

Horizons - Cosmology from a Multicultural Perspective

Huntington Library / Carnegie “First Light” Conference

by Dr. Bryan E. Penprase
Dean of Faculty, Soka University of America





HÆMISPHERIUM
LATUM BO
ANTI

RIUM STELLARUM
REALE
QUUM.



Capricornus
Sagittarius
Scorpio
Libra
Virgo
Leo
Cancer
Gemini
Taurus
Aries
Pisces
Colarus

Antinous
Aquila
Lyra
Draco
Bootes
Corona
Ursa
Perseus
Andromeda
Pegasus
Delphinus
Equuleus
Cygnus
Sagittarius
Antinous
Capricornus
Aquarius
Pisces
Colarus
Taurus
Gemini
Cancer
Leo
Virgo
Libra
Scorpio
Sagittarius
Capricornus

Equinoctialis
Solstitialis
Equinoctialis
Solstitialis
Equinoctialis
Solstitialis
Equinoctialis
Solstitialis
Equinoctialis
Solstitialis

Bryan E. Penprase

Penprase



The Power of Stars

Second Edition

The Power of Stars

 Springer

2nd Ed.

Dr. Bryan E. Penprase



HEMISPHERA
ALIS COELI
SPHERA
GRA-

RIIBORE
ET TERRAE
CASCENO
PHIA.

Cassiopeia

Cepheus

Aquila

Antinous

VIRGO

MAR

Serpens

Bootes DEL

ZVR

LI

SCORPIO

Hydra

Argo

Thron

Pera

Lupa

Thabit

Cygnus

Ca

nichys

lola

Ursa Major

Ursa

Minor

Ursa

Major

Ursa

Minor

Ursa

Major

Ursa

Minor

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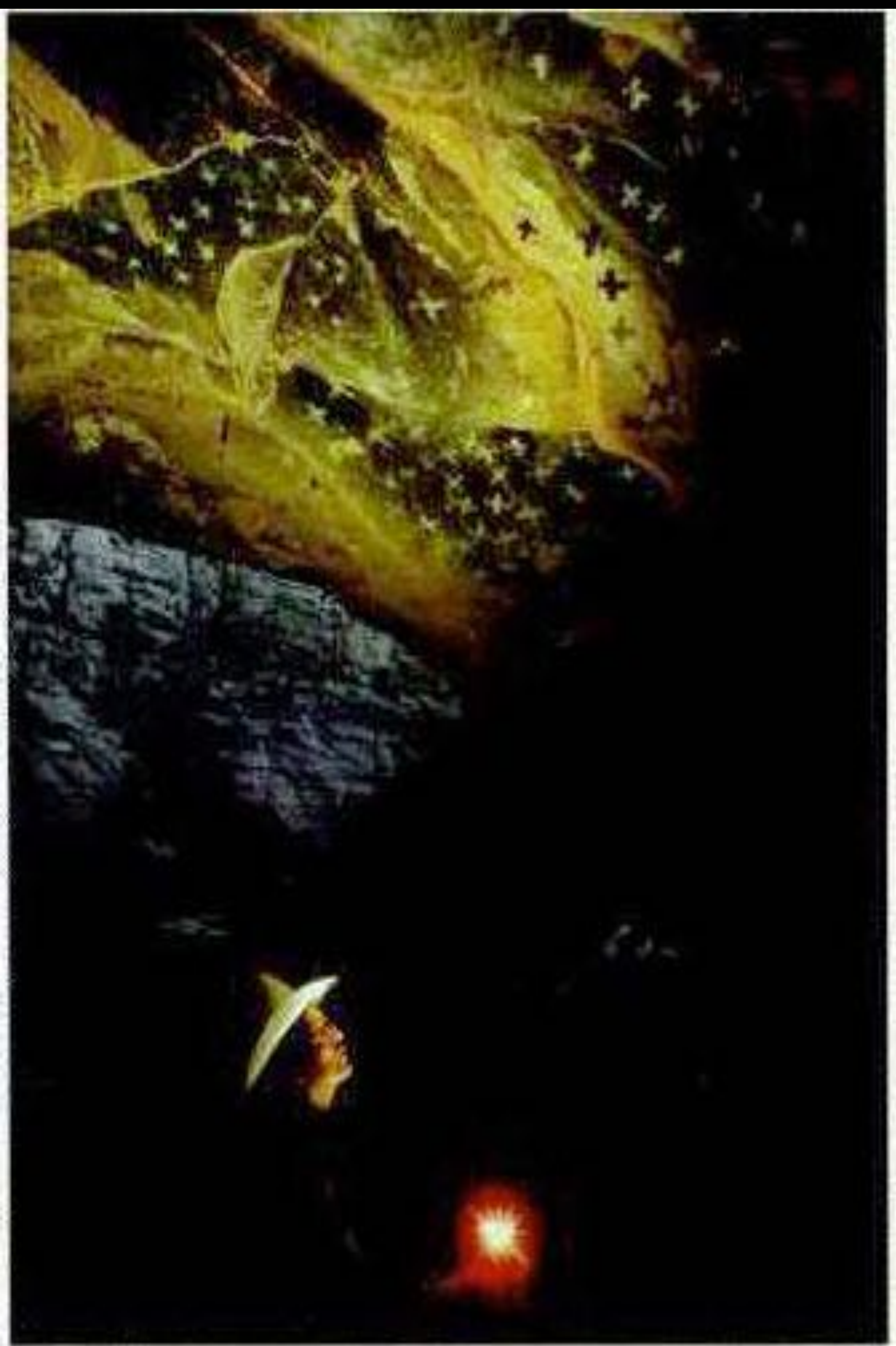


Fig. 10.13. The Navajo constellation Male One Who Revolves (BIG DIPPER). One chanter says that the man's leg is broken, thus producing the bend in the dipper's handle.

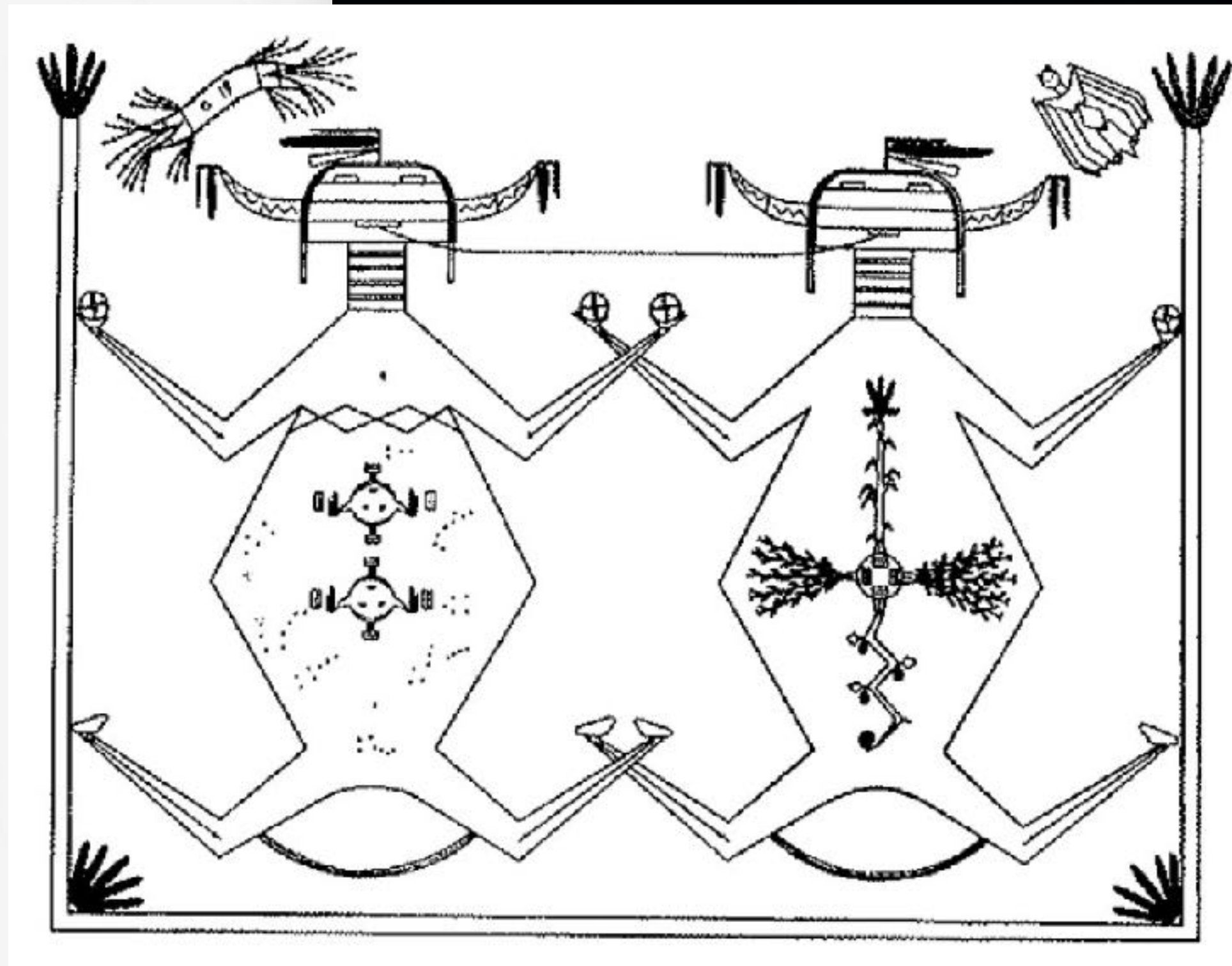
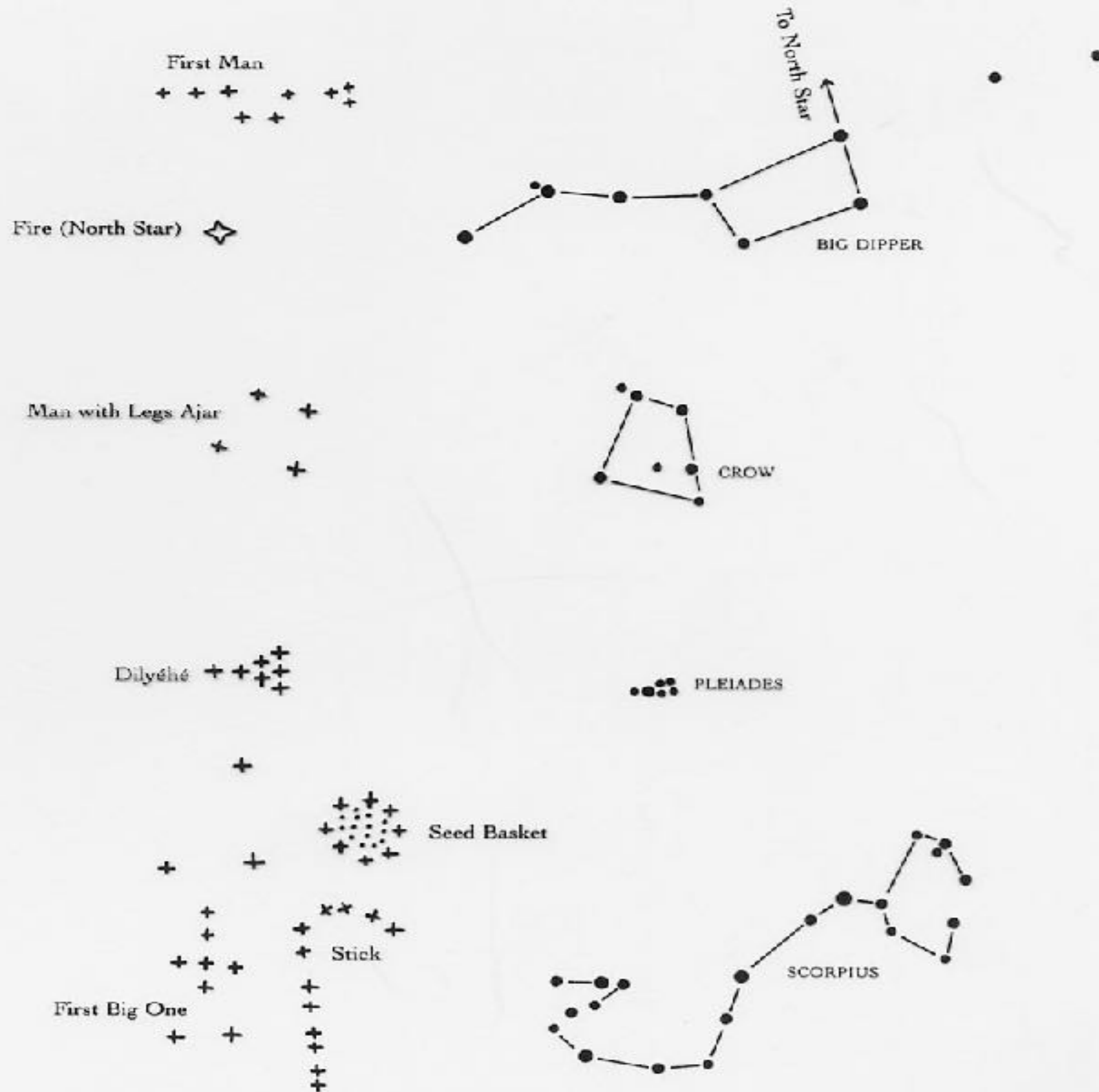
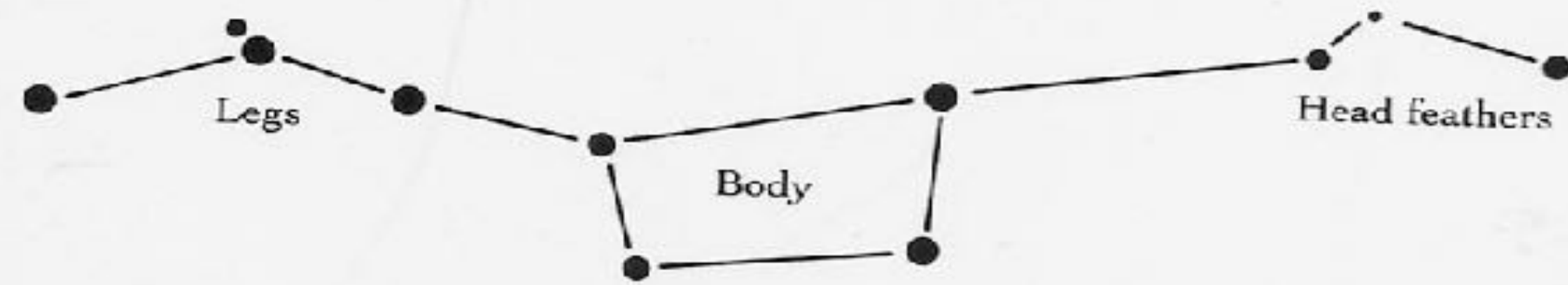
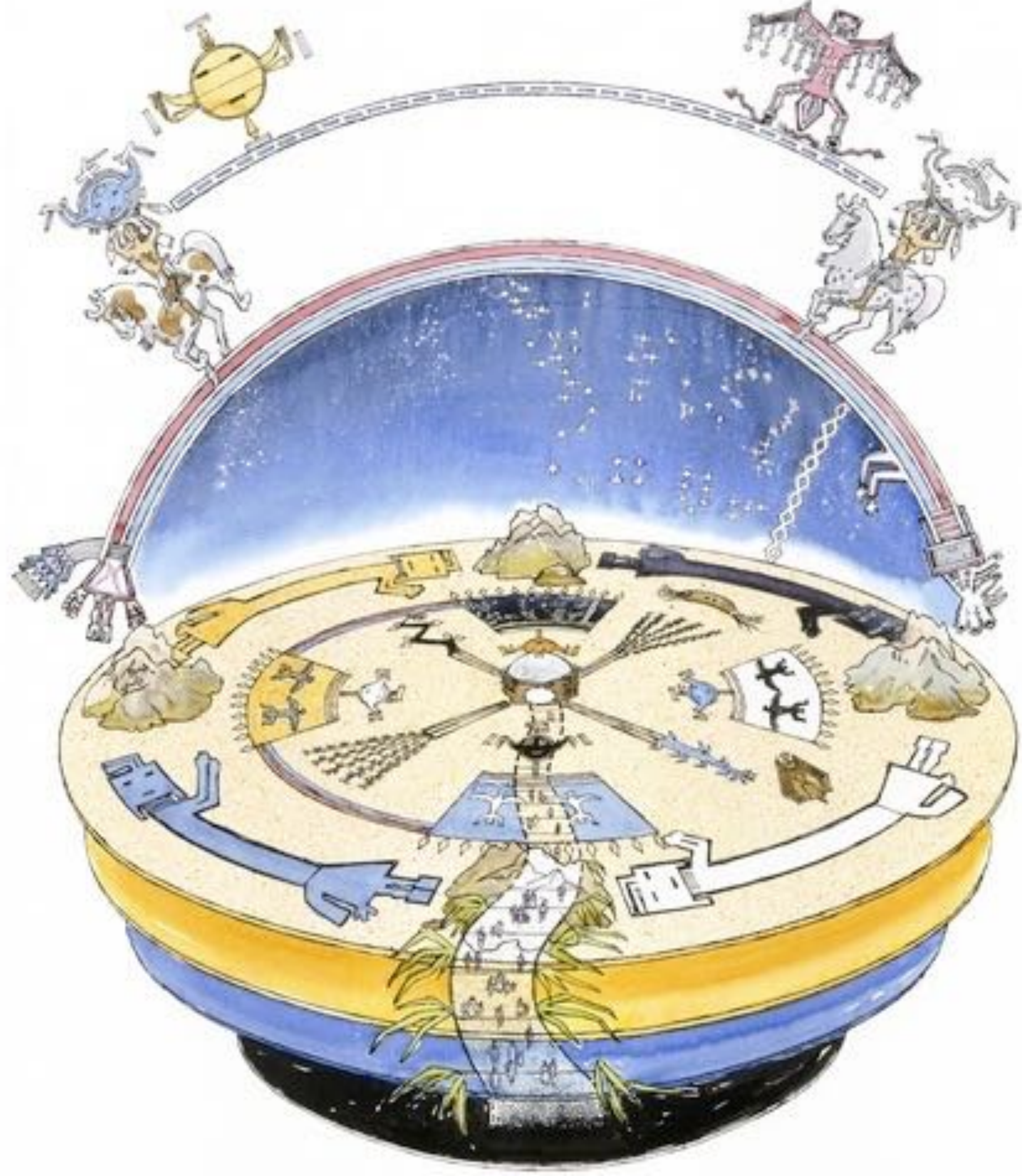


Fig. 10.14. Navajo chanters do not consider it necessary that constellations in sandpaintings look exactly like







Creation of the Stars

Pueblo creation stories describe how the First People lived in a world far below this one. In an epic voyage, they ascended to the present world and found their place in it. The following passage from a Zia creation story describes the making of the stars. Ūt'sēt is the mother of Indians, and her sister Now'ûtsēt is the mother of other people.

The two mothers created the moon from a slightly black stone, many varieties of a yellow stone, turkis, and a red stone, that the world might be lighted at night, and that the moon might be a companion and a brother to the sun. But the moon traveled slowly, and did not always furnish light, and so they created the star people and made their eyes of beautiful sparkling white crystal, that they might twinkle and brighten the world at night. When the star people lived in the lower world they were gathered into groups, which were very beautiful; they were not scattered about as they are in the upper world. . . .

When the people were ready to pass through to the upper world, Ūt'sēt called the *I-shits* (mole) and gave him the sack of stars, telling him to leave first with the sack. The little animal did not know what the sack contained, but he grew very tired carrying it, and wondered what could be in the sack. After entering the new world he was very tired, and laying the sack down he thought he would peep into it and see its contents. He cut only





'Alapay (Sky World)



'Antap (Middle World)



C'oyinahsup (Lower world)



Decorative header text in Devanagari script.

Column of text in Devanagari script on the left side of page 46.



Text block in Devanagari script below the first illustration on page 46.



Text block in Devanagari script below the second illustration on page 46.



Text block in Devanagari script on the left side of page 46, below the first illustration.

Text block in Devanagari script on the left side of page 46, below the second illustration.

Text block in Devanagari script on the left side of page 46, below the third illustration.

Decorative header text in Devanagari script.

Column of text in Devanagari script on the left side of page 47.



Text block in Devanagari script below the first illustration on page 47.



Text block in Devanagari script below the second illustration on page 47.



Text block in Devanagari script on the left side of page 47, below the first illustration.

Text block in Devanagari script on the left side of page 47, below the second illustration.

Text block in Devanagari script on the left side of page 47, below the third illustration.

Decorative header text in Devanagari script.

Column of text in Devanagari script on the left side of page 48.



Text block in Devanagari script below the first illustration on page 48.



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Text block in Devanagari script on the left side of page 48, below the third illustration.



