

Cosmigraphics: Picturing Space Through Time in 4,000 Years of Mapping the Universe

by **Maria Popova**

A visual catalog of our quintessential quest to understand the cosmos and our place in it.

Long before Galileo pioneered the telescope, **antagonizing the church** and unleashing a “**hummingbird effect**” of **innovation**, humanity had been busy cataloging the heavens through millennia of **imaginative speculative maps of the cosmos**. We have always sought to make visible the invisible forces we long to understand, the **mercy and miracle** of existence, and nothing beckons to us with more intense allure than the majesty and mystery of the universe.

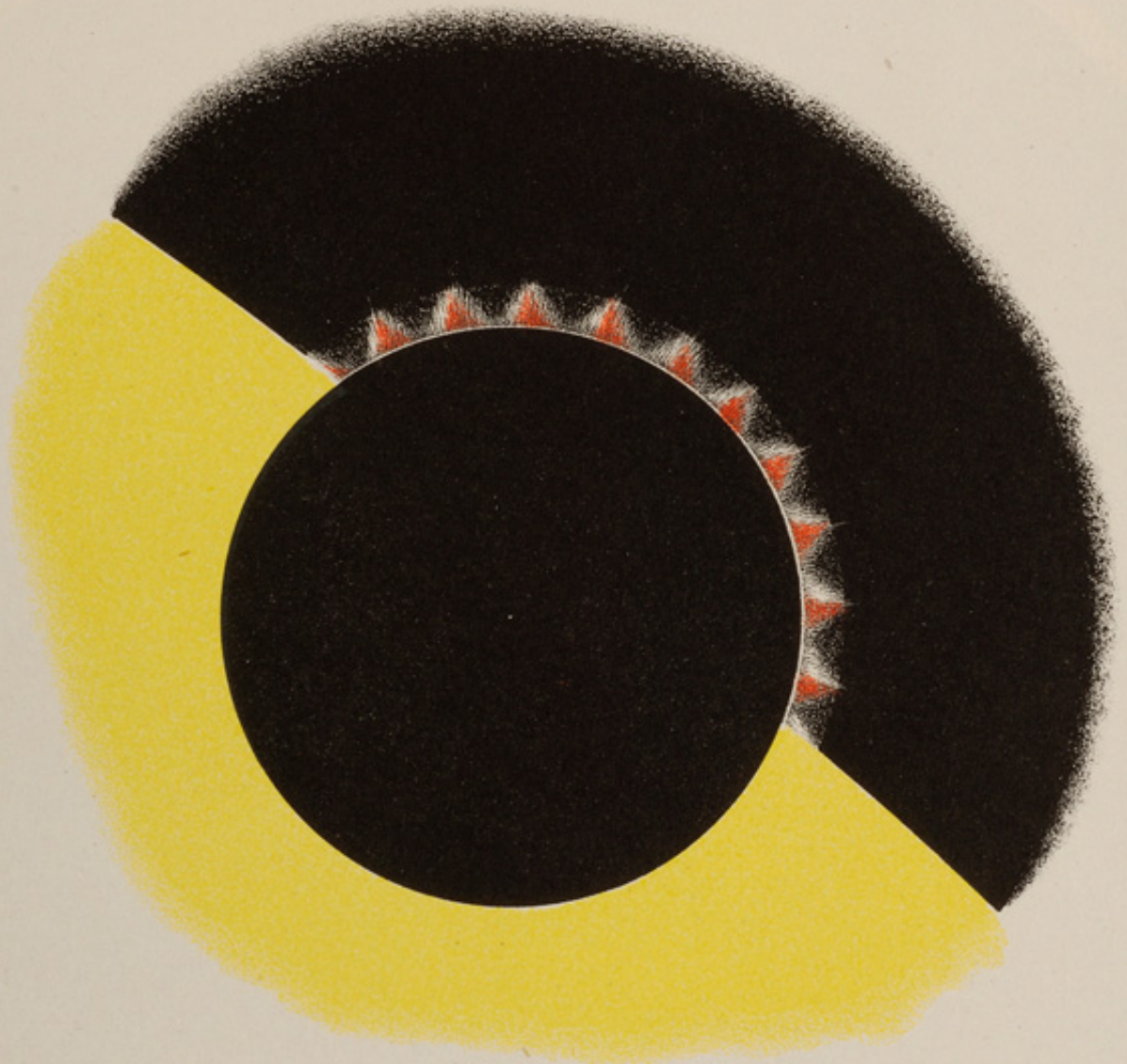
Four millennia of that mesmerism-made-visible is what journalist, photographer, and astrovisualization scholar **Michael Benson** explores with great dedication and discernment in ***Cosmigraphics: Picturing Space Through Time*** (*public library*) — a pictorial catalog of our quest to order the cosmos and grasp our place in it, a sensemaking process defined by what Benson aptly calls our “gradually dawning, forever incomplete situational awareness.” From glorious paintings of the creation myth predating **William Blake’s work** by centuries to the pioneering galaxy drawing that inspired Van Gogh’s *Starry Night* to NASA’s maps of the Apollo 11 landing site, the images remind us that the cosmos — **like Whitman**, like ourselves — is vast and contains multitudes. This masterwork of scholarship also attests, ever so gently, ever so powerfully, to **the value of the “ungoogleable”** — a considerable portion of Benson’s bewitching images comes from the vaults of the world’s great science libraries and archives, bringing to light a wealth of previously unseen treasures.



Cosmigraphics

{ PICTURING SPACE THROUGH TIME }

MICHAEL BENSON



Transit of Venus 1874.

Sydney, N. S. W.

