Morgan Arboretum — A Model Urban Forest

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Abstract

A project in urban forestry, the Morgan Arboretum and Woodlands, near Montreal is described indicating how this property has evolved over three decades from a demonstration woodlot to a multiple-use, people-oriented urban forest. The evolution of this versatile urban forest in response to changing social attitudes and needs is traced. Long-term financial and moral support from an active Association of concerned citizens and corporations has been a vital element in the survival and growth of the project from the outset. More recently the project has attracted support from government agencies as its ability to respond to a wide range of public needs has been recognized and developed. The importance of urban forests in an amenity and educational role is indicated and some specific and general problems of urban forestry are discussed briefly.

Résumé

Un projet d'étude en foresterie urbaine, situé près de Montréal, l'Arboretum Morgan est décrit et analysé; on étudie l'évolution de ce domaine qui, à son origine, était un simple boisé d'étude et qui est devenu une forêt urbaine à usages multiples, destinée au grand public. On démontre que l'évolution de cette forêt urbaine versatile s'est effectuée en fonction des besoins et des aspirations de la société. Une association active de citoyens intéressés et concernés a, de longue date, prêté son appui moral et financier à cette entreprise et a largement contribué à son succès et à son expansion. Récemment encore, l'Arboretum recevait l'aide d'organismes gouvernementaux qui reconnaissent son intérêt et son potentiel au niveau du public, pour satisfaire des besoins d'ordres très divers. On souligne l'importance du rôle des forêts urbaines pour la récréation et l'éducation et on aborde brièvement quelques problèmes d'ordre général et particulier.

Growing Pains in Urbania

Population pressures on the urban environment are increasing at an accelerating rate to the extent that almost all Canadians will be living in cities by the turn of the century (Kelly 1975). This formidable prediction is cause for serious concern regarding the protection of what remains of urban green spaces and the general absence of any long-range plans for their improvement. Growing cities are gradually spreading over the best farm forest lands in an unplanned and unregulated manner. The

lands are used for developments of all kinds, for the construction of houses, roads, schools, shopping centres and factories. Between 1966 and 1977 2.6% of Canada's best arable land of a scanty 7.6% total was taken out of agriculture (Conservation Council of Ontario 1975). At least as much forest land, a prime target for suburban housing developments, was also annexed, although exact statistics on a national scale are not available. If municipalities and governments, combined with private citizen pressures, had been able to move quickly enough, some of this lost land could have been reserved as needed green space in municipal and suburban areas. Unfortunately land speculation, leap-frogging developments, preoccupation with grand projects and a laissez-faire attitude to the declining quality of life in cities have taken precedence over the provision of open spaces and amenity woodlands in most urban regions.

"The greatest deterrent to a better park system is the current mentality that places higher priority on such services as roads and expressways than on amenities that will contribute to the quality of urban life. Toronto Parks... has in 1970 the same budget for park purchase as it had in 1956" (Conservation Council of Ontario 1971).

Montreal, for example, has been poorly served with parks, woodland and open space for its three million population, although Frederick Law Olmsted laid out its first park on Mount Royal in 1887.

Rey-Lescure (1976) quantified it as follows:

"Dans l'entre-deux guerres, ces forêts couvraient plus que 8% de l'île de Montréal. Aujourd'hui elles ne couvrent plus que 4%; cette diminution peut sembler minime mais ce sont quand même 5034 acres de forêts qui ont disparu alors qu'on aurait pu facilement les transformer en parc.

Si la tendance se maintient c'est en 1985 que toutes les forêts non-protégées auront été bâchées. En effet cette destruction massive est récente; près de 1/3 des forêts ont disparues entre 1964 et 1973 donc en 9 ans."

In June 1972 the Planning Committee of the Montreal Urban Community (MUC) prepared a preliminary development plan (Esquisse 72 1972) of the Community's territory which followed the enactment of the Montreal Urban Community Act in January 1970. The draft development plan stated in part,

"Wooded lots are also critical sectors in that they are becoming increasingly rare and are being threatened with ill-considered destruction, with the exception... of the woods of Mount Royal and of Agrignon Park... Others belong to lots which we would like to earmark for major metropolitan parks, such as the de Liesse woods and the whole of Cap-Saint-Jacques. The Morgan Arboretum is a special case... à public treasure which we do not hesitate to classify as a conservation area."

