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URBAN FORESTRY IN THE FEDERAL REPUBLIC OF GERMANY¹

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Abstract. Every third person in West Germany lives in a large city with a population of more than 100,000. In some areas population densities approach 5,500 persons per square kilometer! In spite of the resulting pressures, German cities are generally considered very livable places. Urban foresters share the credit for contributing to the enhancement of the quality of living through their professional involvement.

In the sense of providing on a sustained basis multiple benefits to city people, urban forests in Germany have been in existence for at least 50 years. However, events as far back as 600 years ago help explain certain aspects of these forests. The most dramatic changes and developments leading to Germany's contemporary "green" cities took place after WW II. Reconstruction of the war-ravaged, overpopulated cities led to urban renewal guided by concerted urban planning which tries to integrate traditional and modern, architectural, social, political, infra-structural and environmental considerations. As a result of the urban planning process, the urban forest in many German cities is a composite of three distinct components: the peripheral green belt and radial spokes together with other inner city green spaces. These components are serving product (timber), environmental (noise and air pollution abatement, climate modification, watershed protection) and recreational functions to variable degrees.

In the U.S., continuing urbanization, increasing environmental awareness, leisure time and energy costs among other factors, are certain to increasingly challenge urban foresters who have barely begun to define their professional image and scope (Shafer and Moeller, 1979). As urban forestry in Germany builds on decades of experience, experimentation and resourcefulness, it may be of interest to take the German situation as a measure of probabilities and possibilities in America's fast-changing urban environment.

The Federal Republic of Germany (FRG), highly

industrialized and among the leading economic worldpowers, accommodates her 62 million people on slightly less than 25 million hectares (ha), an area roughly the size of Oregon (population 2.5 million). This amounts to a population density of 247 persons per square kilometer in the FRG nationwide and as many as 5,500 persons per square kilometer in highly congested urban areas such as the Ruhr region. Every third person lives in a large city, including 21 million people in 68 cities with populations of more than 100,000 (Romer, 1979).

Twenty-nine percent of the FRG is forested. This amounts to approximately 0.12 ha per person on a national average but much less in conurbations. For a country with such population pressures on a limited area, green space, especially within reach of urban people, assumes great importance with respect to environmental benefits and physical and mental well-being. Recognition of this fact is reflected in the increasing popularity of an environmentally-oriented new political party in the FRG, the "Green Party."

History

Germans pride themselves with having initiated scientific forestry. They can stake the same claim with respect to urban forestry. If we accept Burns and Moeller's (1979) definition of urban forestry as a "concept through which the planning and management of woody vegetation and green space are coordinated and manipulated to provide multiple and sustained benefits to urban people,"

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the early 1920's would be considered the beginning of urban forestry in Germany. However, we can look back considerably farther in history to identify events and trends which set the stage for the evolution of this concept.

The city of Frankfurt for instance, has owned its now famous forest since 1372 (Frankfurt, 1972). Until about 215 years ago when appropriate forestry practices were begun there, this forest on the city's periphery served primarily as range for domestic stock and as a supplier of timber and fuel wood. Efforts to provide recreational opportunities started about 100 years ago. Other forests next to German cities such as Stuttgart, Munich, Nuremberg and Cologne experienced similar gradual shifts from product to service functions during the same general period. These forests in the urban periphery have survived as more or less continuous green belts usually within 5 to 10 miles of the city core, serving as several mile wide buffers between the cities and outlying suburban areas or neighboring communities. These forests have traditionally been under the management of trained foresters.

Urban greenspaces within the city proper have traditionally been handled by private citizens, public institutions (e.g., universities) or city-employed horti-arboriculturists. The peripheral forest and the urban greenspaces together make up the urban forest proper.

Urban greenspaces have a long history too, as documented for Nuremberg by Friedrich (1972). In the crowded medieval cities, contained by defensive city walls, only a few affluent citizens or institutions maintained gardens for produce and decorative or educational purposes. During the 16th century, more extensive gothic gardens were developed just outside the city walls. These garden belts of moderate width frequently contained wells, pumps, even heated greenhouses and eventually evolved into centers for the bubbly social life of the Renaissance period. Some of these areas still do exist today as more or less continuous innercity greenbelts.

Arboricultural practices such as plant propagation, pruning and pest control were already to be found at that time. A 1511 city ordinance in Nuremberg for instance, required the collecting of

tree-defoliating caterpillars by certain deadlines.

