

through careless handling of plant material. Cities, often obliged by law to accept low bidders, are often stuck with poor workmanship. Many good firms will not work for cities if graft, slow payment or political favoritism is involved.

Sidewalk trees are expensive. To cut a hole in concrete, bring in loam, buy a tree big enough to withstand casual vandalism (2-2½" diameter), water it, plant it carefully, and add bollards and protective devices adds up. The real cost for a 3" tree, the fashionable size these days, is bet-

ween \$200 and \$300.

There is a cost-benefit-ratio between whether to plant new trees more frequently, or take better care of those growing and newly planted. However, the bottom line remains . . . in one city, given actual urban realities, the average age of sidewalk trees is around 10 years.

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## THE MORGAN ARBORETUM AND URBAN FORESTRY <sup>1</sup>

by Dr. Dan McArthur

The Morgan Arboretum and Woodlands occupies a 530-acre forested tract of land on the western extremity of Montreal Island and forms a northern extension of the McDonald College experimental farm. The principal function of this forested area is to serve as a research, teaching, and demonstration forest. It is owned by McGill University and administered by the Department of Renewable Resources of the McGill Faculty of Agriculture located on the McDonald Campus. By its location, nature and mission, this small forest is ideally suited to serve as an example of multiple-use forestry and also as an example of a special kind of urban forest.

Essentially the forest consists of some 350 acres of natural stands, 87 acres occupied by miniplantations of a variety of coniferous and broad-leaved species, a 23-acre ecological preserve, 40 acres occupied by the Arboretum

tree specimens, and 30 acres occupied by a tree nursery, building sites, roads, and open areas.

Although human activity in the area probably goes back some 200 years, we will only note briefly more recent results. In the early 1930's there was, it seems, an exodus of small landowners from the area. Their farms and farmsteads, some 22 in all, were purchased by the Morgan Estate and amalgamated into one large holding.

In 1945 a 1000-acre portion of this holding was acquired from the Morgan Trust Company by the Royal Institution for the Advancement of Learning, otherwise known as McGill University. The transaction was initiated by the late Cleveland Morgan, an eminent amateur horticulturist and botanist who was motivated by a desire to secure the permanent preservation of the woods. It was assisted by the interest and generosity of the late J.W. McConnell and the

Government of Quebec. An important clause in the agreement of sale required that a part of the property "be set aside as an arboretum, in order to facilitate the conduct of teaching, investigation and research in silvicultural and arboricultural problems with a view, amongst other things, to the development of more scientific and profitable forestry practices and policies."

Of the total land acquisition, the forested part, plus some of the adjacent and included fields, was allocated to the development of an arboretum and experimental forest. The predominantly agricultural part of the area was added to the experimental farm of the Faculty of Agriculture.

During the late 1940's and early 1950's the main concern was to establish an arboretum without delay. This task was tackled with tremendous vigor and drive by the late Dr. W.H. Brittain who was Dean of the Faculty of Agriculture at the time and a most enthusiastic proponent of the development of private forestry, silviculture, and arboriculture. Thanks to his herculean efforts which included actual planting as well as acquisition of stock and design, and to the cooperation of various botanical gardens and individuals, the principal arboretum plantings were soon completed. The Montreal Botanical Gardens deserve special mention for cooperation during this phase.

A second important phase of development was the establishment of a large number of small demonstration plantings of coniferous and broadleaved species. To some extent this progress went on concurrently with arboretum planting. Again, thanks to Dr. Brittain's efforts and assistance he received from interested agencies and individuals, the work was rapidly completed.

Special projects have developed with time. A major one was Dr. Brittain's research on the white-barked birches upon which he spent his last post-retirement years in vigorous work. Collections of birch seed from across Canada were made as a basis for taxonomic research on birch species and varieties. From these seedlings were grown for study and eventually gave rise to a massive living collection of well documented birch provenances growing in the arboretum

where they are available for further study.

In general the arboretum collections have grown by trial and error. Successes and failures have yielded much valuable evidence regarding tree species potential. At the same time the specimens have been and still are available for observation and study.

Recreation is superimposed on other activities and the users are mainly members of the Arboretum Association who, in recognition of their financial support, enjoy recreational privileges in the area.

Research at many levels is carried out continually. In addition to the basic studies conducted by the department, students conduct undergraduate and graduate research field work on a number of topics. Currently research on aspects of recreational use of the forest environment is in progress. One major project which involves ecological field trips for some 15,000 primary school students is supported by the Quebec Department of Lands and Forests. Another, supported by the Canadian Forestry Service, is a study of recreational possibilities for the aged and handicapped.

Originally the forest was not perceived as an urban forest but rather as an experimental and demonstration area. It has, however, become an urban forest without abandoning its original mission. In fact, we believe that the original objectives have done much to direct the project along lines that make it today what we would class, for the sake of argument, if you like, an ideal urban forest. It conforms to the definition of forest; it is near a large urban population; it produces a variety of goods and services desired by society; and, it serves as a functioning demonstration of examples of conservation.

The basic principle of management is to strive to conform to the original objectives and to maintain the flow of goods and services in response to demand. We feel that it is of fundamental importance that production of goods be part of the activity at all times.

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