

Biographical Encyclopedia of Astronomers

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Hippocrates of Chios

Born Chios (Khíos, Greece), circa 470 BC

Died Athens, (Greece), circa 410 BC

Hippocrates was a Greek geometer and astronomer whose works are known only through references by later authors

Hippocrates was born on the island of Chios, off the west coast of what is now Turkey, and spent most of his adult life in Athens, where he journeyed to prosecute pirates who had stolen his property. In that city, Hippocrates attended lectures and attained significant proficiency in geometry. More than one author (e.g., Eudemus and Theophrastus) maintained that he was not a practical man, but that he excelled in geometry.

Hippocrates's was the first known work on the elements of geometry, preceding Euclid's *Elements* by about a century. He made significant discoveries in two of the three most important geometric problems of ancient times: duplication of the cube and squaring the circle. He is not known to have addressed the third problem, trisection of the angle, at least in works that cite him. These are all "impossible" problems because they cannot be solved using only an unmarked straight edge and a compass

An important motivation for Greek studies of geometrical constructions was their application to astronomy—for example, measuring the sizes of the Earth, Moon, and Sun. Hippocrates discovered crescent-shaped figures—lunes or lunules—whose area can be squared, unlike the circle, whose area cannot be squared without resorting to nongeometrical methods. Hippocrates is also credited with inventing the method of geometric reduction, the process of moving from one problem to another whose solution depends on the solution of the former

Aristotle mentions Hippocrates of Chios among the Pythagoreans to dispute their view that comets are like planets but rarely seen, as Mercury is rarely seen because it rises only a little above the horizon. They believed that a comet's tail does not belong to the comet itself but is "assumed by it on its course in certain situations when our sight is reflected by the Sun from the moisture attracted by the comet. It appears at greater intervals than the other stars because it is slowest to get clear of the Sun and has been left behind by the Sun to the extent of the whole of its circle before it reappears at the same point."

Aristotle mentions the Pythagoreans in his discussion of the Milky Way, which he says they believe was either a path caused by a star that fell from heaven or by the Sun scorching the circle (of the Milky Way) when it moved in that region, and that Anaxagoras and Democritus say it is the light of certain stars. Hippocrates is also mentioned by Eudemus of Rhodes

Thus we can conclude that Hippocrates was among those early observers of celestial phenomena who struggled with many different Causative models to explain what they saw. His work in geometry was tied in with the observational material gathered and discussed by the

Pythagoreans. Hipparchus and Ptolemy were his worthy descendants, creating what we know of Greek mathematical astronomy. Hippocrates was one of those Greeks who made the beginnings of science possible, believing that natural phenomena were not ruled by inscrutable gods but that they could be understood by careful observation and analysis.

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