

Pieter Zeeman (1865–1943) repeated Fizeau's experiment in 1914, with far greater accuracy. He considered it "One of the most ingenious experiments of the whole domain of physics." (page 87).

The book includes 70 illustrations variously sourced from manuscripts and letters, contemporary photographs and portraits, and diagrams of apparatus. All figures are accompanied by detailed and highly informative captions, thus deftly avoiding a clutter of technical detail in the main narrative. Back matter includes a handy genealogy of Fizeau and his wife; a neat chronology illustrating Fizeau's world line; letters between Fizeau and Foucault in 1850; bibliography; and a proper index. The book is nicely designed with a clear font that is easy on the eye. Its white matte paper is of high quality that is adequate for the reproduction of the half-tones.

Lequeux's conclusion (page 126) vividly encapsulates Fizeau's enormous impact on French physics and astronomy.

In a world where science was becoming a full-fledged profession, Fizeau was one of the last amateurs: his personal fortune allowed him to conduct his research as he saw fit. ... [The] optical work of Fizeau assures him an honoured place in the history of [optical] science, and his fertile ideas are still sources of inspiration for physicists.

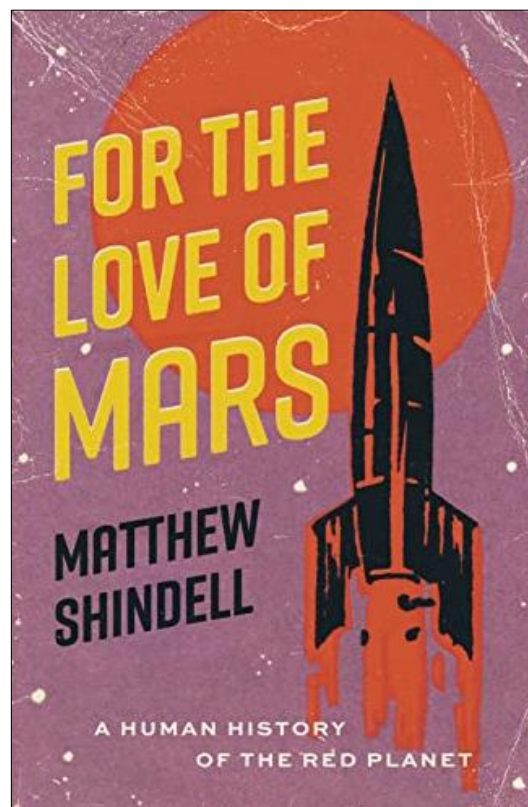
This excellent biography is written in a lively manner that will delight public readers and inform historians. Lequeux succeeds magnificently in bringing Hippolyte Fizeau out of dark shadows and into brilliant light.

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***For the Love of Mars: A Human History of the Red Planet*, by Matthew Shindell. (Chicago, University of Chicago Press, 2023). Pp. xvi + 226. ISBN 978-0-226-82189-4 (hardback), 155 × 235 mm, US\$27.99.**

Dr. Matthew Shindell is author of the highly-regarded 2019 book *The Life and Science of Harold C. Urey*. He is currently Curator of spacecraft, instruments, and other artifacts related to space exploration at the Smithsonian National Air and Space Museum.

In this new book, he casts an often bemused eye at the human love affair with the planet Mars. "My goal," he states, "is to understand Mars in the context of the changing 'world systems' that humans constructed." (page 11). This obviously is closely akin to 'world-building', a subject considered in another book reviewed in this issue of the *JAHH*, *World-Building and the New Astronomy in Seventeenth-Century Prose Fictions of Cosmic Voyage*. These two concepts overlap at several points in Shindell's book, such as his look at a 1744 novel by Christian Kimmich, in which



... a group of Christian travellers visit a fictional Marian moon. Here they encounter an Edenic world of lush and colorful vegetation, populated by mythological creatures and peaceful humans. (page 109).