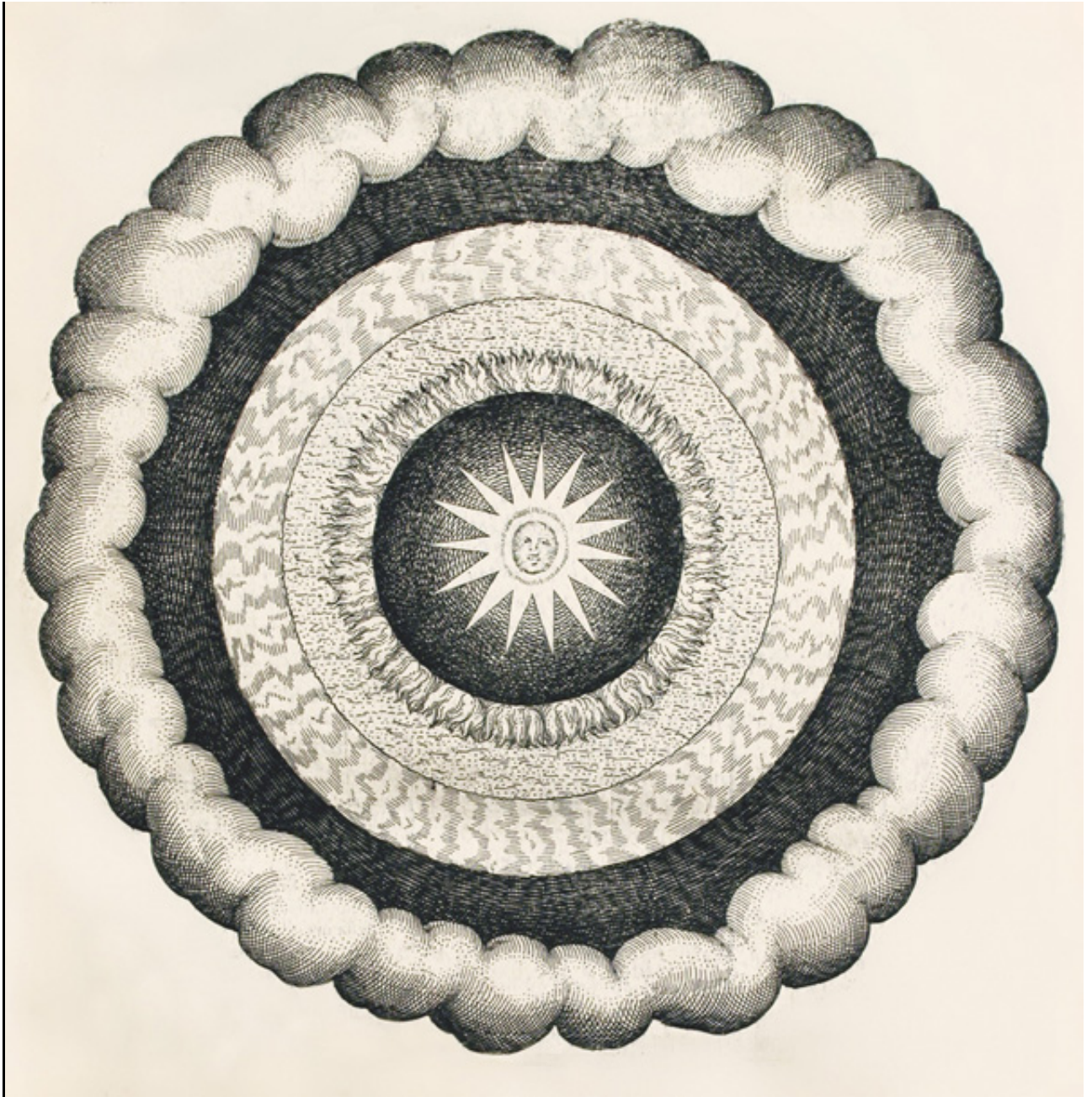
M. A. Fairfax's Observations.

Illustration from Henry Russell's 1892 treatise 'Observations of the Transit of Venus.'

Courtesy of The Royal Society

The book's title is an allusion to Italo Calvino's beloved *Cosmicomics*, a passage from which Benson deploys as the epigraph:

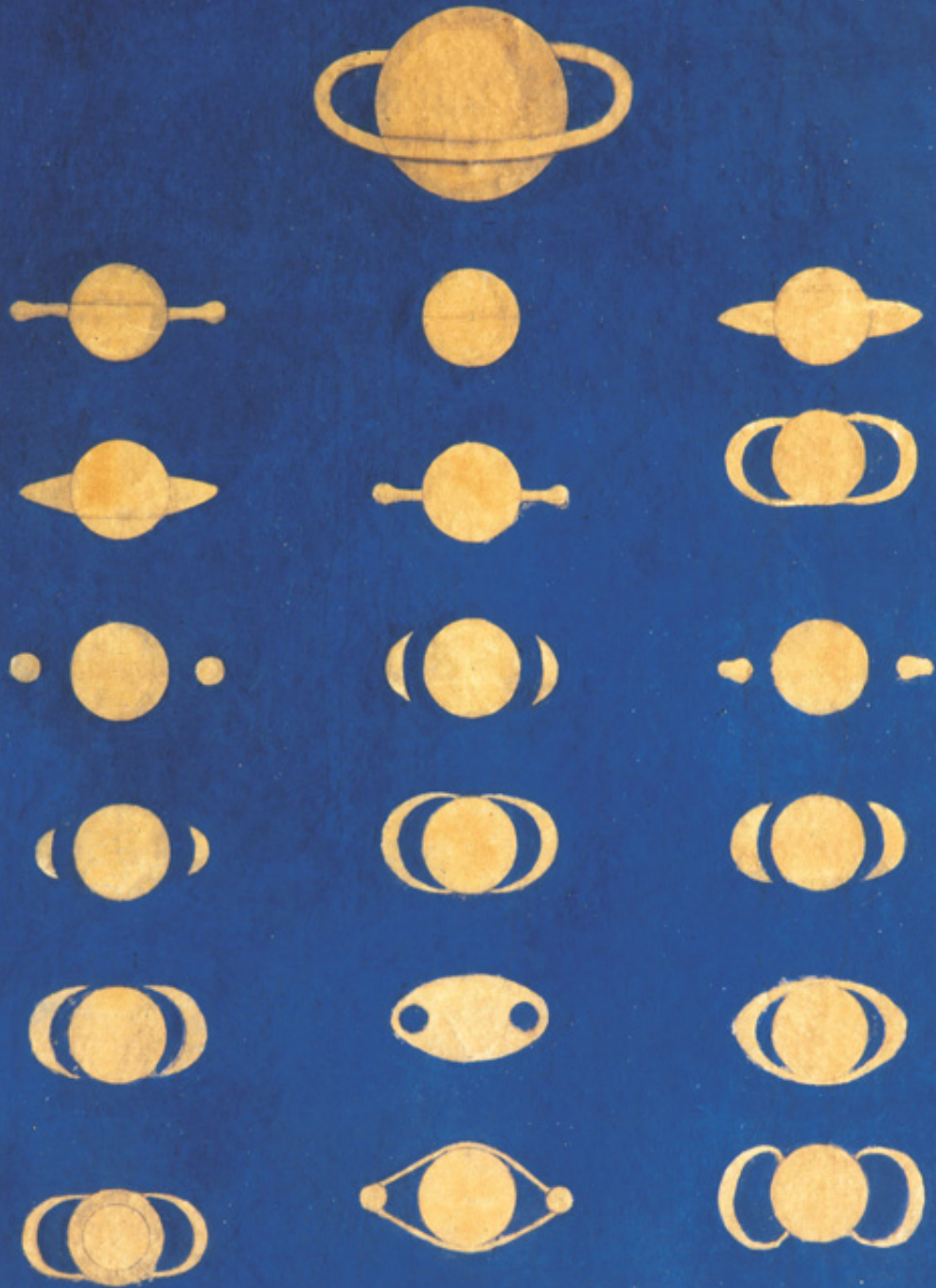
In the universe now there was no longer a container and a thing contained, but only a general thickness of signs, superimposed and coagulated, occupying the whole volume of space; it was constantly being dotted, minutely, a network of lines and scratches and reliefs and engravings; the universe was scrawled over on all sides, along all its dimensions. There was no longer any way to establish a point of reference; the Galaxy went on turning but I could no longer count the revolutions, any point could be the point of departure, any sign heaped up with the others could be mine, but discovering it would have served no purpose, because it was clear that, independent of signs, space didn't exist and perhaps had never existed.



