

BIG

IMAGINING
THE
UNIVERSE

BANG

p. 6

FOREWORD

Mohamed Ridouani, Luc Sels, Denise Vandevooort,
Bart Raymaekers, Lien De Keukelaere

p. 13

LIGHT IN BLACKNESS

Abdelkader Benali

p. 19

IMAGINING THE UNIVERSE

Barbara Baert

p. 71

TO THE EDGE OF TIME

Thomas Hertog

p. 103

CATALOGUE

p. 104

IMAGINING THE UNIVERSE: ETERNAL WONDER

Jan Van der Stock, Hannah Redler Hawes,
Thomas Hertog, Annelies Vogels

p. 298

BIBLIOGRAPHY

p. 301

LENDERS

p. 302

COLOPHON

FOREWORD

Mohamed Ridouani

MAYOR OF THE CITY OF LEUVEN

Luc Sels

RECTOR OF KU LEUVEN

Denise Vandevoort

ALDERMAN FOR CULTURE OF THE CITY OF LEUVEN
AND CO-CHAIRMAN KU[N]ST LEUVEN

Bart Raymaekers

ADVISOR ON CULTURE, ART AND HERITAGE TO THE RECTOR OF KU LEUVEN
AND CO-CHAIRMAN KU[N]ST LEUVEN

Lien De Keukelaere

COORDINATOR KU[N]ST LEUVEN

From 15 October 2021 until 30 January 2022, the university city of Leuven will serve as the backdrop for BANG! Big Bang City Festival. The programme's main theme is our amazement about the Universe and its origins. We chose this theme because it is a bit of a blind spot in our collective memory: almost nobody knows that Leuven is the birthplace of the Big Bang theory which was developed by Professor Georges Lemaître. With the BANG! city festival, we hope to rock Leuven again this autumn with another Big Bang, together with more than 120 partners. KU[N]ST Leuven, the partnership between the city of Leuven and KU Leuven, is the driving force behind this festival. It has already produced several successful city festivals, that have attracted hundreds of thousands of visitors to the city.

As always, the programme includes a number of major exhibitions with international appeal. They focus on the nexus between art and science, which is typical of Leuven as a creative hub and a knowledge and innovation centre. From 22 October 2021, M Leuven will be hosting 'Imagining the Universe', an exhibition about people's amazement about the Universe in art and the science of Antiquity until the end of the eighteenth century. 'To the Edge of Time', the exhibition at KU Leuven's University Library, seamlessly ties in with the story that is told at the M Museum Leuven. The spotlight is on Georges Lemaître and on the story of modern cosmology, using modern and contemporary artworks and intriguing scientific objects. The M Museum is also hosting a solo show by the British land artist Richard Long. Finally, the exhibition 'An Eternal Gaze' in the superb setting of PARCUM / Abdij van Park explores stories about creation, transience and hope through the lens of religious heritage. During the BANG! city festival, a new artwork by French artist Félicie d'Estienne d'Orves will also be installed in the city.

This book was written in the context of two exhibitions: 'Imagining the Universe' at M and 'To the Edge of Time' at the University Library in Leuven. The main theme of the book and these two exhibitions is our never-ending amazement about the Universe, as expressed in more than 6,000 years of art and science. For centuries, scientists have known that there can be no knowledge without imagination. Likewise, imagination has relied on knowledge for many centuries, as artists know all too well. Professor Thomas Hertog (a cosmologist at KU Leuven and co-curator of 'To the Edge of Time') and Professor Barbara Baert (an art historian at KU Leuven) discuss the origins of our Universe in two essays, starting from their respective disciplines. The Dutch author Abdelkader Benali connects both their perspectives in a joint interview. Professor Jan Van der Stock, director of Illuminare KU Leuven and the curator of 'Imagining the Universe', London-based Hannah Redler Hawes, the co-curator of 'Beyond the Big Bang', and Thomas Hertog subsequently outline the story behind these two exhibitions. The book also comprises a visually impressive overview of all the key works in both exhibitions. We wish to extend our sincere thanks to all the authors who contributed to this publication and to Annelies Vogels, responsible for exhibitions at KU Leuven, for her expert supervision and coordination. We are also grateful to all the other employees and parties involved, as well as the Hannibal Books team.

The exhibitions, the publication and the entire programme of BANG! are an invitation to go and explore. Come to Leuven this autumn and prepare to be amazed. Enjoy your visit!

Remember to
stars and not do

Try to make s
you see and w
what makes the

Be curious

look up at the
down at your feet.
sense of what
wonder about
the Universe exist.
us.

Stephen Hawking (Cambridge, United Kingdom, 2010)

LIGHT IN BLACKNESS

Abdelkader Benali

“This is the way the world ends
Not with a bang but a whimper.”

T.S. Eliot, *The Hollow Men*, 1925

Even a conversation about infinity must eventually end, although that end does not come with a bang or a whimper, but with an invitation.

