principle, enables us, at the same time, to ascertain whether we have fixed the values of our data in accordance with the actual state of nature. If not, it becomes an important question, whether the assumed values can be corrected, so as to bring the results of theory to agree with facts? Thus it happens, that as theories approach to their perfection, a more and more exact determination of data becomes requisite. Deviations from observed fact, which, in a first or approximative verification, may be disregarded as trifling, become important when a high degree of precision is attained. A difference between the calculated and observed places of a planet, which would have been disregarded by Kepler in his verification of the law of elliptic motion, would now be considered fatal to the theory of gravity, unless it could be shown to arise from an erroneous assumption of some of the numerical data of our system.

(225.) The observations most appropriate for the ready and exact determination of physical data are, therefore, those which it is most necessary to have performed with exactness and perseverance. Hence it is, that their performance, in many cases, becomes a national concern, and observatories are erected and maintained, and expeditions despatched to distant regions, at an expense which, to a superficial view, would appear most disproportioned to their objects. But it may very reasonably be asked why the direct assistance afforded by governments to the execution of continued series of observations adapted to this especial end should continue to be, as it has hitherto almost exclusively been, confined to astronomy.

(226.) Physical data intended to be employed as elements of calculation in extensive theories, require to be known with a much greater degree of exactness than any single observation possesses, not only on account of their dignity and importance, as affording the means of representing an indefinite multitude of facts; but because, in the variety of combinations that may arise, or in the changes that circumstances may undergo, cases will occur when any trifling error in