Long before the notion of vacuum existed in cosmology, English physician and cosmologist Robert Fludd captured the concept of non-space in his 1617 creation series, which depicts multiple chaotic fires subsiding until a central starlike structure becomes visible amid concentric rings of smoke and debris. Even though Fludd believed in a geocentric cosmology, this image comes strikingly close to current theories of solar system formation.

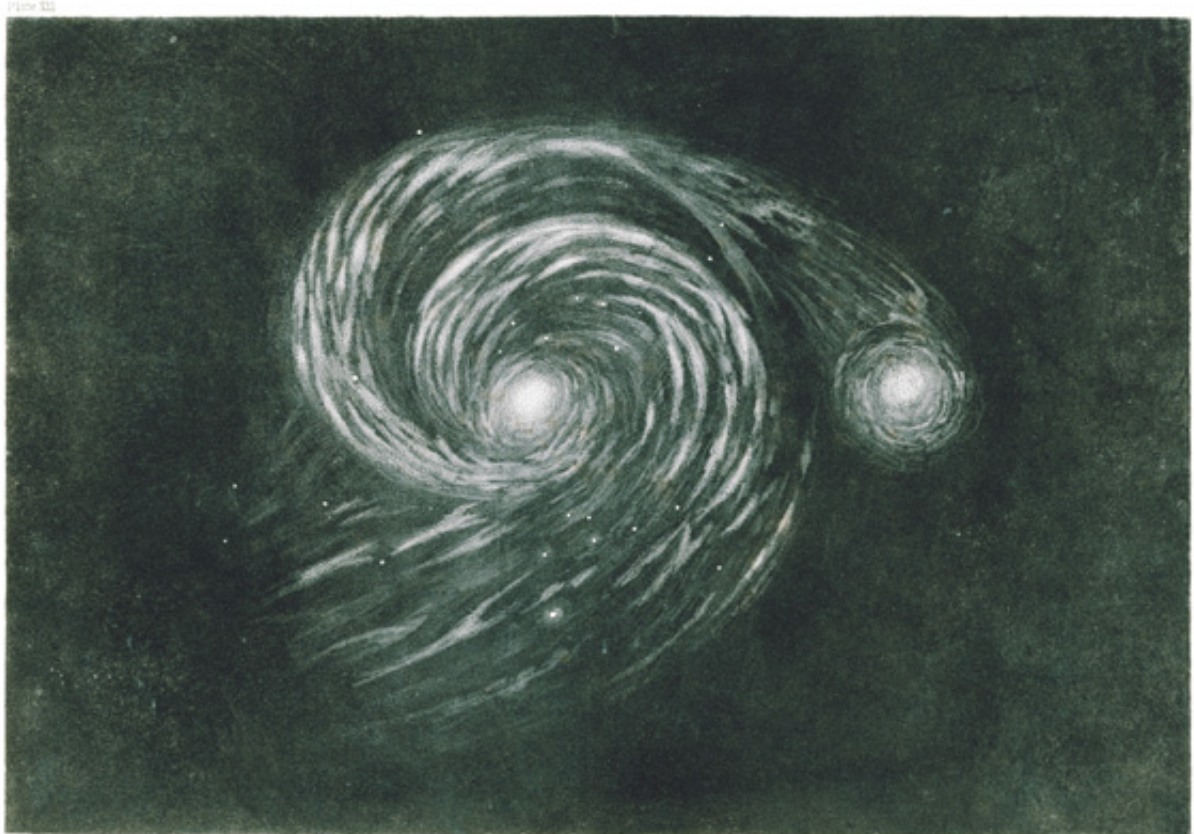
Courtesy of U. of Oklahoma History of Science collections

Variae SATURNI Phases ab Astronomis observatae.



Paintings of Saturn by German astronomer-artist Maria Clara Eimmart, a pioneering woman in science, from 1693–1698. Eimmart's depictions are based on a 1659 engraving by Dutch astronomer Christiaan Huygens, the first to confirm that Saturn's mysterious appendages, which had confounded astronomers since Galileo, were in fact 'a thin flat ring, nowhere touching.' What makes Eimmart's painting unique is that it combines the observations of more than ten astronomers into a depiction of superior accuracy.

Dipartimento di Fisica e Astronomia, Università di Bologna



THE GREAT SPIRAL NEBULA

In 1845, Anglo-Irish astronomer William Parsons, the 3rd Earl of Rosse, equipped his castle with a giant six-ton telescope, soon nicknamed the 'Leviathan,' which remained the largest telescope in the world until 1918. Despite the cloudy Irish skies, Lord Rosse managed to glimpse and draw the spellbinding spiral structures of what were thought to be nebulae within the Milky Way. This print, based on Lord Rosse's drawing of one such nebula — M51, known today as the Whirlpool Galaxy — became a sensation throughout Europe and inspired Van Gogh's iconic 'The Starry Night.'

