Freedom's Journal. "He made astronomical observation central to the discourse of freedom …", and further criticised modern astronomers for failing to account for the sublime (page 70). Having read American history all my life, I have never come across the fascinating description Fraser gives, and this goes double for his next chapter.

In this, Fraser writes:

> Cherokee astronomical printing can be understood as an index for the continuity between the secular and the sacred, the universe as instrumental to state power and the universe as vast, changing, and alive. (page 81).

For example, the Cherokee poet Tso-le-oh- who wrote a poem about the comet of 1853 that "… invited consideration of fundamental questions about life in the universe." (page 98). It was published in a newspaper, the *Cherokee Advocate*. National leaders of the tribe

> … recognized the significance of science—especially star science—to preserving the sovereignty of the Cherokee people. (page 105).

No less interesting is his final chapter dealing with Hawaii. He concentrates on the last monarch, Queen Lili'uokalani, who was the first to translate the Kumulipo, which "… functions as an account of the trajectory of the universe, an account that looks backward toward the beginning of time." (page 142). The book was published in 1897, but was never made available to the public: Queen Lili printed very few copies as personal gifts. Fraser lists the archival locations of the 11 copies that still exist (the Library of Congress has two). Having lived in Hawaii, I never heard anyone mention this book that is so important to the history of astronomy. Her translation, writes Fraser,

> … did not merely provide readers with a transparent window onto an ancient, Hawaiian-language cosmography. It framed and shaped that cosmography for readers unfamiliar with Hawaiian culture. (page 155).

In this, his first book, Fraser has explored the multiple paths by which American Astronomy was transmitted to the public in the print medium. To say it is essential reading would be to understate the importance of this study for astronomy in the United States.

There is one typo: "that that" on page 24.

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The Moon in the Greek and Roman Imagination: Myth, Literature, Science and Philosophy, by Karen ní Mheallaigh. (Cambridge, Cambridge University Press, 2021). Pp. xiv + 322. ISBN 978-1-108-71628-4 (softcover), 153 × 230 mm, US$29.99.

As the subtitle of the book heralds, this is a wide-ranging study of the Moon in Classical times. The author, Karen ní Mheallaigh, is Professor of Greek at the University of Exeter. She has previously written a book on Lucian (125–180), who features prominently in this title.

The author positions this as "… the first sustained exploration of the Moon's influence on the Graeco-Roman literary and scientific imagination." (page 6). The text is divided into three rather loose Imaginations: mythic, scientific and fantastic. Each is governed by a cogent description she offers at the outset:

> Before the encroachments of telescopic lenses, the Moon was a place of both unverifiable reality and unfalsifiable possibility. (page 3).

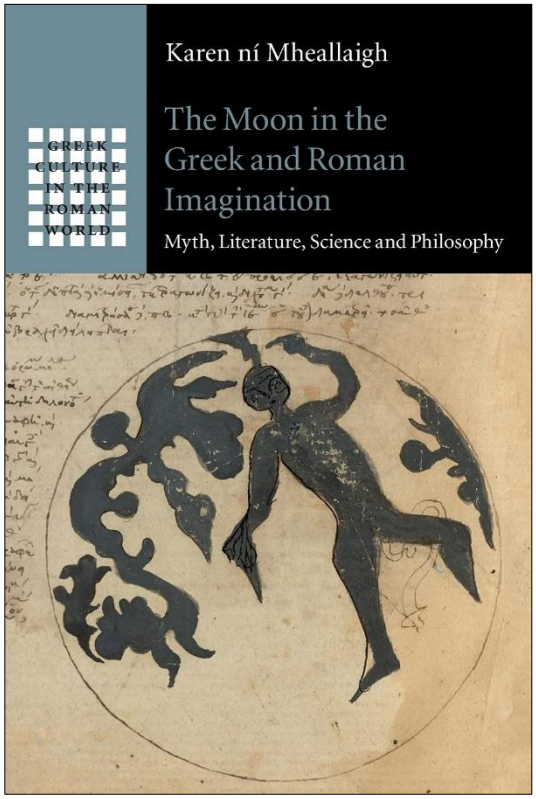
In this it bears an uncanny resemblance to the various aspects of exobiology discussed in Dr Dick's book review in this issue of the *JAHH*. In some ways, we can see our future in the past, as elucidated by ní Mheallaigh.

There is a very ancient Greek myth, attested in Hesiod in the seventh century BCE, about the Moon goddess Selene and her love for the mortal Endymion. In reworking the myth to position Selene as the protagonist, ní Mheallaigh writes that "… Sappho had, for the first time, moved the Moon centre-stage in the optical power-games of Greek literature." (page 24). Selene, she explains, embodies a

> ... uniquely optical nature as the supreme gazed-at-gazer, both universally visible and, in reverse, commanding a panoptic view of the Earth. (page 24).

