Biographical Encyclopedia of Astronomers

Mästlin [Möstlin], Michael

Born Göppingen, (Baden-Württemberg, Germany), 30 September 1550

Died Tübingen, (Baden-Württemberg, Germany), 20/30 October 1631

Michael Mästlin was a noted observer and mathematician himself, but is perhaps best known as the teacher of Johannes Kepler.

Mästlin was the son of Jakob Mästlin and Dorothea Simon (died 1565), who were devout Lutherans; he had a younger brother and an older sister. Young Michael was sent to the monastic school in Königsbronn, and eventually he enrolled at Tübingen University in 1568. There, Mästlin studied mathematics and astronomy under Philip Apian (the son of the famous astronomer Peter Apian), whom Mästlin eventually replaced Mästlin received his master's degree, *summa cum laude*, from Tübingen University in 1571. He tutored and taught there until he was called to be a deacon at the Lutheran Church in Backnang in 1576. There, Mästlin married Margarete Grüninger (1551–1588) in April 1577, who bore him three sons and three daughters; she died (possibly due to complications during childbirth) with their sixth child. Mästlin then married Margarete Burkhardt, a daughter of a Tübingen professor, in 1589; they had eight more children.

Mästlin's publication of his careful observations of the comet of 1577 brought him fame as an astronomer. His reputation spread across Europe, leading to his appointment as professor of mathematics at the University of Heidelberg in 1580. In 1584, Mästlin returned to the faculty at Tübingen, where he remained until his death.

For a while in the late 1570s, Mästlin was apparently the chief scientific advisor to his patron, Duke Ludwig III of Württemberg. Ludwig's successor, Duke Friedrich I, also relied on advice and opinions from Mästlin. At Tübingen, Mästlin was elected dean of the arts faculty several times. He was well liked by both his colleagues and his students. Mästlin was very generous both to his family and to others. He was a religious man; he followed the Lutheran line in opposing the Gregorian calendar reform partly because it was initiated by the pope. Mästlin had several students who became noted mathematicians, the most famous being Kepler. Mästlin also maintained interests in biblical chronology and geography.

Mästlin was a prolific scholar of astronomy, writing extensively and corresponding with other astronomers throughout Europe He can be considered the first astronomer to propose an orbit for a comet (though he did not use a proper procedure), placing the comet of 1577 in a heliocentric orbit just outside the orbit of Venus; he claimed that this supported the Copernican model of heliocentricity. Mästlin was an avid mathematician, working with spherical trigonometry to convert his observations into a useful format, and followed the published works of Johann Müller (Regiomontanus), Region Ontarus, Peter Apian, and Caspar Peucer in doing so. Mästlin read scholarly books very carefully, making extensive notes in many of his own books in neat, small handwriting. For example, he heavily annotated his personal copies of

Nicolaus Copernicus' *De revolutionibus* (noting, among many other things, numerous typographical errors in cataloged star positions), Tycho Brahe's *De mundi aetherei* on the 1577 comet (carefully assessing the positional observations), and Johann Schöner's 1544 treatise containing observations of Müller and Bernard Walther (where Mästlin seemed quite interested in eclipse measurements).

Through Mästlin's course on astronomy used his own textbook that followed Ptolemaic themes, this was likely due to the fact that basic astronomy (as taught at a low level at that time) did not need the technical aspects of Copernicus's heliocentrism and Müller's spherical trigonometry. In more advanced courses, these more technical aspects were evidently taught by Mästlin, who was widely known as a heliocentrist That reputation originated in Mästlin's treatise on the 1577 comet, in which he placed the comet in a Venus-like orbit around the Sun, as Brahe did in his major work on the same comet a decade later. Both Mästlin and Brahe attributed the idea for such an orbit to Abu Ma'shar. Kepler credited Mästlin with having introduced him to Copernicus's philosophy during Kepler's student years at Tübingen (1589–1594). Kepler's mentor wrote an appendix entailing a discussion of Copernican astronomy in the younger astronomer's first major publication, *Mysterium Cosmographicum* (1596, Tübingen). Mästlin maintained a long and productive correspondence with Kepler on astronomical matters. Kepler probably owed much of his own development of astronomical thought over the years to the training he received from Mästlin.

In the late 1570s, Mästlin prepared for publication his *Ephemerides novae*, which were ephemerides of the planets based on Copernican theory (following the work of Erasmus Reinhold). Mästlin duly noted that the ephemerides needed correcting because the observations upon which they were based lacked accuracy, and he stated that Copernicus' theory is truer than older ideas. Following Regiomontanus, Peter Apian, and others from the previous 100 years, Mästlin joined his own generation of observers (including Brahe) in working carefully to obtain the best positional measurements possible of celestial objects and thereby improve the state of knowledge in astronomy

Mästlin was known in his lifetime as a first-rate astronomical observer—his good eyesight is indicated by his 1579 drawing of 11 stars in the Pleiades—and as an astronomer who was willing to intelligently challenge the old way of thinking about astronomy through the use of observations obtained in a more detailed and systematic fashion. In his early years, Mästlin improvised by using a thread to determine the position of transient objects (1572 supernova; comet of 1577) by checking their alignments with various stars. He impressed Brahe by finding that the supernova (B Cas) showed no parallax and must therefore be as distant as the other stars, attacking the Aristotelian position that the stellar region is unchanging. By 1577, Mästlin was using a clock to record times of observation; his was the first generation of astronomers for whom timekeeping was taken to be important, and times were noted often, despite the poor quality of timepieces at the time Mästlin's treatises on comets and the 1572 supernova notably parallel Brahe's own treatises on these objects in that, unlike other typical treatises on such objects in that era, they concentrated on observations and reductions of observations while keeping astrological speculation to a bare minimum. Mästlin is also credited with being the

first to publish his own finding that the unlit part of the crescent Moon glows faintly due to sunlight reflected off the Earth onto the Moon.

