

PHILOSOPHICAL PHYSICS

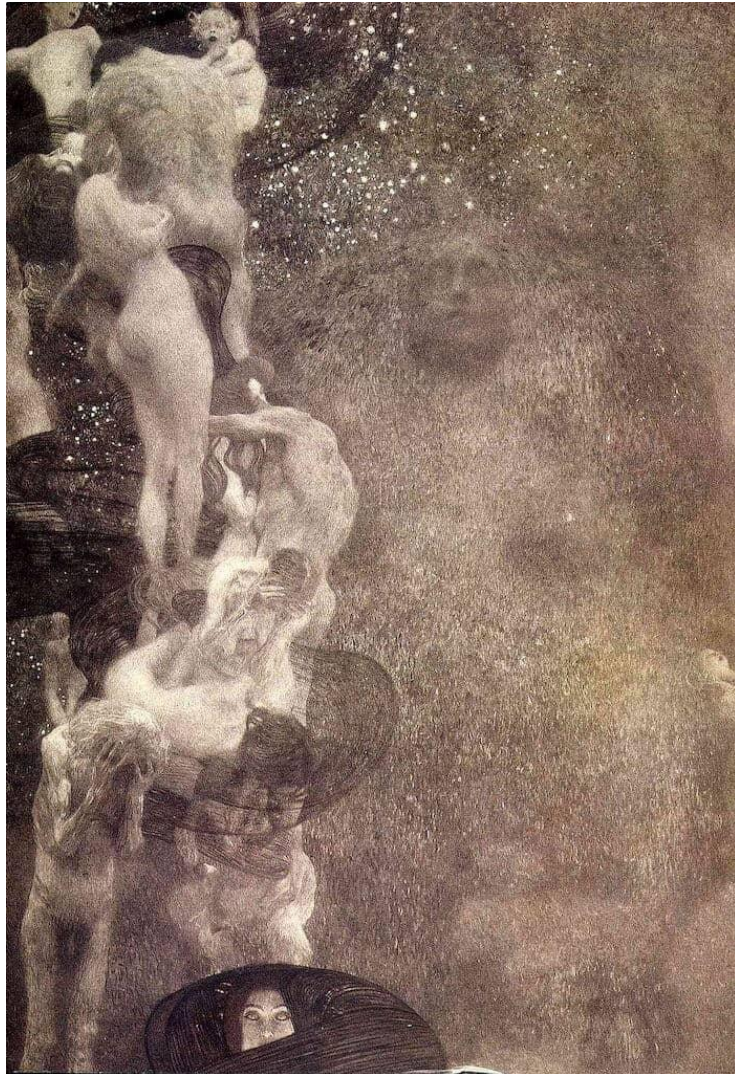


Figure 1: *Philosophy (Philosophie)*, an allegory painted by Gustav Klimt

Reconnecting *Leib* and *Körper* through Allegorical Reading

The **theme of this thesis** should be understood as a **manifold**, meaning a structure analogous to the curves and surfaces found in general relativity. A manifold is a topological space that can be described by a collection of local maps (**an atlas**), which, in this case, is the **thesis** itself. This work does not aim to capture the entire “topological” complexity at once. Instead, each **chapter** functions as a **local coordinate map**, translating specific, complex subsets of the research area into structured frameworks. This atlas is not exhaustive, but it provides the necessary maps to navigate us through the manifold.

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Philosophical Physics: Reconnecting *Leib* and *Körper* through Allegorical Reading

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Abstract

Subjective, experiential human life is framed as something fundamentally different from scientific concepts in contemporary physics. *Leib* (subjective, experiential, meaningful description) and *Körper* (objective, measurable description) appear to be in conflict with each other as ways of describing phenomena. This leads European society to be confronted with the crisis of scientificity and the crisis of meaning, first identified by Edmund Husserl. These two crises are, for physics, the consequences of philosophy's gradual splitting, even though physics originally sprang from natural philosophy. Physics developed a mere *Körper*-oriented description of reality, benefiting primarily the intertwined military, economic, and state sectors. Nowadays ethics, consciousness, and meaning are often disregarded in this discipline, making physics mostly humanless. This thesis identifies three responding trends among European citizens towards *Körper*-oriented physics: scientific triumphalism (*Körper* triumph), science denial (*Körper* rejection) and the New Age movement (failed *Körper* integration in the *Leib* sphere). All three trends represent dead ends and will not solve (or even worsen) the current challenges of pandemics, rising technocratic tendencies, alienation from the value of human life, and climate crises.

By analysing this development, this thesis concludes that, in order to reconnect human experiential life with scientific concepts in physics, it is necessary to first adopt a phenomenological stance and accept the inescapable human position. By clarifying that phenomena are constituted in our consciousness and therefore can only be understood through a human filter, scientific concepts must not be taken literally. Rather, they should be understood symbolically, historically embedded, and shaped by human projection. Therefore, physics is taken for what it is: a human narrative about the cosmos and us. This framing is made more explicit through an unconventional approach of transforming scientific concepts into an allegory, but unlike the New Age movement, the scientific concepts remain intact in their logical rigor. Exemplified by shifting concepts of gravity into symbols, an allegorical reading of their scientific conceptualisation is created. The theoretical part answers the following research question: **Can *Leib* and *Körper* be reconnected through an allegorical reading?** This research is visualized in my artistic work through a performative installation that should be approached similarly to the hermeneutic method of tarot readings.

The thesis focuses on Western culture, particularly Europe.

I want to thank my parents for their support, for teaching me curiosity, and for encouraging my desire to understand.

My friends for inspiring me and showing me the wonderful colourfulness of life.

Valerie, Virgil, and Martin for their feedback and dialogues throughout this thesis.

The Universe for being so sublime.

And my sister for everything



1 Introduction

“There’s the universe and then there’s the process of developing a mathematical understanding of it. This is physics, and physics is a human process. Physics is not the universe. Rather, it is one very human attempt to get at its innards.”¹

– *Disordered Cosmos*, Prescod-Weinstein

Newton’s law of universal gravitation (1687) posits that every particle attracts every other particle in the universe. This means that gravitational interaction extends not only between my body and the Earth but also between my body and my dead grandmother’s bones in the cemetery, between my body and the material body of Donald Trump, and between my body and the Andromeda galaxy. While this scientific fact is trivial in its magnitude of actual gravitational power, there are philosophical implications of Newton’s description of the phenomenon. All matter is interconnected by gravity in the whole universe! This physical fact became meaningful to my human existence, also because all three mentioned “objects” were meaningful to me (even though in very different ways).

I have always been baffled by how people react when I say that I have a bachelor’s degree in physics. Their responses go from telling me about their old school days and the horrible teacher they had, to insisting that they are “simply too dumb” to understand the mathematics behind physics. They almost always add that there is no real need to apply what they learned to their everyday lives. Physics seems quite separate from personal experience, something that happens out there, in publications and laboratories.

“We are well off in life without physics and math!”

I beg to differ!

For me, physics has always felt closer to Klimt’s *Philosophy* (Figure 1): a vision of the cosmos that is at once sublime, deathlike, and deeply human. It is a way of describing physical phenomena but also of situating myself within this vast world. Concepts of natural laws, energy, forces, dark matter, and the idea of never-provable infinity gave me a sense of understanding within the mysterious context I, as a human, find myself in.

¹ Chanda Prescod-Weinstein, *The Disordered Cosmos: A Journey into Dark Matter, Spacetime, and Dreams Deferred*, First edition (Bold Type Books, 2021), 147.

Physics and its mathematical models, which were developed over centuries by human observation and thought, are a human endeavour to render the universe for human understanding and meaning. Therefore, physics is never something neutral. That does not diminish the scientific precision or predictive power of physics, but this framing offers a rediscovery of its human basis. Yet this personal, human dimension often remains only implicit within physics, contributing to the disconnection some people notice when they say they are well off in life without the discipline.

This is not only anecdotal, but also supported by the *Special Eurobarometer 557* stating that 36% of European citizens say that scientific knowledge is not important in their daily lives.² We often talk about science communication when it comes to data like this, but I think it signals a deeper issue within the culture of science and what this culture can mean for us personally. In a time marked by conspiracy theories, global pandemics, and rising climate emergency, the ability to relate scientific understanding of phenomena to the human experience becomes alarmingly necessary, calling for a transformation.

In recent decades, the history and philosophy of science have been a major academic growth area, but realistically their insights have rarely changed the discipline they analyse.³ Scientists like Adam Frank, Marcelo Gleiser, and Evan Thompson argue in their book *The Blind Spot* that the human perspective must be included in science so we can reorient science itself. The theoretical groundwork for a shift is there; what remains unresolved is how to enact it!

With my master's thesis I want to look at why the human perspective in physics became separated from scientific concepts in the first place and, based on this analysis, I propose that it can be restored by centring the human perspective in scientific concepts.

Therefore, we must renew our culture in physics by art, history, and literature and revive the quality of imagination. We must lay open what we imagine if we describe the world and how the imaginative descriptions of others shape the scientific concepts they propose. To make this more explicit, the scientific concepts should be seen as allegories, as narratives with symbolic elements describing a phenomenon.

² European Commission. Directorate General for Research and Innovation., *European Citizens' Knowledge and Attitudes towards Science and Technology: Eurobarometer Report*. (Publications Office, 2025), 8, <https://doi.org/10.2777/6040908>.

³ C. P. Snow and Stefan Collini, *The Two Cultures*, 1st edn (Cambridge University Press, 2012), xlviii, <https://doi.org/10.1017/CBO9781139196949>.

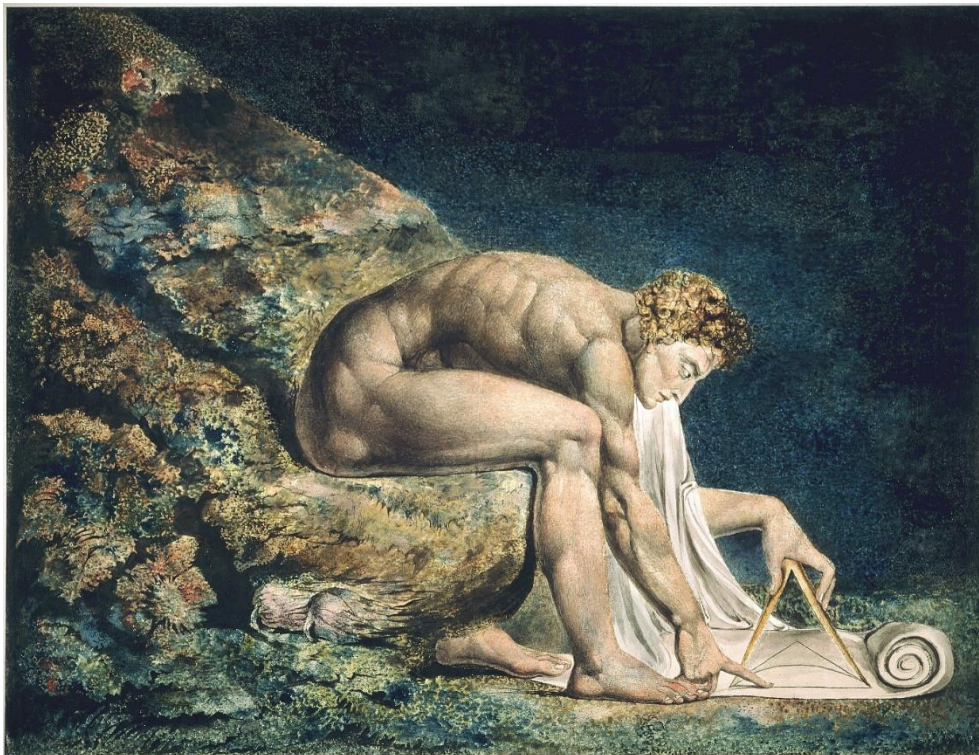
The imaginative layer, harnessed by faith and reason, is channelled, in my case, into an artistic work in the form of a performative installation. Every element in the installation is an analogical object embodying a scientific conceptualization of gravity embedded in its historical and cultural human context. The integration of the scientific concept with the human aspect should result in a symbolic object that engages with the human perspective in physics in a more responsible and transparent way. Altogether the symbolic objects form an allegory of gravity.

Because this allegory is (even as an artwork) also a conceptualization (to be more precise my conceptualization) of gravity again, the viewer should interact with the artwork by remaining faithful to the inescapable human perspective through which the concept is received. This is suggested by engaging with the artwork as one would with a tarot reading, meaning understanding the symbolic layers of every part in the allegory but also reflecting how it can relate to one's own lifeworld and cosmic understanding. I call this hermeneutic approach allegorical reading.

The performative installation is supported by my research in the written component of the master's thesis, which asks whether the personal, subjective, and experiential description can be reconnected with the sphere of scientific description through my method of allegorical reading?

Our stories are our stories (Figure 2), and we need to treat our cosmic understanding with more respect and consideration. There should be a renegotiation of our stories, all of them, especially the scientific ones, what philosophical implications they really have, and what they mean for us as human beings. As James Baldwin said: "There is a reason, after all, that some people wish to colonize the moon, and others dance before it as before an ancient friend."⁴

⁴ James Baldwin, *No Name in the Street*, Vintage International Ser (Knopf Doubleday Publishing Group, 2013), 193–94.



2 Terminology and Framework

Before turning to the main problem, this chapter begins by mapping out the terminology and conceptual framework used throughout this thesis. It introduces the **key notions** of the lifeworld, scientific concept, Husserl's concept of crisis, *Leib*, *Körper*⁵, and the thesis's own framework of *the Divide* as the source of two major crises (the crisis of scientificity and the crisis of meaning). In this thesis, "crisis" functions as a loaded term for the sudden escalation or occurrence of a problem situation that cannot be overcome with conventional problem-solving techniques.⁶ This definition foreshadows why the diagnosis I develop later calls for an unconventional solution represented by my approach of allegorical reading. In Husserl's sense, however, crisis carries a more specific meaning and concerns the amnesia of the lifeworld as the starting point of any observation. But what, then, is the lifeworld?

2.1 Lifeworld and the Pre-Scientific World

The lifeworld (*Lebenswelt*) defines the entirety of the actual and possible **experiential horizon of human life** and is a term established by the philosopher and mathematician Edmund Husserl (1859-1938).⁷ It can refer to anything from the sensible world of human perceptual experience to the practical world of human cultural life, encompassing everything from immediate sensation to meaningful existence.⁸ The lifeworld functions as a **pre-scientific world**, which is not yet aware of its mathematical idealization. Mathematical idealization is put over wherever the lifeworld in its function as pre-scientific world does not appear with exact precision. The pre-scientific world finds itself everywhere in the "oscillation of the merely typical", meaning in vagueness, and wherever more precision is wanted, the mathematical idealization imposes itself.⁹ Husserl employs the metaphor

⁵ The English translation für *Leib* is often lived body, animate body or body-subject and for *Körper* the term physical body or simply "body" is used. I decided to retain the original German terms *Leib* and *Körper* to avoid semantic ambiguity of the English word "body" and to provide an orthographic contrast that underlines the distinction between the two ways of describing the world.

⁶ Thorsten Benkel et al., eds, *Lexikon zur Soziologie* (Springer Fachmedien Wiesbaden, 2024), 701, <https://doi.org/10.1007/978-3-658-42567-8>.

⁷ Benkel et al., *Lexikon zur Soziologie*, 736.

⁸ George Heffernan, 'On the Several Senses of Crisis in Husserl's The Crisis', *Husserl Studies* 41, no. 3 (2025): 361, <https://doi.org/10.1007/s10743-025-09366-2>.

⁹ Edmund Husserl, *Die Krisis der europäischen Wissenschaften und die transzendente Phänomenologie: eine Einleitung in die phänomenologische Philosophie*, ed. Elisabeth Ströker, Philosophische Bibliothek 641 (Meiner, 2012), xv-xvi, 25.

that the lifeworld – in its function as the pre-scientific world – is therefore the universal basis (*Boden*, seen in Figure 4) of world-life, making the lifeworld the foundation of the sciences, including physics.¹⁰ Later interpretations emphasize that the lifeworld is also historical, sociological and cultural relative¹¹, which this thesis additionally considers. Today, the term lifeworld is often used in social sciences, health sciences, education, and gender studies for the analysis of concrete, subjective experiences. However, it was originally intended on a macro-level for all European sciences.



Figure 4: The lifeworld functions analogous to the house of this boy: as the *Boden* for his concepts metaphorically represented by the books.

2.2 Scientific Concept in Physics

On the other hand, scientific concepts are **mental models or general ideas** that help us understand the natural world, representing observable phenomena, unobservable entities, or processes. Although connected to the product of human brain activity, it does not contain, in its definitions, any explicit reference to the human lifeworld. A scientific concept in **physics** is a mental model or general idea in the scientific study of matter, energy, and the relationships between them, including the study of forces, heat, light, sound, electricity, and the structure of atoms.¹²

Even though “physics” is defined as a study, not a culture in the *Oxford Learner’s Dictionary*, physics does have a culture and is not separate from the world.¹³ As Joseph Martin argues in the chapter “How Physics became ‘What Physicists do’” in his book *Solid State Insurrection*, physics as a field

¹⁰ Heffernan, ‘On the Several Senses of Crisis in Husserl’s The Crisis’, 361.

¹¹ David Carr, ‘Husserl’s Problematic Concept of the Life-World’, *American Philosophical Quarterly* 7, no. 4 (1970): 336.

¹² Oxford University Press, ‘Physics’, in *Oxford Learner’s Dictionary*, 2025, <https://www.oxfordlearnersdictionaries.com/definition/english/physics?q=physics>.

¹³ Prescod-Weinstein, *The Disordered Cosmos*, 186.

of study is neither essential nor context-independent. Instead, it is a historically contingent social entity that has been assembled in different ways at different times by different people acting on different motives. Physics is a **human-built category**, as are all other disciplines.¹⁴ This critical definition is important for understanding scientific concepts in physics not as objective discoveries of a world independent of the observer. Rather, these concepts are influenced by the lifeworld of those who participate in the social entity of physics, and who thereby shape it through their activities in the discipline.

2.3 Husserl's Crisis of the European Sciences

Framing the sciences through an epistemic lens was something quite radical and new nearly 100 years ago. Husserl was one of the first to address the human aspect in science in his last major philosophical work *The Crisis of the European Sciences and Transcendental Phenomenology* (published in 1936 in German) which marks a decisive turn away from the “Cartesian”¹⁵ way toward human history and the **problem of the correlation between scientific objectivity and pure, absolute subjectivity**.¹⁶

In this work, he describes several senses of crisis, of which, in the interpretation of George Heffernan, the two essential ones are the crisis of the sciences understood as the inadequacy of their scientificity, and the crisis of the sciences understood as the loss of their meaningfulness for life. Both crises are to be understood conjunctively, not “either/or”, but rather as a matter of “both/and”.¹⁷

The Crisis of Scientificity

The crisis of scientificity arises from the fact that modern sciences forget the lifeworld as the foundational source for the natural sciences.¹⁸ Husserl's critique focuses on the way that modern sciences treat their history merely as a collection of facts, without critically examining the philosophy behind their concepts.¹⁹ This neglect conceals the underlying

¹⁴ Joseph D. Martin, *Solid State Insurrection: How the Science of Substance Made American Physics Matter* (University of Pittsburgh Press, 2018), 33.

¹⁵ Referring to the philosophy of René Descartes, especially his famous separation of mind and body.

¹⁶ Husserl, *Die Krisis der europäischen Wissenschaften und die transzendente Phänomenologie*, VII, IX.

¹⁷ Heffernan, ‘On the Several Senses of Crisis in Husserl's The Crisis’, 363, 367.

¹⁸ Heffernan, ‘On the Several Senses of Crisis in Husserl's The Crisis’, 360–61.

¹⁹ Husserl, *Die Krisis der europäischen Wissenschaften und die transzendente Phänomenologie*, XXIV.

assumptions, reductions, and approximations of those concepts. Science, in effect, treats the form of the idea – which is merely a method – as if it were the ultimate reality.²⁰ Husserl emphasizes that his critique does this without sacrificing the sciences’ original sense of scientificity, which remains intact in terms of the legitimacy of their methodological achievements.²¹ But the unexamined assumptions and implicit biases cannot simply be rationalized away. Every scientific procedure used in this process (even in the hard sciences) ultimately originates again in pre-scientific fundamental forms²², first recognized and interpreted by the human mind.