First public greenspaces within the cities seem to have been established in the 15th century. In Nuremberg for instance, a people's park came into being in 1443. Linden trees were planted, fountains installed and fireworks, dances and shooting competitions took place there for public enjoyment.

The following centuries were marked by wars and social upheaval. As a result, existing urban greenspaces often degenerated into vegetable gardens, were neglected or used for housing developments. Industrialization in the 18th century created dramatic but unregulated growth of cities outside the former city walls often resulting in very crowded and drab housing conditions. As a reaction to these unpleasant circumstances in the second half of the last century, efforts were made to humanize the urban environment by involving the population in recreational activities such as gardening and various sports. The increasingly powerful garden and sports clubs gave considerable momentum to the development of new greenspaces, scenic hiking trails, public swimming pools and public city parks. Germany's first public playground (for boys only!) was created in 1876 in Nuremberg.

Since WW I, there have been more or less successful efforts to integrate urban green space planning into overall urban planning. These efforts were originally aided by the inflation in the early 20's, when many cities assumed responsibility for the employment of an army of jobless. It was during these years for instance, that many cities completely revamped their existing greenspace and tackled many new projects with the help of numerous laborers.

Much as the inflation proved a blessing in disguise with respect to urban greenspace programs, the destruction of many German cities in WW II may be viewed in a similar light. Postwar reconstruction in many cities led to urban renewal often characterized by a happy synthesis between historic and modern architecture and accentuated by greening attempts (Fig. 1). The incorporation of green space planning into the overall urban planning and development process has contributed significantly to the success of ur-

ban renewal in Germany since the 50's. New urban planning laws facilitated this integration by giving local authorities a better range of planning and implementation tools and by bringing the citizens into the planning process.

In several German cities such as Nuremberg and Stuttgart, the urban forest is now viewed as a composite of three distinct components whose spatial and functional relationship is coordinated by the overall urban planning process. This urban forest concept, which includes the forest belt surrounding the city, radial green arms reaching into the city and numerous greenspaces dotting the inner city, was originally conceived by a Prof. Jansen in 1924 (Friedrich, 1972), but has only lately reached the implementation phase. Each of these three components will now be discussed individually.



Fig. 1. In this scenery from Cologne, the happy synthesis between architecture from the 12th and 20th centuries is pleasantly accentuated by a small-scale greening attempt. (Photo: H. Schabel).

The peripheral urban forest belt

These forests generally surround cities in a partial circle (Fig. 2). They are easily and quickly reached on foot, by bike, automobile or public transportation. In many German cities, every second forest visitor tends to arrive on foot (Rozsnyay, 1972). Forest parking lots along the forest edge connect with all-weather foot, bike, horseback or sports trails leading into and through the forest. In Frankfurt alone this trail system adds up to 450 km in the 4,300 ha city forest (Frankfurt, 1972). Forest roads are generally closed to vehicles, a measure endorsed by an overwhelming majority of the people (Rozsnyay, 1972).

These forests are managed by state or city foresters, professionals who have received the standard German forestry education leading to a master's degree. As resource managers, these foresters are responsible for virtually every aspect of forest land management: biological, technical, economic, and social. Like other forests in Germany, these green belts are managed for multiple use in the German sense, in that one area may simultaneously serve several purposes. Different priority combinations of product, environmental and recreational functions are identified by detailed maps which translate into corresponding management procedures.

Timber production remains a major objective in these urban forests. According to several polls, over two-thirds of the forest visitors are aware of various management activities but only 5 to 8% resent certain aspects related to management (Rozsnyay, 1972). Silvicultural and harvesting procedures are generally modified to assure compatibility with environmental and visual quality and recreational objectives. As a result, the emphasis is usually on mixed forest types which, according to several recent polls, were preferred by the people questioned over pure conifer and hardwood types, in that sequence (Rozsnyay, 1972). Uneven-aged forests which result from seed tree and shelterwood cuts or group regeneration seem particularly popular. Along the forest edges and in travel-influence-zones, arboricultural practices such as the addition of exotic specimen trees (American representatives including *Sequoia*,

Pseudotsuga, *Chamaecyparis*, *Tsuga*, *Thuja* and *Liriodendron* are very common) or the enhancement of uncommon native trees and shrubs (*Sorbus*, *Malus*, *Acer*, etc.), the maintenance of character trees of old age, big size or rugged appearance (usually *Tilia* and *Quercus*), as well as pruning and wide spacing for landscaping and safety reasons are prevalent. Small clearcuts never fail to find approval by the public for their edge use.

