

will give a value of this quantity, and the average of all (under certain restrictions) will be its exact value. We say, under certain restrictions; for, if the circumstances under which the observations are made be not alike, they may not all be equally favorable to exactness, and it would be doing injustice to those most advantageous, to class them with the rest. In such cases as these, as well as in cases where the *data* are numerous and complicated together, so as not to admit of single, separate determination (a thing of continual occurrence), we have to enter into very nice, and often not a little intricate, considerations respecting the *probable* accuracy of our results, or the limits of error within which it is *probable* they lie. In so doing we are obliged to have recourse to a refined and curious branch of mathematical inquiry, called the doctrine of probabilities, the object of which (as its name imports) is to reduce our estimation of the probability of any conclusion to calculation, so as to be able to give more than a mere guess at the degree of reliance which ought to be placed in it.

(230.) To give some general idea of the considerations which such computations involve, let us imagine a person firing with a pistol at a wafer on a wall ten yards distant: we might, in a general way, take it for granted, that he would hit the wall, but not the wafer, at the first shot: but if we would form any thing like a probable conjecture of *how near* he would come to it, we must first have an idea of his skill. No better way of judging could be devised than by letting him fire a hundred shots at it, and marking where they all struck. Suppose this done,—suppose the wafer has been hit once or twice, that a certain number of balls have hit the wall within an inch of it, a certain number between one and two inches, and so on, and that one or two have been some feet wide of the mark. Still the question arises, what estimate are we thence to form of his skill? *how near* (or nearer) may we after this experience, safely, or at least not unfairly, bet that he will come to the mark the next subsequent shot? This