

## Reclaiming Common Ground Water, Neighborhoods, and Public Places



ANNE WHISTON SPIRN



Back Bay Fens, Boston, 1904. This seemingly natural environment is in fact the creation of Frederick Law Olmsted, who in the late 19th century transformed a polluted mud flat into a park that combines the beauties of a natural salt marsh with the urban functions of flood control and sewerage.  
(Frances Loeb Library, Graduate School of Design, Harvard University)

If cities are to become more livable, it will be by design: not just through the design of built projects—homes and workplaces, gardens and parks, streets and sewer systems—but also through visions that may never be realized. Urban design is a process of envisioning and describing the shape of the future, of posing alternatives from which to choose. Without visions to guide their development, cities will be shaped by the politics of expedience.

For hundreds of years, Bostonians have proposed visions for their city that, built and unbuilt, contributed to the public debate about its future.<sup>1</sup> This chapter was conceived and written in that tradition, at the invitation of the Boston Society of Architects.<sup>2</sup> In its original incarnation, it was an illustrated public lecture given at the Boston Public Library in April 1985, then again in February 1986 at the Boston Athenaeum. The lecture and the responses and reflections it provoked were a bridge between my book *The Granite Garden: Urban Nature and Human Design* (1984), my subsequent work in Philadelphia, and the ideas advanced in my most recent book, *The Language of Landscape* (1998).<sup>3</sup> Today some proposals described here have been realized; others remain unfulfilled. My lecture was part of a larger public discussion to which many people contributed. Their efforts over the past two decades have improved greatly the environmental, social, and aesthetic qualities of Boston's public realm.

My proposals were shaped by some of the most urgent issues of the time—the pollution of Boston Harbor and shrinking water supplies, the deterioration of Boston's inner-city neighborhoods, and the decline in quality of public space downtown. The 1970s had wrought great changes in Boston's built environment, transformations fully felt by 1985. High-rise office buildings, huge parking structures, and

deep street canyons—dark, windy, grid-locked by traffic—had made an unpleasant downtown environment. Arson, disinvestment, and illegal dumping had created vast, trash-filled wastelands in inner-city neighborhoods, while deep cuts in the Park Department's budget had led to unkempt parks and playgrounds littered with smashed glass and broken benches. Polluted water and closed beaches mocked plans to turn Boston Harbor into a state park, yet no waterfront neighborhood wanted the new sewage-treatment plant, then under study, located in their vicinity. Widespread dissatisfaction and growing public resistance hampered future plans, but protests against further downtown development, neglect of inner-city neighborhoods, and the proposed sewage-treatment plant all had different constituencies who perceived their concerns as unrelated.

These challenges, despite their apparent diversity, were part of a single, larger failing: the failure to recognize the critical importance of the public realm. This was, and is, not Boston's challenge alone. All across the United States, the neglect and deterioration of the urban public realm threatens to become a pervasive symbol of misplaced priorities and missed opportunities that will characterize the late twentieth century for future generations.

There is growing recognition internationally that solutions to urban problems must integrate economic, social, and environmental issues and must be addressed at local, regional, and national scales. This was the conclusion reached in 1992 at an international conference on the future of cities convened by the Organization for Economic Cooperation and Development (OECD) and attended by ministers in housing, urban development, environment, employment, and education from many countries.<sup>4</sup> The OECD has documented model programs that integrate environmental quality, education, job

creation, and community development. Most entail institutional innovations focused primarily on social and economic issues; few such programs have specifically engaged the built environment or resulted in memorable public spaces. In 1985, my goal was (and still is) to weave together these different sets of concerns (environmental, social, and aesthetic) and scales of intervention to demonstrate how solutions to seemingly intractable, competing problems could address multiple purposes rather than a single, narrowly defined one—and then to imagine how these might be expressed in renewed public places.

The time: April 30, 1985. The place: Boston Public Library at Copley Square. The hall was packed that evening, for there was widespread concern about the future shape of Boston.

#### **Reclaiming Common Ground: The Future Shape of Boston**

*There is much to admire in the public realm of Boston. Boston Common, the oldest park in the United States, has served a variety of public functions since it was set aside as a common field in 1640. The Public Garden, its swan boats floating on a willow-lined pond, sits at the base of the Common. Commonwealth Avenue, with its shady, urbane mall, is a straight green ribbon that runs through Back Bay, setting off the fine architecture that lines it. The Esplanade, with its lagoons and public harbor, affords views up and down the Charles River. The Emerald Necklace, threading its way from the Back Bay up the Muddy River and out to Jamaica Pond, the Arboretum, and Franklin Park, connects old Boston to the newer suburbs and structured the growth of adjacent neighborhoods. The curving beach of Castle Island and South Boston marks the edge between harbor and city with a graceful arc. This is the public*

realm—places for public assembly and personal enjoyment that are accessible to all citizens—a testament to the vision of past Bostonians. It was hard-won, achieved through prolonged struggle, protected from encroachment and neglect by the sustained efforts of citizens ever since. Many of the features Bostonians most admire were conceived not as mere ornaments, but as pragmatic solutions to environmental and social problems.

Boston's current challenges seem overwhelming, yet they are not new to Boston, and they are not unique. Many issues confronting Boston face most large American cities: water pollution and dwindling water supplies, deteriorating inner-city neighborhoods, declining environmental quality in downtown streets and plazas. Whether and how these issues are resolved in the next decade will determine the shape of Boston for many years to come. In the nineteenth century, Bostonians forged new urban forms and institutions to meet the challenges of the day; these innovations then became models for the nation. Today Boston could lead once again: in managing urban water resources, in reconstructing inner-city neighborhoods to benefit the people who live there and the region at large, in building a downtown with memorable public spaces.

Water is Boston's greatest problem and its most important resource. The pollution of Boston Harbor by sewage has long been headline news, but the region's shrinking water supply (degraded well water throughout the metropolitan area, in particular) is equally if not more important. Metropolitan sewer and water districts were landmark institutions when founded nearly a century ago, but they need rethinking today. Something is wrong when sewage from as far away as Framingham and Walpole is transported twenty miles to sewage-treatment plants in Boston Harbor, thereby concentrating the sewage of an entire region into a small basin.

