

Lowell: The Experiment on the Merrimack

Step back in time two hundred years—before the age of factories. America is a nation of farmers, and the forces of nature have not yet been harnessed on a large scale. Rumors of English industrial textile production have spread to New England. The history of Lowell and America’s industrial revolution begins with the story of a river.

The River

Water from New Hampshire’s White Mountains rushes through countless streams, merging to form the headwaters of the Merrimack River. The river courses south into Massachusetts and is joined by hundreds of tributaries in its race to the Atlantic Ocean. Near the confluence of the Concord and Merrimack rivers, an enormous volume of water plummets over thirty feet at a site known as the Pawtucket Falls. The city of Lowell exists because of this waterfall.

Harnessing Water for Weaving

By 1821, the technology of using wheels to convert falling water into energy to drive machinery was well understood. However, two important developments—the power loom and the factory system—were new to the United States. A design for the power loom had been spirited out of England just ten years earlier by a wealthy Boston merchant, Francis Cabot Lowell.

In 1811, Lowell visited England where he saw for himself the new technology of mechanized textile production. The power loom, which wove cloth in great quantities, was a new English invention and its export was prohibited. Lowell memorized the mechanics and general construction of the loom, intent on returning to America to build a working model for use in American textile factories. In 1812, Lowell returned to the United States and engaged the services of mechanic Paul Moody. A year later, the two fabricated a working prototype of an American power loom.

Capital and Industry

Francis Cabot Lowell envisioned an entire community involved in textile production, a planned industrial city. To raise the capital needed for such a venture, he enlisted support from a group of investors later dubbed the “Boston Associates.” Lowell and his investors built a textile mill on the Charles River in Waltham, Massachusetts. By 1817, the factory was a financial success, and the Boston Associates began looking to expand beyond the limited power-producing capacity of the Charles River. Lowell died that year, but the investors recognized the potential of his vision and forged ahead with his ideas and plans. They set out to find a power source around which to build a large-scale manufacturing center.

Mills on the Merrimack

Although the Pawtucket Falls are located many miles northwest of the important port city of Boston, they offered an ideal site for water-powered manufacturing. In 1821, the Boston Associates purchased land around the falls and the rights to the Pawtucket Canal, a small transportation canal built in the 1790s to circumvent the falls. The Associates built several mills and financed the enlargement of the Pawtucket Canal for water power. The first mills opened in 1823. During the next 25 years, additional mills and an intricate series of power canals were built. By 1848, Lowell was the largest industrial center in America. Fifty thousand miles of cotton cloth—enough to circle the world twice— was produced in the city each year.



Women at Work: Lowell's Early Labor Force

Machines require people to tend them, so it was necessary to recruit a massive work force. People in the United States had heard of the degraded condition of English workers, and the Boston Associates believed that such conditions would not be tolerated in America. They decided to run their mills using a work force of young women recruited from New England farms. Lowell became as much a social experiment as a technological one and was known around the world for its innovation.

Life on the Corporation

Lowell's "mill girls" were expected to work in the factories for only a few years. The idea was that they would return to the farms, marry, or become teachers, leaving their positions vacant for other women. The result would be an industrial revolution without the creation of a permanent working class.

Initially, everything seemed to work according to plan. Women flocked to the "City of Spindles" where they could earn money and take advantage of a city's cultural offerings. Boardinghouses owned and managed by the corporations served as "home" for these young women. Although crowded, the quarters provided an atmosphere in which women could share experiences and forge bonds of solidarity. By the 1840s, nearly 10,000 Yankee women had left New England towns and villages to work in Lowell's ten major textile corporations.

Despite relatively high wages and a variety of cultural opportunities, mill life was arduous and frequently demanding. The ringing of bells replaced the sun and the seasons as signals for daily tasks. Company rules regulated women's lives both at work and after hours; curfew was at 10 pm, church attendance was mandatory, and any sign of improper behavior was grounds for dismissal.

