

Excellence Cluster 264 Topoi

Research Area D – Posters on Research Activities 2007–2009

[1. February 2010]

Impressum

Posters on Research Activities 2007–2009
as of: 1. February 2010

edited by

Excellence Cluster 264 Topoi

represented by its Director

Prof. Dr. Friederike Fless

Administrative Offices:

Topoi-Haus Dahlem
Freie Universität zu Berlin
Hittorfstraße 18
14195 Berlin

Topoi-Haus Mitte
Humboldt-Universität zu Berlin
Hannoversche Straße 6
10099 Berlin

www.topoi.org

Topoi is the joint responsibility of the Freie Universität Berlin and the Humboldt-Universität zu Berlin. Partner institutions are the Berlin Brandenburg Academy of Sciences and Humanities, the German Archeological Institute, the Max Planck Institute for the History of Science and the Prussian Cultural Heritage Foundation. Furthermore Topoi is interlinked with several university institutes as well as other institutions.

RESEARCH AREA D: THEORY AND SCIENCE

D-I-1: Cosmology

Posters

- The Enigmas of Tablet C. Methodological Problems and Interpretative Questions 58
- The Triangular Dance of the 183 Worlds. Place and Cosmological Explanations..... 59
- The Homogeneity of the First Element. First Element and Fire 60

D-I-2: Anima Mundi

Poster

- Anima Mundi. World Soul and Cosmic Space in Platonism and Early Christianity 61

D-II-1: Ontology of Space

Poster

- Ontology of Space. Bodyhood, Extension, Dimensionality, Typology of Space and Time.. 62

D-II-2: Place, Space and Motion

Poster

- Place, Space and Motion. Physical and Methaphysical Theories in Ancient Philosophy... 63

D-III-1: Diagrams

Poster

- Diagrams, Diagrammatics, and Diagrammatology. Space as a Medium for Depicting and Exploring Epistemic Objects 64

D-III-2: The Epistemological Dynamics of Early Writing

Poster

- The Epistemological Dynamics of Early Writing. Materiality und Representation as Constituents of Scientific Thought 65

D-III-3: Mechanics

Poster

- Philological Foundations. Mechanics and Philosophy of Nature 66

D-III-E-II-1: Dialectical Topoi

Poster

- Dialectical Topoi. Aristotelian Theory of Argumentation and Its Early Modern Reception 67

D-III-E-II-2: Mapping Body and Soul

Poster

- Mapping Body and Soul. Concepts of Space in Ancient Medicine and Philosophy of Mind 68

The Enigmas of Tablet C

Methodological Problems and Interpretative Questions

An enigmatic document

► Tablet C (F 492 Bernabé), dated to the fourth century BCE, might shed important new light on the relationship between cosmology, physics, theology, and eschatology in an Orphic/Bacchic context. Some unique and perplexing features of the document, however, render its interpretation highly difficult and inevitably tentative. The object was found in 1879 in Timpone Grande in Thurii, inside a wooden coffin, near the skull of the cremated deceased (fig. 1A). Whereas more recent discoveries have significantly enhanced our understanding of the religious content and sociological context of the other gold tablets, almost 40 of which have been discovered by now, this document has remained just as puzzling and isolated as when Domenico Comparetti first transcribed it and Hermann Diels published its *editio princeps* in 1902.



Fig. 1 | A: Tablet C = F 492 Bernabé, Napoli Museo Nazionale inv. no. 111464 (photo from Pugliese Carratelli 1993) | B: Tablet A4, Timpone Grande, 54 × 29 mm

Remarkably, it is the only gold tablet found so far that was folded as an envelope and used to wrap another gold tablet (Tablet A4 = F 487 Bernabé | fig. 1B). The engraved text of Tablet C is also unique in both its form and content. Intelligible words, and occasionally conjunctions of words, are interrupted by unintelligible strings of letters. Moreover, whereas the texts of the other gold tablets are related to one another by ‘family resemblance’, the discernable parts of this text have no parallels on other tablets. However, besides material similarity, the physical arrangement with the ‘main-stream’ Tablet A4 strongly indicates that this text comes from the same religious context.

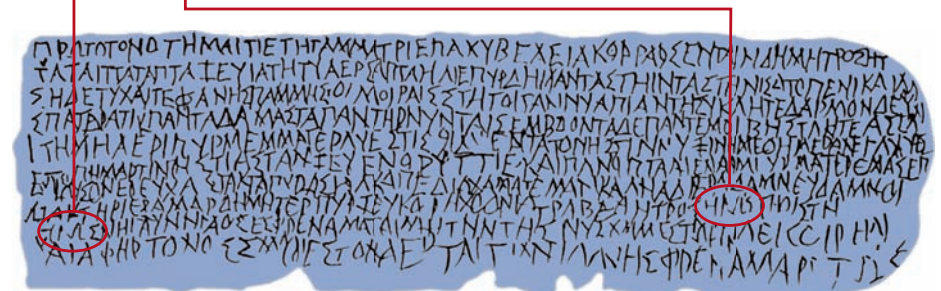
Methodological problems

► Ordinarily, the interpretation and analysis of a text starts with establishing a text, at least in a preliminary manner. In this instance, however, a general interpretative stance on the peculiar characteristics of the text governs in a fundamental way the most basic philological work. The crux is one’s assessment of the unintelligible letter series: are they (a) corruptions, due to negligent writing or

other causes, (b) encoded forms of Greek words, (c) words, possibly corrupted, from another language, (d) *voces magicæ*, (e) meaningless strings of letters inserted into the text intentionally, for instance to conceal the message contained in the text? The list might, of course, be continued. All these options, each of which has found supporters, entail radically different treatments of the text. For instance, hypothesis (a) implies extensive, and often heavy-

New readings:

- HPΩΣ Oliv., Barnabé
*** Zuntz
- HNIΣ Oliv., Barnabé
- HMΣ Zuntz
- HPΩΣ Betegh



The ‘Word Search’:

1. ΠΡΩΤΟΓΟΝΟ ΓΗ ΜΑΙΤΙΕΤΗΓΑΜΜΑΤΡΙΕΠΑ ΚΥΒΕΛΕΙΑ ΚΟΡΡΑ ΦΣΕΝΤΑΙΝ ΔΗΜΗΤΡΟΣ ΗΓ
2. ΤΑΤΑΙΤΤΑΤ ΑΠΤΑ ΖΕΥ ΙΑΤΗΤΥ ΑΕΡ Σ ΑΠΤΑ ΗΑΙΕ ΠΥΡ ΔΗ ΪΑΝΤ ΑΣΤΗ ΙΝΤ ΑΣΤΗ ΝΙΣΑΤΟΠΕΝΙΚΑΙΜ
3. ΣΗΔΕ ΤΥΧΑ ΙΤΕ ΦΑΝΗΣ ΠΑΜΜΗΣΤΟΙ ΜΟΙΡΑΙ Σ ΣΤΗΤΟΙΓΑΝΝΥΑΠΙΑΝΘ ΣΥ ΚΑΗΤΕ ΔΑΙΜΟΝ ΔΕΥΧΙ
4. Σ ΠΑΤΕΡΑ ΤΙΚ ΠΑΝΤΑΔΑΜΑΣΤΑ ΠΑΝΤ ΗΡ ΝΥΝ ΤΑΙΣ ΕΜΒΑΟΝΤΑ ΔΕ ΠΑΝΤ ΕΜΟΙΒΗΣ ΤΑΗΤΕ ΑΣΤΑ
5. ΤΗΜΗ ΑΕΡ Ι ΠΥΡ ΜΕΜ ΜΑΤΕΡ ΑΥΕΣ ΤΙΣΟΙΔΕΝΤΑΓΟΝΗΣΣΙΝ ΝΥΕ ΙΝΗΜΕΘ ΗΜΕΡ’Α ΜΕΡΑΝΕΓ ΑΥΥΕΣ
6. ΕΥΤΙΣΙΠ ΗΜΑΡΤΙΑ Π ΗΣΤΙΑ ΣΤΑΝ ΖΕΥ ΕΝΟΥΥΤΤΙΕ* ΚΑΙ ΠΑΝΟΠΤΑ ΑΙΕΝΑΦ ΜΙΥ* ΜΑΤΕΡ ΕΜΑΣΕΠ
7. ΟΥΣΟΝΕΟ ΕΥΧΑΣ ΤΑΚΤΑ ΠΥΡ ΔΣΥΟΚΑΠΕΔΙΟΧΑΜΑΤΕΜΑΝΚΑΑΗΑΔ ΙΕΡΑ ΔΑΜΝΕΥ ΔΑΜΝΟΙ
8. ΟΥΤΑΚΤΗΡ ΙΕΡΑ ΜΑΡ ΔΗΜΗΤΕΡ ΠΥΡ ΖΕΥ ΚΟΡΗ ΧΘΟΝΙΑ ΤΡΑΒΔΑΗΤΡΟΣ ΗΡΩΣ ΤΗΟΙΣΤΗ
9. Υ ΗΡΩΣ ΝΗΙΑΤΥΝΝΓΑΟΣ ΕΣ ΦΡΕΑ ΜΑΤΑΙΜΗΤΗΝΤΗΣ ΝΥΣΧ Μ ΜΕΣΤΩΡ ΕΙΛΕ ΚΟΙΡΗΝ
10. ΑΙΑΦΗΡΤΟΝΟΣΕΜΑΦΙΕΣΤΟΝ ΑΕΡ Τ ΑΙΤΙΑΝ ΙΜΝΗΣ ΦΡΕΝΑ ΜΑΡ*ΤΩΣ

