

THE CITY AS A GARDEN: URBAN NATURE AND CITY DESIGN

Anne Whiston Spirn¹

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Boston's Fens and Riverway are a remarkable integration of urban nature and human purpose. Conceived by Frederick Law Olmsted (1822-1903), the great American landscape architect, and built in the 1880s and 1890s on the site of tidal flats and floodplains polluted by sewage and industrial effluent, these projects were designed to purify water and protect adjacent land from flooding. They also incorporated a sewer, paths and bridle trails, a parkway, and Boston's first streetcar line; together, they form a landscape system designed to accommodate the movement of people, the flow of water, and the removal of wastes. This skeleton of park, road, sewer, and public transit structured the growing city and its suburbs.

Olmsted's contemporaries knew full well that these parks were constructed, for they had seen and smelled the filthy, stinking, muddy mess the Fens and Riverway replaced; the recognition of the transformation was part of their social meaning and aesthetic power. Today these works are admired, but most people believe that they are wetlands and forest, which Olmsted preserved, rather than places he designed and built, daring experiments of engineering, ecology, landscape design, and city planning.

Why were Olmsted's landmark achievements in the Fens and Riverway forgotten? The answer lies partly in people's loss of an ability to "read" landscape and partly in their understanding of nature and what is natural. On the one hand, the appearance of Fens and Riverway concealed the human hand in their creation: most people cannot distinguish between forests that merely grew and those that were planted, between shores that were shaped solely by river's flow and plants' growth and those planted to resemble them. In addition, the definition of nature as an entity as separate and even opposed to the city, which is very strong in European and North American cultures, gradually erased the memory of Fens and Riverway as artful, deliberate reconstructions of landscapes laid waste by human occupation.

Nature is a complex word, a set of ideas for which many cultures have no one name. Is nature a sacred entity where humans are one with all living creatures, or a wilderness requiring protection from humans? Are natural phenomena, like trees and wind, animated by gods, or is nature just a bunch of inert resources for human use? Is nature a web of life-sustaining processes that connects everything in the physical and biological worlds including humans? These and other ideas of nature coexist in human societies; such ideas underlie whether people think cities are part of the natural world and how they shape them.

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I never learned to doubt that the city was part of nature. A tiny plot of trees in a nearby vacant lot was a wilderness that provided ample space for childhood fantasies. Several blocks away, a creek disappeared into an underground culvert large enough to accommodate a small adventurer armed with candles and matches, seeking the stream's mouth. Later, downtown Cincinnati afforded nature of a different sort: flocks of pigeons, the wide, brown waters of the Ohio River, hilltops overlooking river and city, and parks whose creekbeds were littered with stone twigs and shells – the fossil remains of ancient plants and animals. Later still, I began to think of nature not just as features like sun, wind, trees, and rivers, but also as the processes that shape them.

I first learned about landscape architecture while studying art history, through the works of Frederick Law Olmsted. Through the design of parks and parkways, he sought to improve the city's climate, alleviate air and water pollution, mitigate floods, and provide a naturalistic counterpoint to the city's buildings and bustling streets. His approach seemed very modern to me, and I decided to enter a profession that promised a synthesis of nature and city, science and art.

As a landscape architect and environmental planner, I was trained in the 1970s to design new communities that accommodated both human purpose and natural processes like the flow of air and water, the transmission and transformation of solar energy, and the growth and succession of plant communities. However, it seemed contradictory to be so concerned with the integration of nature and human activities outside the city and so little concerned with the reclamation of land at its center. Abandoning the city for outlying suburbs and rural areas, without questioning the attitudes that spawned urban problems, guarantees that a retreat to the countryside will provide only temporary respite from those problems. If a dispersed settlement pattern becomes the norm, more energy will be required to sustain it, and thus more wastes produced. The isolation of the city and the refusal to grapple with its environmental problems will only hasten the deterioration of the countryside. It is in the common interest of the city and the countryside surrounding it to manage the region as an interacting, interdependent system. It is in the interest of remote areas that cities provide a healthier and more attractive environment, just as it is in the interest of urban areas that resources in remote areas be exploited wisely.

In the early 1980s, most landscape architects thought that although it might be beneficial to design the city in harmony with natural processes, too little was known about urban nature for such an approach to be practical. Most people saw the form of cities as forged largely by social and economic forces in which natural processes played little role. Frustrated by these attitudes, I searched for knowledge about urban nature and discovered that a wealth of information existed, sequestered in specialized scientific journals. I decided to write a book about urban nature and city design not just for designers and planners, but for all concerned with the fate of the city and of nature: policy makers and public officials, journalists, community activists, and citizens. The English title for the book is *The Granite Garden: Urban Nature and Human Design*. I chose the title deliberately, for the garden is a powerful metaphor for reconceiving cities and metropolitan regions that implies beauty and pleasure, as well as pragmatic function. If one considers a city as something constructed and cultivated, like a garden, as part of nature, and if one thinks of nature as natural processes, then new visions of the city emerge.

