Chapter 1

The Origins of Urban Forestry

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1. Introduction

This chapter is an introduction to the background of our urban forests and the evolution of urban forestry as a serious field of study and practice. Before any discussion of the history of urban forestry can commence, it is necessary to consider the development of cities and communities in conjunction with the changing views regarding urban vegetation. The origins of forms and landscapes that led up to the 19th century tree-lined boulevard can be traced in Europe, as well as other types of urban vegetation. The concept of urban forestry evolved slowly, from horticulturists to tree wardens to the city foresters, shade tree commissions, and tree cities of today (see Chapter 23, this volume).

2. Agricultural Revolution

After we had spent much of our collective human life span as nomadic hunter-gatherers, the development of agriculture and concurrent domestication of plants and animals allowed humans to congregate and form permanent settlements. In floodplain valleys of the Tigris, Euphrates, Indus, and Nile Rivers 10,000 to 15,000 years ago, the beginnings of agriculture and civilization as we know them were formed. Population centers close to agricultural land arose and food became a commodity that could be traded or stolen. Food surpluses allowed a division of labor within the community and a cultural evolution took place along with technological improvements (Miller, 1997). One of the first uses of trees was as a source of food. Cultivation of the date palm goes back at least 5000 years, and there is a bas-relief representation of it on the terrace wall of Queen Hatshepsut’s temple which was done about 3500 years ago (Everett, 1981). Trees were also admired for their beauty in ancient times; recall the Genesis story “out of the ground made the Lord God to grow every tree that is pleasant to the sight, and good for food” (Bates, 1936).
3. Development of Urban Areas and Vegetation Use

3.1. Ancient Times

Initial population gatherings changed over time from villages to towns to city-states to empires. Ancient cities were often crowded, walled, and filled with poor citizens and slaves. Babylon, a city in the sixth century BC along the Euphrates River, has the first mention of intentional use of vegetation in an urban environment—the Hanging Gardens (Miller, 1997). Ancient civilizations used trees for aesthetic purposes; formal gardens, landscapes, and sacred groves were generally associated with temples, statues, and buildings. Trees were held in high regard and sometimes worshipped in societies such as those of the Egyptians, Phoenicians, Greeks, and Chinese (Grey and Deneke, 1986). The Olympic Games of the Greeks inspired enclosed sports grounds frequently set in a grove of plane trees. Three of these groves, dating from the sixth century BC, generated famous schools of learning: the Lyceum, the Academy, and the Cynosarges (Mumford, 1961).

3.2. Dark Ages

With the downfall of the Roman Empire, the Dark Ages descended upon Europe by AD 500. At first, people moved to the countryside and the size of cities diminished. City-states emerged as the ruling power and it was a time of warfare and feudalism. By AD 1100, the populace was moving back into the now-walled cities for protection (Miller, 1997). The walls ensured that a margin of agricultural land would remain around the city (Mumford, 1961).

3.3. Medieval Times

Medieval towns generally had a castle, market area, and church as well as homes and shops. Usually situated in the countryside in a militarily advantageous setting, the towns remained small and had ready access to the natural landscape. Space behind the homes allowed room for gardens (Miller, 1997).

3.4. Middle Ages

As cities became more crowded and continued to be confined behind city walls, population growth put pressure on available space and took over any open garden areas (Miller, 1989). The Middle Ages demonstrated that unlimited growth and unsanitary conditions provided their own population checks as plagues swept through the burgeoning urban areas. Access to the countryside was eliminated by the 14th century when gunpowder necessitated stronger city protection (Miller, 1997). The separatist nature of the Middle Ages influenced planting in newly emerging botanical gardens by stressing plants with medicinal uses, often needed for survival (Grey and Deneke, 1986).

At this point, urban areas were fairly well established. There was a shift in thinking among educated upper classes from survival to aesthetics. Urban design began its modern development; following is its evolution from the formal gardens of the elite to public green spaces and street trees.
4. Modern European Urban Design

4.1. Garden Allée

Renaissance Italy developed the “first distinct landscape element” called the garden allée. These tree-lined pathways were the organizational basis of landscape gardens, generally enclosed by walls. In 16th century France, garden allées no longer functioned as the basis but became elements of the unique French landscape style in which the allées frequently extended beyond the wall. As part of a contribution to tree-lined boulevards, allées were used as recreational areas and created large spatial patterns and visual frames (Lawrence, 1988): “The role of trees as a public amenity in an urban landscape derives in large part from the Renaissance allée” (p. 356).

