

# ■ Everlasting Pursuit of Scientific Exploration: The Unfinished Frame Narratives in Johannes Kepler's *Somnium*\*

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## Abstract

In *Somnium*, published posthumously in 1634, Johannes Kepler (1571-1630) integrates his advocacy for Copernican heliocentrism with imaginative narrative, thus laying the groundwork for modern science fiction. Originating from a 1593 student astronomical disputation and expanded through a dream vision added in 1609, Kepler's *Somnium* unfolds through intricately layered frame narratives. Two embedded narratives abruptly end as the dreamer in the outermost narrative awakens, leaving them without proper conclusions. The core narrative contains a fantastical lunar tour given by a supernatural daemon, detailing the extraterrestrial life forms and otherworldly landscapes on the moon. This essay analyzes the unfinished frame narratives in *Somnium*, arguing that the daemon in the core narrative epitomizes an unprejudiced astronomer just like Kepler, who remains detached when presenting carefully calculated and scientifically grounded accounts of the lunar world. The daemon's interrupted speech aptly symbolizes the unfinished state of Kepler's astronomical explorations of the moon, which further attests to the insatiable human

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curiosity for unraveling the mysteries of the unknown as well as the everlasting pursuit of scientific inquiries.

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When I had reached this point in my dream, a wind arose with the rattle of rain, disturbing my sleep and at the same time wiping out the end of the book acquired at Frankfurt. Therefore, leaving behind the Daemon narrator and her auditors, Duracotus the son with his mother, Fiolxhilde, as they were with their heads covered up, I returned to myself and found my head really covered with the pillow and my body with the blankets.

—Johannes Kepler, *Somnium*, pp. 28-29

## Introduction

Johannes Kepler (1571-1630), a distinguished mathematician and astronomer, seamlessly blends astronomical discourse with literary invention in *Somnium seu Opus Posthumum de Astronomia Lunari* (*The Dream; or, Posthumous Work on Lunar Astronomy*),<sup>1</sup> published posthumously by his son in 1634. *Somnium* emerged during the Scientific Revolution, a period characterized by significant astronomical inquiry and the advent of the telescope, which collectively reshaped contemporary understandings of the cosmos. Devoted to mathematics and astronomy, Kepler was especially interested in how the universe was structured. His astronomical perspectives, significantly influenced by his teacher Michael Maestlin, were aligned with the heliocentric model envisioned by Nicolaus Copernicus,<sup>2</sup> later espoused by figures like Giordano Bruno<sup>3</sup> and Galileo Galilei.<sup>4</sup> Kepler's initial astronomical focus was the moon, its relative proximity to earth making it more accessible to empirical observation, and he was particularly intrigued by the presence of spots on the moon. In

<sup>1</sup> Kepler's *Somnium* was originally composed in Latin. The citations within this essay are drawn from Rosen's translation *Kepler's Somnium: The Dream, or Posthumous Work on Lunar Astronomy* (1967), which will henceforth be referred to simply as *Somnium*.

<sup>2</sup> Copernicus's influential and controversial scientific treatise *De Revolutionibus Orbium Coelestium* (*On the Revolutions of the Heavenly Spheres*, published in 1543) proposed a heliocentric world system against Ptolemaic geocentrism. For the historical context that motivated Copernicus to adopt heliocentrism to solve the problems in contemporary debates about astrological prognostication, see Robert S. Westman's *The Copernican Question* (2011).

<sup>3</sup> In his work *De l'infinito universo e mondi* (*On the Infinite Universe and Worlds*) published in 1584, Giordano Bruno (1548-1600) proposed a view of an immense universe filled with innumerable stars, each functioning as a center of motion in its own world (Dick 65-69; Campbell 116-20); he also speculated about the "innumerable and excellent individuals" that should inhabit the innumerable worlds (Campbell 119).

<sup>4</sup> Galileo Galilei (1564-1642) published his first telescopic observations of the surface of the moon, the phases of Venus, the innumerable fixed stars and the Milky Way, and his discovery of the four moons orbiting Jupiter in *Sidereus nuncius* (*Sidereal Messenger*) in March 1610. In April 1610 Kepler wrote his enthusiastic reactions in *Dissertatio cum nuncio sidereo* (*Conversation with Sidereal Messenger*), while also reminding Galileo of Kepler's own earlier discoveries in *Optics* (Dick 70).

1593, years before the invention of the telescope for astronomical observation, Kepler authored a student disputation at the University of Tübingen. This work advocated Copernican heliocentrism over age-old geocentrism, presenting cosmological phenomena from an alternative standpoint stationed on the moon.<sup>5</sup> However, due to Professor Veit Müller's strong opposition to Copernican astronomy, he refused to approve a debate on Kepler's disputation, and it was thus put away (*Somnium*, "Appendix C" 207-8; Dick 70 and 203n27).

In his ground-breaking treatise *Ad Vitellionem paralipomena, quibus astronomiae pars optica traditur* (*Optics: Paralipomena to Witelo and Optical Part of Astronomy*) published in 1604, Kepler explored why human eyes might not perceive the motion of the earth. He explained this as a result of the eyes being "attached to the head," and thus "to the body" and "to the entire region and its perceptible horizon" (336). This attachment limits the perception of the earth-container housing the observer, and is compounded by the relative imperceptibility of the stars' speed compared to the much faster movements of the human body on Earth (336-37). Kepler theorized that "even if someone were to carry us across to the moon or to another of the wandering stars," due to the universal limitations of the visual perspective, the observer would still erroneously perceive the moon as stationary and other celestial bodies as moving (336). Kepler later turned this idea into a frame narrative for his lunar astronomical disputation. This narrative eventually evolved into the science-fictional work *Somnium*, wherein he envisioned supernatural daemons carrying humans to the moon.<sup>6</sup>

In *Optics*, Kepler confirmed Plutarch's argument in *De facie in orbe lunae* (*Concerning the Face Which Appears in the Orb of the Moon*), which Kepler encountered in 1595, that the spots on the moon are real rather than optical illusions produced by human eyesight.<sup>7</sup> He also agreed with Plutarch regarding the moon's earthlike features. Plutarch's text, a classical source on

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<sup>5</sup> Kepler explains in the notes he later appended to *Somnium*: "The purpose of my *Dream* is to use the example of the moon to build up an argument in favor of the motion of the earth, or rather to overcome objections taken from the universal opposition of mankind" (*Somnium* 36, Note 4); and "the thesis of the whole *Dream*" is "an argument in favor of the motion of the earth or rather a refutation of the argument, based on sense perception, against the motion of the earth" (*Somnium* 82, Note 96).

