

Anniversaries

Published 360 years ago



ATHANASIUS KIRCHER AND HIS *MUNDUS SUBTERRANEUS* (1665)

Tina Asmussen (GERMANY)

When Athanasius Kircher's (1602–1680) *Mundus Subterraneus* was finally published in 1665, it marked the culmination of over two decades of anticipation. In 1657, he published *Iter Extaticum II: Qui & Mundi Subterranei Prodromus Dicitur* in Rome, which served as a precursor to the more comprehensive treatment in the 1665 work. Advertisements for his *Mundus Subterraneus* had appeared as early as the mid-1640s. Kircher's publication on optics, *Ars magna lucis et umbrae*, included a list of both completed works and those in preparation (“*De libris ab Authore partim editis; partim edendum paratis*”), among which the *Mundus Subterraneus* was prominently featured (Kircher, 1646, 936). Upon its release by the Amsterdam printer Janssonius van Waesberghe, the *Mundus Subterraneus* quickly established itself as a cornerstone of early modern natural philosophy, with reprints issued in 1668 and 1678. The work was dedicated to two of the era's supreme authorities: Pope Alexander VII (Volume I) and Emperor Leopold I (Volume II), symbolizing the synthesis of spiritual and temporal power. The influence of *Mundus Subterraneus* extended beyond its original Latin edition. A Dutch translation appeared in 1682, and a partial English translation, focusing on volcanic phenomena, was published in 1669 under the title *The Volcano's Or, Burning and Fire-vomiting Mountains, Famous in the World*.

Kircher's monumental work exemplifies his distinctive methodology, which integrated natural-philosophical theories with empirical and experiential insights (Asmussen, 2016, 111–119). The book opens with a narrative rooted in personal experience, which Kircher claims inspired his enduring interest in the subterranean world. In the preface, he recounts his dispatch by the Roman Jesuit Order in May 1637 to accompany the Landgrave of Hesse-Darmstadt as a confessor on his journey to Malta. During his return trip, which took him through Naples en route to Rome, Kircher witnessed the dramatic eruptions of Mount Etna, Stromboli, and Vesuvius, and experienced the accompanying severe earthquakes.

The preface, that recounts this adventure story, is structured into three parts. The first outlines the purpose of his journey. The second vividly describes the earthquake he experienced, demonstrating Kircher's penchant for detailed observation. This section is complemented by a striking double-page copper engraving of the erupting Vesuvius. The combination of awe and terror inspired by these events, as Kircher describes, ignited his desire to explore the earth's inner workings in depth. The third part of the preface chronicles his daring ascent of Mount Vesuvius in gripping detail:

“In the middle of the night, I ascended the mountain through difficult, rough, and steep paths; when I had finally reached its crater, I saw, horrendous to describe, the entire area illuminated by fire, with an unbearable stench of burning sulfur and bitumen” (Kircher, 1665, Preface III, n.p.).

Kircher even claims to have been lowered into the crater to investigate whether Etna, Stromboli, and Vesuvius were interconnected underground and to study the molten lava more closely. While the veracity of this much-cited account remains speculative, it undoubtedly catered to the tastes of his audience. As Monica Azzolini argues, Kircher's depiction resonated with early modern Rome's humanistic and artistic circles, which had a particular fascination with Virgil's *Aeneid* and its evocative portrayal of the underworld (Azzolini, 2024).

