

a century of confirming thought, observation, and calculation an adopted axiom, and the accepted formula of all physical explanations. For a time, indeed, the exact formula of gravitation seemed liable to some correction, but gradually the apparent anomalies disappeared, and even in our century none of the many attempts to modify the gravitation formula, to look upon it as merely an approximation, or to go behind it and find some more general relation from which it could be deduced, have been generally useful or acceptable.¹ It still stands there as the only universally accepted mathematical expression which corresponds to a general physical property of natural objects.

Two different lines of thought combined to give the formula of Newton a still wider importance than its author primarily intended, or than it has been found possible to maintain in the course of further inquiry. The first was the ancient philosophical idea of attraction, which, without being mathematically defined and practically useful, had nevertheless, from the dawn of Greek speculation

of that tendency, are now sufficiently known by observations and experiments. If this or any other learned author can by the laws of mechanism explain these phenomena, he will not only not be contradicted, but will, moreover, have the abundant thanks of the learned world. But in the meantime, to compare gravitation, which is a phenomenon or actual matter of fact, with Epicurus' declination of atoms seems to be a very extraordinary method of reasoning" (§§ 118-124, Leibniz's 'Philosophische Schriften,' by Gerhardt, Berlin, 1890, vol. vii. p. 439 *sq.*)

¹ A very complete account of

these different attempts will be found in the writings of C. Isenkrahe, 'Das Räthsel von der Schwerkraft,' Braunschweig, 1879; "Euler's Theorie von der Ursache der Gravitation," in 'Zeitschrift für Mathematik und Physik,' vol. xxvi.; 'Ueber die Fernkraft,' Leipzig, 1889; "Ueber die Zurückführung der Schwere auf Absorption," in 'Abhandlungen zur Geschichte der Mathematik,' vol. vi., Leipzig, Teubner, 1892. See also as bearing on this subject, Paul du Bois-Reymond, 'Ueber die Grundlagen der Erkenntniss in den exacten Wissenschaften,' Tübingen, 1890.