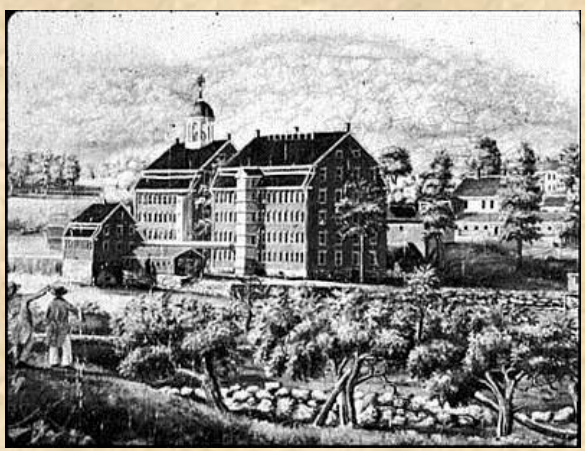
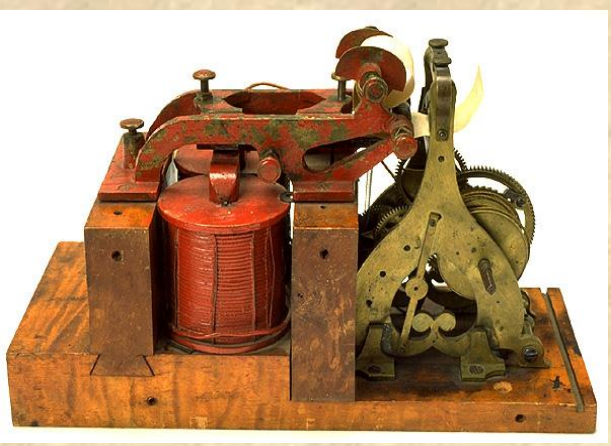
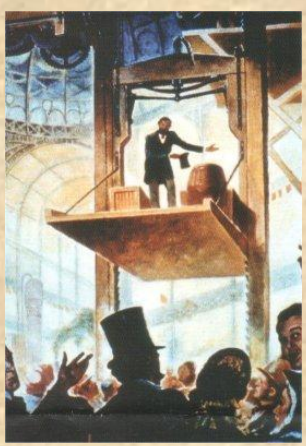
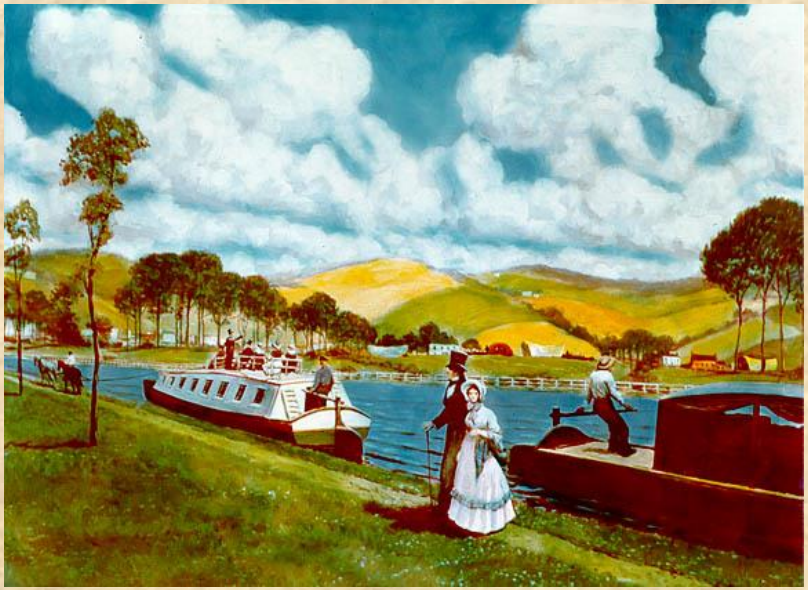
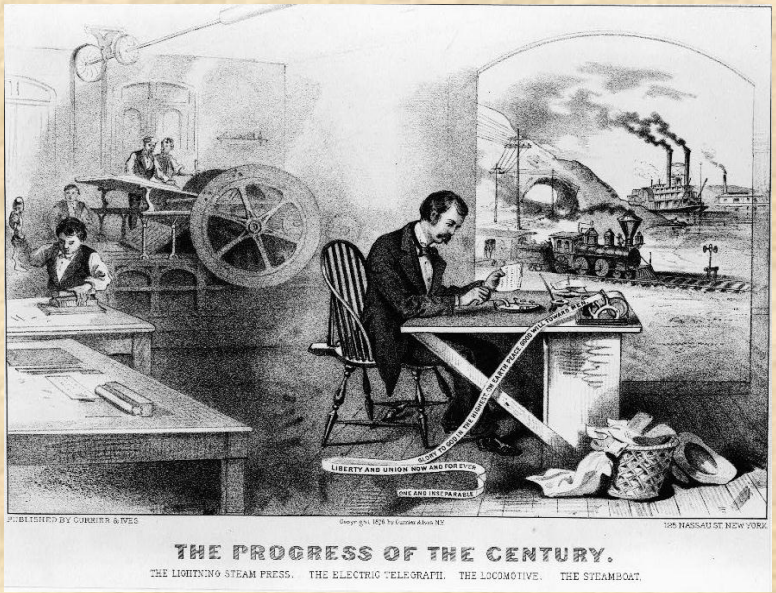




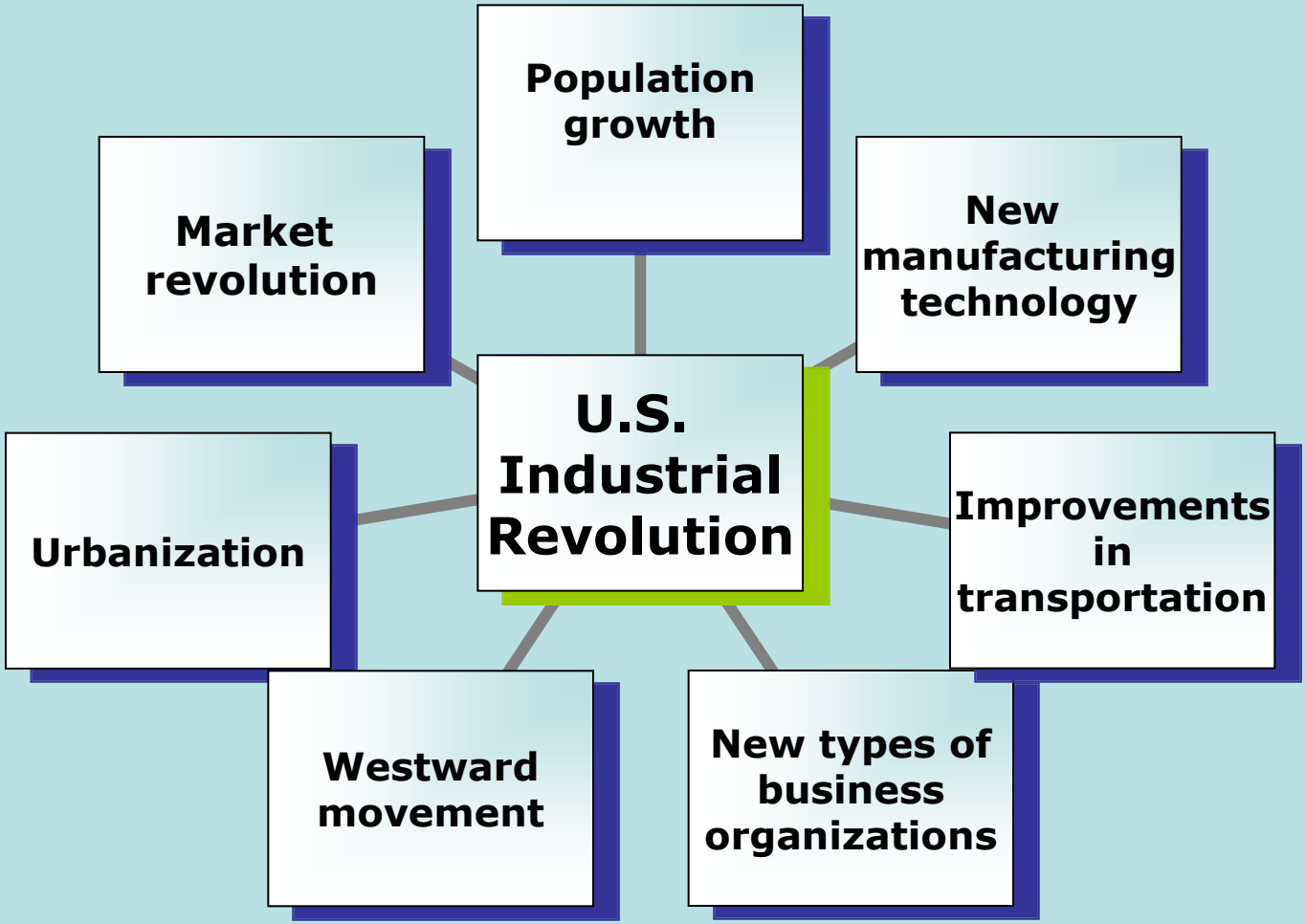


FIRST INDUSTRIAL REVOLUTION IN AMERICA: 1790-1860





Major effects of the Industrial Revolution

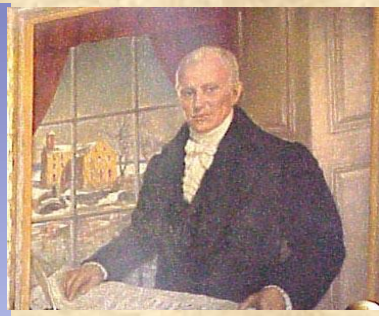


Industrial Revolution defined

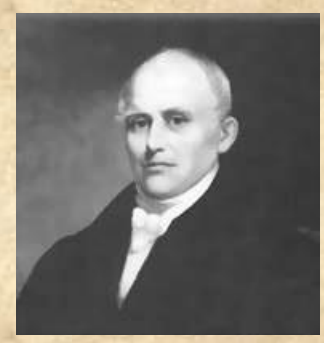
- Beginning in the late 18th and early 19th centuries, power-driven machinery was invented to manufacture goods.
- This fundamentally changed the ways agriculture, manufacturing, and transportation were done.
- The Industrial Revolution had a profound effect on socioeconomic and cultural conditions in 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.

Samuel Slater (1768-1835)
"Father of the Industrial Revolution in the U.S."

- 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.

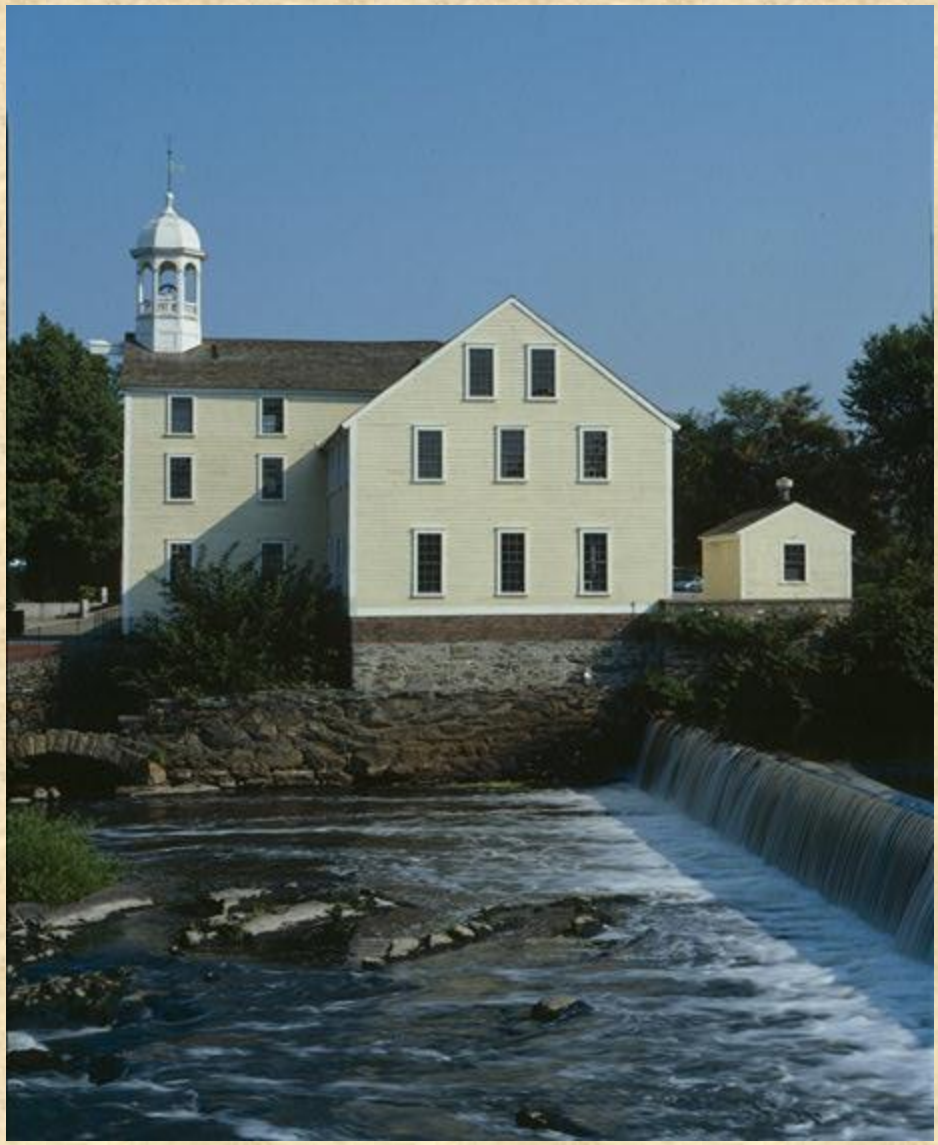


- While the textile industry was long established in Great Britain, it was just starting in America. Slater believed he could become wealthy in America's infant textile industry.
- Slater was not the first immigrant with textile experience, but he was the first who knew how to build and operate textile machinery.

By 1790, Slater and his partners built one of the first factories in America on the Blackstone River in Rhode Island.

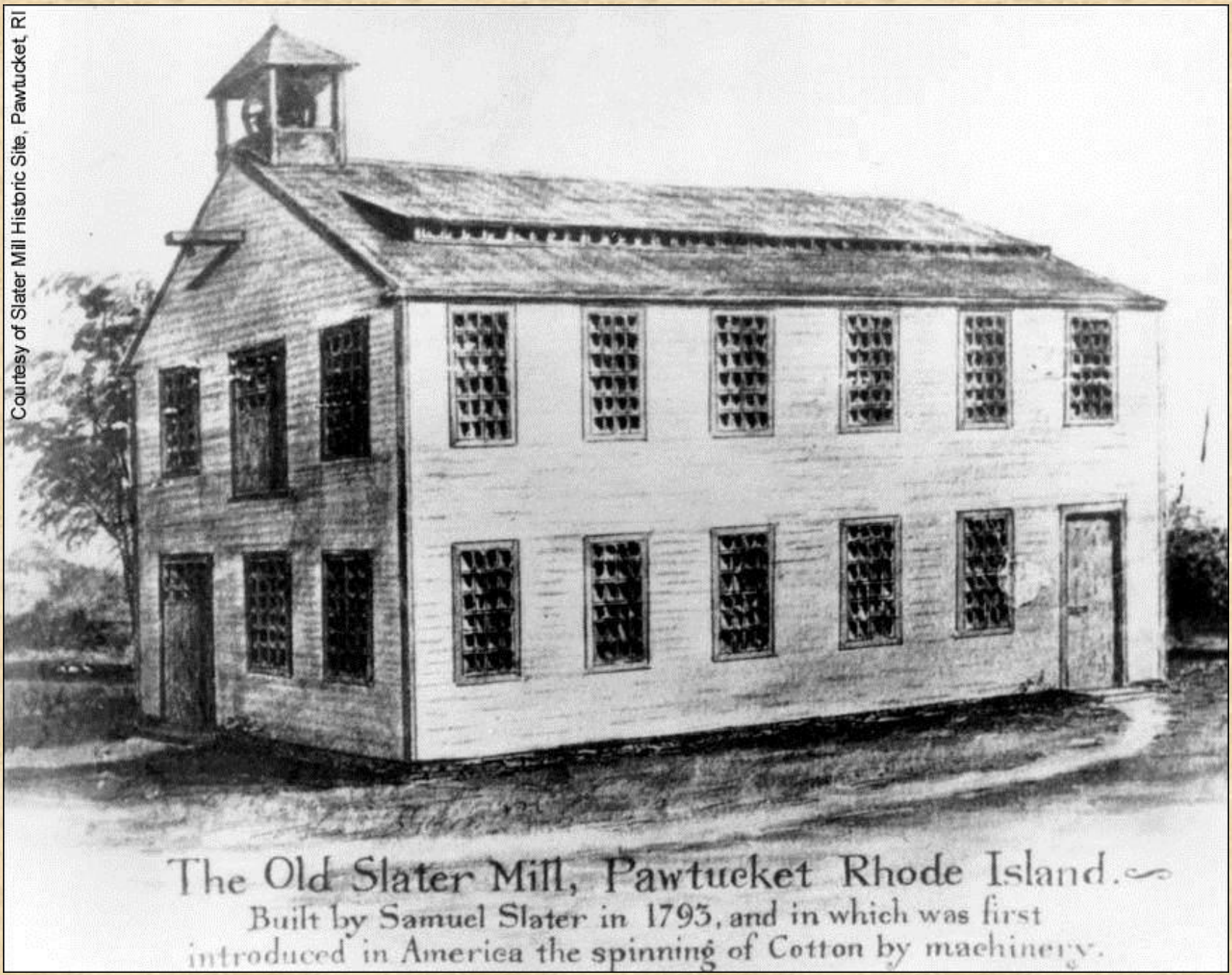
In 1793, they built Slater Mill, the first American factory to successfully produce cotton yarn with water-powered machines.

