

philosophical speculations which tended to prevent their ready acceptance, it cannot be denied that, as a first approximation, "his equivalent" was sufficiently near the truth to be practically useful.

But neither the happy generalisation of Mohr, which was lost or forgotten, nor the numerical estimate of Mayer, which remained unnoticed, succeeded in impressing contemporary philosophers with the importance of the subject. This was done almost at the same date, though quite independently, by the persistent and persevering experiments and measurements of James Prescott Joule, who laboured unnoticed and practically without support from 1841 to 1847, when he had the good fortune of gaining the attention and friendship of William Thomson (Lord Kelvin).¹

13.
Joule.

¹ Joule not only defined more clearly the different data and conditions on which the correctness of the result must depend, but had also at his command a much greater wealth of novel experimental facts, brought together by his own resourceful mind. Thus from 1843 to 1850 he published no fewer than ten series of experiments, approximating from widely differing results to the true figure. See Helm's list ('Energetik,' p. 34). After he had laboured for more than five years his work was, in 1847, at the meeting of the British Association in Oxford, still almost unknown. He himself reports as follows in 1885 ('Joint Scientific Papers,' 1887, p. 215): "It was in the year 1843 that I read a paper 'On the Calorific Effects of Magneto-Electricity and the Mechanical Value of Heat' to the Chemical Section of the British Association at Cork. With the exception of some eminent men . . .

the subject did not excite much general attention; so that when I brought it forward again at the meeting in 1847 the chairman suggested that, as the business of the section pressed, I should not read any paper, but confine myself to a short verbal description of my experiments. This I endeavoured to do, and discussion not being invited, the communication would have passed without comment if a young man had not risen in the section, and by his intelligent observations created a lively interest in the new theory. The young man was William Thomson, who had two years previously passed the University of Cambridge with the highest honour, and is now probably the foremost scientific authority of the age." See also Lord Kelvin's account of the meeting in 1847 in 'Popular Lectures and Addresses' (London, 1894, vol. ii. p. 556, &c.)