BJHS **51**(4): 703–719, December 2018. © British Society for the History of Science 2018

Book reviews

ZACHARY A. MATUS, **Franciscans and the Elixir of Life: Religion and Science in the Later Middle Ages**. Philadelphia: University of Pennsylvania Press, 2017. Pp. 203. ISBN 978-0-8122-4921-7. £52.00 (cloth).
doi:10.1017/S000708741800081X

Zachary A. Matus's volume *Franciscans and the Elixir of Life: Religion and Science in the Later Middle Ages* shifts our attention from the more typical alchemical project of transmuting base metals into gold to the labors of three Franciscans as they wrote about transmuting the soul via the alchemical production of the elixir of life. This 'universal cure-all', which could heal injuries and extend human life, cannot, Matus insists, be untangled from its religious context. By focusing on the practices and writings of Roger Bacon (England, 1214–1292), Vitalis of Furno (France, 1260–1327) and John of Rupescissa (France, 1310–1362), Matus shows how discussions of the elixir were integral to these Franciscan authors' lives as they theorized about science and nature, lived ritual lives and prepared for the Apocalypse.

Matus uses the first half of the book to explore the historical context of Franciscan ideas of natural history and natural philosophy and set those ideas alongside the ways Bacon, Furno and Rupescissa wrote about their elixirs. Admitting that alchemy was a marginal practice for medieval Franciscans, he argues that examining it nonetheless highlights the ways friars theorized nature and the material world. Matus sets the stage with the writings of Bonaventure, Peter of John Olivi, and Nicholas of Lyra, suggesting that understanding the natural world was essential for Franciscan concepts of creation and salvation. Within this context, the alchemical works of Bacon, Furno and Rupescissa fit neatly into this general world view of Franciscan science.

https://doi.org/10.1017/S000708741800081X Published online by Cambridge University Press

Matus then turns to the elixir of life itself, discussing its history and how it fit into medieval Christian cosmology. According to premodern European medical theory, health and illness were determined by the holistic maintenance of humoral equilibrium. Various natural or divine actions could knock that balance out of order. Medicines were made from herbs and animal and human ingredients, as well as from mineral and chemical substances, and were formulated for each individual patient in order to restore humoral balance. Alchemical medicines like Bacon's elixir were not only intended to restore humoral balance; they also improved the patient's natural, or original, humoral balance. According to Bacon, the elixir could 'create a perfect body' (p. 48). Indeed, if the elixir could make human bodies more perfect, he hoped that it could at the same time 'make people and places hospitable to the Christian message' (p. 51). John of Rupescissa's elixir, on the other hand, was fundamentally connected to the heavens. Although it was composed of earthly elements, its status as the quintessence, the fifth element, meant that it was a substance beyond the earth and connected to heaven. On the other hand, Vitalis of Furno's alchemy stands as a foil to Bacon's and Rupescissa's since he drew primarily upon existing works.

Chapters 3 and 4 offer Matus's most intriguing readings of medieval Franciscans' approaches to the elixir of life. Starting from the point that medieval alchemy cannot be meaningfully disentangled from Christian discourses about the end of times, Matus insists that the elixir was a material way to 'realize spiritual truth' (p. 71). Roger Bacon and John of Rupescissa stand as exemplars of the ways in which alchemy could create physical matter out of spiritual truth. Bacon's elixir convincingly fits into this analysis of a spiritual, alchemical actor in the apocalypse. Rather than giving the elixir to individuals, Bacon proposed that it could be beamed using 'astrological rays about the world via giant mirrors' in order to effect a spiritual change in people around the world, essentially doing the labor of missionizing friars (p. 79). Although John of Rupescissa did not propose that his elixir had the same broad-range effects, he designed it for evangelical men to use against the Antichrist: 'John's treatise on the elixir, the *De consideratione*, is an attempt to arm evangelical men … to provide a substance "for protection in every time of war and tribulation, and especially in the time of Antichrist"' (p. 96). Using these readings of Bacon and Rupescissa, Matus asserts that it is impossible to separate alchemy and discussions of the Apocalypse.

