

# Cosmic Horror and the Philosophical Origins of Science Fiction

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## Abstract

This piece explores the origins of science fiction in philosophical speculation about the size of the universe, the existence of other solar systems and other galaxies, and the possibility of alien life. Science fiction helps us to grapple with the dizzying possibilities that a vast universe affords, by allowing our imagination to fill in the details.

The eternal silence of these infinite spaces frightens me.

Blaise Pascal, *Thoughts* (1670)

We now live in a universe composed of billions of galaxies. And, for the most part, we rarely give this any thought. We go about our lives as people have done in the past. Still, you might have reflected on the vastness of the universe: perhaps when you visited a planetarium, or watched a documentary, or even looked up at the (probably light-polluted) night sky and felt a dizziness, a vertigo. That experience is cosmic horror, a sense of the sublime that makes you feel both small and insignificant and a part of a huge, interconnected whole. Once we realize the universe is enormous, and that we're but a tiny speck in that vast world, we need to recalibrate ourselves. We need to find meaning and significance in being the tiny speck we are. As I'll argue here, science fiction helps us to come to terms with cosmic horror, as the history of philosophy shows. As a literary form, science fiction originated in

philosophical speculation about the universe and our place within it.

The past centuries have seen a steady expansion of our picture of the universe. From the eighteenth century until the 1920s, scientists were debating whether the Milky Way was the only galaxy or whether the distant nebulae they could glimpse through telescopes were also galaxies, each composed of millions of stars. Kant was a proponent of the latter theory, in his 1755 *Universal Natural History and Theory of the Heavens*, and he wrote in the *Critique of Pure Reason* (1781): 'it is not merely an opinion but a strong belief (on the correctness of which I would wager many advantages in life) that there are also inhabitants of other worlds'. Before the sixteenth century, it was common to view the world as a compact ball of neatly nested spheres. Around the Earth the Moon, planets and stars circled in a slow and stately dance, each attached to its own crystalline sphere. The stars lit up the night sky from their fixed positions like precious but ultimately



tractable jewels. This geocentric model, exemplified in Ptolemy's *Almagest*, allowed the ancients to explain a wide range of astronomical phenomena. As Copernicus noted in *On the Revolutions of the Heavenly Spheres* (1543), medieval Muslim scholars such as al-Battani, al-Bitruji and Ibn Rushd had already poked holes in the geocentric bubble. It would not take long for that bubble to burst.

Heliocentrism held within it the seeds of a vast universe, because of the problem of stellar parallax. As a theory of the universe, it faced initial difficulty because it predicted parallax, an optical illusion where a distant object appears to move when the observer shifts position. What explained the lack of parallax? Copernicus argued that the cosmos is enormous, and the stars are very far away. Later authors proposed that each star contained its own solar system, or 'world'. The Italian Dominican friar and philosopher Giordano Bruno was among the first to realize the daunting implications of this picture. When he was burned at the stake in 1600, it was not for his adoption of heliocentrism, but for heresy. Still, Bruno grasped the philosophical significance of heliocentrism, professing that

the universe was *not* the world (i.e. solar system). Rather, the universe was infinite, 'those magnificent stars and luminous bodies which are so many inhabited worlds, great creatures and superlative divinities: those which seem to be, and are, innumerable worlds not very unlike that in which we find ourselves'.

While telescopes could show Jupiter had moons, they weren't powerful enough to establish the existence of exoplanets or intelligent alien life. Early modern people looked at the Moon with yearning – so close, yet so unreachable! To make up for this, they invented fantastical tales of what life on the Moon would look like. The astronomer Johannes Kepler wrote a short novel *Somnium* ('Dream') (published posthumously in 1634), which features the Icelandic witch Fiolxhilde and her son Duracotus who visit the Moon and its strange realms by communing with demons. Soon thereafter followed the publications of Francis Godwin's (1638) *Man in the Moon* and Cyrano de Bergerac's (1657) three novels set on the Moon. Cyrano de Bergerac paid some attention to the practicalities of reaching the Moon. The narrator (also named Cyrano)



