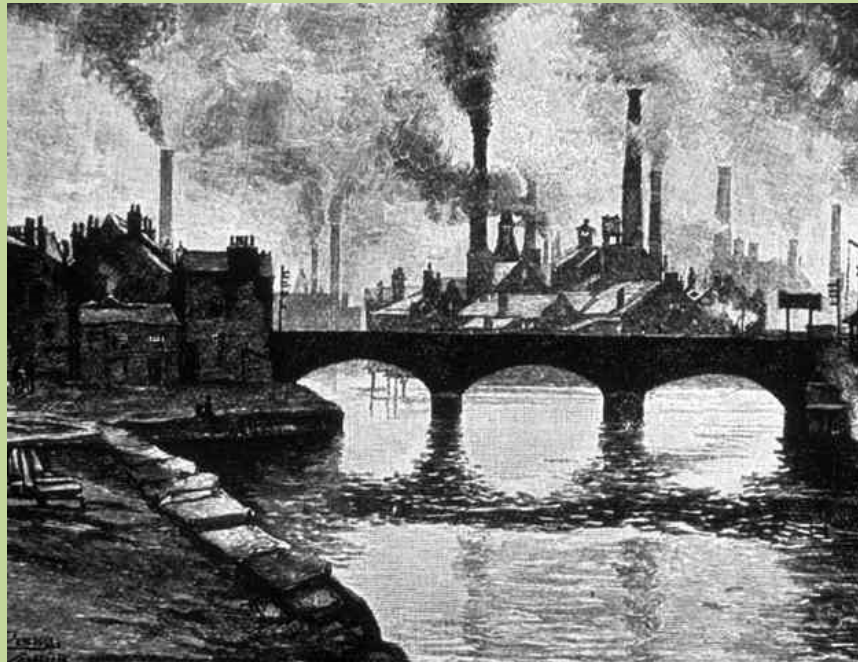
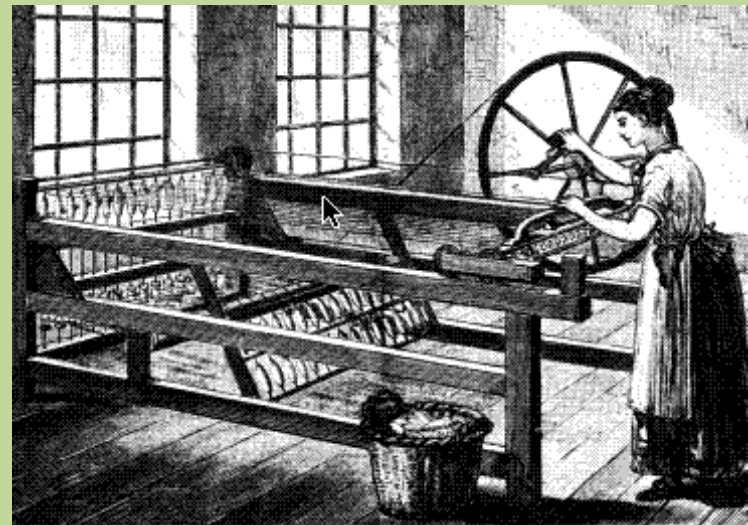


The Industrial Revolution

THE EUROPEAN MOMENT (1750 – 1900)



- In England during the mid 1700s goods that were normally produced by hand began to be produced more and more by machines. This Industrial Revolution would have great effects on:
 - Western society (bitter class struggles)
 - Economics (explosion of manufacturing; socialism)
 - International relations (The West will become wealthier & stronger)
 - the environment
 - Technology



Why England?

- Natural resources (coal, rivers, iron ore, harbors)
- Political stability
- Highly developed banking system (loans)
- Growing population
- Patent system (therefore an incentive to invent)
- Weak guilds (guilds were usually resistant to change)



- Why did it happen at all?
 - Spirit of inventiveness since the Scientific Revolution
 - Capitalism rewards those who can develop something profitable
 - Increased overall trade
 - *Why not?* History has been a story of progress.