The End of an Era

The experiment on the Merrimack carried within it the seeds of its own destruction. Success spawned competition—investors saw the potential for huge profits, and new industrial cities sprang up along the nation’s waterways. Textile prices fell. To keep dividends high, mill owners cut labor costs. Workers were required to tend more machines, and the speed of the machines was increased.

Working conditions became a source of growing discontent. The noise of textile machinery deafened workers. Whirring gears and rapidly spinning belts were rarely covered by protective devices, and accidents were common. Worst of all, weave rooms were unventilated, and many workers suffered from lung diseases such as tuberculosis, pneumonia, and brown lung.

Exhausted by rigorous work schedules and disenchanted with the indifference of corporations toward their well being, many operatives organized to improve working conditions. In 1844, hundreds of women united to form the Lowell Female Labor Reform Association. Thousands of workers signed petitions urging the state legislature to pass a law limiting the length of the work day to ten hours. Legislators ignored these protests; not until 1874 did Massachusetts move to restrict the length of the work day. Even then, employers found many ways to evade the law.

The Ten Hour Movement and other early protest efforts were largely unsuccessful, in part because women could not vote. Many women left the mills. Vacant positions were eventually filled by immigrant men, women, and children, and the “mill girl” era came to a close.

The Immigrant Experience

Irish immigrants began coming to Lowell during the 1820s. Irish men were a vital force behind canal and mill construction. Management considered the Irish good enough to work outdoors, and employed some Irish women inside the mills. By the late 1840s, labor shortages led to the hiring of large numbers of foreign-born workers. Irish immigrants, driven from their homeland by the potato famine, assured mill owners of a plentiful and needy labor pool.

By 1860, nearly 25% of the city’s 37,000 residents were Irish immigrants or the children of Irish immigrants. Soon after, Lowell became home to thousands of French Canadians, many of whom had been recruited by mill agents. Following the French Canadians came immigrants from dozens of different countries, mostly from Eastern and Southern Europe.



A City in Transition

Over the years the character of Lowell changed. Since immigrants were driven from their homelands for economic, political, or religious reasons and were desperate for jobs, it was no longer necessary for management to maintain a paternalistic interest in the welfare of the workers. In time, the boardinghouse system broke down, and workers crowded into tenements. Real wages were even lower than they had been in the “mill girl” era, forcing whole families to work in the mills. Water power was augmented by coal-burning steam engines, and the once clean, bright appearance of Lowell was lost under layers of soot and grime.

Lowell changed from a city peopled primarily by young, single workers to a city of families and ethnic communities. Community life revolved around churches, coffee houses, and fraternal organizations. Newcomers created ethnic neighborhoods that in many ways resembled the worlds they had left behind. This environment eased the transition into a new culture, allowing immigrant families to maintain traditions, share their native culture, and become accustomed to American life.

At Work in the Mills: Labor vs. Management

Mill work was as grueling for immigrants as it had been for “mill girls.” Advances in technology in mid-19th century Lowell were designed to increase productivity but did little to improve working conditions. Factory workers labored long hours in hot, humid, and crowded conditions. Periodic “speed-ups” and “stretch-outs” contributed to the high rate of accidents and work-related illness. Safety regulations were virtually nonexistent. A high premium was placed on production.

Though well aware of dangerous working conditions, unfair hiring practices, and inadequate wages, immigrant workers had few avenues for voicing their grievances. A troublemaker was quickly fired and replaced by one of the thousands of new immigrants in search of work.

*IWW leader William
“Big Bill” Haywood leads
strikers down Dutton
Street during 1912 strike.*



Mill owners prevented attempts to organize by keeping workers from different ethnic groups in separate workrooms and deliberately provoking conflict among groups. It wasn't until the strike of 1912 that laborers collectively stood up for their rights, forcing management to address their grievances. That year, an outside group, the Industrial Workers of the World, organized Lowell's workers across class, gender, and ethnic lines.

Over time, the once clearly marked boundaries of ethnic neighborhoods grew fuzzy. Interaction between members of different groups became commonplace. Shared customs gave people a sense of place in the community, while new traditions fostered a sense of ownership in the city.

