

just as human as we are, and just as capable of making intelligent choices.

A sober and professional study of the stone circles in Aberdeenshire, this small book should be read by anyone interested in archaeoastronomy.

Dr Clifford Cunningham
University of Southern Queensland,
3915 Cordova Drive,
Austin, TX 78759, USA.
E-mail: Cliff.Cunningham@usq.edu.au

***This Dark Star: Thomas Digges, The Scientific Revolution and the Infinite Universe*, by Charles L. Ladner. (Xlibris, 2022). Pp. xxiii + 179. ISBN 978-1-6698-2648-4 (softcover), 150 × 230 mm, US\$17.99.**

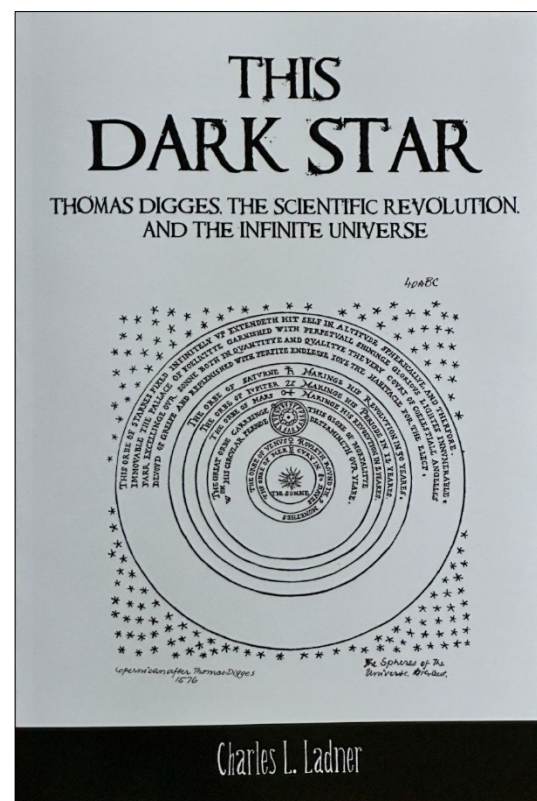
This Dark Star is a biography of Thomas Digges (ca. 1546–1595) set in the context of the scientific revolution of the sixteenth and seventeenth centuries. The author, Charles L. Ladner, is a graduate of Notre Dame's program in the humanities and a retired financial executive. He holds two Masters degrees, an MBA from Columbia and an MA from Villanova. Ladner is to be commended for his command of the development of science up to the time of Isaac Newton (1642–1727), and for recognizing the need to examine Digges' contributions to astronomy and cosmology.

The book begins with an excellent summary of the achievements of the principle actors in the scientific revolution and explains the essence of the scientific method and the deleterious effects of conflating Christianity and Aristotelian physics and cosmology. Chapters 5 to 7 present the story of Digges and the scientific revolution, and Chapter 8 presents the essence of the reading that Shakespeare's *Hamlet* is a cosmic allegory. Science spills over into Chapter 9, but otherwise it and Chapter 10 detail Digges' service to Queen and country after he had forsaken his scientific career, and an Appendix gives an interesting account of his descendants in America.

The beginning of the scientific revolution in the Early Modern era is conventionally dated to the year 1543 with publication of the Latin treatise *De Revolutionibus Orbium Coelestium* (*On the Revolutions of the Celestial Orbs*). The author of this weighty 400-page tome is Nicholas Copernicus (1473–1543), a canon who resided at the Frauen-

burg Cathedral in Poland, and who contended that the Sun is the center of our planetary system. The heliocentric model replaced the age-old perception of the Earth lying inert at the center of the Universe, but it retained the notion that the stars were held by a sphere that also is centered on Earth.

Thomas Digges is the first professional scientist to assert that the Solar System is embedded in an infinite plenum of stars. He announced this in an essay entitled *A Perfit Description of the Caelestiall Orbs* that was printed in 1576 in a popular almanac founded by his father. The essay gained no attention among academics either in England or abroad, for it was printed in a common alman-



ac, was written in English, and contradicted the standard model of bounded geocentrism. Three years earlier, a book that Digges did publish in Latin similarly attracted little attention. Its quaint title (in translation) is *Mathematical Wings or Ladders*.