Archaeological Center

Maya Cosmology

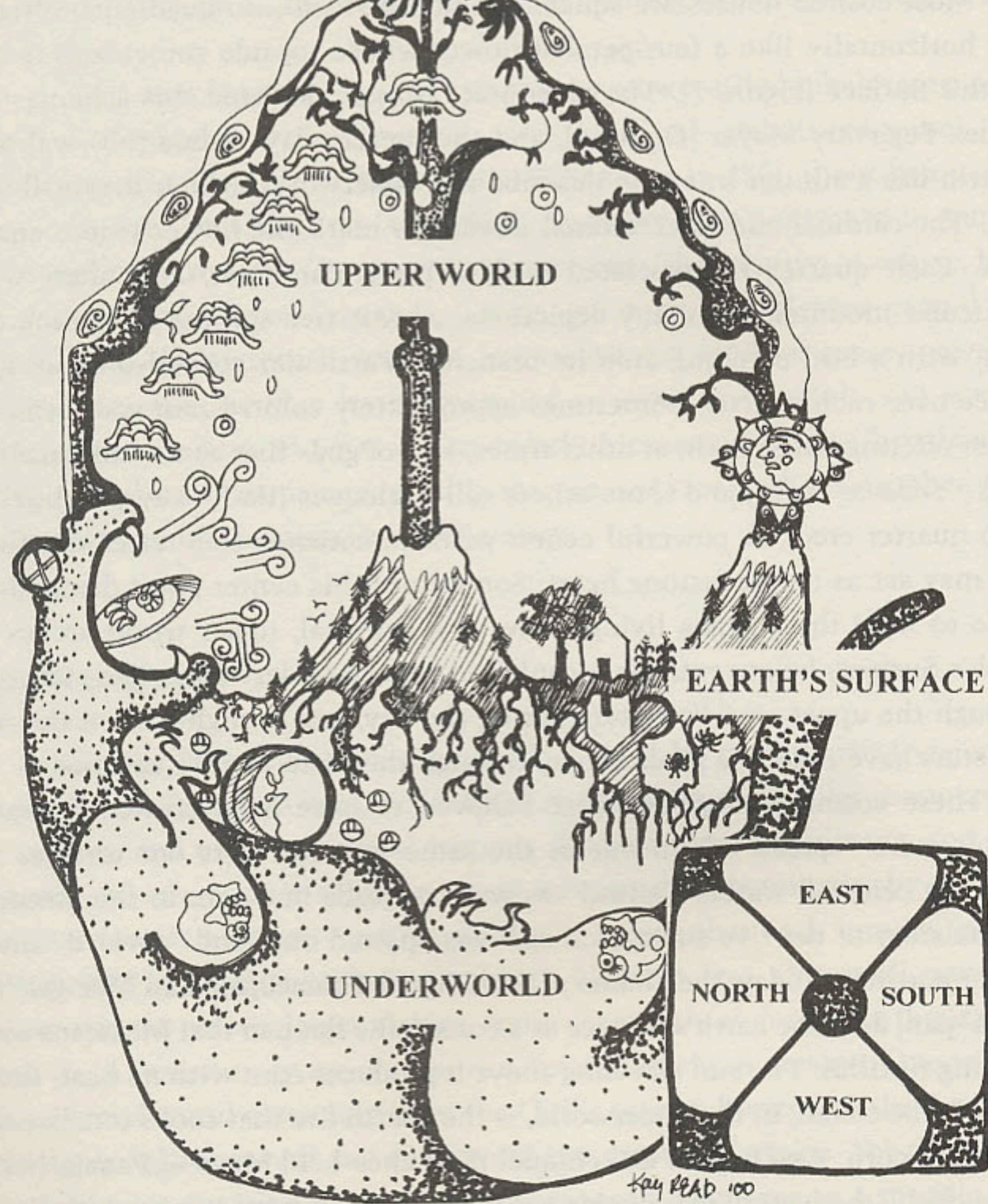


Figure 7. An imaginative rendering of a Mesoamerican mythological cosmos, portraying the upper world, earth's surface, and the underworld as well as the four cardinal directions (Drawing by Kay A. Read)

260 day Venus year: *tzolkin*



Fig. 5.21 Interlocking numbers and day names comprise the basis of the Mayan tzolkin, a 260-day calendar pairing 20-day names (represented by the *Jade gear*) and 13 numbers (represented by the *stone gear*). Each day the system advances by one cog, producing a day name and number (original figure by B. Penprase)

365 day “vague year” - Haab



The Haab

Since the Maya needed to maintain crops and time their activities with the stars, a second calendar was needed to fix dates within the solar year. The official count of solar days for the Maya was known as the *haab*, or “vague year,” and took secondary importance to the tzolkin. The haab operated much like the tzolkin, but had its basis in 18-named months, with 20 numbered days, and operated somewhat more simply, with its names consisting of 1 of 18 month names, and 20 numbers, progressing along with day names such as “1 Pop,” “2 Pop,” “3 Pop,” until 20 was reached and then the next month would be used. The 18-named months and 20 numbered days together gave a 360-day period, close to the solar year, known as the “tun.” To keep the calendar from drifting, an extra unnamed (and very unlucky)

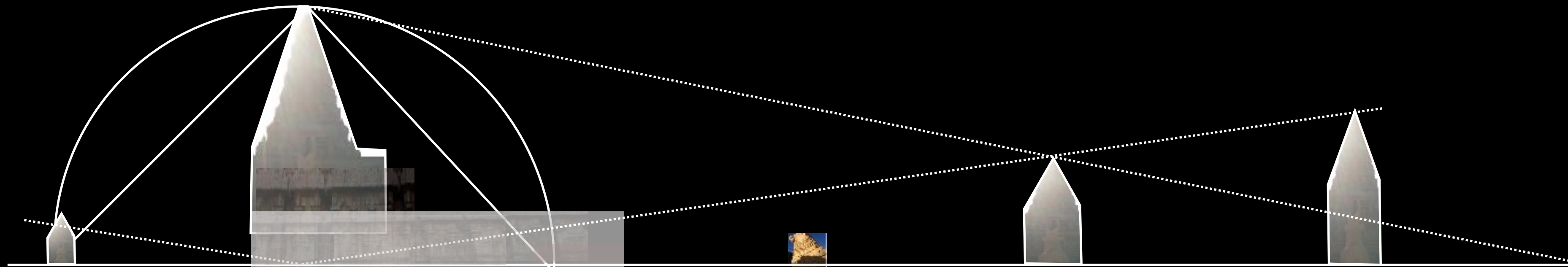
5 days were added to the end. The year-ending days were known as the “*uayeb*” to give a 365-day solar year, much as in the early Egyptian calendar, except the *uayeb* was a time of dread instead of a time of festivities. Groups of 20 of the haab years formed the grouping known as the *baktun*, which is analogous to a Mayan “decade.”

Calendar Round - $73 \times 260 = 4 \times 13 \times 365 = 52$ years



Fig. 5.22 Schematic for Mayan interlocking calendars, featuring day names and numbers for the 260 day tzolkin (*left*) interlocking with the 365-day haab calendar (*right*). The cycles continue with unique combinations of day names for 52 years before repeating and this cycle is known as the calendrical round (original figure by the author)