Two hours earlier, we took our seats around the large, square table in the stately Spoelberch Room at the University Library in Leuven. The table takes up almost the entire space. Conversational partners who stretch their arms across its surface will find it impossible to touch one another's fingertips. This idea of reaching out yet never connecting with the centre – but persisting anyway in the hope that a supreme effort will allow us to make the other side – can be seen as a form of magical thinking. The perseverance behind this ambition is an extremely powerful force, one that propels all forms of endeavour – it is the age-old tension that occurs between ambition and goal, between dream and deed – and it is also the driving force behind our own conversation. A dialogue in which we attempt to capture the grandeur of the Universe in images.

Two hours later, the table seems to have disappeared, diminished by the cross-border content of the conversation. We seem to have touched upon something, I don't know what exactly, but it feels as though the crown of my skull has been lifted and I have been given a view inside. Through dialogue, we have become sharper in our vision.

“It is the scientist's job to keep translating the results of multidisciplinary research, however abstract, into its broader, cultural value.” This is how the agenda for our meeting seems to have been formulated. Barbara Baert herself shaped this mission when she spent a year as a fellow at the Institute for Advanced Studies at 1, Einstein Drive in Princeton. It is no coincidence that the street on which the institute is located is named after Einstein. “When he arrived in America after fleeing the Nazis, it provided him with an intellectual shelter,” she says. Founded in the 1930s, the institute was a place where eminent scientists from different disciplines could talk to one another. Einstein and Lemaître were colleagues for a few months in the 1930s, both unsure of what the future would hold, in which the Universe would be mapped out to thirteen decimal places.¹

It is a Monday morning in May, students are walking leisurely through the streets of Leuven, safe in the knowledge that the vaccination programme will soon lead to the lifting of social restrictions. The world looks brighter and is starting to look bigger. The large square in front of the library is deceptively empty. When will we start to discuss this historic period in nostalgic terms? In the University Library of Leuven, stained glass filters the light onto Thomas Hertog and Barbara Baert, both passionate about the pioneering work of the physicist Georges Lemaître, who foresaw our forever expanding Universe. We have met to cross swords on the greatest of all subjects – the Universe – in the hope of making it both bigger and smaller.

The chairs are not vacated and even draw nearer, like mirrors that are constantly brought a little closer together and reflect new perspectives with each movement. Barbara talks animatedly about different cultures and how they depicted the creation of the Universe. She includes painting, literature and film in her circular dance through time and space,

¹ The magnetic dipole moment of the electron is approximately $-9.284764620 \times 10^{-24}$ Joule per Tesla, which is considered one of the most accurate measurements in physics.

demonstrating that our view of the infinite can also be introspective. While speaking, she raises her hands in the air, as if holding everything in her left hand and nothing in her right, before bringing them into contact with each other. During the conversation, she keeps her back straight. Imagination is a physical matter, her speeches feel like little performances, the fire of the humanities being passed onwards. And that energy is spurred on by a clear goal: "When I speak to the first-year students, I make it clear that I'm going to turn them into erudite people."

"Why so emphatically 'erudite'?"

"Because the path of humanities wasn't a self-evident choice for all of them. They had to defend it at home. I want to put the wind in their sails."

Barbara flies, Thomas sits. The silence of the monastery descends upon him. I picture him sunk in contemplation before a large blackboard covered with formulas. Thomas Duke is a tall man. He relaxes upon the wooden chair. I detect something of the cat within him, an imperturbable creature that goes its own way, at ease in his attentiveness. He will often rise from that chair and fling his arms towards the middle of the table, the place where he hopes to find common ground. The hand is like a dipstick that indicates the space that the hard and humane sciences may give each other in the search for a grand connection.

At one point, he stretches his arm as far as he possibly can, the hand can't extend any further, and he touches the point where the table can be split in two. With downturned palms he confesses that this conversation, in connection with the exhibition, is meant to be a meeting of minds. For modern physics is in dire need of imagination. "To find inspiration for further research, bold thinking is required and that is only possible if we abandon the comfortable space of hard research. And that's why we're here," he gestures towards the centre of the table, "in what I will call the no-man's-land. In this no-man's-land, where the boundary between physics, my field, and that of the humanities, Barbara's field, becomes diffuse. It is here that inspiration awaits." The emphatic nature of his pronouncement suggests that his stance is not an obvious one. "Certain colleagues have retreated behind the wall of formulas, where they feel more at ease. They don't see the point of this conversation. But if we don't have this discussion, we lose touch with the world. Then the world does not understand us. And then we don't understand the world."

I suggest that it might also be due to the fact that modern physics has reached a level where even the super-specialists must admit that it is fiendishly difficult to explain. The exciting riddles of the quest for an all-embracing theory that can explain both the infinitely large and infinitely small have turned into a mysterious language that, apart from a few insiders, no one understands. This contrasts with the time of Lemaître and Einstein, when scientific breakthroughs made the front page of *The New York Times*. The formula $E=mc^2$ became so ubiquitous worldwide that I too heard about it in primary school and became fascinated by the calculation, although I understood very little. The Universe captured in a formula, a formula devised by a man who, with his frizzy hair and bushy moustache, became the icon of the brilliant scientist.

