

whatever, and have no right to be called knowledge, however exact they may be. A recognition of these fundamental truths, and of the real nature of scientific knowledge, is gradually making its way into philosophical literature. It is also more and more being allowed by the leaders of scientific thought themselves, some of whom have probably done more than philosophers by profession to lay bare the roots and foundations of scientific reasoning. At best it has been, and is still, a slow process by which these plain truths are being elaborated and promulgated, nor is it possible to give any single names with which we could identify in anything like completeness the modern theory of knowledge. In a note<sup>1</sup> I have tried to collect references to the more

61.  
Limitation  
of scientific  
knowledge.

<sup>1</sup> The most important enunciation of the nature of exact science, viz., that it aims at describing and not at explaining natural phenomena, is probably to be found in the introductory sentence of G. Kirchhoff's Lectures 'On Dynamics.' On the idea expressed in this simple sentence the whole of the purely scientific discussion of the principles of natural philosophy hangs, together with the more recent interest taken by philosophical writers in this subject. The sentence has been quoted over and over again, not only in text-books of natural philosophy but also in philosophical treatises. It is, on the one side, the result of the labours of mathematicians and experimentalists, on the other side the starting-point for a clearer separation and recognition of the different aims of scientific and philosophical thought. Among German thinkers it is especially E. du Bois Reymond who, in many passages of his various Addresses,

has referred to this subject. Shortly before Kirchhoff's Lectures there appeared E. Dühring's 'Critical History of the general Principles of Mechanics' (1873), a book which would have exercised a greater influence had it not been for the polemical invectives introduced into the later editions. Kirchhoff's definition should be contrasted with the closing sentence of Lotze's 'Logic' (1874), in which he expresses the hope that "German philosophy will always rise again to the attempt to comprehend and not only to calculate the order of things." The next important and epoch-making discussion of this subject is the 'Critical Exposition of the Development of Dynamics,' by E. Mach ('Die Mechanik in ihrer Entwicklung,' 1st ed., 1883), a book which has now acquired a world-wide reputation, and should be studied by every teacher of natural as well as of mental philosophy. Somewhat later, Karl Pearson published his 'Grammar