

abroad, I will try to sum up finally the principal points in it which are of importance for the history of contemporary thought.

Ever since the conception of energy as a quantity which, like matter, is preserved in all natural processes, forced itself with more or less clearness upon natural philosophers, the question has been insistent as to the number of different forms in which this quantity can manifest itself; and some of the earliest propounders of the doctrine attempted an enumeration of the different forms, mechanical energy of motion and of attraction usually heading the list. When that form of energy which we call heat was subjected to examination, and the remarkable property formerly called latent heat defined in the new terminology, the want arose of bringing about some kind of connection between our ideas of motion and those of heat, which were shown to be mutually convertible quantities in nature. Before that time sound and light had already yielded to the kinetic view, and an enormous increase of our knowledge in acoustics and optics had followed. Thus we find some of the pioneers of the physical or energy view of nature—notably Rankine and Joule in this country, Redtenbacher and subsequently Clausius abroad—engaged in translating the properties of heat into mechanical analogies.<sup>1</sup> It was not thought

<sup>1</sup> Rosenberger, in his 'Geschichte der Physik' (vol. iii. p. 550, &c.), gives a number of references to theories mostly forgotten which were published before and after the year 1850. Clausius, who keeps his mechanical theory of heat quite separate from his kinetic theory of gases (see the three

volumes on 'Die mechanische Wärmetheorie,' 2nd ed., 1876, &c.), admits, nevertheless, in a paper published in 1857 (Pogg. 'Ann.,' vol. c., and 'Mechan. Wärmetheor.,' vol. iii. p. 1, &c.), that "from the beginning of his researches referring to heat he had attempted to account to himself for the internal