FIRST INDUSTRIAL REVOLUTION IN AMERICA: 1790-1860
Major effects of the Industrial Revolution

- Market revolution
- Urbanization
- Westward movement
- Population growth
- New manufacturing technology
- Improvements in transportation
- New types of business organizations
Beginning in the late 18th and early 19th centuries, power-driven machinery was invented to manufacture goods.

This fundamentally changed the ways agriculture, manufacturing, and transportation were done.

The Industrial Revolution had a profound effect on socioeconomic and cultural conditions in Britain and later spread throughout Europe, North America and eventually the world.

The Industrial Revolution is a major turning point in human history, comparable to the invention of farming or the rise of the first city-states. Almost every aspect of daily life and human society was transformed.
Born in England in 1768. He was apprenticed to a partner of Arkwright’s for eight years, during which time he became superintendent of the cotton mill and learned how the Arkwright machines and mill operated.

In 1789, Slater decided to emigrate secretly to America. The British government had laws forbidding skilled mechanics from leaving.

While the textile industry was long established in Great Britain, it was just starting in America. Slater believed he could become wealthy in America's infant textile industry.

Slater was not the first immigrant with textile experience, but he was the first who knew how to build and operate textile machinery.
By 1790, Slater and his partners built one of the first factories in America on the Blackstone River in Rhode Island.

In 1793, they built Slater Mill, the first American factory to successfully produce cotton yarn with water-powered machines.

Within a few years there were hundreds of mills/factories turning out cotton yarn.

Water power demonstration website: you must be on the internet.

http://www.nps.gov/lowe/photosmultimedia/waterpower.htm
The Old Slater Mill, Pawtucket Rhode Island.

Built by Samuel Slater in 1793, and in which was first introduced in America the spinning of Cotton by machinery.
Slater's mill replaced this with this
Eli Whitney (1765-1825)

- American inventor and entrepreneur
- Invented the cotton gin
- Popularized the system of interchangeable parts
- His innovations greatly impacted American history
Cotton is an ancient crop first grown in both South America and India over 6,000 years ago.

Only rare sea island or long-staple cotton could be grown profitably before Eli Whitney’s invention.

Short-staple cotton, a species that could be grown in wider areas, was unsuitable because it contained hundreds of seeds that had to be removed by hand.

Eli Whitney invented a machine that mechanically removed seeds and made short-staple cotton a viable crop.
Jefferson's letter of November 16, 1793, is a reply to Whitney's application to the federal government for a patent for his invention.

Jefferson gives Whitney the requirements to obtain a patent, and asks for more information because he is interested in purchasing a gin for his plantation in Virginia.

Yale University Library
Whitney’s patented cotton gin was soon copied by many others. He spent years and thousands of dollars trying to uphold his patent.

An original model of an Eli Whitney cotton gin on display in the National Museum of American History.

Whitney’s original patent application drawing
When Whitney invented his machine, the South was at a turning point regarding slavery.

The high cost of maintaining slaves made the crops produced by slave labor, such as tobacco, indigo, and rice, less profitable.

The cotton gin changed this by making short-staple cotton the most profitable cash crop. Cotton production required cheap labor, and the demand for slaves exploded.

Slavery became a permanent fixture; few, if any, southerners spoke out against it.

Slavery was the backbone of the prosperous economic system in the South.

It is estimated that in the 11 southern slave states income derived from slave labor ranged from 17% to over 30%.
Whitney and his partner set up cotton gins throughout the South.

Instead of charging money, Whitney took two-fifths of the crop farmers brought in to be ginned. Farmers, angry at the high price, began making their own versions of the cotton gin.

After a long and largely unsuccessful struggle, Whitney gave up defending his patent and returned to New Haven, Connecticut, in 1798.
Cotton exports, in pounds, before and after invention of the cotton gin
Growth in number of slaves after invention of the cotton gin
Cotton as % of U.S. exports, 1800-1860

By 1850, America was growing three-quarters of the world's supply of cotton. The majority of southern cotton was shipped to New England or exported to Great Britain where it was turned into cloth.

Note: In 2005, the U.S. was still the world leader in cotton production.
Growth of cotton production (bales) and slave population
ELI WHITNEY
and
The American System of Manufacturing
As the Napoleonic wars broke out in Europe, Whitney knew that the U.S. army would need a new source for muskets to arm its soldiers.

Traditionally, muskets had been made one at a time by skilled craftsmen. No two muskets were alike, and parts from one would not fit another.

Whitney proposed to produce muskets with interchangeable parts. He demonstrated his procedure to government officials, who gave him a contract.

The contract called for Whitney to produce 10,000 muskets in two years.

It took Whitney eight years to fulfill the contract. A second contract called for him to produce 15,000 muskets, which he accomplished in two years.

