

ENVIRONMENTAL HISTORY *of the* HUDSON RIVER

*Human Uses that Changed the Ecology,
Ecology that Changed Human Uses*

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CHAPTER 14

THE RISE AND DEMISE OF THE HUDSON RIVER ICE HARVESTING INDUSTRY

Urban Needs and Rural Responses

Wendy E. Harris and Arnold Pickman

ABSTRACT

The origins of Hudson River ice harvesting can be traced to late-eighteenth-century New York City, where population growth, pollution, and technological advance resulted in the destruction of nearby water sources. By the second half of the nineteenth century, an enormous ice industry had developed along the rural shorelines of the Hudson River, north of Poughkeepsie. This unique industry involved the transformation of an important environmental resource—the waters of the Hudson River itself—into a commodity, represented by standard-sized blocks of ice that were stored in enormous ice houses until the summer months and then shipped by barge down the river to be consumed by urban dwellers. The interplay between the changing demands of distant urban markets and the technological capabilities of the ice industry had dramatic consequences—not only for the cultures and economies of local Hudson River communities but for shoreline appearance and morphology as well. Ironically, the demise of the Hudson River ice industry can be attributed to the same forces that drove its creation.

INTRODUCTION

The human desire for ice and the ability to harvest and store it date back at least four thousand years, to ancient Babylon and China (David 1995, xi). In

the United States, the earliest documented ice harvesting occurred at Jamestown in the seventeenth century (Cotter and Hudson 1957, 10). By the eighteenth century it was widely practiced throughout the colonies (Belden 1983, 145–68; Funderberg 1995, 3–32). In New York City, at that time, the demand for ice was satisfied by the exploitation of water sources located on the city's immediate outskirts. In time, as a result of the city's expansion, these sources were destroyed and New Yorkers were forced to look elsewhere for their ice. By the third quarter of the nineteenth century, the city would come to rely upon the frozen waters of the mid- and upper Hudson River. During this period, ice was transformed into the greatest of the country's natural resources, and the Hudson River became America's greatest ice producer.

The story of the Hudson River ice industry is a story about the river's frozen waters, its shorelines, landscapes, and communities, but it is also the story about the enormous market for ice located at the river's mouth—New York City. "Ice," said Henry David Thoreau (1904, 231), "is an interesting subject for contemplation." To understand the significance of the Hudson River ice harvesting industry's history, we suggest that the reader follow Thoreau's suggestion and contemplate what ice must have meant to the generations of New Yorkers who lived their lives before fans, air conditioning, and electric-powered refrigerators. In the middle of the nineteenth century, a reporter—most likely an

urban dweller—writing about what he termed the “consequences of ice,” described:

cold water on the table, cooling pillows for the sick, antiseptic layers for meats and fruits, cobblers, juleps, and smashes, neat plates of well-moulded butter, wines not flat but bright and sparkling. (*New York Times* 1865)

Ice helped New Yorkers endure the summer heat, allowed them to create such hot weather treats as water ices and ice cream, cooled their food and beverages, and brought them some relief during the periodic epidemics that swept through crowded neighborhoods killing thousands.

In the following discussion, we examine the relationships between changing patterns of consumption among the urban consumers who constituted the New York City market for ice and the Hudson River communities and landscapes that were the settings for ice production. We trace these relationships within the framework of a feedback model that considers how human uses and shifts in human uses affect the character of the environment, and how, in turn, an altered environment may drive subsequent human uses. Specifically, in the case of the ice industry, we focus upon the processes of population growth, industrial expansion, and technological advance. We will look at the roles these processes played in two distinct environmental, social and temporal settings—late-eighteenth/early-nineteenth-century Manhattan Island and the Hudson River in the late nineteenth/early twentieth century—and also how these processes shaped the rise as well as the demise of the once thriving ice industry.

EIGHTEENTH-CENTURY USE OF ICE

In the eighteenth century, when first encountered in New York City’s historical record, commercially distributed ice and foods requiring ice for their preparation were luxuries enjoyed by the wealthy. The earliest documentary evidence suggesting that ice was being harvested, sold, and used commer-

cially in New York City comes in the form of advertisements placed in newspapers by confectioners, many of French and Italian descent, who had emigrated to North America in order to ply their trade. Arriving here, they brought with them a great culinary novelty—ice cream—the consumption of which had lately become a craze among fashionable circles in Britain and on the Continent (David 1995, 316). Anglo-American elites soon developed a taste for ice cream and fruit-infused water ices, thus creating—for the first time in the city’s history—a market for ice.

Among the earliest New York confectioners to sell ice cream was Philip Lenzi, who came to the city by way of London. On November 25, 1773, an advertisement in *Rivington’s New York Gazetteer*, announced “Monsieur Lenzi’s” arrival with an explanation of his many offerings and services. Based temporarily in a private home “near the Exchange,” he planned to sell a wide range of European-style “sweetmeats.” Ice cream appears in this announcement, buried in a long list between “brown sugar candy” and “sugar ornaments.” By 1777, Lenzi had his own confectioner’s shop at 517 Hanover Square and had placed ice cream in a more noticeable spot in his advertisement. “May be had everyday,” his notice reads, “ice cream” (*New-York Gazette and the Weekly Mercury* 1777).

In the early 1780s, another French confectioner began advertising in the city’s newspapers. Joseph Corre arrived in America during the Revolutionary War as the personal cook to a British officer (Garrett 1978, 201). Before the war’s end, he had struck out on his own and opened a confectionary store, near Lenzi’s shop, on Hanover Square. In a 1781 advertisement, Corre announces that he “continues to serve the Ladies and Gentleman of this garrison, upon the most reasonable terms, with ICE CREAM” (*New-York Gazette and the Weekly Mercury* 1781).

As seen in other late-eighteenth-century advertisements, a number of the city’s confectioners began to focus exclusively on the sale of ice cream, suggesting the rise of what we would now recognize as ice cream shops. Of equal interest are the efforts made by at least one confectioner, Isherwood and Grieg, to ensure the patronage of the city’s more genteel citizens. Their ad announced that a special

room, next to their store, had been “fitted up” for ladies (*Commercial Advertiser* 1798).

Along with ice cream, the city’s gentry adopted other aspects of English cuisine. Among these were elaborate desserts requiring ice for their creation and preservation. Such items included syllabubs, molded jellies, bombes, blancmanges, and flummuries. Serving and consuming these concoctions was to become a form of entertainment, as well as symbolic of one’s membership among the elite (Belden 1983, 157, 165–68). From their earliest arrival on Manhattan’s shores, the confectioners—sensing an opportunity—also offered their services as caterers. In his 1773 advertisement, Lenzi indicated his availability “to furnish any public entertainment, as he has had the management of several given at Balls, Masquerades &c. in most of the principal cities of Europe” (*Rivington’s New York Gazetteer* 1773). Corre also advertised that he was able to “provide dinners or suppers at any private house in town for the convenience of ladies and gentlemen” (*New-York Morning Post and Daily Advertiser* 1785). Throughout this period, wealthy households relied upon confectioners to provision the receptions, assemblies, routs, dinner parties, and banquets that constituted society’s seasonal social round.

At least four New York City confectioners—Joseph Corre, Jacques Madeline Delacroix, Peter Thorin, and John H. Contoit—are known to have turned their entrepreneurial talents to the creation and management of pleasure gardens—a bigger and grander venue for the sale of ice cream. As one European visitor remarked after visiting two such establishments, “They are both kept by French people who through the sale of ice cream alone have gained a large fortune” (Garrett 1978, 210). Much like the ice trade itself, pleasure gardens were a ubiquitous but now largely forgotten part of urban life. Pre-dating public parks by more than a century, pleasure gardens were in fact gardens with manicured lawns, groves of shade trees, fountains, statues, gravel walkways, gazebos, pavilions, and muslin-draped outdoor “supper boxes.” At the same time, however, they were also social centers where city dwellers could gather to see one another and be seen, and be treated to theatrical performances, concerts, fireworks, and other forms of entertainment.

In 1800, the city’s eight pleasure gardens represented its “most popular diversion” (Garrett 1978, 621).

