

JOSHUA NALL, *News from Mars: Mass Media and the Forging of a New Astronomy, 1860–1910*. Pittsburgh: University of Pittsburgh Press, 2019. Pp. 287. ISBN 978-0-8229-4552-9. \$50.00 (hardcover).

doi:10.1017/S0007087420000266

Astronauts steel themselves for one, inevitable inquiry whenever children are invited to ask them questions: *how do you go to the toilet?* There is more than a little of the same chagrin in Agnes Mary Clerke's 1896 account of an eminent astronomer who agreed to take one question on his field 'from a lady of the inanely inquisitive kind' on condition 'it [wasn't] about Mars'. The question – inevitably – was about Mars (p. 105).

The late nineteenth and early twentieth centuries were marked, in many countries, by an insatiable appetite for news of the red planet. Most specifically, folk were keen to know whether it might be, or might once have been, home to intelligent life. Joshua Nall sets out to show us, in his impeccable book, how this vexing public fixation was a necessary and constitutive feature of 'proper' astronomy. The astronomical practices that underpinned accounts of Mars, he argues, 'were co-constructed with the transatlantic news economy that discussed and circulated that knowledge' (p. 7). In other words, scientific knowledge in this realm was not mediated (transmitted), but mediatized (unknowable or non-existent except for its instantiation in media form).

Nall's four chunky chapters explore this process of astronomical mediatization in closely adjacent contexts. In the first, the reader discovers how Briton Richard Proctor developed 'imaginative astronomy' in the teeth of opposition from those who would rather use laboratory techniques of metrology (such as spectroscopy) to study the heavenly bodies, or who pursued government-affiliated useful knowledge. In doing so, Nall argues, Proctor revealed an affinity with the democratic journalism (participatory, egalitarian, gossipy) imported from the US to the UK, where it was adopted and developed by William Stead. Unfortunately, there was no place in the Royal Astronomical Society for a 'Stead of science', and so Proctor betook himself to the US. Chapters 2 and 3 are the most substantial embodiment of the book's thesis, deftly outlining the technological sublime inherent in the positioning of new observatories in the American West. On the one hand, clear, dark and empty skies made a perfect home for precision observation; on the other, the new observatories depended upon and validated the networks of railroad and telegraph that connected them to the intellectual East. Signalling to Mars itself was a most glorious conflation of astronomy's mysterious metaphysics and its technologies of transmission. Nall's case study concerning the relationship of the Harvard Observatory in Peru to the *New York Herald* fleshes out the argument (as well as tacitly extending the domain of the 'West', a topic which could do with a little more discussion). The observatory was dependent upon financial support from the *Herald*, and a three-thousand-mile telegraph, constructed at the same time, enabled direct delivery of its discoveries in the form of 'news'. In turn, this amplified the appetite for still more news, delivered at ever greater speed. In late summer 1892, the canals of Mars came to be the focus for this addictive kind of science, so much so that even the conservative director of the competitor Lick Observatory, Edward Holden, was drawn in on the newspaper's terms. In a kind of subplot, Nall highlights the contrasting attitudes and choices of the astronomical Pickering brothers, the one trying to do 'serious' science, the other playing the *Herald's* game. Nall's final chapter retells the reasonably well-known history of Percival Lowell, but repositions him as rather late to a Martian field that was already well established in both its content and its mediatization. Lowell's actions in connecting with the renegade Pickering, William, take on fresh significance in the light of the foregoing chapter, as do the attempts of his critics to shift the ground of authority to the relatively permanent genre of the encyclopedia, and away from the bulimic modality of the newspaper.

Nall's account is cautiously and carefully set out, and very much convincing: an exemplary piece of work in the Lightman and Secord mode. If one were to tease at its edges, one might notice how the two central chapters begin to suggest some unasked-for ontological questions. If media

technologies were a necessary element in the construction of planetary astronomy, are we beginning to diverge from the consistent humanism of the Cambridge HPS approach, and towards the actor-network theory of Bruno Latour? Awkward historical counterfactuals whisper quietly: could a different form of astronomy have developed amongst these media? One might also take issue with Nall's ruling out of science-fictional sources and angles on the Mars question; historians of science have recently begun to show a permeability, perhaps even a necessary connection, between science fiction and fact. This permeability concerns what is thinkable, what is desirable, and is moreover deeply implicated in shared and specific forms of media. Excluding such sources seems a little arbitrary and difficult to sustain. Without them, we are ill-placed to parse the latest Martian fatuity, namely the recent suggestion, from apparently serious scientists (Stephen Hawking), that the solution to ecological collapse on Earth may be the colonization of Mars. Please, not that question again.

CHARLOTTE SLEIGH  
*University of Kent*

RICHARD J. OOSTERHOFF, *Making Mathematical Culture: University and Print in the Circle of Lefèvre d'Étaples*, Oxford: Oxford University Press, 2018. Pp. 304. ISBN 978-0-1988-2352-0. £65.00 (hardback).

doi:10.1017/S0007087420000278

At the turn of the sixteenth century, Paris pullulated with colleges providing guidance and material support to university students as they went through their formative years. One such institution, the Collège du Cardinal Lemoine, stood out for its teaching staff and its vibrant intellectual life. The main architect of Lemoine's reputation was Jacques Lefèvre d'Étaples (c.1455–1536), a classic example of Renaissance polymath and regent master of the college for seventeen years. In that capacity, Lefèvre developed a reform programme in defence of mathematical education at a time in which the scientific status of mathematics was still being discussed. At Lemoine, Lefèvre was not alone but could count on his circle of trusted friends and students, most notably Charles de Bovelles and Josse Clichtove. Together with them he crafted innovative printed textbooks that changed the way mathematics was taught in the university classroom, and contributed to the rise of mathematics as one of the leading scientific disciplines.

This is the history told by Richard Oosterhoff in his book, which follows up numerous articles and a doctoral dissertation on the same topic. In keeping with the idea that Lefèvre's reform project was more of a team effort, Oosterhoff compiles a diversity of perspectives and gives voice to all the parties involved – master and students alike. As a result, the reader not only learns about the intellectual journey that led Lefèvre to embrace mathematics as a scientific and pedagogical model, but also has the opportunity to peek into his classroom and see how his views were received by his students. The opportunity is provided by a collection of manuscripts and heavily annotated printed books owned by a student of Lefèvre's, Beatus Rhenanus. Oosterhoff skilfully manages to turn this group of heterogeneous writings into a coherent whole, thereby shedding new light on what happened within the walls of the Collège du Cardinal Lemoine under Lefèvre's regency.

Traditional histories of mathematics tend to depict the Renaissance as the transitional period that led to the mathematization of science. But how did this transition exactly happen? Oosterhoff answers this question by looking at the way Lefèvre's 'analogical' (i.e. cross-disciplinary) conception of mathematics paved the way for the host of mixed mathematical sciences that flourished in the seventeenth century. In the process, Oosterhoff reassesses the role of textbooks and universities, two elements that have often been associated with cultural conservatism and the defence of the status quo. On the contrary, Oosterhoff claims, it is through their textbooks (which were meant to meet the needs of the university classroom) that Lefèvre and his circle blurred the disciplinary boundaries of the medieval quadrivium. The argument runs through six