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The Beginning and the End: Images of the Universe

Overview:

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 self?

Last Judgment (of individuals) or threats to our planet?

Gradual collapse, endless nothingness, or a final ‘bang’ ?

Validity of visual images – whether spiritual or scientific

Creation

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.
[Gen 1:1]

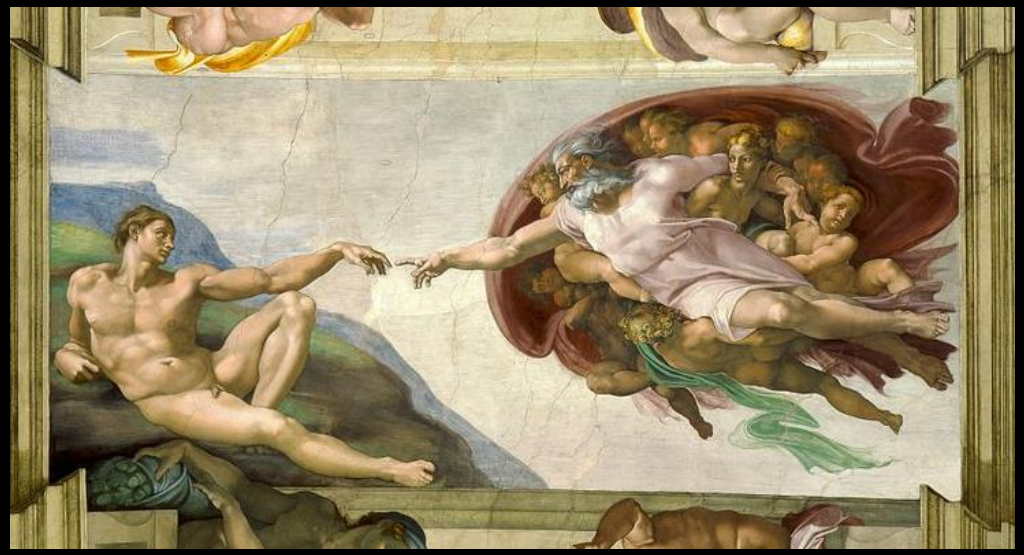
The Sistine Chapel
Ceiling
Michelangelo, 1508-12

Last Judgment

Then I saw a
new heaven and
a new earth, for
the first heaven
and the
first earth had
passed away…
[Rev 21:1-27]

The Sistine Chapel
Altar Wall
Michelangelo, 1536-41

Separation of Light from Dark

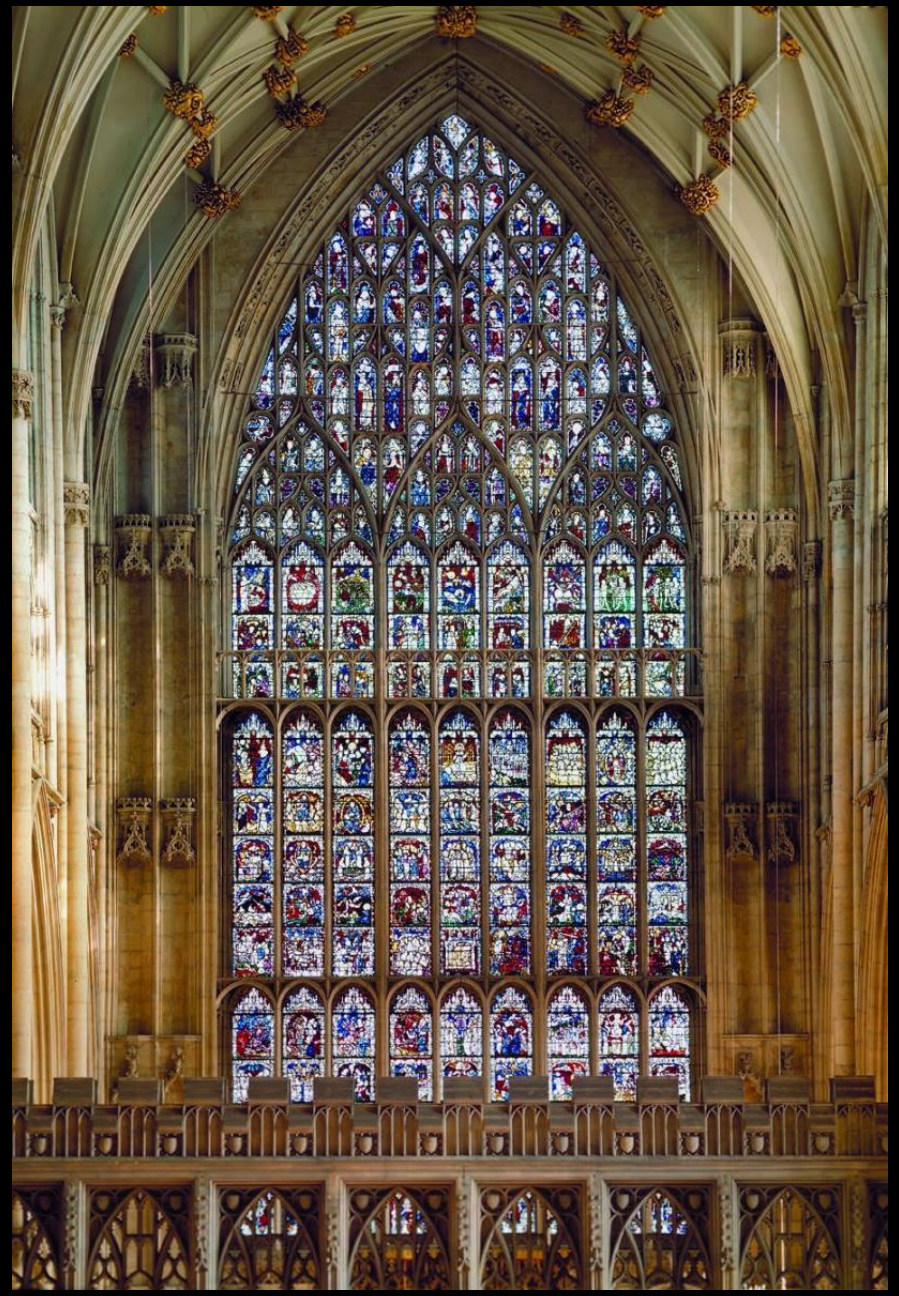


Creation of Man(kind)

Creation of Sun, Moon and Planets

The order is roughly the same – but a different timescale

Composites



York Minster, 1405-08

Ego sum Alpha
et Omega

Catacomb of Comodilla, Rome 4th century

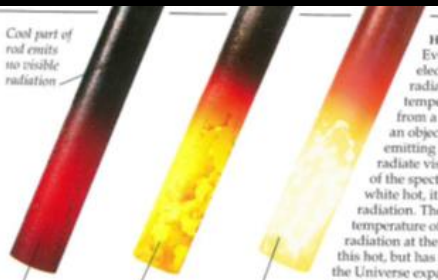
S Apollinare in Classe,
Ravenna Alpha, Omega
(7th century)

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, 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.

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.

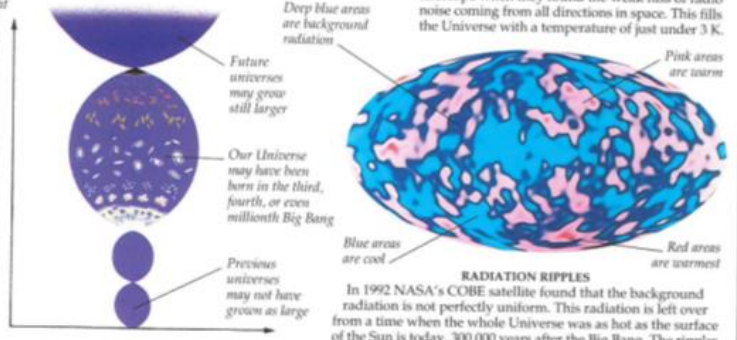
GAMOW'S HOT AIR
George Gamow (1904-1968) was the first person to work out how hot the Big Bang must have been. Just as air in a bicycle tyre gets hot when it is pumped in, the Universe must have been very hot when it was squeezed into a tiny volume. Gamow said the leftover heat from this fireball should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



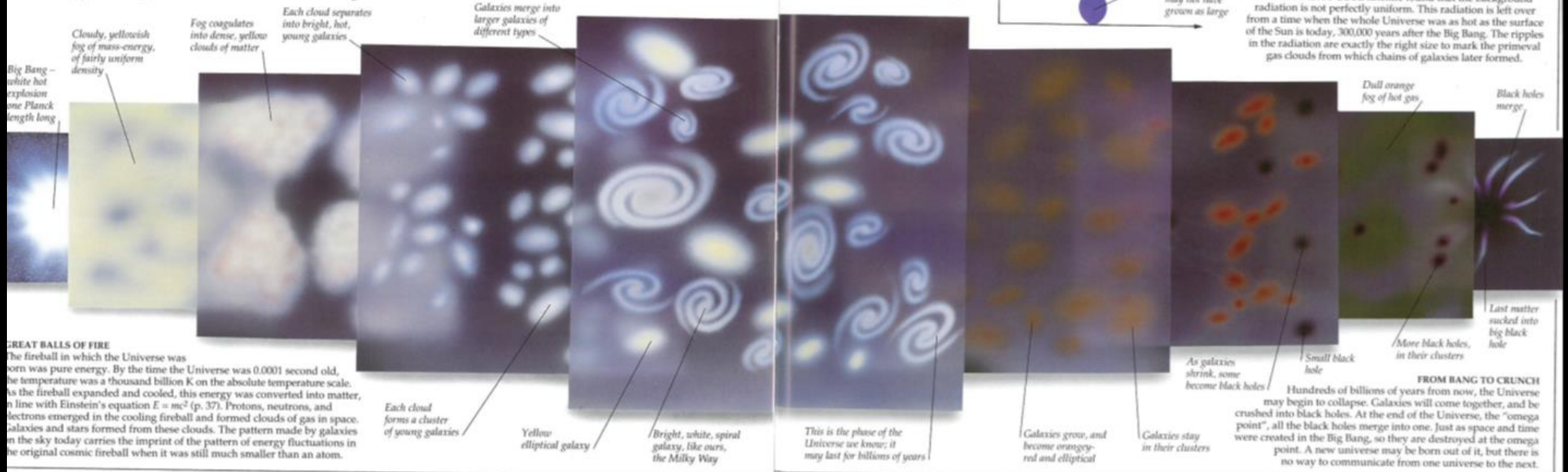
HOT RODS
Everything radiates electromagnetic energy. The radiation wavelength depends on the temperature. The invisible warmth from a radiator is infrared heat. When an object gets hot enough, as well as emitting infrared heat it will begin to radiate visible light, starting at the red end of the spectrum. 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.

FROM BANG TO CRUNCH
Hundreds of billions of years from now, the Universe may begin to collapse. Galaxies will come together, and be crushed into black holes. At the end of the Universe, the "omega point", all the black holes merge into one. Just as space and time were created in the Big Bang, so they are destroyed at the omega point. A new universe may be born out of it, but there is no way to communicate from one universe to the next.

J and M Gribbin, *Time and Space*, Doring Kindersley, Eyewitness Science, 1994 ed

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, 1601)

First there was Chaos , the vast immeasurable abyss … Outrageous as a sea, dark, wasteful, wild (Milton, *Paradise Lost,* 1667)

In the beginning the Universe was created. This has made a lot of people very angry and been widely regarded as a bad move (Douglas Adams, *The Restaurant at the End of the Universe,* 1980)

Big Bang: *The singularity at the beginning of the universe*

Big Crunch: *The singularity at the end of the universe*

Stephen Hawking, *A Brief History of Time,* 1988

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

Genesis, Michelangelo, modern science (NASA/AMNH)

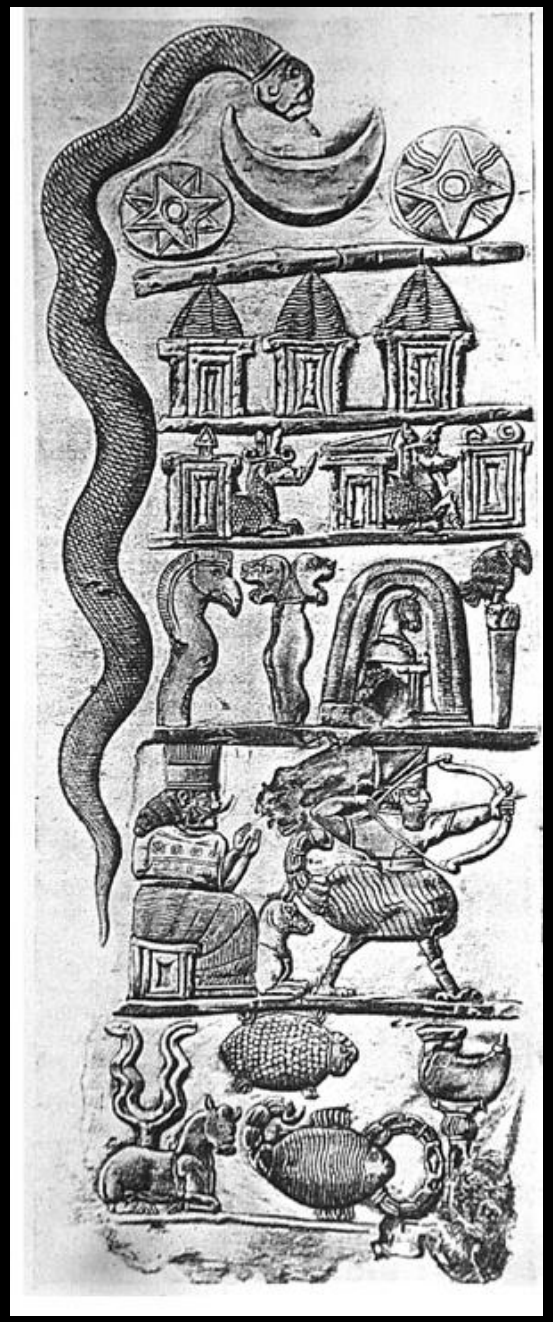
1. Timing		Judaeo-Christian	Michelangelo	Scientific theory	Timing (NASA + AMNH)
Day 1	Light and Dark	Let there be light: and there was light…. and God divided the light from the darkness	The Separation of Light and Darkness	Big Bang	13.82 billion years ago (or 13.7? 15?)
Day 2	Atmosphere, firmament	Let there be a firmament in the midst of the waters …. called the firmament Heaven.	The Creation of the Sun, Moon, Planets	First stars and galaxies	10 billion years ago
Day 3	Land, vegetation	Let the dry land appear …. grass, seed, fruit	Separation of Land and Water	Formation of sun then earth/planets	4.6 billion years ago
Day 4	Sun, moon and stars	Two great lights; the greater light to rule the day, and the lesser light to rule the night: he made the stars also	The Creation of Adam	Single cell life	3.8 billion years ago
Day 5	Birds and sea creatures	the moving creatures, and fowl that may fly… great whales, and every living creature that moveth	The Creation of Eve	Dinosaurs	228 million years ago
Day 6	Animals, human beings	Living creatures, beasts of the earth …created man in his own image … male and female – EVALUATES – ‘good’	[Then 4 panels on the Fall, Noah etc]	First humans	1.8 million (first ‘modern humans’ c 300,000)

Babylonia, Sumeria

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) [legend of Marduk]

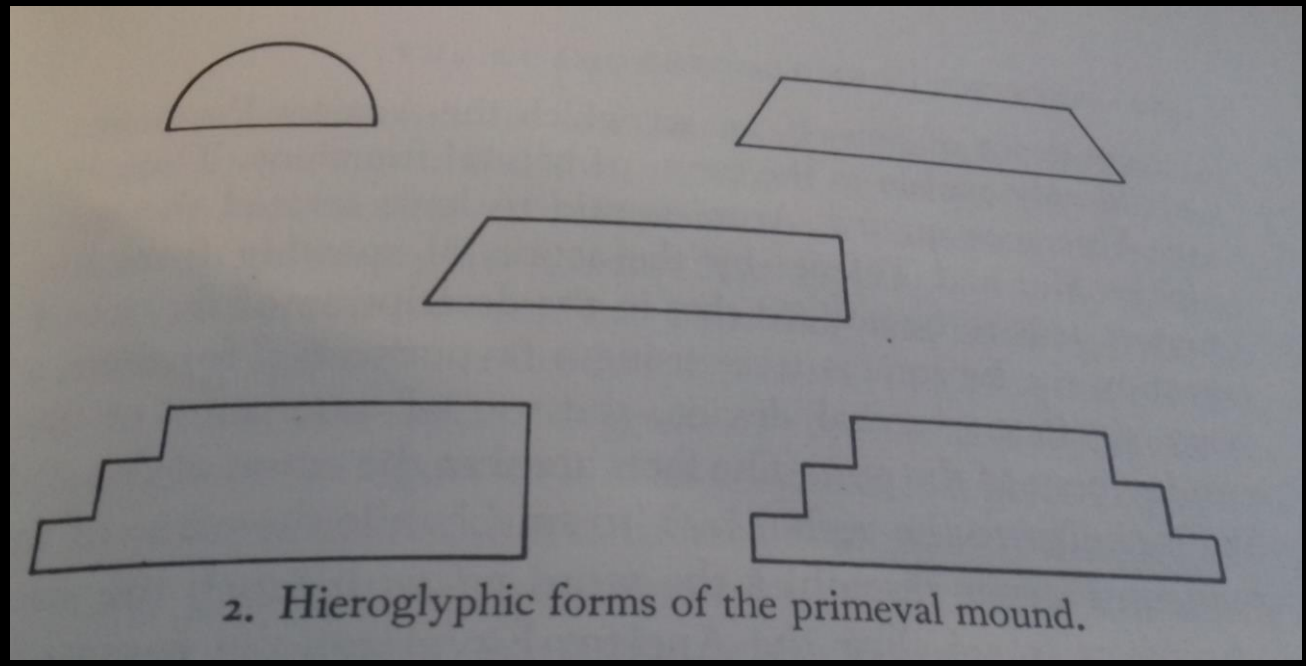
Babylonian cylinder seal, rising of the sun-god c 2300BC