Cities are Part of Nature

Natural processes pervade cities and towns, connecting buildings, streets, sewers, and parks with the air, earth, water, and living organisms within and around them. Acknowledged and harnessed, the forces of nature represent a powerful resource for shaping a beneficial urban habitat; ignored or subverted, they magnify problems that have plagued cities for centuries: poisoned air and water floods, landslides, and earthquakes. The processes of nature should be cultivated and integrated with the varied urban pursuits and purposes of human beings; but before their power to shape human enterprises can be appreciated, nature in the city must be recognized.

Nature in the city is more than trees, gardens, and parks. It is the air we breathe, the earth we stand on, the water we drink, the organisms with which we share the urban habitat. Nature in the city is the powerful force that can shake the earth and cause it to slide, heave, or crumple. It is rain and rushing rivers; water from a faucet, delivered by pipes from some outlying river or reservoir, then used and washed away into the sewer, returned to the waters of river and sea. Nature in the city is an evening breeze, the sun and the sky. Nature in the city is the complex interaction between the multiple purposes and activities of human beings and of the natural processes that govern the movement of air, the erosion of the earth, the flow of water, and the birth and death of living organisms.

Nature is a continuum, with wilderness at one pole and the city at the other. The same natural processes operate in the wilds of Hokkaido and the streets of Tokyo. Air is a mixture of gases and suspended particles. Paving and building stone are composed of rock, and they affect heat gain and water runoff just as exposed rock surfaces do anywhere. Plants invariably seek a combination of light, water, and air to survive. The city is neither wholly natural or wholly contrived. It is a transformation of wild nature by humans to serve their own purposes, just as rice fields are managed for food production and forests for timber. The realization that nature is a whole that embraces the city has powerful implications for how cities are built and maintained and for the health, safety, and welfare of every resident.

Disregard of natural processes in the city is and always has been costly and dangerous. Many cities have suffered from failure to take account of natural processes: Los Angeles and New York suffer frequent episodes of poor air quality, the result of both urban form and transportation modes; Mexico City has subsided twenty-five feet because it failed to recognize the relationship between water and ground stability; Los Angeles and Hong Kong are plagued by massive landslides, many of them triggered by urban development; Houston is devastated by floods caused by urbanization upstream, and many other cities by construction on floodplains within the city. The cost of disregarding nature extends also to quality of life. The newer parts of cities – across continents, climates, and cultures – have acquired a boring sameness. The potential of the natural environment to contribute to a distinctive, memorable, and meaningful urban form is unrecognized and forfeited.

Modern urban problems are no different, in essence, from those that plagued ancient cities, except in degree, in the toxicity and persistence of new contaminants, and in the extent of the earth that is now urbanized. As cities grow, environmental problems become more pressing. Yet they continue to be treated as isolated phenomena rather than as related phenomena arising from common human activities, aggravated by a disregard for the processes of nature. Nature has been seen as a superficial embellishment, as a luxury encountered only in parks and gardens, rather than as an essential force that permeates the city.

The resources afforded and the difficulties posed by each city's natural setting are a constant that successive generations in that city must address again and again, each in accord with their own values and technology. The structure of Edo – high city and low city – was well adapted to its context of hills and valleys, rivers and sea, and Jinnai Hidenobu has described in his book, *Tokyo: A Spatial Anthropology*, how this landscape structure persists beneath the towers and highways of modern Tokyo. Tokyo must still contend, as Edo did, with floods, earthquakes, and fire. Civilizations and governments rise and fall; traditions, values, and policies change, but the natural environment of each city remains an enduring framework within which the human community builds. A city's natural environment and its urban form, taken together, are a record of the interaction between natural processes and human purpose over time. Together they contribute to each city's unique identity.

Urban Nature and City Design

Although many of the environmental challenges facing cities are greater than ever before, the knowledge and the tools available to meet them are far more sophisticated. They need only be applied. More is known about urban nature today than ever before, yet little of this information has been applied to molding urban form: the shape of buildings and parks, the course of roads, and the pattern of the whole. A small fraction of that knowledge has been employed in establishing regulations to improve environmental quality, but these are commonly perceived as restrictive and punitive, rather than as posing opportunities for new approaches to city design. Regulations have also been vulnerable to shifts in public policy, whereas the physical form of the city endures through generation after generation of politicians and public officials. Take air pollution, for example. Regulations controlling emissions of air pollutants may be reduced, but urban form, if designed to disperse those pollutants, will continue to do so regardless of changes in policy.

