

# **Where Are We, Really?**

## **Parallel Universes, Fact or Fiction**

Lecture 2: The Plurality of Worlds in Religion, Philosophy and Fiction – from Ancient Scriptures to Today's Sci-Fi



# Parallel Worlds in Early Philosophy

- Atomists and Epicureans: Multiple worlds in infinite space
- Stoics and eternal recurrence: Multiple worlds in infinite time

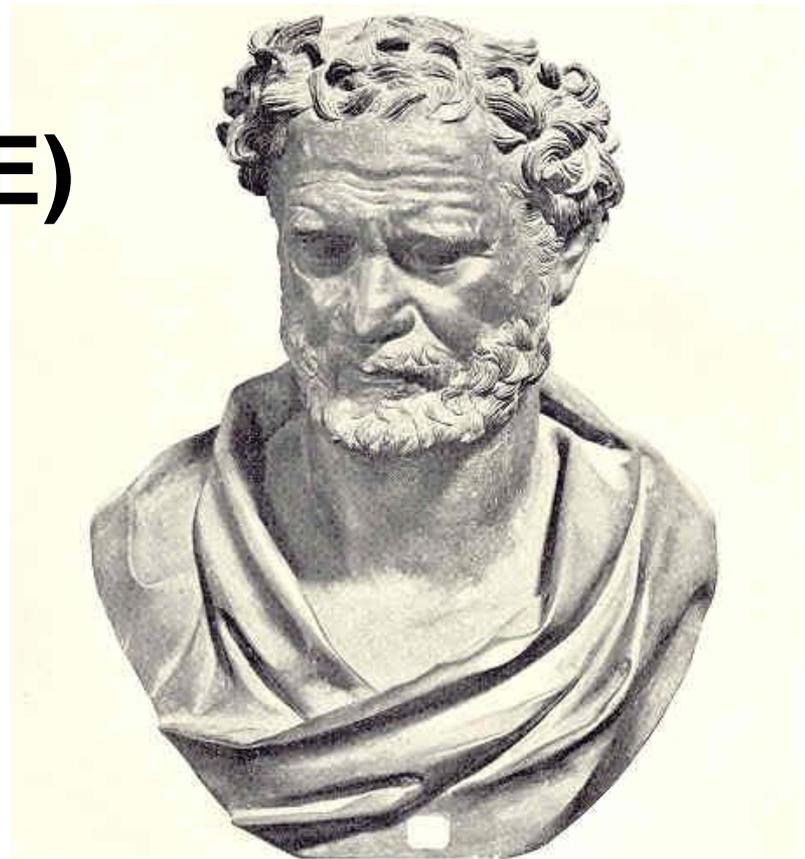
# Leucippus

(1<sup>st</sup> half of 5<sup>th</sup> cent. BCE)

# Democritus

(460?-370? BCE)

- Believed that reality consists of an infinite space filled with an infinite number of indivisible atoms (**atomos**: ατομοσ) whose attributes and motions determine what we perceive

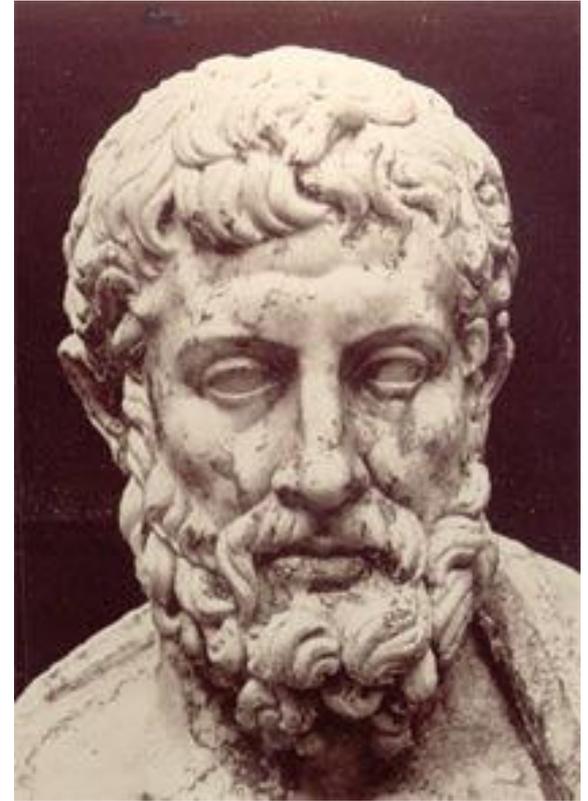


Bust of Democritus

- Argued that an infinite space has no center, and therefore, other worlds (**cosmoi**: κοσμοι) besides that of which our finite Earth is the center must exist

# Metrodorus of Chios

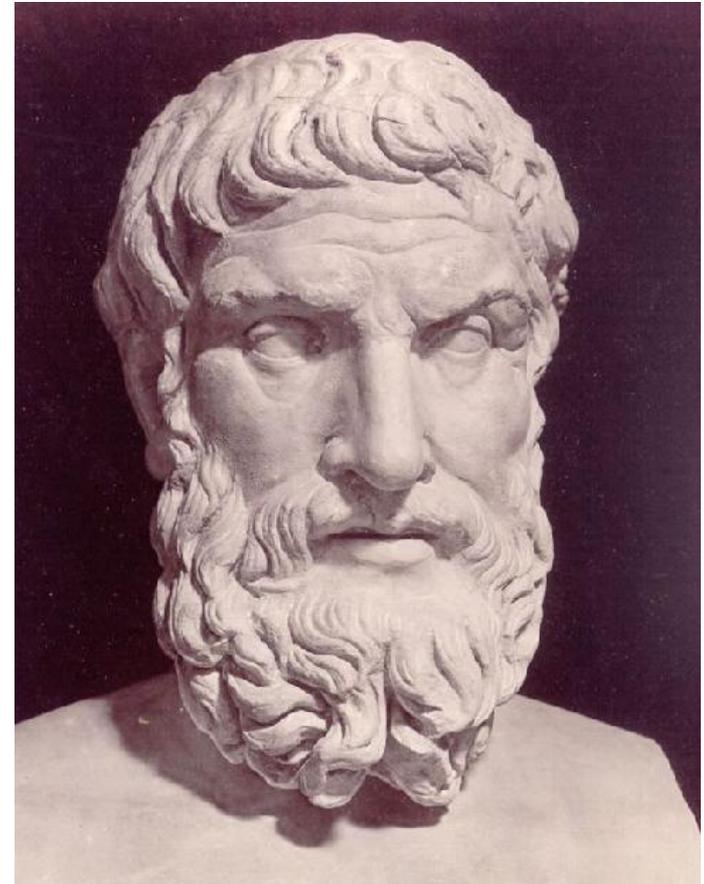
- Pre-Socratic philosopher of school of Democritus
- Skeptic: Doubted everything – “We know nothing, no, not even whether we know or not”
- Maintained that everyone has a unique reality – “Everything is to each person only what it appears to him to be”
- Believed the infinity of space implied the plurality of worlds – “A single ear of corn in a large field is as strange as a single world in infinite space”



Metrodorus (4<sup>th</sup> Century BCE)

# Epicurus

- Greek philosopher; taught that the gods do not punish or reward, that death is the end of body and soul, and that the highest good in life is peace, freedom from fear (***ataraxia***: **αταραξια**) and absence of pain (***aponia***: **απονια**)
- Took his ideas of cosmology from the Atomists
- Argued that nothing should be believed except what can be shown by experiment or proved by logic – including that multiple worlds must exist because a finite world could not use up an infinity of atoms



Epicurus (341 BCE – 270 BCE)

... There are infinite worlds both like and unlike this world of ours. For the atoms being infinite in number ... are born on far out into space. For these atoms, which are of such a nature that a world could be created out of them or made by them, have not been used up either on one world or on a limited number of worlds, nor again on all the worlds alike ... So that there nowhere exists an obstacle to the infinite number of the worlds.

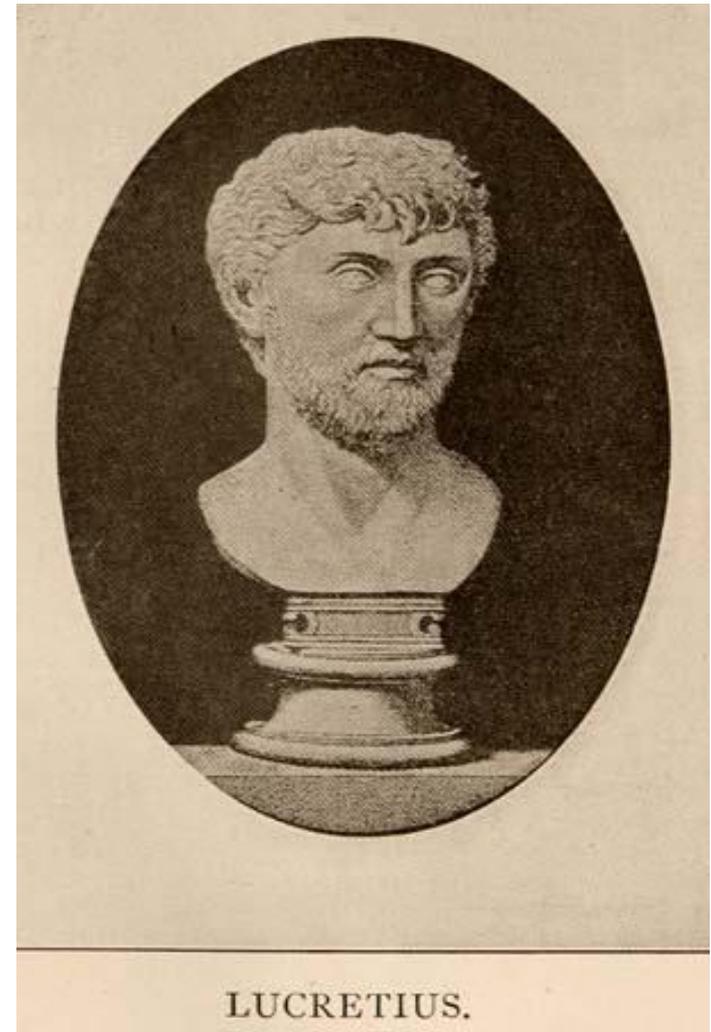
A world is a circumscribed portion of sky, containing heavenly bodies and an earth and all the heavenly phenomena ... it is a piece cut off from the infinite and ends in a boundary either rare or dense, either revolving or stationary ... For all such conditions are possible seeing that no phenomenon is evidence against this in our world ...

-- Epicurus

# Lucretius

## (99?-55? BCE)

- Roman aristocrat, poet and Epicurean philosopher
- Wrote *De Rerum Natura* (On the Nature of Things)
- Believed that space must be infinite and that it was filled with an infinity of atoms
- Argued that "... Other orbs of Earth in other regions of space, with various races of men and generations of beasts" had to exist because the finite Earth could not use up an infinite number of atoms



# Stoicism



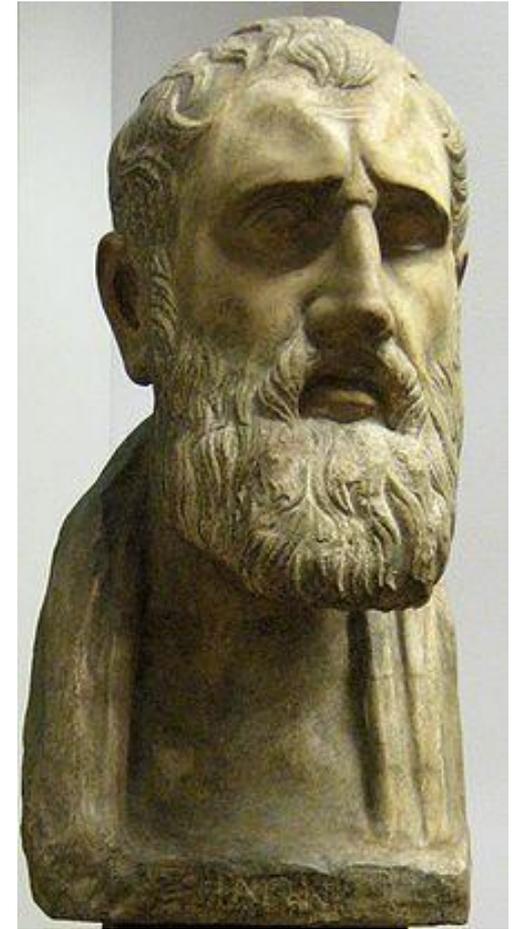
Stoa Poikile area, Agora, Athens



Rendering of Stoa Poikile (“Painted Porch”) as it appeared c. 400 BCE

# Zeno of Citium

- Greek philosopher; founder of ***stoicism***
- Taught in the Stoa Poikile, located on the north side of the ancient Agora, the open forum of Athens
- Determinist; believed that the individual's will should be aligned with nature; taught that logic, reflection and concentration helped achieve inner discipline through wisdom, courage, justice and temperance
- Opposed the Epicureans
- Cosmology influenced by Empedocles



Zeno of Citium  
(Early 3<sup>rd</sup> Century BCE)

# Empedocles (490-430 BCE)

- Originated idea that there are four basic elements
- Taught that elements are conserved – neither created nor destroyed; only their patterns change
- Believed the universe undergoes ***eternal recurrence*** – its configuration repeats after a sufficient time



# Ekpyrosis (Εκπυροσις)

- The periodic rebirth of the universe from fire according to the Stoics



# Ekpyrosis (Εκπυροσις)

- The periodic rebirth of the universe from fire according to the Stoics

... When moisture has been exhausted, the earth could not be nourished, and there would be no returning stream of air, as its creation would be impossible when the water had been all used up; nothing, therefore, they say, is left but fire as the agency, vivifying and divine, by which the universe should be renewed again, and the same external order called into being.

-- Marcus Tullius Cicero (c. 50 BCE)

... After the conflagration of the cosmos everything again will come to be in numerical order until every specific quality too will return to its original state, just as it was before and came to be in that cosmos.

