real motions of the heavenly bodies must be circular and uniform. The Pythagoreans, as well as the Platonists, maintained this dogma. According to Geminus, "They supposed the motions of the sun, and the moon, and the five planets, to be circular and equable: for they would not allow of such disorder among divine and eternal things, as that they should sometimes move quicker, and sometimes slower, and sometimes stand still; for no one would tolerate such anomaly in the movements, even of a man, who was decent and orderly. The occasions of life, however, are often reasons for men going quicker or slower, but in the incorruptible nature of the stars, it is not possible that any cause can be alleged of quickness and slowness. Whereupon they propounded this question, how the phenomena might be represented by equable and circular motions."

These conjectures and assumptions led naturally to the establishment of the various parts of the Theory of Epicycles. It is probable that this theory was adopted with respect to the Planets at or before the time of Plato. And Aristotle gives us an account of the system thus devised.[7] "Eudoxus," he says, "attributed four spheres to each Planet: the first revolved with the fixed stars (and this produced the diurnal motion); the second gave the planet a motion along the ecliptic (the mean motion in longitude); the third had its axis perpendicular[8] to the ecliptic (and this gave the inequality of each planetary motion, really arising from its special motion about the sun); the fourth produced the oblique motion transverse to this (the motion in latitude)." He is also said to have attributed a motion in latitude and a corresponding sphere to the Sun as well as to the Moon, of which it is difficult to understand the meaning, if Aristotle has reported rightly of the theory; for it would be absurd to ascribe to Eudoxus a knowledge of the motions by which the sun deviates from the ecliptic. Calippus conceived that two additional spheres must be given to the sun and to the moon, in order to explain the phenomena: probably he was aware of the inequalities of the motions of these luminaries. He also proposed an additional sphere for each planet, to account, we may suppose, for the results of the eccentricity of the orbits.

The hypothesis, in this form, does not appear to have been reduced to measure, and was, moreover, unnecessarily complex. The resolution

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[7] Metaph. xi. 8.

[8] Aristotle says "has its poles in the ecliptic," but this must be a mistake of his. He professes merely to receive these opinions from the mathematical astronomers, ' ἐκ τῆς οἰκειοτάτης φιλοσοφίας τῶν μαθηματικῶν.