Biographical Encyclopedia of Astronomers

Digges, Thomas

Born Kent, England, circa 1546

Died London, England, 24 August 1595

Thomas Digges's reputation among historians rests largely on the fact that he was the leader of the English Copernicanists. Among astronomers, he is remembered as among the first to advocate an infinite stellar universe far outside the orbit of Saturn, populated by stars that might themselves have planets.

Thomas was the son of Leonard Digges and Bridget Wilford. He received his mathematical training from his father, who died while Thomas was in his early teens, and from John Dee, who described Thomas as his most worthy mathematical heir. Digges and his wife Agnes Saint Leger had six children, including Sir Dudley Digges and Leonard Digges the younger.

There is no record that Thomas attended any university; his proficiency in mathematical and military matters derived from his father's and Dee's tutoring. He served the government in various capacities. Digges was one of the officers designated in 1582 to repair the harbor at Dover, on which he was engaged for several years; he also served as a member of Parliament in 1572 and 1584/1585, and as a general of the English forces in the Netherlands from 1586 to 1594. He was buried in the church of Saint Mary, Aldermanbury

Thomas Digges added a discussion of the Platonic solids and five of the Archimedean solids to his father's *Pantometria* (1571) and completed his father's *Stratioticos* (1579). The second editions of both works provided answers to questions on ballistics that had been raised in the first edition of *Stratioticos*.

Digges' reputation among his contemporaries rested on his observations of the new star of 1572, on his ability to cultivate mathematics, and on the preservation of his father's writings and instruments. In *Alae seu Scalae Mathematicae* (1573), he published his observations of the star of 1572, which are regarded as the best published observations next to those of Tycho Brahe. Brahe's high opinion of them is attested by his devotion of over 30 pages of his *Progymnasmata* (Prague, 1602) to Digges's treatise

Digges' father is regarded as the maker of the first efficient telescopes, and Thomas was keen to enhance his father's reputation as much as possible. Among the drawings and descriptions of instruments preserved by Digges are a drawing of a rectilinear scale with transversals and an illustration of the use of a theodolite for estimating the range of artillery rapidly and accurately. In the *Stratioticos*, he added a description of what appears to be a reflecting telescope 35 years before Galileo Galilei and a full 100 years before Isaac Newton's reflecting telescope. Unfortunately, the instrument, if it was ever actually built, is no longer extant, and even the uses for it that Digges attributed to his father in the preface to *Pantometria* do not include any celestial observations

Already in the *Alae* (1573), Digges referred to the probable truth of the Copernican theory. In 1576, he added an English translation of parts of Book I of Nicolaus Copernicus's *De revolutionibus* to his father's *Prognostication everlastinge* (1576). The full title *is A Perfect Description of the Caelestiall Orbes according to*

the most aunciente doctrine of the Pythagoreans, lately revived by Copernicus and approved by Geometrical Demonstrations. Digges contributed to a misunderstanding that referred to Copernicus as having revived Pythagorean doctrines, but he also altered the Copernican theory in a way that removed Copernicus's ambiguity about the size of the Universe. Copernicus imagined a finite Universe with the stars located in the last sphere and the Sun at the center, but because of Copernicus's uncertainty about the nature of space beyond the stars, he left the question of whether it is finite or infinite to natural philosophers. It was Digges who first represented the stars in the Copernican system at various distances, thus committing the theory to an infinite space. By proposing that the stars are at varying distances, he was also trying to encourage astronomers to make more observations in the hope that they would prove the Copernican theory true or in need of modification. However, he still retained the Sun at the center, indicating that he did not go as far as Giordano Bruno in his conception of an infinite universe. The English thus owe their understanding of the Copernican universe as infinite to Digges, who allowed his own interpretation to pass as part of Copernicus's own theory

The fact that Digges did not carry out telescopic observations may be explained by the circumstances of his career and the fact that he never had the funds to carry out a systematic research program. On the other hand, he may also have realized that with the available instruments, stellar parallax still could not be observed and thus did not serve as a crucial experiment for the heliocentric theory. Digges further suggested that the decline in brilliance of the new star of 1572 might be the result of the Earth's motion in its orbit away from the star. If that were true, then after it reached its maximum elongation, the star would begin to increase in brilliance, thus confirming the Earth's orbital motion. In fact, the star continued to fade from view. The hope that a large collection of new and more accurate observations would quickly verify or correct the Copernican theory was too optimistic.

André Goddu

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