-- Chrysippus (c. 260 BCE)

The Stoics say that when the planets return to the same position, with respect to inclination and declination, to where each was at the beginning when the cosmos was first established, at specified periods of time they bring about the conflagration and destruction of things. And when again the cosmos returns from the beginning to the same state, and when again the heavenly bodies are similarly disposed, each thing that occurred in the former period will come to pass again indistinguishably ...

-- Nemesius (c. 390)

# Parallel Worlds in Early Religions

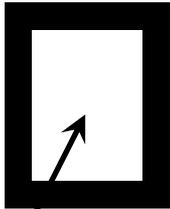
- Heavens
  - ... Egyptian *Pet*
  - ... Sumerian *Dilmun*
  - ... Greek *Olympus*
  
- Underworlds
  - ... Egyptian *Neter-Khertet / Duat*
  - ... Sumerian-Babylonian *Irkalla / Arallu*
  - ... Greek *Hades (Fields of Asphodel, Tartarus, Elysium)*

# Egyptian Hieroglyphics for “Pet” (“Heaven”)

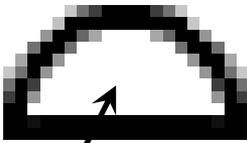
“hry” (sky)



“pet” (heaven)



“p”



“t”



# Heaven (*Pet*) in the Egyptian Book of the Dead



Papyrus from the Book of the Dead of Nakht (c. 1350-1300 BCE), showing Thoth weighing the deceased's heart, and the deceased pulling flax, reaping and plowing in the Field of Rushes in Pet

# Heaven (*Pet*) in the Egyptian Book of the Dead

The place of the deceased in heaven is by the side of the Gods in the most holy place ... he sits on a great throne by the side of the Gods ... He is clothed in the finest raiment ... He thirsts not, nor hungers, nor is sad ... He eats what the Gods eat, he drinks what they drink, he lives as they live, and he dwells where they dwell ... he wears the apparel which they wear, the white linen and sandals ... and he goes to the great lake in the midst of the Field of Peace whereon the great Gods sit; and these great and never failing Gods give unto him of the Tree of Life of which they themselves eat that he likewise may live. The bread which he eats never decays and his beer never grows stale.

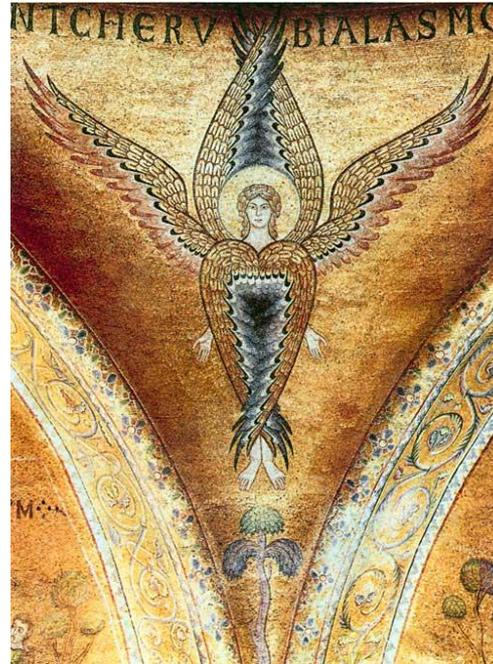
# Heaven in Early Israelite Religion

- God
- The heavenly host
  - ... Malachim: messengers (angels, αγγελος)
  - ... Cherubim: winged warlike creatures [Gen. 3, Ex. 37]
  - ... Seraphim: winged fire-creatures [Is. 6]
  - ... Ofanim and Chayot: motors and bearers of the heavenly Chariot [Ez. 1]
  - ... The Satan: the accuser or adversary [Job, Zech. 3]
- The Garden of Eden?
  - ... “A river issues forth from Eden ... and becomes four headwaters ... and the fourth river is the Euphrates” [Gen. 2:10-14]

# The Heavenly Host



Cherub (c. 10<sup>th</sup> Century BCE)



Seraph (12<sup>th</sup> Century Fresco)



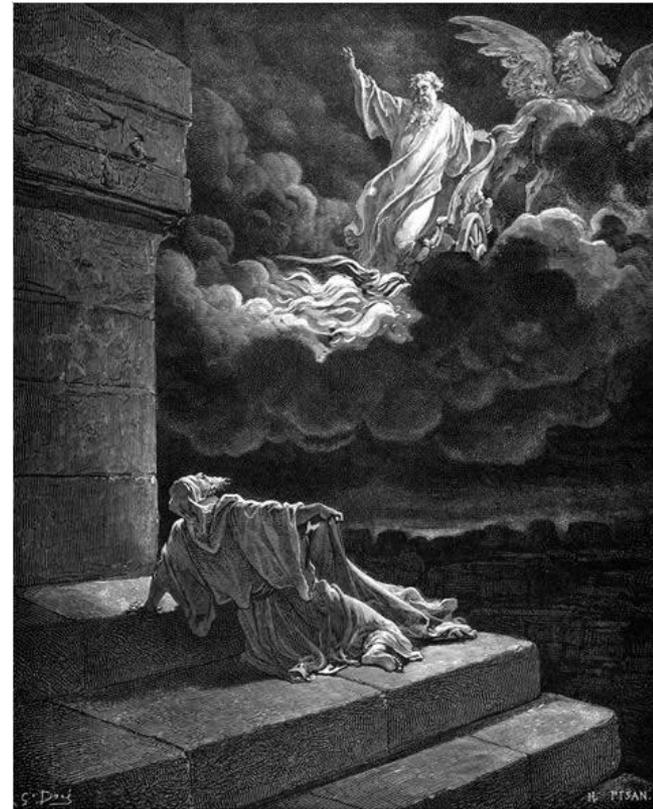
Ofanim and Chayot  
(based on Ez.1)

# Heaven in Early Israelite Religion

## -Travel to Heaven

... Enoch: “And Enoch walked with God; then he was no more, for God had taken him.” (Gen. 5:24)

... Elijah and the Chariot: “As they were walking and conversing, behold! – a chariot of fire and horses of fire appeared and separated between the two of them, and Elijah ascended to heaven in the whirlwind. Elisha was watching and shouting, ‘Father! Father! Israel’s chariot and horsemen!’ And then he saw him no more.”  
(2 Kgs. 2:11-12)



“Elijah Taken up to Heaven in a Chariot of Fire”, by Gustav Doré

# Heaven in Early Israelite Religion

- Ezekiel's vision of the heavenly Chariot (Ez. 1:1-28)

There was the likeness of an expanse above [the Chariot], like the color of the awesome ice ... above the expanse ... was the appearance of sapphire stone in the likeness of a throne, and upon the likeness of the throne there was a likeness like the appearance of a man upon it, from above. And I saw the color of Chashmal, like the appearance of fire inside it all around ... and a brilliance surrounding it. Like the appearance of a rainbow that would be in the clouds on a rainy day, so was the appearance of the brilliance all around. That was the appearance of the likeness of the glory of God! (Ez.1:22-28)

# Jewish Mysticism – The Kabbalah



Frontispiece of the *Zohar*, published in Mantua, Italy, 17<sup>th</sup> Century



Illuminated manuscript of an introduction to the *Zohar* by Rabbi Ashlag

# Jewish Mysticism – The Kabbalah

- Everything in this world has a duplicate in Heaven
- Actions in this world and Heaven are related
- The indwelling presence of God in this world (feminine *Shechinah*) links the worlds

Come and see: All measuring and measurements exist in the world so that this world may be established in mystery of the pattern above, linking this world to the world above, becoming all one in one mystery. (*Zohar*, 2:234a)

From earth below action is aroused above. (*Zohar*, 1:35a)

Come and see: An entity above is not aroused until there is first aroused below that upon which it may abide. Mystery of the matter: Black light is not joined with white light until She [*Shechinah*] is first aroused. Once aroused, white light immediately abides upon Her. (*Zohar*, 1:77b)

# Early Christian Views of Heaven



Resurrected Soul, late Roman fresco c. 3<sup>rd</sup> Century

# Early Christian Views of Heaven

- Book of Hebrews (late 1<sup>st</sup> Century): Image of Heaven similar to Jewish Kabbalah?
  - ... Jesus “entered, not into a sanctuary made with hands, a copy of the true one, but into heaven itself” [Heb. 9:24]
  - ... “God ... hath in these last days spoken unto us by His son ... by whom also he made the worlds” [Heb.1:1-2]
- Revelation of John (late 1<sup>st</sup> Century): Duplicate Jerusalem in Heaven
  - ... “And I saw the holy city, the new Jerusalem, coming down out of heaven from God, prepared as a bride adorned for her husband.” [Rev. 21:2]

# Early Christian Views of Heaven

... We had died and left our body and we began to be carried by four angels ... and their hands did not touch us as they bore us ... we arrived at a wide open space with a grove; the trees bore roses and all kinds of flowers. The trees were high as cypresses, and their leaves sang without pause ... We came then toward a place whose walls were as if made of light, and in front of the gate of the place four angels were standing, and we put on white robes. We went in and we heard voices in unison saying Holy Holy Holy without cease. And there we saw a white-haired man sitting, but his face was young; we could not see his feet. On his right and on his left were four *seniores* and behind them many others ... and four angels raised us up, and we kissed the man, and with his own hands he drew us up to his face.

-- *The Passion of Perpetua*, c. 200

# Hinduism

- ***Puranas*** (oral c. 500 BCE, written 3<sup>rd</sup>-5<sup>th</sup> century CE)

... Narratives of history of universe from creation to destruction, including genealogies of kings, sages, heroes, demigods, and descriptions of Hindu cosmology and philosophy

... Written as stories told by one person to another

... Recited by traveling brahmin scholars

... Several Puranas refer to “innumerable” other universes or to universes being annihilated and re-born again



Varaha avatar, from the *Bhagavata Purana*

# The *Bhagavata Purana*

There are innumerable universes besides this one, and although they are unlimitedly large, they move about like atoms in You. Therefore You are called infinite. [6.16.37]

Lord Shiva said, “My dear son, Lord Brahma and the other Devas, who move within this universe under the misconception of our greatness, cannot exhibit any power to compete with the supreme personality of the Godhead, for innumerable universes and their inhabitants come into existence and are annihilated by the simple direction of the Lord. [9.4.56]

Even though over a period of time I might count all the atoms of the universe, I could not count all of My opulences which I manifest within innumerable universes. [11.16.39]

# The *Brahma Vaivarta Purana*

And who will search through the wide infinities of space to count the universes side by side, each containing its Brahma, its Vishnu, its Shiva? Who can count the Indras in them all – those Indras, side by side, who reign at once in all the innumerable worlds; those others who passed away before them; or even the Indras who succeed each other in any given line, ascending to godly kingship, one by one, and one by one, passing away?

# Islam

- ***Koran*** (6<sup>th</sup> century CE)
  - ... 7 verses describe 7 heavens
  - ... Each heaven has its own “order”
  - ... Another verse says these heavens have similar Earths
  - ... “All praise belongs to Allah, Lord of the Worlds”



Moghul *Koran* inscribed by Emperor Aurangzeb,  
inlaid with ruby, lapis lazuli and garnet, 1658-1707

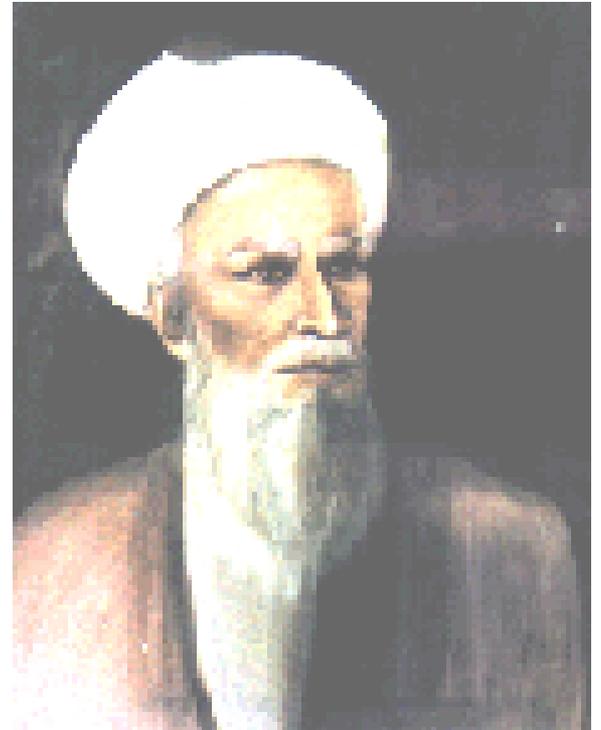
# The *Koran*

So [Allah] decreed them as seven heavens (one above the other) in two days and revealed to each heaven its orders. And We [Allah] adorned the lowest heaven with lights, and protection. Such is the decree of the Exalted; the Knowledgeable. [41:12]

Allah is the one who created seven Heavens and from Earth like them [of corresponding type]; [Allah's] command descends among them so that you may know that Allah is capable of anything and that Allah knows everything. [65:12]

# Fakhr al-Din al-Razi (Fakhruddin Razi)

- 12<sup>th</sup> century CE Persian Sunni theologian and philosopher
- Wrote on medicine, physics, law, astrology, literature and history
- Criticized the idea of a geocentric universe and proposed the existence of parallel universes in his interpretation of the *Koran's* verse, "All praise belongs to Allah, Lord of the worlds"



Fakhr al-Din al-Razi  
(1149-1209)

It is established by evidence that there exists beyond the world a void without a terminal limit, and it is established as well by evidence that Allah Most High has power over all contingent beings. Therefore He the Most High has the power to create a thousand thousand worlds beyond this world such that each one of those worlds be bigger and more massive than this world as well as having the like of what this world has of ... the heavens and the earth, and the sun and the moon. The arguments of the philosophers for establishing that the world is one are weak, flimsy arguments founded upon feeble premises.