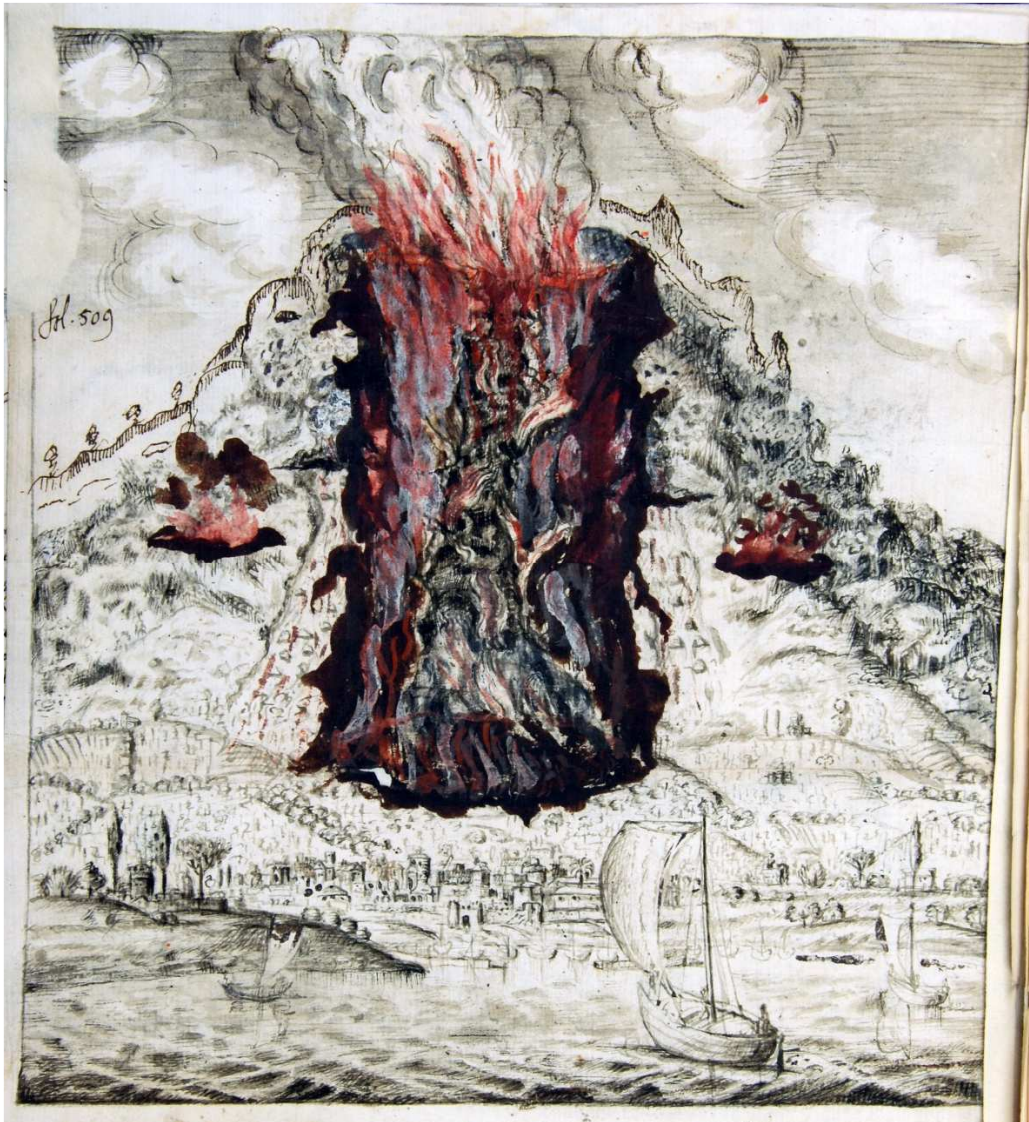


Figure 1. Drawing of the Vesuvius. Kircher, A. *Mundus subterraneus quo Universae Naturae divitiae et occulta miracula reuelata ... in decern libros digestum*. Biblioteca Nazionale Centrale Vittorio Emmanuele II, Rome, Fondo Gesuitico 562.

A manuscript of the *Mundus Subterraneus* preserved in the Biblioteca Nazionale Centrale di Roma reveals that parts of the work, including the preface, were completed as early as a decade before its actual publication. Apparently, it was difficult to provide the financial means to produce this extremely expensive book, lavishly illustrated with many double-sided engravings (on Kircher's patronage refer to Asmussen, 2016, 64–110; Baldwin, 2004). This manuscript also shows how Kircher provided instructions for the engraver's on how to etch the illustrations and it even contained impressive drawings by Roman artists (Strasser, 1982 and 1996). The most impressive drawing depicts Mount Vesuvius during its eruption. The interior of the crater is rendered in dramatic colors, undoubtedly constituting the highlight of the manuscript (Fig. 1).



Figure 2. Cornelis Bloemaert II, Portrait of Athanasius Kircher included in the *Mundus Subterraneus*, 1664; Rijksmuseum Amsterdam <https://id.rijksmuseum.nl/200159915>