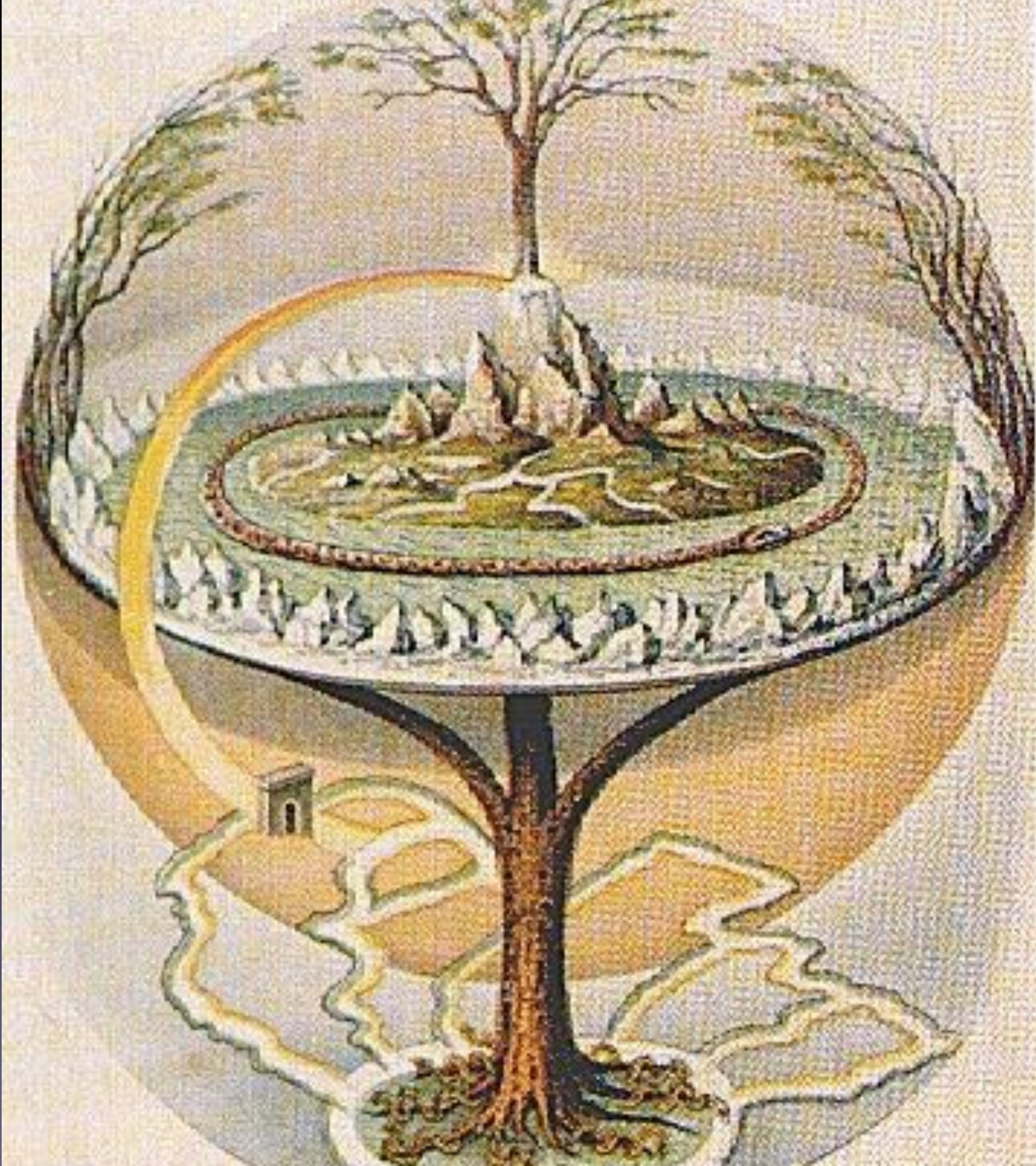


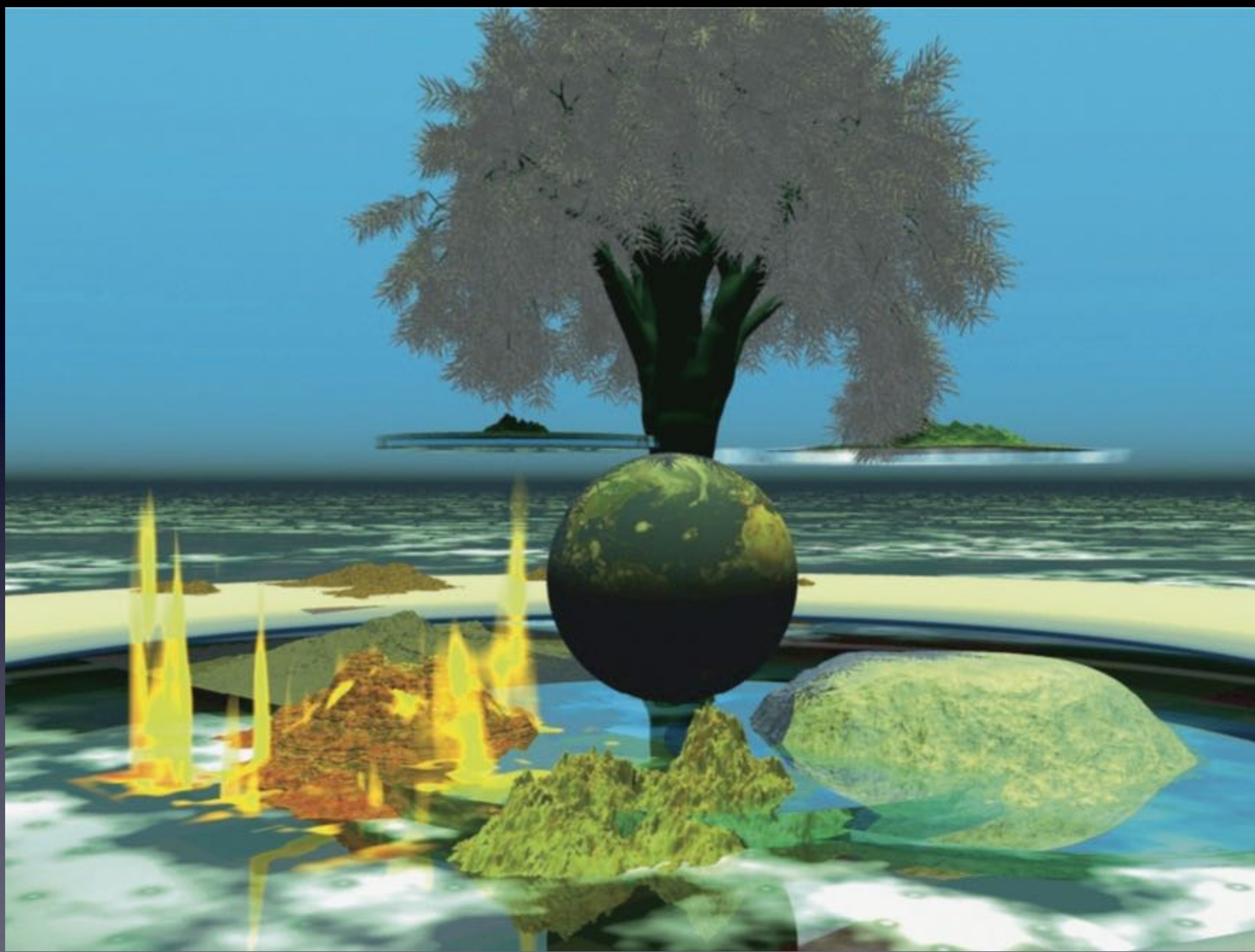
59.9 meters

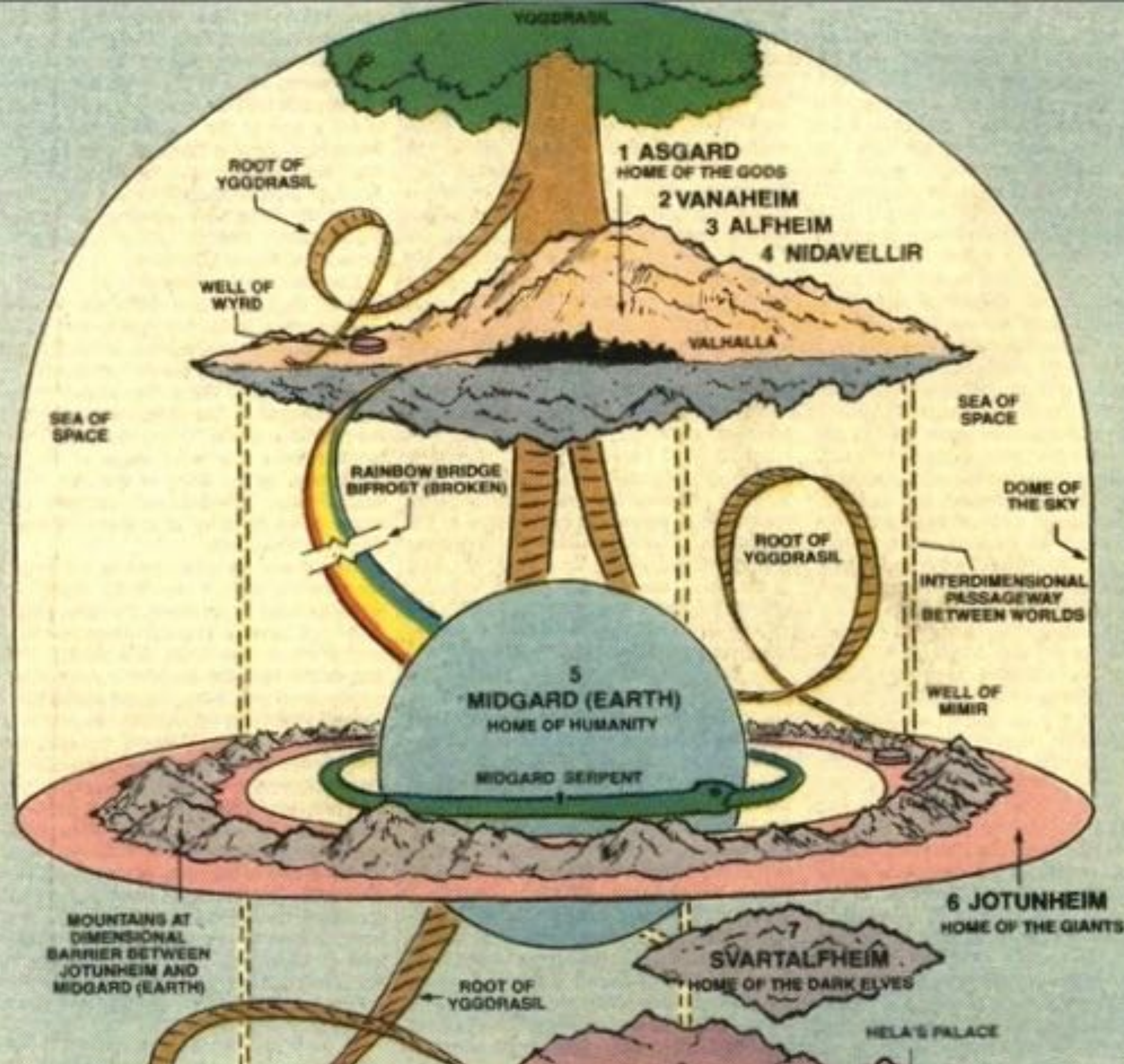
59.9 meters

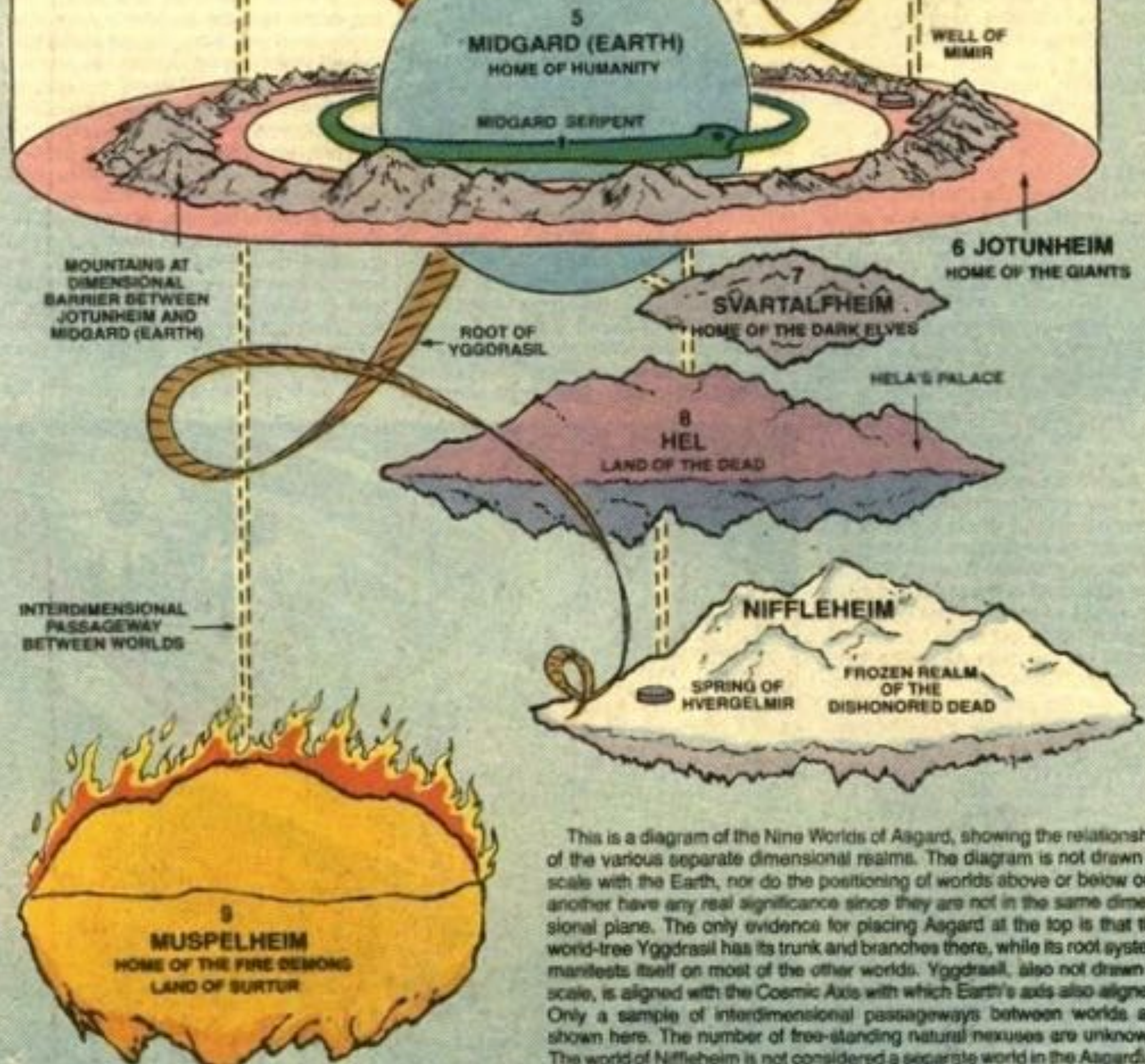
120 meters





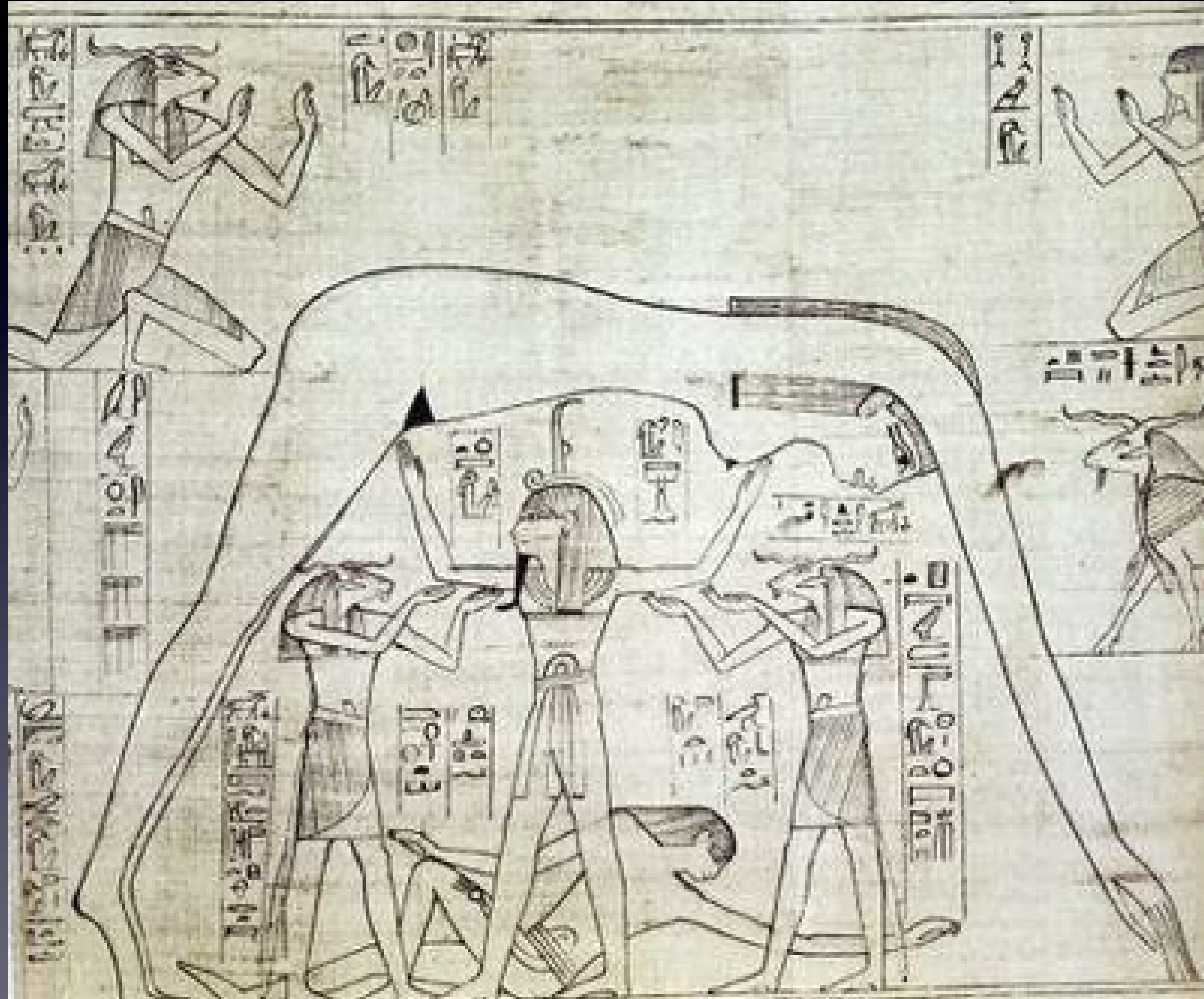


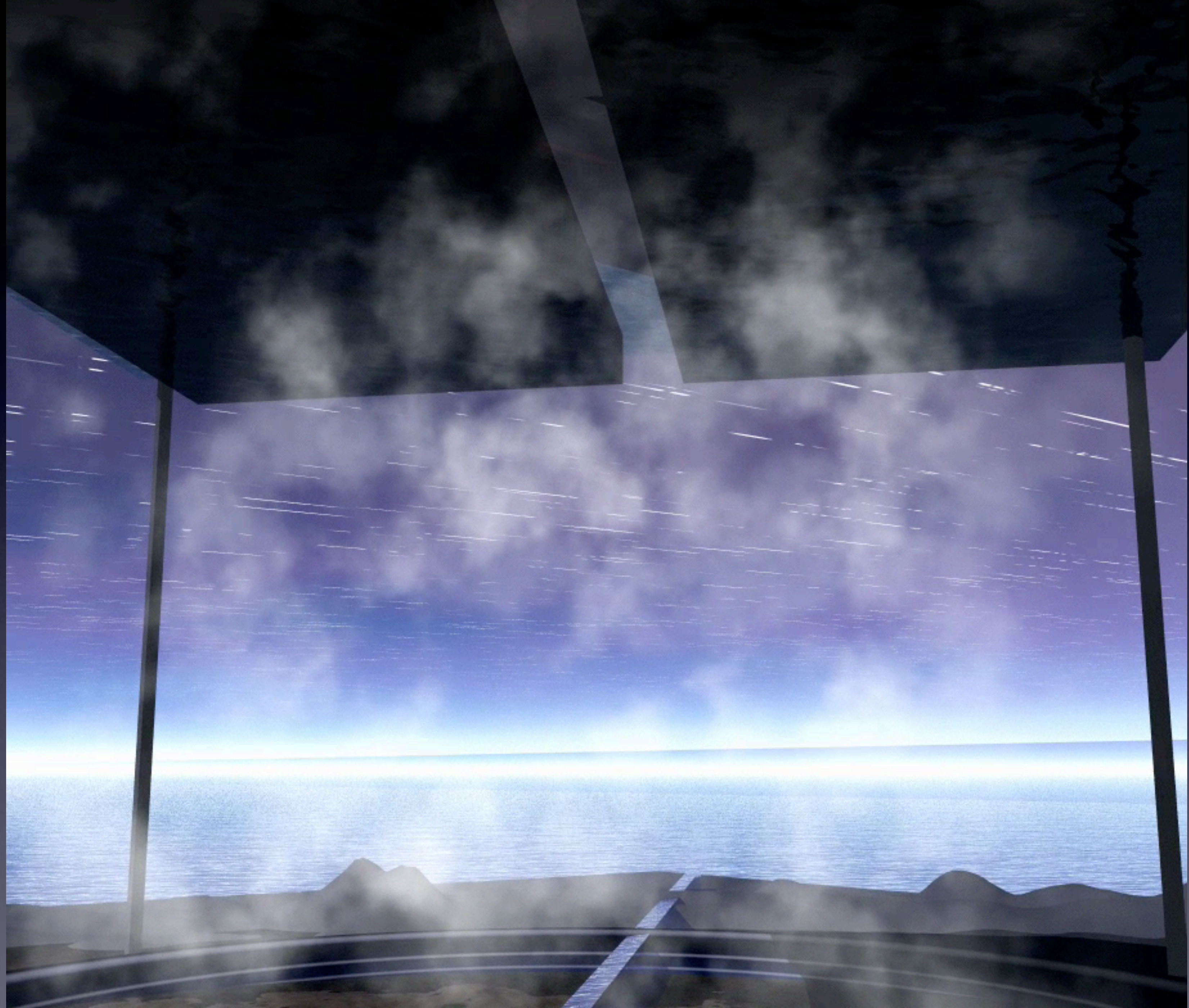




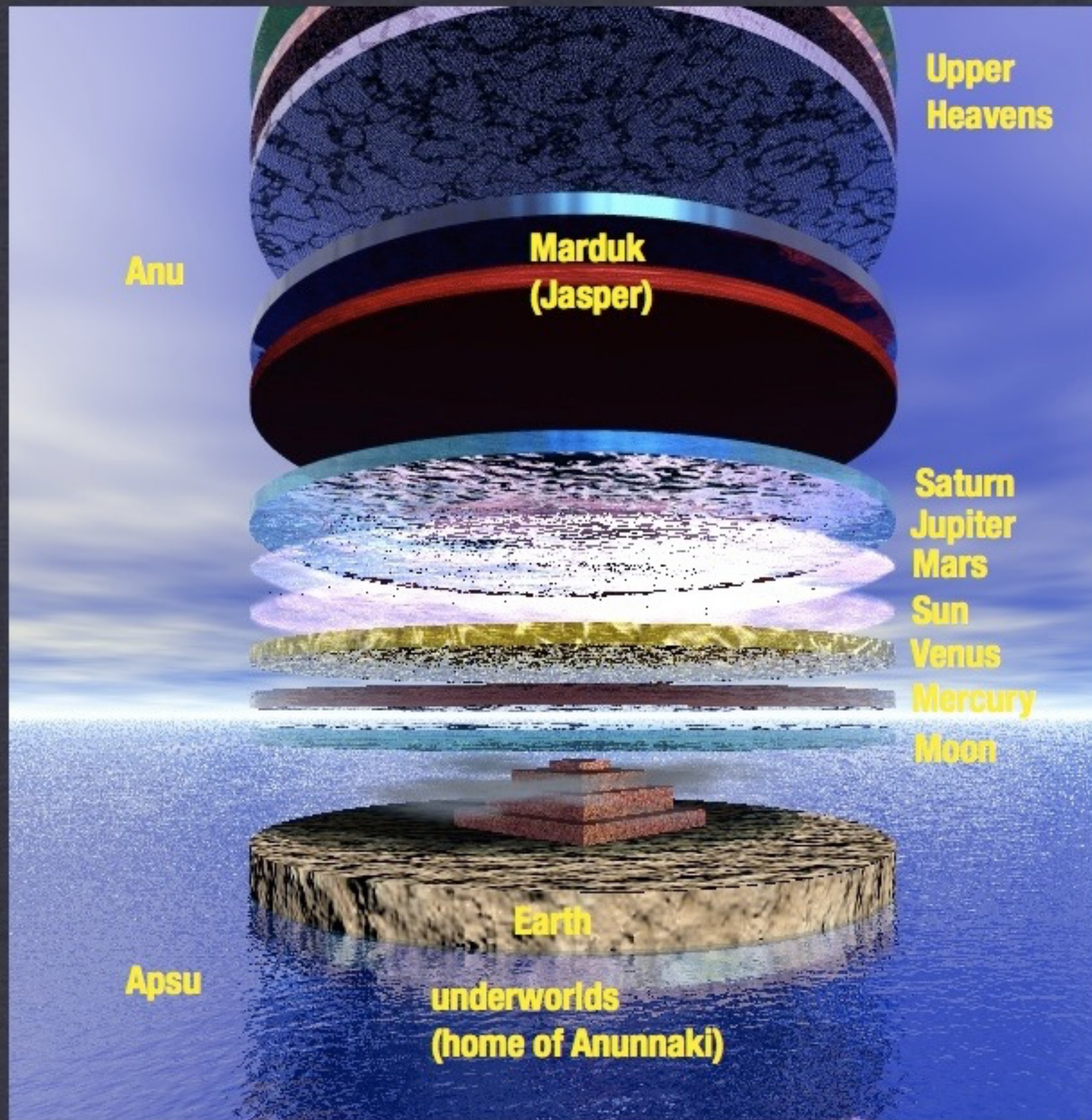
This is a diagram of the Nine Worlds of Asgard, showing the relationship of the various separate dimensional realms. The diagram is not drawn to scale with the Earth, nor do the positioning of worlds above or below one another have any real significance since they are not in the same dimensional plane. The only evidence for placing Asgard at the top is that the world-tree Yggdrasil has its trunk and branches there, while its root system manifests itself on most of the other worlds. Yggdrasil, also not drawn to scale, is aligned with the Cosmic Axis with which Earth's axis also aligned. Only a sample of interdimensional passageways between worlds are shown here. The number of free-standing natural nexuses are unknown. The world of Niffleheim is not considered a separate world in the Asgardian

