

Mechanics, including the	Dynamics of Statics of	Solids-Kinetics, Liquids - <i>Hydraulics</i> , Gases-Pneumatics, Solids, Liquids, (Hydro Gases, statics.
Phenomena of		Heat, Light, Sound, Electricity, Magnetism.
Properties of		Impenetrability, Weight, Hardness, Color, Solubility, etc., etc.

Dynamics treats of the effects of force in producing motion, and of the laws of the motion thus produced. It investigates the laws which govern matter and force. Matter is the vehicle by means of which we become acquainted with the immaterial essence which we in our ignorance call force, and until we know what matter is we cannot hope to know anything about the absolute nature of force. The principal forces known to us are those of adhesion, cohesion, gravitation, heat, light, electricity, magnetism, chemism, vital force, each a peculiar phase or manifestation of the Universal Force or power pervading all space.

The *Dynamics of Solids* includes an investigation of the general properties of matter, such as solidity, extension, divisibility, motion, attraction, repulsion, gravitation, central forces; and at the surface of our globe the phenomena of falling bodies, the motions of projectiles, the vibration of pendulums, the theory of machines and the principles on which their energy depends; the properties of the lever, wheel and axle, pulley, inclined plane, wedge, and screw, and the effects resulting from their various combinations. That branch of dynamics which treats of change of momentum is known as *Kinetics*,

grandest problem in Kinetics. *Hydrostatics* and Physical Astronomy furnishes the *Hydraulics* deals with the motion of fluids, and their driving power. Upon its principles depend the construction of fire engines, force pumps, lifting pumps, waterwheels, steam engines, etc. *Pneumatics* deals with gases and their effects on solid and liquid bodies.

Statics treats of the relations that must subsist among forces in order that they may produce equilibrium. It is the science of bodies at rest. *Hydrostatics* treats of the equilibrium and pressure of fluids. As the term fluid includes both liquids and gases, it is evident that the actions of siphons, fountains, hydrostatic presses, barometers, "pneumatic" tubes, the determination of the specific gravities of solids and liquids, etc., etc., depend upon hydrostatic principles.

Heat deals with the expansion of solids, liquids and gases; the laws of fusion and boiling for solids and liquids; the vaporization of liquids and solids; the liquification and solidification of gases and liquids; conduction, radiation, diathermancy, latent and specific heat; the mechanical equivalent of heat; and a whole host of other problems. The construction of thermometers, calorimeters, and hygrometers presupposes a knowledge of the laws of heat. Its principles underlie the construction of economical gas and steam engines, the heating of buildings; they explain the production of winds and ocean currents, and account for the formation of dew, fog, rain, snow, sleet and hail.

Optics, the *Science of Light*, pertains to everything connected with light itself and our conception of it. It treats of vision, light and color, as well as the various phenomena of visible objects produced by the rays of light reflected from mirrors or transmitted through lenses. Single,