Matus's fourth chapter deals with an essential question: how did these Franciscans wrestle with the fact that their pursuits in making these elixirs would not have resulted in products that functioned in the ways they were intended? To reconcile this failure, Matus proposes that Bacon and Rupescissa considered their elixirs to be within or part of the 'subjunctive' world. Essentially, they envisioned 'the creation of the elixir as a manifestation of what God *could* do and a product that *could* exist within the framework of the world created by God' (p. 117, original emphasis). The elixirs, then, were part of their understanding that the world could exist in 'harmony with what scripture or theological truth claim[ed] to suggest' (p. 118). Although the elixirs would be made from terrestrial substances, the interference of God would make them work in certain ways. Thus, for Rupescissa and Bacon, the elixir was an essentially Christian alchemical product that was impacted directly by God and designed to aid in the battle against Antichrist.

Matus's close reading of Bacon, Furno and Rupescissa is interesting in part because it is not designed to argue that there was a particular 'school' of medieval Franciscan alchemy. Attention to Vitalis of Furno is rather limited in comparison with the author's discussion of Bacon and Rupescissa. This close reading of these two authors paints a clear picture of the intersections between religion and alchemical practice in the lives of these Franciscans, although additional or longer quotations from these alchemists could help readers better visualize the ways in which their rhetoric displays these connections. Matus's contributions in this volume are clear evidence, first, that scholars might do well to stop thinking about religion and science as intertwining threads in the medieval material of life that can potentially be unwound and, second, that alchemy

https://doi.org/10.1017/S000708741800081X Published online by Cambridge University Press

can be considered a subjunctive science. In this volume, religion and alchemy are presented as different angles of the same object, both of which direct the Franciscan authors and their readers to similar questions and theories about the ways in which the world works, or could work.

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A. Mark Smith, **From Sight to Light: The Passage from Ancient to Modern Optics**. Chicago and London: The University of Chicago Press, 2017. Pp xi + 457. ISBN 978-0-226-52857-1. $36.00 (paperback).
doi:10.1017/S0007087418000821

Students of the history of optics looking for a decent introduction to the field have hitherto had two main options: David C. Lindberg's *Theories of Vision from Al-Kindi to Kepler* (1976) and Olivier Darrigol's *A History of Optics from Greek Antiquity to the Nineteenth Century* (2012), which, in pursuing the story beyond Kepler, is, by necessity, sketchier on the earlier period. A. Mark Smith's book (first published in 2015, now available in paperback) seems destined to be a new 'go-to' resource, even if his stated intention is to supplement, rather than supplant. He describes his work as a 'revamping' of David Lindberg's book (p. 4): as he writes, the broad narrative – the change in the focus of optics that provides his title – remains more or less the same, although there are some significant shifts in emphasis.

The most obvious change lies in the additional attention that Smith pays to the classical roots of the tradition within which thinkers before Kepler largely operated. Lindberg's book covered the whole of ancient optics in an opening chapter on the 'background' to the work of the ninth-century Arab scholar al-Kindi. Smith, by contrast, splits things up into two chapters covering, first, the emergence of optics as a science and, second, the 'flowering' of Greek optics, with Ptolemy featuring prominently in the latter. Perhaps a more profound bit of 'revamping', however, comes with the focus that Smith brings to issues that we might call 'psychological' or even 'epistemological'. He has argued elsewhere that the fundamental framework for approaching classical or medieval work in optics is an understanding of how thinkers in those periods approached cognition. Placing the optical work he examines here within this framework certainly leads to a richer account, even if discussions of what classical and medieval philosophers thought about psychology or epistemology do not always make for the easiest reading, even in Smith's elegant paraphrases.

Some revamping that Smith does not particularly trumpet is an approach that sits squarely in the historiographical tradition that has risen to prominence since the publication of Lindberg's book. In his introduction, he references some key texts in the shaping of the perspective that is known as 'the social construction of scientific knowledge'. He does so in a bid to defend himself against charges of orientalism in the creation of what is an avowedly Western-oriented narrative. Taking as an example Ibn Sahl and Willibrord Snel's independent discoveries of the sine law of refraction in the tenth and seventeenth centuries, he emphasizes the importance of the contemporary 'marketplace of ideas':

> Whereas there appear to have been no buyers in Ibn Sahl's marketplace, there was a brisk trade in Snel's. It was therefore in the 'West', not the 'East', that the sine law became historically significant and meaningful as it was there that it became communal and fruitful (p. 9).

Smith's account is unapologetically teleological, with the work of Johannes Kepler standing at the *telos*. That seems fair enough, although readers with a particularly historical cast of mind may wish he had done a bit more to distinguish the seventeenth-century optics present in the final chapter of the book from the 'modern optics' of the title and the content of 'any modern textbook'

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