

K. Maria D. Lane, *Geographies of Mars: Seeing and Knowing the Red Planet*. Chicago, University of Chicago Press, 2011, xiv + 266 pages, US\$45 hardcover.

In 2012, a century removed from the first serialized segment of *Princess of Mars*, Disney released a lavish film adaptation of the Edward Rice Burroughs pulp classic. Even in trailer stage, *John Carter* was quickly and amusingly compared to *Avatar* (2009). Substitute one 'hostile' environment for another, and the parallels are obvious, not least because *Avatar's* director, James Cameron, told the *New Yorker* that he wanted to make 'something in the Edgar Rice Burroughs mold, like John Carter of Mars.' But the direct revival of Barsoom, Burroughs's fictionalized Red Planet, is also an invitation to revisit the widespread fascination with Mars in the late nineteenth and early twentieth centuries.

While the civilizational, dying-planet frontier scenarios of Burroughs merit only a cameo in Maria Lane's splendid book, this turns out to be a wise decision. Instead, her study emphasizes ideas that crossed and blurred the line between science and popular culture – particularly the fashionable and wildly speculative astronomy of Percival Lowell, who clearly influenced Burroughs but also produced his own lurid yet seemingly much more factual representations of an inhabited Mars. While Lowell's biography is familiar to historians of science, Lane convincingly demonstrates that his astronomy, and the work of his supportive and antagonistic contemporaries, must be understood in spatial terms. The result is an exemplary account of scientific geographies, one that dovetails in intriguing and occasionally surprising ways with both histories of geographical thought and historical geographies of imperialism.

Lane traces the geographic dimensions of the temporally-constrained 'popular phenomenon' of sensational Mars science (p. 3). The key driver of this sensation was a heightened version of the long-standing 'terrestrial analogy', whereby the comparison to Earth 'became a fundamental way of thinking about Mars rather than merely a way of describing it' (pp. 4–5). It was also a way of seeing, 'casting Mars as a landscape that could be observed in the same way travelers and geographers examined Earth's visible landscapes' (p. 5). Lane positions the account that follows this claim firmly within the established body of critical geographic scholarship on cartography, fieldwork, landscape, and empire. She synthesizes writing on the geographies of science (such as that of David Livingstone, pp. 15–16), but ensures that these framing ideas neither overwhelm nor simplify her narrative. Perhaps her most resonant contribution is the use of 'geography' to blur distinctions between scientific and popular knowledge, by showing how and where such knowledge was made, and by carefully documenting the influence of 'geographical practices and ideas' on 'the functions and meanings of Mars' (p. 14).

The power of the terrestrial analogy was such that it seemed, for a time, to sweep aside formidable obstacles to thorough Mars science, in the process granting the Red Planet a 'specific cultural significance' (p. 7). This repeated comparison supported what seem now to be preposterous theories of inhabitation, though they influenced even the most rigorous astronomical debates. Meanwhile, photographs of impressive equipment and confident maps accompanied media accounts of Percival Lowell's 'discoveries', leading to jaw-dropping headlines such as the August 1911 *New York Times* announcement that 'Martians Build Two Immense Canals in Two Years' (p. 206). While such claims were certainly contested, Lowell's captivating tall tales, backed by the double authority of laboratory and field science, were received with

startling credulity, particularly in the USA. Lane might have ruminated at greater length on how Lowell's imaginative geographies became so dominant – the traces of Marxist cultural studies are faint here – and her narrative focus means that the rich historical terrain of 1890s America, for instance, is treated in a rather limited manner. But her attempts to link the Mars sensation to broader (and overlapping) cultural, geopolitical, and scientific contexts are nonetheless largely convincing.

Chapter two is a focused discussion of Mars cartography from the 1870s to the early twentieth century, when new photographic technologies severely destabilized ideas of a populated planet and associated canal networks. This chronology is more or less present in the remaining chapters, and while Lane never renders Mars science as a unified discipline, or loses sight of the historical arcs of popularity and critique, she is also understandably captivated by the promoters of an inhabited Mars, chief among them Percival Lowell. Chapter three cleverly locates Lowell within a shifting map of astronomical legitimacy, particularly the combination of adventure and influence associated with remote, mountain-based observations from sites such as Lowell's headquarters on an Arizona mesa. In chapter four, Lane shows how astronomers went beyond the authority of laboratory location to embrace the idea that their work was 'physical exploration' (p. 99), with its attendant tropes of rugged, masculine questing and the 'geographical gaze' (p. 101). This embrace of geographical methods marked a significant shift in astronomy, encouraging instrument-heavy expeditions that further excited audiences and promoted 'direct views' of and 'travels' to Martian landscapes (p. 137). Chapter five intriguingly situates a high-profile dispute between Lowell and Alfred Russel Wallace inside broader debates over nature–society interactions and geopolitical ambitions, while chapter six turns finally, and less satisfyingly, to the complicated 'otherness' of the Martians who populated the extrapolative scenarios of numerous British and American commentators.

On the book's last page, Lane quotes Fraser MacDonald's reminder that the investigation of outer space has always 'been about' – and is not merely related to – 'familiar terrestrial and ideological struggles here on Earth.' Lane rolls MacDonald's cold war inquiries backward, while noting the continued resonance today, in discussions of Mars and much else, of 'turn-of-the-century imperial geography' and a particular 'vision of human–environment relationships' (p. 216). These gestures are welcome and appropriate, and Lane rightly resists a more thorough investigation of recent Mars science. Even so we might reflect on the limits of this hundred-year argumentative leap – limits perhaps captured by distinctions between the Edgar Rice Burroughs of 1912 and 2012. Lane has produced a truly impressive study in the historical geography of science. But like much of this literature, her book addresses a moment where scientific authority was still vested in the personae of gentlemen scientist–adventurers. Because the astronomical projects of Percival Lowell and others were also grounds for the birth of a quite different twentieth-century 'big science' – a transition that Lane alludes to directly in her discussions of changing observational and recording techniques – geographers considering this subsequent period should borrow from, but also voyage beyond, the scholarship that *Geographies of Mars* so delightfully deepens.

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