Specific Changes

- **Division of Labor allowed mass production.** In other words, by breaking up a process into several repetitive tasks (think assembly line) and using interchangeable parts many items could be made quicker than before.

Example: The Wedgwood Potteries in England mass produced inexpensive china.



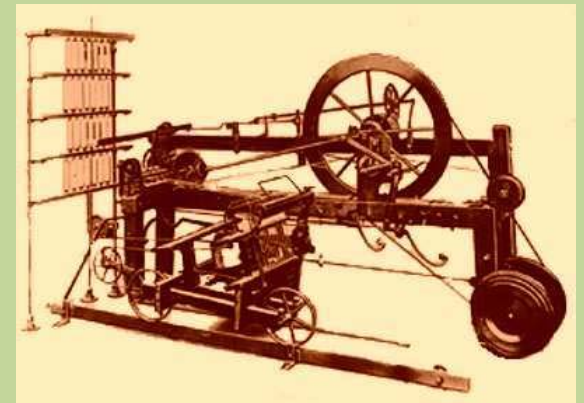
- **Mechanization.** Machines carried out tasks that had been done by hand. New inventions made previous jobs less difficult. For example, in the textile industry changes came quickly as new machines quickly replaced old ones.



Flying Shuttle

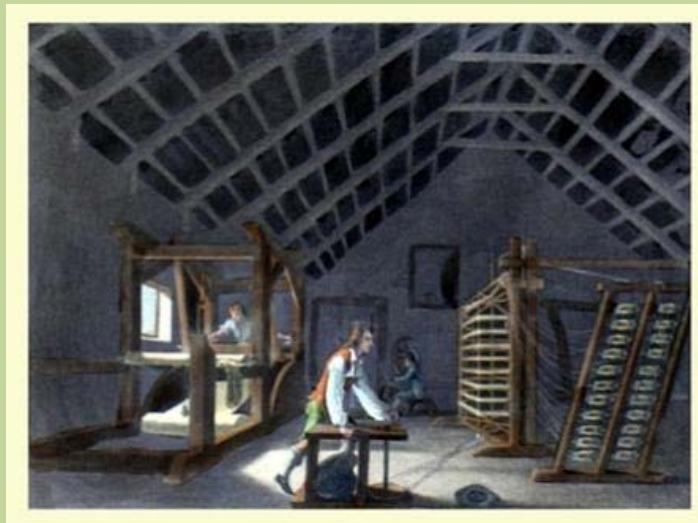


Spinning Jenny



Spinning Mule

- British cotton output increased tenfold between 1770-1790. In India it took 500 hours to spin a pound of cotton, the mule could do it in 3 hours.
- The effects of mechanization on textiles in Britain:
 - Greater demand for American cotton (Eli Whitney will invent the cotton gin, therefore slavery is still important)
 - Decrease in the price of cloth (90% drop between 1782-1812)
 - New inventions did not require much skill (even a kid could do it!)





- These new machines were big and bulky (not suitable for peoples' homes) therefore factories began to be built.

- **Use of coal increases use of iron.** Although iron had been used for thousands of years in Europe, the Tropics, China, etc. smelting was a resource intense activity that led to deforestation.
- In 1709, it was discovered that “coke” (coal from which the impurities have been cooked out, think coal) could be used in place of wood burning furnaces.
- Coal was plentiful (there seemed to be endless quantities of it!) and it helped make iron cheaper to produce.
- BY 1844, Britain was producing more iron than the rest of the world combined.



- Cheaper iron meant it would be used to make just about everything (ex: bridges, buildings, hardware, tools, etc.)