Courtesy of the Wolbach Library, Harvard

The project, which does for space what *Cartographies of Time* did for the invisible dimension, also celebrates the natural marriage of art and science. These early astronomers were often spectacular draughtsmen as well — take, for instance, **Johannes Hevelius and his groundbreaking catalog of stars**. As Benson points out, art and science were “essentially fused” until about the 17th century and many

of the creators of the images in the book were also well-versed in optics, anatomy, and the natural sciences.



A 1573 painting by Portuguese artist, historian, and philosopher Francisco de Holanda, a student of Michelangelo's, envisions the creation of the Ptolemaic universe by an omnipotent creator.

Courtesy of Biblioteca Nacional de España



De Holanda was fascinated by the geometry of the cosmos, particularly the triangular form and its interplay with the circle.

Courtesy of Biblioteca Nacional de España

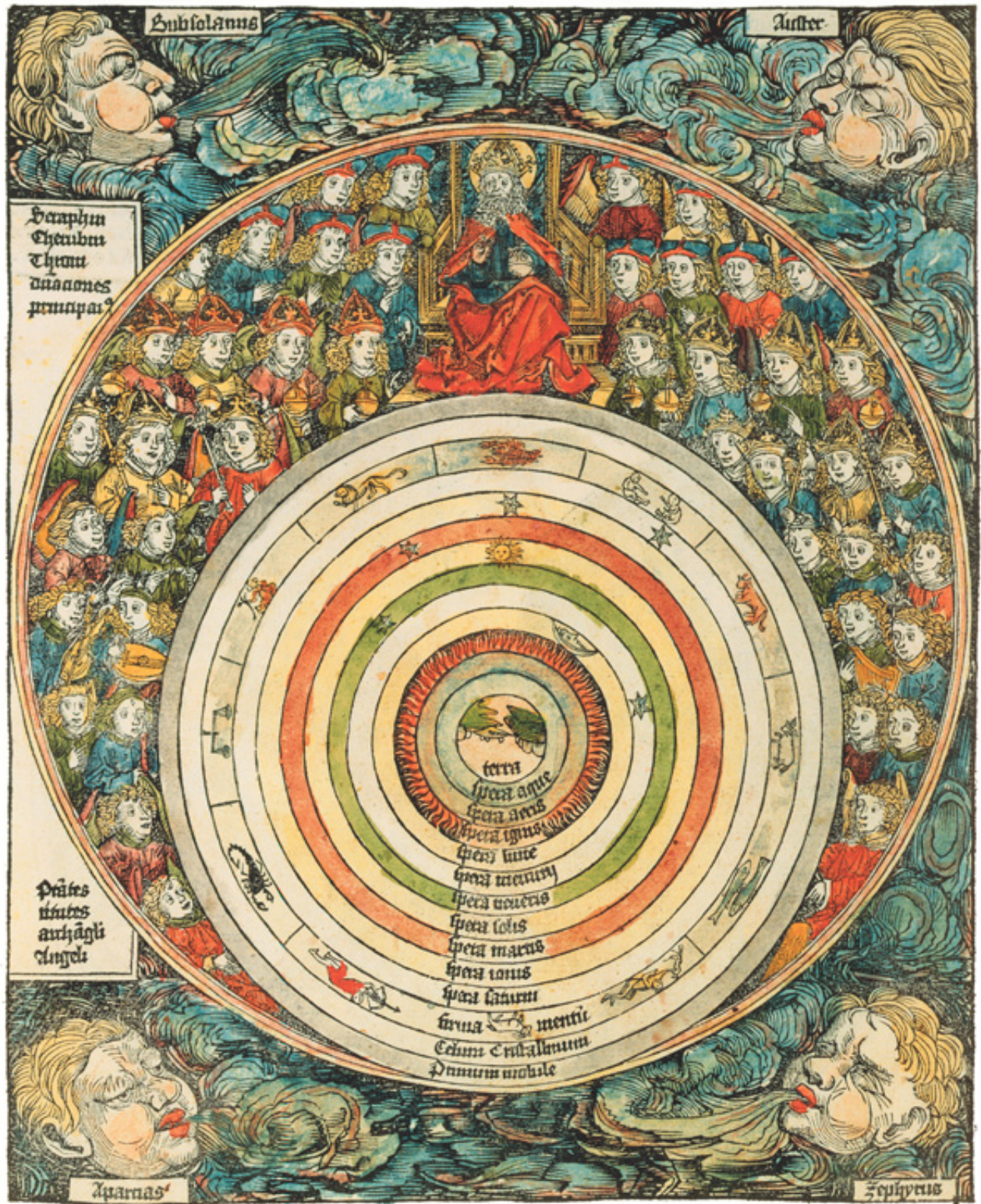


This cryptic and unsettling 'Fool's Cap Map of the World' (1580–1590), made by an unknown artist, appropriates French mathematician and cartographer Oronce Finé's cordiform, or heart-shaped, projection of the Earth; the world in this iconic image is dressed in a jester's belled cap, beneath which a Latin inscription from Ecclesiastes reads: 'The number of fools is infinite.'

Public domain via Wikimedia

The book is, above all, a kind of conceptual fossil record of how our understanding of the universe evolved, visualizing through breathtaking art the “fits and starts of ignorance” by which science progresses — many of the astronomers behind these enchanting images weren’t “scientists” in the modern sense but instead dabbled in alchemy, astrology, and various rites driven by religion and superstition. (For instance, Isaac Newton, often celebrated as the greatest scientist of all time, spent a considerable amount of his youth **self-flagellating over his sins**, and trying to discover “The Philosopher’s Stone,” a mythic substance believed to transmute ordinary metals into gold. And one of the gorgeous images in Benson’s catalog comes from a 1907 children’s astronomy book I happen to own, titled *The Book of Stars for Young People*, the final pages of which have always struck me with their counterblast: “Far out in space lies this island of a system, and beyond the gulfs of space are

other suns, with other systems: some may be akin to ours and some quite different... The whole implies design, creation, and the working of a mighty intelligence; and yet there are small, weak creatures here on this little globe who refuse to believe in God.”)



