An aerial, sepia-toned photograph of a sprawling industrial city, likely Manchester, during the Industrial Revolution. The landscape is dominated by a dense network of factories, warehouses, and residential buildings. Numerous tall, dark smokestacks are visible, many of which are emitting thick plumes of white smoke that drift across the sky. The city extends to the horizon, where the industrial area meets a more open landscape under a hazy, overcast sky. The overall atmosphere is one of intense industrial activity and urban expansion.

# **The Industrial Revolution of Great Britain**

**by Gordon Hurst, SKA High School for Girls**



An aerial photograph of a lush green agricultural landscape. The land is divided into numerous rectangular and irregular fields by dark lines representing hedges or stone walls. Scattered throughout the landscape are several large, mature trees. In the far distance, a range of low, rolling hills is visible under a hazy sky. The overall scene depicts a typical English countryside from the 18th or 19th century.

# **It starts with the Agrarian Revolution (The Agricultural Revolution)**

**In the early 1700's, agricultural inventions  
created major changes in food production.**

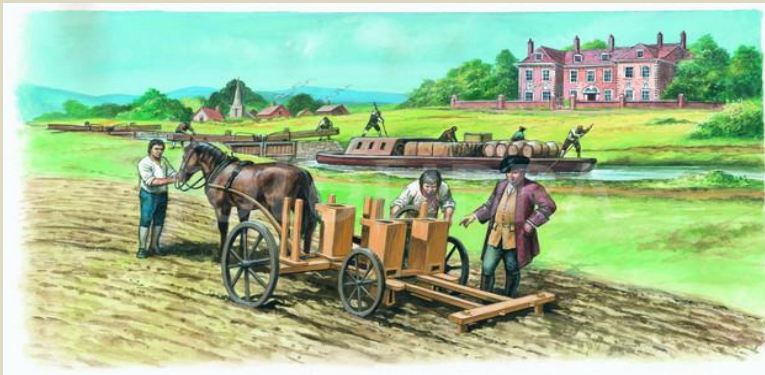
**Three main people were:**

**Jethro Tull**

**Robert Bakewell**

**Charles, Viscount Townshend**

# Jethro Tull



- Invented the **horse-drawn seed drill** in 1701 and then the **horse-drawn hoe**
- In 1731 he wrote ***Horse Hoeing Husbandry***
- His inventions were labor saving devices meaning that fewer farm workers were needed to work the fields

# Robert Bakewell



He is responsible for **selective-breeding** of sheep, cattle and horses. He bred different sheep for wool and meat, larger and fatter cattle for meat and stronger horses for farm work