-- Fakhr al-Din al-Razi, *Matalib al-'Aliya*

# *One Thousand and One Nights*

- Collection of tales from Arabic, Persian, Indian, Turkish, Egyptian and Mesopotamian sources
- Probably collated and structured around a Persian framing story c. 8<sup>th</sup> Century CE
- Subsequently additional tales added in Iraq (c. 9<sup>th</sup> – 10<sup>th</sup> century CE), Egypt and Syria (c. 13<sup>th</sup> century CE)
- Framing story concerns Princess Scheherazade, who must tell wicked King Shahryar a new story each night to avoid being executed



Arabic manuscript of *One Thousand and One Nights*, c. 14<sup>th</sup> Century CE

# “The Tale of Bulukiya” from *One Thousand and One Nights*

- Longest story in the collection
- Many science fictional elements
  - ... Bulukiya’s quest for the herb of immortality
  - ... Exploration of undersea civilization populated by water-breathing mermen
  - ... Journey to Paradise and Hell
  - ... Travel across cosmos to worlds much larger than Earth populated by alien creatures, djinns, angels, talking serpents, etc.



Asked Bulukiya, “And hath Allah created other mountains behind the mountain Kaf?”; whereto [the Angel] answered, “Yes, behind this mountain is a range of mountains five hundred years' journey long, of snow and ice, and this it is that wardeth off the heat of Jahannam from the world, which verily would else be consumed thereby. Moreover, behind the mountain Kaf are forty worlds, each one the bigness of this world forty times told, some of gold and some of silver and others of carnelian. Each of these worlds hath its own colour, and Allah hath peopled them with angels, that know not Eve nor Adam nor night nor day, and have no other business than to celebrate His praises and hallow Him and make profession of His Unity and proclaim His Omnipotence and supplicate Him on behalf of the followers of Mohammed (whom Allah bless and keep!).”

-- “The Tale of Bulukiya”, from *One Thousand and One Nights*

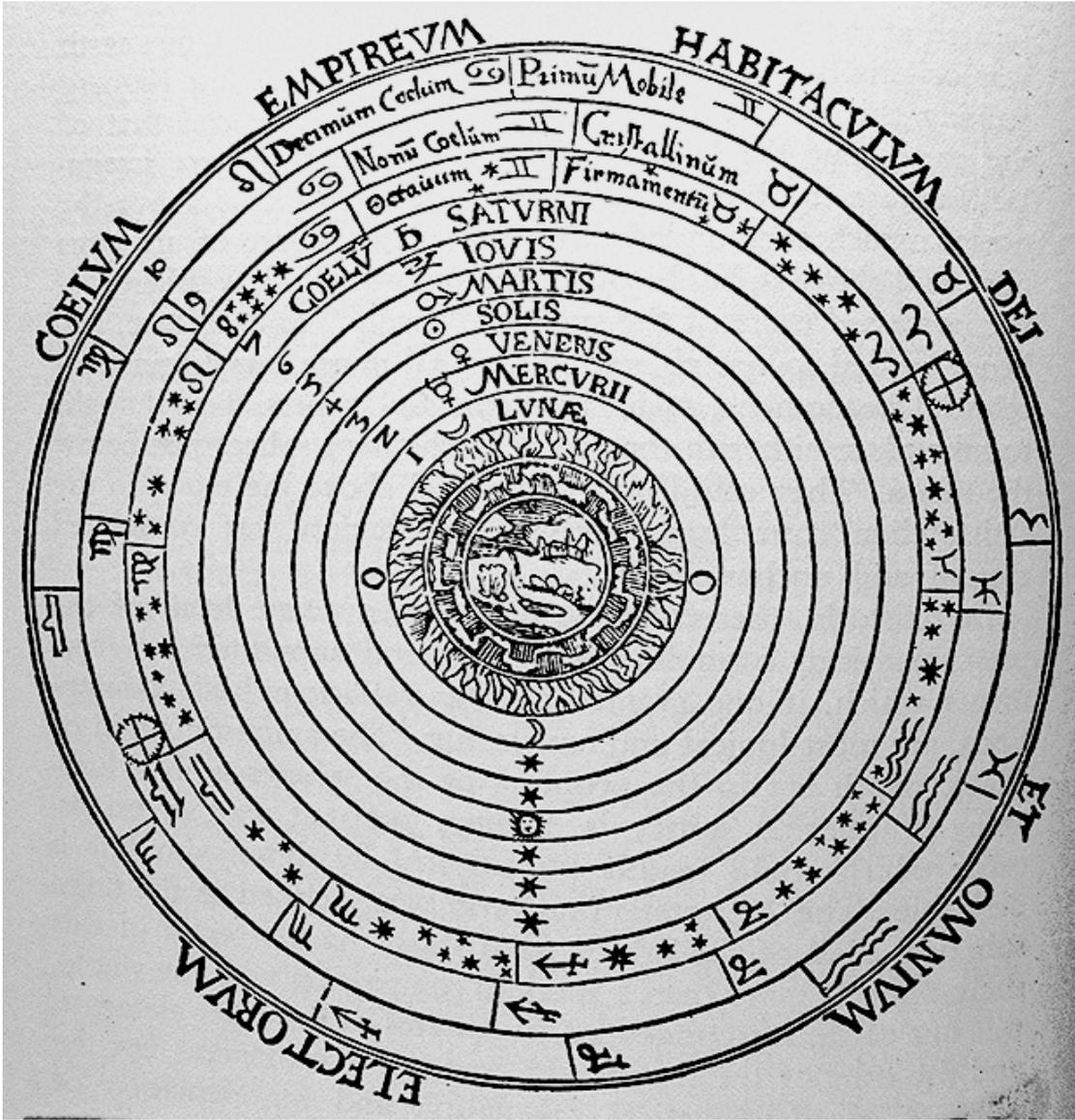
# 竹取物語, *Taketori Monogatari* (*Tale of the Bamboo-Cutter*)

- 10<sup>th</sup> century Japanese folk tale
- Taketori no Okina (“The old bamboo cutter”) finds a tiny baby inside a strange shiny bamboo stalk
- He takes the baby home, naming her Kaguya-hime (“Radiant night-princess”); she becomes a young woman of surpassing beauty
- Five princes and the Emperor ask to marry Kaguya-hime, but she refuses them all; eventually she explains that she is a refugee from a celestial war and must return home to the Moon
- Heavenly beings ultimately arrive to take her back to the Moon



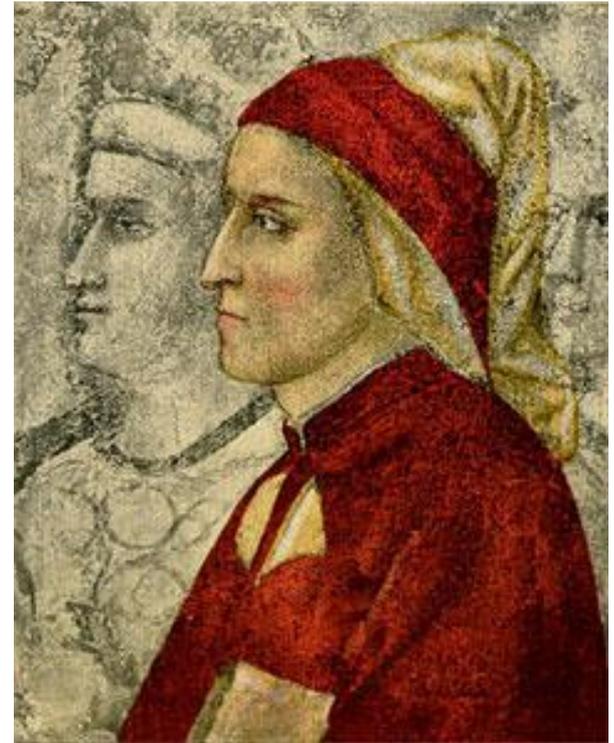
Kaguya-hime returns to the Moon;  
illustration by Hiromiche c. 1600

# Medieval Western View of the Universe



# Dante Alighieri (1265-1321)

- Florentine poet, literary theorist, moral philosopher and political thinker
- Wrote *la Divina Commedia*, first major work to be published in Italian; considered father of Italian language
- Loved Beatrice Polinari, but married Gemma di Manetto Donati, of a politically powerful family
- Supported the Guelph faction (pro-Papacy) in their conflict with the Ghibellines (pro-Holy Roman Emperor), which led to his exile from Florence in 1302; conceived and wrote *la Divina Commedia* and died in exile



Portrait of Dante by Giotto in the chapel of the Bargello Palace in Florence (c. 1301)



Dante's tomb in Ravenna



Dante's tomb in the Basilica of Santa Croce, Florence

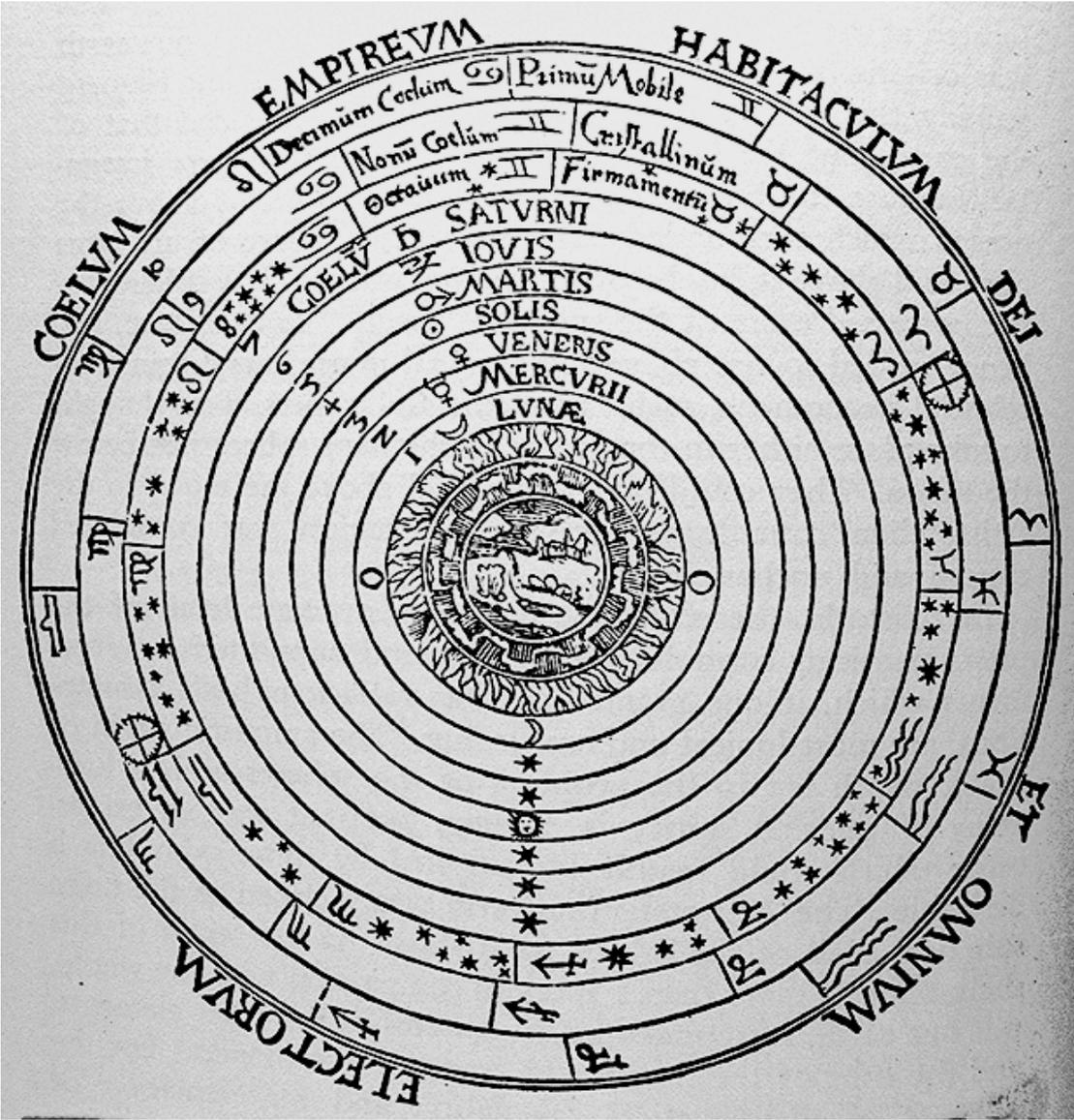
# *la Divina Commedia*

- Originally titled *Commedia*  
... Called “Divine” by Boccaccio
- 3 parts: *Inferno*, *Purgatorio*, *Paradiso*, describing the 3 realms of the dead as parallel worlds
- 3 main characters: Narrator (Dante), Beatrice, Vergil
- Main influences: Aquinas’s *Summa Theologica*, Thomistic philosophy
- Depicts Dante’s travels through the realms of the dead  
... Allegorically represents soul’s journey towards God