While regular "timber" forestry continues to be practiced in these urban green belts, their foremost function is that of providing various environmental and recreational benefits to the urban public.

In cities such as Frankfurt, the urban forest contributes significantly to the city's water supply system. As a result, American red oak, which was found to be particularly beneficial with respect to replenishing ground water supplies and which also meets timber, wildlife and aesthetic objectives in an admirable way, is likely to be given greater consideration in future silvicultural prescriptions.

Besides serving as reservoirs and cleansers of water, urban forests in cities such as Wiesbaden and Stuttgart, which as a result of their topography happen to have poor air exchange patterns (low wind velocities and frequent inversions), serve as modifiers of the local climate. The beneficial influence of the urban green belt on urban air flow patterns in these cities was proven by infrared thermography, tracers and radiosondes.

Today, the urban green belt serves primarily as the recreational backyard for city people who seek fresh air, solitude, free movement, relaxation and contact with nature. In cities like Munich, the rate of use of the peripheral forest belt amounts to more than 1,000 people/ha/yr (Bichlmaier, 1969). On certain peak days, as many as 25 people have been counted per ha in the forests of Stuttgart (Oechssler, F. 1973). Frankfurt's city forest accommodates more than five million visitors every year, 750,000 of whom visit its six forest playgrounds which are famous for their attractive and innovative designs (Frankfurt, 1972). Spray fountains and sports trails, the latter designed in cooperation with sports physicians, are particularly popular features of these forest

playgrounds, typically located along the forest edge next to the city. Former eye sores in the forest, such as garbage mounds in Stuttgart and Frankfurt, were covered, vegetated and converted into major recreational attractions with vista points, ski and sled runs, playgrounds, grill opportunities and more (Fig. 2). Most forest visitors prefer social interaction and usually remain close to these playgrounds. For others, hiking opportunities on well-marked trails usually leading to focal points such as vistas, ponds, meadows, wildlife compounds, outdoor cafes and restaurants, abound. More remote forest areas remain deliberately underdeveloped yet accessible to accommodate those people who seek nature observation and tranquility (Oechssler, F. 1973). Stratifying the visitors in this fashion has frequently succeeded in eliminating potential use conflicts.

Management and hunting of game species such as roe, red and fallow deer, wild boar, mouflon sheep and hares follows the same patterns as in the rest of the country. However, special safety precautions are taken in the urban periphery.

The radial urban green spaces

These components of the city forest are green ribbons originating at the peripheral green belt and reaching toward the city center. According to urban development plans, these green spokes serve primarily as avenues for leisure travel (hiking and biking) between the city and the peripheral forest as well as noise and pollution buffers and recreational niches. Usually private properties, community gardens, urban parks and playgrounds are integrated into these green rays. In many cases, efforts are still underway to implement this planning concept. In the case of Stuttgart the radial green spaces generally coincide with topographic channels parallel to the windflow, thereby leading fresh air from the peripheral forest into the city which is located at the bottom of a bowl-like depression.

Inner city green spaces

Together with these radial components, the inner city forest consists of numerous vegetated areas dotting the cityscape which range from small-scale greening attempts, sometimes a single

tree or other vegetation in existing niches (Fig. 1), to larger city parks, cemeteries, zoos and botanical gardens with their standard attractions. Cities like Stuttgart, Wiesbaden and Bonn to name a few, are green cities now as a result of historic developments on one hand, which preserved green spaces through centuries, and on the other hand coordinated city planning which included a deliberate effort to maximize green space. Urban renewal led to the reclamation of idle wasteland, quarries, gravel pits, mine spoils, railroads and the like. Ten to fifteen years of planning and redevelopment of alternate routes preceded the elimination of traffic flow in the city centers and the development of green pedestrian zones with trees, shrubs, flowers, aesthetic pavement variations, benches, outdoor bazaars, cafes and restaurants, picnic groves and other people pockets. Fountains in many variations together with vegetation act to mute city noise and add the visual and auditory appeal of illusionary forest streams. New green space continues to be added

by putting traffic underground and greening the resulting roofs (Fig. 3). Parking lots outside the pedestrian zones are increasingly lawned or in vegetated concrete. City ordinances such as in Wiesbaden, where one tree is required per 6 parking spaces, result in parking lots which truly do justice to their names (parks!). Many city parks include leisure facilities which provide both indoor and outdoor opportunities for sports, games and cultural activities, but also nature appreciation and tranquility for those trying to get away from the city bustle (Wynne, 1977).