Babylonian marker stone



Babylonian *Mappa Mundi* , C 6th century BC

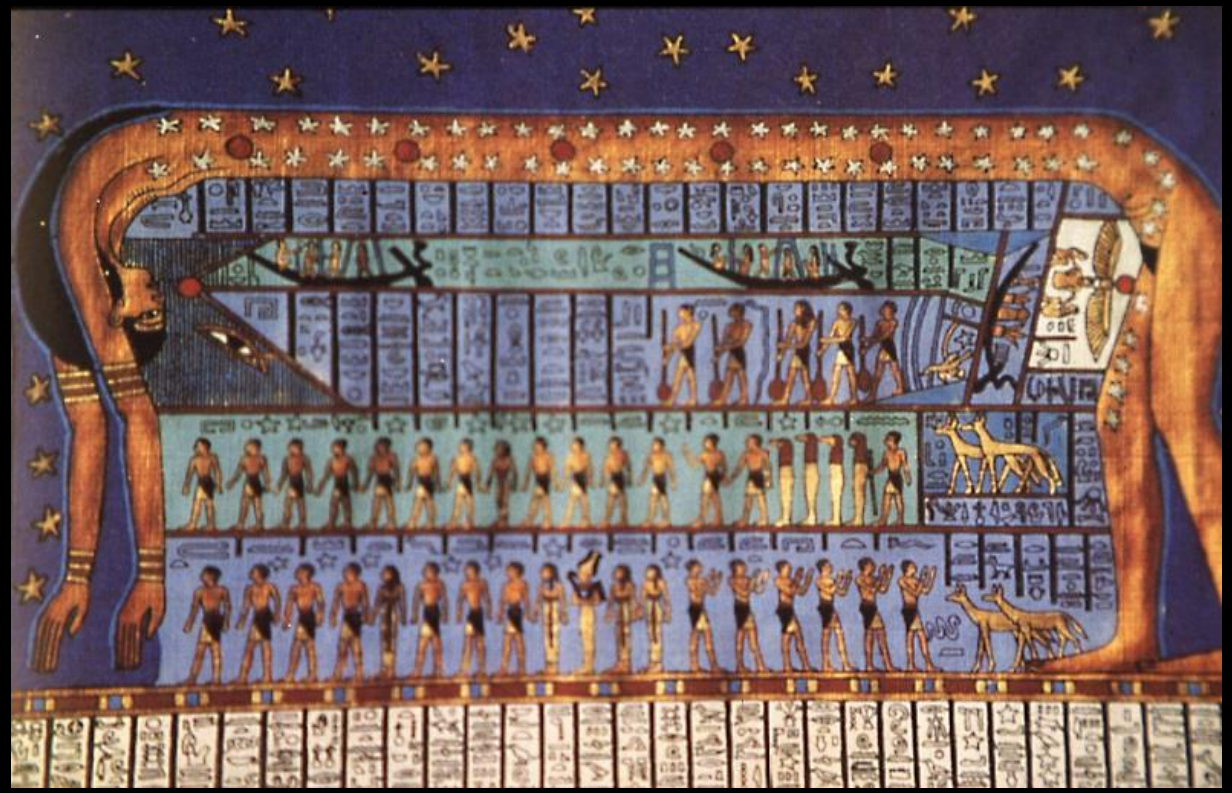
Egyptian hieroglyphs:
The mound that arose from the primeval waters (or Benben stone)



2. Hieroglyphic forms of the primeval mound.

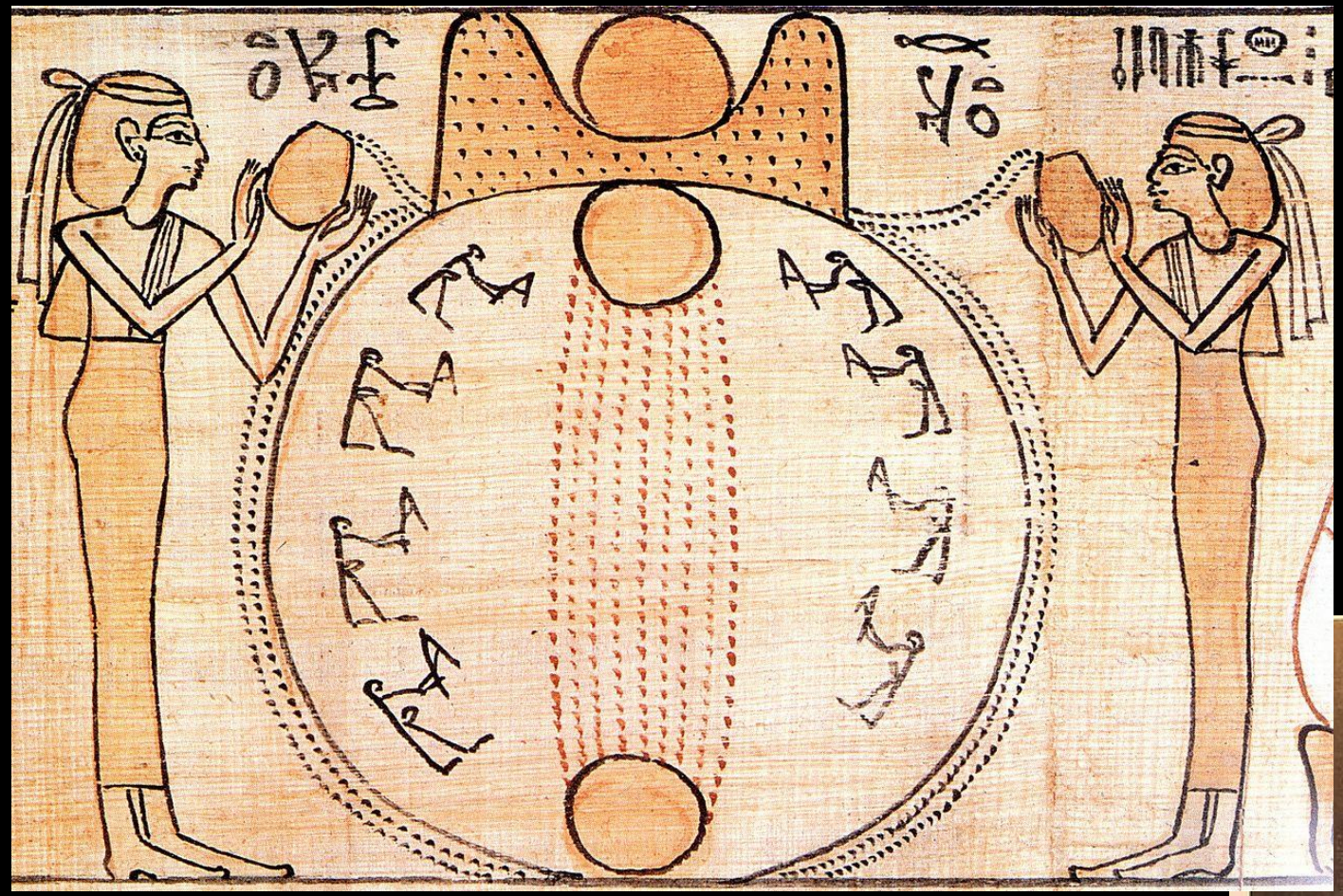
Egypt

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



Egyptian ‘Shabaka stone’
Creation myth of Ptah, c 710 BC

The sun rises over the circular mound of creation as goddesses pour out the primeval waters around (c 1000 BCE)

Greece

Plato (*Timaeus,* 31B); Aristotle, *On the Heavens*, Thales, Heraclitus, Empedocles, Anaximander

Hesiod*, Theogony:*

First of all there was Chaos …

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

Prometheus forming man in the likeness of the gods, Italy 3rd cent

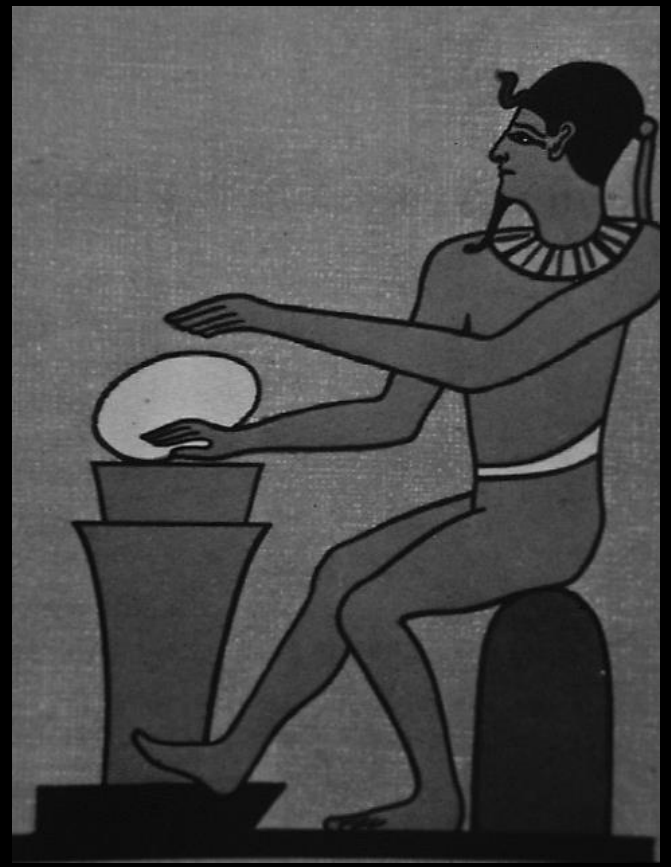
Rome

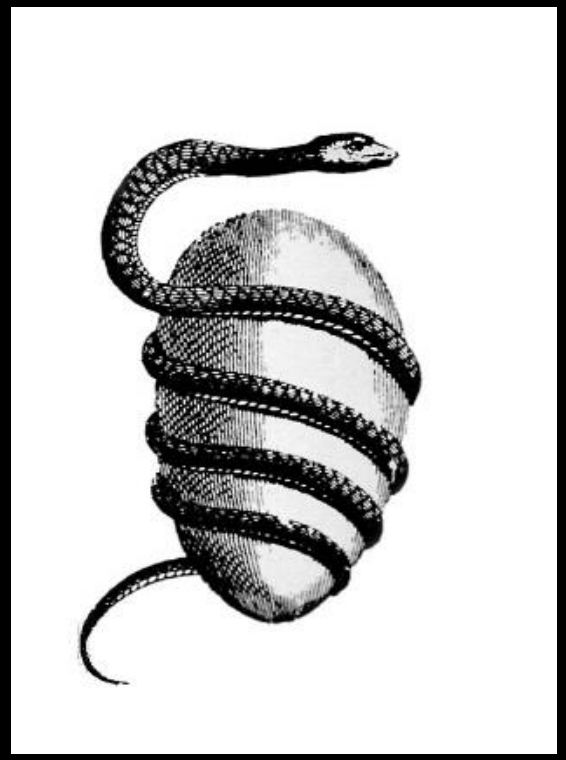
Ovid, *Metamorphoses*, attributes to "*God, or kindlier Nature …Whatever god it was*"
… *Before the seas, and this terrestrial ball, And Heav'n's high canopy, that covers all, … Rather a rude and indigested mass: A lifeless lump, unfashion'd, and unfram'd …and justly Chaos nam'd.*

Prometheus forming man in the likeness of the gods,
Graeco-Roman Gem, 3rd cent CE, Louvre