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


Courtesy of Slater Mill Historic Site, Pawtucket, RI
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

CARDING, DRAWING, AND ROVING AS IT WAS IN SAMUEL SLATER'S EARLY MILLS
(From an old engraving)

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 gin

- 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.

Sir Germantown Nov. 16. 1793.

Your favor of Octob. 18. inclosing a drawing of your cotton gin, was received on the 6th inst. The only requisite of the law not unemployed with is the forwarding a model, which being received your patent may be made out & delivered to your order immediately.

As the state of Virginia, of which I am, carries on household manufactures of cotton to a great extent, as I also do myself, and one of our great embarrassments is the cleaning the cotton of the seed, I feel a considerable interest in the success of your invention for family use. permit me therefore to ask information from you on these points, has the machine been thoroughly tried in the spinning of cotton, or is it as yet but a machine of theory? what quantity of cotton has it cleaned on an average of several days, & worked by hand, & by how many hands? what will be the cost of one of them made to be worked by hand? favorable answers to these questions would induce me to engage one of them to be forwarded to Richmond for me. wishing to hear from you on the subject, I am Sir

Your most obed. servt

P.S. is this the machine advertised the last year by Pearce at the Patterson Manufactory?

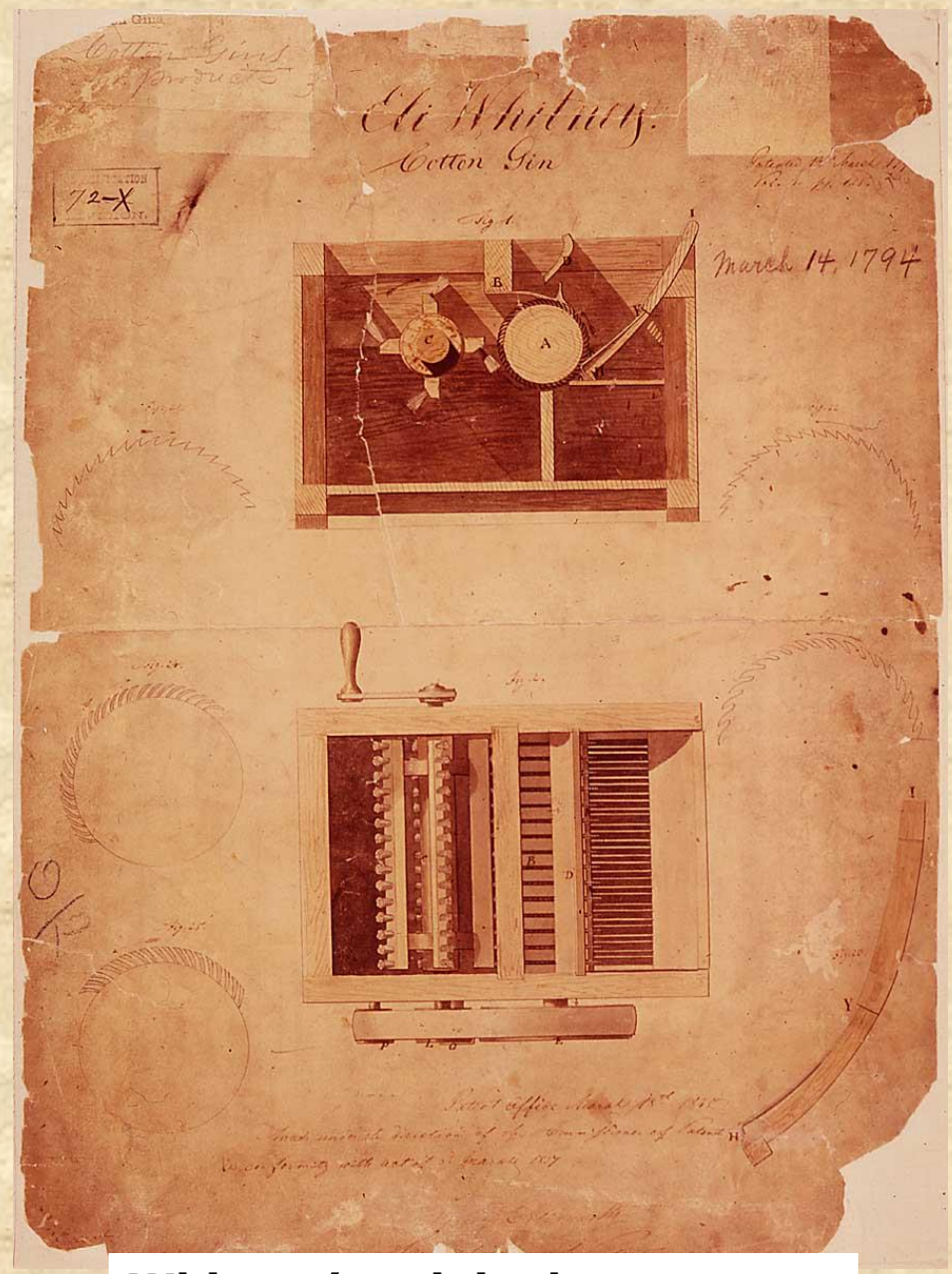
Mr. Eli Whitney. Connecticut. New Haven.

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.

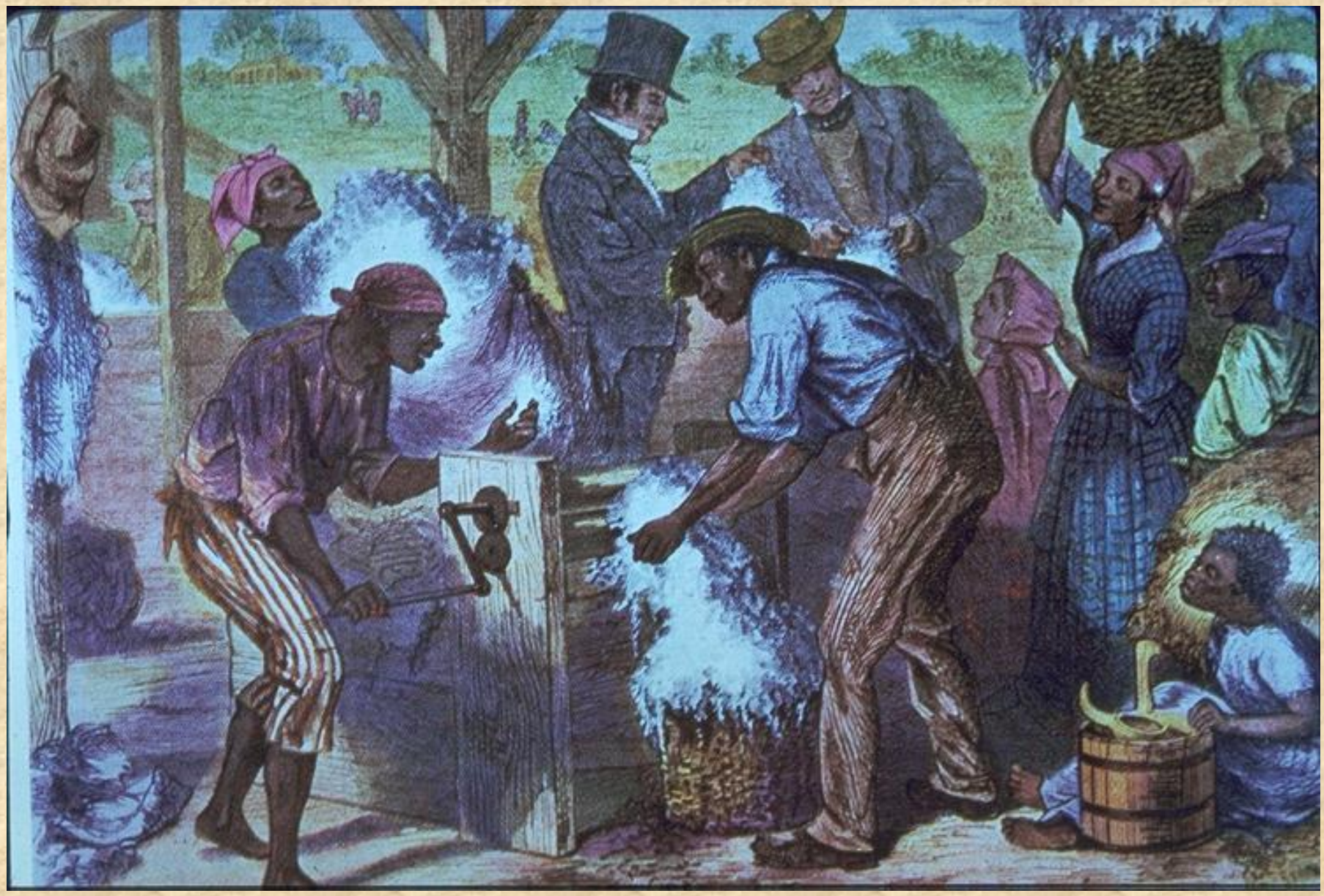


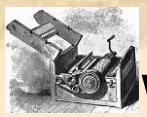
Whitney's original patent application drawing

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

Role of the cotton gin in preserving slavery

- 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%.

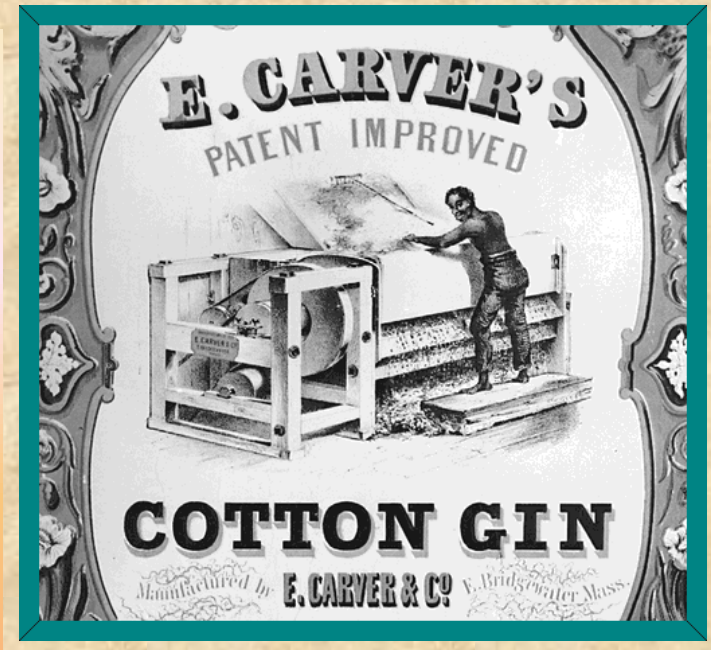


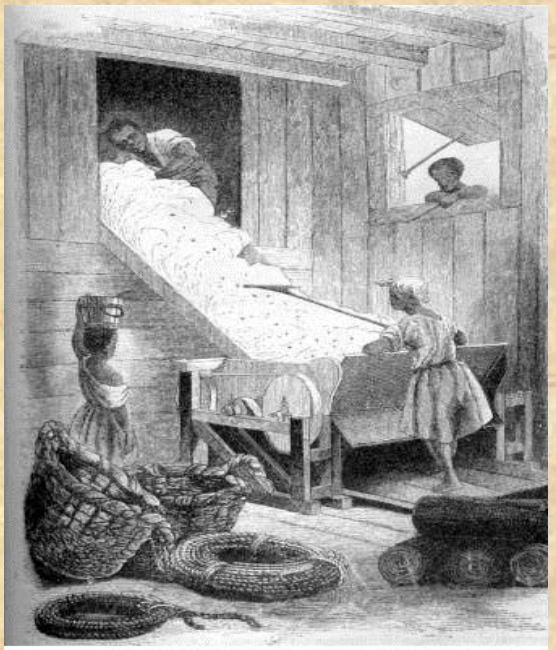


Whitney and his partner set up cotton gins throughout the South.

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.

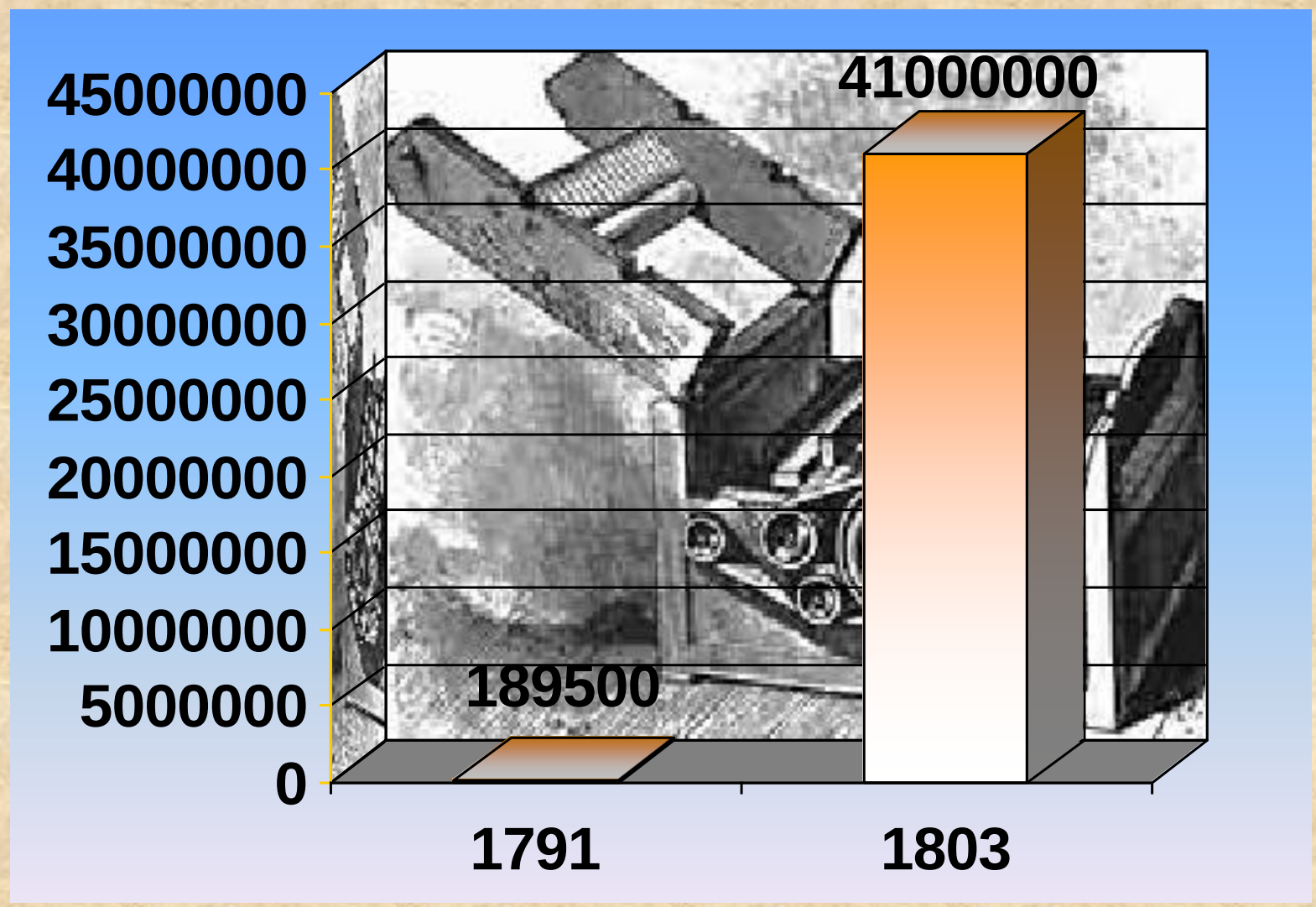
After a long and largely unsuccessful struggle, Whitney gave up defending his patent and returned to New Haven, Connecticut, in 1798.