handed corrections. Hypothesis (e), by contrast, accepts that what looks gibberish is just gibberish in no need of emendation. The major challenge in this case is to explain why this tablet, unlike the vast majority of other tablets, doesn’t have a continuous text, and why this otherwise unattested form of encoding was used in this instance. The above options may, of course, be combined. The methodological problem in this case is where to stop with the emendations. New readings can, nonetheless, be offered on purely epigraphic grounds (for an example, see fig. above).

Interpretative remarks and questions

► The intelligible words of the text can be divided into three main groups: 1. *Divine names* (Prōtogenos, Gē, Mētēr, Kubeleia, Dēmētēr, Zeus, Tucha(i), Phanēs (?), Moira(i), Hestia, Korē, Chthonia). 2. *Terms with religious or eschatological implications* (blood (?), daimon, invoke, prayer, release, wrongdoing (?), sacred things, hero). 3. *Physical and cosmological terms* (earth, air, sun, fire, the stars (?), night, day, seer-of-everything (i.e. the sun)).

The central interpretative question concerns the interrelation of these terms, and, in particular the place and function of physical and cosmological notions in the theological and eschatological context. The terms used on Tablet C might bring into focus connected features of other gold tablets,

e.g. that on the three tablets found in the neighbouring Timpone Piccolo the deceased attribute their deaths to the ‘star-flinger’. Similarly, together with the fact that the deceased on the Pharsalos gold tablet (F 477 Bernabé) calls himself Asterios, the use of the epic epithet ‘starry’ in the set formula ‘I am child of Earth and Starry Sky’ might become more emphatic. One may speculate that the text of Tablet C contained hints of a more elaborate explanation linking theology and eschatology with physics and cosmology. Unusual forms of encoding might have been used in order to veil this teaching.

The Triangular Dance of the 183 Worlds

Place and Cosmological Explanations

Whereas Aristotle and the Stoics maintain that there is a single, finite world, the Atomists hold that there is an infinite multiplicity and variety of worlds interspersed at irregular intervals in the infinite void. Plutarch (c. 46–120 C.E.), in *On the obsolescence of oracles*, calls attention to the fact that Plato in the *Timaeus* suggested a third, intermediate option. At 55 C, *Timaeus* proposes that after using four regular solids – tetrahedron, octahedron, icosahedron and cube – for the construction of fire, air, water and earth, respectively, the Demiurge used the fifth construction, the dodecahedron for the shape of the world. Cleombrotus, the character of the dialogue speaking at this point, adds an important qualification: there are five worlds, one for each regular solid, and they are according to the ‘elements’ (422A). This means that Plutarch, like the author of the *Epinomis*, assigns the fifth regular solid to a fifth element, *aithēr*.



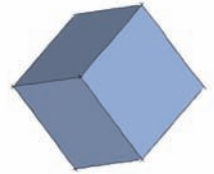
Fire



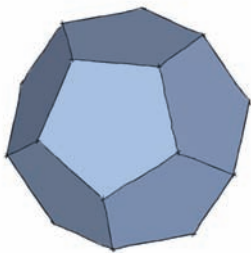
Air



Water



Earth



Aithēr

This special Platonic position is further elaborated by another anonymous authority. Cleombrotus reports that according to a sage, an expert of Oriental lore, who is in commerce with demigods and is accessible only for short periods each year,

there are altogether 183 worlds: three at the apexes of a triangle, and sixty along each side of the triangle. Successive worlds are in contact with each other; they revolve as in a dance, and surround the interior of the triangle, a common hearth, which is the Field of Ideas (422B-C).

This report is immediately rebuked by Lamprias as pretentious. Lamprias argues that there is no need to invoke this mysterious wise man of Oriental lore: the same number of worlds in the same triangular arrangement was propounded by the Pythagorean philosopher Petron, as attested by Hippys of Rhegium, who is also mentioned by Phanius of Eresus. But the Pythagorean philosopher Petron, and perhaps the historian Hippys of Rhegium as well, are phantom figures.

183 Worlds

While the debate on whether or not Petron existed is bound to remain inconclusive, it is worthwhile to formulate a tentative account of the figure 183.

In its first formulation, originating from the mysterious sage, the number 183 is embedded in a Platonic supra-cosmical topography. This topography is no longer present in the leaner ‘Pythagorean’ variant. But the worlds follow one another *kata stoicheion* – presumably element-wise, even though Lamprias professes that he has no further indication how this phrase should be understood. If the worlds are ordered ‘element-wise’, however, the figure 183 should take into account what elements each world is composed of, what sort of transformations are allowed in such worlds, and – similar to *Timaeus*’ proposal – the overall arrangement of these elements.

One such account might be the following: There are three worlds of utmost simplicity – made of the single, aetherial element – one of them spherical, the other two approximating this figure in the shape of a dodecahedron or icosahedron. These are placed at the apexes of a triangle. The remaining 180 worlds, then, could be the ones that are made up of the five elements: earth, water, air, fire, and *aithēr*. Excluding the empty arrangement, which does not contain any of these elements, and the purely aetherial worlds, there remain 30 setups for worlds. If each of these setups can give rise to worlds of six different shapes – the five Platonic solids and the sphere – we will have the 180 worlds which are allotted to the sides of the supra-cosmic triangle of ‘Petron’.

If this account is on the right track, it would indicate that Plutarch’s report about these 183 worlds – although a mock-Pythagorean pedigree is claimed for them – should find its intellectual niche most probably in the early Academy.



¹ Cf. *Phaedrus* 247C–E, about the Extracrestrial Place of the Ideas.