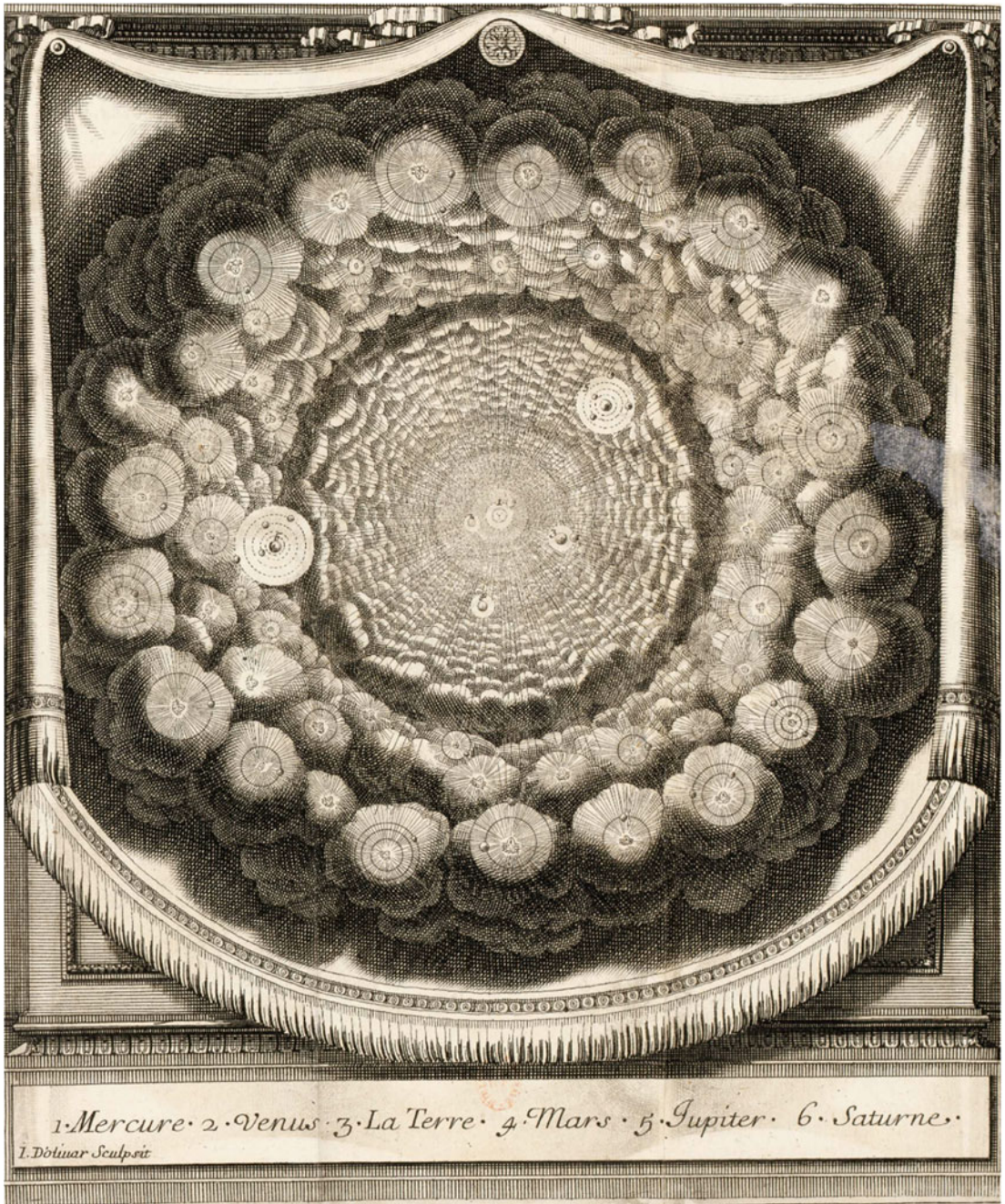
**Figure 1.** Engraving from *The collection of the most notable things seen by John Wilkins, erudite English bishop, on his famous trip from the Earth to the Moon* (Morghen, 1783), depicting 'Pumpkins used as dwellings to secure against wild beasts', from <https://www.metmuseum.org/art/collection/search/811200>.

straps bottles of dew to his body, and eventually succeeds with a kind of space rocket.