This led one of us (Sheehan) to think of Piaget's stages of cognitive development in children—the stage called Level 2 visual perspective-taking, that is, the understanding that others may see things in a different way,

which tends to occur by ages 4–5. If she is right, Sappho took this step regarding perspective-taking regarding celestial bodies by 700 BCE, and without it, Aristarchus' grand step forward—seeing how things would look from the viewpoint of standing in the Sun or another planet rather than the central Earth alone—would not have been possible. The whole illusion of perspective which apparently Eudoxus wrote about also becomes clear when one recognizes the uniqueness of a particular viewpoint. I have often thought that the fact that Copernicus' ideas about heliocentrism (and the elegant explanation of retrograde movements of the planets) took place when it did partly because the availa-



bility of ancient texts gave Europeans something that might be called Level 2 literary perspective-taking—the Bible and Aristotle did not express the only possible point of view as had been the case among the Medieval scholastics—but also because artists like Alberti were working out the principles of perspective in art, and showing how three-dimensional depth and space could be represented on a two-dimensional surface. This exactly counterparts what we face when we look at the night sky—this is an apparent two-dimensional surface that, with the aid of perspective, can be deconvolved (if that is the right word) into the actual three-dimensional surface, where the actual movements of the planets through space suddenly spring up out of the flat like the displays of a pop-up book. Ultimately, there is no better example of what she describes as the Moon's commanding a panoptic view of the Earth than the view of the Earth rising over the Moon captured by Bill Anders on Apollo 8 in 1968 (Sheehan, 2023); this photograph is featured (page 272) by ní Mheallaigh in her final chapter, which compares modern space imagery with concepts from antiquity.

In her first section, the author looks at Archaic poets, several of whom treated the solar and lunar eclipse theme:

> In terms of this history of astronomy, these poets' distinctive contribution was to make the behaviour of the celestial bodies a matter of public spectacle as well as speculation. (page 32).

The spectacle of the heavens themselves naturally piqued the acquisitive nature of humans. Who has not thought of capturing a moonbeam? This mythic idea was actually put into practice by Thessalian witches and

> … the notorious trick of pulling the Moon down from the sky … At some level, this idea represents the reception and exploitation, in magical thought, of the phenomenon of lunar eclipse. (page 37).

The earliest reference to the Thessalian trick comes from the fifth-century BCE, in the play *Clouds* by Aristophanes. A farmer suggests hiring Thessalian witches to "… draw down the Moon in the night, then/lock it up in a circular case,/like a mirror." (page 41). This attests to the very ancient relationship between mirrors and the Moon; many thought the Moon was a mirror, and that the dark markings we see on it were actually seas on Earth reflected back to us. To this day, the dark areas of the Moon are known as *mare* (seas). Aside from its mythical aspects, the author writes

> … there is evidence for the use of mirrors in antiquity as a scientific tool to aid understanding of the Moon, particularly by illustrating its phases. This is a topic I mean to explore more fully elsewhere. (page 43).

It is with Parmenides in the fifth-century BCE that we begin to see serious speculation about the Moon. He expressed for the first time that the Moon shines by reflected sun-

light, and that "… the phases of the Moon are a change in the Moon's appearance only, not an alteration in its actual shape." (page 66). Ní Mheallaigh tantalisingly suggests that "Parmenides' astronomy might actually have influenced the cave allegory …" of Plato (page 66), as "… his revelation of the Sun's true role in things brought with it the realization that one's former 'reality' is but a shadow." (page 67).

Extending this analysis, the author treads new ground in optics. "Discussions of theories of vision in the fifth century BCE have not taken stock of the Moon's involvement with the history of the eye." (page 68). She argues that "…it was the reflective eye that nudged the Greeks towards the reflective Moon, not the other way round," (page 69) and that the changing phases of the Moon "…provide the perfect analogy for the dilation and contraction of the pupil." (page 78).

The position of the Moon in the cosmos was a matter of great debate between the Stoics and the Academics. It was Academics, led by Lucius and Lamprias, who had the last word. The Platonic view placed the Moon above Earth and below the Sun where it could mediate between the two. "Lucius concludes that the Moon is in fact a world analogous to ours, nothing less than a 'celestial earth'." (page 153). This made the next step quite logical: the Moon was inhabited. A discussion of creatures on the Moon, courtesy of some Pythagorean thinkers, shows the author is willing to abjure the usual academic prose: "In spite of its fantastic tang, Pythagorean astrobiology was firmly rooted in contemporary scientific thought." (page 124). And this led to yet another insights based on perspective. "Theon give us our very first insight into what it might be like to be on the Moon …" (page 170), Lucius writes the earliest imagined vision of the Moon ("… a typography of marvellous beauty …", page 196), and Lamprias offers the earliest form "… of an imagined lunar perspective on our world, and it was an enormously influential idea." (page 175). All this was preserved for posterity by Plutarch in his book *On the Face of the Moon,* the only ancient work on the Moon to have survived intact.