That appealed enormously to the imagination. Not only did space and time become relative, but it also suddenly seemed possible that if you knew how to use your imagination well, you could one day have such brilliant insights yourself. Einstein democratised science. Suddenly it was within everyone's reach. Add to that Georges Lemaître with his theory of the Big Bang – the words alone conjure up wonderful associations – the super-beginning that gave birth to everything that followed, from the pyramids to Andy Warhol via the *Mona Lisa*. The beginning of a romantic adventure with infinity. Where are the Einsteins of today? Who still has that enigmatic, spiritual aura of a Georges Lemaître? Which scientist do we want to see on a poster nowadays?

Thomas sighs and explains that it has effectively become much more difficult for physicists to inform the general public about the new insights offered by research into the very largest and smallest things. It is now accepted that the mind-boggling mysteries of nature, which go against everything we intuitively feel, are hard to explain. "Was it really so different in Lemaître's time?" interjects Barbara. "There was far greater awareness that, when it comes to understanding the world, the natural sciences and humanities are mutually supportive."

Thomas has first-hand experience of a different way of doing things; he worked intensively with Stephen Hawking, the scientist who introduced black holes to the general public. He recognises that it takes a certain courage to step outside the inner circle of scientists. "Sometimes, I would read the notes of my research with Hawking documented in a British newspaper two weeks later. Our in-depth investigations explained to laymen."

Thomas indicates that what appears hermetic now will soon have far-reaching consequences for our way of life. "It is remarkable that what was once considered an esoteric science, quantum physics, is today responsible for a third of our global economy." The by-products of this elusive search for the core of the smallest of all things are in our microchips, our information devices, our medical instruments. The world now being explored is our future on a pinhead. A formula can become a global industry. A derivative may contain a clue that fights a deadly disease."

There was a time when physicists and cultural scientists sought each other out. Barbara Baert cites the meeting between Einstein and Warburg. Not everyone will know Aby Warburg. He came from a wealthy family and developed into a collector of images that he catalogued in a library in Hamburg. "In this way, he wanted to create an atlas in which the 'origin' images of the world's cultures are clearly recorded. The DNA of mankind, as it were." The forerunner of Google, so to speak, but driven by an intellectual curiosity about what connects us as human beings across times and cultures. Warburg's library exudes the idealistic spirit of the time: political boundaries are there to be broken down, civilisation and its opposite, chaos, permeate everything; science has a humanising character, it brings people together in a common project that benefits everyone, irrespective of origin or gender. When Hubble looked through his lens in Pasadena, California in 1925, he observed that

the Universe was millions of light-years larger than previously imagined. As science pushes boundaries, we should feel inspired to go yet further. Aby Warburg points the way, striving to develop a connecting network of bright minds. The cultural elite is setting itself the task of carrying out the preliminary work of the new era, of that there can be no doubt.

“Warburg invited Einstein to pay him a visit and see his image atlas.” They met by the Baltic Sea, sat in comfortable beach chairs and discussed Kepler and Newton. “Warburg was a man who was obsessed with technology. He had ten telephones on his desk. He called the device a ‘Telechairs’. It enabled him to communicate at any time.” Warburg was the first digitised human being to draw on infinite images in order to share them with infinite people. “He saw Kepler as representative of the man who makes a leap and dares to think in new forms. In order to understand the planetary movements, he abandoned the circle for the ellipse.” Who else would Warburg share the knowledge derived from the *Bilderatlas* with, if not the Master of the Universe, Albert Einstein?

For Einstein, it was just as natural to introduce his insights to the art historian Warburg. “The science was less specialised. The work was embedded in a broader cultural context,” Thomas adds. “Nowadays we have become more critical of generalists. And that comes with a risk. Any scientific activity that is overly hermetic runs the risk of losing its connection and relevance to society.” If we are no longer curious about each other’s findings, the light goes out. For that reason, too, the making of this book feels like a stunt, for formulas do not seem to outlast stories, and the latest insights about the cosmos defy all imagination. And yet, for Georges Lemaître, the search for the beginning of the world began in the imagination, not on the blackboard. “Lemaître represents the germ of the beginning as an egg. That image came from his intuition, even before there was a mathematical explanation.”

