

information. Even in those branches which, like astronomy, optics, and dynamics, are almost exclusively under the dominion of mathematics, and in which no effectual progress can be made without *some* acquaintance with geometry, the principal *results* may be perfectly understood without it. To one incapable of following out the intricacies of mathematical demonstration, the conviction afforded by verified predictions must stand in the place of that purer and more satisfactory reliance, which a verification of every step in the process of reasoning can alone afford, since every one will acknowledge the validity of pretensions which he is in the daily habit of seeing brought to the test of practice.

(21.) Among the verifications of this practical kind which abound in every department of physics, there are none more imposing than the precise prediction of the greater phenomena of astronomy; none, certainly, which carry a broader conviction home to every mind from their notoriety and unequivocal character. The prediction of eclipses has, accordingly, from the earliest ages, excited the admiration of mankind, and been one grand instrument by which their allegiance (so to speak) to natural science, and their respect for its professors, has been maintained; and though strangely abused, in unenlightened ages, by the supernatural pretensions of astrologers, the credence given even to their absurdities shows the force of this kind of evidence on men's minds. The predictions of astronomers are, however, now far too familiar to endanger the just equipoise of our judgment, since even the return of comets, true to their paths, and exact to the hour of their appointment, has ceased to amaze, though it must ever delight all who have souls capable of being penetrated by such beautiful instances of accordance between theory and facts. But the age of mere wonder in such things is past, and men prefer being guided and enlightened to being astonished and dazzled. Eclipses, comets, and the like, afford but rare and transient displays of the powers of calculation, and of the certainty of the principles on which it is grounded. A page of "lunar distances" from the Nautical Alma-