# Charles “Turnip” Townshend



Year 1



Year 2



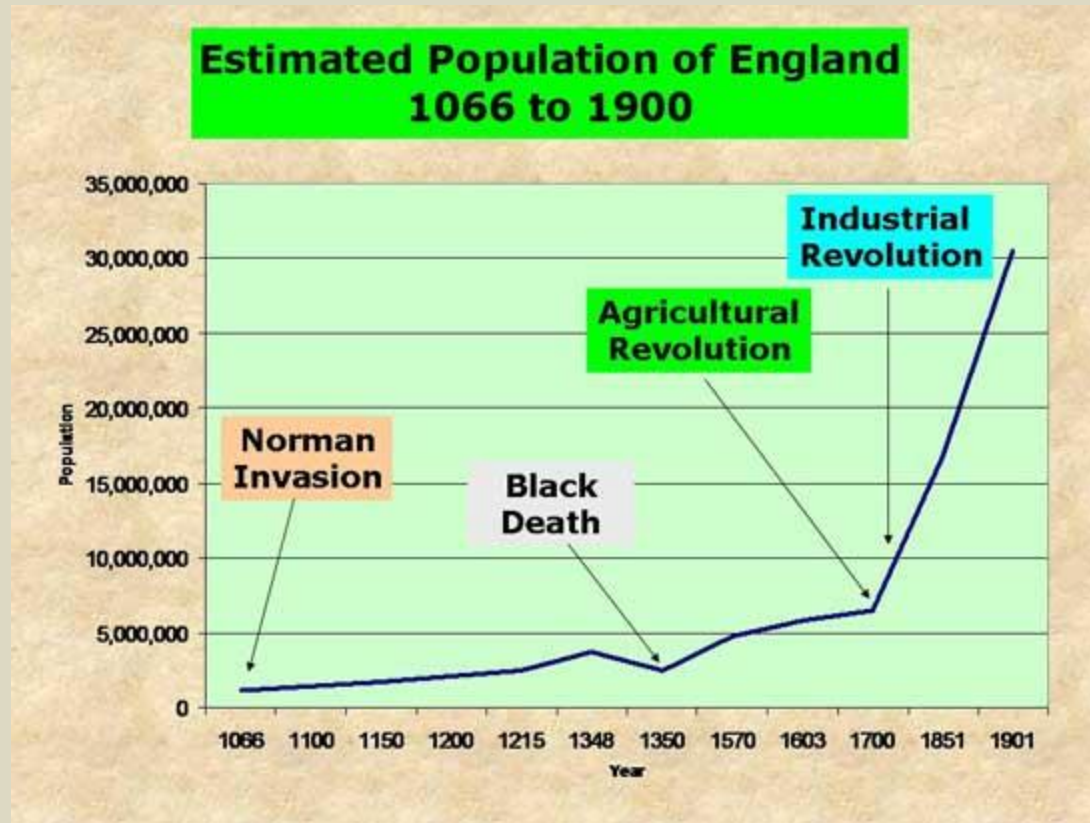
Year 3



Year 4

Changed the **crop rotation system**. Legumes added nitrogen to the soil making it more fertile. No longer needed to keep fields fallow. The **four-year** crop rotation now created full field productions and more crops year round

# The Population Grows



**More and better food availability leads to dramatic population growth**

# Urbanization Begins

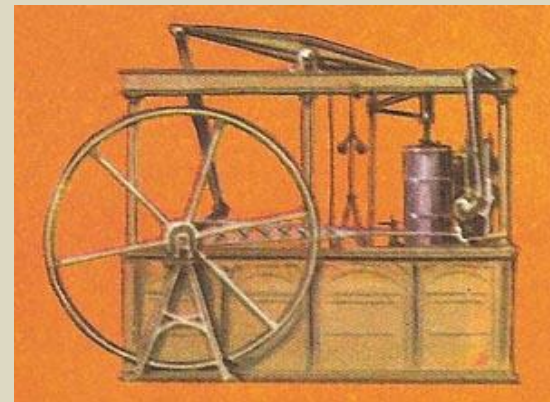
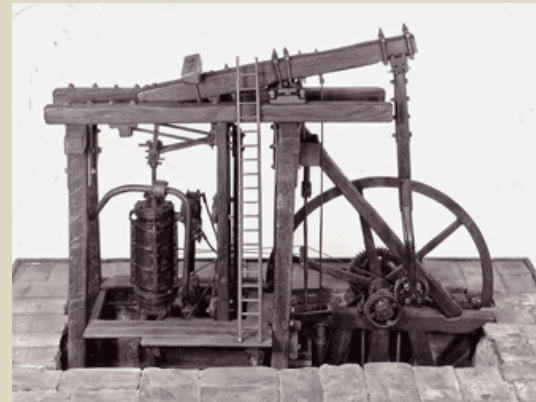
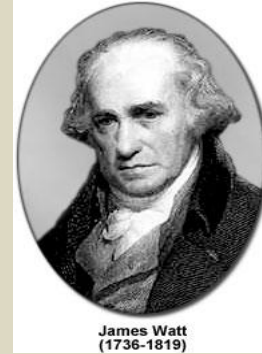


