

Original Paper

Milton's Picture of the Cosmos in *Paradise Lost*, Books II & III, and Copernicus

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Abstract

When Milton wrote *Paradise Lost* it was still a matter of dispute whether Copernicus and Galileo were right and the earth revolved on its axis, or whether the old view that matched “the Appearances” still held true — for it certainly appears that the heavens revolve around *us*. Even Francis Bacon, the opponent of Scholastic and Aristotelian authoritarianism, found it “a hard thing that Copernicus separated the Sun from the company of the planets.” Milton who, aged 29, had visited the old Galileo imprisoned at his villa and looked through his telescope, adapts in Book III, to describe Satan's travels, a traditional theme based on the old cosmology: “the Journey through the Seven Planetary Spheres”; and he has “the utmost Orb” of this World, “the starry Sphere,” enclosing “the luminous inferior Orbs” — the same image of the world that he could find in Plato. But he is careful not to say that the earth is in the center.

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The Science Fiction story by Martin Amis, “The Janitor on Mars” which I reviewed in last September's *Journal*, drew my attention to Milton's great interest in Copernicus whose view that not the Heavens but the Earth moved was still a matter of dispute in 17th century England. Copernicus is mentioned in the story but not Milton. However, the Martians' fatal attempt to overthrow the topmost Power of the Universe is surely modeled not on Prometheus who is briefly mentioned but on the rebel angels in *Paradise Lost*.

Copernicus is mentioned when the Janitor expresses his frustration at the backwardness of Earthly science:

“And whenever I tried to liven things up” by sending hints to scientists on his neural radio, “it was usually a total dud.” As an example he mentions Aristarchus: “Almost exactly twenty-three centuries ago there's this Greek gentleman working on the brightness fluctuations of the planets. ... This Aristarchus happens on a completely coherent heliocentric system” instead of the usual view that everything revolves round the Earth. “He spreads the word around the land. And what happens? Ptolemy. Christianity. You weren't *ready*. So we all had to wait two thousand years for Copernicus. Stuff like that happened all the time.” [1]

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Two roots of European Culture

The Janitor at his distance from Earth perhaps could not grasp the intricacies of the relationship between Christianity and Classical Culture in European history. Ptolemy, the Graeco-Roman astronomer whom the Janitor lumps together with Christianity, came from Alexandria, the city where Hebraism and Hellenism first seriously met. There by the second century B.C. the Hebrew Bible had been translated into Greek. From then on, for many centuries a series of first Jewish (especially Philo), then Christian writers, all deep into Greek culture, especially Platonism, interpreted the Bible in Hellenistic terms. Like Plato, their center of interest was not the shape of the physical universe, so they (for example, Clement of Alexandria and Origen in the second and third centuries) were probably not terribly relieved when Ptolemy “saved the phenomena” — that is, showed how Aristarchus’ data about the planets could be explained away by an elaborate theory of *epicycles* upon each planet’s main cycle and people could still go on believing that the Sun rises and sets as it appears to do. (*Phenomena* means “appearances”.) [2]

The opposition to Aristarchus’ heliocentric cosmology when it was revived by Copernicus in the 16th century came not so much from the Platonic tradition as from Aristotle who, from the 13th century, had been accepted by the Schools (that is, Scholasticism) as the great authority on almost everything. Aristotle of course *was* interested in the structure and workings of the physical world. His view of the cosmos made sense. Of the four elements, earth and water, being heavy, naturally sink to the bottom — that is, to the center of a spherical universe. Air is more volatile and fire, as we can see, flies upward. Aristotle added a fifth element or quintessence, a more subtle fire, for the stars. Some of his cosmology, however, showed the influence of his teacher, Plato. God is the unmoved Prime Mover who moves everything else in the way that a Beloved moves those who love, by the power of their *eros*, just as Plato (in *Republic* VI 505d) said the Good is “that which every soul pursues (or strives after).” Every potential being, from unformed matter upward strives to actualize its proper form. Those that are nearest the source of the motion, that is, the “fixed stars” on the outermost visible sphere, describe perfect circles; it is in the world beneath the Moon that disturbances arise.