Though he was unable to undertake a huge observational program, such as Brahe did at Hven, Mästlin was an important influence on Brahe's work through his correspondence. Mästlin challenged his contemporaries to improve observational data rather than simply accepting what had been passed down from antiquity through medieval times. He was also familiar with constructing sundials, celestial globes, quadrants, cross-staffs, and maps—all knowledge that was likely passed on to a large degree from his professor, Philip Apian, at Tübingen. Within four years of Galileo Galilei's first pointing a telescope skyward, Mästlin had obtained two small telescopes which, though rather poor, showed him sunspots and the satellites of Jupiter. Mästlin remained an eager astronomical observer into his later years, making notes of his observations of the comets of 1618 and of a lunar eclipse in 1628

Much of Mästlin's library now resides at the Municipal Library in Schaffhausen, Switzerland.

Daniel W. E. Green

Alternate names

Moestlinus

Möschlin, Michael

Selected References

Gingerich, Owen (2002). *An Annotated Census of Copernicus' De Revolutionibus* (Nuremberg, 1543 and Basel, 1566). Leiden: Brill. (Contains Mästlin's extensive annotations from his personal copy in Schaffhausen, inscribed over a period of about 50 years. One of Mästlin's notes therein states that Andreas Osiander was the anonymous author of the controversial preface to Copernicus's book.)

Green, D. W. E. (2004). Astronomy of the 1572 Supernova (B Cassiopeiae). *Astronimische Nachrichten,* Vol. 325, p. 689.

Hellman, C. Doris (1944). The Comet of 1577: *Its Place in the History of Astronomy*. New York: Columbia University Press, pp. 137ff. (Reprint, New York: AMS Press, 1971.) (A detailed discussion of Mästlin and the context of his observations on comets.)

Jarrell, Richard A. (1971). "The Life and Scientific Work of the Tübingen Astronomer, Michael Mästlin, 1550–1631." Ph.D. diss., University of Toronto. (The most extensive discussion of Mästlin's life and career.)

Mästlin, Michael (1573). *Demonstratio astronomica loci stelle novae. In Consideratio novae stellae, quae mense Novembri anno salutis 1572*, by N. Frischlin, pp. 27-32. Tübingen. (Mästlin's treatise was first published here. The same treatise on the 1572 supernova by Mästlin also appears in Brahe's 1602 *Astronomiae instauratae progymnasmata*, pp. 544-548.)

—— (1578). *Observuatio & demonstratio cometae aetherei, qvi anno 1577. et 1578. constitutus in sphaera Veneris, apparuit*. Tübingen: Förge. (Contains Mästlin's detailed account of observations and analysis of the comet of 1577.)

—— (1581). *Consideratio & obseruatio cometae aetherei astronomica, qvi anno MDLXXX*. Heidelberg: Jacob Mylius. (Contains Mästlin's detailed account of observations and analysis of the comet of 1580.)

—— (1582*). Epitome astronomiae*. Heidelberg. (This general astronomy text based on Ptolemaic and Alfonsine principles went into numerous editions/reprintings until 1624; it was evidently used by Mästlin as his course textbook at Tübingen.)

Methuen, Charlotte (1996). "Mästlin's Teaching of Copernicus: The Evidence of His University Textbook and Disputations." *Isis* 87: 230-247. (An analysis of Mästlin's embracing of heliocentrism.)

Rosen, Edward (1974). "Mästlin, Michael." In *Dictionary of Scientific Biography*, edited by Charles Coulston Gillispie. Vol. 9, p. 167. New York: Charles Scribner's Sons.

Westman, Robert S. (1972). "The Comet and the Cosmos: Kepler, Mästlin, and the Copernican Hypothesis." In *The Reception of Copernicus' Heliocentric Theory*, edited by Jerzy Dobrzyck, pp. 7–30. Dordrecht: D. Reidel. (A discussion of Mästlin's incorporation of the comet of 1577 into a heliocentric model, with its impact on Kepler.)

—— (1975). "Three Responses to the Copernican Theory: Johannes Praetorius, Tycho Brahe, and Michael Mästlin." In *The Copernican Achievement*, pp. 285-345. Berkeley: University of California Press. (A discussion of Mästlin's acceptance of heliocentrism.)

Zinner, Ernst (1925). *Verzeichnis der astronomischen Handschriften des deutschen Kulturgebietes*. Munich: C. H. Beck, 1925, pp. 217-219, 469-470. (Details the location in 1925 of many of Mästlin's unpublished papers.)