

ascended before sunrise by scientific travelers provided with instruments, I would hope that this reiterated invitation on my part to the observation of the *undulation of the stars* may not be wholly disregarded.

I have already called attention to the fact that the basis of a very important part of the astronomy of our planetary system was already laid *before* the memorable years 1608 and 1610, and therefore *before* the great epoch of the invention of telescopic vision, and its application to astronomical purposes. The treasure transmitted by the learning of the Greeks and Arabs was augmented by the careful and persevering labors of George Purbach, Regiomontanus (*i. e.*, Johann Müller), and Bernhard Walther of Nürnberg. To their efforts succeeded a bold and glorious development of thought—the Copernican system; this, again, was followed by the rich treasures derived from the exact observations of Tycho Brahe, and the combined acumen and persevering spirit of calculation of Kepler. Two great men, Kepler and Galileo, occupy the most important turning-point in the history of measuring astronomy; both indicating the epoch that separates observation by the naked eye, though aided by greatly improved instruments of measurement, from *telescopic vision*. Galileo was at that period forty-four, and Kepler thirty-seven years of age; Tycho Brahe, the most exact of the measuring astronomers of that great age, had been dead seven years. I have already mentioned, in a preceding volume of this work (see vol. ii., p. 328), that none of Kepler's cotemporaries, Galileo not excepted, bestowed any adequate praise on the discovery of the three laws which have immortalized his name. Discovered by purely empirical methods, although more rich in results to the whole domain of science than the isolated discovery of unseen cosmical bodies, these laws belong entirely to the period of *natural vision*, to the epoch of Tycho Brahe and his observations, although the printing of the work entitled *Astronomia nova seu Physica cœlestis de motibus Stellæ Martis* was not completed until 1609, and the third law, that the squares of the periodic times of revolution of two planets are as the cubes of their mean distances, was first fully developed in 1619, in the *Harmonice Mundi*.

The transition from natural to telescopic vision which characterizes the first ten years of the seventeenth century was more important to astronomy (the knowledge of the regions of space) than the year 1492 (that of the discoveries