Athanasius Kircher's (1602–1680) academic career, centered at the Collegio Romano from 1634, placed him at the heart of Roman scientific culture (Findlen 2004; Lo Sardo, 2004). His work was shaped by both local patronage and the transnational Jesuit network, as well as by the broader *respublica literaria* (Asmussen 2016; Findlen 1991). His efforts spanned disciplines—physics, mathematics, Oriental languages, and beyond—and reflected a deeply integrative view of knowledge. Kircher remains a figure of striking complexity, his legacy is subject to polarized interpretations that began during his lifetime and continue to this day (Fig. 2). Was he the “last man who knew everything,” or merely a “pompous Jesuit” (Findlen, 2004; Eco, 1986)? Contemporary perspectives ranged from René Descartes, who dismissed him as a charlatan, to Georg Philipp Harsdörffer, who extolled him as *Germanus incredibilis*, one of the era's foremost scholars. By the 18th century, Kircher's reputation underwent significant decline. Johann Burckhard Mencke's inclusion of him in *De Charlataneria Eruditorum* (1715) epitomizes the era's growing disdain. Accusations of plagiarism, linguistic inadequacy, and intellectual gullibility, coupled with charges of self-promotion, painted a picture of a figure increasingly out of step with the evolving

scientific methodologies of the Enlightenment. His encyclopedic, theologically grounded approach to knowledge became anachronistic, relegating him to the margins of the history of science until well into the 20th century (Asmussen, Burkart, Rößler 2013; 7–22).

A reassessment began in the latter half of the 20th century. Scholars contextualized Kircher as a central figure in the cultural and scientific milieu of his time. Scholars such as Paula Findlen have provided critical insights into Kircher's intellectual and sociocultural contexts, emphasizing the importance of viewing his achievements holistically. As Findlen aptly notes, Kircher's significance cannot be fully appreciated by focusing solely on his failures or isolating individual works. Rather, he must be understood as a product of the world that shaped him, and which he, in turn, profoundly influenced (Findlen 2004, 41).

The multifaceted legacy of Athanasius Kircher finds a striking embodiment in his *Mundus Subterraneus* (1665), a monumental exploration of the Earth's natural and subterranean processes. This encyclopedic work, spanning two volumes, encapsulates Kircher's characteristic ambition to synthesize diverse fields of knowledge into a unified framework, blending ancient, medieval and early modern natural philosophy with experimental science, theology and metaphysics. As such, it serves as both a testament to his intellectual audacity and a window into the scientific culture of the 17th century.

The first volume of *Mundus Subterraneus* addresses the philosophical and scientific dimensions of natural phenomena, offering interpretations of the Earth's internal and surface operations. Here, Kircher examines everything from volcanic activity to the movement of water and air,

framing his inquiries within a broader cosmological and natural-philosophical context. In contrast, the second volume shifts to a practical perspective, cataloguing the Earth’s “fruits”—gemstones, fossils, metals, and minerals—and their usage (Figs 3a and 3b). Kircher’s vision of the Earth was deeply informed by classical authorities such as Plato and Strabo, as well as early modern thinkers like Georg Agricola. These influences coalesced in a model of the Earth as a dynamic, living system, governed by natural laws but imbued with an almost organic vitality.



Fig. 3a (left). Frontispiece of the *Mundus Subterraneus*, Vol. I. by print maker Theodor Matham after drawing from Johann Paul Schor. Courtesy of Science History Institute, <https://digital.sciencehistory.org/works/48i3cct>.

Fig. 3b (right). Frontispiece of the *Mundus Subterraneus*, Vol. II by the print maker Anthonie Heeres Siverdtsma (mentioned on object) after drawing from drawing by Crispijn van de Passe (II) (mentioned on object). Rijksmuseum Amsterdam. <https://id.rijksmuseum.nl/200255829>

Central to his interpretation was the idea of an eternal fire at the Earth’s core, an ancient concept that Kircher expanded into a sophisticated hypothesis (Fig. 4). He proposed an intricate network of subterranean “chimneys” and passageways through which fire, air, and water circulated, analogous to the human body’s circulatory system. This analogy underscored Kircher’s broader commitment to demonstrating the interconnectedness of natural phenomena (Nummedal, 2001).

Practical applications of his theories were another significant focus of *Mundus Subterraneus*. Kircher delved into the origins of stones and metals, drawing heavily on Agricola’s *De Re Metallica* and integrating observations from Jesuit colleagues involved in mining ventures across Europe and the Americas. His discussions of mining techniques, machinery, and geological formations highlighted his effort to bridge the gap between theoretical and applied science. Alchemy, a contentious subject, also features in *Mundus Subterraneus* (Asmussen, 2013). While he avoided endorsing alchemical claims outright, his openness to its philosophical and experimental aspects demonstrated a willingness to explore contentious areas of inquiry. His nuanced views positioned alchemy and mining—often marginalized in natural philosophy—as integral to understanding the Earth’s processes (Baldwin, 1993; Nummedal, 2001).