In physics the crisis of scientificity becomes more prominent in the face of unresolved problems such as reconciling quantum theory with general relativity. Both theories struggle to bridge the gap of their mathematical idealization of space and time and their correlating limitations. This does not diminish the marvellous achievements of either theory or the impressive accuracy of their calculations.

The Crisis of the Loss of Meaningfulness

The crisis of the loss of meaningfulness is the loss of meaningfulness of the sciences for human life. Husserl asks about the meaningfulness of modern science for the life crisis of European humanity.²³ In an indirect reference to Husserl, Gurwitch paraphrases his argument: “Science, it seems, has nothing to say regarding things that matter most for human existence.”²⁴ Husserl points out that European sciences trace their origin back to natural philosophy, “where knowledge was supposed to make us wise and give meaning to life”²⁵. Husserl sees philosophy as setting the standard for all other cultural phenomena, including the sciences. Once philosophy is split from its foundational role, science loses its connection to meaning, leading to a situation where **meaning is no longer a concern of scientists**.²⁶ This leads to the loss of the significance of the sciences for human life. Again, his critique does not sacrifice the methodological

²⁰ Husserl, *Die Krisis der europäischen Wissenschaften und die transzendente Phänomenologie*, 52.

²¹ Heffernan, ‘On the Several Senses of Crisis in Husserl’s The Crisis’, 358.

²² Husserl, *Die Krisis der europäischen Wissenschaften und die transzendente Phänomenologie*, XV–XVI.

²³ Heffernan, ‘On the Several Senses of Crisis in Husserl’s The Crisis’, 351, 359.

²⁴ Aron Gurwitsch, *Studies in Phenomenology and Psychology*, 2. printing, Studies in Phenomenology & Existential Philosophy (Northwestern Univ. Press, 1971), 400.

²⁵ David Jalal Hyder and Hans-Jörg Rheinberger, eds, *Science and the Life-World: Essays on Husserl’s Crisis of European Sciences* (Stanford University Press, 2010), 86.

²⁶ R. Philip Buckley, *Husserl, Heidegger and the Crisis of Philosophical Responsibility*, *Phaenomenologica* 125 (Kluwer academic publ, 1992), 24.

accuracy of the scientific results but is concerned with what science has meant and can mean for human existence.²⁷

Regarding physics, its achievements shape human life in profound ways, especially in fields like technology and medicine, but the conceptual foundations and ideas remain mostly unrecognized within everyday life. The research questions currently being asked and funded in physics often fail to address the most crucial issues that concern human beings, namely questions about their own existence. For example, research on “Phase behavior of Cacio e Pepe sauce”²⁸ is rare, and questions about love, meaning, and consciousness remain unanswered. The crisis of meaning in physics stems from a failure of scientific research to address questions essential to the lifeworld of people and from not including philosophy in their practice as a necessity rather than an extra curriculum activity. With this detachment, results in physics remain shallow and alienated from life.

Or to use Adam Frank, Marcelo Gleiser, and Evan Thompson’s analogy that condenses both crises : we should not confuse the map with the territory but instead remember why we made maps in the first place.²⁹ This is well represented in William Blake’s satirical, allegorical personification of Newton (Figure 3), absorbed in diagrams, crouched and naked. His body appears to echo the proportions of the golden ratio, while his environment teems with life and algae – yet he is so fixated on his calculations that he fails to notice them or himself being the source of his process.

2.4 The Framework of *the Divide* as the Source of the Two Crises in Physics

Husserl recognized that the crises are consequences of the disintegration of the unity of philosophy, science, and a truly human way of being.³⁰ According to interpretations of Husserl’s work by Bernet, Marbach, and Kern, the fundamental problem of the crisis lies in the relationship between abstract world of scientific concepts and the concrete world of subjective life.³¹ This interpretation provides the framework on which this

²⁷ Husserl, *Die Krisis der europäischen Wissenschaften und die transzendente Phänomenologie*, XI.

²⁸ G. Bartolucci et al., ‘Phase Behavior of Cacio e Pepe Sauce’, *Physics of Fluids* 37, no. 4 (2025): 044122, <https://doi.org/10.1063/5.0255841>.

²⁹ Adam Frank et al., *The Blind Spot: Why Science Cannot Ignore Human Experience* (The MIT Press, 2024), 10, <https://doi.org/10.7551/mitpress/13711.001.0001>.

³⁰ Husserl, *Die Krisis der europäischen Wissenschaften und die transzendente Phänomenologie*, XII.

³¹ Rudolf Bernet et al., *Edmund Husserl: Darstellung seines Denkens* (Meiner, 1989), 203–4; Heffernan, ‘On the Several Senses of Crisis in Husserl’s *The Crisis*’, 368–69.

thesis is based: **the crises are the consequence of a divide between the lifeworld and scientific concepts.**

Husserl further exemplified this in the **distinction between *Leib* and *Körper***. The *Leib* is the lived body, which is human and belongs to the realm of subjective perception and experience.³² The *Körper* is the objective body, which a human has and which is accessible to objective observation.³³ To grasp the *Leib* in its entirety, a purely physical description as *Körper* lacks a necessary dimension.³⁴ This distinction reappears in Jean-Paul Sartre's differentiation between the body as "a conscious structure of my subjective awareness" (body-for-itself) and the body as physicality (body-for-others).³⁵ The body for others is always bound to the observations method available to the observer. In alignment with this differentiation, this thesis calls **descriptions and conceptualizations belonging to the lifeworld *Leib*** and **descriptions and conceptualizations belonging to scientific concepts *Körper*** from now on. This thesis framework also extends these terms beyond the human body, arguing that both types of descriptions can also apply to the cosmological body and the social body. Historically both were at some points in history (and in New Age Movement until today) taken as *Leib*, having its own lifeworld, subjective perception, and experience, and both can – and were – reduced to mere *Körper*.

From now on ideas about what humans, social systems or the cosmos represent, will be analysed through the terms of *Leib* and *Körper*, to understand how these two understanding gradually became separated. By framing phenomena of the universe in either a *Leib* or *Körper* manner, this thesis assumes that this gives rise to a divided understanding of the spheres to which these descriptions apply. Therefore, this divide in description leads to a separation between the lifeworld and scientific concepts by framing them as fundamentally different or even excluding one or the other in the understanding of the world. From now on, this division is simply called *the Divide* and taken as the source of the two prominent crises. The following subchapter will provide a historical examination of how *the Divide* in physics was established.

³² Benkel et al., *Lexikon zur Soziologie*, 740.

³³ Benkel et al., *Lexikon zur Soziologie*, 690.

³⁴ 'Was Ist Der Leib? : Eine Kritik an Der Leib/Körper-Unterscheidung', in *Körper:Gender:Sexualität Als Chance Für Die Theologie*, by Monika Datterl et al., with Wehinger, Daniel (Universität Innsbruck, 2023), 15–16, <https://ulb-dok.uibk.ac.at/8885753>.

³⁵ Jean-Paul Sartre et al., *Das Sein und das Nichts: Versuch einer phänomenologischen Ontologie*, 25. Auflage, trans. Hans Schöneberg, *Gesammelte Werke in Einzelausgaben / Jean-Paul Sartre Philosophische Schriften*, Band 3 (Rowohlt Taschenbuch Verlag, 2024), 539, 583.



3 The Establishment of *the Divide* in Physics Historically

This chapter functions as a navigation through the **historical developments** in Europe that shaped the **materialization of *the Divide* in physics**, a discipline rooted in natural philosophy, where *Leib* has increasingly been abstracted and marginalised. This thesis argues that the allegory of the machine – employed by Descartes and challenged by Husserl and Sartre³⁶ – represents a mere *Körper*-like conceptualization. A machine is an object that can be described completely by mechanical and hence measurable principles. Therefore, every time this metaphor is used, it points to a merely measurable and “objective” conceptualization. This is why for the historical analysis in the first part (until and including the Scientific Revolution; chapter 3.1 and 3.2), the thesis primarily uses Carolyn Merchant’s *The Death of Nature* (1980), complemented by secondary literature. Merchant focuses on the epistemic transformation of nature from a **living organism** to a **machine**³⁷, signifying a shift from understanding the cosmos and natural world as a *Leib* to a scientific philosophy of them as *Körper*. This displacement of the *Leib* by the *Körper* established the foundations of modern physics prevalent until today. By systematically excluding meaning, experience, and consciousness as integral components of nature – and most dramatically human existence and subjective experience – the metaphysical *Divide* in the discipline emerged.

The analysis in the first part of this thesis:

- 1) Focuses on how the processes of human adaptation to the environment foster psychological changes and the emergence of specific concepts about nature and the cosmos.
- 2) Explains the prominent concepts rooted in projections of human imagination and differentiate certain trends within those concepts into the categories of *Körper* and *Leib*.
- 3) Points out the consequences of the philosophical implications of the concepts which shape societal practices and determine which forms of knowledge become dominant or marginalized.³⁸

In the second part of this historical chapter, this thesis argues that *the Divide* was conceptually established in the Scientific Revolution, though it

³⁶ ‘Körper’, 16–17.

³⁷ Carolyn Merchant, *Der Tod der Natur: Ökologie, Frauen und neuzeitliche Naturwissenschaft*, trans. Holger Fliessbach (Verlag C. H. Beck, 1987), 14.

³⁸ Merchant, *Der Tod der Natur*, 55, 81–82.

had not yet transformed human culture to the extent it does today. The second section examines how the *Divide* gradually translated into a cultural rift, visible in the debates among intellectual champions who emphasized either *Körper*-oriented or *Leib*-centred understandings of nature and knowledge from the Scientific Revolution onwards. Following the perspective of cultural historian Stefan Collini, education serves as the key social activity in which *the Divide* becomes most apparent³⁹, as debates within this field show the growing anxiety over the inability of disciplines devoted to *Körper* (the sciences, especially physics) or *Leib* (the humanities) to communicate with one another⁴⁰. This thesis engages with Collini's perspective because his analysis doesn't assert any superiority of the humanities over the sciences or vice versa.⁴¹

The debates will be analysed in terms of:

- 1) The historical context in which they arose.
- 2) The core arguments and their respective emphasis on *Körper* or *Leib*.
- 3) The consequences of these debates as cultural manifestations of *the Divide*, culminating in the dominance of the *Körper* model as the prevailing paradigm in physics in European culture.

The aim of this analysis is not to simplify Europe's history, but rather to highlight key historical milestones that contributed to *the Divide* in physics. It seeks to show that the criteria of modern physics, and its entanglement with the state, economy (Figure 5), and the military, are neither random nor preordained. They are the result of a cultural transformation, resulting in the prominence of the *Körper*, marginalization of the *Leib* and therefore a *Divide* which gave rise to the two prominent crises.

³⁹ Snow and Collini, *The Two Cultures*, xii.

⁴⁰ Snow and Collini, *The Two Cultures*, xi.

⁴¹ Snow and Collini, *The Two Cultures*, ix.



Figure 6: The Nebra Sky Disc is a 3.600-year-old star compass and the world's oldest concrete depiction of astronomical phenomena, while also featuring religious symbols. The cluster of seven small gold dots may be the Pleiades (part of the constellation Taurus). Furthermore, every element (including the sun, the horizon and the moon) is interpreted as a symbol within a complex Central European belief system.

3.1 Pre-Scientific Worldviews and the Cosmic *Leib*

Merchant argues that, since the dawn of humanity, the human lifeworld has been characterised by a direct, organic relationship with the natural order, read in this thesis as a *Leib* conceptualization of the cosmos. The living cosmos possessed a form of consciousness and sensual capacity, anchoring the reciprocal relationship with humanity in a value system that persisted from ancient times (Figure 6) until the late Renaissance.⁴² Nevertheless, during these historical periods, this thesis argues that the first seeds were sown for the gradual exclusion of the *Leib* from the cosmological worldview thereby affecting human's self-understanding. This process culminated in the Scientific Revolution (chapter 3.2) and later led to the near-total removal of the *Leib* from not only conceptualization of nature but also shared epistemic infrastructure about the cosmos in society (chapters 3.3).

⁴² Merchant, *Der Tod der Natur*, 17,21.



3.1.1 First Systematization of *Leib* and *Körper* in Classical Thought (600 BCE – 500 CE)

In Antiquity, a finite, living cosmos was described mainly by the cosmic *Leib*, and the emphasis was laid on the importance of every part in the cosmos-nature-individual system. This can be seen in the ancient bodily analogies of the cosmos to the human body. The macrocosms theory analogized the cosmos to the human body, soul, and mind. The geo-cosmic view linked Earth to a living, breathing, sweating, excreting body. Both theories relied directly on the *Leib*, either as an element or as an explicit analogical reference, in their descriptive systems, making the cosmos possess its own lifeworld and therefore conceptualized it as something experienced within the human lifeworld.⁴³ However, Mediterranean and Greek culture expanded into new natural environments and their evolution laid the foundations for more systematized cosmic and individual understandings, which this thesis reads as a **first differentiation between *Leib* and *Körper***.

This differentiation of the cosmos is exemplified in Plato's *Timaeus* (c. 360 BC). As UCL philosopher Mark Eli Kalderon notes, *Timaeus* played a crucial role in ancient and Hellenistic thinking about visual perception.⁴⁴ Plato describes a cosmos divided into the mutable, rational, temporal world of nature (realm of coming to be) and the immutable, eternal forms (realm of being), which this thesis interprets as the realms of *Leib* and *Körper*. By systemizing the cosmos into two spheres, Plato creates a **dualistic metaphysical structure**⁴⁵ and therefore lays the metaphysical basis for *The Divide*. But in his philosophy, *The Divide* was still bridged, as Merchant points out, by the cosmic soul⁴⁶ (*anima mundi*), which acts as the source of movement in the physical cosmos. Importantly, Plato reserved *Körper* for only context-independent, abstract entities and quantities. Husserl observes that this reservation was later overthrown in scientific concepts like Newton's gravity theory (chapter 6.2) which took Euclid's geometry (3rd

⁴³ Merchant, *Der Tod der Natur*, 19, 34.

⁴⁴ Mark Eli Kalderon, *Cosmos and Perception in Plato's 'Timaeus': In the Eye of the Cognitive Storm*, Issues in Ancient Philosophy (Routledge, Taylor & Francis Group, 2023), xiii.

⁴⁵ Christina Hoenig, *Plato's Timaeus and the Latin Tradition* (Cambridge University Press, 2018), 15.

⁴⁶ Merchant, *Der Tod der Natur*, 23.

century BCE), which reflected Platonic idealization (*Körper*), and applied his mathematical space over reality without these ancient limitations.⁴⁷

Aristotle (384-322 BCE) offers another example of interpretable *Leib/Körper*-dualism, this time in the individual. By challenging Plato's cosmic dualism between eternal forms (*Körper*) and the sensible world (*Leib*), he argues that it does not exist on a transcendental level of reality but rather in individual things (exemplified in Figure 7).⁴⁸ He structures the substance of a being into natural/artificial. In his *Physics*, he defines nature (*physis*) as every natural object "having within itself a principle of change and persistence, in some cases with respect to place, in others with respect to growth and diminution, and in others with respect to alteration."⁴⁹ This internal principle is interpreted as *Leib*. On the other hand, artificial objects (*technē*) do not have an inherent principle of change, are abstract, planned and fall under the *Körper*.⁵⁰ This distinction established the **first conceptual structure of the Divide in the individual**.

Another key aspect of cosmic systematization was the ancient conception of the cosmos as **rationally ordered and governed by immanent principles**. For example, Stoicism⁵¹ (3rd century BCE Athen – 1st century CE, Rome) viewed the cosmos as a *Leib* with immanent laws of nature governed by an active principle (*pneuma*). Later mechanists in the Scientific Revolution were influenced by the idea of immanent laws, but unlike the ancient authors, they stripped the cosmos of its immanent, dynamic, and creative principles (world soul, *logos*, *pneuma*,...).⁵² Without this bridge to the lifeworld, the natural laws became something outside, acting on humans, but not influenced by them. Consequently, what was a rationally ordered dualistic cosmos with immanent rules, transformed into a rigid, law-governed universe detached from the *Leib*.

Dualistic systematization of the cosmos and the individual into a *Körper* sphere and a *Leib* sphere characterized antiquity. The notion of immanent laws cemented this idea and remains relevant for modern physics today. Plato's metaphysical two spheres in the cosmos, and Aristotle's relocation

⁴⁷ Husserl, *Die Krisis der europäischen Wissenschaften und die transzendente Phänomenologie*, XV–XVI.

⁴⁸ Merchant, *Der Tod der Natur*, 26.

⁴⁹ Aristoteles, *Aristoteles' Physik: Vorlesung über Natur; Griechisch - Deutsch. Erster Halbband: Bücher I(A)-IV(Δ)*, Philosophische Bibliothek 380 (Felix Meiner Verlag, 1987), 51.

⁵⁰ Merchant, *Der Tod der Natur*, 24.

⁵¹ A position named after the philosophy of the Stoa, characterised by an attitude of composure (*ataraxia*) and freedom from passion and affect, ethical rigorous, deterministic; Jürgen Mittelstraß, *Enzyklopädie Philosophie und Wissenschaftstheorie: Bd. 7: Re-Te*, 2nd ed, J. B. Metzler Humanities (German Language) Series (J. B. Metzler'sche Verlagsbuchhandlung & Carl Ernst Poeschel GmbH, 2024), 537.

⁵² Merchant, *Der Tod der Natur*, 270.

of these spheres into the individual, constituted the first steps towards *The Divide*. Despite later developments, in antiquity, the cosmic *Leib* remained flexible and adaptable, integrating those first differentiations, which explains its noticeable longevity.

Later in antiquity, Neoplatonism (Plotinus c. 204/5–270 CE) emerged, fusing Platonism with elements of the newly trending Christian philosophy. *The Divide*, established in Plato's philosophy, was further developed, consisting of a higher part, corresponding to the divine idea/God (*Körper*), and a lower part (*Leib*), corresponding with the phenomenal world.⁵³ This made *The Divide* not only explicit but also began to **establish a hierarchy** in which *Körper* were regarded as more significant and valuable than the world of experience (*Leib*), hinting already at systems that became more popular from the Middle Ages onward.

Nevertheless, the philosophies of antiquity understood the cosmos and the individual still as parts of the same lifeworld. This thesis argues that foremost the emerging sectors of **economy, state, and the military** – visualized in ancient story – contributed to the establishment of *the Divide* by **containing inherent structures undermining philosophical thought and therefore aspects of human existence (*Leib*)**.

This is exemplified in the story of Thales of Miletus (c. 624/3 – 548/4 BCE), one of the great Greek philosophers. Aristotle recounts that Thales became “as poor as if philosophy were useless.” However, he applied his astronomical knowledge to predict the next abundant olive harvest “thanks to the study of the stars,” which allowed him to rent numerous olive presses in the Miletus region and generate substantial income. This story aimed to illustrate that philosophers could easily become wealthy, but it also shows that under economic necessity, natural philosophy becomes practical rather than existential or philosophical in orientation.⁵⁴

Regarding state and the military, the historian of science Mitchell G. Ash argues that science and politics function as interactive resource potentials for one another. Science and the military are two social groups that provide resources to one another and acquire resources from each other.⁵⁵ Early examples of this can be seen in Archimedes, who applied his mathematical and mechanical skills to defend Syracuse with catapults, pulleys,

⁵³ Merchant, *Der Tod der Natur*, 23.

⁵⁴ Livio Rossetti, *Thales the Measurer*, Issues in Ancient Philosophy (Routledge, Taylor & Francis group, 2022), 158–59.

⁵⁵ Christian Forstner and Götz Neuneck, eds, *Physik, Militär und Frieden: Physiker zwischen Rüstungsforschung und Friedensbewegung*, SpringerLink Bücher (Springer Spektrum, 2018), 5, <https://doi.org/10.1007/978-3-658-20105-0>.

and innovative machines in the third century BCE (Figure 8).⁵⁶ In ancient times, however, the cooperation remained limited to the individual engagement of singular thinkers.