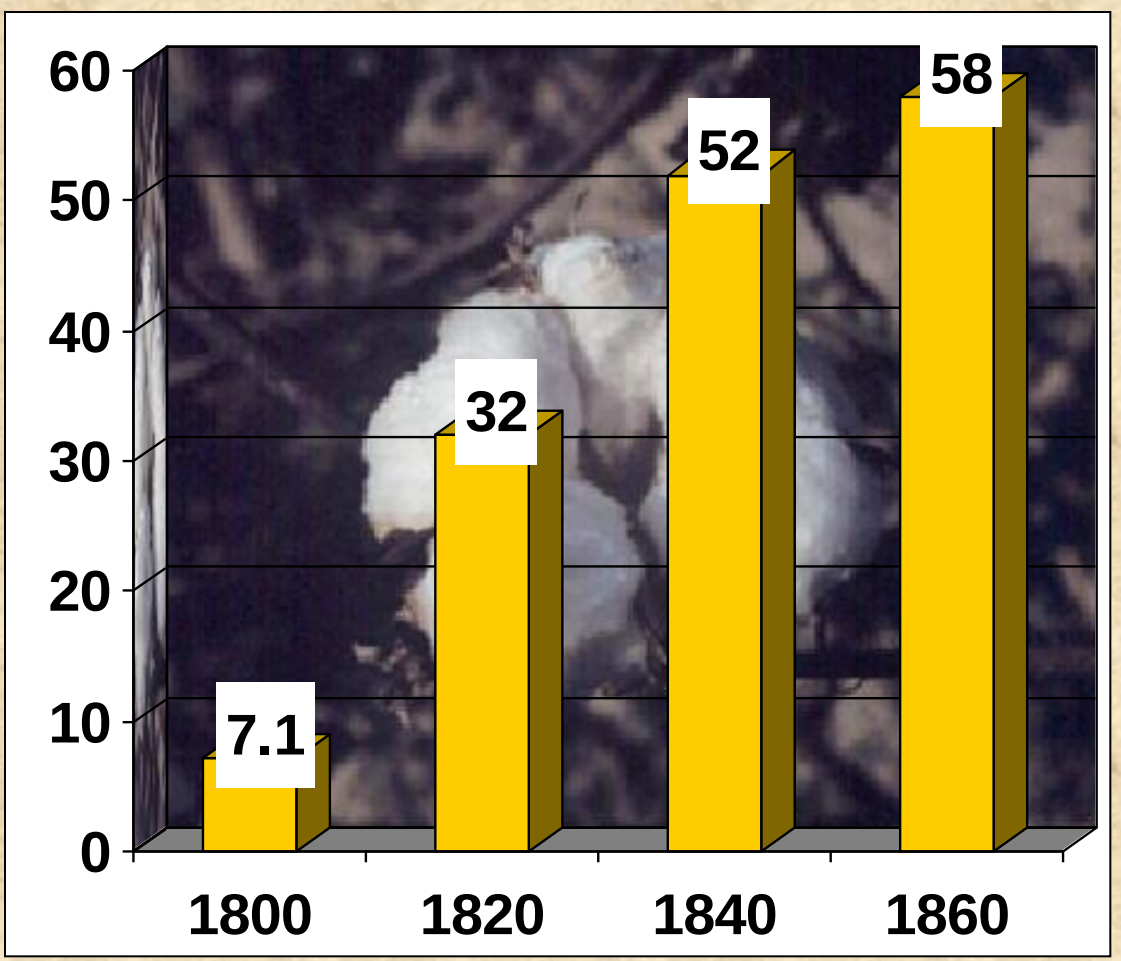
Center for Louisiana Studies, http://cls.louisiana.edu

Cotton exports, in pounds, before and after invention of the cotton gin



Growth in number of slaves after invention of the cotton gin

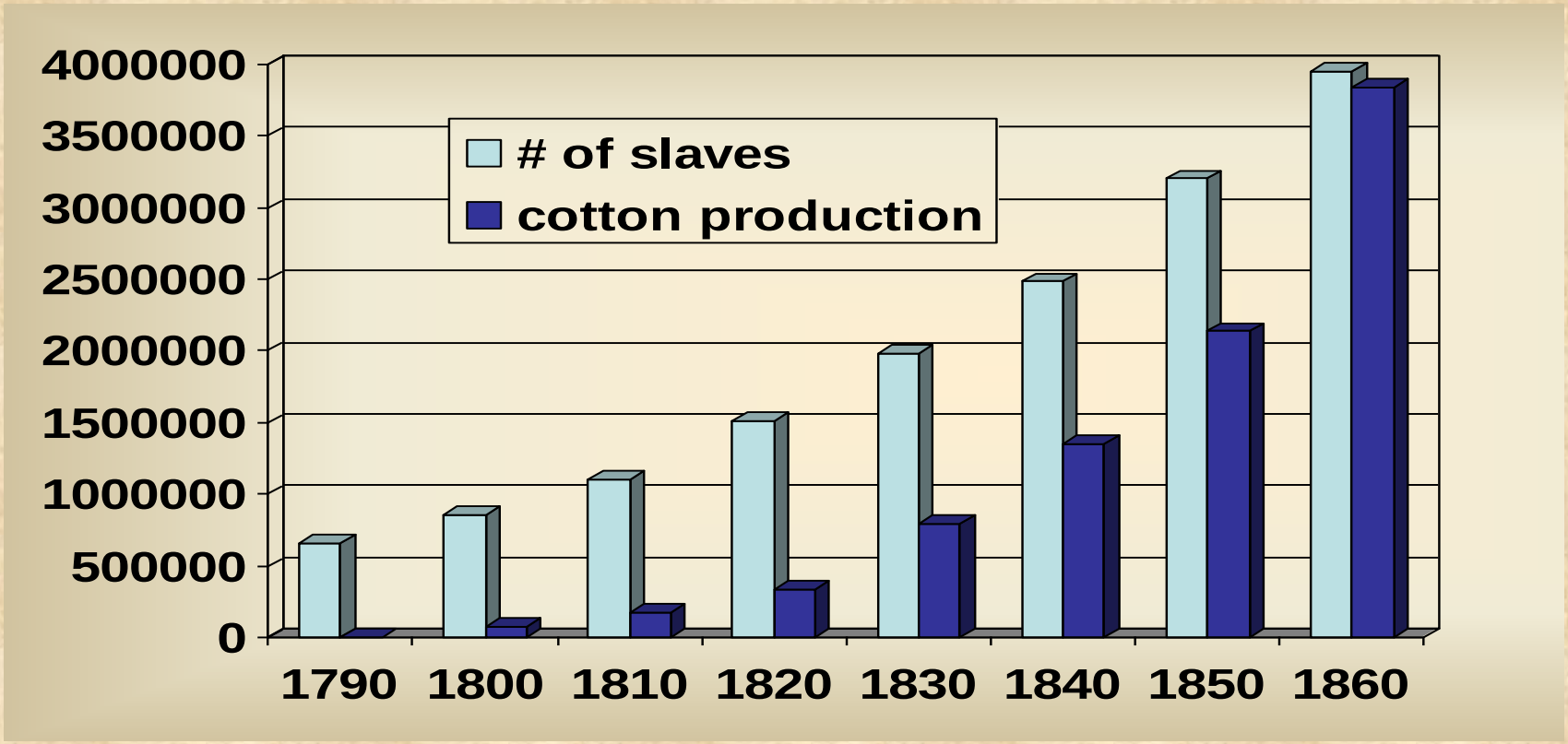
Cotton as % of U.S. exports, 1800-1860



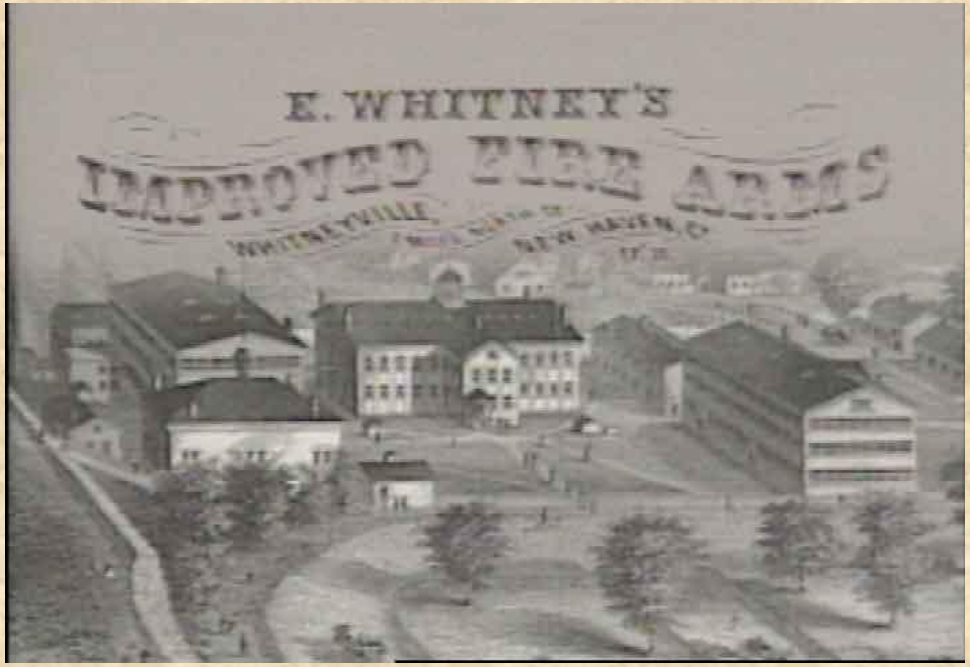
By 1850, America was growing three-quarters of the world's supply of cotton. The majority of southern cotton was shipped to New England or exported to Great Britain where it was turned into cloth.

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

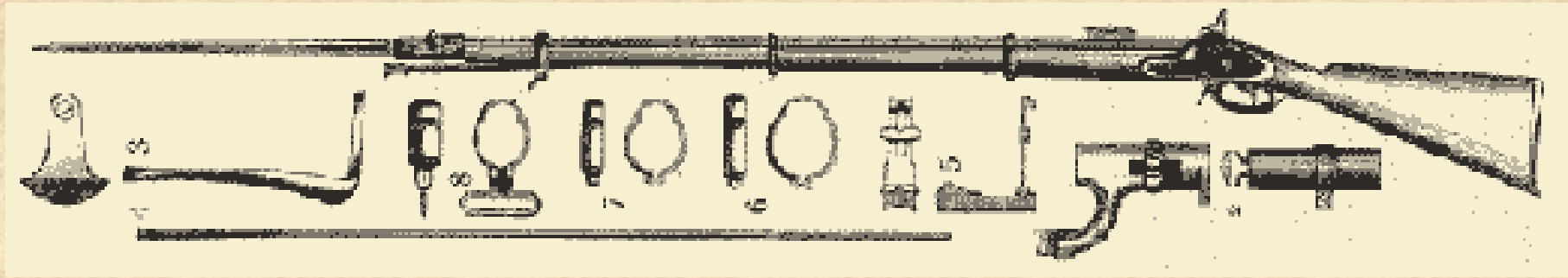


- As the Napoleonic wars broke out in Europe, Whitney knew that the U.S. army would need a new source for muskets to arm its soldiers.
- Traditionally, muskets had been made one at a time by skilled craftsmen. No two muskets were alike, and parts from one would not fit another.
- Whitney proposed to 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.

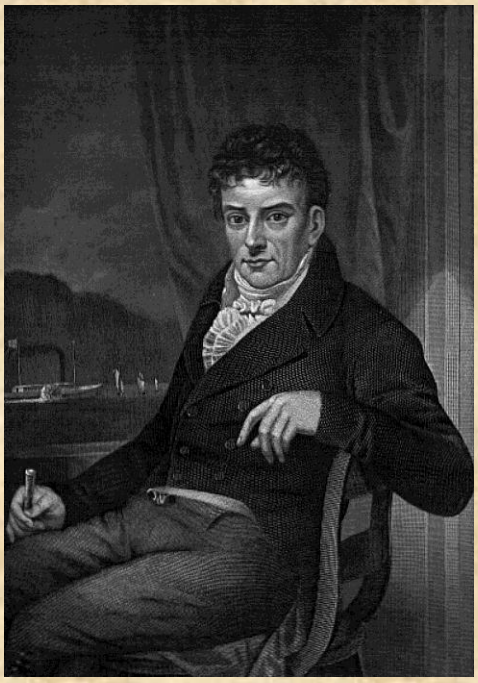
Whitney's musket

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.

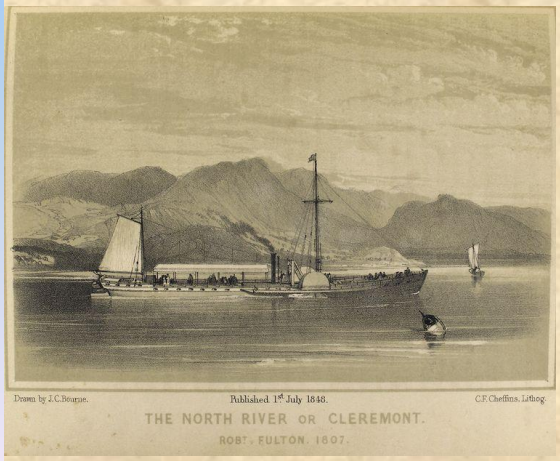


Robert Fulton

- 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.

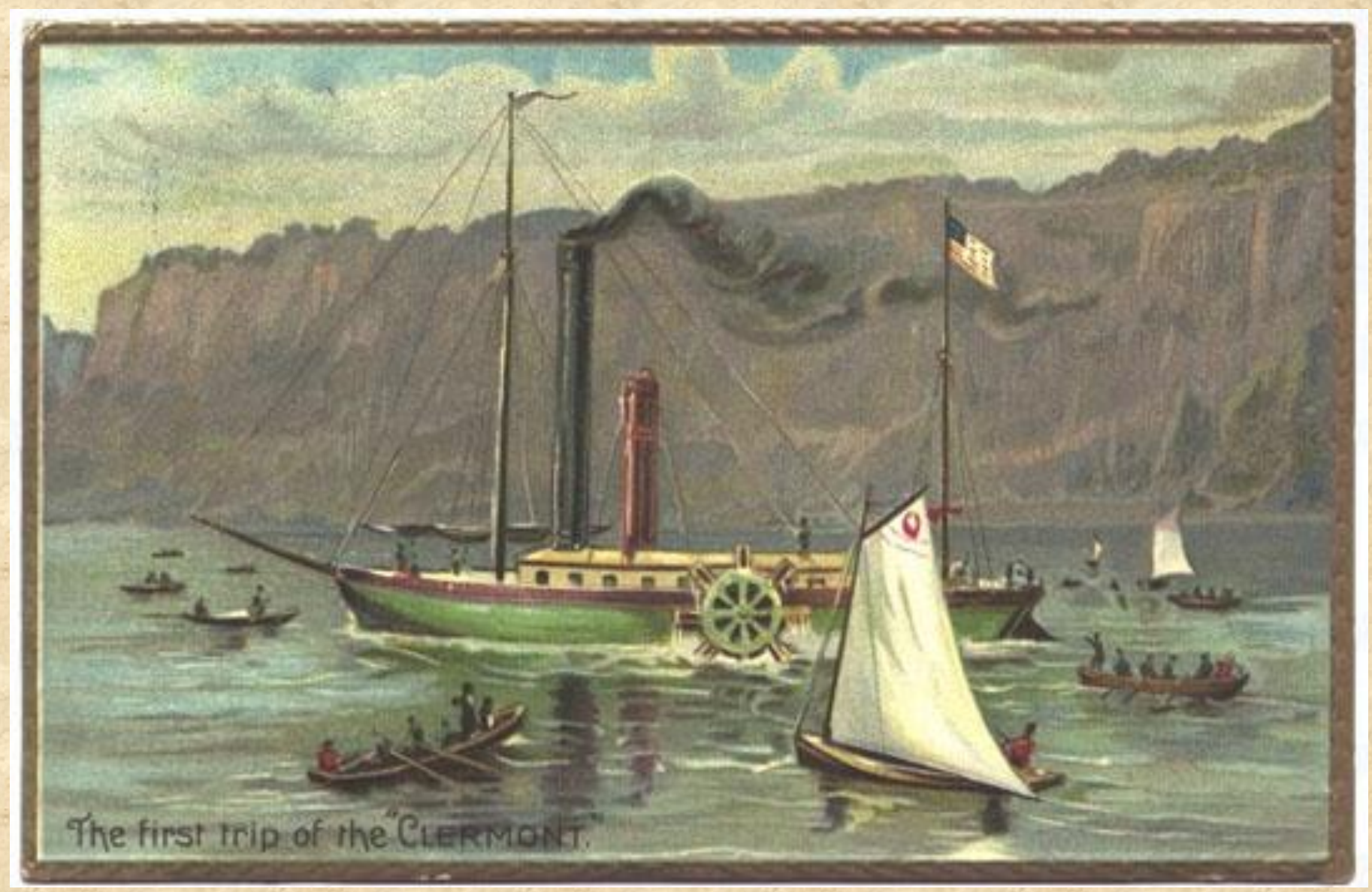


Robert Fulton

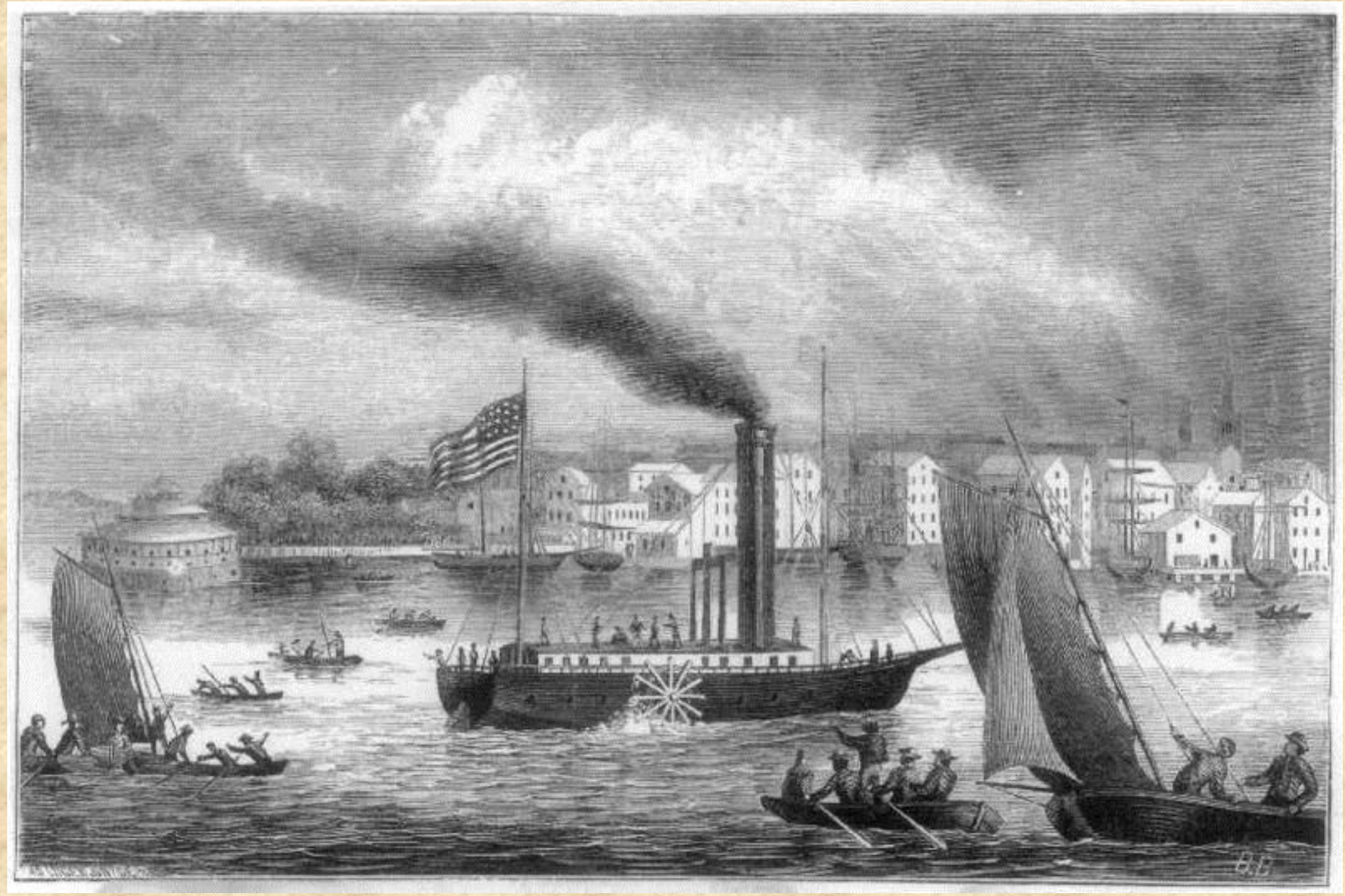


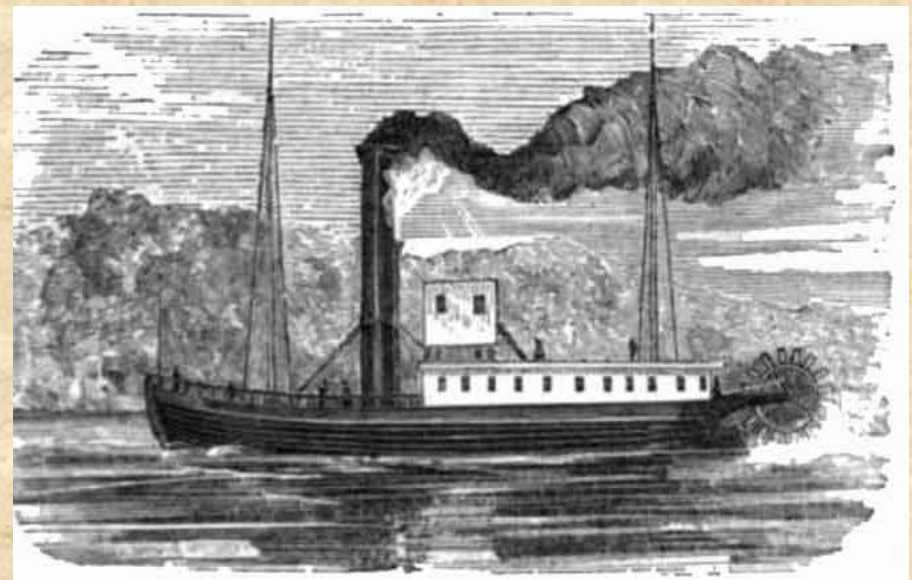
Clermont

Clermont, 1807



Another view of the *Clermont's* first voyage





The *Enterprise* in 1815

Henry Shreve

- 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* 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

