

59.  
Objections  
raised by  
atomists.

The propounders of this atomic view of electricity very naturally look with little favour on those other theories which, under the name of energetics or phenomenology, would restrict the method of science to the use of only such quantities and data as can be actually seen and directly measured, and which condemn the introduction of such useful conceptions as the atom, the electron, and the ether, which cannot be directly seen and can only be measured by indirect processes; and there is no doubt that the century ends with a very emphatic assertion of the rights and the legitimacy of the atomic and mechanical views of nature, regarding the energy principle as a regulative but not, by itself, a constructive method of research and progress; for, as Dr Larmor says, "If a molecular constitution of matter is fundamental, energy cannot also be so."<sup>1</sup> Nevertheless though in many ways opposed, the two views of nature meet at least in one important point. Both theories have been

dans le champ magnétique? Ici encore, la théorie vint aider l'expérience; cette fois, c'est à H. A. Lorentz que l'on est redevable du résultat obtenu. Il est juste de dire que d'autres considérations, par exemple celle de Lord Kelvin" (see Tait, Proc. Royal Soc., Edinburgh, 1875-76, p. 118) "auraient pu, elles aussi, probablement conduire à cette découverte de la polarisation des raies. Mais en fait, cette découverte a été faite grâce à l'intervention de la théorie des 'ions' de H. A. Lorentz. Dans cette théorie, dit M. Zeemann, on admet qu'il existe dans tous les corps de petites masses électrisées, ou 'ions,' dont les mouvements constituent tous les phénomènes électriques; les vibrations lumineuses seraient des vibrations de ces ions. L'état de l'éther est

déterminé entièrement par la charge, la position et le mouvement de ces ions. . . . M. Lorentz fit remarquer que les bords des raies élargies devaient être polarisés. L'expérience permit à Zeemann de vérifier cette conclusion de Lorentz" (p. 37).

<sup>1</sup> 'Æther and Matter,' p. 286: "One effect of admitting a molecular synthesis of dynamical principles . . . is to depose the conception of energy from the fundamental or absolute status that is sometimes assigned to it. . . . We can know nothing about the aggregate or total energy of the molecules of a material system, except that its numerical value is diminished in a definite manner when the system does mechanical work or loses heat. The definite amount of energy that plays so prominent a part in mechanical