

omy, when further advanced, would be able to render an account of many things for which she has not accounted even to this day. Thus, in the passage in the seventh Book of the *Republic*, he says that the philosopher requires a reason for the proportion of the day to the month, and the month to the year, deeper and more substantial than mere observation can give. Yet Astronomy has not yet shown us any reason why the proportion of the times of the earth's rotation on its axis, the moon's revolution round the earth, and the earth's revolution round the sun, might not have been made by the Creator quite different from what they are. But in thus asking Mathematical Astronomy for reasons which she cannot give, Plato was only doing what a great astronomical discoverer, Kepler, did at a later period. One of the questions which Kepler especially wished to have answered was, why there are five planets, and why at such particular distances from the sun? And it is still more curious that he thought he had found the reason of these things, in the relations of those Five Regular Solids which, as we have seen, Plato was desirous of introducing into the philosophy of the universe. We have Kepler's account of this, his imaginary discovery, in the *Mysterium Cosmographicum*, published in 1596, as stated in our History, Book v. Chap. iv. Sect. 2.

Kepler regards the law which thus determines the number and magnitude of the planetary orbits by means of the five regular solids as a discovery no less remarkable and certain than the Three Laws which give his name its imperishable place in the history of astronomy.

We are not on this account to think that there is no steady criterion of the difference between imaginary and real discoveries in science. As discovery becomes possible by the liberty of guessing, it becomes real by allowing observation constantly and authoritatively to determine the value of guesses. Kepler added to Plato's boldness of fancy his own patient and candid habit of testing his fancies by a rigorous and laborious comparison with the phenomena; and thus his discoveries led to those of Newton.