The Homogeneity of the First Element

First Element and Fire

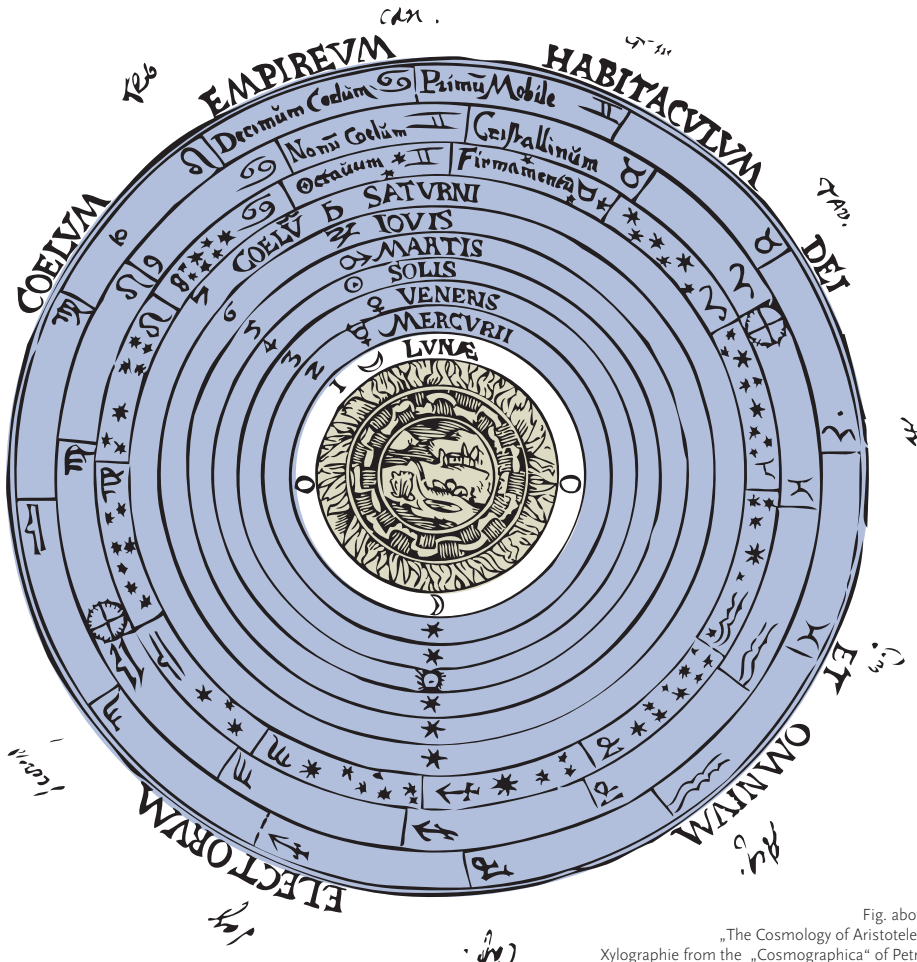


Fig. above:
„The Cosmology of Aristoteles”.
Xylographie from the „Cosmographica” of Petrus
Apianus, 1540 | Drawing based on a picture from
bpk / Kunstbibliothek, SMB.

Aristotle holds that the universe is finite and spherical. It can be divided into two large regions: the region above the Moon (supralunary region) and the region below the Moon (sublunary region). The latter is made up of four elements: fire, air, water and earth, while the former consists of only one element, of the so-called first element. The sublunary elements have separate subregions, “proper places”, which are concentric spheres embedded in each other, the innermost of these being earth, in the middle of the universe, then water, air and finally fire. The supralunary region is similar in structure, inasmuch as it is built up of rotating concentric spheres which are themselves completely transparent, some carrying planets or stars, some only contributing to the motion of other spheres with their own movements.

One of the questions that arises regarding this structure is whether or not there is a region where the first element coincides with the

sublunary elements. There would seem to be, because Aristotle claims that the sphere of fire is moved by the motion of the first element. But there are other, stronger doctrinal grounds on which to base the view that the region of the first element does not overlap with the sublunary realm. These grounds are rooted in the concept of the first element, of which Aristotle gives the most detailed account in the *De Caelo*¹, though he occasionally refers to it a number of times in his other works, too². He enumerates the properties of this element in the third book of the *De Caelo*: it has no lightness or heaviness, it is ungenerated and imperishable and cannot change in either quantity or quality³. This seems to be in stark contrast with the four terrestrial elements, which change into one another⁴ and never exist in a pure form in reality; they are always mixed with each other⁵. Thus, the first element appears to be superior to the four terrestrial elements⁶.

The constant and changeless nature of the heavenly revolutions is grounded in the idea that the first element is unique in the sense that it has no opposite and does not admit of the qualities that the terrestrial elements do. If it could mix with any of the terrestrial elements, change and decay could occur in the heavens, and this would have undesirable consequences for the Aristotelean system. Hence, it is most probable that the celestial region does not overlap with the sublunary region.

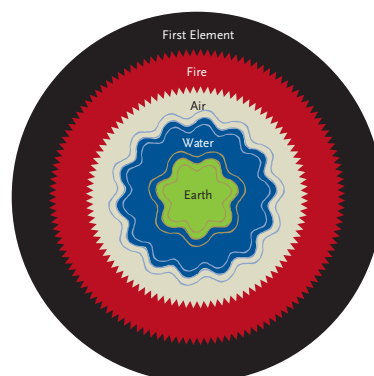


Fig. above Δ | FIRST MODEL
Fire and the first element overlap to a certain extent

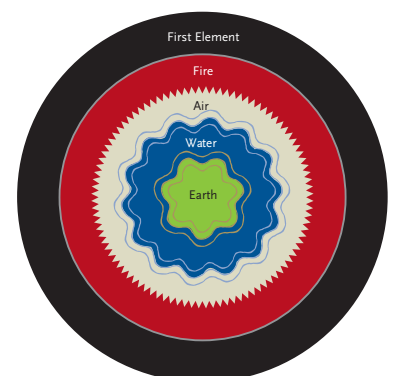


Fig. right ▷ | SECOND MODEL
Fire and the first element do not overlap

1 De Caelo, I. 2-4, 268 b 11-271 a 33.
2 Meteorology, I. 1-3, 338 a 1-341 a 36; De Gen. An. II. 3, 736 b 30-737 a 1; Metaphysics A 8, 1073 a 31-32, De Anima II. 7, 418 b 7-10.
3 De Caelo, I. 3, 269 b 18-270 a 35.
4 De Generatione et Corruptione, II. 4, 331 a 7-331 a 20.
5 De Generatione et Corruptione, II. 8, 334 b 31-335 a 23.
6 De Caelo, I. 2, 269 b 13-17.

Anima Mundi

World Soul and Cosmic Space in Platonism and Early Christianity

ENSOULED WORLD

It is in Plato's dialogue *Timaeus* that we first encounter the highly influential doctrine of the world soul (Tim. 41d5: *tau pantos psuchê* – lit. “soul of the all”). But even before Plato, in the Presocratics, there is an appeal to a “Weltvernunft” or “Weltgeist” (*nous*). Anaxagoras, for instance, speaks of a rational principle that moves and orders everything.

With Plato, the cosmos is ensouled because it is considered a living being and divine. The *Timaeus* attributes altogether three functions to the world soul: *life*, *movement*, and *cognition*. The analogy between micro- and macrocosm, which is fundamental for the whole of the Platonic tradition, rests on the assumption that world soul and human soul share the same essence. Accordingly, the Neoplatonist Plotinus referred to them as siblings (“soul sisters”).

ENSOULED SPACE

What is the relation between the world soul and cosmic space? It seems obvious that the soul is in a body. Therefore, one may assume that the world soul is located in cosmic space. However, it is already stated in the *Timaeus* itself that the world soul envelops the cosmos, as it were. Hence, one ought to say that cosmic space is contained in the world soul and not vice versa.

Without doubt, the doctrine of the world soul is of special significance for the periods of Middle and Neoplatonism. Since the *Timaeus* suggests a rather dynamic notion of space, Plotinus will later say that space is holy, because it is permeated by soul. Later Neoplatonists go even further and make space the measure (*metron*) of things in space. Moreover, space is attributed to an ordering function.



FROM ANIMA MUNDI TO HARMONIA MUNDI

A good example of the rich *Nachwirkung* of the world soul-theme in Antiquity and Late Antiquity and its connection to spatial thinking is the dissertation project of D-I-2: “*Harmonia mundi*. The concept of musical space in the philosophy and music theory of Late Antiquity.” In the *Timaeus*, Plato describes the constitution of the world soul (and human soul) by means of mathematical ratios and musical intervals. Some interpreters have connected this musical space located, as it were, within soul to the Pythagorean doctrine of the harmony of the spheres. The project in question will systematically review ancient and late ancient readings of the world soul as musical space and shed new light on the noteworthy transition from *anima mundi* to *harmonia mundi*.

THE QUEST FOR A CHRISTIAN PLATONISM

Early Christian theologians reacted differently to the Platonic concept of a divine soul of the world. Some dismissed the notion outright, while others substituted it with the Logos or the Holy Spirit. We shall connect the reception of the *anima mundi* in Early Christianity to the long-standing question of the existence of a distinctively Christian Platonism.