Something is wrong when water is piped sixty miles from a reservoir whose water level has been falling, slowly but inexorably, while groundwater resources within the local region are permitted to deteriorate. These are life-threatening problems that affect the health of millions of people dependent on metropolitan water and sewer systems.<sup>5</sup>

Boston's inner neighborhoods are riddled with vacant land, abandoned buildings, and closed fire stations and libraries. The state of these neighborhoods is invisible from downtown, but downtown prosperity, symbolized by gleaming new towers, is clearly visible from the neighborhoods, a stark and disturbing juxtaposition. In the face of unemployment and the decline of local social services, the new towers are a daily reminder to residents of inner-city neighborhoods that they have not shared in Boston's recent economic growth.<sup>6</sup>

Even downtown the boom has been a mixed blessing. Downtown Boston has become a collection of major development projects by private investors, the urban fabric a patchwork of streets and open spaces. The public realm is seen as leftover space, something pieced together, considered only after everything else has already happened, rather than conceived as the frame within which the city evolves. Most of the new buildings that transformed Boston's skyline in the 1970s and 1980s were private projects constructed in a vacuum of public vision. Buildings are designed with more concern for how they look as a part of Boston's skyline than for how people feel in the streets and plazas outside their doors. New office towers have created dark, windy canyons and barren plazas; dusty, gritty winds make sitting and walking outdoors uncomfortable in summer, frigid in winter. Interior atriums do not compensate for the degraded public realm outside their doors. Some, ostensibly public, are really private enclaves guarded by private police. The

sumptuous, costly materials lavished on the interiors contrast vividly with potholed, trash-filled streets and narrow, broken sidewalks outside.<sup>7</sup>

Viewed separately, problems seem monumental and compete for meager resources. This need not be, if only they were seen as opportunities to devise solutions that address more than a single, narrowly defined issue.

#### *Restoring Water, Rebuilding Neighborhoods, Reclaiming Public Space*

Every problem embodies an opportunity, and crises often provide the greatest opportunities for constructive change. The magnitude of sewer and water problems in Boston is sobering, but there is growing recognition that the current system must be reconstructed. At a time of cutbacks in funds for public spaces and neighborhood redevelopment, millions of dollars are earmarked for new public works related to sewage treatment. This affords a rare chance to exploit new ideas and new technologies and to create new jobs and public amenities at the same time. Water conservation, sewage treatment, neighborhood reconstruction, and renewal of an impoverished public realm should be addressed together with other issues facing Boston. The first step is to focus on issues of primary importance and to analyze each in terms of its essential characteristics and contributing causes. The second step is to look for overlaps and interconnections among the issues; the third step is to devise solutions that accommodate multiple concerns.

There may be as many as fifteen thousand vacant house lots within the city of Boston, amounting to somewhere between three and four thousand acres of vacant land.<sup>8</sup> Viewed together with the social and economic needs of the neighborhoods in which they occur, vacant lands present an opportunity to integrate nature and city in new

ways and to transform the city and the way people live within it. If vacant lands were perceived collectively as part of the city's greater land resource, Bostonians could realize a potential for reshaping the city unmatched since the nineteenth century.

There are many proposals for new development in downtown Boston, but these projects are widely seen as a threat to the quality of life downtown. If there were a vision for what the public realm should be, a vision that incorporated both private development and the welfare of all the city's citizens, development would be welcomed, not feared.

The problem of water, the pollution of surface and groundwater, is paramount, for it threatens the health, even the lives, of all. Pollution in Boston Harbor results both from a centralized system of overloaded, outmoded sewage-treatment plants that flush millions of gallons of untreated sewage per day into the harbor during every breakdown or rainstorm, and from dumping massive amounts of sludge, a byproduct of the treatment process. Two treatment plants in Boston Harbor treat all the sewage from forty-three communities, including some from twenty miles away, so the breakdown of a single plant pours millions of gallons of sewage into the harbor. These two plants plus several wet-weather plants also treat storm water from roof and street drains throughout the region, for unlike in newer cities, many of Boston's sanitary and storm sewers are combined. After rainfalls, storm water enters the system rapidly, mixes with sanitary sewage, and produces tremendous burst of sewage that must be treated or released during and immediately after every storm. Even when Boston's sewage system is functioning well, it produces tons of sludge contaminated with poisonous heavy metals, which is simply dumped back into the harbor. A solution to the pollution of Boston Harbor might therefore include the following strategies: decen-

tralize sewage treatment within the region, prevent sewer overflows after rainstorms by slowing the time it takes for storm water to reach sewers, and reuse rather than discard the resources contained in sewage sludge.<sup>9</sup>

Decentralizing the region's sewage treatment could have many other benefits besides reducing water pollution in the harbor. In suburban communities, wastewater treatment facilities could be combined with parks, using the properties of sunlight, air, plants, and soil to accomplish secondary and tertiary treatment of wastewater. These methods have already been tested elsewhere. Arcata, California, for example, has combined wetlands, parks, and sewage-treatment facilities; funds for sewage treatment also support wildlife habitat and recreation. Secondary effluent from the treatment plant—a lot cleaner than the water in Boston Harbor today—is discharged into the wetland for further treatment. Islands in the center of the marsh are protected feeding and nesting spots for birds; peregrine falcons and migrating birds are now regular visitors to the sanctuary. At Bishop's Lodge resort in Santa Fe, New Mexico, a rocky cascade is part of a man-made system of ornamental waterfalls and pools designed to treat sewage effluent. Sewage receives initial treatment and is then released to a series of cascades; aerated and exposed to sunlight as it falls, the water then irrigates pastures, lawns, and gardens. The effluent is purified further by plants and soil as it seeps through the ground to replenish the underlying aquifer from which the resort draws its drinking water. If subregional sewage treatment were introduced in the Boston area, a treatment facility for communities bordering Fowl Meadow Marsh, like Norwood, Canton, and Walpole, could not only underwrite maintenance of a park, but also recharge the Neponset Aquifer, a potential source of supplementary water for the Boston region.<sup>10</sup>

Sewage sludge poses a major disposal

problem for Boston and for most major cities, yet sludge is rich in nutrients, an ideal soil amendment, especially when composted with wood chips and leaves. Philadelphia, a city that produces more than two hundred dry tons of sewage sludge per day, converted its sludge into a marketable resource. The city used one product—"Philorganic"—to fertilize parks and golf courses and to reclaim old landfill sites. "Garden Life," sold in forty-pound bags or in bulk, is made by composting dry sludge with wood chips. Parks in Washington, D.C., have been treated with a similar product called "Com-pro." Boston is prevented from utilizing the nutrients in sludge due to the high concentrations of heavy metals it contains. If treatment facilities were decentralized, sludge from some plants would be low in heavy metals and could be used for fertilizer and soil reclamation.<sup>11</sup>

