

The conceptions involved in the atomic and kinetic views of natural processes, and the statistical manner of dealing with these crowds of moving particles, have thus introduced into natural philosophy two distinct and novel considerations not known to former ages: first, the consideration that our knowledge of things and phenomena in nature is not historical, but that it is that of the mean or average and of the total effects produced by an immensely large number of singly imperceptible events upon our senses which are too coarse to receive or deal with individual occurrences; secondly, the consideration that our knowledge is not purely mechanical, inasmuch

history of each separately, so that, in order to reduce their labour within human limits, they concentrate their attention on a small number of artificial groups. The varying number of individuals in each group, and not the varying state of each individual, is the primary datum from which they work. This, of course, is not the only method of studying human nature. We may observe the conduct of individual men and compare it with that conduct which their previous character and their present circumstances, according to the best existing theory, would lead us to expect. Those who practise this method endeavour to improve their knowledge of the elements of human nature in much the same way as an astronomer corrects the elements of a planet by comparing its actual position with that deduced from the received elements. The study of human nature by parents and schoolmasters, by historians and statesmen, is, therefore, to be distinguished from that carried on by registrars and tabulators, and by those statesmen who put their faith in figures. The one

may be called the historical and the other the statistical method. The equations of dynamics completely express the laws of the historical method as applied to matter, but the application of these equations implies a perfect knowledge of all the data. But the smallest portion of matter which we can subject to experiment consists of millions of molecules, not one of which ever becomes sensible to us. We cannot, therefore, ascertain the actual motion of any one of these molecules; so that we are obliged to abandon the strict historical method of dealing with large groups of molecules. The data of the statistical method, as applied to molecular science, are the sums of large numbers of molecular quantities. In studying the relations between quantities of this kind, we meet with a new kind of regularity, the regularity of averages, which we can depend upon quite sufficiently for all practical purposes, but which can make no claim to that character of absolute precision which belongs to the laws of abstract dynamics."