

Biographical Encyclopedia of Astronomers

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Theon of Alexandria

Born Alexandria, (Egypt), circa 335

Died Alexandria, (Egypt), circa 400

The details of the life of Theon, Greco-Egyptian mathematician, astronomer, and teacher of late antique Alexandria, are speculative and derive primarily from later accounts that are frequently confused or inaccurate. His predictions and observations of the solar and lunar eclipses of 364, however, establish that he was an active scholar at that time; similarly, he is said to have reached maturity during the latter two decades of the 4th century. A pagan, Theon served as the last member of the *Mouseion* at Alexandria and devoted himself especially to the study of older Greek religious practices and beliefs. Though he seems not to have actually taught philosophy, he was regarded as a philosopher in some later sources. He worked with associates such as his older contemporary Pappus, the mathematicians Orgines and Eulalius, and his student Epiphanius. Importantly, Theon was also the father of the Neoplatonist philosopher and mathematician Hypatia and was her closest associate and collaborator. His death is thought to have occurred before she was killed by a Christian mob in 415.

Theon's surviving works all ultimately derive from his activities as a professor, being chiefly commentaries on and explications of the works of earlier authors in the fields of mathematics and astronomy. In the case of the former, Theon produced reworked editions of several of Euclid's treatises: a highly influential edition of the *Elements*, along with an edition of the *Data* (on the basics of geometrical figures), and of the *Optics*, subsequently identified as student notes taken during lectures. He also produced an edition of the Pseudo-Euclidean work on visual reflection, the *Catoptrics*. In general, Theon's mathematical contribution is slight, but he does offer insights into the Greek sexagesimal system as it was applied in calculation.

Theon's astronomical contributions are more significant, and his commentaries on the two major works of Ptolemy are partially extant. The more extensive of these is his commentary on the *Almagest*, originally written in 13 books but now missing book 11 and most of book 5. The commentary itself is a reworking of Theon's own lectures and has thus been criticized as being merely a scholastic exercise. Its value, however, lies in its incorporation of information from lost works on which Theon relied, including that of Pappus. Theon also wrote two commentaries on Ptolemy's *Handy Tables*, claiming that he was the first to do so. *The Great Commentary* is fragmentary, with slightly more than three of its original five books now extant (books 1–3, the beginning of book 4). In describing how to use the Ptolemaic computations, it also explains the reasoning and calculations behind them, thus repeating some of the information in the commentary on the *Almagest*. There is some indication that Hypatia may have revised book 3. *The Little Commentary* on the *Handy Tables* survives complete in one book and is consciously directed at students limited in their geometrical and mathematical preparation. In it, Theon discusses the theory later known as "trepidation," the variability of the

rate of precession. It is thought that in the 7th century the Syrian Severus Sebokht used Theon's *Little Commentary* in conjunction with the *Handy Tables*.

Theon also wrote a now-lost work on the astrolabe, called in the 10th-century *Suda Lexicon* (Treatise on the Small Astrolabe); Arabic sources also attribute to him a work on the instrument. Significantly, while Theon clearly did not invent the astrolabe, his work served as the most important link transmitting its theoretical concepts from the Greek to the Islamic world and then to Europe. Indeed, Sebokht's work on the astrolabe, which is still extant, was drawn from and preserves material from Theon's lost treatise.

Theon's name is also associated with a number of other lost works, including tracts on planetary movements, on the star Sirius, and on other natural occurrences. He also seems to have written commentaries on esoteric religious and magical texts as well as to have composed poetry, one extant example of which is in praise of Ptolemy.

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