The rewards for designing the city in concert with natural processes apply equally to all cities, old and new, large and small. Some cities have adapted ingeniously to natural processes: Stuttgart, Germany, which has deployed its parkland to funnel clean, cool air into its congested downtown; Denver, Colorado, whose systems of riverways and parkways function as a storm drainage and flood control system; Boston, where wetlands upstream of the city were purchased for flood storage at a fraction the cost of a new dam; Zurich and Frankfurt, which manage their urban forests for timber production as well as recreation. These cities have each dealt in a comprehensive way with at least one urban challenge. But comprehensive solutions are not the only means of improvement. There are ingenious small projects as well: Paley Park, a tiny downtown park that provides a cool, calm retreat in the midst of New York City; a plaza in Kobe, Japan that provides space for floodwaters; projects in Denver that have transformed the once degraded South Platte River into a resource for recreation and flood protection.

Both the Stuttgart Plan and Paley Park in New York affect the microclimate and air quality at street level. Stuttgart's is a grand scheme; it affects an entire city and captures the imagination. Paley Park is a modest project; it improves the microclimate of one small space and delights those who use it. Large-scale, comprehensive change is most easily implemented in rapidly growing cities and in new towns and has immediate, major results. Although the impact of the grand scheme is greater, its scale is daunting and may not be replicable in another city. Incremental change through small projects is often more manageable, more feasible, and more adaptable to local needs and values. The modest project can be readily repeated in infinite variations, adapted

to the special character of other places. When coordinated, incremental changes can have a far-reaching effect. When guided by a comprehensive understanding of long-term goals for change, it may even be more effective. An incremental approach to change permits the assessment of successes and failures and the refinement of subsequent interventions. Solutions need not be comprehensive, but the understanding of the problem must be.

To realize the opportunities inherent in the city's natural environment, to see beyond short-term costs and benefits, to perceive the consequences of the myriad, seemingly unrelated actions that make up daily city life, and to coordinate thousands of incremental improvements, a fresh attitude to the city and to shaping its form is necessary. The city must be recognized as part of nature and designed accordingly. Cities, their suburbs and countryside must be viewed as a single, evolving system within nature, as must every individual park and building within that larger whole. The social value of nature must be cultivated, like a garden, rather than ignored or subdued.

What Every City Should Do

There are models to guide us in designing, building, and sustaining cities that are well-adapted to their natural environment. The Granite Garden: Urban Nature and Human Design, describes successful examples and outlines what every city should do in order to better adapt to natural processes. I wrote the book for several reasons: to open people's eyes to nature in the city, to share successful examples in order to inspire people to imagine what their own city might be like, and to provide them with a comprehensive framework within which to assess the natural environment of their city, set priorities, and take action.

The book has five major parts on Air, Earth, Water, Life, and the Urban Ecosystem. Each part contains a warning of the consequences of failure to account for nature in the city as well as a prescription for how to adapt to urban nature. Each part concludes with "A Plan for Every City": a checklist and guide to what types of information are important and to strategic approaches, both for devising a comprehensive plan and for designing a new project in a specific locale. A comprehensive understanding of the environmental conditions and challenges for the city as a whole should underlie every project, whether ambitious or modest. This understanding should include: patterns of climate and air pollution, water movement, pollution, and flooding; spatial distribution of geological hazards and resources, and plant and animal associations. Solutions to environmental challenges facing a specific city and its region must not be undertaken as isolated problems, but rather coordinated and formulated with as much understanding of the urban ecosystem as knowledge permits. To facilitate a comprehensive plan for managing the urban ecosystem and to establish a frame within which individual components can be designed, every city should identify its most critical problems and most significant resources, explore the potential links among them, and establish priorities for their resolution and protection. Although cities share some challenges, each has others that are particular to its own situation.

An understanding of the urban natural environment should guide all aspects of physical planning and design of cities: the location of specific land uses; the shape, size, and landscaping of urban parks and plazas; the alignment and width of streets and highways; and the overall pattern of the city's transportation network and places of work, residence, and play. In particular, the integration of all urban open land into a unified plan could extend the traditionally accepted aesthetic and recreational value of open space to a crucial role in health, safety, and welfare. Parks and plazas, temple grounds and shrines, gardens and rice fields, lakes and rivers,

floodplains and marshy lowlands, steep hillsides and rocky outcrops, and even parking lots and highway corridors could be included in a cohesive open space system to improve air quality and climate, to reduce flooding and improve water quality, to limit the impact of geological hazards, such as earthquakes, landslides, and subsidence, to provide a diverse community of plants and animals within the city, to conserve energy, water, and mineral resources, and to enhance the safe assimilation of the city's wastes.