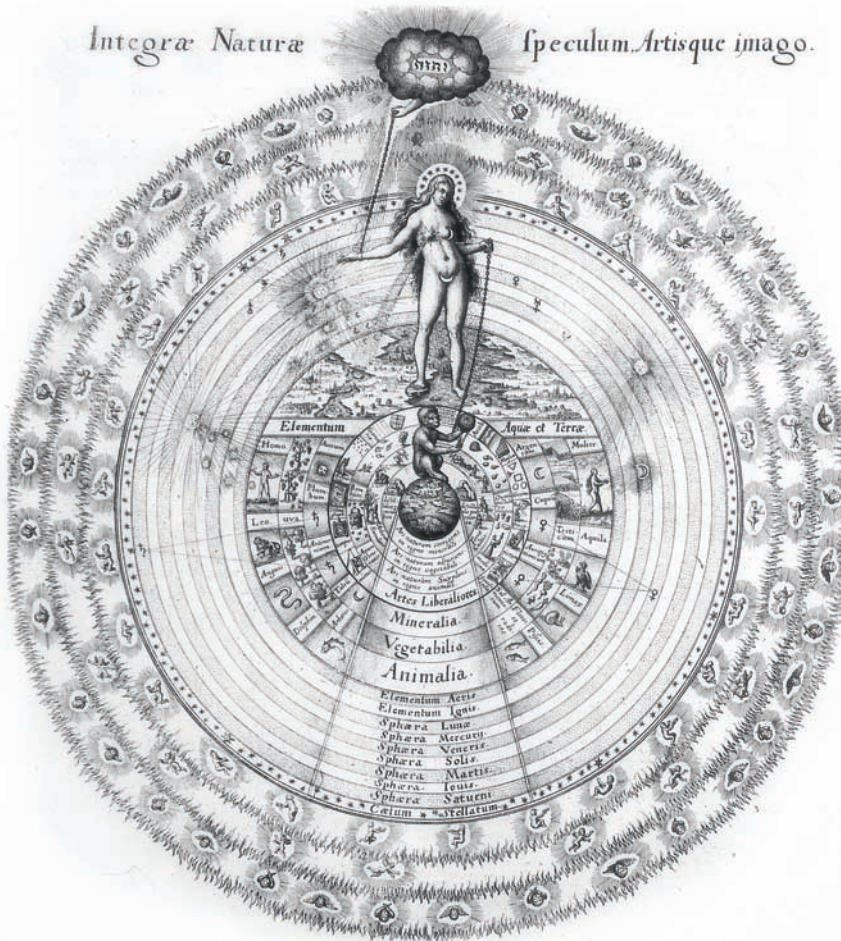
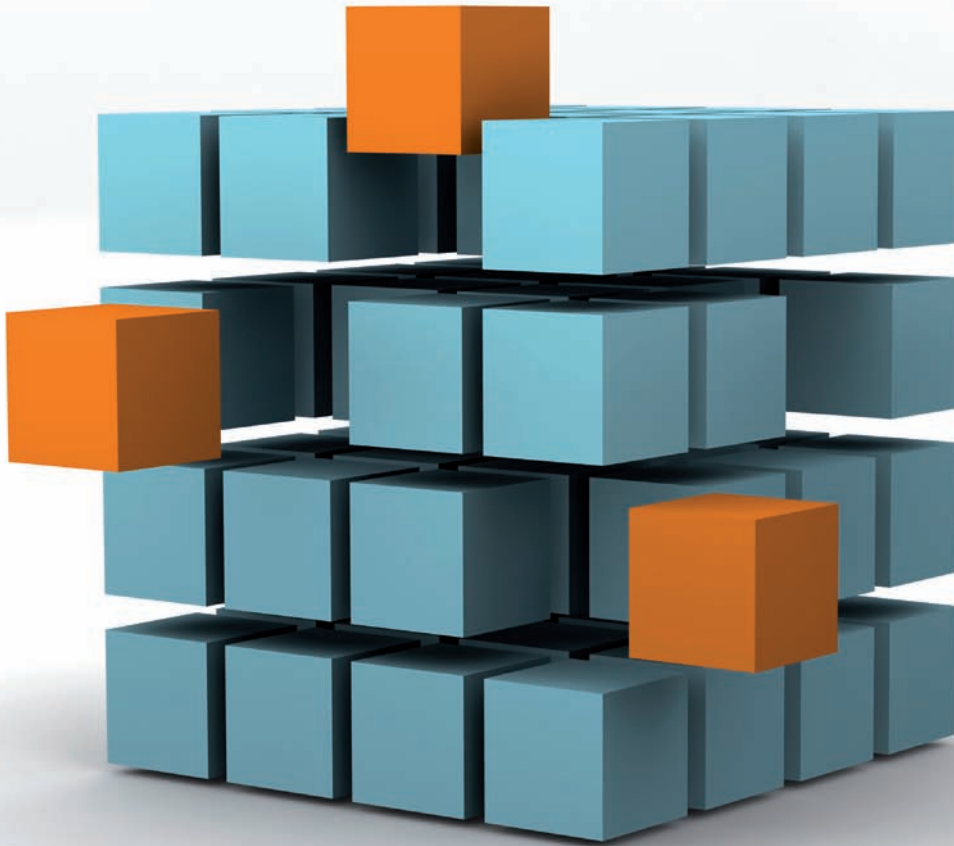


Fig. from Robert Fludd, *Utriusque Cosmi Historia* (1617–1621)

Ontology of Space

Bodyhood, Extension, Dimensionality, Topology of Space and Time



In the picture you see a disintegrating cube. Or do you see an aggregate of many cubes? Is the status of the brown cubes different from the status of the blue cubes? Do the blue cubes constitute a disintegrating larger cube, whereas the brown cubes constitute parts of it that are now separate? Or is there no reason at all to assume that there is any object besides the individual small cubes? What reason could there be?

Research Group D-II-1 “Ontology of Space” focuses on such metaphysical questions regarding space and spatial entities in an ancient context. We seek to explore central conceptual difficulties in formulating theories dealing with spatial entities. Our belief is that in many respects the ontology of objects or processes is intimately linked with questions about space. This poster highlights some of the problems we work on.

Illustration: Peter Galbraith: “Beginning of Chaos”

Christian Pfeiffer (Doctoral Fellow)
Graduate School of Ancient Philosophy, HU Berlin
christian.pfeiffer@topoi.org

BODYHOOD AND EXTENSION

Bodies are typically viewed as three-dimensional objects. But is three-dimensional extendedness sufficient to yield physical bodies, or do we need one or more additional properties (such as impenetrability, *antitypia*) to distinguish bodies from other three-dimensionally extended entities (such as the void)? Is extension a property of bodies, as Aristotle believed, or is there a space-like entity which accounts for the extension of bodies and is independent of them, as in the Platonic *chōra*?

SPACE AND INDIVIDUATION

The example of the cubes shows that the question whether several constituents make up a larger unity is intimately linked with questions about spatiality. For Aristotle, an object is one if its constituents are continuous with each other. Continuity is viewed as a kind of connectedness. Every

boundary within a body is shared by two or more parts. External boundaries, by contrast, are not shared by the body and its environment. Rather, in this case, there are two coinciding boundaries. This distinction can be used to articulate the “joints” in reality.

TOPOLOGY OF SPACE AND TIME

For Aristotle, time and space are in many ways structurally isomorphic, e.g., they are both continuous but only finitely divisible in actuality. But Aristotle seems unwilling to consider time as yet another dimension, in addition to, and on a par with, the three spatial dimensions (as contemporary “four dimensionalists” do), and his systematic commitments appear to give priority to space over spatial change, and priority to change over time, insofar as Aristotle defines time as a “number of change”. This suggests that the topological features of time are to be understood as following from the topological features of space, via the notion of change.



