

forced to consider anew the ultimate principles of all physical reasoning, notably the scope and validity of the Newtonian laws of motion and of the conceptions of force and action, of absolute and relative motion, as defined or implied in the mechanical scheme which is based upon them. Also with their increasing complexity<sup>1</sup> modern dynamical explanations have undoubtedly, to every impartial observer, acquired a certain character of artificiality which suggests the question to what extent all such mechanical schemes are an expression of actual truths or merely useful illustrations. For the pursuit of scientific research this question is perhaps of little importance: a method is a correct one if it leads to correct results verified by observation. Philosophically, as bearing upon the processes, powers, and limits of human reasoning, the question is all-important. We are thus led beyond the province of scientific into that of philosophic thought. In future chapters we shall frequently have occasion to note this tendency of the purely scientific thought of the century to lead up to philosophical problems. Wherever this is the case a history of scientific thought may legitimately close one of its chapters.

60.  
Artificial  
character of  
modern  
dynamical  
explana-  
tions.

61.  
The philo-  
sophic prob-  
lem raised.

and physical theory is really the mechanically available energy. . . . This energy is definite, but is not, like matter itself, an entity that is conserved in unchanging amount. . . . It may and usually does diminish, in the course of gradual physical changes."

<sup>1</sup> The three volumes of the 'Rapports,' &c., mentioned above, have been significantly prefaced by a discourse of M. Poincaré on the relations of experimental and mathematical physics, in which he insists upon the unity and simplicity

of nature as the two conditions which make generalisations possible and useful. With special reference to modern electrical theories, such as those of Lorentz and Larmor, which he had already criticised in his course on 'Electricité et Optique' (2nd ed., 1901, p. 577, &c.), he discusses the possibility of ultimate mechanical explanations. Of these, according to his view, an "infinity" is always possible. He asks what is the aim we are following—"Ce n'est pas le mécanisme, le vrai, le seul but, c'est l'unité."