One of the city’s best-known pleasure gardens was Brannon’s, located on the road to Greenwich Village. Recalling it in 1794, an English visitor remarked that “iced creams and iced liquors are much drank [sic] here during the hot weather” (Garrett 1978, 147). In fact, due to the involvement of so many confectioners, the consumption of ice cream and iced beverages became one of the more notable activities at the city’s pleasure gardens—playing a major part in the promotion of these establishments and in the memories of those who frequented them. Delacroix’s Columbia Garden was located adjacent to the Battery where it received pleasant waterfront breezes during the heat of summer. Elizabeth Bleeker remembered it as “a most romantic place,” and wrote in her diary that she “had a charming glass of ice cream, which has chilled me ever since” (Garrett 1978, 204–205). As expressed by a young woman in 1803, in a letter to a friend:

In the cool of the evening we walk down to the Battery and go into the garden. Sit half an hour, eat ice cream, drink lemonade, hear fine music, see a variety of people, and return home happy and refreshed. (Belden 1983, 168)

SALE AND STORAGE OF ICE

As the literature suggests, confectioners and pleasure gardens had to have an abundance of ice on hand in order to provide products to their customers. Writing of a famous early-nineteenth-century British confectioner/caterer, food historian Elizabeth David (1995, 325) observes that “the consumption of ice for cooling and freezing in [this establishment] was clearly quite considerable.” In addition to using ice to prepare ice cream and desserts, confectioners also treated ice as a commodity to be bought and sold. Fairly early on in their New York careers, both Lenzi and Corre were selling ice from their shops. In June 1777, Lenzi ran an advertisement: “May be had everyday, ice cream; likewise ice for refreshing wine, &c.” By 1788, Corre and an unnamed confectioner

were also selling ice on a daily basis out of their Wall Street shops (*The New-York Morning Post and Daily Advertiser* 1788a; 1788b). Since the peak period for ice consumption was during the warmer months, the confectioners would have required spaces that were specially constructed to slow down the inevitable melting of ice. Their options would have included interior “cellars” built within the basements of their shops, exterior ice houses in their backyards that had storage space below ground accessible through some sort of superstructure, or else to purchase ice everyday from some nearby source.

At New York City’s pleasure gardens, ice was apparently stored on the premises. Columbia Gardens, for example, most likely had an ice house somewhere on its grounds. In 1806, we find Corre, its owner, offering ice for sale here by subscription, from May through September (Stokes 1929 Vol. 5, 144). Additionally, on a number of occasions in which the pleasure gardens themselves came up for sale, ice houses are mentioned in the advertisements. For example, Peter Thorin, announcing the sale of New Vauxhall Garden, stated that the property contained “a large icehouse almost full of excellent ice” (Garrett 1978, 193). In 1804, when Mount Vernon Garden was offered for sale, the advertisement stated that the property contained an ice house along with several other buildings (*American Citizen* 1804). It should also be noted that at least two different late-eighteenth-century pleasure gardens took the name “Ice House Garden” (*Daily Advertiser* 1798; Garrett 1978, 170–91).

During this period, ice could also be purchased from commercial ice houses not associated with confectioners. According to a newspaper notice appearing in 1784, ice was available for delivery every morning and evening from an ice house that stood at the end of Wall Street near the Hudson River (*The New York Packet and the American Advertiser* 1784). Another outlet was a “cellar” located beneath the Government House (formerly standing near the tip of Manhattan, overlooking the harbor) where ice was sold every morning (Stokes 1929 Vol. 5, 1369). We know as well that wealthy families maintained private ice houses at their city townhouses and at their estates on the city’s outskirts. For example, a 1795 advertisement for a thirteen-room house on Division Street, a “Spacious Ice House” is described as “under the Cellar” (*The American Min-*

erva and the New-York Advertiser 1795). In 1804, a “large elegant new HOUSE” being sold on Water Street had “a liquor vault and ice House” in its yard (*The Daily Advertiser* 1804).

Unfortunately there are no surviving images of New York City’s eighteenth-century commercial or domestic ice houses, nor have any remains of these been identified by archaeologists. We can reconstruct their probable appearance and size, however, from documentary sources, from archaeological excavations that have been conducted elsewhere, and from ice houses preserved at historic properties such as Mount Vernon, Monticello, and the Van Cortlandt Manor (Dillon 1975, 5; Sack Heritage Group; Thomas Jefferson Foundation).

For a sense of how an interior ice “cellar” might be constructed, we can extrapolate from an early-nineteenth-century English description (McIntosh 1828, 262):

The London confectioners, as well as most people on the continent, content themselves with keeping [ice] in cellars, surrounded with very thick walls, and without windows, being entered sometimes by straight and sometimes by crooked passages, secured by double and often treble doors, and the ice thickly covered by straw or mats.

Freestanding backyard ice houses, other sources tell us, included both aboveground and subterranean masonry components. The buried or shaft portion where the ice was stored was shaped like an “inverted cone” with a grate or gravel at the bottom for drainage. Access to the building was through the upper part of the structure, which was located at ground level. The latter was often round or octagon-shaped with a shingled, thatched, or bricked domed roof (David 1995, xiv–xvi; Thomas Jefferson Foundation; Webster 1845 (VIII, 2). In Philadelphia, the archaeological excavation of portions of a circa 1780s ice house indicated that its shaft portion was originally eighteen feet (5.49 meters) deep with a diameter of approximately thirteen feet (3.96 meters) (Yamin 2008, 40–43) (Fig. 14.1). An eighteenth-century exterior ice “well” excavated in Alexandria, Virginia, was estimated to have a capacity of sixty-eight tons (City of Alexandria).

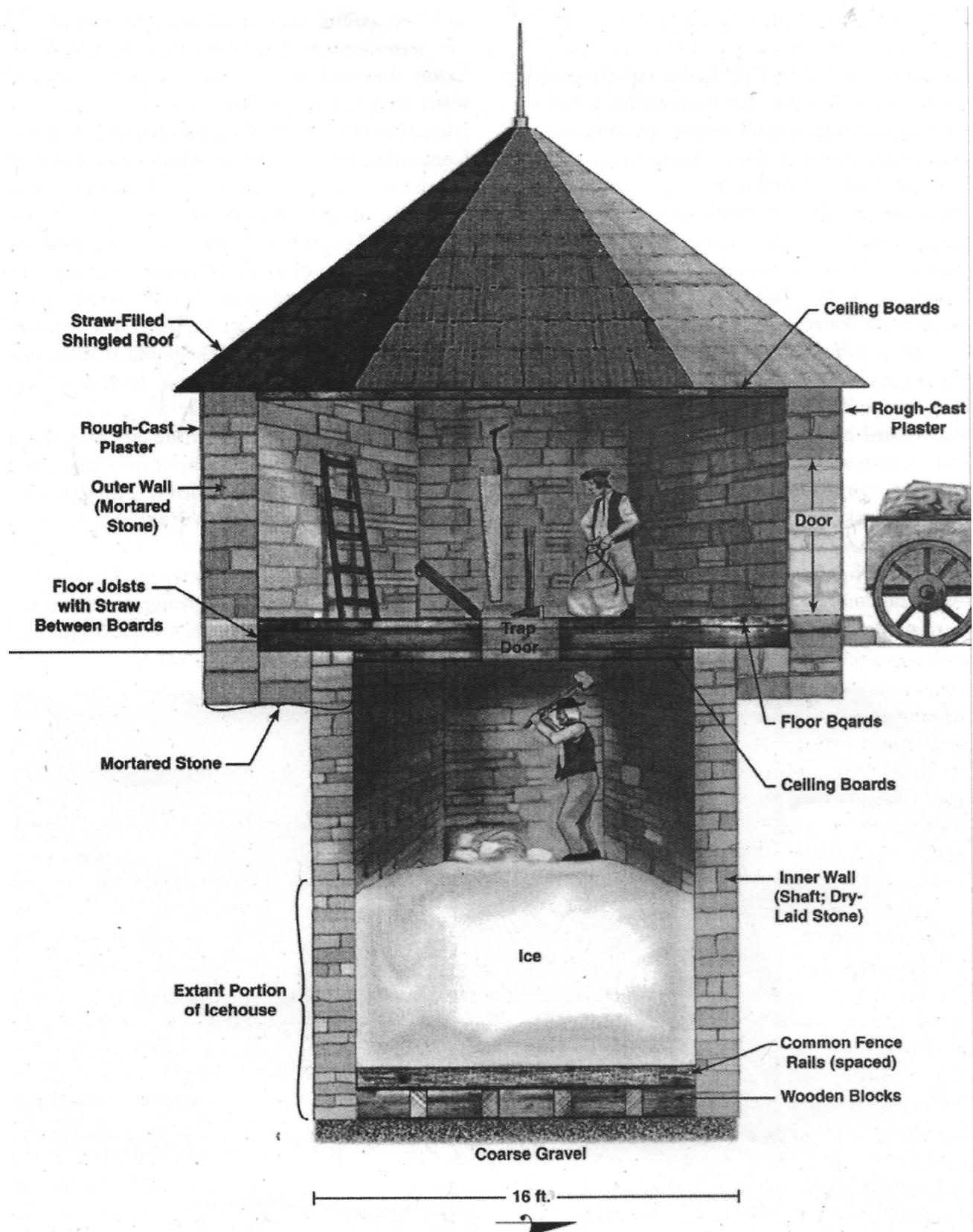


FIG. 14.1. Drawing of a ca. 1780s Ice House, probably belonging to Robert Morris—based on documentary sources and results of archaeological excavations conducted by John Milner Associates, Inc., at the site of the Liberty Bell Center in Philadelphia. Rendering by Todd Benedict and Rob Schultz, John Milner Associates, Inc. Source: Yamin (2008, 45, Fig. 3.6) (courtesy of Rebecca Yamin and John Milner Associates).

