

Industrial Growth in the North

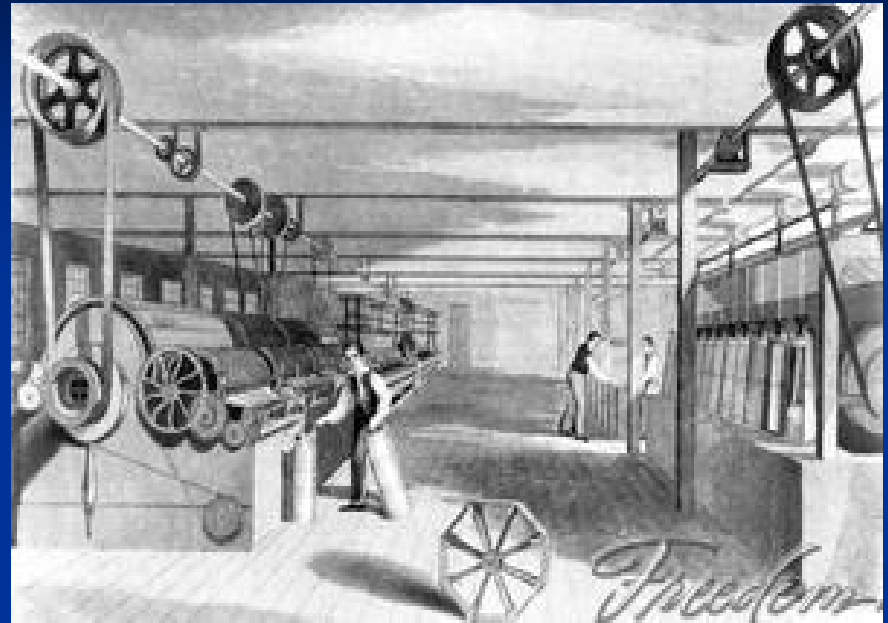


Industrial Revolution

- 1780-1840's
- Major growth in the use of machines in manufacturing and production
 - Begins in Britain and spreads worldwide
 - Richard Arkwright – Water Frame
 - James Watt – Steam Engine
 - Increased production capacities
 - Invention of the Cotton Gin
 - Expansion of trade

Slater Mill

- First American Textile Mill built by Samuel Slater in 1790
 - Pawtucket, Rhode Island
- Used water power to power mill's machinery to spin cotton thread
- Slater used British models
 - Built from memory
- Hundreds of cotton/wool companies by 1813
 - Mostly in Northeast
 - Many fast-flowing rivers for power
- Rhode Island system
 - Hired families
 - Divided factory work into simple tasks



Eli Whitney

- Massachusetts Inventor
- Innovations that transformed and galvanized both the North and South
 - Interchangeable Parts
 - Transformed Northern Manufacturing
 - Cotton Gin—1793
 - Transformed Southern Agriculture

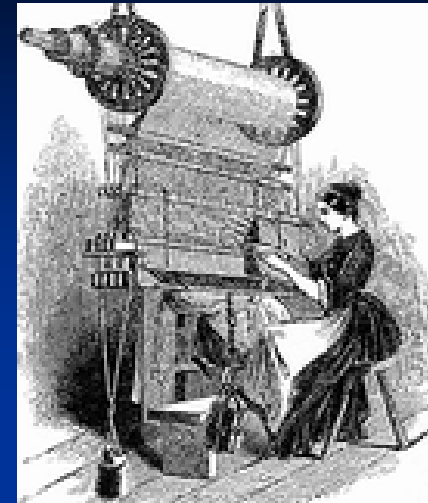


Interchangeable Parts

- After the success of the Cotton Gin, Whitney was hired by the government to manufacture 10,000 rifles in 2 years (1798-1800)
 - Whitney used the idea of Interchangeable Parts
 - Rifles were made of identical pieces that could be switched from rifle to rifle
- Required a new way of manufacturing
 - Machines that followed a pattern to make identical parts
 - No individual craftsman's skill required
 - Milling machines
- Whitney took eight years to fill his order for rifles
 - More time was needed to work out and build each machine before major production could begin
 - After his system was perfected, Whitney filled an additional order to the government in 1811-1813 for 15,000
- Transformed ideas of industry and mass production in America