**‘Once we realize the universe is enormous, and that we’re but a tiny speck in that vast world, we need to recalibrate ourselves. We need to find meaning and significance in being the tiny speck we are.’**

Eighteenth-century authors also gave free rein to their imaginations. Filippo Morghen (1783) imagined various scenes in lunar society such as ‘Pumpkins used as dwellings to secure against wild beasts’, as can be seen in [Figure 1](#). In this magical, whimsical world, gigantic gourds are habitable. In deep space, the only limits are the limits of our imagination.

At the edge of scientific knowledge and the philosophical questions it prompts, our motivation for science fiction arises. Humans have now visited the Moon, but the mystery of distant worlds remains, as does the existence of alien life. While Kant thought it highly probable that space aliens existed, the existence of extraterrestrial life remains elusive. Science also offers plenty of other mysteries, such as the limits and possibilities of artificial intelligence, genetic engineering, and more. I’ll now review a few examples of early works that are at the intersection of science fiction and philosophy, to demonstrate the philosophical origins of this literary genre. As we will see, science



**Figure 2.** The original frontispiece of *Entretiens sur la pluralité des mondes*, engraving by Jean Dolivar (1686). From Bibliothèque Nationale de France, [http://classes.bnf.fr/essentiels/grand/ess\\_1075.htm](http://classes.bnf.fr/essentiels/grand/ess_1075.htm).

fiction is inherently philosophical as it speculates about the fringes of our scientific knowledge.

## ‘Pondering astronomical phenomena gives us a sense of cosmic horror, and makes us dwindle into insignificance.’

A wildly popular early work of science fiction is Bernard Bouvier de Fontenelle’s *Conversations on the Plurality of Worlds* (1686). This book is set over five evenings, each featuring a dialogue between an unnamed philosopher and marquise as they stroll in her gardens, gaze up at the stars and ponder the full implications of the new astronomical picture of the world. The starting point of their conversations is an idle speculation by the philosopher that ‘every star could be a world. I wouldn’t swear that it’s true, but I think so, because it pleases me to think so’ (p. 10). The marquise, who is clever but entirely ignorant about astronomy, presses him to say more and when he seems reluctant asks, ‘Do you think I’m incapable of enjoying intellectual pleasures?’

As the philosopher remarks, ‘All philosophy ... is based on two things only: curiosity and poor eyesight; if you had better eyesight you could see perfectly well whether or not these stars are solar systems, and if you were less curious you wouldn’t care about knowing’ (p. 11). With better senses we could simply peer up and see what these solar systems look like. But we can’t, so we need philosophical speculation.

In the successive evenings, the characters examine the solar system, and the possibility of life on the moon and on the planets. Eventually, they leave the solar system to ponder the possibility of life in other solar systems. When the full implications of this picture sink in, the marquise expresses cosmic horror: ‘here is a universe so

large that I’m lost, I no longer know where I am, I’m nothing. Each star will be the centre of a vortex, perhaps as large as ours? ... As many spaces as there are fixed stars? This confounds me – troubles me – terrifies me.’

However, the philosopher replies, ‘This puts me at my ease. When the sky was only this blue vault, with the stars nailed to it, the universe seemed small and narrow to me; I felt oppressed by it. Now ... it seems to me I breathe more freely, I’m in a larger air.’ In the final pages of this short work, the philosopher and the marquise discuss the Milky Way and the realization that it consists of thousands, millions of stars. Just as the Moon resembles Earth, the Milky Way’s stars each resemble our sun, as shown in the frontispiece of the book (Figure 2).

