

the wave. It must not be forgotten, however, that these waves are not movements of ether, which is an immovable substance, but simply stresses of the same as when a hammer falls upon an anvil imbedded in a base of concrete, the stress is carried from top to base though the anvil does not move.

Now the slowest and longest variety of waves we have discovered are called Hertzian. These, as you know, are made use of in wireless telegraphy. Waves shorter still affect the body as heat; shorter still, they have the power of affecting the chemistry of the retina of the eye and producing what is known to consciousness as light, or color. Beyond the spectrum there are shorter waves than the violet, which though they do not effect the retina consciously, produce effects upon certain sensitive substances and are used in photography. These rays are also of incalculable value in elaborating the energy of plant life.

A few years ago certain rays were discovered even shorter than the actinic rays of the sunlight, so short indeed, they proved to be, that they can penetrate certain substances without disturbing their corpuscular arrangement. These were called after their discoverer, Roentgen, but by Herr Roentgen himself "X" rays. Later, M. Curie and his clever wife made discoveries in the powers of radium, and found that this substance emits particles which flow in streams, which impart stresses of great velocity and rapidity. There is no need that I should do more than merely outline these familiar facts, but let us not forget that in all these different varieties of waves we do not have anything new. All are really of the same kind, and are produced in the same way, namely, by changes in the motions of the corpuscles which compose all kinds of matter.

Coming now to consider the effects of light rays upon living organisms, you are all familiar with the therapeutic value of certain kinds of rays. We know how effective they are in reducing growths of a malignant nature upon the surface of the body. They also seem to be able to penetrate some distance beneath the surface of the body, but there they rapidly lose their efficiency. We are not, however, so familiar with the destructive effects of the shorter rays of sunlight. We all know that they have an exceedingly stimulating effect upon living organisms, and are the source of all life upon our planet. We also are familiar, in a general way, with the fact that exposure to the direct rays of the sun, especially in hot climates, is prejudicial to health, and often fatally so. We know that white men have not been able to make the tropics their permanent home. More than this, we are quite familiar with the action of sunlight upon bacteria, which succumb more rapidly