terms, or expressions of partial motions; and these terms involve *sines* and *cosines*, that is, certain technical modes of measuring circular motion, the circular motion having some constant relation to the time. And thus the problem of the resolution of the celestial motions into equable circular ones, which was propounded above two thousand years ago in the school of Plato, is still the great object of the study of modern astronomers, whether observers or calculators.

That Hipparchus should have succeeded in the first great steps of this resolution for the sun and moon, and should have seen its applicability in other cases, is a circumstance which gives him one of the most distinguished places in the roll of great astronomers. As to the charges or the sneers against the complexity of his system, to which we have referred, it is easy to see that they are of no force. As a system of *calculation*, his is not only good, but, as we have just said, in many cases no better has yet been discovered. If, when the actual motions of the heavens are calculated in the best possible way, the process is complex and difficult, and if we are discontented at this, nature, and not the astronomer, must be the object of our displeasure. This plea of the astronomers must be allowed to be reasonable. "We must not be repelled," says Ptolemy,[12] "by the complexity of the hypotheses, but explain the phenomena as well as we can. If the hypotheses satisfy each apparent inequality separately, the combination of them will represent the truth; and why should it appear wonderful to any that such a complexity should exist in the heavens, when we know nothing of their nature which entitles us to suppose that any inconsistency will result?"

But it may be said, we now know that the motions are more simple than they were thus represented, and that the Theory of Epicycles was false, as a conception of the real construction of the heavens. And to this we may reply, that it does not appear that the best astronomers of antiquity conceived the cycles and epicycles to have a material existence. Though the dogmatic philosophers, as the Aristotelians, appear to have taught that the celestial spheres were real solid bodies, they are spoken of by Ptolemy as imaginary;[13] and it is clear, from his proof of the identity of the results of the hypothesis of an eccentric and an epicycle, that they are intended to pass for no more than geometrical conceptions, in which view they are true representations of the apparent motions.

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[12] *Synt.* xiii. 2. [13] Ibid. iii. 3.