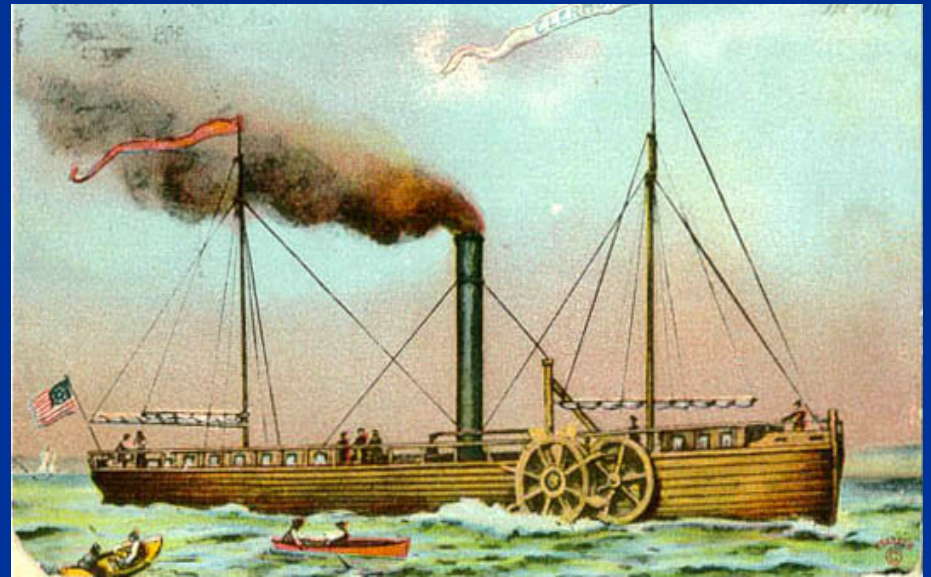
Lowell System

- Francis Cabot Lowell
- Developed a water powered plant to spin thread and weave cloth in 1814
 - Waltham, Massachusetts
- Employed young women
 - Provided boardinghouses, clean facilities, good wages, evening lectures
- As machines became quicker and more efficient, girls had to work harder to keep up
 - Harder work, worsening conditions, wages cuts
 - Competition for jobs due to immigration of 1840's
 - Sarah Bagley – Lowell Female Labor Reform Association—1844
 - Trade Unions—skilled workers organize in response to hard economic times
 - Improve pay and working conditions
 - Early strikes unsuccessful
 - Lowell system abandoned in 1850s



Steamboat

- The first steamboats were tested in Europe during the late 1700s
- American Robert Fulton improved the design and built the Clermont
 - North River Steamboat
 - Sailed up the Hudson on August 17, 1807
 - First successful commercial steamboat service
- Could sail upstream
- Did not rely on wind power
- Revolutionized American travel and trade
 - 727 by 1855



Robert Fulton's *North River Steamboat* -Clermont

Gibbons v. Ogden (1824)

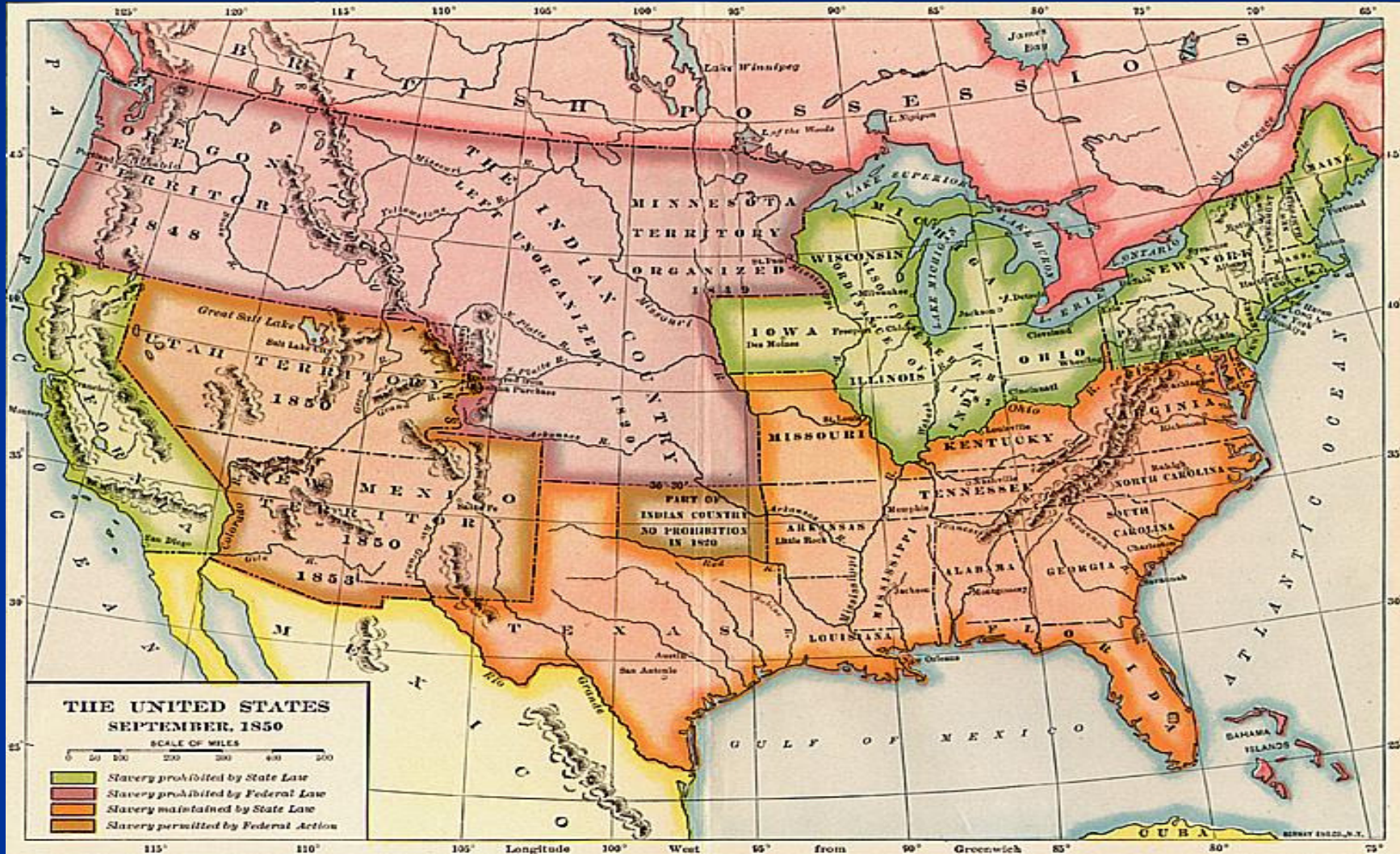
- First Supreme Court ruling on commerce between the states
 - Ogden had the only state license to operate steamboats in New York
 - Gibbons had a federal license to operate between New York and New Jersey.
- Chief Justice John Marshall and the Court
 - Reinforced the division of powers
 - Reinforced federal government's authority to regulate trade between the states; ended monopolistic control over waterways
 - Expanded the definition of commerce to include the transportation of people
 - Today this has been expanded to include communications technology too.