Until Galileo with his telescope discovered the moons of Jupiter, only seven heavenly bodies were known between the “fixed stars” and the Earth: Saturn, Jupiter, Mars, Sun, Venus, Mercury, Moon — to give the planets their Latin, not Greek or Babylonian names. A popular form of late Classical and Medieval fiction was the journey through the seven spheres.[3] Dante used this framework for his *Paradiso* and Milton for the itinerary of Satan’s journey in *Paradise Lost*, perhaps the last work of literature in this tradition. (Both make clear that the visible heavens are but symbols for the invisible.)

Milton and Galileo

While I was working on this paper a friend sent me a very relevant book: *Galilei* by Toshiyuki TOYODA. [4] Without it I would not have known that Milton, age twenty-nine, visited Galileo in 1637 at his villa overlooking Florence where he spent his last eight years under house arrest after his second trial for “having held and taught” Copernican doctrine.[5] A painting by the artist Gatti shows the young Englishman stooping to look through a telescope while the white-bearded scientist stands beside him gesturing with both hands. Seven years later in his *Areopagitica*, a passionate appeal for freedom of speech and publication, Milton told the English Parliament of his visit to Galileo, imprisoned by the Inquisition because he had different views on astronomy from the censors of his book. (Toyoda, p. 77) The book in question was *Dialogue on the Two Great Systems of the World, the Ptolemaic and the Copernican*, published in Florence in 1632.[6]

Galileo had been advised by his friends in high places to present his views as theory, not as fact, so the dialogue form was very convenient. Even so (to sum up very roughly Prof. Toyoda's detailed and convincing research), in order to appease the conservative forces in Church and society (including the uneducated), Galileo had to be punished. [7]

"Fundamentalism" Then and Now

A similar, though not so serious [8] case has been reported in the news from America while I have been writing this paper:

"The Kansas Board of Education rejected evolution as a scientific principle..., dealing a victory to religious conservatives who are increasingly challenging science education in U. S. schools."

"Now Kansas, along with dozens of other school boards, labels evolution as 'just a theory'."

Asahi Evening News, Aug. 12 & Aug. 22, 1999

According to Prof. Toyoda's book (p. 122), the religious conservatives of Southern Europe opposed Galileo for the same reason that those of the Southern United States oppose evolution: "It's against the Bible." So I must defend my view that the real problem for the heliocentric theory was not the Bible but Aristotle. Rather, the problem was that both the Bible and the natural world were interpreted in terms of Aristotelianism, Platonism or other preconceptions. There were also the simple doubts of the uneducated who thought that if the Earth revolved, we'd all fly off into space.

Milton, too, reads the Bible with some preconceptions, especially legalistic ones about God's justice, but none that hinder his appreciation of Galileo and Copernicus.

Milton's Cosmos, the scene of Satan's Voyage

1. In *Paradise Lost*, Book II

Milton constructs for us his picture of the universe as we follow Satan on his voyage of exploration in Books II and III. Book II takes us from Hell through Chaos up to the Light.

Satan, escaping from his dungeon at the very bottom of the Abyss of Chaos, [9]

"Stood on the brink of Hell and looked a while Pondering his voyage..." (lines 918-9)

before plunging into the confusion. Loud noises struck his ear *as if* "The steadfast Earth" had been torn from her Axle. (926-7)

Comment: That is, the Earth, though steadfast, *does* turn on an axis. It moves. This simile right at the beginning is perhaps meant to assure us that, despite all his poetical images based on the traditional cosmology, Milton is on the side of the new.

As the voyage through Chaos begins, if Milton has aroused in us (as he tends to do) any sympathy for the poor Devil, we want to call out, "Fasten your seat belt!" for Satan,

"As in a cloudy Chair ascending rides
Audacious, but that seat soon falling, meets
A vast vacuity:" (930-2)

— in modern English, an "air pocket."

Comment: Milton's Chaos is both the primeval waters "without form and void" at the beginning of the Book of Genesis and Hesiod's Chaos from whom, with his Consort Night, all the gods were born (Hesiod, *Theogony* 116-128). In terms of a later Greek science, Chaos was a battle-ground of

"hot, cold, moist and dry,"

that is, the qualities of "embryon Atoms" (898, 900) that had not yet been formed into the four elements that make up our Cosmos and the "four humors" (liquids) that make up our bodies. Chaos is

"The Womb of nature and perhaps her Grave,
Of neither Sea (= water), nor Shore (= earth), nor Air, nor Fire,
But all these in their pregnant causes mixed." (911-3)