The MUC published, in early 1973, a comprehensive, illustrated report conceived as an initial framework for action by the Planning Department. The report proposed the purchase and development of three parks to protect them from the wave of urban expansion. Nature trails were to be developed from which motorized traffic would be banned. These recommendations have yet to be implemented to any degree and urban forestry needs remain a low priority in the city's development plans.

Developments in Urban Forestry

About 1900, Mulvany (Lockhart 1974) referred to metropolitan spaces and parks as being "the lungs of the city and... that a park is nothing without trees." Fitch (1976), in decrying the architectural and planning problems of the Montreal surroundings called for the recycling of land and buildings.

"Look around and you'll see that a first class war would have done the same damage as have developers and planners over the last few years. The battle to save trees and parks is the same as saving architectural artifacts. It's not just a question of saving houses but of keeping the world fit to live in."

As a result of these tendencies towards concentration and congestion and the elimination of natural ecosystems Gill and Bonnett (1973) noted that urbanites fear unfamiliar wild areas.

This indicates the importance of understanding the natural environment and with it the need to preserve some natural areas, or recreate them in the city to start the process of "re-naturalization" of urban residents. Most Canadians feel more at home in a metro station, a downtown shopping plaza or city street than they do in a mountain meadow, a forest trail or even an urban forest. These same citizens are now being asked to make informed decisions about the use and management of renewable resources. Lack of familiarity or knowledge, or both, suggests that they could

easily support alternatives that would not be in the best interests of the short or long-term developments of the region. Jorgensen (1974) suggests that,

"Urban Canadians have limited access to, and (limited) familiarity with, forest practices and their ecological implications... The proper management of the Canadian forest depends to a high degree on... an enlightened public... Urban and amenity forestry is a logical part of the answer to this dilemma from a general forestry, as well as a national, point-of-view."

In 1973 Project Planning Associates in an urban open space study for Canadian Communities set up standards for open space based on their examination of 376 communities — 5,000 population and larger.

"The ratio was highest in the Prairies at 10 to 34 acres per 1,000 inhabitants and... lowest in Quebec where it is usually 2 to 5 acres per 1,000. Shortage of money and availability of land are main impediments to correcting open-space shortages in Canadian communities."

Gabeline, Lanken and Pape (1975) report that "with Viau Park (the 1976 Olympic site) included, Montreal has an average of 2.6 acres of green space per 1,000... far below the desirable standard..." This situation will not improve in the years ahead.

Rey-Lescure (1974) cited the National Recreation Association guidelines of 25 acres per 1,000 inhabitants divided into 10 acres per 1,000 in urban parks and 15 acres per 1,000 in regional parks as being most desirable. Using this standard he asks where, by the year 2000, Montreal will find 28,000 acres of land for parks for a population of 2,845,000 and 125,000 acres for the metropolitan region with an expected 5 million population?

The Morgan Arboretum and Woodlands, a forested area in the west end of the Montreal Island, was initially developed to demonstrate good forestry practices. (Fig. 1). Only an active membership organization has prevented its being overrun by high speed highways, gas pipelines and suburban developments that have been located elsewhere. Encroachments are a constant and continuing threat.

The property now functions as a model metropolitan forest in the Montreal region and fulfills the role of an urban forest as defined by Jorgensen (1974) and others (Jones, MacArthur and Thompson 1976). Andresen (1976) defines urban forestry as the management of urbanized vegetation affected by intensive social influence, use and value. Urban forestry is also defined as the management of trees and forests in urban surroundings, with emphasis on the use of trees to improve the educational, recreational and amenity characteristics of city living, located within reach of the urban center by public transportation. In urban forestry services have top priority with products, although secondary, still indispensable.

The Arboretum forest is of the urban fringe type described by Richardson (1972) as follows:

"We need to distinguish two types of urban forest; that within the city limits . . . , and forest areas on the urban fringes which can serve as stepping stones to the country. Woodland areas within towns could, and should, be used to absorb large numbers of people, to hide the unattractive concomitants of urbanization and to mask its polluting halitosis. But we must also provide forest areas within easy reach of the conurbations that provoke the problems . . ."

