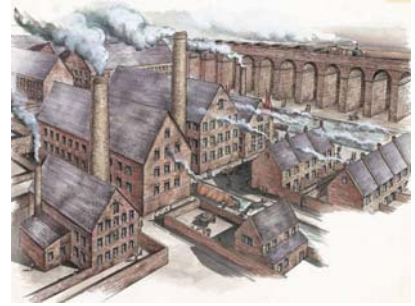


## 13:1a Industrial Innovations & Ideas

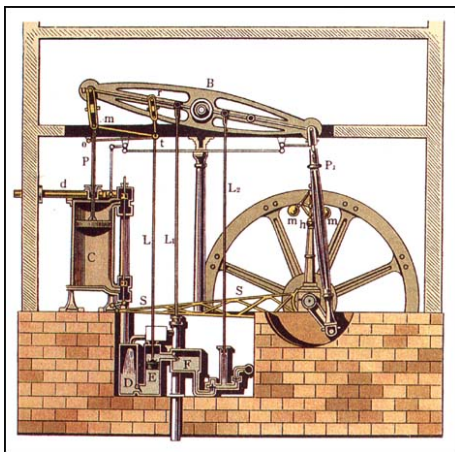
✓ During the 1800's a “revolution” in the way goods are produced and, in turn, how people live took place in Western Europe, the United States and other parts of the world.



Great Britain was the birth place of the Industrial Revolution because the economic and political conditions were ideal.

✓ Hand tools in small shops or homes (**cottage industry**) produced most goods until the late 1700's.

✓ **Mass production** replaced it during the early 1800's (many identical products by machines that rapidly do one job)



✓ **James Watt** (1736—1819) was a Scottish engineer who developed a new steam engine and adopted it for use to run machines (1769).

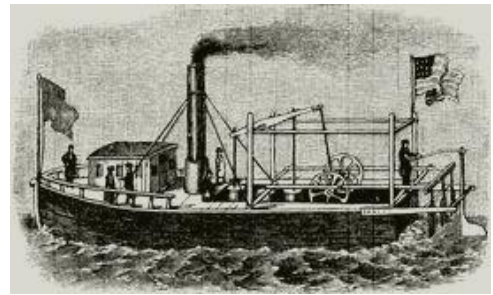
## 13:1b Industrial Innovations & Ideas



✓ **George Stephenson's** (1781—1848) locomotive, **The Rocket**, averaged 14 miles an hour (1829).

### ✓ **John Fitch**

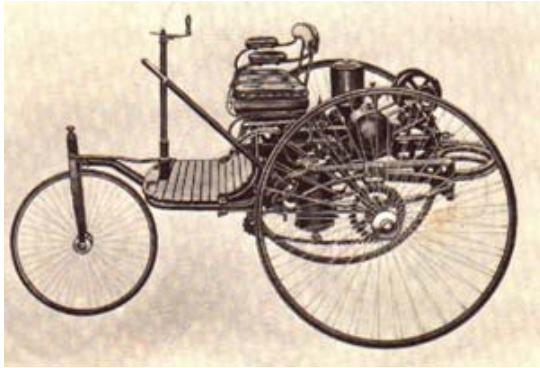
(1743—1798) developed the first working steamship in 1787. Credit is also given to **James Rumsey** (1743—1792) for developing a steam boat that same year.



✓ **Robert Fulton** (1765—1815) made the first practical use of a steamship in 1807 with his ship “Clermont.”

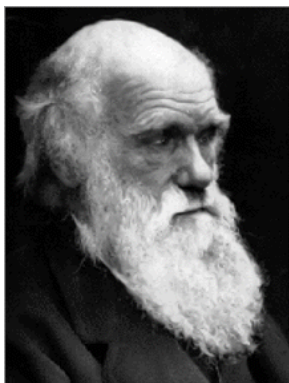
✓ **Henry Bessemer** (1813—1898) invented a process for making better steel faster and in large amounts.

## 13:1c Industrial Innovations & Ideas



✓ **Gottlieb Daimler** (1834—1900) and **Karl Benz** (1844—1929) devised the first automobile, powered by an internal combustion gas engine (1886).

✓ **Louis Pasteur** (1822—1895) discovered that germs cause infectious diseases; also discovered several vaccines. His work also represents the revolution of **scientific methodology**. Pasteur superimposed two indisputable rules of modern research: the freedom of creative imagination necessarily subjected to rigorous experimentation.



✓ **Charles Darwin**, a British Naturalist (1809 -1882) developed the idea of **Natural Selection**. “I have called this principle, by which each slight variation, if useful, is preserved, by the term Natural Selection.” from **The Origin of Species** (1859).

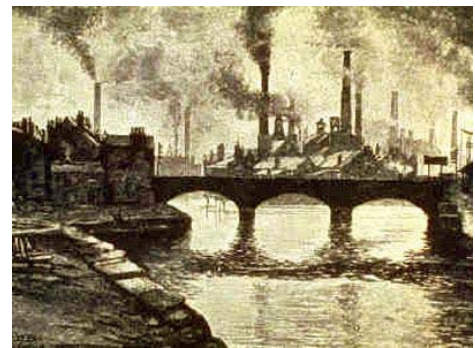


## 13:1d Industrial Innovations & Ideas



✓ **Orville** (1871—1948) and **Wilbur Wright** (1867—1912) made the first successful airplane flight (Kitty Hawk, North Carolina –1903)

✓ The new industrial era brought challenges. Factories, mills and mines were dangerous, often unhealthy, and caused pollution. Child labor was a common practice.



✓ Cities around factories grew rapidly, they became crowded and unsanitary.



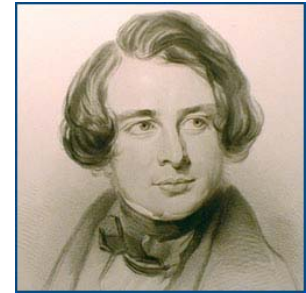
✓ Some people became rich while most workers lived in relative poverty.

## 13:1e Industrial Innovations & Ideas



✓ **Thomas Malthus** (1766—1834) blamed over population for poverty and, ultimately, widespread famine and death.

✓ **Charles Dickens** (1812—1870) wrote novels to show the plight of poor working families. His works include *David Copperfield* and *Great Expectations*.



✓ Some applied the theory of Charles Darwin (natural selection ... survival of the fittest) to economic realities. According to **Social Darwinism** the poor and down trodden simply were not fit to survive.



✓ Writers and artists turned to **romanticism** championing individualism, love of nature and humanitarianism, not the ugly materialistic side of the new industrial society. Left is **The Kiss** by Francesco Hayez (1791—1882).