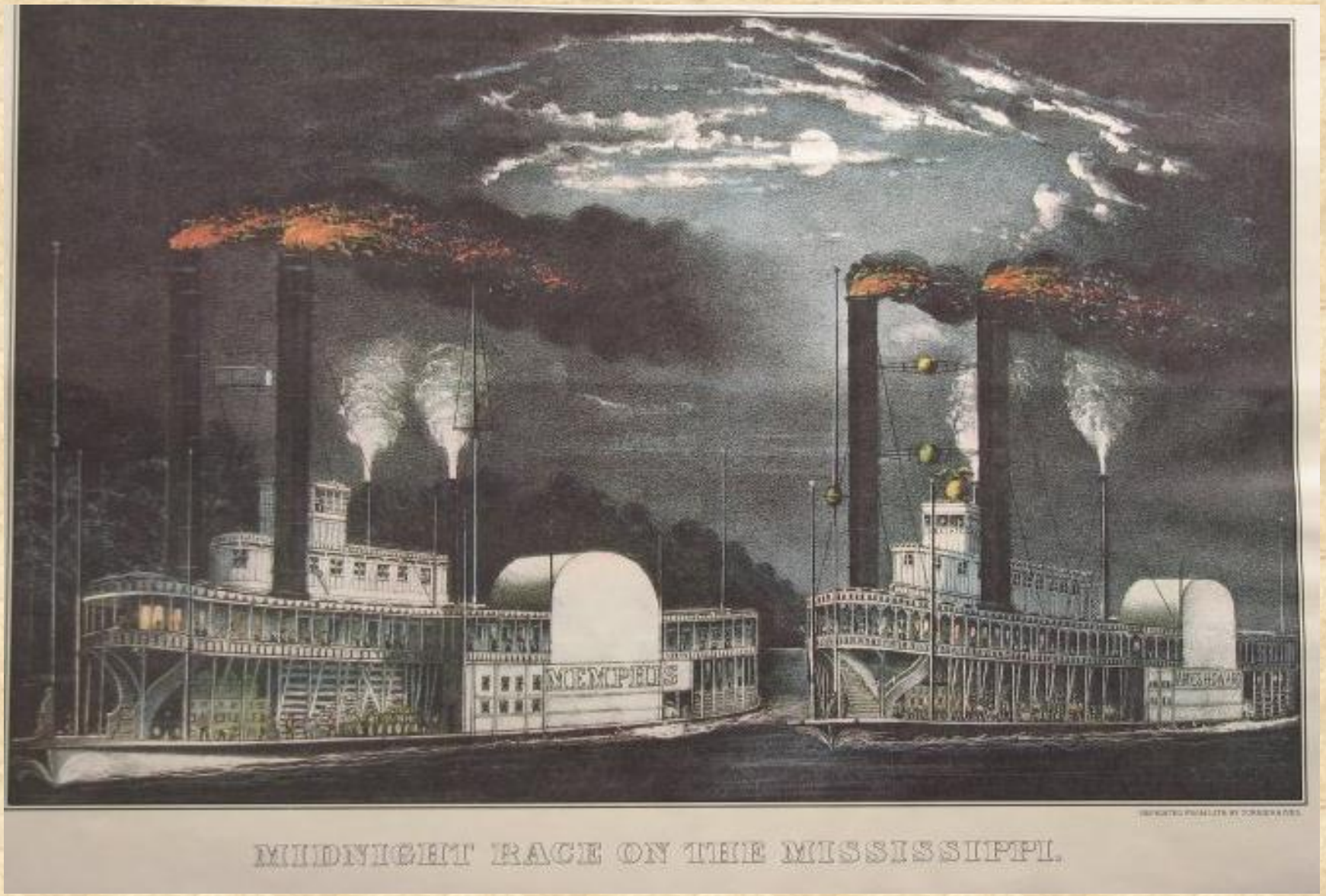
CAIRO. MOUTH OF THE OHIO. CAIRO AN DER MÜNDUNG DES OHIO.

MUSCADINE, JOWA. MUSCADINE, IN JOWA.

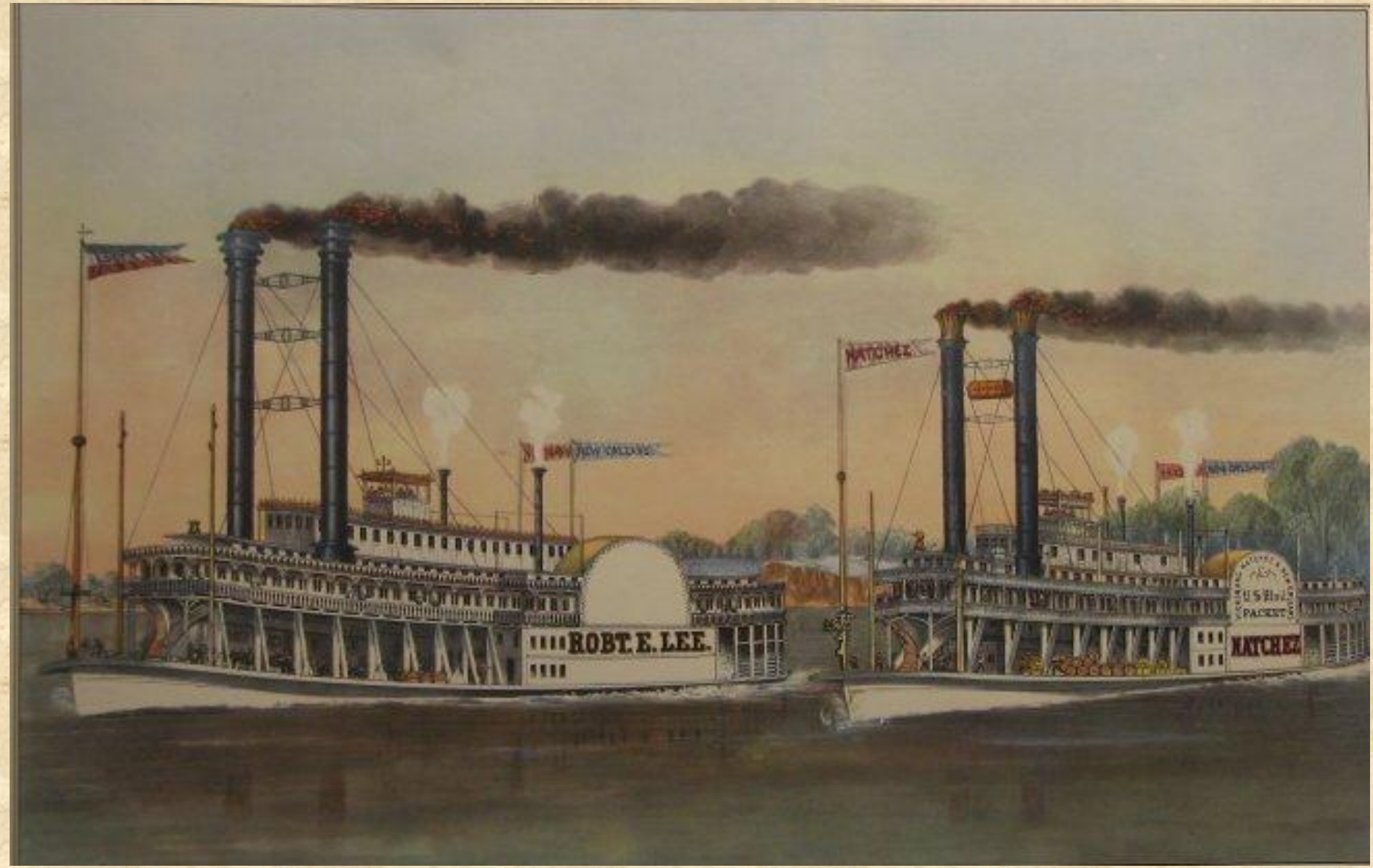
QUINCY, Illinois.

MEMPHIS. TENESSEE. DIE STADT MEMPHIS. TENESSEE.

Steamboat horns: click

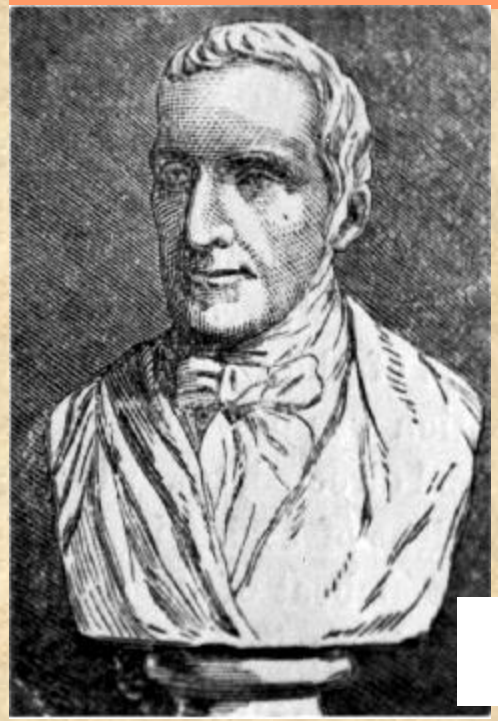


Steamboat race between the *Memphis* and the *James Howard* in 1877.



"THE GREAT RACE ON THE MISSISSIPPI
FROM NEW ORLEANS TO ST. LOUIS 1210 MILES. Between the Steamers Robt. E. Lee Capt. J.W. Cannon and Natchez. Capt. T.P. Leathers.
Won by The R.E. Lee. Time: 3 Days 18 Hours 30 Minutes." (Currier & Ives)

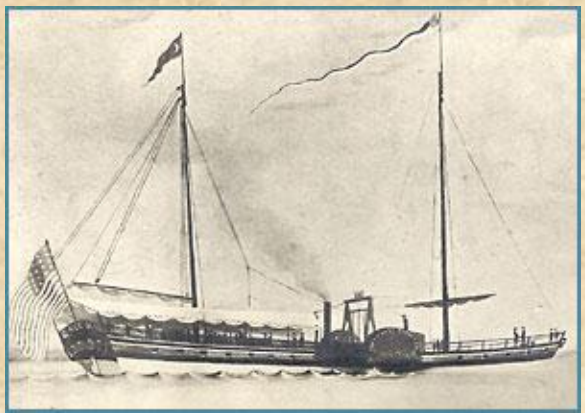
The Stevens family were inventors who designed successful steamboats, including the *Phoenix*, the first steamboat to travel on the ocean.



Colonel John Stevens

Edwin A. Stevens

Robert L. Stevens



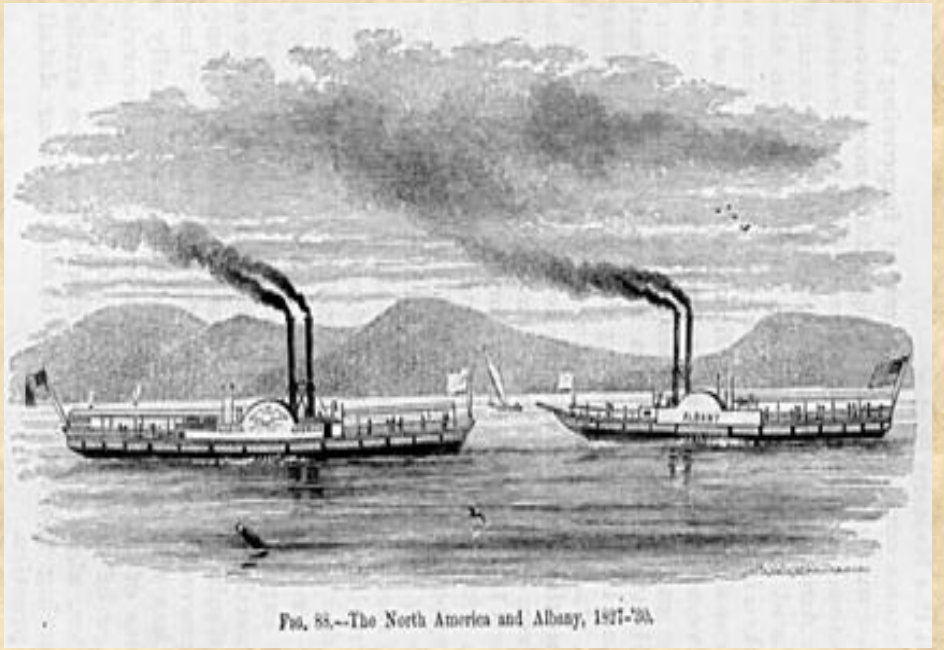
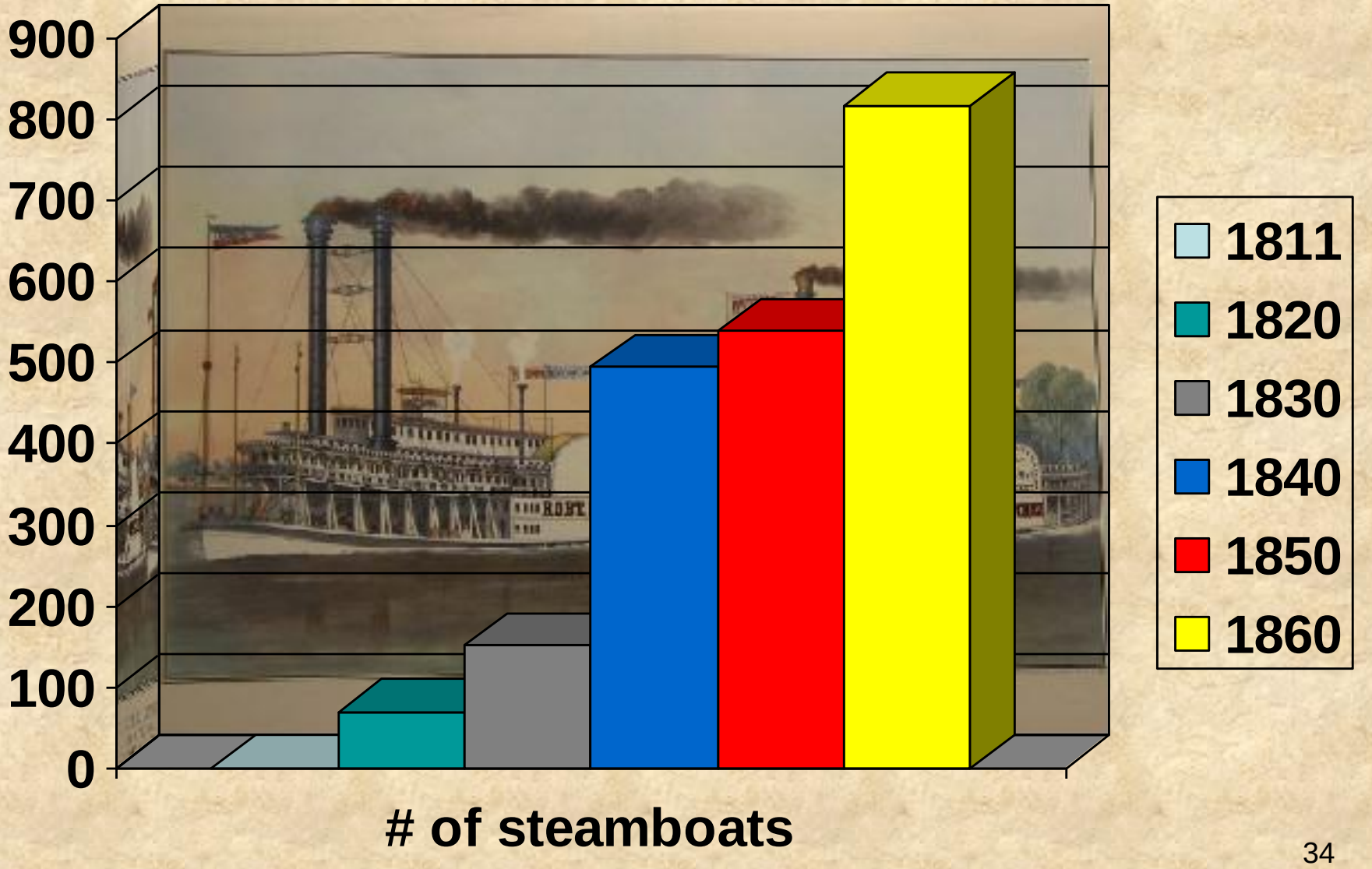


Fig. 88.—The North America and Albany, 1827-'28.

