

# The Beginning and the End: Images of the Universe

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# Creation myths, spiritual and cosmological concepts, and scientific theories

- Creation and Last Judgment? or Big Bang and Gravitational Collapse?
- Concepts of the beginning and end – of the planet, solar system, universe, self?
- Images - from ancient myths, to the Sistine chapel, to modern scientific texts

# Images of the beginning

- Early ideas and images
- Greece and Rome
- The chicken or the (Orphic) egg?
- *Ex nihilo* (out of nothing)
- *Ex chaos* (out of chaos)
- Measured and mathematical
- Narrative (Judao Christian)
- Astronomical
- Abstract or modern concepts

# Images of 'the end'

- Of the planet
- Of the solar system
- Of the universe
- Of me ...
- Last Judgment (of individuals) or threats to our planet? Gradual collapse or a final 'bang' ?
- Validity of visual images, as record (spiritual or scientific, is significant and valid.





The Beginning: The ceiling of the Sistine Chapel, 1508-12

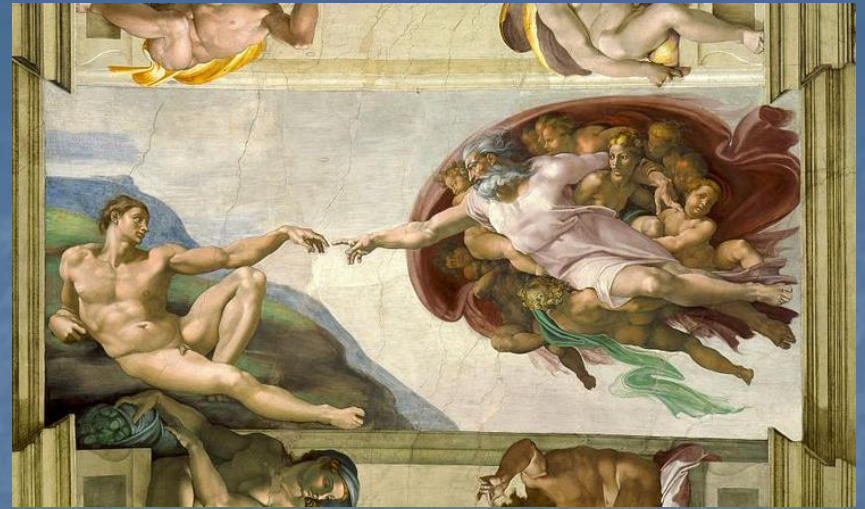


The end: Sistine Chapel showing Michelangelo's Last Judgment (1536-41)





Separation of Light from Dark



Creation of Man



Creation of Sun, Moon and Planets

*In the beginning God created the heaven and the earth. And the earth was without form, and void; and darkness was upon the face of the deep (Genesis 1)*



# Composites



York Minster, 1405-08



Ego sum  
Alpha  
et Omega



Catacomb of Comodilla, Rome, 4c



S Apollinare in  
Classe, Ravenna A,  
 $\omega$ , (7<sup>th</sup> cent)





Antwerp Cathedral (mainly 15<sup>th</sup> century):

- Cosmological design on vault, South aisle;
- *Last Judgment*, portal on West Front

as experienced by Sir Thomas Gresham





# Composites



**JUST LIKE HOME**  
Galaxy M51 is like our Milky Way, and this artwork shows how it would look from outside. It is made of hundreds of billions of stars like our Sun. In the Universe, a single galaxy is no more important than a single grain of sand on the beach. Galaxies spread in great chains and filaments across the Universe, like wisps of smoke. These echo the masses of primeval material from which the galaxy chains formed.

15 billion years later. One theory says that gravity will keep slowing the expanding Universe down, until it eventually stops expanding and starts to collapse back into itself. All the processes of expansion will run backwards, ending in a Big Crunch in which matter is turned back into energy and squeezed out of existence as space contracts.

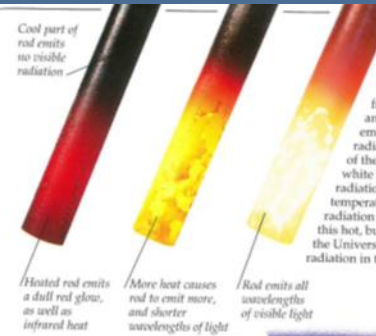
## The birth of space and time

THE UNIVERSE WAS BORN IN A BIG BANG. This was not like a big explosion in the middle of empty space. Both space and time actually began with the Big Bang. All the mass and energy filling the Universe today always did fill the Universe, but in the beginning there was very little space to fill. It was a tiny, hot, dense fireball that contained all the energy of the present day Universe.

The seed from which the Universe grew was a bubble of spacetime one Planck length (p. 54) across, born with an "age" of one Planck time (p. 56). In the first split second, it expanded rapidly up to the size of a grapefruit, in a process called "inflation". Then, as energy was converted into the kind of matter we know today, mainly hydrogen and helium, the expansion slowed down. The Universe is still expanding, but ever more slowly,



**GAMOW'S HOT AIR**  
George Gamow (1904-1968) was the first person to work out how hot the Big Bang must have been. Just as air in a bicycle tyre gets hot when it is pumped in, the Universe must have been very hot when it was squeezed into a tiny volume. Gamow said the leftover heat from this fireball should still fill space today, at a temperature of a few K (around -270 °C).

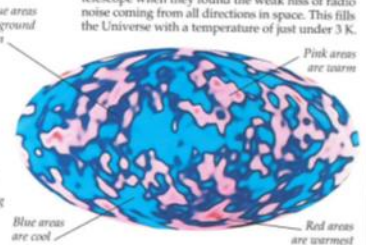
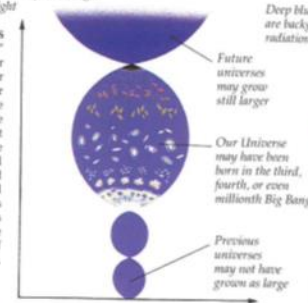


**HOT RODS**  
Everything radiates electromagnetic energy. The radiation wavelength depends on the temperature. The invisible warmth from a radiator is infrared heat. When an object gets hot enough, as well as emitting infrared heat it will begin to radiate visible light, starting at the red end of the spectrum. By the time an object gets white hot, it is emitting all colours of visible radiation. The surface of the Sun is at a temperature of nearly 6,000 K. The background radiation at the end of the Big Bang used to be this hot, but has cooled down to about 3 K as the Universe expanded. This corresponds to radiation in the microwave radio band.

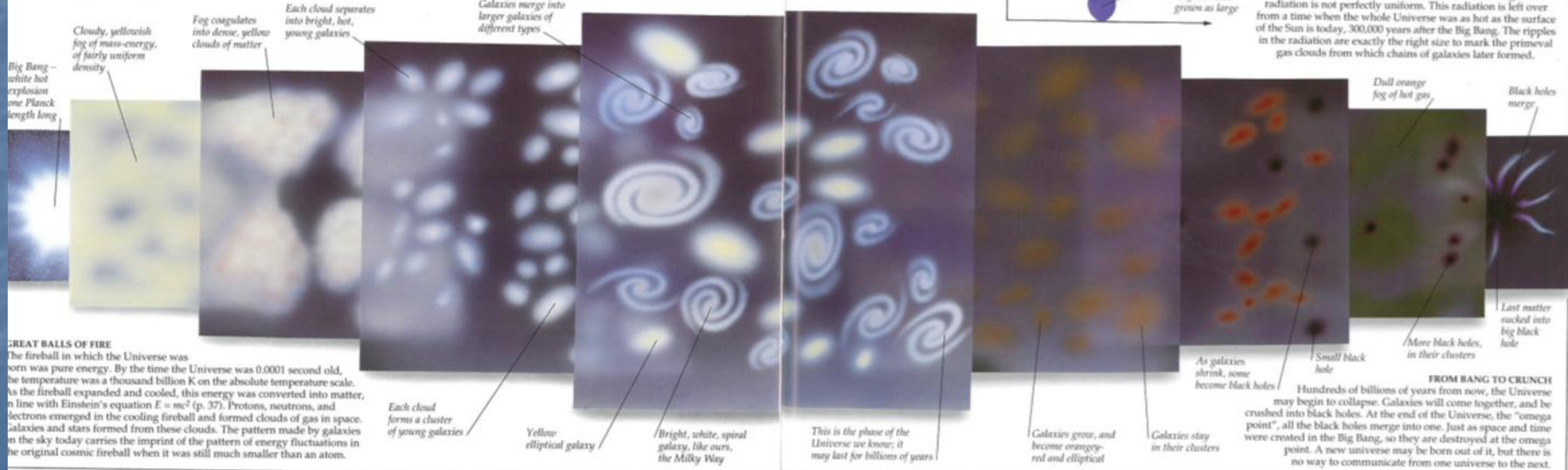


**DISCOVERING THE BIG BANG BY ACCIDENT**  
Gamow's prediction that the Universe must be filled with radiation making a temperature of a few K, was made in the 1940s. The radiation was found in 1964, by accident. Arno Penzias (b. 1933) and Robert Wilson (b. 1936) were testing a radio telescope when they found the weak hiss of radio noise coming from all directions in space. This fills the Universe with a temperature of just under 3 K.

**BOUNCING UNIVERSES**  
Where did the first universe "seed" come from? Nobody can know for sure. The best guess is that our Universe was born when another universe collapsed. If the whole Universe collapsed, space and time would come to an end when it reached the Planck size. Some cosmologists think that this would make it "bounce" and expand again. A tiny quantum seed could make bigger and bigger bounces until it made a universe as big as ours. The idea of a cyclic universe echoes some of the earliest ideas of Chinese and other philosophies.



**RADIATION RIPPLES**  
In 1992 NASA's COBE satellite found that the background radiation is not perfectly uniform. This radiation is left over from a time when the whole Universe was as hot as the surface of the Sun is today, 300,000 years after the Big Bang. The ripples in the radiation are exactly the right size to mark the primeval gas clouds from which chains of galaxies later formed.



