Plato on Time and the World

Viktor Ilievski • Daniel Vázquez
Silvia De Bianchi
Editors

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Editors
Viktor Ilievski
Autonomous University of Barcelona
Barcelona, Spain

Daniel Vázquez
Mary Immaculate College
Limerick, Ireland

Silvia De Bianchi
University of Milan
Milan, Italy

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Preface

The project of the present volume originated as a follow-up to the debate that took place on 11–13 May 2021, at the online conference entitled "Plato on Time, Eternity and the World", which the editors organized within the framework of the ERC project PROTEUS—*Paradoxes and Metaphors of Time in Early Universe(s)*. On that occasion Barbara Sattler, Luc Brisson, Sarah Broadie, Federico Petrucci and Carolina Araujo shared their ideas with our research team and the public, thereby giving rise to a stimulating discussion that inspired the present collection.

That occasion also provided the opportunity for us all to interact, unfortunately for the last time, with Sarah Broadie, who sadly passed away a few months later, on August 8th, 2021. She gave a talk entitled "Timaean Demiurgy: Is It All Over and Done With?", in which she scrutinized the reasons why we should interpret in metaphysical terms the temporal profile assigned to the cosmos in Plato's *Timaeus*. In a sense, this question represents a sort of a guideline for the present volume, in which the authors give different interpretations of Plato's view of the world, its generation, and the meaning of temporality of/within it.

Many of the readers will be genuinely and mainly interested in this book because they are scholars or students in Ancient Philosophy, or perhaps they are historians and philosophers of science interested in cosmological aspects or in ancient theories of matter and motion, or again interested in the reflections regarding time in the antiquity. However,

there is a further group of readers who might want to consider the relevance that Plato's views of time and the world have for current theoretical physics.

This consideration is not new. We have a relatively recent example of a collection that tries to make philosophers and physicists interact on the interpretation of Plato's *Timaeus*, its impact across different epochs and on current cosmology and physics. I am referring to *One Book, the Whole Universe* (2010) edited by Richard Mohr and Barbara Sattler, which is one of the books that inspired the ERC project PROTEUS itself.

Those acquainted with the project PROTEUS know that it investigates strategies devised throughout different epochs and authors of Western philosophy who discuss time in cosmology, namely it studies how they represented time, e.g., as being fundamental or not fundamental, as continuous or discrete, depending on the idea of the universe and the mathematics endorsed. However, the project is also showing a reciprocal relationship between the idea of the world and that of time. In other words, it seems that depending on the idea of time (space and matter) that one endorses, a very specific configuration of the cosmos arises.

Current studies have shown that this is not mere coincidence and that it is innate in us to generate such connection that produces patterns of representation of the cosmos. Indeed, ethnoanthropological and archeoastronomical studies leading to the creation of the field of ethnomathematics (D'Ambrosio, Ubiratan. 2016. An Overview of the History of Ethnomathematics. In *Current and Future Perspectives of Ethnomathematics as a Program*, Milton Rosa et al., 5–10. Berlin: Springer; Oliveras, Maria L. 1999. Ethnomathematics and Mathematical Education. *ZDM* 31/3: 85–91.) identified and discussed the nature of the structural link between mathematical practices and cosmovision developed in different contexts, including Egyptian, Mesopotamian and pre-Colombian civilizations (see Rubiño-Martín, José et al. (eds.). 2009. *Cosmology Across Cultures: ASP Conference Series Vol. 409.* San Francisco: Astronomical Society of the Pacific; Ruggles, Clive L. N. (ed.). 2015. Handbook of Archaeoastronomy and Ethnoastronomy. Berlin: Springer.). Several studies have also shown that cosmographies informed cosmovisions in central America, New Guinea, and in the Babylonian cultures. These cosmographies were all based on a geometro-mathematical ordering and are representatives of

the structural link between the way in which we produce the series of natural numbers, the way in which we count (through sets of objects or parts of the body) and produce notions of time (see Gontier, Nathalie. 2018. Cosmological and Phenomenological Transitions Into How Humans Conceptualize and Experience Time. *Time and Mind* 11/3: 325–335). This is just one possible direction to explore the link between the idea of the World and time, and many others can be investigated.