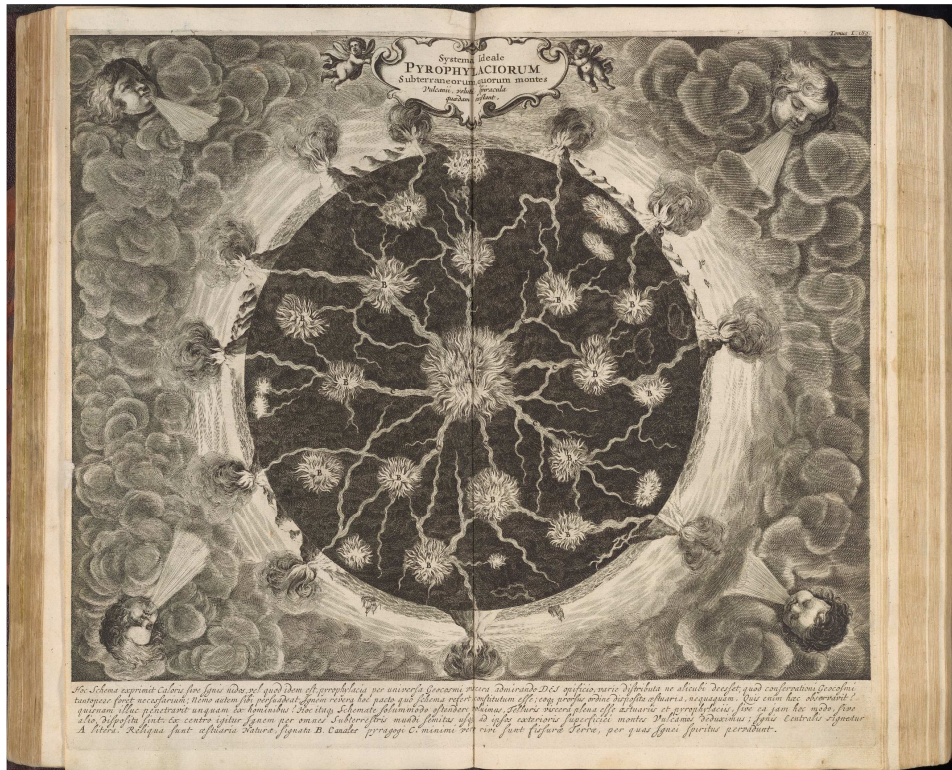


Figure 4. Cross-section of the earth showing interconnectedness of fire. Courtesy of Science History Institute, <https://digital.sciencehistory.org/works/48i3cct>.)

The influence of *Mundus Subterraneus* on early modern science was profound. Kircher's integration of natural philosophy with practical disciplines such as mining, metallurgy, and alchemy expanded the boundaries of scientific inquiry, bridging theoretical knowledge and applied science. His illustrations, which vividly depicted volcanic eruptions, subterranean waterways, and mining machinery, captivated readers and enhanced the work's accessibility and appeal. The book encapsulates Kircher's vision of the Earth as a living, dynamic entity, governed by natural laws yet profoundly shaped by human activity. Its rich blend of natural philosophy, practical knowledge, and imaginative speculation secured its place as a seminal text, influencing scientific and cultural discourses for centuries. As we mark the anniversary of this remarkable work, we celebrate not only its historical significance but also its enduring capacity to inspire inquiry and wonder.

Further Reading

- Asmussen, T. (2013). "'Ein Grausamer Alchemysten Feind'. Athanasius Kircher Als Akteur Und Figur Gelehrter Polemik Im 17. Jahrhundert." In *Scharlatan! Eine Figur Der Relegation in Der Frühneuzeitlichen Gelehrtenkultur*, edited by Tina Asmussen and Hole Rößler, 17, no. 2/3:215–44. Zeitsprünge. Forschungen Zur Frühen Neuzeit. Frankfurt a. M.: Vittorio Klostermann.
- Asmussen, T., Burkart, L., Rößler, H. (2013) *Theatrum Kircherianum. Kultur Und Inszenierung von Wissen Im Rom Des 17. Jahrhunderts*. Wiesbaden: Harrassowitz.
- Asmussen, T. (2016). *Scientia Kircherianum: Die Fabrikation des Wissens bei Athanasius Kircher*. Affalterbach: Didymos-Verlag, 2016.
- Azzolini, M. (2024). "God's Underlands: Athanasius Kircher's Epic Journey in the Mundus Subterraneus." In *The Eschatological Imagination: Space, Time, and Experience (1300–1800)*, edited by Wietse de Boer and Christine Göttler, 96:185–218. Intersections Interdisciplinary Studies in Early Modern Culture. Leiden: Brill.
- Baldwin, M. (2003). "Alchemy and the Society of Jesus in the Seventeenth Century: Stange Bedfellows?" *Ambix* 40: 41–64.