EARLY NYC ICE SOURCES

By 1800, New York City had a rapidly growing population of 60,500. Ten years earlier, it had surpassed Philadelphia as the largest city in the United States. Also, as stated above, during this period certain sectors of its citizenry apparently enjoyed a dependable and sizeable supply of ice. Where did it come from? At that time, the most readily available ice source would have been the Collect (from the Dutch "kolck" or "small body of water") also known as the Fresh Water Pond. Located on what was then the city's northern outskirts, near present-day Foley Square, it was most likely a glacial kettle pond, fed by springs and local streams (Fig. 14.2). The Collect was praised by Early Euro-American residents of New York as an excellent spot for fishing and snipe hunting. In the winter the Collect was a popular spot for ice skating. Gallows were erected along its shorelines during the summer, and crowds gathered here to watch public hangings. By the time ice suppliers and confectioners began harvesting ice commercially from the Collect, however, a group of so

called "noxious" industries were located on its southern shore. At the close of the American Revolution, the pond, now considered a prime industrial water source, was surrounded by tanneries, breweries, distilleries, rope-walks, potteries, and furnaces. Contemporary accounts described it as a dumping ground for animal carcasses and human corpses. Ironically, the first documentary evidence we have that the Collect served as an ice source appears in 1806 on the eve of its abandonment for that purpose. A newspaper advertisement placed by Joseph Corre, the confectioner, ice supplier, and owner of a pleasure garden, informed the public that because the Collect had become so "putrid" he had (at great cost) "procured ice from a fresh spring about three miles from the city." By then, the city had begun the process of filling in portions of the Collect and leveling the hills that surrounded it (Hill and Waring 1897, 207–208; Koepel 2000, 42, 52, 116; Stokes 1929, Vol. 5, 144).

Corre's new ice source may well have been Sunfish Pond, then located at a greater distance from the city near present-day Park Avenue South and



FIG. 14.2. 1797 map (Taylor 1797) showing location of early ice source, Collect Pond, at what was then the northern edge of New York City (courtesy of the Map Division, New York Public Library).

32nd Street. Streams originating near present-day Times Square fed the one-acre pond, which then drained into the East River's Kip Bay. Described as a favorite spot for fishing and muskratting, by the 1830s Sunfish Pond's purity too had been compromised as a result of a glue factory that had located along its northern shore. It was filled in by the 1840s (Depew 1895, 467; Koepel 2000, 240).

CAUSES UNDERLYING THE RISE OF THE HUDSON RIVER ICE INDUSTRY

The discussion now moves nearly a century ahead and more than a hundred miles (over 160 kilometers) north of the island of Manhattan, to the reaches of the Hudson located between Poughkeepsie and Albany, where, by the 1880s, the shorelines of Ulster, Greene, Rensselaer, and Albany Counties had become the center of New York City's ice production. Here, far from the city's contaminated waters and safely above the estuary's saltwater front, 135 ice houses had been constructed. The Hudson River was now producing between 2,000,000 and 2,750,000 tons of ice during a good winter season, making it the largest producer in the United States (Hall 1884, 24–26).

The Hudson River ice industry's true beginnings, however, date to the 1830s and to only thirty miles (some 48 kilometers) upstream from New York City at Rockland Lake, where ice was cut and hauled down the side of Hook Mountain to the river. Here it was stored in a 1,500-ton ice house until it could be shipped to the city by steamboat (Stott 1979, 7–8). Demand for ice kept growing, and by the 1860s, the company that controlled production at Rockland Lake, the Knickerbocker Ice Company, had developed ice fields on the river almost as far north as Albany (Stott 1979, 9). A number of causes underlay this expansion, including the tremendous improvement in ice harvesting and storage technology that had occurred since ice was first taken from the Collect, New York City's unprecedented growth, and changes in the food distribution system.

Many of the innovations that would transform the ice trade were introduced by Nathaniel Jarvis Wyeth, a young associate of Frederick Tudor, the Boston man generally credited with the creation of

North America's international ice trade. Tudor's business had begun in 1806, centering upon the shipment of Massachusetts ice to warm weather ports, including Charleston, Martinique, Cuba, and later to India. Wyeth, as an ice supplier and later Tudor's foreman, had grown frustrated with the slow and haphazard methods used in the hand-harvesting of ice from New England's frozen ponds. Among other innovations, in the 1820s he devised a horse-drawn ice plow with parallel blades that allowed workers to grid out and cut an ice field into easily removable standard-sized blocks of ice cut at right angles (Hall 1884, 2–4; Maclay 1895; Smith 1961; Stott 1979, 7).

Not only did Wyeth's invention allow greater quantities of ice to be cut at a faster rate, but the ice that was produced could be efficiently stacked within Wyeth's newly configured ice houses. Unlike their eighteenth-century predecessors, these were above ground, multiroomed, multistoried, and constructed of wood (Fig. 14.3). Construction of these ice houses was made feasible by other early-nineteenth-century technological innovations. One of these was the discovery of the insulating property of various materials (Weightman 2003). Most ice houses had double walls packed with such materials, including wood shavings, sawdust, and hay, which would also be packed around the ice blocks. Additionally, the development of steam-powered ice elevators enabled the ice houses to be easily filled. A large ice house could hold sixty thousand tons of ice.

In the spring, the ice was removed and shipped to market in specially constructed ice barges (Fig.

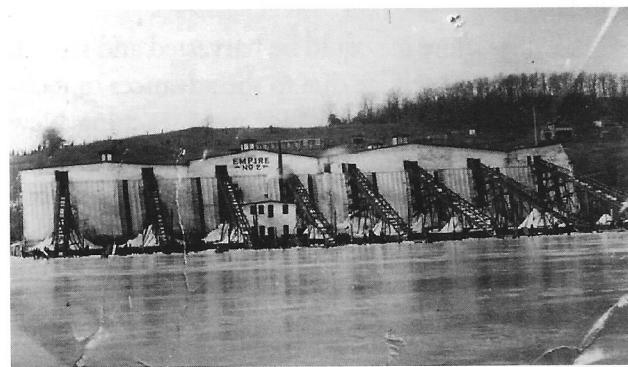


FIG. 14.3. Undated photograph of the Empire Number 2 Ice House at Catskill, N.Y. Note the powerhouse in the center of the photograph and the ice elevators in front each of the large vertical loading doors (courtesy of the Vedder Memorial Library, Greene County Historical Society).

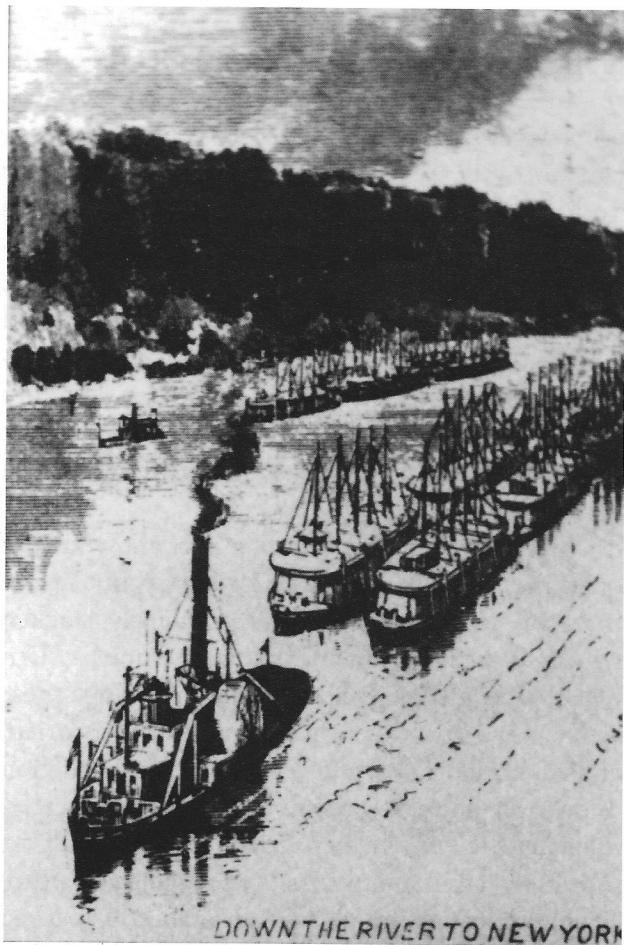


FIG. 14.4. 1884 illustration showing Hudson River ice barges (cover illustration, *New York Chronicle* 1993).