The Evolution of An Urban Forest

The Morgan Arboretum has now become a working model for the management of metropolitan forests. Its multiple benefits aided by its easy accessibility have become of value to many city dwellers for a multitude of pursuits from exercising dogs to hiking, from cross-country skiing and snowshoeing to horseback riding, jogging and orienteering and other forms of exercising. Nature and the outdoors are important activities and include bird watching and feeding, conservation education, animal tracking and flora

and fauna observations of many kinds. The evolution of the 600-acre tract from an almost unused nature preserve, to a demonstration forest, to an intensively used outdoor education, recreation and nature centre has spanned nearly three decades.

In the late 'forties Morgan's Woods was set aside to be developed as an arboretum and as a research, production and demonstration forest for the education of woodland owners in the urban and rural communities of southern Quebec. These important functions continue today but other purposes have been superimposed and have become increasingly popular as the educational, recreational and amenity demands on the area have grown and developed. The obvious educational values of a managed forest for nature interpretation, to introduce urbanites to forest conservation and use values, and to provide them with an aesthetic outdoor experience have developed concurrently with other forest values and the original purpose of demonstration forestry.

A modified program of commercial wood production is still going on. This takes the form of annual harvests of 200 to 300 cords of firewood and pulpwood, 350 to 500 gallons of maple syrup

Fig. 1. On the western end of Montreal Island the Morgan Arboretum, upper left, is within easy reach of a large urban population.

and regular spring offerings of plants and trees as well as Christmas trees and boughs thinned from the conifer plantations. These products provide important revenue and useful lessons in good forestry practices. The removal of over-mature, defective and high-risk trees in stand improvement cuts maintains the forest in good condition. This is not just cosmetic forestry but demonstrates to an uninformed and, where logging is concerned often hostile public, the varied and valid uses of forest land. The harvesting methods range from polewood thinnings and prunings, to strip clear-cutting of pioneer woodlands, to single-tree selection harvests of old growth pine and tolerant hardwood stands. In addition the various collections of native and exotic trees provide an unique educational resource for identification, for landscape design, and for records of hardiness. All these processes and materials help to show the mass of urban forest users that a woodland can be more, much more, than a tree preserve or protection forest — a message that has not yet been well-presented to the Canadian public. A production forest under good management can also yield multiple benefits of an environmental nature and introduces the urban resident to the psychical and rehabilitating influences of the forest environment.

An Integrated Approach

In 1948 the Arboretum collection of Canada's 140 native tree species and some promising exotics was commenced by the first curator, William Harold Brittain. Dr. Brittain, the Dean of Agriculture at McGill's Macdonald College was a dynamic proponent of the idea that trees were an important but neglected resource on the farm. He established group plantings of the various families of tree species in suitable fields. Mass plantings of the common coniferous and most promising hardwood species followed. Roads and trails were developed and expanded into a 12-mile (19-km) network in the area. Maple syrup and wood harvesting operations were undertaken to bring in some revenue, to maintain the vigour of the mature forest, and to serve as a model for small forest owners. From 1955 onwards the harvesting programme was regularized and successive thinning treatments of young stands began. The planting of fast-growing hybrids and promising commercial hardwoods was completed by 1965 and data on hardwood plantation performance recorded.

Small numbers of many kinds of visitors were using the area sporadically for educational and scientific outings and field trips at this early stage. A complete vegetation analysis was made (Long 1950) followed by a forest inventory using permanent sample plots which formed the basis for a forest management plan (Jones 1962). The plan included timber harvesting, sugar bush management and recreation developments and is still in use today. Research on hardwood silviculture, conifer planting trials on wet land, and various methods of encouraging woodland management

for different income classes of landowners initiated in 1961 and a centennial project on white birch (*Betula* spp.) begun (Brittain and Grant 1965). Activities in forest recreation and education expanded rapidly through the 'sixties and a nature education programme was developed to meet these obvious needs (MacArthur 1969). This was followed by a detailed study which catalogued urban recreation attitudes (Inhaber 1972). Algar (1973) developed an innovative programme for introducing forest conservation concepts and behaviour to young children from suburbia and the city core. MacArthur and Thompson (1975), with the financial support of the Canadian Forestry Service, Department of Fisheries and the Environment, have expanded on this educational-recreational-behavioural work. Their research assessed the methods and impacts of a low-key nature education and recreation programme for senior citizens and the handicapped.

Current major objectives are to provide a healthy, natural habitat for outdoor educational opportunities for all ages, for compatible recreational pursuits in an attractive landscape so that all sectors of the community can benefit.