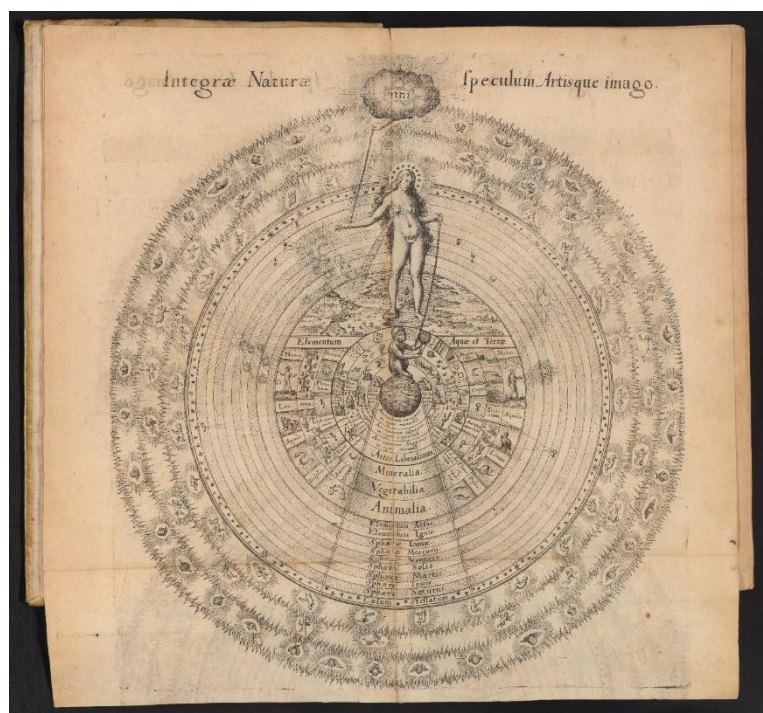
Figure 8: The allegory shows a Roman soldier killing Archimedes who was too concerned with his mathematics (“Noli turbare circulos meos!”) that he didn’t notice the urgency. It visualizes the conflict between philosophy and immediate danger/war.

Both anecdotes exemplify a use of natural philosophy that differs from that of Plato and Aristotle, who sought to understand the cosmos and our existence within it. Instead, Thales’s and Archimedes’ stories point to a practical application of natural philosophy that exploits or destroys nature under capitalistic or military pressures.

Throughout this period, all these ideas of the cosmos still put humans in an experiential relationship with the cosmos and nature, allowing emerging technological changes to be integrated without fundamentally destabilizing the prevailing cosmic *Leib*⁵⁷. Simultaneously capitalistic actions through those technologies became more elaborate in the High Middle Ages. While the cosmos was not yet fully divided, these developments laid the groundwork for the dualistic hierarchical transformations starting in the Middle Age that would culminate in the Scientific Revolution.

⁵⁶ Martí Domínguez, ‘Science without a Conscience: Technology at War’s Service’, *Metode Science Studies Journal* 15, no. 8 (2025): 3, <https://doi.org/10.7203/metode.15.32538>.

⁵⁷ Merchant, *Der Tod der Natur*, 277.



3.1.2 First Prioritization of *Körper* through a Gendered Cosmos in the Medieval Period (1000 – 1500 CE)

The key development of the medieval period was that the dualistic systematization of the cosmos and the individual into a *Körper* sphere and a *Leib* sphere in antiquity deepened further through a cosmological worldview privileging *Körper* over *Leib*.

Understanding this development requires a closer look at the circumstances of the Middle Ages: the population in 12th- and 13th centuries was growing, leading to intensified feudal pressure and increased resource demand. Urbanization and expanding economic activities led to an ecological break in the 14th century, triggering famines and a demographic collapse, intensified by the Black Death.⁵⁸ The brutality of death and the power of nature over humanity were everywhere (Figure 10).

The fact that human life was constantly threatened challenged ancient benign world-soul images, revealing nature's power over humans and its capacity for destruction. These pressures fostered a growing depreciation of nature accompanied by a **hierarchical understanding of the cosmic *Leib*** driven by the desire for **divine control** over it in medieval cosmology, interpreted here as the desire to control the lifeworld through ideas and concepts.

The introduction of a controlling God provided solace. Exemplified in the 12th century School of Chartres, Plato's *Timaeus* (chapter 3.1.1) was reinterpreted: Matter was the lowest part of the hierarchy, followed by nature



Figure 10: The power of death is depicted in an allegorical cycle, in which every social group dances with Death. Represented as a skeleton, Death, as part of nature, is conceptualized as a *Leib*, but perceived as something brutal.

⁵⁸ Merchant, *Der Tod der Natur*, 55–67, 74.

(mother), functioning again as a bridge, but this time subordinate to God/the Idea (father).⁵⁹ Antiquity's systematized *Leib/Körper* dualism became **gendered, valuing a higher, virtual principle of order (*Körper*) imposing (mathematical) order on matter (*Leib*), including humans and their lifeworld.**⁶⁰ The idea/order/*Körper*, nature, and humans and their lifeworld were all separated from one another (seen in Figure 9) and although the cosmos was still a *Leib* this conceptualization contributed to the beginning of hierarchy within the metaphysical *Divide*, which later turned to mere *Körper* conceptualization.

This hierarchical structure shaped the era's science, also known as **alchemy** (11th and 12th centuries). Alchemy was the practice of natural philosophy based on the interpretation of Egyptian and other ancient texts such as the *Tabula Smaragdina*.⁶¹ Here, Earth (mother) receives the Sun (father)⁶², again positioning *Körper* as something higher and therefore more important than the "receiving" lifeworld in a gendered context. This profoundly influenced modern science. The receptive relationship between father/sun and mother/earth is crucial for understanding how human-developed models and concepts came to be framed as independent of the individual who produced them. This thesis emphasizes this distinction between merely receiving ideas and actively producing them. When ideas are passively received by the lower, material human being the **responsibility for them is passed on to the higher, virtual, divine authority.** The *Tabula's* formula "as above, so below" ⁶³ cemented this cosmic *Divide* into the microcosm.

The concept of a *Körper* imposing on the lifeworld and God's authority over nature reshaped practices. The fall of feudalism and the New World expansion (14th/15th centuries) commercialized resources⁶⁴, leading not only to a "lower" living cosmos, but also to ambitions to turn away from the cosmic *Leib* entirely. But first humanity had to be re-positioned to pave the way for *the Divide* towards the Renaissance.

⁵⁹ Merchant, *Der Tod der Natur*, 23.

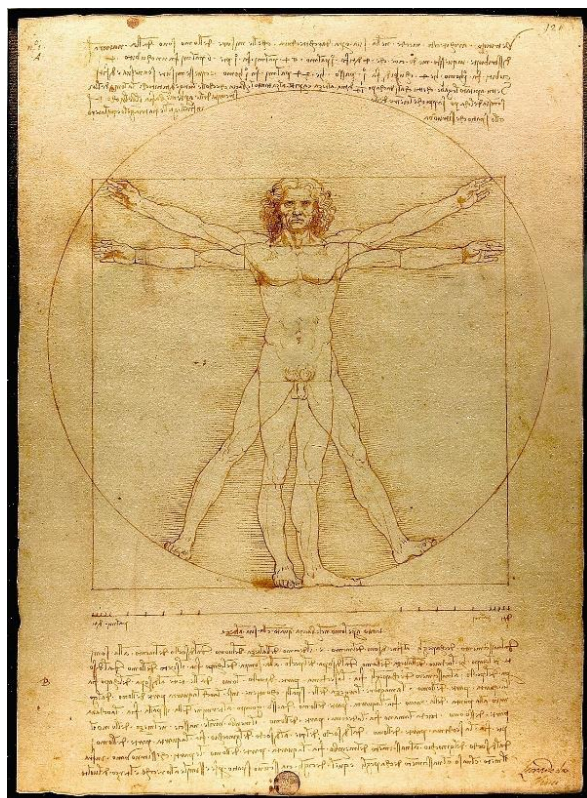
⁶⁰ Anna Somfai, 'The Eleventh-Century Shift in the Reception of Plato's *Timaeus* and Calcidius's *Commentary*', *Journal of the Warburg and Courtauld Institutes* 65, no. 1 (2002): 3–4, <https://doi.org/10.2307/4135103>.

⁶¹ This is a text which, according to the legend, was inscribed on an emerald tablet found in the grave of Hermes Trismegistus, as a summary of his teachings and became the creed of alchemists in the Middle Ages. Guillaume Delmeulle, 'At the Origins of the *De Perfecto Magisterio* : A Translation from Arabic or a Latin Composition?', *Ambix* 68, no. 4 (2021): 436, <https://doi.org/10.1080/00026980.2021.1983693>.

⁶² Merchant, *Der Tod der Natur*, 98.

⁶³ Peter Marshall, 'Alchemy and Gnosis from Antiquity to Early Modern Times: "As above so Below"', in *The Gnostic World*, 1st edn, by Garry W. Trompf et al., ed. Garry W. Trompf et al. (Routledge, 2018), 398, <https://doi.org/10.4324/9781315561608-37>.

⁶⁴ Merchant, *Der Tod der Natur*, 19.



3.1.3 Re-Positioning Humans in the Cosmic *Leib* during the Renaissance (1350-1600)

During the Renaissance, the idea of human beings subordinate to the *Körper* was transformed through the rediscovery of ancient texts. Renaissance intellectuals distanced themselves from medieval Scholastic theology and selectively revived and combined classical sources into a philosophical spectrum shaped by their own cultural context. They emphasized human dignity, creativity, and individual worth. Central to this shift was the idea of human free will: the freedom to shape one's own form of being, which distinguished humans from other created beings.⁶⁵ Consequently, humans gained fluidity within the cosmic hierarchical structure which bifurcated outer nature from the individual *Leib*.

This period of human emancipation from the cosmos was defined by Italian city-states (c. 1350-1530), where mercantile and urban economies, as well as market expansion strengthened ties between production and capital. Although most late 15th-century Europeans still lived in close-knit communities, humans had intensified their intervention in nature since the High Middle Ages, leading to further **abstraction of the human *Leib* from the conceptualization of nature's *Leib*** (Figure 11). Nevertheless, in the Renaissance, humans and nature were presented as being in organic unity. Both developments appear important for understanding the emerging distance between the cosmic *Leib* and the individual *Leib*.⁶⁶

The Neoplatonic hierarchical cosmology inherited from the Middle Ages provided the mainstream framework for the macrocosm.⁶⁷ The central issue in Renaissance cosmology and philosophy was now the changed human/cosmic *Leib* relationship. Medieval Scholastic tradition – shaped by Thomas Aquinas (1125-1274) – had described a cosmos divided by belief in God, who occupied the realm of eternal ideas and truths (*Körper*), while a subordinate field of perception was the domain where natural reason should rule (*Leib*, lifeworld). This hierarchy comprised ontological levels of being, whose boundaries allowed knowledge of God but not metaphysical transcendence.⁶⁸ Renaissance Neoplatonism challenged this static hierarchy by introducing the idea of **human ontological fluidity within**

Figure 11: Da Vinci's sketch shows a man after the concepts of Vitruv, being although in unity, united with a *Körper*-like outside, as the centre of the sphere.

⁶⁵ Marko Uršič, 'Pico Della Mirandola on the Dignity of Man and Some Contemporary Echoes of His Philosophy', *Clotho* 2, no. 2 (2020): 59–60, <https://doi.org/10.4312/clotho.2.2.59-72>.

⁶⁶ Merchant, *Der Tod der Natur*, 40, 65, 81.

⁶⁷ Merchant, *Der Tod der Natur*, 24, 115.

⁶⁸ Wilhelm Weischedel, *Die philosophische Hintertreppe: die großen Philosophen in Alltag und Denken*, 45. Auflage; Ungekürzte Ausgabe, dtv 30020 (Dt. Taschenbuch-Verl, 2018), 93–94.

the chain of being.⁶⁹ This thesis argues that this development not only abstracted the human *Leib* from the cosmic *Leib* but also marginalized it, since human fluidity implied not only freedom but also a progressive removal of the human *Leib*'s role within the cosmological order, yielding a conception of the cosmos as a stable structure no longer dependent on a fixed human position and experience.



Figure 12: The magician confronts nature to reveal her secrets. No direct barrier remains between them, allowing the magician to move freely. The cosmic *Leib* and the human *Leib* are thus conceived independent yet existing on the same level.

By differentiating the cosmic *Leib* from the human *Leib*, the observation and systematic study of the cosmos gained prominence. The first European universities emerged (1088 University of Bologna, 1150 University of Paris, 1167 University of Oxford), organized around the trivium⁷⁰ and quadrivium⁷¹, while elites became interested in artisans' empirical and mechanical skills.⁷² Applying artisan skills and methods to nature and the **cosmic *Leib*** combined with a strong analytical tendency made the relationship to the **human *Leib* more detached**, laying the foundation for modern science and the abstraction from cosmic *Leib* to cosmic *Körper*.

This conception is exemplified in the Renaissance Neoplatonic nature magic developed by Marsilio Ficino, Giovanni Pico della Mirandola, and

⁶⁹ Merchant, *Der Tod der Natur*, 114.

⁷⁰ Grammar, logic, and rhetoric

⁷¹ Arithmetic, geometry, music, and astronomy

⁷² Dale A. Ostlie, 'The Copernican Revolution', in *Astronomy: The Human Quest for Understanding*, 1st edn, by Dale A. Ostlie (Oxford University Press Oxford, 2022), 92, <https://doi.org/10.1093/oso/9780198825821.003.0004>; Merchant, *Der Tod der Natur*, 102.

Heinrich Cornelius Agrippa von Nettesheim.⁷³ They envisioned the cosmos in a chain-like hierarchy. Again, at its base lay earthly matter (*Leib*), and at the apex of this structure was the pure spirit (*spiritus mundi*), positioned behind the cosmos as the realm of platonic forms and eternal ideas (*Körper*). But, as Merchant notes, Neoplatonic magicians can navigate this hierarchy via rituals, talismans, and innovations channelling divine forces downward to celebrate, according to a Jungian reading, the holy marriage (*hieros gamos*⁷⁴) in which mind and matter unite.⁷⁵ Humans appeared as agents in this relationship, capable of **manipulating nature at their will and move freely in the cosmic structure**. The gnostic ascent of Neoplatonic magic aimed at understanding and spiritual renewal to gain knowledge and power for the practitioner further separated the world as an object of manipulation from the human subject (Figure 12).⁷⁶

The cosmological repositioning of humans from the cosmic *Leib*, human's correlating independence, and the growing objectification of the cosmic *Leib* led to the idea of using nature and experimenting with nature. According to Galileo "natural philosophy is inscribed in a grand book in the language of mathematic".⁷⁷ A book is a *Körper* conceptualization of the cosmos. The cosmic *Leib* was now allowed to be treated like an **object**. This new attitude towards the cosmos was carried forward by Copernicus, Tycho Brahe, Kepler and Galileo Galilei marking the beginnings of physics. Their observations established a calculable cosmic order, shifting the cosmic *Leib* toward *Körper* conceptualization. In Husserl's analysis, Galilei defined the way **mathematics was applied to the lifeworld, without preserving awareness of their status as idealizations of nature coming from humans**, thereby removing the *Leib* from cosmological description.⁷⁸ Together with Renaissance philosophical movements, the emphasis shifted towards observation and evidence in reaching plausible conclusions (inductive reasoning).

During 15th- to 16th-century expeditions, European folklore and discourse transformed untamed nature – including Earth, women, and non-

⁷³ Paola Zambelli, ed., *White Magic, Black Magic in the European Renaissance*, Studies in Medieval and Reformation Traditions 1573-4188, v. 125 (Brill, 2010), 2–4.

⁷⁴ Can be translated as holy marriage and describes the sacred union that takes place between two deities.

⁷⁵ Roelof van den Broek and Wouter J. Hanegraaff, eds, *Gnosis and Hermeticism from Antiquity to Modern Times*, SUNY Series in Western Esoteric Traditions (State University of New York Press, 1998), 164.

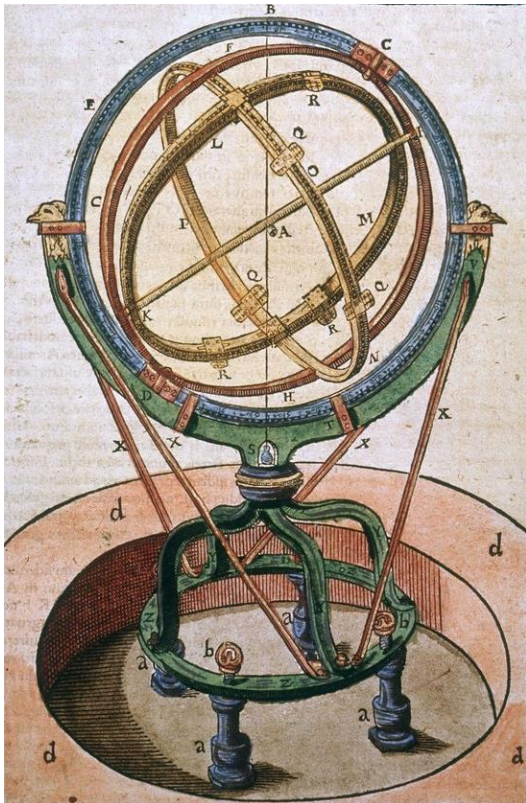
⁷⁶ Merchant, *Der Tod der Natur*, 119–23.

⁷⁷ Galilei, Galileo, *Il Saggiatore* (G. Barbèra, 1864), 60. In original Italian „La filosofia è scritta in questo grandissimo libro che contunualmente ci sta aperto innanzi agli occhi (io dico l'universo),...”

⁷⁸ Husserl, *Die Krisis der europäischen Wissenschaften und die transzendente Phänomenologie*, XIV–XVII.

Europeans – into a wild, almost *Körper*-like entity requiring control. As Merchant notes, this was the beginning of witch trials, mechanism, and the “death of nature”, read as the death of the cosmic *Leib*, and the establishment of a mere *Körper* conceptualization of the cosmos.⁷⁹

⁷⁹ Merchant, *Der Tod der Natur*, 146–50, 160–68.



3.2 The Shift from Cosmic *Leib* to *Körper* and Dominance of Mechanistic Philosophy in the Scientific Revolution (1543 - 1687)

Nicolaus Copernicus, strongly influenced by Plato's view of the realm of ideas as the key to truth, marked a critical shift in humanity's cosmic understanding and its questioning of nature by publishing *De revolutionibus orbium coelestium* (1543). The medieval geocentric system positioned the lower Earth at the centre of a cosmos, but at the start of the Scientific Revolution Copernicus's heliocentrism displaced both Earth and human subjects from this central position.⁸⁰

Consequently, the cosmic *Leib*, which had before already been pushed more in the direction of an object, transformed into a *Körper* (Figure 13). While Renaissance philosophy questioned the human position, this thesis identifies the Scientific Revolution as ***the Divide's defining moment in physics***: the cosmic *Leib* lost its significance and humans (and their life-worlds) were excluded from cosmological explanations and descriptions.

Between 1500 and 1700 a mechanical philosophy with mathematical idealized models (*Körper*) of the cosmos – communicated through the metaphor of the machine – was favoured, while organic, animistic, and later vitalistic models became associated with chaos, superstition or heresy.⁸¹ The dominant pattern of thought was articulated by Bacon, Descartes, Hobbes, and Newton.⁸² By removing the vital, human part of the cosmic *Leib* in favour of *Körper* the personal relationship to the human *Leib* was lost and therefore the philosophical dimensions of human's projection and lived experience as part of conceptualizations of the physical world. Merchant's analysis shows that this "modern" Western transformation continues to shape cultural perception of classical physics today.⁸³

⁸⁰ Ostlie, 'The Copernican Revolution', 94–96.

⁸¹ Merchant, *Der Tod der Natur*, 195.

⁸² Merchant, *Der Tod der Natur*, 13–14.

⁸³ Merchant, *Der Tod der Natur*, 263.