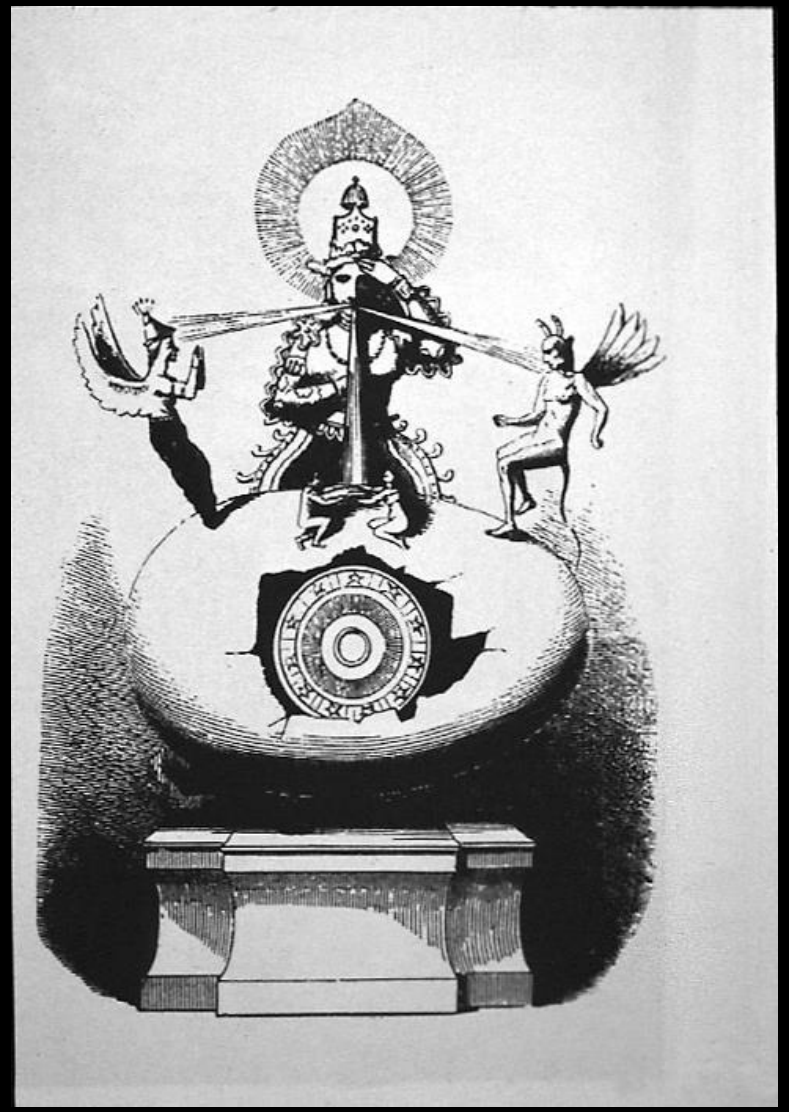
The Cosmic Egg

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

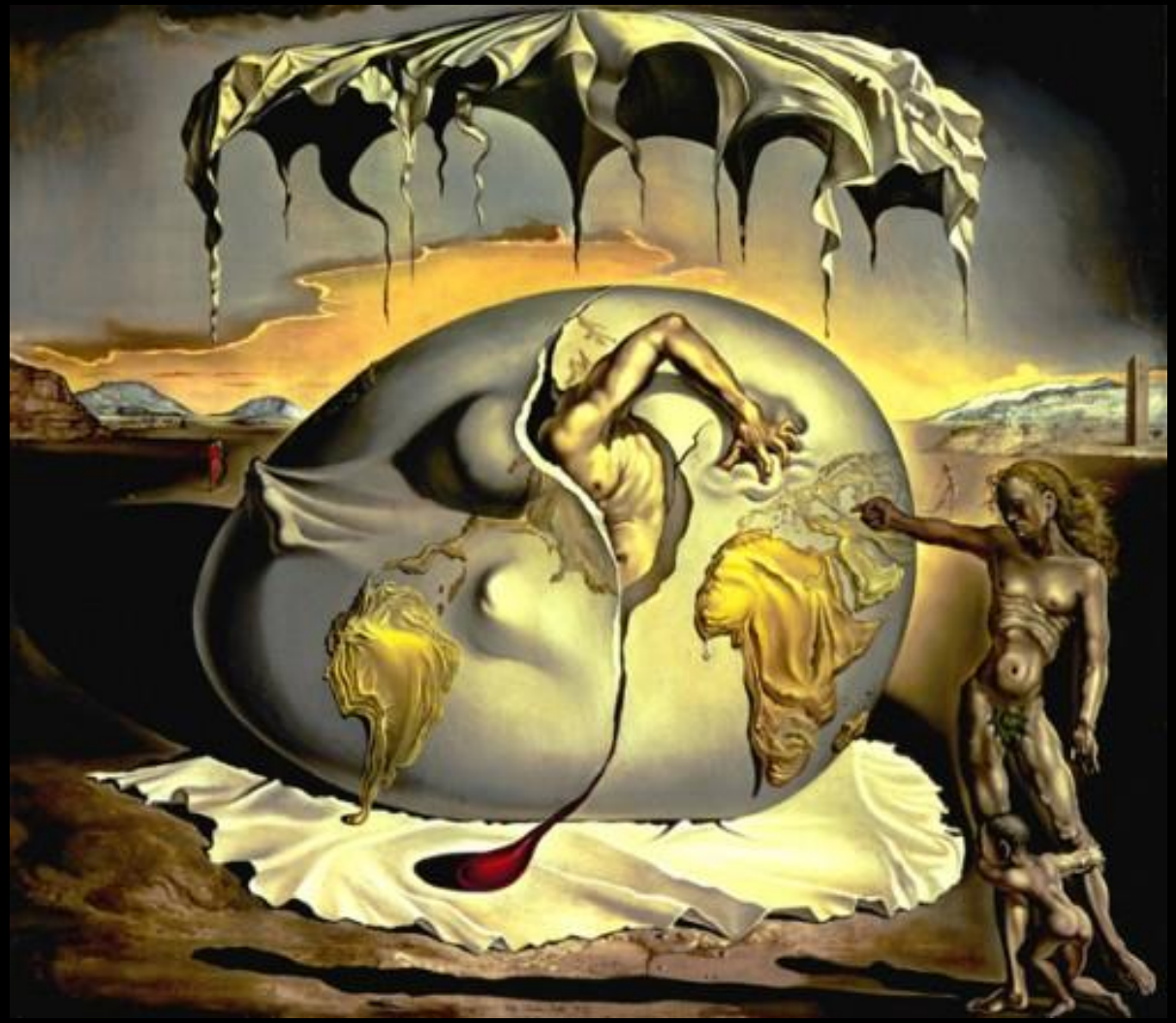




Orphic egg from J Bryant, *Analysis of Ancient mythology, 1774*

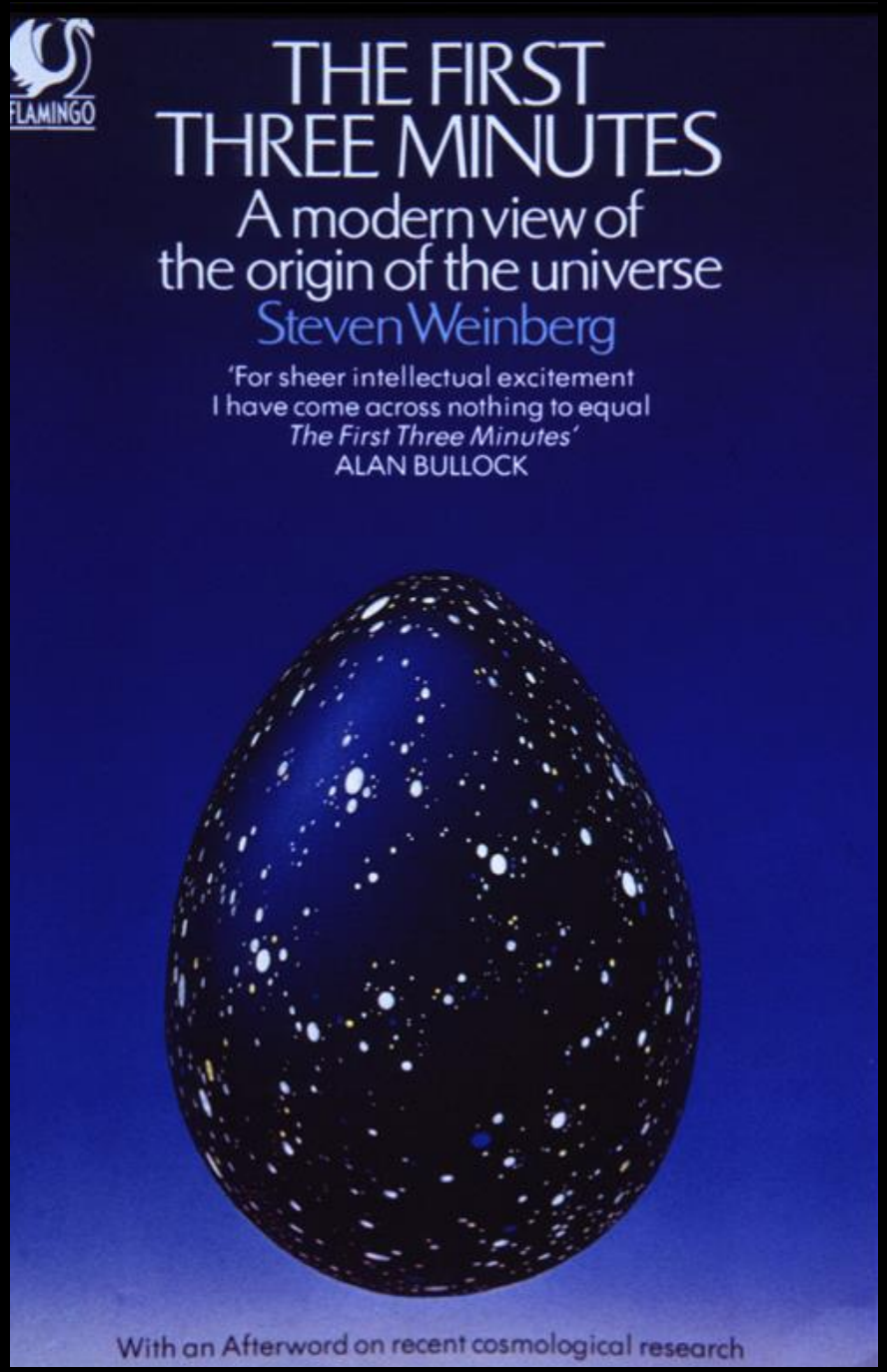


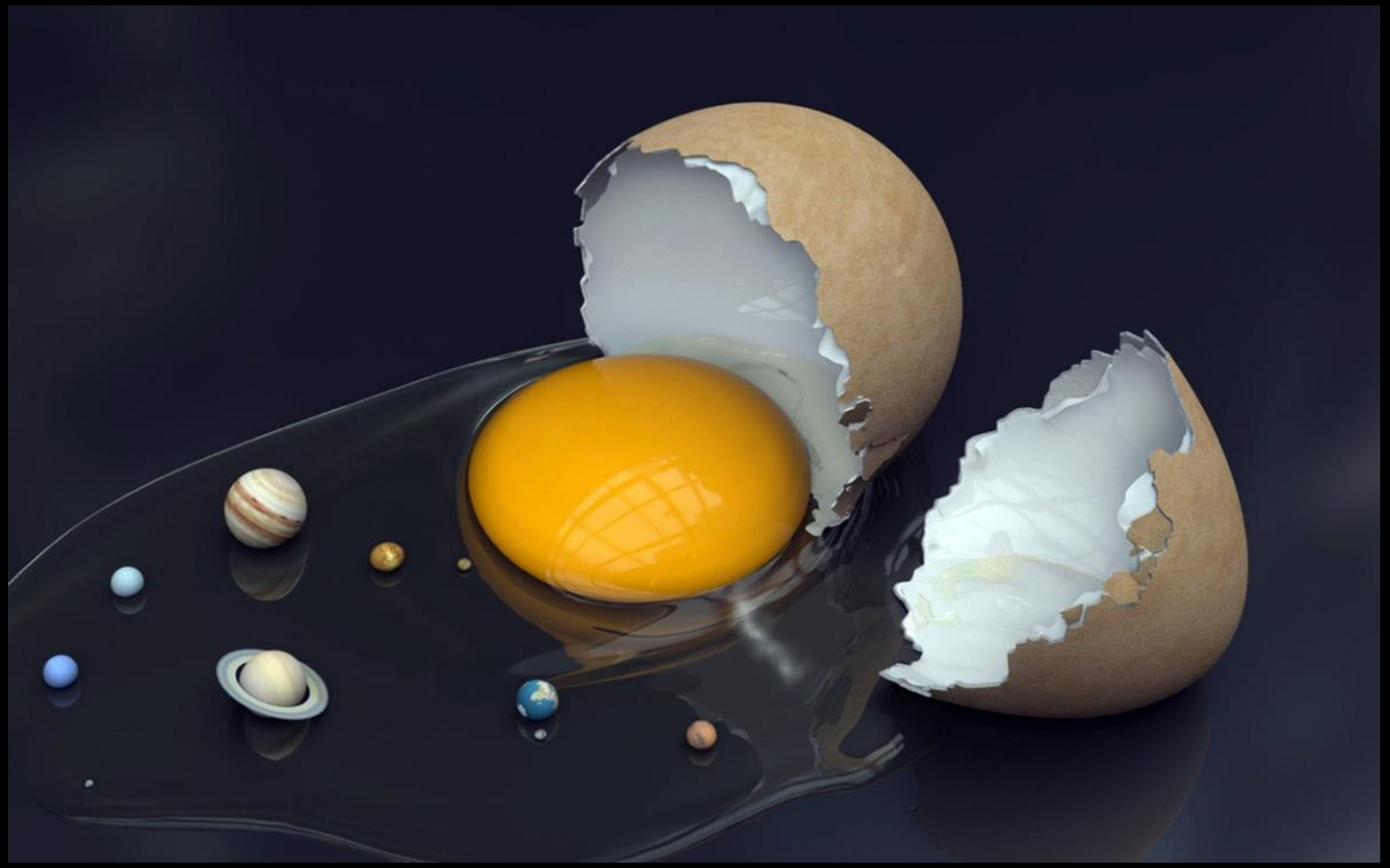
Hindu: *Then even nothingness was not, nor existence. There was no air then, nor the heavens beyond it ... At first there was only darkness wrapped in darkness*. (*Rigveda*, c. 1500–1200 BCE)



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

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

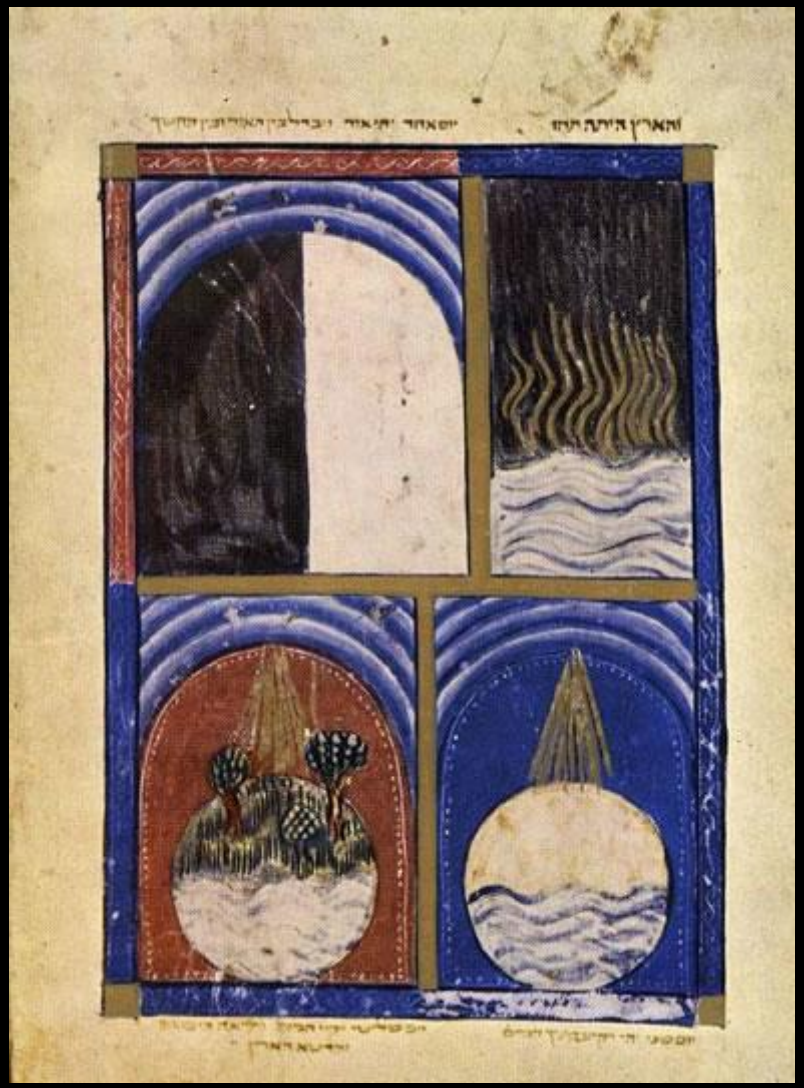




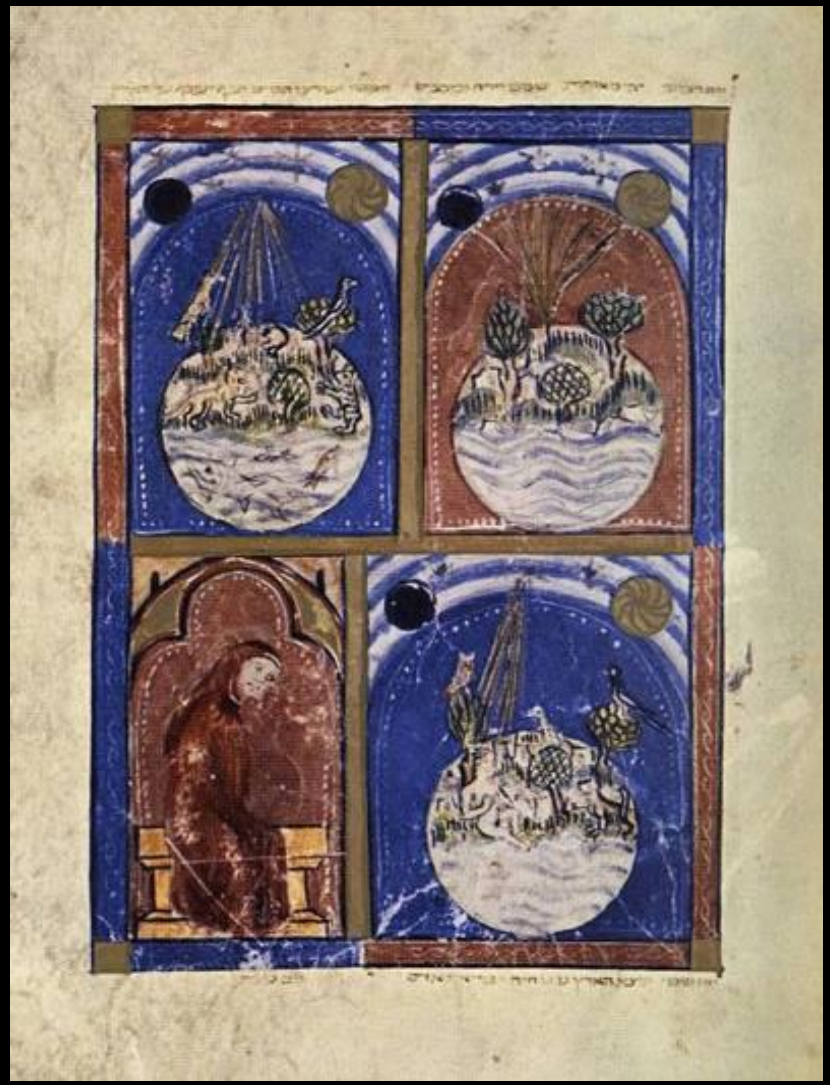
Broken egg shell 0472 from Exotic HD Wallpapers @cuzzsoft.com

Steven Weinberg, 1983

From Darkness to Light



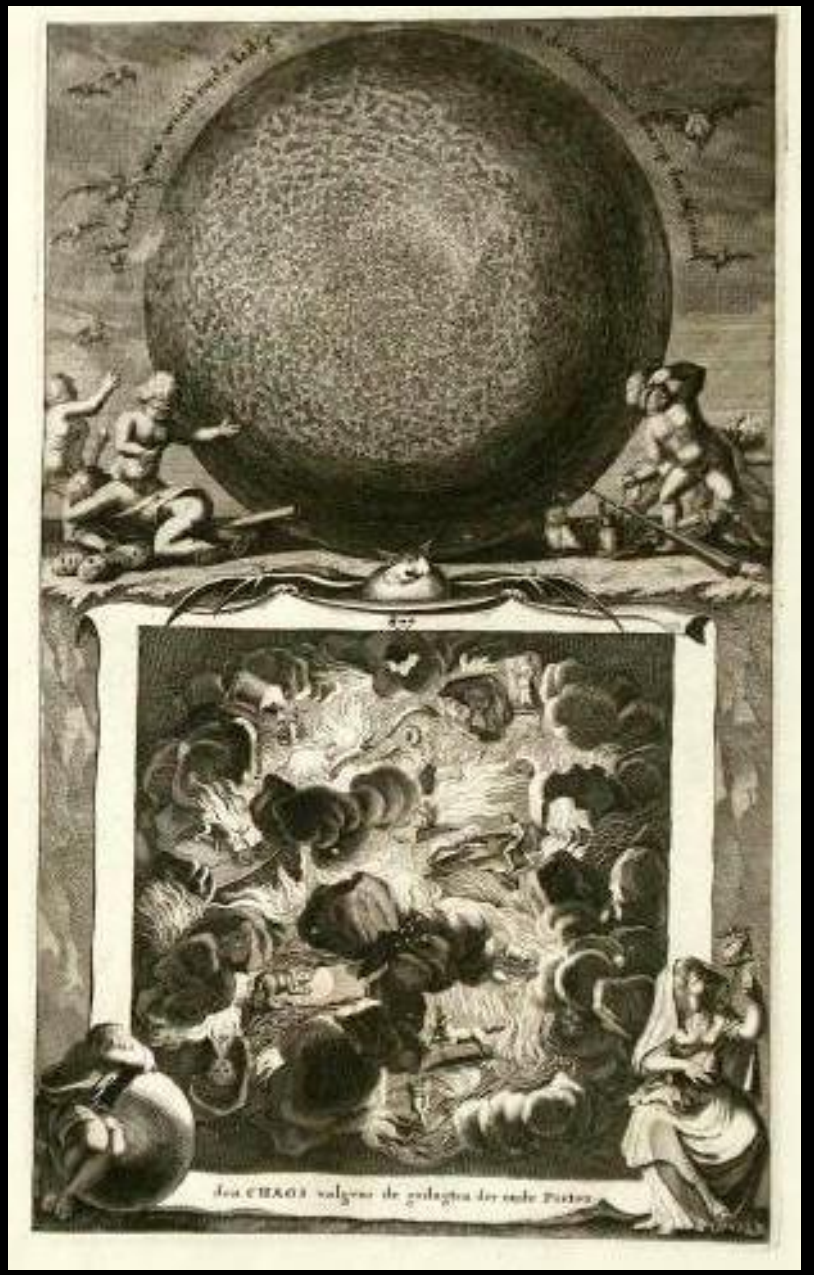
Serajevo Haggadah, Spain 12th C (darkness over the waters; light and dark; sea; vegetation)



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 the Universe from Chaos*, 1690