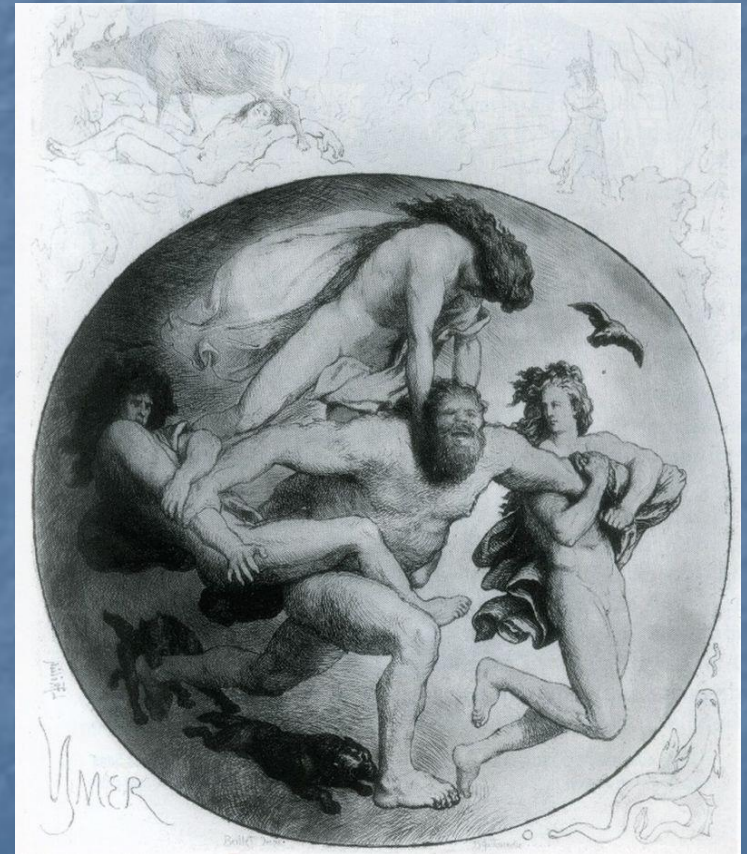
**GREAT BALLS OF FIRE**  
The fireball in which the Universe was born was pure energy. By the time the Universe was 0.0001 second old, the temperature was a thousand billion K on the absolute temperature scale. As the fireball expanded and cooled, this energy was converted into matter, in line with Einstein's equation  $E = mc^2$  (p. 37). Protons, neutrons, and electrons emerged in the cooling fireball and formed clouds of gas in space. Galaxies and stars formed from these clouds. The pattern made by galaxies in the sky today carries the imprint of the pattern of energy fluctuations in the original cosmic fireball when it was still much smaller than an atom.

Creation from nothing? From chaos? From division of primordial Unity? From dismemberment of primordial being?

*Before there was soil, or sky, or any green thing, there was only the gaping abyss ... chaos of perfect silence and darkness ... and the drops formed themselves into Ymir, the first of the godlike giants.*

*Odin slew Ymir, constructing the world from his corpse... the oceans from his blood, the soil from his skin and muscles, vegetation from his hair, clouds from his brains, and the sky from his skull...*

*(The Poetic Edda, Norse 13thC, from earlier tradition)*



Lorenz Frolich, 1820-1908,  
*Ymir killed by Odin and his brothers,*



- *A great while ago the world began, With hey, ho, the wind and the rain* (William Shakespeare, *Twelfth Night* Vi).
- *First there was Chaos , the vast immeasurable abyss ... Outrageous as a sea, dark, wasteful, wild* (Milton, *Paradise Lost*).
- *In the beginning the Universe was created. This has made a lot of people very angry and has been widely regarded as a bad move.*  
Douglas Adams
- *Our Universe sprouted from an initial event, the 'big bang' or 'fireball.' It expanded and cooled: the intricate pattern of stars and galaxies we see around us emerged thousands of millions of years later: on at least one planet around at least one star, atoms have assembled into creatures complex enough to ponder how they evolved.* (Martin Rees, *Before the Beginning* 1997).



Babylonian  
marker  
stone

Babylonian cylinder seal, rising of the sun-god c 2300BC



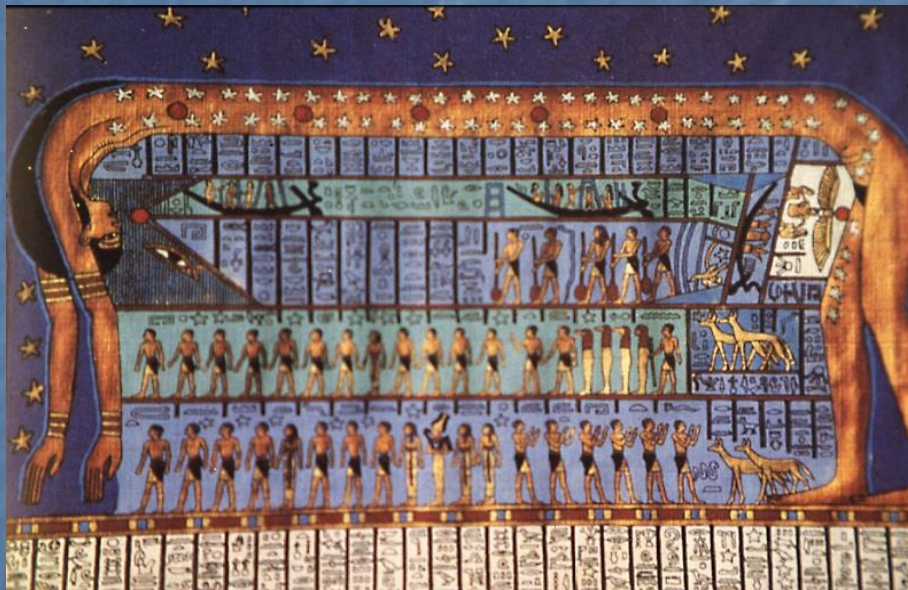
The 'Shabaka stone'  
Creation myth of Ptah, c 710 BC

*When the sky above was not named/And  
the earth beneath did not yet bear a  
name/.../And chaos, the mother of them  
both/Their waters were mingled together  
... When of the gods none had been called  
into being (Enuma Elish, 1800-1600 BCE)*



# Egypt

*The world arose out of the lifeless waters of chaos ... gave rise to the earth god Geb and the sky goddess Nut, who defined the limits of the world*



Egyptian, image of the sky goddess Nut



Eleventh-century BCE Egyptian Funerary Papyrus Showing Nut arched over the earth-god Geb



## Greece

*She [Gaia the Earth] lay with Ouranos and bare deep-swirling Okeanos [primordial waters] (Hesiod, Theogony, Greek 7thC B.C.)*



## Rome

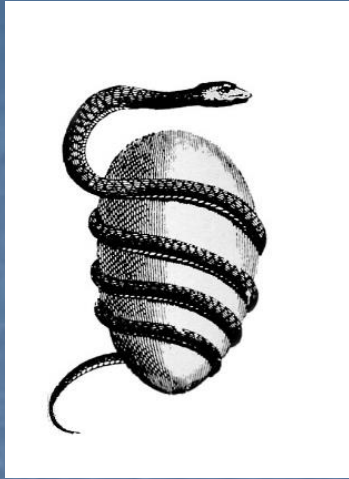
*Ovid, Metamorphoses, attributes to "God, or kindlier Nature ... Whatever god it was" ... Before the seas, and this terrestrial ball, And Heav'n's high canopy, that covers all, ... Rather a rude and indigested mass: A lifeless lump, unfashion'd, and unfram'd ...and justly Chaos nam'd.*



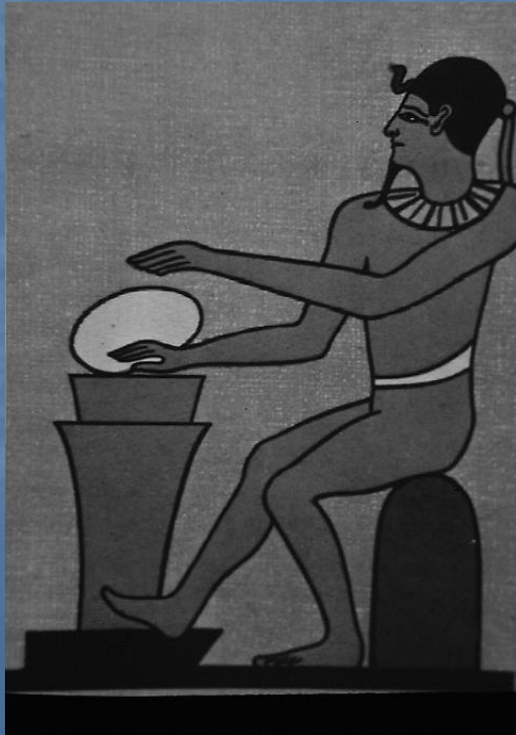
Prometheus forming man, Graeco-Roman gem 3<sup>rd</sup> C BC

Prometheus forming man in the likeness of the gods, Italy 3<sup>rd</sup> cent CE, Louvre

