writings he adopted a different and more general process of reasoning. If electrical and magnetic as well as optical phenomena are produced by the motions of the parts of a medium possessed of certain mechanical properties, this medium represents a mechanical system, and must therefore be subject to the general laws which regulate all mechanical systems. These general laws are laid down in dynamics, where it is shown that a complete quences on the lines knowledge of the behaviour of such a system can be of a theory of Energy. reduced to the knowledge of the distribution in it of a quantity called Energy.

53. Consc-

I intend in the next chapter to trace historically the

drops this somewhat crude device, as well as the older theory of particles acting at a distance, with forces which, according to Weber, depend on their velocities, and starts from "the conception of a complicated mechanism capable of a vast variety of motion, but at the same time so connected that the motion of one part depends . . . on the motion of other parts, these motions being communicated by forces arising from the relative displacement of the connected parts, in virtue of their elasticity" (Papers, vol. i. p. 533). He further says: "I have on a former occasion attempted to describe a particular kind of motion and a particular kind of strain, so arranged as to account for the phenomena. In the present paper I avoid any hypothesis of this kind; and in using such words as electric momentum and electric elasticity in reference to the known phenomena of the induction of currents and the polarisation of dielectrics, I wish merely to direct the mind of the reader to mechanical phenomena which will assist him in understanding the

electrical ones. All such phrases in the present paper are to be considered as illustrative, not as explanatory. In speaking of the energy of the field, however, I. wish to be understood literally. All energy is the same as mechanical energy, whether it exists in the form of motion or in that of elasticity, or in any other form. The energy in electro-magnetic phe-nomena is mechanical energy. The only question is, Where does it reside? On the old theories it resides in the electrified bodies, conducting circuits, and magnets, in the form of an unknown quality called potential energy, or the power of producing certain effects at a distance. On our theory it resides in the electro-magnetic field, in the space surrounding the electrified and magnetic bodies, as well as in those bodies themselves, and is in two different forms, which may be described without hypothesis as magnetic polarisation and electric polarisation, or, according to a very probable hypothesis, as the motion and the strain of one and the same medium" (p. 563).