3.2.1 The Fall of the Old Order and the Degradation of the Cosmic *Leib*

The Scientific Revolution was defined by the collapse of the old order (Figure 14) cosmologically (heliocentrism), socially (commercialisation), and religiously (Reformation). **Large-scale technologies spread** and capitalism demanded that nature be made more machine-like and manipulable (a *Körper*), which primarily served the economic demands of the new industries.⁸⁴ Church authority crumbled during the Scientific Revolution, most famously in Galileo's 1633 trial⁸⁵ and in the Reformation associated with Martin Luther (1483-1546). Luther made religious truth an individual responsibility, which fostered scepticism about how the world was described toward the end of this century. By the early 17th century, the quest for **certainty** entered philosophy (which has influenced classical physics to this day) with the big question about how to determine which scales and standards to use to describe the cosmos truthfully.⁸⁶ The scale could have been the human *Leib* or subjective perception, but it was not. This thesis sees this transformation not merely as scientific triumph but as a philosophical crisis after the Church's fall: the rising mechanistic philosophy, as an answer to scepticism, **failed to restore the Church's cosmic *Leib* and its corresponding relationship to human experience** (although within the Church both were subordinate to God).

To understand why, nevertheless, the *Körper* triumphed as the most truthful description, the shift of the cosmic *Leib* from a subordinate position to an existential threat must be understood.

Initially, the cosmic *Leib* was cast as "wild and untamed" nature, something to be feared. This was a response to the collapse of the old order, as humans projected their anxiety onto different scales of reality. As Merchant argues, the projection onto the macrocosm was the **New World as "untamed nature"**, while the projection onto the microcosm was **witches and ungodly women**. Like medieval anxiety (chapter 3.1.2), this fuelled the desire to have power over nature, and mechanism provided the tools.⁸⁷

Figure 14: The common perception of in the 16th century was that the world is sinful and chaotic. On the left side the Earth is turned upside-down (blue sphere) and the devil sits in the centre.

⁸⁴ Merchant, *Der Tod der Natur*, 22, 81, 141, 193, 221.

⁸⁵ John Hedley Brooke, *Science and Religion: Some Historical Perspectives*, 1st edn (Cambridge University Press, 2014), 106–8, <https://doi.org/10.1017/CBO9781107589018>; Maurice A. Finocchiaro, ed., *The Galileo Affair: A Documentary History*, California Studies in the History of Science (University of California, 1989), 305–8.

⁸⁶ Merchant, *Der Tod der Natur*, 192–94.

⁸⁷ Merchant, *Der Tod der Natur*, 146, 163.

This branding of the wild cosmic *Leib* was articulated by Francis Bacon (1561-1626), who promoted inductive methods⁸⁸. This made him, alongside Galileo, one of the central early architects of scientific empiricism, which remains foundational in physics today. Merchant argues that Bacon wanted to “subdue wild nature” and “wrest its secrets from her” (like witches) for “civilizing” society (like the New World).⁸⁹ The “**wildness**” he drew on came from Judeo-Christian tradition and Protestant dominion theology (also articulated by Locke, Calvin, Puritans). These thinkers concluded that God had empowered humans to tame the cosmic *Leib*. Bacon believed that human dominion was lost through the Fall of Adam and Eve and their expulsion from Paradise, and could be regained by **mastering nature**. In his mechanistic utopia, *New Atlantis* (1626/1627), he aimed to – in Merchant’s paraphrasing – “confine nature to the laboratory, dissected by mind and hand, and penetrated in order to reveal its hidden secrets” to recreate nature artificially for the benefit of economic prosperity. This idea is now being carried out by technocrats in contemporary Europe.⁹⁰

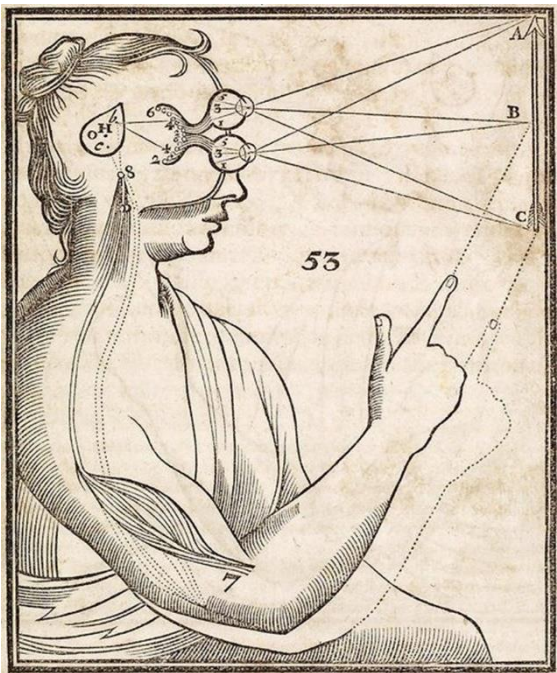
Bacon argued that the experimental philosopher should not be diverted by metaphysical considerations.⁹¹ This gave rise to the idea of a **wild cosmic *Leib* that must be tamed without philosophical reflection**, which later made its conceptual transformation into a mere *Körper* easier.

⁸⁸ Data are collected, analysed, and interpreted, and then a kind of fact or axiom is inductively derived. The person who collects, analyses, and interprets the data is assumed to be independent of those actions. Tarekegn Jebessa Tesgera and Aman Preet Singh, ‘The Role of Aristotelians, Positivists, Hegelians, and Relativists in Shaping the Ideas Knowledge & Knowledge Management’, *Annals of the Romanian Society for Cell Biology* (Arad) 25, no. 6 (2021): 811, 2592390830, ProQuest Central Premium.

⁸⁹ Merchant, *Der Tod der Natur*, 163.

⁹⁰ Merchant, *Der Tod der Natur*, 101–2, 146, 180–88.

⁹¹ Francis Bacon, *Novum Organum: True Suggestions for the Interpretation of Nature*, [Annotated edition] (Jürgen Beck Jazzybee Publisher, 2015), 5.



3.2.2 Mechanists, the Question of Certainty, and the Reduction of the Cosmic *Leib* to the *Körper*

The antidote to the collapse of the old order and the wild cosmic *Leib* came from French thinkers like Mersenne, Descartes, Gassendi, and Hobbes. Between 1620 and 1640, they developed a mechanistic philosophy to restore certainty, individual responsibility, and social stability. They rejected everything tied to change, uncertainty, and unpredictability, which includes human subjectivity and the problem of subjective experience inside every concept. To counter religious scepticism, they emphasized control, moderation, reasonable judgement, and sovereign authority. In their view, the divinely ordered cosmos resembled a deterministic system of predictable parts.⁹²

This shift began with Marin Mersenne (1588-1648). As a trained theologian, Mersenne saw the cosmos as a machine governed by God's will, making the cosmic *Leib* a *Körper* directed by God. In his *La Vérité des sciences* (1625), he combated scepticism by arguing that mathematical relations applied to sensory-accessible phenomena provide sufficient certainty for cosmic understanding.⁹³ This thesis reads Mersenne's position as claiming that **a cosmic *Körper*, without considering the cosmic *Leib* in the construction of its phenomena, was a sufficient explanation**, without positing this approach as the entirety of existence (he was not that radical).

René Descartes (1596-1650), although aligned with Mersenne in opposing scepticism, took a more radical step in *Principia philosophiae* (1644), reconstructing the entire cosmos – including the human body (Figure 15), environment, and animals – as a *Körper*. The Renaissance *spiritus mundi* (cosmic soul) was replaced by a mechanical ether; matter became passive, and motion was transmitted solely by contact. This created the prototype of the cosmic *Körper*, including a conceptualisation of human physicality. The system's metaphysical stability rested on a sovereign Creator who established, *ex nihilo*⁹⁴, eternal mathematical truths accessible to the human mind, thereby denying humans as the source of concepts. These truths ensured unchangeable natural law. The cosmos was officially separated from subjective human perception. **Only quantitative properties (size, motion, quantity) – *Körper* properties – were objectively real**; qualitative ones (meaning *Leib*-related) like colour and taste were subjective,

⁹² Merchant, *Der Tod der Natur*, 140, 192–209.

⁹³ Dana Jalobeanu and Charles T. Wolfe, eds, *Encyclopedia of Early Modern Philosophy and the Sciences* (Springer International Publishing, 2022), 1312–22, <https://doi.org/10.1007/978-3-319-31069-5>.

⁹⁴ Not eternal but created “out of nothing” by some divine creative act

epistemologically inferior. This founded a science of mechanics based on quantitative properties, later reflected in the drive for global standardization of the kilogram and the meter (SI units) in physics. Nevertheless, Descartes's core challenge was extracting mathematical reality from its entanglement with the physical *Leib*.⁹⁵

Pierre Gassendi (1592-1655) similarly searched for the foundations for truth. He based his cosmic *Körper* conceptualization on **atoms** (formed by a bodiless Christian God, like Descartes' mathematical forms). Atoms were the stable elements and phenomena following universal causality. He also believed in ideas as images and took physical, physiological, and psychological dimensions of perception into account, paradoxically accepting the *Leib* as source of *Körper* idealizations.⁹⁶ In his philosophy, sensory *Leib*-phenomena yielded only knowledge about probability. This empiricism of probability laid the groundwork for experimental science, forming the philosophical basis of experimental physics. Gassendi broke with Descartes, who sought absolute mathematical truth while Gassendi insisted that truth can only be **practical probability, leaving space for multidimensional construction of reality**. This resulted in Gassendi's contributions being secondary to Descartes's, and his account of *Leib* entanglement in conceptualization being often forgotten.⁹⁷

Despite differences, Descartes and Gassendi both framed the universe as *Körper*. Nevertheless, both Descartes (*res cogitans*⁹⁸) and Gassendi (*ego*⁹⁹) preserved a Christian, immaterial rational soul, retaining faint cosmic *Leib* traces in the individual. Thomas Hobbes (1588-1679) radicalized this in the 1640s-1660s. He reduced In his *A Short Tract on First Principles* (1630/31) human experience to **mere material motion**: matter stimulated senses, information was processed via language, and the mind was a calculating machine.¹⁰⁰ This thesis sees it as **fully reducing cosmic as well as human *Leib* to *Körper***, leaving no room for consciousness, soul, meaning, eros, or metaphysics. But because of Hobbes "atomistic" theories on "societal nature" in the market, 17th-century market-oriented Britain embraced

⁹⁵ Jalobeanu and Wolfe, *Encyclopedia of Early Modern Philosophy and the Sciences*, 859; Merchant, *Der Tod der Natur*, 195, 205–7, 230, 236, 264.

⁹⁶ Jalobeanu and Wolfe, *Encyclopedia of Early Modern Philosophy and the Sciences*, 722.

⁹⁷ Merchant, *Der Tod der Natur*, 200–206.

⁹⁸ Jalobeanu and Wolfe, *Encyclopedia of Early Modern Philosophy and the Sciences*, 1352.

⁹⁹ Jalobeanu and Wolfe, *Encyclopedia of Early Modern Philosophy and the Sciences*, 719.

¹⁰⁰ Merchant, *Der Tod der Natur*, 208–10, 237–38, 264.

his philosophy for its practical utility in justifying capitalism, not his philosophical rigor.¹⁰¹

This reduced the cosmos to a universe. This exclusion of *Leib* served not coherence but utility for the rising economy. The Scientific Revolution philosophers thus produced a **metaphysical *Divide*** through a philosophical preference for *Körper* over *Leib* in the cosmos and the part of human that was connected to the physical world.

¹⁰¹ Merchant, *Der Tod der Natur*, 214–16.

3.2.3 The *Körper* preference in Mechanistic Logic, Triumph of Newton, and the Establishment of Modern Physics

This thesis wants to point out that by founding physics on the work of Descartes et al. a hidden metaphysic is conserved. Both the cosmic *Körper* and the human *Körper* inherited from the mechanist are guided by the philosophy of the new mechanistic logic: **discrete components** make reality discrete and therefore extractable, allowing analysis via part-problems described by mathematics. This philosophical permission of reality extraction implies **context-free** descriptions of changeable, complex phenomena. This subtracts, in this thesis's view, environmental context, human assumption, subjective experience and interpretation, values of reality, and therefore overall, the *Leib* and its entanglement with the observed phenomena.¹⁰²

This method found its pinnacle in Newton's *Philosophie Naturalis Principia Mathematica* (1687) embodying this logic in the 17th century.¹⁰³ Newton fused Galileo's terrestrial mechanics with Copernicus-Kepler astronomy. Like Descartes, his *Principia* posited passive matter moved by external forces. He postulated **matter, motion, force, space, and absolute time as the four non-reducible, ontological terms to explain the cosmic *Körper***¹⁰⁴ (Figure 16). This excluded the non-reducible *Leib* as a conceptual starting point of the cosmos. But even Newton questioned this mere cosmic *Körper*, trying to invoke vivid qualities of the cosmos in the form of gravity, fermentation, and electricity¹⁰⁵ to avert the philosophical conclusion of decay.¹⁰⁶

It must be mentioned that this thesis does not question the scientific results and development that came with this description. But Newton's reservation was not unbased – this description alone was not enough to explain reality or the universe; it was just accurate for an observed phenomenon (for example movement of celestial bodies).

Although Newton had reservations, his **mere cosmic *Körper* triumphed** establishing a **new order** in the 17th century. Alternatives philosophies critiqued his philosophy and the failure to explain *Leib* aspects like life and the origin of movement. Nevertheless, post 1660 Restoration and Anglican reconsolidation stigmatized those reservations as anti-authority, making

¹⁰² Merchant, *Der Tod der Natur*, 113, 232–40.

¹⁰³ Merchant, *Der Tod der Natur*, 265.

¹⁰⁴ Sir Isaac Newton and N. W. Chittenden, *Newton's Principia: The Mathematical Principles of Natural Philosophy* (Geo. P. Putnam, 1850), lxvii–lxviii.

¹⁰⁵ B. J. T. Dobbs, 'Newton's Alchemy and His Theory of Matter', *Isis* 73, no. 4 (1982): 511–28.

¹⁰⁶ Merchant, *Der Tod der Natur*, 234–35, 263–76.

Leib arguments connected with anarchy.¹⁰⁷ The cosmic *Leib* was now no longer living, but a flawed, dead *Körper*: matter comprised atoms, colour was light refraction, the sun centred the solar system, *Körper* obeyed natural laws. The description was independent of *Leib*, humans, values, and context – positioning itself from a God-eye-view.

The remaining human *Leib* was relegated to culture and society. This nature/culture dualism, in this thesis's view – pitting mere *Körper* (nature, cosmos, earth) against *Leib*-inclusive culture – was a defining moment of Western civilisation's rise, per Merchant.¹⁰⁸ Science, from the 17th century to today, views **lifeworld and the lived experience part of humans' illusion of reality** (and not part of the universe) or tries (if describable, predictable, controllable) to **frame lifeworld as *Körper***, often **denying philosophical nuance and forgetting the human as source of their *Körper***.¹⁰⁹

In Husserl's eyes, philosophy was left merely legitimizing this natural objectivism¹¹⁰, losing authority as sciences fell into crisis by eliminating the *Leib* context, and therefore the new established mechanics, which birthed physics today, turned away from questions of meaning, human existence, reason, irrationality, freedom, and responsibility.¹¹¹ This led to several debates about the loss of humanity in the cosmic description and perception which will be analysed in the following chapter.

¹⁰⁷ Merchant, *Der Tod der Natur*, 139–40, 209, 230–32, 241, 264–69.

¹⁰⁸ Merchant, *Der Tod der Natur*, 160.

¹⁰⁹ Merchant, *Der Tod der Natur*, 235.

¹¹⁰ Husserl, *Die Krisis der europäischen Wissenschaften und die transzendente Phänomenologie*, XVIII.

¹¹¹ Husserl, *Die Krisis der europäischen Wissenschaften und die transzendente Phänomenologie*, XI.



3.3 *Leib* vs. *Körper* in Education as the Cultural Manifestation of *the Divide* (1600-1980)

The metaphysical *Divide*, reflected in descriptions that increasingly favoured *Körper* in physics, was philosophically established after the Scientific Revolution. What followed was a cultural manifestation (Figure 17) of this worldview in academic disciplines and state infrastructure over the next 400 years. Physics came to be regarded as the paradigm of rigorous excellence and the perfect explanation of the universe, while the *Leib* perspective became increasingly marginalized.

Since education reveals how school and university curricula (and therefore culture) have institutionalized *the Divide*, this chapter analyses three key debates spanning three centuries:

- 1) Coleridge vs Bentham (1817, Enlightenment)
- 2) Arnold vs Huxley (1880 and 1882, Industrialization)
- 3) Leavis vs. C.P. Snow (1959 and 1962, Modernity)

This thesis builds on cultural historian Stefan Collini's contextualization of C.P. Snow's *The Two Cultures*, which traces *the Divide*'s cultural manifestation in European society up to the debate between Leavis and Snow.

This chapter:

- 1) contextualizes the cultural developments and how physics, as a discipline, was positioned at the time.
- 2) assesses each debate to *Leib* criteria (history, human subjectivity, ethics, context, individual interpretive contributions) versus *Körper* criteria (mathematical idealization, quantity over quality, truth via calculation/measurement, utility for capitalistic/state/military ambitions).
- 3) briefly looks at the resulting consequences, beginning with the Enlightenment and the aftermath of the Scientific Revolution.



3.3.1 Coleridge vs. Benthamites and Standardized Knowledge as the Triumph of *Körper* (1680-1800)

During the 18th century, academic descriptions of the cosmos remained philosophical (as evident in Newton's *Philosophiae Naturalis Principia Mathematica*) and the **methods of the “natural philosophers” gained cultural authority**. Enlightenment thinkers, per Collini, aspired to be “the Newton of the moral sciences” by reducing more *Leib*-related phenomena to *Körper*. Therefore, human phenomena, including the human *Leib*, fell under the pressure of *Körper* conceptualization and psychology became naturalized through the work of John Locke (1632-1704). This further separated the mind and human *Leib* from the new discipline of physics.¹¹²

This categorical thinking was also visible at the end of the late 17th century. Textbooks, show-experiments and encyclopaedias (Figure 18) **integrated science into educated lay culture**.¹¹³ Everything was put into categories but this representation of knowledge, although collected in a *Körper*-like manner, did not differentiate between human experience and nature in the importance of the categories.¹¹⁴ What was lost was the individual relation of the subjective experience to the cosmic description. This new science was institutionalized via the Royal Society (1660), Paris Academy of Sciences (1666), and Berlin Academy of Sciences (1700).

The cultural shift of standardizing knowledge in a *Körper*-like manner sparked a debate between the Romantics via Samuel Taylor Coleridge (1772-1834) and the Benthamites (Utilitarians) through the followers of Jeremy Bentham (1748-1832).¹¹⁵ At stake was *Leib*'s imagination and creativity betted against *Körper*'s reasoning.

Coleridge's Romanticism reacted against Enlightenment reductionism, which was a necessary consequence of *Körper* conceptualization. He and William Blake (chapter 2.4) contrasted poetry's creative/emotional fullness (*Leib* sphere) and its ability to relate to the cosmos in human terms with Newtonian science's impoverished *Körper*-conceptualization. They feared that *Körper* idealization (calculation and measurement) would **displace cultivation and compassion**. Coleridge's arguments centred on imagination, genius, individual cultivation, positioning *Leib* as the drive for

¹¹² Snow and Collini, *The Two Cultures*, x; Merchant, *Der Tod der Natur*, 266; Husserl, *Die Krisis der europäischen Wissenschaften und die transzendente Phänomenologie*, XVIII.

¹¹³ Merchant, *Der Tod der Natur*, 261–62.

¹¹⁴ Snow and Collini, *The Two Cultures*, x.