4.2. Wall Promenade

During the 16th century, tree-lined streets were mostly absent in European public spaces. By the end of the century, the wall promenade had taken form. Trees had been planted along old walls or the sites of old walls since the Middle Ages. With new military ramparts and earthworks built in the 16th century, the wide surfaces around them were left open or planted with two to four rows of trees. Thus the garden allée was adapted to a new form (Lawrence, 1988).

4.3. Waterside Promenade

In the 17th century the wall promenade, with many variations, had spread to most of western Europe. The waterside promenade also arose during this time with the expansion of waterborne commerce and subsequent remodeling of waterways. One variation, the tree-lined canal, became distinctive in the first decades of the 17th century. The main example is Amsterdam’s “Plan of the Three Canals” in 1615, under which important houses were built and a row of elm trees planted along the new canals (Mumford, 1961; Lawrence, 1988). Lindens also were used along these canals (Lawrence, 1997): “The practice was the first recorded use of buildings, traffic, and rows of trees together as a unified spatial form in a city interior rather than in isolation as with allées and wall promenades” (Lawrence, 1988, p. 359). The “Plan of the Three Canals” included ample garden space in each lot and brought the open space, trees, and gardens of the suburbs into the inner city (Mumford, 1961). This form spread through the Low Countries but not outside them; thus, this Dutch innovation remained regionalized for another century. The second type of waterside promenade was the quay promenade, which was common in western Europe. Riverside areas that were rebuilt often had trees along one part for less than 100 meters. The trees were rarely used in conjunction with buildings or vehicular traffic, but rather as adornment to the landscape or for recreation (Lawrence, 1988).

4.4. Malls and Cours

Recreational space was in demand in the beginning of the 17th century. Originating in Italy and spreading throughout many parts of western Europe, variations on the garden al-
lèe were created to accommodate the upper-class fixation on both a game the English called pall mall and on pleasurable carriage riding. The playing grounds, or malls, were grass-covered and lined with trees and were usually in gardens but sometimes in the open for use as public grounds; they doubled as promenades when not being used. The fad eventually ended and the grounds were converted to other uses. In 1616, Marie de Medici introduced carriage riding for pleasure to France and it became very popular with high society. Some of these cours were accessible to anyone with a carriage. The pastime was soon adopted by other western European cities. These two recreational areas were part of the urban landscape rather than semiprivate gardens or estates: “The cours was especially important because it transformed the garden allée into a place for vehicles, albeit one not yet integrated into a city’s street system” (Lawrence, 1988, p. 361).

4.5. Exterior Avenues

French rural areas often had tree-lined streets onward from the 16th century. Outside extensions of garden allées, now called avenues, transferred the informal tree-lined post road to a formal geometric design. The rural avenues served as formal entryways to city gates or to large suburban structures by the late 1600s. These exterior avenues later provided examples in large-scale spatial design. They also became incorporated into the city as it grew, turning “many tree-lined country roads into tree-lined streets.” This form was generally connected with formal French gardens but could be found anywhere in Northwestern Europe (Lawrence, 1988). In the 1640s, lindens were planted along Unter den Linden in Berlin (Lawrence, 1997).

4.6. Baroque Boulevard

The baroque boulevard of the 17th century contributed most to the development of the 19th century tree-lined boulevard. In 1670, with the destruction of Paris’ surrounding walls and their transformation into broad, elevated, tree-planted promenades, Louis XIV created a recreational zone at the edge of the city. Early 18th century Paris enlarged, and the inclusion of the boulevards within the city greatly increased their popularity. Only after the Napoleonic wars did city walls transform to pedestrian, rather than military, zones in much of Europe (Lawrence, 1988). These conversions “resulted in the creation of many new tree-lined boulevards and established the baroque boulevard as an important element of the European urban landscape” (Lawrence, 1988, p. 365).

4.7. Interior Avenues

City centers, often leftovers of medieval towns, were generally treeless. It was not until existing cities had planned expansion or new towns were designed that trees were incorporated into the street system. The typical city street, with traffic, buildings, and trees, did not come into widespread use until after the redesign of Versailles in the 1670s to a residence city. One of the main contributions in this restructuring was the development of the interior tree-lined avenue, which was a meshing of the exterior tree-lined avenue and the place promenade. This design had limited use except as a formal entryway up through
the mid 1700s. At this time French urban theorists did not even approve of such uses of trees along city interior avenues. Around the middle of the 18th century, the interior avenue was integrated with general urban expansion, not only in residence cities (Lawrence, 1988). However, interior avenues served mainly as a place promenade during this century and were “somewhat restricted and formal” (Lawrence, 1988, p. 369).