A 1493 woodcut by German physician and cartographer Hartmann Schedel, depicting the seventh day, or Sabbath, when God rested.

Courtesy of the Huntington Library



The Nebra Sky Disc (2000–1600 B.C.), excavated illegally in Germany in 1999, is considered to be both humanity's first-known portable astronomical instrument and the oldest-known visual depiction of celestial objects.

Public domain via Wikimedia

*Plafis Luna, ab Oppositione recentis.
Obscurata, in 21° gradu II, circa limit. A.*

C. E. DANF.

*Anno Christi 1643, Die 26 Novemb. hora 11 à merid. num. ab
Oppositione vero 6. Divi 2 Current.*



22.

One of the phases of the moon from Selenographia, world's first lunar atlas completed by German-Polish astronomer Johannes Hevelius in 1647 after years of obsessive observations. Hevelius also created history's first true moon map.

Courtesy of the Wolbach Library, Harvard

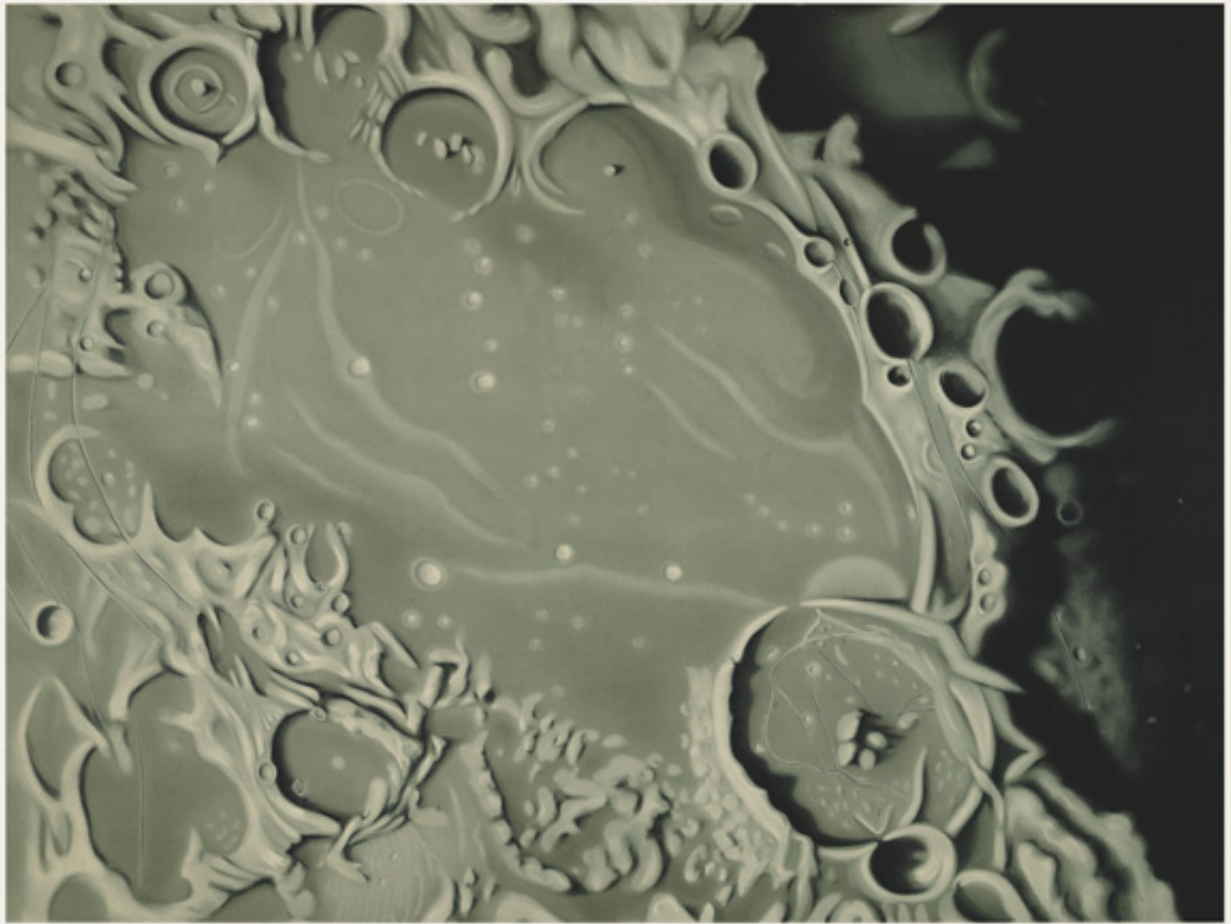


PLATE VI.

Copyright 1872 by Étienne Trouvelot

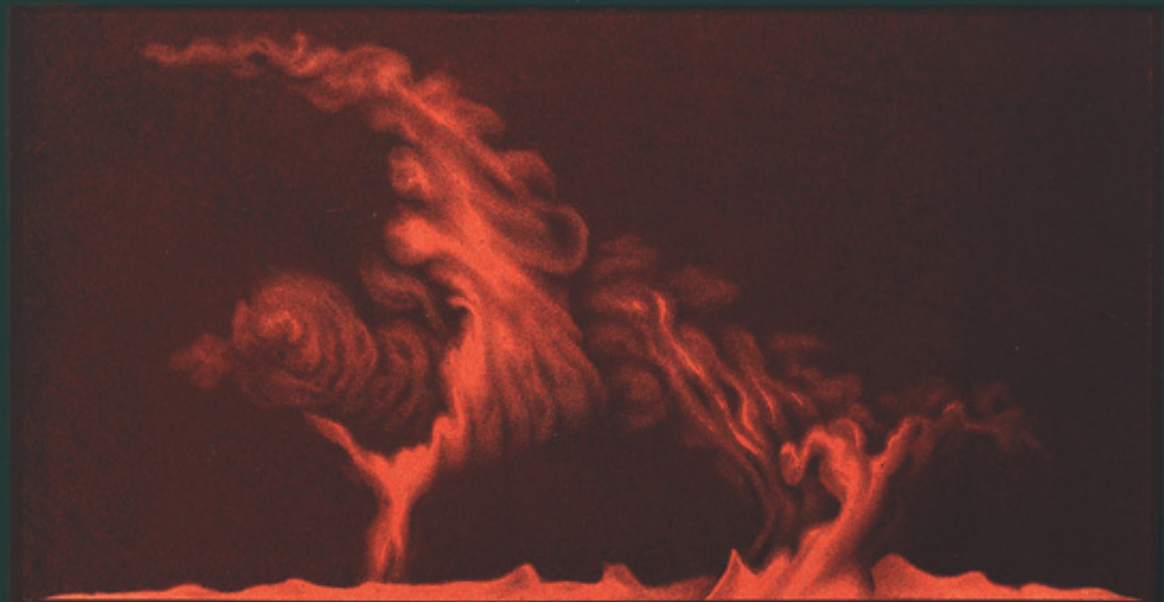
MARE HUMORUM.

