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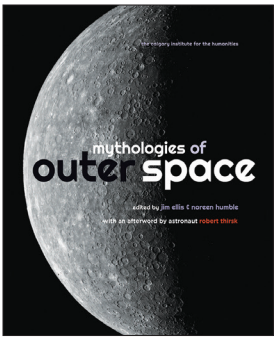

MYTHOLOGIES OF OUTER SPACE

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how we let the moon die

alice gorman

In the last few years, Earth's Moon has become a target of renewed interest, not only for scientific inquiry, but for exploitation as a commercial resource and a stepping stone to the rest of the solar system. Underpinning the idea that the Moon's mineral resources exist for the benefit of humanity is a widespread perception that the Moon is a dead world. But is this true, and what are the implications of treating the Moon as dead? This essay is an exploration of human engagements with the Moon, particularly those of the so-called spacefaring nations, as we enter a new phase of space exploration.

€ why it isn't dead

Image courtesy of NASA. https://unsplash.com/@nasa

the living moon

The Moon has not always been regarded as dead. In many cultures, both ancient and modern, the Moon is a living being, sometimes a god or goddess, sometimes a more generalized kind of spiritual entity (e.g., Gee 2020; Nilsson 1940). In a multitude of belief systems, it was the final home of the souls of the dead (Russell 1983).

In the fifth century BCE, the Greek philosopher Anaxagoras proposed that the Moon was a rocky body like Earth (Kalachanis, Theodosius, and Dimitrijević 2018). The resemblance was emphasized after Galileo Galilei started Moon gazing with his newly invented telescope in 1609. His instrument appeared to reveal mountains, valleys, and seas just like Earth's. This was all the more startling because some scientists of the time believed the Moon to be a smooth sphere. As he wrote in his 1610 treatise *Siderius Nuncius* (*The Starry Messenger*), Galileo saw that the Moon's surface was in fact rough and rocky with dark, flat, low-lying regions and brighter highlands.

Telescopes initiated a new era of planetary geography. The mapping of other celestial bodies took place in parallel with seventeenth-century European colonial expansion: both the Moon and Earth were being mapped, categorized, and named at the same time (Gorman 2015). The English astronomer Thomas Harriot is credited with the first maps of the lunar surface in 1609–10. The Dutch astronomer Michael van Langren charted the mountains, craters, and *maria*, or seas, in 1645. It seemed obvious that the dark areas were oceans and the lighter areas continents.

If the Moon was like Earth, then it was a place that could support life. For some, this was the mythical old man or woman on the Moon. For others, it was entire civilizations of sentient beings and populations of lunar fauna and flora. And there could be travel between Earth and the Moon. Until the mid-1800s, there was a hypothesis that the birds who fled the European winter sojourned on the Moon (Gorman 2019, 149–54). Inquiry into the nature of life on the Moon, however, was not always motivated by science. Lunar denizens were the perfect medium for making critiques of social and political life on Earth.

There was great excitement in 1835 when a New York newspaper announced that the renowned astronomer Sir John Herschel had seen the lunar inhabitants through his telescope. A series of six articles depicted a range of lunar beings, including human-like forms with batwing membranes connecting their hands and feet, fauna and flora with a

remarkable similarity to terrestrial species, but also animals like unicorns, although of a "bluish lead colour." Observing the interactions between "Vespertilio-homo," the batwinged hominids, and the other fauna, the author concluded approvingly that peace reigned on the Moon: "The universal state of amity among all classes of lunar creatures, and the apparent absence of every carnivorous or ferocious creatures, gave us the most refined pleasure, and doubly endeared to us this lovely nocturnal companion of our larger, but less favored world."[1] The Moon resembled earlier versions of Earth, before the Fall introduced conflict, labour, and sorrow. Sadly, the report was revealed as a hoax aimed at boosting circulation, which it did, appealing to an audience who longed to find life on the Moon and dream of a better world.

By the twentieth century it was known that the Moon was oceanless and without atmosphere. There were no beings to reflect Earth back to us. The depopulated Moon started to take on other meanings.

the man in the moon is dying!