While many ancient thoughts on the Moon can be traced through the millennia to our own time, one that is 180 degrees different is the lunar far side. Often referred to in modern times as the 'dark side', for the ancients that was the side illuminated by Helios, the Sun god.

Turning towards Lucian, ní Mheallaigh tells of his book *True Stories*:

> Here, Lucian unlocks the explosive imaginative energy that is packed into the figurative language of scientific and astronomical discourse, and brings many of the most famous philosophical theories to life in a very literal way, so that the Moon becomes a surreal place of deliteralized metaphor. (page 246).

These pages are packed with incredible fantasy, not least being a proto telescope ní Mheallaigh describes as an "… uncanny innovation." (page 258). It employed a mirror to magnify vision through technology. Did Lucian or someone else actually build it? She writes that the addition of a magnifying mirror to observe a distant world was an imaginative move that "… seems to reach forward and anticipate …" Galileo's telescope (page 259).

For all its strengths the book is not perfect. The Index is deficient. For example, the concept of analogical drift has an entry for page 71, but not when it is first introduced on page 43. The text contains several typos: 'enhanced' should be 'enhance' (page 37); Stepsiades should be Strepsiades (page 41); 'of in' should be 'in' (page 47); 'there are there are' should be 'there are' (page 107); 'in into' should be 'into' (page 107); and 'eating' should be 'eat' (page 126). A person named "Philp" is mentioned on page 93, but nowhere else; and the acronym EMT is introduced on page 186 with no explanation.

While the authors' command of the literature is exemplary, she did not mention the *Letter to Pythocles*, written by Epicurus (341–270 BCE), in which he suggested the phases of the Moon might be caused by the interposition of another astral body in front of the Moon.

With all of the thousands of scholarly books published, filling gaps in the literature is no easy task, all the more reason ní Mheallaigh should be commended for doing so. Replete with novel insights, this is an important book for history of astronomy, optics, and classical studies. In addition to the softcover version, the book is also available in hardback for $103.

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***China and the International Astronomical Union: Divorce, Separation and Reconciliation (1958–1982)*, by Thierry Montmerle and Yi Zhou. (Cham, Springer, 2022). Pp. xviii + 213. ISBN 978-3-031-01786-5 (hardback), 160 × 240 mm, US$139.99.**

Thierry Montmerle and Yi Zhou's *China and the International Astronomical Union: Divorce, Separation and Reconciliation (1958–1982)* is a valuable historical account of Cold War science diplomacy. It focuses primarily on the interactions between China and the International Astronomical Union (IAU), but also sheds light on the geopolitics affecting the umbrella International Council of Scientific Unions (ICSU) and its other members in addition to the IAU. Drawing on rich documentation from the IAU Archives in Paris and other sources, including Chinese historical studies, the book meticulously reconstructs the dramatic story of how the Chinese Astronomical Society (CAS), founded in 1922, entered ('adhered to') the IAU in 1935, withdrew from it in 1960, and then rejoined it in 1982 against the background of shifting international politics.

Calling China's withdrawal from the IAU in protest of the latter's admission of Taiwan "… the most important crisis in the post-WWII history …" of the IAU, the authors focus, first, on the background to and dramatic events around the IAU's 10th General Assembly at Moscow in 1958 that would lead to this 'divorce'. Remarkably, the CAS, based in Nanjing (Nanking), continued its membership in the IAU for several years even after the founding of the People's Republic in 1949 which had resulted in a disruption in many of its scientific connections with the West. In 1955, for example, Zhang Yuzhe (Yu-Che Chang 张钰哲), as the longtime President of the Society, attended the 9th IAU General Assembly in Dublin. In 1958, just prior to the opening of the Moscow meeting, however, a rival Chinese astronomical society from Taiwan, under control of the Chinese Nationalists, also applied for membership of the IAU.

Even though much of the IAU leadership was critical of the evident role played by the US Government in prompting Taiwan's application, it nevertheless voted, in 1959, to accept it as the only option in accordance with its statutes while trying to convince the CAS to stay. Zhang, on behalf of the CAS, however, wrote to the IAU by the end of the year to protest its decision to admit Taiwan, calling it a "… hoax of American imperialists of creating 'two Chinas'.", and declared that the CAS would withdraw from the IAU if it did not rescind this step (page 48). No compromise was reached, and China officially withdrew from the IAU in 1960. Then, outside of the IAU, Chinese astronomers nevertheless kept extensive connections with colleagues in Europe and Australia in the 1960s and 1970s through individual and bilateral relations, except for the most chaotic years during the Cultural Revolution (1966–1976).