Those who are acquainted with the standard model of current cosmology are aware of the fact that it is based on the major tenet of spacetime continuum of general relativity, and that gravity is derived from the dynamics of spacetime and matter. Current approaches to Quantum Gravity, on the contrary, try to describe in various ways the "coming into being" of the continuous four-dimensional world in which we live, by portraying in different ways discrete space and time and continuous spacetime emerging from discrete structures (as approximation). The fact that some of these approaches, depending on the formalism adopted and the dimensionality considered therein, refer to fundamental structures as triangles or tetrahedra, should capture the attention of those who rightly noticed that Plato's view of the fundamental geometry of the physical world identified the very same elements. From the conceptual standpoint, there is another extremely interesting pattern that connects Plato and current fundamental physics. Plato's *chōra* and the elements are not referring to the direct description of physical matter and atoms, but to something more fundamental, to a sort of that fundamental or micromatter that theories of Quantum Gravity are still searching for. Plato's cosmology and cosmogony seem to encode universal pattern of construction of the way in which we think of interacting concepts, such as continuous or discrete space(time) and "stuff", or the way in which we geometrize continuous structures out of discrete elements.

The same interest that bounds together theoretical physicists and Plato scholars today is embodied by the reflections upon the coming into being of the world and of time that happen at once. How do we have to interpret the term "at once"? Is it something that simply means simultaneous appearance or simultaneous motion, e.g., as soon as the planets start moving time starts flowing, or do we rather have to focus on the transition from an atemporal to a temporal world? Is this transition implying a

specific form of instantaneity as atemporality or has it more to do with an embodiment of eternity in the sempiternity of the physical world?

In a very similar way, when confronting the solutions of equations in Quantum Cosmology and Quantum Gravity, we can find different options and possibilities, such as the idea that our universe resulted from another one and underwent a Bounce, or that our universe emerged as a condensate out of a process called "geometrogenesis". In any scenario, time (and in the case of geometrogenesis also space) is considered to be emergent.

This non-fundamentality of time, at least from a metaphysical standpoint, is a common trait of Plato's cosmogony as depicted in the *Timaeus,* and is echoed in many of the current Quantum Gravity approaches. The problem of thinking of our universe as resulting from a transition represents a pattern in Western thought that is far from being clearly solved or stated in perspicuous terms and it persisted throughout centuries.

Finally, there is another aspect that makes us think about the relevance of Plato's conception of time and the world and it has to do with the problem of our destination, more precisely with the question of how we want to live on this planet and in the cosmos. This question is extremely pressing now, not just for philosophers or theoretical physicists, but for any human being; this volume touches this question in some of its contributions, thereby opening the reflection on ethics and morals.

Before concluding, I would like to remember that this was the topic of the discussion that Sarah Broadie and I had in person in March 2018 in Durham. I shall never forget her words and I hope that her spirit can accompany this volume as being one of the speakers at the conference that inspired it. My deepest gratitude goes to Viktor and Daniel for their work that deeply stimulated the research team and myself.

Milan, Italy Silvia De Bianchi

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Contents

Notes on Contributors

Carolina Araujo is Professor of Philosophy at the Federal University of Rio de Janeiro, working mainly on Ancient Greek Philosophy and Women in Philosophy. Her latest book is Cooperative Flourishing in Plato's Republic: a Theory of Justice (2023).

Luc Brisson Director of Research [Emeritus] at the National Center for Scientific Research (Paris [Villejuif], France; Centre Jean Pépin, UMR 8230 CNRS-ENS, PSL), is known for his works on both Plato and Plotinus, including bibliographies, translations, and commentaries. He has also published numerous works on the history of philosophy and religions in Antiquity.