In 1913, another piece of fake news revealed how attitudes toward the Moon had changed over the previous sixty years. A strange article was published in the US newspaper *The Times-Dispatch*. Entitled "The Man in the Moon Is Dying!," the article described how chemical processes were causing the topography of the Moon to disintegrate, levelling mountains and filling up craters. Soon the shadow geography that created the appearance of the man in the Moon would be seen no more from the surface of Earth:

> Science tells us that the big smiling face we see when the moon is full is made up of shadows cast by the great craters and enormous hollows called the seas of the moon. The right eye of the Man in the Moon is formed by the Sea of Tranquillity; the left eye by the Sea of Showers; the nose by the Sea of Clouds, and the mouth by the Sea of Humors. The crater and sea walls are crumbling, and so the shadows are changing—and so the old Man in the Moon is passing away.[2]

This observation was allegedly the work of Professor J. B. Hale, chair of astronomy at King's College London. It's a name to inspire confidence, evoking the famous American astronomer George Ellery Hale (1868–1938); but it appears that this person did not exist, and there does not seem to be any published research about chemical or mechanical weathering on the Moon on which the article could be based.

But the vision of the Moon as a dynamic geology that could change over the lifespan of a human was striking. The geological erosion was erasing one of the longest enduring symbols of humanity's connection to the Moon. Even if fantastical, this also symbolized the changing relationship of twentieth-century "Western" industrial nations to the worlds beyond Earth.

the moon in the space age

The Space Age did not magically spring into being in 1957, when the first satellite was launched. It was a work in progress and had been brewing for some decades. The Moon's transition into the Space Age was part of a general reconceptualizing of space as an infinite duplication of stars and galaxies. The profusion of burning stars was contrasted to the void that lay between them, and in this void lay death. C. S. Lewis characterized this view in his 1938 novel *Out of the Silent Planet* (which I quote often): "He had read of 'Space': at the back of his thinking for years had lurked the dismal fancy of the black, cold, vacuity, the utter deadness, which was supposed to separate the worlds."

In 1957, the year that the polished silver sphere Sputnik 1 became the first human object to leave Earth, the French historian and philosopher of science Alexandre Koyré published *From the Closed World to Infinite Universe*, which described how the cosmos lost its soul. The book was an account of how the Enlightenment replaced the intimate, animated cosmos, which interacted daily in human lives, with a cold, implacable, infinite expanse of interchangeable atoms and stars. It was this view that C. S. Lewis fought against in three science fiction novels that became known as the Space Trilogy. It seems to me no coincidence that Koyré's scholarly tour de force was published at the very moment when human material culture began to re-inscribe meaning in outer space, not as a divine force that controlled our lives, but with conquest and mastery at the centre of desire.

before & after apollo 11

A decade later, the Cold War provided the impetus for the grand expedition of humans to the Moon. Both the Soviet Union and the United States had set their sights on the Moon; and the first human object to reach it was the Soviet probe Luna 2 and its rocket in 1959. In 1962, US president John F. Kennedy made his famous "We Choose to Go to the Moon" speech, and in 1969, Apollo 11 landed in the Sea of Tranquility.

The preparation for the Apollo missions required an immense amount of new lunar science. Remote sensing data was collected; scientists tried to figure out the depth of lunar

dust for fear that the landing module would be swallowed up as if in quicksand (e.g., Gold 1962); the terrain was imaged and pored over in a fine-grained detail that would have left Galileo giddy.

While there was still some faint possibility that the Moon sheltered microbial life (the astronauts were quarantined on their return in case they introduced an interplanetary plague), the process was as deadly to the Moon as the fake chemical erosion invented by *The Times-Dispatch*. Firstly, the development of lunar science cemented the idea of the Moon as a static body, unchanged and unchanging. Then the astronauts walked the surface, sending back photos that looked to be taken in black-and-white film, but were actually in colour, so little of it there was. We saw through our own eyes the grey regolith (the broken rock and dust covering the bedrock), the black shadows, and the blackness of the sky, deeper than the void. The starry lunar night seen by the astronauts did not appear in these photos due to exposure times. Having been stripped of life, the Moon now was denied its own beauty.

The astronauts themselves did not necessarily feel this. Neil Armstrong said the Moon had "a stark beauty all its own. It's like much of the high desert of the United States" (Phillips 2014). Astronaut Alan Bean, after his return from the Apollo 12 mission in late 1969, used his painting skills to portray a distinctly lunar palette of muted mauves and yellows. Talking with lunar scientist Phil Metzger, Bean said he did not find the Moon to be a monotone place: it had its own colours and textures (Gorman 2019, 179).