**Fewer farm workers were needed due to the new inventions and techniques. Mass migrations to the cities took place.**

# James Watt

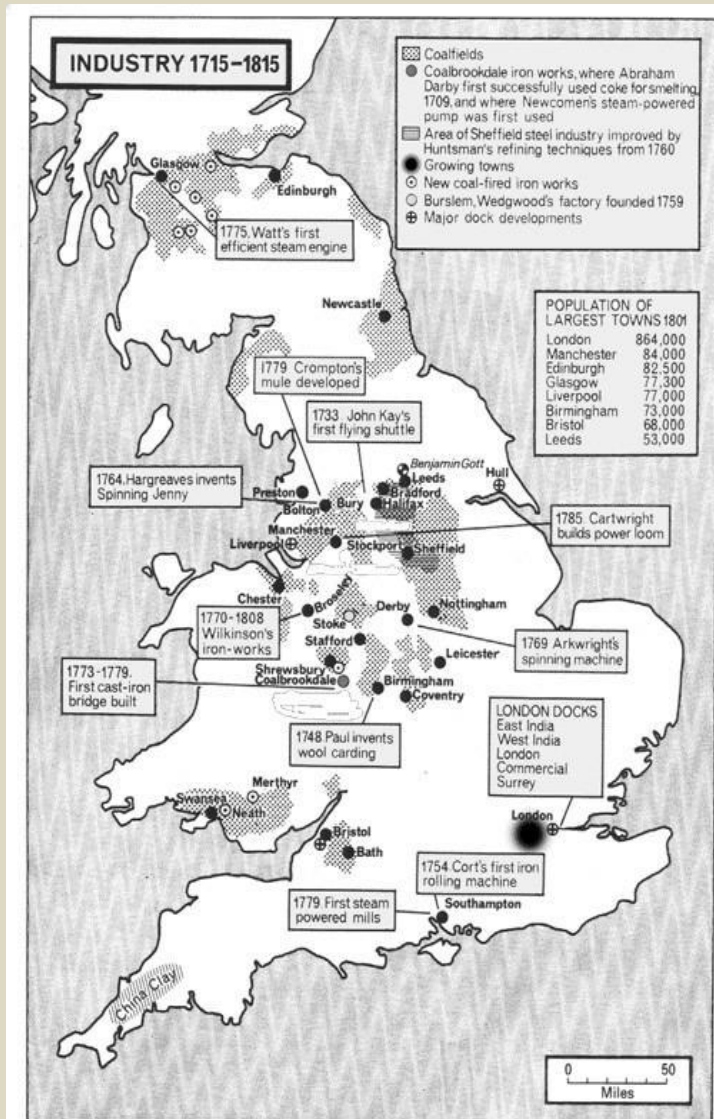
He is one of several men credited for inventing the **Steam Engine**.

This new power source gave rise to the birth of the **Factory System** that changed British industry





# England has the Raw Materials



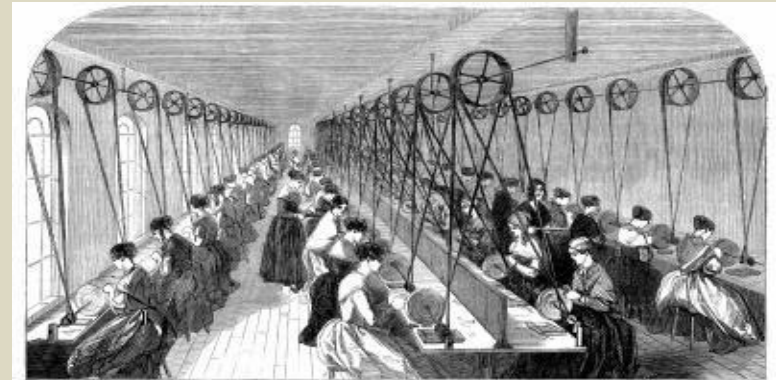
- Abundance of **coal** to power the steam engines
- Plentiful supply of fresh **water** from rivers and streams
- Large deposits of **iron ore** to build the factory machines

# The Textile Industry Changes

- Cottage Industries disappear as textile factories are built to mass-produce **fabrics**
- Major improvements are made by new machines that **spin and weave** textiles
- **Urbanization** creates a plentiful labor supply