Nature Transformed

The development of the textile industry in Lowell dramatically altered the ecology of the Merrimack River watershed. The river was dammed in numerous spots, changing its width and rate of flow. Forests were cut, and canals, roads, bridges, and buildings were constructed. Natural resources, particularly water, were viewed as commodities, and nature was seen as something to be controlled or tamed.

Although Lowell was originally developed with the intention of blending the factory into the pastoral landscape, this soon changed. As the industry and the city grew rapidly during the 19th century, serious pollution of the air and the watershed dramatically degraded the environment. Only with the growing environmental activism of the 1960s and 1970s did citizens and government act to begin to rehabilitate the Merrimack River watershed.



Technological Change and the End of an Era

Less than a century after the city began its rise to industrial eminence, Lowell entered a period of decline sparked, in part, by changes in technology. The rise of steam power in the late 19th century undermined the very foundation on which Lowell had been built—the water power of the Pawtucket Falls. By the middle of the 20th century, most of the city's textile mills had shut down, many moving south where raw material and cheaper labor were readily available. Lowell's days as a bustling textile center drew to a close.

Lowell Today

The transformative power of technology is clearly visible. Technological innovation and obsolescence are recurrent themes in Lowell. After an economic resurgence built around higher education and high technology in the early 1980s, the city's economic climate again cooled. Many feel confident that a new mix of technology, improved education, and cultural vitality has positioned the city for success in the 21st century.



Immigrants from India, Central and South America, and Southeast Asia are coming to Lowell for reasons similar to those of their earlier counterparts. Many of the mills house new industry and business. For Lowell, technological and social changes continue to play an integral role in shaping the city's growth and character.

Timeline of Events

1769
Richard Arkwright patents spinning frame (England), and opens first successful water-powered spinning mill in 1771.

1776
Declaration of Independence.

1787
Edmund Cartwright patents power loom (England).

Constitutional Convention held in Philadelphia.

1789
Beginning of French Revolution.

1790-91
Slater Mill opens in Pawtucket, RI; first successful US spinning mill.

1793
Invention of cotton gin. US cotton production increases nearly 7,000% by 1815; as a consequence, the economic value of slavery soars.

1796
Completion of Pawtucket Canal opens Merrimack River to commercial traffic.

1807
Embargo Act closes off all US trade with Europe due to Napoleonic Wars.

1810-12
Francis Cabot Lowell visits England; memorizes workings of power loom.

1813
FC Lowell founds Boston Manufacturing Company in Waltham; first integrated textile mill in the world (all steps of production in one building).

1817
Death of Francis Cabot Lowell.

1821
Merrimack Manufacturing Company founded in East Chelmsford by Patrick Tracy Jackson, Nathan Appleton, Kirk Boott and other "Boston Associates."

1822
Irish immigrants and others begin digging canals for water power.

1823
Mill agents begin recruiting young women from New England farms to work in the mills; they live in boardinghouses run by the corporations.

1826
East Chelmsford renamed Lowell.

1834
First "turnout" (strike) in Lowell protests a wage cut; it ends in failure.

1835
Boston and Lowell Railroad begins service, one of the first rail lines in the US.

1837
Financial panic leads to nationwide Depression that lasts for several years; fledgling labor movement is undermined because of high unemployment.

1843
First telegraph line built from Washington to Baltimore by Samuel Morse.

1844
The Ten Hour Movement begins; workers petition the state legislature to pass a law limiting the workday to ten hours (not successful).

Founding of the Lowell Female Labor Reform Association.

1844-45
Uriah Boyden and James B. Francis develop inward-flow turbine. Turbines begin to replace water wheels in Lowell mills.

1845-51
Potato famine in Ireland leads to massive emigration; many settle in Lowell and begin to supplement Yankee women in the work force.

1846-47
Mexican War is opposed by most New Englanders, who see it as a war to extend slavery. Mill owners, however, are anxious to appease plantation owners and keep cotton prices low.

