CHAP. II.

OF THE COMMUNICATION OF MOTION THROUGH BODIES.—OF SOUND AND LIGHT.

(269.) The propagation of motion through all substances, whether of a single impulse, as a blow or thrust, or of one frequently and regularly repeated, such as a jarring or vibratory movement, depends wholly on these molecular forces; and it is on such propagation that sound, and very probably light, depend. To conceive the manner in which a motion may be conveyed from one part of a substance to another, whether solid or fluid, we may attend to what takes place when a wave is made to run along a stretched string, or the surface of still water. Every part of the string, or water, is in succession moved from its place, and agitated with a motion similar to that of the original impulse, leaving its place and returning to it, and when one part ceases to move the next receives, as it were, the impression, and forwards it onward. This may seem a slow and circuitous process in description; but when sound, for example, is conveyed through the air, we are to consider, 1st, that the air, the substance actually in motion, is extremely light and acted upon by a very powerful elasticity, so that the force which propagates the motion, or by which the particles adjacent act on, and urge forward, each other, is very great, compared with the quantity of materials set in motion by it: and the same is true, even in a greater degree, in liquids and solids; for in these the elastic forces are even greater, in proportion to the weight, than in air.

(270.) A general notion of the mode in which sounds are conveyed through the air was not altogether deficient among the ancients; but it is to Newton that we owe the first attempt to analyze the process, and show correctly what takes place in the communication of motion from particle to particle. Reasoning on the properties of the