<sup>6</sup> Probably inspired by his observations of the solar eclipse in October 1605, Kepler conceived the "plan" of wrapping up his 1593 lunar astronomical disputation with the "dream" (*Somnium* 58, Note 49). Yet as Rosen notes, Kepler did not put his plan down on paper until the summer of 1609 (*Somnium* 58n112).

<sup>7</sup> Kepler learned about Plutarch's work *Concerning the Face* in 1595 from a work by the German astronomer Erasmus Reinhold; Kepler also cited Reinhold's ideas concerning the nature of the moon in ch. 6 of *Optics* (*Somnium* 33; Dick 203n28). Kepler later translated Plutarch's entire work from Greek to Latin, published together with *Somnium* (1634).

dream visions and lunar voyages,<sup>8</sup> likely influenced Kepler's choice of structure for the added frame narratives in *Somnium*, particularly the lunar voyage involving such supernatural spirits as "daemons." While drawing inspiration from Plutarch's *Concerning the Face* and Lucian's *A True History*, Kepler diverges from Lucian's satiric parody of futile human curiosity and modifies Plutarch's approach to blend philosophical myths and scientific procedures in the pursuit of knowledge (Chen-Morris, *Measuring Shadows* 173). For Kepler, the dream in *Somnium* is far from a meaningless daydream; it carries positive meanings and imparts true knowledge about the universe to its readers.

More than a decade later, while residing in Prague as the Imperial Mathematician, Kepler revisited his student disputation, resumed work on it, and added the dream vision along with two embedded frame narratives in 1609, thus forming the manuscript of *Somnium*. The first added frame narrative depicts an autobiographical story of Duracotus and his mother Fiolxhilde. The second contains a speech given by a supernatural daemon from the moon invoked by Duracotus's mother, which is fundamentally based on Kepler's 1593 astronomical disputation. This 1609 version, once circulated, was misconstrued by Kepler's adversaries, leading to the legal prosecution and imprisonment of his mother for alleged witchcraft.<sup>9</sup> This incident prompted Kepler to compose 223 explanatory notes throughout the decade of 1621-1630,<sup>10</sup> aiming to clarify the work's content. These notes were appended to the work for publication, which was eventually carried out posthumously by his son in 1634.

Kepler's *Somnium* intertwines scientific inquiry with literary and philosophical influences. Sheila J. Rabin argues that Kepler's departure from Aristotelian astrology marked a shift away from the idea of celestial bodies exerting direct influence over earthly events.<sup>11</sup> Critics such as Dean Swinford (2015), Raz

<sup>8</sup> In Note 2, Kepler lists several literary precedents, including Cicero's *Republic*, Plato's *Timaeus*, Plutarch's *Concerning the Face*, and Lucian's *A True History* (*Somnium* 30-33).

<sup>9</sup> Kepler's mother was arrested in August 1620 and, due to her son's vigorous defense, was eventually pardoned and released in September 1621. For more detailed information, see Max Caspar's *Kepler*, pp. 240-56, and David K. Love's *Kepler and the Universe*, pp. 166-69.

<sup>10</sup> Rosen argues that instead of 1620, Kepler should have begun writing these notes in late 1621 or even early 1622. See Rosen's "Introduction" (*Somnium* xix-xx).

<sup>11</sup> Rabin discusses the complex relationship between astrology and astronomy (764-68) and argues that Kepler's belief in "a physical heaven that was no different from the earth" (767) destroys one foundation of medieval astrology which believed in the immortal influence of the non-physical celestial bodies over the terrestrial region (766-67). Such astrological beliefs had developed from the Aristotelian cosmos, according to which, the planetary motions would influence and control the terrestrial elements to make things happen (Aristotle, *De caelo* [*On the Heavens*] 2.3). For the development of astrology from the fourteenth century until it became severed from astronomy as a science in the seventeenth and eighteenth centuries, see ch. 23 "Astrology" by H. Darrel Rutkin in *The Cambridge History of Science*, vol. 3 (pp. 541-61).

Chen-Morris (2005, 2016), and Pierre Connes (2020) have explored the interconnections between Kepler's *Somnium*, Plutarch's *Concerning the Face*, and Lucian's *A True History*, emphasizing how Kepler blends science, mythology, and speculative fiction. Both Marjorie Hope Nicolson and Steven J. Dick have pointed out the close connection between Kepler's daemons and Plutarch's "souls" or "Spirits," who undergo the cleansing process on the moon after death (Nicolson 17; Dick 1-72). In this essay, I will focus primarily on the unfinished frame narratives in *Somnium*, arguing that the daemon in the core narrative embodies an impartial astronomer, much like Kepler, presenting scientifically grounded views of the lunar world with detachment. The daemon's interrupted speech reflects the unfinished nature of Kepler's lunar explorations, symbolizing humanity's insatiable curiosity and the infinite pursuit of scientific discovery.

### Layered Frame Narratives in *Somnium* as Imperfect Chinese Boxes

The compositional evolution of Kepler's *Somnium*, which spanned from 1593 to 1630, resulted in its complex, multi-layered structure. The work is structured partly like Chinese boxes or Russian nesting dolls, where each larger layer encompasses a smaller one. At the outermost level, there is a dream framework that wraps up the story of a young son's travels to a foreign country and his subsequent return to his mother, who recounts her acquisition of knowledge from wise spirits. Nested within this mother-son dialogue is the narrative told by "the Daemon" from the moon, which includes accounts of the mystical transport of humans to the moon and incorporates Kepler's 1593 lunar astronomical disputation.

