

In confirmation of these ideas as regards pressure, is the explanation of the pressure and elasticity of gases given by Professors Clausius, Ioule and others. Their investigations go to prove that these properties are owing to the molecules of the gases moving in all directions with great velocities, pressure being due to the momenta, masses and number of molecules within a given space, and elasticity to the *vis viva* or energy of the molecules within the same space.

A similar mode of action must be assumed for the luminiferous ether; that is to say, in still ether, as in still air, the constituent particles are moving in straight lines with immense velocities, subject to no actions except their impacts on each other and the atoms of gross matter. These motions are to be carefully distinguished from the ethereal waves, which correspond to the sound waves in air.

We can now explain forces of cohesion, and all kinds of tensile forces. Without the assumption of the existence of ether, constituted as above, such forces could not be explained.

How these forces are produced, may be illustrated by the various pneumatic phenomena, which may be classed under the popular idea of suction.

When the air in a receiver is rarified, the particles, having greater space to move in, do not impinge the same number of times in a unit of time against each other, nor against the sides of the vessel, their velocity being supposed to remain unaltered; hence the pressure is less on the inside than on the outside, and there results an apparent tension or attraction of the parts of the receiver towards the inside. Similarly, if two flat surfaces are pressed together, the same phenomena are witnessed; in this case, it perhaps is possible that the air, instead of being rarified, may be condensed; in which case, the results would be accounted for by supposing the velocities of the particles of confined air to have been lessened to some extent. If the velocities of the particles are unaltered, the elasticity is proportional to the density; if otherwise, it is not.

Now, substitute for air the luminiferous ether, and for the flat plates the sides of two atoms, and it becomes evident how they may cohere. If this be the explanation of cohesion, we must assume all atoms that are known to unite with others to have flat faces. The luminiferous ether alone, in the present state of our knowledge, can be supposed to consist of spherical atoms.