Currently, Boston's combined treatment system of sanitary sewage and storm water is a liability; with modification, it could be an asset. For some parameters, like suspended solids and coliform bacteria, the quality of storm water running off roads, roofs, and sidewalks is no better than raw sanitary sewage, and it should be treated before entering streams and rivers. A combined system makes it feasible to treat this storm runoff. The issue then is how to prevent sewer overflows after rainstorms. Chicago and Denver employ floodplain parks designed to hold storm water after a rainfall and release it gradually to sewers. Denver also requires that new and renovated buildings in its downtown renewal district detain storm water on site. In downtown Denver, storm water is ponded temporarily on plazas, parking lots, and rooftops. Skyline Plaza, for instance, is a park designed to hold up to several inches of storm water. "Wet roofs" have other benefits besides flood control; they reduce the building's heat gain and energy consumption for air conditioning. Imagine what

Boston might be like if a similar requirement were implemented, and countless rooftops were transformed into gardens with retention pools. Some might look like the Oakland Art Museum, whose rooftop gardens function as a park.<sup>12</sup>

Outside downtown, there is more space to detain storm-water runoff, especially in inner-city neighborhoods where vacant land is concentrated in former floodplains, bogs, and marshes that were sewered and filled in the nineteenth century. Such places are well suited to projects combining storm-water detention and recreation. There are large vacant areas in sections of Dorchester and Roxbury, especially in the Dudley neighborhood where a stream that once marked the boundary between the two towns now flows in an underground sewer. Dudley is one of Sam Bass Warner's nineteenth-century "streetcar suburbs," where public investment in streets and sewers facilitated development by private real estate speculators and builders.<sup>13</sup> The Dudley neighborhood, fully built with homes and businesses by the end of the nineteenth century, is now 30 percent vacant. This statistic is misleading, however, for it conceals a striking pattern: 90 percent of the land within the original floodplain is vacant, with only a few, scattered vacant lots on higher ground. Floodplains and low marshy areas, now vacant, were the last spots developed. They were less favorable locations environmentally, and the houses built on them—many as rental properties for multiple families rather than homes owned and inhabited by a single family—were undoubtedly plagued by wet basements. Some of these properties were already vacant by the early twentieth century, many by the end of the Depression, and most by the 1960s.<sup>14</sup> Although poor drainage probably played an important early role in abandonment, by the 1950s policies like redlining made it difficult to obtain mortgages and home improvement loans in inner-

city neighborhoods like Dudley at a time when federal subsidies for highway construction and mortgages on new suburban homes made suburbs widely accessible and affordable.<sup>15</sup> Yet common wisdom among Bostonians who live outside these neighborhoods holds that the vacant land was the product of civil unrest in the 1960s, that buildings were burned down by rioters, leaving widespread vacancies. This misconception has unfortunate results, for it places blame on the victims of abandonment rather than the perpetrators, on riots rather than poor drainage, shoddy, ill-considered development, long-term neglect, and federal policies that favored suburban development and hindered inner-city investment.<sup>16</sup>

Dudley is not unusual. The same constellation of contributing factors is found in inner-city neighborhoods throughout Boston and other American cities.<sup>17</sup> Land was originally developed, at considerable public expense, without regard for unhealthy or hazardous environmental conditions that contributed to later abandonment. The mistake is being repeated, at great public cost, as public housing, schools, and subsidized homes for families with low incomes are once again built on abandoned, poorly drained land. There are plans to build homes for low-income families on some of the low-lying tracts in the Dudley neighborhood; such plans are well-meaning, but ill-conceived, for maintenance will cost considerably more than in better-drained locations. As neighborhoods like Dudley are rebuilt and repopulated, much of the land now vacant will be built on once again. Some lands, however, should remain open, and now is the time to identify them. Thousands of vacant house lots in Boston are tax-delinquent, the owners absent, many unknown and unaccountable for the condition of their property. The city should decide now which vacant land to acquire. The open floodplain offers an oppor-

tunity to detain storm water and provide a linear park for the neighborhood. Reclamation of this common ground could help form a framework for future residential and commercial development to benefit current residents while also contributing to the reclamation of the larger region. And the construction and maintenance of these projects could provide jobs for residents of these inner-city neighborhoods. The cost of this public open space could be borne by funds for regional metropolitan flood control and sewage treatment.<sup>18</sup>

Funds for maintaining public parks are usually among the first to be cut in times of financial crisis. In the 1980s, faced with the destruction of parks and playgrounds within a few years of construction and with declining funds for maintenance, Boston's Neighborhood Development and Employment Agency (NDEA) launched an experimental program in 1983. The Grassroots Program supported neighborhood-initiated projects to convert vacant lots into various types of open space. Funded projects were selected from proposals made by neighborhood organizations and included playgrounds, community gardens, sitting areas, and meadows of wildflowers and clover. Boston Urban Gardeners, a nonprofit organization, helped local groups prepare proposals. Since location, use, design, construction management, and maintenance were all the responsibility of the organization making the proposal, the projects were typically small in scale. The result was a transformation of vacant lots into attractive community open space—playgrounds, sitting areas, and community gardens—that met the needs of local residents. The projects afforded people the opportunity to shape the place they live, to give form to common needs and shared aspirations, to share and care for common ground.<sup>19</sup>

Cooper's Place is a community garden built in 1984 as part of the Grassroots Pro-

gram. Cooper's Place, with its flower garden open to visitors and plots for individual gardeners, has become a neighborhood landmark. It was sponsored by the Roxbury Action Program, Boston Urban Gardeners, and the Highland Park 400, a local senior-citizens' group. The land was purchased by the Boston Natural Areas Fund, the garden designed by my students at the Harvard Graduate School of Design and constructed by unemployed youth enrolled in a four-month program in landscape construction and maintenance at Roxbury Community College. Several years after the garden was constructed, vacant buildings next door and across the street were renovated and occupied. Community landscape projects have had a similar impact in other neighborhoods, including Dudley. A few were part of the NDEA's Grassroots Program, but most were sponsored privately by Boston Urban Gardeners, supported by donations, grants from private foundations, and the vision and energy of neighborhood residents. The most successful recent contributions to the public realm of Boston's inner-city neighborhoods have been local projects achieved, for the most part, by private initiatives.

Small-scale, resident-initiated projects, appropriate at the scale of a neighborhood, are not the answer to improving the public realm downtown. The challenge there is to match the interests of private developers with the needs and desires of those people who live, work, and visit downtown.<sup>20</sup> Recently, major private development has, for the most part, overshadowed and outstripped public investment in its impact on the shape of the city. Many of the decisions that affect the public realm so profoundly are made outside the public forum. In this flood of private projects and with a paucity of major public works, proponents of the public realm are cast in a defensive, negative posture. Their role is restricted to environmental-impact

statements and public hearings, to reviews of designs after they are complete, at the point where alterations, even minor ones, are extremely costly. The result is frustration in both camps, among developers who are taking financial risks and among the public who must live with the product. Boston needs a clearly articulated vision for its public realm, a setting within which privately financed improvements can make their contribution, a vision against which citizens can measure proposals and results.