¹¹⁵ John Stuart Mill and Mark Philp, *Autobiography*, First edition, Oxford World's Classics (Oxford University Press, 2018), 74.

excellence, pleading that a reduction of it would be a neglect of truth. This truth in his eyes could only be revealed by meaning and significance.¹¹⁶

Benthamites – John Stuart Mill’s term for utilitarianism’s radical wing¹¹⁷ – countered the Romantics with human utility. They were **suspicious of feeling**, historically embodying modernity’s technocratic strand. Their reduction of human experience to the quantifiable, measurable, and manageable (*Körper* idealization) rejected the *Leib*. ***Körper* was positioned as universal standard** transcending *Leib*-context. They aimed at absolute truth and for them, empirical science and mathematics constituted true knowledge. Taking *Körper* as the sole description rendered education reproducible and thus mass accessible.¹¹⁸

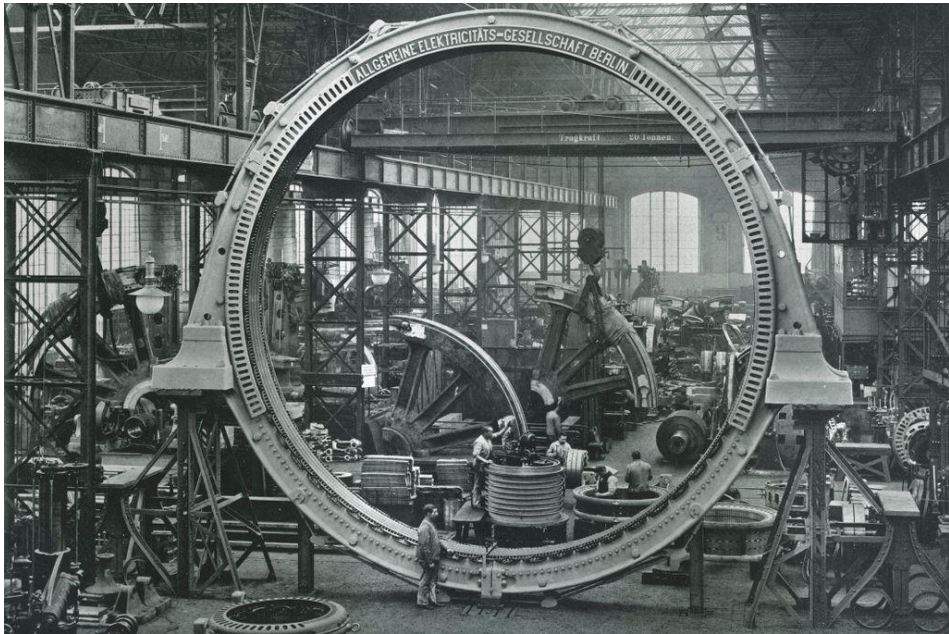
This was in its heart a philosophical debate about truth (concrete truth vs “absolute” truth). After this debate, a long-term victory of the Benthamites materialized: University College London (1825) embodied Benthamite principles and Hazelwood School (1818) implemented their monitorial systems. This *Körper*-triumph democratised working-class access, and their monitorial knowledge standardization persists in modern classrooms across Europe. It must be said that standardized knowledge led to the decline of individual cultivation (as Coleridge feared) but is also part of the reason the prosperity increased in Europe. This development of the loss of *Leib*-like cosmic description in education together with a lack of individual relationship to the communicated knowledge was the beginning of the manifested cultural *Divide* in physics. Although more people could access the knowledge about the natural laws and physical entities, the world became more “outside”, more “alienated”. The question began to arise: “What has this knowledge to do with me?”¹¹⁹

¹¹⁶ Mill and Philp, *Autobiography*, 45, 88–89.

¹¹⁷ The term is coined by John Stuart Mill, describing them as a “reasoning machine” Mill and Philp, *Autobiography*, 64.

¹¹⁸ Mill and Philp, *Autobiography*, 64–65.

¹¹⁹ Paradoxically, Bentham asked this question also, which is why he critiqued Greek, Latin and Religion as disciplines, emphasizing utility in the first place. James E. Crimmins, ‘Jeremy Bentham’, in *The Stanford Encyclopedia of Philosophy*, Spring 2026, ed. Edward N. Zalta and Uri Nodelman (Metaphysics Research Lab, Stanford University, 2026), <https://plato.stanford.edu/archives/spr2026/entries/bentham/>.



3.3.2 Institutionalization of Industrialization by Applied Science: Arnold vs. Huxley (1760/80-1900)

The emerging industrialization, together with observer-independent (*Leib*-independent) knowledge, made **physics and industry more entangled** during the 19th century, causing physics to **distance itself even further from philosophical/ethical considerations** (Figure 19).

Discoveries concerning the transformation of mechanical work into heat fuelled the new thermodynamics, which were directly applied to steam engines and motors. New findings in electrodynamic enabled generators, telegraphy, and electromotors, while optics and mechanics facilitated machine construction and precision instruments. Physics became technically indispensable for a capitalist society.¹²⁰ This is why **applied science** was brought into higher education through the establishment of the Natural Sciences Tripos at Cambridge (1851) and the endowment of the Cavendish Laboratory (1874).¹²¹ This institutionalization elevated *Körper*-knowledge in its applied aspect, **embedding capitalistic ambition within the higher education system**.

Applied science, nevertheless, meant applied for industry, not for the philosophical inquiry. This transformation is also reflected in the semantic evolution of “science” and “scientist”. As Collini points out, the *Oxford English Dictionary* illustrates this development from the 1860s: “We shall...use the word ‘science’ in the sense which Englishmen so commonly give to it; as expressing physical and experimental science, to the **exclusion of theological and metaphysical**.” Science had become narrowed to refer solely to the “physical” or “natural”, excluding its philosophical dimension while embracing experimental inquiry.¹²²

The most famous debate on this topic took place between the distinguished naturalist¹²³ and comparative anatomist¹²⁴ T.H. Huxley (1825-

¹²⁰ Sally Mitchell, ed., *Victorian Britain: An Encyclopedia*, Routledge Revivals (Routledge, 2012), 601–3, <https://doi.org/10.4324/9780203815595>.

¹²¹ Snow and Collini, *The Two Cultures*, xii–xiii.

¹²² Snow and Collini, *The Two Cultures*, xi–xii.

¹²³ A person who studies animals, plants, birds and other living beings. ‘Naturalist Noun - Definition, Pictures, Pronunciation and Usage Notes | Oxford Advanced Learner’s Dictionary at OxfordLearnersDictionaries.Com’, accessed 23 May 2026, <https://www.oxfordlearnersdictionaries.com/definition/english/naturalist>.

¹²⁴ Compared bodies and how they part between humans and other animals like apes, reptiles, and birds. Now this “science” is seen as a misguided attempt to “coordinate and classify” the immensity of nature. ‘COMPARATIVE ANATOMY Collocation | Meaning and Examples of Use’, 20 May 2026, <https://dictionary.cambridge.org/example/english/comparative-anatomy>.

1895) and the literary critic and cultural theorist Matthew Arnolds (1822-1888) in late 19th-century Victorian England.¹²⁵

Huxley was the era's most outspoken advocate of science. He argued that science offered indispensable contributions to **national well-being, as evidenced in capitalist achievements**. He criticized traditional classical education for resisting the integration of science into its curriculum, asserting that natural science was more valuable than dead languages. In his view, **workers needed practical industrial skills**, with utility and practicality as central pillars. His democratic intention was to elevate the masses from poverty. While this aim was arguably noble, Huxley rejected science as a philosophical explanation of nature or as historically contextualized inquiry, reducing it instead to a mere tool for industrial growth. This also implies, only a pure cosmic *Körper* is required for a capitalist society (paralleling the ancient story of Thales; chapter 3.1.1).¹²⁶

Arnold countered Huxley in his 1882 Rede Lecture by contrasting literary and scientific education. He admitted that the category of literature should also include works such as Newton's *Principia* and Darwin's *On the Origin of Species*, and he proposed incorporating language and history into the realm of systematic knowledge (or *Wissenschaften*¹²⁷). Yet, although he recognized the significance of natural science, he maintained that science might **produce a valuable specialist but not an educated man in the fuller sense**. For Arnold, literature, especially the literature of antiquity, remained indispensable. In this thesis's interpretation, this positions the *Leib* as a primary source of knowledge and frames a well-rounded education as necessarily entangled with the historical and philosophical background situated in the *Leib* of predecessors.¹²⁸

The debate between Huxley and Arnold had long-term consequences, most notably the increased acceptance of the sciences in school curricula without their historical contextualization. Huxley contributed to dismantling the dominance of classical languages. While this helped to improve education in many ways and made it more accessible as well as more directly linked to employment, it also exemplified a clearer manifestation of *the Divide*. This led to sharper **distinction between STEM and the humanities**, with STEM disciplines largely excluding philosophical and historical reflection and becoming more industry-oriented than before.

¹²⁵ Snow and Collini, *The Two Cultures*, xiii–xv.

¹²⁶ Snow and Collini, *The Two Cultures*, xiii–xiv.

¹²⁷ German word for sciences, but more general, including also the humanities. It stands for knowledge gained by observation&experiment. 'Wissenschaft', 20 May 2026, <https://dictionary.cambridge.org/de/worterbuch/deutsch-englisch/wissenschaft>.

¹²⁸ Snow and Collini, *The Two Cultures*, xiv–xv.



3.3.3 The Militarization of Physics and Its Role as a Tool of State Power: C.P. Snow vs Leavis (1900-1930)

At the beginning of the 20th century, physics had already underpinned education and rapidly developing industry. Over the next 100 years, the identity of the “hard sciences” crystallized, becoming associated with **the military and state power**.

Starting with the First World War – which was sometimes described as the “war of minds” – international physics networks were disrupted, while military research in areas such as radio technology and artillery ranging expanded among opposing groups. This development defined the outcome of the war itself in new and unimaginably brutal ways. During the war period, **systematic armaments research** emerged, and **new institutional structures for military research** were established within the discipline of physics (Figure 21).¹²⁹

In the interwar period, the revealed power of scientific and technical innovations paradoxically fostered a cultural conception of physics (and other sciences) as the ultimate hope for the world.¹³⁰ *Körper* as a tool for power became central to physics, and the primary goal shifted from knowledge about human existence outperforming competitors under the label of development.

The Second World War demonstrated the destructive power of physics most brutally through the Manhattan Project and the dropping of two atomic bombs on Hiroshima and Nagasaki.¹³¹ As a reaction, the late 1950s (also known as the Sputnik years) were defined by concerns about technological competitiveness.¹³² Scientific expertise thus became the **central authority in matters of state and economy**, although its curricula had little to do with questions of humanity and ethics. There was no longer a personal or human relationship to the cosmos in the methods and research questions of physics, thereby cementing *the Divide*.

This rising scientific authority (Figure 20) resulted in a particular heated debate between the scientist and author C.P. Snow (1905-1980), and the literary critic and Cambridge professor F.R. Leavis (1895-1978). In his 1959 Rede Lecture, Snow proposed his program of privileging mere *Körper* as a solution for humanity and called on the **humanities to follow *Körper***

¹²⁹ Forstner and Neuneck, *Physik, Militär und Frieden*, 12–17.

¹³⁰ Snow and Collini, *The Two Cultures*, xxii–xxiii.

¹³¹ ‘Manhattan Project: Science > BOMB DESIGN AND COMPONENTS’, accessed 23 May 2026, <https://www.osti.gov/opennet/manhattan-project-history/Science/BombDesign/bomb-design.html>.

¹³² Snow and Collini, *The Two Cultures*, xli.

idealization.¹³³ Leavis's 1962 lecture responded with an aggressive counterattack. This thesis interprets this moment as symptomatic of *the Divide*.¹³⁴

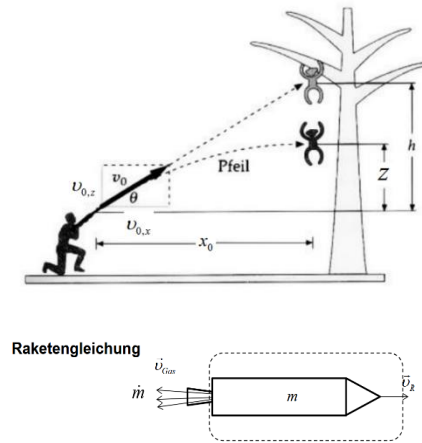


Figure 21: Both pictures are examples from the PowerPoint presentation of the first semester students on the University of Vienna. They show a hunter and a monkey, as well as a rocket hinting the orientation how physics focuses its research until today.

Snow generalized scientists as inherently moral and more concerned with **collective welfare** than “literary intellectuals”. Like Huxley, he empathized **employment opportunities** provided by science and generalized his argument to a global scale. He praised the export of Western technology to “backward” countries and advocated for more philosophy. Paradoxically, his modernist vision of industrializing other countries – regardless of their historical traditions or technical infrastructure – constitutes a program that overlooks philosophical and political considerations.¹³⁵ Snow thus remained, although critiquing it, within *the Divide* of a capitalist society: he elevated *Körper* over *Leib* and emphasized the economic benefits of mere *Körper* while neglecting philosophical and political dimensions.

The technocratic vision of C.P. Snow – read in this thesis as *Körper* idealization and capitalist ambition – was criticized by Leavis. He stressed the limitations of this project and argued that if “the efficiency of the machinery becomes the ultimate value”, then “this seems to us to mean something

¹³³ Snow and Collini, *The Two Cultures*, vii–x, xliii.

¹³⁴ Snow and Collini, *The Two Cultures*, xxix–xxx.

¹³⁵ Snow and Collini, *The Two Cultures*, viii–ix, xxii, xxvi–xxxi, lxiii–lxix.

very different from expanding and richer human life”¹³⁶ Leavis recognized the damage inflicted by the Industrial Revolution on the quality of lived experience and defended great literature as unique, living source of the most vital form of human response. In this thesis’s view, he defended *Leib* as the only antidote to the cheapening and corrupting of experience by the dominant forces of modern mass society.¹³⁷

The reaction to this debate was not, as Leavis had demanded, to reintegrate *Leib* into the cultural authority of science, but rather to **elevate the status of science and increase the scientific literacy of non-scientists**. The consequence – despite Einstein’s theory of relativity, quantum theory, and the growth of various forms of interdisciplinary work – was that individual, social, and political realms increasingly came to be **conceptualized through *Körper* idealizations in a pursuit of power**.¹³⁸

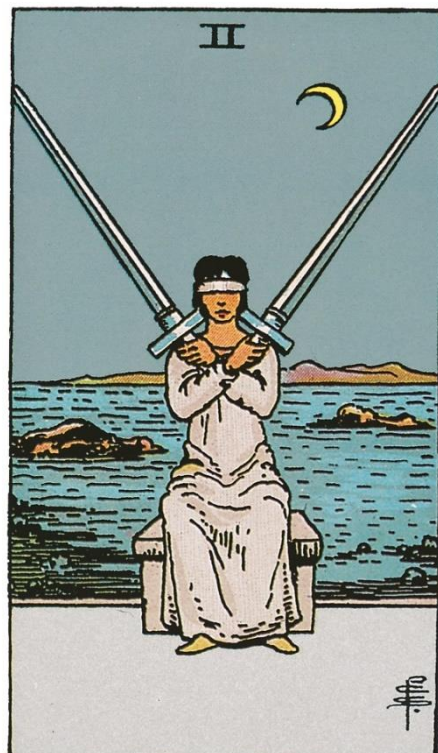
Additionally, by the 1980s, roughly half of the Western world’s research was funded by private industry, making science appear as part of the commercial strategies of pharmaceutical companies, aerospace industries, and similar actors.¹³⁹ Defence research and state interests further shaped research agendas. Physics became almost total *Körper*-oriented. Metaphysics and philosophy were no longer part of it, as excluding *Leib*-related dimensions better served stakeholders interests. This fostered the myth of the **value-neutral authority of physics**, which persists to this day.

¹³⁶ Cambridge At The University Press, *Scrutiny A Quarterly Review Vol I 1932-33* (1963), 82, <http://archive.org/details/in.ernet.dli.2015.184925>.

¹³⁷ Snow and Collini, *The Two Cultures*, xxxi–xxxii.

¹³⁸ Snow and Collini, *The Two Cultures*, xli–xliv; Merchant, *Der Tod der Natur*, 263.

¹³⁹ Snow and Collini, *The Two Cultures*, lxv–lxvi.



4 Crises of European Sciences and their Contemporary Responses

The previous chapters have exhaustively shown how physics-as-we-know-it developed from natural philosophy and a human relationship to the cosmic *Leib*, into an authoritative, context-free, and purely *Körper*-based conceptualization of the cosmos, nature, and humans (shaped by industry, the economy, the military, and the state) while becoming distant from the human lifeworld. In an advanced capitalist society, *the Divide* is inherent because the realm of *Leib* resists control, predictability, and standardization in ways that *Körper* idealizations enable industrial and capitalist ambitions.¹⁴⁰ This is why physics holds a far-reaching authority and exerts profound influence on contemporary society and the environment.¹⁴¹

The Divide is the source of the before mentioned crises (chapter 2.3 and 2.4). As a scientist, I am most interested in the crisis of scientificity; however, for the purpose of this thesis, I place particular emphasis on the current state of the **crisis of meaning**. This crisis is most evident in both quantitative data and qualitative findings from *Eurobarometer Special Report 557*, which investigates European citizens' attitudes toward and knowledge of science.

Following my interpretation of these statistics, this chapter draws on *The Blind Spot* by Adam Frank, Marcelo Gleiser, and Evan Thompson. The book identifies three well-known responses to the crisis of meaning: scientific triumphalism, scientific denial, and New Age movements. Scientific triumphalism embraces the philosophical implications of a purely *Körper*-based conceptualization, whereas scientific denial and New Age movements emerge as counter-movements seeking a return to *Leib* but grounded in problematic philosophical assumptions. Although these positions rest on different premises, they all represent dead ends with potentially dangerous consequences, serving as a cautionary tale of how failing to bridge *the Divide* may lead to further fragmentation and crisis.¹⁴²

The analysis in this chapter therefore constitutes an appeal to recognize the urgency of overcoming *The Divide* (Figure 22) by reconnecting the sphere of the lifeworld with that of scientific concepts.

Figure 22: This tarot card represents denial and closing off from others, but it can also signify that it is time to separate from others to turn the awareness inwards.

¹⁴⁰ Merchant, *Der Tod der Natur*, 234.

¹⁴¹ Frank et al., *The Blind Spot*, 8.

¹⁴² Frank et al., *The Blind Spot*, ix–xi.



4.1 European Citizens Knowledge and Attitudes in Data

The “*European Citizens’ Knowledge and Attitudes towards Science and Technology*” Eurobarometer Special Report 557 was published by the European Commission based on surveys conducted in September/October 2024 across the 27 EU Member States and eight non-EU European countries. It provides a detailed picture of citizens’ attitude towards science.

Already in the second sentence of its introduction, the Eurobarometer reveals a distinctly economic orientation: the goal is for Europe to “compete globally” and to “preserve its unique social model”. Both points precede any reference to improving daily lives and addressing major societal challenges. This order is not merely semantic; it reflects a deeper **prioritisation of capitalistic logic** as the guiding principle for science, neglecting meaning as the most important goal of the sciences.¹⁴³

Additionally, the EU Framework Programme (Horizon Europe) supports these ambitions with a planned budget of €93.5 billion – but funding is conditional on “strengthening the EU’s position in science” and serving industrial relevance. Climate change ranks only as third priority, and technological breakthroughs are considered fundable only if they demonstrate commercial potential. Knowledge exchange and international cooperation is mentioned last.¹⁴⁴ This clearly situates research within a **close relationship with industry, framing it as competitive rather than oriented toward collective knowledge**. Scientific inquiry is legitimised insofar as it promises economic return or addresses social crises (dangerous for economy). Without these purposes, the Eurobarometer’s introductory statement offers little foundation for the intrinsic or existential value of science – or any philosophical reflections whatsoever.

Regarding citizens’ knowledge: a considerable portion of European respondents appears increasingly distanced from fundamental scientific concepts. One quarter (26%) could not correctly answer more than five out of ten of the basic scientific statements presented.¹⁴⁵ The physics question was the worst performing with less than half (45%) of the respondents answering it correctly (“Lasers work by focusing sound waves” was a false statement).¹⁴⁶ Only half (56%) reported feeling well informed about scientific

¹⁴³ European Commission. Directorate General for Research and Innovation., *European Citizens’ Knowledge and Attitudes towards Science and Technology*, 5.

¹⁴⁴ European Commission. Directorate General for Research and Innovation., *European Citizens’ Knowledge and Attitudes towards Science and Technology*, 5.

¹⁴⁵ European Commission. Directorate General for Research and Innovation., *European Citizens’ Knowledge and Attitudes towards Science and Technology*, 8.