Nonetheless, the perception of the Moon as a long-dead world inimical to life had taken hold in the popular imagination. The idea of the death of a celestial body was based on a contrast to the Earth as "alive," aided by the iconic *Earthrise* photograph taken in 1968, and in contrast to earlier conceptions of the Moon as part of a cosmology where everything in the heavens partook of "life" in some way. Science and the cultural associations of colour had conspired together to suck the life out of the Moon.

what's at stake—lunar mining

None of this would matter if capitalism had not been victorious at the end of the Cold War. In the ideological vacuum left by the cessation of competition for the Moon, a slow creep started.

The success of the Apollo 11 mission made the Moon less critical as an ideological weapon in this war, and for over fifty years there were no further plans for human missions. In space gatherings all over the world, people debated "Moon or Mars?," the question being whether the Moon should be bypassed in favour of throwing all resources toward the next human missions to the "red planet."

In the meantime, changes were afoot. In the 2000s, space agencies such as NASA moved to a model of outsourcing technology and missions to private industry. Space billionaires declared that their wealth would be used to support their boyish ambitions of high tech and space travel. From merely capitalist, the overall tenor of the space world became hyper-capitalist, treating the exploitation of space resources as inevitable. The original UN space treaty provisions about sharing the benefits of space exploration with all humanity were reframed as a disincentive for potential investors. The investor, rather than the astronaut, became the new "envoy of all humanity."

In the span of a decade or so, the debate died. It was no longer "Moon or Mars?" It was Moon *and* Mars, with the former viewed as a test bed for technology and governance. It became a sacrificial lamb to protect possible life on Mars. The Moon was dead and on its corpse the space billionaires started planning their conquest of the solar system. If one questioned this premise publicly, the predominantly white, male Musk bros and suburban scions of colonialism became angry. Not just annoyed, *angry*. As if a living Moon was a personal insult, an assault on their masculinity.

permanently shadowed regions

One reason for the change of direction was that recent studies had shown that the Moon did, in fact, have resources that could support life. In 2008, data collected by India's Chandrayaan 1 lunar orbiter provided evidence that deep craters in the permanently shadowed regions (PSRs) at the lunar south pole were full of a substance more precious than diamonds: water ice. Water and oxygen derived from the ice could be consumed by humans, but this was not the real drawing card. It could also be used to make rocket fuel, powering a local lunar economy and enabling the long trip to Mars. However, the discovery of water, usually considered a prerequisite for life, did not change the entrenched perception of death. The water was neutralized in ice, a potential not yet realized.

The reason the water ice survived was because it was shielded from the heat of the Sun by permanent shadows. For two billion years, only starlight and zodiacal light—the light of the Sun reflected through interplanetary dust—reached the surface of the ice lakes in the craters. Let that sink in: shadows two billion years old. On Earth, the polar regions have six months of light alternating with six months of darkness, with periods of twilight at the changing of the seasons. We do not have such permanent shadows, unless it is in the mouths of deep caves where the lack of light is simply darkness.

As intangible as they are, these shadows seem to me to have intrinsic value. They are among the oldest shadows in the solar system. As a landscape type, such permanently shadowed regions are rare. They are known on the dwarf planet Ceres in the asteroid belt, and on Mercury, where it is thought they also harbour water ice and other volatiles.

Just as the Sun never penetrates the shadows, there are also areas of the south pole that are never (or rarely) in darkness. They are called the peaks of eternal light, recalling Dante's symbol of spiritual apotheosis in the *Divine Comedy* (Daigle-Williamson 2015). The lunar night is savage, with temperatures falling to -130 degrees Celsius. The peaks offer refuge from the cold and an uninterrupted source of solar power for the deep ice mines to come.

Numerous missions are now planned to the PSRs. India's Chandrayaan 3 mission landed close to the south pole in 2023, closely following a failed Russian landing attempt. The NASA Artemis 3 mission to send the first woman to the Moon will land somewhere in the south pole PSR (Speck 2022). Orbiters and rovers are going to prepare the way for industrial infrastructure and habitats in the borderlands between light and shadow.

Inside the shadows, lunar ice miners will work in artificial light just as they do underground on Earth. It won't, most likely, be with drills, blasts, and ice picks. Thermal mining is a technique where the ice will be vaporized, the gas collected and then refrozen to allow for transport and processing (Sowers and Dreyer 2019). The business case for extracting profit along with the ice has already been made. The shadows will swim back to fill the voids left when the lights are turned off. But will they be the same? The two-billion-year reign of darkness will have ended.