Comment: This last line calls to mind those high-vision TV photos through new, more powerful telescopes, of galaxies and solar systems in early stages of formation. Do these spirals and clusters of star dust contain the "pregnant causes" of beings like us? Milton would be inclined to say Yes. To him, Chaos is an unlimited reserve out of which the Almighty Maker might ordain

"His dark materials to create more Worlds..." (916)

Satan set out on his voyage in search of one such new world,

"the happy seat
Of some new race called Man, about this time
To be created..." (347-9)

Old Chaos tells Satan the way to that place while complaining that his frontiers are being encroached on, not only to make room for Hell, but

"Now Heaven and Earth, another World
Hung o'er my Realm, linked in a golden Chain"

to the side of Heaven from which Satan's legions fell. (1004-5)

Comment: The Heaven from which the rebel angels fell was the invisible Heaven "above the starry Sphere" (III 416), but "Heaven and Earth" mean this visible world where we live. (In shape it is a Globe, III 422.)

After meeting old Chaos, Satan pushed on. Gradually light glimmered from above where

"Nature first begins
Her farthest verge, and Chaos to retire..." (1037-8)

Comment: In *this* image there is no sharp boundary. Light emanates down into the darkness and nothingness until it fades away — a neo-Platonic image. But on the same page, there *is* a boundary :

"the utmost Orb (the solid outer Sphere)
Of this frail World..." (1029-30)

The poet needed *this* image, too, to tell his story, because the outermost Orb must be solid enough for Satan to land on.

When Satan at last flew, like a weather-beaten ship, out of the storms of Chaos into calmer air (1040-6), he could see

“Far off the Empyrean Heaven”

(his former home above the stars) and near it

“hanging in a golden Chain

This pendant world, in bigness like a Star

Of smallest magnitude close by the Moon.” (1051-3)

That is, compared to the Empyrean Heaven, our whole visible universe of “Heaven and Earth” looked as small as a tiny star beside a large moon.

“Thither” to that tiny universe Satan “hies.” (End of Book II)

Milton's cosmos and the scene of Satan's voyage

2. In *Paradise Lost*, Book III

Like many scenes in traditional epic from Homer on, Book III begins in Heaven from where “the Almighty Father” looks down at the whole Universe including Earth, “Hell and the Gulf between.” (lines 55-70) He sees Adam and Eve in their Garden and then Satan

“Coasting the wall of Heaven on this side Night

(i.e. keeping on the shady side)... and ready now

To stoop with wearied wings, and willing feet

On the bare outside of this World...” (71-4)

After plans are made in Heaven for Man's ultimate redemption, Milton returns to Satan's voyage on his way to make Man fall. (From III line 418.)

“Meanwhile upon the firm opacous Globe

Of this round World, whose first convex divides

The luminous inferior Orbs, enclosed

From Chaos and the inroad of Darkness old,

Satan alighted walks.” (418-22)

Comment: “The luminous inferior Orbs” make up what we call “the Solar System.” Milton is careful *not* to say that the Earth is the center.

The outer Orb that, far off, had appeared to Satan as a Globe

“... now seems a boundless Continent

Dark, waste, and wild, under the frown of Night...

Starless” and exposed to the storms of Chaos. (423-5)

Milton compares Satan to a hungry vulture on the barren plains of Central Asia,

“where Chinese drive

With Sails and Wind their canie Waggons light...”

(We can see the Silk Road on television, Milton with his mind's eye.)

Milton's Satire on "The Paradise of Fools"

There was nothing, living or lifeless, on that windy Sea of Land, but in later times it would be filled with

"all who in vain things
Built their fond hopes of Glory or lasting fame
Or happiness in this or the other life..." (448-50)

Milton emphasizes Medieval examples: hermits, pilgrims, members of religious orders (especially the two that persecuted Galileo). All think they are on the way to Heaven following the same itinerary as Dante in the *Paradiso*:

"They pass the Planets seven, and pass the fixed,
And that Crystalline Sphere whose balance weighs
The Trepidation talked (the so-called trepidation), and that first moved (by the Unmoved Mover);"

but just as they reach the foot of the stairs up to Heaven's gate, they are blown away into space with all their holy paraphernalia. (481-93)

Comment: The planets seven include Sun and Moon. Even Francis Bacon the opponent of Scholasticism found it "a hard thing that he (Copernicus) separated the Sun from the company of the planets" [10]. The other spheres listed by Milton correspond to those in Dante. Dante, traveling upward, arrives at the Primum Mobile ("that first moved") in canto 27, lines 97 ff., of the *Paradiso*.