¹⁴⁶ European Commission. Directorate General for Research and Innovation., *European Citizens’ Knowledge and Attitudes towards Science and Technology*, 33.

discoveries and technological developments, and even fewer (11%) described themselves as very well informed.¹⁴⁷ These findings suggest that scientific knowledge is **not so much integrated into the lifeworld** of Europeans, despite science's profound influences on their daily lives.

However, science's authority is broadly accepted: There is a wide consensus that science and technology have a **positive impact on society** and that science prepares the younger generation to act as well-informed citizens – underlining the authority attributed to science. Over half of the population (52%) wishes to be informed about decisions in science and technology, and only a small minority (6%) considers public engagement unnecessary, indicating strong interests of citizens.¹⁴⁸

However, a clear discrepancy emerges between interest and perceived accessibility (Figure 23). Despite the predominantly positive attitudes towards science, half of Europeans (53%) perceives it as **too complicated to understand**, and more than one third (36%) view scientific knowledge as **irrelevant to their daily lives**. This thesis identifies here precisely the symptoms of *the Divide* between *Körper* and *Leib*. The primary barriers to engagement – lack of time (40%), lack of interest (37%), and lack of knowledge in the field of science and technology (36%) – all relate to the sphere of lifeworld and its disconnection from scientific concepts.¹⁴⁹

At the centre of this tension stands the figure of the scientist, culturally expected to serve as a key actor in providing explanation and fostering public understanding. Nevertheless, respondents view the archetypal scientist with scepticism: half (50%) believe that scientists are **too dependent on industrial interests** to speak with integrity on controversial matters, nearly the same proportion (48%) see them as **too narrowly focused on their own specialization** to contextualize issues societally, and many (48%) feel scientists do **not dedicate enough time to engage with the public** and explain their work. Consequently, the typical scientist appears to the average European citizen as an ineffective communicator (43%), arrogant (30%), narrow-minded (28%) and immoral (19%). This perception perfectly embodies the downside of *Körper* idealization: the economy/industry entanglement, lack of metaphysics, disconnection from the lifeworld and alleged God-eyes view of reality.¹⁵⁰

¹⁴⁷ European Commission. Directorate General for Research and Innovation., *European Citizens' Knowledge and Attitudes towards Science and Technology*, 8.

¹⁴⁸ European Commission. Directorate General for Research and Innovation., *European Citizens' Knowledge and Attitudes towards Science and Technology*, 9–10.

¹⁴⁹ European Commission. Directorate General for Research and Innovation., *European Citizens' Knowledge and Attitudes towards Science and Technology*, 8, 10.

¹⁵⁰ European Commission. Directorate General for Research and Innovation., *European Citizens' Knowledge and Attitudes towards Science and Technology*, 9–10.



4.2 Scientific Triumphalism, Doubling Down on *Körper* Authority, and Technocracy

To follow up on the image of the scientist and the correlated “God’s-eye view”, the first response to *the Divide* in physics and its resulting crises is scientific triumphalism: the doubling down on science’s authority by framing all problems – technical, moral, and social – as solvable **only through *Körper* conceptualization**. Scientific triumphalism echoes Enlightenment optimism (chapter 3.3.1) but lacks its philosophical reservations. It often denies the value of philosophy, treating science’s inherent philosophy as perfectly knowable, definite reality existing “out there”, independent of minds and actions – rendering it effectively “humanless” (without *Leib*). This separates reality from our cognitive interactions (crisis of scientificity) and renders theoretical models distant from empirical data and fundamental questions (crisis of meaning).¹⁵¹

It must be acknowledged that scientific triumphalism has solved gigantic problems, such as antibiotics in medicine and atomic energy. Its **technology** represents local patches of nature sufficiently resembling strongly controlled environments modelled after laboratory conditions. Although, *Körper* idealization rests only on few predictive successes regarding human activities, they function as the heart of scientific triumphalism arguments. **Progress** in science, carried out by those achievements in technology, is take synonymous to science itself.¹⁵²

The *Körper* is a viewpoint encompassing problematic assumptions that lead to frequent inconsistencies – despite being sold to the public as “what science says”.¹⁵³ This philosophy reduces complex phenomena to simpler ones in the school of thought of **smallism**.¹⁵⁴ In this view, the abstract (e.g. particle) is not presupposed by the concrete (e.g. the whole system); therefore, consciousness is excluded by construction. This manifests in the claim that *Leib*’s reality is illusory, bifurcating nature into a “real physical substrate” and subjective appearances. Implicit is a mysterious causal leap between physical process and experience (e.g. light waves to the colour red). Most proponents of the “**illusion of mind**” theory are typical **physicists** (former materialists), maintaining that everything existing is

¹⁵¹ Frank et al., *The Blind Spot*, ix–xiv.

¹⁵² Frank et al., *The Blind Spot*, 10–12; Prescod-Weinstein, *The Disordered Cosmos*, 256.

¹⁵³ Frank et al., *The Blind Spot*, 5, 254.

¹⁵⁴ The philosophical assumption that mature concepts in science can be explained in terms of the smallest aspects of physical reality. Guilherme Sanches De Oliveira and Anthony Chemero, ‘Against Smallism And Localism’, *Studies in Logic, Grammar and Rhetoric* 41, no. 1 (2015): 14–15, <https://doi.org/10.1515/slgr-2015-0017>.

physical and that mind must be accounted for in terms of fundamental physical entities and process.¹⁵⁵

This results in a **deterministic worldview**, where everything is (and must be) predictable for controlled progress. The manifestation of this can be seen in triumphalist stories (Figure 24) such as genetic programming (genes are not programs but require the existence of a whole organism), uploading consciousness to a computer (personhood is not a computational data structure), or claiming physics has answered why there is existence (physics cannot address such questions).¹⁵⁶

Underlying is a desire for **control**. As Nancy Cartwright observes, this philosophical idea breeds fundamentalist doctrines¹⁵⁷ often countered by **technocratic ambitions**, which neglecting democratic interests. Rushkoff argues that the unreflective scientific solutionism inevitably mostly does not sustainably solve the problem but promotes **economic growth**, entangled as it is with physics worldview. Resource management, blockchain quantification, and behavioural datafication render everything predictable, controllable, and market-ready – *Körper* idealizations are primarily serving as trade justifications, seen in Klaus Schwab’s “Great Reset” (World Economic Forum, COVID era) proposal that capitalism should invest in science and technology for treating “crisis as opportunity”.¹⁵⁸

Ironically, the crises we face are driven by the success of science and technology (climate change, habitat destruction, spreading of pandemics through fast transportation, digital surveillance, growing prevalence of AI).¹⁵⁹ Both have played a pivotal role in creating the Anthropocene¹⁶⁰ by resource extraction and consumption through the cultural, political, and economic adaption of the *Körper* idealized worldview. The inherent growth and progress assumption in science led to higher emissions and energy consumption, making global warming an example of technological advancement resulting in the stress for the project of civilisation nowadays.

¹⁵⁵ Frank et al., *The Blind Spot*, 6–7, 20–22.

¹⁵⁶ Frank et al., *The Blind Spot*, 254.

¹⁵⁷ Nancy Cartwright, *The Dappled World: A Study of the Boundaries of Science*, Reprinted (Cambridge Univ. Press, 2010), 25.

¹⁵⁸ Douglas Rushkoff, *Survival of the Richest: warum wir vor den Tech-Milliardären nicht einmal auf dem Mars sicher sind*, Deutsche Erstausgabe, trans. Stephan Gebauer, edition suhrkamp Sonderdruck (Suhrkamp, 2025), 185–86.

¹⁵⁹ Frank et al., *The Blind Spot*, viii.

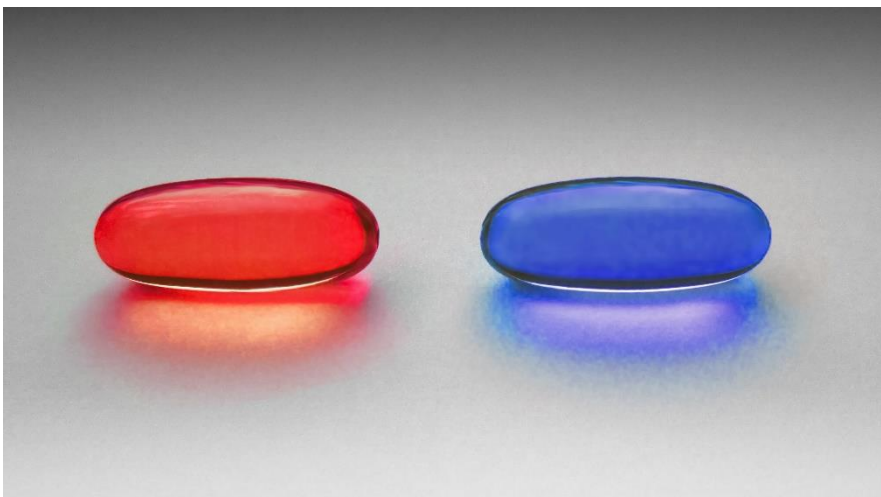
¹⁶⁰ Labelled by Paul Crutzen and Eugene Stoermer as the epoch beginning from the point where the scale of human activity (in particular those responsible for Western colonialism) where it now dominated the processes that set the state of the coupled planet systems Frank et al., *The Blind Spot*, 236–37.

A concrete example where this inherent philosophy did damage, is the Bill and Melinda Gates foundation, which sent mosquito nets to Zambia and Nigeria to protect people from malaria. The villagers used those nets to catch fishes which leading to depleted fish populations and polluted drinking water. **Körper idealization resides in (and cannot be without) the lifeworld of concrete human beings** and the story of **transcending human life by perfect knowledge is essentially religious**.¹⁶¹

As David Mermin said the lifeworld of humans is a very real part of reality, even if the formalism does not contain it. These assumptions of reductionism, smallism, consciousness-as-illusion, nature's bifurcation, controllable reality, and capitalistic gain through science built the scientific triumphalism's philosophical patchwork. This school of thought **hinders reflection on humanity's relation to the universe**. Science prioritized answerable questions over vital ones, valuing rapid progress (for capitalism) forgetting to bridge the gap between consciousness and physical models, which lead to no progress on mind/meaning. The fact that science's offspring technologies fuelled industrial productivity and foundational research (e.g. quantum interpretation) became career suicide contributed to **physics-as-we-know-it being unable to tell us what to do in face of crises and value transformation**. Even if scientific triumphalism is trying to claim it otherwise.¹⁶²

¹⁶¹ Rushkoff, *Survival of the Richest*, 190; Frank et al., *The Blind Spot*, 255.

¹⁶² Frank et al., *The Blind Spot*, 69, 95, 120.



4.3 Scientific Denial as *Körper* Rejection

Science’s shortcomings have given rise to two counter-movements: one of which is scientific denial. Looking at statistics, half of European citizens, similar to the 2021 report (50%), agree that we can **no longer trust scientists** to tell the truth about controversial scientific and technological issues because they depend too much on **money from industry**; over a third (35%) agree that the problems we are facing today are **so complex that scientists are no longer able to understand them**; and 14% think that the influence of science and technology is negative.¹⁶³ This data illustrate some of the criticisms already discussed, such as science’s relationship to industry, the marginalization of the *Leib* sphere, and the reduction of ethical considerations.

As a response to these shortcomings, scientific denial is misdirected: it **rejects science’s capacity for evidence-based knowledge and *Körper* conceptualization**, instead grounding its claims solely in personal, subjective experience and ideology (mere *Leib* sphere). It is politically associated with both the right and, in different forms, with so-called postmodernism on the left.¹⁶⁴ *Körper* conceptualization in physics is framed as elitist and manipulative. In addition to conspiracy theories and mistrust, certain populist and economic actors exploit this movement by spreading intentional disinformation through so-called alternative facts.

With regard to conspiracy theories, vaccine hesitancy persists has persisted from the COVID era until today. The Eurobarometer also reveals that 34% believe that a cure for cancer exists but is **hidden from the public**, and 35% believe that viruses have been produced in **government** laboratories to control our freedom.¹⁶⁵ This contributed to widespread misinformation during COVID, societal polarization (especially within close social circles), and preventable deaths due to vaccine refusal.¹⁶⁶

In the sphere of climate change, scientific denial movements criticize measurements as too expensive or, again, elitist. This is evident in Germany (criticism of the *Energiewende*), France (the Yellow Vests

¹⁶³ European Commission. Directorate General for Research and Innovation., *European Citizens’ Knowledge and Attitudes towards Science and Technology*, 8–9.

¹⁶⁴ Frank et al., *The Blind Spot*, x.

¹⁶⁵ European Commission. Directorate General for Research and Innovation., *European Citizens’ Knowledge and Attitudes towards Science and Technology*, 43.

¹⁶⁶ Bundesstelle für Sektenfragen, *Das Phänomen Verschwörungstheorien in Zeiten der COVID-19-Pandemie*, Bericht an die Bundesministerin für Frauen, Familie, Jugend und Integration (Vienna, 2021), 5–8,

movement), and the Netherlands (the nitrogen crisis).¹⁶⁷ EU-funded reports such as HEAT (2025) identify this movement as a **political threat** because it actively blocks policy. The EU often attempts to counter these destructive movements with further explanations of “science-as-we-know-it”, rather than addressing the capitalistic implications and existential concerns faced by citizens.

The underlying philosophical assumption of scientific denial movements is a belief in **hidden actors and elites** (pharmaceutical companies, Big Tech), combined with a general **mistrust of authority** (Figure 25). There is some empirical basis for these concerns, as shown in previous chapters through the entanglement of economy, industry, the state, and the military. As Alexandre Publia observes, “the military-industrial complex necessary for state security and surveillance apparatuses remains supported by universities, physics, robotics, and engineering departments.”¹⁶⁸

Nuclear physics, for example, is now crucial for medical technologies but remains entangled with weapons and energy production. NASA, for instance, was originally founded as part of a Cold War context¹⁶⁹, and technologies like the internet were initially developed for military purposes.¹⁷⁰ Physicists at all levels often **fail to take responsibility for broader epistemological questions or to critically reflect on how scientific knowledge and models are produced**. Moreover, the risks associated with scientific actions (failed tests, unobserved radiation, or pollution) are often insufficiently addressed within the science community and are instead shifted into the sphere of political responsibility.¹⁷¹

However, the accusations put forward by scientific denial movements remain fundamentally misguided in their logic and evidential basis due to their complete rejection of the scientific method. Philosophically, these movements embody a form of **scepticism** and **destructive relativism** that is itself a product of an alienated science that has abstracted too far and communicated too little with the lifeworld. Unlike the scepticism of the Scientific Revolution, which aimed to build empiricism, modern

https://www.bundeskanzleramt.gv.at/dam/jcr:fdd6aaf5-3d9b-4738-bd58-88661324f742/verschwoerungstheorien_052021.pdf.

¹⁶⁷ Martin Franz et al., ‘Discontented Agricultural Transformation – Why Are Farmers Protesting in Germany?’, *Journal of Rural Studies* 120 (December 2025): 3, <https://doi.org/10.1016/j.jrurstud.2025.103837>.

¹⁶⁸ Abolition Collective, *Abolishing Carceral Society* (Common Notions, 2018), 148.

¹⁶⁹ NASA, *The National Aeronautics and Space Act of 1958 Creates NASA*, 25 July 2023, <https://www.nasa.gov/history/65-years-ago-the-national-aeronautics-and-space-act-of-1958-creates-nasa/>.

¹⁷⁰ Joseph Vogl, *Kapital und Ressentiment: eine kurze Theorie der Gegenwart*, 3. Aufl (Beck, 2021), 38–39.

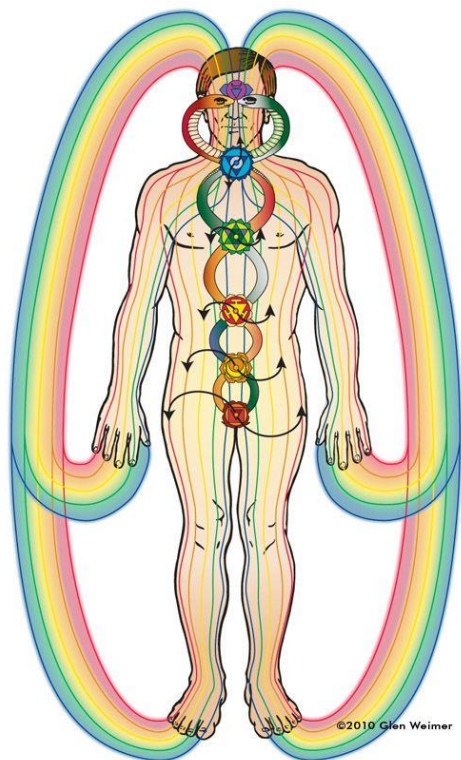
¹⁷¹ Prescod-Weinstein, *The Disordered Cosmos*, 42, 158, 223.

scepticism ignores consensus and selectively adopts methods and statements. In scientific denial movements, this becomes **dogmatic** and extreme. Instead of critically transcending *Körper* idealization toward a more complex synthesis, it rejects it outright, often **denying the possibility of any common denominator**.

However, as Prescod-Weinstein also notes, we experience physics whether we believe in it or not. When we reheat our food, we experience part of the electromagnetic spectrum via microwaves; if we want to visualize our bones, we use X-rays; we try to protect ourselves from UV rays with sunscreen, or melanin protects us; and a rainbow functions like a spectrograph in breaking down the light into different frequencies.¹⁷² Thus, even though scientific denial rejects evidence-based physical phenomena, these phenomena still occur around us.

The danger lies in treating justified **criticism of the authority of Körper-based science** (and especially physics) as grounds to completely reject *Körper* knowledge altogether and relying solely on *Leib* and personal experience as the primary source of understanding the world. Critiques of influence and stakeholders in science, and real existential concerns should be taken seriously; otherwise, mistrust toward the “institution of science” will continue to deepen.

¹⁷² Prescod-Weinstein, *The Disordered Cosmos*, 79–81.



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4.4 New Age Movement as a Failed *Leib* Return

The second countermovement is the New Age movement, which seeks a **return to *Leib* by contextualizing “*Körper*” knowledge from scientific progress within the personal sphere, emphasizing economic, social, and cultural transformation**. As early as the 20th century, many Europeans sought to reconnect *Körper* and *Leib*, beginning with Victorian physics’ development of metaphysics and theology by physicists such as Balfour Stuart, P.G. Taite, and George Johnston Stoney. There were also movements of “quantum mysticism”, originating in the first generation of quantum physicist (Heisenberg, Bohr, Pauli, and others).¹⁷³ These visionary alternatives often tried to explain the *Leib* sphere through *Körper* findings and to translate human perception and experience into *Körper* concepts. Its underlying schools of thought are spirituality, esotericism, and holism, often combined with channelling, crystals, natural diets, astrology, body work, and healing.¹⁷⁴ Since the 1970s and 1980s, the New Age movement has become mainstream and has lost much of its esoteric character¹⁷⁵ by popularizing esotericism, particularly among middle-class, urban women, for economic gain.

The New Age movement’s core philosophical assumption is that natural laws and physical findings are directly shaped by the personal sphere (*Leib* sphere). Like science denial, it critiques mere *Körper* idealization and embraces relativisms (“your truth, my truth”), often prioritizing *Leib* over *Körper*. In this thesis, that is just as problematic as prioritizing *Körper* over *Leib*, because the exclusion of either one leads to destructive and problematic consequences. The key difference is that the New Age movement synthesises physics and belief systems, considering both useful but incomplete. In contrast, science denialism completely rejects physics, framing it as a complete lie or conspiracy. New Age relativism is non-hierarchical and often overlooks already established or disproven knowledge, whereas scientific denial is generally anti-institutional.

What the New Age movement wants to achieve is unity. But instead of researching, they often make wild assumptions and claim that in the history of science, many of its “margins” were later corrected, making the

¹⁷³ Egil Asprem, ‘Dis/Unity of Knowledge: Models for the Study of Modern Esotericism and Science’, *Numen* 62, nos 5–6 (2015): 539–40, <https://doi.org/10.1163/15685276-12341391>.

¹⁷⁴ Daniel P. Mears and Christopher G. Ellison, ‘Who Buys New Age Materials? Exploring Sociodemographic, Religious, Network, and Contextual Correlates of New Age Consumption’, *Sociology of Religion* 61, no. 3 (2000): 291, <https://doi.org/10.2307/3712580>.