MATHEMATICAL SPACES

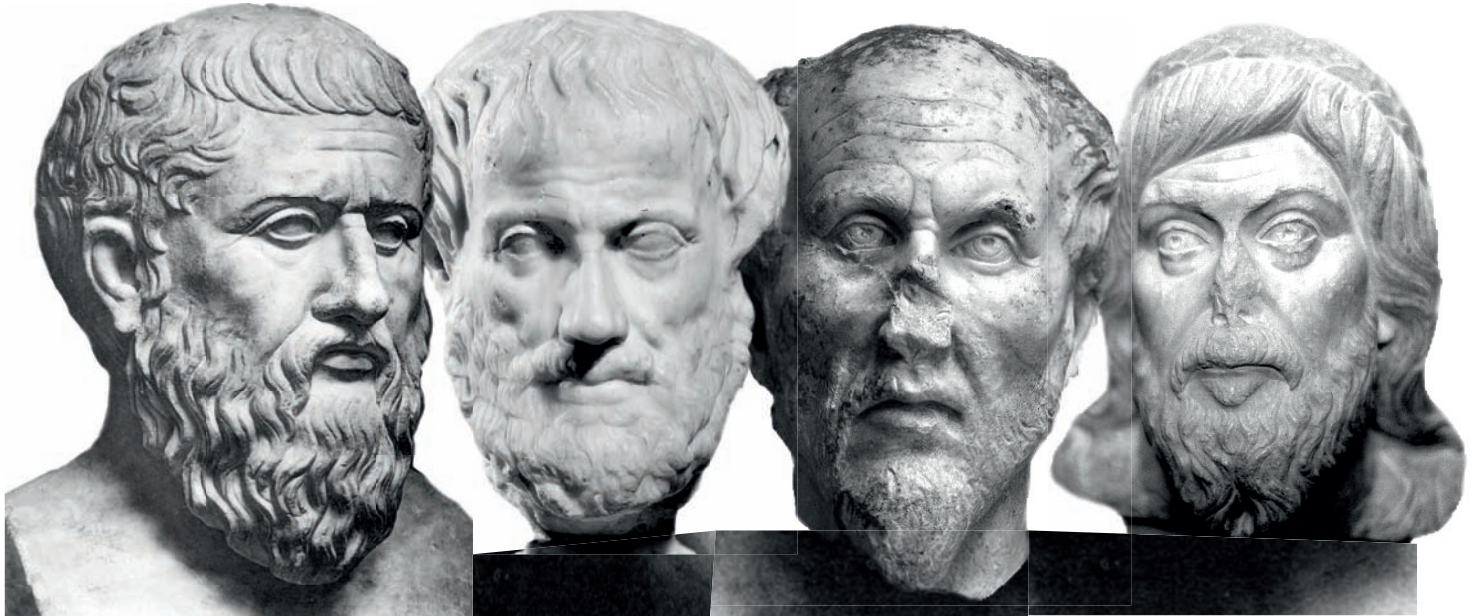
Greek mathematicians made a sharp distinction between numbers and magnitudes. They even proved that there must be such a distinction. Though Descartes abolished the distinction, we can still reconstruct and understand the proof the ancients had given. What does this show us about the relationship between mathematics and logic, or about the relationship between counting, numbers, measuring, and continuous magnitude? Wittgenstein's philosophy of mathematics includes extensive reflection about necessary truth and about proof. His ideas can be used to evaluate the shift that has taken place in the way space is mathematically represented. And the historical case can be used to illuminate how Wittgenstein thought about necessity, proof, and logic.

MEMBERS

Andreas Anagnostopoulos, HU Berlin
Jonathan Beere, HU Berlin
Gábor Betegh, CEU Budapest
Christian Pfeiffer, HU Berlin
Christof Rapp, LMU München

Place, Space and Motion

Physical and Metaphysical Theories in Ancient Philosophy



Group picture with Plato, Aristotle, Plotinus und Proklus (from left to right)

SPACE, MATTER, BODY

Jonathan Beere is interested in the connections among space, matter, body and the conditions for the possibility of motion. He is pursuing these issues within two contexts. One context is Aristotle's denial that the vacuum is a condition for the possibility of motion, as the atomists had claimed. Aristotle insists, against them, that motion in a vacuum is impossible. The second context is Plato's *Timaeus*, which argues for the existence of a "receiver" of the cosmos. Puzzlingly, this "receiver" seems in some ways like space, in some ways like matter.

CAUSES OF SPACE

Christoph Helmig is writing a commentary on Simplicius' *Corollarium de loco (Excursus on Space / Place)*, the most important late antique text on space and place (*topos*). Starting from Plato's *Timaeus* and Aristotle's *Physics* IV.1-5, Simplicius develops a Neoplatonic metaphysics of space that seeks to investigate the ontological causes of spatiality. On his view, space is dynamic. Not only is it the measure (*metron*) of spatial entities, but it also actively orders them. Helmig is also working on a reconstruction of Proclus' lost treatise "On Place".

SOUL AND PRIME MATTER

Christopher Noble is currently working on Plotinus' theory of primary matter, conceived of as something lacking sensible qualities and extension, and its background in Plato's *Timaeus*. A future project will consider why Plotinus denies extension to soul, and how non-extended souls interact with bodies.

TOPOLOGY OF CHANGE

Jacob Rosen is working on the topology of change in Aristotle's *Physics*. Changes are extended, have edges, can touch or be continuous with each other, are divisible – thus they have a topological structure, in both time and space. Aristotle conducted a systematic analysis of this structure, and thought he had discovered thereby important constraints on what kinds of changes are possible.

BETWEEN PLATO AND NEOPLATONISM

Georgia Mouroutsou is studying the reception of the Platonic *chora* in the Middle Platonism of the two first centuries CE, focusing on why the Middle Platonists understood *chora* as matter rather than as space. The project also involves Aristotle, whose arguments against the existence of space independent of matter decisively influenced Middle

Platonism. The ultimate aim is to show how the reception of *chora* by the Middle Platonists illuminates their own distinctive philosophical agenda and self-conception.

PRIORITY OF LOCOMOTION

Sebastian Odzuck is working on the priority of locomotion in Aristotle's *Physics*. Aristotle recognizes four distinct kinds of change that are not reducible to one another: change with respect to quality, quantity, place and substance. Odzuck is writing a dissertation in which he examines how Aristotle can claim that locomotion has priority over the other kinds of change.

ORT, ZEIT, VAKUUM

Ioannis Papachristou is writing a dissertation on Philoponus' *Commentary on Aristotle's Physics IV* (on place, time, and void) with a special emphasis on the *Corollaria de loco et inani (Excursus on Place / Space and Void)*. His aim is to explain why Philoponus maintains, against Aristotle, the existence of a vacuum. In the context of this dispute with Aristotle, Philoponus introduced the concept of impetus, which constituted a radical innovation in the science of motion.

Diagrams, Diagrammatics, and Diagrammatology

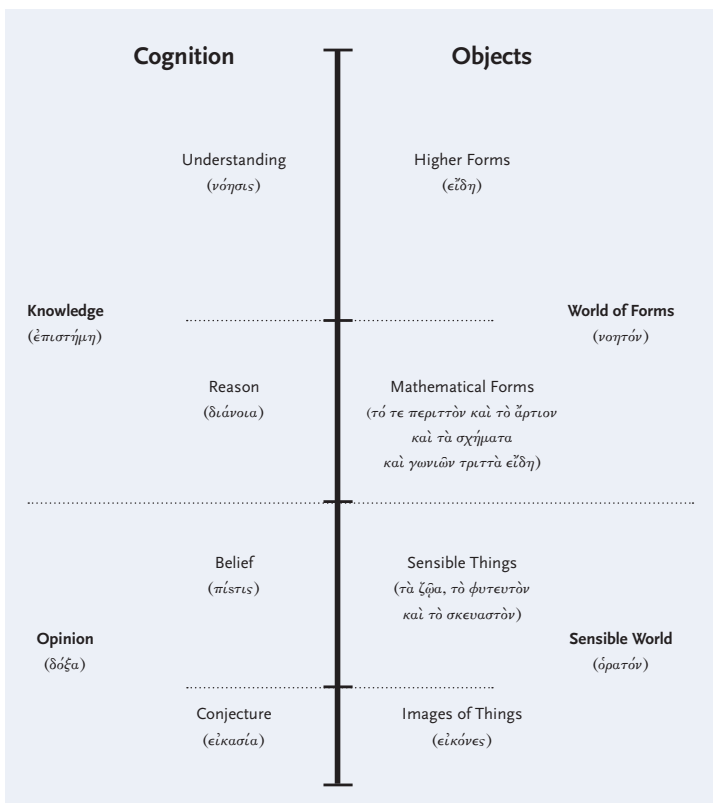
Space as a Medium for Depicting and Exploring Epistemic Objects

TOPIC OF RESEARCH

Diagrams are of great importance for the discovery, analysis and justification of scientific knowledge. Our project aims at working out the cognitive significance of diagrams. We focus specifically on the use of spatial structures in depicting epistemic objects. We claim that the cognitive productivity of diagrams stems from their power to depict non-spatial states by means of graphical spatial relations.