George Frederic Watts, *Creation* or *Chaos Passing to Cosmos*, 1873-75

Measured and Mathematical

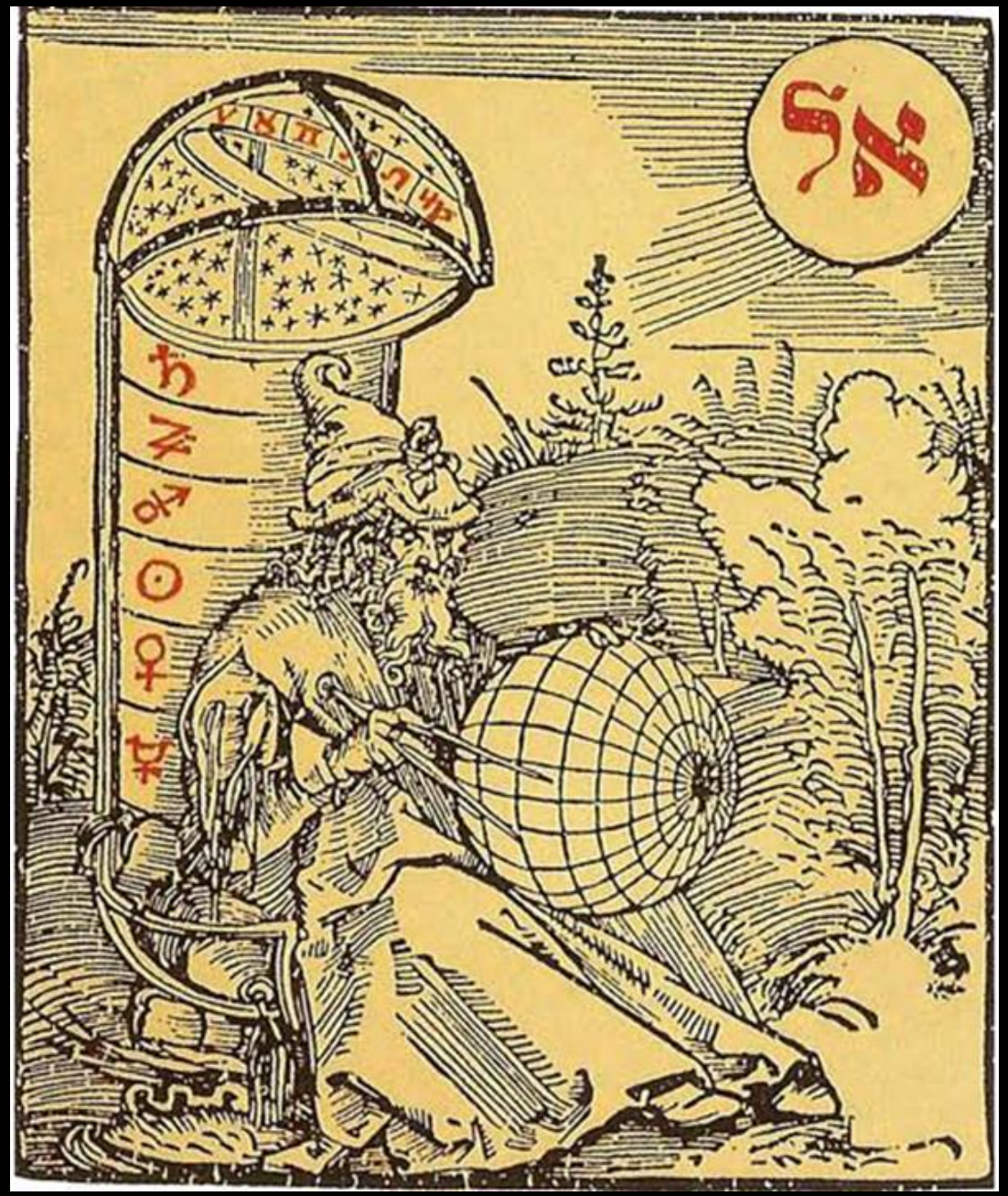
Bible Moralisée, Bodleian 1230-40

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

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

Bible Moralisée , 13th century

Linked with Mysticism, Kabbalah, Astrology



William Blake, *The Ancient of Days,* 1793

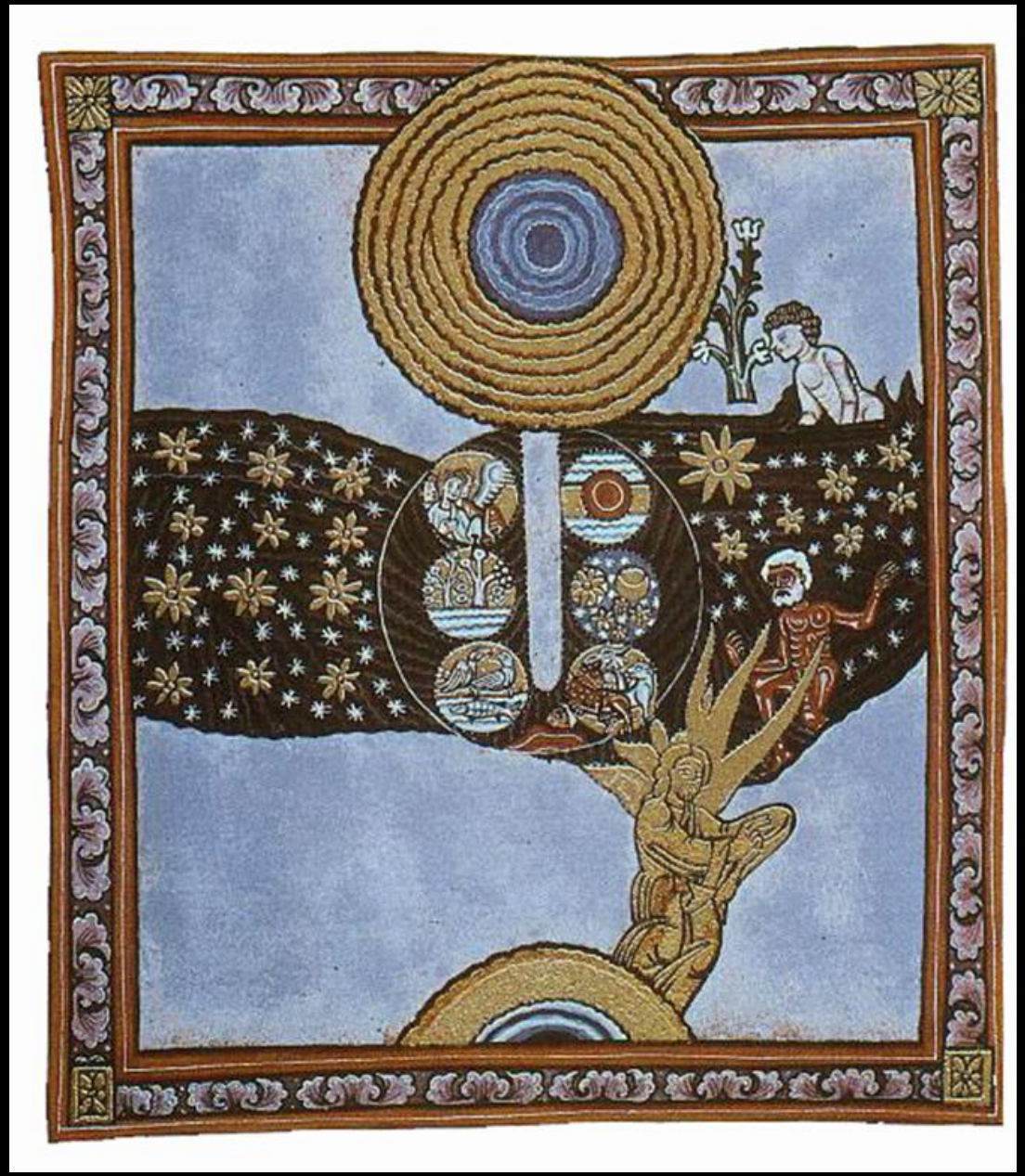
Cosmic man

Jain cosmology (India religion from 5th cent BCE) cosmology considers the universe, as ‘uncreated’ – with neither beginning nor end. Opposed to any concept of a creator. Hence, the shape of Universe perceived as a cosmic man (17th century)

Cf – Ifugao peoples in Phillippines, Arapesh in Papua New Guinea – they have no theory as to the origins; always existed and always will - *but that in itself is a theory*

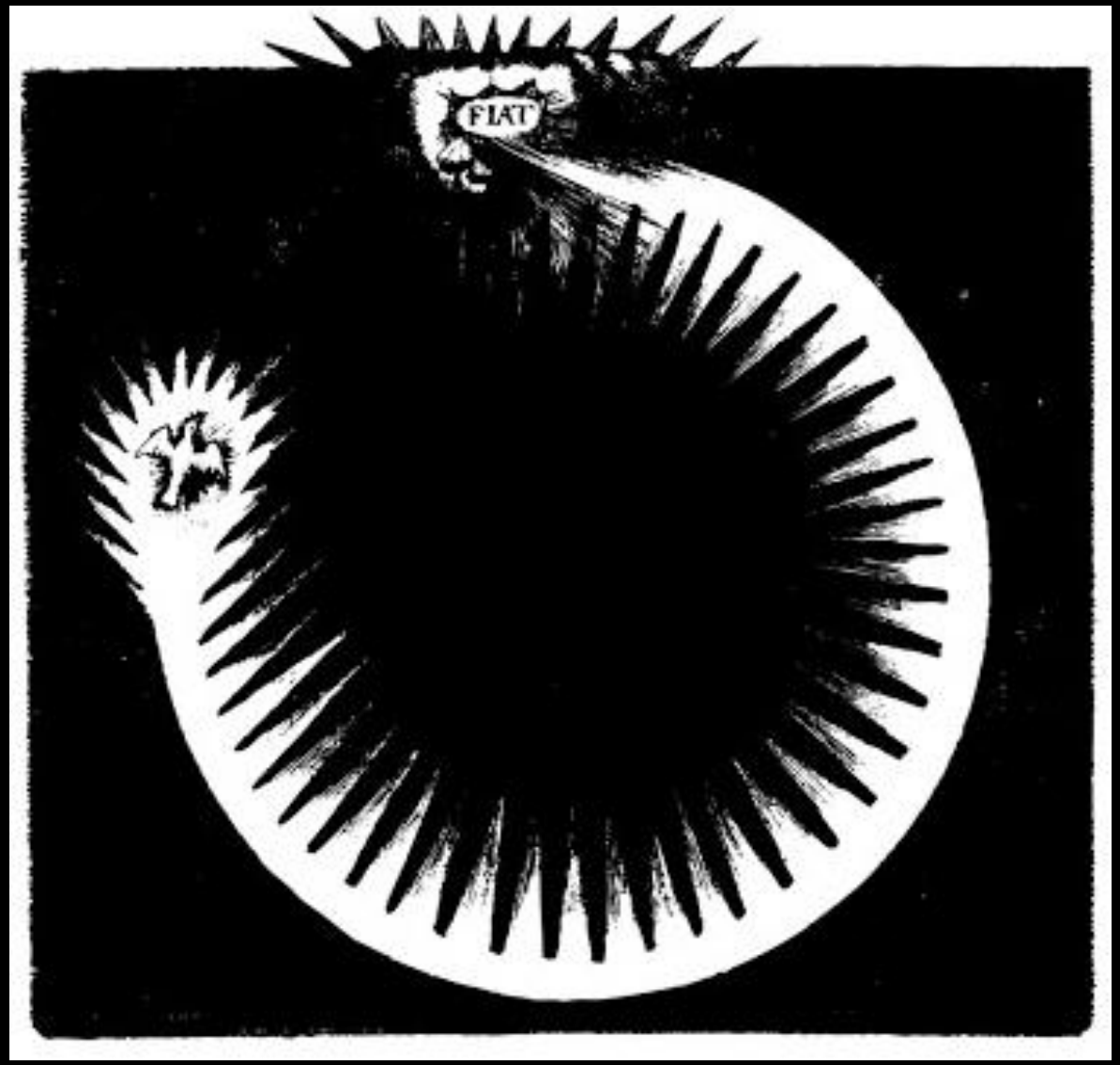
Ex Nihilo – from Nothing

Monreale, Sicily *God Creating the Universe*, 1175

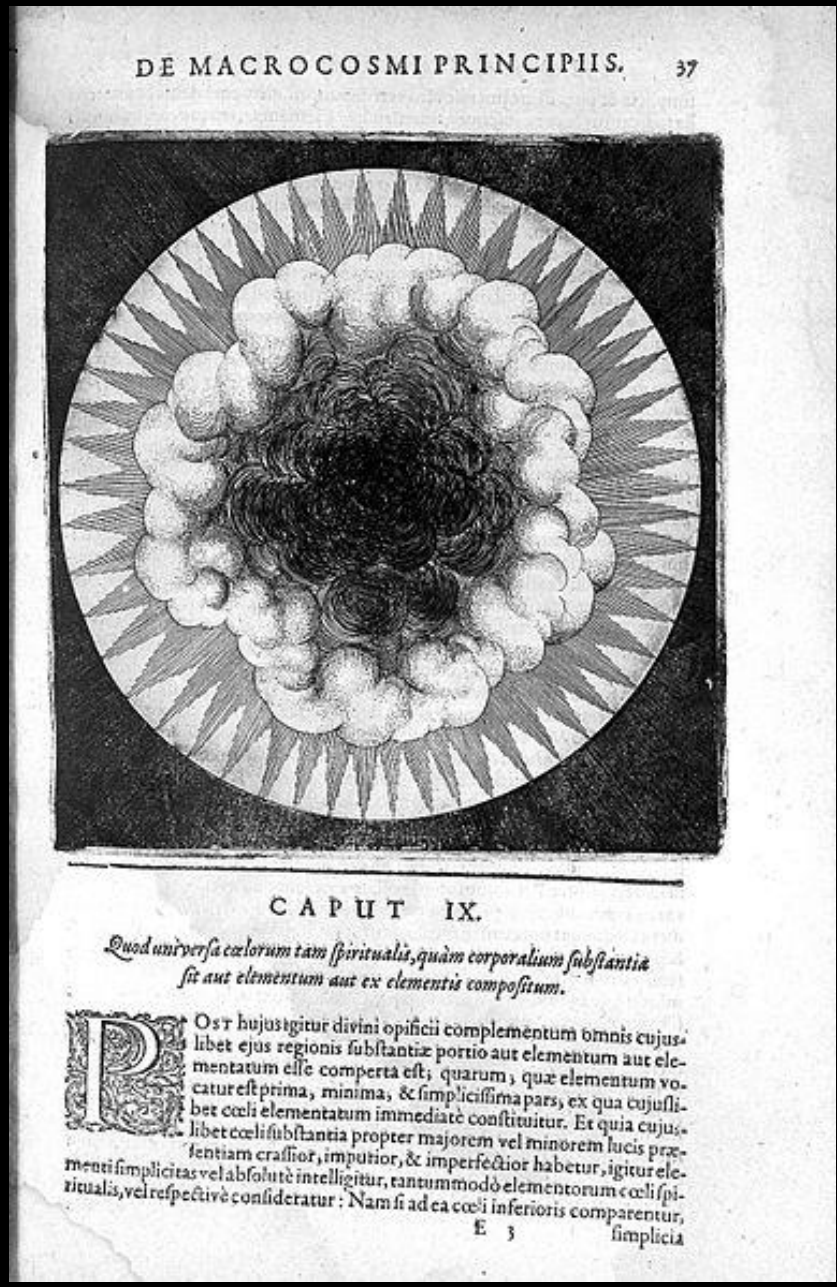


Hildegarde of Bingen, Six days of Creation *Scivias*
12th century

Ex Nihilo - A 17th century Big Bang?



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



DE MACROCOSMI PRINCIPIIS. 37

CAPUT IX.

Quod universa cœlorum tam spiritualis, quàm corporalis substantia sit aut elementum aut ex elementis compositum.

POST hujus igitur divini opificii complementum omnis cujuslibet ejus regionis substantiæ portio aut elementum aut elementatum esse comperta est; quarum, quæ elementum vocatur est prima, minima, & simplicissima pars, ex qua cujuslibet cœli elementatum immediatè constituitur. Et quia cujuslibet cœli substantia propter majorem vel minorem lucis præsentiam crassior, impurior, & imperfectior habetur, igitur elementi simplicitas vel absolutè intelligitur, tantummodò elementorum cœli spiritualis, vel respectivè consideratur: Nam si ad ea cœli inferioris comparentur,

Fludd's vision of Big Bang (cf Fr Georges Lemaître 1927)

Narrative approach

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

BIBLIA IN LINGVA VVLGARE TRADVTTA: LO PRIMO LIBRO SECONDO LALINGVA GRECA E CHIAMATO GENESIS: CIOE IN LATINO GENERATION: IN LOQVAL SI MANIFESTA LORIGINE DILMONDO. .C.I.

EL PRINCIPIO creo idio lo cielo & la terra. Ma laterra era uana & uota. Et le tenebre erano ſopra la faccia dellabiſſo: & lo ſpirito di dio era portato ſopra lacque. Diſſe idio ſia fatta la luce e fata e la luce & idio uide che la luce era buona & ſi diuiſe la luce dalle tenebre. Et appelloe la luce die: & le tenebre nocte. & tra il ueſpro & la matina lo di uno & primo.

Inuerita idio diſſe ſia fatto lo ſtermaméto nel mezzo de lacque & diuidanſe lacque da lacque. & facto e il firmamento & dio diuiſe lacque le quali erano ſotto il firmamento da quelle cherano ſopra il firmaméto e fatto e coſi. Et chiamo idio lo firmamento cielo & fatto e tra lo ueſpro & la matina lodi ſecondo.

