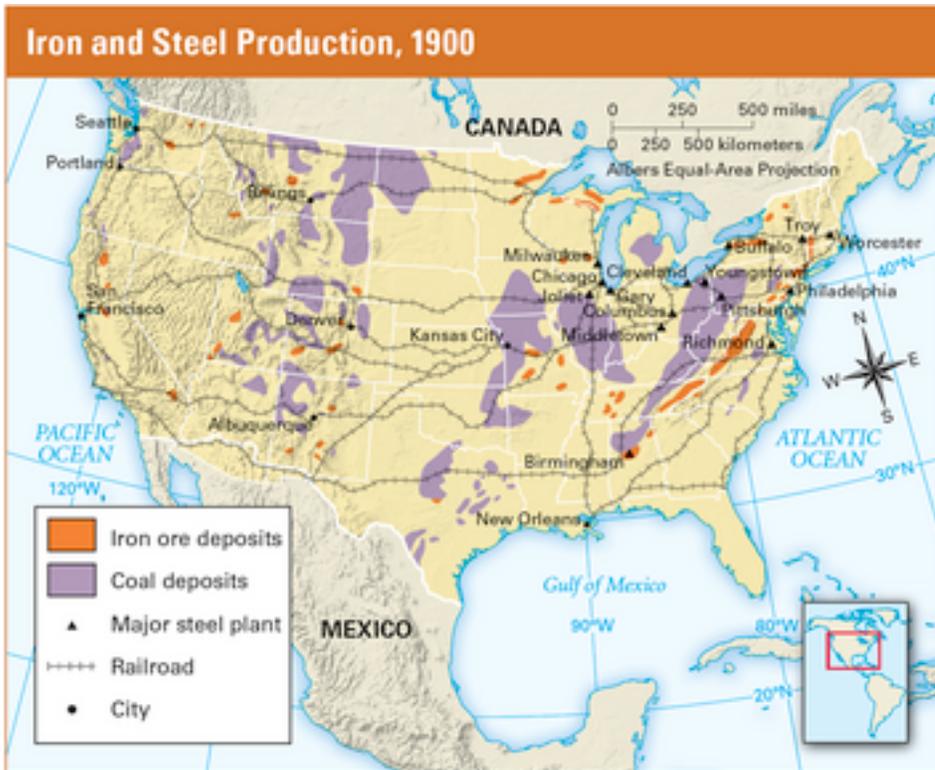


Improved Technology (HA)



The nation's major steel plants in 1900 were located near or in regions with rich deposits of iron and coal. Railroads shipped ore to mills and finished steel to customers.

By the 1860s, many of the factors necessary for the rapid industrialization of the United States were already in place. Machines had taken over much of the work once done by hand. Work had moved from homes to factories. Railroads had begun to connect customers and manufacturers with an efficient transportation system.

After the Civil War, new inventions and improved technology prompted the growth of new industries. Some of these innovations, or new ideas, helped businesses to grow and become more efficient. Others made daily life easier for many Americans.

The Age of Steel Before the Civil War, the nation's railroads ran on iron rails that wore out quickly. Railroad owners knew that rails made of steel—a mixture of iron, carbon, and sometimes other metals—were stronger and would last longer. Steel, however, was difficult and costly to make.

In 1872, a Scottish immigrant named Andrew Carnegie went to England to study a less expensive method of making steel, a method invented by Henry Bessemer. Carnegie owned a company that made iron bridges for railroads. He knew that his bridges would be better if they were made of steel. Carnegie was so impressed by the Bessemer process that he brought it back to the United States. "The day of iron has passed," he announced. "Steel is king!"

Carnegie was right. **Within a decade, steel was replacing iron in rails, locomotives, and bridges.** Other industries took advantage of steel, which was less expensive than iron. Steel nails, needles, and knives became common household items.

Many steel companies competed fiercely to supply steel for such products. To remain the leader, Carnegie hired scientists to improve the quality of his company's steel. He employed good managers to make his steel mill run efficiently. His recipe for success was "adopt every improvement, have the best machinery, and know the most."

To keep costs low, Carnegie set out to control every step in the steelmaking process. He purchased iron mines to supply his ore, coalfields to fire his furnaces, and railroads to ship his finished steel to customers.

To reduce his competition, Carnegie also bought up several rival steel companies. He then combined them all to form the giant Carnegie Steel Company. By 1900, Carnegie Steel produced a quarter of the nation's steel.

Electric Power In 1876, Thomas Edison opened an “invention factory” in New Jersey. With a team of workers, he set out to create a “minor” invention every ten days and a major one “every six months or so.”

Edison succeeded brilliantly. More than any other inventor, he helped turn electricity into an everyday source of light and power. His workshop turned out the first practical electric lightbulb, the phonograph (record player), the motion picture projector, and many other inventions.

In 1882, Edison built the first electrical power station and distribution system in New York City. His team invented everything the system required, including generators, regulators, meters, switches, light sockets, fuse boxes, and underground electric cables. When he finally turned the generator on, electricity began to flow to homes, stores, and factories. The age of electricity had begun.