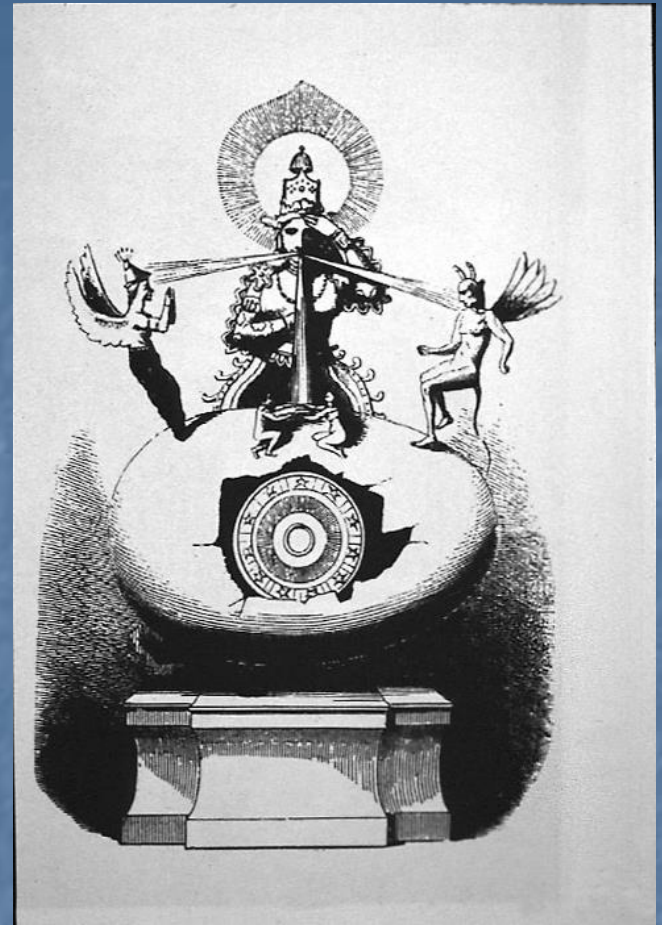
# The Cosmic Egg



Orphic egg from  
J Bryant,  
*Analysis of  
Ancient  
mythology*, 1774

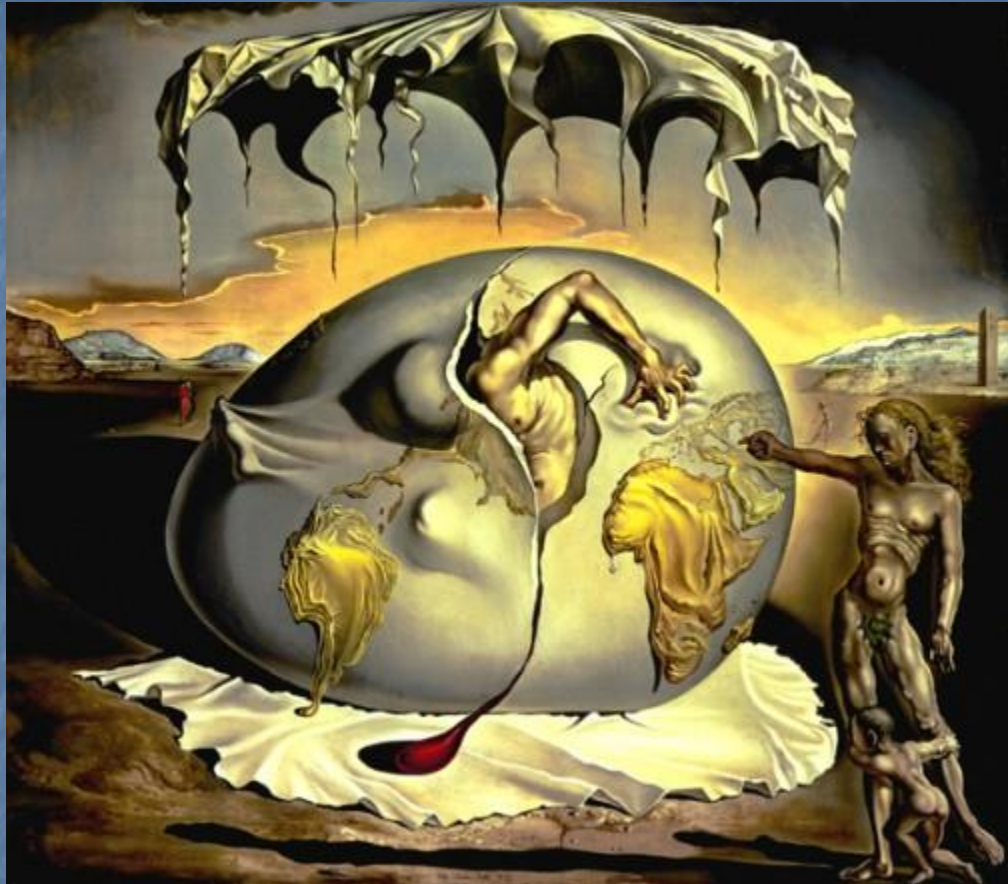


Ptah fashioning the  
egg of the world  
from E A Budge  
*Studies in Egyptian  
Mythology* 1904



Hindu: *Then even nothingness was not, nor existence. There was no air then, nor the heavens beyond it ... At first there was only darkness wrapped in darkness. (Rigveda, c. 1500–1200 BCE)*



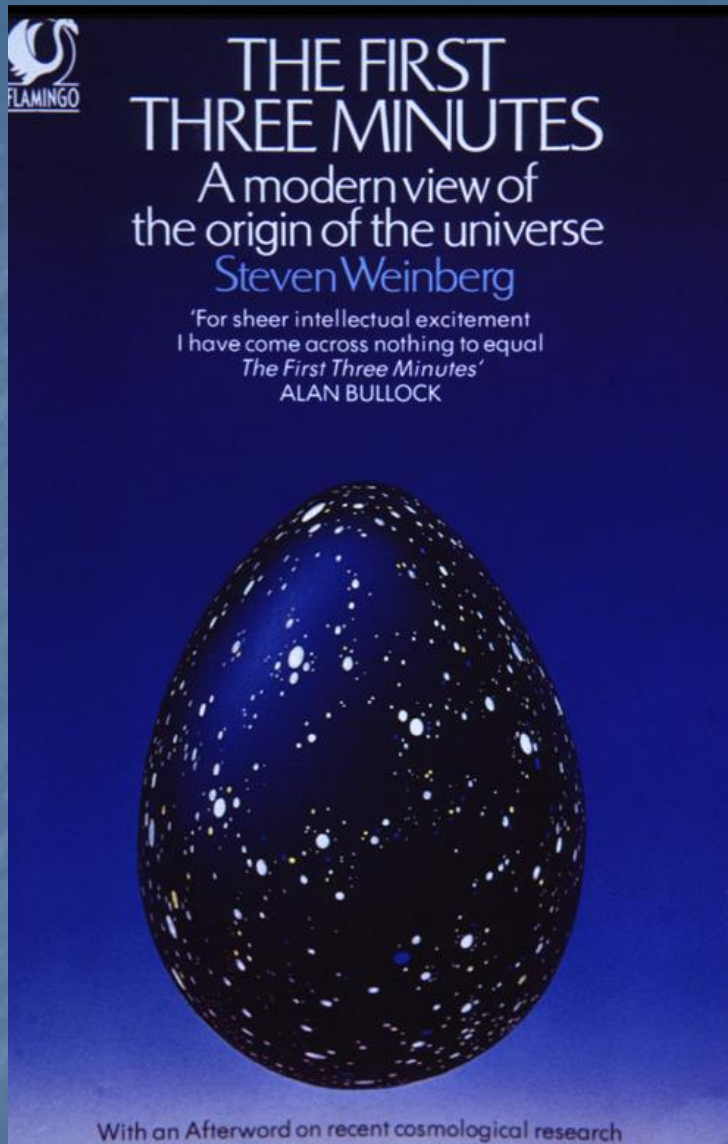


Salvador Dalí, *Geopoliticus Child watching the Birth of the New Man*, 1940-48



Constantin Brancusi, *Beginning of the World*, bronze 1924

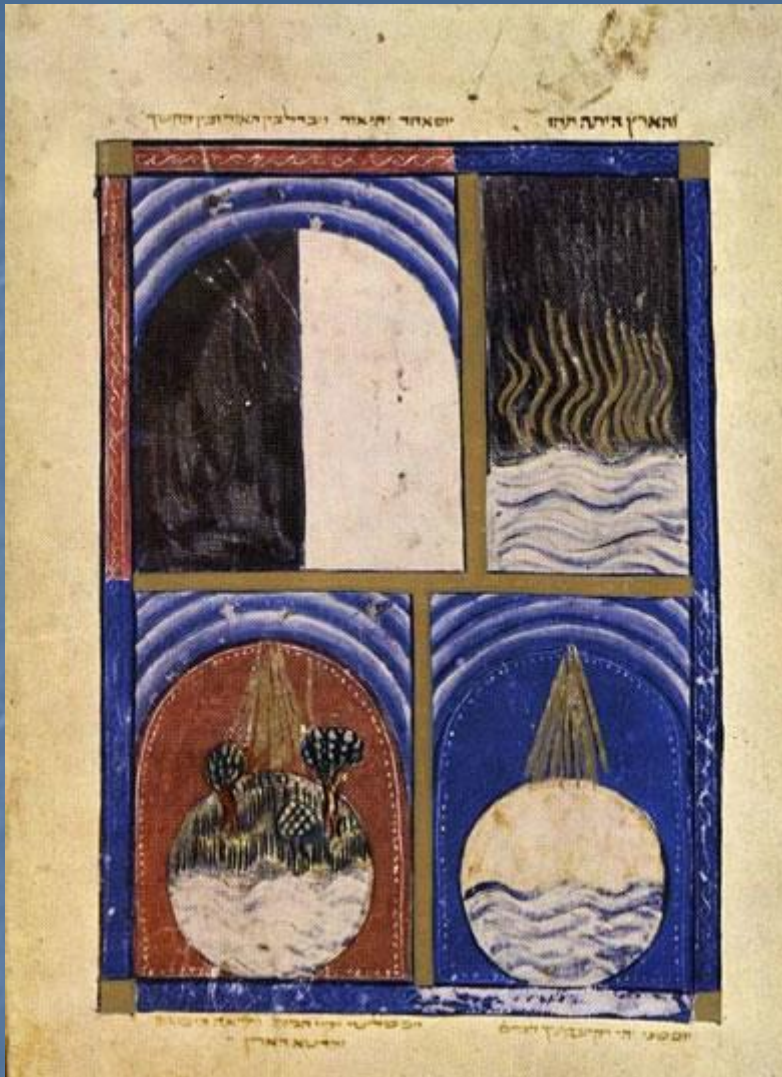




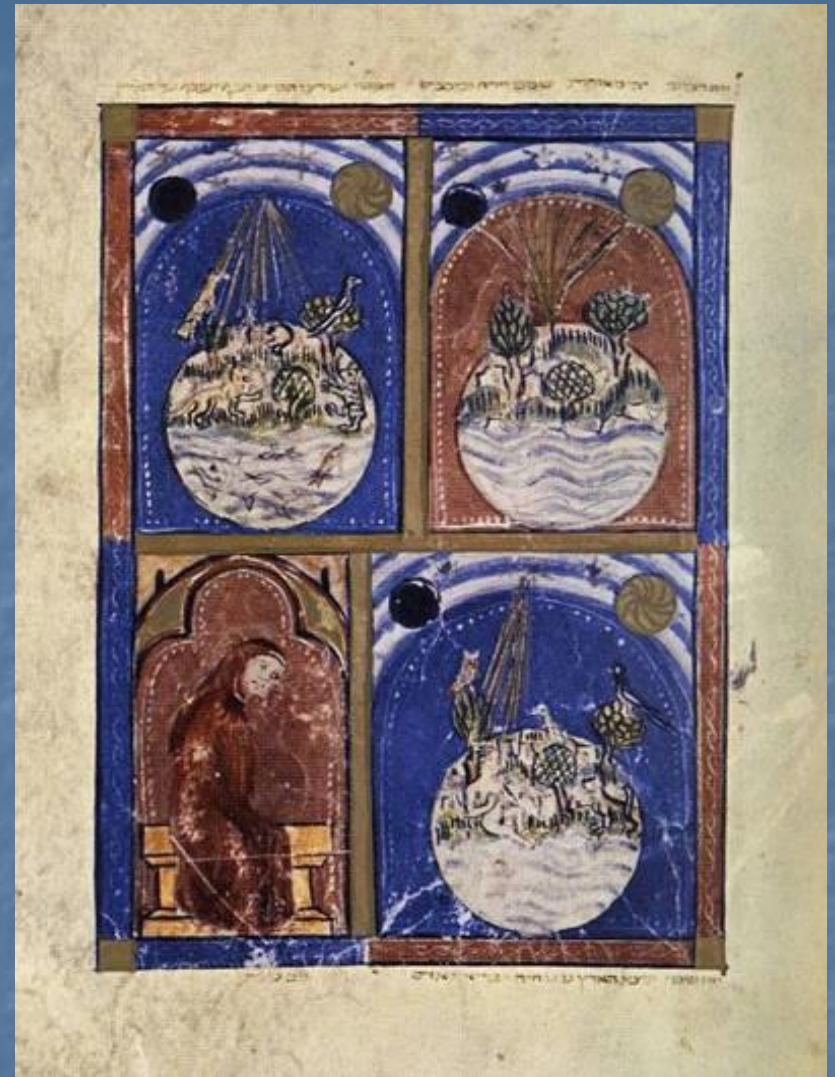
*Broken egg shell 0472* from Exotic HD  
Wallpapers @cuzzsoft.com