14.4). These barges are identifiable by the large windmills that extended above the deck that were used to pump out any meltwater that accumulated during the trip downriver, an invention that has been credited to Thomas Edison (de Noyelles 1982, 138; Dibner n.d., 17–20; Hall 1884, 17; Walsh 1983).

Because more ice could be harvested and stored, and less lost to meltage due to the advances in technology, greater amounts of ice were reaching New York City (Hall 1884, 9–10; Jones 1984, 800; Weightman 2003, 105–15). The city was now the largest ice market in the country, requiring nearly 1.5 million tons of ice yearly by the 1880s (Hall 1884, 24). It had seen tremendous growth in just a short period of time. From 1830 to 1880 more than 960,000 people were added to its population (New York State 2000, 2). Not only did the city require ever-increasing amounts of food to feed its citizens, but more ice was needed to keep food from spoiling

as it moved through an expanding and increasingly complex food distribution system.

For more than two hundred years, beginning with the Dutch, New Yorkers had obtained fresh locally produced food at centrally located municipally regulated markets. Provisions arrived from throughout the neighboring region by various means: from the gardens of New Jersey and Long Island on market boats and farm wagons; by sloops from Hudson River Valley farmsteads; in fishing and oyster boats from Long Island Sound and Raritan Bay; and on the hoof as droves of cattle were herded overland. Some of the produce originated from gardens and farms on the portion of Manhattan Island immediately north of the city. As late as 1837, only one-sixth of the island was covered with buildings and streets. Although much of the remaining land was either wooded or enclosed by private estates, an extensive portion was still under cultivation (Lindner and Zacharias 1999, 340; Spann 1981: 124–28).

Thomas F. Devoe, butcher and market historian, chronicled practices at the city's twelve municipal markets during the 1820s. Because perishable items, such as fish, meat, milk, and butter, were usually purchased on a daily basis, marketmen used very limited amounts of ice. Devoe records only one case during this period in which any significant quantity of ice was stored at a city market. This was the Grand Street Market, where a customer, James Allaire, paid the costs for constructing and filling a subterranean ice house. His reason for doing this, according to Allaire, was so he might "now and then, have a good piece of corned beef through the warm weather" (Devoe 1865, 456). Beginning in 1839, with the introduction of iceboxes into the public markets, butchers and fishmongers began to keep ice on hand so that they might "keep pieces over." Some consumers had also acquired iceboxes, and they too needed a constant supply of ice to keep food cool (Burrows and Wallace 1999, 46, 451; Devoe 1865, 346–47, 456, 485).

Gradually, the entire system underwent a major transformation due to the loss of local food producers whose farmland had been swallowed by suburbanization, the proliferation of middlemen grocers, the rise of privately owned neighborhood grocery stores, and the development of refrigerated railroad cars that carried perishable food into the

city from distant sources. As the Federal Trade Commission was to observe early in the twentieth century, "supplying the needs of a great city is no longer the casual affair of farmers with their farmers' wagons" (Lindner and Zacharias 1999, 281–82; Spann 1981, 124–28; Tangires 2003).

In general, underlying the city's growing market for ice was a change in consumption patterns favoring large industry. In the mid-nineteenth century the major consumers of ice had been families, hotels, saloons, and ice cream stores. As the century drew to a close, the major consumers became breweries, meat packers, and the railroads (Hall 1884, 5). Ice, once considered a luxury, was now a necessity.

Having discussed the factors driving the rise of the Hudson River ice industry, we will now examine the consequences—for the river's landscapes and its communities.

EFFECTS UPON THE LANDSCAPE

During the latter third of the nineteenth century and the opening decades of the twentieth, ice fields and ice houses became the dominant elements along portions of the river's shoreline north of Poughkeepsie. During the 1990s, as archaeologists working for the New York District Corps of Engineers, we undertook a series of investigations here as part of a habitat restoration study. We focused especially upon three ice house sites located on lower Schodack-Houghtaling Island, a seven-mile-long island just south of Albany. Our research suggests that not only did the ice industry greatly affect the economic and social history of the Hudson River but it also transformed the physical landscape (Harris and Pickman 1999; 2000; Huey 1998). Elsewhere we have examined how throughout the nineteenth century, the river's shorelines were greatly modified as a result of a series of engineering efforts that included navigation improvement projects, railroad construction, and the making of land to support industrial production (Harris et al. 1996). Landscape changes associated with ice harvesting fall within the latter category.

Modifications to the shoreline morphology began during the opening phases of an ice house's construction. Sediment was removed from the river bottom by steam dredges and then redeposited be-

hind bulkheads in shallow water near the shore to form a projecting wharf directly in front of the ice house, providing a loading area for ice barges. This process would be followed at almost every ice house built along the river. In a contemporary aerial photograph (Fig. 14.5), the areas of shoreline terrain seen protruding into the river from its western bank are actually former ice house sites. This altered shoreline survives today as a highly visible feature of the riverine landscape.

Historic maps and newspapers indicate that an ice house building boom occurred on Schodack-Houghtaling Island and adjoining areas of the river in the 1880s. The construction of so many of these huge buildings drastically altered the appearance of less-populated reaches of the river as well as the waterfronts of small villages such as Catskill, Athens, New Baltimore, Coeymans, and Coxsackie. The map shown in Figure 14.6, indicating the locations of seventy-one ice houses that once stood on the

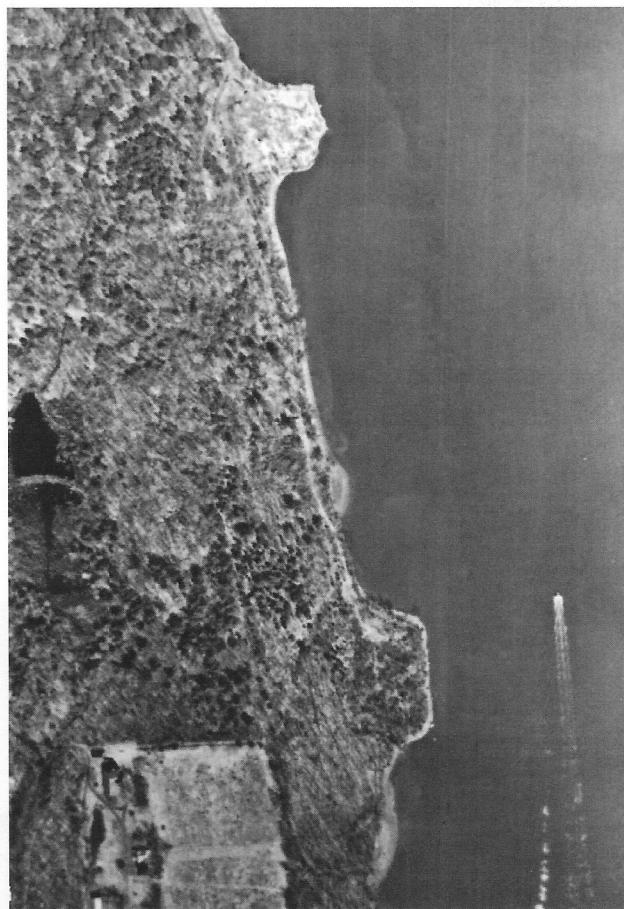


FIG. 14.5. A 1989 aerial photograph of the Hudson River's western shoreline clearly indicates the locations of former ice house wharves. Scale of original: 1 in = 480 ft [1 cm = 57.6 m] (courtesy of Col-East, Inc.).