For Thomas Hertog, the power of images is evident. They inspire us to philosophise and guide our intuition towards a fuller picture. And when we manage to extract a photographic image from the cosmos, scientists can actually show what they have found billions of light-years from our planet. The public fleetingly gathers around an image in celebration of that voyage of discovery, just like the scientists in 2019 when the horizon of a black hole was captured through the simultaneous deployment of telescopes worldwide. “That felt like a breakthrough. We saw that it was a black hole. That picture sticks in the mind and becomes iconic.” For Barbara Baert, the photograph has a halo, not only because of the reflection of the black hole’s horizon, but also a halo in the religious sense of the word: an appearance of the absolute. She recognises its beauty and yet the thought immediately comes to mind that what she sees is immense and elusive. The photograph of the black hole is also a cruel image. One stares into absolute nothingness. Barbara therefore delivers a penetrating reflection on the blackest of all blacks, that of Kazimir Malevich. The black that illuminates everything around it. What remains when light itself no longer exists. Barbara sees an extra dimension

in the black hole. “There is reciprocity. We see the black hole. But the black hole is also looking at us. We are being watched.” And that premise is hidden, too, in the medieval depictions of the Universe. “A seemingly illogical placement of cities and regions starts to make sense if we look at it from the viewpoint of the Universe itself.” The imaginer turns the spectator into God, or a black hole, which absorbs all information through the pupil. “And when we contemplate that, we are touched by what the Arabs call *ruh*, a spiritual wind that comes from somewhere to inspire us,” says Barbara.

We are silent for a moment. The world moves on. The sunlight has moved from one corner to the other.

When a fruitful conversation ends, it does so with an agreement to repeat the discussion. In this sense, a conversation has neither an end nor a beginning. It hangs in the air, and it takes two powerful personalities to make it visible. Barbara Baert asks Thomas Hertog where he wants to be in 2025. In that year, Leuven University will celebrate its 600th anniversary. Thomas sighs: “2025? To me, that’s still an eternity away.”

IMAGINING THE UNIVERSE*

Barbara Baert

DEPARTMENT OF ART HISTORY, KU LEUVEN

The natural phenomena described in this essay are facts, while certain characters and their actions are entirely fictitious.

* The insights in this essay evolved out of the discussions I had with astrophysicists while a Senior Fellow at the Institute for Advanced Study in Princeton, USA, in 2019. I would like to thank director Robbert Dijkgraaf for his hospitality. I am also grateful to Catho Creemers, Lien De Keukelaere, Stephanie Heremans, Thomas Hertog, Koen Kwanten, Julia van Rosmalen, Paul Vandenbroeck, Jan Van der Stock, Marc Vervenne and Annelies Vogels.

“It’s the stars that are imprisoned in their own power, and they cannot really help us. They merely design the nets, and on cosmic looms they weave the warp thread that we must complete with our own weft.”

Olga Tokarczuk, *Drive Your Plow Over the Bones of the Dead*, p. 212

Human beings yearn to comprehend how ‘something’ can come from ‘nothing’ and are uniquely equipped to give visual expression to this mystery. An array of astonishing objects and inventive symbols bear material witnesses to the countless creation myths surrounding the origin of the Universe.

How we imagine the Universe is determined by the central dichotomy of chaos versus cosmos. Chaos is the anarchic primordial state that precedes the cosmos (Fig. 1). Yet the formless is an essential precursor to the genesis of the cosmos: *ordo ab chaos* [order from chaos]. It is just as important to depict, therefore, as the ensuing harmony. The chaotic primal stage, which presents itself as an all-consuming morass, as a murky sludge or dark waters, usually belongs to the female, or hermaphroditic, primal principle. In the Mesopotamian creation myth, the goddess Tiamat is the embodiment of primal chaos. However, she is opposed by her son Marduk, who creates order. According to an ancient Babylonian legend: “The god Marduk defeats Tiamat in a duel, cleaves her body in two and creates the firmament and the world from the two halves.” In Germanic mythology, order is preceded by a bottomless chasm: the *Ginnungagap*. After a fierce battle, fire and ice are eventually reconciled within an harmonious universe. The chasm, or abyss (from the Greek *abismos*), is a boundless, infinite void. The abyss is akin to a black hole. It consumes everything and spews out monsters devoid of form, order and reason. It is a feral, terrifying preliminary stage of creation that must be fought by the gods. The chasm is petrifying. It is the nightmare of the cosmic vanishing point, of the psychotic relapse and being devoured by the primal mother.

The word ‘cosmos’ dates back to Homeric times (c. 800 BC) and means ‘order’ or ‘ornament’. It is the Universe governed by intelligent laws. The cosmos escapes the caprices of the gods but responds to its immanent first principle. Anaximander (c. 610-c. 546 BC), one of the so-called Presocratic philosophers, defined this early ordering principle as the *apeiron*. Together with his teacher, Thales of Miletus (c. 624/623-c. 548/554 BC), and Anaximenes (active c. 585-526 BC), Anaximander was one of the first sages to contemplate the origin of the Universe and its constituent elements (the *cosmiotēs*). As a result, a school of thought developed in ancient Greece that was free of phantasmatic mythologies and which ushered in the nascent natural sciences. Chaos was

no longer transformed into order by the gods, but by an intrinsic law of nature: *physis*. Mystery became a problem and that problem demanded empirical solutions based on scrutiny of the natural world. For we too recognise processes such as evaporation, burning, melting and freezing in our daily lives.