Our research is based on four hypotheses: (i) Diagrams employ spatial logics to depict, above all, non-spatial, theoretical relations. (ii) Diagrams do not depict isolated objects, but epistemic structures. (iii) Diagrams open up a space for exploring as well as experimenting and operating with the usually abstract states of the matter they depict. They visualize theories. (iv) The use of diagrams and related graphical objects constitutes a defining feature of the human species, as important as the use of language.

Illustration: Plato's Simile of the Divided Line



Cf. Plato, *Politeia* 509C–511E. Note that the text itself does not provide unambiguous instructions on how to construct the diagram.

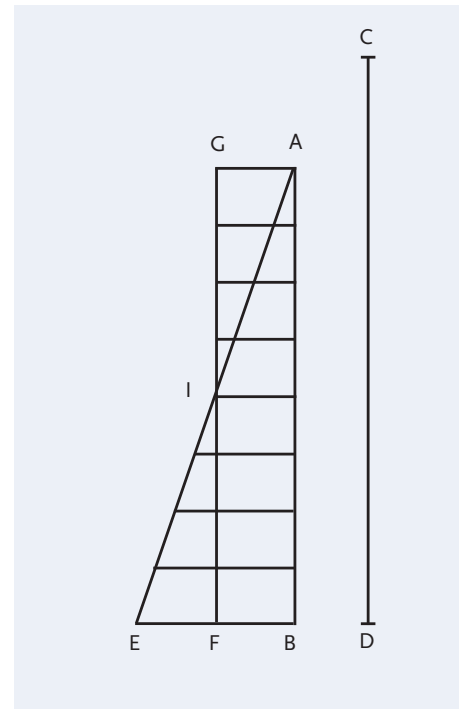
DIAGRAMMATIC SPATIALITY

In the context of diagrammatics, spatiality refers to the inscription of graphical marks on two-dimensional surfaces. Point, line and plane form the basic diagrammatical elements. Geometrical, topological and topographical relations are used to identify semantic contents. In sum, diagrams can be said to employ a unique kind of spatiality (*Eigenräumlichkeit*). Nonetheless, diagrams are thoroughly mobile: What they depict is effortlessly circulated and transmitted into other forms of representation.

PROJECTS

Sybille Krämer is working on a monograph on diagrammatology. In her theory, diagrams play a dual role by providing an indispensable bridging of the difference between the visible and the intelligible, while at the same time producing this very difference. She analyses the crucial role that diagrammatic inscriptions play in human cognition. To this end, she looks at key examples of thought about diagrams in Western philosophy, including Plato, Descartes, Leibniz, Kant, Peirce and Deleuze.

Jan Wöpping is studying diagrams as cognitive artifacts, i.e. external material objects which extend the mind beyond an individual's bodily boundaries. He is currently doing research on Nicole Orèsmes's configuration doctrine (14th century) and Galileo Galilei's geometrical physics (17th century), considered as important historical turning points in the use of diagrams. Subsequently, he intends to identify what consequences a closer look at such cognitive artifacts would have on a theory of human cognition.



A diagram used by Galileo in his *Dialogues Concerning Two New Sciences* (1638) for demonstrating the Merton Rule. Vertical lines represent time intervals, horizontal lines represent speed levels.

PARTICIPANTS

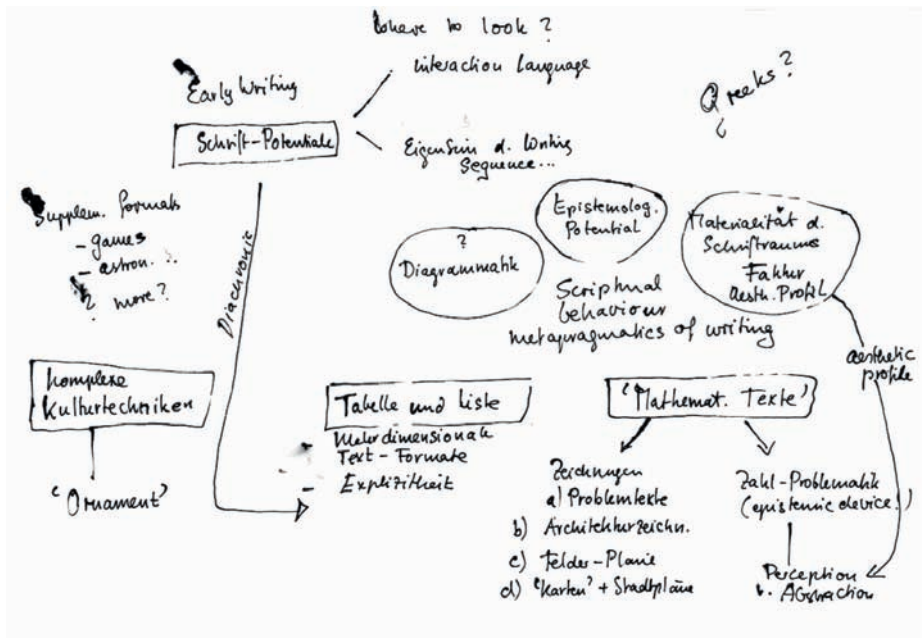
(i) DFG Graduiertenkolleg Schriftbildlichkeit (Graduate Program 'Notational Iconicity'), Spokesperson: Sybille Krämer; (ii) a work group including, besides Krämer / Wöpping: Eva Cancik-Kirschbaum, Steffen Siegel (BBAW, FSU Jena), Benjamin Meyer-Krahmer, Nils Güttler, André Reichert and Michael Rottman (doctoral and post-doctoral fellows of the Graduiertenkolleg Schriftbildlichkeit); (iii) Frederik Stjernfelt, University of Aarhus. (iv) Gerhard Dirmoser, Linz, with whom exhibitions on the topic of diagrams are planned.

CONFERENCES

The research group is currently organizing two conferences. The first addresses the connections between the role of spatiality in cartographic and utopian thinking (June 2010), the second focuses on diagrammatic reasoning (January 2011).

The Epistemological Dynamics of Early Writing

Materiality und Representation as Constituents of Scientific Thought



processes in the material record in Ancient Mesopotamia. An early and not entirely obvious example is the set of knot drawings on the reverse of an Early Dynastic scholarly tablet. These drawings are highly elaborate and depict similar structures of varying complexity, most probably copied from a template. This and the tablet's context (the famous Sumerian titles and professions list on the obverse) indicate that our set of drawings is in fact a list with geometric structure as its topic.

GAMEBOARDS

Recently published cuneiform texts (Finkel 1999) make it clear that Mesopotamian gameboards (The Royal Game of Ur) could also be used to model the movement of the five visible planets through the twelve zodiacal signs that form the ecliptic. We are investigating the use of these gameboards as what Tomasello (2000) calls a "joint intentional frame" for modelling configurations of zodiacal signs and planets and as a possible medium for the transmission of astronomical and astrological information from Mesopotamia to early Greek and Sanskrit astronomers (Pingree 1978). The use of gameboards for diagramming configurations of heavenly bodies (and in particular the attestation of trine aspect in Late Babylonian, Greek and Sanskrit sources) also raises many of the same theoretical questions posed by Reviel Netz's recent discussion of the use of diagrams in Euclid.

WHAT?