Growth in the number of steamboats on western rivers, 1811 to 1860



Early railroads

 **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.**

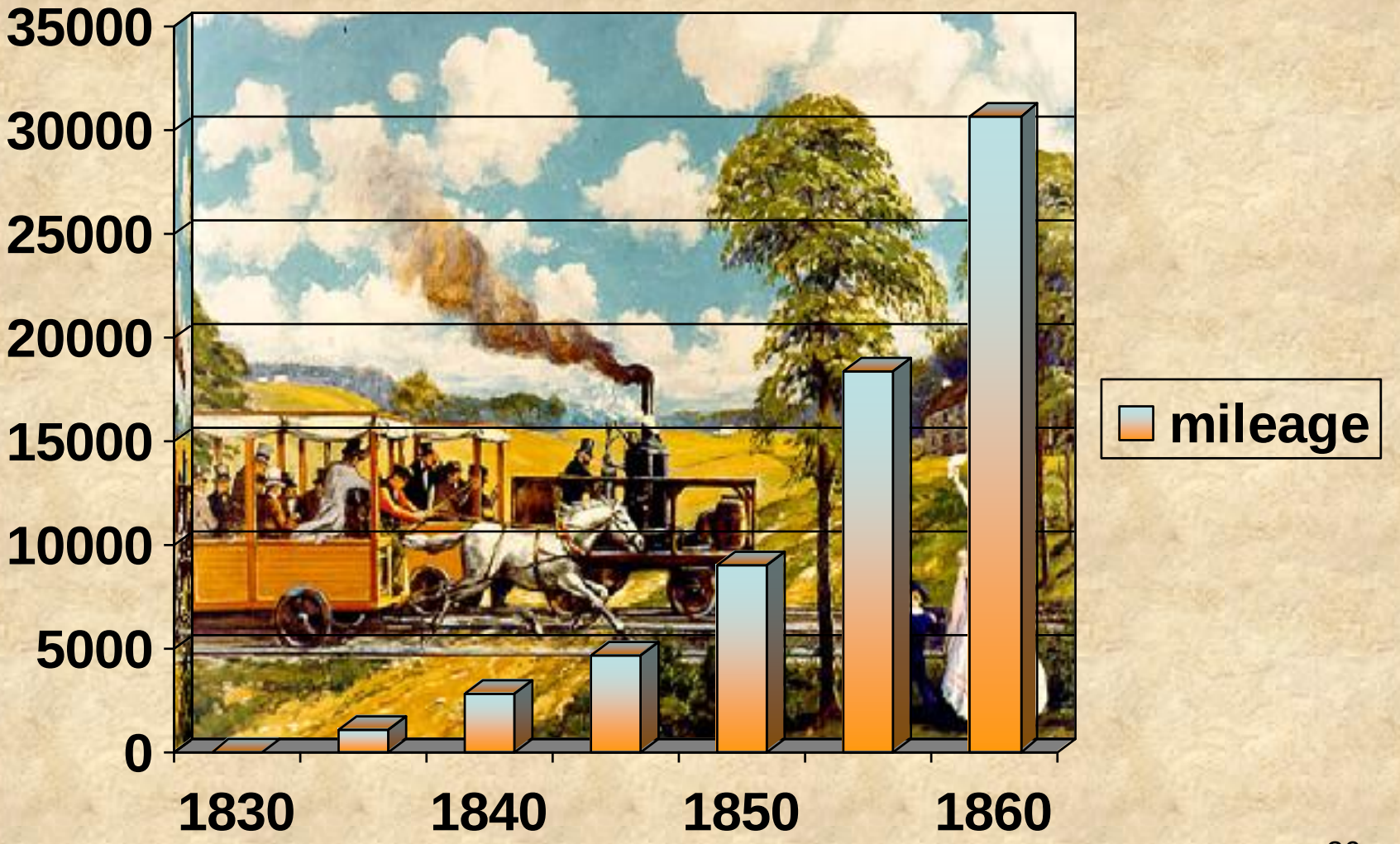
 **Railroads had several advantages over steam and canal boats:**

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.

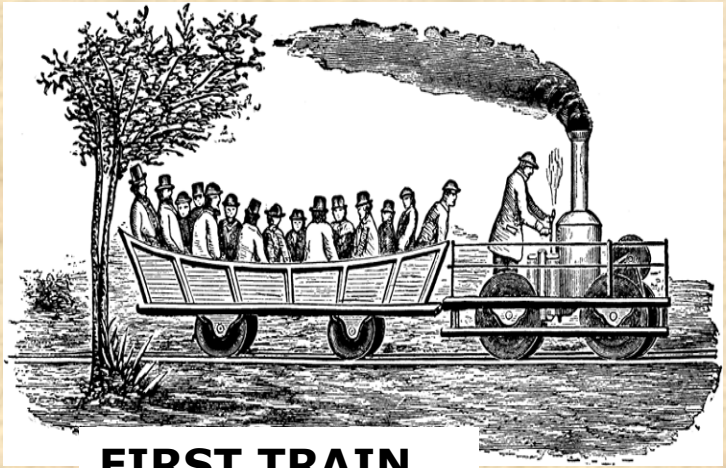
Third, they could travel year round in any climate and were not affected by freezing temperatures.

Railroad construction: 1830-1860

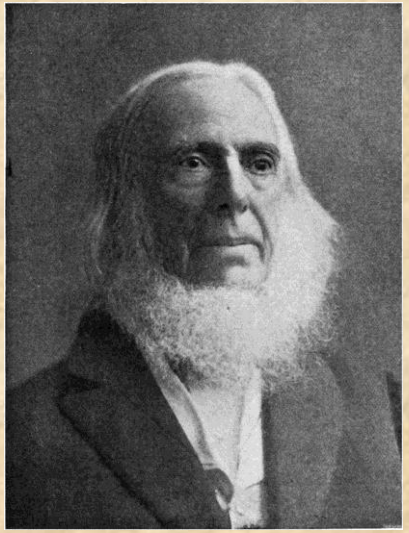


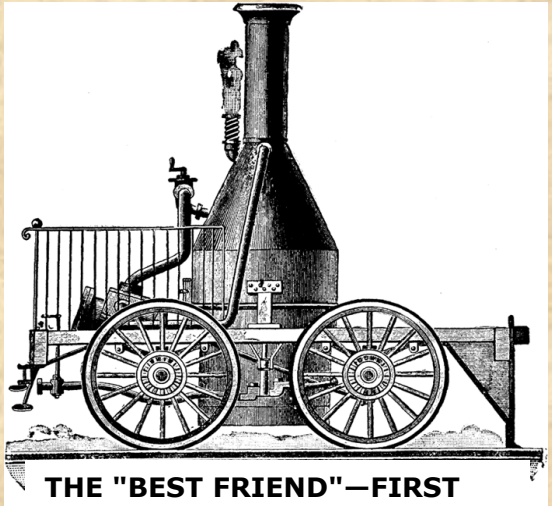
Peter Cooper

- **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.**



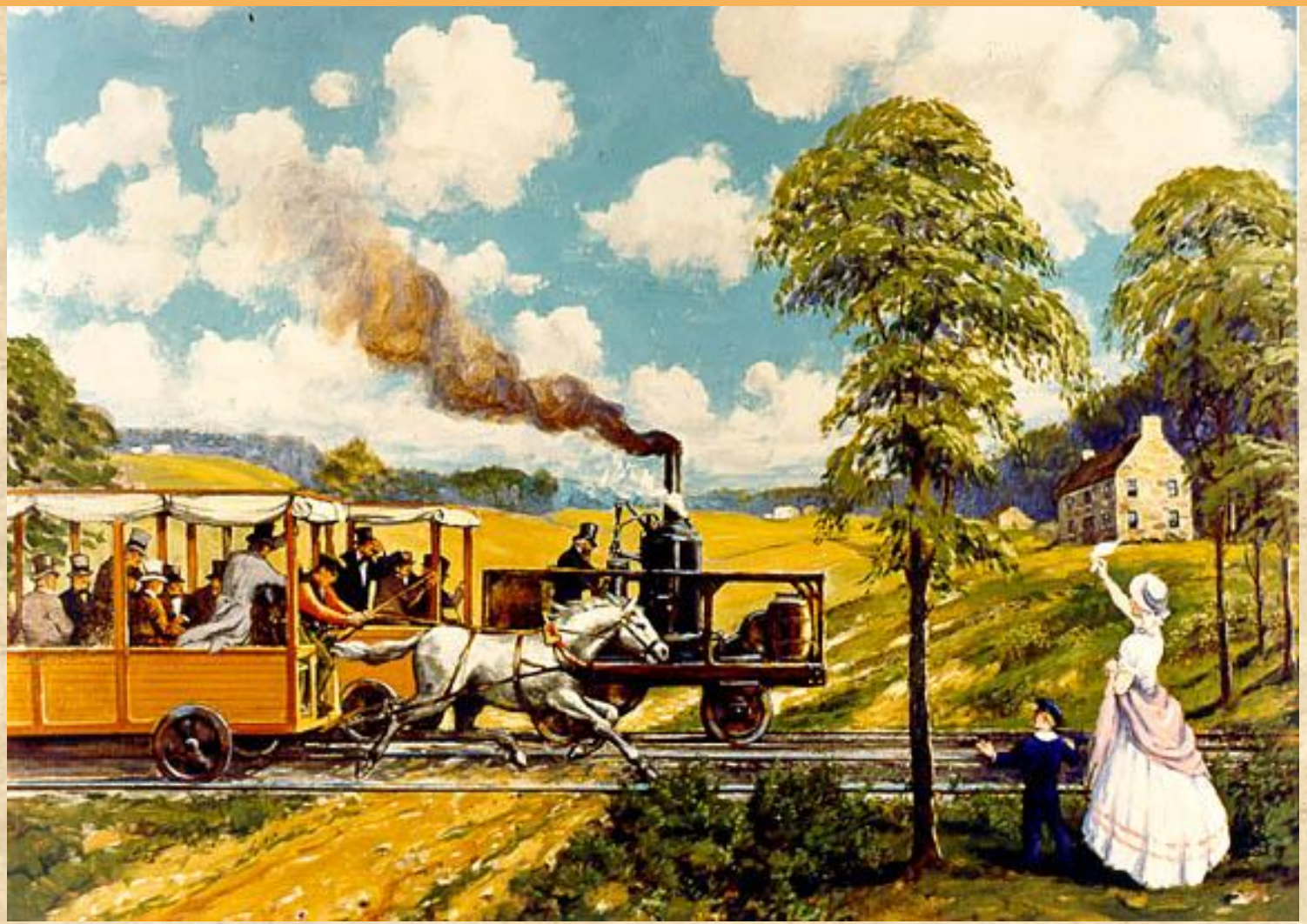
FIRST TRAIN IN AMERICA.



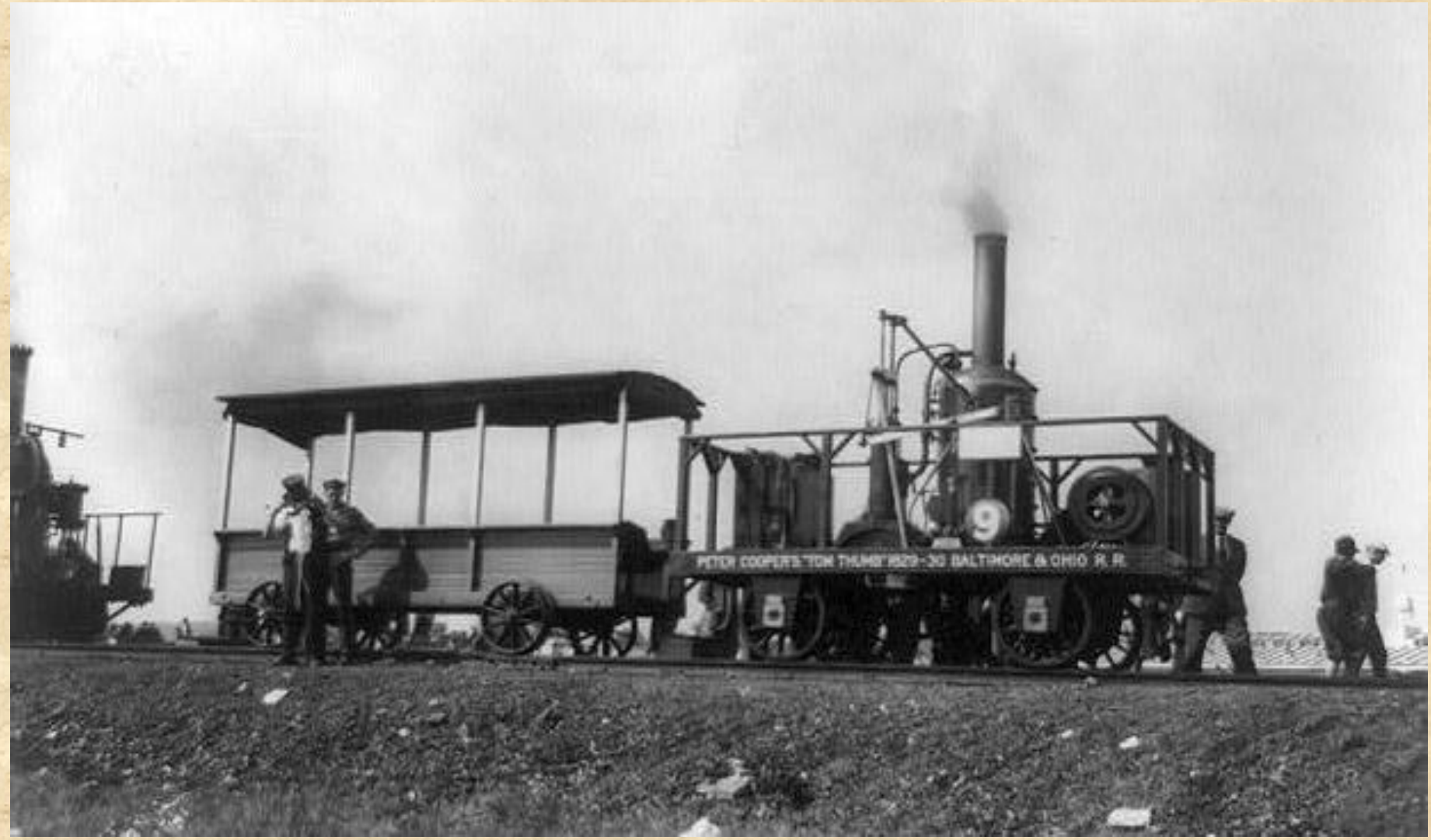


THE "BEST FRIEND"—FIRST LOCOMOTIVE BUILT IN AMERICA. BUILT BY PETER COOPER.

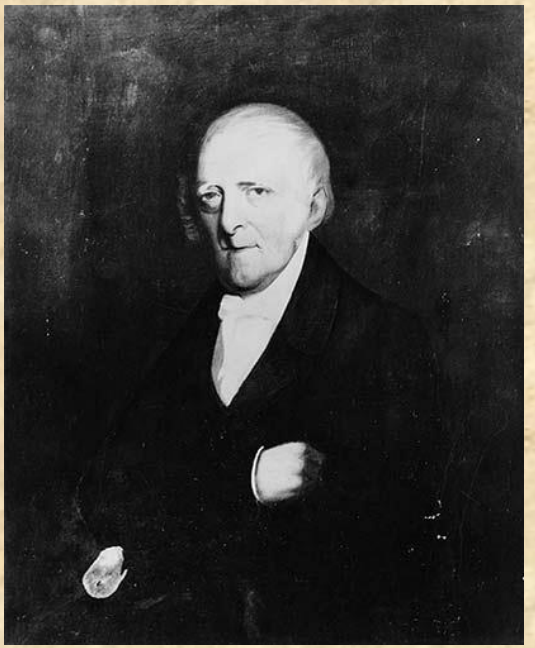
The first steam engine to operate on a commercial track in the United States, the *Tom Thumb* became famous for its race against a horse-drawn car on August 25, 1830, from Ellicott's Mill to Baltimore. The horse won the race when the engine broke down.