Steven Weinberg, 1983

## Darkness and light



Serajevo Haggadah, Spain 12<sup>th</sup> C  
(darkness over the waters; light and dark; sea; vegetation)



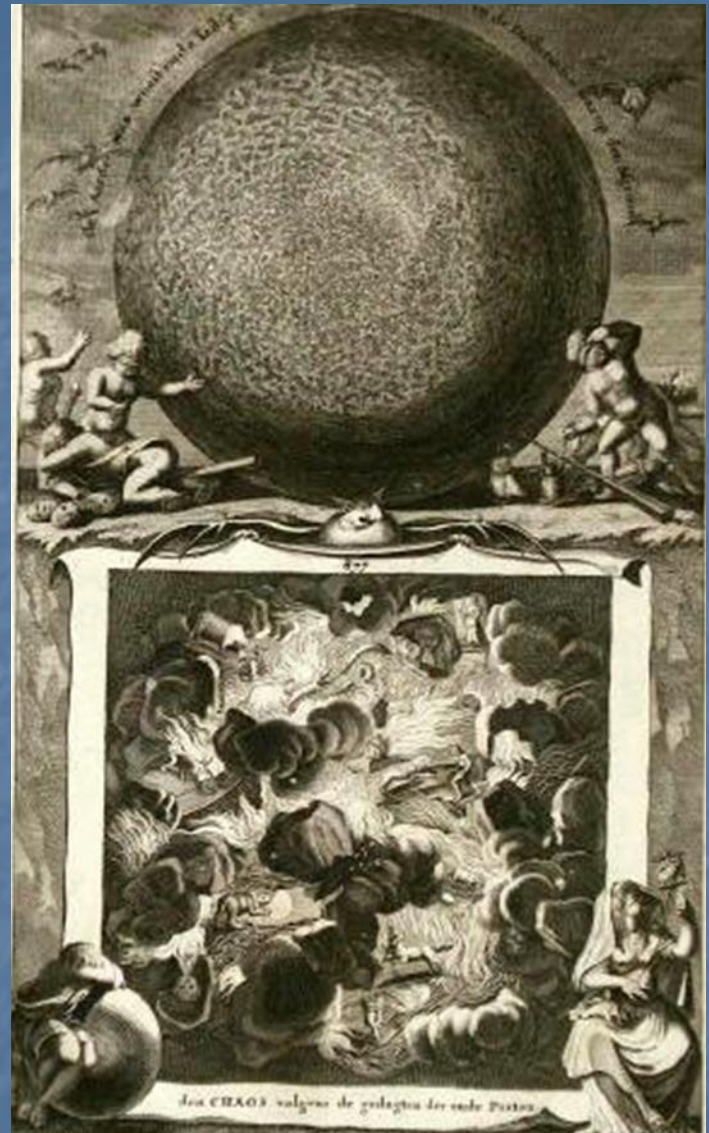
Serajevo Haggadah (plants;  
animals; birds; mankind)



## From Chaos ...



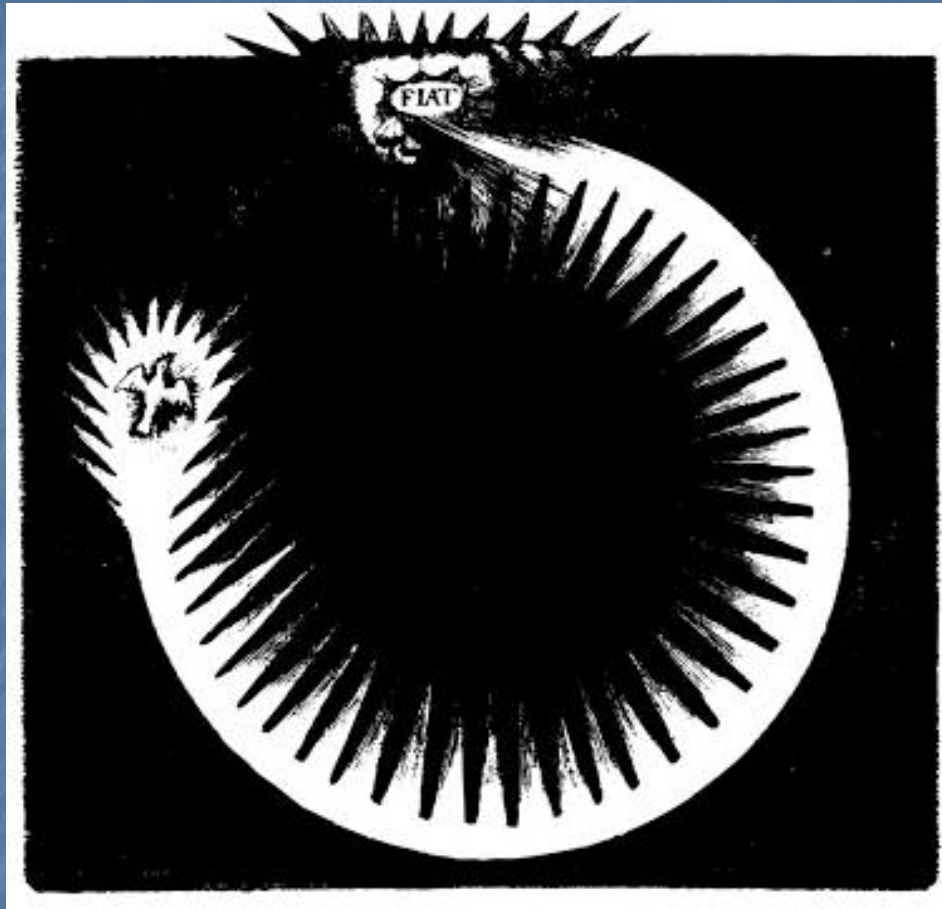
Fernando Gallego, Creation from Chaos  
c 1488 (University of Arizona)



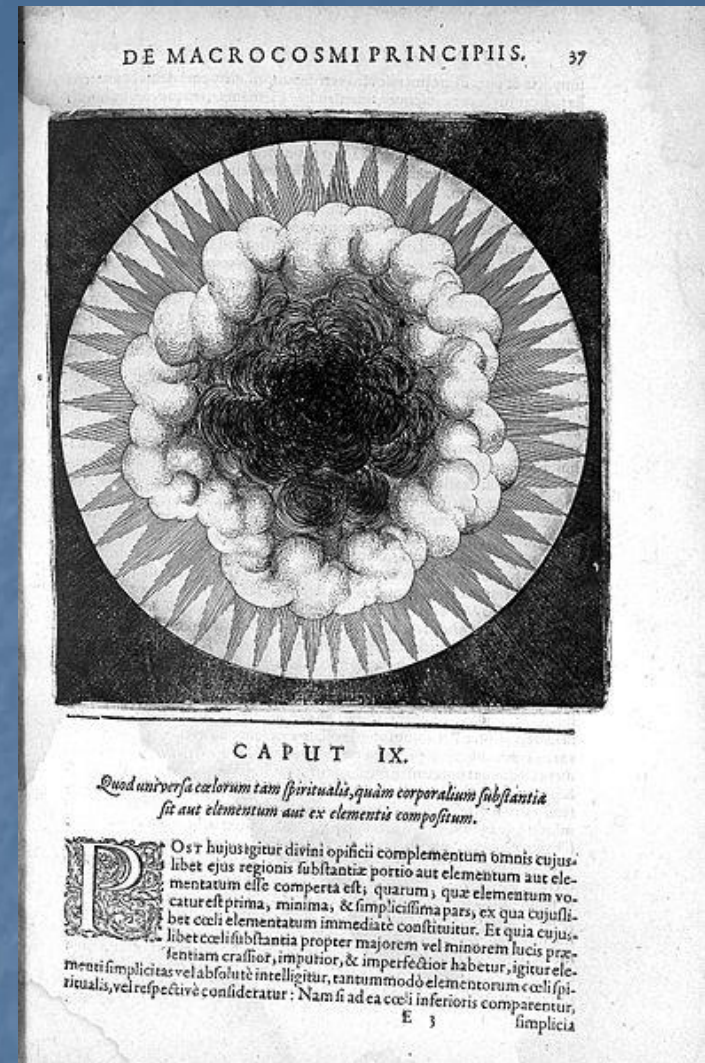
Anon. Copper engraving of the origin  
of universe from Chaos, 1690



## Ex Nihilo - A 17<sup>th</sup> century Big bang?



Fludd, 'Fiat' from *Utriusque cosmi ...* 1617



Fludd, an early vision of the Big bang?