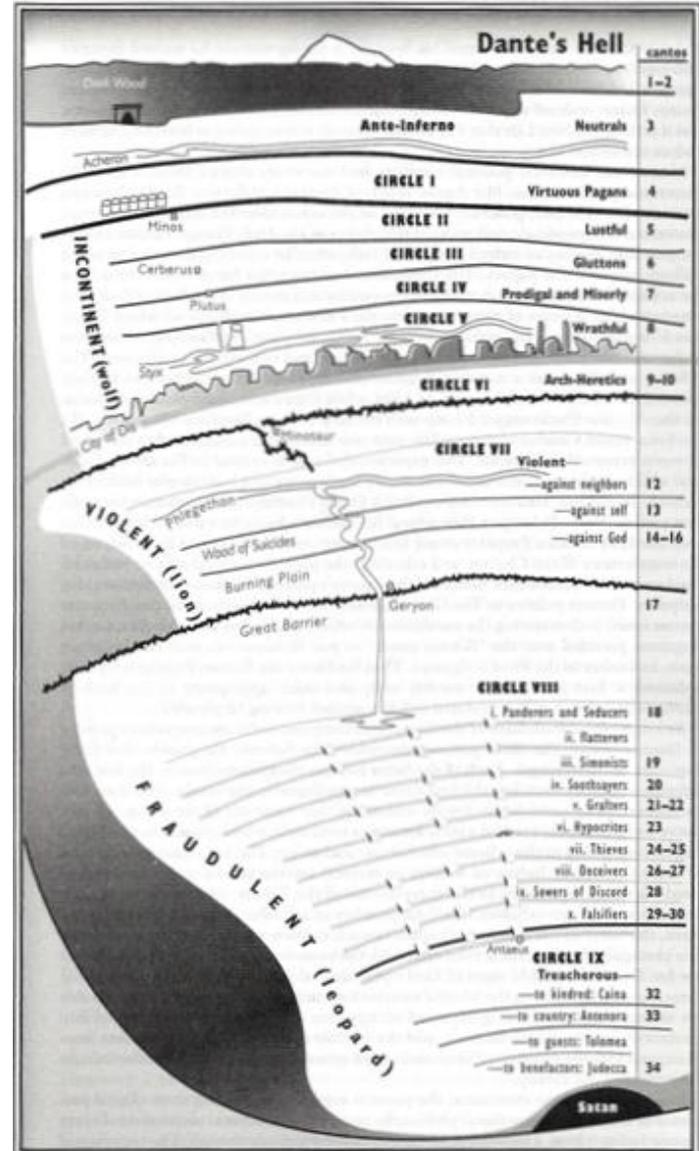
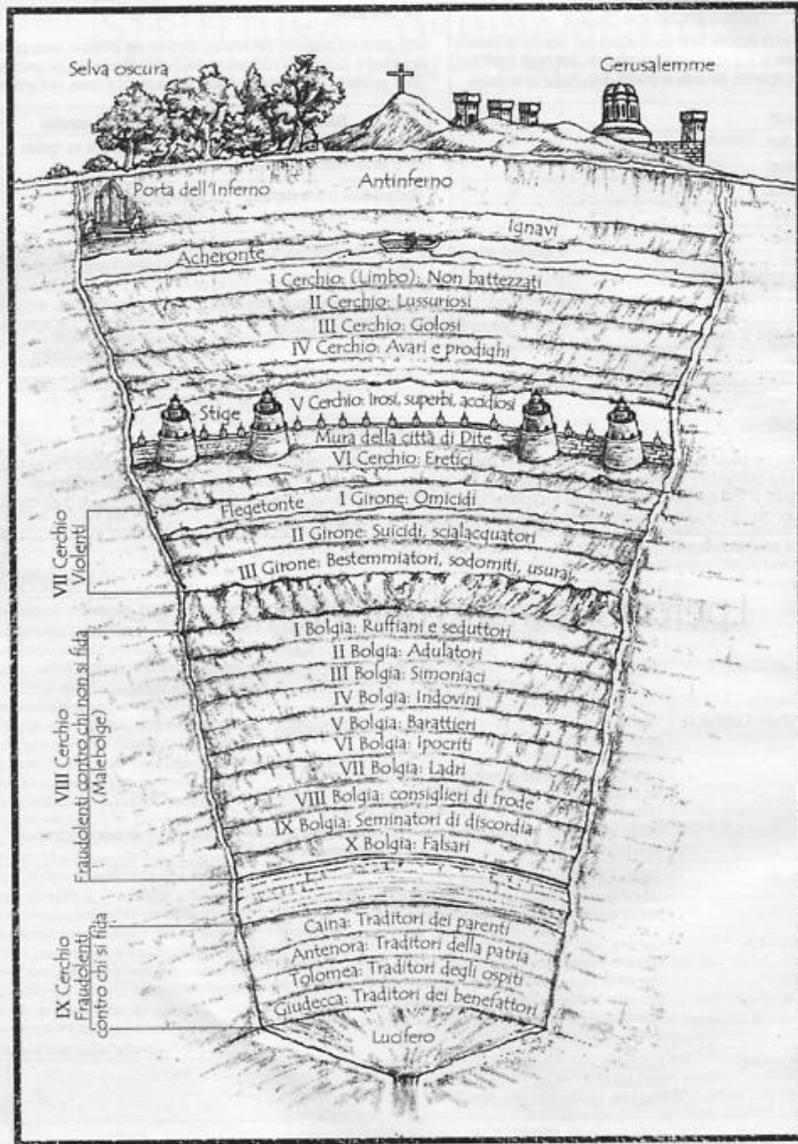


First page of manuscript copy of *la Divina Commedia*, 1337

# Medieval Western View of the Universe



# The System of Dante's Hell



# The System of Dante's Hell

Antechamber: Indecisives

1<sup>st</sup> Circle (Limbo): Unbaptized and Virtuous Pagans

2<sup>nd</sup> Circle: Lustful

3<sup>rd</sup> Circle: Gluttons

4<sup>th</sup> Circle: Hoarders and Wasters

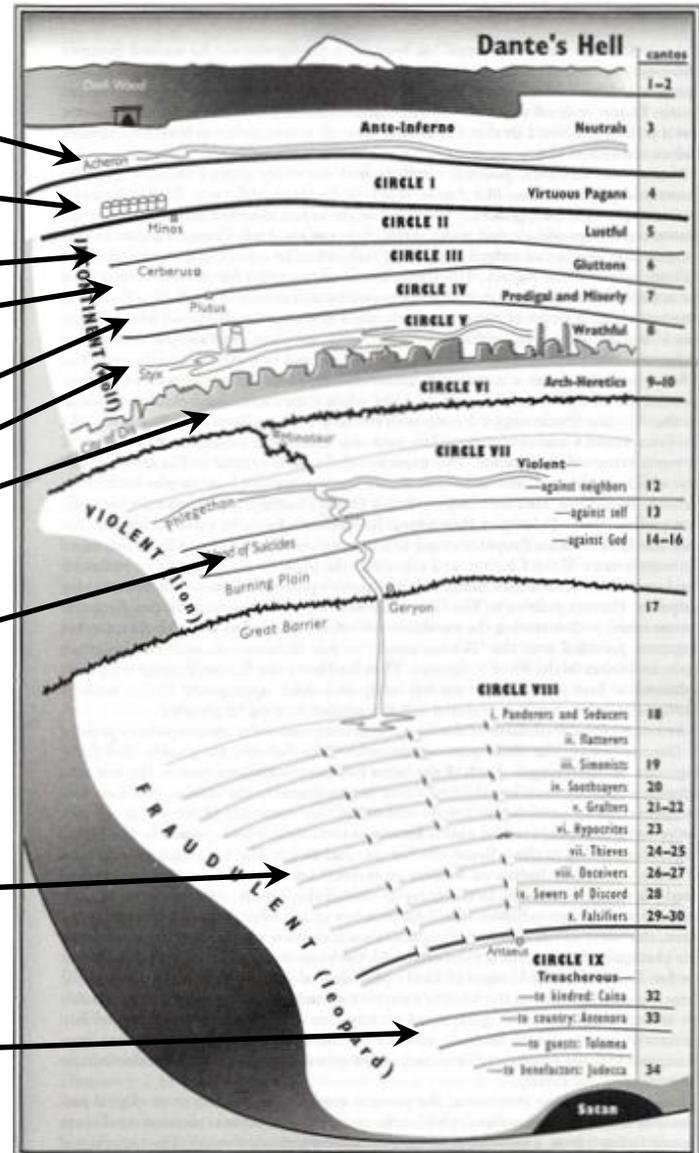
5<sup>th</sup> Circle: Wrathful and Sullen

6<sup>th</sup> Circle: Heretics

7<sup>th</sup> Circle: Violent

8<sup>th</sup> Circle: Fraudulent

9<sup>th</sup> Circle: Traitors



# The Empyrean in Dante's *Paradiso*

- The abode of God and of the blessed is located beyond time and space, outside the *primum mobile*, the sphere that drives all motion in the universe
- The blessed souls form a mystic, ineffable “White Rose” with the Trinity at the center
- From the Empyrean, Dante perceives the whole created universe in its indescribable entirety

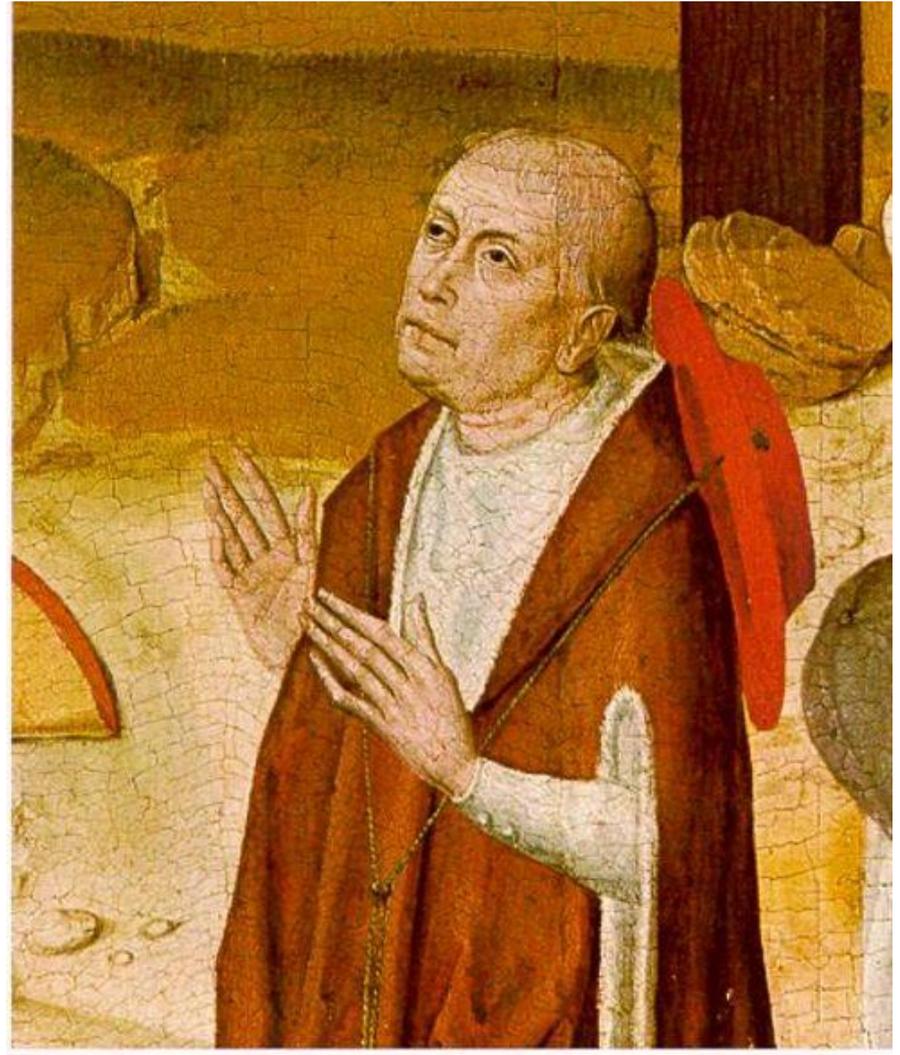


Gustav Dore's “White Rose” of the Empyrean (1867)

# Nicholas of Cusa

## (1401-1464)

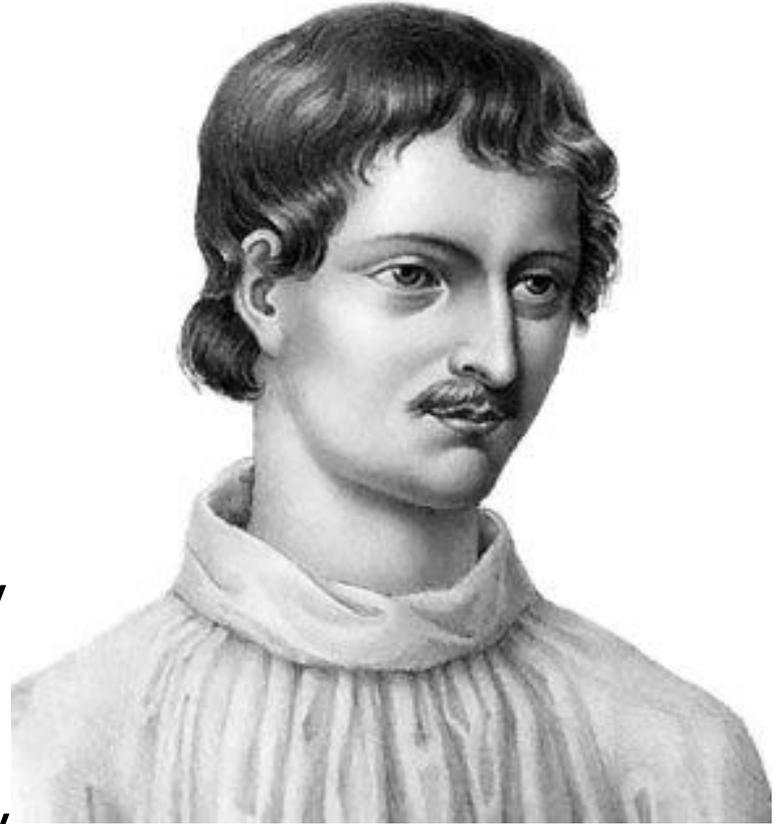
- German Cardinal of the Roman Catholic Church
- Believed that the universe was actually infinite, without external limits (“privatively infinite”) as seen from the human point of view
- Held that the earth was not the center of the universe, because an infinite space can have no center



# Giordano Bruno

## (1548-1600)

- Italian priest and philosopher
- Deeply influenced by Nicholas of Cusa's ideas on infinity and indeterminacy
- Developed a pantheistic philosophy of a transcendent, ineffable God Who contained contradictions because of His metaphysical infinity
- Held that the Earth was not the center of the Universe (following Copernicus) and that there were an infinite number of worlds besides Earth
- Charged with blasphemy and heresy and burned at the stake



In short then, to come straight to my proposition, it appeareth to me ridiculous to affirm that nothing is beyond the heaven ...