American Railroads

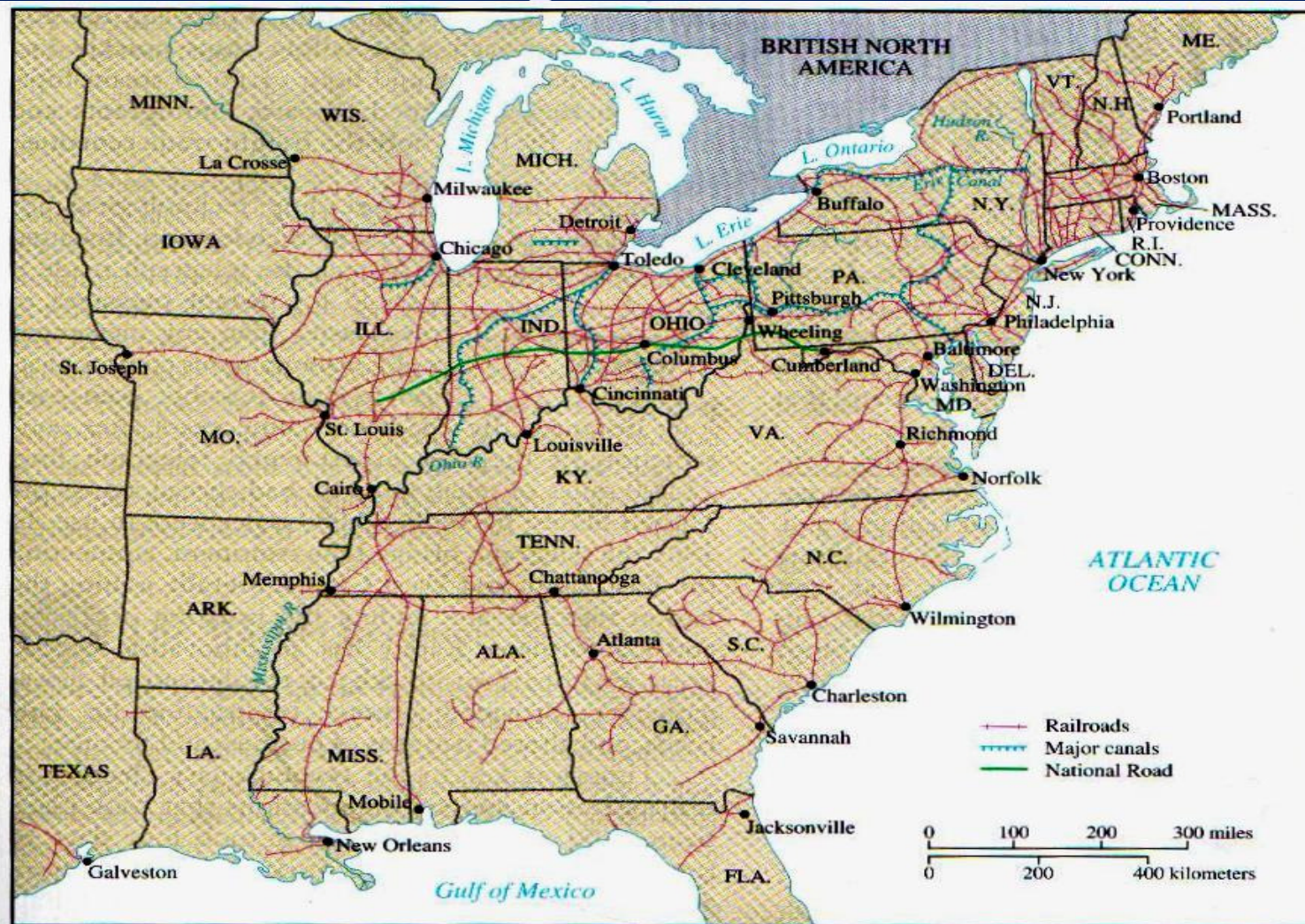
- Peter Cooper builds *Tom Thumb* in 1830
 - Loses to Horse Drawn carriage in race on the Baltimore & Ohio railroad
- By 1840 2,800 miles of track had been laid
 - Most rail was laid in the North
 - Where rail was laid, industry, agriculture, and commerce grew
- By 1860, 30,000 miles of track was laid
 - Linked major cities
 - Provided national markets for farmers, manufacturers
 - Increased competition, lowered prices for consumers
 - Contributed to urban and industrial growth



