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STS.003 The Rise of Modern Science
Spring 2008

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STS.003

Spring 2008

Keywords for Week 5

Lecture 8: Thermodynamics and the Industrial Revolution

James Watt (1736-1819)

Steam engine

Wedgwood pottery, first factory steam engine, 1782

Antoine Lavoisier (1743-1794)

Caloric theory of heat

Benjamin Thompson, Count Rumford (1753-1814), *An Experimental Enquiry Concerning the Source of the Heat which is Excited by Friction* (1798)

Mechanical theory of heat

Lazare Carnot (1753-1823), *Fundamental Principles of Equilibrium and Movement* (1803)

Waterwheel

École Polytechnique

Sadi Carnot (1796-1832), *Reflections on the Motive Power of Fire* (1824)

Ideal heat engine

James Prescott Joule (1818-1889), paddle wheel experiment, 1845

Mechanical equivalent of heat

Robert Mayer (1814-1878), *Remarks on the Forces of Inanimate Nature* (1842)

Hermann von Helmholtz (1821-1894), "On the Conservation of Force" (1847)

Tensive force

Living force (*vis viva*)

Rudolf Clausius (1822-1888), "On the Moving Source of Heat" (1850)

Entropy

William Thomson, Lord Kelvin (1824-1907), "On the Dynamical Theory of Heat" (1851)

Energy

Irreversibility

Conservation of energy

Dissipation of energy

Hermann von Helmholtz (1821-1894), "The Interaction of Natural Forces" (1854)

Thermal death

Lecture 9: Physics and the Telegraph

British Empire

Submarine telegraphy

William Thomson, Lord Kelvin (1824-1907)

Mirror galvanometer

The Atlantic Cable

Ampermeter, voltmeter, electrical balance, electrometer

Werner von Siemens (1816-1892)

British ohm

André-Marie Ampère (1775-1836)

Electrodynamics

Action-at-a-distance theory of electromagnetism

Michael Faraday (1791-1867)

Electromagnetic induction

Field theory of electromagnetism

James Clerk Maxwell (1831-1879), *Treatise on Electricity and Magnetism* (1873)

Ether

Maxwell equations

Oliver Heaviside (1850-1925)

Hendrich Hertz (1857-1894)

Radio waves