Major momentum for the greening of cities has come from the federal and international garden fairs hosted by different cities at two and ten year intervals, respectively. Generous federal funding for these events can completely alter the appearance of a city and have a lasting impact. Preparations for these garden fairs usually promote the implementation of a recent planning concept which attempts to mesh existing green spaces into a green web (Fig. 3) permeating the



Fig. 2. View of Frankfurt and a portion of its 600 year old peripheral forest belt. This forest is managed for timber, watershed protection, climate modification and especially recreation. A former eyesore, 20 million cubic meters of garbage were converted into a major recreational attraction, Monte Scherbelino in the foreground. (Photo: Archives, Frankfurt City Forest Office).

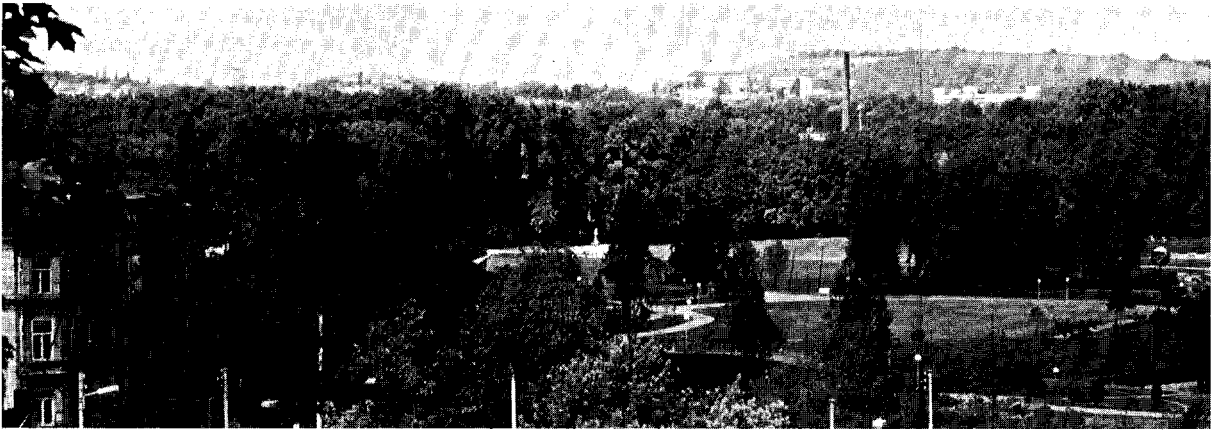


Fig. 3. Scenery from Stuttgart. In preparation for a recent garden fair, the lawned area in the middle of the picture was newly created by eliminating some old, but historically insignificant structures and by putting traffic underground. This new green space permits leisure travel between two existing city parks (in background and behind photographer) without interference from traffic. (Photo: H. Schabel).

entire city and providing interconnections between the radial components and the peripheral forest.

Public efforts for city beautification and enhancement of living conditions are usually paralleled by private involvement resulting from compliance with city ordinances, participation in garden contests sponsored by the cities, or private initiative. The degree of public involvement is probably reflected best in the fact that vandalism ranks only as a minor problem. The user density in most parts of the urban forest also results in a situation of mutual control. Major problems in the urban forest at this time primarily deal with avoidance of user conflicts.

As far as monetary aspects are concerned, facilities in the urban forest are generally open to the public without charge. The German taxpayer is accustomed to funding social programs with taxes and expects the public authorities to provide a full range of services without charge. Local and regional authorities in turn are conditioned to revenue sharing from higher levels without sacrifice of their independence or fear of outside governmental intrusion into local affairs (Wynne, 1977).

Conclusions

While many of the smaller greening attempts in German cities may not amount to more than minor

cosmetic changes, their total environmental, aesthetic and recreational impact has often succeeded to radically change the city character. The contemporary urban forest German style should be understood as the end result of historic trends and events, generally crowded living conditions, the active demands and involvement of a socially and environmentally aware, affluent urban population and above all the integration of urban forestry into comprehensive urban renewal planning and development.

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