The imaginative exercises of the philosopher and the marquise point to the power of science fiction to familiarize us with the utterly strange and alien. Pondering astronomical phenomena gives us a sense of cosmic horror, and makes us dwindle into insignificance. But Fontenelle sublimates the cosmic horror into an optimistic cosmopolitanism: we are among the many potential creatures who inhabit a wondrous universe.

Telescopes were not the only scientific innovation that prompted science fiction and philosophical speculation due to their ability to elicit cosmic horror. Microscopes, by giving us a sense of the tiny, did much the same thing. In the seventeenth century, people did not have as ready access to microscopes as we do today and their magnification was modest by today’s standards. Yet, picture books gave a sense of a world of minute things as vast in its complexity as our everyday environment, with mites and lice looking like colossal mastodons, and mould like dense forests. A catalyst was Robert Hooke’s bestseller *Micrographia* (1665), published by the Royal Society, a book with large, luxurious fold-out images of fleas, urine crystals, and everyday objects such as a razor blade and the point of a needle (see Figure 3).

The mathematician and philosopher Blaise Pascal considered the implications of both telescopes and microscopes. He invites us to imagine that each atom would harbour an



Figure 3. A flea from Robert Hooke's *Micrographia*, [https://commons.wikimedia.org/wiki/File:Robert\\_Hooke,\\_Micrographia,\\_flea\\_Wellcome\\_L0043504.jpg](https://commons.wikimedia.org/wiki/File:Robert_Hooke,_Micrographia,_flea_Wellcome_L0043504.jpg).

infinity of universes, each with its firmament, its planets, its earth, in the same proportion as in the visible world; and on this earth animals, and finally mites, where he will find again what he saw before, and find still in the others the same thing without end and without cessation. Let him lose himself in wonders as astonishing in their minuteness as the others are in their extent!

We no longer think that the microscopic world would harbour infinite universes within universes, like a never-ending series of Russian dolls. Pascal was probably influenced by his work on infinitesimals in mathematics when he formulated that idea. Still, we can recapture something of Pascal's disquiet when we consider the quantum world, a very strange world indeed,

which has led physicists to propose radical views of reality such as the many worlds hypothesis or quantum superposition. Microscopes and telescopes give us vertigo.

When you think of the vast and the tiny, it leads inevitably to self-contemplation: what is humanity's place in nature? Humans seem squeezed between what Pascal called 'two abysses of the infinite and nothing'. Pascal admonished us to 'contemplate them in silence' rather than 'to examine them with presumption'.

But if there's anything humans aren't good at, it is to contemplate in silence. Science fiction affords us a way out of cosmic horror. The form of science fiction grants us some power over the vastness of space and the frontiers of science. We can see this clearly in Fontenelle's preface to the *Conversations*. Fontenelle wrote that he

wanted to help educate women in the science of astronomy. To make up for their prior lack of access to formal education, he wanted to write in a pleasing, literary style which he borrowed from the psychological novel *La Princesse de Clèves* (1678), attributed to Madame de La Fayette. Thus, science fiction served as a way to popularize science for women. It is hard to overstate the popularity of *Conversations*. It was reprinted and translated numerous times. In its wake a veritable genre of educational science fiction works was established, including Algarotti's *Newtonianism for the Ladies, or Dialogues on Light and Colour* (1737). In a pleasing format of fiction, our cosmic horror becomes more graspable, and – perhaps like the philosopher – we're able to breathe more freely and we are in a larger air.

Science fiction not only allows us to frame and come to terms with cosmic horror, it also allows us to engage critically with science and its findings. Take Margaret Cavendish's *Blazing-world* (1666). This story features an intriguing proto-feminist utopia, a society that lives in harmony under the enlightened rulership of a single Empress. Various anthropomorphic animals (Bear-men, Ape-men, Worm-men, Fish-men, Bird-men) serve as the Empress' scientific experts. The Bear-men peer through telescopes and microscopes in their examinations of the Blazing-world. Cavendish (and her main character, the Empress) is not impressed with these instruments. She thinks they are uninformative, and that they cause too much division. She says to the Bear-men: 'your Glasses are false Informers, and instead of discovering the Truth, delude your Senses; Wherefore I Command you to break them, and let the Bird-men trust only to their natural eyes, and examine Cœstial Objects by the motions of their own Sense and Reason.'

