The temperature of the air decreases uniformly as we ascend above the earth's surface; but this decrease does not go on continuously. At a certain elevation, varying on different days, the decrease is arrested; and for a depth of two or three thousand feet of air, the temperature decreases little, or even increases in ascending. Above this, the diminution again takes place at nearly the same rate as in the lower regions. This intermediate region of undecreasing temperature extended in the various ascents, from about altitude 4000 to 6000 feet, 6500 to 10,000, 2000 to 4500, and 4000 to 8000. This interruption in the decrease of temperature is accompanied by a large and abrupt fall in the temperature of the dew-point, or by an actual condensation of vapor. Thus, this region is the *region of the clouds*, and the increase of heat appears to arise from the latent heat liberated when aqueous vapor is formed into clouds.

CHAPTER IV.

Theories of Heat.

The Dynamical Theory of Heat.

THAT the transmission of *radiant* Heat takes place by means of the vibrations of a medium, as the transmission of Sound certainly does, and the transmission of Light most probably, is a theory which, as I have endeavored to explain, has strong arguments and analogies in its favor. But that Heat itself, in its essence and quantity, is Motion, is a hypothesis of quite another kind. This hypothesis has been recently asserted and maintained with great ability. The doctrine thus asserted is, that Motion may be converted into Heat, and Heat into Motion; that Heat and Motion may produce each other, as we see in the rarefaction and condensation of air, in steam-engines, and the like: and that in all such cases the Motion produced and the Heat expended exactly measure each other. The foundation of this theory is conceived to have been laid by Mr. Joule of Manchester, in 1844; and it has since been prosecuted by him and by Professor Thomson of Glasgow, by experimental investigations of various kinds. It is difficult to make these experiments so as to be quite satisfactory; for it is