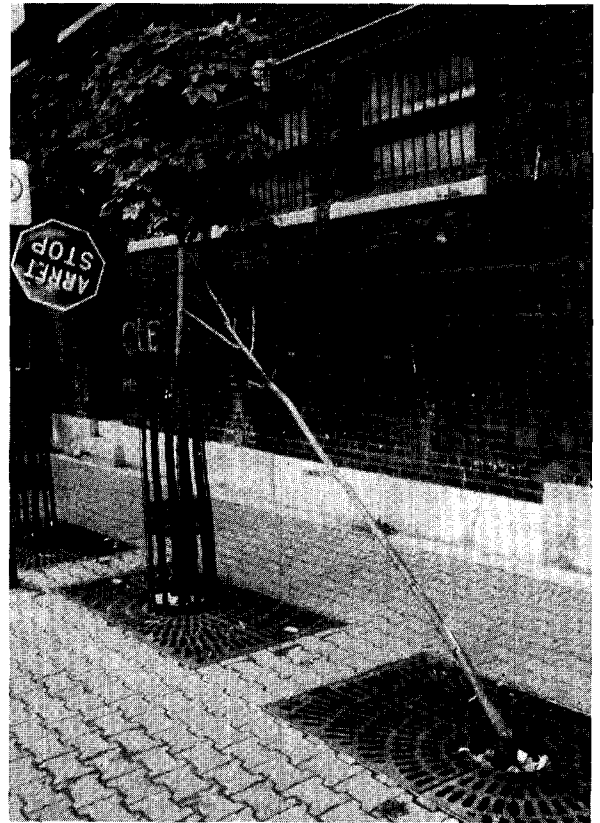


Fig. 8. Vandalism and mechanical damage are a major cause of tree loss in the urban environment.

meter pile of snow has to be left intact around the trees. About 30,000 trees are protected this way each year and we hope to reduce damages caused by mechanical accidents to 1% within the next two years.

Natural disasters. City trees are always vulnerable to mother Nature's will. As such, 1983 has been quite harsh for the health of Montreal trees (Fig. 9). Two violent ice storms decimated and damaged some 60,000 trees within a few hours. Mount-Royal park, the jewel among our large green spaces, has been turned into a battlefield. We have been forced to set up an emergency plan, which first consisted of clearing streets and sidewalks of broken branches, after which pruning or cutting down damaged and dangerous trees could be carried out. After the storm, pruning and restoration operations have taken place over a 2 year period; some are still going on (work is scheduled to last until 1985).

Later in 1983, an unusual heat wave which lasted four months has resulted in a weakening of the concrete in several areas of the city, leading to fissures and cracks in dozens of homes.

Trees along the city's avenues were immediately accused of being the culprits and, what's more jurisprudence, based on numerous scientific writings, confirmed this interpretation. The City of Montreal, with the help of Dery, Rocray, & Associates of Quebec and other engineering firms, has undertaken a major study to clearly demonstrate that the climatic conditions are the major cause of this weakening, sharing responsibility with trees and several other environmental factors (mineralized surfaces, lawns, the buildings, etc.). The results of this study will soon be published to shed new light on this extremely important problem facing trees in the urban environment.

Future Solutions

Setting up urban programs. It is essential that the arboriculturist, or whoever else is responsible for green spaces in a city, be involved in the conception and operation of major urban planning projects. Trees should not be considered as poor cousins to be used only for aesthetic value, and as secondary elements in urban planning. Directors and heads of parks and tree planting programs must work with engineers and urban planners in designing streets and public squares as well as in renovating residential, industrial and commercial zones. We must serve as a vehicle for, and defend an approach which aims at using soft technology at higher decision-making levels. This essential work is our responsibility and should not be delegated to anyone else.

Montreal's example may be interesting for other American and European cities. The "park-botanical garden" module, which is responsible for keeping the city green, is an integral part of the Public Works Department of the City of Montreal. The department's organizational structure has concentrated human and material resources so as to be effective in program conception and research. It has also promoted decentralization of action for each district. The importance of trees in the city now concerns all department employees, including engineers, technicians and all blue collar

workers involved in city maintenance. Our present structure is conceived according to roles rather than specialities.

Montreal could no longer think of planning streets or sidewalks without planting trees there as well. As for ground work, blue collar employees are responsible for the cleanliness of the city's streets and parks, as well as for snow removal and tree watering. This new reorganization has enabled us to reinforce the framework by establishing maintenance norms, production units and a performance index. In doing this, it has opened up the whole Public Works Department to the "green mission". Within another year, our mechanized systems and data processing units should enable us to have access to tree inventories, as well as to their spatial location in the city. The presence of the Botanical Garden, its arboretum containing some 3,000 species of woody plants, and the production nursery in Terrebonne, allow us to keep up-to-date with the latest research and experimental work.

These material resources are supported by a dynamic team of professionals which include forestry engineers, biologists specialized in phytopathology and the study of weeds, landscape architects, agronomists, and technicians in horticulture and arboriculture. The presence of specialists from varied disciplines in our team has **created** a stimulating and extremely motivating atmosphere.

Private sector. In today's times of budget rationalization, the manager must compile data and measure the productivity of his personnel. Hiring



Fig. 9. Natural disasters. Ice storm

private firms to prune and cut down our trees offers essential means of comparison for decision-making concerning the management of trees in the urban environment. The City of Montreal is presently comparing use of its own resources against that of the private sector.

The awareness of citizens to trees in the urban environment must be one of our major preoccupations. This awareness project can take the form of a direct mail campaign during tree planting, of symbolic tree planting ceremonies in schools and public areas, of guided tours in large parks and natural sites, of educational publications and brochures, and finally, through the electronic media, it can inform citizens about the importance of their green heritage. This campaign must lead to concrete actions by citizens in their respective districts.

It is our intention to share part of the maintenance responsibility for our green heritage with the citizens themselves. We now feel that such specialized work as watering, hand weeding and collecting fallen branches and leaves should gradually be transferred to the residents on a voluntary basis. This transfer implies an evolution of public manners and behavior but remains the best insurance to preserve trees in our cities. We are willing to bet that the citizens are ready to meet this challenge. It is, I believe, the only road we can take in the future of urban forestry.

*Assistant Director & Chief Horticulturist
Dept. Public Works
Montreal, Quebec, Canada*

ABSTRACT

WESELOH, R.M. 1984. **Scientists continue to find natural enemies of gypsy moth.** *Am. Nurseryman* 159(2): 87-88.

The gypsy moth is an important forest insect in much of the Northeast. It defoliates deciduous trees and may kill pines and hemlocks. Natural enemies have long been studied as a means of controlling the gypsy moth, which was originally imported in 1868 from France. Beginning about 1905, many parasites and predators were brought to the U.S. from Europe and Asia. At present, ten parasitic wasps and flies and one predacious beetle are established as naturalized "citizens." However, these beneficial insects have not been sufficient to prevent outbreaks from occurring. Thus, there is a continuing effort to introduce new natural enemies from overseas, some which may have been overlooked so far, but which might be effective if they became established in this country. It should be pointed out that all imported natural enemies are carefully screened to make sure they do not attack beneficial insects of plants.