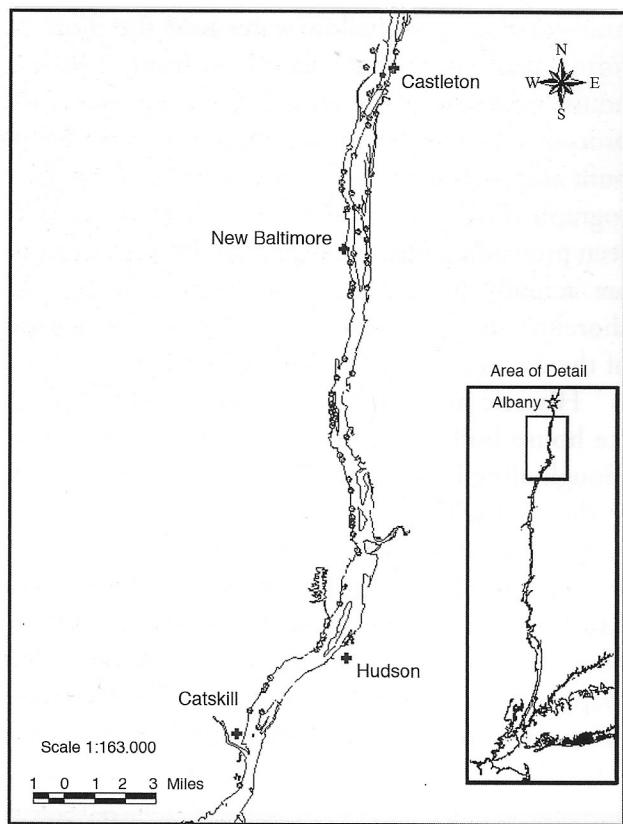


FIG. 14.6. Locations of Hudson River ice houses between Catskill and Castleton, N.Y., ca. 1890s. Circles indicate ice house locations, plotted using maps of that period (Beers 1891; USACE 1897), aerial photographs (Col-East Inc. 1989), and twentieth-century topographic maps (USGS 1953a, 1953b, 1953c, 1953d) (drawn by Dag Madara).

riverbanks between Catskill and Castleton, should provide readers with a sense of the density of these industrial structures. What the map cannot convey is the visual impact of individual ice houses. Painted a brilliant white in order to repel the sun's rays and forestall the melting of their contents, most ice-houses were more than three stories high, thus dwarfing all other aspects of the river's built envi-

ronment. The remains of one of the ice houses we investigated extended some four hundred feet (approximately 122 meters) along the shoreline.

For those viewing the shorelines from a distance, such as passengers on the railroad or on steamboats traveling between New York City and Albany, the newly constructed clusters of ice house complexes may have been experienced as glaring intrusions upon the landscape's scenic beauty. Indeed, one Hudson River guidebook referred to the ice houses as "immense storehouses that line the banks of the river . . . all the way to the head of navigation, and which form a feature of the scenery more conspicuous than ornamental" (Ingersoll 1893, 129). Another guidebook praised the river's pastoral views but made an exception of what the writer termed "the great unattractive whitewashed ice houses perched on the river banks, suggesting the out-reaching grasps of the monopolistic ice barons" (Buckman 1909, 122) (Fig. 14.7).

EFFECTS ON HUDSON RIVER COMMUNITIES AND WORKERS

Although the available evidence indicates that outsiders responded to the transformed landscape with ambivalence, for those living and working in Hudson River communities the economic benefits of the developing ice harvesting industry far outweighed changes to the familiar landscape, and they eagerly embraced it. Local newspapers reported enthusiastically upon the construction and expansion of individual ice houses, providing readers with progress reports on dredging and filling of mudflats, pile driving, bricklaying, framing, roofing, and the in-

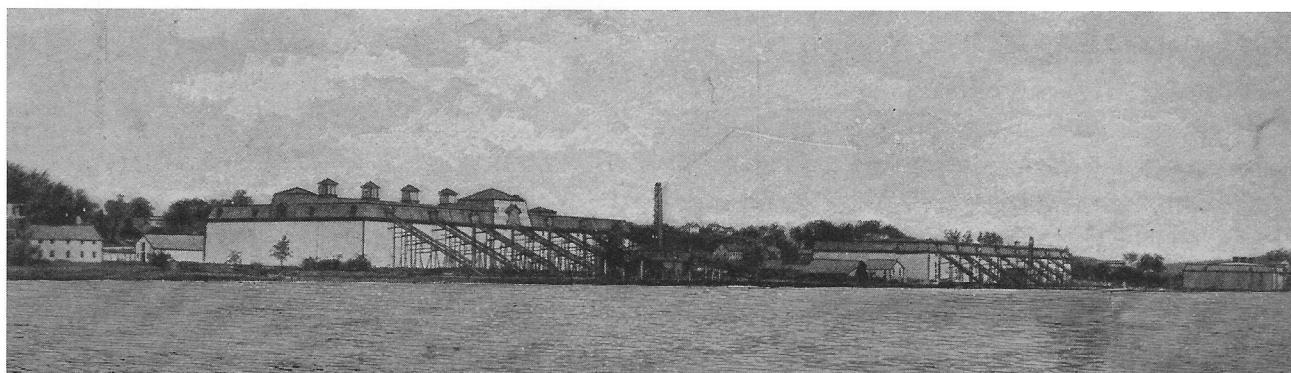


FIG. 14.7. View of ice houses from the river illustrates impact of these large structures on the landscape (Source: Bruce 1903).

stallation of engine rooms, smoke stacks, and elevators. In a village such as Coeymans in 1892, the construction of a huge new ice house was "astonishing" and a source of wonder rather than dismay. Local residents were encouraged to visit the construction site and reassured that "if a favorable winter ensues, an increased force of help will find employment in the ice harvest at this point" (*Coeymans Herald* 1892).

Watching the ice workers from his home on the banks of the Hudson, the naturalist John Burroughs (1886, 202), wrote:

On a stern winter night, it is a pleasant thought that a harvest is growing down there on those desolate plains which will bring work to many needy hands by and by, and health and comfort to the great cities some months later.

As Burroughs's observations suggest, the ice harvesting industry involved the transformation of the river's frozen surface into a site of human labor. Despite the use of horse power to mark out and cut ice blocks, and steam power to load the block into ice houses, Hudson River ice harvesting was essentially a labor intensive industry (Fig. 14.8).

Estimates place the size of the Hudson River ice industry seasonal work force at up to twenty thousand workers (Hall 1884, 26). Like the industry they labored in, the history and culture of Hudson River ice house workers have been largely forgotten. As part of our research on the Schodack-Houghtaling Island ice houses, we tried to learn more about these people, their origins, and their experiences.

During the third and fourth quarters of the nineteenth century, the Hudson River ice houses became a major factor in local economies, and for workers in river communities their construction was a welcome development. Most prospective ice workers engaged in seasonal pursuits such as agriculture, logging, fishing, ship building, brickyard work, and river transportation—all of which ceased during the winter months (Hall 1884, 26; Post n.d.). A local newspaper column noted that "several hundred men hereabouts annually make calculation on the income derived from two or three weeks' employment in the ice harvest to tide them over to the settled Spring work" (Anonymous n.d.).



FIG. 14.8. 1883 photograph of Hudson River ice crew scraping the ice prior to cutting, near Athens, N.Y. (courtesy of the Vedder Memorial Library, Greene County Historical Society).

Work in the ice industry could also extend beyond winter. Commenting on Greene County's forty ice houses, Beers (1884, 58) noted: "The business gives employment to a large number of men, both in harvesting the ice in the winter and breaking it out and loading barges in the summer." Thus, not only did the ice houses provide a new source of income to the region's farmers, artisans, tradesmen, and laborers, but one that could potentially provide a year-round basis of support for themselves and their families.

To further explore the composition of the ice house workforce, and to confirm the data contained in secondary sources and in newspapers of the period, we examined the records of the Van Orden, Vanderpool, and Sherman Ice House, constructed in 1881 on the western shoreline of Houghtaling Island opposite the village of New Baltimore. Weekly payrolls from the 1889 harvesting season list sixty-six persons, a figure that apparently included both year-round and seasonal workers (Sherman 1889b; 1889c). The names of twenty of these workers also appear in the 1892 New York State census records and directories for two adjacent villages on the west bank of the Hudson (Lant 1892; New York State 1892). Six of these workers were described as farmers, while three others were river pilots or boatmen. The other workers included two carpenters (one a ship carpenter), a painter, a stonemason, and a butcher. Another, described as an engineer, apparently operated the ice house steam engine, and may have been a year-round employee. Only five of these ice house workers were described as laborers. Two of the ice house

employees were substantial landowners—one of the farmers having 139 acres, and one of the carpenters, 92 acres. The butcher also owned an acre of land. This small sample supports the inference that many ice house employees were unaccustomed to working as industrial laborers.