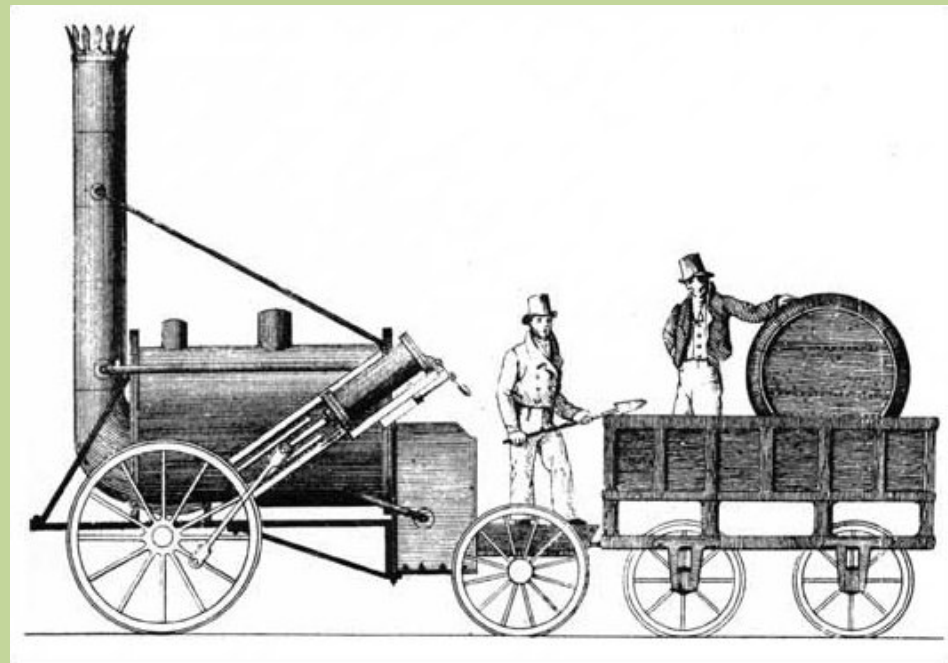
- **The Steam engine.** Scotsman James Watt developed an efficient steam engine in 1765.
- The steam engine was the “most celebrated” invention of the 18th century because it became possible to substitute human, animal, water, & wind power.



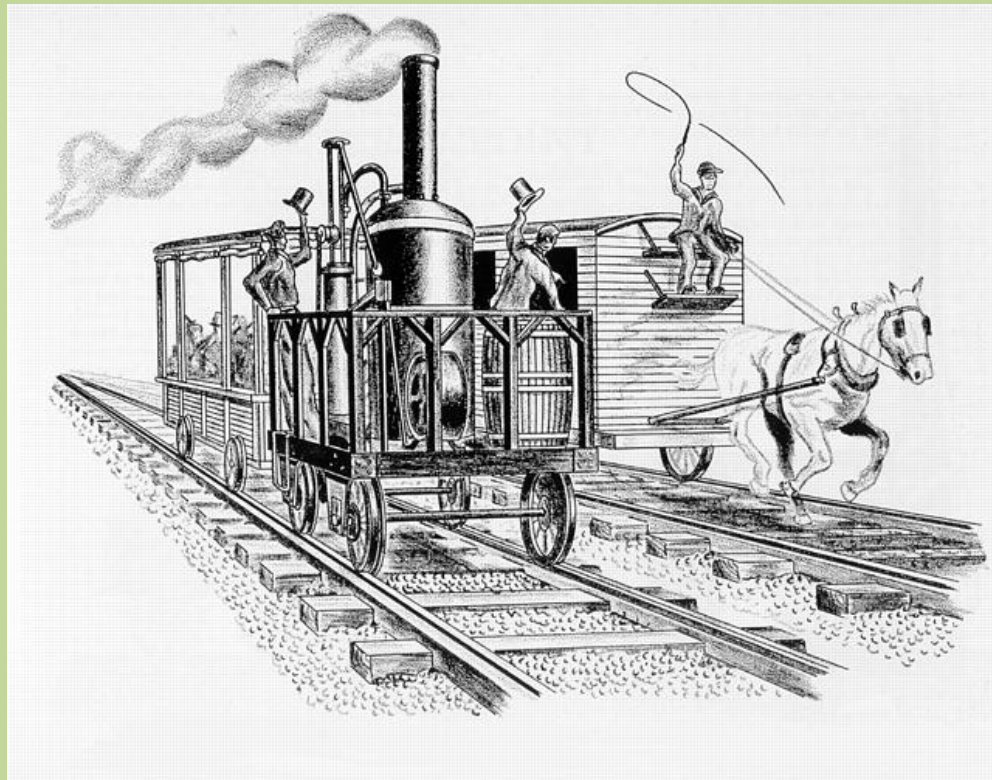
- Steam engines were eventually put on boats (steamboats), which allowed ships to move upstream and without wind. (In 1838, the *Great Western* and the *Sirius* crossed the Atlantic Ocean on steam alone).