4.8. Place

The place or square contributed to urban vegetation use in two ways. The beginnings of the place, inspired by the Italian Renaissance, used no vegetation in a very formal, balanced design. By the 18th century, French places became rich, intricate areas. Often at the junction of important streets, the places were within the matrix of city streets and structures and became a vital part of urban design. In addition to being integrated into the center of cities, places also influenced street tree use by incorporating a new dimension of vegetation use within the city. French, German, and Spanish squares differed from British design in that they were “usually open to vehicular traffic and integrated with structures” as public areas (Lawrence, 1988, p. 364). The British, who generally lacked street trees in the 1700s, had private enclosed parks instead (Lawrence, 1988).

4.9. Boulevard

The early 19th century saw the planting of trees on general use streets to provide shade and ornament rather than the use of trees solely for recreation as was the case in the previously described urban design forms. Since the late 17th century, streets had been widened, straightened, paved, drained, and lit. The British provided several of these new features including house numbers and storm drains, but as previously mentioned did not include street trees. England gave the example, but it was 19th-century France whose streets took on familiar, modern characteristics. The British developed the sidewalk and the French used its potential to provide a modicum of safety for both pedestrians and trees. Sidewalks were a great improvement as tree-planting sites over the previously used road edge; they were better drained and protected the soil from compaction and the trees from injury. With this, the boulevard form was complete (Lawrence, 1988):

The new boulevard form facilitated transportation; police access, waste disposal, drainage, and air circulation, in addition to being enormous public-works projects. They also made trees essential and prominent in the urban landscape. They combined various prior usages as repetitive visual elements that gave dimension to vistas and distant perspectives, as graceful ornaments complementing the often mediocre design of structures along the boulevards, as shady promenades for pedestrians, and as purifiers of the polluted urban air (p. 372).

The few tree-lined streets of 1848 Paris gave Napoleon III an example for his city rebuilding plans. But what was the impetus behind the new uses of trees? Changing public perceptions had a great deal to do with the existence of street trees. During the 19th century the concept of vegetation as a healthful element in the city became popular. Modern uses of trees mirror those of the 1800s when trees were part of cleaner city living. They gave shade to the opened streets and filtered particles believed to cause disease (Lawrence, 1988). There were other, less aesthetic reasons for the use of new street designs. Napoleon’s
restructuring of Paris was primarily to assist troop movement through the city. Wide, open boulevards doubled as parade grounds. The trees, while pleasant to see, also provided a degree of defense to the troops. These boulevards also were part of a token effort by autocratic rulers to show beneficence and civic commitment to the populace (Grey and Denke, 1986; Lawrence, 1988).

5. Industrial Revolution and Romanticism

The Renaissance was a period of flowering in the European arts and sciences. Technological improvements led to mechanization and industrialization. Demand grew within cities for labor; workers migrated from agricultural areas now getting better production with fewer farmers. The steam engine allowed for product transportation, better metal working was developed, and the Industrial Revolution had begun by the middle of the 18th century. Unfortunately, urban centers were ill-equipped to handle this massive influx even with improved sanitation; cities were dark, dirty, and crowded. Urban vegetation was a matter of consequence with the upper and middle classes only. During the 19th century (post-Industrial Revolution) conditions remained oppressive for the poor working class (Miller, 1997).

Romanticism and its love of the natural landscape was the reaction to the abuses of the Industrial Revolution. It was a sharp contrast with the formality of baroque design. Romantic ideals encouraged elements of nature to be included in urban areas as well as avoiding cites through suburban development (Miller, 1989). In England, the response to industrialism followed a very different path than would be taken by America. City size and land use were strongly controlled, with the development of greenbelts around urban centers, creating satellites outside the urban areas linked to the city with effective mass transit systems, and by regulating land use. These models were used throughout Europe as industrialization expanded. Such efforts have produced European cities with access to natural, undeveloped areas and restrained urban centers from becoming too large (Miller, 1997).

6. American Urban Development

6.1. Cities and Towns

When the first settlers arrived, they were confronted with a heavily forested region filled with dangers. The woods not only concealed the enemy, but they took up valuable, necessary agricultural land and were a source of raw materials. These factors led to the deforestation of significant acreage (Grey and Denke, 1986).