Ladner is quite correct in his assessment that historians have unjustly shortchanged Digges' science. In the Preface, he singles out two chief aspects of Digges' work which are neglected in the literature. The first topic is the assertion that stars are scattered in infinite space, and the second is that the popularized writing style of *A Perfit Description*

tion is Digges' "... greatest contribution ..." (p. xiv), or at least "... one of [his] most important contributions." (p. 112). Ladner's account of Digges' infinite universe resembles that which Palingenius (ca 1500–1543) postulated nearly 500 years ago in a poem that was highly popular in England and which Digges partially memorized, but the assertion that a telescope enabled Digges "... to see a deep three-dimensional field of stars stretching to infinity ..." (p. 102) needs an explanation of how one can 'see' in three dimensions to 'infinity', even in the mind's eye.

A third topic of interest to Ladner is his presumption that Digges proved heliocentrism telescopically, but despite repeated attestation to that effect (pp. xiii–xiv, ix, 49, 87, 90, 95), there is no explanation of how Digges might have accomplished this. Ladner correctly characterizes Digges' *Wings or Ladders* as a book on "... parallactic measurement of objects in space ..." (p. 95), and he knows that Digges hoped to prove heliocentricity through the construction of "... better instruments to test parallax ...", but he mentions only Digges' ten-foot cross-staff even as he assigns telescopes to "... look at the night stars." (p. 101).

The book lists five Diggesian contributions to the new paradigm, four of which concern the two designated topics mentioned above. The fifth entry proclaims that Digges "... was the first to use a telescope for astronomical observation ..." (p. 103), which would include a study of the Sun, Moon and planets, but planetary and lunar observations are referenced only in connection with the capabilities of modern reproductions of Diggesian telescopic designs by Colin Ronan in 1991 and Michael Gainer in 2009. These statements are preceded by one on "... developing the means to measure the distances between planets to prove the Copernican theory." (p. 86). The presentation is not "... perhaps oversimplified ..." (p. 159), but its lack of an account of the fundamental role of planets is not entirely the author's responsibility because the literature upon which he bases his narrative itself leaves something to be desired.

This Dark Star is another book that investigates the possibility of sixteenth-century astronomical telescoping and as such it is a refreshing change from most extant accounts. It will encourage lay readers and scientists alike to delve further into the fascinating pre-

history of the modern World view, while the biographical information will be useful to those interested in the Digges family and its migration to the New World.

Professor Peter D. Usher
 Pennsylvania State University,
 University Park 16802, USA.
 E-mail: pxu1@psu.edu

Astronomer, Cartographer and Naturalist of the New World: The Life and Scholarly Achievements of Georg Marggrafe (1610–1643) in Colonial Dutch Brazil. Volume 1, by Huib J. Zuidervart and Oscar T. Matsuura. (Amsterdam, Amsterdam University Press, 2022). Pp. 400. ISBN 978-94-6372-218-6 (hardback), 160 × 240 mm, Euro 69.

Fate conspired mightily to obscure the life and scientific career of Georg Marggrafe (1610–1643), and until this book was published last year, it succeeded. We owe this magnificent tribute to Marggrafe to two Dutch scientists.

Dr Huib Zuidervart is a retired senior researcher (2007–2019) at the Huygens Institute for the History of the Netherlands (KNAW). He was Editor-in-Chief of *Studium*, the Dutch Journal for the History of Science and Universities. Dr Oscar Matsuura is a retired professor at the University of São Paulo, who now mainly studies the history of astronomy in Brazil. The genesis of the book was their first meeting in 2009. Matsuura published a book in 2011 on Marggrafe's astronomical work, but it was in Portuguese and received scant notice. The impetus for this book really began in 2017 when Marggrafe's draft letters were found in the Leiden City Archives after being missing for more than a century.

Marggrafe did achieve some after-death fame for his 1648 book *Historia Naturalis Brasiliae*, and much of this book deals with that aspect of his career, but Chapters 7, 8 and 9 are devoted entirely to astronomy. He matriculated from Leiden University in 1636, and from the beginning of his observations in Leiden in 1637, he was especially interested in the orbit of Mercury ("... it was his key problem ...", p. 229), because observations of the 1631 transit of Mercury in front of the Sun proved the planet's orbital data were incorrect. In Leiden, he observed Mercury as often as he could; his sketches of Mercury are shown on page 229.