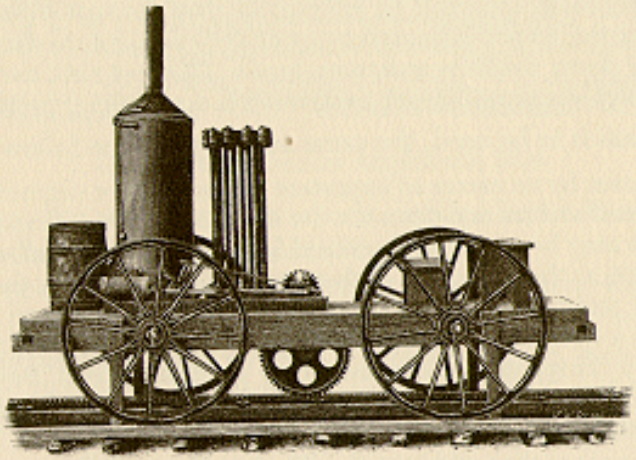
Peter Cooper's steam engine, *Tom Thumb*

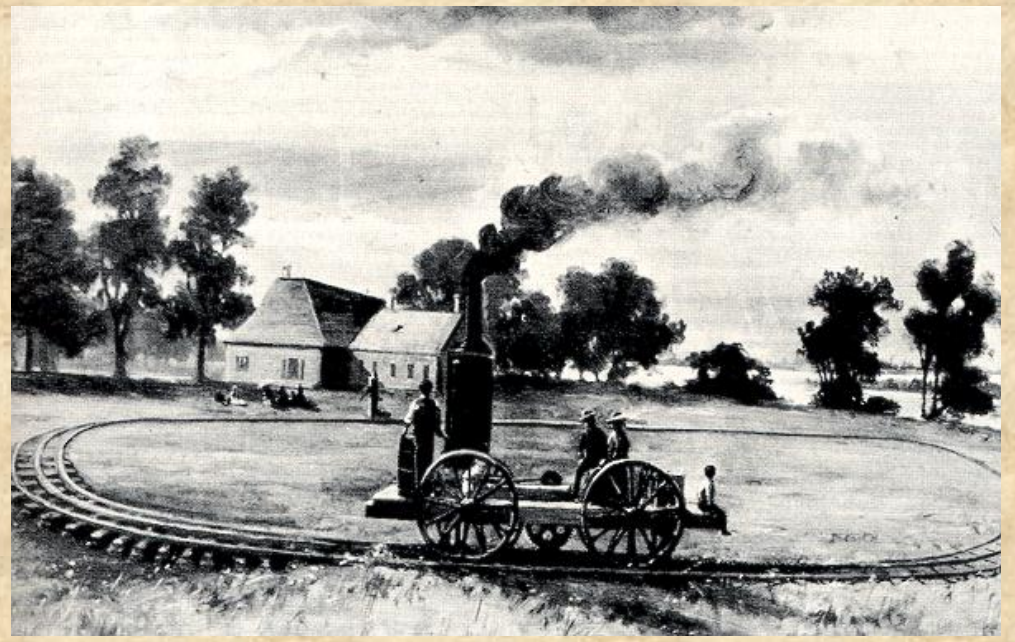


John Stevens

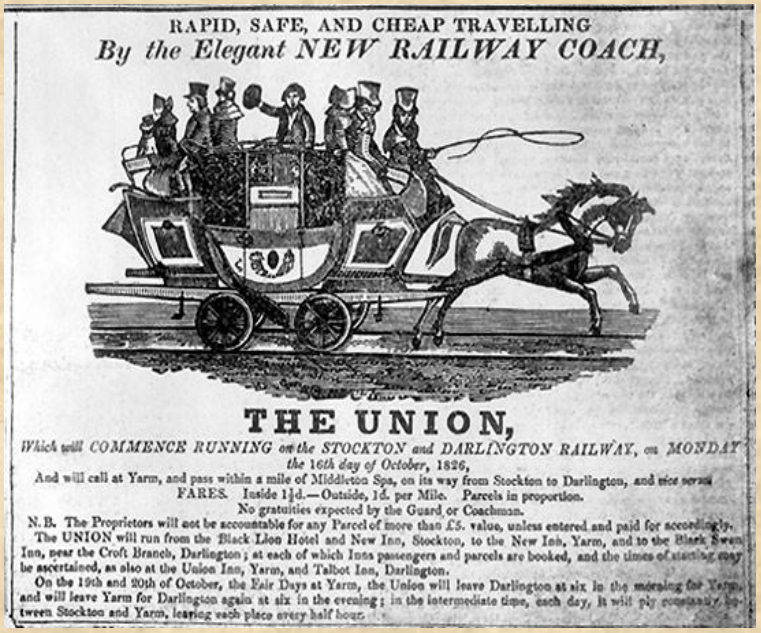


John Stevens became interested in steam locomotion in the 1780s. He established the world's first steam ferry, and later built the first operating steam locomotive in the United States.





Painting of the opening of the Stockton & Darlington Railway, 1825



RAPID, SAFE, AND CHEAP TRAVELLING
By the Elegant NEW RAILWAY COACH,

THE UNION,

Which will COMMENCE RUNNING on the STOCKTON and DARLINGTON RAILWAY, on MONDAY the 16th day of October, 1826,

And will call at Yarm, and pass within a mile of Middleton Spa, on its way from Stockton to Darlington, and vice versa

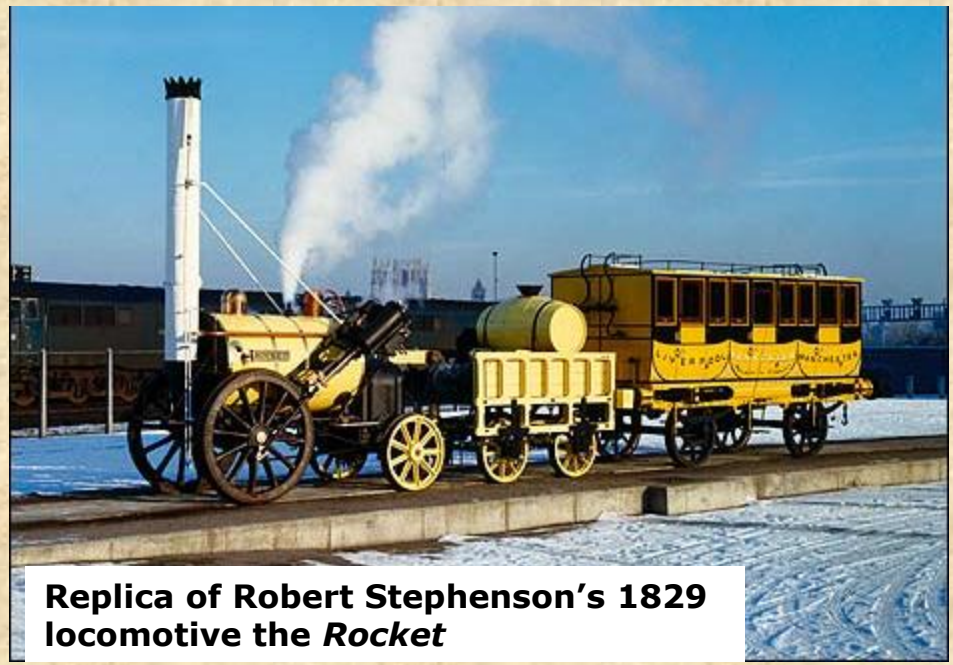
FARES. Inside 1½d.—Outside, 1d. per Mile. Parcels in proportion.

No gratuities expected by the Guard or Coachman.

N.B. The Proprietors will not be accountable for any Parcel of more than £5. value, unless entered and paid for accordingly.

The UNION will run from the Black Lion Hotel and New Inn, Stockton, to the New Inn, Yarm, and to the Black Swan Inn, near the Croft Branch, Darlington; at each of which Inns passengers and parcels are booked, and the times of starting may be ascertained, as also at the Union Inn, Yarm, and Talbot Inn, Darlington.

On the 19th and 20th of October, the Fair Days at Yarm, the Union will leave Darlington at six in the morning for Yarm, and will leave Yarm for Darlington again at six in the evening; in the intermediate time, each day, it will ply constantly between Stockton and Yarm, leaving each place every half hour.



Replica of Robert Stephenson's 1829 locomotive the *Rocket*

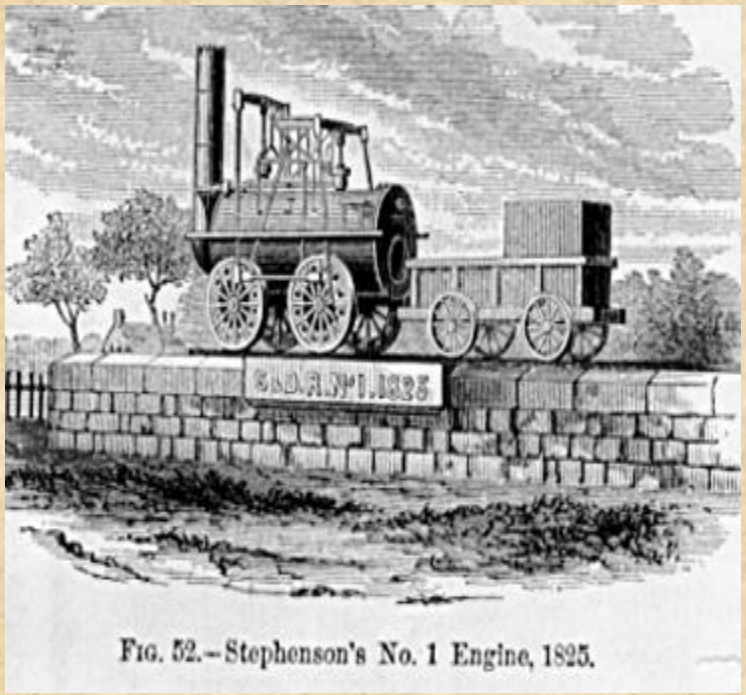
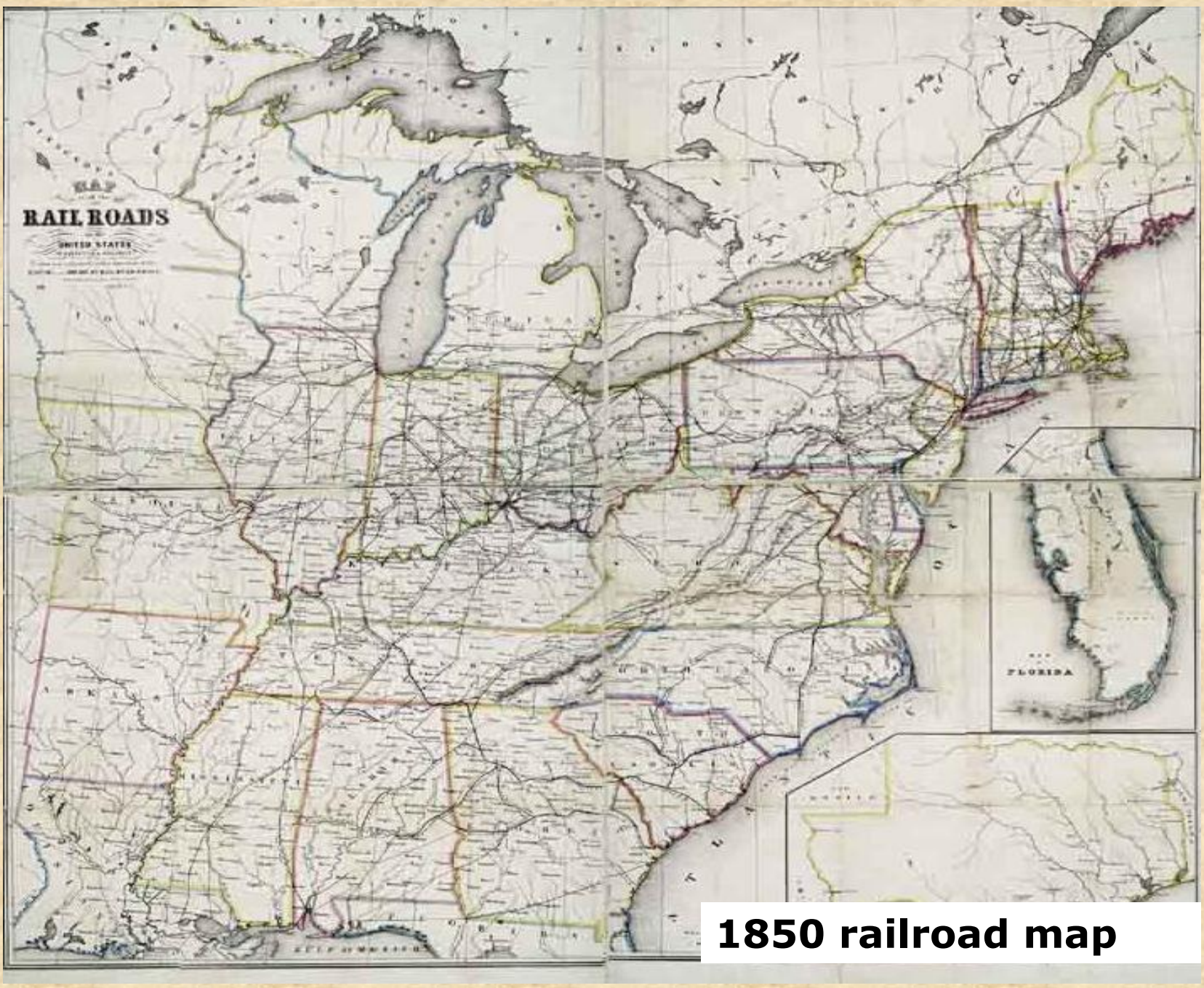
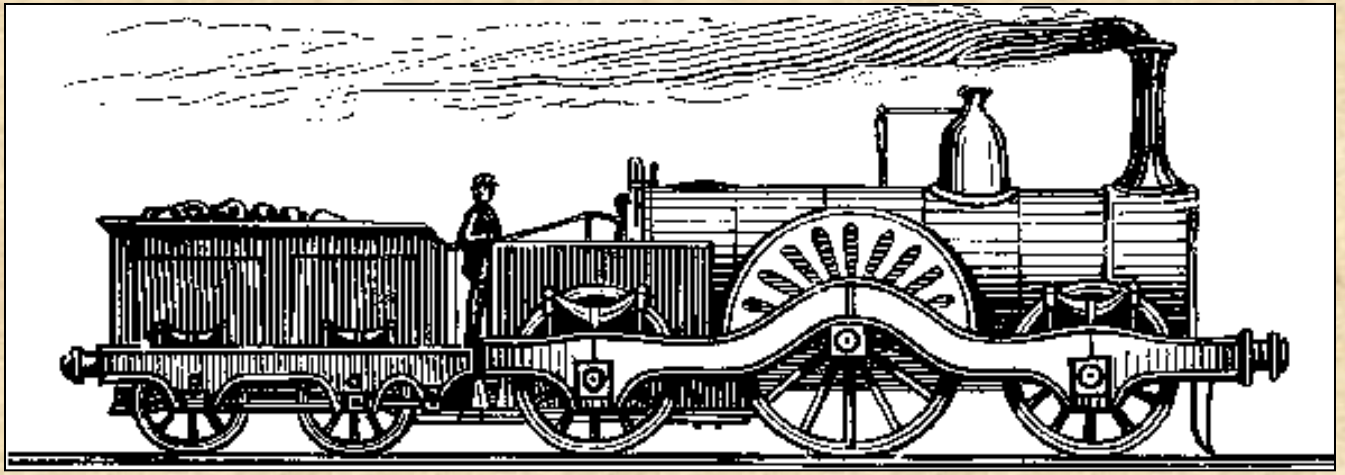


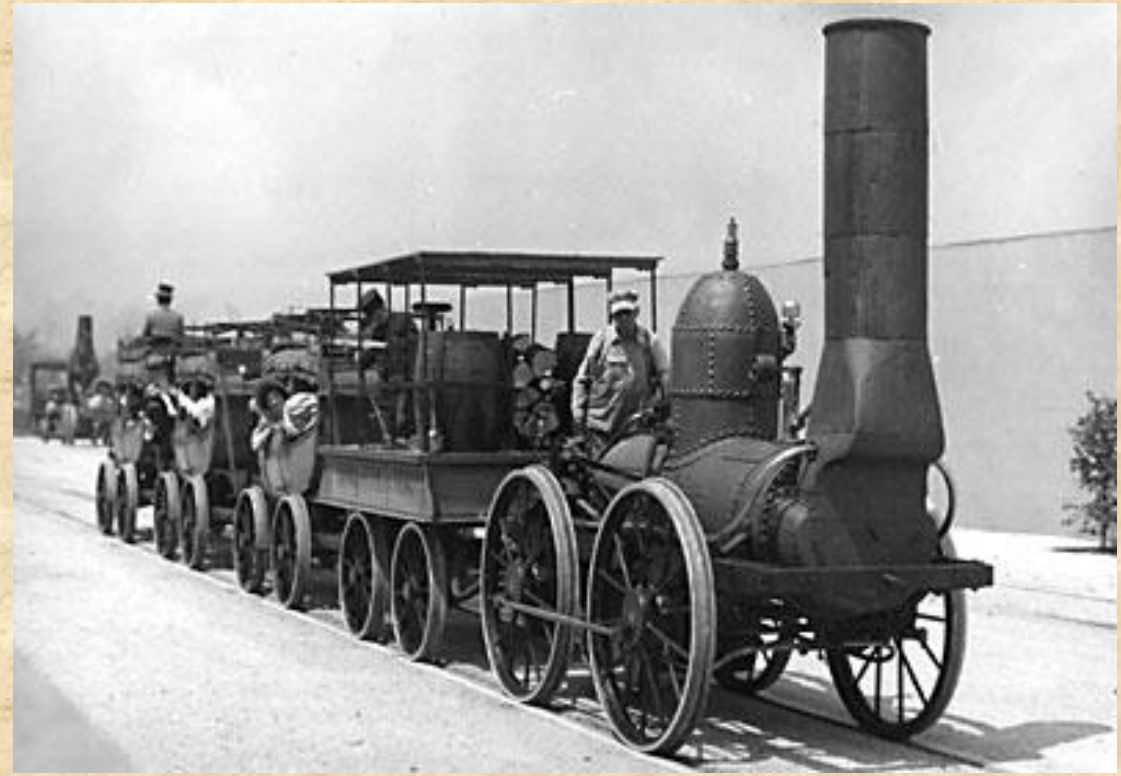
Fig. 52.—Stephenson's No. 1 Engine, 1825.