I can imagine an infinite number of worlds like the Earth, with a Garden of Eden on each one. In all these Gardens of Eden, half the Adams and Eves will not eat the fruit of knowledge, and half will. But half of infinity is infinity, so an infinite number of worlds will fall from grace and there will be an infinite number of crucifixions.

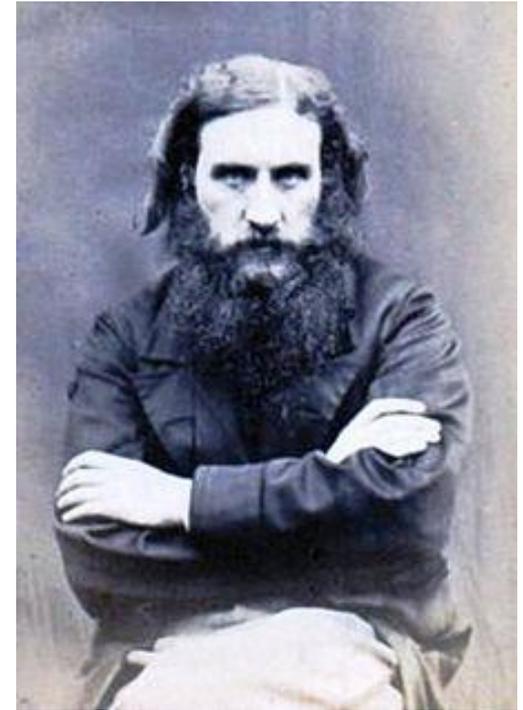
-- Giordano Bruno

# Scientific Revolution

- Copernicus
- Kepler
  - ... *Somnium* – first science fiction novel
- Galileo
- Newton
  - ... Voltaire's *Micromegas* and popularizations with the Marquise de Chatelet
- Leibniz, Laplace, Euler, Lavoisier, etc.
- Universal scientific theories = **single** all-encompassing universe

# George MacDonald

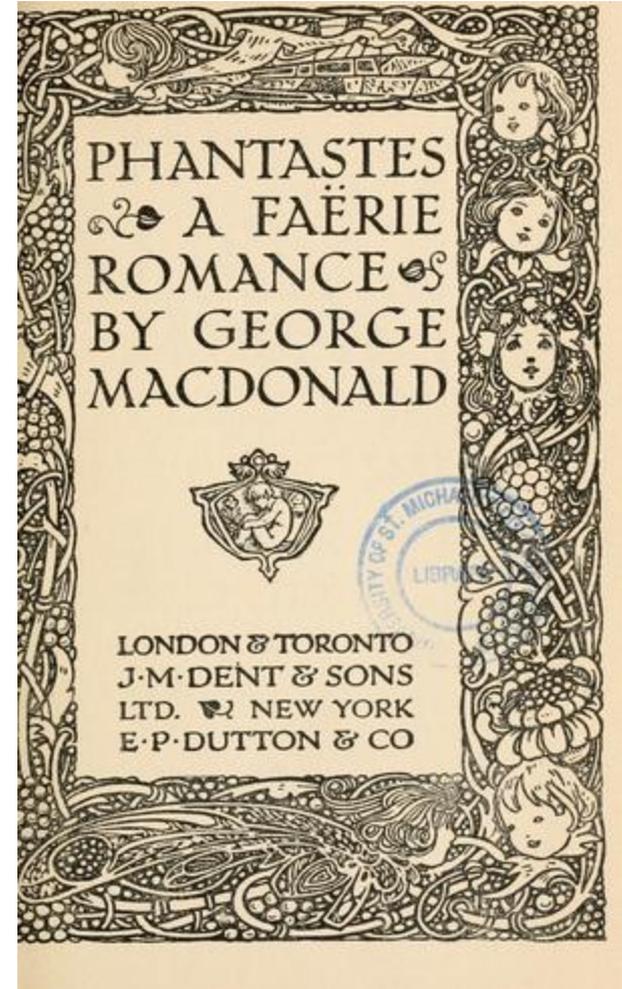
- Scottish Congregationalist minister and author; rejected predestination
- Mentor to Lewis Carroll; inspiration for many other fantasists including Auden, Tolkien and C.S. Lewis
- Friend of Mark Twain, Tennyson, Dickens, Thackeray, Ruskin, Longfellow and Whitman
- First to deploy *fantasy* as a literary device in serious novels exploring the human condition



George MacDonald  
(1824-1905)

# *Phantastes* (1858)

- Written by George MacDonald; considered first fantasy novel for adults
- Full title *Phantastes: A Faerie Romance for Men and Women*
- Story centers on a young man, Anodos, who enters a dreamlike alternate world inhabited by spirits, faeries, Pygmalion, Sir Percival and other fantastic characters
- Anodos searches there for his ideal of female beauty, finding and losing it several times



Frontispiece of 1916 edition

# Charles Lutwidge Dodgson (Lewis Carroll) (1832-1898)

- Author, mathematician, Anglican deacon and talented amateur photographer; Christ Church Mathematical Lecturer at Oxford 1855-1881; stuttered severely
- Developed an early version of Scrabble and several other games and inventions
- Uniquely avoided becoming an Anglican priest while remaining on Oxford faculty
- Wrote *Alice's Adventures in Wonderland* and its sequel *Through the Looking-Glass and What Alice Found There*, early novels of an alternate fantasy world



Charles Lutwidge Dodgson  
(1832-1898)

# ***Alice's Adventures in Wonderland (1865)***

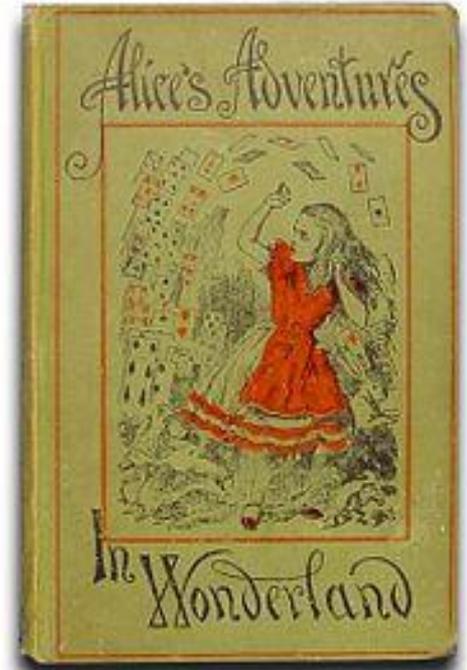
- Originally written for Alice Liddell, daughter of the Dean of Christ Church College at Oxford, who begged Carroll to publish it with McDonald's support
- Alice falls down a rabbit hole into a fantasy world populated by peculiar anthropomorphic creatures



Alice Liddell – photograph taken by Lewis Carroll, late 1850's

- Narrative distinguished by logic-play and nonsense

- Initially received poor to indifferent reviews
- Popularity increased after publication of sequel, *Through the Looking-Glass and What Alice found There* (1871)



Cover of 1898 edition

# Fantasy Worlds

- *The Wonderful Wizard of Oz*, L. Frank Baum (1900)
- *The Chronicles of Narnia: The Lion, The Witch and the Wardrobe*, C. S. Lewis (1949)
- *The Lord of the Rings: The Fellowship of the Ring*, J. R. R. Tolkien (1954)
- *Harry Potter: Harry Potter and the Philosopher's Stone*, J. K. Rowling (1997)

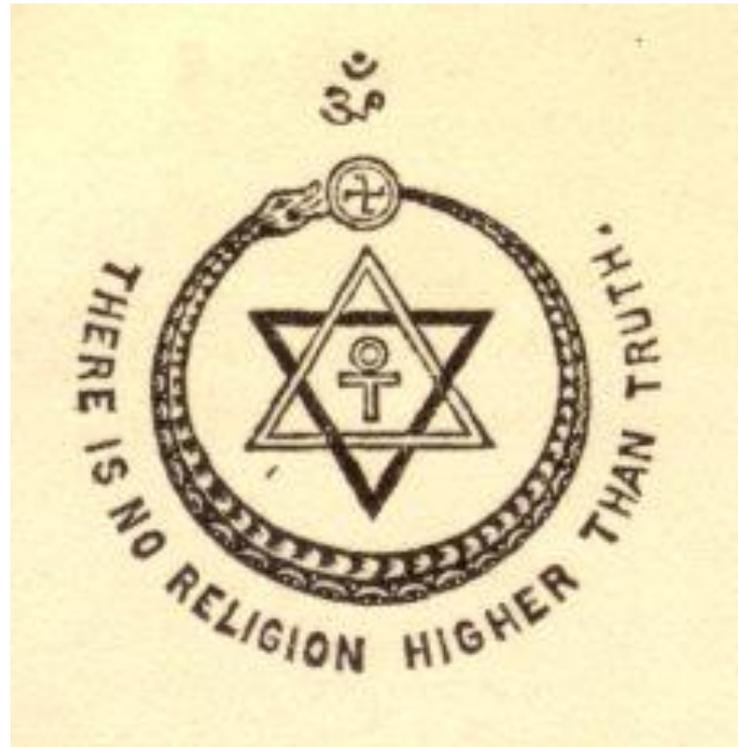
# Helena Blavatsky (1831-1891)

- Co-founder of the Theosophical Society in 1875
- Author of *The Secret Doctrine*, 1888, considered the foundational work of modern Theosophy
- Granddaughter of Russian nobility; fought in the battle of Mentan for the unification of Italy on Garibaldi's side in 1867; traveled to Tibet and lived in ashrams where no European had previously ventured, instructed by her Teacher, Takhur Gulab-Singh, who she initially met in 1851 in Hyde Park



Helena Blavatsky (1831-1891)

# Theosophy

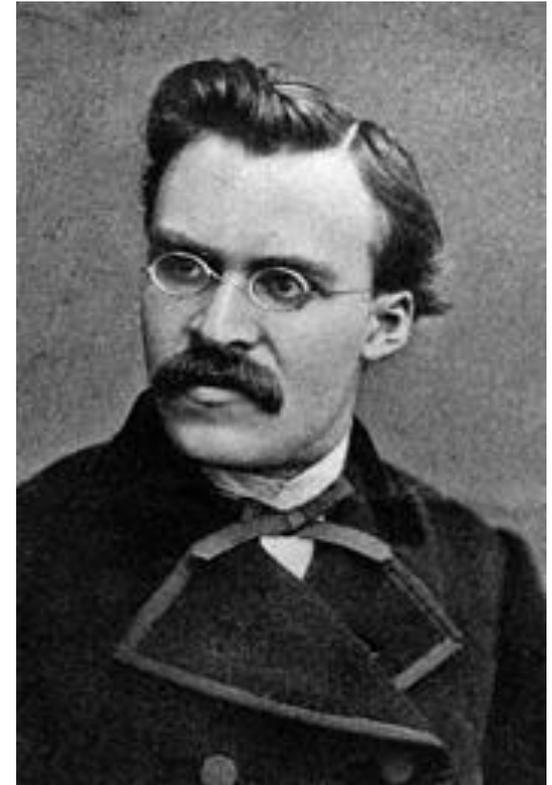


# Theosophy

- Spiritual philosophy that attempts to reconcile scientific, philosophical and religious disciplines and practices into unified worldview
  - ... Elaborate descriptions and expositions
  - ... Hindu and Buddhist terminology
- Basic principles
  - ... One universal truth – unknowable, indescribable
  - ... Truth manifests in existence – constant flux, no “creation”
  - ... Fundamental identity of all souls with universal oversoul: karma and reincarnation – 7 stage evolutionary process
- Multiple universes a consequence of existence’s constant flux
  - ... Existence is “... the playground of numberless Universes incessantly manifesting and disappearing ... [each one] standing in the relation of an effect as regards its predecessor, and being a cause as regards its successor.”