I do not think, as I at first suspected, that Milton in III 481-93 is satirizing his fellow Great Poet. With Dante Milton had dared

"to venture down
The dark descent, and up to reascend" (III 19-20)

in Books I and II of *Paradise Lost* (like the heroes of Homer's *Odyssey* and Vergil's *Aeneid*). [11] As the poet Vergil had been Dante's guide through the *Inferno*, so Dante, along with Homer, Hesiod and Vergil, had been Milton's. The *Divine Comedy* provided many models (if Milton needed them) for fierce attacks on unsatisfactory churchmen, not least in those very cantos of the *Paradiso* describing the itinerary Milton outlines in III 481-93.

From Outer Orb via the Sun to the Earth

After wandering long on "the bare outside of this World" (III 74) Satan found the stairway that led up to Heaven's Gate and below it a passage down to the Earth above the Bible lands where once it had appeared as "Jacob's Ladder" (*Genesis* 28: 10-17). Sitting on the bottom step he

"Looks down with wonder at the sudden view
Of all this World at once." (542-3)

Then he plunged obliquely

"Down right into the World's first Region..." (562)

What at a distance had seemed like shining stars now

“... nigh at hand seemed other Worlds,
 ... or happy Isles,
 ... but who dwelt happy there
 He stayed not to enquire...” (562-71)

In other literary descriptions of travels through the Heavens, the traveler always stops at each Sphere or Planet and talks with the beings there, but Satan was in a hurry. He makes only one stop:

“...above them all
 The golden Sun... allured his eye:” (571-3)

The Sun a Planet or the Center?

As Satan bent his course toward the Sun he experienced a confusion of direction, reflecting (we may guess) the pioneer nature of Milton’s attempt to shift, in a traditional “Journey through the Spheres,” from an Earth-centered Cosmos to a Sun-centered one.

“... but up or down
 By center, or eccentric, hard to tell,
 Or Longitude, where the great Luminary
 Aloof the vulgar Constellations thick,
 That from his Lordly eye keep distance due,
 Dispenses Light from far; ...” (574-9)

like a crowd of common people (the *vulgus*) keeping their distance from a Nobleman.

In describing Satan’s landing on the Sun, Milton humorously (?) remarks, ‘That was a sun-spot that Galileo *didn’t* see ! ’

“There lands the Fiend, a spot like which perhaps
 Astronomer in the Sun’s lucent Orb
 Through his glazed Optic Tube yet never saw.” (588-90)

On the Sun :

Satan disguising himself as a young Cherub asked Uriel, the Angel in charge of the Sun:

“In which of all these shining Orbs” (668)

he could find Man so that he could go and admire the great Creator’s newest work.

The Angel, not discerning the hypocrisy, commended the Cherub’s desire to know the works of God. He himself had been present at the creation of the world out of Chaos when all four elements

“And this Ethereal quintessence of Heaven
 Flew upward, spirited with various forms,
 That rolled orbicular, and turned to Stars...” (716-8)

Comment: “Rolled orbicular” suggests that their shapes naturally resulted from their motion.
 Then the Angel answered Satan’s question:

“Look downward on that Globe whose hither side
 With light from hence, though but reflected, shines;
 That place is Earth, the seat of Man, that light
 His day...” (722-5)

The Angel also explains the monthly round of

“...the neighboring Moon
 (So call that opposite fair Star)...
 That spot to which I point is Paradise,
 Adam’s abode...
 Thy way thou canst not miss...” (733-5)

Satan bowed low, because in Heaven no one neglected the honour and reverence due to superior Spirits. Then (like a schoolboy, perhaps, released from the headmaster’s office) he

“Throws his steep flight in many an Airy wheel” (741)

and soon lands on the Earth. (End of book III)

A further note on *Paradise Lost* Book III

Milton’s oldest model for his “view of all this world at once” (542-3) seen “from above” (56) is Plato’s “myth” in *Republic* X 616b-617e.

This is not “Plato’s cosmology” but just one of many “myths” that he made up to illustrate a point, in this case, each soul’s freedom to choose a good life in spite of the limitations of Necessity. It’s not “science” but “ethics.” But it *is* the earliest literary example of what became the classical European “system of the universe.”