1847

Opening of Northern Canal marks completion of Lowell's 5.6 mile power canal system, the largest such system in the world.

1850

Annual production of 50,000 miles of cloth makes Lowell the largest industrial center in the US; population of 33,000 is second largest in Massachusetts.

Fugitive Slave Law infuriates many in North.

1860

75% of the world's cotton is grown in the southern US.

Cotton accounts for 60% of all US exports.

1861-65

Civil War. Most textile mills in Lowell and elsewhere sharply reduce production due to lack of cotton. Thousands of textile workers lose their jobs.

ca 1865

Beginning of massive influx of French Canadians into Lowell and other New England mill towns. They settle in what becomes known as Little Canada and comprise 20% of Lowell's population by the early 20th century.

1870s

Steam power begins to replace water power. By 1880, Fall River has surpassed Lowell as the largest textile manufacturing center in the US.

1874

Massachusetts legislature finally passes a law limiting the work day to ten hours. Many employers fail to comply with it.

1875

Strike by male mule spinners is unsuccessful when they refuse to make alliance with immigrant and women workers.

1890s-1900s

Immigrants from Greece, Poland, Portugal and other southern and eastern European nations begin arriving in Lowell (and elsewhere) in large numbers.

1893

Beginning of nationwide Depression.

1903

Anticipating a strike, all Lowell textile mills lock out workers. United action by mill management prevents improvements in wages and working conditions.

1912

Textile workers in Lawrence respond to a wage cut with a general strike. Led by the Industrial Workers of the World, the "Bread and Roses" strike soon spreads to Lowell. Workers win major wage gains, but do not form a lasting union.

1914-18

World War I temporarily revives the depressed New England textile industry.

1918-32

Eight of Lowell's original eleven textile companies move or go out of business.

1921-24

Congress passes laws restricting immigration to about 15% of pre-1914 levels.

1929

Stock market crash is followed by prolonged nationwide Depression.

1935

Wagner Act legalizes labor unions in US.

1938

First successful union representation election in Lowell occurs at Merrimack Manufacturing Company.

1939-45

World War II temporarily revives depressed New England textile industry.

1950s

Last three of Lowell's original eleven textile companies move or go out of business.

1960s

People from Latin America begin immigrating to Lowell.

Destruction of historic boardinghouses fuels historic preservation movement.

1970s

Lowell begins a period of economic revival as many high-tech companies open plants.

Southeast Asians, including Cambodians, Laotians, and Vietnamese begin to settle in Lowell.

1978

Congress creates Lowell National Historical Park to interpret the industrial revolution.

1987

Tsongas Industrial History Center created by cooperative agreement between University of Massachusetts Lowell and Lowell National Historical Park.

Photo Information

Your curriculum packet contains three of the following nine prints:

1. Boott Mills Courtyard (circa 1880) Workers crowd the Boott Courtyard during a break from work. The original design of the complex (1839) featured four smaller mill buildings in a row, surrounded by trees and grass. Over time, more and larger buildings were constructed. By 1900, the once open millyard was fully enclosed. The transition from farm to factory was complete.

2. Merrimack Manufacturing Company Boardinghouses The first mill workers in Lowell were young women from farms across New England. To persuade parents to allow their daughters to move to the city, owners built numerous clean, safe boardinghouses for their workers. The houses were cramped, but the women were well fed and closely supervised.

3. Workers on the Moody Street Feeder (Lowell Canal System) Not all workers coming to Lowell worked in the mills. This photo shows the human power necessary to build and maintain canals. The Moody Street Feeder was built to bring additional water from the Western Canal to the Merrimack Canal through brick-vaulted tunnels.

4. Transverse View of Manville Company's No. 3 Mill, Manville, RI (circa 1874) This cutaway view of a working mill illustrates the transmission of power. Each of the four turbines has its own flume, tailrace, and flywheel to power machines on different floors. Machines performing different functions were located on different floors.