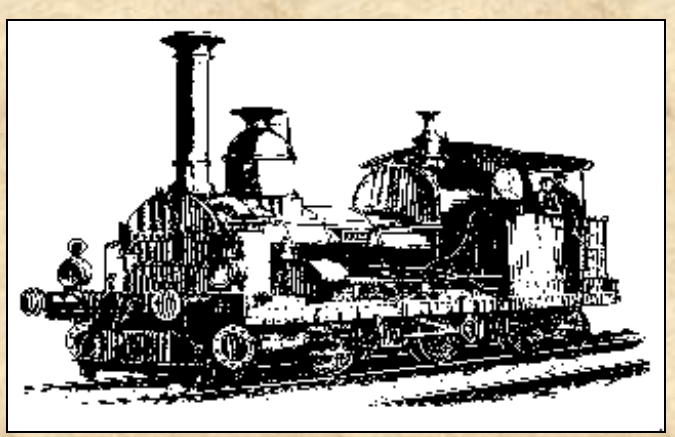


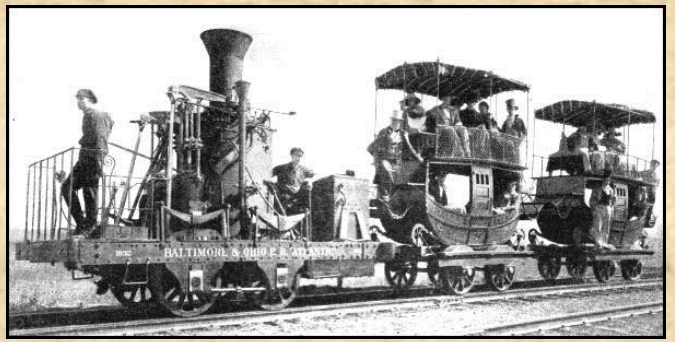
1850 railroad map

Early trains









Niagara Falls—Canada Side.

Plan of the
NEW ENGLAND STATES,
on an
Enlarged Scale.

ENSIGN, BRIDGMAN & FANNING'S
RAIL ROAD
MAP OF THE
EASTERN STATES.

Names of RAIL ROADS which are designated by Numbers on the annexed Plan of the NEW ENGLAND STATES

MAINE
1. SOMERSET & KENNEBEC...RR
2. ANDROSCOGGIN...

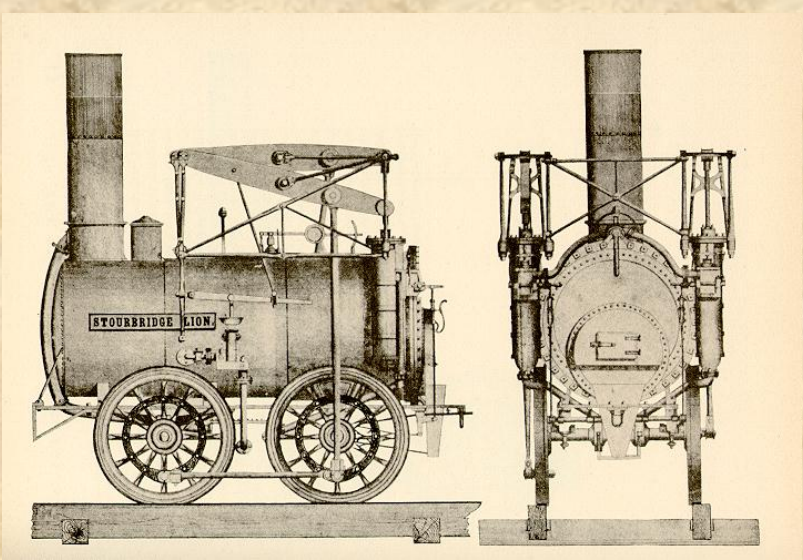
NEW HAMPSHIRE
3. MANCHESTER & LAWRENCE...RR
4. CONTOOCOOK VALLEY...

MASSACHUSETTS
5. DANVERS & GEORGETOWN...RR
6. SALEM & LOWELL...
7. BOSTON & MAINE...
8. LOWELL & LAWRENCE...
9. NASHUA & LOWELL...
10. STONY-BROOK...
11. PETERBORO & SHIRLEY...
12. FITCHBURG & WORCESTER...
13. LANCASTER & STERLING RR...
14. BRATTLEBORO & VT. & MASS...

Published by
ENSIGN, BRIDGMAN & FANNING
156 William St. New York 1856.

17½ x 23½

- **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.

1840 railroad advertisement

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.

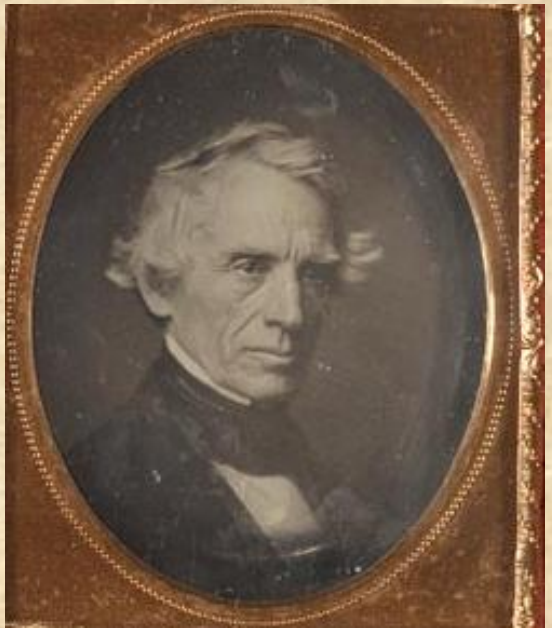
 In 1844 the first message was sent between the two cities. In the following years, Morse and his partners expanded their lines to several other cities.

 Soon several small telegraph companies were operating.

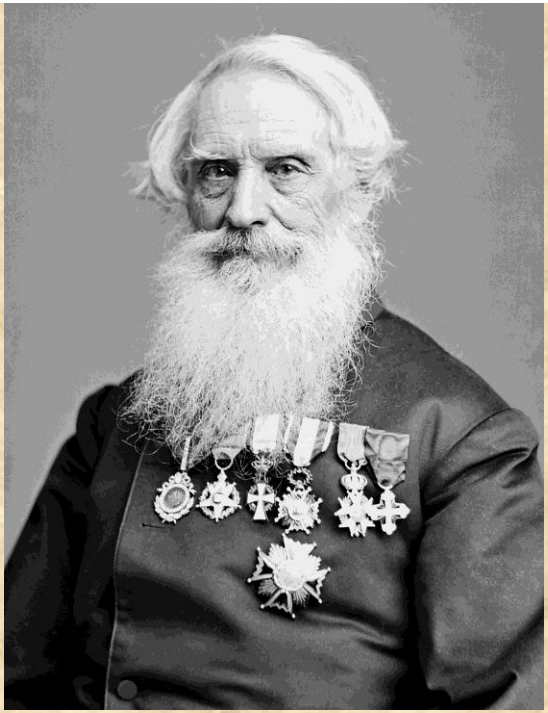
 In 1861 the Western Union company built the first transcontinental telegraph system.

 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

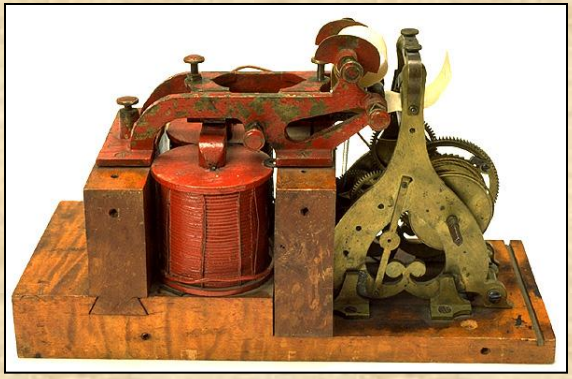


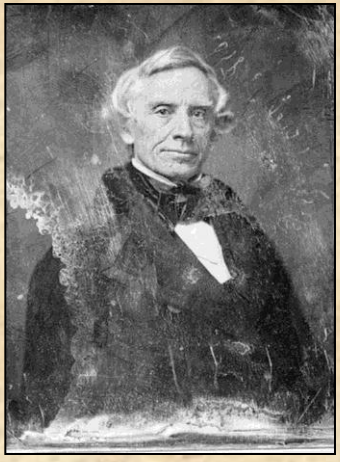
Samuel F.B. Morse

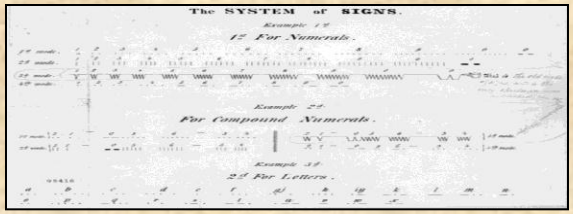


Samuel Morse

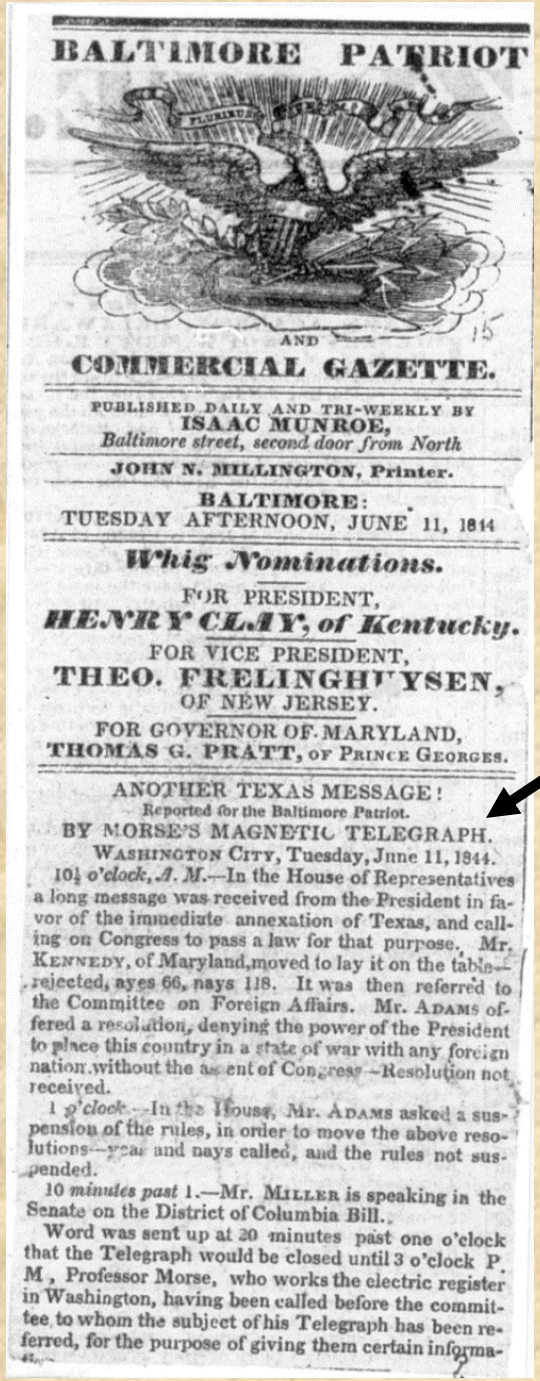
In 1835, Samuel Morse proved that signals could be transmitted by wire. He invented the Morse Code which used dots and dashes to transmit messages. In 1838 Congress funded construction of an experimental telegraph line from Washington to Baltimore, a distance of 40 miles. The first official message,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







Morse Code



BALTIMORE PATRIOT

AND

COMMERCIAL GAZETTE.

PUBLISHED DAILY AND TRI-WEEKLY BY
ISAAC MUNROE,
Baltimore street, second door from North

JOHN N. MILLINGTON, Printer.

BALTIMORE:
TUESDAY AFTERNOON, JUNE 11, 1844

Whig Nominations.

FOR PRESIDENT,
HENRY CLAY, of Kentucky.

FOR VICE PRESIDENT,
THEO. FRELINGHUYSEN,
OF NEW JERSEY.

FOR GOVERNOR OF MARYLAND,
THOMAS G. PRATT, OF PRINCE GEORGES.

ANOTHER TEXAS MESSAGE!
Reported for the Baltimore Patriot.
BY MORSE'S MAGNETIC TELEGRAPH.
WASHINGTON CITY, Tuesday, June 11, 1844.

10½ *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 66, nays 118. 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.

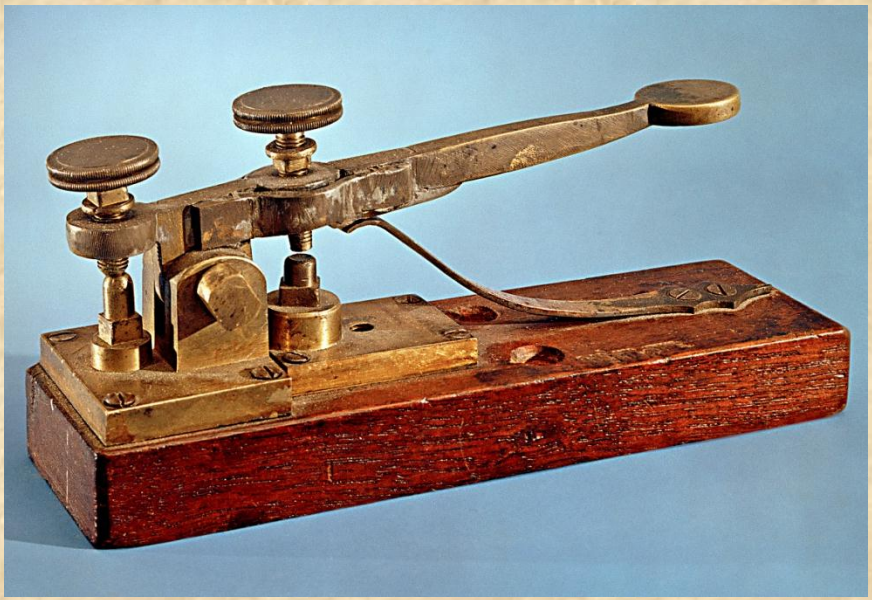
1 *o'clock*.—In the House, Mr. ADAMS asked a suspension of the rules, in order to move the above resolutions—yeas and nays called, and the rules not suspended.

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

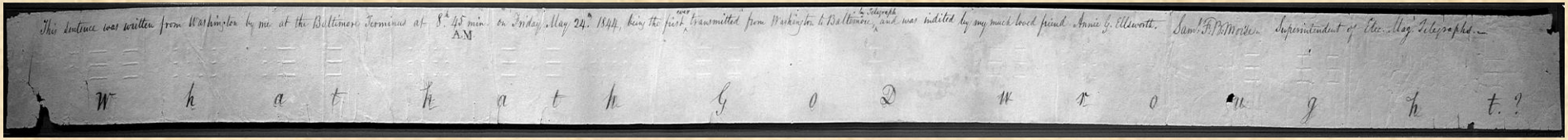
Word was sent up at 20 minutes past one o'clock that the Telegraph would be closed until 3 o'clock P. M, Professor Morse, who works the electric register in Washington, having been called before the committee to whom the subject of his Telegraph has been referred, for the purpose of giving them certain informa-

"Another Texas Message by Morse's magnetic telegraph": 1844

The original telegraph receiver used in Baltimore to receive the first telegraph message on May 24, 1844.



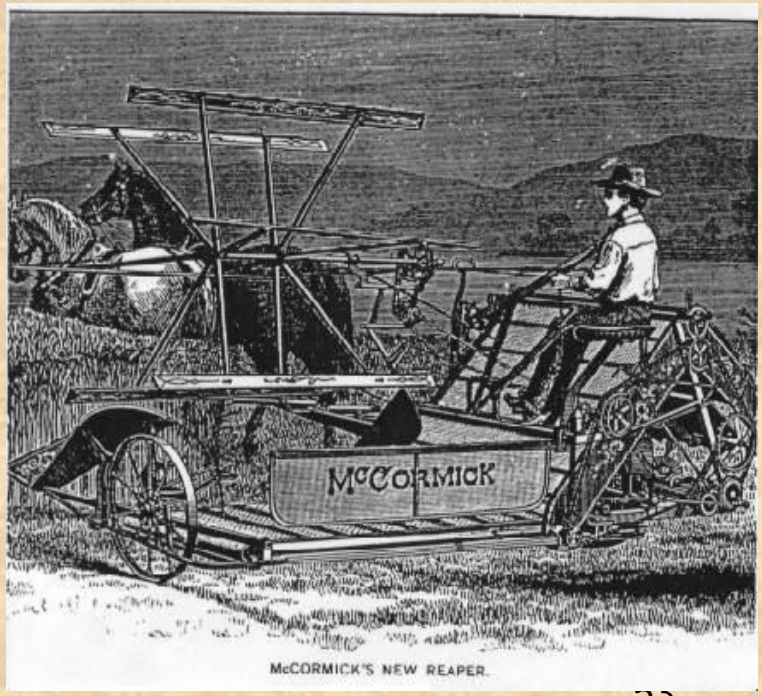
Early telegraph key, 1844-1845



First telegraphic message: "What hath God wrought?"

Cyrus McCormick

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.

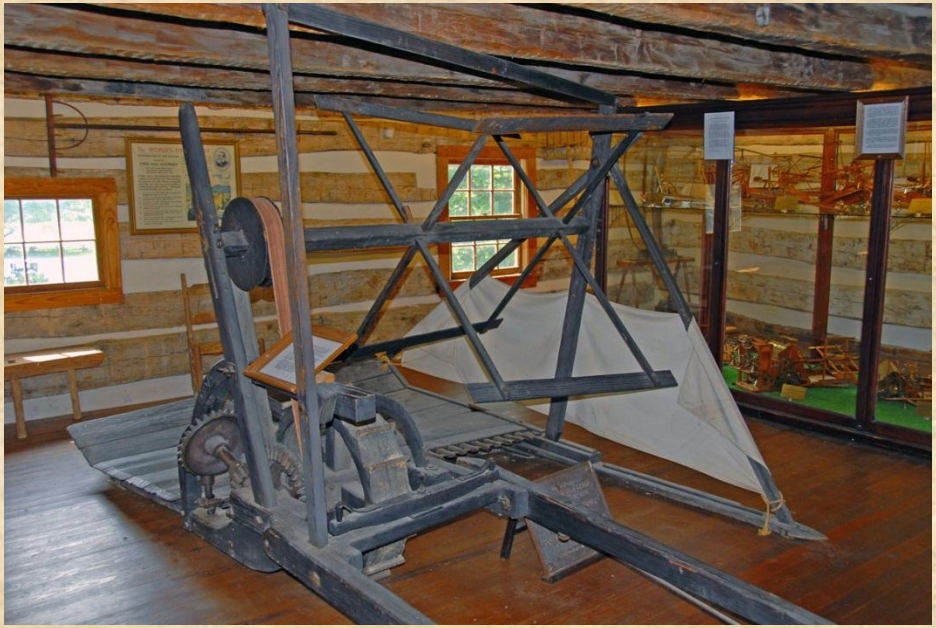
 Reaping is the process of harvesting a crop. It includes cutting grain or pulses (seeds or legumes) using a scythe, sickle or reaping machine.