Philadelphia was one of the first planned cities in the emerging United States. In William Penn’s 1682 design, he called for “five open spaces of five to ten acres each, filled with trees” (Miller, 1989, p. 33). This is not surprising, as Penn, an Englishman here to develop an allotted piece of land, followed traditional English design. However, street and yard trees did not generally appear in Philadelphia until after 1784, when insurance regulations were changed (Miller, 1989). Outside of cities, trees were often planted on estates in the late 18th century; visitors to Mount Vernon and Monticello can see trees planted by George Washington and Thomas Jefferson. The latter carried his love of trees into the new
city of Washington; a watercolor painted by G. Burton in 1824 shows an avenue of Lombardy poplars planted under Jefferson's direction along Pennsylvania Avenue leading to the Capitol (Lawrence, 1997).

Town commons were nothing new in urban design. England used these almost exclusively for vegetational settings. Before the 1790s, New England commons, with no one designated to maintain them, were greens ruled by grazing animals, children, and the occasional militia practice (Schein, 1993). Trees and grass were not purposely planted in commons until the late 1700s (Miller, 1989).

By the end of the 18th century, new city planning in the United States included street tree plantings. In 1791, Major Pierre Charles L'Enfant submitted his proposal for the design of Washington, DC. Following French styles, his baroque city was dominated by a street system. The main avenues were over 150 feet wide and had the gravel walk planted with trees on each side (Mumford, 1961). Although his design was never carried out to full extent, some of the basic groundwork was begun and French urban design was transferred in large-scale planning to the developing United States.

Plans for other areas called for the inclusion of trees. In 1807, the territory of Michigan passed a law to plant trees on Detroit's boulevards and to build squares with trees. It was recommended in 1821 when choosing a capital for Mississippi that "every other block is filled with native vegetation or...planted with groves of trees" (Miller, 1989, p. 3). The rationale was for a healthier environment and better fire control (Miller, 1989).

6.2. Industrial Revolution

When the Industrial Revolution began in the 1850s, less than 20% of Americans lived in urban areas. In 1950, the number was 50% and currently over 80% of the population considered urban. Although it took 100 years for the Industrial Revolution to reach the United States, not much had been learned from the disaster in Europe. Cities became over crowded and polluted; these conditions, as in England, prompted the Romantic Movement.

6.3. Romantic Movement

Resulting from the romanticized landscape idea were city beautification efforts such as street trees, city parks, and civic centers. Leading the city park movement was Frederick Law Olmstead, best known for designing Central Park in New York City. This movement wanted naturally landscaped parks as part of the new industrial cities. But for many city inhabitants, this was not sufficient impetus to remain (Miller, 1989).

The idea of suburbs was explored in the mid-1800s; one of the earliest examples Llewellyn Park in West Orange, New Jersey (Grey and Deneke, 1986), where a magnificent bald cypress grows by the road leading uphill to Thomas Edison's former home. At the same time, suburbs expanded along mass transit lines and homes were within walking distance of the station. Major outmigrations began in the 1920s. Post-World War II development generally subdivided and lacked trees. There was a great demand for housing that needed to be met quickly. The rise of the automobile allowed subdivisions to be placed anywhere, especially in leftover green spaces between mass transit corridors. Traffic congestion reached intolerable conditions by the 1950s (Miller, 1997).
With the development of an interstate highway system for defense purposes in 1956, the government was persuaded to fund expressways through the cities. This allowed even more people easy escape to the everexpanding suburbs. The flight of wealthy city residents to low-density suburban housing hastened inner-city decay. But the suburbs themselves suffered from insufficient land-use planning (Miller, 1997).

6.4. Recent Developments and Ideas for the Future

The low point in American cities was reached during the mid and late 1960s and 1970s. Riots, pollution, crime, and poverty were increasingly prevalent. Federal government programs often did more harm than good. New trends are showing that suburban congestion and commuting are enticing people to move back into urban centers, bringing tax money and revitalization along with them (Miller, 1997).

According to Miller (1997), in the future this pattern will continue, increasing the demand for urban amenities. More emphasis will be placed by the government on managing urban forests and preserving open space through easements and zoning. It has been a long and winding path to the urban forests of today; luckily, it was a path chosen over the centuries that has left us with a precious living legacy, one that reminds us of our inexorable and necessary connection with the natural environment.

