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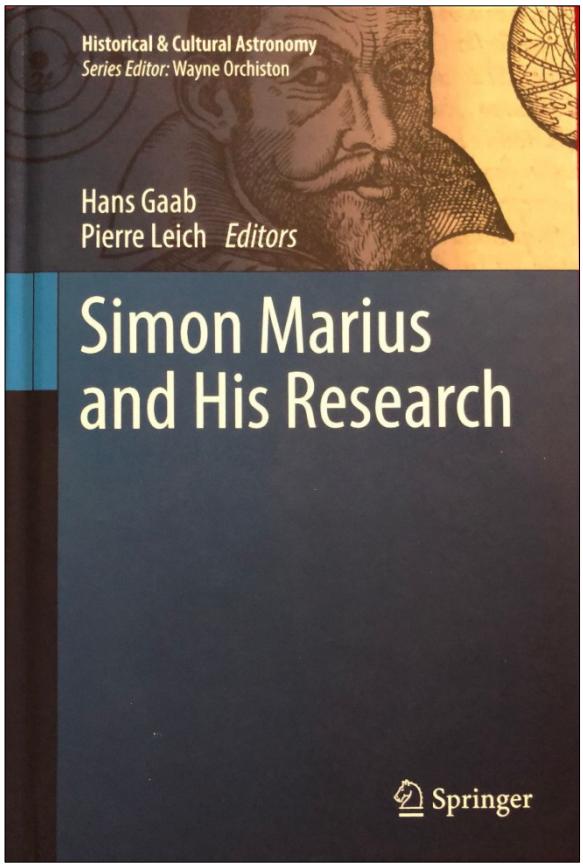
Simon Marius and His Research, edited by Hans Gaab and Pierre Leich. (Cham (Switzerland),Springer, 2018). Pp. xii + 477. ISBN 978-3-319-92620-9 (hardback), 160 x 240 mm, US $149.99.

This book about Simon Marius, edited by Dr Hans Gaab (a teacher of Mathematics and Physics in Nuremberg) and Pierre Leich (President of the Simon Marius Society) consists of 20 contributed chapters. Some are geared towards science communication, reflecting the prime interest of Mr Leich, while others are of a rigorously scholarly nature.

The first 138 pages set the stage for what follows. Chapter 1 is the first full and proper English translation of Marius' 1614 book on the



moons of Jupiter, *Mundus Iovialis*, based on a 1916 translation by Arthur Prickard and completed here by Albert van Helden. The second chapter, by Graab, is an extended biography of Marius. These two chapters together are sufficiently important to merit adding this book to any history of astronomy collection, and to show how much work still needs to be done. Thony Christie's chapter is about a 'first approach' to an astrological text by Marius, *Tabulae Directionum Novae* (1599) that remains untranslated. Its importance to astronomy is not its content, but the fact his patron was so impressed with it he "… sent Marius to study with Tycho in Prague in 1601." (page 368).

"In the calendars for 1601 to 1603, Marius explicitly announced his allegiance to Tycho's reformed astronomical calculations …" as related in a chapter by Richard L. Kremer.

> Marius presented himself as an astronomical calculator interested in predictive accuracy, not as a natural philosopher concerned with the framework of the universe. (page 337).

This public stance is a key reason why his research has so long been neglected, compared to the fame of his contemporaries Tycho, Kepler and Galileo. In a book of this nature, written by various people working on their own research, there is naturally some overlap in coverage. Thus the excellent chapter by Klaus Matthäus on Marius as a calendar writer needs to be read in conjunction with the chapter by Kremer. Together they provide a thorough 90-page study of this central aspect of Marius' career.

Of course Marius did make observations, notably two reports he published on the comets of 1596 and 1618, but in his 1596 booklet he ascribed the appearance of the comet to astrological aspects of the planets. He even accepted the comet "… as a symbol of horror." (page 208). This chapter on the comets by Jürgen Hamel is especially fascinating as he reveals how Marius viewed both the substance and origin of comets:

> He stated that comet tails show no explicit relationship to the sun or the planets. So they can't be an optical phenomenon but must have an independent substantial existence. (page 217).

As for where the material came from Marius was "… swayed by the biblical creation myth …", meaning he did not believe they were primordial objects but rather created by a deity (page 217). Even so, Marius postulated a physical origin for comets. Stating he saw sunspots that looked like comets, he wonders

> What if such sunspots were cold areas in the high temperatures of the sun and later by combination or, rather, balling up, became a comet? (page 219).