Looking down “from above,” the souls waiting to descend to be born in the world see the whole cosmos shaped like the simple hand-spinning equipment that ancient women used (and a few still use). Standing (like Milton’s Satan) on the top or outside of the world, the souls see the Spindle of Necessity like a column of light stretching downward through the whole of heaven and earth. On it turn the eight concentric Spheres — the outer and largest one spangled with stars, the five planets of different colors, and Sun and Moon. All fit together to form the whorl of the Spindle and each sings a different musical note of the scale, “the Music of the Spheres.” Long after Newton’s *Principia* was published (1687) and almost everyone had begun to live in a Copernican universe, the “Music of the Spheres” continued to resound in 18th century poetry.

Conclusion

Milton lived in a time of transition from an Earth-centered cosmology to a Copernican one. Most art, poetry, sermons and other literature still reflected the old classical picture of the universe, and *Paradise Lost* does so, too. But Milton was well aware of an alternative view, made known throughout Europe by Galileo’s book, *The Two Great Systems of the World, Ptolemaic and Copernican*, and in Book VIII has Adam discuss these two views with his angel guest. Already in Book IV, Milton was probably the first poet ever to describe a sunset in Copernican terms as an alternative to the usual Ptolemaic way we speak about sunsets even today.

In the Garden of Eden:

“... the Sun (had) now fallen
 Beneath the Azores (in the West); whether^[12] the Prime Orb,
 Incredible how swift, had thither rolled
 Diurnal (as the Sun does every day),
 or (as an alternative description of sunset)
 this less volubil (= revolvable) Earth
 By shorter flight to the East, had left him (= the Sun) there
 Arraying with reflected Purple and Gold
 The Clouds that on his Western Throne attend:”
 (IV lines 591-7)

If the Earth moves just a short distance, she “save(s) the Sun his labour” (VIII, 131) by leaving the Sun where he is, not circling the great universe at incredible speed.

References

The text used for *Paradise Lost* is from *The Poetical Works of John Milton*, ed. Beeching, Oxford U. P., 1922. I have modernized Milton’s spelling but kept his capital letters. Also: *John Milton, Selected Poetry*, Oxford World’s Classics, ed. J. Goldberg and S. Orgel, Oxford U. P., 1997.

Notes

1. *The New Yorker* Oct. 26 & Nov. 2, 1998, p. 224.
2. Clement of Alexandria (like the others) took for granted Plato’s picture of the heavens “as a series of spheres revolving above the earth” and does not seem aware of any challenge to this view. See *Clement of Alexandria* in Loeb Classical Library, ed. Butterworth, 1919, pp. 154-5, footnote c.
3. For example Cicero’s *Dream of Scipio* (1st century B.C.) and the *Commentary* on it by Macrobius (about 400 A.D.); *The Marriage of Philology and Mercury* by Martianus Capella (4th century) in which each Sphere or Planet introduces one of the Seven Liberal Arts of the educational curriculum; and the *Cosmographia* or *De Mundi Universitate* by Bernardus Silvestris, during the “12th Century Renaissance” in France, a work that was known to Chaucer.
4. Volume 21 in *Famous Books of the World (Sekai no Meicho)*, Chuo Koronsha, 1973. The author was then a Physics professor of Nagoya University and also an expert on the history of science in Italy.
5. *The New Britannica* 15th edition, p. 86, *Galileo*.
6. Japanese translation, *Tenmon Taiwa* by Seizo AOKI, in two volumes, 1959 and 1969, Iwanami Bunko.
7. See especially pages 120-138 of Prof. TOYODA’s *Galilei*.
8. Not so serious as the case of Giordano Bruno who was burned at the stake in Rome in 1600. See TOYODA, *op.cit* pages 23-27 and 96.
9. *Abyss* comes from the Greek and Latin translations of *Genesis* 1:2 while *Chaos* comes from Hesiod.
10. Bacon, *A Description of the Intellectual Globe* (c. 1611-19), *The Oxford Francis Bacon* VI, 1996, p. 121.
11. Odysseus visits the Underworld in *Odyssey* Book Eleven, and Aeneas in the *Aeneid* Book Six.
12. The 1997 Oxford World’s Classics edition modernizes Milton’s spelling of “whither” to “whether” and adds the note: “Milton once again declines to choose between the Ptolemaic and Copernican systems.”