The "... unconstrained variety of ideas about what the red planet might be like ..." (page 109) was finally tamed in the nineteenth century, when authors employed scientific theories "... of celestial and biological evolution" to their works. An example of this comes from 1880:

The ship Percy Greg devised for his 1880 journey to Mars, *Across the Zodiac*, was called the *Astronaut*, possibly introducing this word into English for

the first time. (page 111).

Mars became a foil for humanity's best and worst. Greg used it to celebrate Victorian ideals, while H.G. Wells used it "... to skewer them." (page 112). What all these early novels had in common, which is something their authors probably never even intended, was their key role in shaping the real future. Werner von Braun, for example, was influenced by an 1897 German novel by Kurd Lasswitz, which depicts Martians with imperial ambitions against the Earth. "The British Empire ... attempts to fight them off ..." (page 113), exactly what happened from 1939 to 1945 in response to Germany's imperial ambitions as it fired rockets into England that were created by von Braun.

I have highlighted this literary foray, but it is really just a small part of Shindell's book. The last half of the book is a fine survey of modern spacecraft exploration of Mars, while the history of astronomy portion is confined to the first half. Here, extraneous information often detracts from the story of Mars. Shindell devotes nearly a full page to an 1844 book by Robert Chambers, telling us about Chambers' study "... of phrenology and associated race science ..." (page 99), but not once mentioning what Chambers wrote about Mars. A look at Athanasius Kircher (1602–1680) goes on for three pages before Mars makes an appearance. Kircher's interest in Egyptian hieroglyphs, observations of sunspots and eclipses, collection of natural objects, and much else is related, but along the way the lay reader will have lost the Mars focus.

On the plus side, Shindell's use of obscure sources is exemplary, and he puts things in context. He places a discussion of Percival Lowell's infamous Martian canals against a backdrop of the importance of canals here on Earth:

At the end of the nineteenth century, canals were seen as symbols of progress. To make canal building the ultimate project of a superior race of intelligent Martians was to celebrate the achievement of the industrious builders of the Suez Canal and the Panama canal. (page 106).

Shindell then enfold all this with mention of a poem, *The Gospel from Mars*, which "... celebrated the canal builders of Earth ..." and their counterparts on Mars (page 107). (Unfortunately, Shindell does not date the poem, but it was written in 1907). Even though

Lowell's vision of Martians and canals are often framed in romantic terms, that was not his intent. Lowell was concerned about encroaching deserts and the occurrences of drought, the same thing the Martians were fighting by being forced to build canals. Shindell also reminds us that Lowell's vision of Mars was not a progressive one, as the canal-building program could only happen in a "... well-ordered hierarchical society ... [and] such a stratified society was the natural result of human evolution." (page 107).

As others have noted before, Mars is really a mirror for us Earthlings: "Human definitions of Mars have been connected to definitions of ourselves, and understandings of our own significance." (page 10). Beginning with Mayan, Chinese, and Mesopotamian creation stories, and ending with rovers on Mars, Shindell takes us on a multi-thousand-year journey that is best expressed in three words from NASA's Dr. Carl Pilcher: "Mars is magic." (page 156).

Even professional historians of astronomy may find something new here, and this book can certainly be recommended for the citizen scientist. There is a typo on page 88: "difficult it" should read "difficult". The Index needs work: extremophiles are on page 163, but they are first listed on page 174.

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***The Land of the Solstices: Myth, Geography and Astronomy in Ancient Greece*, by Tomislav Bilić. (Oxford, BAR, 2021). Pp. xiii + 198. ISBN 978-1-4073-5862-8 (softcover), 210 × 295 mm, Euro49.**

Tomislav Bilić works at the Archaeological Museum in Zagreb. Through a superb grasp of the sources, he has opened a new understanding of how the ancient world (Greeks in particular) understood diurnal and annual solar motions. Early in the book, he puts forth his project, to

... treat ancient scientific and narrative accounts of solar phenomena concurrently not with respect to their accuracy, i.e. their correspondence with objective reality, but as attempts at description and explanation of the specific phenomena of physical reality. (page 3).