¹⁷⁵ Esoteric comes from old Greek: ἐσωτερικός, *esōterikósas*; meaning “inner”, belonging to the “inner sphere”.

unknown merely “not yet discovered”. The claim that *Körper* is not enough to understand the cosmos and human existence is consistent with this thesis’s aim, but the New Age movement **barely engages with the *Körper* itself** (mathematical calculation, geometry, analysis, linear algebra, statics, classical mechanics, and dynamics). Instead, it often applies *Körper* concepts through metaphors and rhetorical strategies **without philosophical and logical coherence to the actual *Körper* concept** (Figure 26).¹⁷⁶ For example, quantum entanglement¹⁷⁷ becomes in New Age discourse an unproven claim about human behavioural entanglement. Another example is quantum healing, which posits that the mind spontaneously corrects bodily errors via quantum fields rather than mere matter. In New Age discourse, illnesses are therefore understood as consciousness disturbances on the quantum level. All those “quantum” ideas ignore the fact that humans comprise around 10^{29} particles and that decoherence theory states that, through environmental interactions, superpositions carrying quantum effects collapse within 10^{-20} seconds. This transfer from micro to macro is therefore scientifically unjustified and absurd.¹⁷⁸

Quantum healing, as well as many other New Age trends, uncritically **appropriates Asian and Indigenous worldviews** (“Hawaiian culture has practiced this method for centuries”¹⁷⁹), thereby precluding constructive dialogue and making cultural understanding rare, if not impossible.¹⁸⁰

But the primary danger lies in laypeople falsely applying physical models to the personal sphere and being **economically exploited**. Online courses, esoteric influencers, 200€ sound baths, retreats, and large markets proliferate. This longing for meaning – unaddressed by science’s “crisis of meaning” and by Europe’s failed philosophical integration after the collapse of Church authority; chapters 2.3, 2.4, and 3.2 – is exploited for profit, not transformation. In Western culture, this growth is evident in the crystal market (USD 14,500.75 million in 2025, projected to reach 29,030.40 million by 2033 with a CAGR 8.2%)¹⁸¹, and the spiritual service market was valued at USD 376 billion in 2024.¹⁸²

¹⁷⁶ Asprem, ‘Dis/Unity of Knowledge’, 538–39.

¹⁷⁷ specific correlation between particles’ energy/wavelength states

¹⁷⁸ Interview /. Eva Tinsobin, ‘Quantenphysik hat nichts mit Quantenheilung zu tun’, DER STANDARD, 3 May 2013, <https://www.derstandard.at/story/1363709682106/quantenphysik-hat-nichts-mit-quantenheilung-zu-tun>.

¹⁷⁹ Eva Tinsobin, ‘Mit Quanten heilen’, DER STANDARD, 3 May 2013, <https://www.derstandard.at/story/1363709574591/mit-quanten-heilen>.

¹⁸⁰ Frank et al., *The Blind Spot*, x–xi.

¹⁸¹ Future Market Report, ‘Kristallwachstum Marktgröße, Anteil, Wachstum | CAGR Prognose 2033’, Future Market Report, accessed 26 April 2026, <https://www.futuremarketreport.com/de/industry-report/crystal-growth-market>.

¹⁸² ‘Spiritual Services Market Size, Trends & Forecast, 2035’, accessed 26 April 2026, <https://www.transparencymarketresearch.com/spiritual-services-market.html>.

Physics enabled the New Age movement by failing to demonstrate how its models apply to the personal *Leib* sphere or by addressing consciousness, world connection, philosophy, and meaning. This explanatory gap fuels free interpretation by those lacking scientific training, meaning that New Age thought fills the void left by physics. Integrating the subjective realm as a starting point is legitimate, as is asking how *Körper* knowledge relates to the self. Yet this requires neither wild misinterpretations nor discredited theories. Acknowledging the subject as prior – or, in this thesis, acknowledging *Leib* as the universal foundation for physics – provides deeper grounding than esoteric decoration.



5 Transformation of Physics Back to Its Philosophical Roots

Scientific triumphalism, science denial, and New Age thinking are problematic responses to the crises. This thesis wants to offer a response that addresses the problems at their root: *the Divide of Körper and Leib* in physics. In the light of new findings in physics and the human crises we face, its prevailing model of thinking in mere *Körper* has been challenged. The role of metaphor, analogy, category-transforming speculation, and off-beat intuition has become more prominent in science, and the philosophical problems of mind, consciousness, and meaning are now so acute that it is time not for further reduction, but for a step toward acceptance and integration.¹⁸³ The *Leib* must be reintegrated into physics (although one could argue that it was always already there), without rejecting the *Körper* completely or neglecting a deep engagement with constructed *Körper* knowledge (Figure 27).

Figure 27: On the left side, I would interpret the *Körper*, and on the right side, the human element woven into scientific conceptualization. Both are visible only from our human standpoint along the road of knowledge.

¹⁸³ Snow and Collini, *The Two Cultures*, xlvi; Frank et al., *The Blind Spot*, 188.



5.1 Connection of *Leib* and *Körper* and its Philosophical Conclusions

The first question is: how exactly are *Leib* and *Körper* already connected? For every *Körper* conceptualization that has ever existed (and every *Körper* conceptualization still to come), the **primacy of the lifeworld** (*Leib* sphere) is necessary. The primacy of the lifeworld consists in the **primacy of consciousness** and the **primacy of embodiment**, making both the irreducible preconditions of scientific knowledge and of everything that has been or will be achieved in physics.¹⁸⁴ The lifeworld is the only world we can perceive, investigate, and act in. If we want to say anything about the perceived physical world, nature, and cosmos, the *Leib* must – and always did – serve as the necessary starting point for any discipline that claims to speak about accruing phenomena in these domains (especially physics!).

We must accept that our human situation is inescapable. In cosmology, the universe can only be known from our inside position; in quantum physics, experiments can only be known by including our questioning and investigative methods.¹⁸⁵ Everything we investigate resides, as *The Blind Spot* argues, within the horizon of our consciousness. Consciousness discloses the world through the medium of our body. Our body is inescapable. The metaphor of the **horizon** is taken because it visualizes the limit we cannot step beyond (Figure 28).¹⁸⁶ That does not mean – and would be highly speculative – that our lifeworld is all that exists, since it depends on external sources (linguistic, cultural, biological, social, conceptual).¹⁸⁷ But it must be made clear that, in doing physics, we can never step outside embodiment and therefore never have access to any world other than the one disclosed by our consciousness.

This perceived world is “an achievement of intelligence, not a premise on top of intelligence” as Stephan Grossberg and Gail Carpenter put it.¹⁸⁸ We should embrace this very human starting point not as a failure of knowledge, but as our **necessary lens** for understand the concepts, models, and practices that our consciousness, through the medium of the body, brings forth.

This is why in physics the phenomenon of the cosmos, as understood through our lifeworld, is constructed out of concepts, models, and practice

Figure 28: Reality resides within the horizon of consciousness disclosed by our embodiment, being unescapable.

¹⁸⁴ Frank et al., *The Blind Spot*, xi, 187–91.

¹⁸⁵ Frank et al., *The Blind Spot*, viii.

¹⁸⁶ Frank et al., *The Blind Spot*, 186.

¹⁸⁷ Frank et al., *The Blind Spot*, 189.

¹⁸⁸ Brian Cantwell Smith, *The Promise of Artificial Intelligence: Reckoning and Judgment* (The MIT Press, 2019), 35.

that reside in the lifeworld of those who have contributed to the body of knowledge about these phenomena. The interplay between understanding the cosmos through our human perceptual and cognitive lens and recognizing the personal, historically, and culturally influenced construction by earlier human interpretation leads to the conclusion that **any understanding of the cosmos always includes a human component**. Consequently, the presentations, descriptions, and models of the cosmos and its behaviour are inherently human, because human lifeworld, languages and practise are woven into them. This is why this thesis argues that, in order to understand the cosmos as a whole, a mere *Körper* (external, objectified, and measurable entity) is not sufficient. It must also include the **cosmic Leib**: the sphere of human interaction inscribed into the cosmic description, and therefore the projection of human behaviour, perception, and meaning into the very framework of cosmic understanding.

Including the *Leib* – and therefore also the cosmic *Leib* – in physics would lead to a more unified view of the world, one that helps re-image the relationship between the human project and the rest of the Earth. Life will always escape mere *Körper* because although it is grounded in physics, it is beyond physics in its historical, collective, and emergent dimensions.¹⁸⁹ To include life in its fullest sense and to recognize living beings as autonomous, organizationally closed agents capable of open-ended evolution¹⁹⁰ (and thus enmeshed with their lifeworld) is, in the face of climate emergency, increasingly necessary. Framing the Earth, as well as “nature”, not as dead *Körper* but also as *Leib* (given that everything described by humans carries this human component inscribed into it) changes the relationship between humanity and “the outside”. The boundary of “the outside” is blurred by the infusion of living, breathing history and understanding present in every waking moment of perceiving this “out there”. Or as *The Blind Spot* argues “A better story is not that we rise above the great, strange mystery of being human in the vast world, a better story is that science takes us deeper into that mystery, revealing new ways to experience it, delight in it and most of all, value it.”¹⁹¹

¹⁸⁹ Frank et al., *The Blind Spot*, 161–62, 226–27.

¹⁹⁰ Frank et al., *The Blind Spot*, 156–57.

¹⁹¹ Frank et al., *The Blind Spot*, 255.



5.2 Cosmic *Leib* Integration Through Allegory

But how can the human interaction woven into cosmic description (cosmic *Leib*) be integrated into physics' seemingly pure *Körper* idealization?

I propose that physics as a discipline should change its aspiration: not only calculating for economy, military, and state purposes, but returning to its philosophical roots. It should engage more deeply with curiosity and imagination and critically analyse how the lifeworld and scientific concepts are connected within one system of relations. Simultaneously, it must interrogate the unspoken philosophical backgrounds, traces of cultural histories, and thought patterns that appear in the commitments made when constructing a phenomenon. To include this perspective, the very way physics is understood must change!

Physics can be understood as a narrative: a collectively constructed and continuously revised description of nature. It proceeds by discarding disproven parts and incorporating new theories, maintaining a body of knowledge that helps us navigate the world. Scientific concepts function as the building blocks of this narrative – as **stories** – and philosophy should be part of physics in order to interrogate and interpret them.

Physicists, in this sense, are not only observers; everyone contributing to physics is also an **author**. They tell their stories about phenomena by creating scientific concepts, articulated not through **sentences** but through equations, using mathematics as a medium to construct these compelling tales.¹⁹² These equations should not be taken as reality itself; rather, they express phenomena through chosen geometry, formal languages, entities, and measurable variables. These choices are not neutral. They emerge from human experience, imagination, and historically situated perspectives (*Leib*), in addition to their formal mathematical expression as *Körper*.

Thus, the elements of physical theories should not be taken as a literal representation of reality, but as **symbols**. As symbolic construction, they carry layers of meaning that reveal their additional historical, personal, cultural, and philosophical contexts. When these symbolic elements are considered in relation to one another, they form structured constellations of meaning. It is at this relational level that they can be read as **allegorical**. For this reason, scientific concepts are not simply quantifiable, objective descriptions (mere *Körper*), but can be understood as allegories (*Körper* with integrated *Leib*).

¹⁹² Frank et al., *The Blind Spot*, 69–70, 245, 251; Prescod-Weinstein, *The Disordered Cosmos*, 19, 162, 258.

From this perspective, scientific concepts do more than describe; they organize and communicate complex, often implicit dimensions of understanding that cannot be fully captured in a purely formal term. **Allegory allows the *Leib* to remain present** (Figure 29) within the scientific narrative without undermining its rigor. Instead, it provides a framework for expressing the depth, hidden structures, and relational complexity embedded in these concepts.

Viewing physics in this way reveals it as a narrative about the relationship between human beings and the physical world of matter, energy, and forces – adding a necessary dimension rather than replacing existing approaches. Even though the history of physics is marked by the exclusion of such perspectives, these narrative dimensions remain central to how meaning within physics is produced and negotiated.

Approaching physical concepts as allegories makes the human contribution within them visible again. An **allegory is an imagery-rich narrative**. It enables philosophical assumptions, reductions, and approximations to become more explicit and experientially graspable through pictures. Allegory functions by translating abstract and metaphysical concepts into forms that can be articulated and understood, operating through analogy to make every highly abstract concept relatable. In this way, allegory provides a bridge that reconnects the cosmic *Leib* with its *Körper* expression.

In doing so, allegories also expose the system of relation within a theory more directly, as their imagery makes explicit how elements are conceptually “positioned” in relation to one another. This brings to light the implicit philosophical foundations, cultural histories, and epistemic commitments involved. Critical reflection therefore becomes not optional but necessary: philosophical interrogation of the assumptions, reductions, and choices embedded in scientific concepts can engage directly with the symbolic structures and thus becomes an essential part of understanding physics itself.



5.3 Allegorical Reading and Drawing the Cards

If the inclusion of the cosmic *Leib* is carried out by shifting the perspective of scientific concepts – not framing them as substitution of reality, but as allegories in which each element functions as a symbol for a multidimensional human understanding of a phenomenon, then the question arises: how should the *Leib* engage with these allegorical concepts in physics?

As mentioned before, the human filter is unavoidable. So, there is not only the scientific concept which, in the form of an allegory, carries both the cosmic *Körper* and the cosmic *Leib*. There is also the **personal interaction of the human *Leib*** (the individual's own lifeworld) when engaging with such an allegorical scientific concept. In this process, the cosmic *Leib* and the human *Leib* interact and enter into a relationship that can be understood **epistemologically as analogous to the reading of a tarot card**.

Tarot cards originated as a card game in the 15th century and were later developed into a symbolic and interpretative system from the 18th century onward. They renewed their popularity in the 20th century through the hippie movement.¹⁹³ They can be interpreted in a way similar to how one would interpret the images and symbols of one's own dreams. Tarot cards do two things:

- (1) They stage an encounter with abstract concepts
- (2) They give a distinct experience of one's own views

By drawing a card, one is confronted with an allegorical configuration that invites a closer examination of both the concept itself and one's own interpretation of it. Each card has established meanings, but its imagery also opens a personal and temporal dimension. This process of **allegorical reading** and therefore **projecting the symbolic structure onto one's own lifeworld**, can help establish meaning in relation to everyday life. By engaging with and decoding the symbolic language, both the understanding of the abstract concept on the card and the personal relation to it can be deepened.¹⁹⁴

They encourage active reading, seeing, and interpretation. They generate a productive ambiguity that invites speculation and meaning-making, thereby fostering intersubjective engagement. At the same time, they preserve a degree of mystery while guiding interpretations.

¹⁹³ Mike Sosteric, 'A Sociology of Tarot', *The Canadian Journal of Sociology / Cahiers Canadiens de Sociologie* 39, no. 3 (2014): 357–61.

¹⁹⁴ Waite, A.E., 'Rider Tarot - Game Instruction', Booklet, Stamford, CT, n.d.

INSTRUCTION TO ALLEGORICAL READING

0. A card is drawn (a scientific concept is chosen)
1. The card presents an allegory (the scientific concept appears as an allegory)
2. Narrative imagery is constructed through symbols (the allegorical scientific concept contains symbolic elements)
3. Each symbol carries established, multi-layered meaning (each element of the scientific concept is embedded in human contexts)
4. These meanings are interpreted through individual, personal, and temporal perspectives (the elements pass through the human *Leib*)
5. Relations and descriptions emerge through the interaction between what the card communicates and how it is received (the interplay between allegorical scientific concept and human *Leib* takes place)
6. The resulting understanding (an intertwined combination of allegorical scientific concept and personally interpretation) is integrated into one's lifeworld (the allegorical scientific concept, mediated by the human *Leib*, becomes meaningful in lifeworld)

This instruction shows how the method of tarot as allegorical reading can function **as a tool to reintegrate scientific concepts including the cosmic *Leib* into the lifeworld.**

Raffaela Edelbauer, together with Simon Gortschnig, explores a related approach in her *Archigonium – Wissenschafts-Tarot* (Figure 30). They present human concepts through allegories as a way of approaching questions via the associative-projective method. The *Archigonium* serves as a tool to practice thinking, to establish connections between distant elements, and to search for creative answers to otherwise unsolvable questions.¹⁹⁵

I understand tarot not as a game with cards, but as an associative-projective method and as a **necessary instruction for how to approach scientific concepts**. For this reason, my artwork does not involve the drawing of cards, but rather a direct engagement with a single, deliberately chosen card. The card of Gravity. The interaction typically occurring between humans and cards is translated here into an **epistemological structure how the audience can engage with the artwork**. Instead of a card, there is a room that functions as a single tarot card: a space in which the allegory of Gravity can be experienced, where the cosmic *Leib* becomes perceptible, and where the human *Leib* is confronted in a way epistemologically similar to drawing a card and asking about life.

¹⁹⁵ Archigonium, 'Archigonium', Archigonium, accessed 24 May 2026, <https://archigonium.bigcartel.com/>.

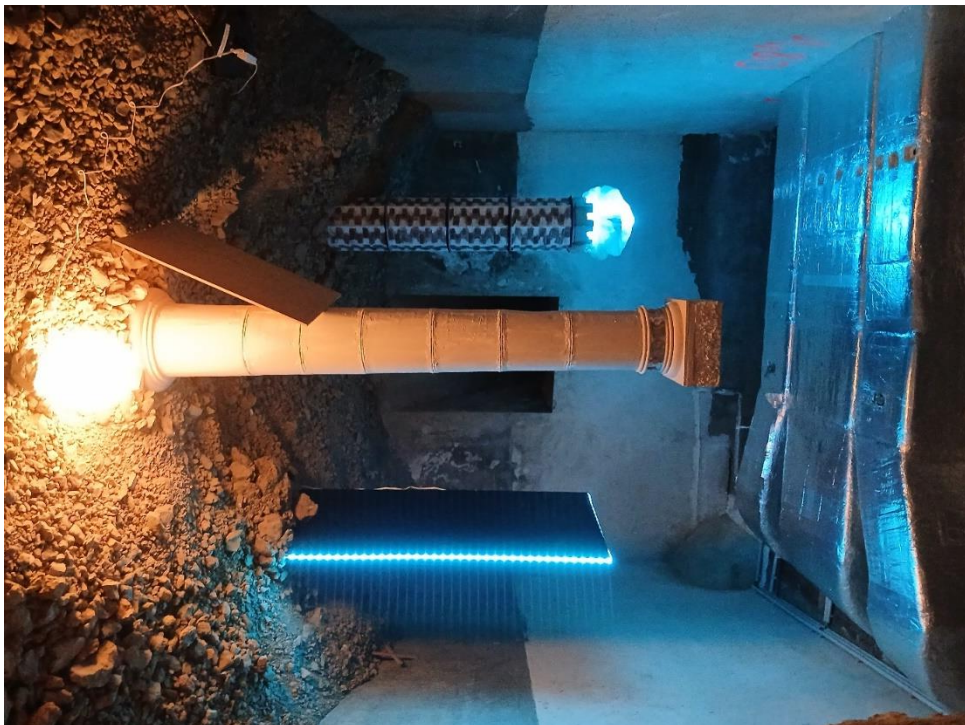


Figure 31: Allegory of Gravity

6 The Allegory of Gravity

For my artwork (Figure 31), I chose gravity as a theme. Paralleling my philosophical statements about the allegorical reading of scientific concepts, I go one step further and construct an allegory of gravity in the literal sense. This is done in order to make the *Leib* dimension within the scientific concepts more explicit. The work is realized as a **performative installation** in which the objects in the space stand symbolically for elements within conceptual accounts of gravity, while a performer embodies gravity itself as a represented force. The relation between space, sound, objects, and performer creates a narrative – an allegory of gravity – that can be directly experienced by the audience present in the installation.

This spatial artwork is intended **to be approached like a tarot card to be read**. An explanatory text accompanies the installation, comparable to the booklet provided with tarot cards, offering orientation regarding the symbolic elements and their general meaning. But the rest belongs to speculation, to wondering about the relationship between the elements and each visitor's own lifeworld, in which the story enacted by the installation and the corresponding performance can be interpreted and integrated.