It is paradoxical that Bostonians are not creating for the future what many value from the past. Historic districts like Back Bay were achieved through the construction of the public realm as a framework for private development, not through fragmented assembly of private projects, with the city trying to make the best of leftover space for the public realm. Contrast the nineteenth century's achievements in the public realm, for example, with the results of the past two decades of development, both private and public, in the Back Bay along Boylston Street and Copley Square. Commercial developments like Prudential Center and Copley Place exploit nostalgic symbols of the nineteenth century's public realm in their interior spaces and turn their backs to the street. Copley Place is a luxurious shopping mall with interior spaces arranged like streets; it even has a "town square" with trees, flowers, park benches, and a white bandstand as a setting for a restaurant. Such symbols of a gracious public realm are limited to the interior. Copley Place offers no such amenities to the public realm immediately outside its walls; the sidewalks alongside are very narrow, uniformed guards stand inside the entrance, and the complex turns its back (loading docks and garbage dumpsters) to the residential neighborhood behind. The 1960s addition to the public library is also fortresslike and forbidding. In contrast, the old library next door

makes a generous addition to the public space of sidewalk and street along Boylston; the base of the building forms a bench, well-used on a sunny day, full of people sitting, waiting for a bus, watching passersby. The juxtaposition of these buildings highlights the difference between the regard that Bostonians of the late nineteenth century had for the public realm and that of their late-twentieth-century counterparts.

There is no vision now for the public realm of Boylston, a street with its source at the Common, its terminus at the Fens; no wonder the developers of Prudential Center and Copley Place chose to focus inward. Why is there no vision for the marvelous street that Boylston could be? It is an active commercial street with all the ingredients for lively success, a street experiencing pressure for large investment of private capital. Boston is not New York and Boylston Street is not Fifth Avenue, but with a new vision for Boylston Street, why couldn't a new Prudential Center (slated for renovation in the near future) offer some of the same amenities that Rockefeller Center in New York gives to the public realm of Fifth Avenue? This might be difficult to achieve, but then so were the projects of the last century that Bostonians admire and take so much for granted.<sup>21</sup>

*Boston's Public Realm:  
A Hard-Won Legacy*

The historic urban fabric of Boston is distinguished not just by the quality of individual buildings, but of entire streets, parks, and districts. For many Americans, these have come to stand as models to be emulated. The Back Bay—framed by the Common and Public Gardens, the Esplanade, and the Fens—is one such district. Many of its prized features are the direct result of solutions to nineteenth-century Boston's environmental and social problems: the need to clean up the foul wa-

ters of the Back Bay tidal flats and to prevent the flooding of Stony Brook and Muddy River; the need for more land to accommodate the city's growth; the need for efficient transportation between the old center and growing, outlying towns; and the demand for "breathing spaces" within the city and for access to rural landscapes.

The Back Bay and the Emerald Necklace are two of the most spectacular examples of Victorian urban design in America. Frederick Law Olmsted considered the Fens and the Riverway among the most important projects of his entire career. In their time they served as landmarks for the nation. They remain outstanding examples of collective vision and sustained public energy. But they were not the product of a single genius; they incorporated the ideas of many individuals, their form forged through public dialogue, evolving over decades.

One hundred and eighty years ago, Boston was still a peninsula and the Back Bay was a marsh where high tide lapped at the western edge of the Common. In 1821 a dam was built across the bay to harness the tides to drive mills, but the dam converted the basin, in the words of one critic, into "an empty mud-basin, reeking with filth, abhorrent to the smell, and disgusting to the eye."<sup>22</sup> The Back Bay residential district was a project conceived to provide more building space to accommodate a growing population and eliminate a hazard to public health. Filling the Back Bay was a monumental public undertaking, spanning several decades: "Landfill progressed at the rate of almost two house lots per day, a train of thirty-five loaded gravel cars arriving in the Back Bay on the average of one an hour, night and day, six days a week for almost forty years."<sup>23</sup>

The Back Bay is a human creation forged by the need for new building space and guided by a vision of what a healthy, attractive, urbane neighborhood should be. The

public realm as we know it today was established first as the frame: the Public Garden served as the base for the new district and streets were laid out with Commonwealth Avenue planted as a tree-lined mall. This sequence—public investment in an attractive and coherent infrastructure, followed by private investment—is clearly visible in an aerial view of Boston in 1870.

As the new Back Bay residential district neared completion in 1871, the Roxbury tidal flats at its western end were still "the filthiest marsh and mudflats to be found anywhere . . . a body of water so foul that even clams and eels cannot live in it, and that no one will go within a mile of in summertime unless from necessity, so great is the stench."<sup>24</sup> The sewers of Roxbury emptied onto these mudflats, and sewage was carried back into the low-lying streets of lower Roxbury during floods. This nuisance was transformed into a new park called the Fens, designed as an amenity and a basin to store floodwater. Over the next two decades, the Fens was extended into a linked system of parks and parkways up the Muddy River, to Jamaica Pond, the Arboretum, and Franklin Park. This was the nation's first metropolitan-scale park system. It linked the new neighborhood of Back Bay to the center of Boston and to the outlying suburbs and countryside.

Designs for the Back Bay and the Emerald Necklace were not produced overnight, nor did they spring from the mind of a single visionary. Many proposals were made for the layout of the Public Gardens, Back Bay, the Fens, and for Boston at large, from Robert Gourlay's "General Plan for Enlarging and Improving the City of Boston (1844) to Charles Eliot's proposal for a metropolitan park system (1893). These were among Boston's first city plans, produced by professional designers and planners and by private citizens with no design training, presented in published pamphlets, public speeches, and

the press. A lawyer named Uriel Crocker, for example, proposed a linear park system of streams, ponds, and hilltops with a continuous parkway between the Charles River and Chestnut Hill Reservoir in 1869. That same year, Robert Morris Copeland, a landscape architect, proposed a metropolitan park system linked by parkways one hundred feet wide and a metropolitan park commission to implement and manage the parks. Several years later, in 1872, Copeland published "The Most Beautiful City in America: Essay and Plan for the Improvement of the City of Boston," a pamphlet outlining how Boston's natural resources might be exploited to meet its economic needs. Copeland's plan featured a new, integrated public infrastructure of open space and sewer and transportation systems designed to shape the future growth of the city. As part of this plan, he proposed a park along a stream on the Roxbury-Dorchester border—the very same area in the Dudley Street neighborhood discussed earlier. That floodplain, open land in Copeland's day, was later built on and is now open again. After Copeland's death in 1874, his associate Ernest Bowditch proposed a plan based on Copeland's ideas, which included a linear park following the upper valley of Muddy River as a link between Back Bay and Jamaica Pond and a system of rural parks to protect the metropolitan water supply. These preceded Olmsted's proposal for the Riverway by six years and Eliot's proposal for a metropolitan park system by nearly twenty years. The future shape of Boston was the subject of continuing debate throughout the last half of the nineteenth century. Though not implemented, the visions of Gourlay, Crocker, Copeland, Bowditch, and dozens of others influenced the course Boston took.<sup>25</sup>