Diſſe in uerita idio .Ragunſi lacque le quali ſono ſotto lo cielo in uno loco & appanſcha la arida: & fatto e coſi: Et ſi chiamoe idio laida terra. Et le cõgregationi dellacque chiamo Mari & queſto uide idio chera buono & ſi diſſe. Germini la terra herba uerde facendo lo ſeme: & il legno pomifero facendo fructo ſecõdo la generatione ſua in ſe iſteſo il ſeme dil quale in ſempiterno ſia ſopra la terra. & fatto e coſi. Et la terra menoe herba uerzitante & facendo ſeme ſecondo la ſua generatione. Et il legno facõdo fructo & auẽdo zaſcuno el ſeme ſecondo laſpetie ſua. Vide idio che queſto era buono: et fatto e tra iluеſpro et la matina lo di terzo.

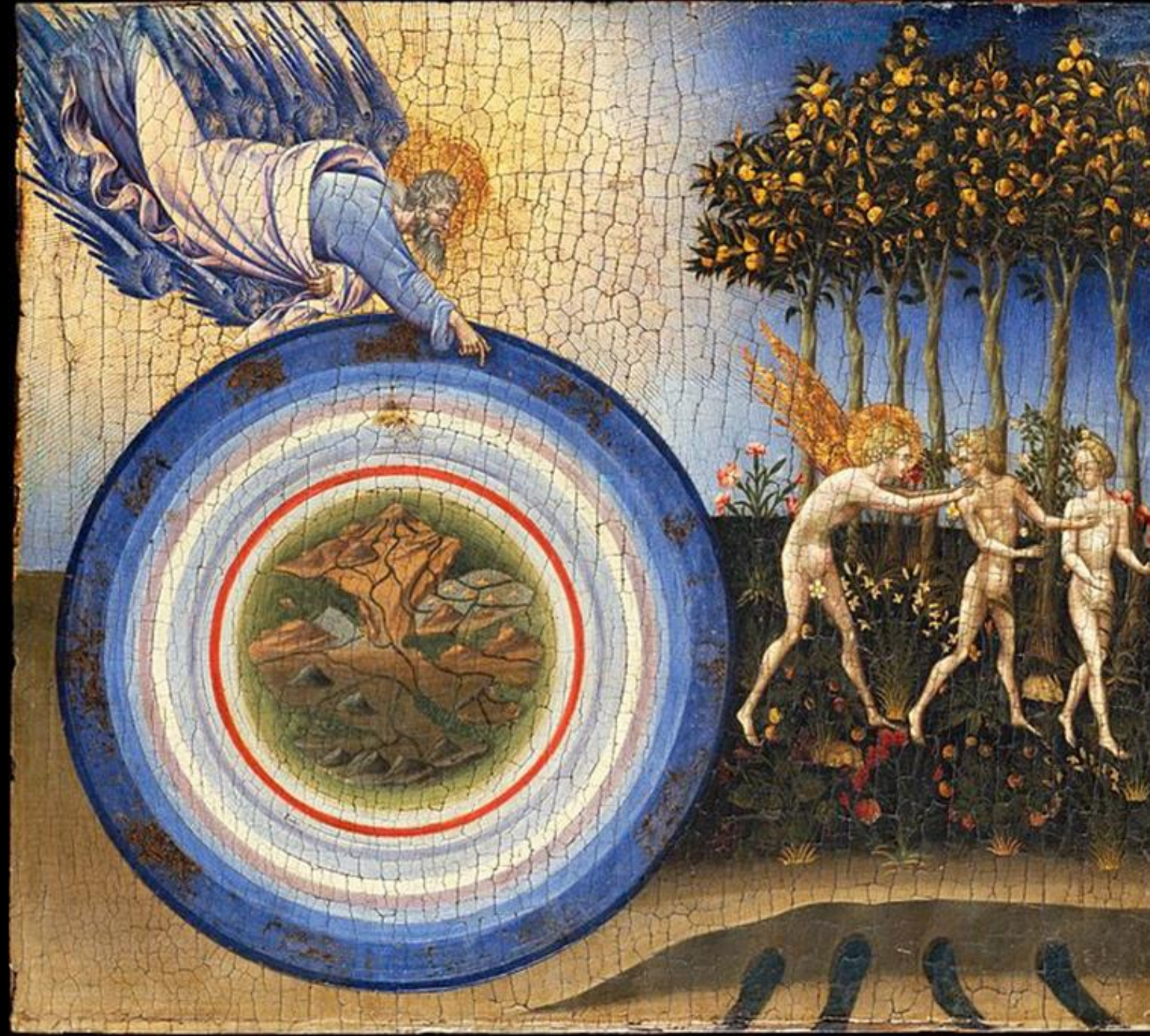
Diſſe ancora idio ſia fatto illuminari nel firmaméto del cielo: & diuidano il di da la nocte ſieno in ſegni & tẽpi: et dii: egli anni: accio che lucano nel firmaméto del cielo: & illuminano la terra. Et fatto e coſi Fece idio dui grandi luminari magori: accio che ſoprasteſſe il di: uno magiore luminare: cioe il ſole: et el luminare minore: cioe la luna che ſoprasteſſe ala nocte & alle ſtelle. Et ſi le puoſe nel firmamento del cielo acio che luceſſero ſopra la terra et diuideſſe la luce da le tenebre: et diuiſero la luce dalle tenebre Et uide idio chera buono queſto & fatto e tra il ueſpro et la matina: lo di quarto.

Bibl Vulgaria Istoriata, Venice 1471

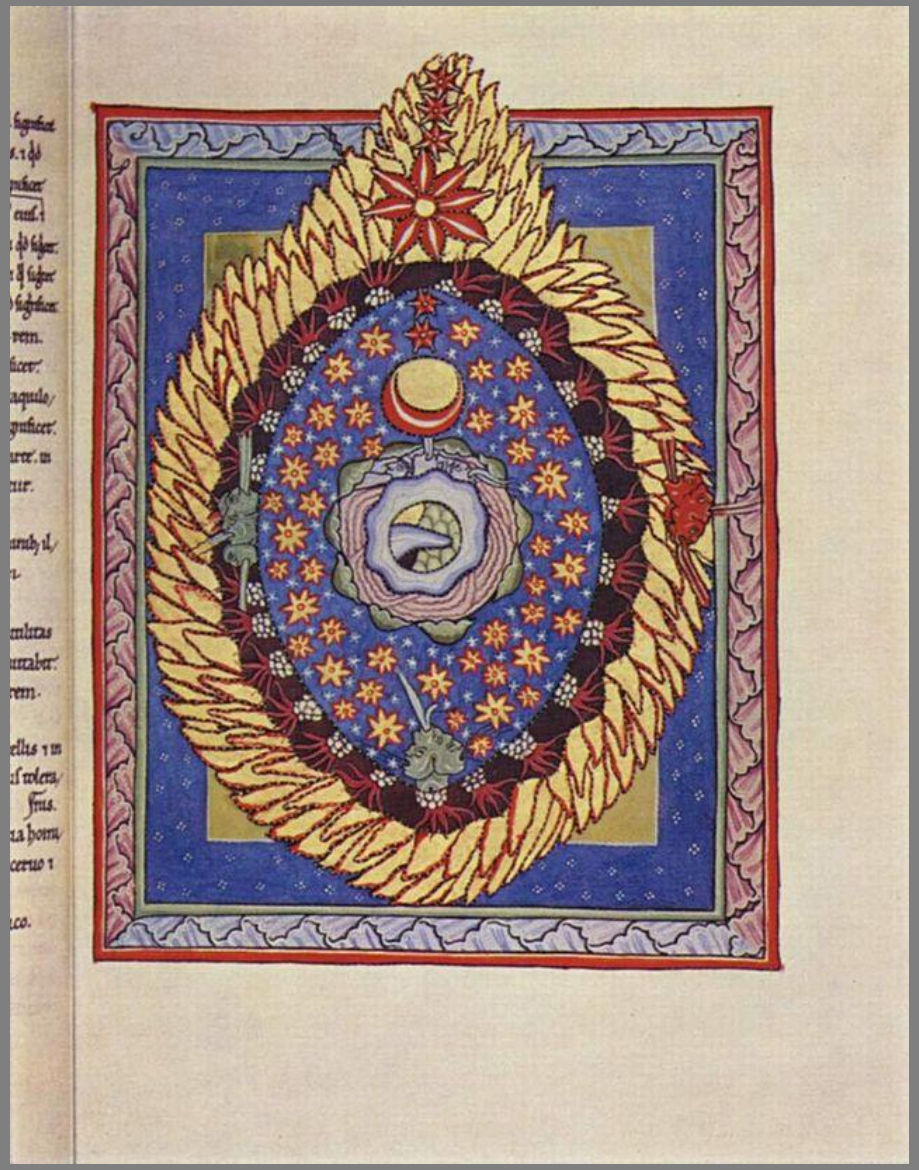
Cosmological

Giovanni do Paolo
Creation and Expulsion from Paradise, 1445

Cf Dante's Cosmology
c 1308-21;
Johannes Sacrobosco
Sphaera Mundi, 12th C



Abstract



Hildegarde of Bingen, 12th cent

Barnett Newman, *Adam*, 1952, Tate Modern

19th-20th century Edward Burne-Jones, *Days of Creation*, 1870-76

George Frederick Watts, *After the Deluge*, 1885-92

Watts felt it impossible to depict the Creator … *that is what I could wish to make those who look at the picture conceive for themselves.*

I have not tried to paint a portrait of the sun – but to impress you with the idea of its enormous power.

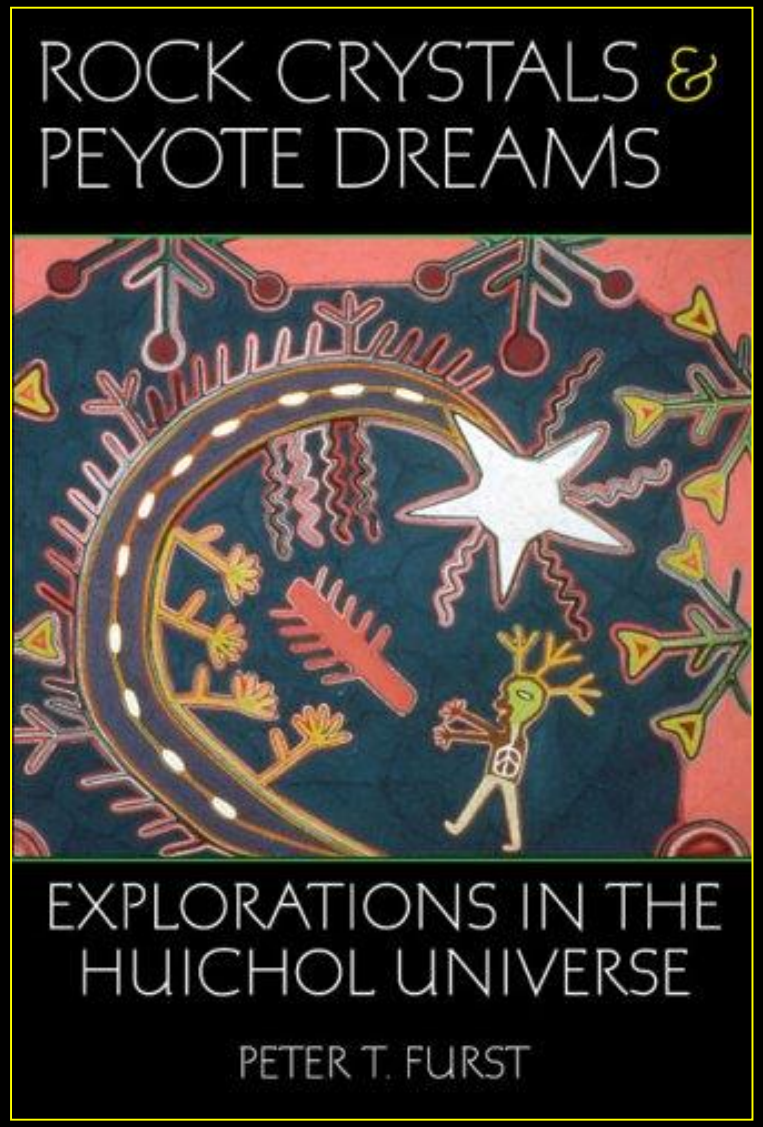
George Frederic Watts, *The Sower of the Systems*, c 1902

Vision of creation of the cosmos – robed faceless figure, sweeping across space, a swirl of stars and nebulae – centrifugal forces of creation

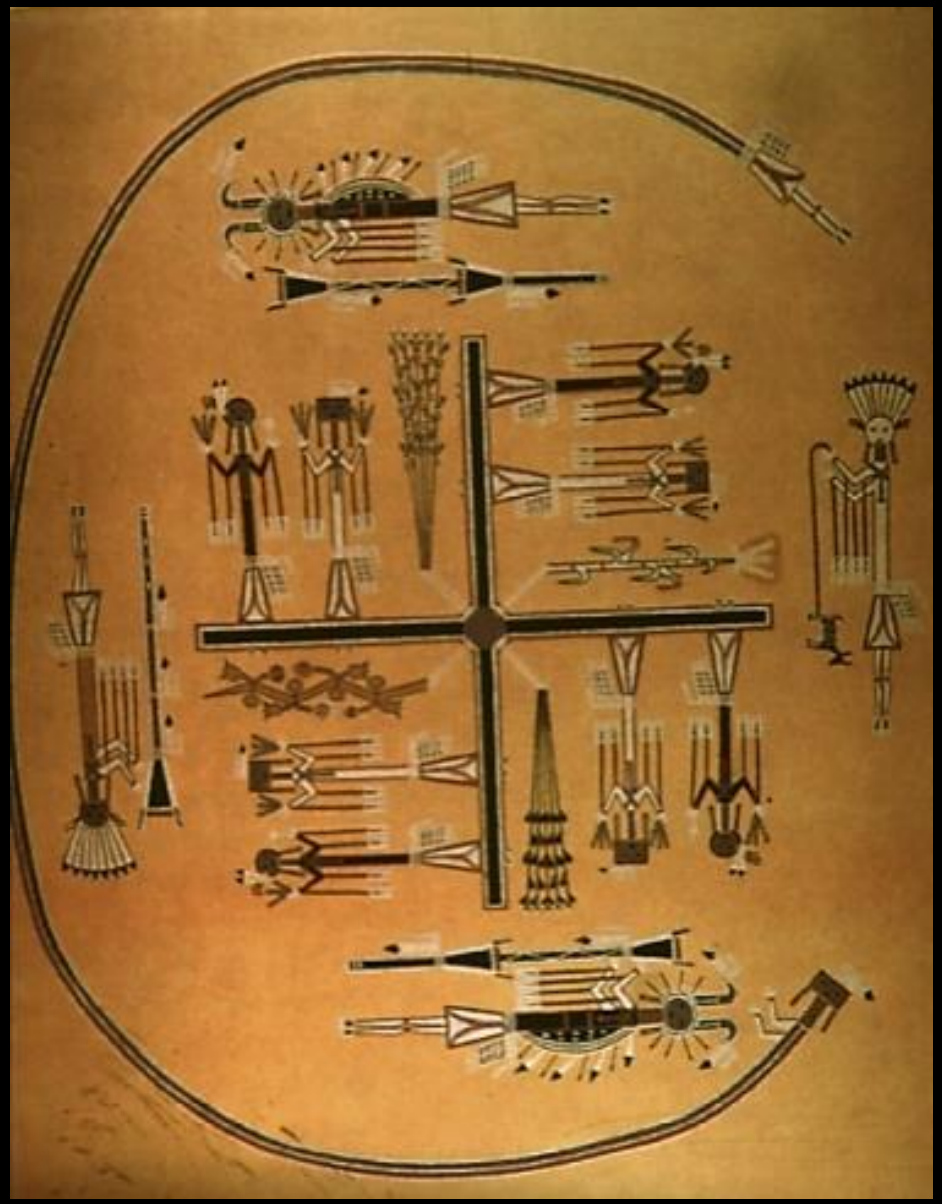
Fascinated by astronomy, telescopes, scientific discoveries

James Tissot
The Creation
(c. 1896–1902)

Abstract – legends, myths

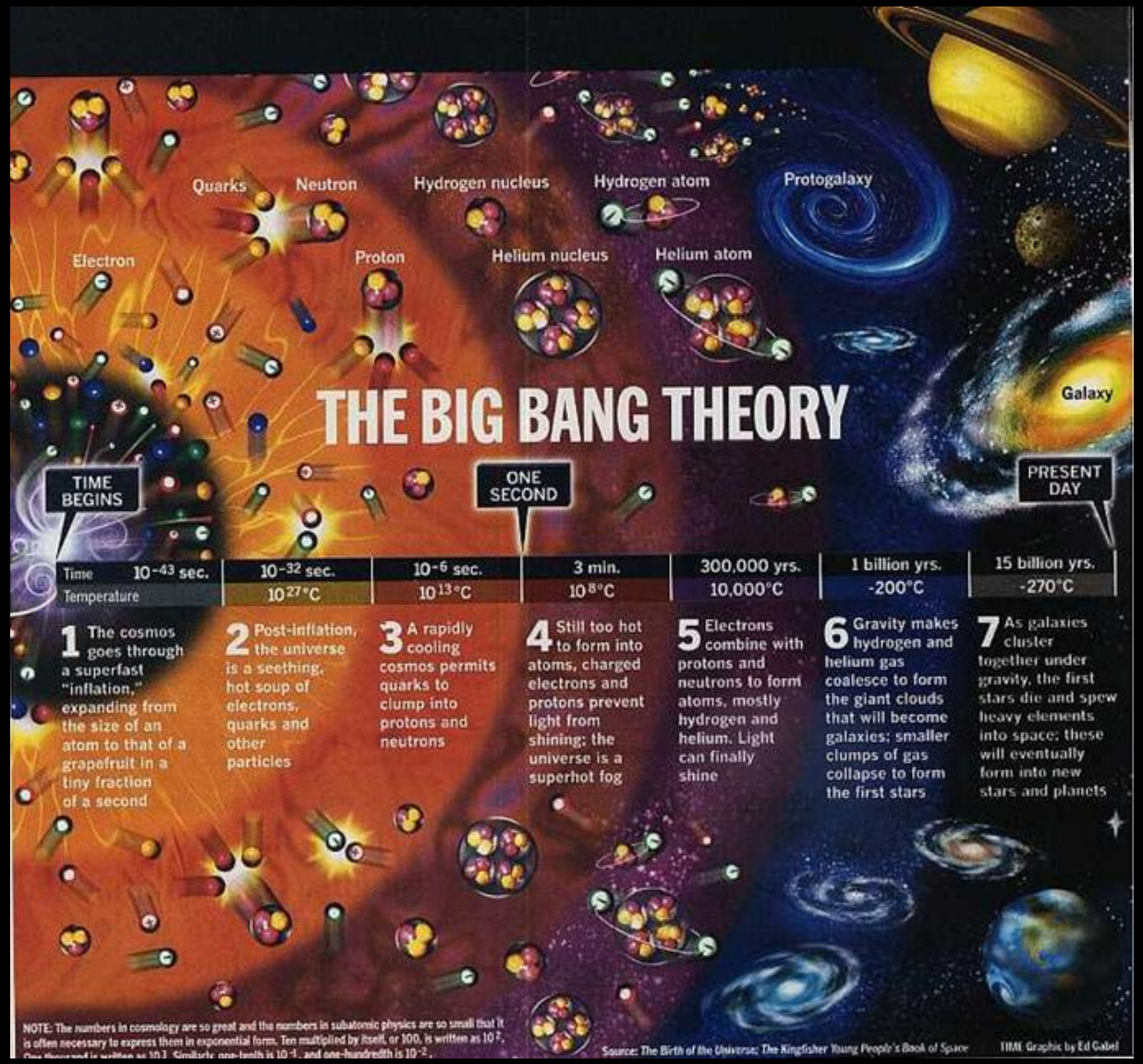


Ramon Medina, Mexico – 1960s book cover



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

Modern scientific diagrams - as art works?