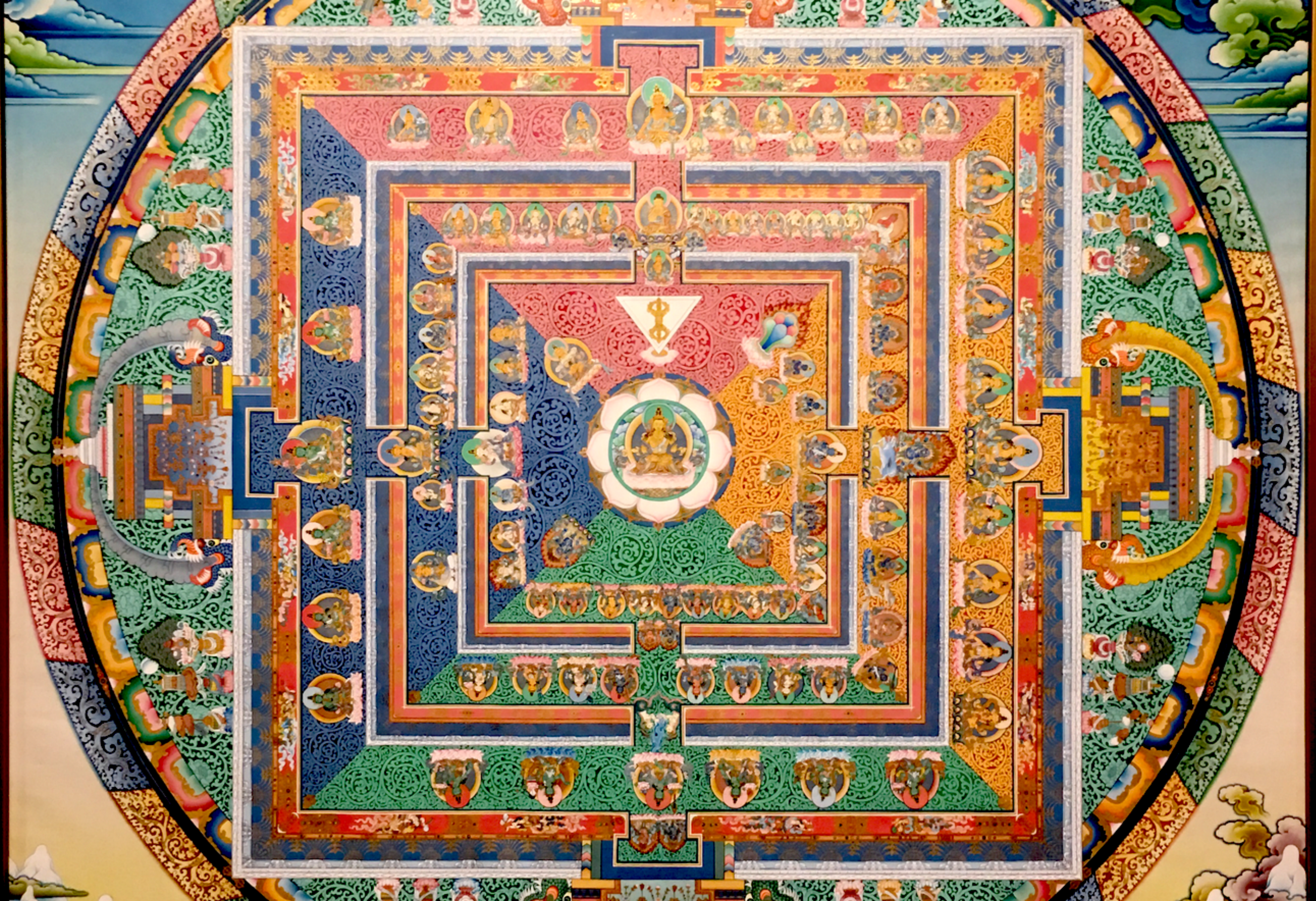
Egyptian Cosmology













Cosmological Structures in Southern Asia

Gangaikonda Cholapuram, India



Borobudur, Indonesia

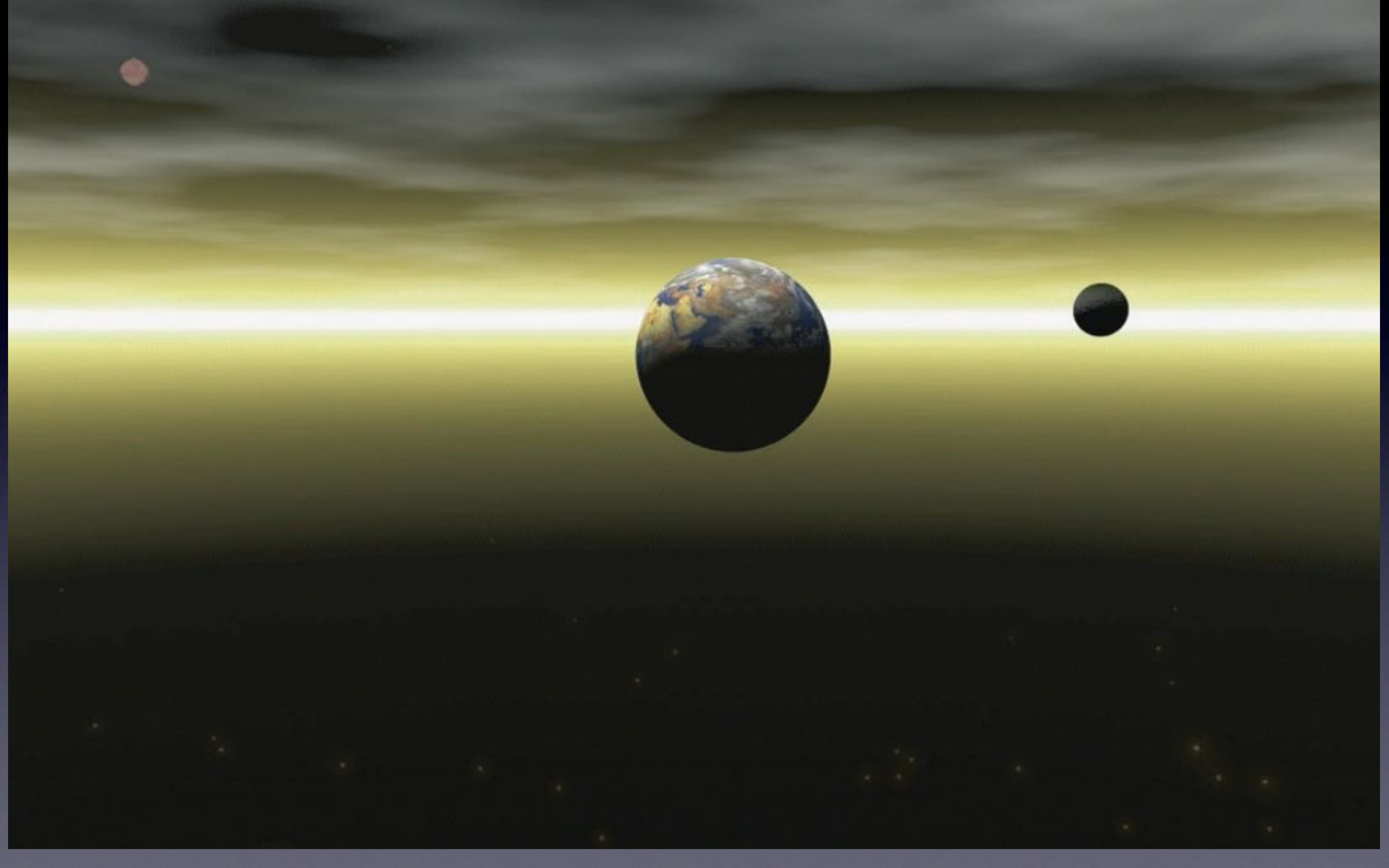


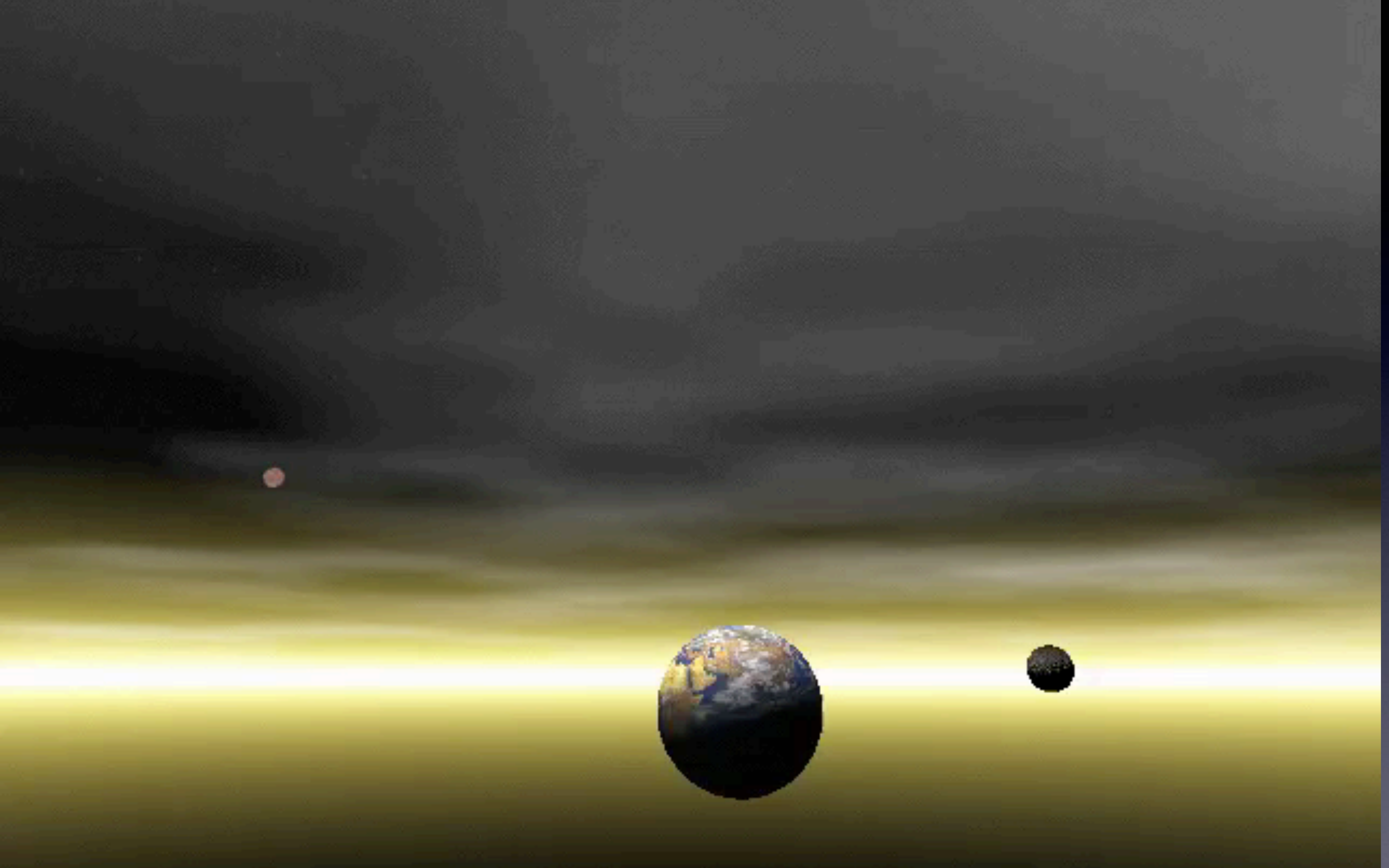
一男人坐在石上兩手托日月

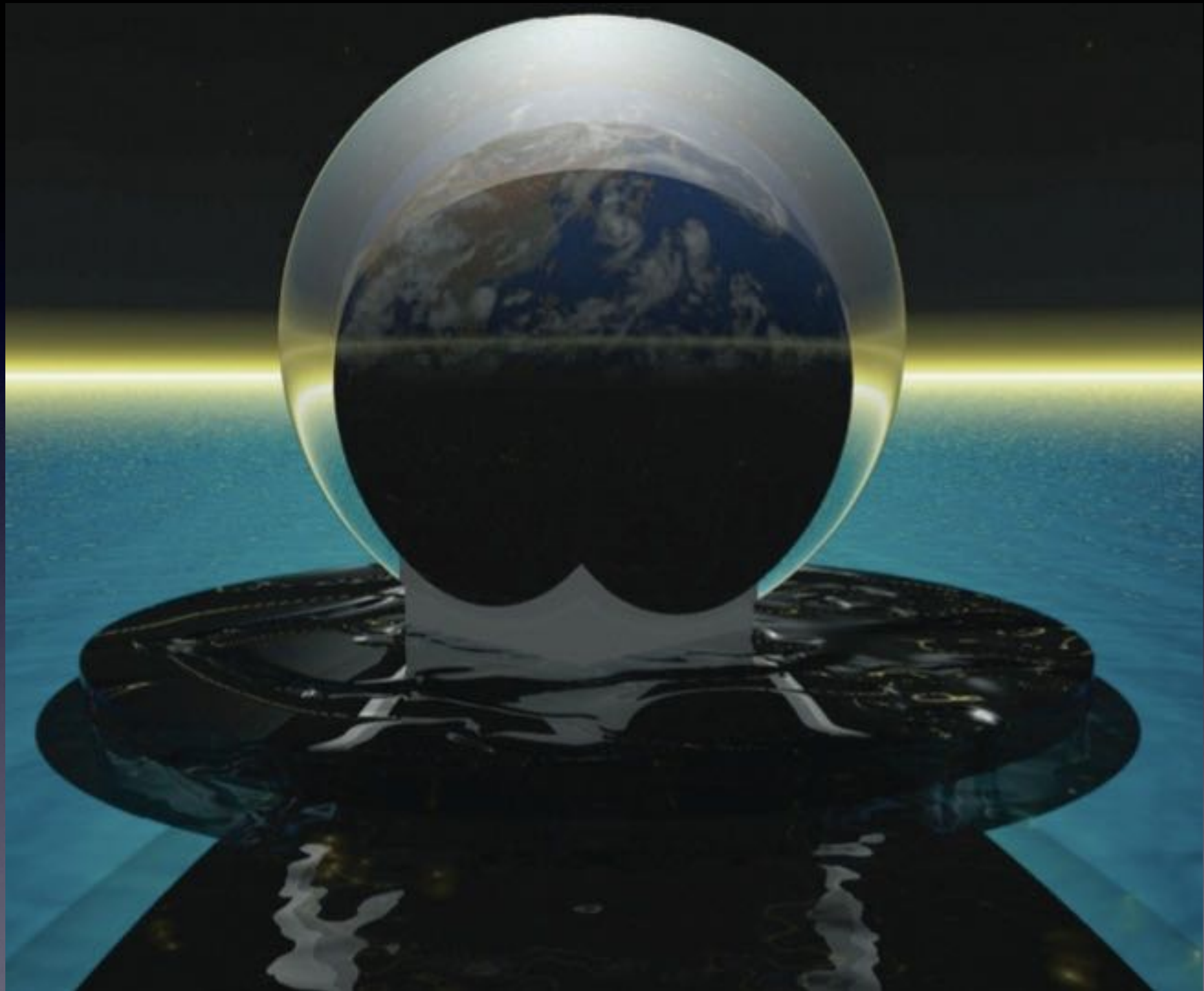
山

自從盤古得
 希夷席廟
 龍爭事可
 怨萬代兵
 士難考計
 且就武侯
 定玄機

山





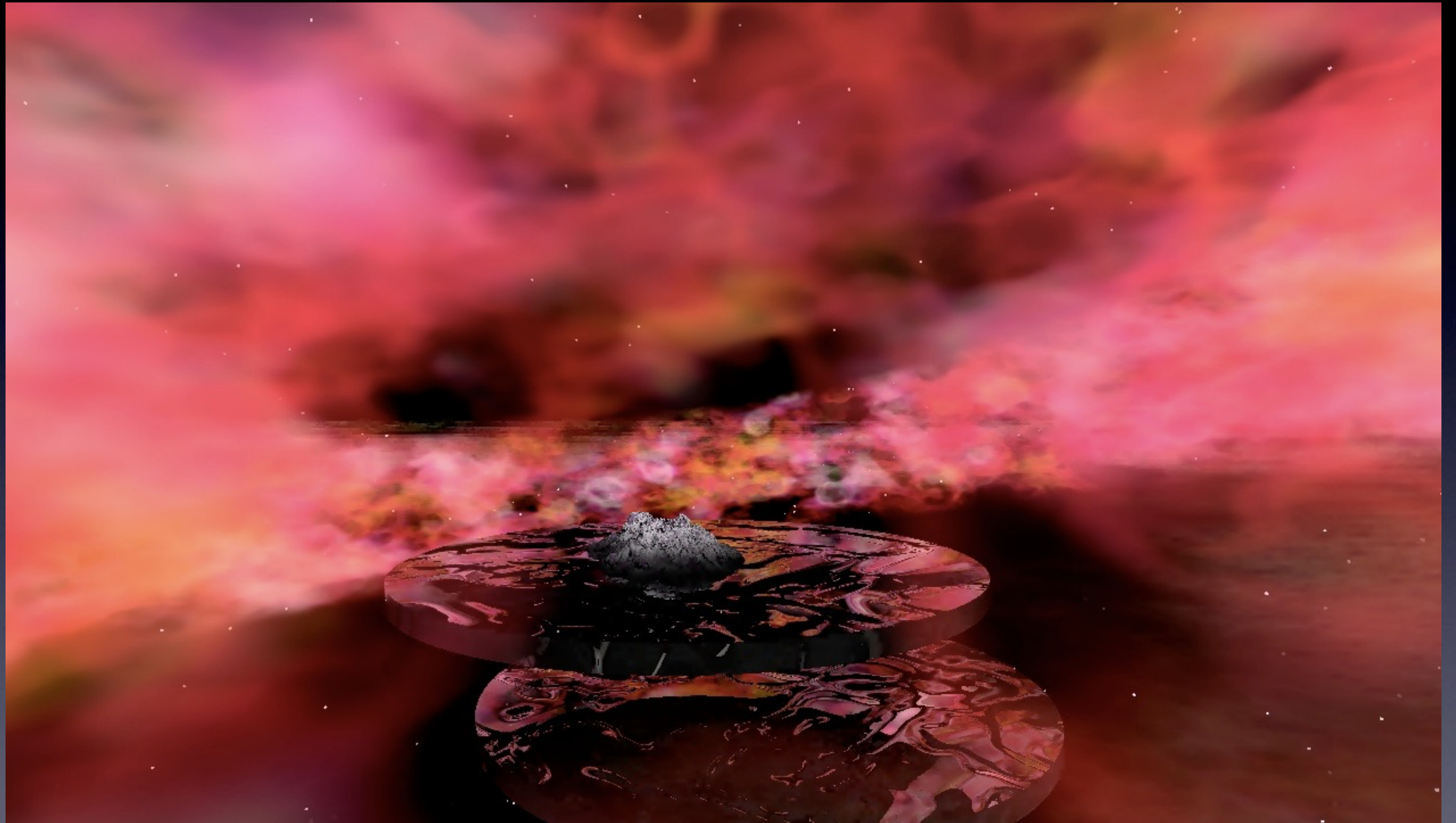






HYPOTHESIS PTOLEMAICA
 in qua Terra totius Orbium
 est centrum

HYPOTHESIS BRAHEA
 in qua centrum Luna et Fir-
 mamenti est Terra reliquorum
 quinq; Planetarum Sol



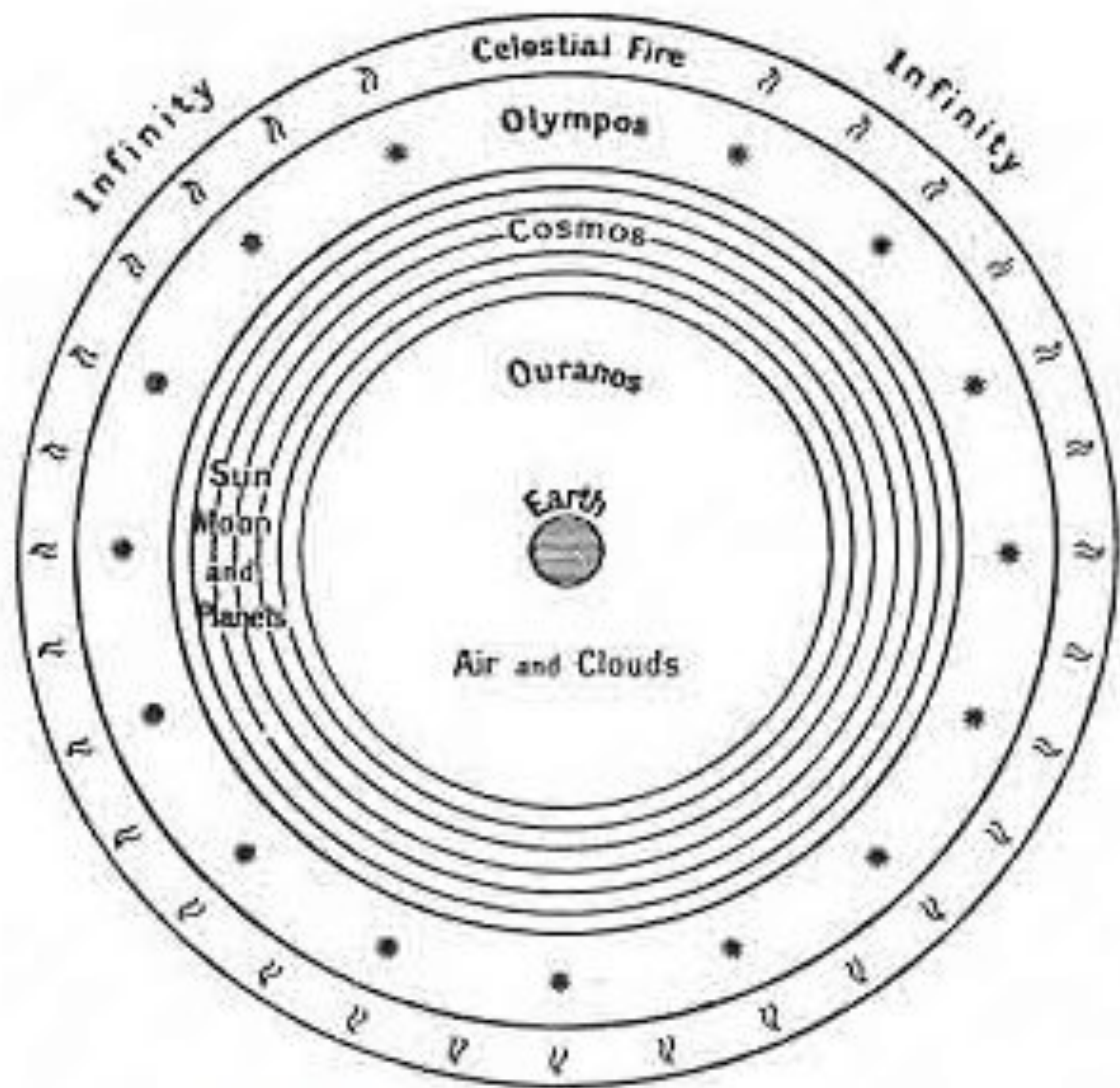
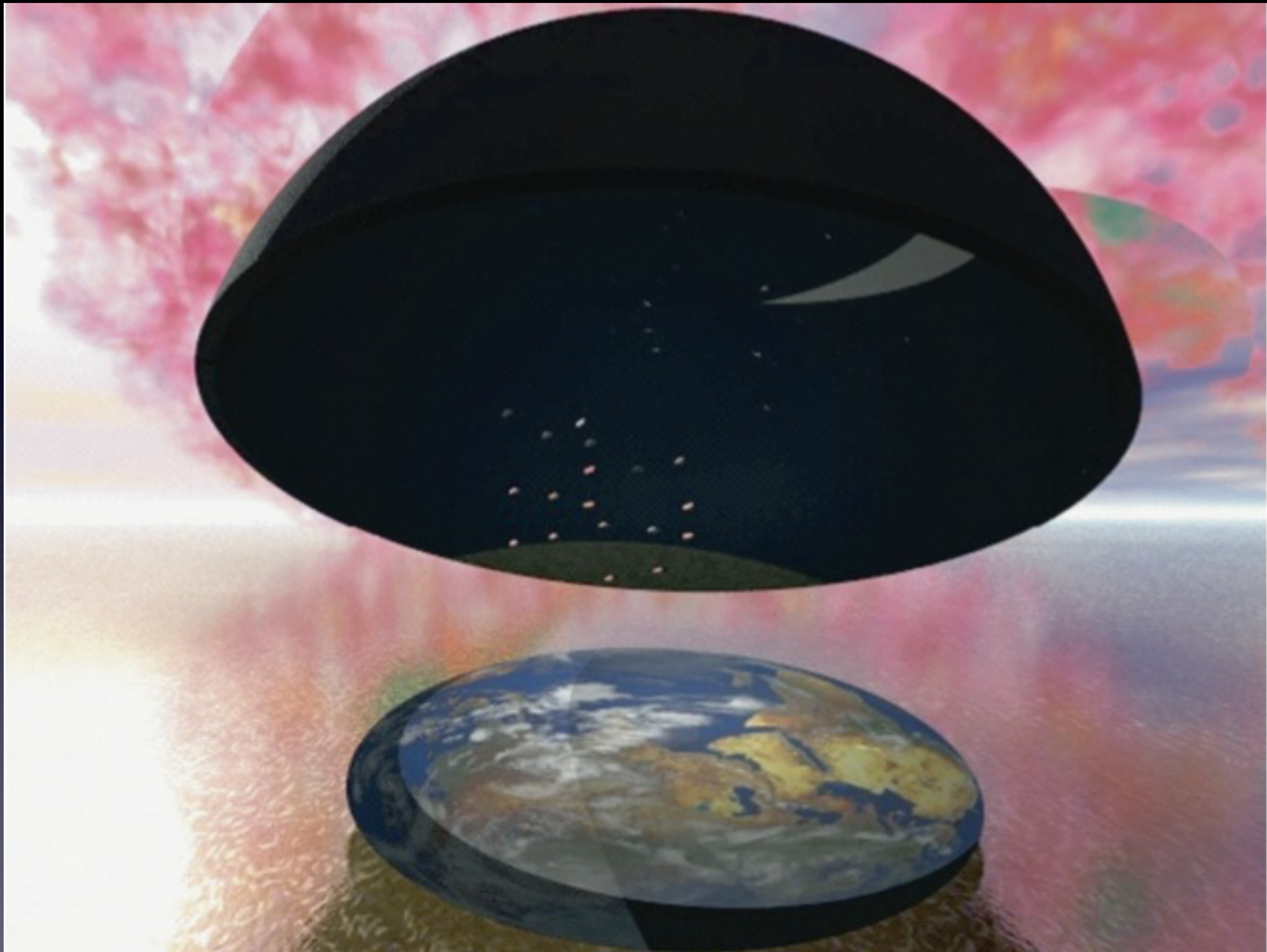
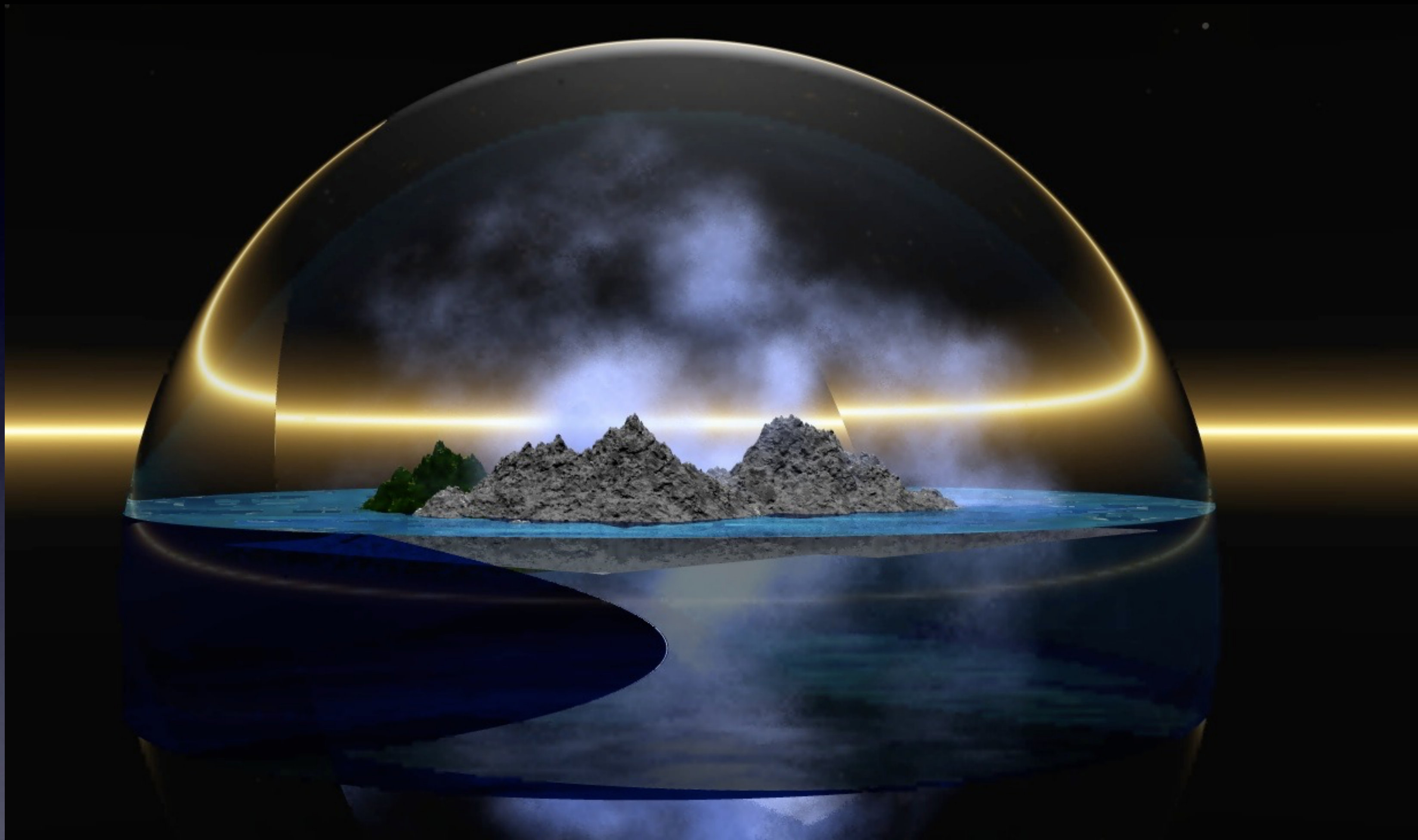
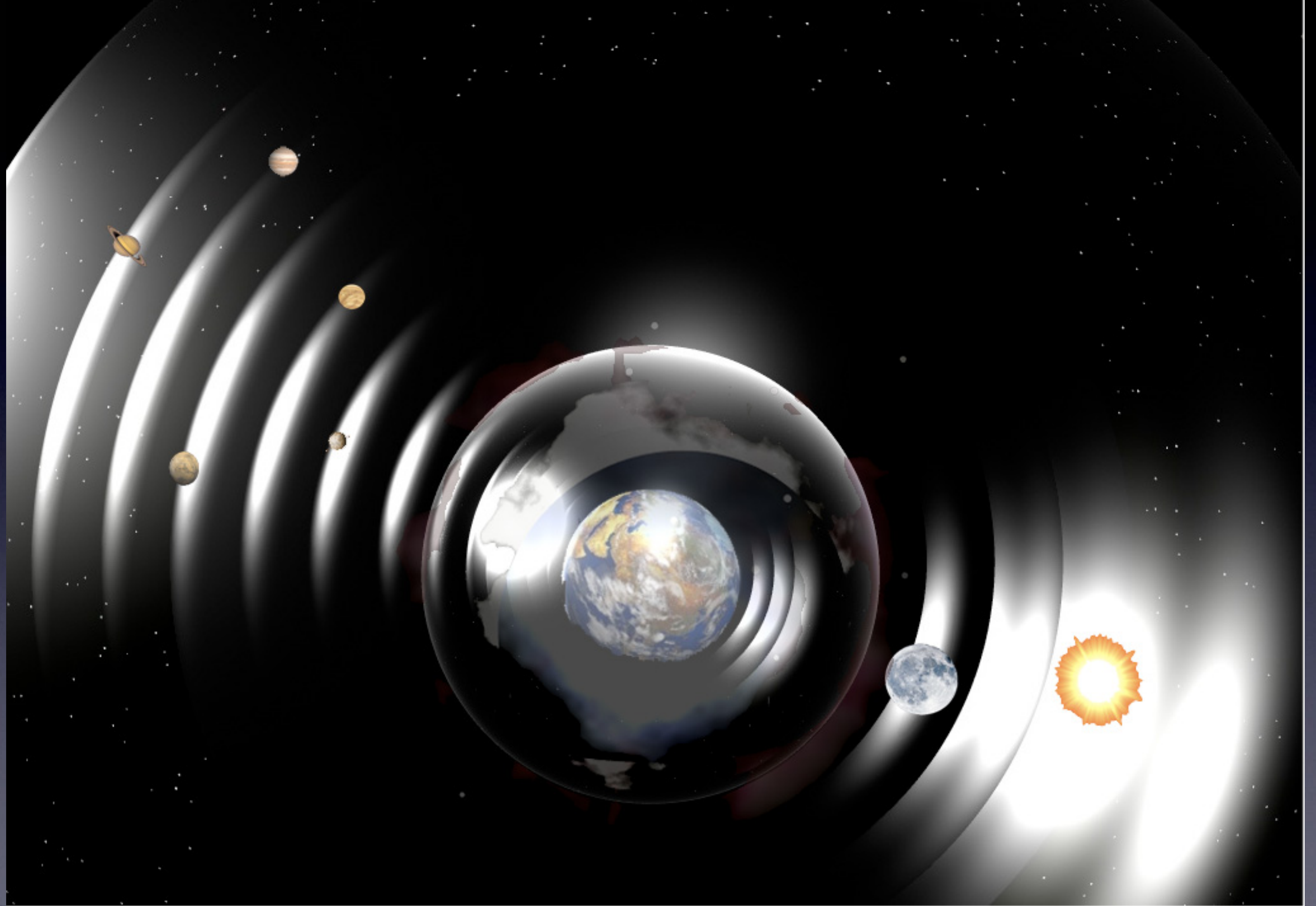