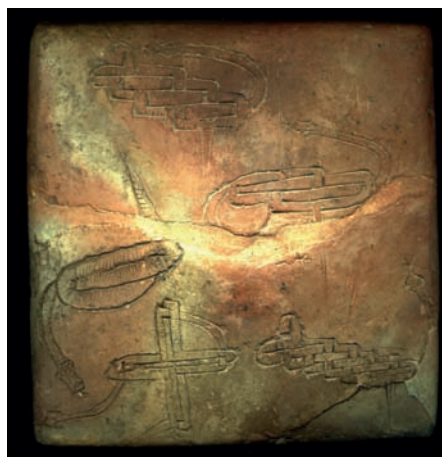
The Research Group aims at understanding the cognitive, material, and epistemological impact of spatiality and the experience of space in the development of scientific thought. The textual tradition of cuneiform is examined from two specific perspectives:

1. The 'material' conditions of writing and the representation of (three-dimensional) space: verbalised, geometric, algebraic, as a model, as illustration / figure.
2. The impact of the medium as such, i.e. the principal spatiality of the clay tablet; two-dimensional parameters such as sequence, layout, and order condition the systematization of facts and thought. Genuine 'modes of representation' are generated: lists, tables, 'diagrams', ect.

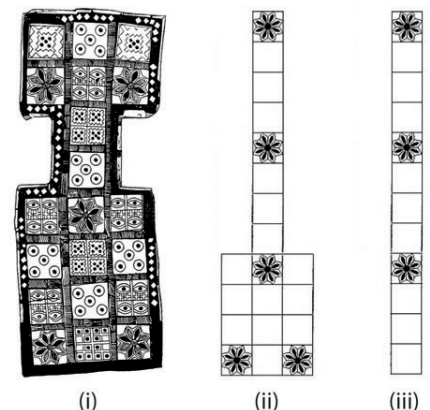
The interdependency of representational space and the generation of different types of knowledge in the Ancient Near East will be compared to similar phenomena in neighbouring Greece, in order to analyse differences and similarities in the interplay of space and knowledge.

KNOTS

The very fact of material representation of concepts of thought is an essential (pre)condition for increasing their complexity and degree of abstraction. It is therefore a most important incitement for the development of mathematical thinking and its subsequent dissociation from the entirely concrete. The process of 'playing' with the material representation of forms and structures not only facilitates their systematisation, but also evokes substantial innovations. One central issue of our research is to identify evidence of these



Knotted snakes on the reverse of the Fara school tablet VAT 9130 (Southern Mesopotamia, ca. 2600 B.C.). Photo: Vorderasiatisches Museum, Berlin, Germany.



(i) Mesopotamian gameboard from the Early Dynastic period, ca. 2600 BCE, (ii) the layout of the gameboard found from ca. 1500 BCE on, which Late Babylonian and Seleucid descriptions analyze as consisting of a central pathway (iii) with twelve squares that correspond to the twelve zodiacal signs. (i) a drawing from H.J.R. Murray, A History of Board Games Other than Chess (Oxford 1957), (ii) and (iii) from Irving L. Finkel, "On the Rules for the Royal Game of Ur", in Ancient Board Games in Perspective (British Museum Press 2007).

Philological Foundations

Mechanics and Philosophy of Nature

The group, based at the Aristoteles-Archiv of the Freie Universität Berlin (founded in 1965 by Paul Moraux), investigates the Greek manuscript tradition of Aristotelian texts and diagrams that are of particular importance for Area D.

The group has two main focuses. One is the text of the *Mechanica* attributed to Aristotle, with its frequent use of geometric discourse and diagrammatic representation. The other focus is the diagrams preserved in the manuscripts of *Physics*, *De caelo*, *De generatione et corruptione*, *Meteorologica* and of their Greek commentaries from late Antiquity and the Byzantine era.

This philological research is relevant, e.g., to the projects concerned with mathematical aspects of Aristotle's general theory of motion (D-II-1, D-II-2) and with his theory of the soul (D-III-E-II).

THE TEXT OF THE MECHANICA

The investigation of the medieval transmission of the *Mechanica*, accompanied by a study of its reception in the Renaissance period, will eventually lead to a new critical edition.

Of the 31 manuscripts containing the *Mechanica*, the earliest are fairly late (beginning of the 14th century), which makes the assessment of earlier phases of the textual tradition difficult.



The situation is further complicated by the presence of a relatively independent branch in the tradition, that of a paraphrase by Georgios Pachymeres (1242–after 1310), which in turn influenced some of the manuscripts of the Aristotelian text.

One of the fundamental tasks of the edition will be to remove the direct influence of this paraphrase, while preserving the evidence that it may give of earlier states of the source text.

The paraphrase of the Paleologan polymath Pachymeres is extant in two autograph copies (ca. 1300 A.D.); it is also an important source for the reconstruction of the diagrams accompanying the text.

AN INVENTORY OF DIAGRAMS

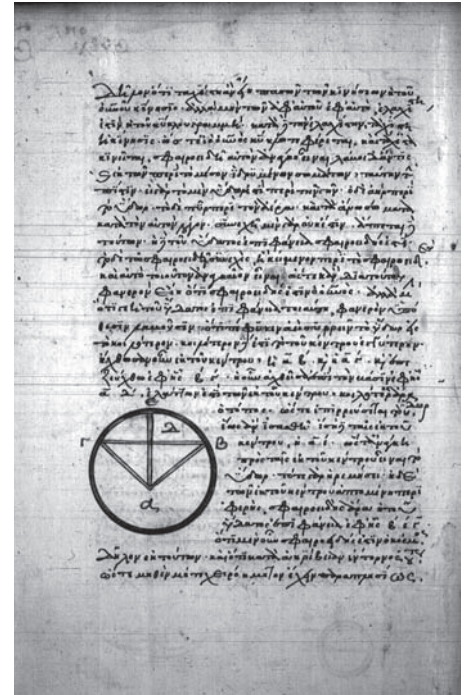
A comprehensive inventory of the diagrams preserved in the extant manuscripts of Aristotle's natural philosophy, primarily but not exclusively his cosmology and theory of motion, will allow scholars to use the diagrams in at least two important ways.

First, they serve as evidence for the validation and refinement of stemmata codicum. Second, the diagrams are also worth studying for the light they shed on the philosophical and scientific content of the texts in which they are found.

Since manuscripts are numerous (ca. 150–200 items) and most of them contain a multitude of diagrams, the first stage of the project is concentrating on the treatise *De caelo* (ca. 65 manuscripts), the medieval transmission of which is better understood (thanks to the work of Moraux) than that of, e.g., the *Physics*.

In each case the position and the kind of diagram (geometrical, logical figure, line diagram, tree diagram, other drawing) is registered, and the corresponding part of text is indicated. More precise data (Incipit and Explicit of relevant folium, precise junction of text and diagram) is recorded for manuscripts of particular importance for the transmission. Also, the relevant sections of the microfilm are scanned and archived.

Berol. Ham. 512 Pachymeres' autograph, ca. 1300, f. 225v: *Mechanica* 1,849a 19sq. (component motions of rotating radii)
© Staatsbibliothek zu Berlin – Preussischer Kulturbesitz



Vind. phil. gr. 64 Bessarion's circle, ca. 1460, f. 107v: *De caelo* II 4, 287a 4sq. (sphericity of the water's surface)
© Österreichische Nationalbibliothek

Both the investigation of the transmission of the *Mechanica* and the inventory of diagrams rely vitally on the resources of the Aristoteles-Archiv, esp. its comprehensive microfilm collection and manuscript documentation, which are unique in the world.

MEMBERS

- Dieter Harlfinger, Aristoteles-Archiv/FU Berlin
- Lutz Koch, Aristoteles-Archiv/FU Berlin
- Jonathan Beere, HU Berlin
- Klaus Corcilus, Universität Hamburg
- Jürgen Renn, MPIWG Berlin
- Matthias Schemmel, MPIWG Berlin

- István Bodnár, CEU Budapest (Senior fellow)
- Joyce von Leeuwen, HU Berlin (Doctoral fellow)
- Christina Prapa, FU Berlin (Student assistant)

Dialectical Topoi

Aristotelian Theory of Argumentation and Its Early Modern Reception

DIALECTICAL TOPOI IN ARISTOTLE

Dialectical *topoi* are a cornerstone of Aristotle's theory of argumentation (dialectic). Although Aristotle does not explain exactly what they are, dialectical *topoi* can be characterized as schemes of arguments which allow us to find suitable premisses for establishing or refuting a given thesis. They play a prominent role in Aristotle's *Topics*, the *Rhetoric*, and *Sophistical Refutations*.

