

in fact, an electro-magnetic disturbance of very short wave length. I also mentioned above how this suggestion received a brilliant confirmation from Hertz when he succeeded in exhibiting electro-magnetic waves, which in travelling through space, though not luminous, showed all the properties peculiar to light waves, such as reflexion, refraction, polarisation, &c.

Whilst in this country, during the period from 1850 to 1870, the Scotch school of natural philosophy was thus occupied in rebuilding the whole edifice of physical science on the new basis afforded by the energy ideas, Clausius in Germany worked at the further elaboration of the dynamical theory of heat, and, as I stated above, at the kinetic theory of gases, without abandoning the astronomical view of natural phenomena, which, with its supposition of forces acting at a distance, still almost exclusively governed theoretical physics and chemistry abroad. No one did more to emphasise the difference between this and Faraday's views than Clerk Maxwell, who had welded the latter into a consistent scheme by means of the conception of energy. About the year 1870 Helmholtz again appeared as a leader of scientific thought in this domain, and placed himself at the head of a movement which by degrees almost completely swept away the older ideas. It was by him or at his suggestion that many of the more modern English works of science were translated¹ and intro-

¹ Notably Thomson and Tait's 'Natural Philosophy,' and several of Tyndall's well-known more popular works on 'Sound,' 'Heat,' and 'Fragments of Science.' Helmholtz was also one of the first natural philosophers of eminent rank abroad who broke with the older habit of exclusiveness which clung to academic teachers in Germany, and who followed the English example set by the "Addresses" of