

namely, that we may see how theories may be highly estimable, though they contain false representations of the real state of things, and may be extremely useful, though they involve unnecessary complexity. In the advance of knowledge, the value of the true part of a theory may much outweigh the accompanying error, and the use of a rule may be little impaired by its want of simplicity. The first steps of our progress do not lose their importance because they are not the last; and the outset of the journey may require no less vigor and activity than its close.

That which is true in the Hipparchian theory, and which no succeeding discoveries have deprived of its value, is the *Resolution* of the apparent motions of the heavenly bodies into an assemblage of circular motions. The test of the truth and reality of this Resolution is, that it leads to the construction of theoretical Tables of the motions of the luminaries, by which their places are given at any time, agreeing nearly with their places as actually observed. The assumption that these circular motions, thus introduced, are all exactly uniform, is the fundamental principle of the whole process. This assumption is, it may be said, false; and we have seen how fantastic some of the arguments were, which were originally urged in its favor. But *some* assumption is necessary, in order that the motions, at different points of a revolution, may be somehow connected, that is, in order that we may have *any* theory of the motions; and no assumption more simple than the one now mentioned can be selected. The merit of the theory is this;—that obtaining the amount of the eccentricity, the place of the apogee, and, it may be, other elements, from a *few* observations, it deduces from these, results agreeing with *all* observations, however numerous and distant. To express an inequality by means of an epicycle, implies, not only that there is an inequality, but further,—that the inequality is at its greatest value at a certain known place,—diminishes in proceeding from that place by a known law,—continues its diminution for a known portion of the revolution of the luminary,—then increases again; and so on: that is, the introduction of the epicycle represents the inequality of motion, as completely as it can be represented with respect to its *quantity*.

We may further illustrate this, by remarking that such a Resolution of the unequal motions of the heavenly bodies into equable circular motions, is, in fact, equivalent to the most recent and improved processes by which modern astronomers deal with such motions. Their universal method is to resolve all unequal motions into a series of