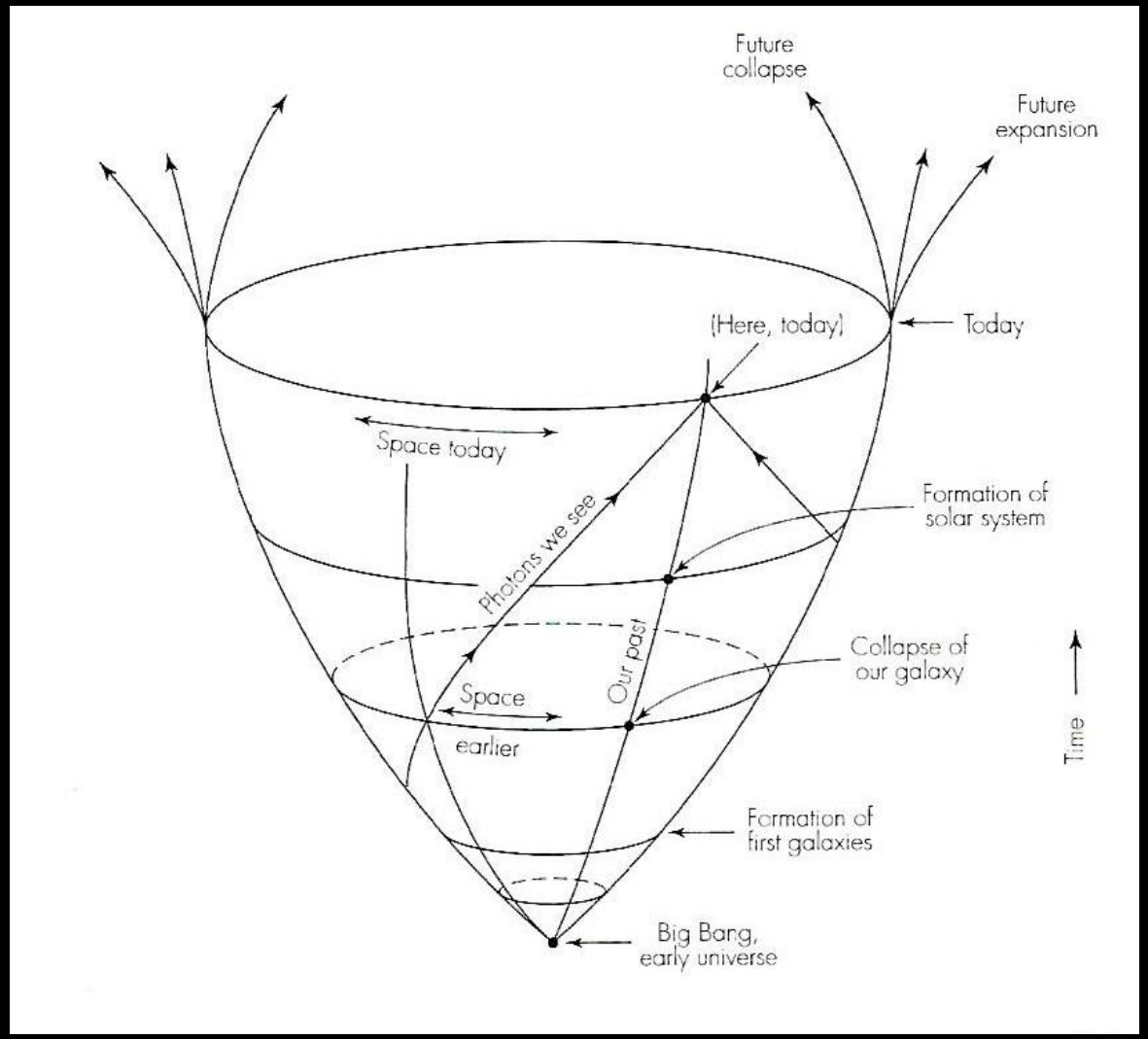
G Smoot, *Wrinkles in Time: The Imprint of Creation*, 1993

Smoot 'History of the Universe'

Modern, scientific

Using visual images to explain to the uninitiated?

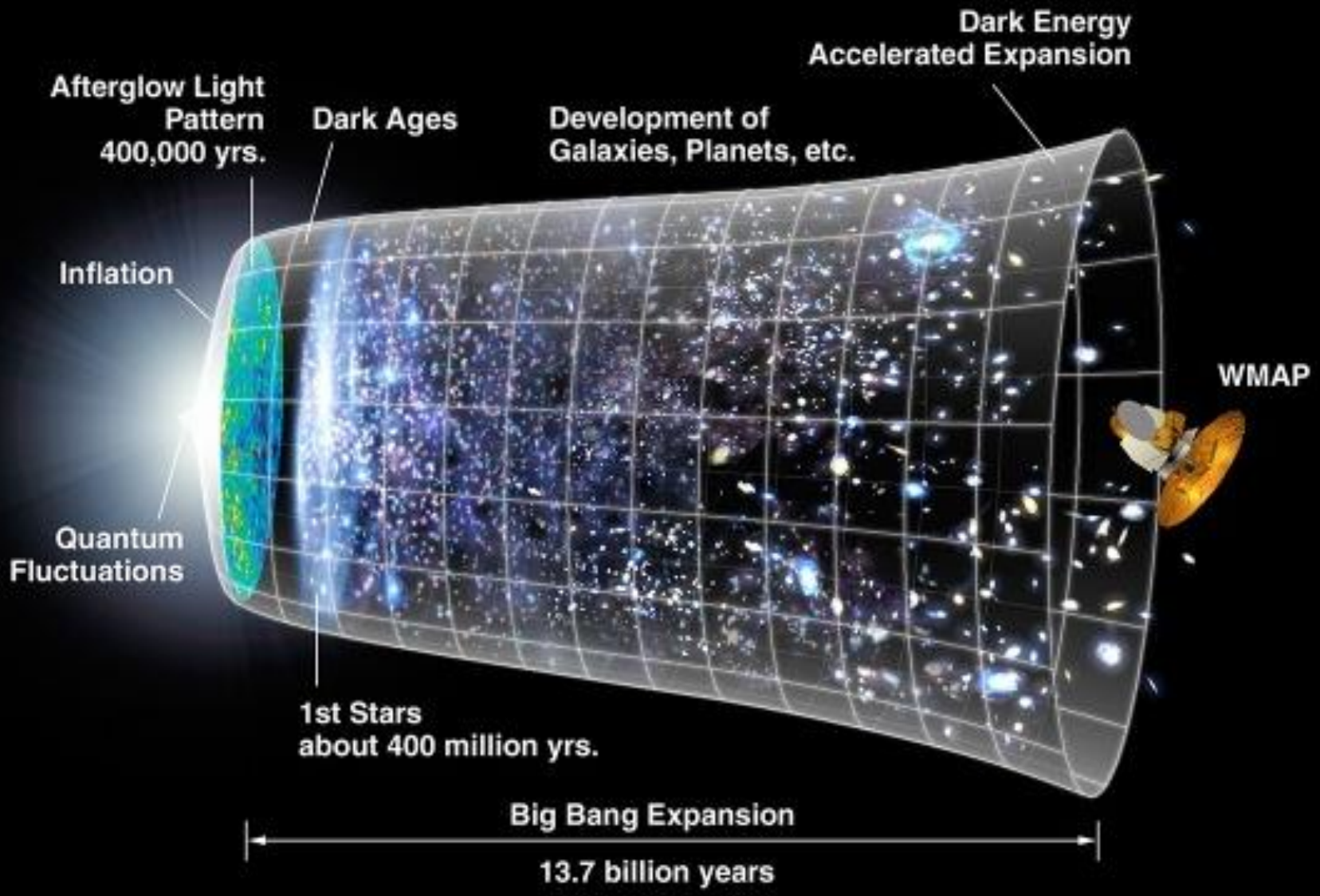
Freibourg Cathedral 14th C



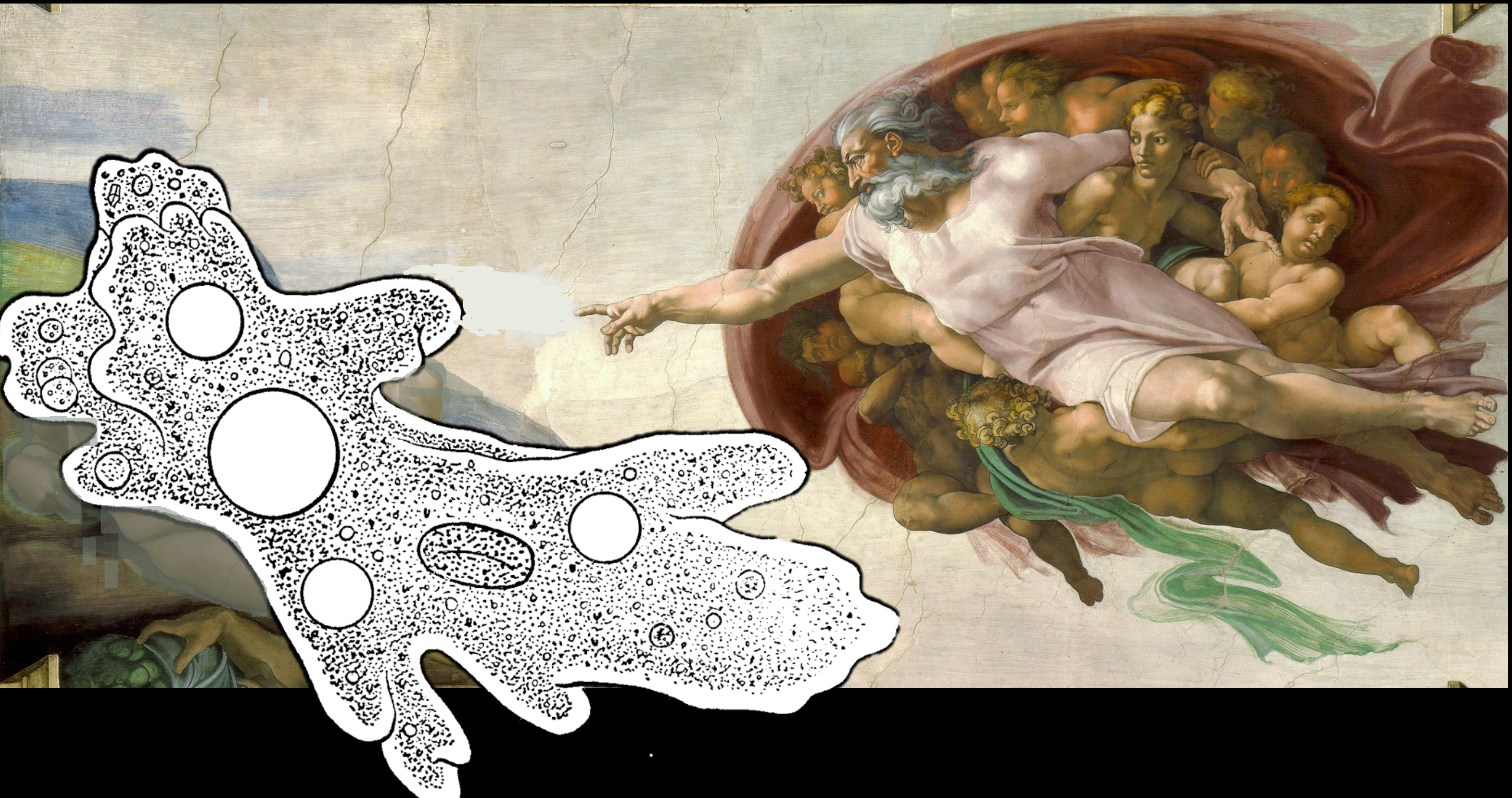
Cosmic expansion (Hogan, *The Little Book of the Big Bang*)

Cedric Sorel, *Big Bang,* 2008

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



NASA image of the Big Bang/Creation



The end of the beginning

Many not illustrated (myths, Islam)

or did not survive

Those that did, show an attempt to explain in visual terms

Examples readily fall into categories

(as well as chronological)

But: When is a scientific drawing an art work?

What is scientific and what is artistic?

Do similar concepts apply to images of ‘The End’?

The End

- Of the planet, solar system, universe?
- Of the individual? - Death, mortality?
- The great unknown?
- Link with judgment: disciplinary propaganda in the absence of judicial?
- The Judao-Christian tradition (widely known and represented)
- Other views/ideas, up to and including the present day (chronological approach)

Influences

Judao-Christian – Scriptures

Other spiritual beliefs and faiths

Scientific developments

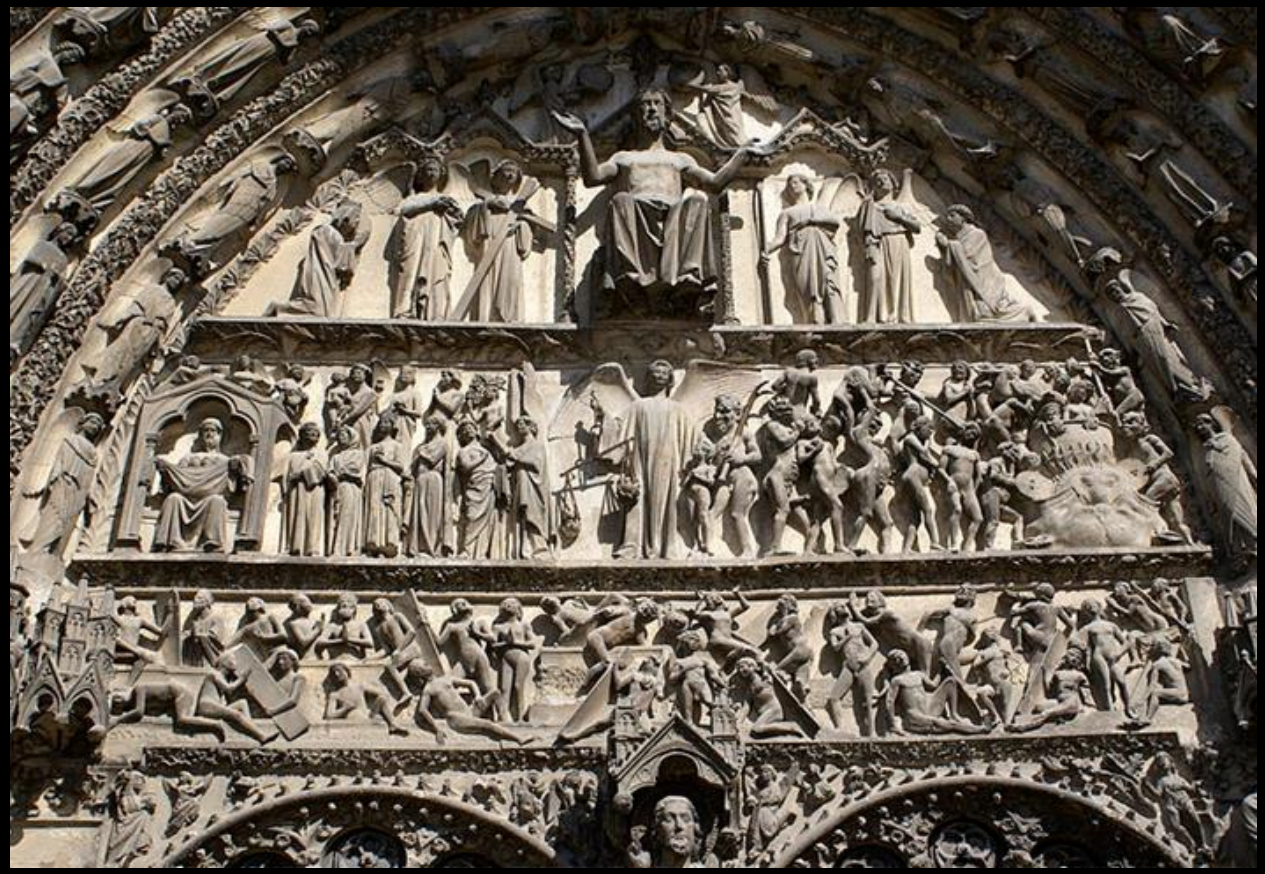
Threats? – To the universe? multiverses? To the planet? To way of life? To self?

