the latter in stable and self-repeating averages. Possessed therefore, as we seem to be, of the greatest wealth and variety of observations and notions, we may—perhaps erroneously—conclude that we can grasp the simpler cosmical and molecular movements and phenomena by starting from molar, physical, or mechanical models.[1]

[1] English naturalists have always excelled in this line of investigation, whereas foreign scientific literature has been rich in purely mathematical deductions from formulæ which contained no *construirbare Vorstellung*. And it is interesting to note that both lines of thought go back to Newton. Whereas Newton himself believed in the possibility of a mechanical explanation or representation of the gravitation formula, the second edition of the 'Principia' by Cotes can be looked upon as sanctioning the view that gravitation is an ultimate quality which must be accepted as such; and as it was the second edition through which Newton's ideas became largely known on the Continent, it is not surprising that he was there accused of reintroducing the *qualitates occultæ* of the older metaphysics, which Descartes and others had successfully banished. Clerk Maxwell says ("Action at a Distance," 'Scient. Pap.,' vol. ii. p. 316): "The doctrine of direct action at a distance cannot claim for its author the discoverer of universal gravitation. It was first asserted by Roger Cotes in his preface to the 'Principia,' which he edited during Newton's life. According to Cotes it is by experience that we learn that all bodies gravitate. We do not learn in any other way that they are extended, movable, or solid. Gravitation, therefore, has as much right to be considered an essential property of matter as extension, mobility, or impenetrability. And when the Newtonian philosophy gained ground in Europe, it was the opinion of Cotes rather than that of Newton that became most prevalent." In fact, philosophers could be divided into two classes—those who took the fact of gravity or the wider idea of a universal attraction as a beginning, and drew from this beginning all the possible mathematical and experimental consequences which they could think of; and those who, whilst admitting this process as a legitimate one, thought it necessary to go behind the assumed beginning and find a still more hidden mechanical reason for this admitted property. To the latter class belonged Newton himself, Huygens, Euler, and in modern times notably Faraday and his followers; to the former class belonged Daniel Bernoulli, who wrote to Euler, 4th February 1744, referring to the ether theory of the latter: "Moreover, I believe both that the ether is *gravis versus solem* and the air *versus terram*, and I cannot conceal from you that on these points I am a perfect Newtonian, and I am surprised that you adhere so long to the *principiis Cartesianis;* there is possibly some feeling in the matter. If God has been able to create an *animam* whose nature is unknown to us, He has also been able to impress an *attractionem universalem materiæ*, though such is *attractio supra captum*, whereas the *principia Cartesiana* involve always something *contra captum*" (see