In 1875, the city of Boston passed the Park Act, which established a municipal park commission empowered to prepare a city

plan and to take land within city limits. The park commissioners' first action was to advertise for "civil and landscape engineers" and interested citizens to present their views at a public hearing. The majority of those who presented their ideas to the commission were private citizens, many of them petitioning for parks in their own neighborhoods, and property owners who wished to sell land to the city. In the summer of 1876 the commission published a plan of proposed parks and parkways for the city of Boston, which was distributed and read widely. A public meeting was held in June of 1876 in Fanueil Hall to endorse the plan: its organizers called it "Parks for the People."

The first project to be implemented was the Back Bay Park. The City Council voted an appropriation for the purchase of one hundred acres of land in the middle of mudflats, and the commissioners hired Olmsted to prepare a design. The result was a landmark in city planning and environmental design. A large, masonry storm-water basin had long been part of the city's plan for the Back Bay Park. Olmsted felt that a masonry storage basin big enough to hold floodwaters from Muddy River and Stony Brook would be excessively ugly and expensive. Instead he designed the entire park as a flood storage basin with gently sloping banks covered by marsh grasses and other plants that could tolerate changing water levels. The resulting design was revolutionary, a synthesis of environmental engineering and aesthetics.

By 1881 the Fens was under construction. Tidal flats were scooped out by a dredger, then graded and planted. Olmsted intended the Fens to look like a natural salt marsh around which the city had happened to grow. Never before had anyone attempted to *create* a salt marsh. The planting design required considerable research and a good deal of professional courage. In fact, the first phase of the Fens to be planted was a disas-

ter: most of the plants died, and Olmsted was forced to reconsider the original selection and placement of plants. But within ten years the Fens looked like a landscape that had always been there. In 1881 Olmsted proposed to continue the park up the Muddy River valley. At that time the city's plans for parks and for sewers were separate. The city proposed to connect Back Bay Park to Parker Hill and to convey the waters of Muddy River to the Charles in a straight, masonry conduit, several miles in length. Olmsted proposed instead that the two projects be combined and that the linear park serve as a storm drainage system. Olmsted was critical of the city's plan, which he maintained would be very costly and therefore delayed many years: "Meantime . . . the Muddy River valley will be very dirty, unhealthy, and squalid. No one will want to live in the neighborhood of it. Property will have little value and there will grow up near the best . . . district of the city . . . an unhealthy and pestilential neighborhood."<sup>26</sup> The final proposal incorporated sewer improvements, a park, a roadway connecting the center of the city to the outskirts, and a streetcar line.

The current alignment and shape of the Riverway are the nineteenth century's artificial creation. The banks of the river were regraded, lined with walkways, crossed by bridges for pedestrians and vehicles, and landscaped to form the Riverway as we know it today. Sanitary sewage was intercepted by a new underground sewer and diverted to the Charles, while the Riverway was designed to accommodate the normal stream flow and floodwater of the Muddy River, as well as runoff from adjacent areas. Like the Fens, within a few decades of construction the Riverway had the appearance of a natural floodplain. Depressed below street level, with steep, wooded banks between the roadway above and the path below, it is still a retreat in the middle of modern Boston.

Olmsted described the integrated purposes of the Fens and the Riverway in his report to the park commissioners in 1881. The primary purpose was the abatement of a hazard to public health. In solving this problem he sought to "thrifly turn to account" those essential improvements to provide other benefits as well: improved transportation between adjoining districts; an attractive framework that would encourage private investment, thereby increasing the city's tax base; and finally, the enhancement of natural features to provide a variety of scenery. Putting these multiple purposes into perspective, he concluded that "the continued application of the term *park* to an undertaking of the character thus indicated tends to perpetuate an unfortunate delusion, and to invite unjust expectations and criticisms."<sup>27</sup>

What are the lessons that can be drawn from the story of these civic improvements one hundred years ago? Consider Olmsted's design for the Fens and the Riverway. Originally proposed by the city as parks, they were refashioned by Olmsted to address other issues, some identical to those that face Boston today. Olmsted related these individual projects to a comprehensive vision of the city as a whole and created an attractive public framework to encourage private investment. Environmental problems provoked by the conflict between human activities and natural processes were resolved by adapting to those processes rather than by trying to subdue them.

Not only the tangible products—Back Bay, Fens, and Riverway—are important. The process itself contributed to the success of the solution: a process of open public dialogue that continued over several decades. Visions of people like Robert Morris Copeland contributed to the form the Emerald Necklace and metropolitan park system took, for Olmsted incorporated many ideas initially proposed by others. But their legacy was greater than ideas alone. Vigorous, sustained

discussion not only led to widespread acceptance of the proposals, it also generated the support necessary to implement such ambitious projects.

Design is a powerful tool to forge consensus for major public investment. In this tradition, I offer one person's vision of what the future shape of Boston might be.

#### *A Vision: The Future Shape of Boston*

From Great Brewster, a craggy outpost at the entry to Boston Harbor, the long arms of Hull and Winthrop embrace the Harbor. Held between a deep blue, watery foreground and blue sky above, Boston is a narrow band along the horizon. Downtown is marked by towers that rise across the water, catching and reflecting the sun. In the foreground, dark humps of Lovell and George's Islands break the water surface. From this vantage, the city is a silent silhouette, seen clearly for what it is: a fragile human construct, supported by the earth, permeated by air and water. Out here in the harbor, the sound is of waves breaking against rocks and of "a distant bell, moving on the groundswell, its clanging marking a time not our time."<sup>28</sup> Out here time is marked by no clock, but by the apparent motion of the sun through the sky vault, the rise and fall of tides, and the daily cycle of the sea breeze, blowing off land in morning, from sea in evening. Approaching the city over the harbor, now a vast state park, cries of gulls and breaking waves begin to mingle with city sounds. The earlier image of the city as a delicate construct recedes as massive buildings fill the horizon, their stolid mass a reassurance of human importance.