How do you rehabilitate a shadow?

what we do in the shadows

The PSRs are a unique landscape that illustrate how natural heritage intersects with cultural heritage. Before, they were simply a neutral, if notable, landform. Now that they have been established to have utility for humans, they are being overwritten with economic and scientific values. But that doesn't seem enough, not for me, anyway. The ancientry, coldness, and power of the dark ice craters is not part of this story, and I think it should be.

The quality of shadows on the Moon is very different to those on Earth. Sunlight reflected from the Moon's gently rounded terrain provides some feeble illumination inside the shadow, as does earthshine, which is a secondary source of light in lunar skies. But without direct sunlight and atmospheric refraction, the depths of shadows are pitch-black, and inside them, the temperature drops radically.

The evolution of my thinking about lunar shadows started with NASA's 2011 guidelines on heritage protection on the Moon. The guidelines propose that buffer or exclusion zones be placed around US sites to protect them from the impacts of dust abrasion during future surface activities. The buffer proposed for Apollo 11 was a circle with a radius of fifty metres. I wondered if this would encompass all parts of the site, and this made me realize that the shadows cast by the hardware abandoned there were also part of the "fabric" of the site.

In searching through the archive of Apollo images, I was very struck by those in which the astronauts appear only as shadows in the photograph they or another crew member are taking. They reminded me of a series of paintings by the Italian artist Giorgio de Chirico in the 1910s. These paintings featured empty urban landscapes with colonnades, towers, and statues casting shadows at odd angles (e.g., *L'enigme du jour* [1914]—see Hollier 1994). They are stark and stylized. Art critics say the use of light and colour evokes melancholy, or even despair. Similarly, the Apollo images, with the silent shadow astronauts stalking on elongated legs, seems to amplify the loneliness of landscape.

When the astronauts left, nothing moved on the lunar surface—but the shadows are still a dynamic part of the site. As the lunar day rolls by, the shadows circle around the object that cast them, like sundials. They are both part of the natural environment and cultural objects. They contribute to the aesthetic significance of the site that is created by the distinct lunar surface and light. Lunar rocks are irregular in shape, but the human-made

shadows are clean lines and angles, or lacy anemones filtered through mesh antennas. Some shadows lie on the surface while others, such as those cast by the ridges on the soles of the astronauts' overshoes, are embedded in the regolith. Underneath and around the hardware is an intangible "shadow site."

The shadows have a symbolic resonance on Earth, as they are a beloved tool of lunar conspiracy theorists to argue that the Apollo landings were filmed in a movie studio. Others have explained the complex reasons why we might not be able to rely on terrestrial experience when using off-Earth shadows as a truth-telling tool (Perlmutter and Dahmen 2008; Platoff 2011). These evanescent effects of light are a battleground of ideologies, signs from which the truth can be read.

Compared to the young shadows of human traces, the shadows of the PSRs are unbearably ancient for something that doesn't technically exist. Their value lies in this continuity. They don't care about us: they lie in "Craters of indifference to human time," as the poet and lunar environmentalist Ceridwen Dovey phrases it (in Dovey and Potts 2020). For all this ancientry and power, however, they are still vulnerable to human predation. Two billion years of darkness can be broken in a moment, and surely this moment should not be taken lightly.

In the PSRs, the shadows both create and conceal treasure from the human gaze. They are an active force in trapping and freezing the water: the ice lakes are a result of their interaction with the complex lunar environment. The craters that cast them have names; perhaps we should give the shadows their own names to acknowledge that their intangibility translates into something more substantial, so much so that it has excited the cupidity of the lunar capitalists.

