

of the oblique motion of the moon into two separate motions, by Eudoxus, was not the simplest way of conceiving it; and Calippus imagined the connection of these spheres in some way which made it necessary nearly to double their number; in this manner his system had no less than 55 spheres.

Such was the progress which the *Idea* of the hypothesis of epicycles had made in men's minds, previously to the establishment of the theory by Hipparchus. There had also been a preparation for this step, on the other side, by the collection of *Facts*. We know that observations of the Eclipses of the Moon were made by the Chaldeans 367 B. C. at Babylon, and were known to the Greeks; for Hipparchus and Ptolemy founded their Theory of the Moon on these observations. Perhaps we cannot consider, as equally certain, the story that, at the time of Alexander's conquest, the Chaldeans possessed a series of observations, which went back 1903 years, and which Aristotle caused Callisthenes to bring to him in Greece. All the Greek observations which are of any value, begin with the school of Alexandria. Aristyllus and Timocharis appear, by the citations of Hipparchus, to have observed the Places of Stars and Planets, and the Times of the Solstices, at various periods from B. C. 295 to B. C. 269. Without their observations, indeed, it would not have been easy for Hipparchus to establish either the Theory of the Sun or the Precession of the Equinoxes.

In order that observations at distant intervals may be compared with each other, they must be referred to some common era. The Chaldeans dated by the era of Nabonassar, which commenced 749 B. C. The Greek observations were referred to the Calippic periods of 76 years, of which the first began 331 B. C. These are the dates used by Hipparchus and Ptolemy.