Thales of Miletus accepted water’s potentiality to freeze and evaporate as the primary principle of the Universe. Anaximenes considered air to be a primordial substance, for it too is changeable and transforms from ether to mist. It was the invisibility of Anaximander’s *apeiron* that enabled him to start conceptualising the origin of everything in terms of immutability. Yet it is Pythagoras (c. 540-c. 500 BC) who has ultimately had the most profound and enduring impact on how we imagine the Universe. The philosopher and mathematician posited that the varied lengths of a lyre’s strings could be reduced to numbers: 2:1, 3:2, 4:3 (octave, fifth, quarter). Pythagoras thus mirrored the harmony of the cosmos in numerology and music (the *mathemata* and the *akousmata*). His theses on numbers and strings are anything but outdated. Contemporary natural scientists researching the so-called ‘string theory’ also refer to it as ‘Pythagoras’ revenge’.

Heraclitus of Ephesus (c. 540-480 BC) took a different path. While he rejected the principle of immutability he also chose to depart, just like the other Presocratic philosophers, from a cosmic and volatile primal element: fire. Everything is cyclical, everything flows, *pantha rei*. It is to Heraclitus that we owe the words: “There is harmony (*harmonia*) in the tension of opposites, like the bow and the lyre.” In *De Rivier van Herakleitos* [Heraclitus’ River] (p. 59), Etienne Vermeersch and Johan Braeckman write: “A philosophy of the Universe has thus developed which posits absolute change against a stable *archè*. How to reconcile these antagonistic principles? The answer lies in the atomism of Leucippus (d. 370 BC) and Democritus (c. 460-c. 370 BC). They adopt the idea of the unity, indivisibility and immutability of being, but also confirm the existence of the non-essential as empty space.” Space is teeming with atoms. These are the indivisible particles within the emptiness of the Universe. Their attraction and collision creates mutable, perceptible things. But atoms can also be the cause of an invisible ‘something’ like the psyche.

There, in the distance, awakens the *logos* of Plato (c. 427-347 BC) and Aristotle (385-323 BC).

The first part of this essay, *Images of Creation Myths*, explores the rich spectrum of mythical archetypes and their visual symbols. These image traditions are an endless source of fascination because they grant us visual access to the cosmos while prompting us to reflect upon our place in creation. I will focus, in particular, on the cosmic egg, but also on the creative breath of God, which is called *ruach* in Hebrew (Genesis 1, 1). How can something invisible, like breath, be expressed in colour and line? To what extremes are artistically minded people driven in their pursuit of this seemingly impossible visual quest?

This brings me to the second part of the essay: *Plasticity, or the Image before the Image*. There is perhaps no greater challenge for the artist than to stretch his or her imaginative powers to the limit and, toppling over the edge, to coincide with their own creative ontological foundation. And if the infinite calls for visual solutions, are these not to be found in precisely the images that express this naked incipience? Artists became proficient in expressing the Universe through images that are pregnant with figuration, swollen with power. They experimented with the 'almost' image, with the 'image-in-an-image', as a reflection of the Universe itself. This artistic quest for the 'image before images' is a visual *pars pro toto* for the creation of the cosmos. I will dwell on the infinity of the spiral, for example, but also on the all-consuming power of the flawless black square or on the mysterious, veined tremor in a piece of marble. In the second part of this essay, therefore, I will mainly examine 'abstract' iconographies as accurate expressions of creation-in-the-making. 'The image before images' therefore emerges in the face of that majestic, bewildering, black pupil that we call 'cosmos'.

At this juncture, the third and final part of this essay unfolds: *The Upturned Gaze*. People have believed in the animating power of eye contact since the age of Homer (c. 800-c. 750 BC). The woman carved and brought to life by the creator-sculptor Pygmalion (Ovid, *Metamorphoses*, Book X) simultaneously sees the light of the Universe and the eyes of her creator (*lumen* means both 'light' and 'eye'). Remember, too, that only the newborn child clings to the mother's gaze in a unique hypnotic blue pupil. Just as we now try to fathom the Universe through the epic scrutiny of deep space, eye contact in the arts is also aimed at insight and intensity. Only the gaze between humans and the Universe can give birth to and legitimise philosophy, science and the arts. In the last part of this essay, I will seek out the moments of reciprocal eye contact in our story. On the one hand, the gaze of the creator-artist whose eyes bring the artwork to life, and on the other, that of the reader who, by reaching this point in the narrative, has already participated in a unique, complex choreography between imagination and desire.

And there on the horizon, the astrophysicist waves.
Now the door is ajar.
The door to the third room.

"I find satellite pictures and the curvature of the Earth very moving. So it is true that we live on the surface of a sphere, exposed to the gaze of the planets, left in a great void, where after the Fall where the light was smashed to smithereens and blown apart? It is true. We should remember that every day, for we do tend to forget. We believe that we are free, and that God will forgive us. Personally I think otherwise. Finally, transformed into tiny quivering protons, each of our deed will set off into Outer Space, where the planets will keep watching it like a film until the end of the world."