# Measured and Mathematical



*Bible Moralisée*, Bodleian 1230-40



French *Histori Scholastica* God  
Creator, Guyart des Moulins, 1411



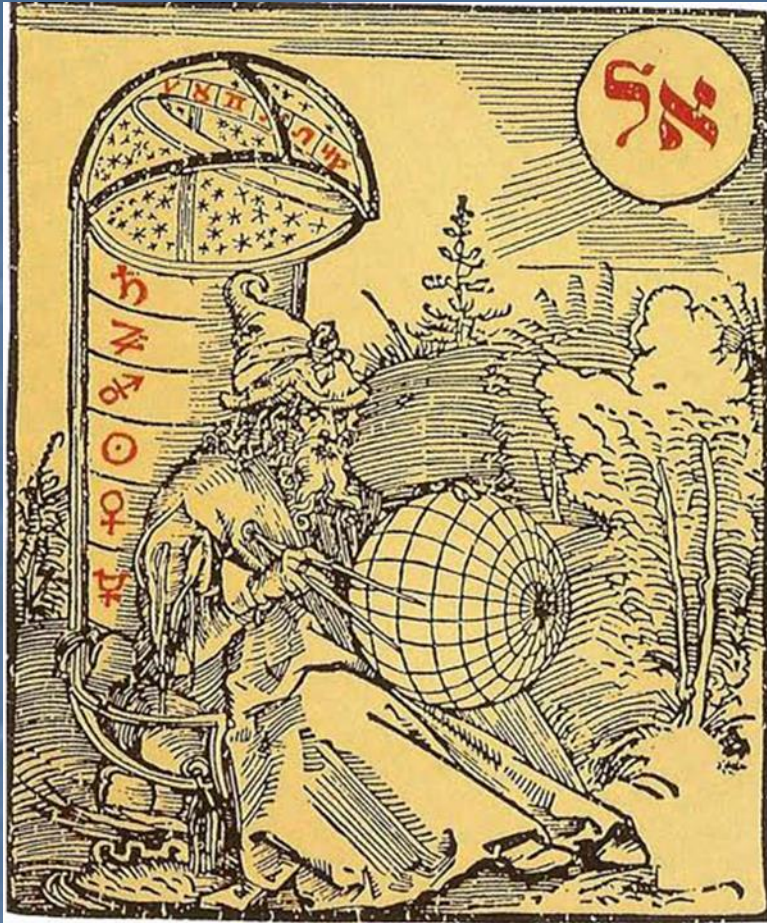


*Bible Moralisée* , frontispiece,  
Miniaturist, French (c 1250)



*Bible Moralisée* , 13<sup>th</sup> century





Linked with Astrology



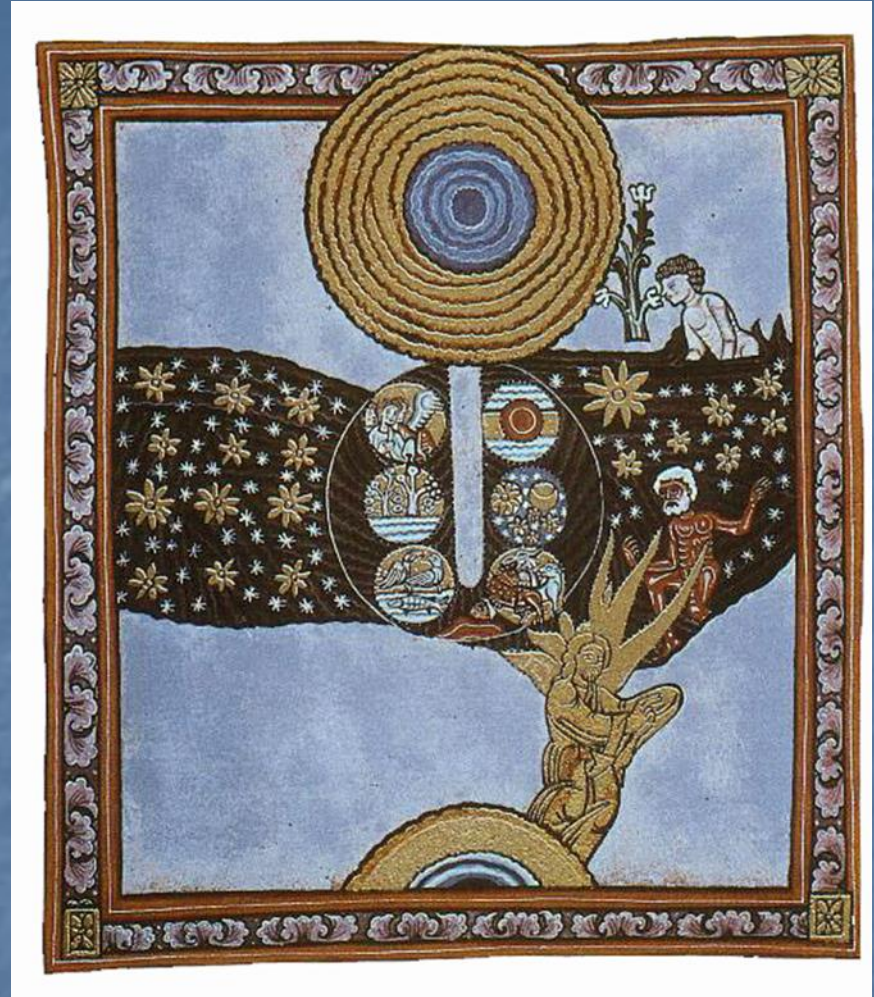
William Blake,  
*Ancient of Days*, 1793



## Ex Nihilo – from Nothing



Monreale, Sicily *God  
Creating the Universe*, 1175



Hildegard of Bingen,  
*Six days of Creation Scivias*, 12<sup>th</sup> cent



# Narrative approach



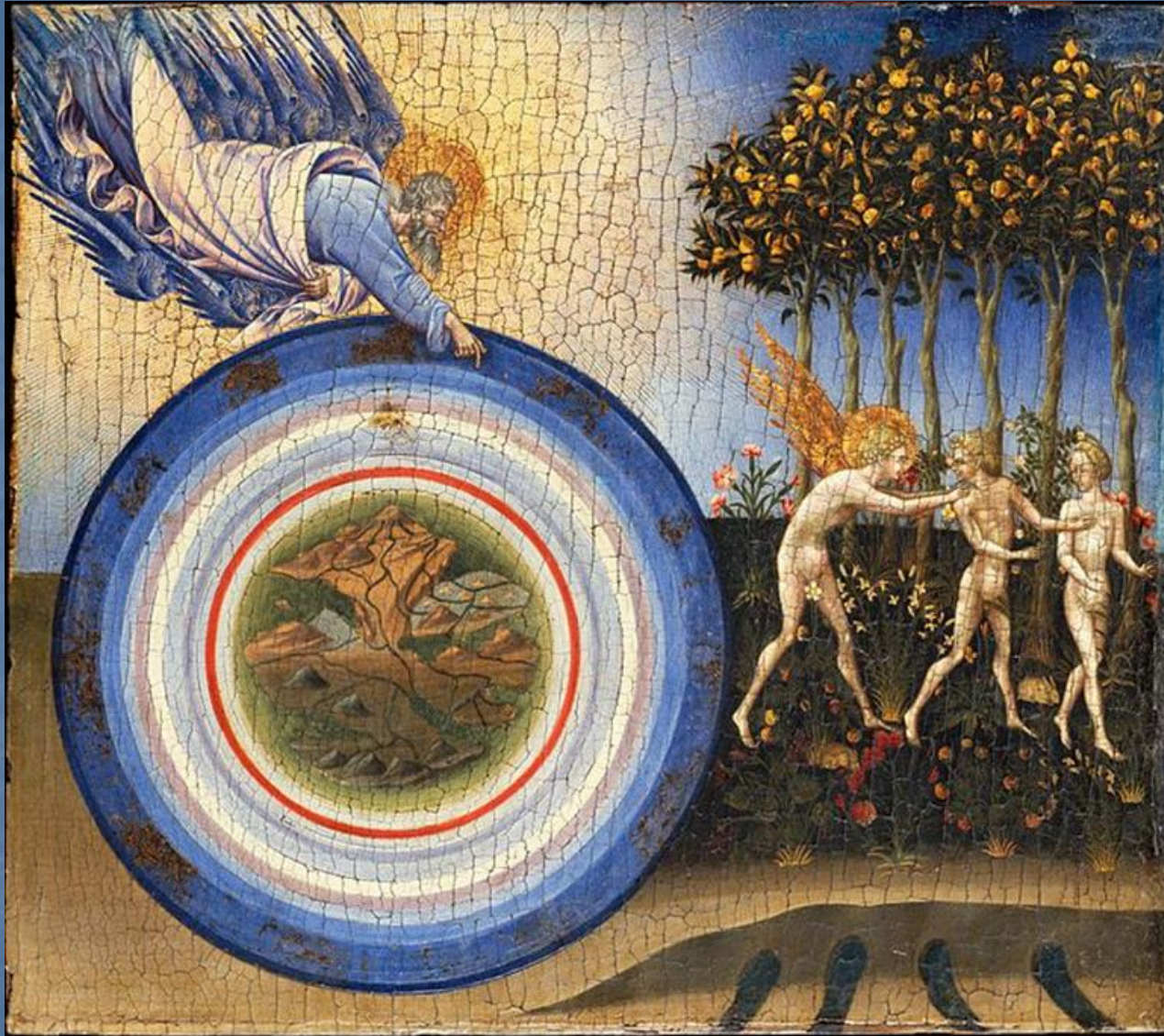
St Mark's Venice, *Creation*, c 1210



Bibl Vulgaria Istoriata, Venice 1471



## Cosmological



Giovanni di Paolo *Creation and Expulsion from Paradise*, 1445

Cf Dante's Cosmology c 1308-21; Johannes Sacrobosco *Sphaera Mundi*, 12<sup>th</sup> C