He invented a new system using high-precision tools to manufacture parts. The parts could be assembled by any unskilled worker, and were entirely interchangeable.
Whitney’s arms factory. It was later sold to Winchester Repeating Arms Company, and is today a museum.
The U.S. government complained that Whitney’s muskets were more expensive than those of other manufacturers. Whitney showed them, through an early use of the now-common business practice of cost accounting, that his were not over-priced.
Robert Fulton

Fulton constructed his first steamboat in France in 1803.

In the U.S. in 1807, he built the steamboat Clermont.

The Clermont was the first steamboat used as a regularly scheduled commercial transport ship.

Robert Fulton patented his steamboat design and constructed several more, including the world’s first steam warship in 1814.

The New York state legislature gave Fulton the sole right (monopoly) to run steamboats in New York. This led to the famous 1824 Supreme Court case, Gibbons v. Ogden, which struck down Fulton’s monopoly and made it illegal for state governments to regulate interstate commerce.
Clermont, 1807
Another view of the Clermont’s first voyage
In 1811, Fulton and several partners built the *New Orleans*, the first steamboat to steam on the Mississippi River.

In 1814, Henry Shreve designed a flat-bottom steamboat, the *Enterprise*, for the shallow waters of the western rivers.

The *Enterprise* in 1815

The *Enterprise* was the first steamboat to make a return trip from New Orleans to Louisville, Kentucky.

Within a few years there were hundreds of steamboats carrying cargo and passengers up and down all navigable western rivers.
Early steamboats at river ports
Steamboat horns: click
Steamboat race between the *Memphis* and the *James Howard* in 1877.
“THE GREAT RACE ON THE MISSISSIPPI
The Stevens family were inventors who designed successful steamboats, including the *Phoenix*, the first steamboat to travel on the ocean.
Growth in the number of steamboats on western rivers, 1811 to 1860.
Railroads were the most important factor for economic growth in the second half of the 19th century. The foundation for this was laid in the antebellum period (before the Civil War, 1861-1865) when early railroads tended to duplicate existing steamboat and canal routes.

Railroads had several advantages over steam and canal boats:

First was their speed. Early freight trains could run between 10 and 30 miles per hour, much faster than water transportation in canals or steamboats.

Second, they could travel over manmade (straight) routes rather than having to follow natural waterways. This resulted in shorter travel time. They could be built in rugged terrain and cost only a fraction of the cost of canal construction.

Third, they could travel year round in any climate and were not affected by freezing temperatures.
Railroad construction: 1830-1860
Peter Cooper was an American inventor, politician, industrialist, and philanthropist. He built the first steam-powered railroad locomotive in the U.S. His locomotive was named *Tom Thumb* and was used successfully on the Baltimore and Ohio Railroad starting in 1830.
The first steam engine to operate on a commercial track in the United States, the *Tom Thumb* became famous for its race against a horse-drawn car on August 25, 1830, from Ellicott’s Mill to Baltimore. The horse won the race when the engine broke down.
Peter Cooper's steam engine, *Tom Thumb*
John Stevens became interested in steam locomotion in the 1780s. He established the world's first steam ferry, and later built the first operating steam locomotive in the United States.
Painting of the opening of the Stockton & Darlington Railway, 1825

Replica of Robert Stephenson’s 1829 locomotive the Rocket
Early trains
The first railroad charter in North America was granted to John Stevens in 1815.

The first locomotive, the *Stourbridge Lion*, came from England in 1829. Within a few years most locomotives were made in American factories.

The Baltimore and Ohio Railroad was opened in 1830. It used horsepower until an American-made locomotive came into service in 1831.

Railroads faced competition from existing canals. It wasn’t until the early 1840s that railroads were proven to be a faster and cheaper method of transporting agricultural and other commodities.
Mathias Baldwin (1795-1866) built the “Old Ironsides” engine to carry passengers on the new Philadelphia, Germantown, and Norristown Railroads. His Baldwin Locomotive Works would manufacture more locomotives than any other company in the world.
ARE NOW RUNNING,

DAILY, BETWEEN

Baltimore & Wrightsville,

The termination of the Philadelphia & Columbia Rail-Road; connecting with that Road and with the Pennsylvania State Canals, at Columbia.

The Hours of Departure and Arrival

Of the PASSenger TRAINS, at present, are as follows, viz:—

PASSengers leaving Baltimore at 3 A.M., arrive at York at 4 P.M.; leave York at 6 A.M. and 8 P.M., arrive at Wrightsville at 7 A.M. and 9 P.M.; leave Wrightsville at 8 A.M. and 10 P.M., arrive at York at 11 A.M. and 1 P.M.

In time for the Morning and Afternoon Trains to Philadelphia.

PASSengers going West, by taking the Stage at Harrisburg, for York, in the Morning, arrive in Baltimore to Dinner. Those going West, by leaving Baltimore at 9 o’clock A.M., arrive at Harrisburg the same Evening, and take the Canal Boats the next day.