The choices made in the visual representation of the elements are themselves **projections from my own lifeworld**. In this sense, the allegory does not only render the cosmic *Leib* explicit, but also my own human interpretation of the allegorical scientific concepts. This becomes visible in the specific assignments of abstract elements to concrete objects, as well as in the decision to involve a living human performer. The work therefore stages not only the allegory of gravity, but also the situated perspective through which this allegory is constructed.

6.1 Relationship of Cosmic *Leib* and human *Leib* Analogous to Gravity

I chose gravity as a theme because this interaction has two properties that align closely with central claims of this thesis. In classical physics, gravity is described as a force according to which **every particle attracts every other particle in the universe, and it acts without spatial limitation**.

This means that a gravitational interaction is occurring between our bodies and every particle in the universe, at every living (and dead) moment, even if the magnitude of this force is so small due to distance that the gravitational pull of the Earth dominates. This also provides a useful argument for why the universe cannot be infinite in mass: if it were,

gravitational forces (including those of objects arbitrarily far away) would accumulate. In contrast to the electric force, which can be compensated by opposite charges, there is no “negative mass” that cancels gravitational attraction. Even if each individual contribution were imperceptibly small compared with Earth’s gravity, their combined effect, because gravitational forces add linearly, could in principle overwhelm the local gravitational field.

This interaction also implies that humans, as accumulations of particles, have a gravitational relationship with every other human, with the Earth, with the chair they are sitting on, with the bones of their great-grand-mother resting in the cemetery, and with the Andromeda galaxy many light-years away. For industry, the military, and the state, it may only matter how much this force practically influences technology or other controlled environments. But from the perspective of philosophical physics, even if the force is minuscule, it is significant that the material of our embodiment is in a constant, force-like relation with every other material in the entire universe.

By using Newton’s law of universal gravitation, which serves as a good approximation of gravity’s effects when extreme accuracy is not required, or when dealing with relatively weak field, this relation can be expressed as:

$$F = G \frac{m_1 m_2}{r^2}$$

Where F is the gravitational force between two bodies, m_1 and m_2 their masses, r the distance between their centres of mass, and G the gravitational constant. I will take my body weight as m_1 to calculate the gravitational force between me and other materials (Figure 32).

Objects	Mass (m_2) [kg]	Distance [m]	Newton [N]
Sun	1.989E+30	1.496E+11	0.4448556
Moon	7.35E+22	384000000	0.00249501
Friend who sits opposite from me	70	2.3	6.62353E-08
Grandmother lying on Vienna’s Central Cemetery	10	6000	1.39042E-15
One drone in Ukraine	5	1000000	2.50275E-20
Donald Trump	110	7000000	1.12368E-20
Andromeda Galaxy	1E+42	2.4E+22	8.6901E-12

Figure 32: Table of gravitational interaction between myself and other "objects".

Whether we like it or not, it is a scientific fact that **we are interconnected through gravitational interaction** with Trump, with war, with the Earth, and everything in this vast universe. This interaction is not only a force acting on us, but the force of our mass also acts **back** on every object. Even if the effect is negligible in practical terms, it highlights a philosophical trait of the universe: every material entity is connected to every other, and this connectivity depends on mass and distance but is indissoluble.

6.2 Körper of Gravity

Before I dive into the integration of the *Leib* of gravity, the contemporary *Körper* of gravity must be established.

The current framework for understanding gravity is **Einstein's special and general theory of relativity**. He showed that Newton's law of universal gravitation, together with the idea of absolute time as a universal clock ticking at the same rate for all observers, is an approximation, valid only for the special case of scales on which human existence typically unfolds. In Einstein's theories, time flows according to local conditions. The special theory of relativity states that the laws of physics are invariant in any inertial frame of reference, but that time and space depend on the relative motion of observers. The general theory of relativity then adds that local conditions, such as gravity, can also influence the flow of time. The rate at which time passes may therefore **differ from one observer to another**, depending on their relative state of motion or the local gravitational field. To connect these different local frames, Einstein used the speed of light as the cornerstone of a universal physical narrative. To understand the natural laws only from a given frame of reference, and to recognize that local conditions shape our description, is a perfect analogy for the notion of embodied perspective developed in this thesis.¹⁹⁶

Gravity is the only interaction that does not fit into the Standard Model's particle-based description of forces, which makes it inherently different from the other radiation and matter fields. In general relativity, gravity is therefore not treated as a force in the same sense as the others, but rather as a pseudo-force arising from the geometry of spacetime. To describe changes in speed or direction (acceleration), space and time are modelled using Riemannian geometry, turning them into a curved spacetime. Matter and energy ($E=mc^2$) cause spacetime to curve, and this curvature is experienced as a force called gravity. **Gravity is thus a property of space-**

¹⁹⁶ Frank et al., *The Blind Spot*, 15, 110–11, 121–22.

time or, as often summarized, “...spacetime tells matter how to move, and matter tells spacetime how to curve.” In effect, Einstein’s equation is describing how the metric – the ruler we use to measure spacetime – changes dynamically in space and time due to the presence of matter and energy. Solving Einstein’s equation yields the metric, that is, the information about the curvature of spacetime.¹⁹⁷

Einstein’s theories are the currently the most widely accepted explanations of gravity. They have not been disproven and provide highly accurate predictions for many cosmological phenomena. Before this, Newton’s law of universal gravitation was used, and today there are attempts to develop new theories that combine quantum theory with the relativistic description of gravity. In this attempted fusion, the crisis of scientificity is acutely present: deep philosophical commitments again become visible beneath the formalism. The response proposed by this thesis is to make the commitments more transparent and to engage with them explicitly. This means integrating the *Leib*!

¹⁹⁷ Prescod-Weinstein, *The Disordered Cosmos*, 12–13, 56–61.

6.3 *Leib* of Gravity

The *Leib* of gravity is visualized by transforming the *Leib*-aspects embedded within the elements of theories of gravity into symbols and placing them in relation to one another within the performative installation. For example, the *Leib* can be visualized by a pillar representing the history of the person who developed the theory; the *Leib* can be the light as mathematical idealization, or an apple can act as a transformed symbol for a theory in physics about gravity. In relation to one another, the form an allegory of the scientific conceptualization that invites allegorical reading of the presented elements. Every element plays a role and, as I mentioned before, is presented according to my personal interpretation.

6.3.1 Location of the Artwork (Plato's Cave Allegory)

The artwork takes place in the cellar of the ceramic workshop, in a small dark room beside the ovens. This space evokes Platon's allegory of the cave, an allegory frequently used by scientists to illustrate scientific achievements or to reflect on the process of knowledge. Plato's cave is one of the most well-known allegories of antiquity, in which Socrates compares the necessity of philosophy to the process of liberation.¹⁹⁸ The transformation of physics demanded by this thesis resonates with the priority Plato assigns to philosophy, yet the decision to keep the artwork in the cave/cellar should point to the inescapable human position. The shadows in Platon's cave are not to be transcended, but to be acknowledged as shadows and then processed according to their limitations and the human interpretations they invite.

6.3.2 Sound

The sound in the background consists of gravitational waves captured by the Laser Interferometer Gravitational-Wave Observatory (LIGO), converted from spacetime distortion signals into an audible "chirp". The specific chirp chosen for this artwork corresponds to the final moments of the lives of two black holes and, that were neutron stars that orbited each other for billions of years and eventually merged. The sound is that of the first black-hole event detected by LIGO, stylized as a characteristic rising

¹⁹⁸ Dr Laura D'Olimpio, 'Ethics Explainer: Plato's Cave', *THE ETHICS CENTRE*, 17 March 2019, <https://ethics.org.au/ethics-explainer-platos-cave/>.

tone. It represents the merging of the spheres of lifeworld and scientific concepts and, at the same time, makes the cosmic *Leib* audible.¹⁹⁹

6.3.3 Hole

Gravity did not always exist as a distinct interaction but co-emerged with the structure of space as we know it. It began when the distribution of energy (and later matter) was established in the early universe, often traced back to the Big Bang (Figure 33). Therefore, the starting point of the performer is a hole whose geometry resembles the graphical representation of the creation of the universe, where the X and Y axes represent the

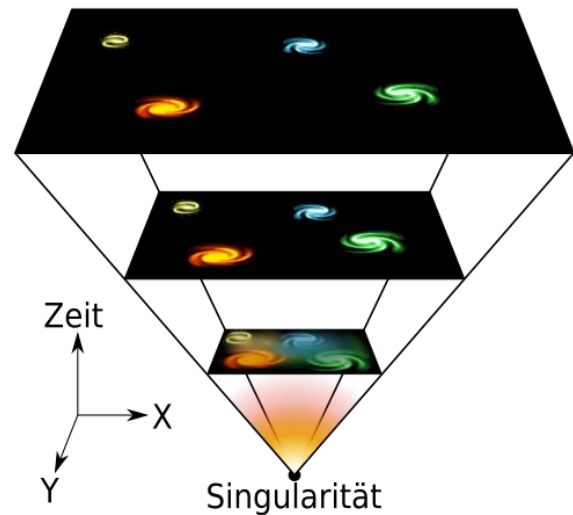


Figure 33: Creation of the universe after the Big Bang.

space and the Z axes represents time. That fact that the hole is not visible at the beginning, that the audience is positioned at the greatest distance from the hole, and that the origin of the hole remains unseen are all properties consistent with the idea with the idea that it represents the emerge of gravity.

6.3.4 Personification of Gravity

Gravity is not an object, but a living force. This is why gravity is the only element in the allegory that is represented not by a thing, but by a living performer. If the cosmic *Leib* has always, due to the human's entanglement with its "creation" as a concept, carried human trace within it, gravity must have a human element communicated through the performer.

In art history, references to nature or natural forces are often feminized. In this thesis the gender, race, and cultural background of the performer are intentionally left indeterminate, as long as the human dimension is made explicit. Gravity holds a torch. This choice echoes the image of the alchemist pursuing nature in Neoplatonic magic (Figure 12), but here it is not

¹⁹⁹ 'Sources and Types of Gravitational Waves', LIGO Lab | Caltech, accessed 30 April 2026, <https://www.ligo.caltech.edu/page/gw-sources>.

the alchemist who shines the light and thus holds the power. It is nature – and in this case gravity – that decides what is revealed to humans and what remains hidden.

The natural force knows the space by heart. After its creation, the space in which the performance unfolds becomes familiar and can be seen as the space of a lighthouse keeper carrying out daily routines. Gravity is not influenced by time; only matter matters to gravity. The performer starts in the hole, the symbolic birthplace of gravity, and then moves forward, looking around the space, checking that everything is in place. The objects on the ground are known to gravity in their materiality and understood as traces of matter, because gravity, as omnipresent field, exists between and through all material.

6.3.5 Matter

Gravity is not only acquaintance with matter but is THE entity that engages and negotiates with it. The matter on the ground forms the foundation for gravity, and by moving through space gravity displaces and interacts with this material layer. The matter on the ground also represents our embodiment and organic precondition for any scientific conceptualization.

6.3.6 Pillars

The pillars stand on the material foundation – the foundation of embodiment. They represent not only the consciousness that discloses the world to us, but also the historical and cultural basis on which scientific concepts are built, around which they cluster, and on which they depend. Their arrangement – left, middle, right – evokes the temporal order of past, present, and future, echoing the positioning of cards in tarot readings that structure questions. The left (past) pillar is Newton's tower, the middle (present) pillar is Einstein's pillar, and the right (future) pillar is the door to modern quantum gravitation.

Taking pillars as representations of history and human consciousness is inspired by my own lifeworld: growing up in Vienna, where Historicism's many pillars along the Ringstraße suggest that history has materialized in stone and column. I choose pillars from the locations where the theories of gravity are "housed" because they reveal the "home" of each theory – the

visual, cultural, and educational background that has shaped it. They mark the lifeworld that formed the production of knowledge by the physicists who developed these theories.

Newton Pillar

The *Philosophiæ Naturalis Principia Mathematica*, discussed in chapter 3.2.3, laid the foundation for classical physics and expounds Newton's laws of motion and his law of universal gravitation. The work was presented to the Royal Society in 1686 and published in 1687. Newton studied and taught at **Trinity College, University of Cambridge**. Although he developed the law of gravitation at his home in Woolsthorpe, I choose to represent the historical and cultural context with a pillar inspired by one of the towers at the entrance to Trinity College (Figure 34). The entrance is especially striking

because of the clock at its centre, symbolizing absolute time – a concept deeply engraved in Newton's theory. Newton likely passed under this tower many times. The clock tower itself is a medieval gate structure adapted to the college façade, and in this thesis, it stands for the anxiety of a collapsing order and the desire for control that accompanied the early-modern scientific revolution. For me, this tower serves as a representation of the historical and cultural background in which Newton's law of universal gravitation was established.



Figure 34: Clock tower in Great Court.

Einstein Pillar

Einstein was summoned to the Prussian Academy of Sciences in Berlin, where he completed his general theory of relativity and supported his assumptions with astronomical observations. During this period, he contributed to the unification of the sciences and interdisciplinary approaches. In 1915 he completed the final steps of his theory and presented the relativistic framework, including gravity, to his colleagues. The Academy itself was initially reluctant to engage with fundamental questions of physics,

and its rigid structure left little room for Einstein's groundbreaking ideas. He later had to flee the country in the 1930s and emigrate to the United States, which also meant being excluded from the Academy because his political views were no longer considered compatible with its increasingly nationalistic stance. This is why the influence of the Academy is represented by a neoclassical pillar at its entrance (Figure 35), while Einstein's mathematical idealization, symbolized by an object, stands before the pillar, not on top of it. In the *Acknowledgement* of his theory, one can infer that his intellectual circle, rather than the Academy itself, inspired much of his theory. His mathematical idealization and his theory stand in front of the pillar, triumphing over it, while the pillar functions like the ghost of a past authoritarian institution.²⁰⁰



Figure 35: Entrance of the Academy.

Modern Pillar

Gravitational theory struggles to be reconciled with quantum theory and therefore resists integration into the Standard Model, because it not only acts on matter but also on itself and is not independent of its location. A functioning theory of quantum gravitation is one of the “holy grails” of foundational physics, and the community has searched for solutions over the past decades (string theory being one of them).²⁰¹

There is, as yet, no “winner” among the candidate theories which is represented by a black, modern door. In contrast to the pillars and towers that support an entry, the door marks an open, unresolved threshold. The entry is “open” but not yet determined or supported.

²⁰⁰ Jürgen Renn et al., *ALBERT EINSTEIN: ALTE UND NEUE KONTEXTE IN BERLIN*, n.d., 1–13.

²⁰¹ Reinhard Kleindl, ‘Der “Gral” der Quantengravitation könnte bereits vor Jahrzehnten gefunden worden sein’, *DER STANDARD*, 21 March 2026, <https://www.derstandard.at/story/3000000312256/der-gral-der-quantengravitation-koennte-bereits-vor-jahrzehnten-gefunden-worden-sein>.

6.3.7 Mathematical Idealization

It is important which mathematical idealization is chosen to represent space. This is why there is a luminous object on the Newton tower, a luminous object in front of the Einstein pillar, and a luminous object around the door. Light serves as the measurement scale for gravity, which is why all three objects must shine. Each object represents the geometry in which space is described in the corresponding theory.

Cube

On the Newton tower sits a cube. For Newton, space was composed of three intersecting planes that follow Euclidean geometry, formalized in René Descartes's (chapter 3.2.2) Cartesian coordinates (x , y , and z).²⁰² Descartes provided the means for geometric construction (lines, curves, surfaces, and solids) with his coordinate system, thereby enabling a linear, grid-like – or cubic – conception of space.

Sphere

As explained in relation to Einstein's feelings toward the Academy, his mathematical idealization stands in front of the pillar. In his case, the mathematical idealization of space is represented by a sphere, because his theory posits a sphere-like curvature in spacetime when a symmetric gravitational field is present. The idea of thinking in terms of curves, rather than strictly linear lines, was revolutionary for the understanding of the universe.

Quantized Space

There is, for now, no fully defined geometry, but in quantum gravity the aim is to combine relativity theory with quantum field theory, proposing that space is discrete. In these approaches, space is mathematically idealized as being constituted by points that are infinitesimally small or “grainy” at the smallest scales. This can be represented by the points of the LED light.

²⁰² Prescod-Weinstein, *The Disordered Cosmos*, 45-46, 49.

6.3.8 Physical Models

The theories of physics developed by Newton, Einstein, and modern physicists are represented by physical objects (not luminous like the mathematical idealization). Each object is acted upon by gravity.

Rotten Apple of Newton

Newton unified terrestrial and celestial physics through the radical idea of a single, universal time that runs across the vastness of space. His law of universal gravitation is an equation describing how an apple falls to the ground or how the Moon orbits the Earth. The apple visualizes the dead body (*Körper*) he postulated, which is moved solely by an external force (gravity itself).

Reference frames

Einstein's theory localizes the flow of time, discarding the Newtonian universal clock and assigning each small region of space its own time, which ticks according to the gravitational field in its surroundings and the state of motion of the observer. This is communicated by two picture frames representing reference frames. Gravity takes one frame with it, while the other remains at the Academy pillar, narrating the shift between reference frames when gravity is at play.

Missing concept

Because there is no final solution, the door and quantized space do not possess a fully established physical theory and therefore have no corresponding object.

7 Conclusion

My artwork aims to pull scientific conceptualization further into the realm of imagination and to make the human component more explicit, thereby creating greater transparency regarding the cosmic *Leib*. The integration of the cosmic Leib (or rather, the rendering of its always-already present transparency) into the *Körper* idealization in physics is intended to address the two prominent crises outlined in chapter 2.3.

Regarding the crisis of scientificity: scientific theories, as narrative within physics, postulate unobservable entities (atoms, electrons, quarks), whose interactions produce observable effects. The bridge between experimental data and the leap to theory rests on assumptions, approximations, and commitments once phenomena are structured into models. By adopting the structure of a model – and therefore its elements – but rendering them symbolically, the conceptual framework is made transparent as something that is and will always remain human, due to our inescapable inside position. In this way, the human components are revealed. This symbolic dimension, that is, the treatment of elements of a scientific concept as symbols (realized in the artwork through their transformation into artistic objects), offers a way of dealing with the crisis of scientificity.

Regarding the crisis of meaning: engaging with this construction of symbolic elements within scientific concepts already concerns meaning in human existence. In contrast to smallism, I argue that the whole system is more significant than its isolated parts. By relating, speculating, and imagining how these elements fit together, philosophy is invited. Philosophy, following Husserl, encompasses metaphysics and embeds science within broader questions of cultural, human, natural, and cosmic existence. As Collini suggests, incorporating philosophical considerations – limits and dangers – into scientific education can also yield substantial benefits by deepening our understanding of the natural world.²⁰³ Philosophy is carried out by the human who philosophizes; thus, it is not only the allegory itself, but also its creation through the reader (that is, allegorical reading) that generates meaning. This philosophical physics, together with logic and ethics within a universal philosophy, can significantly contribute to questions of meaningful life and thereby address the crisis of meaning.²⁰⁴

The method of reading elements of scientific concepts as symbols, of constructing allegories, and of engaging in allegorical reading represents a

²⁰³ Heffernan, 'On the Several Senses of Crisis in Husserl's *The Crisis*', 357, 380; Snow and Collini, *The Two Cultures*, lvii, lxiv.

²⁰⁴ Heffernan, 'On the Several Senses of Crisis in Husserl's *The Crisis*', 377.

promising approach to understanding science and engaging with physics. However, further research is needed to determine within which framework these symbols can be interpreted (for example, historical, cultural, or personal contexts) and how these different dimensions – especially those relating to the human component – interact with one another. Moreover, it remains necessary to explore how an intersubjective perspective on allegorical interpretation and symbolic relations can be established, so that a shared basis for contributions to the body of knowledge in physics can emerge.

Phenomena are concrete truths; how we describe them stays our choice. This does not mean that our current descriptions are bad (they are powerful, predictive, and have solved many problems). Yet, in the face of a possible new Renaissance and a potential transformation of the modern order, it may be time to strengthen imagination once again, to return to history, and to think more poetically in order to revitalize the creative power of culture. This can be achieved by reading the world as art, by approaching scientific concepts as artistic constructions, created and developed over centuries by humans, through which we articulate our narrative of existence within a fascinating cosmos.

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