# Abstract

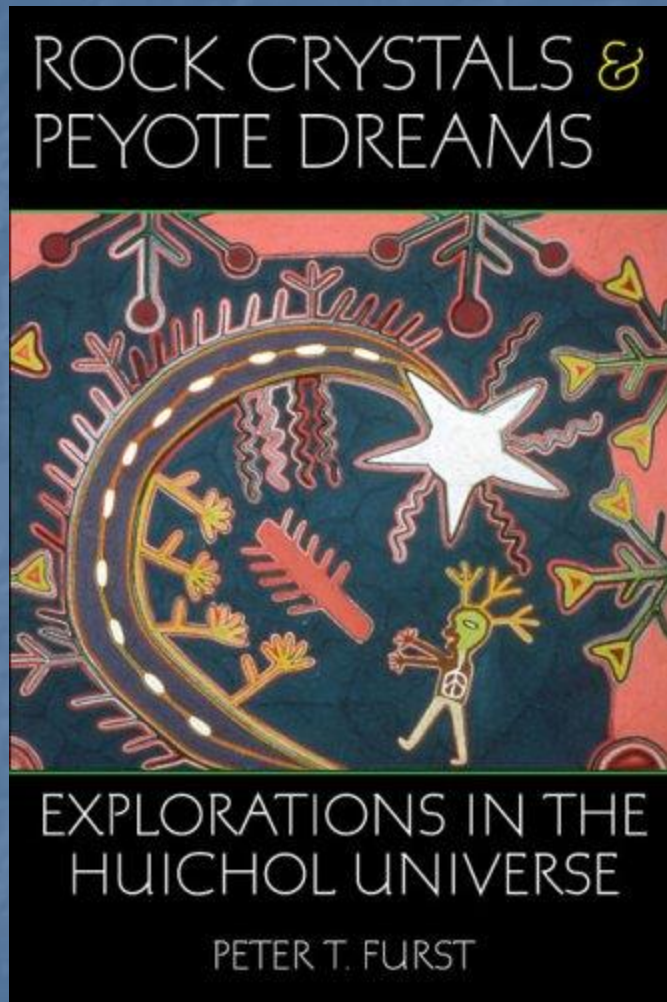


Hildegarde of Bingen, 12<sup>th</sup> cent

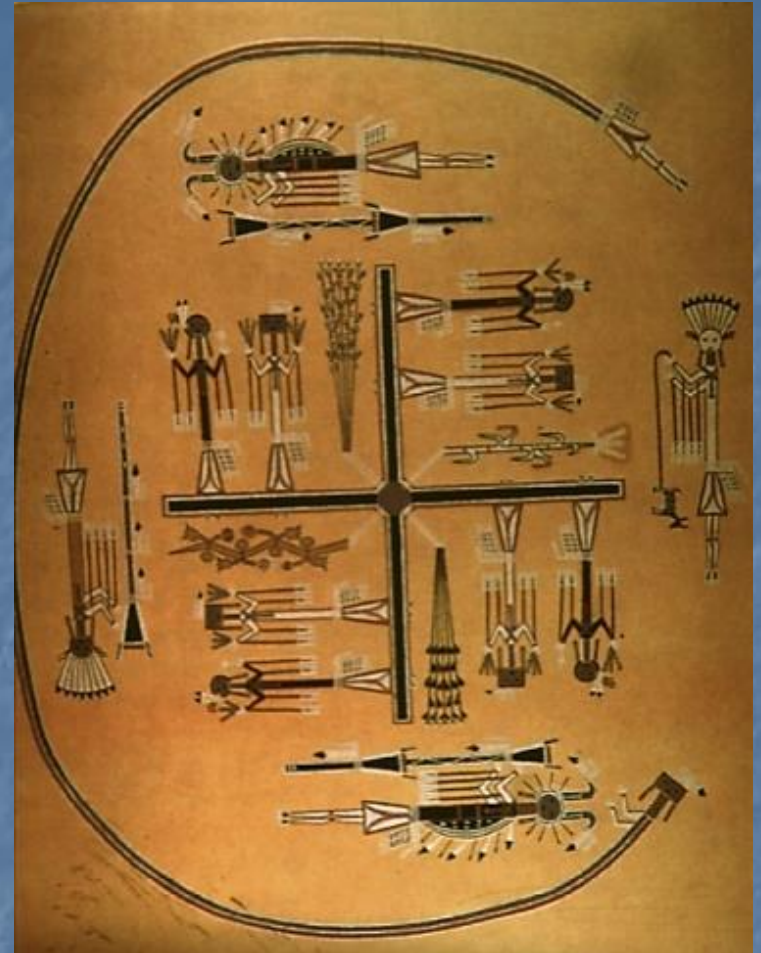


Barnett Newman, *Adam*, 1952  
Tate Modern

## Abstract



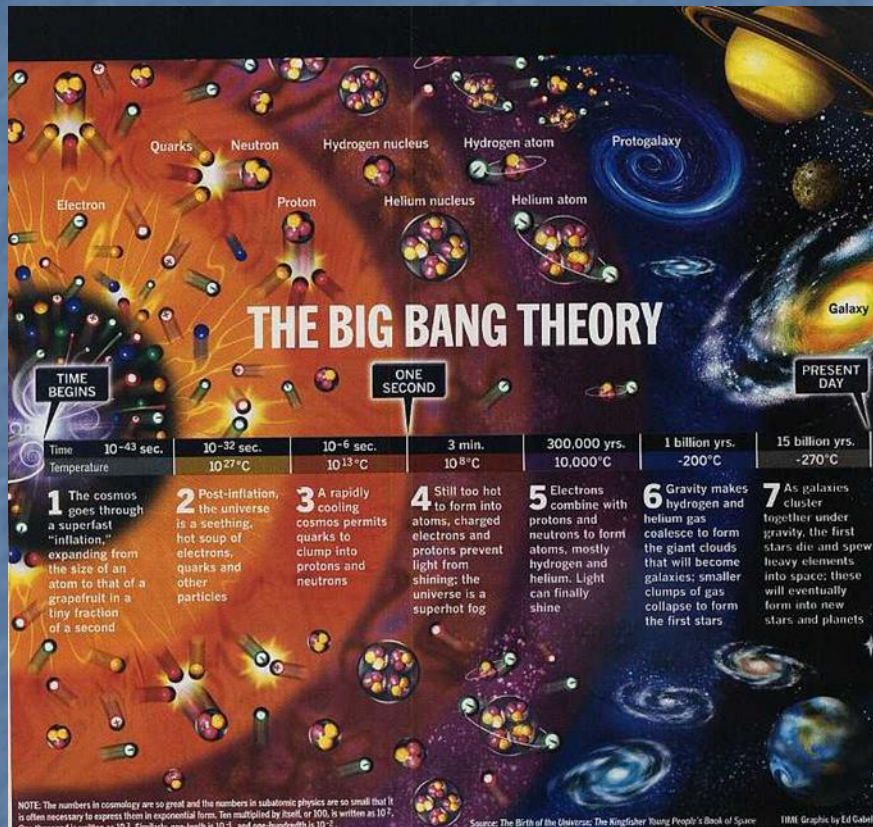
Ramon Medina, Mexico 20<sup>th</sup> c



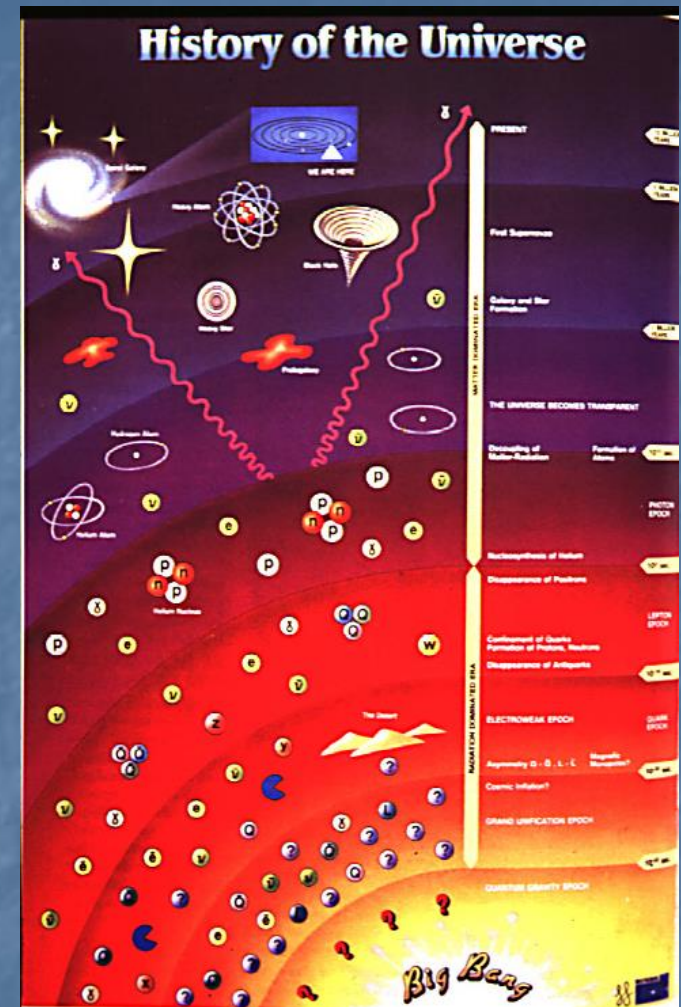
Fred Stevens, *The Whirling Log*, sand painting 1966 (Navaho)



## Modern – scientific diagrams as art works?

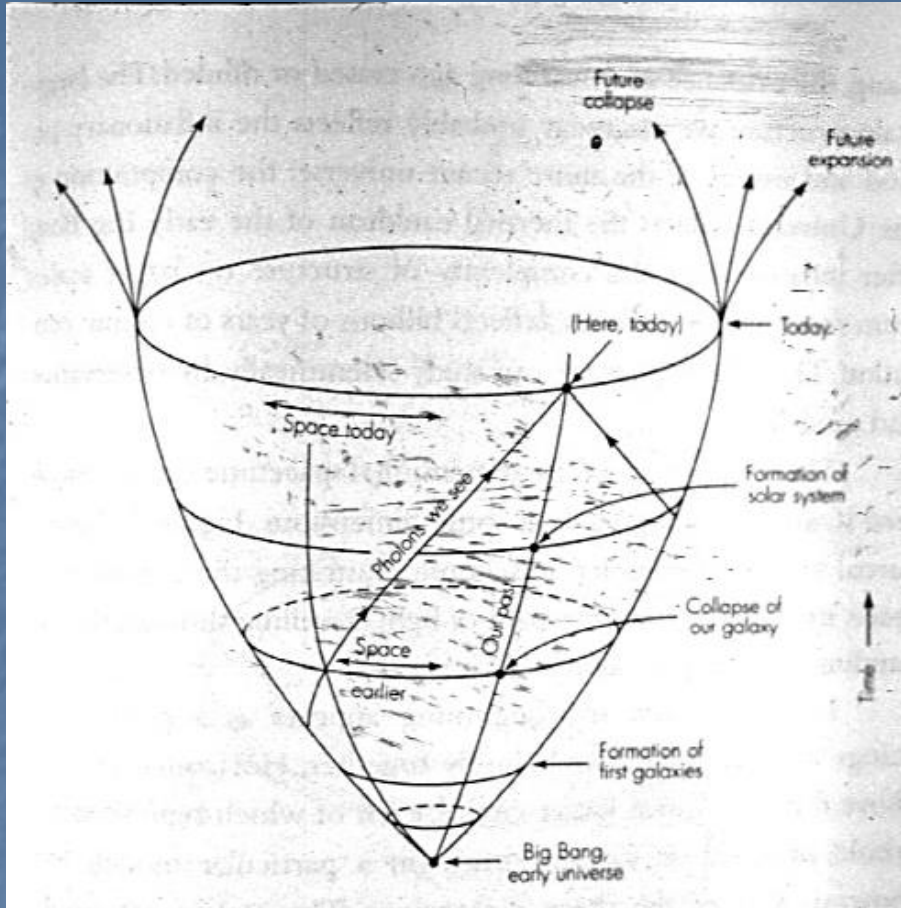


From Smoot, *Wrinkles in Time: The Imprint of Creation*, 1993



## Smoot 'History of the Universe'

## Modern – scientific diagrams as art works?



Cosmic expansion, as a cone (from *The Little Book of the Big Bang*)