Cottage Industry



Typical textile factory

# Technological Inventions

**John Kay**

**The Flying Shuttle**

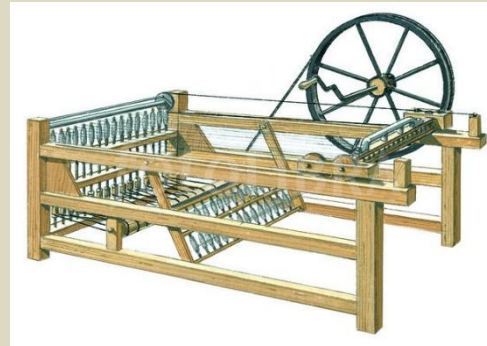
Doubles speed of weaving



**James Hargreaves**

**The Spinning Jenny**

Spins 20 threads at once



**Richard Arkwright**

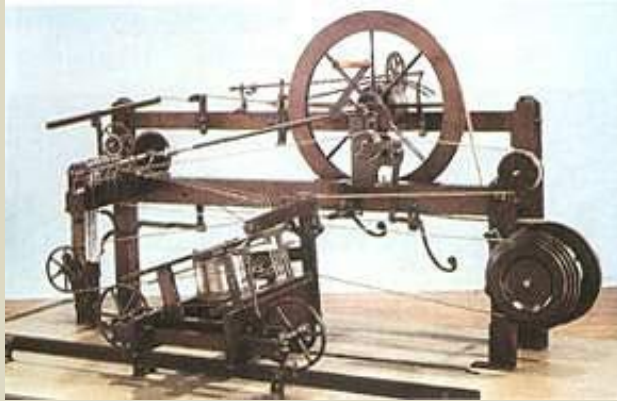
**The Water Frame**

Uses water power to spin  
300 threads at once





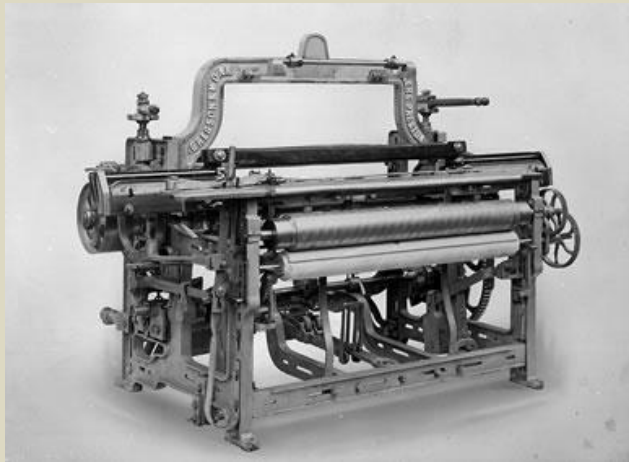
# Technological Inventions



**Samuel Crompton**

**The Spinning Mule**

Combines Jenny and Water Frame to spin finer thread



**Edmund Cartwright**

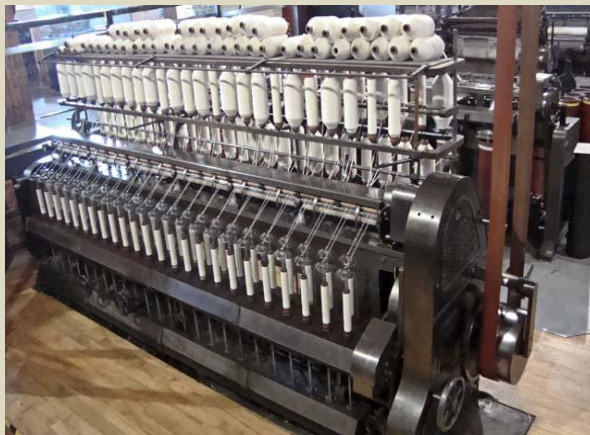
**Power Loom**

First time steam power used for weaving

# Bigger, Better Machines are Made



Old Version



New Version

- **Technological advancements** lead to more efficient machines
- **The Steam Engine** allows for factories to run all day
- **The supply of cheap labor** provides an abundance of factory workers

# Eli Whitney's Invention

In North America, the **Cotton Gin** is invented. It is a simple hand-driven machine that removes the seeds from the cotton balls. It is a labor-saving invention that causes increased cotton production and the better use of labor in the fields



