

the immediate action of any thing projected from a luminous body, but is rather the result of certain vibrations which act upon the retina, in a manner somewhat analogous to the action of sound-waves upon the tympanum. It may be directly shown by several experiments, that sound is produced by the undulations of the air propagated from a sonorous (vibrating) body in concentric spheres.

The manner in which this takes place can be illustrated by the effect produced when a pebble is dropped into still water. For light however the medium is not air, for it travels through vacuum and even through many solid substances which are said to be transparent or translucent. There is no positive proof of the existence of a medium though for the requirements of the theory an extremely tenuous one, termed luminiferous ether has been supposed. This fluid, according to scientists, fills all space and penetrates through the molecules of all matter. A luminous body is one which has the power of setting this ether in vibration.

Among the phenomena which have given weight to this theory and which have been explained by it alone, is that known as "interference of light". It is illustrated in the following experiment. A ray of monochromatic light, red for example, is allowed to enter a dark room through a very narrow slit. On a screen, placed at a certain distance away, upon which this light is received, a bright band of red is seen, on either side of which appear alternate bands of black and red gradually diminishing in intensity until at a certain distance from the centre they vanish. In other words there are alternate bands of light and darkness. Before

explaining this phenomena several physicists draw our attention to an occurrence in nature more easily understood but very analogous. At the port of Batisha in Tony King there is a point at which the ocean is perfectly tranquil while on either side the waters are violently disturbed by the incoming tide. This is explained in the following manner. The tide wave reaches this point by two different channels, so that there are actually two waves one arriving six hours later than the other. This six hours is equivalent to one half a wave length so that when the two waves meet the crest of one arrives at the same moment as the trough of the other. As a consequence they destroy each other and their mutual action tends to give the waters their accustomed level. The same thing occurs with sound waves. It may be shown by experiment that if the same sound be made to travel through two tubes, so as to reach the ear in opposite phases no sound is heard. If now the communication with one of these tubes is stopped, the sound becomes audible. Applying this analogy to the interference of light, it is supposed that the waves which come from the edges of the slit above mentioned produce a band of light directly in front of it, because the waves travel the same distance. But those which strike the screen obliquely, traverse distances slightly different. When this difference is equivalent to one half an undulation, there is interference, and no light is produced, but when there is a difference of a whole wave length, they do not exert any influence upon each other, and the band of light is seen. The same result is obtained with thin layers of substances which reflect the light from their lower and upper surfaces.