The Dantean symbolism in which degrees of light represent closeness to heaven, with hell in the pit of darkness, seems apt to describe the contrast between the peaks and crater depths. The temperature range from light to dark is from about -50 degrees Celsius, which is Antarctic-level bearable, to -130 degrees Celsius in the pits. The crater ice lakes resemble the lowlands "where the sun is silent" in *The Inferno*, whence Dante escapes to begin his journey upward (canto 1; Longfellow 1904). The first circle of *Paradiso* is the Moon, which Dante observes is "much like a diamond that the sun has struck": the peaks of eternal light. Here, Beatrice offers to Dante "a new form, light so living that it trembles in your sight" (canto 2). Perhaps it is not that the Moon is dead, but that our vocabulary of planetary light and shade has not yet developed enough to do it justice.

wasteland & wilderness

Just as Dante gives us a symbolic vocabulary of light, T. S. Eliot's iconic modernist poem *The Waste Land* (1922) presents a symbolism of water. As Piechucka (2009) argues, aridity and sterility are strongly linked in the poem. It is notable that Eliot makes rock and water categories of mutual exclusion in the wasteland: "Here there is no water only rock / . . . mountains of rock without water." Without water, the wasteland is inimical to life: "Dead mountain mouth of carious teeth that cannot spit." However, such a perceived lack of resources is sometimes what protects a landscape against the depredations of human exploitation.

On Earth, places seemingly untouched by human hands, like the icefields of the Antarctic or the Namib Desert, are given value. Such landscapes are designated wildernesses worthy of the benevolent protection of wealthy nations, who hold the power to preserve or destroy them. They are also often ideological battlefields, where Indigenous rights come up against the capitalist interests of mining companies; and environmentalists seek to evict the people whose long agency had shaped the landscape declared "pristine" (Fletcher et al. 2021; Pickerill 2008). The wilderness stands in opposition to urban, industrial, and agricultural landscapes.

The Moon's death has deprived it of the opportunity to be perceived as a wilderness in the eyes of many. By this standard, there is nothing there to preserve or maintain. However, it does have the potential to become a wasteland. The Wikipedia article on lunar resources states that the goal of sustainable development on the Moon is to "ensure that future generations are not faced with a barren lunar wasteland by wanton practices."[3]

Human activity transforms landscapes into "wastelands" when resources have been depleted and ecosystems destroyed. As the residue of industrial processes, the wasteland has no further potential to be exploited or "improved." Its natural values have been extinguished, leaving only scars and industrial detritus. The wasteland is vividly evoked in J. R. R. Tolkien's (1955) description of the destruction wrought by warfare on the plain of Dagorlad, a grey landscape of smoking dust cones, poisonous oil sumps, and noxious airs where nothing can live.

These oppositions are firmly grounded in a subset of economic and environmental beliefs held in contemporary Western capitalist societies. They are not universal among the humans for whom the Moon is supposedly a province or common heritage, as stated

in the UN outer space treaties (see this volume's appendix). As Chang (1992, 852) has expressed it, "The core of the Western environmental movement is derived from the present stage of the wasteland. It is not a movement derived from the different world views of indigenous [*sic*] persons, such as Native Hawaiians, who hold completely different attitudes towards scarcity and human influence on nature."

Space industry has a deep entanglement with wastelands. Early launch sites were located in places seen as unproductive and with low populations, such as the forests of French Guiana or the deserts of Woomera in South Australia and White Sands in the United States. This was very much not how these lands were perceived by their traditional owners. Kokatha people knew how to find water in the desert by observing vegetation and soil patterns, while the rocket range required the building of an expensive pipeline to supply the engineers and their families (Gorman 2005).

The Moon doesn't quite fit into either category. It is not wilderness, but it is not yet wasteland—this is a state that may lie in its future, a planet laid waste and abandoned when it no longer serves a purpose as a launch site for Mars, or as a source of minerals valued or scarce on Earth. The mission of lunar sustainability advocates is to postpone this moment for as long as possible. This is not the epitome of ethical and sustainable behaviour it might seem. If the Moon is already dead, how can it die further?

why the moon lives

To finish, I want to present some arguments about why the Moon should not be perceived as dead. An aspect of this is that, unlike the rapid erosion of the lunar surface presented in "The Man in the Moon Is Dying!," some change happens at a pace far slower than our short and frenetic human lives. We judge the Moon by standards it cannot meet, without plate tectonics, vulcanism, and atmosphere. This does not seem like environmental justice to me.

The Moon is currently in the Copernican or Neolunarisian geological age (Guo et al. 2014), which began roughly around eight hundred million years ago and is characterized by craters with bright rays, such as Tycho. In earlier periods the Moon had much more active vulcanism. In this latest phase, the lunar surface is shaped by external forces such as impacts with cosmic rays, micrometeorites, and meteorites. Already human activity is making its own contributions with the impacts of rocket bodies.

