

the theory was confirmed. The shadow of the earth on the moon's surface being circular, proved that the earth was round in form. To us living as we do in the full blaze of astronomical knowledge, these truths seem simple and easily ascertained; yet they were not arrived at with certainty till after long continued and painstaking observation by men of keen intellect and eminent sagacity.

Pythagoras, who flourished about 500 years before the Christian era, was the first philosopher who suspected the motion of the earth round the sun, but he left no writings. Hence we are unacquainted with the ground of his theory, which was not accepted by his contemporaries. The most distinguished of the Greek astronomers was Hipparchus, who lived a little more than a century before Christ. He calculated eclipses pretty accurately, and made a valuable catalogue of the stars. After him, about the beginning of the second century of the Christian era, comes Ptolemy of Alexandria, who published his celebrated work the *Almagest*, in which he reviews the work of Hipparchus, describes the heavens and the milky way, and gives a catalogue of stars. He supposed the earth to be at rest and the centre of the universe, a theory which seems to have been generally accepted till about 1543, when that eminent astronomer, Copernicus, published his celebrated work "concerning the revolution of the Celestial Orbs," propounding the true theory of the solar system. Three years after the death of Copernicus, Tycho Brahe was born. He rejected the true theory of his great predecessor, but astronomy is indebted to him for many valuable observations, of which his pupil Kepler made such good use that he was able to discover three most important laws which we will notice in a subsequent article. Contemporay with Kepler was the illustrious Galileo. While residing at Venice he heard it reported that a Dutch optician had discovered a certain combination of lenses, by means of which distant objects were approximated to the sight. He at once set about an experiment by which the truth of the report could be tested, and on the following day had a telescope which magnified three times. A second attempt secured one which magnified seven or eight times, and

he subsequently increased the magnifying power to thirty-two times. By the latter means he discovered the mountains of the moon, and the phases of Venus, which are precisely similar to those of the moon. These phases had been formerly announced by Copernicus as a necessary consequence of his system; but he had no instrument by which his theory could be tested. The actual discovery of their existence clearly proved that the planet revolved round the sun, and in an orbit nearer to the sun than to the earth. Turning his telescope to the planet Jupiter, he was gladdened by the sight of its satellites, presenting on a more limited scale the very same appearance which the sun, surrounded by the planets, would present if viewed at a sufficient distance. Saturn, with his wonderful rings, presented under the limited power of his telescope the aspect of three stars. Galileo also discovered spots on the disc of the sun, from which he calculated that he revolved on his axis in twenty-seven days—a calculation not far from the truth. The remarkable discoveries of this eminent man made a profound popular impression, and brought a nest of ecclesiastical and philosophical hornets about his ears. On the one hand the Court of Rome was indignant at the daring heresy of this son of the church, and attempted to stifle the truth by numerous quotations from Scripture and the fathers, and on the other he was attacked by the disciples of Aristotle, in whom were included almost all the learned men of the age. Galileo was summoned before the Inquisition, and was made to promise that he would never, either by word or pen, affirm that the world went round! Afterwards he wrote a celebrated astronomical dialogue, which, although ostensibly intended to show that the earth was standing still, yet was so ingeniously conducted as to leave no doubt in the mind of the reader as to the doctrine of the earth's motion. For this relapse into heresy the venerable old man was again brought before his inquisitorial tormentors, and in the seventieth year of his age was condemned to imprisonment during the pleasure of the Inquisition. In the course of a year he was released, but forbidden to return to Florence. He spent the remainder of his days in a small village in