The development of the ice industry brought communities into a new relationship with the frozen waters of the Hudson. In addition to the funds that flowed directly to the workers, the economic power of the ice industry derived from its indirect impact upon local villages as ice house employees spent their money in hotels, boarding-houses, restaurants, saloons, clothing stores, and other retail establishments (Beecher 1991, 79). Between wages spent and wages pocketed, many river communities became economically dependent upon the ice industry. Newspapers such as the *Catskill Examiner* ran special columns during the winter months devoted wholly to the progress of the harvest. One column proclaimed that "ice is the only the only thing talked about in New Baltimore now" (*Catskill Examiner* 1883a). During warm winters, when the ice harvest was poor, the columns chronicled the dismal mood of the villages:

The ice grows less and less encouraging. We have had and are having uniform spring weather . . . up the river the ice men have done nothing and below us it is of course the same . . . the laboring class feel the loss of their work on the ice very severely and when they suffer, the interests of the business community are seriously affected. (*Catskill Examiner* 1880)

During good harvest seasons, when the winters were cold, the workers had employment, but this involved exposure to the harsh, and often dangerous, working conditions on the ice fields. The diary of ice house owner Augustus Sherman attests to numerous days of sub-zero temperatures, and days when the wind and the temperature created conditions so severe that work became impossible (see, e.g., Sherman 1882; 1889a; 1895). Both secondary accounts and journals of the ice men indicate that working on the ice had other hazards that sometimes led to severe injury or even death. Accidents recounted in the local newspapers and elsewhere in-

clude falling through the ice or open channels into the freezing water, being struck by falling ice cakes which weighed up to several hundred pounds, and being ensnared in the ice house elevating machinery (Beecher 1979, 3; Rothra 1988, 18).

While the wages earned in the ice fields provided a needed supplement to local incomes, ice workers also encountered, possibly for the first time, relations of production typical of industrial capitalism. The process of being incorporated into the wage labor system was not always a smooth one, as suggested by the many accounts of strikes on the Hudson River ice fields. Some affected single ice houses and were quickly resolved. Others were more widespread and involved violence and threats of violence (*Catskill Examiner* 1875; 1876; 1879; 1883a; 1883b; *Coeymans Herald* 1879; 1881; 1882). Thus, for the farmers, artisans, and tradesmen listed in the Vanderpool, Van Orden, and Sherman payroll, life in the ice fields may have provided an initial personal encounter with labor strife. Participation in the ice industry workforce also brought many workers into contact with men and women of other ethnic and cultural backgrounds. Contemporary newspaper accounts note that the ice industry's labor force included African Americans and women, as well as Irish and Italian immigrants (*Catskill Examiner* 1875; 1878).

The following quote is from an atypically pro-labor local newspaper account of an 1875 strike on the ice fields:

By 10 o'clock the crowd numbered about 500 tough and determined men, many of whom had come from points 8 to 10 miles [13 to 16 km] distant to get work, and they formed a line and marched up and down Main Street . . . The procession comprised all nationalities, including a liberal infusion of the Hibernian element—fairly spoiling for a fight—and was peppered with Anglo-Africans. . . . Pale faces and darkies met in peace on the platform of "fourteen shillings a day." (*Catskill Examiner* 1875)

While this account reflects racial and ethnic attitudes typical of the period, it also indicates the workers' solidarity in the face of what they perceived as economic exploitation by the ice house owners.

Thus, within the larger Hudson River landscape, ice fields and ice houses became sites of both human conflict and accommodation as a generation of workers were absorbed into the culture of the new industrial society.

THE DEMISE OF THE HUDSON RIVER ICE INDUSTRY

Beginning in the first decade of the twentieth century, New York consumers began to question the purity of Hudson River ice. It was alleged that raw sewage was pouring into the river from towns directly adjacent to the ice fields (*The New York Times* 1903a; 1903b). After testing the water, the city issued a statement saying that typhoid fever may have

been caused by "the present condition" of Hudson River ice (*The New York Times* 1907). The ice industry fought back, claiming convincingly that typhoid bacteria were killed by long-term freezing and citing as proof the city's low death rate from intestinal diseases (*The New York Times* 1903c; 1913; *Albany Telegram* 1910). By then, though, other factors were beginning to take a toll on New Yorkers' desire for natural ice. Chief among these was the high cost of ice, caused primarily by the development of ice monopolies and the inability of the Hudson River ice industry to meet urban demand (*The Troy Weekly Times* 1889; *The New York Tribune* 1900). In 1920, the *New York Times* carried a story noting that decreasing amounts of Hudson River ice were being harvested and that as a consequence ice houses were being abandoned.

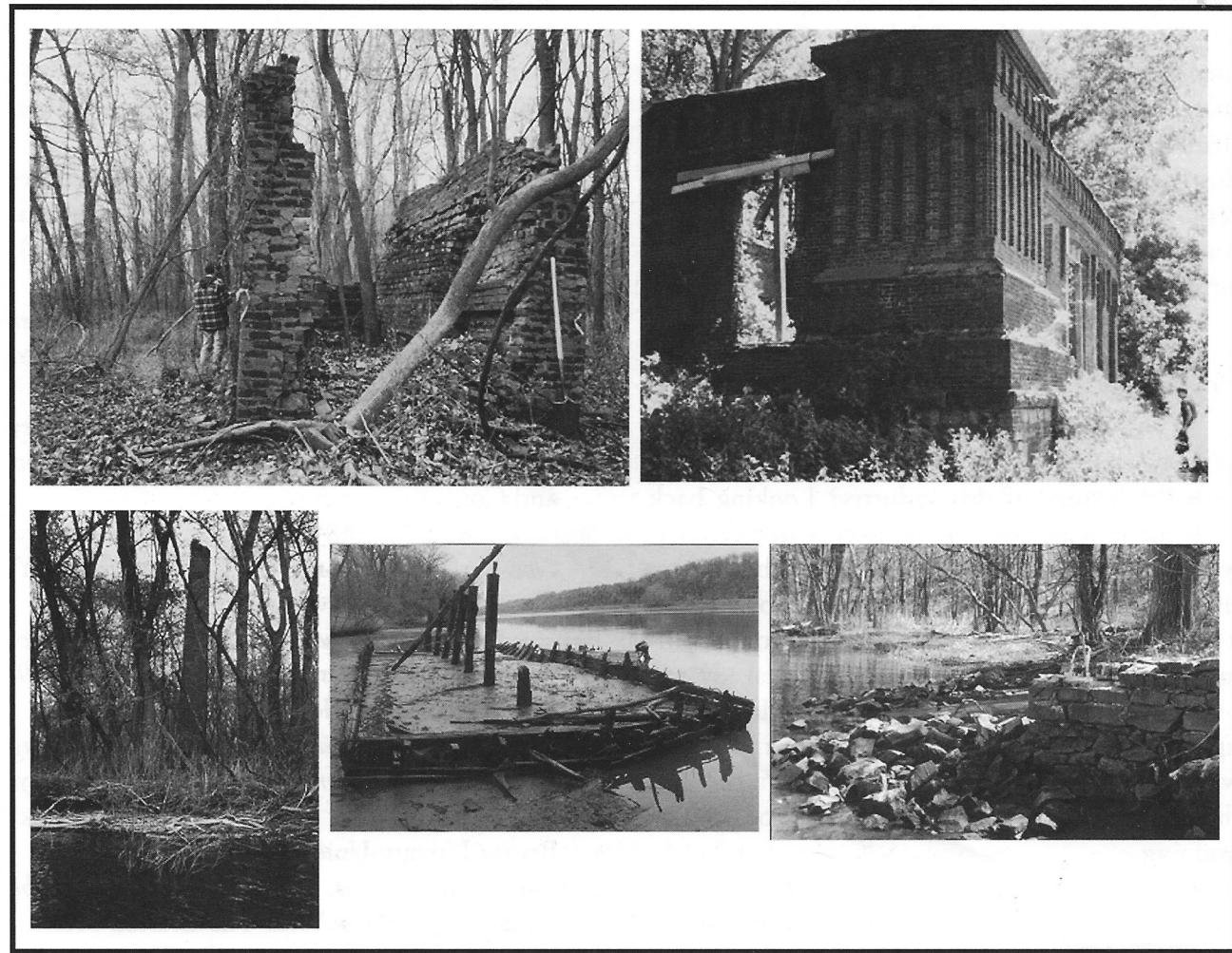


FIG. 14.9. Visible Remains of Hudson River Ice Houses. Clockwise from upper left: Brick Structure that probably housed the steam engine and firebox—P. McCabe & Co. Ice House, Schodack-Houghtaling Island; Powerhouse—Scott Brothers Ice House, Nutten Hook; Eroding Foundation Wall—Van Orden, Vanderpoel & Sherman Ice House, Schodack-Houghtaling Island; Barge Remains—P. McCabe & Co. Ice House, Schodack-Houghtaling Island; Brick Chimney—Miller & Whitbeck Ice House, Schodack-Houghtaling Island (photographs by Wendy Elizabeth Harris, 1998).