Curiosity, fear - *telophobia*?

Judao-Christian …. 'Heaven and earth shall pass away' – judgment of mankind

Romanesque and Gothic

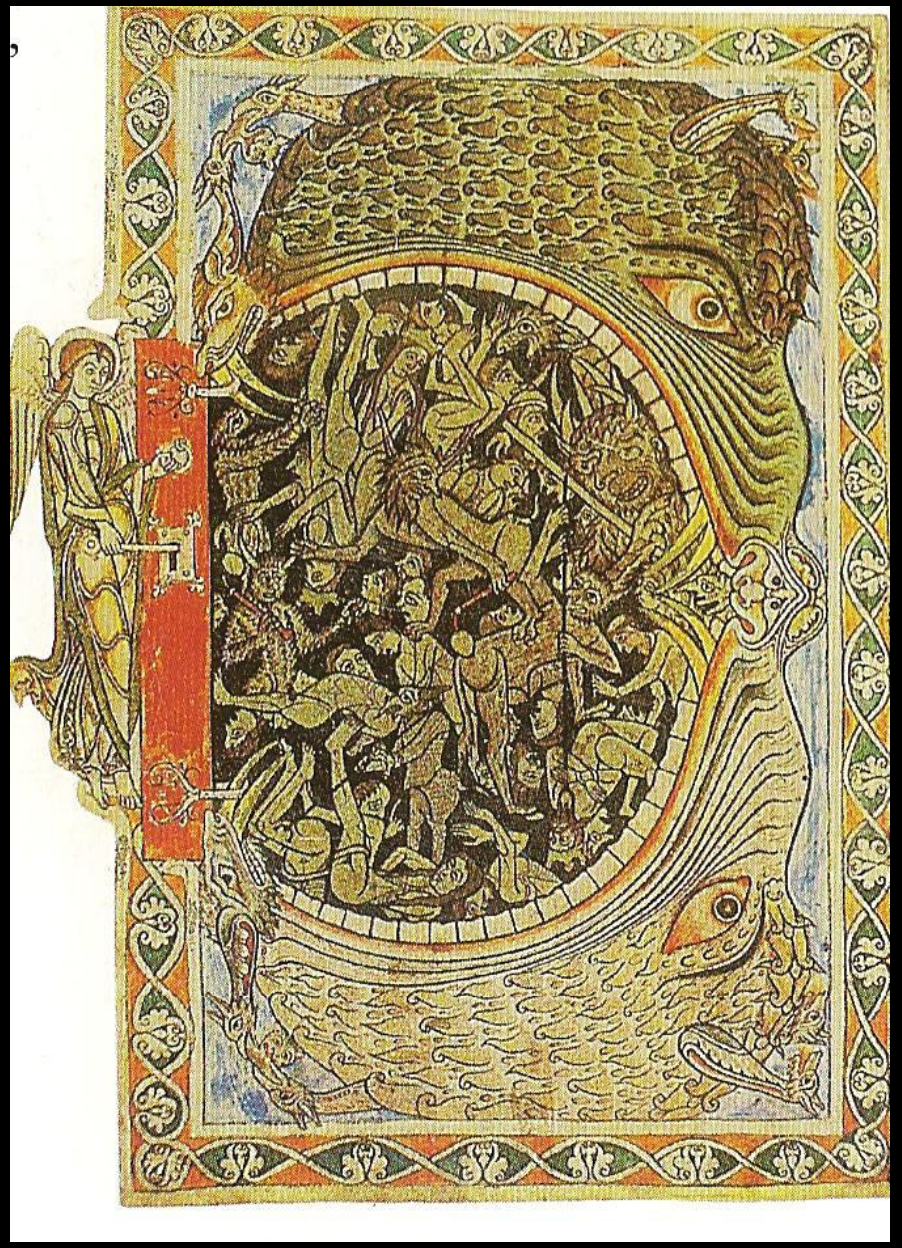
Vezelay, *Last Judgment*, 1125



Bourges, *Last Judgment*, 1230-65

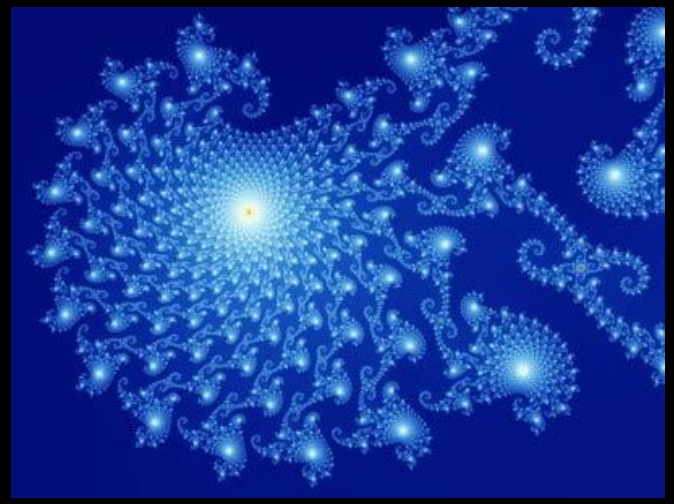
Manuscripts

St Sever Apocalypse, 1028-72



Winchester Psalter, mid 12th C

Byzantine



Christ in Chora, Constantinople, c 1315-21

Benoit Mandelbrot 1975 - fractals

(Proto) Renaissance

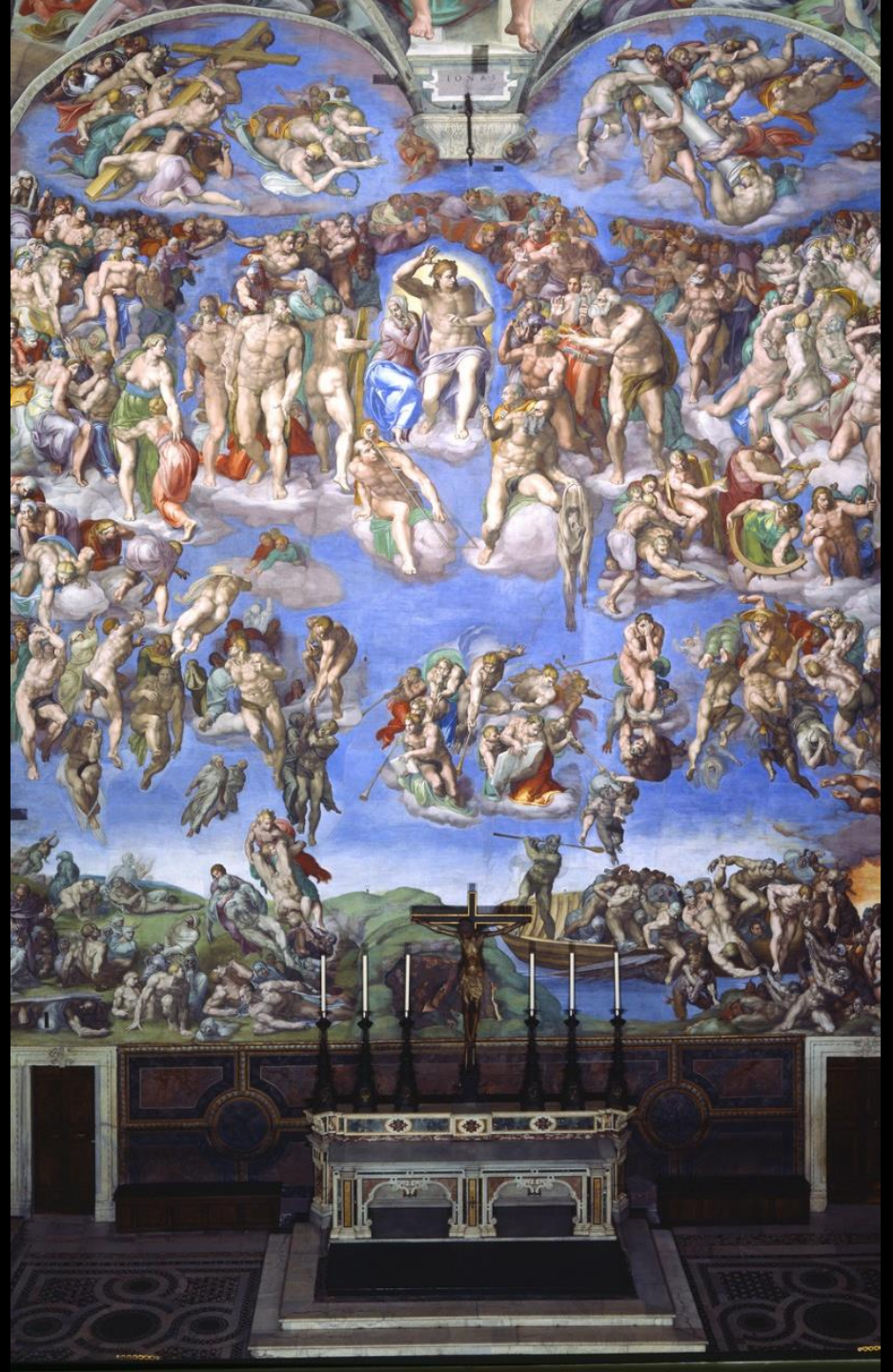
Giotto, *Last Judgment*, c 1305

Renaissance/Sixteenth century

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

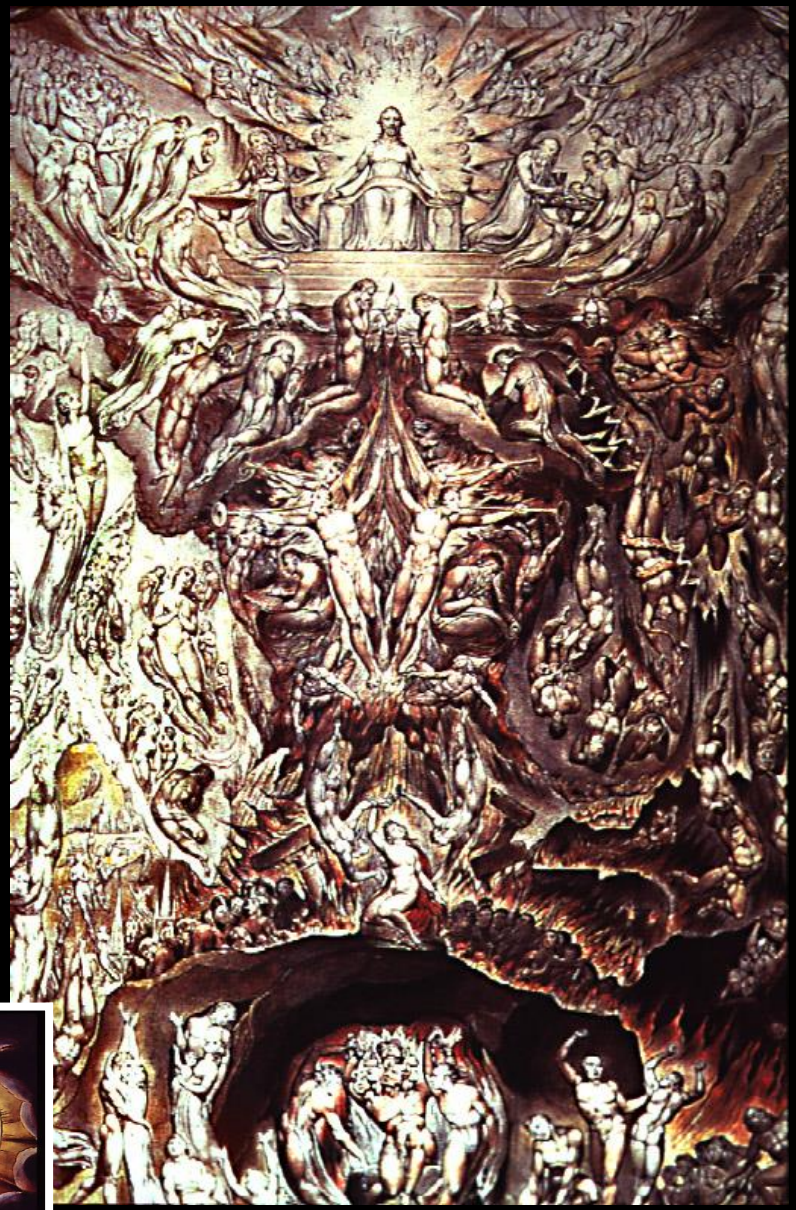
Michelangelo, *Last Judgment,* 1541

(Influence of Copernicus, heliocentricity)



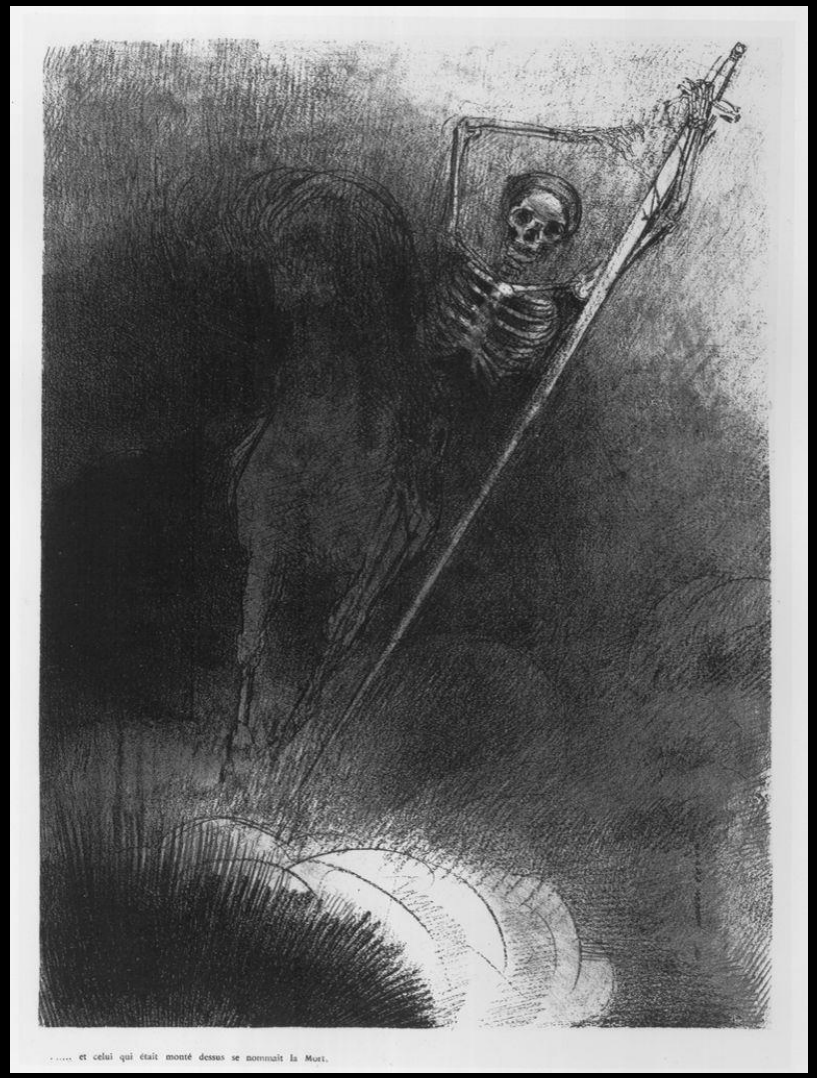
Nineteenth century

Gustave Doré, *Paradiso* 31



William Blake, *Last Judgment*

Focus on the individual/people?

