

this day, the tribes of uncivilized and half-civilized man, over the whole face of the earth, have before their eyes a vast body of facts, of exactly the same nature as those with which Europe has built the stately fabric of her physical philosophy; but, in almost every other part of the earth, the process of the intellect by which these facts become science, is unknown. The scientific faculty does not work. The scattered stones are there, but the builder's hand is wanting. And again, we have no lack of proof that mere activity of thought is equally inefficient in producing real knowledge. Almost the whole of the career of the Greek schools of philosophy; of the schoolmen of Europe in the middle ages; of the Arabian and Indian philosophers; shows us that we may have extreme ingenuity and subtlety, invention and connection, demonstration and method; and yet that out of these germs, no physical science may be developed. We may obtain, by such means, Logic and Metaphysics, and even Geometry and Algebra; but out of such materials we shall never form Mechanics and Optics, Chemistry and Physiology. How impossible the formation of these sciences is without a constant and careful reference to observation and experiment;—how rapid and prosperous their progress may be when they draw from such sources the materials on which the mind of the philosopher employs itself;—the history of those branches of knowledge for the last three hundred years abundantly teaches us.

Accordingly, the existence of clear Ideas applied to distinct Facts will be discernible in the History of Science, whenever any marked advance takes place. And, in tracing the progress of the various provinces of knowledge which come under our survey, it will be important for us to see that, at all such epochs, such a combination has occurred; that whenever any material step in general knowledge has been made, —whenever any philosophical discovery arrests our attention,—some man or men come before us, who have possessed, in an eminent degree, a clearness of the ideas which belong to the subject in question, and who have applied such ideas in a vigorous and distinct manner to ascertained facts and exact observations. We shall never proceed through any considerable range of our narrative, without having occasion to remind the reader of this reflection.

*Successive Steps in Science.*³—But there is another remark which we must also make. Such sciences' as we have here to do with are,

³ Concerning *Successive Generalizations in Science*, see the *Philosophy*, book i. ch. 2, sect. 11.