By 1900, some 25 million lightbulbs were glowing across the country. Many factories were replacing waterwheels and steam engines with electric motors. Streetcars powered by electricity carried workers and shoppers along city streets. New electric-powered devices, such as washing machines and vacuum cleaners, were making housework easier.

The Telephone **The telephone was invented by a Scottish immigrant, Alexander Graham Bell.** In 1876, as he was getting ready to test his “talking machine,” Bell spilled acid on himself. “Watson—come here—I want to see you,” he commanded his assistant. Thomas Watson, who was in another room, heard every word over Bell’s telephone.

Bell’s invention worked so well that, by 1915, Americans were communicating with one another over 9 million telephones. All these telephones made American industry more efficient and competitive by allowing producers, sellers, and customers to communicate quickly and easily.

**The Triangle Factory
Fire Ends in Tragedy**

About 1400 workers from the Triangle Shirtwaist Factory were part of the strike of 1909. Their demands included air-lacked doors during working hours and safer fire escapes in the Asch Building.

Rather than meet these demands, Block and Harris responded by locking the workers out of the factory and advertising for replacements. "If the union had won, we would have been safe," said another Rose Sullivan. "But the bosses deflated us and we didn't get the open doors or the better fire escapes." Because of that defeat, 100 workers would die tragically.

The cause of the fire that swept through the Triangle Shirtwaist Factory in 1911 was never known. But one Saturday afternoon, people on the eighth floor began to cry. "Fire!" Within minutes, the entire floor was a "mass of flames." Escaping workers rushed to the stairs or pushed their way into the two small elevators. The stairs, however, were soon blocked, and the elevators stopped running.

On the tenth floor, Mary Aher was warned of the fire by telephone. Owner Isaac Harris and production manager Sam Bernstein led some people out onto the roof. People from nearby buildings assisted

ladders between the rooftops to help those on the roof-escape.

Workers on the sixth floor had no warning. The fire just appeared. Some women died immediately. Strikers later found them as "shadows behind one sewing machine."

Those who had time to escape found themselves trapped by the locked factory doors. In desperation, they rushed to the windows and began to jump.

The crowd that gathered outside the Asch Building watched in horror as girls began to fall out of the sky—"for streaming back from their hair and dresses"—and drop to their deaths on the pavement below.

Firefighters arrived quickly but had trouble bringing their equipment close to the building because of the ladders on the pavement. There was little the firemen could do, however. Their ladders were not tall enough to reach beyond the sixth floor.

Their safety nets were just as useless. The workers hit with such force, said one fireman, that they "went right through the life nets."

It was all over in half an hour.

At the funeral for the victims, garment workers marched under a banner proclaiming, "We demand fire protection." As she marched, Rose Schindlerman glanced up at the buildings lining the funeral procession. "There they were. Girls right at the top of hundreds of buildings, looking down on us," she recalled. "The structures were no different from the Asch Building... many were in a far worse condition."

FIRE TRAP VICTIMS BURIED
LEGISLATE NEW LAW TO SAVE S...
NEW YORK EVENING JOURNAL
WOMAN TELLS OF FIGHT FOR LIFE AT BARRED DOORS!

This New York paper ran an eye-opening account of barred doors at the Triangle fire in a cartoon that demanded "Who Is Responsible?"

New Production Methods New methods of organizing work were also making businesses more efficient. **Factory owners adopted Eli Whitney’s idea of assembling a wide variety of products from interchangeable parts.** They also used the assembly line. In a shoe factory, for example, one worker operated a heel-cutting machine. Another operated a sole-cutting machine. Another made shoelaces. Still other workers assembled, labeled, and packaged the shoes.

Henry Ford was one person who foresaw the great potential in the assembly line. Ford created a moving assembly line to mass-produce automobiles. In Ford plants, workers stood in place all day, while a conveyor brought the work to them. After each worker did one or two tasks, the belt moved the product to the next worker’s station.

These techniques of mass production [mass production: the use of interchangeable parts and assembly lines to make large quantities of identical goods] enabled workers to produce more goods per day at a lower cost. As prices dropped, more Americans could afford to buy manufactured products. More customers meant more factories. By 1900, almost four times as many Americans worked in factories as had a generation earlier.



Lying flat on the lower wing of the 1903 Wright flyer, Orville Wright begins the first successful airplane flight in history as his brother Wilbur runs alongside during takeoff. The Wright brothers designed and built the flyer out of wood and cloth. It was powered by a gasoline engine of the Wrights' own design.

Air Transport While Henry Ford was turning out cars on the assembly line, brothers Orville and Wilbur Wright were experimenting with flying. In 1903, with his brother Wilbur running alongside, Orville successfully piloted the first “flying machine” in Kitty Hawk, North Carolina. Although the flight was only 12 seconds in duration, it sparked worldwide interest in flying.

By the late 1920s, an industry based on air travel had emerged. The U.S. postal service used planes to transport mail across the country while the military used planes for exploration and scouting. At the same time, wealthy Americans took their first commercial flights across the country.