Of the city's three great rivers, the Mystic and the Charles have long been dammed to control the rise and fall of water along their banks. Only the Neponset remains a tidal river, its lower course still lined by

Neponset Marsh. Further upstream Fowl Meadow Marsh extends from Milton to Canton and Norwood; it overlies the Neponset Aquifer, one source of Boston's water supply. Water purification plants in the southwestern part of the Boston region are located near Fowl Meadow Marsh. After receiving initial treatment, effluent is purified in lagoons and constructed marshes, then released to the larger marsh where it seeps through the soil to replenish groundwater tapped by the city.

The sewage-treatment plant with adjacent composting facility and park along Fowl Meadow is one of many new satellite treatment plants built as a part of the city's renovation of its water system. The former metropolitan sewage district was divided into smaller subregions, their boundaries determined by watershed, each with its own water purification plant and adjoining park. Each facility receives used water from the watershed it serves, and here that water is purified: first in the plant itself, then in the park's lagoons, marshes, and fountains. Formerly all the region's wastewater was treated and dumped into Boston Harbor. The introduction of satellite treatment plants permitted the adoption of innovative technology and the construction and maintenance of parks throughout the region.

Decentralization has also isolated those watersheds whose wastewater contains high concentrations of heavy metals. Formerly, heavy metals mixed with all of Boston's sewage and prevented the city from recapturing the organic nutrients in sewage sludge. Now most of the subregional purification plants process and recycle metal-free sludge. Sludge, mixed with wood chips and leaf mold from the city's parks, is composted to produce a nutrient-rich soil amendment called Metroloam. Metroloam is used within city and region as a replacement for topsoil and packaged and marketed at garden centers.

The benefits have been many: sludge no longer poses a disposal problem or pollution hazard; raked leaves and wood chips harvested from tree work no longer add to the region's sanitary landfills; and the availability of enormous quantities of cheap soil amendment has permitted the reclamation of vast areas of derelict land within Boston at modest cost.

Inner-city neighborhoods have benefited from the renovation of the city's water system. Take the Dudley neighborhood. Twenty years ago, one-third of all properties were vacant; now the neighborhood is rebuilt. The original floodplain of the buried brook is a linear park that threads its way through the neighborhood and beyond. At some points it is quite narrow, at other points it broadens out into shallow basins that hold storm water after a rain. Like the wetlands of the Charles River at the city's outskirts, this park is paid for and maintained as part of the region's flood control and water-treatment system. It has counterparts in other parts of the city, and the form of these parks varies from neighborhood to neighborhood. In some neighborhoods, detention basins form a linear park system, while in others they are discrete elements within the mosaic of buildings, pavement, and private yards. Because of all these basins within the city, the sewers have not overflowed since the Great Hurricane twenty years ago. Many of the storm-water basins are flooded every winter, forming popular skating ponds; experts attribute the phenomenal number of youngsters from Roxbury and Dorchester who now play in the National Hockey League to these neighborhood skating ponds.

The presence of water is pervasive: by harbor and riverbank, permeating public places in the neighborhoods and downtown. The fountain in City Hall Plaza commemorates the reconstruction of the city's water system and celebrates the integration of

natural and human cycles. The fountain is showy on a hot summer afternoon, when sun shines through spray and mist sparking rainbows, and water evaporates off wet pavement, cooling the air. In autumn the fountain bubbles softly, feeding still pools; ripples of flowing water reflect the color and activity on the plaza. In winter water freezes into ice crystals as it trickles from the fountain, color varying with thickness, motion captured in ever-shifting forms. The sound of water moving under the ice and the gradually changing color and transparency of the ice as it thaws mark the transition from late winter to early spring. Water leaves the fountain at City Hall Plaza along runnels that irrigate trees on the plaza and feed a series of pools in a stepped basin. Normally only the pools at the bottom are filled, but after a storm runoff from surrounding pavement and rooftops flows into the basin. One can always gauge the magnitude of a rainstorm by which step the water reaches. Only once in the last ten years has water reached the top step.

Besides the pervasive influence of water, the most powerful mark the late twentieth century left on the urban fabric is the great diversity of landscapes and buildings. Boston's tradition of fostering the construction of innovative projects was established during this period. Experimentation was most intense in inner-city neighborhoods. The combination of a relatively inexpensive land resource and the establishment of building funds to promote experimentation in new urban forms made these neighborhoods centers of innovation. They now exhibit an eclectic array of landscape and building forms, products of individual enterprise and invention: houses designed and built by youth, sewage treatment gardens, fish farms, solar streetlights. Some of the models have since been replicated widely, while others remain original, but singular.



Just as the Back Bay and Emerald Neck-lace are a showcase of nineteenth-century architecture and urban design, so are the neighborhoods of Dorchester and Roxbury showcases of late-twentieth-century architectural exploration.<sup>29</sup> Separated by more than a century, both were a product of intense, sustained, and visionary public efforts. Both represent public investment in the creation of common ground that ordered individual contributions of private citizens. Both addressed environmental nuisances as well as the need for new housing. Both are a source of pride to the city and landmarks in the history of urban design.

These vignettes are one person's vision for the future shape of Boston. The new Boston, however, will result from many people's visions and actions. It should be the product of a collective vision, one that is widely shared by the region's citizens, forged through the consideration of alternatives in a public dialogue. Design is a means to this end.

The cumulative impact of sewer reconstruction, economic growth, and redevelopment of vacant land within Boston will have a profound impact on the future shape of the city. We must decide, before it is too late, whether they will shape Boston by design or default. How we resolve these issues will determine the quality of the future, not just for the next generation, but for many generations to come.

### Epilogue

In the audience that April evening in 1985 were many people who had worked on these issues and whose efforts contributed to Boston's transformation by the 1990s. There were several immediate outcomes: an illustrated feature article in the *Boston Globe* and meetings with several members of the governor's cabinet.<sup>30</sup> Ken Kruckemeyer of the

Massachusetts Department of Transportation determined to bring these ideas to the attention of then-governor Michael Dukakis, and for several months after the lecture, I presented the proposals to individual members of his cabinet. They were enthusiastic, but nothing further came from these talks. The forces ranged against serious consideration of my proposals were considerable. Though the plans for a new sewage system had not been finalized, firms were already lining up for engineering and design work and to write environmental-impact statements, and construction firms were waiting eagerly in the wings.