*Somnium* opens amidst the political turmoil in Prague, leading the narrator (a persona of Kepler) to turn to read Bohemian legends about Libussa, "renowned for her skill in magic" (11). The narrator recounts that after a night of stargazing, he falls into a deep sleep, during which he dreams of reading a book obtained at a Frankfurt fair (*Somnium* 11). Kepler's association of historical events with a legendary, magic-wielding female ruler reflects his fascination with the occult, despite his professional focus on mathematics and astronomy. This blend of historical and mystical elements subtly foreshadows the increasingly occult ambience of the frame narrative about the son and his witch-mother. The narrative culminates in the evocation of the supernatural daemon,<sup>12</sup> but the

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<sup>12</sup> In exploring Kepler's descriptions of the daemons' flight between the moon and the earth in the context of contemporary witch-theories, Victoria Flood argues that such "[q]uasi or pseudo necromantic practices" as conducted by Fiolxhilde evidence the close connection between astronomy and witchcraft

supernatural atmosphere is then somewhat dispelled by the daemon's detached, rational demeanor and by the content of her speech, which is firmly grounded in scientific reasoning.

With this dream framework comes the second narrator of the book the first narrator dreams of reading. This second narrator, Duracotus, begins by introducing his background: "My country is Iceland, which the ancients called Thule. My mother was Fiolxhilde. Her recent death freed me to write, as I had long wished to do" (*Somnium* 11). Duracotus then recounts his earlier life, explaining how at fourteen he was impulsively traded by his mother to a ship captain, and sailed with the captain to Denmark, where he spent five years studying astronomy under Tycho Brahe<sup>13</sup> (*Somnium* 12-13). Upon his return to Iceland, Duracotus reunites with his still-living mother, who reveals her secret knowledge acquired from nine "very wise spirits" and invites him to join in summoning one such daemon-teacher (*Somnium* 14). After her ceremonial call, both mother and son, heads covered by their clothing, begin to hear "the rasping of an indistinct and unclear voice [becoming] audible . . . in the Icelandic tongue" (*Somnium* 14-15).

Now the reader is introduced to the voice of the third narrator, the "Daemon from Levania (i.e. the moon)," who delivers an extensive and detailed narration covering the moon's geography and astronomy, including its location, distance from the earth, climate, and the flora and fauna of the lunar surface (*Somnium* 15-28). As the daemon begins discussing the clouds and rain in the Subvolvan hemisphere (i.e., the lunar hemisphere always facing the earth) (*Somnium* 28), the first narrator intervenes, telling the reader: "When I had reached this point in my dream, a wind arose with the rattle of rain, disturbing my sleep and at the same time wiping out the end of the book acquired at Frankfurt" (*Somnium* 28-29). This interruption brings an abrupt and unexpected conclusion to the entire narrative.

In *Somnium*, the narrative perspective shifts from the initial "I" as dreamer-reader of the book acquired at a Frankfurt fair, to "I" as Duracotus and briefly as his mother Fiolxhilde, the two human characters inside the book, then to the "we" as the "Daemon from Levania," and suddenly back to the original "I"

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in seventeenth-century astronomical imaginations (87). In *Somnium*, Kepler takes advantage of the "porous boundary" between "the plausible" and "the implausible" in contemporary witch-theories (Flood 95). This point also links to the potential of science fiction to cross the boundary between literature and science, presenting what seems implausible as scientifically plausible in the fictional world of the literary text.

<sup>13</sup> Tycho Brahe was the real-life astronomer with whom Kepler worked for one and a half years (1600-01) in Prague under King Rudolph II.

as the dreamer, who is abruptly awakened from sleep by the noise of the rain. Fernand Hallyn offers a diagram to illustrate the layered structure of *Somnium*, as shown in Figure 1 below:

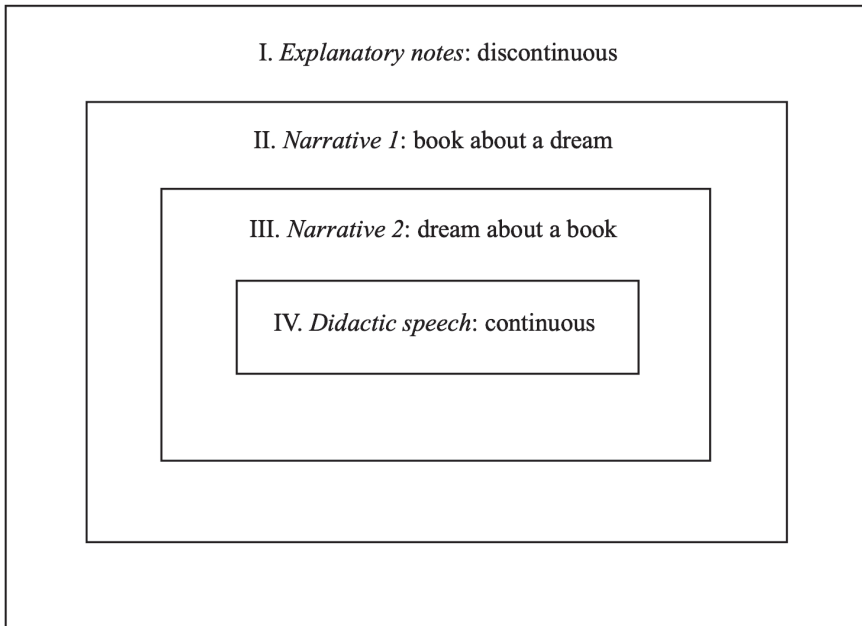


Figure 1. (originally “Figure 11.1” in Hallyn 262)

However, I do not perceive the narrative structure of *Somnium* as being as neatly and perfectly layered as illustrated in Hallyn’s diagram. Instead, I propose a modified model, drawing on Hallyn’s diagram, to more accurately represent the actual layered framework of the work (see Figure 2 below).