From a Study made in 1871.

E. T. Trouvelot

Beginning in 1870, French-born artist and astronomer Étienne Trouvelot spent a decade producing a series of spectacular illustrations of celestial bodies and cosmic phenomena. In 1872, he joined the Harvard College Observatory and began using its powerful telescopes in perfecting his drawings. His pastel illustrations, including this chromolithograph of Mare Humorum, a vast impact basin on the southwest side of the Earth-facing hemisphere of the moon, were among the first serious attempts to enlist art in popularizing the results of observations using technology developed for scientific research.

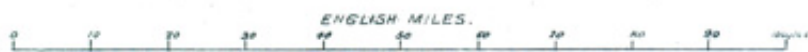
Courtesy of the U. of Michigan Library



L. TROUVELDT.

J. H. BUFFORD IMP.

SOLAR PROMINENCES.



Étienne Trouvelot's 1872 engravings of solar phenomena, produced during his first year at the Harvard College Observatory for the institution's journal. The legend at the bottom reveals that the distance between the two prominences in the lower part of the engraving is one hundred thousand miles, more than 12 times the diameter of Earth. Despite the journal's modest circulation, such engravings were soon co-opted by more mainstream publications and became trailblazing tools of science communication that greatly influenced public understanding of the universe's scale.

Courtesy of the Wolbach Library, Harvard

What makes Benson's project especially enchanting is the strange duality it straddles: On the one hand, the longing to make tangible and visible the complex forces that rule our existence is a deeply human one; on the other, the notion of simplifying such expansive complexities into static images seems paradoxical to a dangerous degree — something best captured by pioneering astronomer Maria Mitchell when **she marveled**: *“The world of learning is so broad, and the human soul is so limited in power! We reach forth and strain every nerve, but we seize only a bit of the curtain that hides the infinite from us.”*

Unable to seize the infinite, are we fooling ourselves by trying to reduce it into a seizable visual representation? At what point do we, like Calvino's protagonist, begin to mistake the presence or absence of “signs” for the presence or absence of space itself? It calls to mind Susan Sontag's concern about **how photography's “aesthetic consumerism” endangers the real experience of life**, which the great physicist Werner Heisenberg channeled decades earlier in a remark that exposes the dark side of visualizing the universe:

Contemporary thought is endangered by the picture of nature drawn by science. This danger lies in the fact that the picture is now regarded as an exhaustive account of nature itself so that science forgets that in its study of nature it is studying its own picture.

PLATE. XXXI.