Coinciding with these trends and contributing to the industry's decline was the increasing availability of technology for cooling air and manufacturing ice (Gosnell 2005, 378). Unfortunately, this involved the use of large machinery and dangerous gases such as ammonia. By the 1930s, however, these obstacles had been overcome and millions of electric refrigerators were in use in American homes (Rogers n.d.; Weightman 2003). The era of the natural ice industry had come to an end. As one Catskill resident observed at the time: "The ice house has followed the livery stable to oblivion" (Anonymous 1931).

The falloff and ultimate disappearance of the ice trade severely disrupted the economies of such industry centers as New Baltimore, Coeymans, and Catskill. Some of these communities would never recover the vitality they had known during the ice industry's brief existence (Bush 2009, pers. comm.).

Within the reaches of the river that we examined as archaeologists, the landscape and economy that was created by the ice industry lasted no more than fifty years. By the time we encountered the industry's infrastructure—at the end of the twentieth century—it existed as ruins (Fig. 14.9). The frozen waters of the Hudson had long ago ceased to have any value for urban consumers.

CONCLUSIONS

What observations can we make when confronted with the history of this industry? Looking back from the vantage point of the twenty-first century, we see a regionally focused and sustainable extractive industry that both flourished and collapsed as a result of the same forces. Population growth, pollution, economic change, and technological advance pushed the ice trade off the island of Manhattan, up to the reaches of the mid-and upper Hudson, where it became an enormous industry. In the end, these forces followed the industry, and became its undoing.

REFERENCES CITED

Albany Telegram. 1910. Natural ice men prepared to fight manufacturers of artificial ice, July 31. Ice Industry Folder, Vertical Files, Greene County Historical Society, Vedder Memorial Library, Coxsackie, NY.

American Citizen. 1804. Advertisement, Vol. 5, Issue 1352 (Aug. 4), 3. New York: D. Dennis-ton and J. Cheetham. Collection of the New York Public Library.

American Minerva and the New-York Adver-tiser. 1795. Advertisement, Vol. II, Issue 587 (Nov. 23), 1. New York: G. Bunce. Collection of the New York Public Library.

Anonymous. n.d. The ice prospects. Unidentified newspaper article in Ice Industry Folder, Vertical Files, Greene County Historical Society, Vedder Memorial Library, Coxsackie, NY.

—. 1931. Deplores passing of a once great industry. Unattributed newspaper (Feb. 5). Ice Industry Folder, Vertical Files, Greene County Historical Society, Vedder Memorial Library, Coxsackie, N.Y.

Beecher, R. 1979. A winter's ice harvest, 1900–1901. *Greene County Historical Society Journal* 3(4): 1–3.

—. 1988. The Shermans of New Baltimore: The fourth generation's Augustus Sherman. *Greene County Historical Society Journal* 12(3): 21–28.

—. 1991. *Under three flags: A Hudson River history, Coxsackie and Clinton and settlements*. Hendersonville, NY: Black Dome Press.

Beers, F. W. 1891. *Atlas of the Hudson River Valley from New York City to Troy*. New York: Watson and Co.

Beers, J. B. and Co. 1884. *History of Greene County, New York*. 1969 reprint ed. Cornwallville, NY: Hope Farm Press.

Belden, L. C. 1983. *The festive tradition, table dec-oration, and desserts In America, 1650–1900*. New York: W. W. Norton.

Bruce, W. 1903. *Panorama of the Hudson showing both sides of the river from New York to Albany*. Photographs by G. Willard Shear. New York: Bryant Literary Union.

Buckman, D. L. 1909. *Old steamboat days on the Hudson River*. New York: The Grafton Press.

Burroughs, J. 1886. A river view. In *The writings of John Burroughs, Volume VII. Signs and seasons, 195–213*. Cambridge: The Riverside Press.

Burrows, E. G., and M. Wallace. 1999. *Gotham: A*

history of New York City to 1898. New York: Oxford University Press.

Bush, C. S. 2009. Personal Communication. Town Historian, Town of New Baltimore, Greene County, N.Y.; July.

Catskill Examiner. 1875. The strike, January. Ice Industry Folder, Vertical Files, Greene County Historical Society, Vedder Memorial Library, Coxsackie, NY.

—. 1876. The ice business, n.d. Ice Industry Folder, Vertical Files, Greene County Historical Society, Vedder Memorial Library, Coxsackie, NY.

—. 1878. The ice harvest, Feb. 23. Ice Industry Folder, Vertical Files, Greene County Historical Society, Vedder Memorial Library, Coxsackie, NY.

—. 1879. The ice harvest, Jan. 18. Ice Industry Folder, Vertical Files, Greene County Historical Society, Vedder Memorial Library, Coxsackie, NY.

—. 1880. The ice harvest. Jan. 24. Ice Industry Folder, Vertical Files, Greene County Historical Society, Vedder Memorial Library, Coxsackie, NY.

—. 1883a. The ice harvest, Jan. 20. Ice Industry Folder, Vertical Files, Greene County Historical Society, Vedder Memorial Library, Coxsackie, NY.

—. 1883b. The ice harvest, Jan. 27. Ice Industry Folder, Vertical Files, Greene County Historical Society, Vedder Memorial Library, Coxsackie, NY.

City of Alexandria. Gadsby's Tavern Museum. The ice well. http://gadsbys.home.att.net/icewells_cr.pdf; accessed July 2009.

Coeymans Herald. 1879. The meeting of the workingmen, June 18. New York State Library, Albany, NY.

—. 1881. Local brevities, July 20. New York State Library, Albany, NY.

—. 1882. Coeymans, June 15. New York State Library, Albany, NY.

—. 1892. Coeymans, Oct. 5. New York State Library. Albany. NY.

Col-East Inc., North Adams, Massachusetts. 1989. Aerial Photograph Series of the Hudson River. April 20.

Commercial Advertiser. 1798. Advertisement for Ish-
erwood and Greig, Confectioners. Vol. I(186) (May 5): 2.

Cotter, J. L., and J. P. Hudson. 1957. *New discoveries at Jamestown: Site of the first successful English settlement in America*. Washington, DC: National Park Service, United States Department of the Interior. http://www.nps.gov/history/history/online_books/jame/discovery.pdf; accessed July 2009.

Daily Advertiser. 1798. Advertisement for "Ice House Garden" Vol. 4, Issue 4263 (Oct. 6), 4. New York: Collection of the New York Public Library.

—. 1804. Advertisement. Vol. 20, Issue 5863 (Jan. 13), 3. New York: Francis Childs. Collection of the New York Public Library.

David, E. 1995. *Harvest of the cold months: The social history of ice*. New York: Viking Penguin.

deNoyelles, D. 1982. *Within these gates*. Privately published.

Depew, C. M. 1895. *1795-1895. One hundred years of American commerce*. New York: D.O. Haynes.

Devoe, T. F. 1862. *The market book: A history of the public markets in the City of New York*. New York: The Author.

Dibner, B. n.d. The other end of the hawser: The history and technology of the barges that tugs towed . . . cold cargoes . . . *Tugbitts: The Quarterly Journal of the Tugboat Enthusiasts Society of the Americas*. South Street Seaport Library Vertical Files.

Dillon, J. 1975. National Register of Historic Places Nomination Form, Van Cortlandt Manor. Washington DC: United States Department of Interior, National Park Service.

Funderburg, A. C. 1995. *Chocolate, strawberry, and vanilla: A history of American ice cream*. Bowling Green: Bowling Green State University Press.

Garrett, T. M. 1978. A history of pleasure gardens in New York City, 1700-1865. Dissertation, New York University. Ann Arbor: University Microfilms International.

Gosnell, M. 2005. *Ice: The nature, the history, and the uses of an astonishing substance*. Chicago: The University of Chicago Press.

Hall, H. 1884. The ice industry of the United States. *Tenth U.S. Census*, 1880, Volume 22. Washington, DC: U.S. Census Office.

Harris, W. E., and A. Pickman. 1999. Cultural resources investigation, ice harvesting industry remains located on property belonging to the U.S. Army Corps of Engineers, New York District, Schodack-Houghtaling Island, Town of New Baltimore, Greene County, New York. Prepared for New York District Army Corps of Engineers. On file New York District Army Corps of Engineers and New York Office of Parks, Recreation, and Historic Preservation, Waterford.

—. 2000. Towards an archaeology of the Hudson River ice harvesting industry. *Northeast Historical Archaeology* 29: 49–82.

Harris, W. E., A. Pickman, and N. Rothschild. 1996. *Landscape, land use, and the iconography of space in the Hudson River Valley: From prehistory to the present*. Paper presented at the New York Academy of Sciences, Dec. 9, New York City.