D. C. H. BORDLEY, Superintendent.

Transportation Office Baltimore and Susquehanna Rail-Road Co.,
Baltimore, June 10, 1840.
Samuel F.B. Morse: Inventor of the telegraph

Morse, an artist, inventor and college professor, demonstrated in 1835 that signals could be transmitted by wire using electricity.

He received $30,000 ($800,000 in 2005 dollars) in 1843 from the government to build an experimental telegraph line between Baltimore and Washington D.C.

In 1844 the first message was sent between the two cities. In the following years, Morse and his partners expanded their lines to several other cities.

Soon several small telegraph companies were operating.

In 1861 the Western Union company built the first transcontinental telegraph system.

Until the invention of the telephone in 1877, the telegraph was the only long-distance method of communication.
Painting by Morse of his daughter Susan in 1837

Samuel F.B. Morse
In 1835, Samuel Morse proved that signals could be transmitted by wire. He invented the Morse Code which used dots and dashes to transmit messages. In 1838 Congress funded construction of an experimental telegraph line from Washington to Baltimore, a distance of 40 miles. The first official message, "What hath God wrought?" opened the completed line on May 24, 1844.
By Morse's Magnetic Telegraph.

WASHINGTON CITY, Tuesday, June 11, 1844.

10 o'clock, A. M.—In the House of Representatives a long message was received from the President in favor of the immediate annexation of Texas, and calling on Congress to pass a law for that purpose. Mr. Kennedy, of Maryland, moved to lay it on the table—rejected, ayes 60, nays 120. It was then referred to the Committee on Foreign Affairs. Mr. Adams offered a resolution, denying the power of the President to place this country in a state of war with any foreign nation without the assent of Congress—Resolution not received.

1 o'clock.—In the House, Mr. Adams asked a suspension of the rules, in order to move the above resolutions—yeas and nays called, and the rules not suspended.

10 minutes past 1.—Mr. Miller is speaking in the Senate on the District of Columbia Bill.

Word was sent up at 20 minutes past one o'clock that the Telegraph would be closed until 3 o'clock P. M., Professor Morse, who works the electric register in Washington, having been called before the committee to whom the subject of his Telegraph has been referred, for the purpose of giving them certain informa-
The original telegraph receiver used in Baltimore to receive the first telegraph message on May 24, 1844.

First telegraphic message: “What hath God wrought?”
In 1831, at the age of 22, McCormick invented the first successful mechanical reaper, which later led to the harvesting machine industry. McCormick ushered in a new era of agricultural mechanization. Now fewer farmers could feed more people. This made it possible for millions of people to leave farms for jobs and careers in the new cities and factories.
Five thousand years of reaping (harvesting): 3000 BCE to 1831 CE
Cyrus McCormick

He is known as the “Father of Modern Agriculture.”

Building on the work of his father, McCormick invented a mechanical horse-drawn reaper in 1831.

Reaping is the process of harvesting a crop. It includes cutting grain or pulses (seeds or legumes) using a scythe, sickle or reaping machine.

The mechanical reaper increased the farmer’s yield by tenfold and allowed farmers to greatly expand land under cultivation.

McCormick, after a slow start, became wealthy producing reapers and other mechanical farm implements in his Chicago factories.

His reaper played an important role in opening up western lands to farming.
John Deere

Deere knew that Jethro Woods’ iron plows were not working well in the tough western prairie soil where farmers were now moving.

In 1837, he invented a steel plow that easily moved through tough western soils.

His plows were a commercial success. The company he founded is still a major player in the agricultural machinery industry.

John Deere plows moved across the continent in wagon trains, helping settle the far west and turn it into a rich agricultural farming country.
John Deere invented a steel plow that could cut through land that in the past could not be cultivated with iron plows. He went on to build a large agricultural implement business.
Samuel Colt constructed the first practicable multi-shot revolving-breech-loading pistol in 1836. With investors he began a company, but they were not successful until the outbreak of the Mexican War in 1846. The war brought orders from the government for thousands of Colt revolvers. The new company, *Colt’s Patent Fire-Arms Manufacturing*, was a success, and in the early 1850s Colt built the world’s largest arms factory. Colt’s pistols, before the 1860s, did not fire bullets; they were cap and ball weapons.
Colt 1847 *Walker* pistol used by Texas Rangers

18-year-old Samuel Colt first experimented with pistol design while on a long sea voyage with missionaries in 1832.
In 1834-35, Thomas Davenport, with the aid of his wife Emily, invented the first electric motor.

In 1837 he received the first patent for a machine run by electricity.

His electric motor was used to run lathes, drills and a printing press.

His invention was ahead of its time; electricity as a power source would not come into play until the later part of the 19th century.