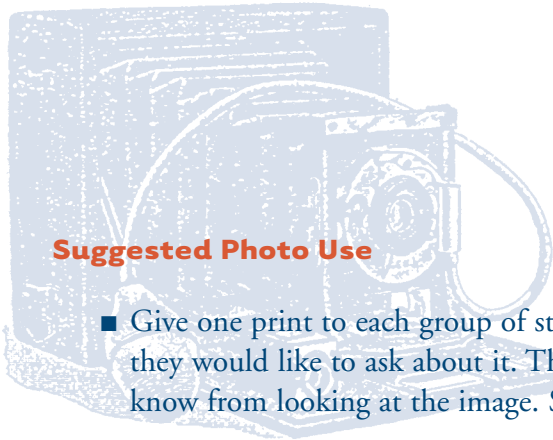
5. Weave Room at Harding, Whitman & Co. (circa 1900) Harding, Whitman & Co. owned both the Arlington Mills in Lawrence and the Whitman Mills in New Bedford. This photo shows the crowded conditions of a large weave room with more than 1000 looms. Note the closeness of the machines.

6. Fifteen Flats on Sullivan Court and Fenwick Street in Lowell, 1939 Immigrants coming to Lowell often had no choice but to live in dirty, overcrowded tenements. Fifteen families lived in this building. Rent for one of these units was about \$3.00 per week in 1939, while weekly salaries ranged from about \$8.00–14.00. There were no bathrooms in the living space; residents shared toilets in the basement.

7. The Lowell Canal System, 1823–1848 These four maps illustrate the changes that took place in the Lowell Canal System over 25 years. By 1848, this was the largest system of power canals in the world. Over 50,000 miles of cloth was produced each year, enough to circle the earth twice.

8. Time Table of the Lowell Mills, 1864 First Bell was to wake up, Second Bell was breakfast, and Third Bell was the beginning of work. Docked pay and lost jobs were the punishments for tardiness. Efforts to reduce the work day to ten hours were unsuccessful in the 1840s.

9. The Mom Family from Cambodia Arrives at Logan Airport for Resettlement in Lowell, 1986 Immigration to Lowell continues today. The two women on the left came to Lowell first and saved money to bring the rest of their family here. This “chain migration” has been a common practice among all immigrant groups.



Suggested Photo Use

- Give one print to each group of students. Have students make a list of questions they would like to ask about it. Then have students make a list of things they know from looking at the image. Share the results with the entire class.
- The first photographic images were produced in 1839 in France. They were called daguerreotypes, after the name of the painter and inventor, Louis Daguerre. It is not surprising that most early photographs record prominent people, since the process was complicated and expensive.
 - Ask students to pretend that they are the photographer or artist who created this image. Why did they choose this one instead of another?
 - What did the photographer want the world to remember about this print?
- Ask the students to view the print from the point of view of the person in the scene. What is the person thinking or feeling?
- Ask the students to examine the prints and find details which show that the scene took place in the past.
- Have students write a title or news headline for each print.
- Ask each student or group of students to select a print and create a story or newspaper article using the print as an illustration.

Further Reading

General

- Cronon, William. *Changes in the Land: Indians, Colonists and the Ecology of New England*. New York: Hill and Wang, 1984. Excellent ecological history depicting the effects of changing land-use patterns on the New England landscape.
- Dalzell, Robert. *Enterprising Elite: The Boston Associates and the World They Made*. Cambridge, MA: Harvard University Press, 1987. Excellent introduction to the origins and early years of Lowell. It gives a good perspective on how Lowell fit into the larger picture of American history.
- Dublin, Thomas. *Farm to Factory: Women's Letters 1830-1860*. New York: Columbia University Press, 1981. A series of letters written by and to several Lowell mill girls. Great primary source for life in early Lowell.
- Dublin, Thomas. *The Story of an Industrial City*. Washington, D.C.: National Park Service, 1993. Lowell National Historical Park handbook. This is the best single source on Lowell history. Excellent color illustrations.
- Larkin, Jack. *The Reshaping of Everyday Life 1790-1840*. New York: Harper & Row, 1989. Highly readable portrayal of the daily lives of Americans in the first fifty years of the new republic.
- Macauley, David. *Mill*. Boston: Houghton Mifflin, 1983. Excellent discussion of how water power works; extensively illustrated.
- Macauley, David. *The Way Things Work*. Boston: Houghton Mifflin, 1988. Excellent pictures and discussion of technology. Also available in cd-rom version.
- Steinberg, Theodore. *Nature Incorporated: Industrialization and the Waters of New England*. New York: Cambridge University Press, 1994. A "must-read" work on environmental history and political ecology.
- Weible, Robert, ed. *The Continuing Revolution*. Lowell, MA: Lowell Historical Society, 1991. A volume of essays on Lowell including engineering and industry, immigration, labor and management issues and more.