In another chapter, Jay Pasachoff writes Marius should be "… better known to the world at large …" in part because he was "… one of the first to see sunspots telescopically." (page 195). Possibly this lack of acclaim is due to the fact the publication which he listed his observations in 1613 exists in only two extant copies. The sunspot observations are detailed in a separate chapter by Dagmar and Ralph Neuhäuser.

On the vexed question as to whether Marius or Galileo first spied the four moons of Jupiter,

Pasachoff concludes they "… nearly simultaneously and independently discovered them …", attributing some confusion about the priority to the differing Julian and Gregorian calendars by which they dated observations (page 191). Whatever the case, the names we know them by, Callisto, Io, Ganymede and Callisto, originated from Marius. These names were announced in *Mundus Iovialis,* which still exists in more than 30 copies.

Astronomers of that era needed a patron to pay the bills and establish them in society. For Marius, this was Hans Philip Fuchs von Bimbach, whose military and courtly life is given an excellent 38-page treatment by Wolfgang R. Dick. He pays particular attention to a visit Bimbach made to the Frankfurt Fair in 1608, where he first saw a telescope. He did not buy this telescope from an unknown Belgian, but from this encounter,

> … in October 1608 Marius was probably the first astronomer outside of the Netherlands who learned about the invention of telescope, but it took about another 9 months until he could hold one in his hands. (page 164).

This was a Dutch telescope bought by Bimbach, which he sometimes let Marius take to his home; it was with this instrument he first saw the moons of Jupiter. In January 1610 Marius was given his own telescope by Bimbach, made of high-grade Venetian glass, which he used until a new telescope came his way in 1613.

Marius had to confront the Copernican Revolution; two aspects of this are considered in separate chapters by Christopher Graney and Pierre Leich. Each examines Marius' support of the Tychonic system instead of the Copernican, with special attention to the parallax problem. As Leich states, "… during Marius' lifetime the missing stellar parallax spoke against the heliocentric system." (page 266). The 32 pages devoted to these chapters will be of intense interest to the many scholars who study this transitional period in astronomy.

Leich also writes a chapter on the Marius-Portal, a website that launched in 2004. It now contains most of Marius' writings and the extensive secondary literature about him in many languages; this valuable resource can be accessed at www.simon-marius.net.

The book is nicely typeset and has many illustrations, but it contains numerous typos; on pages 9 and 10 alone there are seven errors. Many people mentioned in the text fail to appear in the Index. For example William Gilbert on page 268; Josef Klug appears in the text several times, but does not have an Index entry.

While Marius will never achieve the fame of his detractor Galileo, this book is designed to set out a framework for establishing his importance in the history of astronomy, and in this it succeeds admirably.

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***The Wayward Comet: A Descriptive History of Cometary Orbits, Kepler's Problem and the Cometarium*, by Martin Beech. (Boca Raton, Universal Publishers, 2016). Pp. ix + 220. ISBN 978-1627340649 (softcover), 153 x 230 mm, US $25.95.**

Models have played an essential role in the history of science, and astronomy is certainly not an exception. In fact, it may be posited that astronomy has a particular dependence on models since it deals with far-flung objects and phenomena whose understanding requires dealing with large scales of space and time. There is an ambivalence to the idea of model to which astronomy is also not strange: models encompass intellectual constructs that help describe and predict phenomena, as well as tri-dimensional artifacts that may not only perform those functions but also provide for demonstrational, teaching, and in many cases, commercial purposes.

This ambivalence is central to Martin Beech's *The Wayward Comet: A Descriptive History of Cometary Orbits, Kepler's Problem and the Cometarium*, which, as the full title suggests, seeks to address the historical understanding of the orbits of comets in geometrical and mathematical terms, as well as through the design and construction of tri-dimensional devices. In this regard, and as the subtitle of the book also indicates, the cometarium holds a special place in Beech's account. Designed in the eighteenth century to illustrate that periodical comets move in elliptical orbits around the Sun, the cometarium is normally overshadowed by the orrery (generally speaking, a mechanical model of the Solar System), which was seemingly produced in much larger quantities, and is unsurprisingly better represented in museum collections. *The Wayward Comet* is divided into four chapters. An excerpt from a dialogue by the eighteenth century lecturer and instrument maker Benjamin Martin containing a reference to the cometarium serves as the open gambit for the first chapter.

Beech proceeds to presenting a general picture of the history of celestial mechanics as applied to the Solar System, and particularly to cometary orbits. The chapter continues with a survey of how these orbits are represented in various printed images and tri-dimensional devices dating from the eighteenth through the late twentieth century. Beech addresses the