The United States – 1850



US Transportation – 1860



Major Railroads, Canals, and Roads in 1860 *Transportation networks linked port cities to the interior. These links were most dense in the populous Northeast and the Old Northwest.*

Telegraph

- Samuel Morse invented the Telegraph in 1832
 - Could transmit messages over a wire through a series of electrical pulses
 - Pulses converted to dots and dashes called Morse Code
- Allowed for communication over thousands of miles
- Publicly tested in 1844
- Telegraph grew with the railroad
 - Telegraph wire was strung on poles alongside railroads
 - First transcontinental line – 1861

INTERNATIONAL MORSE CODE

1. A dash is equal to three dots.
2. The space between parts of the same letter is equal to one dot.
3. The space between two letters is equal to three dots.
4. The space between two words is equal to five dots.

A	• —	U	• • —
B	— • • •	V	• • • —
C	— • — •	W	— — —
D	— • •	X	— • • —
E	•	Y	— • — —
F	• • — •	Z	— — • •
G	— — •		
H	• • • •		
I	• •		
J	• — — —		
K	— • —	1	• — — — —
L	• — • •	2	• • — — —
M	— —	3	• • • — —
N	— •	4	• • • • —
O	— — —	5	• • • • •
P	• — — •	6	— • • • •
Q	— — • —	7	— — • • •
R	• — •	8	— — — • •
S	• • •	9	— — — — •
T	—	0	— — — — —

Agricultural Revolution



JOHN DEERE



- John Deere
 - Blacksmith from Vermont
 - Facing Bankruptcy at 32, Deere moved to Grand Detour, Illinois
 - Developed a cast-steel plow in 1837 to cut through the tough Midwestern soil
 - Began Production in 1843
 - Had sold 10,000 by 1855

Cyrus McCormick

- Cyrus McCormick
 - Son of Virginia farmer
 - Father had begun design of horse-drawn reaper but had abandoned project after 16 years
 - Cyrus picked up and finished design in 6 weeks
 - Patented Mechanical Reaper in 1834
 - Cut time to harvest an acre of wheat from 20 hours to 1 hour.
 - Moved to Chicago and mass produced reapers throughout the 1840s
 - Steam engine technology to run mechanized factory
 - Provided Credit



➤ Agricultural inventions by Deere and McCormick helped expand wheat and corn production in the Midwest .

Industrial Revolution at Home

- Isaac Singer – Sewing Machine (1850)
 - Improved on Elias Howe's earlier design
 - Women bought them for their homes and earned money sewing clothing for large companies
- Household Inventions
 - Iceboxes—allow people to store fresh food safely
 - Iron cook stoves replace cooking hearths
 - Mass production of old inventions makes them affordable for more people
- Cities began to build public water systems
 - Running water in homes