Olga Tokarczuk, *Drive Your Plow Over the Bones of the Dead*, p. 43



FIG. 1
Master Bartolomé, *Chaos*, after 1493, Tucson, The University of Arizona Museum of Art, gift of the Samuel H. Kress Foundation.

IMAGES OF CREATION MYTHS

“I want to speak about bodies changed into new forms. You, gods, since you are the ones who alter these, and all other things, inspire my attempt, and spin out a continuous thread of words, from the world’s first origins to my own time. Before there was earth or sea or the sky that covers everything, Nature appeared the same throughout the whole world: what we call chaos: a raw confused mass, nothing but inert matter, badly combined discordant atoms of things, confused in the one place.”

Ovid, *Metamorphoses*, Book I, vv. 1-9

THE COSMIC EGG

**“He grew into a turf,
Became a reed-tussock.
The golden-eye, pretty bird,
Flew, glided,
Found a reed-grown island,
Cast a copper nest,
Laid a golden egg.”**

Ancient Baltic song about the cosmic egg,
in: Martin Puhvel, *Songs of Creation*, p. 6

Conscious of their place in the Universe, humans seek the first principle imbued with the energy and power to extract an ordered ‘something’ (for this is the meaning of the word cosmos) from ‘nothingness’ (chaos). These wonderful pre-creation stages employ concepts of potentiality, such as the natural elements of water and air, but also symbolic objects that are particularly well-suited to representing the moment of creation: the egg, for example.

Since prehistoric times, ovoid forms have appeared on rock paintings as a sign of regeneration, as decoration on stoneware and in the form of monoliths, for example, amongst the Navajo peoples. The egg, with its mysterious contents that hover between white slime and yellow elixir, has a place as a fertility symbol in the creation of the Universe itself. When the cosmologist and priest Georges Lemaître (1894-1966) was on the trail of what would later become known as the Big Bang, he also used the image of the cosmological egg to represent that one atom responsible for ‘The Event’: the ultimate greatness that emerges from the infinitesimally small.

The cosmic egg from which everything emerged appears in Egyptian, Indian, Chinese, Japanese, Polynesian, Persian, Finnish and Greek myths. The ancient Egyptians believed that the cosmic egg originated in a swampy ‘morass’. That egg, in turn, created the Sun and the Earth. In other versions, Thoth, the god of wisdom and the moon, laid an egg that brought forth the sun god Re, whose heat formed the world. The cosmogonic egg became the matrix of things. It swept away the chaos (the swamp) and spawned numerous other egg matrices.

In Indian narratives, we read how Hiranyagarbha, the cosmic egg, floated in the primordial waters of an empty void. From the splitting of this golden egg, the cosmos was born. Brahmanda, Sanskrit for ‘the unchanging essence of the Universe’, is derived from two words: Brahma, the Hindu god of creation, and the word for ‘one’, which also means ‘egg-shaped’. In India, the interior of the egg is still thought to contain a golden embryo that, like the Sun, floats in a light-filled womb. The eggshell represents the celestial sky. In the iconography of Hinduism, we see this egg floating in a primordial sea of spermatozoa. Occasionally, the egg is also compared to a testicle. Certain Vedic hymns sing the praises of the *purusha*, a creature with a thousand arms, legs and heads, which sprang from the primordial egg the moment the beast separated earth from heaven. The multi-headed monster is Everything until the moment it sacrifices itself to make the rest of creation possible. This means that the giant and newly arisen cosmic

egg touched Everything and then disappeared for the benefit of man and his biotopes.

A similar cosmic egg exists in Chinese Taoism. The creation myth of P’an-Ku tells how the world was once chaos (*hun-tun*), just like the inside of an egg in which he resided. After 18,000 years, the mass split: brightness for the sky, pitch black for the earth. P’an-Ku supported the firmament with his head and stabilised the earth with his feet. The expansion lasted another 18,000 years and P’an-ku became 90,000 *Li* long (one third of a mile). P’an-ku, coincidentally, means ‘curled-up mass’, referring to the shapeless germ that we sometimes find in an egg yolk.

In Japan, it is believed that at the time when heaven and earth were still split, like yin and yang, the world was as chaotic as an egg. The heavens preceded the earth because they were lighter and more malleable than the dense and shrouded earth. Later, the earth hardened and a god was born in its core: the birth of the world.

A myth from Polynesia tells of Ta’aroa, the ancestor of all the gods. He is trapped in the endless space of the egg and lives in eternal darkness. Other Polynesian lore recounts that the mother goddess Varima-te-takere dwells deep in Avaiki, an underworld that resembles a giant hollow coconut. Coiled within this subterranean nut, she created Avatea, the god of light, who was half-man and half-fish. Avatea ascended to the world above and created the Sun and the Moon, as they can still be seen today, with his eyes.