Imagine a city where every building, every park, every highway is designed with more than one end in mind, both in itself and as part of a larger system. Where every building is not only constructed to serve its own internal uses, but also to conserve energy and to create a comfortable environment in the surrounding streets and plazas. Where parks are used for a great deal more than play: for preserving mineral resources, for storing flood waters, for stabilizing hazardous slopes, for producing timber, and for treating wastes.

Overcoming Barriers, Shaping Future Cities

Cities must resist the habit of fragmenting nature, a habit reinforced by the organization of government agencies and the boundaries of professions and academic disciplines. The builders of cities rarely appreciate the cumulative impact of their incremental actions. Design and planning professionals normally concern themselves with a single scale, that of an individual building project or that of planning for metropolitan-wide services. Landscape architects, engineers, or architects usually have no concept of how their projects will affect the environment of the city as a whole or how the problems with which they are grappling could be more efficiently resolved by off-site intervention. Planners often work within a single dimension – transportation, sewage treatment, water supply – with only a hazy notion of how their actions relate to other spheres. Energy consumption, resource depletion, air pollution, water pollution, flooding, and soil contamination are all treated as separate problems, each with a set of specialists and institutions charged with a narrow mandate. Uncoordinated attempts to solve narrowly defined problems are wasteful in the most costly and hazardous sense.

Specialization is necessary, but absence of coordination prevents the effective management of resources and hazards and discourages the resolution of multiple problems with a single solution. Only by viewing the entire urban natural environment as one interacting system can the value of natural processes in the city be fully appreciated. But where can one read about the latest research on urban nature and the wonderful innovations being built in cities around the world? There are no major journals in this important field, no clearinghouse of innovative projects.

How can the lessons learned from failures and successes in cities around the world be disseminated? In my book, *The Granite Garden*, I imagined regional, national, and international clearinghouses to which a city might apply to find out if other cities had found solutions to a specific problem. Imagine the scope of the projects that could be gathered in such a network. The importance of access to this knowledge cannot be overestimated. The greatest barrier to planning, designing, building, and managing better cities is not lack of knowledge, but failure to apply that knowledge.

The most pressing need for research on urban nature and city design is, first, to collect and assess the knowledge which already exists, then to make that knowledge available and to encourage more research in areas where there are gaps. But just as important is something even more

fundamental: the environmental education of children. In the United States, schools teach children about nature in far-away places like tropical rain forests, but usually fail to educate them about how natural processes shape the landscapes in which they live every day. Perhaps environmental education in Japan better prepares students for the environmental challenges facing cities of the future.

Writing in 1983, I ended my book with two visions of the future, one a nightmare, the other a vision of hope, for it was the desire to avoid the dreadful and achieve the hopeful, which drove me to write. So many of the predictions I made in 1983, both bad and good, have now come true, but there are still many dangers to avoid, choices to be made, opportunities to achieve. In the cities of the present, lie many potential cities, some of them nightmares and some visions of hope. Current trends point to a gloomy future, and it is the disasters that are most frequently brought to public attention by the news media. Yet, there are many successful examples, which give hope and inspiration. It is for all of us now, individually and collectively, to shape the cities of the future. It is necessary merely to recognize what is good in the present and to nurture it, to adapt successful models already forged by many cities of the past and present, and to develop new ones. This will occur only through the coordinated efforts of all of us who study and shape the city: public officials and policy-makers, private institutions and corporations, planning and design professionals, and all the city's individual citizens.

Some cities might start with their most urgent problem, be it earthquakes and landslides or floods and water quality, climate or air quality – for which public and financial support can be found, and then find ways to include other issues. Somewhere a visionary may persuade his or her city to take on the challenge of managing the entire urban natural environment. The reasons are compelling. At issue is not just the creation of a safer, more beautiful, more efficient and cost-effective city, but survival itself. We live on a finite world, a sphere of limited dimensions, sheathed in a shallow layer of air. There is no escape, finally. The elsewhere to which we once transported our wastes is now someone else's home. Escape to the countryside is an illusion. The same attitudes responsible for degrading the city's natural environment are now poisoning the countryside, and the urban problems of yesterday have become the suburban and rural problems of today: air and soil pollution and dwindling, contaminated water supplies.

It is time to employ one of the greatest human talents, the ability to shape the environment, to transform an environment that has become hostile to life into a humane habitat that sustains life and nurtures growth, both personal and collective. That is the challenge of our time.