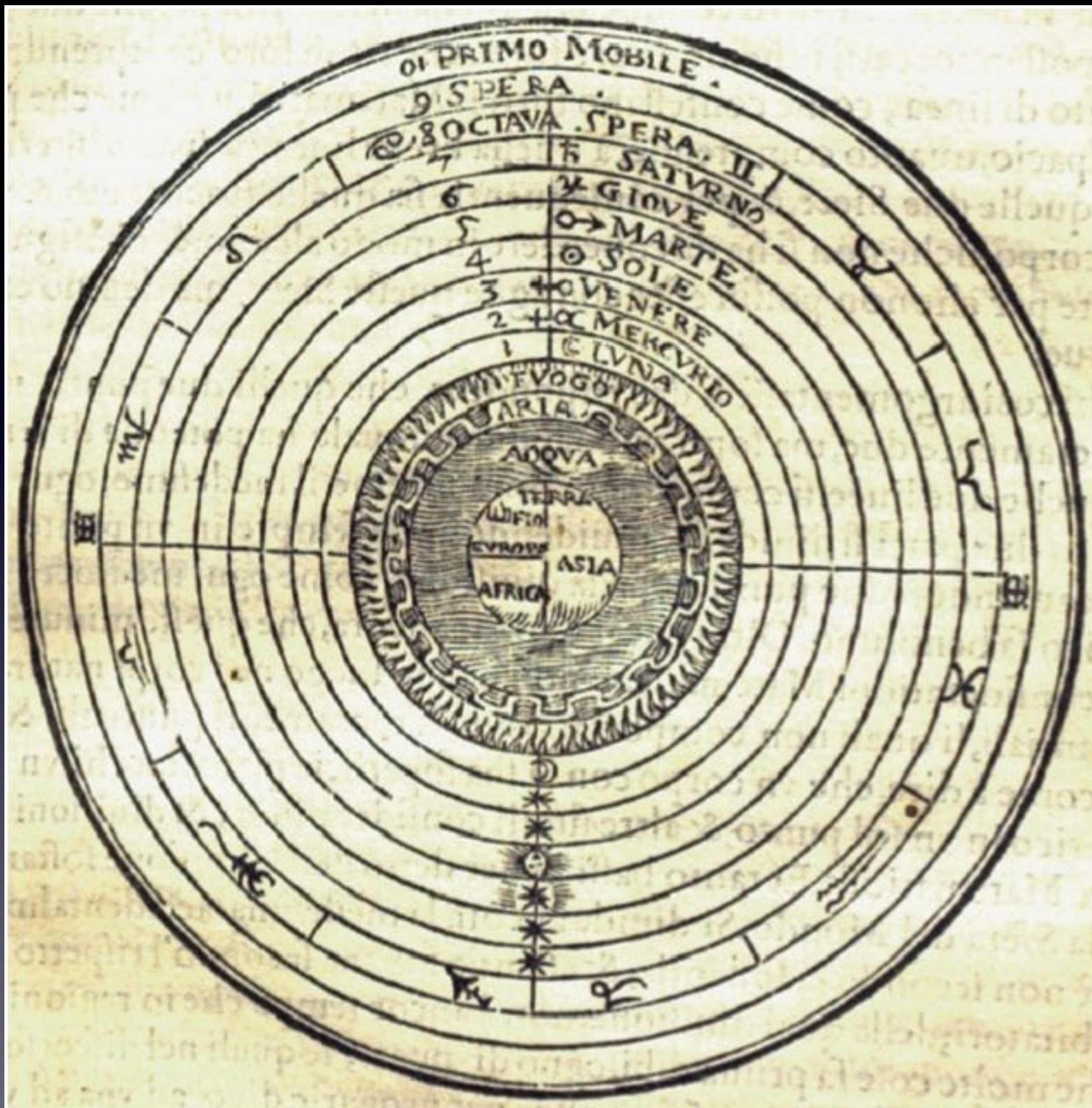
FIGURE 70. *The Universe of Pythagoras (c. 540 B.C.)*

(From *Dante and the Early Astronomers*; M. A. Orr (Mrs. John Evershed), 1913.)



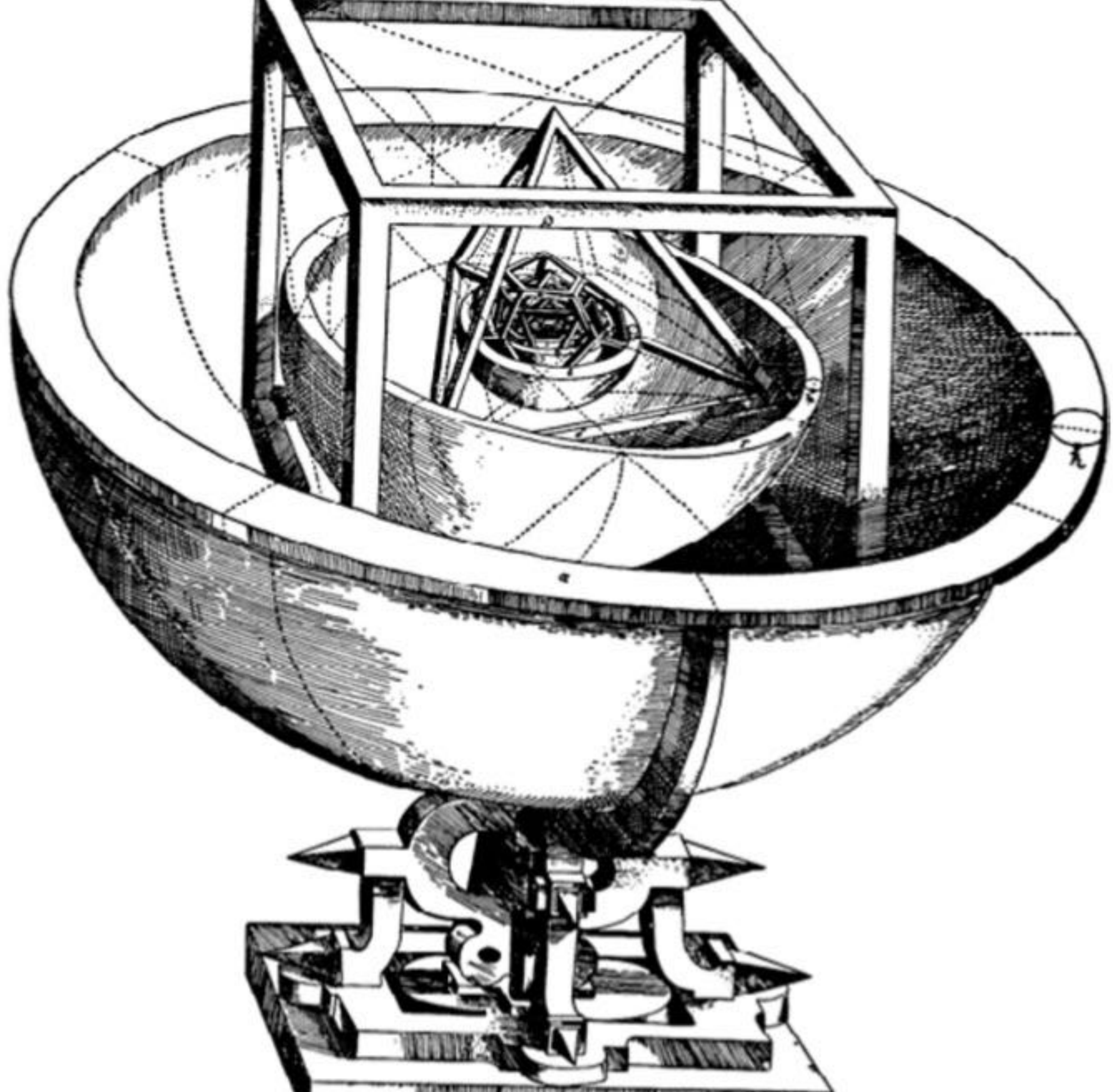


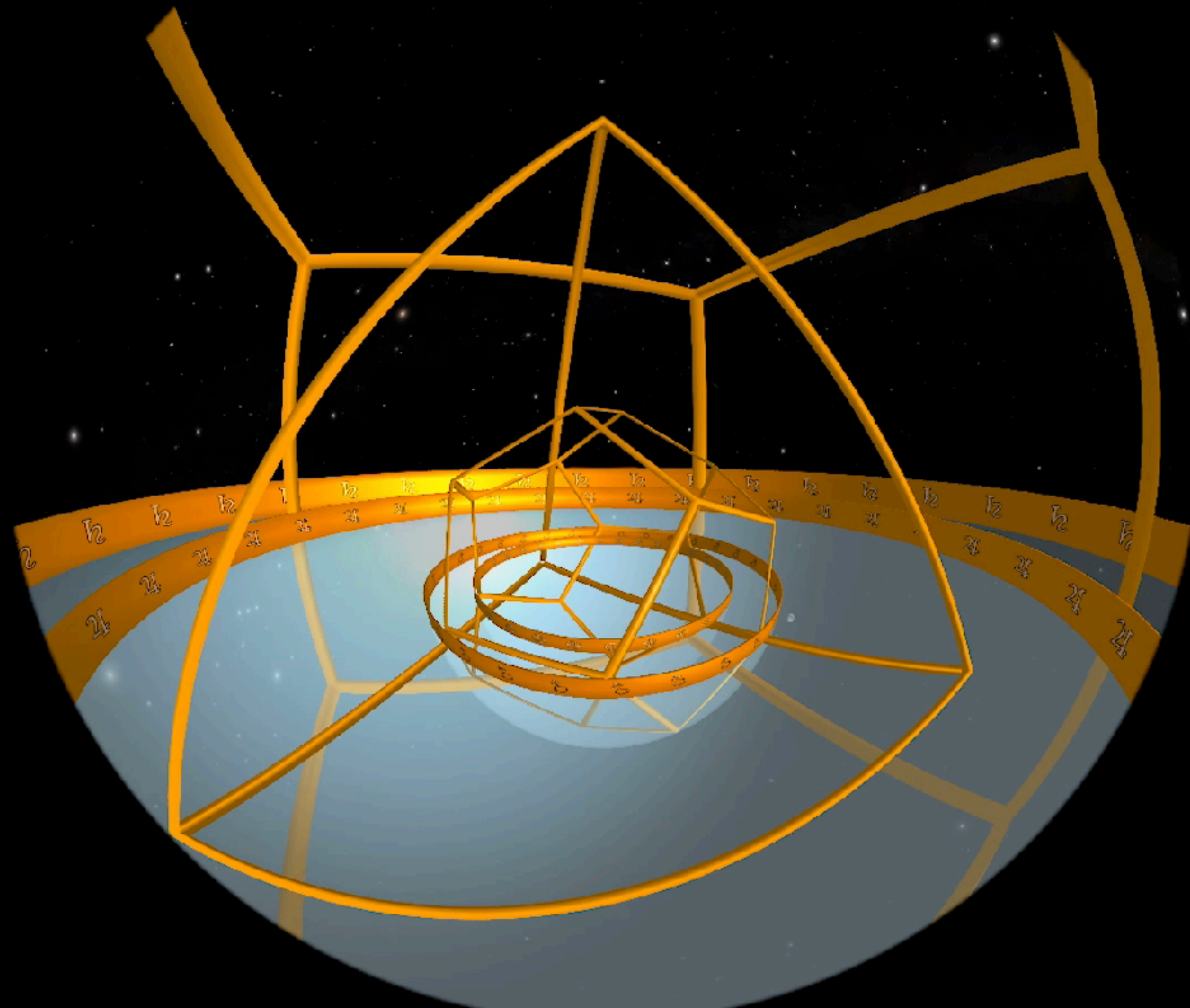


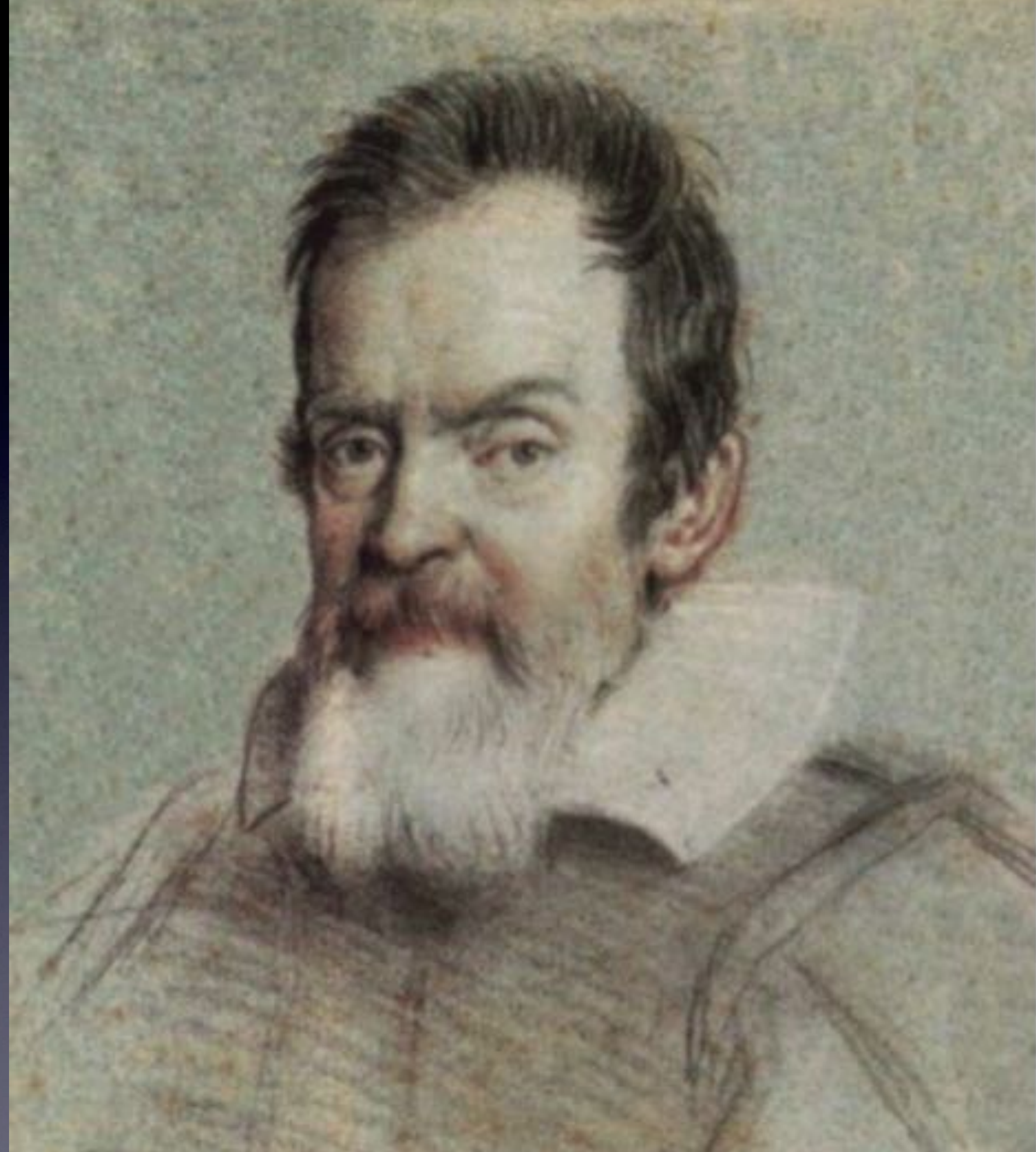


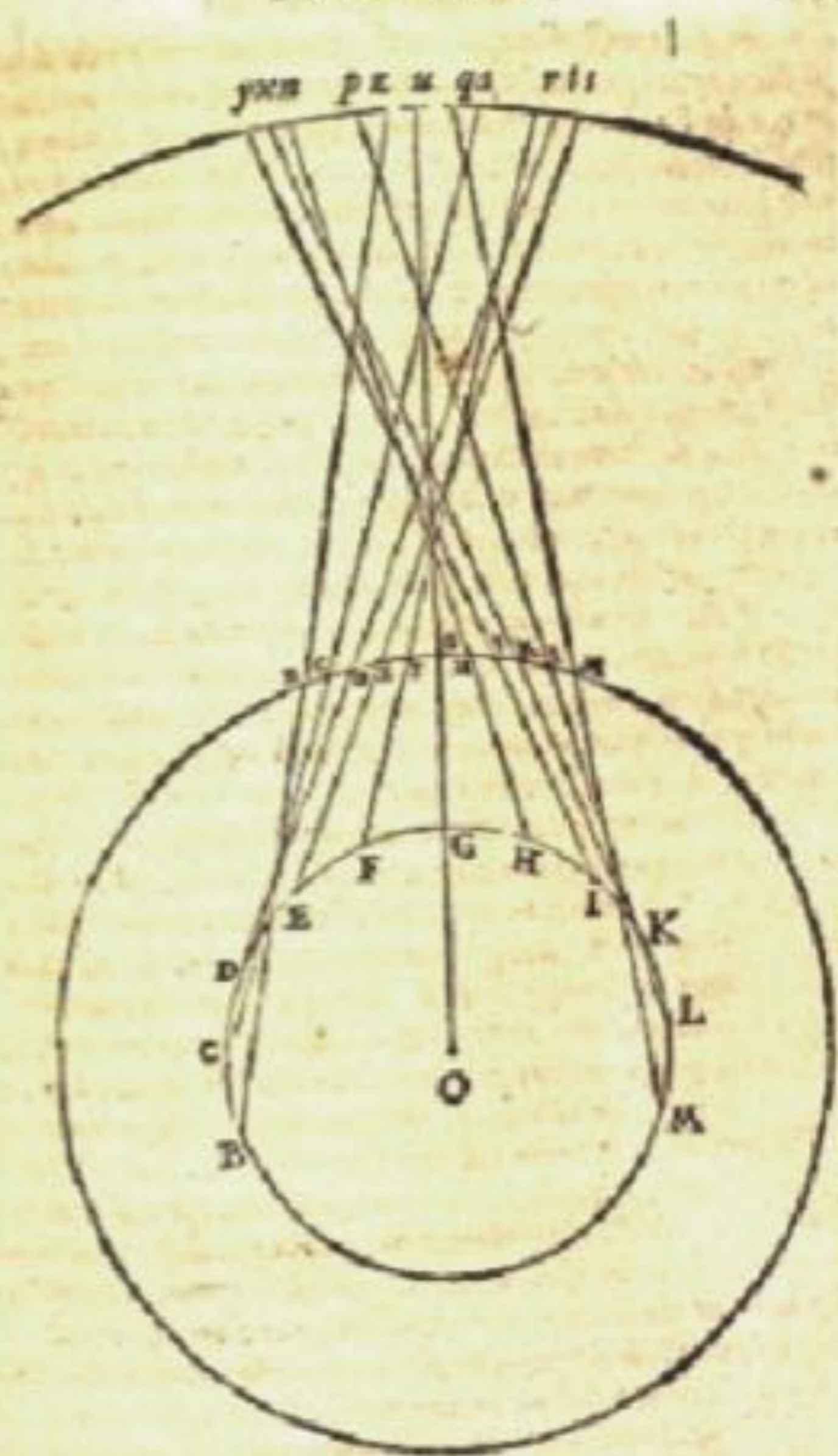




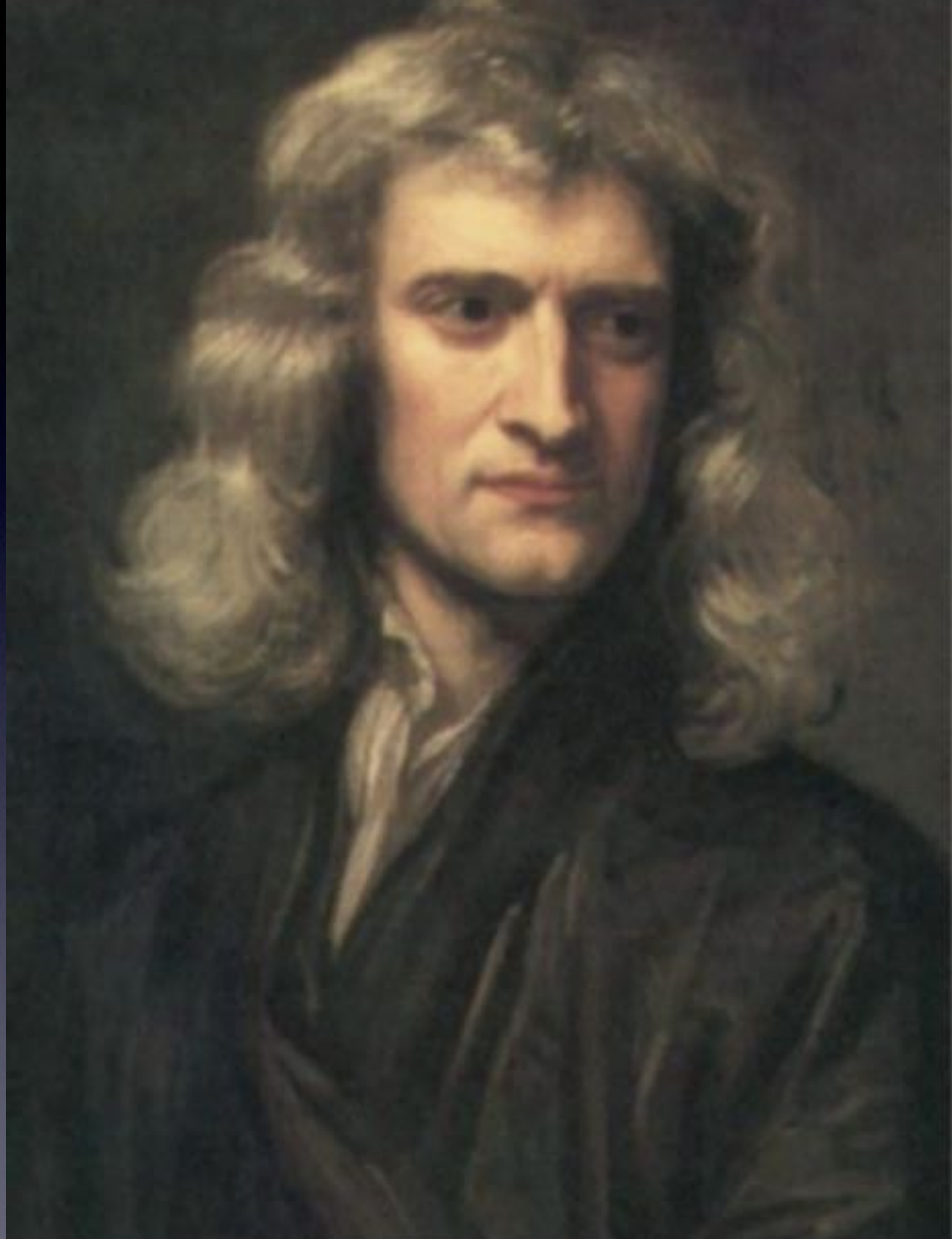








Supponendo hora, che quando la terra è in B. Giove sia in b.
ci apparirà a noi nel Zodiaco essere in p. tirando la linea retta
Bp. Intendasi hora la terra mossa da B. in c. e Giove da b.
Globe esse venuto nel Zo-