# Friedrich Nietzsche

- German philosopher, poet, composer and philologist
- Wrote critical texts on religion, morality, contemporary culture, philosophy and science, marked by use of irony and aphorism
- Major influence on philosophical movements such as existentialism, nihilism and postmodernism
- Revitalized the concept of ***eternal recurrence*** in Western philosophical thought



Friedrich Nietzsche  
(1844-1900)

# Henri Poincare

- Eminent French mathematician and philosopher of science
- Cousin Raymond Poincare became President of France
- Nearly discovered the theory of relativity before Einstein
- “One does not ask whether a scientific theory is true, but only whether it is convenient”



Henri Poincare (1854-1912)

# Eternal Recurrence

- Poincare showed mathematically that eternal recurrence holds if the universe is finite and deterministic and time is infinite (*Poincare's Recurrence Theorem*)
- Nietzsche was fascinated by the opposition between eternal recurrence vs. free will
  - ... “What, if some day a demon were to steal after you into your loneliest loneliness and say to you, ‘This life as you now live it and have lived it, you will have to live once more and innumerable times more’ ... Would you not throw yourself down and gnash your teeth and curse the demon who spoke thus? Or have you once experienced a tremendous moment when you would have answered him: ‘You are a god and never have I heard anything more divine’?” (Nietzsche, *The Gay Science*)

# Scientific Revolution – Part 2

- Einstein – Relativity
- Planck, Einstein, Bohr, Born, Heisenberg, Schrodinger – Quantum mechanics
- 4 dimensional spacetime, uncertainty, probability = maybe the Universe is not all there is

# Science Fiction

- Rationalizes fantasy through scientific frame of reference
  - ... Setting
  - ... Plot
  - ... Characters
  - ... Expressive form: terminology and neologisms
- Johannes Kepler: *Somnium* (1620-1634)
- Mary Shelley: *Frankenstein* (1818)
- Jules Verne, Edgar Rice Burroughs, H. G. Wells, Hugo Gernsback

# H. G. Wells (1866-1946)

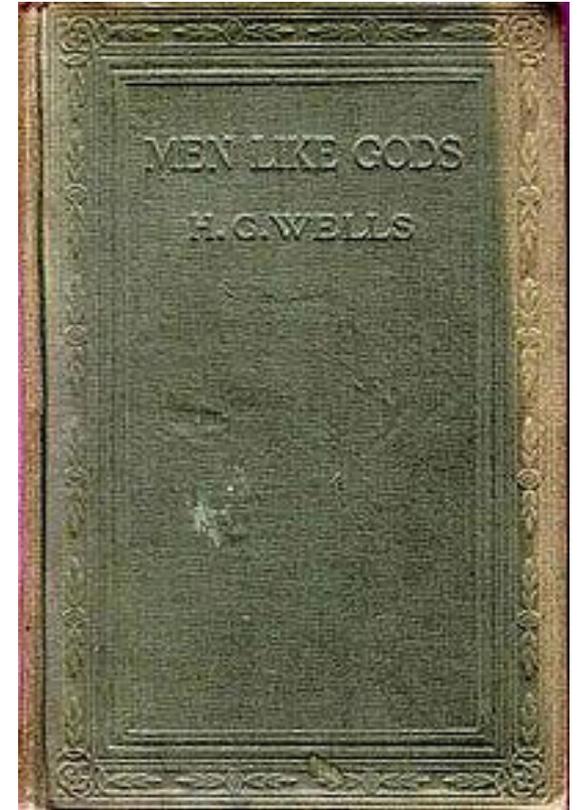
- Novelist, teacher, historian, journalist
- Considered one of the creators of the genre of science fiction with works like *The Time Machine* and *The War of the Worlds*
- Raised in poor circumstances, self-taught
- Had numerous affairs and illegitimate children
- Wrote *Men Like Gods* in 1923, the first sci-fi novel to use the device of a parallel universe



H. G. Wells (1866-1946)

# *Men Like Gods* (1923)

- A depressed newspaperman and other Englishmen are accidentally transported to a parallel universe containing a world called Utopia with a world government, advanced science, no class distinctions, no diseases and no threats to human survival
- The newspaperman's Victorian attitudes are changed by exposure to Utopia, but Utopians begin to fall ill
- The Utopians quarantine the Englishmen, who scheme to escape and take over Utopia, but the newspaperman reveals the plot to the Utopians
- Provoked Aldous Huxley into writing *Brave New World* as a riposte to what he saw as Wells' utopian naivete



First edition

“Then why don’t we go straight on to Taplow Court now?” asked the gentleman with the eye-glass.

“Because,” said Mr. Burleigh, with the touch of asperity natural when one has to insist on a fact already clearly known, and obstinately overlooked, “Rupert insists that we are in some other world. And won’t go on. That is why. He has always had too much imagination. He thinks that things that don’t exist can exist. And now he imagines himself in some sort of scientific romance and out of our world altogether. In another dimension. I sometimes think it would have been better for all of us if Rupert had taken to writing romances – instead of living them.

-- H. G. Wells, *Men Like Gods*

# William Fitzgerald Jenkins (Murray Leinster) (1896-1975)

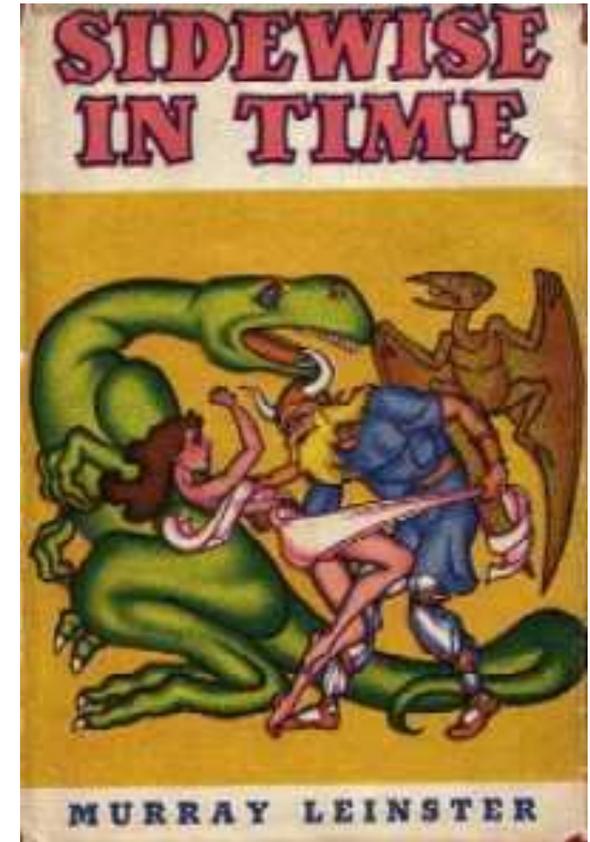
- American science-fiction and pulp fiction writer; Hugo award, 1956
- Coined the phrase “first contact” to describe the first encounter between humans and alien life forms; predicted the Internet in his 1946 novel *A Logic Named Joe*
- His *Sidewise in Time*, the first sci-fi story to explicitly incorporate alternate universes, appeared in the June 1934 issue of *Astounding Stories*



William Fitzgerald Jenkins  
1896-1975

# *Sidewise in Time* (1934)

- A mathematician at a small college determines that an apocalyptic cataclysm will destroy the universe
- Sections of the earth's surface begin changing places with their counterparts in alternate universes having different timelines
- The mathematician leads a group of students to explore one such area; they find themselves isolated from their own timeline
- The mathematician reveals his plan to lead the group to a more primitive timeline where he can use his knowledge to make himself the ruler



1950 edition

The British Academy of Sciences was in extraordinary session to determine the cause of various untoward events. Its members were weary, bleary-eyed, but still conscious of their dignity and the importance of their task. A venerable, whiskered physicist spoke with fitting definiteness and solemnity.

“... And so, gentlemen, I see nothing more that remains to be said. The extraordinary events of the past hours seem to follow from certain facts about our own closed space ... and if we assume the existence of more than one area of closed space, we assume in some sense the existence of a hyper-space separating the closed spaces; hyper-spatial coordinates which mark their relative hyper-spatial positions; hyper— “

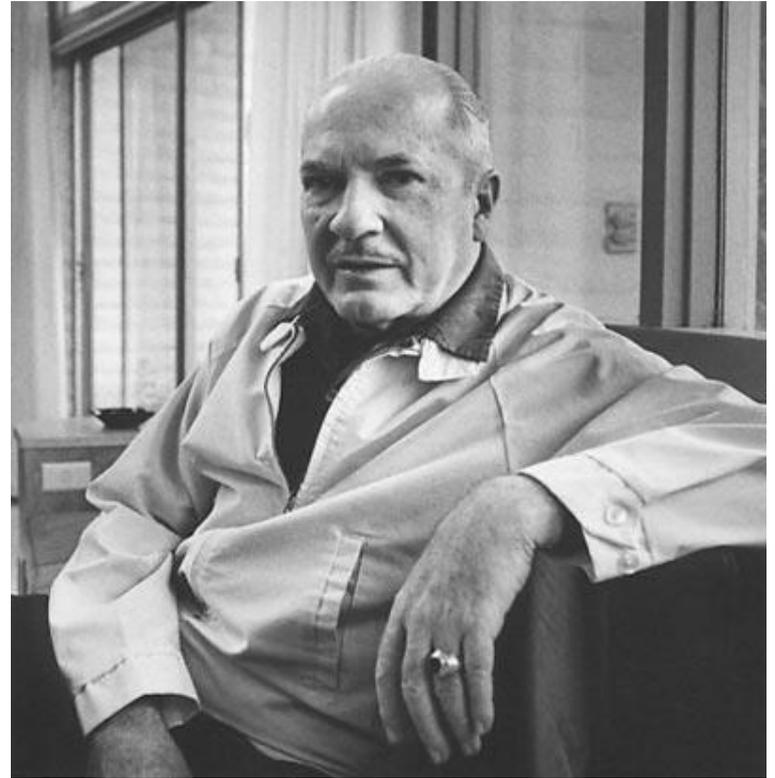
A gentleman with even longer and whiter whiskers than the speaker said in a loud and decided voice:

“Fiddlesticks! Stuff and nonsense!”

-- Murray Leinster, *Sidewise in Time*

# Robert A. Heinlein (1907-1988)

- “The Dean of American Science Fiction Writers”; 4 Hugo Awards, 3 Retro Hugos, inaugural Grand Master Award by the Science Fiction Writers of America for lifetime achievement
- Graduate of U.S. Naval Academy, 1929; served as radio operator and technician on first aircraft carrier, *USS Lexington*, 1931
- First published story 1939; wrote *Starship Troopers*, 1959; *Stranger in a Strange Land*, 1961; *The Moon is a Harsh Mistress*, 1966
- Wrote “Elsewhen,” an early parallel-universe novella, in 1941



Robert A. Heinlein (1907-1988)

# “Elsewhen” (1941)

- Originally published in *Astounding Science Fiction*; collected in 1953 anthology *Assignment in Eternity*
- A professor explains to five students attending his philosophy seminar that he has learned to use mental powers to travel through time
- The students learn the professor’s secret by hypnosis and travel to alternate universes of their choice
  - ... One religious person goes to her version of heaven
  - ... A couple go together to a world at war with space invaders
- The professor and another couple go to a planet with advanced technology and use it to help the first couple

# Olaf Stapledon (1886-1950)

- Oxford MA; Ph.D., U. of Liverpool
- Conscientious objector during WWI
- Influenced Arthur C. Clarke, Virginia Woolf, Jorge Luis Borges, Bertrand Russell and Winston Churchill
- Wrote several philosophical works and novels including *Star Maker*, which C.S. Lewis described as “sheer Devil worship” and Arthur C. Clarke considered one of the finest science fiction works ever written



William Olaf Stapledon  
(1886-1950)

# *Star Maker* (1937)

- Deals with philosophical themes: the essence of life, birth, decay and death and the relationship between Creation and Creator
- An English narrator is transported out of body to another planet where his mind merges with one of that civilization's inhabitants
- As they travel through the Universe, they merge with other life forms to form a group mind which eventually encounters the Star Maker, the Creator of the Universe, who evaluates its quality without any feeling for the suffering of its inhabitants
- Other Universes created by the Star Maker are then described



Original edition

A walker in a mountainous country, lost in mist, and groping from rock to rock, may come suddenly out of the cloud to find himself on the very brink of a precipice. Below he now sees valleys and hills, plains, rivers, and intricate cities, the sea with all its islands, and overhead the sun. So I, in the supreme moment of my cosmical experience, emerged from the mist of my finitude to be confronted by cosmos upon cosmos, and by the light itself that not only illumines but gives life to all. Then immediately the mist closed in upon me again.

-- Olaf Stapledon, *Star Maker*

... In all these creations the goal which ... the Star Maker sought to realize was richness, delicacy, depth, and harmoniousness of being. But what these words in detail mean I should find it hard to say. It seemed to me that in some cases, as in our own cosmos, he pursued this end by means of an evolutionary process crowned by an awakened cosmical mind, which strove to gather into its own awareness the whole wealth of the cosmical existence, and by creative action to increase it. But in many cases this goal was achieved with incomparably greater economy of effort and suffering on the part of the creatures, and without the huge dead loss of utterly wasted, ineffective lives which is to us so heart-rending. Yet in other creations suffering seemed at least as grave and widespread as in our own cosmos.

-- Olaf Stapledon, *Star Maker*

# Jorge Luis Borges

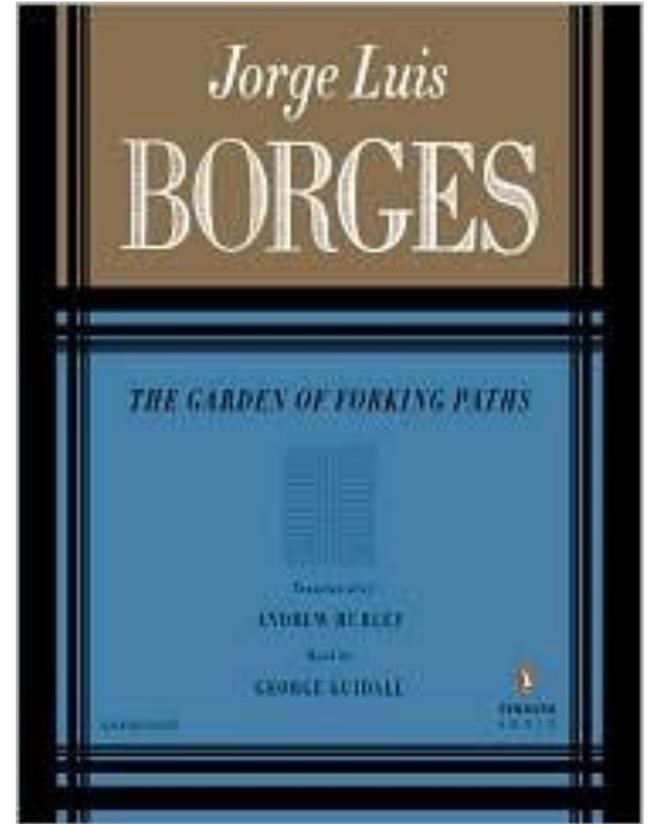
- Argentinian author; director of the Argentine National Library; winner of numerous international literary prizes including the Cervantes Prize, the Spanish-speaking world's highest literary accolade
- At age 9, published his Spanish translation of Oscar Wilde's *The Happy Prince* in his local newspaper
- Wrote "The Garden of Forking Paths" in 1941, describing a universe similar to the "many-worlds" interpretation of quantum physics first developed by Hugh Everett III in 1957



Jorge Luis Borges (1899-1986)

# “The Garden of Forking Paths” (1941)

- A Chinese spy for Germany located in England during WW II is about to be captured just before he needs to let Hitler (“the Leader”) know the location of a key bombing target
- He visits an eminent expert on China who has solved a riddle set by the spy’s ancestor – how to construct an infinite labyrinth
- The expert tells him that the labyrinth is constructed in **time**, not space; that each time an event occurs with more than one possible outcome, the universe **splits into multiple universes**, and in these universes, **all possible outcomes occur**



“Unlike Newton and Schopenhauer, your ancestor did not believe in a uniform and absolute time; he believed in an infinite series of times, a growing, dizzying web of divergent, convergent, and parallel times. That fabric of times that approach one another, fork, are snipped off, or are simply unknown for centuries, contains *all* possibilities. In most of those times, we do not exist; in some, you exist but I do not; in others, I do and you do not; in others still, we both do. In this one, which the favoring hand of chance has dealt me, you have come to my home; in another, when you come through my garden you find me dead; in another, I say these same words, but I am an error, a ghost.”

