

(124.) But, it may be asked, if our measurement of quantity is thus unavoidably liable to error, how is it possible that our observations can possess that quality of numerical veracity which is requisite to render them the foundation of laws, whose distinguishing perfection consists in their strict mathematical expression? To this the reply is twofold; 1st, that though we admit the necessary existence of numerical error in every observation, we can always assign a limit which such error cannot possibly exceed; and the extent of this *latitude of error of observation* is less in proportion to the perfection of the instrumental means we possess, and the care bestowed on their employment. In the greater part of modern measurements, it is, in point of fact, extremely minute, and may be still further diminished, almost to any required extent, by repeating the measurements a great number of times, and under a great variety of circumstances, and taking a mean of the results, when errors of opposite kinds will, at length, compensate each other. But, 2dly, there exists a much more fundamental reply to this objection. In reasoning upon our observations, the existence and possible amount of quantitative error is always to be allowed for; and the extent to which theories may be affected by it is never to be lost sight of. In reasoning upwards, from observations confessedly imperfect to general laws, we must take care always to regard our conclusions as conditional, so far as they may be affected by such unavoidable imperfections; and when at length we shall have arrived at our highest point, and attained to axioms which admit of general and deductive reasoning, the question, whether they *are* vitiated by the errors of observation or not, will still remain to be decided, and must become the object of subsequent verification. This point will be made the subject of more distinct consideration hereafter, when we come to speak of the verification of theories and the laws of probability.

(125.) With respect to our record of observations, it

ed into an act of enrolment in a perpetual archive of what we most prize, and acknowledge to be most valuable?