

feature which distinguishes all physical (actual) processes from merely mechanical (artificial) contrivances; secondly, in a very different direction he had already (1845) taken a great step in advance by showing how two seemingly quite different ways of approaching electrical and magnetic phenomena—the “action-at-a-distance theory” of Continental mathematicians, such as Poisson, and Faraday’s “Lines of force,” filling space continuously,—led, through mathematical language, to the same results.¹ Tait carried on a lifelong battle with the older conceptions of attractive and repulsive forces, assisted in replacing in physics the conception of particles moving about in empty space by the conception of a plenum, and ended by suggesting that the word “force” should be discarded as an unnecessary and misleading term. Maxwell worked in the same direction, though with more caution and impartiality, through his small tract on ‘Matter and Motion,’ and still more by building up a large portion of the sciences of electricity and magnetism on the basis of the conception of Energy and its distribution in space, discarding latterly the mechanical models which he had previously invented as illustrations of Faraday’s “lines and tubes of force.” Incidentally a controversy arose between Tait and Herbert Spencer as to the illegitimate use which the latter

less, of larger or smaller; there is no difference of degree in any other sense. Another sense or meaning is introduced only with reference to the observing or thinking mind which derives more pleasure, more use, from some sensations than from others, and accordingly puts a greater value on the former than

on the latter. The well-known “Demon” of Clerk Maxwell shows by a fiction how, for beings otherwise constituted than we are, the most degraded forms of energy or motion might be of the same value for practical purposes as molar motions are for us.

¹ See *ante*, vol. ii. p. 72.