More important, my proposals did not fit existing institutional structures for planning and implementing environmental, social, and development programs. Institutional innovations like the Metropolitan District Commission, which, at the turn of the century, enabled Boston to deal with issues of water supply and treatment at the regional rather than the local scale, had become obstacles to alternative approaches. The system that was actually implemented was a massive construction project whose centerpiece is the \$3 billion Deer Island facility, the second-largest wastewater treatment plant in the United States.<sup>31</sup> The new plant and related pollution-control facilities have marked a dramatic improvement from the days when raw sewage was discharged directly into Boston Harbor. Nevertheless, the new system represents another example of the highly centralized, engineered systems that Sam Bass Warner, Jr., and Judith Martin have criticized.<sup>32</sup> So far, it has failed to deal adequately with storm-water management and ground-water protection.

By the 1980s, engaging local residents in planning and implementing neighborhood change was an accepted part of the planning process for certain kinds of projects: the Southwest Corridor Project and the Grass-

roots Program were prime examples. These measures matured in the late 1980s and grew into important new neighborhood planning and development initiatives such as those of the Dudley Street Neighborhood Initiative (DSNI).<sup>33</sup> The DSNI sponsored new housing for owners with low income, which have been popular with residents and recognized with design awards. These homes were clustered around common open space on low-lying ground, thus avoiding flooded foundations and wet basements. But planners involved in grassroots work with local neighborhoods on issues such as housing and local open space did not take part in comprehensive, regional planning of public-works projects such as water supply and sewage treatment, so the billions of dollars spent on Boston's new sewer system did nothing to rebuild inner-city neighborhoods.

Public-private partnerships were embraced in the mid-1980s as the answer to building and maintaining the public realm in downtown Boston; the success of Post Office Square pleased developers and public alike and became a model for other acclaimed public places. It would have cost no more to design these new spaces to detain storm water, but the designers and proponents of these new spaces were unaware of their role in the city's hydrological system, so runoff from pavement still strains the sewer system after heavy rains.

In 1986, I moved to Philadelphia to teach at the University of Pennsylvania, and my direct involvement in the future shape of Boston ceased. Ten years later, much has changed. The public realm is renewed: Boston's beaches are open for swimming, neighborhoods are rebuilding, downtown has many new thriving public places. From this vantage, my lecture "Reclaiming Common Ground: The Future Shape of Boston" was one vision among many that helped launch, sustain, and advance public dialogue, and thereby changed

the course of Boston's future. Like Robert Morris Copeland's "The Most Beautiful City in America: Essay and Plan for the Improvement of the City of Boston," my essay now serves as an example of those many others, most of which were more informal and unpublished. Like Copeland's proposals, mine influenced certain decisions and caused some buildings and landscapes to be built differently, but the idea at the heart—an integrated approach to urgent economic, social, and environmental problems facing the city—remains unrealized in Boston. Much has changed, and much is the same. The proposals were shaped by place and time—Boston 1985—but the challenges and solutions still apply, and not just to Boston.

There are comparable conditions in many other cities, from New York to Cincinnati to Denver to Los Angeles. West Philadelphia's Mill Creek neighborhood, for example, faces challenges closely related to those of Boston's Dudley, and Philadelphia and Boston share the problem of combined sewer overflows that degrade water quality. Since 1987, I have adapted and extended the approach outlined in this chapter to Philadelphia and made similar, more highly developed proposals for Mill Creek.<sup>34</sup> In 1999, the Philadelphia Water Department submitted a grant proposal to the US Environmental Protection Agency for funds to plan, design, and build a demonstration project on vacant land in the West Philadelphia Empowerment Zone, which will combine a storm-water detention facility to reduce combined sewer overflows and an environmental study area for a local middle school. The project will be designed by stormwater engineers, teachers and students at the middle school, my students, and myself. Now, more than fourteen years after the first public presentation of the ideas in Boston, twelve years after I first applied them to Philadelphia, part of this vision may be realized.



## Notes

1. See Alex Krieger and Lisa J. Green, *Past Futures: Two Centuries of Imagining Boston* (Cambridge, Mass.: Harvard University Graduate School of Design, May 1985), the catalogue of an exhibit of plans for Boston.

2. This chapter is based on a lecture that was part of a series of three lectures in Boston and two other cities on the future shape of cities sponsored by the American Institute of Architects and the publishers McGraw-Hill; I would like to thank Sally Harkness and the Boston Society of Architects for asking me to give the lecture on the future shape of Boston. Charlotte Kahn was instigator and inspiration in many of the investigations described here and brought me up to date with Boston's accomplishments since 1985. Lorraine Downey, Melvin Colon, Nelson Merced, gardeners at Cooper's Place, and students in my 1984 and 1985 studios at the Harvard Graduate School of Design, especially my research assistant George Batchelor, all helped me understand the context of the issues and solutions. I am grateful to Jack Thomas, who first suggested the inclusion of the Boston lecture as a chapter in this book, and to Mike Lacey, Bob Fishman, Sam Bass Warner, Jr., Judith Martin, Margaret Weir, Arnold Hirsch, James Wescoat, and Carl Abbott for their comments. Greg Watson, John Berg, and Christine Min gave me important material on the present context.

3. Spirn, *The Granite Garden* (New York: Basic Books, 1984), and *The Language of Landscape* (New Haven: Yale University Press, 1998). See also Spirn, *The West Philadelphia Landscape Plan: A Framework for Action* (Philadelphia: Department of Landscape Architecture and Regional Planning, University of Pennsylvania, 1991), and other publications of the West Philadelphia Landscape Project. See also the project's website at [www.upenn.edu/wplp](http://www.upenn.edu/wplp).

4. I was chair of the Panel of Experts for the conference and presided at the three-day meeting. A summary of the proceedings was published in OECD, *Cities for the 21st Century* (Paris: OECD, 1994). Although the U.S. representative to the OECD attended a reception, no representative of the U.S. government participated in this meeting.

5. By the late 1990s, the construction of a new sewage treatment plant at Deer Island had greatly improved water quality in Boston Harbor. However, the establishment of the Massachusetts Water Resources Authority (MWRA) in 1985 and the consol-

idation of sewage treatment into a single plant did not resolve the problems associated with scale raised here.

6. Though much remains to be done, there has been significant improvement in neighborhood community development since 1985.

7. While new atriums are still enclaves guarded by private police, there have been many improvements to downtown Boston's public realm since 1985; Post Office Square is an example.