Persian cosmogony is known through the Ninokhired manuscripts from the Sassanid dynasty (third to seventh centuries). In these accounts, the Universe was shaped like an egg and sculpted by the creator Ahura. The Earth floats in the Universe like a yolk within an egg. The egg universe is subject to the zodiac and had different manifestations under different constellations. In the first stage, the beings closest to Ahura enjoyed a light-filled existence. At this point, they were transcendent and in a state of purity, or *mênok*. But in the second stage, their transcendence became matter, or *gêtah*. There was no misfortune present in the Universe yet, although the evil spirit Ahriman was already lurking. In the third period, Ahriman awoke from his long hibernation and erupted in anger. He penetrated the world of light and the perfect form of the egg, causing death and destruction. Thus Ahriman defiled the Earth. Even today, people are plagued evil and innumerable diseases and dream of returning to the uncontaminated egg.

An egg creation myth that is sung in runes can still be found in present-day Finland. A giant goose flew across the Universe and looked for a place to nest. The sea god Väinämöinen raised his knee from the water and a fertile pinnacle of green peat emerged. On that mountain the goose made her nest, in which she laid six eggs. But Väinämöinen moved his knee and the eggs smashed on the surface of the sea. Väinämöinen then said, “Let the lower part of the eggs form the earth and the upper part the heavenly bodies, and let the yolk shine like the sun and the white like the moon.”

The cosmic egg also had an important place within Greek mythology, especially in the cult around Orpheus. Orpheus came into being during the sixth

century BC and became the embodiment of a multitude of mysteries and rituals that found their way into religion, poetry and tragedy. The rich spectrum of symbols associated with the cult had an enduring and far-reaching influence on Hellenistic culture. In the Orphic cosmogony, everything begins with Chronos. From Chronos came Chaos and Aether. Chaos, however, gave birth to a beautiful, glistening, silvery egg. From this egg, which was patiently hatched by a snake – the serpent is the primeval reptile par excellence; the *ouroboros* of the Greeks lived below ground and is therefore chthonic in nature – Phanes emerged. Phanes, also sometimes called Eros, was a hermaphrodite who brought order to the Universe. From that order, came Ananke. In Orphic mythology, this goddess of fate, in the form of a serpentine creature, is the inescapable exigency that not even the gods can fight. Nyx, the night, was formed alongside Ananke.

Egg cosmogony was also disseminated via the Indo-Iranian Persian Mithras cult (2000 BC). Mithras, literally ‘mediator between good and evil’ and ‘he who has a contract with the sun’, was born from either a rock (*petra genetrix*) or an egg (Fig. 2). Both are images of the firmament. In ancient Persian, the word *asman* means not only ‘sky’ but also ‘stone’ and ‘shell’. Richard Broxton Onians expands on the deeper associations relating to the cosmogonic egg in his unparalleled, erudite study of semantic and anthropological philosophy since the Graeco-Homeric period, *The Origins of European Thought*. Before Homer, the Universe was originally an egg that was carried by Oceanos, the shoreless dark waters. However, the egg already contained a life force: *psyche* (soul, anima). Coiled around the cosmic egg was a snake – the All – that squeezed it tight, like a belt. That serpent is the *pneuma* (spirit, animus) of the Universe which supplants the breath of wind or sigh (*nepesh*, breath of life) and, according to the ancient Orphic myths, fertilises the cosmic egg. The phallic serpent that fertilised the female primal egg emerged from the darkest waters that were still formless and indeterminate. Ovid (43 BC-17 AD) describes this in *Metamorphoses* (Book I, vs. 417-420 and 430-440): “After the remaining moisture had warmed in the sun’s fire, the wet mud of the marshlands swelled with heat, and the fertile seeds of things, nourished by life-giving soil as if in a mother’s womb, grew, and in time acquired a nature. ... In fact when heat and moisture are mixed they conceive, and from these two things the whole of life originates. And though fire and water fight each other, heat and moisture create everything, and this discordant union is suitable for growth. So when the earth muddied from the recent flood glowed again heated by the deep heaven-sent light of the sun she produced innumerable species, partly remaking previous forms, partly creating new monsters. Indeed, though she would not have desired to, she then gave birth to you, great Python, covering so great an area of the mountain slopes, a snake not known before, a terror to the new race of men.”



FIG. 2
Roman relief with Aion/
Phanes inside the Zodiac,
second quarter of the
second century AD,
Modena, Gallerie Estensi.

Onians' study demonstrates that the ancient Greeks associated abstract notions such as viability, inspiration, breath and so on with actual bodily fluids. People and the Universe were connected through their 'liquidity', they were both constituent parts of the same creative 'slime', or all kinds of other excretions. The main fluids of the great cosmological principles were *psyche*, *pneuma* and *nephesh*. Mucous, for instance, contains the *psyche*, which manifests itself magically through the uncontrollability of this liquid excretion. *Pneuma* manifests itself, among other things, in the prophetic powers that reside in the head. Blood is the conductor of *nephesh* and is therefore taboo, for it contains the fragile breath of life.

At this point in our exploration, it is interesting to elaborate briefly on the proto-Indo-European roots of the egg as a creative force. The etymology covers three domains: the egg as receptacle, its relationship to the characteristics of the procreative body, and as a source of nourishment.