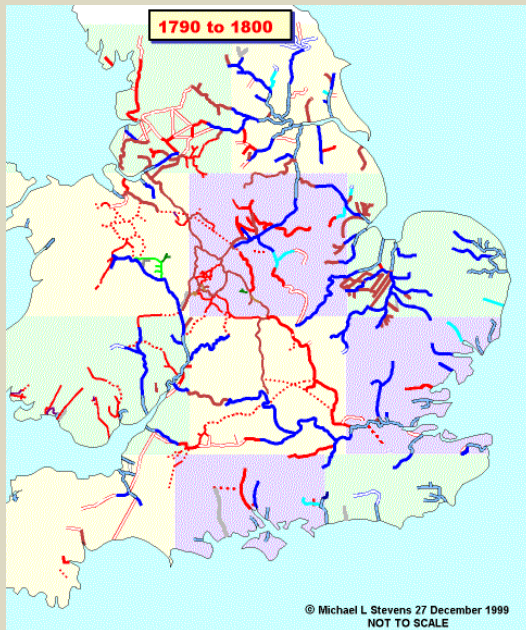


# Factory Towns Emerge

- Life revolves around the factory. It provides for everyone who lives and works there.
- The abundance of cheap labor brings great profits to the factory owners
- British industry thrives



# Infrastructure is needed

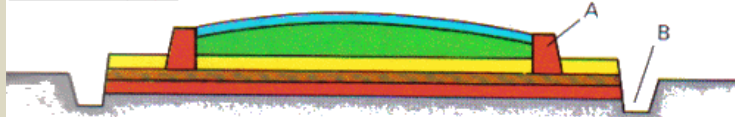


Canals and Waterways

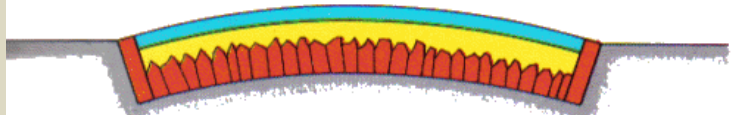
To move the raw materials from the mines to the cities and to carry the finished goods to the ports for export, a **canal system** was built throughout England. Heavier goods can be carried by water than by land. Many cities developed along these **inland waterways**.

# Roads are built connecting cities

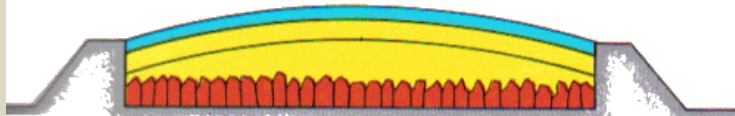
Scientists and Inventors



Roman pavement in section, showing local-stone wearing course (blue), cambered hard filling (green), Roman concrete (yellow), waterproof layer of stones (brown), compacted earth footing (red), retaining stones (A) and drainage ditch (B).



18th-century French engineer Pierre Tresaguet is credited with the first modern pavement design. Its 3-1/4 inch surface of small stones (blue) covers a 6-3/4 inch course of large stone (yellow), resting on a foundation of heavy stone (red) placed on a cambered footing.



A road pavement design by British engineer Thomas Telford. Its 2-inch-thick gravel wearing surface (blue) rests on two layers of 2-1/2 stones, forming a base course 20 inches deep in the middle (yellow). It rests on 6-3/4 inches of heavy stones (red).



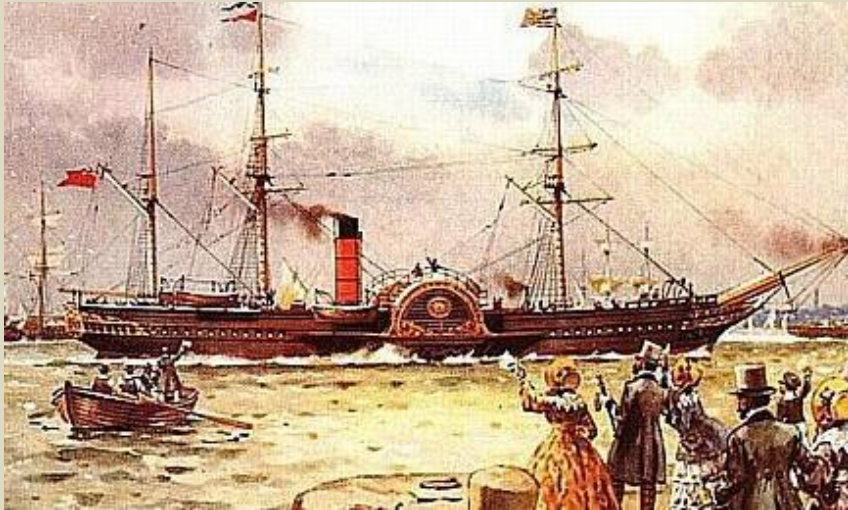
MacAdam's road pavement was simpler than some other versions, but very effective. It comprised three layers -- wearing surface (blue), base course (yellow), and footing (red) -- the first two of 2-inch stones resting on a footing of compacted cambered earth.



