

embrace a mechanical or kinetic view of the nature of heat. Joule, as stated above,<sup>1</sup> was the first who emancipated himself from it.

But whilst these suggestions that heat may be regarded as somehow connected with motion remained mostly vague and undeveloped, they tended to impress upon the scientific mind the interchangeability—or, as it was called, the correlation of the different forces of nature; and the idea seems to have forced itself independently on many minds, through the study of very different groups of natural phenomena. In Germany we may look upon Liebig as the centre of a great scientific movement which tried by means of chemistry to bring the realms of organic and animated existence under the treatment of exact methods. Not only were the methods of organic analysis perfected by him and his school, and many compounds investigated which appeared to be specially the bearers of the living process; but he was also among the first to study the economy of living organisms, the circulation of matter, and the play of the varied processes by which life is maintained. Among these processes, the phenomenon of animal heat, its origin, and the part it plays in the living organism attracted special attention.

8.  
Correlation  
of forces.

9.  
Liebig.

may be said to rest where it did at the time these Lectures were written. The facts which have just been mentioned clearly point out its undulatory character" (p. 506). Between the years 1835 and 1845 theoretical ideas on the nature of heat were entirely dominated by the remarkable discoveries of Melloni, Baden-Powell, Forbes, and others referring to radiant heat,

which was shown to have the same properties of reflexion, refraction, and polarisation as light possessed. The analogy of this form of heat with light threw into oblivion the beginnings of a more general mechanical theory of heat, which—as we shall see further on—had been laid by Sadi Carnot in 1824.

<sup>1</sup> See vol. i. of this work, p. 434.