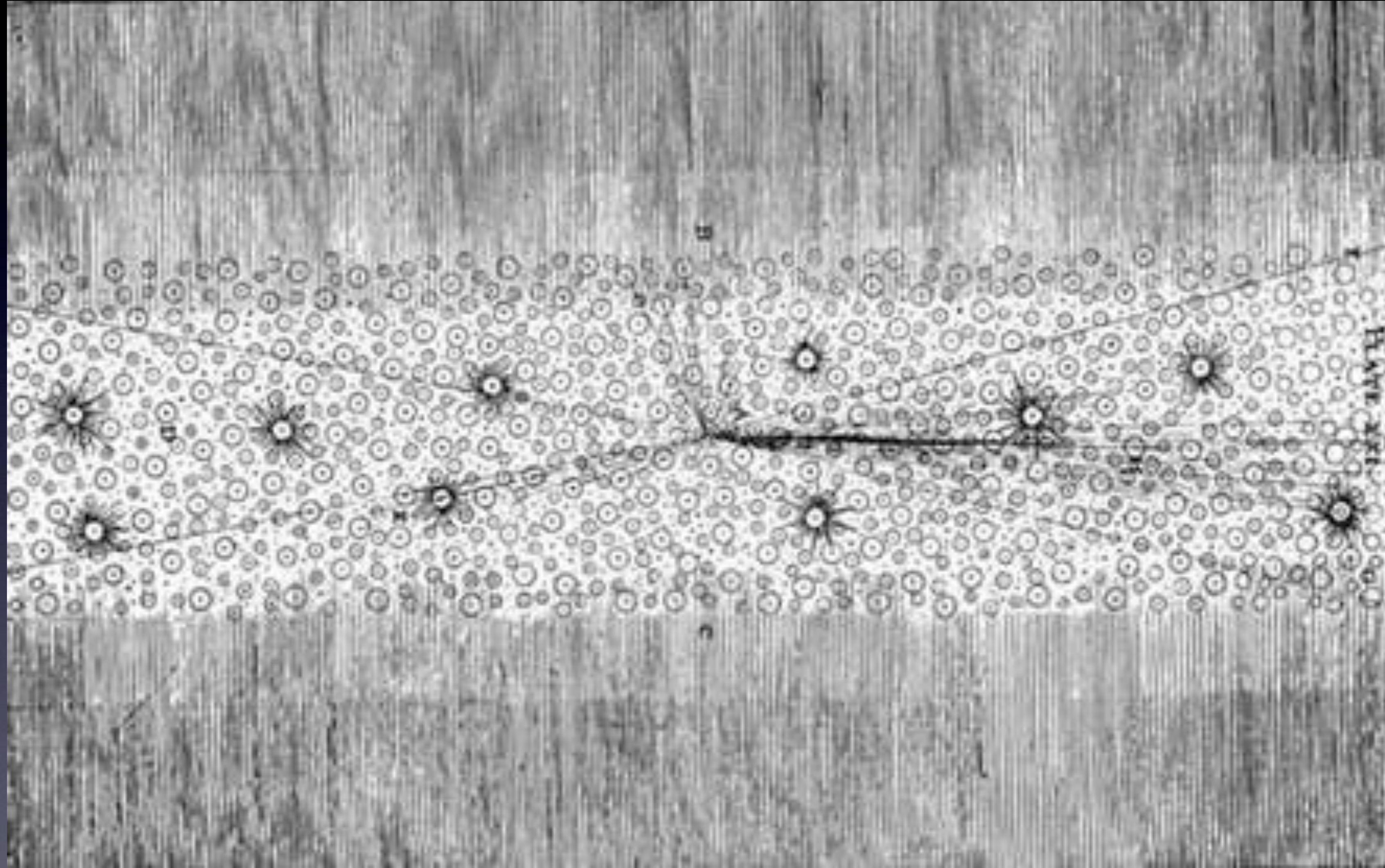








Thomas Wright “A New Theory of the Universe”

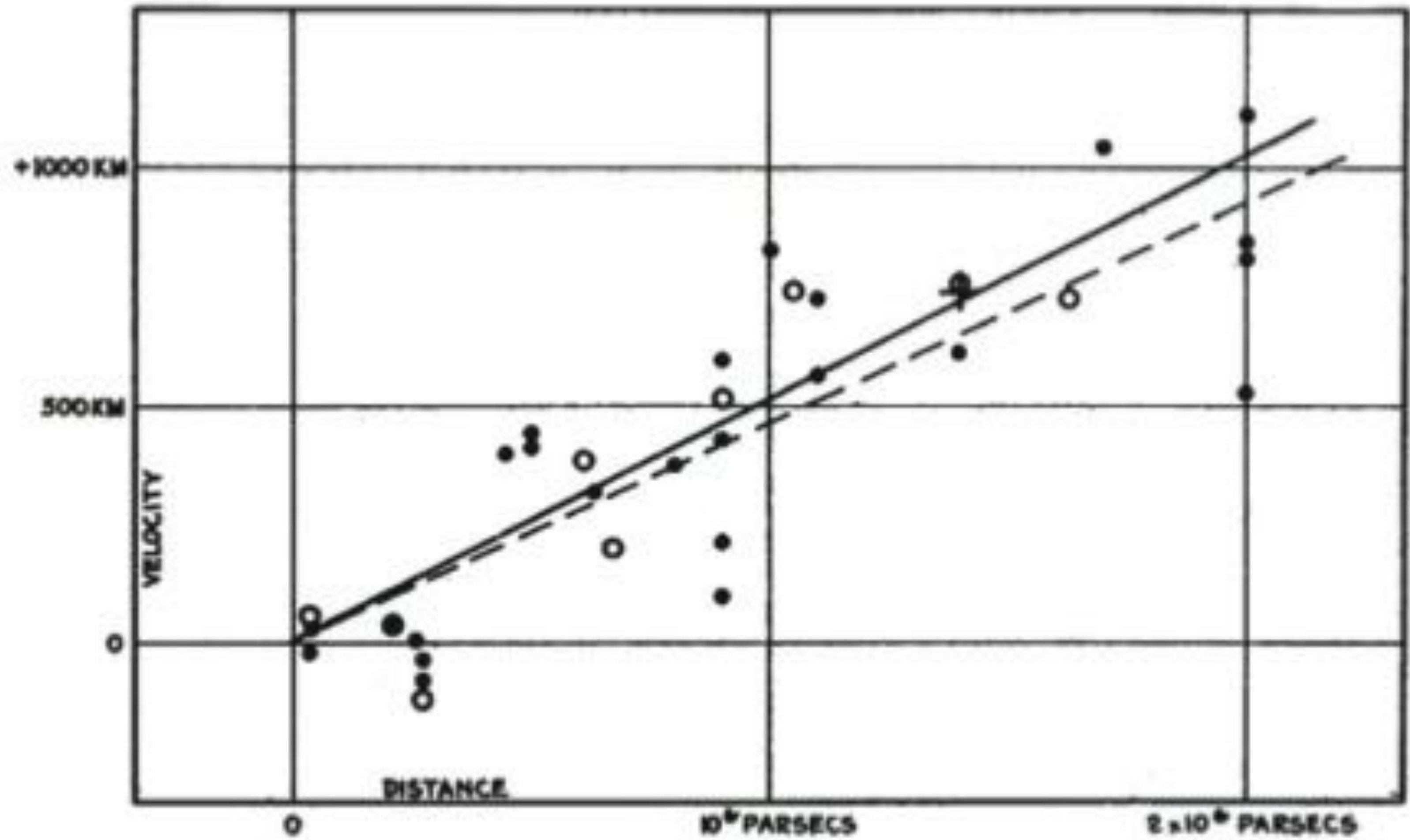


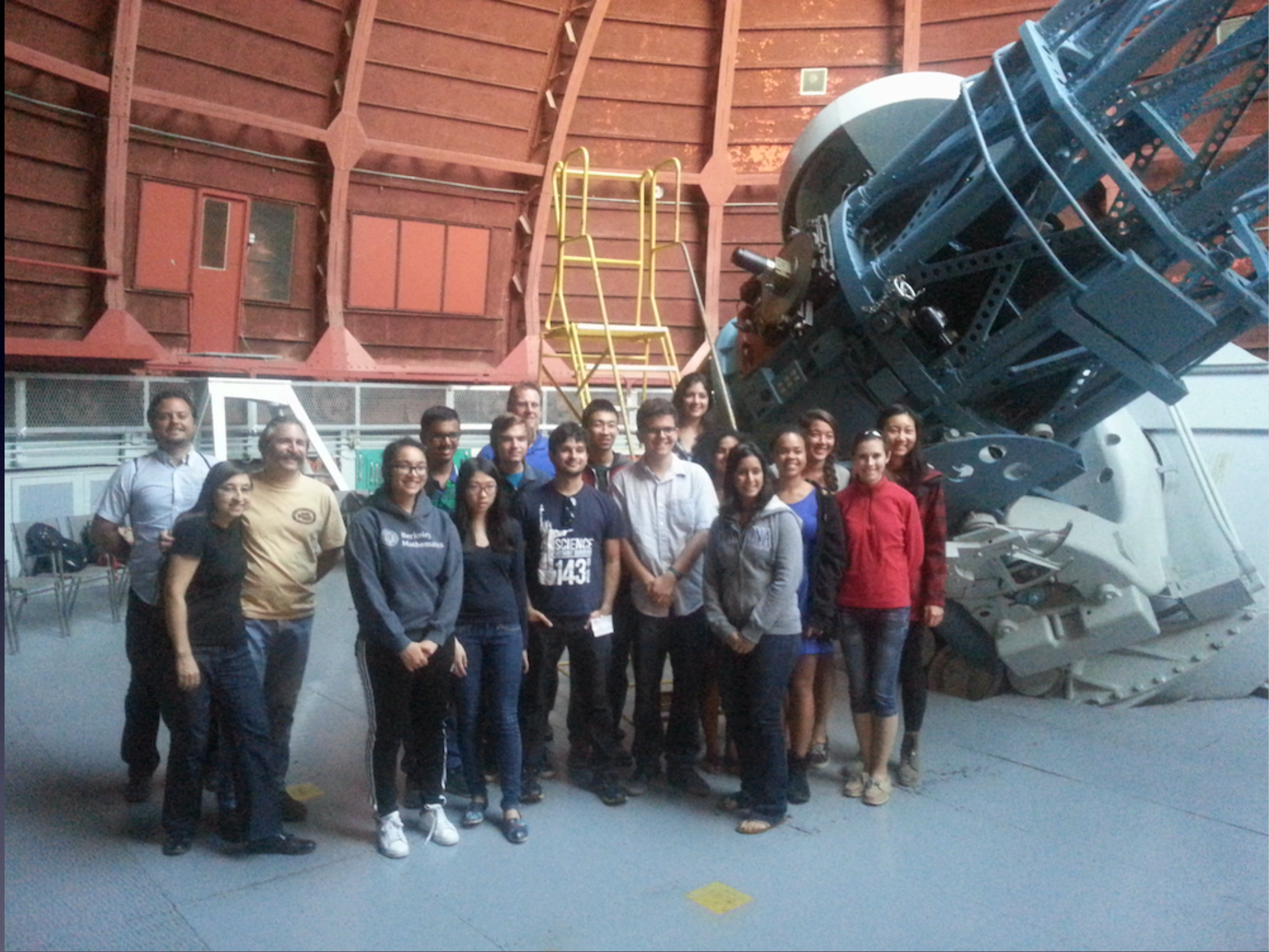




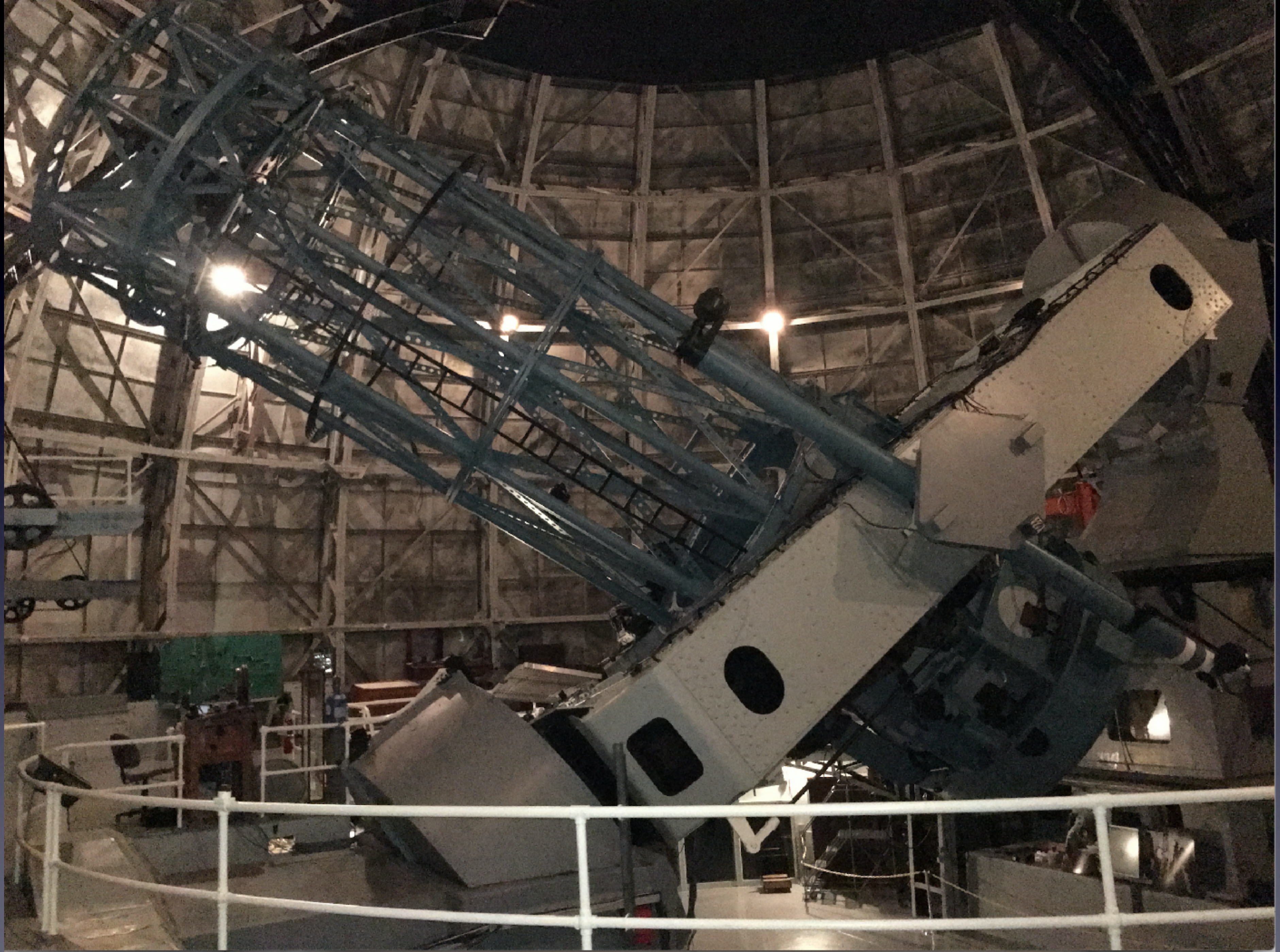


First Evidence for the Big Bang (1926)









