

LIGHT IN PHYSICS, CHEMISTRY AND BIOLOGY

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Light is an entity different from ordinary matter. Nevertheless, it is always associated with tangible objects. The earliest belief was light is 'something' emanating from the eyes. Later on, it became clear that light is an emanation coming from luminous bodies. Newton showed that reflection and refraction of light can be explained on the assumption that it is a stream of corpuscles. However, these were phenomena which could not be explained on the basis of corpuscular theory of light. In some instances, light manifests itself as a wave motion. Clark Maxwell extended and combined the wave theory of light with electricity. Maxwell's electromagnetic theory was able to account for all phenomena involving light, known until the beginning of the nineteenth century.

Later in the nineteenth century, physicists noted several observations which contradicted Maxwell's theory. Max Planck was compelled to assume that light was absorbed and emitted in discrete packets of energy or in other words, light also possessed particle properties. This was the birth of the quantum theory. According to the

quantum theory, the dual behaviour of light as particles or waves was a natural consequence. The quantum theory of light known as Quantum Electrodynamics is perhaps the greatest achievement of mankind. A basic assumption in modern theories of elementary particles is that all forces in nature (possibly with one exception 'gravity') behave similar to light.

There is another more practical aspect of light. It is the chief cause of our origin and existence on the earth. The origin of life and civilization is a change from disorder to order on the surface of the planet. The 'thing' needed for this change is energy and the only external source of energy (except for the potential energy in nuclei) available to the earth is light from the sun.