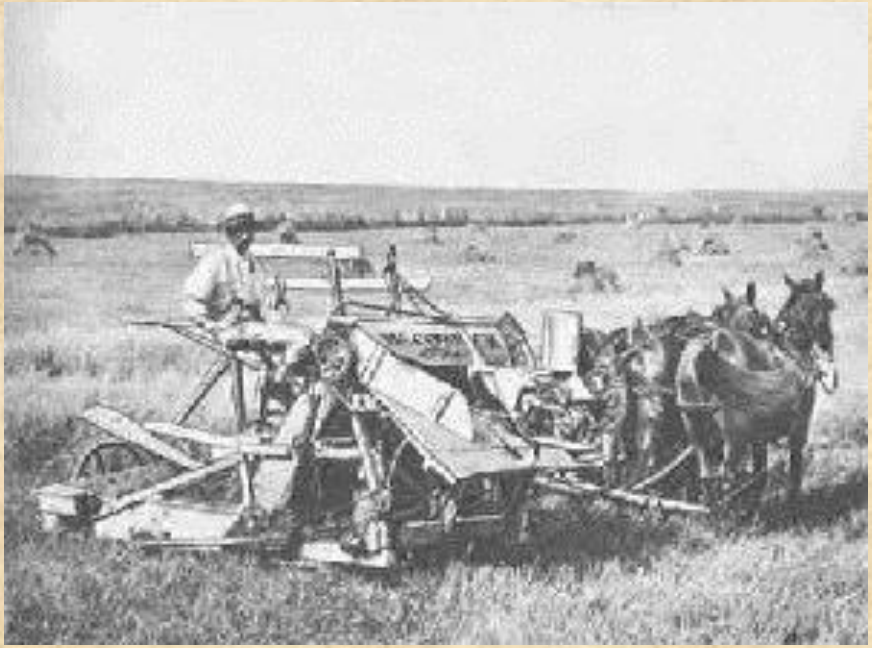
 The mechanical reaper increased the farmer's yield by tenfold and allowed farmers to greatly expand land under cultivation.

 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.

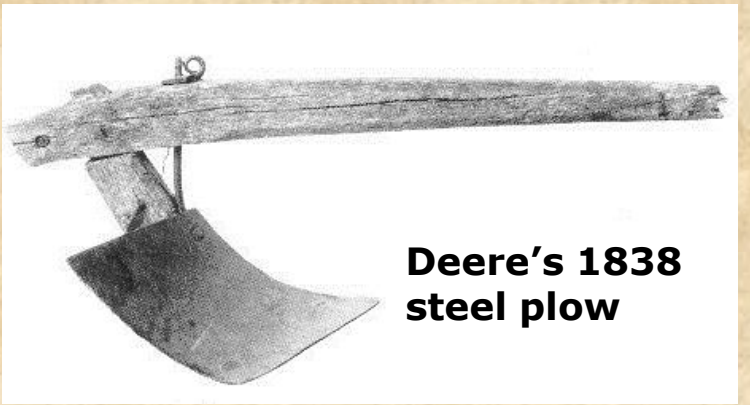
Cyrus McCormick



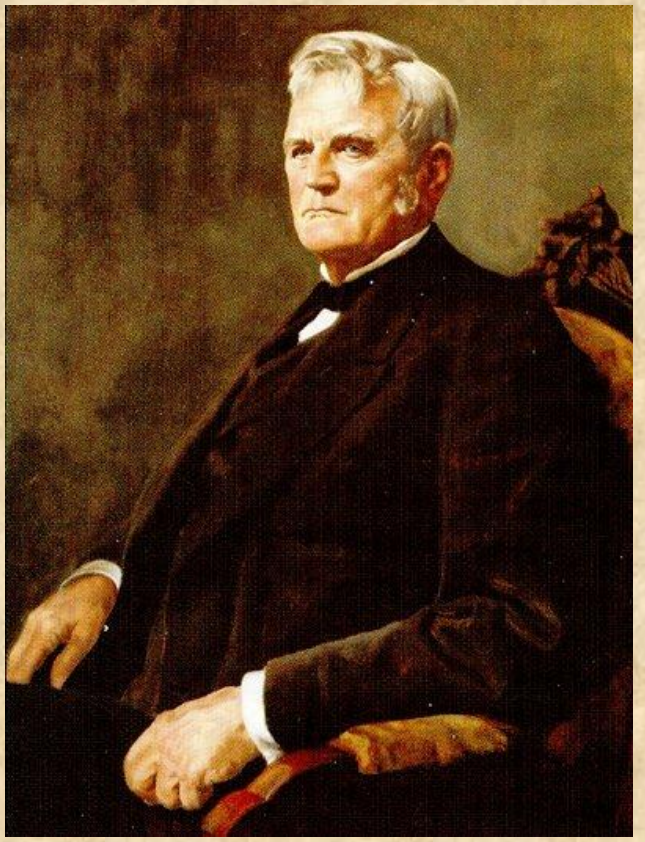


John Deere

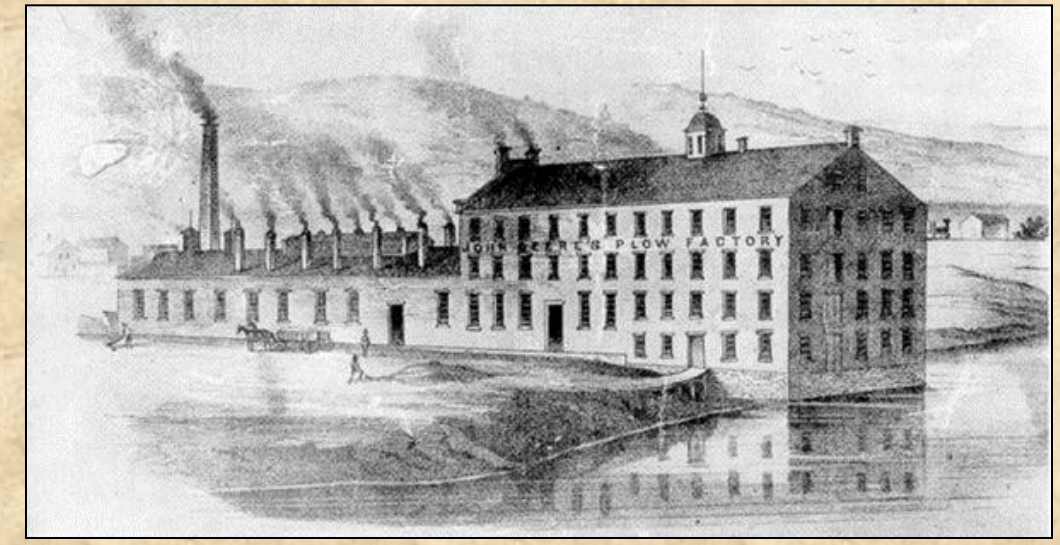
- Deere knew that Jethro Woods' iron plows were not working well in the tough western prairie soil where farmers were now moving.
- In 1837, he invented a steel plow that easily moved through tough western soils.
- His plows were a commercial success. The company he founded is still a major player in 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.



Deere's 1838 steel plow

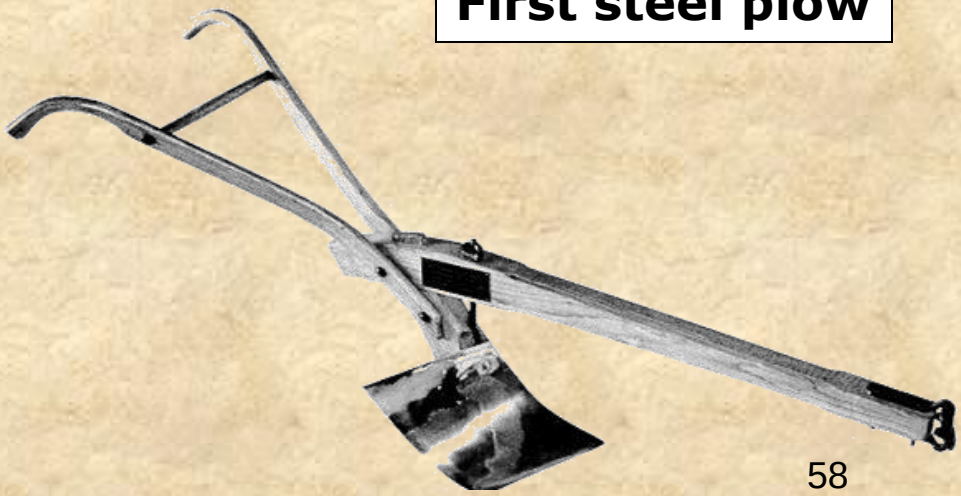


John Deere invented a steel plow that could cut through land that in the past could not be cultivated with iron plows. He went on to build a large agricultural implement business.



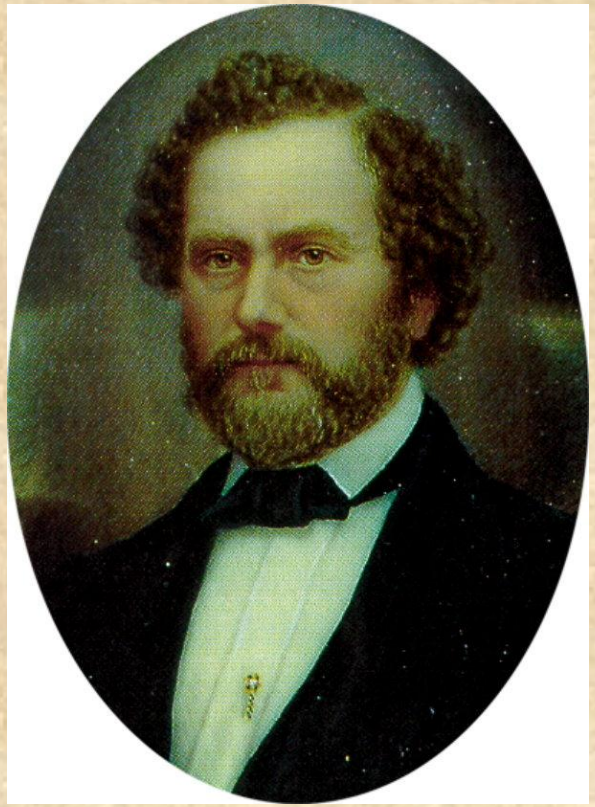
John Deere's 1859 factory

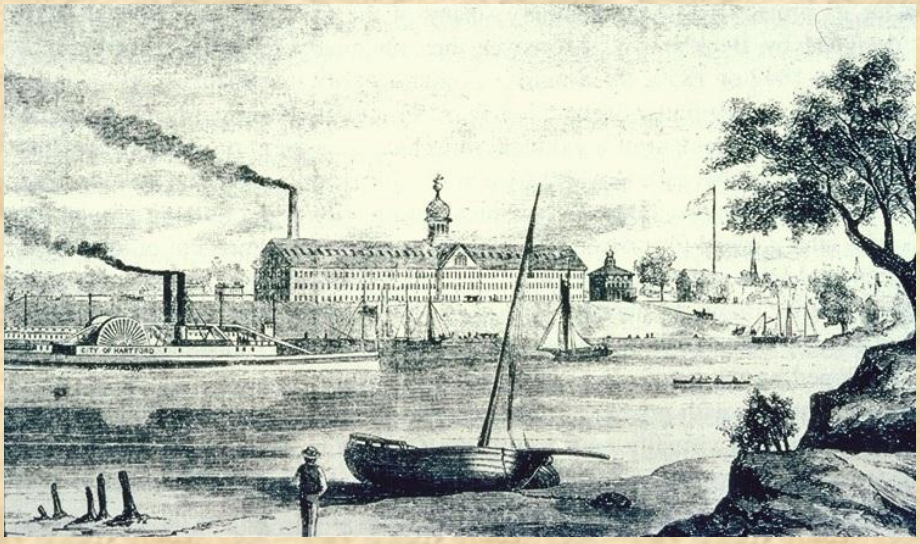
First steel plow



Samuel Colt

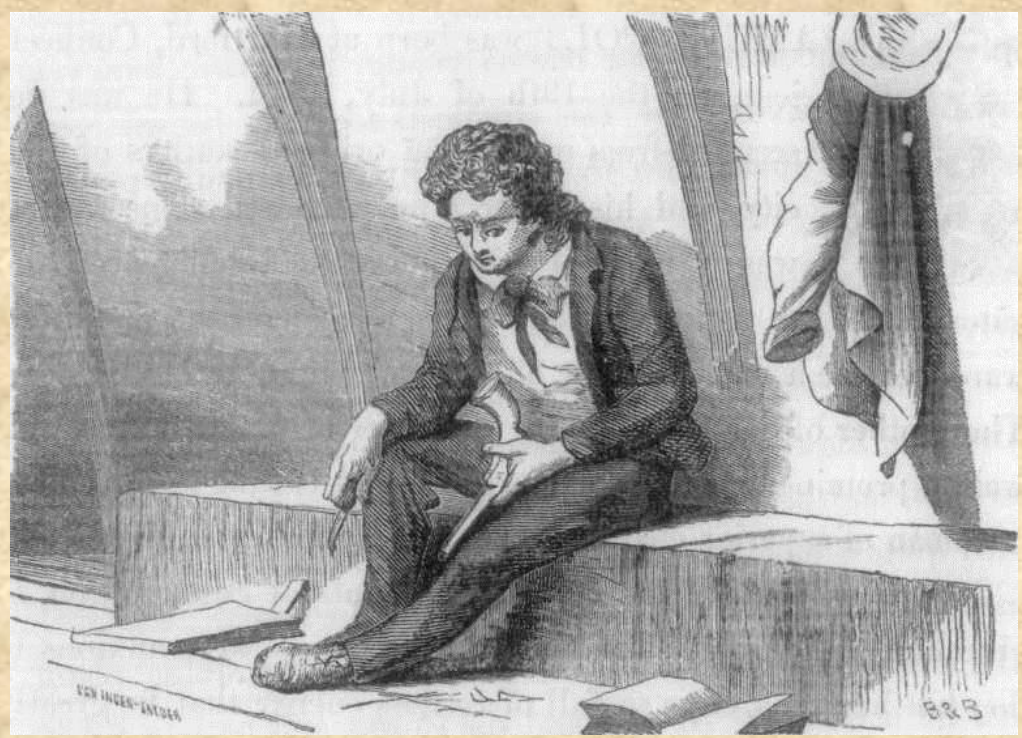
- Samuel Colt constructed the first practicable multi-shot revolving-breech-loading pistol in 1836. With investors he began a company, but they were not successful until the outbreak of the Mexican War in 1846.
- The war brought orders from the government for thousands of Colt revolvers. The new company, *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

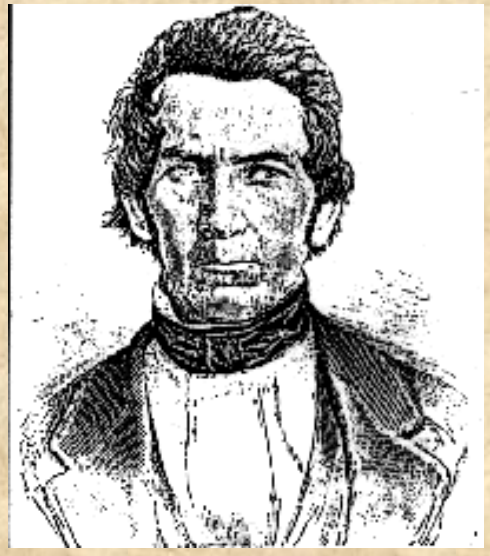
Samuel Colt



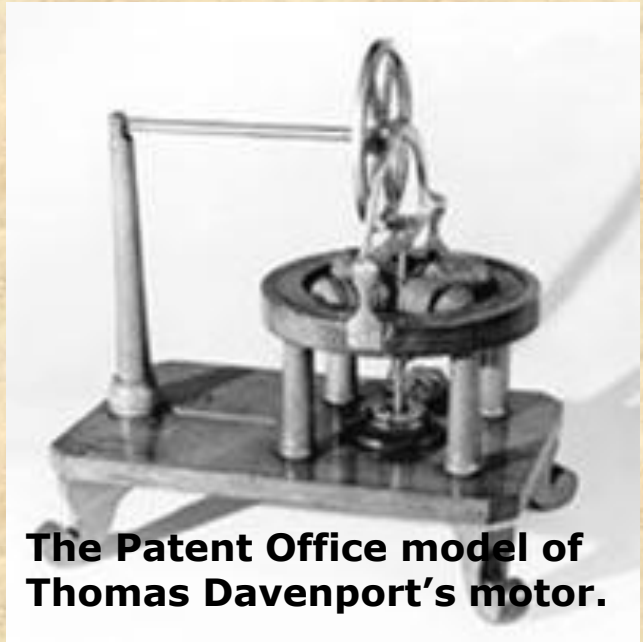
18-year-old Samuel Colt first experimented with pistol design while on a long sea voyage with missionaries in 1832.

Thomas Davenport

- 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.



Thomas and Emily Davenport



The Patent Office model of Thomas Davenport's motor.