"The specific priorities are that the area be managed 1) as an educational area, 2) as a recreational area and 3) for its wood products." (Jones et al. 1976)

Protection measures for the general public include simple sanitary facilities, safe drinking water, a warm-up chalet and hot drinks in the winter, warning signs with respect to water, fire and poisonous plant hazards and selected marked trails and maps for trail users to channel traffic into the most suitable areas. All of these measures have helped to educate recreationists to a standard of conduct and an awareness of the objectives of the forest and formed a clientele of intelligent, sympathetic and concerned users of the property.

The Arboretum is funded by an association currently composed of 3,000 memberships of different categories (single, man-wife, family) which provide over three-quarters of the operating budget. The remaining quarter comes from the sales of products produced from the property. Annual program, upkeep and membership activities are financed almost completely from these two sources.

In addition to use for casual outdoor activities the area is also heavily used by schools and universities as a field station for a great variety of ecological studies associated with formal courses. Here again the users are diverse, ranging from young children on a first visit to students working toward advanced degrees. The characteristics of the forest and its management create a wide range of conditions that can satisfy a diversity of needs.

Some Special Considerations

In the urban forest the usual order of production priorities is reversed with the provision of educational and aesthetic benefits (services be-

coming more important than the production of raw material (goods). All woodlands located near the urban milieu are increasingly perceived as amenity forests. Experience in the Morgan Arboretum, and in other places subject to similar population pressures, indicates that demand is growing for natural areas where spontaneous short visits may take place (MacArthur 1969, 1973). The modern urban forest can, and should, provide a cornucopia of benefits ranging all the way from the purely aesthetic to the purely material.

Services would include the educational and resource-awareness benefits which have been documented by Algar (1973) for Kindergarten to Grade IV children in which he suggests methods whereby city-oriented children may be given a sound preliminary understanding of forest values.

The need for this basic and early training has been indicated by Jones et al. (1976) who identified the problems of growing public awareness, a general lack of basic knowledge, and heavy pressure on easily accessible forests and open spaces and concluded that education is an essential element in any solution. It was their considered opinion that the combination of education with an interesting outdoor recreational experience constituted the most effective approach.

Recreation such as walking, hiking, snowshoeing, skiing and nature observation are the most common leisure activities. These represent a combination that has appeal for most age groups and which can provide a significant learning experience. An important element in the education of all age and interest groups is establishment of the fact that even amenity exploitation or use can have a significant impact on the area being exploited. Thus, basic training in outdoor manners and behaviour is necessary to ensure that the impact of long-term amenity use of open spaces, urban forests, and city parks will be kept to a minimum (Jones 1974).

An appropriate and important role of the urban forest is to assist people in developing an understanding of the complex and dynamic nature of the forest, of its value-producing potential, and of its sensitivity to a wide spectrum of influences. The fact that this role can be effectively played has been amply demonstrated by the Morgan Arboretum experience.

The second urban forest priority, the production of goods, is also an important part of the socio-economic equation. This production phase, where it exists concurrently with intensive amenity use, calls for special approaches, compromises, and modifications. Many people view all production activities as essentially destructive and it is necessary to allay their fears by effective explanation and, above all, by convincing demonstration. This may take some time to achieve but, again, experience in the Morgan Arboretum has shown that it can be done.

While the integration of intensive recreation-education activities and intensive forest exploitation constitutes a special problem it also produces

a special, and highly desirable, result. The whole process produces exactly the kind of education needed to generate an understanding of the forest as a multi-faceted resource. The combination of the aesthetic and production phases makes both more meaningful in both socio-economic and ecological terms. Such an understanding provides a basis for more rational attitudes regarding human use of the urban forest specifically and of forests generally.

Problems

Multiple use forestry projects such as the one we have been discussing all suffer from some rather similar and serious problems. There are, for example, no highly evident short term financial returns. Most managers are happy to break even financially and must struggle without let-up to do so. Without an almost evangelical belief that their work is of real social significance they would probably give up the struggle.

Urban forests in North American metropolitan regions have only been recognized as important relatively recently. Thus they have a low position in the budget priority list of most communities. Usually what appear to be more pressing economic and social needs preoccupy most citizens. Nor is the urban forest immune to the inhibiting effect of the long term nature of investments in forestry which adversely affects all forest management. Although the need and potential may be recognized the funds to create the reality are simply not available.