7. Legislation and the Scientific Treatment of Trees

7.1. Development of Horticulture and Arboriculture

With the origins of urban vegetation design examined, we should now look at the development of the science of tree care and the laws validating and protecting our urban forests. Settlers brought seeds of exotic plants with them to the New World. In both urban and rural areas these often became street trees. Botanic gardens were planted to showcase rare or interesting species. Many of the exotic species causing problems in our vegetated areas escaped from these gardens. The late 18th and early 19th centuries saw proliferate planting of exotics such as Lombardy poplar, English elm, ailanthus, and Norway maple. Since most nurseries received ornamental stock from Europe and most trained horticulturists and foresters also were from Europe, exotic species dominated until the mid-19th century. The change to use of native species was led in part by Andrew Jackson Downing. He felt that the trees that would do best on any specific piece of land would be the ones indigenous to the area (Grey and Denke, 1986).

7.2. Knowledge, Organizations, and Laws

The presence of more lawn and street trees called for more trained tree care professionals. The sciences of horticulture and arboriculture had been around since people began purposeful planting of trees. Felt (1938) asserts that proof of ancient tree care exists in evidence from gardens in Babylon and Assyria in 200 BC, and in Rome and Persia in 500 BC. A large body of written work on the subject includes “Enquiry Into Plants” in 302 BC, by Theophrastus, which describes “‘plastering wounds with mud’ to prevent decay” (Felt.
1938). The subject also was treated by Pliny the Elder in AD 35 and Quintillian and Varro in the first century (Felt, 1938).

Throughout the 16th, 17th, 18th, and 19th centuries, treatises, books, and experiments involving tree care can be found. For example, William Forsythe was a prominent figure in England who wrote extensively on tree care in “The Culture and Management of Fruit Trees” in 1791 (Felt, 1938).

J. Sterling Morton, of Nebraska’s Board of Agriculture, originated Arbor Day in 1872. Having more than one million trees planted in Nebraska that first year evidences his success. The idea took off in the rest of the country and Arbor Day is an annual tree planting and tree awareness festival throughout the United States (Miller, 1989).

Shade tree care and protection became necessary with the appearance of the gypsy moth, brown-tail moth, and elm leaf beetle in New England. In 1891, Massachusetts tried to eradicate the gypsy moth, which was causing unpleasant conditions around Boston. “Tree surgery” gained scientific status due in large part to the efforts of Dr. George Stone. He performed many experiments on trees and worked on cavity-filling techniques during 1895 to 1917. He also taught the first course on shade tree care in America at the Massachusetts Agricultural College (Felt, 1938).

The turn of the century saw John Davey starting a company that specialized in tree maintenance. He is often considered the “father of modern arboriculture.” The great forester, B. E. Fernow, wrote The Care of Trees in Lawn, Street and Park in 1911, while at the University of Toronto. Fernow, applying a two-century-old term, used “tree warden” as opposed to urban forester when referring to practitioners of “esthetic forestry.” The first national meeting of professionals and lay persons occurred in 1924, with the National Shade Tree Conference (Grey and Deneke, 1986).

City forestry programs were begun in most United States cities and many large towns. But it was not until disease struck shade trees that smaller communities started their own forestry programs. Previously they had only tree-planting programs. Diseases such as oak wilt, phloem necrosis, chestnut blight, and Dutch elm disease illustrated the need for organized knowledge and management of shade trees. University courses in arboriculture and new positions in park, tree, and landscape divisions resulted from this need. At this point, the focus was still on individual trees (Miller, 1989).

7.3. Urban Forestry

The concept of urban forestry came out of the University of Toronto in 1965. A key point of the new concept was that urban forests encompassed all the area affected by urban populations. Thus, not only parks and street trees, but greenbelts, watersheds, and recreation areas had to be considered in management strategies. Urban forestry was officially recognized when the President accepted a 1968 report from the Citizens Advisory Committee on Recreation and Natural Beauty. This report suggested the Forest Service create an urban and community forestry program. Funding was finally made available in 1972, when Public Law 92-288 amended the Cooperative Forest Management Act of 1950. The United States Forest Service was charged with spending the money to begin or aid state forestry programs “to provide urban forestry technical assistance” on a local level (Grey and Deneke, 1986). Many organizations and individuals have contributed to making urban and community forestry a well-known and appreciated field of study and public service.
References