The purpose of our Research Group is to investigate the *topos*-based dialectical logic developed in these works, and its relationship to the formal logic developed in the *Prior Analytics*. With regard to Aristotle we are focusing on three projects:

1. The *Topics*' theory of predication in Aristotle's syllogistic: Aristotle's *topoi* about the four predicables in the *Topics* can help us to understand his assertoric and modal syllogistic.
2. The notion of deduction (*sylogismos*) in the *Organon*: Aristotle's *topoi* give rise to dialectical deductions. What is the nature of these dialectical deductions, and how are they related to the *Prior Analytics*' formal theory of deduction?
3. The second book of the *Prior Analytics* (translation into German and commentary): In this book, Aristotle applies the formal apparatus of his syllogistic in an analysis of several notions of his dialectic.



NEW READINGS OF ARISTOTLE'S TOPICS

In the sixteenth century, an intensive reception of Aristotle's *Topics*, both in material and intellectual terms, can be observed. This manifests itself in several new translations based on the Greek text as well as a host of commentaries. What is the relation between the newly awakened interest in the *Topics* and the change of the epochal *episteme*? Are there innovative interpretations of the *Topics* in the Early Modern period, or are the transmissions and transpositions by Cicero and Boethius still in use? Is the spatial dimension that informs both Aristotle's definition of *topos* as 'a place, from which attack starts' and Cicero's definition of *locus* as 'the seat of arguments' (*sedes argumentorum*) reflected on? Are they developed further? Or are there tendencies that run counter to these positions by fostering further abstraction?

Truth – Probability

With regard to epistemology, the relationship between *veritas/scientia* and *opinio/probabilitas/verisimilitudo* is of crucial importance. Our thesis is that the status of *opinio/probabilitas/verisimilitudo* is enhanced in the Renaissance with recourse to interpretations of Aristotle's notion of *endoxon*.

Rhetoric – Dialectics

We are interested in the relation of rhetoric and (topical) dialectics, which, according to recent research, is not to be conceived of as an opposition, but as something rather more nuanced.



To what extent do the two disciplines converge in that neither is concerned with absolute, scientific truth? Do both contribute to a relativist epistemology? In what regard are rhetoric and dialectic 'counterparts'? What criteria for differentiation are discussed in the Renaissance? Is Aristotle's definition of the two disciplines contaminated with other conceptions stemming from other traditions? Our hypothesis: Dialectics, as it was understood in the context of the *Topics*, has contributed just as much as rhetoric to the emergence of a relativist epistemology in the Renaissance.

Dialectics – Dialogue

In Renaissance theories of dialogue, a connection between dialectics and the genre of dialogue is accentuated. If dialogue should indeed build on (topical) dialectics, the omnipresence of the genre in the sixteenth century could be read as a pointer towards the unflagging relevance of dialectics in the early modern period. One of our objectives is to explore the correlation between dialectics and dialogue by analysing selected sixteenth-century dialogues and to investigate the relevance of eristic argumentation for dialogic texts in particular.

Aristotle, *Topics* VIII 1, 155b4–6: "First, then, the person who is going to be devising the questions must find the location (*topos*) from which to attack". Aristotle's use of the term *topos* in this passage resembles military expressions in contexts of strategic planning. In a dialectical argument where two adversaries oppose one another Aristotelian *topoi* give an orientation about possible moves within a field of generally accepted premisses.

Mapping Body and Soul

Concepts of Space in Ancient Medicine and Philosophy of Mind



Galen | Lithograph by Pierre Roche Vigneron. (Paris: Lith de Gre-goire et Deneux, ca. 1865)

Research Group D-III-E-II-2 'Mapping Body and Soul' examines the use of concepts of space in philosophical and medical explanations of the mind in Antiquity, as well as their reception in the Middle Ages and in the Early Modern Age. The research focuses on philosophical, historio-philosophical and philological projects.

The group examines the topic by taking into consideration two different aspects: Firstly, the use of spatial relations in the conception of the soul is considered. The group deals with this range of philosophical topics under the generic term "parts of the soul".

Secondly, the group analyzes the term 'location' in medical theory formation, particularly the role of the term in Galen's theory concerning the origin of illnesses.

PARTICIPATING INSTITUTIONS

Aristoteles-Archiv, Freie Universität Berlin
Leibniz Prize Project „Transformations of the Mind. Philosophical Psychology 1500–1750“
Corpus Medicorum Graecorum / Latinorum,
Berlin Brandenburg Academy of Sciences and Humanities

Dr. Roland Wittwer
Corpus Medicorum Graecorum / Latinorum, BBAW Berlin
roland.wittwer@topoi.org

FIELDS OF RESEARCH

- (i) the relations of space in the theory of mind ('parts' of the soul)
- (ii) the concept of location in the human body (medical theories)
- (iii) the localization of mental powers in the human body

MEMBERS

- Dieter Harlfinger (Aristoteles-Archiv, FU)
- Dominik Perler (Theoretical Philosophy, HU)
- Roland Wittwer (Head of Research Unit CMG, BBAW)
- Christian Brockmann (Classics, Universität Hamburg, CMG, BBAW)

Klaus Corcilus (Ancient Philosophy, Universität Hamburg)

Christof Rapp (Ancient Philosophy, LMU Munich)

FELLOWS

Pavel Gregoric studied the theory of the parts of the soul in Aristotle's philosophical psychology (15.09.2008–15.02.2009). A workshop on cardiocentrism in Aristotle is planned (together with Klaus Corcilus, February 2010).

Jessica Gelber worked on the theory of the parts of the soul in Aristotle's embryology (01.06.2009–30.06.2009).

Christina Savino is reconstructing the medieval and early-modern transmission of Galen's psycho-physiological treatise *Quod animi mores corporis temperamenta sequantur* (01.04.2009 – 31.03.2010).

Hinrich Biesterfeldt will head a workshop on the Arabic tradition of *Quod animi mores...* (together with Roland Wittwer, August to October 2010).

Jim Hankinson will offer a workshop on Galen's doctrine of the partition of the soul (together with Roland Wittwer, October 2010)

DISSERTATION PROJECTS

Florian Gärtner is working on a new edition, including translation and commentary, of the methodological books I and II of Galen's *De locis affectis*.

Jakub Krajczynski is working on the question of the localisation of mental powers in the writings of Alexander of Aphrodisias.

Francesca Pedriali is developing a linguistic and conceptual map of Aristotle's theory of the soul.

Romy Schmidt is reconstructing William of Ockham's theory of the parts of the soul.



Editio princeps (Aldina, 1525) of Galen's *Quod animi mores corporis temperamenta sequantur* with notes and corrections of Cornarius | ThULB Jena 2 Med. V, 2c

CONFERENCES

Berlin, October 23 and 24, 2009:
Partition of the Soul from Plato to Leibniz.

Berlin, November 13 and 14, 2009:
Parts of Soul and Method in Aristotle.

Host Universities

Freie Universität Berlin

Topoi Building Dahlem
Hittorfstraße 18
D-14195 Berlin
phone: +49.30.838-57271
fax: +49.30.838-53770

Humboldt-Universität zu Berlin

Topoi Building Mitte
Hannoversche Straße 6
D-10099 Berlin
phone: +49.30.2093-99073
fax: +49.30.2093-99080

Participating Universities

Technische Universität Berlin

Hochschule für Wirtschaft und Technik
Berlin

Central European University, Budapest

Partner Institutions

Berlin-Brandenburgische
Akademie der Wissenschaften

Deutsches Archäologisches
Institut

Max-Planck-Institut für
Wissenschaftsgeschichte

Stiftung Preußischer Kulturbesitz

info@topoi.org

www.topoi.org

Freie Universität  Berlin

HUMBOLDT-UNIVERSITÄT ZU BERLIN