Another, and related, problem is the difficulty of securing the required land in a situation where long-range plans must compete with many short-range, and more publicly popular, developments. In a pragmatic world long-range plans, especially new ones that involve the setting aside of prime development land and foregoing its tax potential, are generally rebuffed as being impractical and unsound and conditions remain as before (Bunske 1975). Even existing urban forests must struggle from time to time to maintain their integrity. Thus the chance to develop new ones, however valuable they might be, seems slim without strong public support.

Conclusion

The writers believe that the development of urban forests, wherever it is still possible, is well worth serious effort and attention. These forests are versatile long-lasting resources capable of improving the quality of urban life in many ways. At least equally important is their potential, because of their location, to contribute significantly to improvement of public understanding of the principles and objectives of forest management and conservation. This combination of education and recreation we believe represents the ideal urban forest program and our confidence that it can be successfully achieved is based on experience in the Morgan Arboretum.

References

- Algar, Dave.** 1973. Kindergarten to Grade four behaviour on conservation field trips. Unpub. M.Sc. Thesis, McGill Univ., Montreal.
- Andresen, J.W.** 1976. Urban forest research systems. Prac. Div. 1, 1976 IUFRO Congress, Oslo, Norway.
- Brittain, W.H., and W.F. Grant.** 1965. Observations on Canadian birch (*Betula*) collections at the Morgan Arboretum. 1. *B. papyrifera* in eastern Canada. Can. Field-Nat. 79: 189-197.
- Conservation Council of Ontario.** 1971. The urban landscape. A study of open space in urban metropolitan areas. Toronto.
- . 1975. How many Canadians? Toronto.
- Fitch, James M.** 1976. Montreal buildings following poor example of U.S. In The Gazette, Jan. 29. Montreal.
- Gabeline D., D. Lanken and G. Pope.** 1975. Montreal at the crossroads Harvest House, Montreal.
- Gill D., and P. Bonnett.** 1973. Nature in the urban landscape: A study of city ecosystems. York Press, Baltimore, Md.
- Inhaber, J.** 1972. Behaviour and attitudes of suburban forest recreationists in the Morgan Arboretum, Quebec. Unpub. M.Sc. Thesis, McGill Univ., Montreal.
- Jones, A.R.C.** 1962. Guide to the management of the Morgan Arboretum, Unpub. M.sc. Thesis, State University College of Forestry at Syracuse, N.Y.
- . 1974. Basic training for the outdoors. Mac. Jour. 35 (6): 3-6.
- , **J.D. MacArthur and E.R. Thompson.** 1976. An urban forest concept. Inf. Ser., Laur. For. Res. Cen., Environ. Canada. Milieu 12.
- Jorgensen, E.** 1974. Towards an urban forest concept. Tenth Commonwealth Forestry Conf. Oxford and Aberdeen.
- . 1974. Urban and amenity forestry at the forest management institute. Proc. Can. For. Ser. Hardwoods Manage. Workshop. Environment Canada. 233-240.
- Kelly, Frank, ed.** 1975. Population growth and urban problems. Perceptions. Vol. 1, Science Council of Canada.
- Lockhart, R.S.** 1974. Urban recreation planning: a critical review. Unpub. M.E.S. Thesis, York Univ., Downsview, Ont.
- Long, H.D.** 1955. The plant communities of Morgan's woods. Unpub. MSc. Thesis, McGill Univ. Montreal.
- MacArthur, J.D.** 1969. Education for recreation. Mac Jour. 31(2): 22-23.
- . 1973. The role of the Morgan Arboretum in urban forestry. Ont. Shade Tree Council Yearbook. Toronto.
- MacArthur, J.D. and E.R. Thompson.** 1975. Forest nature trails for senior citizens. Mac. Jour. 36 (8): 3-4.
- Project Planning Associates Limited.** 1973. Urban open space study for Canadian communities — inventory stage. Canadian Parks and Recreation Association, Toronto.
- Rey-Lescure, E.** 1976. Problématique des espaces ouverts et applications à la Communauté Urbaine de Montréal. Unpub. M.A.M. Thesis, Univ. de Montréal.
- . 1974. Les forêts urbaines de Montréal. Forêt-Conservation 40 (10): 4-7.
- Richardson, S.D.** 1972. Urban forestry — apartheid or integration? Proc. Seventh World Forestry Congress, Buenos Aires, Argentina.
- Service de Planification.** 1972. Esquisse 72 — Communauté Urbaine de Montréal.
- . 1973. Proposals for urban development. Montreal Urban Community.