But it has previously been shown that there is also an attractive force existing between the molecules. Now what is the effect, when two forces act on a body in opposite directions? Let two boys, at opposite ends of a table, push the table. If both push with equal force, the table does not move; it is as if no one pushed it. But if one boy pushes a little harder than the other, then the table moves in the direction in which the greater force is applied. Now we have the key to the solution of a difficulty, which always arises in the mind of a beginner in science, when he first hears the startling statement that the molecules of bodies, of his own body even, do not touch one another. If faith were of quick growth, he would shudder at the thought of falling to pieces, or of being wafted away by the winds as so much dust.

The ancients, perceiving that matter must be built up of small parts, overcame this difficulty by supposing that the minute particles have hooks or claws by which they grasp one another. Our knowledge of the operation of forces enables us to dispense with hooks and claws, much to the advantage of science. We see that the molecules of a body are kept from falling apart, or from separation, by a universal attractive force; they are also kept from falling together, or from permanent contact, by an ever-existing repellent force. These forces act at insensible distances between molecules, and hence are called *molecular forces*. When forces act between bodies at sensible distances they are called *molar forces*. Give illustrations (1) of molar forces; (2) of molecular forces.

II. THREE STATES OF MATTER.

§ **15. Matter** presents itself in three different states: *solid*, *liquid*, and *gaseous*, — fairly represented by earth, water, and air. Because these forms are so common and abundant, some ancient philosophers held that all solid matter is formed of earth, all liquids of water, and all gases of air. On this account