

SOUND.



ACCORDING to the theory upheld by Tyndall, the sensations conveyed by nerves to the brain are, in all cases, motion. This is not simply the motion of the nerve as a whole: it is the vibration, or tremor, of its molecules or smallest particles. To different kinds of molecular motion are appropriated different nerves. The nerves of taste, for example, are not competent to transmit the tremor of light, nor is the optic nerves competent to transmit sonorous vibrations. For this latter a special nerve is necessary, which passes from the brain into one of the cavities of the ear, and there spreads out in a multitude of filaments. It is the motion imparted to this, the auditory nerve which, in the brain, is translated into sound.

How is sonorous motion produced and propagated? Let a smart blow be given to a bell, and every ear close by is conscious of a shock, to which the name of sound is given. How is this shock transmitted from the bell to the organ of hearing? It cannot be that a disturbed particle of air is shot from the bell upon the ear that hears. The process is this: The vibrations of the bell, which we easily observe, forces the surrounding air violently away on all sides. This motion of the air close to the bell is rapidly imparted to that a little farther off, the air first set in motion coming to rest. The motion of the air, at a little distance, passes on to the air at a greater distance, and comes also, in its turn, to rest. Thus each shell of air, so to speak, surrounding the bell, took up the motion of the shell next preceding and transmitted it to the next succeeding shell, the motion being thus propagated in a pulse, or wave, through the air.

The necessary condition for the transmission of such disturbances is the existence of some medium surrounding the vibratory body. That medium is the air, or any other subject possessing elasticity. This is readily shown by striking a bell within an air pump. As the air is exhausted the sound of the bell diminishes, till it ceases in a vacuum, where there is no longer air surrounding the bell to transfer its vibrations.

Air-waves require certain time for their progress. The same is true of the ether-waves constituting heat, light and electricity; they all travel at an unchanging rate of speed. The speed of the ether-waves is greater than the speed of sound. In a game of base-