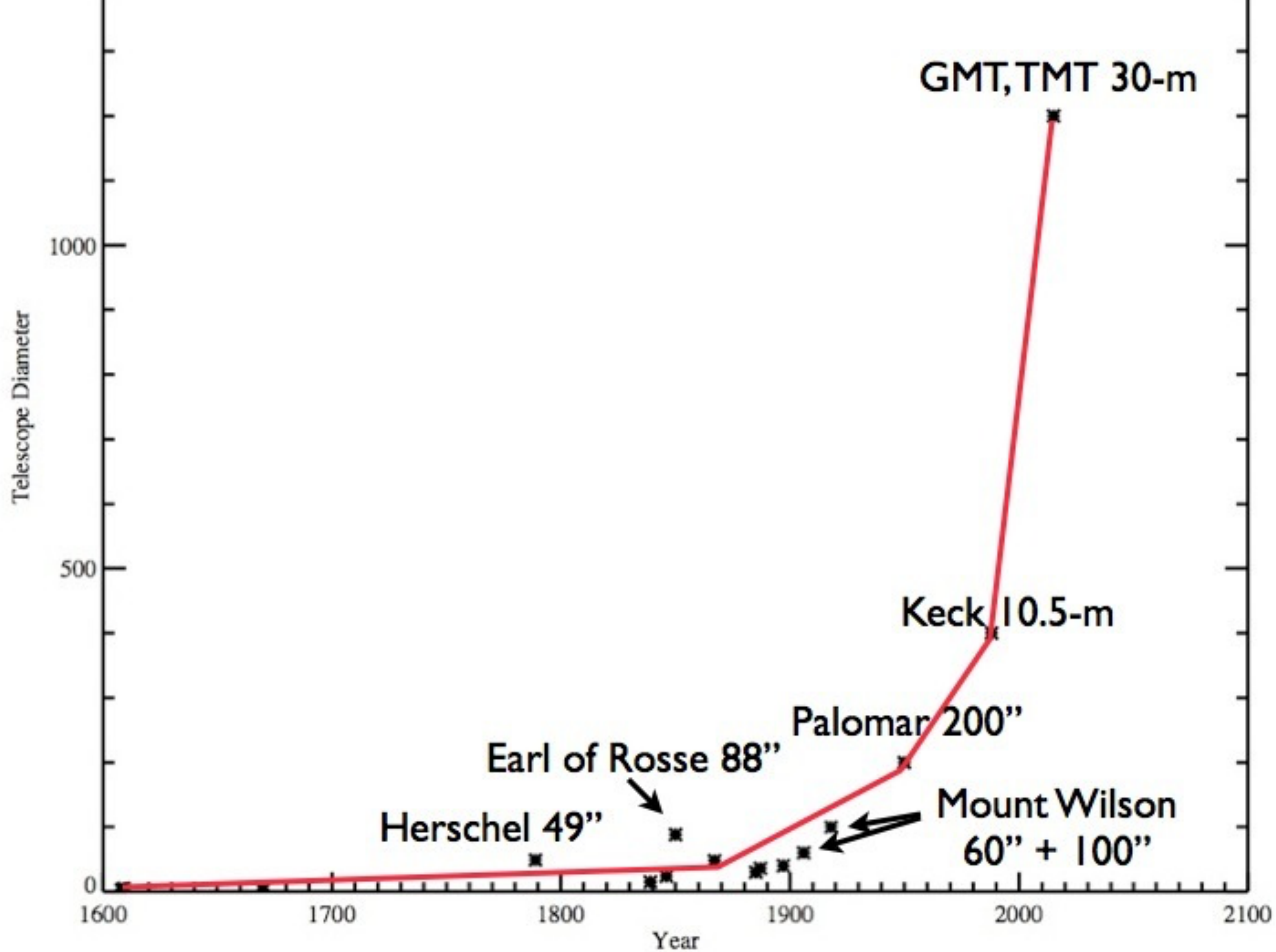






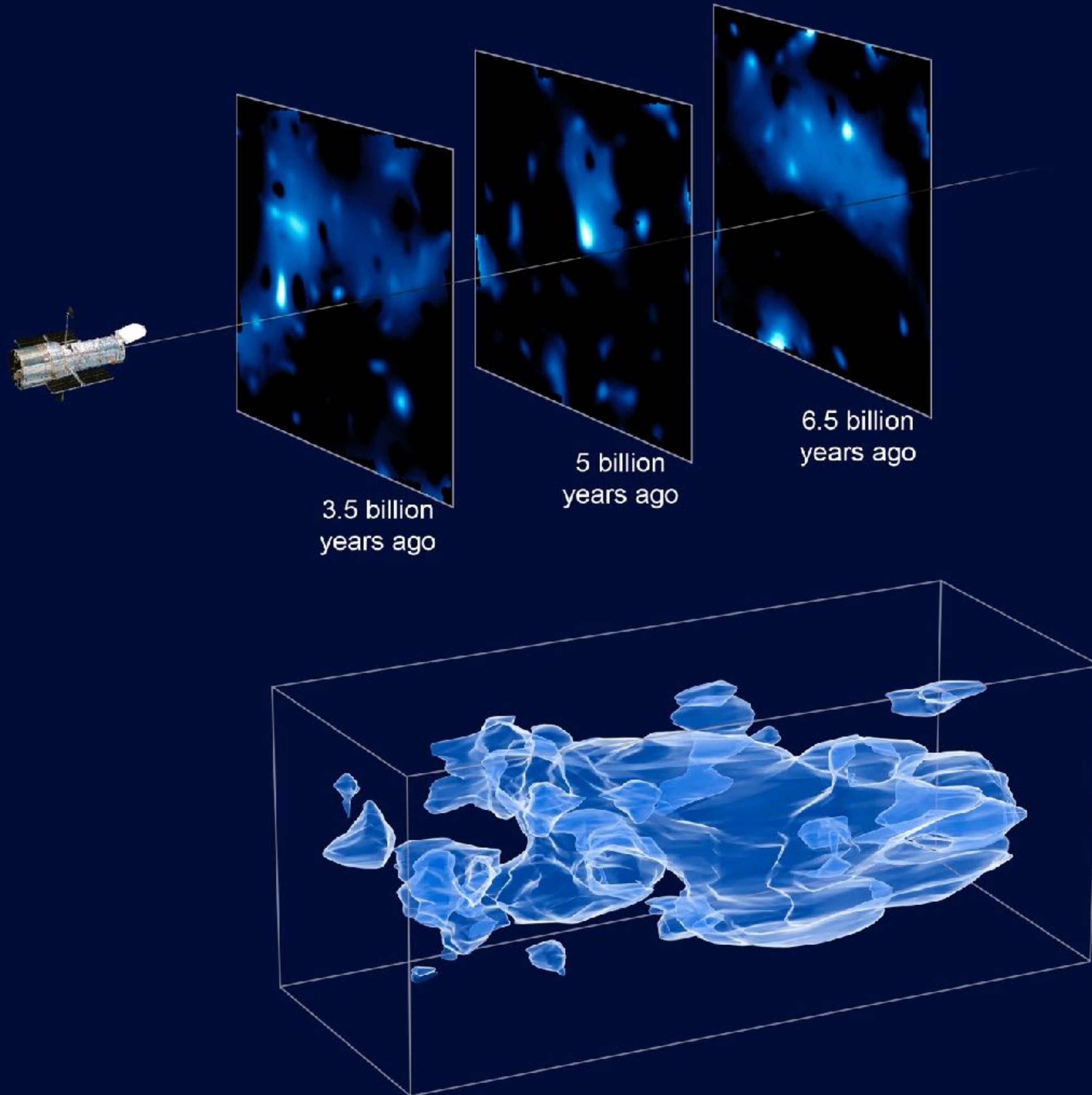




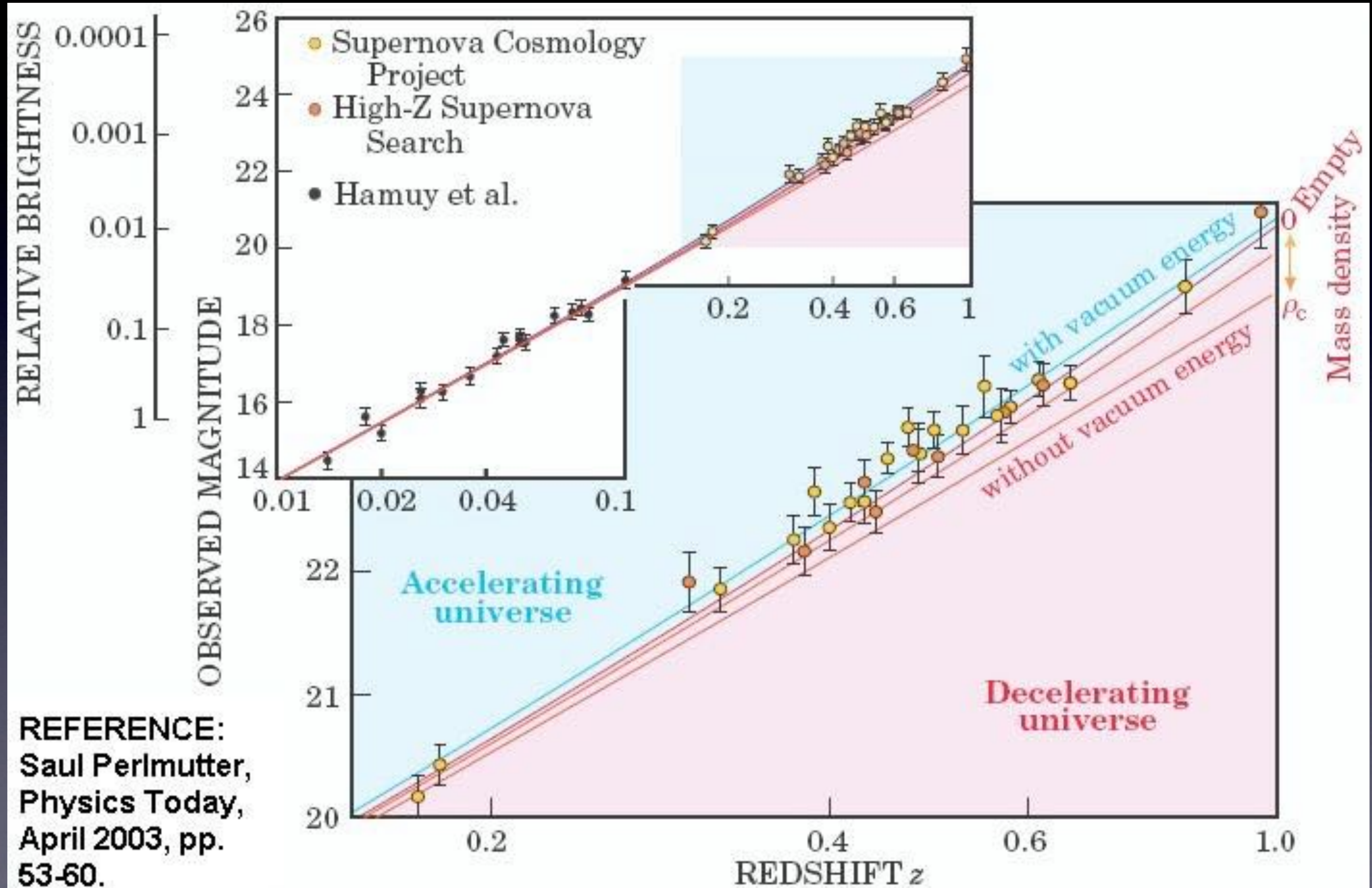


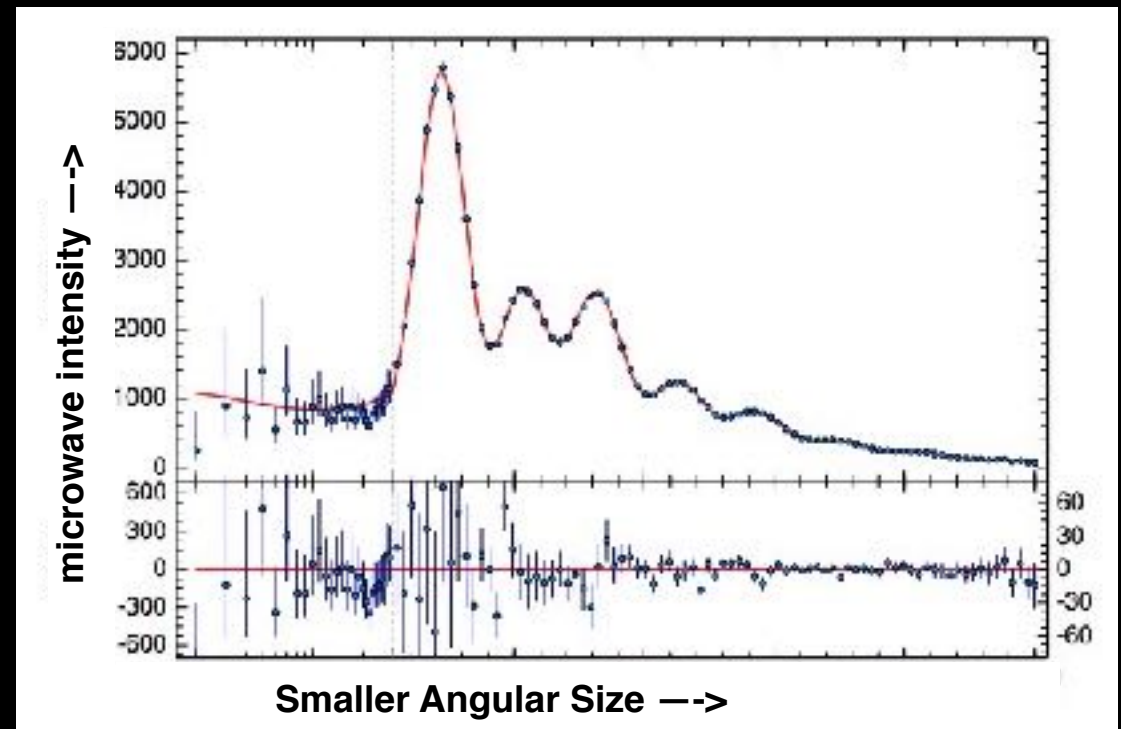
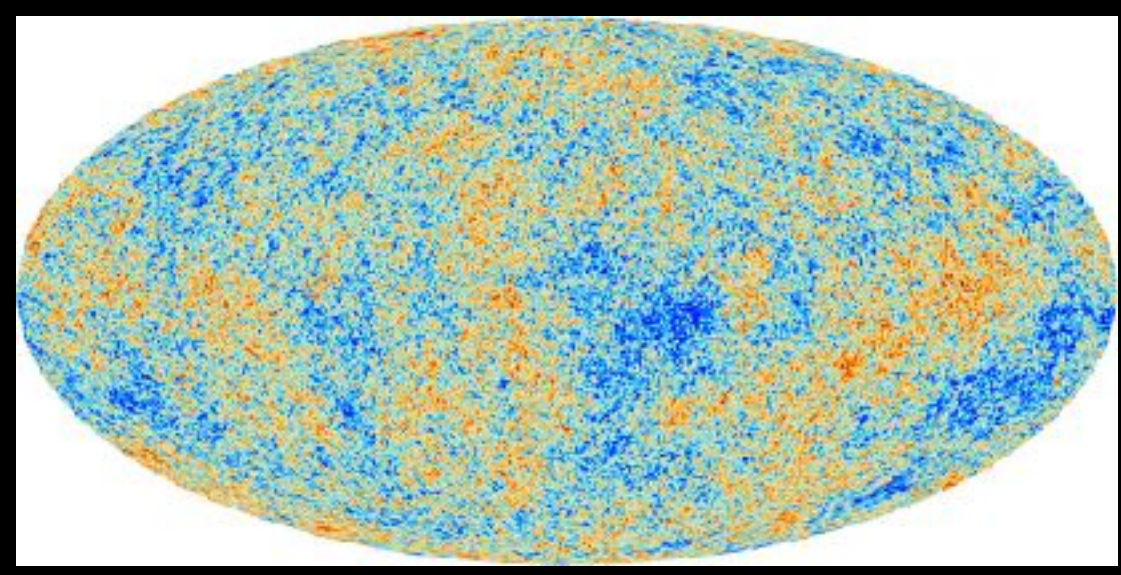
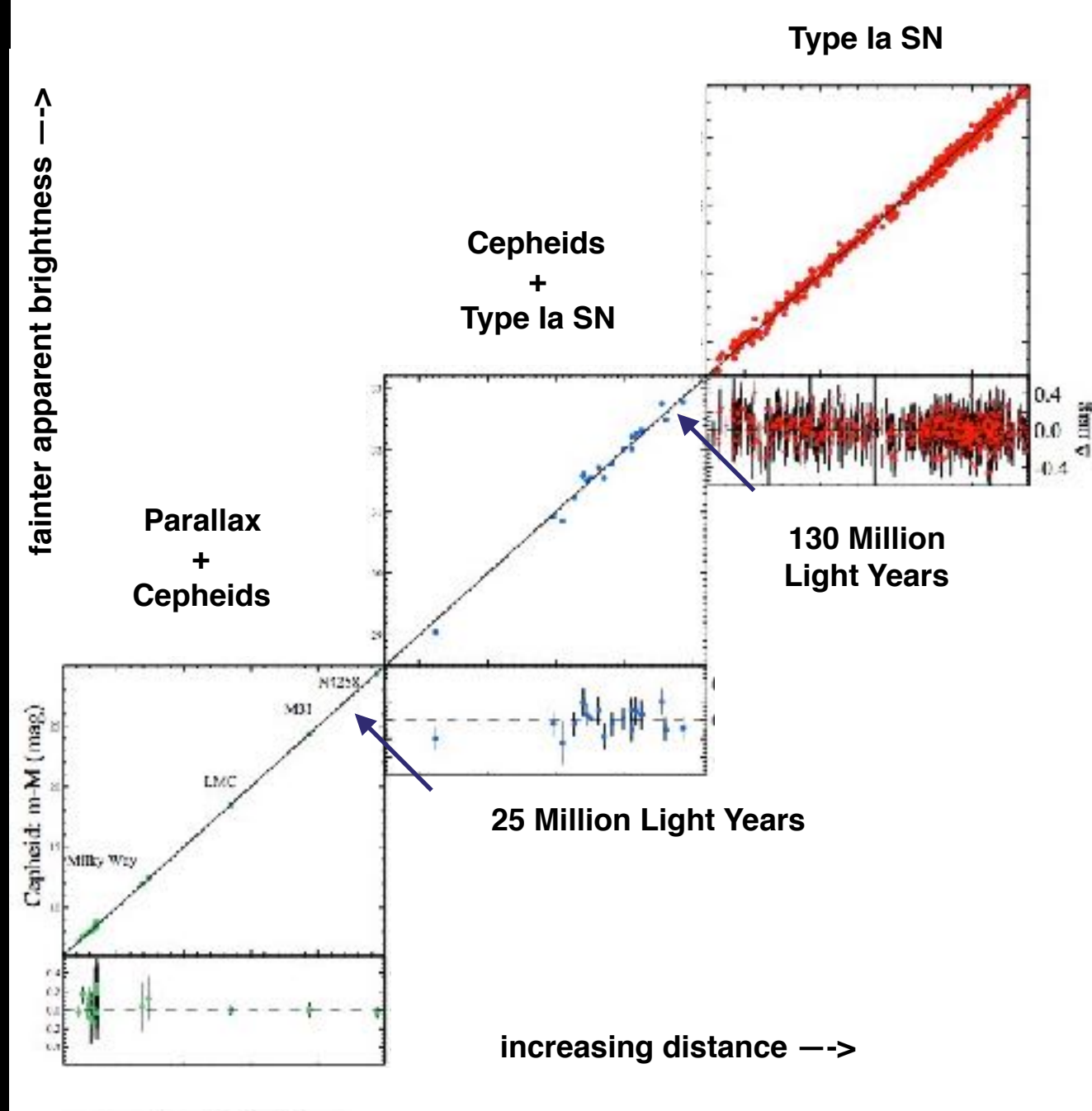
Dark Matter



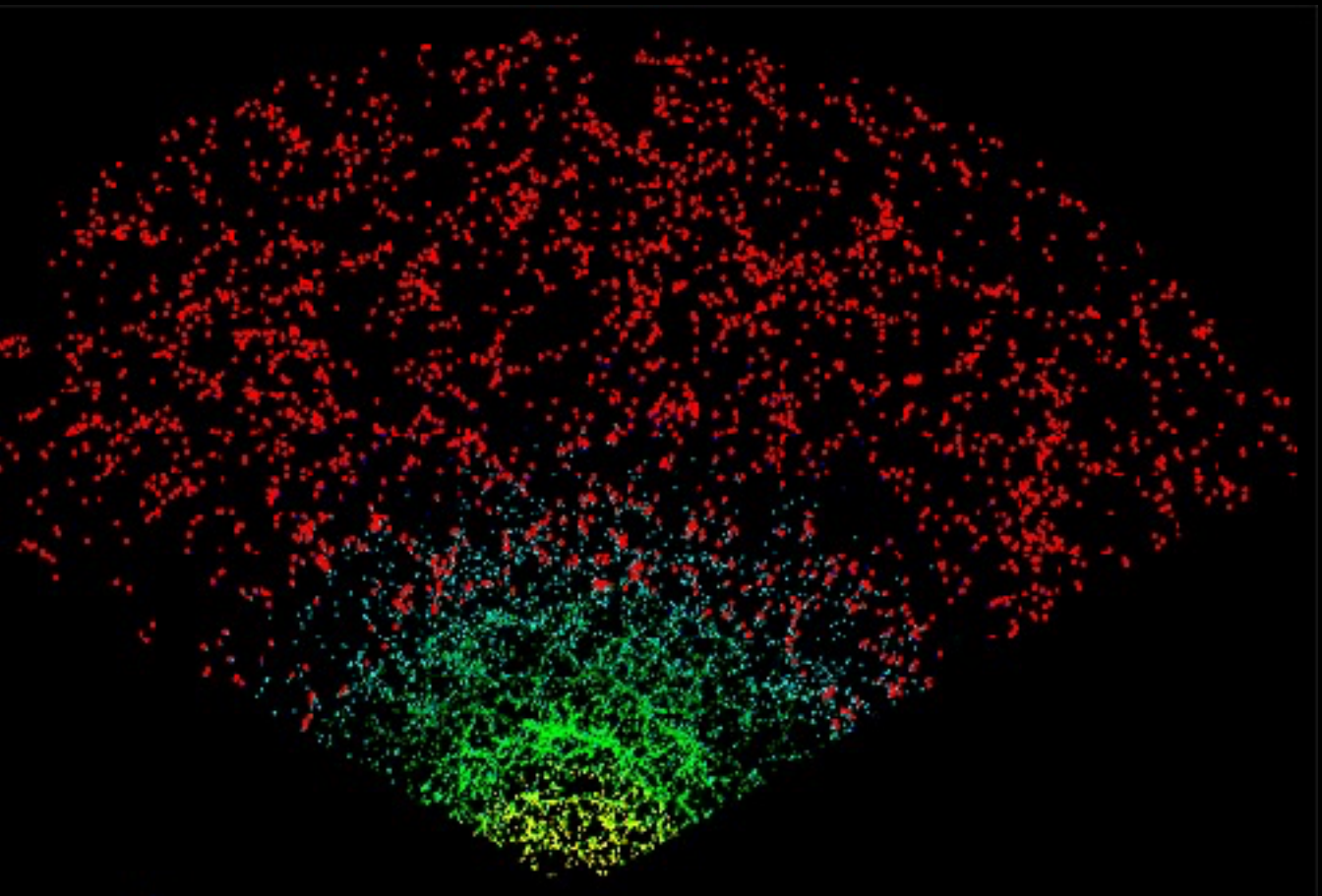
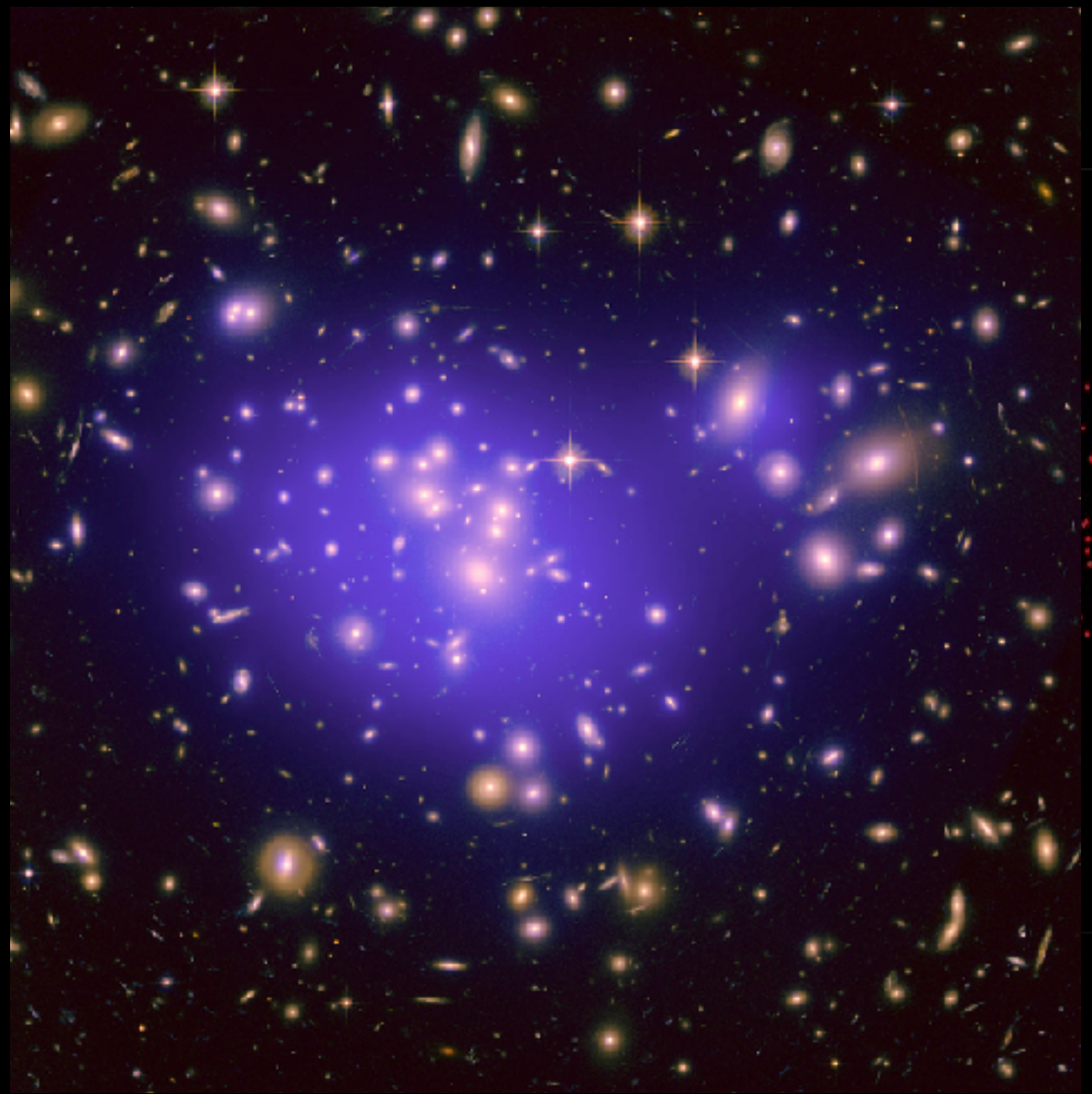


A modern Hubble Diagram - and evidence for "Dark Energy"