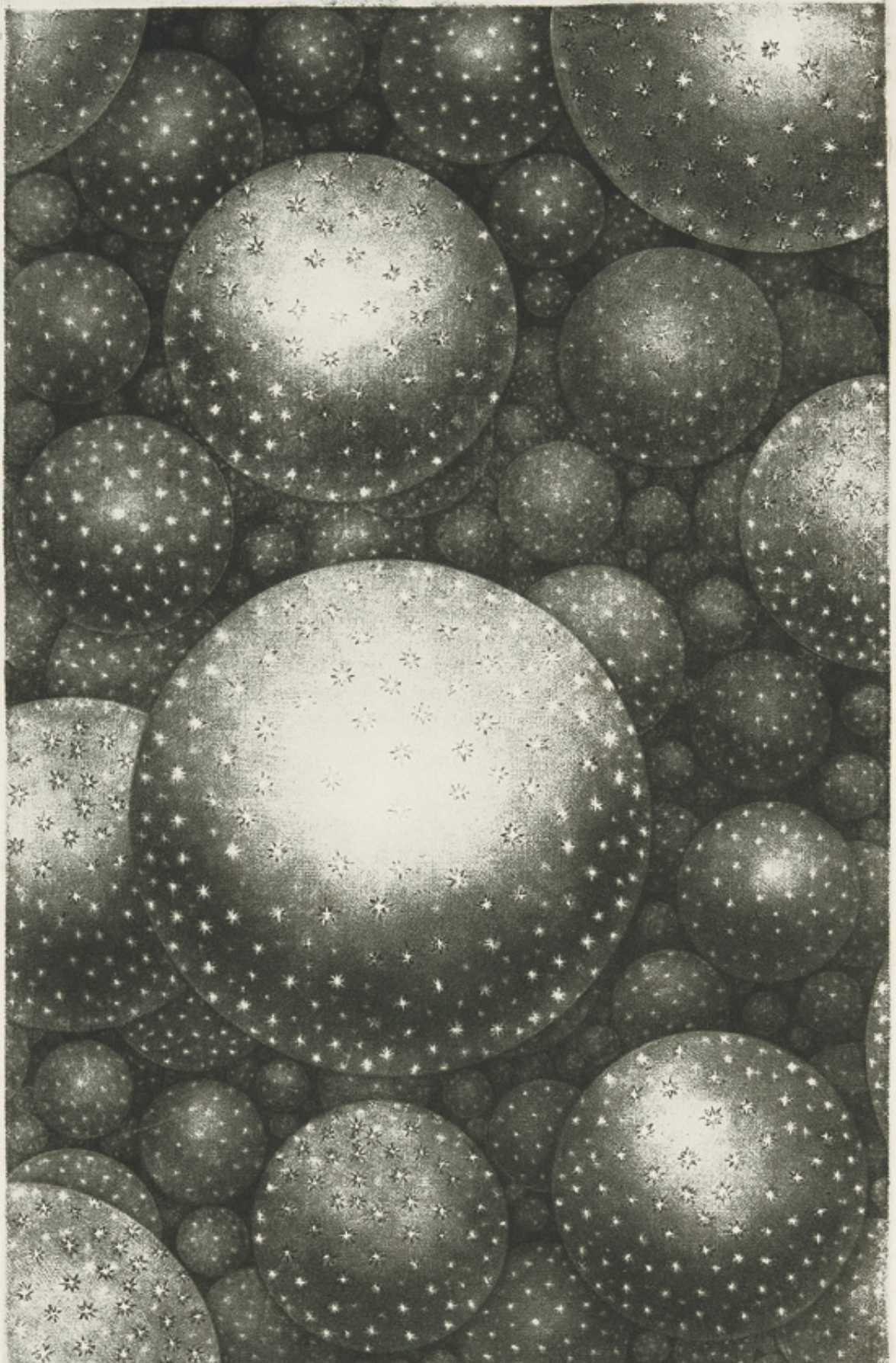


Plate from Thomas Wright's 1750 treatise 'An Original Theory,' depicting Wright's trailblazing notion that the universe is composed of multiple galaxies.

Courtesy of the Wolbach Library, Harvard

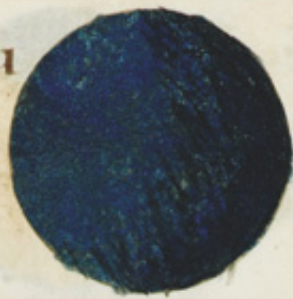
And yet awe, the only appropriate response to the cosmos, is a visceral feeling by nature and thus has no choice but to engage our “aesthetic consumerism” — which is why the yearning at the heart of Benson’s project is a profoundly human one. He turns to the words of the pioneering English astronomer and mathematician Thomas Wright, whose 1750 book *An Original Theory or New Hypothesis of the Universe* Benson considers “one of the best-case studies of scientific reasoning through image.” Wright marvels:

What inconceivable vastness and magnificence of power does such a frame unfold! Suns crowding upon Suns, to our weak sense, indefinitely distant from each other; and myriads of myriads of mansions, like our own, peopling infinity, all subject to the same Creator’s will; a universe of worlds, all decked with mountains, lakes, and seas, herbs, animals, and rivers, rocks, caves, and trees. . . Now, thanks to the sciences, the scene begins to open to us on all sides, and truths scarce to have been dreamt of before persons of observation had proved them possible, invade our senses with a subject too deep for the human understanding, and where our very reason is lost in infinite wonders.

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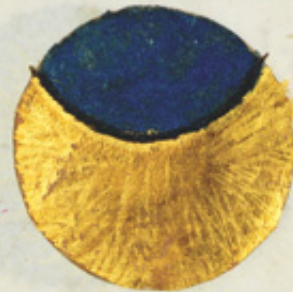
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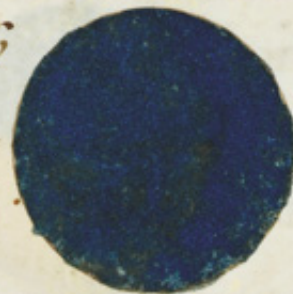
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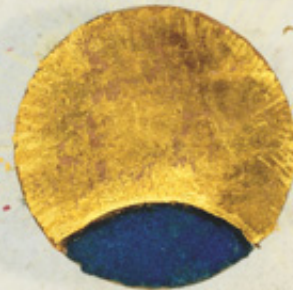
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ano 1488

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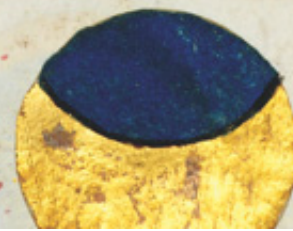