In the revised diagram, the outermost framework features the physical book entitled *Somnium*, authored by Kepler. This book opens with “Narrative 1: ‘Kepler’ dreams about a book,” wherein the narrator “I”—potentially, but not definitely, Kepler—dreams of acquiring a book at a Frankfurt fair. Following this is “Narrative 2: Duracotus’s autobiographical story,” narrated by “I,” who identifies as “Duracotus,” recounting his background and adventures. This leads into a “Didactic speech” given by “The Daemon from Levania,” constituting Narrative 3. The daemon’s speech comes to an abrupt halt as the fictional “Kepler” in Narrative 1 awakens from his dream, simultaneously concluding Narrative 2 and leaving the reader in suspense about the fates of Duracotus, his mother, and the daemon. Finally, outside the fictional construct lie the authorial

explanatory notes, appended at the end of *Somnium*.<sup>14</sup>

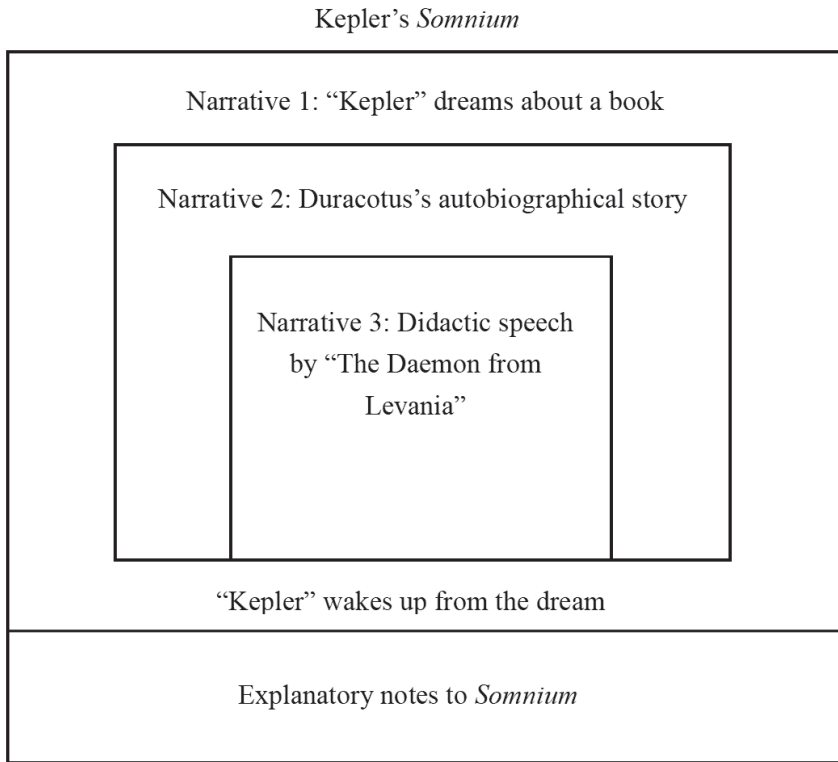


Figure 2. Layered Frame Narratives in Kepler's *Somnium*

Figure 2 above illustrates the clear-cut boundaries between the core scientific discourse and the dream vision narrative in Kepler's *Somnium*. First, Kepler's lunar astronomical disputation, cast as the speech by "The Daemon from Levania" (Narrative 3), can be taken out of the work to stand alone as an independent scientific treatise. Second, Kepler places many of his astronomical discussions in the voluminous notes appended to the work, that is, physically outside the science-fictional narrative, though the notes are in a constant dialogue with the main text.

As is typical in the conventional dream vision, the dream (Narrative 1)

<sup>14</sup> In the 1634 edition of Kepler's *Somnium*, all the notes are appended at the end of the fictional work, starting as a new section on a new page, entitled "JOHANNES KEPLER'S NOTES ON HIS ASTRONOMICAL DREAM / These Notes were written in order between the years 1620 and 1630" (*Somnium* 30).

and the narratives embedded in it (Narratives 2 and 3) come to an abrupt end upon the dreamer's awakening. Unlike Narrative 1, which has a beginning (the descriptions of historical and political contexts that lead to the narrator's dream) and a short ending, Narratives 2 and 3 end prematurely, leaving their storylines unresolved. Such clear-cut boundaries between the different frame narratives along with the appended endnotes reflect the unique compositional evolution of Kepler's work over three decades. In combining literary imagination and scientific discourse, Kepler chooses to layer one frame narrative atop another over the years, rather than rewriting his original lunar astronomical disputation into a brand-new science-fictional work by integrating the literary and scientific elements closely together in one continuous narrative.

### **A Science Fiction with Hard Science at Its Core: The Scientific Principles Underlying *Somnium***

The daemon's speech in *Somnium* encapsulates the image of a rational, unbiased astronomer-scientist, as evidenced by the scientific principles underlying its depiction of the lunar voyage and world. Majorie Hope Nicolson characterizes the moon voyage in *Somnium* as a "mixture of fantasy and realism" (45), though "astronomical speculations" or "science" might be more fitting descriptions than "realism." Nicolson categorizes Kepler's *Somnium* as a science fiction that depicts a "supernatural voyage" to the moon, insisting that "his device for human flight harks past to an age of superstition rather than forward to the era of mechanical flight" (45). However, Kepler's lunar voyage is more than simply "superstitious" or "supernatural." Lacking modern technologies like rockets and spaceships, Kepler relies on the mystical power of supernatural spirits (daemons) to facilitate the lunar voyage. Nonetheless, in conceptualizing this, he, as an astronomer, makes efforts to consider the relevant physical and biological laws that would be involved in such a journey. This includes the earth and moon's magnetic forces in line with the law of gravity,<sup>15</sup> and the effects of rarified air on the human body during space travel.

Kepler's daemon narrates the lunar journey: after completing the first stage, the journey becomes easier, and the human travelers are exposed to open air without the daemons' support, letting them naturally proceed to the moon

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<sup>15</sup> In *Astronomia Nova* (1609), Kepler proposes that gravity is a mutual attraction among bodies, analogous to magnetism: "Gravity is a mutual corporeal disposition among kindred bodies to unite or join together; thus the earth attracts a stone much more than the stone seeks the earth" (1). He postulates that if two stones were placed near each other in space, free from external influences, they would move toward one another in proportion to their masses, similar to magnetic behavior.

