history of the ancient Greek mind, can question, that in acuteness, in ingenuity, in the power of close and distinct reasoning, they have never been surpassed. The common opinion, which considers the defect of their philosophical character to reside rather in the exclusive activity of such qualities, than in the absence of them, is at least so far just.

5. We come back again, therefore, to the question, What was the radical and fatal defect in the physical speculations of the Greek philosophical schools?

To this I answer: The defect was, that though they had in their possession Facts and Ideas, *the Ideas were not distinct and appropriate to the Facts.*

The peculiar characteristics of scientific ideas, which I have endeavored to express by speaking of them as *distinct* and *appropriate to the facts*, must be more fully and formally set forth, when we come to the philosophy of the subject. In the mean time, the reader will probably have no difficulty in conceiving that, for each class of Facts, there is some special set of Ideas, by means of which the facts can be included in general scientific truths; and that these Ideas, which may thus be termed *appropriate*, must be possessed with entire distinctness and clearness, in order that they may be successfully applied. It was the want of Ideas having this reference to material phenomena, which rendered the ancient philosophers, with very few exceptions, helpless and unsuccessful speculators on physical subjects.

This must be illustrated by one or two examples. One of the facts which Aristotle endeavors to explain is this; that when the sun's light passes through a hole, whatever be the form of the hole, the bright image, if formed at any considerable distance from the hole, is round, instead of imitating the figure of the hole, as shadows resemble their objects in form. We shall easily perceive this appearance to be a necessary consequence of the circular figure of the sun, if we conceive light to be diffused from the luminary by means of straight *rays* proceeding from every point of the sun's disk and passing through every point within the boundary of the hole. By attending to the consequences of this mode of conception, it will be seen that each point of the hole will be the vertex of a double cone of rays which has the sun's disk for its base on one side and an image of the sun on the other; and the figure of the image of the hole will be determined by supposing a series of equal bright circles, images of the sun, to be placed along the boundary of an image equal to the hole itself. The figure of the image thus determined will partake of the form of the hole, and