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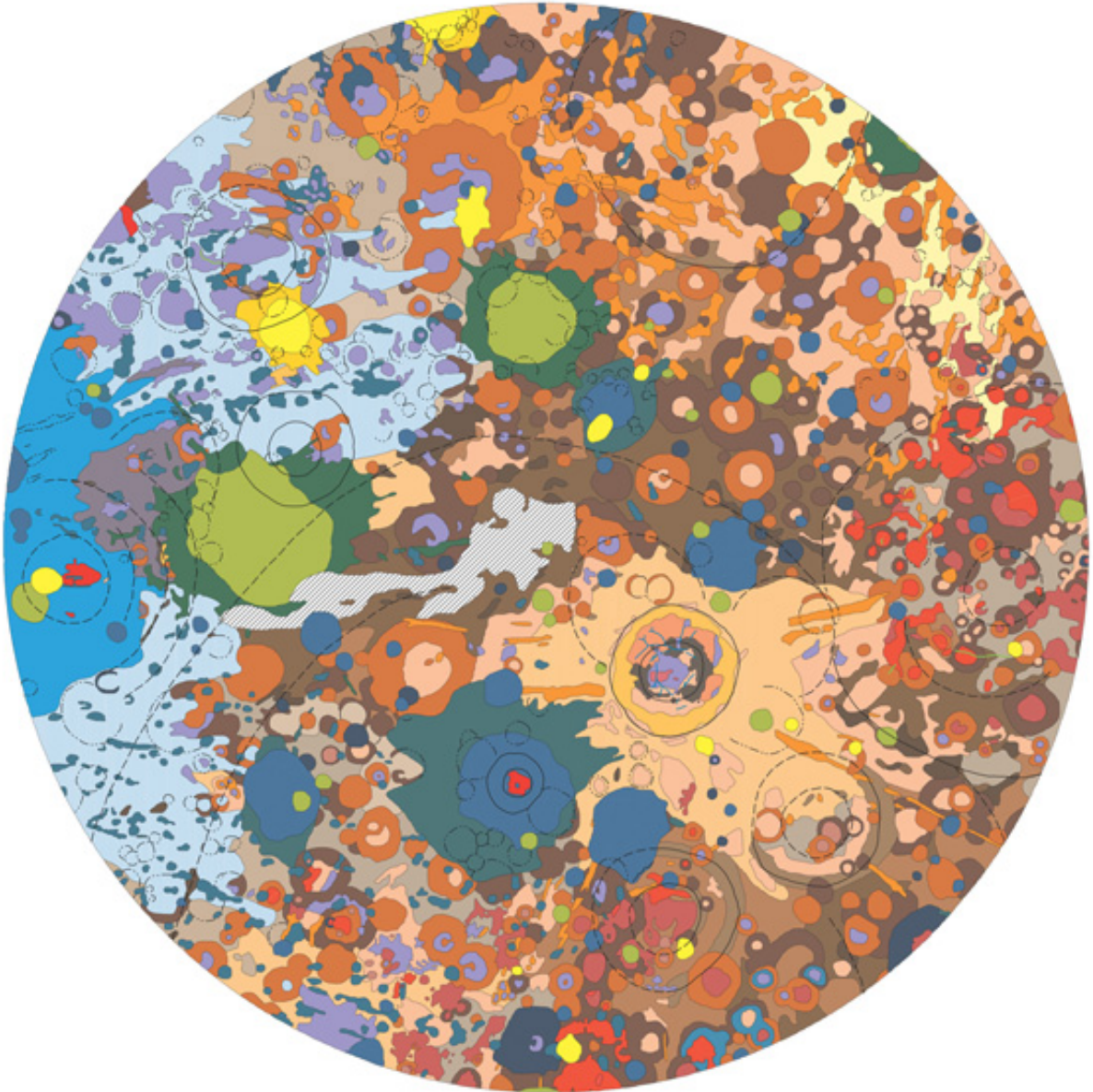
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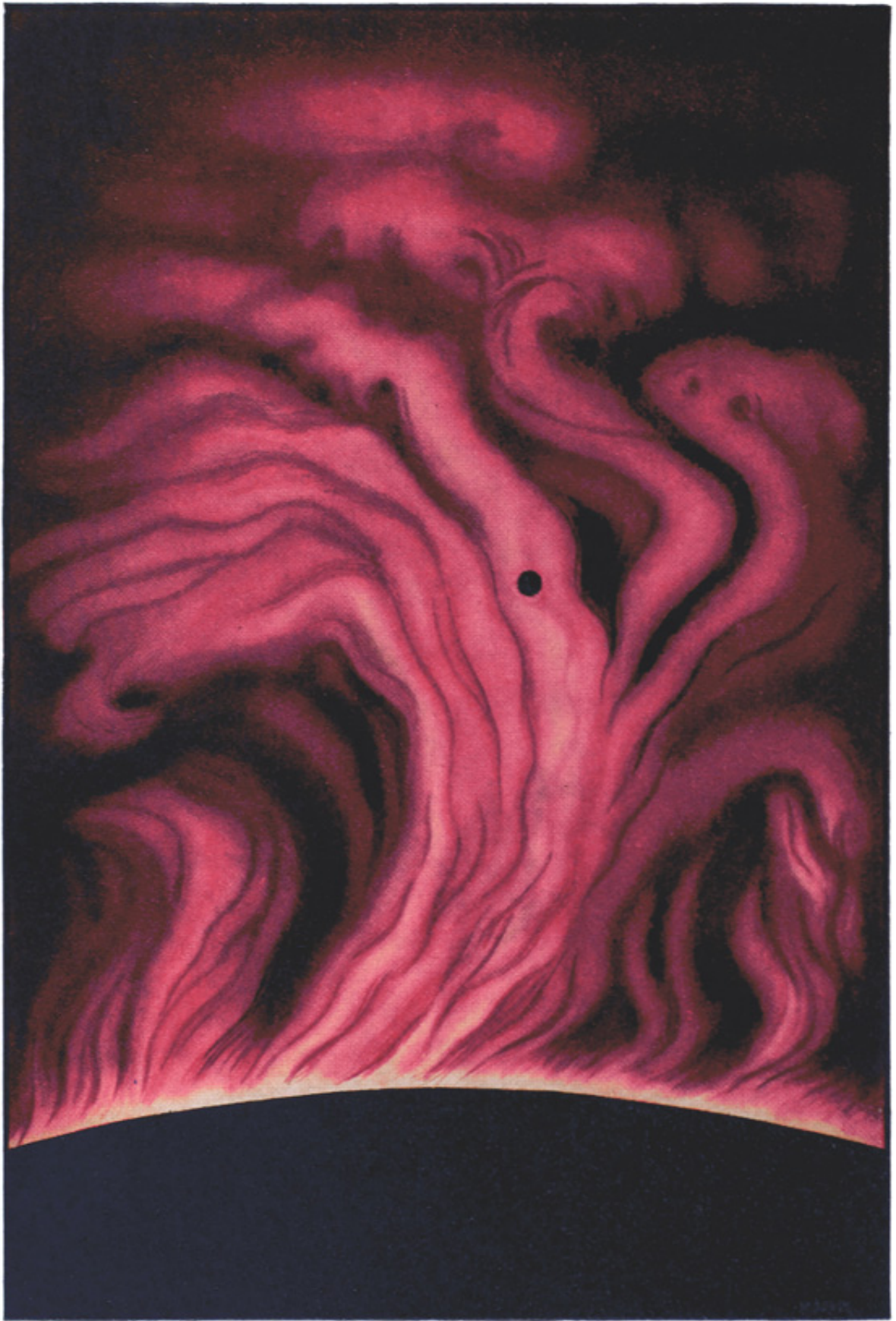
Illuminated solar eclipse prediction tables by German miniaturist Joachinus de Gigantibus, from the 1478 scientific treatise 'Astronomia' by Tuscan-Neapolitan humanist Christianus Probianus.

Courtesy of Rylands Medieval Collection, U. of Manchester



NASA's 1979 geological map of the south polar region of the moon, part of the U.S. Geological Survey.

Courtesy of USGS/NASA



THE EARTH AS IT WOULD APPEAR IN COMPARISON WITH THE
FLAMES SHOOTING OUT FROM THE SUN

Illustration from G. E. Mitton's 'The Book of Stars for Young People,' 1907

Courtesy of AAVSO



Artist-astronomer Étienne Trouvelot's drawing of the total solar eclipse of July 29, 1878, in Wyoming.

Courtesy of the Public Library of Cincinnati and Hamilton County

Cosmigraphics is a treasure trove in its entirety. Complement it with a tour of parallel facets of humanity's visual imagination, Umberto Eco's *atlas of legendary lands* and Manuel Lima's *visual history of tree-like diagrams*, then revisit the little-known story of how Galileo influenced Shakespeare and this lovely children's book about space exploration.