Hill, G.E. and G. E. Waring. 1897. Old wells and water-courses on the isle of Manhattan, Part II, In *Historic New York: Being the first series of the Half Moon papers*, ed. M. W. Goodwin, A. C. Royce, and R. Putnam, New York: G. P. Putnam's Sons.

Huey, P. R. 1998. Historical and archaeological resources of Castleton Island State Park, towns of Stuyvesant, Columbia County, New Baltimore, Greene County, and Schodack, Rensselaer County, New York: A preliminary phase I cultural resources assessment. New York State Office of Parks, Recreation and Historic Preservation.

Ingersoll, E. 1893. *Illustrated guide to the Hudson River and Catskill Mountains*. Chicago and New York: Rand, McNally.

Jones, J. C. 1984. *America's icemen: An illustrated history of the United States ice industry trade, 1665–1925*. Humble, TX: Jobeco Books.

Koeppel, G. T. 2000. *Water for Gotham: A history*. Princeton: Princeton University Press.

Lant, J. H. 1892. *Greene County directory for 1892: Containing the names of the inhabitants of Catskill and Coxsackie*. Hudson, NY: Bryan and Wren.

Linder, M., and L. S. Zacharias. 1999. *Of cabbages and Kings County*. Iowa City: University of Iowa Press.

Maclay, R. 1895. *The ice industry*. In *One hundred years of American commerce*, Vol. II, ed. Chauncey Depew, 466–69. New York: D. O. Haynes.

McIntosh, C. 1828. *The practical gardener and modern horticulturist*. London: Thomas Kelly. <http://books.google.com/books>.

New York Chronicle. 1993. Bringing ice to New York City in 1884. Reprint from 1884 *Harpers Weekly*. Vol. 6, No 2, Cover Illustration. Copy in South Street Seaport Museum Library Vertical Files.

New York Gazette and Weekly Mercury. 1777. Advertisement for Philip Lenzi. Issue 1336 (June 2): 4. Collection of the New York Public Library.

—. 1781. Advertisement for Joseph Corre, Confectioner. Issue 1553 (July 23): 3.

New-York Morning Post and Daily Advertiser. 1785. Advertisement for Joseph Corre, Confectioner. Issue 316 (March 24): 1.

—. 1788a. Advertisement for Joseph Corre, Confectioner. Issue 1230 (June 19): 4.

—. 1788b. Advertisement for "Ice & Ice Cream, Mead & Cakes." Issue 1262 (July 26): 3.

The New York Packet, and the American Advertiser. 1784. Advertisement. Issue 392 (June 10): 2. New York: Samuel Loudon. Collection of the New York Public Library.

New York State. 1892. State census records for Greene County, New York. Microfilm copy in collection of Greene County Historical Society, Vedder Memorial Library, Coxsackie, NY.

—. 2000. Population of New York State by county: 1790 to 1990. Prepared by the Department of Economic Development, State Data Center. <http://www.empire.state.ny.us/nysdc/StateCountyPopests/CountyPopHistory.PDF>; accessed July 2009.

The New York Times. 1865. The ice trade. May 3, 8.

—. 1903a. Ice water. April 28, 8.

—. 1903b. Ice. May 31, 6.

—. 1903c. Concerning ice. July 20, 6.

—. 1907. Sees danger in Hudson ice. March 6, 6.

—. 1913. Natural ice superior. Jan. 24. Ice Industry Folder, Vertical Files, Greene County

Historical Society, Vedder Memorial Library, Coxsackie, NY.

—. 1920. Hudson River ice on decline." Ice Industry Folder, Vertical Files, Greene County Historical Society, Vedder Memorial Library, Coxsackie, NY.

New York Tribune. 1900. An ice famine imminent. March 14, 6.

Post, P. n.d. Ice harvesting, A once important area industry. Clipping in Ice Industry Folder, Vertical Files. Greene County Historical Society, Vedder Memorial Library, Coxsackie, NY.

Rivington's New-York Gazeteer. 1773. Advertisement for Philip Lenzi. Issue 32 (Nov. 25): 4. Collection of the New York Public Library.

Rogers Refrigeration. n.d. Refrigeration History. <http://www.rogersrefrig.com/history.html>; accessed July 2009.

Rothra, W. H. 1988. *Two in a bucket: A personal account of ice harvesting*. Rev. ed. Published by the author. Printed by Overlake Enterprises, Stowe, NY.

Sack Heritage Group. George Washington's ice house. <http://www.sackheritagegroup.com/articles/articles.php?articleID=142>; accessed July 2009.

Sherman, A. 1882. Notebooks. Entry for Jan. 27, 1882. Edward Ely Sherman Memorial Collection, Box 147. Greene County Historical Society, Vedder Memorial Library, Coxsackie, NY.

—. 1889a. Notebooks. Entry for Feb. 4, 1889. Edward Ely Sherman Memorial Collection, Box 147. Greene County Historical Society, Vedder Memorial Library, Coxsackie, NY.

—. 1889b. Ice house account book. Amounts paid Feb. 22, 1889. Edward Ely Sherman Memorial Collection, Box 138. Greene County Historical Society, Vedder Memorial Library, Coxsackie, NY.

—. 1889c. Ice house account book. Amounts paid March 2, 1889. Edward Ely Sherman Memorial Collection, Box 138. Greene County Historical Society, Vedder Memorial Library, Coxsackie, NY.

—. 1895. Notebooks. Entry for Jan. 5, 1895. Edward Ely Sherman Memorial Collection, Box 147. Greene County Historical Society, Vedder Memorial Library, Coxsackie, NY.

Smith, P. C. F. 1961. Crystal blocks of Yankee coldness. *Essex Institute Historical Collections* 97(3): 197–232.

Spann, E. K. 1981. *The new metropolis, New York City, 1840–1857*. New York: Columbia University Press.

Stokes, I. N. P. 1929. *The iconography of Manhattan Island, 1498–1909*. New York: Robert H. Dodd.

Stott, P. 1979. The Knickerbocker Ice Company and Inclined Railway. *The Journal of the Society for Industrial Archaeology* 5(1): 7–18.

Tangires, H. 2002. Public markets and civic culture in nineteenth century America. Baltimore: Johns Hopkins University Press.

Taylor, B. A. 1797. *A new and accurate plan of the city of New York, in the State of New York in North America*. Collection of the New York Public Library, Map Division.

The Thomas Jefferson Foundation. n.d. The ice house. *Jefferson Encyclopedia*. http://wiki.monticello.org/mediawiki/index.php/Ice_House.

Thoreau, H. D. 1904. *Walden*. New York: E. P. Dutton.

Troy Weekly Times. 1889. The hermit's letter, ice items. Vol. XXXIV(2)(Aug. 8): 3.

United States Army Corps of Engineers (USACE), New York District. 1897. Improvement of the Hudson River, New York, in charge of Lieut. Col. William Ludlow and Major A. N. Miller, Corps of Engineers, U.S.A. Map on file U.S. Army Corps of Engineers, New York District, Albany Field Office, Troy, NY.

United States Geological Survey, Department of Interior. 1953a. Delmar Quadrangle, New York. 7.5 Minute Series (Topographic), Photorevised 1980. Digital Raster Graphic (DRG) File 1998.

—. 1953b. Hudson North Quadrangle. 7.5 Minute Series (Topographic), Photorevised 1980. Digital Raster Graphic (DRG) File 1998.

—. 1953c. Hudson South Quadrangle. 7.5 Minute Series (Topographic), Photorevised 1980. Digital Raster Graphic (DRG) File 1998.

—. 1953d. Ravena Quadrangle, New York, 7.5 Minute (Topographic), Scale 1: 24,000. Digital Raster Graphic (DRG) File 1998.

Vedder Memorial Library. n.d. One of the two large

ice houses north of the Rip Van Winkle Bridge, Catskill, New York, Collection of Greene County Historical Society, Vedder Memorial Library, Ice Industry Photographic Files.

—. 1883. Men and ice fields, Lower end of Athens, January 27, 1883. Collection of Greene County Historical Society, Vedder Memorial Library, Ice Industry Photographic Files (Oversize Box 10).

Walsh, A. 1983. Ice harvesting on the Hudson River. Articles appearing in the *Chatham Courier*, Chatham, New York, March 3 and March 10.

Webster, T. (assisted by the late Mrs. Parks). 1852. *An encyclopedia of domestic economy*. Boston: Little, Brown. <http://books.google.com/books>.

Weightman, G. 2003. *The frozen-water trade*. New York: Hyperion.

Yamin, R. 2008. *Digging in the city of brotherly love*. New Haven: Yale University Press.