“In all,” I said, not without a tremble, “I am grateful for, and I venerate, your re-creation of the garden of Ts’ui Pen.”

“Not in all,” he whispered with a smile. “Time forks, perpetually, into countless futures. In one of them, I am your enemy.”

# *It's A Wonderful Life* (1946)

- Based on the short story “The Greatest Gift” by Philip van Doren Stern
- Nominated for 5 Oscars; rated one of the best 100 American films of all time by the American Film Institute
- George Bailey, attempting suicide when his building & loan’s solvency is jeopardized by his uncle Billy’s loss of \$8,000 to heartless slumlord Potter, is saved by his guardian angel, Clarence
- When George tells Clarence that “it would have been better if I’d never been born”, Clarence sends George into a parallel universe in which he never existed, and life is much worse for all those George’s life touched



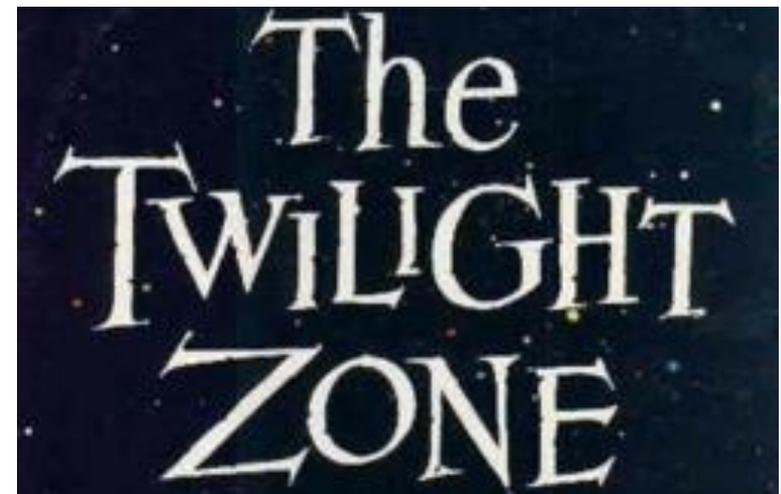
Henry Travers (Clarence) sends James Stewart (George Bailey) into a parallel universe

# Rodman Edward (“Rod”) Serling

- American screenwriter, novelist, TV producer and narrator best known for 1950’s live TV dramas (“Patterns,” “Requiem for a Heavyweight,” etc.) and the pioneering sci-fi series *The Twilight Zone* (1959-1964)
- Clashed frequently with TV executives and sponsors over issues including censorship, racism and anti-war politics
- Garnered 5 Emmy Awards, one Golden Globe Award and a Hugo Award for science fiction writing



Rod Serling (1924-1975)



# *The Twilight Zone* – “The Parallel” (1963)

- An astronaut orbiting the Earth experiences a systems malfunction and blacks out
- When he regains consciousness, he is back on Earth, and returns to his family, but soon discovers that things are different
  - ... He is a colonel instead of a major
  - ... His house now has a picket fence
  - ... No one has heard of John F. Kennedy
- He blacks out again, and finds himself back in his space capsule, landing safely with everything normal ... until a radio transmission is received from his double
- Earliest example of parallel universe as a key TV plot element



Scene from “The Parallel”

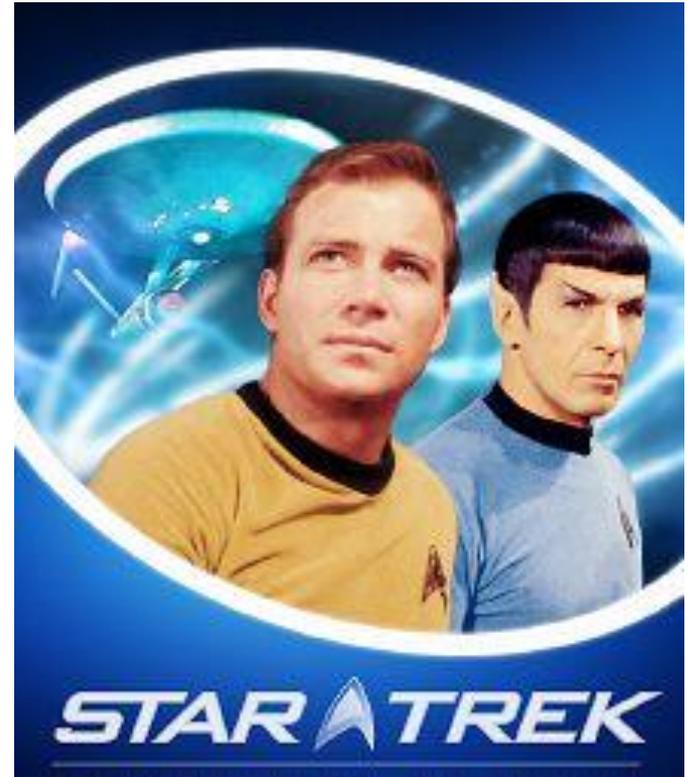
# *Dark Shadows* (1966-1971)

- Cult classic afternoon TV soap opera
  - ... Fans include Tim Burton, Quentin Tarantino, Johnny Depp and Madonna
- Featured werewolves, zombies, man-made monsters, witches, warlocks, time travel and a parallel universe
- Distinguished by vividly melodramatic performances, dramatic plot twists, psychedelic special effects, memorable musical score and a broad and interesting cast of characters



# Star Trek (1966-)

- Sci-fi entertainment franchise and cultural phenomenon
  - ... 6 TV series
  - ... 11 feature films
  - ... Klingon language
  - ... Books, video games, toys, etc.
- Several segments of the original TV series featured alternate or parallel universes
- Later series continued to utilize parallel universe motifs
- Most recent feature film, *Star Trek* (2009), is entirely set in a parallel universe



# *Star Trek*: “The Alternative Factor” (1967)

- USS *Enterprise* detects a disturbance in space while orbiting what should be a dead planet
- Captain Kirk discovers a man called Lazarus, who tells him the effect was caused by his insane enemy
- Lazarus turns out to be two people, one of whom is from a duplicate anti-matter universe; only one of them can be in each universe at a time, yet they are trying to destroy each other
- Kirk traps them in an inter-universe wormhole where they will fight eternally



Lazarus's ship



The two Lazaruses fight

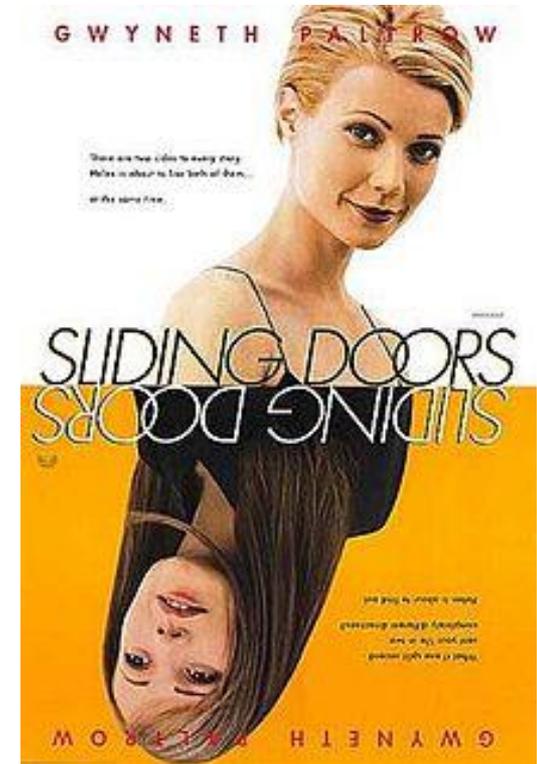
# *Star Trek: Star Trek (2009)*

- Film set in an alternate universe where Kirk and Spock become enemies instead of friends
- The film's alternate universe is created when the original Spock fails to save the planet Romulus from being destroyed by a supernova; Spock's space ship, along with the ship of one of the Romulans, who holds Spock and the Federation responsible, fall into the black hole Spock artificially created to trap the supernova
- The Romulan's ship emerges from the black hole in the past, attacking the Federation and thereby creating the alternate universe, killing Kirk's father just as Kirk is born



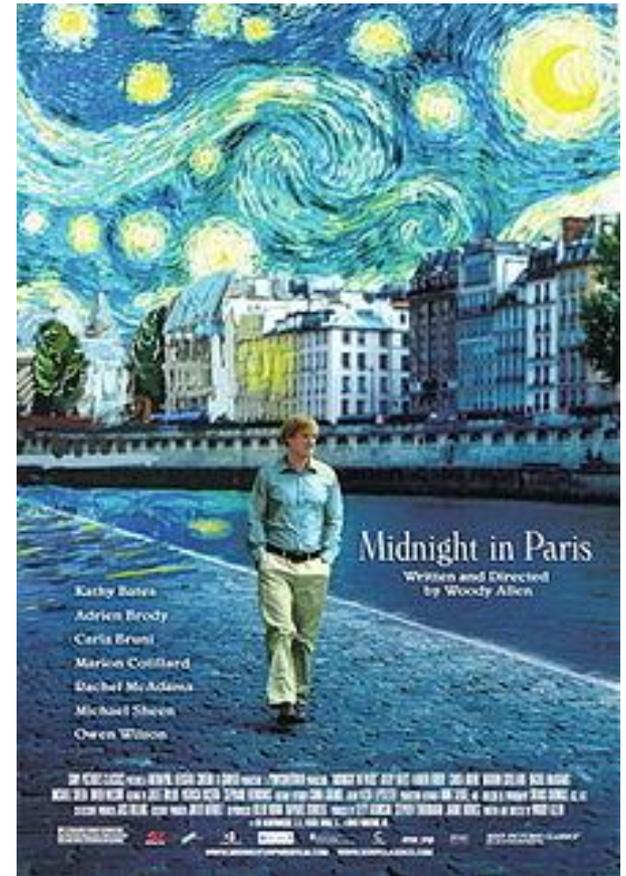
# *Sliding Doors* (1998)

- Sydney Pollack romantic comedy written and directed by Peter Howitt
- Film splits into two parallel universes depending on whether the main character, a public relations executive who has just been fired, catches a London Underground train or takes a taxi home
- In the universe where she takes the train, she catches her boyfriend making love to his ex-girlfriend and dumps him
- In the universe where she takes the taxi, she is the victim of a botched purse-snatching and goes to hospital, and thus fails to catch the boyfriend



# *Midnight in Paris* (2011)

- Woody Allen's romantic comedy about a screenwriter, his fiancée and her parents visiting Paris for business and pleasure
- While walking through the back streets of Paris at midnight, the screenwriter finds himself unexpectedly transported into a parallel universe where it is Paris in the 1920's
- His experiences there force him to confront the shortcomings of the relationship between himself and his fiancée and the differences in their goals in life



# ***Lost* (2004 – 2010)**

- Drama TV series involving survivors of a plane crash on a tropical island
- Plots featured an ensemble cast with a primary storyline on the island and secondary storylines in alternate universes with different assumed realities
  - ... Island vanishes and reappears
  - ... Plane either crashes or doesn't crash
  - ... Backward and forward in time
- Series won numerous awards including Emmy, Golden Globe, Screen Actors Guild; considered among top 10 all-time shows in Nielsen ratings





# Empedocles

- Greek philosopher; originator of idea that there are four basic elements (earth, air, fire, water)
- Believed in the conservation of elements – that no element is created or destroyed; only the patterns by which they combine or separate undergo change
- Taught that the universe undergoes ***eternal recurrence*** – its configuration repeats after sufficient time
  - ... Learned from Pythagoras? “After certain periods of time the things that have happened once happen again and nothing is absolutely new” (Porphyry, *Life of Pythagoras*)



Empedocles

Empedocles (490-430 BCE)

# Marcus Aurelius (121-180)

- Roman Emperor, Stoic philosopher
- Believed in the infinity of time and space and disbelieved in the possibility of an afterlife; held that life's meaning lay in devotion to duty and rational virtue in the face of the indifference of the universe to human existence



These are the properties of the rational soul ... It traverses the whole universe and the surrounding void, and surveys its form, and it extends itself into the infinity of time, and embraces and comprehends the periodic renovation of all things, and it comprehends that those who come after us will see nothing new, nor have those before us seen anything more, but in a manner he who is forty years old, if he has any understanding at all, has seen, by virtue of the uniformity that prevails, all things that have been and all that will be.