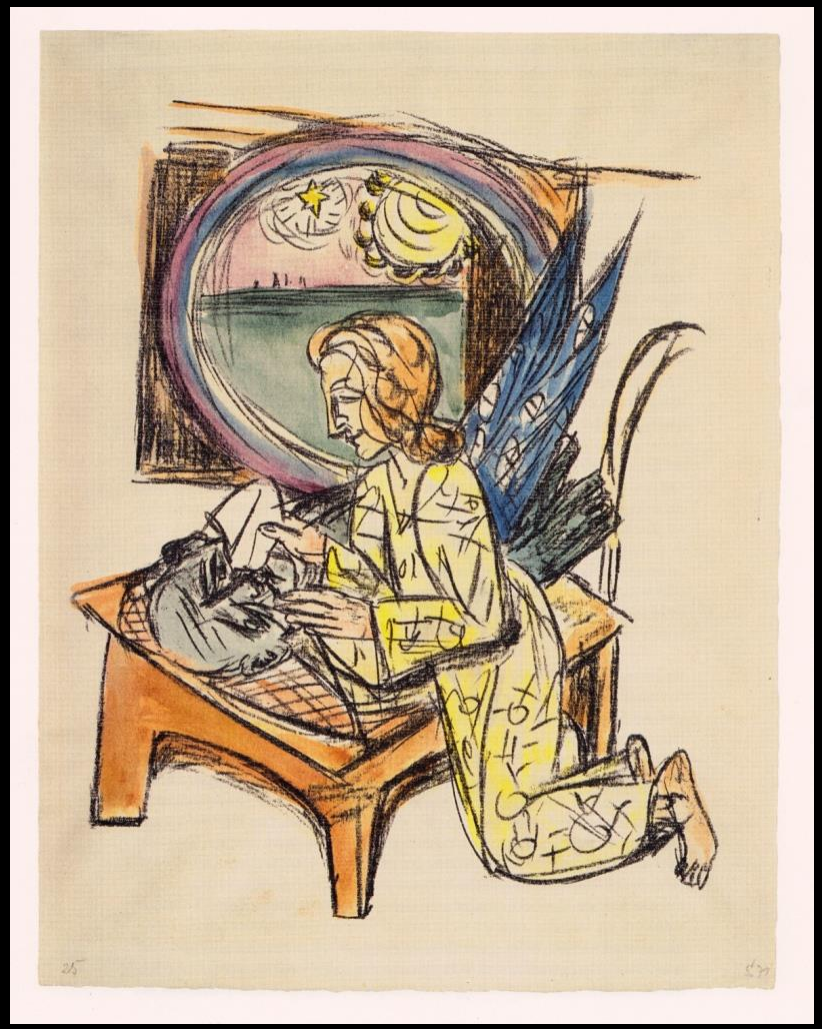


Odillon Redon, *The Apocalypse of St John*, 1899

Ludwig Meiner *Apocalyptic Landscape,* 1912

Wassily Kandinsky, *Last Judgment* 1910

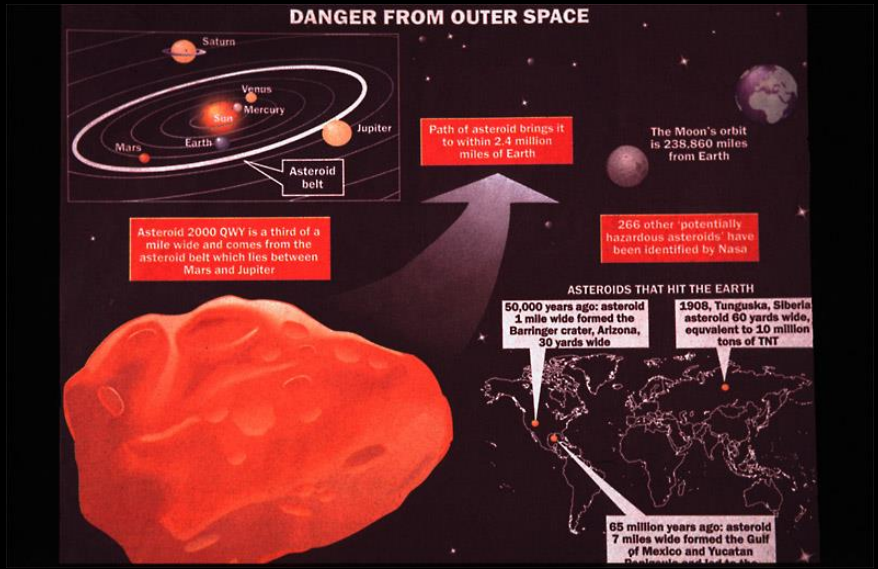
New focus on the planet



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

Scenes from the film *2012*,
calendars predicting the end of the world?

The End?
How?
When?



End by asteroid, *Times*, 5 Sept 2000

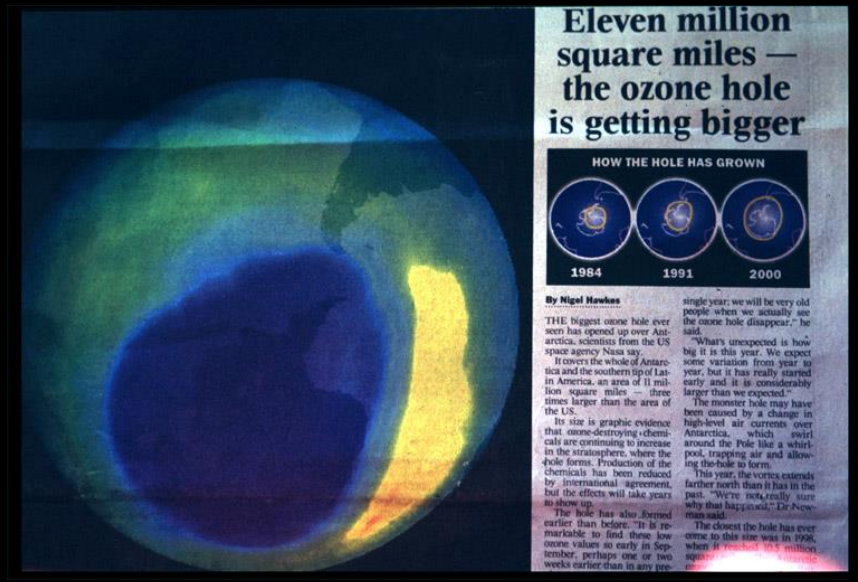
according to asteroid theory, wiped out the dinosaurs.

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."

End by comet, THES 3 Sept 1999



Eleven million square miles — the ozone hole is getting bigger

HOW THE HOLE HAS GROWN

1984 1991 2000

By Nigel Hawkes

THE biggest ozone hole ever seen has opened up over Antarctica, scientists from the US space agency Nasa say.

It covers the whole of Antarctica and the southern tip of Latin America, an area of 11 million square miles — three times larger than the area of the US.

Its size is graphic evidence that ozone-destroying chemicals are continuing to increase in the stratosphere, where the hole forms. Production of the chemicals has been reduced by international agreement, but the effects will take years to show up.

The hole has also formed earlier than before. "It is remarkable to find these low ozone values so early in September, perhaps one or two weeks earlier than in any pre-

single year; we will be very old people when we actually see the ozone hole disappear," he said.

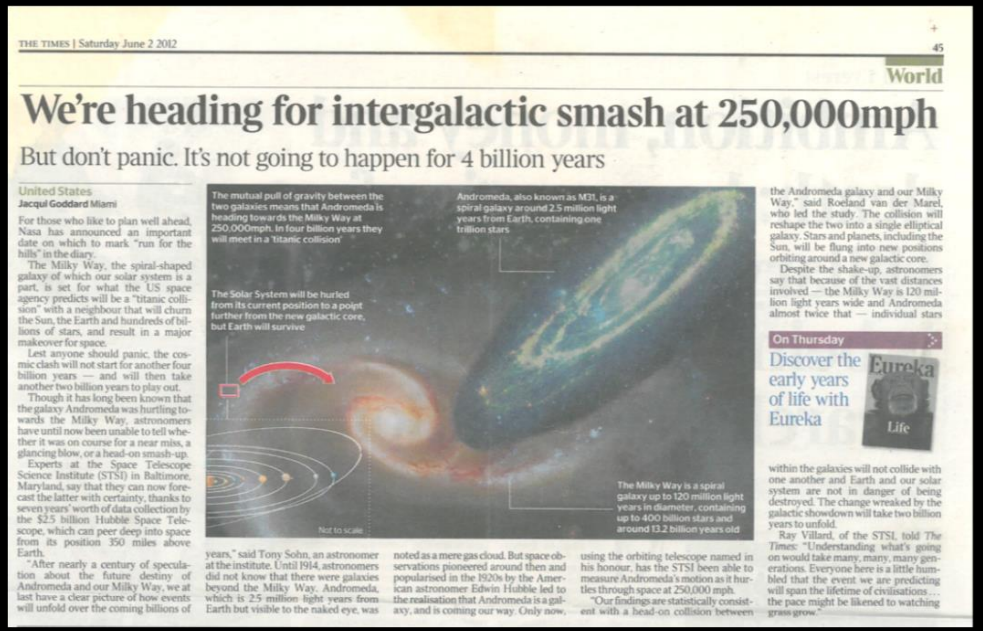
"What's unexpected is how big it is this year. We expect some variation from year to year, but it has really started early and it is considerably larger than we expected."

The monster hole may have been caused by a change in high-level air currents over Antarctica, which swirl around the Pole like a whirlpool, trapping air and allowing the hole to form.

This year, the vortex extends farther north than it has in the past. "We're not really sure why that happened," Dr Newman said.

The closest the hole has ever come to this size was in 1998, when it reached 10.5 million

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



THE TIMES | Saturday June 2 2012

45

World

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 "titanic 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 Tony Sohn, an astronomer at the institute. Until 1914, astronomers did not know that there were galaxies beyond the Milky Way. Andromeda, which is 2.5 million light years from Earth but visible to the naked eye, was 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, 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.

"Our findings are statistically consistent with a head-on collision between 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 wreaked 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."

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 'titanic collision'

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

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

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

Not to scale

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

The Planet

Alberto Ruggieri (b 1963)

Everything ...

Lucio Fontana – *Il fino do dio* , 1990

The world is in danger – David Attenborough

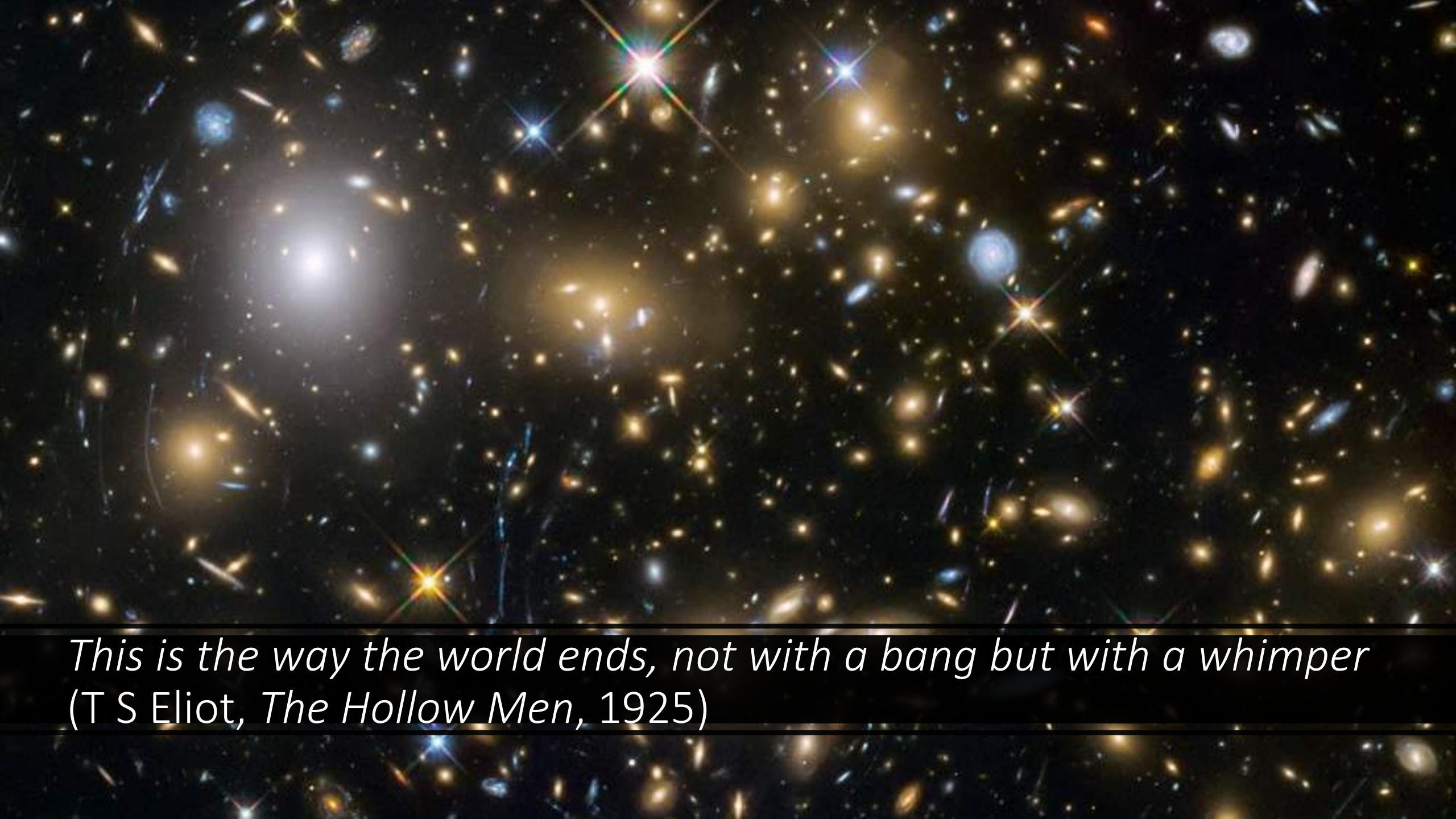
New Scientist 31 Jan 2015, 'Dawn of the Plasticene Age' (Image: Bigshot Toyworks)

The plastics that have been made are enough to wrap the whole world in plastic film …..

Five concentrations in Pacific, Atlantic and Indian oceans (5.25 trillion items)

The solar system – the sun becomes a red giant

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



This is the way the world ends, not with a bang but with a whimper
(T S Eliot, *The Hollow Men*, 1925)


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

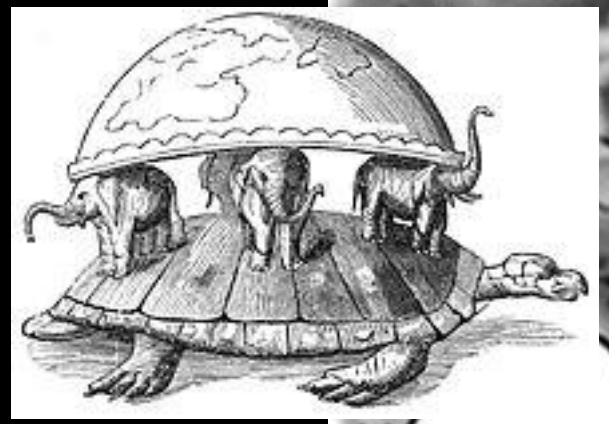
An intense nervousness expressed via humour

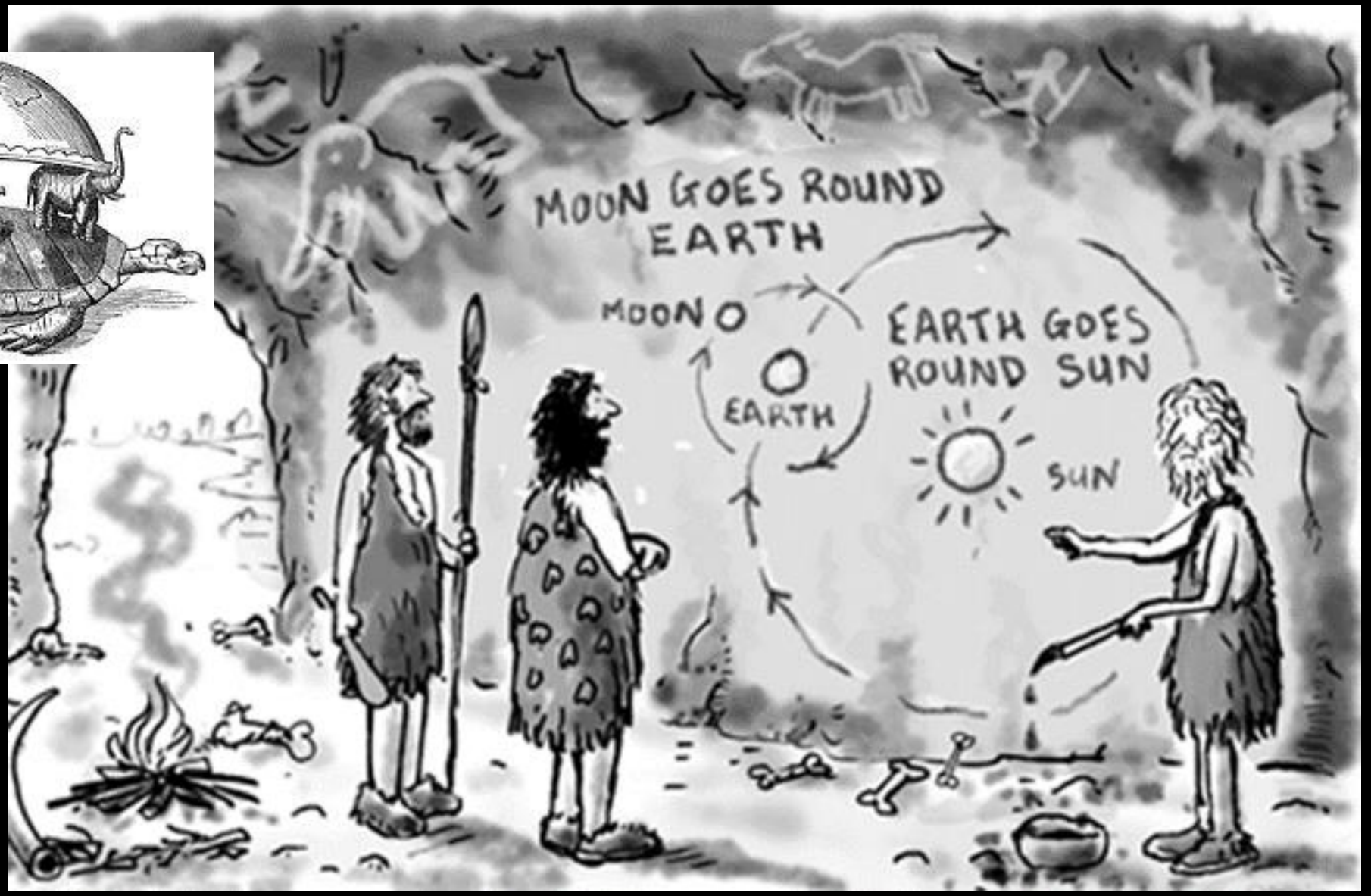
‘it’s not that nigh’

Video games


BOX
http://joelea.tv/DoctorWho.html


WE SCHIENTISTS ARE CONVINCED ZERE ISS A BLACK HOLE AT ZE CENTER OF ZE GALAXY SHVALLOWING EVERYSING AROUND IT!
PROFESSOR HANS VON SCHWOBBLE (THE SMARTEST MAN IN THE UNIVERSE)
IN FIFTY BILLION YEARS ZE BLACK HOLE VILL EVEN SHVALLOW ZE EARTH!
HOW LONG?
FIFTY BILLION YEARS
THANK GOD! I THOUGHT HE SAID FIFTY MILLION!
5-30.
BEGRACC





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

Conclusions (Thoughts and ideas)

Astronomy and cosmology as foundation of / huge influence on human spiritual thought and inspiration

Cosmology and Theology as one and the same thing (not separated until the Enlightenment)

Use of visual images to convey complex ideas


THE END