**Thomas Telford and John (Tar) McAdam** invent new ways to lay roads across the country using local materials in layers and topped with hot tar to create a hard surface



# British ports grow for trade



Ports grow due to the import of **cotton** from the Americas and the export of **finished goods** to the colonies

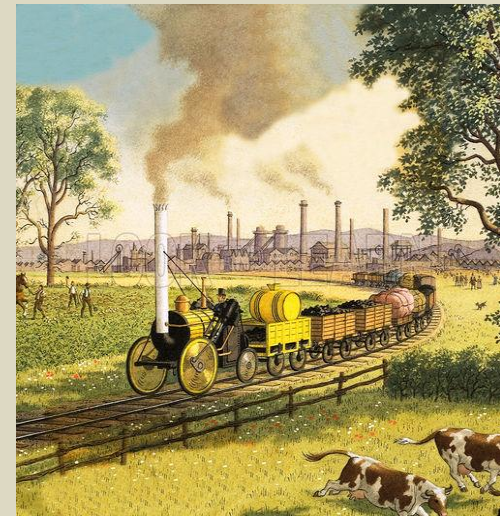
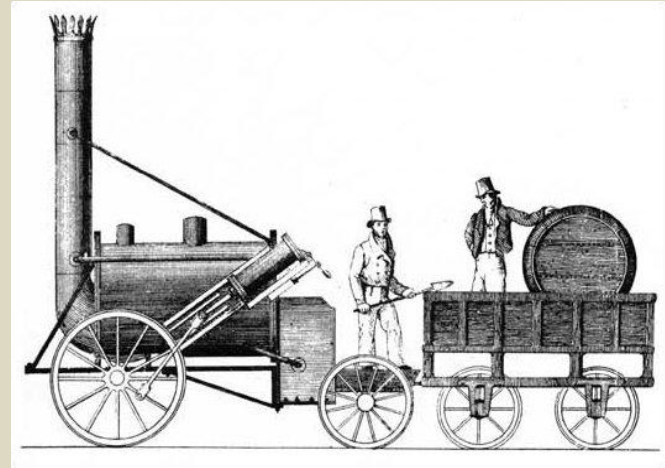


The largest were:-

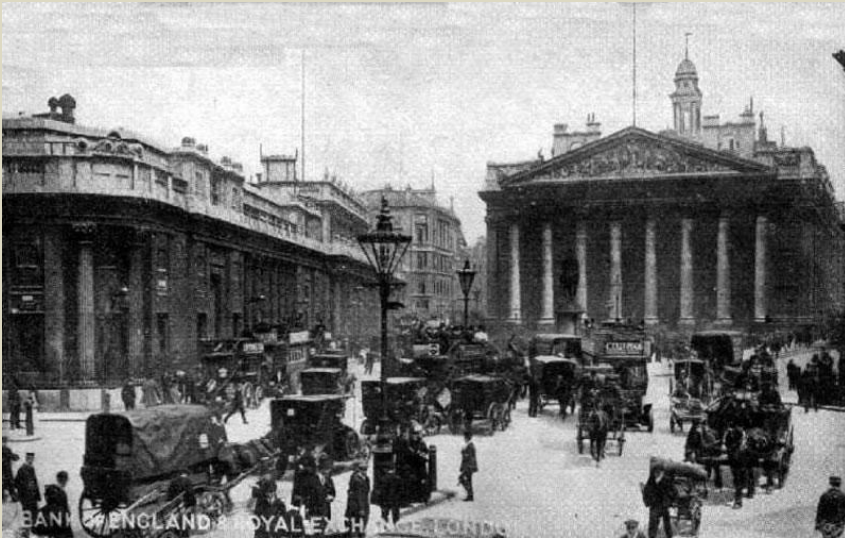
**Liverpool**  
**Bristol**  
**Manchester**  
**London**

# The Steam Engine arrives!

- Robert Stephenson invents the “**rocket**” in 1829 and is used on the Liverpool to Manchester railroad
- Railway networks now connect Britain and the canals are no longer used as the barges are slower than trains.