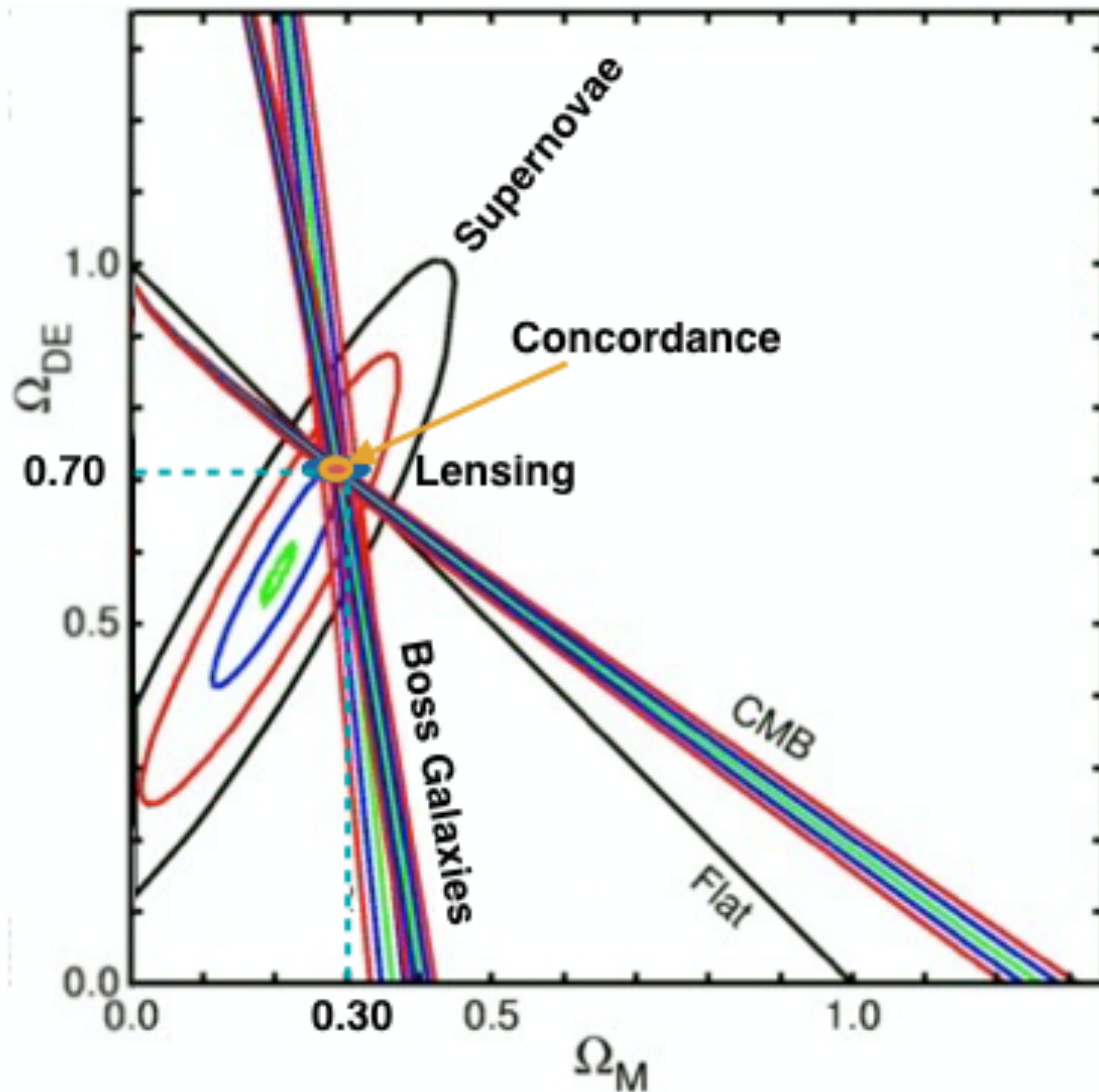


Tracers of our “modern” Cosmology

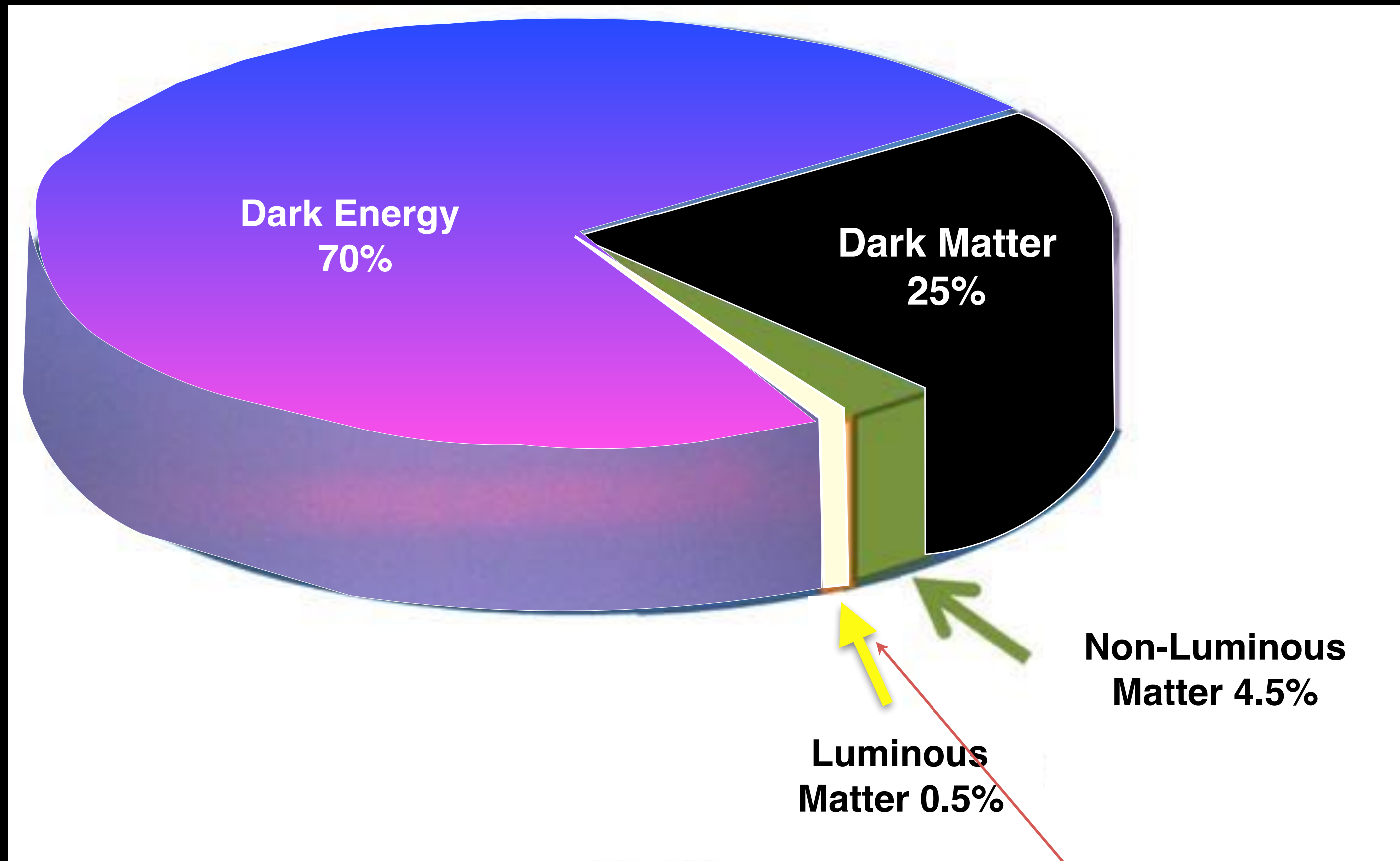


The “Concordance” Cosmology:

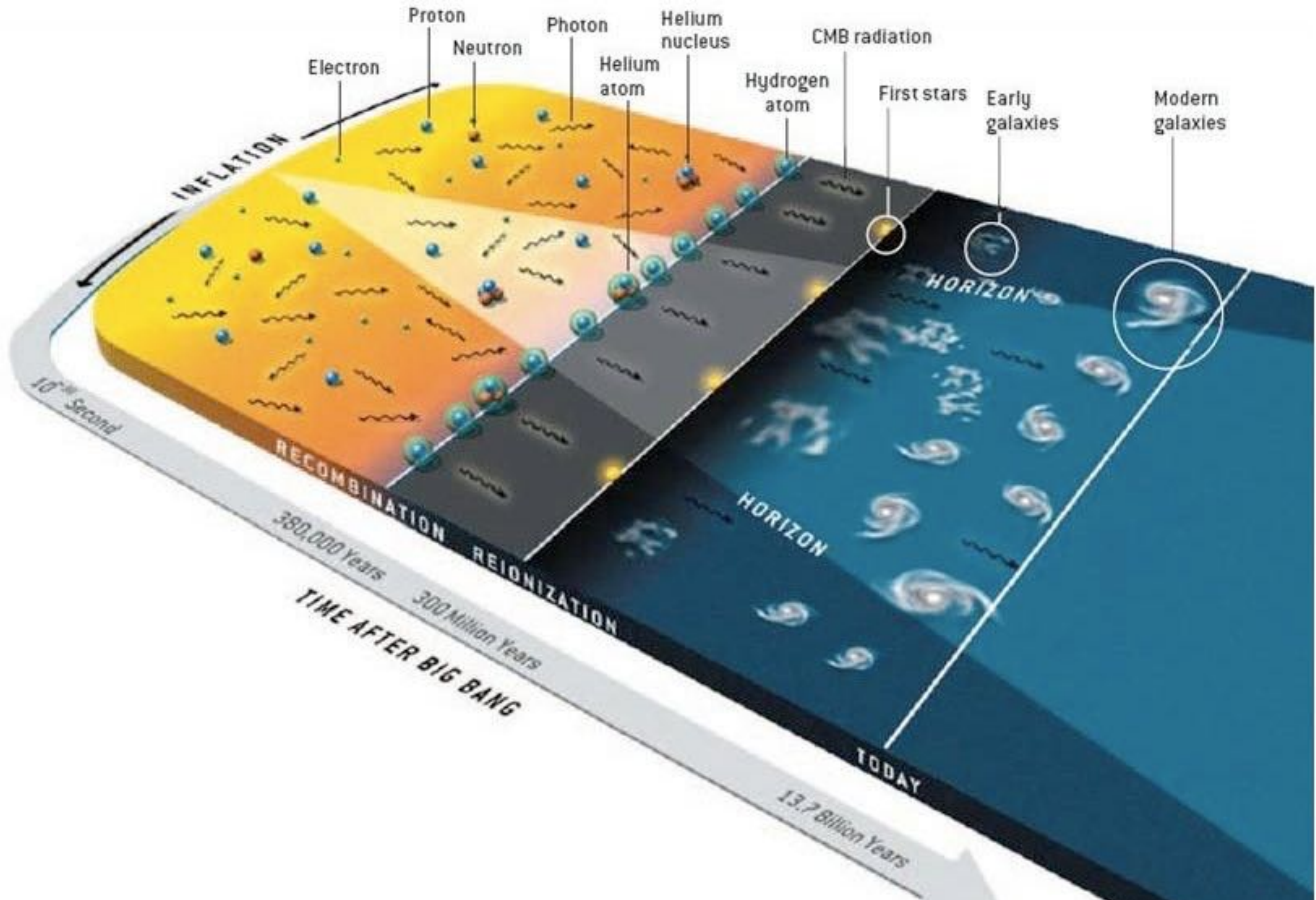
- CMB (cosmic microwave background)
- Type Ia supernova
- BOSS galaxy cluster observations



Our universe, by mass fraction



you are here



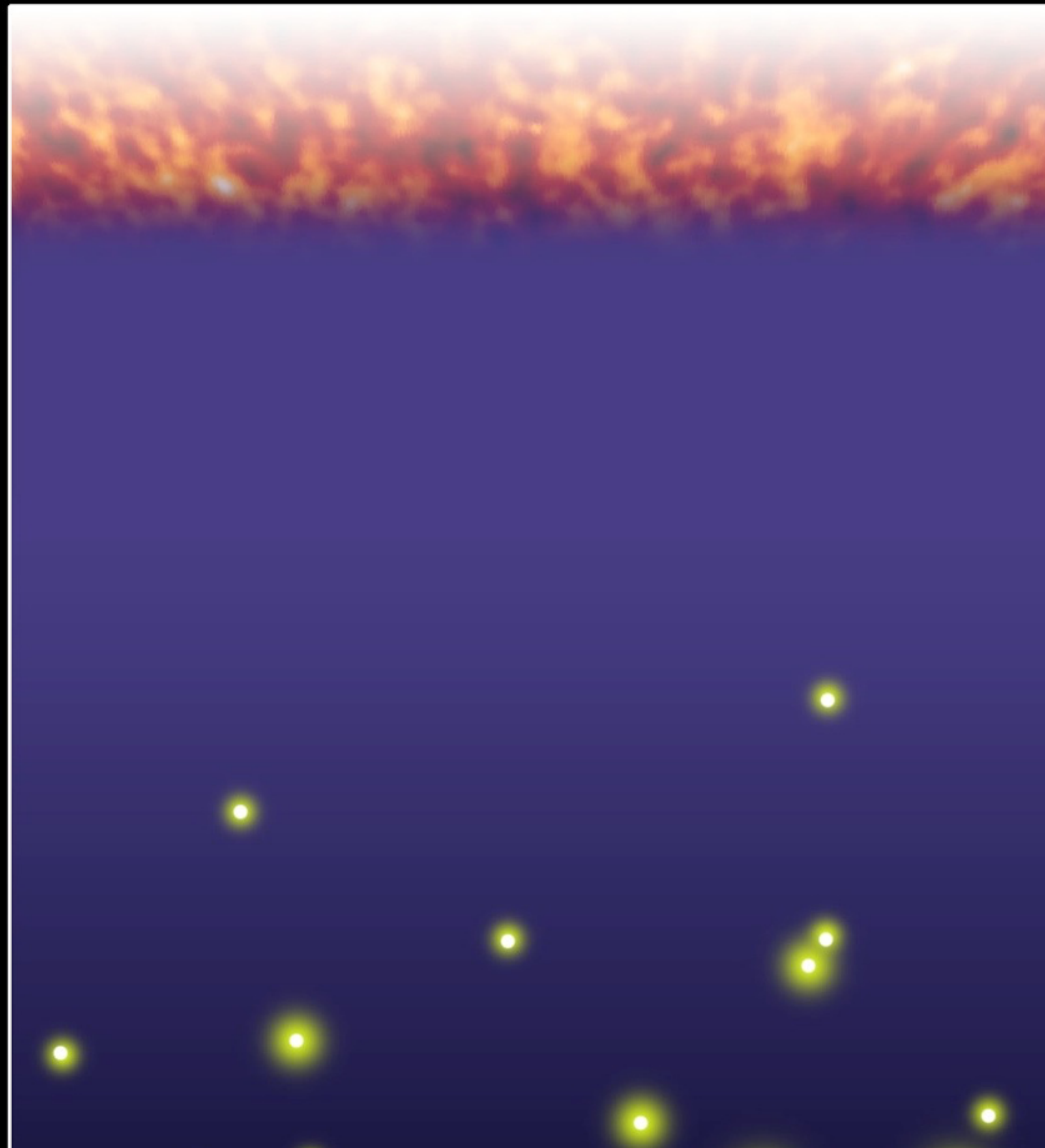
What is the Reionization Era?

A Schematic Outline of the Cosmic History

Time since the
Big Bang (years)

~ 300 thousand

~ 500 million



← The Big Bang

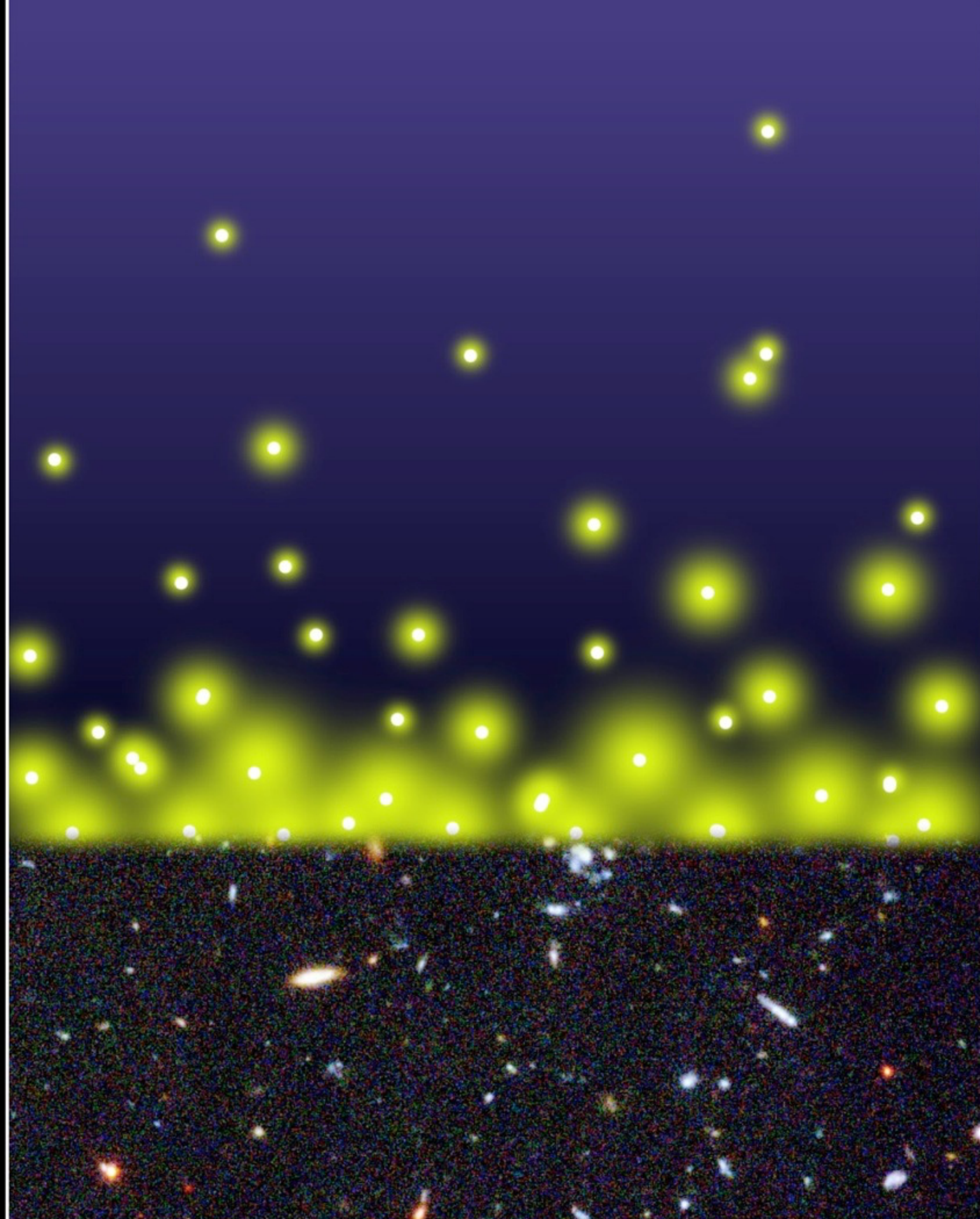
The Universe filled
with ionized gas

← The Universe becomes
neutral and opaque

The Dark Ages start

Galaxies and Quasars
begin to form
The Reionization starts

~ 500 million



Galaxies and Quasars
begin to form
The Reionization starts

The Cosmic Renaissance
The Dark Ages end

← Reionization complete,
the Universe becomes
transparent again

~ 1 billion

Galaxies evolve

~ 1 billion

~ 9 billion

~ 13 billion



The Cosmic Renaissance
The Dark Ages end

← Reionization complete,
the Universe becomes
transparent again

Galaxies evolve

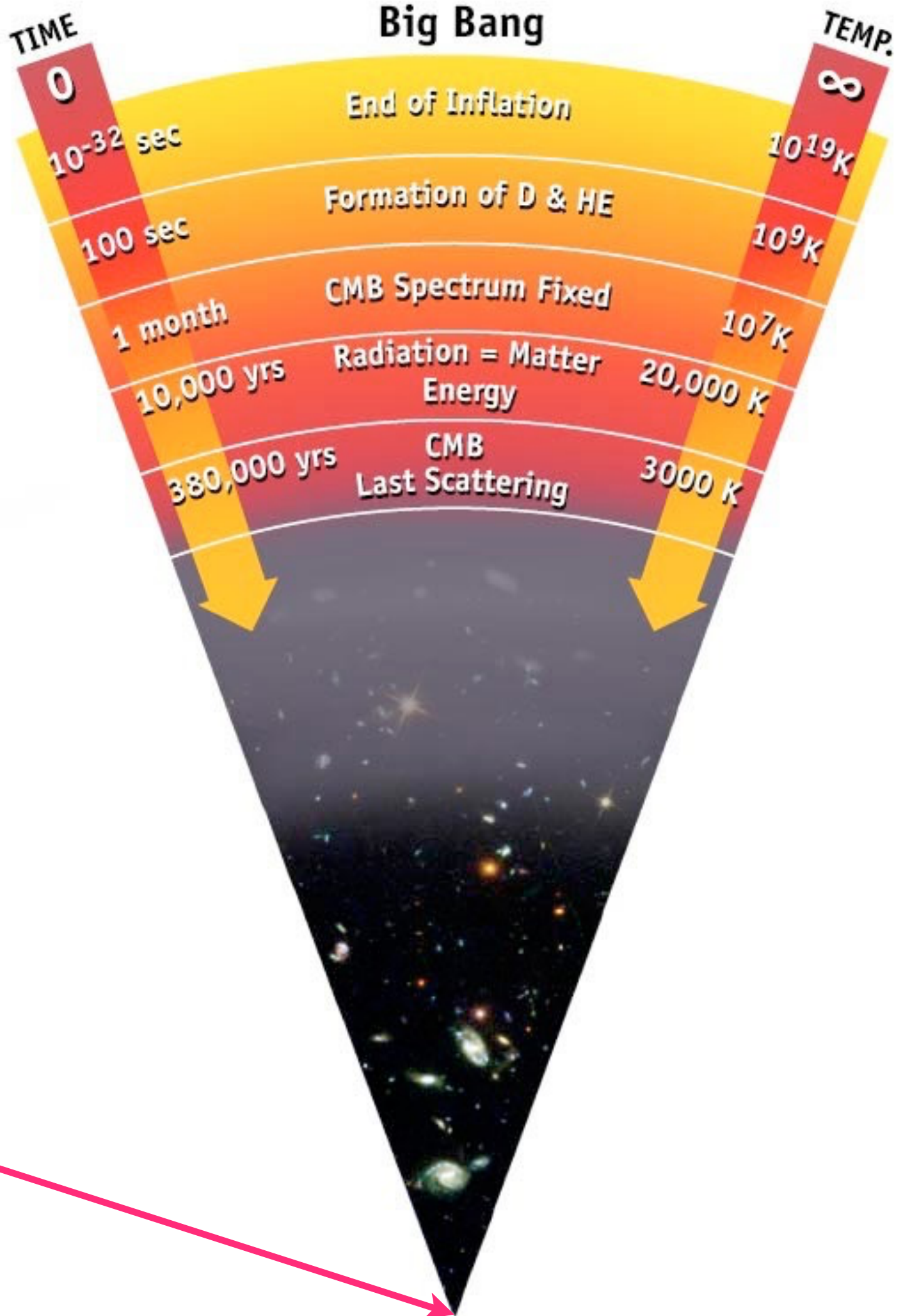
The Solar System forms

Today: Astronomers
figure it all out!

Our Unique Perspective:

Looking Back to the
Beginning of Time

you are here



PRESENT
13.7 Billion Years
after the Big Bang

The cosmic microwave background Radiation's "surface of last scatter" is analogous to the light coming through the clouds to our eye on a cloudy day.

We c
the s
clou
was

Thanks for your Attention!

For more information -
email me!

bpnprase@soka.edu