“autonomously” (*Somnium* 16). To elucidate the underlying causes of these phenomena, Kepler offers extensive explanations in Notes 74-78, focusing on how the varying degrees of the earth's and of the moon's magnetic forces, in relation to distance, might impact the human body during the lunar voyage. For example, in Note 74, he notes that when the body is transported beyond the earth's magnetic influence, entering the stronger magnetic field of the moon, the daemon's task of moving the human body becomes easier (*Somnium* 73).

Kepler also considers two biological challenges for humans during the lunar voyage: “extreme cold and impeded breathing” (*Somnium* 16). He humorously dismisses the issue of “extreme cold,” attributing it to “a power which [the daemons] are born with” (*Somnium* 16).<sup>16</sup> To tackle the problem of “impeded breathing,” he suggests that the daemons apply “damp sponges” on the humans' nostrils (*Somnium* 16, 73). These scientific explanations in the supplementary notes, addressing the imaginary, seemingly supernatural aspects of a lunar journey, demonstrate Kepler's astute abilities to consider different aspects of astronomy.

Not only does the content of the daemon's speech reflect Kepler's astronomical concerns, but the style of *Somnium's* note apparatus also largely adheres to the conventions of the scientific treatise. For instance, the daemon initially mentions the distance between the earth and the moon: “Fifty thousand German miles up in the ether lies the island of Levania” (*Somnium* 15). To justify this figure, Kepler provides detailed mathematical calculations in Note 53, referencing his works *Hipparchus* and *Epitome of Copernican Astronomy* (*Somnium* 62). Similarly, towards the end of the speech, the daemon mentions, “Relief from the heat in the Subvolvan hemisphere is provided chiefly by the constant cloud cover and rain, which sometimes prevail over half the region or more” (*Somnium* 28).<sup>17</sup> In Note 223, Kepler adds extensive discussions of a disputation about “phenomena of the planets” presided over by his teacher Maestlin. The language and sentence structures throughout the daemon's speech and the notes reflect the style of the scientific treatise; for example: “But the reason advanced by the disputant is not satisfactory. . . . For the phenomenon has a different explanation, . . .”; “In a note to his Thesis 151 the author acknowledges

<sup>16</sup> Kepler intended this to be a joke; he explains in Note 72 that the daemon is an allegory for astronomy, so the power refers to the astronomer's “passion for speculating,” which serves to metaphorically counteract the cold (*Somnium* 72-73).

<sup>17</sup> Kepler considered a lunar atmosphere crucial to living creatures because of its “moderating and moisturizing” functions (Dick 81). This idea may have derived from the disputation concerning his observations of the lunar clouds, published in 1606 (Dick 82). However, as James E. Christie notes, Kepler's evidence for the existence of a lunar atmosphere was “thin” (107).

this solution, too, without mentioning my name, and he somehow rejects it on the ground that . . .”; and “See how the similar arguments of David Fabricius were rebutted by me in this way in the introduction to my *Ephemerides*” (*Somnium* 140-41, 145).

### **Allegorical Significance of the Dream Vision and Occult Elements in *Somnium***

In 1609, Kepler augmented his original lunar astronomy with a dream vision in *Somnium*, introducing characters like Duracotus, his mother, and supernatural daemons transporting humans to the moon, thereby transforming it into a science fiction work. Why did Kepler opt for a dream vision as the narrative framework? As Gale E. Christianson contends, Kepler’s choice of a dream framework was a strategic decision intended to present himself as more of a “mythographer” than a “speculative scientist” so as to minimize objections from opponents of Copernicanism (83). Beyond potentially mitigating persecution for his Copernican views, as hinted in his correspondence,<sup>18</sup> Kepler might have also relished the opportunity to craft allegories as intellectual puzzles. In a letter to Matthias Bernegger dated December 4, 1623, Kepler wrote:

There are just as many problems as lines in my writing, which can only be solved astronomically, physically, or historically. But what can one do about this? The people wish that this kind of fun, as they say, would throw itself around their neck, with cozy arms; in playing they do not wish to wrinkle their foreheads. Therefore, I decide to solve the problem myself, in notes ordered and numbered. (*Johannes Kepler: Life and Letters* 155)

Initially, Kepler might have designed *Somnium* to present intricate challenges “astronomically, physically, or historically,” offering learned readers the satisfaction of deciphering and appreciating them. Yet, the distressing circumstances of his mother’s legal troubles revealed to him that not all were inclined to exert such intellectual effort. This prompted Kepler to elucidate these puzzles by writing explanatory notes appended to *Somnium* for publication.

In the dream vision, Duracotus’s journey from his homeland to study astronomy with Tycho Brahe closely mirrors Kepler’s own life story and is almost transparently autobiographical. However, why did Kepler create a fictional mother associated with supernatural entities called daemons despite the potentially controversial connotations of the term? He clarifies in his notes that

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<sup>18</sup> See Kepler’s letter to Matthias Bernegger dated December 4, 1623 (*Johannes Kepler: Life and Letters* 156).

these daemons are used as an allegory for the sciences that disclose “the causes of [natural] phenomena” (*Somnium* 50, Note 34).<sup>19</sup> Furthermore, this aspect of his narrative also serves as a jest, with which he playfully critiques superstitious beliefs about demons and witches. For Kepler, the fictional story is just a story, and he likely did not anticipate that some readers would misconstrue it as factual, linking the witch-mother character with his real-life mother.