# The Bank of England

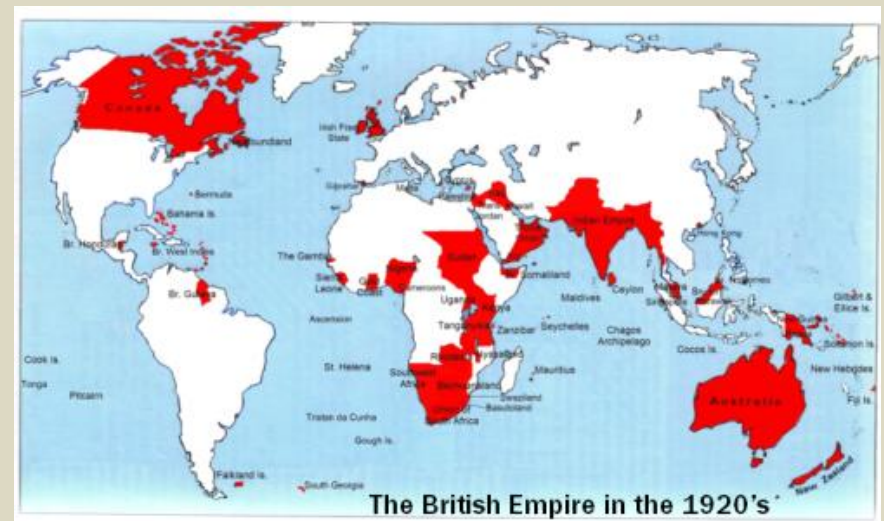
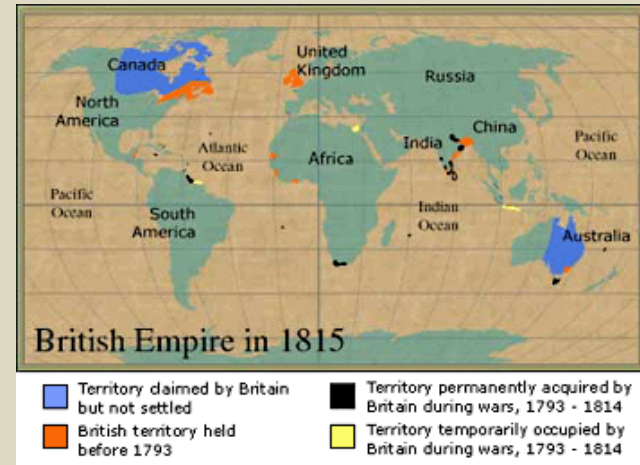


- The British government and the Bank of England encourage manufacturers to produce by supporting them with loans and lowering tariffs on raw cotton and other necessary materials for production
- **A strong bank means a strong economy**



# Ready Markets for the Goods

- The British Empire rapidly grows during the Industrial Revolution
- Each territory is a new market for the finished goods
- Each territory is a new source for raw materials needed for industrial growth
- Britain's economy booms!



# Not All is Good!



- Factory Life is very hard with long hours for both women and children.
- Conditions are very bad
- There are few safety regulations so serious accidents happen
- 14 hour days for very little pay
- If you complain then you are replaced!