This process, which is common on the airless bodies of the solar system, is known as impact gardening. The surface is continually reworked, and ejecta from the impacts is redistributed to other regions. Despite appearances, the lunar surface is in a state of constant renewal. Impact gardening also plays a role in the formation and trapping of water on bodies like the Moon, Ceres, and Mercury (Costello et al. 2020).

Unlike Eliot's wasteland, the Moon has water cycles. Outside the magnificent structures of the polar ice lakes, there is a small-scale and daily creation and dissolution of water molecules in the minute craters caused by micrometeorite bombardment. We hardly know anything about this yet; but it clearly forms part of a larger water ecosystem that, apart from its benefits for human use, is part of a dynamic abiotic ecology (Honniball et al. 2021; Jones et al. 2018; Reiss et al. 2021).

On the surface, particles and rays interact directly with the regolith. Cosmic rays create the helium-3 that so interests humans as a potential power source; micrometeorites strike and melt the dust into shards of obsidian. The dust becomes electrostatically charged and sticky from this bombardment; for the Apollo astronauts it was a nuisance and health hazard, capable of causing equipment failure, lung injury, and seal erosion (Zakharov, Zelenyi, and Popel 2020). But let's reconfigure it from a nuisance to a planetary-scale ecology, responding actively to disturbance by flowing and sticking to moving bodies, even using them for transport off-planet. Inanimate, perhaps; but not without agency as it elicits a reaction from those in contact with it.

The dust has its own unearthly taxonomies. Hidden underneath the surface are microscopic towers and buttresses dubbed fairy castles, created by the static electricity that attracts and repels dust particles with equal measure (Hapke 1967; Szabo et al. 2022). Every bootfall of an Apollo astronaut crushed these sublunarian aerial formations. The fairy castle structure affects how light is reflected from the surface.

I've already spoken of the shadows, but lunar light is equally dynamic. Since the sixteenth century, Earth-based observers have seen what are known as transient lunar phenomena (TLP): "Glows, hazes, mists, brief colour changes and temporary obscurations of lunar surface features" (Hughes 1980, 438). There does not seem to be a single consistent explanation for all TLP characteristics, although outgassing in crater regions certainly accounts for a large proportion of them (Crotts 2009). Discussing the TLP, Hughes (1980, 438) says, "Three thousand million years is a long time for the Moon to be quiet and cold, but is it completely dead? Probably not, is the most reasonable answer."

Colour, then, is less uncommon on the Moon than we might think; but our insistence on correlating colour and life may be at least partially a result of prioritizing human senses such as vision, evolved for terrestrial circumstances. Maybe our eyes don't suit the Moon. Other Earth animals, with fewer cones for colour perception and more rods for light perception, live in a visual world that is no less rich than ours. On the other hand, human eyes are not even the pinnacle of colour perception. The mantis shrimp is known for having the most complex eyes and sophisticated vision in the world of the eyed, with sixteen photoreceptors as opposed to the human three, and the ability to see polarized and ultraviolet light (Cronin et al. 2022). We can only guess at the shades that different eyes might distinguish in the shadowed realms of the lunar surface. And we haven't even started on the acoustic landscape.

The Moon seems dead because we haven't learned to see it as alive. But we are surrounded by decay and death on Earth, and on the Moon we would be the ones bringing death, already introduced with the dead plants on China's Chang'e 4 lander. Imagine if the dominant paradigm of lunar engagement were not a hyper-capitalist, post-Enlightenment dead cosmos with military men writing the script. Along with developing "other forms of knowledge, helped along by a subtle shift in descriptive language," Dovey (2021) urges that we should develop an ethics of kinship rather than of possession.

We would see similarity, not difference, and develop a palette of grey that we would read intimately as we do now the terrestrial landscape, each nuance, each shadow giving meaning. We could navigate by the shadows and travel with the terminator, the dividing line between day and night; and at night, stand with our sister Moon to see the stars with a clarity that only comes by facing the void full on: unafraid and joyful.

notes

1 "The Great Moon Hoax of 1835," *Museum of Hoaxes*, accessed July 20, 2024, https://hoaxes.org/text/display/the_great_moon_hoax_of_1835_text/P5.

2. "The Man in the Moon Is Dying!," *Strange Ago*, July 6, 2017, https://strangeago.com/2017/07/06/man-moon-dying/.

3. Wikipedia, s.v. "Lunar Resources," last modified June 3, 2024, 08:10, https://en.wikipedia.org/wiki/Lunar_resources.

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