Martin Bernal departs from the Greek word *kálathos* [calathus], the characteristic basket with a narrow base and an open, chalice-like mouth. *Kálathos* also means 'receptacle', 'case', 'capital' and 'column'. Even further back, at the Indo-European origin of the word, there is a connection with 'spinning' and 'turning', as well as with < qrh> for 'snake', 'snake's head' and 'cobra'. The Coptic variant of *kálathos* is *kalahe* and means 'breast', 'stomach' and 'womb', after the compound *kala* < qrh> and *he*, for 'belly'. It is in Indo-European semantics, therefore, that we find the relationship between egg and serpent, as in the Orphic myths. Bernal also shows that this kind of basket was often represented adjacent to snake figures, a configuration with possible Egyptian iconographic prototypes. This brings us to a third term that is related to *kálatho*, namely *kivsth*, or 'the mystical serpent coffin'.

An image of *kivsth* appears in numismatics, for example on the coins minted under Eumenes II (197-160), and may stem from the ancient Dionysus cult. The Romans translated *kivsth* into *cista* (box, chest), just as there is still an affinity between the English words 'case' and 'chest' and the old Etruscan *kiste*. A similar connection can be found in Indian and Sanskrit, where 'memory' and 'shrine' – *cetiya* and *stupa* – mean 'memorial' and 'domed reliquary' respectively. Stanley Jeyaraja Tambiah has demonstrated that both terms move loosely back and forth between 'seed', 'relics', 'remains', 'pregnancy', 'womb' and, yes, the cosmic egg. The constant in this chain is the potential for procreation. In early Indian art, coincidentally, Buddha was not depicted anthropomorphically but as a dome-shaped or ovoid shell. Erich Neumann also adds to this etymological chain the Germanic term *Burg*, for 'castle', 'fortress'. The *Burg* is a cave, a mountain, and offers protection. It is *Hohle* (cave), *hohl* (hollow), related to *Halle* (hall), *Helm* (helmet), from the root *hel* (shelter, protection). The mother goddess protects and lives in the *mountain*, from *sich bergen*, or 'to hide', 'find shelter' in *Geborgenheit*.

A second etymological background connects the egg with intimate body parts. The genitals are semantically linked to 'fig', 'cucumber', 'avocado' and 'egg' via the Semitic-Arcadian root *abal-*. It is this association that lends these foods their obscene connotations. Edgar H. Sturtevant sees similar relationships arising in Old Norse and Gothic for verbs that refer to 'sucking'. An affinity is therefore established between 'suck', 'nipple' and 'egg' (Latin: *ovum*). A semantic relationship thus exists between the nourishment provided by both a mother's nipple and eggs, the latter of which have been sucked raw since time immemorial. An egg is reminiscent of an embryo attached to a placenta (the yolk), swimming in amniotic fluid. It contains the final element in the symbolic food chain: the bean. The bean also has a curved, embryonic form. It shares the same primal shape as seeds, larva and eggs. Beans are fleshy and occasionally compared to testicles. They also have a skin and can be peeled, just like tiny bodies. It was once believed that they would sprout into female genitalia if kept too long in a jar. The Greeks also regarded beans as the abode of souls. For this reason, they were a dietary taboo. To consume beans would be to disturb the peace of the ancestors. Typical of all great mythical systems is the black-and-white aspect of the symbol: the world of darkness and the world of light in one form. The primordial goddess is always both fearsome and devouring, as well as abundant in the gift of new life. She both gives and takes. The bean, like the egg, is simultaneously a tomb and a pregnant belly.

This chapter concludes with the praise heaped upon the egg by Erycius Puteanus (1574-1646), a humanist from Venlo. In his *Ovi encomium* (1615), a 'paean to the egg', he lauds it as the greatest of all miracles. The egg is a divine treasure: *esum*, *usum* and *lusum* (for 'food', 'use' and 'play'). People can marvel at a falling meteorite, a shooting star, an earthquake or a hermaphrodite's birth, but the greatest of all wonders are much closer to home and part of everyday life: the spider's web, the honeycomb, the ants' nest. But even then, all this pales into insignificance when compared to the wondrous nature of the egg. Is not the egg the only thing that comes into the world unblemished? Is it not the only thing from which walking, crawling, swimming and flying creatures emerge? On both land and in the sea, species exist that not only incubate eggs but are also hatched from them. Therefore, the egg coincides with creation itself, to rule over Heaven and Earth. And is it not true that, according to ancient wisdom, Heaven and Earth were created in the Orphic egg? The egg, concludes the Dutch humanist, is therefore the only home of both gods and men!



FIG. 3
Hildegard of Bingen,
'Universe', in: *Scivias*
codex, c. 1165,
Eibingen, Abbey of
St Hildegard, fol. 14r.



FIG. 4
'In principio creavit
Deus celum et terram',
in: *Pars Bibliorum*
(Lambeth Bible),
12th century, London,
Lambeth Palace
Library, ms. 3, fol. 6v.