Kepler uses the word “joke” frequently in his notes (Notes 10, 41, [“jocular”] 55, 56, 60, 61, 72, 86), setting a sarcastic undertone amidst his serious lunar astronomy. For example, when addressing the problem of extreme cold during space travel, Kepler explains in Note 72 that the daemon, who serves as an allegory for astronomy, can counteract the cold (i.e., “lack of [heat] needed for living”) with its inherently “ardent passion for speculating,” albeit “in a thoroughly inadequate way” (*Somnium* 73). As Rosen suggests, this jest subtly hints at Kepler’s personal struggles with financial inadequacy as an astronomer, often complaining that his scholarly pursuits fail to translate into sufficient means to meet his basic living needs. Yet while composing this note, Kepler seems to regret what Rosen describes as his “irrepressible flights of fancy” (*Somnium* 73n148), admitting “I do not know whether it is agreeable to pass over into a joke in the midst of a serious discussion. The allegory, too, is becoming chilly” (*Somnium* 72).

Kepler may have most regretted his joke about “dried-up old women” being preferred by the daemons (*Somnium* 15), a remark that unfortunately backfired, leading to his mother’s witchcraft trial. In Note 61, Kepler refers to this phrase as “Aulis and the covenant which ruined Troy,” clarifying that his intent was “merely to joke and reason jocularly” (*Somnium* 65). He argues, “If it is true, as most courts hold with regard to witches, that they are transported through the air, I say that maybe it will be possible, also, for some body to be violently removed from the earth and carried to the moon” (*Somnium* 65). The joke or irony hinges on the line of reasoning that believing witches to be transported through the air is as ridiculous as believing humans can be carried to the moon. However, the tragic consequences following the 1609 manuscript’s circulation reveal that not all readers perceived this statement as satirical; instead, his adversaries interpreted it literally, using it to levy accusations against

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<sup>19</sup> In Note 34, Kepler explains the Greek word *Daemon* is derived from *daiein* (“to know”), “as though it were *daemon*” (*Somnium* 62). As Rosen notes, Kepler erroneously derives *Daemon* (“Knowledge of the phenomena of the heavenly bodies”) from the Greek word *daemon* (“an expert,” “one who knows”). Instead of *daemon*, he might actually be referring to *daimon*, a term in ancient Greece for a minor divinity who served as an intermediary between the great gods and humans, which evolved into the modern “demon” (*Somnium* 62n121, 50n79).

Kepler's mother.

In addition to the jocular undertone in *Somnium*, Kepler utilizes the allegory on deeper, more profound levels. As shown in the epigraph of this paper, he draws a compelling parallel between the dreamer's awakening, covered by a pillow and blankets (in Narrative 1), and the witch-mother's magical ritual invoking the daemon (in Narrative 2), as well as his actual observation of the 1605 solar eclipse, from which event he "conceived the plan" of *Somnium*.<sup>20</sup> Intriguingly linking irrational or suprarational occult rituals with rational scientific practice, he employs this comparison as a rhetorical strategy to disguise the core Copernican theory as the daemon's prognostication. In a 1601 astrological treatise, Kepler uses the physician-patient metaphor to describe how such an approach caters to "the crowd's craving for 'marvels,' addressing their 'unnatural and pernicious appetite.'" By framing his scientific insights as marvels, Kepler aims to persuade his readers to embrace his ideas, akin to administering medicine to cure the diseases of the mind, "which otherwise we could scarcely have persuaded them to take" (Kepler, "On Giving Astrology Sounder Foundations," translated in Judith V. Field, "A Lutheran Astrologer" 230-31; qtd. in Chen-Morris, *Measuring Shadows* 174).

Kepler's striking juxtaposition of supernatural spirits with the tangible, physical creatures naturally produced in the lunar habitat also highlights a unique blend of occult and scientific elements. This blend positions Kepler as a figure who straddles the medieval mysticism and early modern enlightenment of the Scientific Revolution. John W. Traphagan describes Kepler as "a man of great contrasts and contradictions, typical of an age of transition" (6). Despite calling himself "a Lutheran astrologer" and believing in the mystical influence of the stars and planets on human fate, Kepler nevertheless emphasizes reason and intellect, willing to "throw away the nonsense and keep the hard kernel" (*Gesammelte Werke* 184; qtd. in Wagner and Briggs 223).<sup>21</sup>

Although superficially similar, the methods of acquiring and processing knowledge in these two practices—invocations of spirits versus astronomical observations—are markedly different. I concur with Raz Chen-Morris that

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<sup>20</sup> Kepler humorously juxtaposes the head-covering ritual he practiced with friends during his observation of the 1605 solar eclipse (as noted by Rosen in *Somnium* 29n38) with a similar "rite" performed by Duracotus and his mother in summoning the daemon in *Somnium*. He amusingly describes "this very rite" as "magically magical!" (*Somnium* 58n49).

<sup>21</sup> For example, Patrick J. Boner (2007) notes Kepler's critique of astrologers' "foolish" forecasts and his dismissal of Epicurean explanations of the new star of 1604 as products of pure coincidence in an unordered cosmos (xxxviii). Instead, Kepler interprets the appearance of a new star as a remarkable instance to exemplify the divine principles underlying the creation of a systematic and orderly universe.

Kepler rejects the crude empiricism used by the witch-mother but champions the scientific methods with mathematical and optical tools as used by Duracotus to discover the secrets of the heavens (*Measuring Shadows* 176). The witch-mother, representing “Ignorance,” “untutored experience,” and “empirical practice” (*Somnium* 36, Note 4), dies, but the son, fathered by “Reason,” and representing “Science,” lives (*Somnium* 43, Note 10). Although the witch-mother may gain secret knowledge of the world through magical rites and an irrational belief in the supernatural daemons, she is unable to elucidate its fundamental principles and causes. In contrast, Duracotus adopts a scientific and rational approach in his exploration of the universe, utilizing optical instruments such as the camera obscura and the telescope, and applying mathematical and optical principles. Through this comparison, Kepler skillfully draws the readers’ attention to his pursuit as an astronomer, aiming to persuade them to accept the astronomical model he advocates as the truth.

In Kepler’s new astronomy, direct sensory perception, especially visual, is no longer crucial for unraveling the mysteries of the universe. This is partly because physically reaching distant celestial bodies for direct observation was impractical, due to both technological limitations and the potentially life-threatening conditions of these places. In Note 9, Kepler reflects on the fatal pursuits of ancient sages like Empedocles and Pliny the Elder, who lost their lives due to their “blind audacity” and reckless “curiosity” while exploring volcanoes, and alludes to legendary tales of Homer and Aristotle consumed by water (*Somnium* 41-42). Rather than relying solely on sensory experience like explorers venturing into new territories, astronomers used advanced optical instruments, rational thought, and mathematical calculations, applying optical principles and other natural laws to speculate accurately and persuasively about the truths of the celestial world.