*Using visual images to explain to the uninitiated?*



Freibourg Cathedral 14<sup>th</sup> C

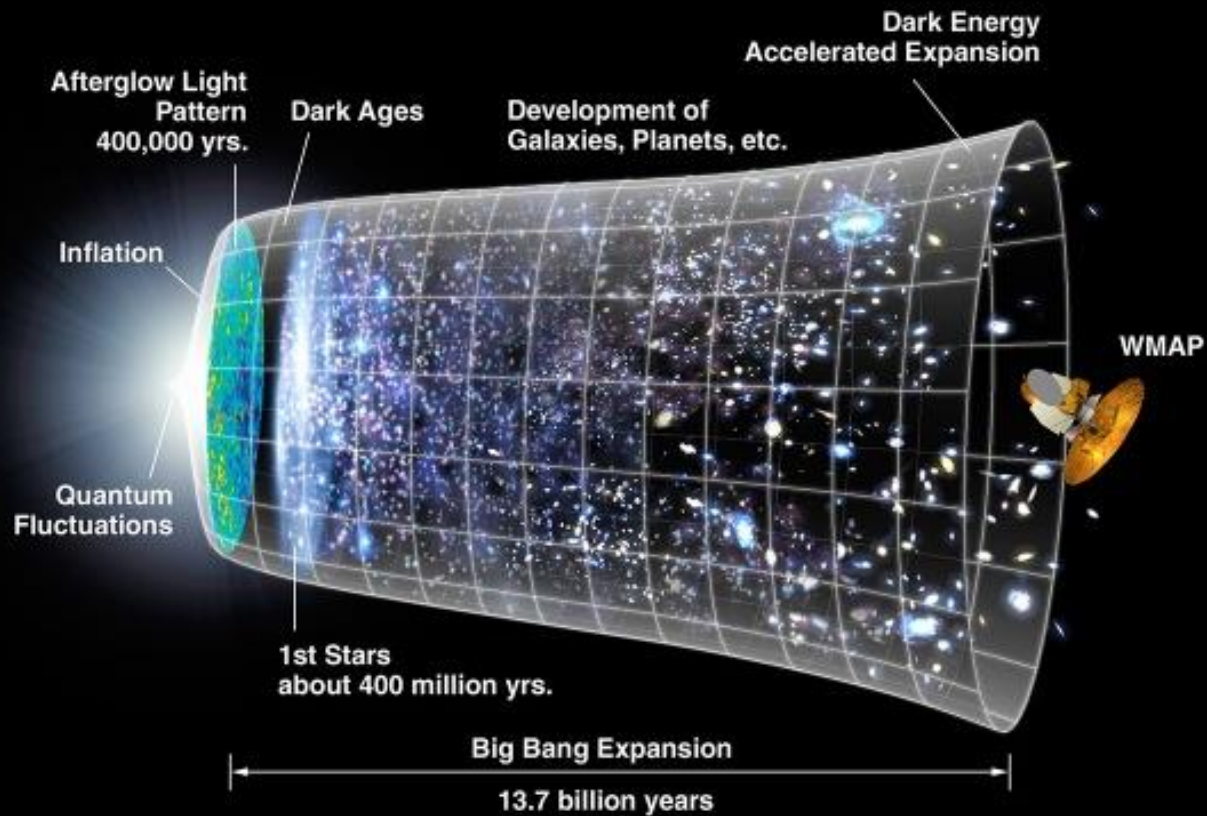




Marc Chagall, *Creation of Man*, 1956-58



Cedric Sorel, *Big Bang*, 2008



NASA/WMAP Science Team

NASA image of the Big Bang/Creation



# Summing up

- Many not illustrated – no attempt?
- Many probably did not survive?
- What is scientific and what is artistic?
- When is a scientific drawing an art work?
- Examples readily fall into categories
- Do similar concepts apply to images of  
‘the end’?



# The End

- Planet, solar system, universe?
- The individual? Death, mortality?
- The great unknown?
- Linked with judgment/guilt – as disciplinary propaganda for the laity in the absence of effective judicial systems?
- The Judao-Christian tradition (widely known of)
- Other views, up to and including the present day

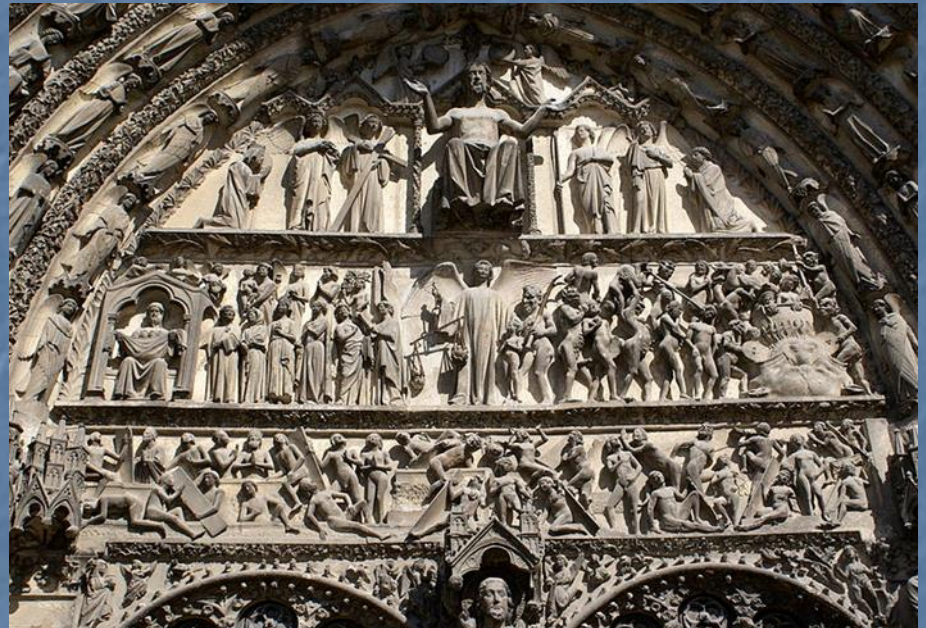


Judao-Christian .... 'Heaven and earth shall pass away' – linked with the judgment of mankind

Romanesque and Gothic



Vezelay, *Last Judgment*, 1125



Bourges, *Last Judgment*, 1230-65



# Manuscripts



St Sever Apocalypse, 1028-72



Winchester Psalter, mid 12<sup>th</sup> C



## Byzantine



Christ in Chora, Constantinople, c 1315-21

## (Proto) Renaissance



Giotto, *Last Judgment*, c 1305



16<sup>th</sup> C - more astronomical or 'cosmic'?



Albrecht Durer, *Opening of the fifth and sixth seals*, 1498 (BM)



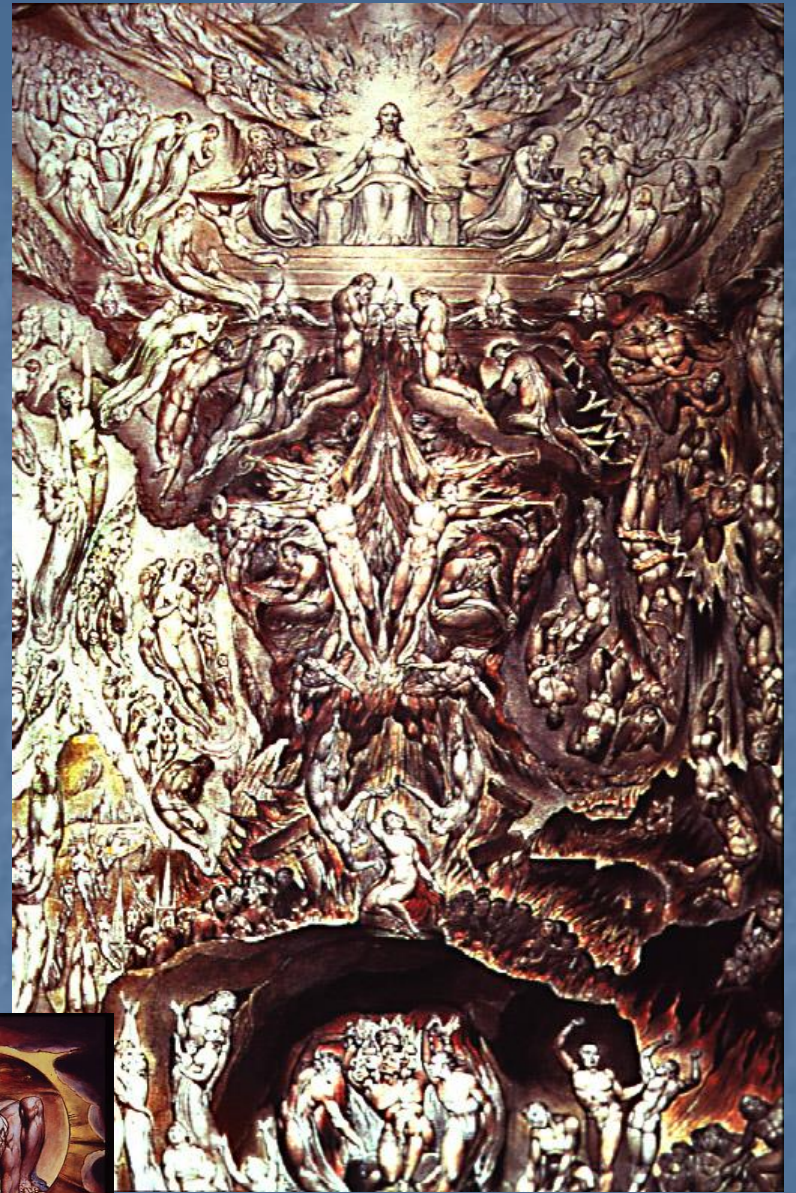
Michelangelo, *Last Judgment*, 1541  
(Influence of Copernicus, heliocentricity?)