8. At the time of my lecture, the City of Boston did not know exactly how much vacant land there was.

9. The solution implemented by the MWRA was to replace the two old treatment plants with a single plant, thereby increasing centralization and failing to take advantage of alternative approaches to treatment such as those proposed here.

10. Beginning in 1978, as part of the Clean Water Act of 1977, the Environmental Protection Agency (EPA) provided financial incentives for municipalities to implement innovative or alternative wastewater treatment methods: 75 to 85 percent of design and construction costs, plus the cost of revision or replacement should the new system not work properly. Despite widespread advertisement, much of the allocated funding was not used. The EPA staff member who managed this program felt that a major reason was fear of risk on the part of the engineering profession. Robert Bastian, EPA, personal communication, 1985. For descriptions of Arcata, Bishop's Lodge, and other, similar projects, see Ann Whiston Spirn, *The Granite Garden*, 150-54 and "The Poetics of City and Nature: Toward a New Aesthetic for Urban Design," *Landscape Journal* 7:2 (Fall 1988), 119-22.

11. Boston now recycles sludge and markets it as a commercial fertilizer, Bay State Organic.

12. See description of Denver's Urban Storm Drainage and Flood Control District in Anne Whiston Spirn, *The Granite Garden*, 157-62 and "Poetics of City and Nature," 120.

13. Sam Bass Warner, Jr., *Streetcar Suburbs* (Cambridge, Mass.: Harvard University Press, 1962).

14. I have traced the development of these neighborhoods through nineteenth- and twentieth-century fire insurance atlases: Hopkins (1873-74); Bromley (1884, 1906); Sanborn (1943, 1968, 1986).

15. This story has been told elsewhere; see, for example, Kenneth Jackson, *Crabgrass Frontier* (New York: Oxford University Press, 1985).

16. The Dudley neighborhood is the subject of Peter Medoff and Holly Sklar, *Streets of Hope: The*

*Fall and Rise of an Urban Neighborhood* (Boston: South End Press, 1994). Medoff and Sklar describe how the Dudley neighborhood was plagued by arson in the 1970s (30-32) but show no awareness of the extent to which vacant land in the old floodplain was already present in the '50s and '60s.

17. I have documented the correlation between old floodplains, wetlands, and vacant land in inner-city neighborhoods of other cities, including Philadelphia, New York, Cincinnati, and Washington, D.C. The work in Philadelphia was sponsored by a grant from the J. N. Pew Charitable Trust (1987-91) and was documented in Anne Whiston Spirn, *Vacant Land: A Resource for Reshaping Urban Neighborhoods* (Philadelphia: Department of Landscape Architecture and Regional Planning, University of Pennsylvania, 1991). My work in other cities, including Boston, was sponsored by a grant from the National Endowment for the Arts (1984-85). See description of Philadelphia's Mill Creek neighborhood in Anne Whiston Spirn, *The Language of Landscape* (New Haven, Conn.: Yale University Press, 1998).

18. In 1985, students in my graduate studio in landscape architecture at the Harvard Graduate School of Design met with staff of Alianza Hispana and Nuestra Comunidad Development Corporation, developed designs for the Dudley neighborhood, and presented their proposals to Dudley residents in a public meeting in May 1985. Their work and this public lecture influenced the decision to reserve the lowest-lying land as a town common.

19. The Grassroots Program, now sponsored by Boston's Public Facilities Department, is still functioning in 1998.

20. This was accomplished at Post Office Square, now a popular downtown park with restaurant and underground parking garage.

21. Prudential Center has since been renovated into what a sign calls "Boston's City Under Glass," an interior arcade with stores, food courts, even a chapel, and an entrance to the new convention center alongside. There are terraces facing Boylston Street, and an enclosed escalator invites pedestrians on the sidewalk outside to enter and ascend to the complex. Still, this stretch of Boylston Street remains an unattractive place for pedestrians.

22. Quoted in Walter Muir Whitehill, *Boston: A Topographical History*, 2d ed. (Cambridge, Mass.: Harvard University Press, 1968), 90.

23. Museum of Fine Arts, *Back Bay Boston: The City as a Work of Art* (Boston: Museum of Fine Arts, 1969), 38.

24. Whitehill, *Boston*, 180.

25. For reproductions of these plans, see Alex Krieger and Lisa J. Green, *Past Futures*; Alex Krieger and David Cobb with Amy Turner, *Mapping Boston* (Cambridge, Mass.: MIT Press, 1999); and Cynthia Zaitzevsky, *Frederick Law Olmsted and the Boston Park System* (Cambridge, Mass.: Harvard University Press, 1982).

26. Frederick Law Olmsted, "The Problem and Its Solution," handwritten notes for a lecture to the Boston Society of Architects, 1886, Olmsted Papers, Library of Congress, Washington, D.C.

27. Frederick Law Olmsted, "Seventh Annual report of the Board of Commissioners of the Department of Parks for the City of Boston for the year 1881," reprinted in S. B. Sutton, ed., *Civilizing American Cities: A Selection of Frederick Law Olmsted's Writings on City Landscapes* (Cambridge, Mass.: MIT Press, 1971), 227.

28. T. S. Eliot, "The Dry Salvages," *Four Quartets in The Collected Poetry and Plays* (New York: Harcourt, Brace, 1962). The Dry Salvages are a group of rocks in Boston's outer harbor.

29. Sam Bass Warner, Jr. (in a lecture at Harvard Graduate School of Design, Cambridge, Mass., 1984).

30. Steve Curwood, "Profile: Shaping the City to Nature's Laws," *Sunday Boston Globe*, May 26, 1985. In 1986, following the Atheneum lecture, the Boston Aquarium published an abridged version in a publication devoted to Boston Harbor.

31. Charles Button, Ken M. Willis, and Crystal Gandrud, "Managing the Boston Harbor Project," *Civil Engineering Practice* (Spring/Summer 1994), 67 and MWRA, "Facts about BHP Construction" (Boston, Mass.: MWRA, fall 1996).

32. See chapter 10 by Martin and Warner. See also Sam Bass Warner, Jr., "Urban River Management, 1630-1997: The Charles River Case," paper presented at the 20th International Congress of the History of Science, May 1997.

33. Medoff and Sklar, in *Streets of Hope*, describe successful efforts of the DSNI, Alianza Hispana, and Nuestra Comunidad Development Corporation in promoting community development.

34. These are described in Spirn, *Language and Landscape* (see pp. 210-15 and 267-72, especially), *West Philadelphia Landscape Plan*. Designs for the environmental study area/stormwater detention facility by my Penn students and Sulzberger Middle School students can be viewed online at [www.upenn.edu/wplp](http://www.upenn.edu/wplp).