Kepler’s choice to channel his astronomical speculations through a supernatural daemon rather than a scientist like the dreamer-Kepler or Duracotus in *Somnium* raises compelling questions. Why is celestial knowledge acquired through daemonic invocation, and not through scientific methods like telescopic observations? As Chen-Morris suggests, the daemon is “an embodiment of Kepler’s conception of scientific observation” (*Measuring Shadows* 173). Kepler employs the daemon as an allegory of the instrumental tube that extends human vision to the moon. In Note 82, Kepler elaborates on this comparison:

The allegory compares the journey through the shadow to the observation of eclipses; the sun, to political business; the dark caves of the moon, to seclusion and scholastic obscurity; the time spent in the caves, to the continuous speculation based on observations of the eclipses. (*Somnium* 75)

The tube of the optical instrument, especially that of the telescope, metaphorically transposes human vision to the moon, akin to the path of the earth's shadow that the daemons traverse during the lunar eclipse. Similarly, the instrumental tube of camera obscura brings distant celestial images to earth for astronomers to observe, record, measure, and analyze, thereby acquiring astronomical knowledge as conveyed in the daemon's speech. This links further to my argument for the daemon as the epitome of the rational, impartial scientist with lifelong dedication to uncovering ultimate truths about the universe.

### **The Daemon as the Epitome of the Rational, Impartial Scientist in the Endless Quest for Scientific Knowledge**

Kepler not only plays the role of the dreamer-narrator in Narrative 1 and slips into the autobiographical Duracotus in Narrative 2, but he also takes on the persona of the daemon in the core layer (Narrative 3), who acts as a detached astronomer, methodically reporting scientific observations through theoretical mathematical computations. In *Somnium*, there exists a sharp contrast and uneasy tension between the daemon's disinterested, unprejudiced demeanor, and the horrifying, nightmarish lunar landscape he describes, which could arouse negative emotions from the readers. The daemon, acting as a geographer-scientist, delivers the auditory tour of the lunar world in a voluble yet emotionally detached manner, seemingly indifferent to the lunarians' daily struggle for survival in their harsh environment. The daemon-scientist appears unconcerned about the emotional impact of his narrative on his audience; his primary objective is to impart precise, factual knowledge and truths about the moon and other celestial bodies in the universe, the focus of his astronomical investigation.

Kepler adopts the guise of an impartial scientific observer through the supernatural figure of the daemon, a detached narrator who embodies Kepler's own objectivity as a scientist. Rather than encouraging scientific inquiry, however, this allegorical device in *Somnium* creates a sense of distance, portraying scientific discoveries as otherworldly and inaccessible to the general public. The daemon's neutrality establishes him as a unique narrator—an observer without personal stakes—highlighting the contrast between scientific objectivity and human passion, as seen in characters like Fiolxhilde. The daemon's detachment and objectivity also reflect the tensions Kepler navigated personally, as he sought to balance personal beliefs, scientific inquiry, and the conservative religious and cultural expectations of his time, exemplified by the persecution of his mother. The daemon's impartial perspective effectively blurs the boundaries between

scientific fact and literary imagination, allowing the narrative to engage with both astronomy and mythology. This approach allows Kepler to present speculative ideas as hypothetical rather than absolute truths, enabling him to sidestep potential religious and political censure and granting him the freedom to explore controversial scientific concepts.

In *Somnium*, Kepler notes, “The corresponding feature in the teaching of astronomy is that the method is not in the least voluble or spontaneous. On the contrary, every prompt answer requires repose, recollection of ideas, and set words” (*Somnium* 57, Note 44). In recasting the astronomical disputation into a supernatural story of the daemon, Kepler portrays the daemon as an astronomer-scientist dedicated to teaching the tenets of lunar astronomy. This portrayal reflects Kepler’s view that an astronomer’s role involves a rigorous application of rationality in the quest for knowledge. His approach implies that scholars devoted to scientific study should remain unaffected by personal emotions, which are often considered irrational and unreliable, as illustrated by Duracotus’s mother’s impulsive act of selling her son to a ship’s skipper in a fit of anger (*Somnium* 12). They should also remain impartial to their audience’s emotional responses to their findings, which may arise from misleading sensory perceptions, as in the lunar inhabitants’ erroneous belief in the moon’s stillness. For Kepler, the primary role of early modern astronomers was to accurately present their discoveries and persuade the public to accept the new, often revolutionary, astronomical theories.

Timothy J. Reiss examines the “transformation” of characters in *Somnium*: from Kepler as Imperial Mathematician, to Duracotus as a young scholar fascinated with the mysterious and astronomical, and ultimately to the daemon, “presented as of superior wisdom and science—indeed, as mind itself and knowledge” (149-50). Through the dream, Kepler revisits his own youthful dedication to astronomy, paralleling Duracotus’s journey. Yet Kepler does not ultimately transform into the daemon. In the fictional story, the daemon is presented as an almost all-knowing spirit, capable of imparting desired knowledge to humans. However, it is paradoxical that the daemon’s speech, in both content and style, is closely associated with the younger Kepler as a student in the University of Tübingen, when he composed the rejected lunar astronomical disputation. This contrasts with the expected wisdom and knowledge one might associate with the older Kepler as Imperial Mathematician or as an established, authoritative scholar.

As Kepler elaborates in Note 55, “for *the mind* there is no passage to the moon except through the earth’s shadow” (*Somnium* 63, emphasis added). This implies that obtaining knowledge of the moon relies on mathematically measur-

ing images observed during the lunar eclipse, when the earth's shadow reaches the moon. I propose that the daemon symbolizes more than just the tube of an astronomical instrument that Kepler describes (*Somnium* 75, Note 82). As Reiss suggests and as illustrated in the detailed lunar astronomical descriptions, the daemon can be viewed metaphorically as the human mind/intellect. This mind is engaged in a range of activities: describing, interpreting, analyzing, investigating, calculating, debating, explaining, formulating principles, and inferring meaning to celestial observations and images mediated through artificial instruments.

