

Factories, such as the one shown above, produced more goods and made them more affordable. However, they also put many skilled craftspeople out of work.

*Pull Factor  
Irish immigration*

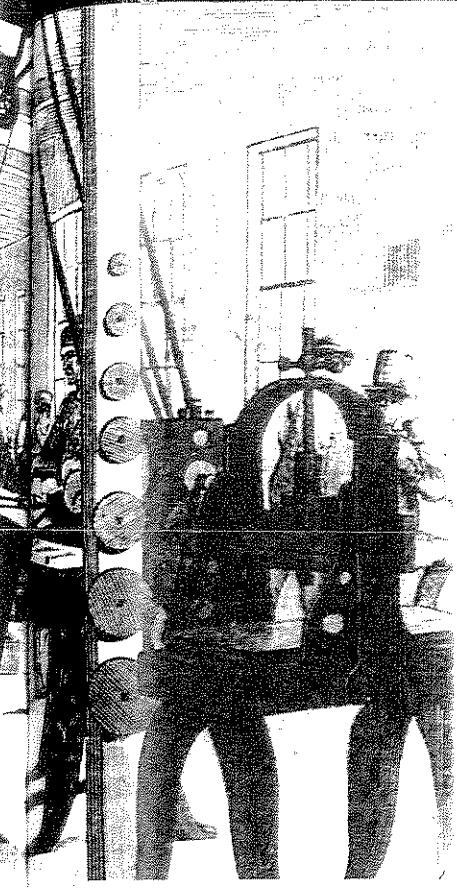
**The Growth of Industry** In 1810, Francis Cabot Lowell, a failing businessman from Boston, visited England. There he saw how mill owners were using machines to spin cotton into thread and weave the threads into cloth. To power these devices, they used fast-moving streams to turn a wheel, which in turn supplied energy to the machinery.

Lowell memorized the design of the British machines. When he returned to Massachusetts, he built even better ones. By 1815, he and his partners had built the first American textile factory, along the Merrimack River. This factory combined spinning and weaving machinery in the same building. One observer marveled that Lowell's mill "took your bale of cotton in at one end and gave out yards of cloth at the other, after goodness knows what digestive process."

To run his machinery, Lowell hired young farmwomen, who jumped at the chance to earn cash wages. The "Lowell girls" toiled 12 to 15 hours each day, with only Sundays off. Soon textile mills were springing up all along other northern rivers.

By the 1830s, inventors had learned to use steam engines to power machinery. With steam engines, businesspeople could build factories anywhere, not just along rivers. Meanwhile, the inventive Eli Whitney showed manufacturers how they could assemble products even more cheaply by making them from identical, interchangeable parts.

New inventions and manufacturing methods made goods cheaper and more plentiful. But they also shifted work from skilled craftspeople to less skilled laborers. When Elias Howe developed the sewing machine, for example, skilled seamstresses could not compete. Some took jobs in garment factories, but they earned much less money working the sewing machines than they had sewing by hand.



For northern industrialists, the new machines and production methods were a source of great wealth. Factory owners tended to favor a strong national government that could promote improvements in manufacturing, trade, and transportation. Southern agrarians, however, looked down on the newly rich industrialists and the laborers who worked for them. Proud southerners called factory workers “wage slaves.” But they also worried that northern interests might grow too powerful and threaten the South’s way of life.

**Machines Make Agriculture More Efficient** The Industrial Revolution changed northern agriculture as well. In 1831, Virginia

farmer Cyrus McCormick built a working model of “a right smart” machine called a *reaper*. A reaper could cut 28 times more grain than a single man using a scythe (a hand tool with a long, curved blade).

In 1847, McCormick built a reaper factory in Chicago. Using interchangeable parts, he was soon producing several thousand reapers a year. By making it easier to harvest large quantities of wheat, inventions like the reaper helped transform the Central Plains into America’s “bread basket.”

Thanks to the Industrial Revolution, the northern economy grew rapidly after 1800. By 1860, the value of manufacturing in the North was ten times greater than in the South.

## 19.6 Transportation in the North

Factory owners needed fast, inexpensive ways to deliver their goods to distant customers. South Carolina congressman John C. Calhoun had a solution. “Let us bind the republic together,” he said, “with a perfect system of roads and canals.” Calhoun called such projects “internal improvements.”

**Building Better Roads** In the early 1800s, most American roads were rutted boneshakers. In 1806, Congress funded the construction of a National Road across the Appalachian Mountains. The purpose of this highway was to tie the new western states with the East. With its smooth gravel surface, the National Road was a joy to travel.

As popular as the National Road was, in 1816 President James Monroe vetoed a bill that would have given states money to build more roads. Monroe argued that spending federal money for internal improvements within a state was unconstitutional.

**Fast Ships and Canals** Even with better roads, river travel was still faster and cheaper than travel by land. But moving upstream, against a river's current, was hard work. To solve this problem, inventors experimented with boats powered by steam engines.

In 1807, Robert Fulton showed that steamboats were practical by racing the steamboat *Clermont* upstream on New York's Hudson River. Said Fulton, "I overtook many boats and passed them as if they had been at anchor." A Dutchman watching the strange craft from the shore shouted, "The devil is on his way up-river with a sawmill on a boat!" By the 1820s, smoke-belching steamboats were chugging up and down major rivers and across the Great Lakes.

Of course, rivers weren't always located where people needed them. In 1817, the state of New York hired engineers and workers to build a 363-mile canal from the Hudson River to Lake Erie. The Erie Canal provided the first all-water link between farms on the Central Plains and East Coast cities. It was so successful that other states built canals as well.

Overseas traders also needed faster ways to travel. Sailing ships sometimes took so long to cross the Pacific Ocean that the goods they carried spoiled. In the 1840s, sleek clipper ships were introduced that cut ocean travel time in half. The clipper ships spurred northern trade with foreign ports around the world.

**Traveling by Rail** The future of transportation, however, lay not on water, but on rails. Inspired by the success of steamboats, inventors developed steam-powered locomotives. Steam-powered trains traveled faster than steamboats, and they could go wherever tracks could be laid—even across mountains.

So many railroad companies were laying tracks by the 1840s that railroads had become the North's biggest business. By 1860, more than 20,000 miles of rail linked northern factories to cities hundreds of miles away.

Many new and faster forms of transportation were put to use in the North. How many of them can you identify in the image below?

Museum of Art, Rhode Island School of Design; Mary B. Jackson Fund