- Baldwin, M. (2004). "Reverie in Time of Plague: Athanasius Kircher and the Plague Epidemic of 1656." In *Athanasius Kircher: The Last Man Who Knew Everything*, edited by Paula Findlen, 63–78. New York: Routledge.
- Eco, U. "Aufgeblasener Jesuit Athanasius", *DIE ZEIT*, Nr. 29, 11.07.1986, p. 59.
- Findlen, Paula, ed. (2004). *Athanasius Kircher: The Last Man Who Knew Everything*. New York: Routledge.
- Kircher, A. (1646). *Athanasii Kircheri [...] Olim in Herbipolensis, et Avenionensi Societatis Jesu Gymnasiis Orientalum Linguarum, et Mathesos, Nunc Huis in Romano Collegio Professoris Ordinarij. Ars Magna Lucis et Umbrae in Mundo, Atque Adeò Universa Natura, Vires, Effectusque Uti Nova, Ita Varia Novorum Reconditorumque Speciminum Exhibitione, Ad Varios Mortalium Usus, Panduntur*. Romae: Scheus, Hermann.
- Kircher, A. (1657). *Iter Extaticum II. Qui & Mundi Subterranei Prodrumus Dicitur. Quo Geocosmi Opificum Sive Terrestris Globi Structura, Una Cum Abditis in Ea Constitutis Arcanioris Naturae Reconditorijs, per Ficti Raptus Integumentum Exponitur Ad Veritatem*. In III. *Dialogos Distinctum*. Romae: Mascardi, Vitalis
- Kircher, A. (1665). *Mundus Subterraneus, in XII Libros Digestus; Quo Divinum Subterrestris Mundi Opificum, Mira Ergasteriorum Naturae in Eo Distribution [...] Protei Regnum, Universae Denique Naturae Majestas et Divitiae Summa Rerum Varietate Exponuntur*. Amsterdam: Janssonius van Waesberge, Eliseus Weyerstraet.
- Kircher, A. (1669). *The Vulcano's, or, Burning and Fire-Vomiting Mountains Famous in the World, with Their Remarkables*. London: Printed by J. Darby for John Allen.
- Kircher, A. *Mundus subterraneus quo Universae Naturae divitiae et occulta miracula reuelata ... in decern libros digestum*. Biblioteca Nazionale Centrale Vittorio Emmanuele II, Rome, Fondo Gesuitico 562.
- Lo Sardo, E. (2001). *Athanasius Kircher: Il Museo Del Mondo*. Rom: Edizioni de Luca.
- Nummedal, T. (2001). "Kircher's Subterranean World and the Dignity of Geocosm." In *The Great Art of Knowing*, edited by Daniel Stolzenberg, 37–47. Stanford: Stanford Univ. Libraries.
- Strasser, G. F. (1982). "Spectaculum Vesuvii. Zu Zwei Neuentdeckten Handschriften von Athanasius Kircher Und Mit Seinen Illustrationsvorlagen." In *Theatrum Europaeum. Festschrift Für Elida Maria Szarota*, edited by Richard Brinkmann, 363–84. München: Fink.
- Strasser, G. F. (1996). "Science and Pseudoscience: Athanasius Kircher's Mundus Subterraneus and His Scrutinium ... Pestis." In *Knowledge, Science, and Literature in Early Modern Germany*, edited by Gerhild Scholz Williams, 219–40. Chapel Hill: The University of North Carolina Press.

Publication online: Posted IUGS Website / INHIGEO Website Anniversaries
 January 2025
 IUGS E-Bulletin Issue 215, 2025

Author: Prof. Dr. Tina Asmussen
 Member (Germany):
 IUGS International Commission on the
 History of Geological Sciences (INHIGEO)

German Mining Museum Bochum:
 Leibniz Research Museum for Georesources
 Am Bergbaumuseum 28, 44791 Bochum, Germany
 Email: tina.asmussen@bergbaumuseum.de

The full list of contributions to the INHIGEO Anniversary Series is available on the website:
<https://inhigeo.org/anniversaries/>