Historical Fiction

- Avi. *The Escape From Home and Beyond the Western Sea*. 2 volumes. New York: Orchard Books, 1996. Fictional account of trials and hardships first in Ireland during the famine, then during voyage to America and last in the mills of Lowell. Grades 5-9 and up.
- Cherry, Lynne. *A River Ran Wild*. New York: Harcourt Brace Jovanovich, 1992. A picture book, great for Grades 1-4, describing the land and the river before industrialization.
- Denenberg, Barry. *So Far From Home: The Diary of Mary Driscoll, an Irish Mill Girl*. New York: Scholastic, Inc., 1997. Fictional diary account of a fourteen-year-old girl's journey from Ireland in 1847 and of her work in a mill in Lowell, Massachusetts. Grades 5-8.
- Mayerson, Evelyn Wilder. *The Cat Who Escaped From Steerage*. New York: Charles Scribner's Sons, 1990. Fictional account of hardships encountered crossing the Atlantic in steerage. Grades 3-6.
- McCully, Emily. *The Bobbin Girl*. New York: Dial Books for Young Readers, 1996. Picture book story of a young mill girl in Lowell. Grades 2-5.
- Paterson, Katherine. *Lyddie*. New York: Lodestar, 1990. Entertaining and accurate historical novel for Grades 6-8. In our experience, the most widely read novel about Lowell's mills.
- Ross, Pat. *Hannah's Fancy Notions*. New York: Puffin Books, 1992. Introduces young readers to the concept that history is made up of the lives of real people like themselves. Grades 2-6.



Regulations

TO BE OBSERVED BY ALL PERSONS EMPLOYED IN THE FACTORIES OF THE

HAMILTON MANUFACTURING COMPANY.

The Overseers are to be punctual in their rooms at the starting of the mill, and not be absent unnecessarily during working hours. They are to see that all those employed in their rooms, are in their places in due season, and keep a correct account of their time and work. They may grant leave of absence to those employed under them, when they have spare hands to supply their places, and not otherwise, except in cases of absolute necessity.

All persons in the employ of the Hamilton Manufacturing Company are to observe the regulations of the Overseer of the room where they are employed. They are not to be absent from their work without his consent, except in cases of sickness, and then they are to send him word of the cause of their absence. They are to board in one of the houses of the Company, and give information to the Counting Room, where they board, when they begin, or whenever they may change their boarding-place, and are to observe the regulations of their boarding-house.

Those intending to leave the employment of the Company are to give at least two weeks' notice to

their Overseer, and their engagement with the Company is not considered as fulfilled, unless they continue faithfully in their employment during this time.

The Company will not employ any one who is habitually absent from public worship on the Sabbath.

A Physician will attend once in every month at the Counting Room, to vaccinate all who may need it, free from expense.

All persons entering into the employment of the Company are considered as engaged for twelve months, and those who leave sooner will not receive a regular discharge.

Payments will be made monthly, including board and wages, which will be made up the last Saturday but one in every month, and paid in the course of the following week.

These regulations are considered part of the contract with all persons entering into the employment of the Hamilton Manufacturing Company.

JOHN AVERY, *Agent.*