## Later Examples



Gustave Doré, *Paradiso* 31

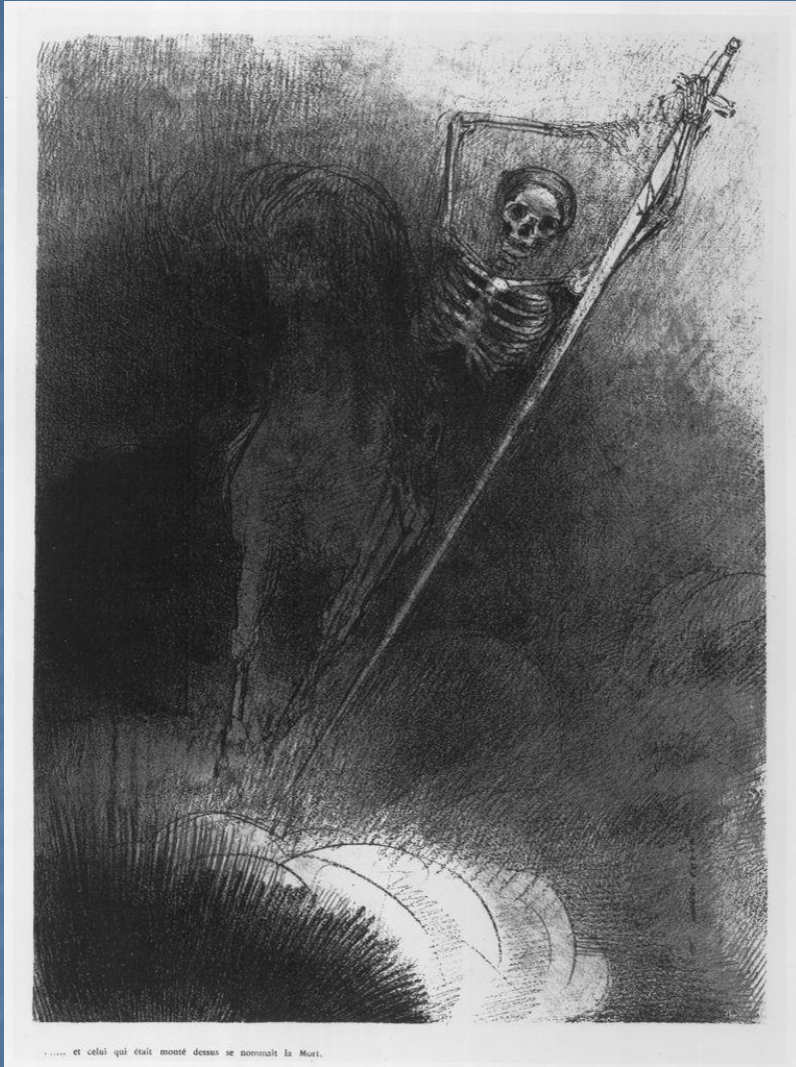


William Blake, *Last Judgment*





Focus back on people/individuals?



Odilon Redon, *The Apocalypse of St John*, 1899



Ludwig Meiner *Apocalyptic Landscape*, 1912



Wassily Kandinsky, *Last Judgment* 1910



## The planet

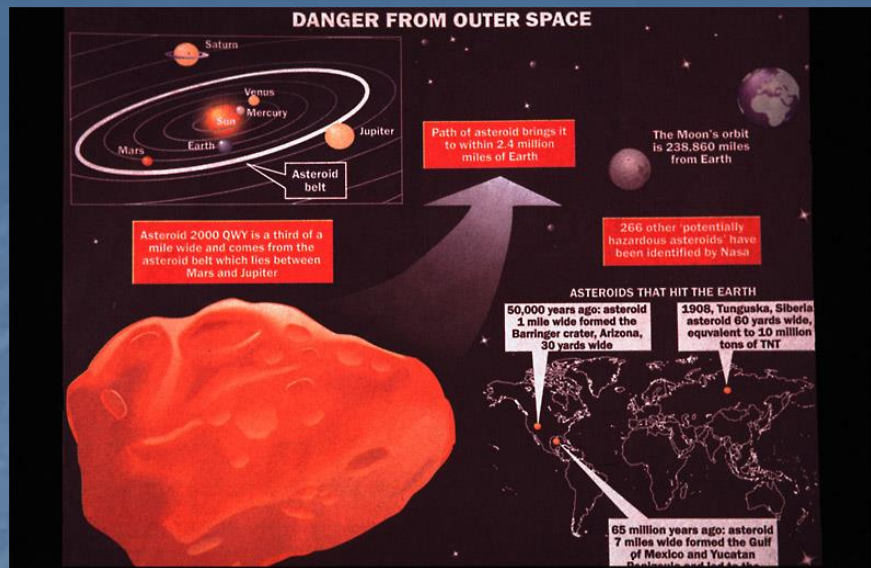


Max Beckmann, *Apocalypse*, 1942  
(while in exile in Holland)

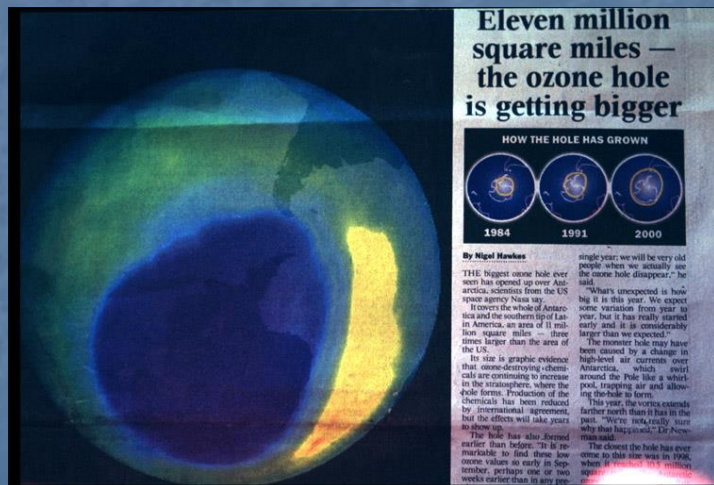


Scenes from the film *2012*, does the Mayan calendar predict the end of the world?





End by asteroid, *Times*, 5 Sept 2000



End by hole in ozone, *Times*, 9 Sept 2000



End by comet, *THES* 3 Sept 1999

THE TIMES | Saturday June 2 2012

## We're heading for intergalactic smash at 250,000mph

But don't panic. It's not going to happen for 4 billion years

United States

Jacqui Goddard Miami

For those who like to plan well ahead, NASA has announced an important date on which to mark "run for the hills" in the diary.

The Milky Way, the spiral-shaped galaxy of which our solar system is a part, is set for what the US space agency predicts will be a "vital collision" with a neighbour that will churn the Sun, the Earth and hundreds of billions of stars, and result in a major makeover for space.

Lest anyone should panic, the cosmic clash will not start for another four billion years — and will then take another two billion years to play out.

Though it has long been known that the galaxy Andromeda was hurtling towards the Milky Way, astronomers have until now been unable to tell whether it was on course for a near miss, a glancing blow, or a head-on smash-up.

Experts at the Space Telescope Science Institute (STSI) in Baltimore, Maryland, say that they can now forecast the latter with certainty, thanks to seven years' worth of data collection by the \$2.5 billion Hubble Space Telescope, which can peer deep into space from its position 350 miles above Earth.

"After nearly a century of speculation about the future destiny of Andromeda and our Milky Way, we at last have a clear picture of how events will unfold over the coming billions of years," said Tom Sola, an astronomer at the institute. Until 1914, astronomers did not know that there were galaxies beyond the Milky Way. Andromeda, which is 25 million light years from Earth but visible to the naked eye, was

The mutual pull of gravity between the two galaxies means that Andromeda is heading towards the Milky Way at 250,000mph. In four billion years they will meet in a "vital collision"

The Solar System will be hurled from its current position to a point further from the new galactic core, but Earth will survive



noted as a mere gas cloud. But space observations pioneered around then and popularised in the 1920s by the American astronomer Edwin Hubble led to the realisation that Andromeda is a galaxy, and is coming our way. Only now,

Andromeda, also known as M31, is a spiral galaxy around 2.5 million light years from Earth, containing one trillion stars

The Milky Way is a spiral galaxy up to 120 million light years in diameter, containing up to 400 billion stars and around 13.2 billion years old

using the orbiting telescope named in his honour, has the STSI been able to measure Andromeda's motion as it hurtles through space at 250,000 mph.

the Andromeda galaxy and our Milky Way," said Roeland van der Marel, who led the study. The collision will reshape the two into a single elliptical galaxy. Stars and planets, including the Sun, will be flung into new positions orbiting around a new galactic core.

Despite the shake-up, astronomers say that because of the vast distances involved — the Milky Way is 120 million light years wide and Andromeda almost twice that — individual stars

within the galaxies will not collide with one another and Earth and our solar system are not in danger of being destroyed. The change wrought by the galactic showdown will take two billion years to unfold.

Ray Villard, of the STSI, told *The Times*: "Understanding what's going on would take many, many, many generations. Everyone here is a little humbled that the event we are predicting will span the lifetime of civilisations... the pace might be likened to watching grass grow."

according to asteroid theory, wiped out the dinosaurs. A European research project should look for smaller asteroids hundreds of metres across, Bailey believes. A 1.5-metre telescope in the southern hemisphere, sweeping the entire sky, would cost about £1 million a year to build and run, he says. Perhaps in three or four years' time it could be upgraded to a four-metre wide field telescope costing about £20 million.

Benny Peiser, a social anthropologist at Liverpool John Moores University, has studied the consequences of past asteroid impacts. "For objects 100 metres across, the environmental effects would be regional but the social and political impact would be much worse; people would be very scared. The likelihood of such an object hitting the Earth in our lifetime is great. There is little we can do about it, except make the public aware that they might have to deal with such an event."

No one has ever destroyed an asteroid, but Bailey says there is a range of measures that could be taken. "For example, if an asteroid 300 metres across hit the Atlantic, it would create a huge tidal wave. If we removed the population from coastal areas, it would save millions of lives."

**On Thursday**  
Discover the early years of life with *Eureka* Life

End by intergalactic smash, *Times*, 2 June 2012



## The solar system



*This is the way the  
world ends,  
not with a bang but with  
a whimper ...'*

*(T S Eliot, *The Hollow  
Men*, 1925)*

*Adolf Schaller, *The Death of the Earth and the Sun*, c 1980s*



The planet



Alberto Ruggieri (b 1963)

Everything ...



Lucio Fontana – *Il fino do dio* , 1990





- New Scientist 31 Jan 2015, 'Dawn of the Plasticene Age' (Image: Bigshot Toyworks)*
- All the plastics that have ever been made are already enough to wrap the whole world in plastic film .....*
  - Five concentrations - Pacific, Atlantic and Indian oceans (5.25 trillion items)*



An intense nervousness  
expressed via humour

Wednesday, May 18, 2011 **METRO** 3  
Judgment day upon us, says religious leader - but he's been wrong before

# The end is nigh (forget about Sunday)



Warning: Mr Camping's supporters in New York. They say the end will come on Saturday Picture: Getty







It's a great idea but can't we have something bit more dramatic – with some primordial soup ... and turtles all the way down