- At first steam engines were too heavy to pull any weight on land, but innovations led to lighter more efficient engines (In 1804, Richard Trevithick built an engine that used a 1/3 of the coal as Watt's engine).
- **Railroads.** Around the turn of the century the steam engine was eventually put on wheels (locomotives).



- Throughout the 1820s railroads were regularly being used by locomotives and horses pulling wagons (in 1829, there was a race in England between a horse drawn wagon and a train, the train cruised to victory going 30 mph).



- Trains greatly affected life in Britain & elsewhere:
 - They provided a cheap way to transport raw materials and final goods.
 - The rail industry created many new jobs; they stimulated the iron, machinery, & construction industries especially in Northern Europe.
 - Travel became easier, rural residents could work in the city.
 - The Midwest was opened up American “Easterners” could get fresh beef from western ranches.



Quick Video



The Railroad Journey and the Industrial Revolution: Crash Course World History 214

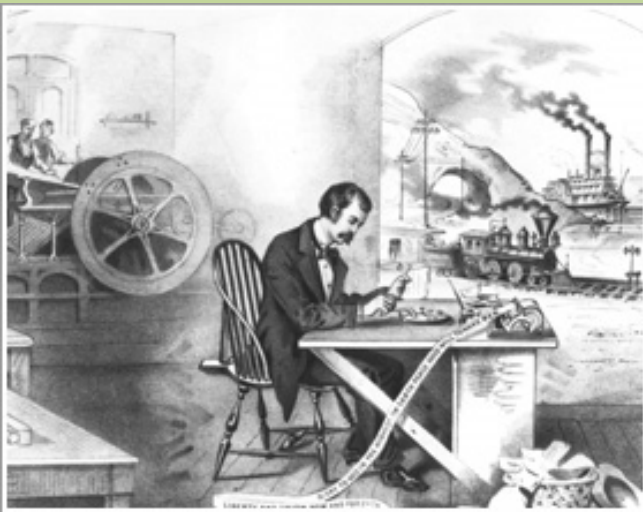
- <https://www.youtube.com/watch?v=GYAk5jCTQ3s>

- **Communication over wires.** The first practical telegraphs were developed in Britain & the U.S.
- Samuel Morse's "Morse Code" (1837) was a system of electrical pulses sent between two points. By the mid 19th century telegraph lines were built (usually next to railways) throughout the Eastern seaboard as well as in parts of Europe.
- Submarine telegraph cables began to be laid first across the English Channel, then in 1866 across the Atlantic.



- **In sum, the Industrial Revolution was characterized by these changes:**
 - Division of labor allowed mass production
 - Mechanization
 - Use of coal increases use of iron
 - The steam engine
 - Railroads
 - Communication over wires

- After its start in England the Industrial Revolution spread to places that had some of the same qualities that Britain had that fueled its industrial growth (U.S., Belgium, Germany, Northern Italy & France).



 The Industrial Revolution on the Continent. The major developments took place in Germany and in the coastal areas along the English Channel where there were better natural resources or pools of labor.



Map 18-1
 Ways of the World, First Edition
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