# So much Child Labor!

- Young children were used in all industries and were exploited in many ways
- Little was done to protect their health and safety
- Mines and factories were unsafe and unfit for any human being





# Urban life was very hard



- **Slum areas** developed where the working classes lived, often close to the factory
- Coal fires produced smoke and pollution
- Sanitary conditions were very bad
- Crime, disease and poverty were “the norm”

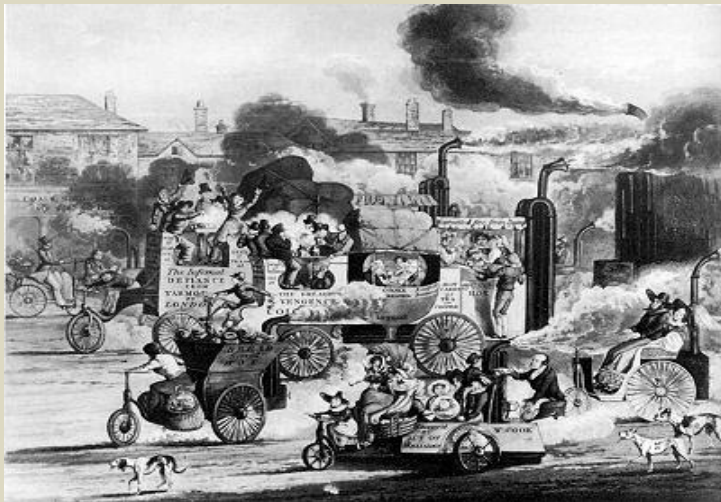


# Inequality of Wealth

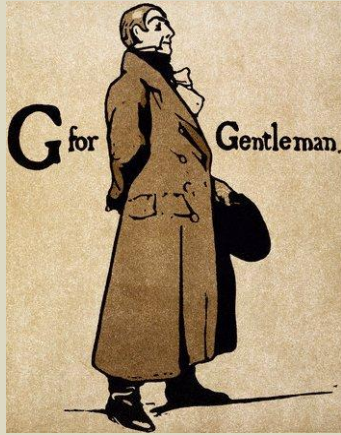
The Rich became Richer



The Poor became Poorer



# The Middle-Class Emerges



- Shopkeepers, merchants, artisans, craftsmen, tradesmen and other professionals became the **Middle-Class**.
- They reformed many laws for the people of Britain
- They even impacted literature as they told about the way life really was in the cities



# Industrialization Spreads

From 1850 onwards other countries had their own Industrial Revolutions:

**France**  
**Germany**  
**United States**

They closely copied the British factory system but improved efficiency due to more modern technology

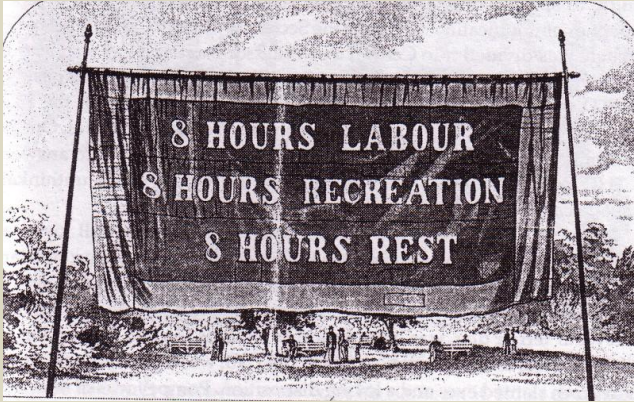
## Spread of Industrial Revolution



# The Inventions Continue

Inventor or Developer	Nation	Invention or Development	Year
<b>Eli Whitney</b>	United States	Interchangeable Parts	1840
<b>Samuel Morse</b>	United States	Telegraph and Morse Code	1840
<b>Elias Howe</b>	United States	Sewing Machine	1844
<b>Henry Bessemer</b>	Great Britain	Steel from Iron Ore	1856
<b>Alexander Graham Bell</b>	United States	Telephone	1876
<b>Thomas Edison</b>	United States	Electric Light Bulb	1879
<b>Gottlieb Daimler</b>	Germany	Automobile	1887
<b>Henry Ford</b>	United States	Mass-produced Automobile	1903
<b>Orville &amp; Wilbur Wright</b>	United States	Airplane	1903

# Age of Reforms



The Industrial Revolution leads to economic, social and political reforms:

- \* **Laissez-Faire economics**
- \* **Drive to end slavery**
- \* **Karl Marx writes**  
***The Communist Manifesto***

