in the gaseous state shows the mechanical energy which we call pressure or expansiveness, the attempt was made to explain the phenomena of expansion, pressure, and temperature of gases by a purely mechanical hypothesis. This answered remarkably well. On the assumption that the particles of a perfect gas possess a rectilinear motion, the experimental formulæ of Boyle and Mariotte, of Dalton, and of Gay-Lussac, could be theoretically deduced. It also became evident that under this conception the forgotten statement of Avogadro must be correct, according to which equal volumes of different gases, under equal pressures and at equal temperatures, contain an equal number of freely moving particles.

36. Internal energy of molecules.

And when Clausius showed further that in perfect gases only a portion of the quantities of energy which are measured as motion or as heat can be explained by the assumed rectilinear motion of the particles of gases, and that an internal motion of the particles themselves must be assumed, the new ideas became still more exactly defined; they included the conception familiar to chemists of compound atoms or molecules. The smallest individual particles of matter in the free state were themselves not simple bodies, but systems of still smaller particles; they were molecules composed of atoms; the symbols of chemists became descriptive of real physical conditions; the vague notions of radicles, types, or compound atoms began to acquire geometrical and mechanical definiteness.

Thus the atomic theory, known to the ancients, revived by Dalton in the early years of the century, and employed by chemical philosophers for half a century as a