Just as the scientific observations and speculations about the celestial bodies, including the moon, could never come to an end, so too could the daemon's auditory tour continue indefinitely, epitomizing the astronomers' everlasting quest for truth and exploration of the universe's mysteries. Therefore, the lecture might as well just stop at the time when the dreamer wakes up—marking the point where Kepler presents his discoveries to date, while leaving room for future revelations yet to come. Had Kepler lived longer, continuing his lifelong journey of astronomical exploration, it is conceivable that he might have expanded *Somnium* with a sequel, further teaching the public newly discovered scientific truths about the cosmos. The daemon's lecture, left unfinished, aptly symbolizes the boundless and ongoing nature of scientific inquiry, extending even beyond an astronomer's lifespan.

## Conclusion

Kepler's *Somnium* is a text crossing the generic boundaries of the scientific treatise and the various literary modes such as dream vision, utopia, and science fiction. It illustrates how Kepler, as an astronomer, may have resorted to literary devices to advance his pioneering astronomical theories and to popularize them among the general public.<sup>22</sup> It also showcases how Kepler as a science fiction writer is capable of weaving scientific discourse into a work of literary imagination, constructing a narrative grounded in established scientific principles. As

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<sup>22</sup> In a letter dated March 2, 1629, when Matthias Bernegger asked Kepler to recommend a textbook on mathematics for classroom use, Kepler replied: "What, if I should present you *for fun* with my astronomy of the moon? As we are driven from this earth, it will be useful to us as a viaticum on our wandering to the moon" (*Johannes Kepler: Life and Letters* 175; emphasis mine). Though writing in a jocular tone, Kepler may consider his *Somnium* to be a work that could help promote Copernicanism to the general public as a way to popularize new astronomical discoveries. Nonetheless, by promoting his lunar astronomy in this way (as a textbook), he may actually have put himself in danger of being persecuted by conservative authorities.

Christianson contends, Kepler, unlike Thomas More or Erasmus, may not have possessed profound political insight but was undeniably “a scientific genius with few peers.” He argues that turning *Somnium* into a social or political polemic “would have detracted from its real value as a unique contribution to science fiction and . . . scientific theory” (89). Christianson’s observation underscores *Somnium*’s significance in both advancing the new genre of science fiction and contributing to the field of science, illustrating the close interconnections between the two fields.

Christianson’s assessment of Kepler suggests that writers’ professional background and academic training significantly influence their narrative choices. This is evident in *Somnium*, where Kepler refrains from presenting a utopian or dystopian world as a critique of contemporary social and political norms, as More and Erasmus have done. Instead, he anchors his science fiction narrative in hard science, specifically revolutionary Copernican astronomy. Kepler’s vivid portrayals of lunar inhabitants and the lunar environment are intricately tied to the scientific principles with an attempt to promote Copernicanism. This approach not only heralds a new era in the history of science but also pioneers a new literary genre: science fiction.

Kepler’s approach exemplifies how scientists, particularly in the fields of physics or astronomy, may resort to literary forms to give free rein to their imagination while theorizing novel ideas about nature and the cosmos. Kepler ingeniously weaves his astronomical theories into a science fiction narrative, using it as a testing ground for his hypotheses in fictional scenarios. While parts of *Somnium* align closely with the astronomical concepts from his scientific treatises, the others are purely imaginary and fantastical, transcending the bounds of rational scientific inquiry, perhaps only constrained by available scientific methods, tools, and technology of his time.

As scientific research and technology advance over time, what was once considered science fiction can transform into scientific facts. Examples include space travel, moon landings, Mars exploration, and ground-breaking Nobel-Prize-winning discoveries of the so-called God particle or Higgs boson<sup>23</sup> that might validate ancient and early modern atomistic or vitalist theories. However, human imagination often soars much higher and faster than current scientific capabilities can reach. For instance, contemporary science cannot empirically validate phenomena like human souls traveling out of bodies or to alternative

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<sup>23</sup> François Englert and Peter W. Higgs were jointly awarded the Nobel Prize in Physics in 2013 for their discovery that the so-called God particle or Higgs boson is the fundamental building block of the universe.

worlds, assuming their existence within the immense universe. It awaits enlightened scientists in the future to turn such science-fictional fantasy into established scientific realities, using more advanced methodologies and technologies.

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# 對科學探索的永恆追尋：克卜勒《夢》 中未竟的框架敘事

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## 摘要

約翰尼斯·克卜勒（Johannes Kepler, 1571-1630）於1634年出版的遺作《夢》（*Somnium*）融合了他對哥白尼日心說的擁護與富有想像力的敘事手法，奠定了現代科幻小說的基礎。《夢》最初源自1593年克卜勒學生時期的天文學論文，並於1609年在科學論文之外增添「夢啓」（dream vision）框架，逐步發展成爲層次錯綜的框架敘事。作品中兩個「嵌入式敘事」（embedded narratives）皆在最外層敘事的夢者驟然驚醒時戛然而止，未能得到完整的結局。核心敘事（core narrative）講述超自然精靈（supernatural daemon）爲夢者進行月球導覽，細緻描繪月球上的外星生命與奇異景觀。本文聚焦探討《夢》中未竟的框架敘事，主張核心敘事中的精靈象徵著不帶偏見的天文學家，如同克卜勒本人，在描述月球異世界時仍保持理性客觀，以精密計算和科學推論爲依據。由於夢者驚醒，夢中該精靈的導覽演說遭到中斷，恰恰象徵克卜勒對月球天文探索的未竟之業，也進一步印證了人類對未知奧秘的無盡好奇心，以及對科學探究永無止境的追尋。

**關鍵字：**約翰尼斯·克卜勒、《夢》、科學論述、科幻小說、夢啓、寓言

