of water flow and of plant growth and reproduction to design over time. Through writing and lobbying, he influenced public perception of Niagara in his own time, but he could not anticipate the future social and political events that would continue to shape Niagara.

Biltmore

BILTMORE, ONCE THE HOME OF GEORGE VANDERBILT, IS NOW PART OF THE Pisgah National Forest. Driving up the entrance road through a lush, mature forest, one finds it difficult to imagine that this landscape was constructed—made, as Olmsted put it, "out of the whole cloth." Vanderbilt assembled his huge estate near Asheville, North Carolina, through the purchase of many small farms and woodlots. He retained Olmsted in 1888 to advise him on the improvement of his newly acquired property. The site was unpromising, Olmsted reported, the soil was "extremely poor and intractable," the woods were "miserable, all the good trees having again and again been culled out and only runts left." Vanderbilt had thought to plant a pastoral landscape of groves and grass, but Olmsted warned that he would "get very poor results at great cost." Instead, he persuaded Vanderbilt to underwrite America's first large-scale experiment in forestry. Olmsted's plan for the estate included a park and garden near the house,
farmlands “on the river bottom chiefly to keep and fatten live stock with a view to manure,” and the remainder as forest.46 Thousands of acres of scrubby, second-growth woodland and old fields were ultimately planted as forest and managed for economic return and aesthetic enjoyment.47

By January 1891 work was well under way, with white pines planted on three hundred acres of old fields, nursery stock readied for the forest, and gangs of workmen assembled to take out “the poor and dilapidated trees of the existing woods.” A large nursery was established at Biltmore to supply forest trees and shrubs in the quantity required and variety desired.49 In 1891 the recently established nursery included about 100,000 trees and bushes “of merchantable size” and about 500,000 seedlings and cuttings that had been propagated there.50

Olmsted saw in Biltmore an opportunity to demonstrate the promise of forestry techniques for the management of land used for recreation.51 Working with a private client, he hoped to avoid the frustrations and misunderstandings he had met in public projects, such as Central Park, where public protest thwarted his plans for landscape management. In Central Park, Olmsted had planted trees thickly, with the intention of culling the weaker trees later, and had introduced “nurse” trees to shelter more tender species intended ultimately to predominate. Years later, when workers cut the trees as planned, park visitors sometimes stood in front of the trees and tried “to wrest the axe from the hand of the woodsman.”52 Olmsted and J. B. Harrison wrote “Observations on the Treatment of Public Plantations, More Especially Related to the Use of the Axe” in 1889 to persuade the public that landscape management includes the creative use of the ax as well as the generative act of planting seeds. The chance to work with a single client must have seemed a welcome relief and an opportunity to gain a powerful patron for forestry. Olmsted encouraged Vanderbilt to become involved in the management of his forest as a suitable, long-term, and “most interesting rural occupation.”53

At Biltmore, Olmsted nurtured the future development of American forestry in more ways than one. Gifford Pinchot, later the first director of the U.S. Forest Service, visited Biltmore upon his return from studying forestry in Europe and was soon employed to work on a management plan. Pinchot later recalled his excitement: “Here was my chance. Biltmore could be made to prove what America did not yet understand, that trees could be cut and the forest preserved at one and the same time.”54 Working under Olmsted at Biltmore was Pinchot’s first job, which included an apprenticeship in public relations, as well as in forestry. Among his first assignments was the preparation of an exhibit and pamphlet on the project for the Chicago world’s fair of 1893, which was sent to thousands of newspapers and prompted much commentary.55 Pinchot continued to work at Biltmore after Olmsted’s retirement in 1893, but also took on other jobs as a consulting forester. His successor at Biltmore as resident forester, Alvin Schenck, established the Biltmore Forest School in 1897, the first such school in America.56 By the
Biltmore Forest, 1893. (Gifford Pinchot, Biltmore Forest: An Account of Its Treatment, and the Results of the First Year's Work [Chicago: Lakeside Press, 1893], courtesy Francis Loeb Library, Graduate School of Design, Harvard University)

early 1900s, however, it became clear that the forest was a financial fiasco in the short term and would yield no economic return for many years. If one of the richest men in America couldn't afford an experiment in forest management, then who could? Pinchot's experience at Biltmore convinced him that the long time frame required by forest management demanded that forest reserves be managed by public agencies.

Pinchot's notion that "trees could be cut and the forest preserved at one and the same time" lies at the core of some of the most bitter disputes of the environmental movement during the last century. They split the ideals of the Forest Service from those of the National Park Service, the goals of the Sierra Club from those of Resources for the Future. They lie at the heart of the debate over the fate of forests, from the wilds of Oregon to the streets of Dayton.

Trees cannot be cut and "the forest" preserved unless there is agreement on what a forest is and whom it is it for. Is it everyday habitat or sacred symbol, mental image or material resource? Is it for plants, animals, or people? And which ones—for native oaks or Norway maples; for spotted owls or English sparrows; for hikers or hunters, naturalists or lumbermen; for local residents or distant populations? There are many kinds of forests, and the answers depend upon the context of a particular place. Since an old-growth forest and an urban forest of trees in city parks and streets are not the same, different priorities should inform their management.

For Olmsted it was appropriate to apply the same methods of forest man-
agement to trees in urban parks and to those in rural woodlands. He published his pamphlet on forestry as applied to Central Park in 1889 as he was commencing work at Biltmore. Nearly a century later, the city forester of Dayton, Ohio, found himself embroiled in a controversy much like the one Olmsted encountered at Central Park, when he proposed a sustained management program for Dayton’s urban forest. The forester planned to harvest diseased and dying street and park trees while they were still marketable, using the proceeds to pay for the cost of removing and planting new trees. The local Sierra Club and Audubon Society chapters opposed the program, citing loss of wildlife habitat in rotten trunks and fallen trees and the desire to “let nature take her course.” They sued the city and won, forcing the abandonment of the program.\(^58\) Preservation versus conservation—this, in a nutshell, is the core dilemma of environmentalism.

The powerful lesson of Biltmore is what human impulse can accomplish given sufficient time, with an eye to restoration and beauty, as well as to utility. One hundred years ago there was no forest at Biltmore, just cut-over woods and infertile fields. Now there is forest. Olmsted had the designer’s faith that he could make something better, not worse. Key to his belief in himself was the ability to envision the future shape of the landscape, to guide it over time, and to imagine human intervention as potentially beneficial, not inevitably detrimental. He aimed to demonstrate how human intervention could make a forest more beautiful and more productive, provided one pursued long-term goals and a gradual return on investment, rather than short-term gain and maximum profit.

Olmsted took a long-term view of landscape construction and development. Unlike a building, a landscape is never “finished” after construction; it grows and changes, season by season, year by year. The form of a landscape can be fundamentally changed through the way it is managed. As design through time, landscape architecture often entails a succession of designs, sometimes requiring the alteration or even the deliberate destruction of early phases through growth, succession, or thinning, for example. At Central Park, Olmsted had envisioned a design that had to be implemented over several decades after the initial construction. And the forest at Biltmore would mature well beyond his own lifetime; at the age of eighty-eight he could say, “The entire undertaking looks to results that can be fully realized only after many years, and, except to a botanist, its value lies in its promises and experiments rather than its actualities.”\(^59\)

**The Fens and the Riverway**

In October 1893 Olmsted wrote to his partners from Biltmore, warning them to turn down any business that would distract them from the Boston work, especially the Riverway, and to follow that work carefully, day by day: “The aims are novel, the conditions are novel. You cannot trust