Silvia De Bianchi (Università degli Studi di Milano Statale & Universitat Autònoma de Barcelona) is Associate Professor at the University of Milan. She is PI of the ERC project Paradoxes and Metaphors of Time in Early Universe(s) investigating temporality in different cosmological models and the legacy of Plato's Timaeus.

Filippo Forcignanò is Associate Professor of History of Ancient Philosophy at the University of Milan, with a primary focus on Plato's philosophy, the debate on the Theory of Forms in the Old Academy, and the presence of pre-Socratic themes in Platonic metaphysics. In addition to several articles, he has published "Forme, linguaggio, sostanze: il dibat-

tito sulle idee nell'Academia antica" (Milan 2017), and an annotated translation of the "Seventh Letter" (Rome 2020).

Lorenzo Giovannetti is Researcher at ILIESI-CNR. Before that he was Postdoc at Eberhard-Karls-Universität Tübingen. He has published on Plato in international venues. His monograph *Eidos and Dynamis. The Intertwinement of Being and Logos in Plato's Thought* (IISF Press) has received a recognition of excellence by the *International Plato Society*.

Viktor Ilievski is a Postdoctoral Researcher in Ancient Philosophy. He has been affiliated with the Autonomous University of Barcelona and the University of Bucharest. He works mostly on Platonic metaphysics and cosmology, as well as on the problem of evil. His most recent publication is *Plato's Theodicy: The Forgotten Fount*.

Laura Marongiu received her PhD in Philosophy at the Universities of Cagliari and Cologne and is postdoctoral fellow at the University of Milan within the ERC Project "PROTEUS". Her research interests center on the history of philosophy and the history of mathematics, with special emphasis on Plato and the Platonic tradition.

Federico M. Petrucci is Associate Professor of History of Ancient Philosophy at the University of Turin. His main interests are Plato and the Platonist tradition. He recently published a new critical edition, with traslation and commentary, of Plato's *Timaeus* (Introduction by Franco Ferrari; Milano 2022).

Daniel Vázquez is an Associate Professor and Head of the Department of Philosophy at Mary Immaculate College, Limerick, and a member of the Trinity Plato Centre. Before his current appointment, he held positions at the UAB (Spain), USP (Brazil), and Oxford (UK). He works primarily on ancient Greek philosophy, particularly on Plato, the Stoics, and the scepticism of Sextus Empiricus.

Abbreviations

Aristotle

Gen. corr.	*De generatione et corruptione*
Metaph.	*Metaphysics*
Ph.	*Physics*

DK Diels-Kranz, *Die Fragmente der Vorsokratiker*

Hermias

In Phdr.	*In Platonis Phaedrum Scholia*

Homer

Il.	*Iliad*

LM Laks-Most: *Early Greek Philosophy*

Philoponus

De aet. mundi	*De aeternitate mundi contra Proclum*

Plato

Ap.	*Apologia*
Cra.	*Cratylus*
Epin.	*Epinomis*
Grg.	*Gorgias*
Leg.	*Leges*
Men.	*Meno*
Prm.	*Parmenides*
Phd.	*Phaedo*
Phdr.	*Phaedrus*
Plt.	*Politicus*
Resp.	*Respublica*
Soph.	*Sophista*
Symp.	*Symposium*
Tht.	*Theaetetus*
Ti.	*Timaeus*

Plotinus

Enn.	*Enneades*

Plutarch

De an. proc.	*De animae procreatione in Timaeo*

Proclus

Elem. Theol.	*Elements of Theology*
In Prm.	*In Platonis Parmenidem comentaria*
In Ti.	*In Platonis Timaeum commentarii*
Theol. Plat.	*Theologia Platonica*

Simplicius

In Phys.	*In Aristotelis de Physica Commentarii*

Syrianus

In metaph.	*In Aristotelis Metaphysica commentaria*