- Marcus Aurelius

# Jewish Mysticism – The Kabbalah

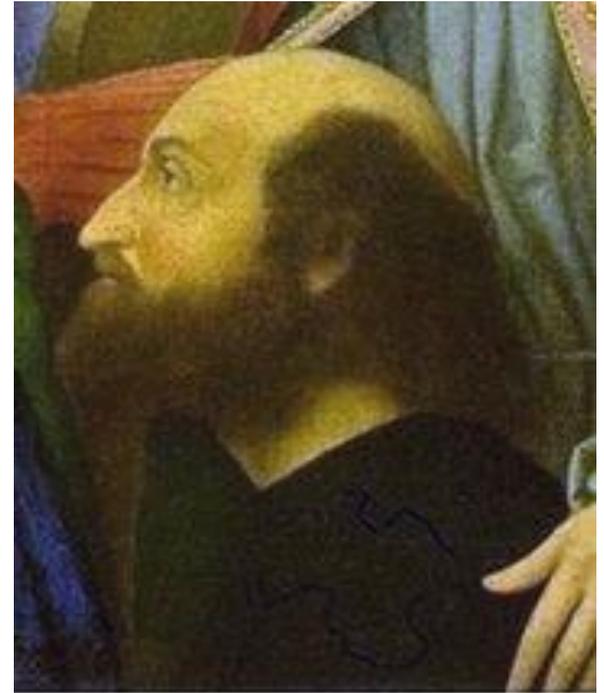
- Rabbi Akiba (1<sup>st</sup> Century) – *Ma'aseh Merkavah* (The Creation of the Chariot)
  - ... Mystical contemplation of infinity and unity of God using vehicle of heavenly Chariot imagery
  - ... Story of *pardes*: Akiba, ben Zoma, ben Azzai, ben Abuya
- Rabbi Shimon bar Yochai (late 1<sup>st</sup> Century – 2<sup>nd</sup> Century)
  - ... Student and contemporary of Akiba
  - ... Collected mystical traditions into orally transmitted body
- *Bahir* (The Brilliant) and *Sefer Yetzirah* (Book of Formation)
  - 1<sup>st</sup> Century – 5<sup>th</sup> Century
- Moses de Leon (1250?-1305) – *Zohar* (The Splendor)
  - ... Compendium of bar Yochai's traditions and others in the form of a commentary on the Five Books of Moses

# Early Christian Views of Heaven

- Book of Hebrews (late 1<sup>st</sup> Century): Image of Heaven similar to Jewish Kabbalah?
  - ... Jesus “entered, not into a sanctuary made with hands, a copy of the true one, but into heaven itself” [Heb. 9:24]
  - ... “God ... hath in these last days spoken unto us by His son ... by whom also he made the worlds” [Heb.1:1-2]
- Papias, Bishop of Hierapolis (2<sup>nd</sup> Century): 3 levels
  - ... “Heaven”
  - ... “Paradise”
  - ... “The City”
- Revelation of John (late 1<sup>st</sup> Century): Duplicate Jerusalem in Heaven
  - ... “And I saw the holy city, the new Jerusalem, coming down out of heaven from God, prepared as a bride adorned for her husband.” [Rev. 21:2]

# Lodovico Ariosto (1474-1533)

- Italian Renaissance epic poet
- Oldest of 10 children; diplomat in service to several Cardinals of the Church, nearly killed by Pope Julius II
- His 1509 play *I Suppositi* was Shakespeare's source for *The Taming of the Shrew*
- Composed first version of *Orlando furioso* in 1516  
... Introduced narrative commentary by the author into poetry



Lodovico Ariosto (1474-1533)  
Portrait by Vincenzo Catena,  
1513

# *Orlando furioso* (1516-1532)

- Romantic epic fantasy that exerted wide influence on later Western culture; takes place during imagined war of Charlemagne against the Saracens
- Knight Orlando's unrequited love for pagan princess Angelica (who falls in love with a Saracen knight and elopes to Cathay) drives him mad (*furioso*)
- A fellow knight, Astolfo, flies to the Moon in Elijah's chariot to find a cure for Orlando
- On the Moon, everything lost on Earth is to be found, including Orlando's lost wits
- Inspired many artists, composers and authors including Spenser, Shakespeare, Byron, Cervantes, Tiepolo, Dore, Handel, Vivaldi



Title page of 1634 translation by John Harrington

### LXVIII

In talk the blest apostle is diffuse  
On this and that, until the day is worn:  
But when the sun is sunk i' the salt sea ooze,  
And overhead the moon uplifts her horn,  
A chariot is prepared, erewhile in use  
To scower the heavens, wherein of old was borne  
From Jewry's misty mountains to the sky,  
Sainted Elias, rapt from mortal eye.

### LXIX

Four goodly coursers next, and redder far  
Than flame, to that fair chariot yokes the sire;  
Who, when the knight and he well seated are,  
Collects the reins; and heavenward they aspire.  
In airy circles swiftly rose the car,  
And reached the region of eternal fire;  
Whose heat the saint by miracle suspends,  
While through the parted air the pair ascends.

LXX

The chariot, towering, threads the fiery sphere,  
And rises thence into the lunar reign.  
This, in its larger part they find as clear  
As polished steel, when undefiled by stain;  
And such it seems, or little less, when near,  
As what the limits of our earth contain:  
Such as our earth, the last of globes below,  
Including seas, which round about it flow.

LXXI

Here doubly waxed the paladin's surprize,  
To see that place so large, when viewed at hand;  
Resembling that a little hoop in size,  
When from the globe surveyed whereon we stand,  
And that he both his eyes behoved to strain,  
If he would view Earth's circling seas and land;  
In that, by reason of the lack of light,  
Their images attained to little height.

## LXXII

Here other river, lake, and rich champaign  
Are seen, than those which are below descried;  
Here other valley, other hill and plain,  
With towns and cities of their own supplied;  
Which mansions of such mighty size contain,  
Such never he before or after spied.  
Here spacious hold and lonely forest lay,  
Where nymphs for ever chased the panting prey.

## LXXIII

He, that with other scope had thither soared,  
Pauses not all these wonder to peruse:  
But led by the disciple of our Lord,  
His way towards a spacious vale pursues;  
A place wherein is wonderfully stored  
Whatever on our earth below we lose.  
Collected there are all things whatsoe'er,  
Lost through time, chance, or our own folly, here.

LXXV

The lover's tears and sighs; what time in pleasure  
And play we here unprofitably spend;  
To this, of ignorant men the eternal leisure,  
And vain designs, aye frustrate of their end.  
Empty desires so far exceed all measure,  
They o'er that valley's better part extend.  
There wilt thou find, if thou wilt thither post,  
Whatever thou on earth beneath hast lost.

LXXVI

He, passing by those heaps, on either hand,  
Of this and now of that the meaning sought;  
Formed of swollen bladders here a hill did stand,  
Whence he heard cries and tumults, as he thought.  
These were old crowns of the Assyrian land  
And Lydian -- as that paladin was taught --  
Grecian and Persian, all of ancient fame;  
And now, alas! well-nigh without a name.

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On this and that, until the day is worn:  
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# Johannes Kepler (1571-1630)

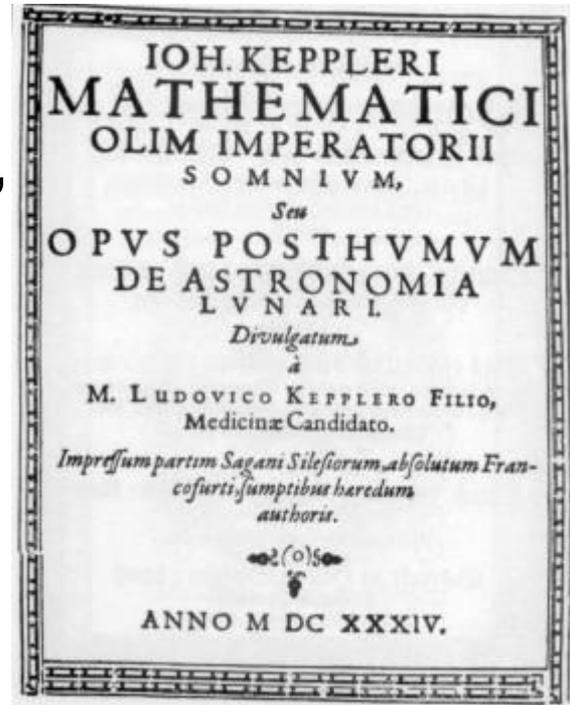
- German astronomer, physicist and astrologer; mystic, influenced by Nicholas of Cusa
- Assistant to Tycho Brahe; Imperial Mathematician to Holy Roman Emperor Rudolf II and successors
- Discovered three laws of planetary motion, including that orbits are ellipses
- Wrote *Somnium (The Dream)*, the first science fiction novel, about a trip from the Earth to the Moon



Johannes Kepler (1571-1630), portrait by unknown artist, 1610

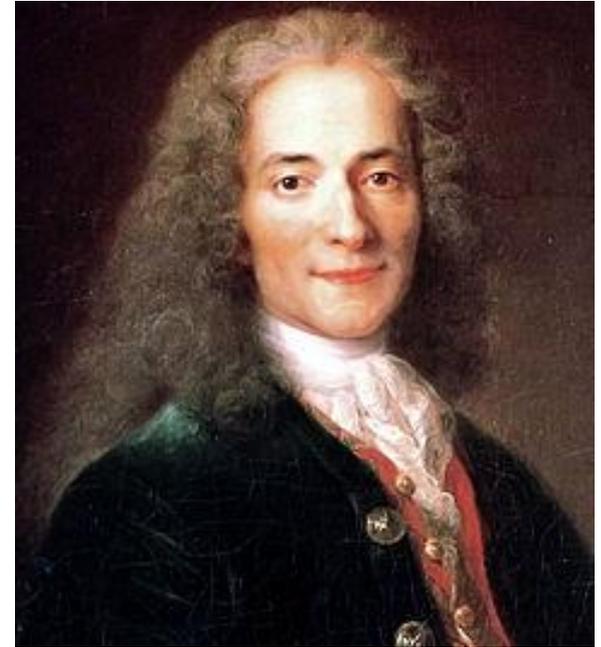
# *Somnium* (1620-1630)

- Published 1634 by Kepler's son Ludwig
- Duracotus, son of Icelandic witch Fiolxhilda, is banished to Denmark and becomes a student of astronomer Tycho Brahe
- Upon Duracotus' return, Fiolxhilda teaches him secrets she learned from a demon who lived on the Moon ("Levania")
- Demons travel between Earth and Moon during lunar eclipses; Duracotus accompanies them
  - ... Given narcotics and moist sponges to hold under nose
  - ... Taken to zero-G point between Earth and Moon, then drifts down to lunar surface
- Describes in detail how astronomical observations might appear from Moon; rationalizes craters as fortified city walls



# Francois-Marie Arouet (Voltaire) (1694-1778)

- French Enlightenment writer, historian, philosopher, wit and satirist
- Relentless advocate of civil liberties and social reform
- Important influencer of both American and French revolutions
- Fascinated by science and especially by Newton; chief popularizer of Newton's works in France (with Marquise de Chatelet)
- Wrote over 2,000 books and pamphlets, including "Micromegas," one of the first science fiction short stories



Francois-Marie Arouet  
(Voltaire) (1694-1778)

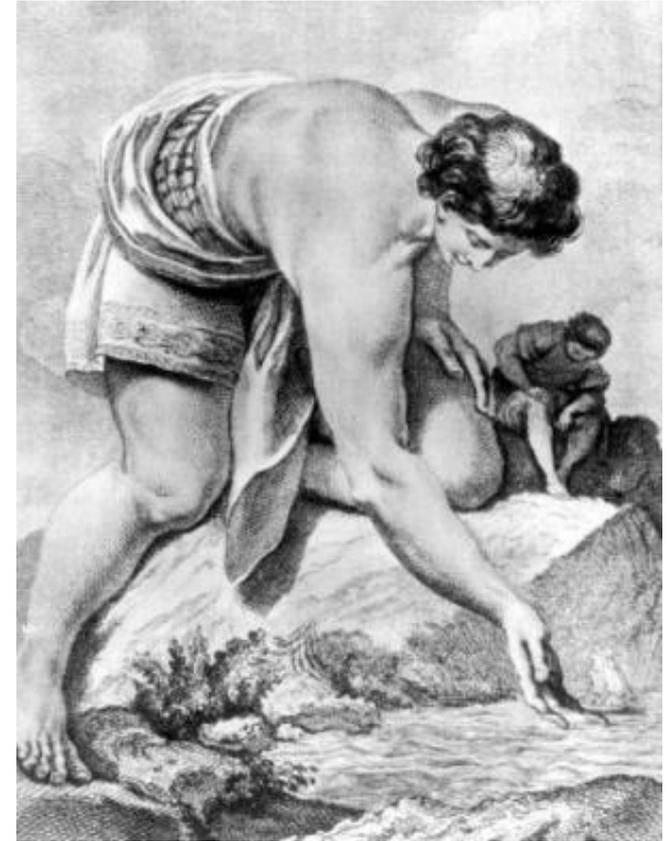
# “Micromegas” (1752)

- Recounts visit to Earth by a being from a planet circling Sirius and his companion from Saturn
- Uses device of outsider commenting on society’s foibles to skewer numerous major figures and trends of Voltaire’s time

... [Micromegas] took to voyaging from planet to planet in order to develop his heart and mind, as the saying goes. Those that travel only by stagecoach or sedan will probably be surprised to learn of the carriage of this vessel; for we, on our little pile of mud, can only conceive of that to which we are accustomed. Our voyager was very familiar with the laws of gravity and with all the other attractive and repulsive forces. He utilized them so well that, whether with the help of a ray of sunlight or some comet, he jumped from globe to globe like a bird vaulting itself from branch to branch. He quickly spanned the Milky Way ... [and] after having toured around, arrived at the planet Saturn.

# “Micromegas” (1752)

- Micromegas is 120,000 feet tall
- The Saturnian is 6,000 feet tall
- Not realizing the Earth is inhabited, they eat mountains for breakfast
- They find a ship sailing in the Baltic and pick it up to observe it under a microscope, discovering people on board
- They learn French, engage in a conversation and leave a book with the philosophers containing “all that can be known of the ultimate essence of things”  
... The book is blank



Micromegas and his Saturnian companion pick up a ship of philosophers in the Baltic

# Poincare's Recurrence Theorem

- Any system meeting the following criteria will return arbitrarily close to any given state after a sufficient time
  - ... Conserves energy
  - ... Describable by ordinary differential equations
  - ... Volume of system's **phase space set** is constant no matter how system evolves (**Liouville's Theorem** – phase space has  $6n$  dimensions if system has  $n$  particles, reflecting 3-D position and momentum for each particle)
- The Universe meets these criteria if it is finite