The Bear-men hold that their glasses compensate for the limitations of human vision and even reason, arguing that 'she [the Empress] did not know the vertue of those Microscopes: for they never delude, but rectifie and inform the Senses'. In this they echo Robert Hooke, who argued in his preface to *Micrographia* that microscopes and telescopes would help us to restore

our faculties, which he believed were negatively affected by the Fall from the Garden of Eden. By criticizing that attitude, Cavendish anticipates later authors, such as Pierre Duhem or Bas van Fraassen, who have shown that our reading of scientific instruments is never straightforward, but always requires interpretation on the part of the person using the instrument.

Cavendish's work reminds us of another role of science fiction that we see from its inception in the early modern period: an opportunity to imagine different worlds and societies and, in this way, challenge our own ways of life. It is no coincidence that early modern science fiction blended with another popular early modern genre, that of utopia. We see utopias in a wide range of periods and times, but they became popular in the Renaissance and later on, exemplified by the eponymous novel by Thomas More (1515). Utopias used the plot device of travel to distant lands to help us imagine political possibilities.

Much like today, the political situation of early modern people was often stuck in a suboptimal political gridlock, or – the opposite – a political turmoil that didn't bode well, as in England which was gripped by political instability, becoming a republic and then shifting back to monarchy within Cavendish's lifetime. In such a world, imagining a different political constellation in fictional narratives is an act of defiance. Margaret Cavendish's *Blazing-world* is a clear example of such a utopia: it envisages a society with an ideal division of scientific labour where women could also be experts and enlightened rulers. Another utopia that centres on scientific expertise is Francis Bacon's unfinished novel *New Atlantis*, published posthumously in 1626. Science fiction helps us to play imaginatively with the glimpses that science affords. Those are glimpses of a different world – perhaps better, perhaps worse, as we still today imagine in our cyberpunk and near-future works.

What can science fiction mean for us today, and for philosophy? In 1686, Fontenelle confidently asserted: 'The art of flying has only just been born; it will be perfected, and some day we'll go to the Moon.' This was quite an assertion, given that mechanical flight was embryonic at

best in that period. With the space of some 350 years between us, we can take stock of these early science fiction prognoses. On the one hand, Fontenelle was right! What people like Kepler, Fontenelle, Cyrano de Bergerac envisaged as a distant fantasy became a reality some time ago. On the other hand, a boundless optimism permeates Fontenelle's work which now seems alien to us. No longer do we envisage, say, flying cars (if only because of the carbon footprint, they seem like a pretty dreadful idea).

What happened to Fontenelle's vision of scientific progress coupled with the virtues of Enlightenment, including education for all? We still have techno-optimism with the likes of Elon Musk and Bill Gates pontificating about the wonders of scientific progress in their slick TED talks. But with the horrors of climate change, pandemics, nuclear weapons and other military violence, and rising inequality at our doorstep, it is difficult to regain a broader optimism about science and creating better worlds. In this grim

picture, it is useful to look back at that very early science fiction. This fiction was written in a period of intense societal flux, with formidable obstacles even to such initiatives as helping women to be educated. Philosophical science fiction broke boundaries and helped us to expand our imagination. When we feel in a mental deadlock, science fiction offers at least a possibility of a way out; as American writer Ursula Le Guin remarked, writers of the genre are 'realists of a larger reality'. This is a reality that fully embraces possibilities and the power of our imagination.

I've shown here that the origins of science fiction are philosophical: philosophers reflected on the deeper implications of scientific advances such as microscopes and telescopes. Fiction liberates us from the sense of cosmic horror that deep space and the tiny microscopic world elicit, because it allows us to speculate freely. Science fiction has the power to help us reflect on who we are, and on our place in the universe.

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