The research carried out by the authors is very impressive: 1,146 footnotes with references to works in practically all European languages and a bibliography of fifty-six pages. In the field of Jesuit science, they have not overlooked anything. This monograph is essential for any study of the history of European astronomy and of Jesuit science. Nine entries in the bibliography testify to Aspass's interest in Jesuit astronomers. I make one small correction: the authors claim "only Jesuits fellows of the Royal Society of London, elected during the eighteenth century, are Roger Boscovich, Christian Mayer and Marcin Poczebout" (366), but there were in fact two more—Giovanni Battista Carbone (1694–1750), an Italian astronomer who worked in Lisbon, elected in 1729, and Louis-Bertrand Castel (1688–1757), a French professor of mathematics and natural philosophy, elected in 1730.

Agustín Udías

Universidad Complutense, Emeritus, Madrid, Spain

agustinudias@gmail.com

DOI:10.1163/22141332-0801P006-02

Thomás A. S. Haddad

Maps of the Moon: Lunar Cartography from the Seventeenth Century to the Space Age.

Map History, 1.2. Leiden: Brill, 2019. Pp. 95. Pb, €70.00/\$85.00.

Despite the seemingly comprehensive title, Haddad's *Maps of the Moon* is more of a long-form essay than a short summary of the field. Twenty-seven beautiful and innovative figures, including three where color is significant, help tell complex stories with brevity. His core argument concerns the importance of Johannes Hevelius's (1611–87) *Selenographica* (Gdańsk, 1647) as the first serious attempt to capture the changing face of the Moon in print, "grabbing time and putting it on paper" (34). The relevance of this to readers of the *Journal of Jesuit Studies* is twofold. First, his argument challenges both the traditional history of science narrative centered on Galileo Galilei (1564–1642) and Thomas Harriot (c.1560–1621) and the narrative within the history of Jesuit science of the significance of Giovanni Battista Riccioli's (1598–1671) and Francesco Maria Grimaldi's (1618–63) work in *Almagestum novum* (Bologna, 1651). Second, at the level of historiography, Haddad critiques the field's lingering positivism inherited from the Jesuit historian Henri Bosmans (1852–1928), who in two articles (1903, 1910) laid the groundwork for the history of selenography in a

rigorous archival study of the complex social milieu of Michael Florent Van Langren (1598–1675).

The sidelining of the Jesuits relates to a distinction adopted by Haddad ultimately from Kant between naturalistic symbols and schematic representations. Haddad sees early Jesuit efforts (Christoph Scheiner [1614]; Charles Malapert [c.1620]; Giuseppe Biancani [1620]; and Cristoforo Borri [1631] cf. Figure 4) falling ambiguously between the naturalistic tradition of Galileo, who tried to depict what he saw in the telescope, and more schematic efforts by Harriot that come out of maritime coastal mapping techniques and appear more like a figure or even a map. By the time of Riccioli and Grimaldi in the 1650s, symbols worked at a different political level, and the politicization of toponyms (following the lead of Van Langren's 1645 map) became a way of triumphing over Hevelius's technical achievements for different audiences. Yet, defining their efforts as a kind of derivative self-fashioning neglects their more nominalist goals for defining the Moon as a non-human object, with captions of "*Nec Homines Lunam incolunt*" (no men reside on the Moon) and perhaps more importantly "*Nec animae in Lunam migrant*" (no souls migrate to the Moon).

For Haddad, following the classicist Christian Jacob, maps are about relations between viewers and representations. Unlike Riccioli and Grimaldi, Hevelius was revolutionary in part because he remained explicit about the problem of memory in technical interstices, as the eye moves from telescope to drawing by hand. Haddad follows Kathrin Müller as well as Mary Winkler and Albert van Helden, in arguing that Hevelius created a "visual language" (35) and made the reader a "virtual witness" (37) by explicitly drawing attention to the technical dimensions of visualizing and printing Moon maps. Through this, Hevelius could show the Moon as a temporal object, both libration (the Moon's apparent wobble caused by changes in the viewer's perspective) and the nature of lunar eclipses based on two viewers at different longitudes. But then all Moon mapping from the Enlightenment down to the Space Age becomes less and less interesting as Hevelius's engagement with time is first abstracted and ultimately eliminated in a paradoxical effort to make print more and more authoritative.

Haddad contends that "Space Age" maps continue this pattern—time abstracted and a stable external viewer. But this seems only true for printed maps. The first main shift that goes unnoticed by Haddad is the Soviet use of video cameras, from 1959 live line-of-site analog video transmitted over FM radio waves that brought the first images of the far side of the Moon back. The second is the digital and robotic, which has the capability of storage to build large memory databases regardless of lines of site or the physical presence of people.

Haddad's main point, that "maps of the moon do not guide anyone from one place to another, they do not play a role in settling border disputes" (86)

and in general his lamenting the decline of human-centered space exploration seems shortsighted in this regard. The Moon is a much more complex, politically contested temporal object in the digital age. Mapping has gone far beyond the surface of the Moon since 1959, when the Soviets returned the first images of the dark side of the Moon—outward to its magnetic and gravity fields and inward to its geological and chemical composition. The Soviets mapped magnetic fields initially with Luna 10 in 1966 (they did not find much of one), and then the United States did the same digitally for the Moon's surface with Lunar Prospector's (1998) electron reflectometer. Lunar Prospector also used gamma rays to measure surface composition, neutrons to measure hydrogen in the crust, alpha particles for gas venting, and doppler measurements for what NASA called the "first truly operational gravity map of the Moon." Currently, Chinese Yutu rovers use an array of sensors and perform core samples to understand the geology of the Moon, while India has been trying to do the same with the Chandrayaan landers. Robots with computer memory rather than humans armed with print technology will map the Moon in the twenty-first century and increasingly computers will read these "maps." Haddad's basic question "When does a depiction of the moon become a lunar map?" (1) remains vitally important.

As the "space age" intersects the "digital age," mapping has been completely transformed for both the Earth and the Moon. The temporal dimension envisioned by Hevelius has become far more broadly and complexly schematized. The broader goals of Riccioli and Grimaldi to suggest the non-human aspects of the Moon also seem relevant. What happens when machine memory and learning encounters and maps an object whose temporal dimensions go beyond human framing and even human reading?

Robert Batchelor

Georgia Southern University, Savannah, GA, USA

batchelo@georgiasouthern.edu

DOI:10.1163/22141332-0801P006-03

Aislinn Muller

The Excommunication of Elizabeth I: Faith, Politics, and Resistance in Post-Reformation England, 1570–1603. St. Andrews Studies in Reformation History. Leiden: Brill, 2020. Pp. x + 242. Hb, \$151.00.

The bull *Regnans in excelsis* proclaimed Queen Elizabeth I's crimes to the Catholic world in 1570. Pope Pius V deprived her of her "pretended claim" to