

ABSTRACT

Anna Motta – Daniela Taormina, *Proclus and the Sciences*

This chapter introduces this new collective volume on Proclus that investigates how late antique Platonism integrates mathematics, theology, and the sciences into a single philosophical project. The book asks how Proclus (410–485 CE) could treat mathematics not only as an autonomous discipline but also as a methodological paradigm for giving theology a universal, necessary, and demonstrable foundation. The editors stress that prevailing accounts of ancient scientific models, though useful, do not fully explain Proclus' attempt to “scientise” theology; therefore, the volume foregrounds his exegetical practices and his formal use of hypotheses and conclusions, especially in relation to Plato's *Parmenides*.

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Dominic J. O'Meara, *Syrianus and Proclus on Why True Mathematics Cannot Be Empirically Based*

This chapter presents arguments by Syrianus (in his *Commentary on Aristotle's Metaphysics*) and Proclus (in his *Commentary on Euclid's Elements*) to refute the Aristotelian explanation of the empirical origin of mathematical concepts, known as abstractionism. The authors seek to establish a higher ontological status for mathematical objects. According to Proclus and Syrianus, mathematical objects do not derive from sensible experience but are discursive projections of a priori concepts (*ousiodeis logoi*) innate in the human soul. These concepts, in turn, originate from a transcendent demiurgic intellect. This Neoplatonic ontology demonstrates how mathematical objects maintain qualities of precision, eternity, and universal validity, while simultaneously allowing for the creative activity of the mathematician. Crucially, this perspective positions mathematics as a fundamental science that serves as a paradigmatic model for physics and a crucial foreshadowing of metaphysics, highlighting its vital role in Proclus' overall philosophical system.

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Anne Sheppard, *The Place of Music in Proclus' Conception of Mathematical Exegesis*

This chapter investigates the role of music (*mousike*) within Proclus' concept of mathematical exegesis, drawing upon the Platonic and Pythagorean traditions. In Plato's *Republic* VII and the *Timaeus*, harmonics is established as the «sister science» of astronomy and a necessary branch of mathematics for the Guardians' education toward dialectic. The author argues that this Platonic conception of the mathematical sciences informs Proclus' application of the notion of mathematical exegesis in his *Commentary on the Timaeus*. The chapter specifically examines passages in *In Tim.* and Proclus' distinction between mathematical, physical, and philosophical interpretation, including his exegesis of the musical scale from *Timaeus* 35b. The core argument is that Proclus' conception of mathematical exegesis intentionally includes music alongside astronomy, adhering to the ancient tradition that incorporates a specific type of music into the domain of mathematics, which is also evident in his discussions in the *Commentary on Euclid* and the *Commentary on the Republic*.

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Denis Walter, *Incommensurability in Geometrical Entities in Proclus' In Eucl. and In Prm.*

This chapter investigates the origin of incommensurability within Proclus' ontology through an analysis of his *Commentary on the First Book of Euclid's Elements* and his *Commentary on the Parmenides*. The central question concerns how incommensurability arises at a specific ontological level and how it corresponds to a distinct mode of cognition. The chapter first situates geometrical entities in an intermediate position between the intelligible and the sensible realms. It then demonstrates that sensible matter cannot serve as the unqualified cause of incommensurability, since it accounts only for imprecision rather than for incommensurability. Likewise, intelligible matter (the soul) alone cannot explain it, as not all objects within the soul exhibit incommensurability. Instead, the chapter argues that incommensurability is an intrinsic property of certain geometrical entities, comparable to their other identifiable features. Ultimately, the essay supports the interpretation that incommensurability is a definable and necessary feature of some geometrical objects.

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Álvaro José Campillo Bo, *The Unfolded Syntax of Intellect: Proclus on the Metaphysical Foundations of Elementary Arrangements*

This chapter examines Proclus' epistemology and ontology of the discursive sciences, focusing on the foundations that ground the logical structures of dialectic and mathematics. It explores Proclus' account of demonstrative reasoning and elementary arrangements as the iconic reflection of the architecture of Intellect. The chapter considers aspects of Proclus' philosophy of language to show how the structures unfolded by discourse reproduce the relational patterns of the Intellect. It analyses how the dynamics of Intellect manifest in the logical operations of dialectics and, in a more attenuated way, in mathematical demonstration, establishing a hierarchical relation between the two sciences. This hierarchy clarifies the dependence of mathematics on dialectic and their mutual intertwining through the discipline of "common mathematics". This dependence is examined by exploring the continuous logical syntax linking both sciences. As a case study, the chapter explores how the opening propositions of the *Elementatio theologica* (1 to 4) can be analytically derived from Euclidean arithmetic definitions. The chapter concludes that, for Proclus, the elementary logical syntaxes in contemplative sciences are not mere methodological tools but discursive enactments of the noetic order.

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Antonio Vargas, *Can the Will Ground Science?*

This chapter has two aims: to determine the ultimate ground of knowledge in Proclus and to argue that his answer to the problem of an unhypothetical first principle is not a self-evident proposition. The author contends that the science grounding all knowledge on an unhypothetical first principle is the Parmenidean dialectic, and Proclus' *Elements of Theology*, despite its *more geometrico* style, is not an instance of this ultimate science. The speculation that it might be so considered because the *Elements* lacks an initial list of axioms is challenged; the author argues this absence is insignificant given the text's overall deficiencies vis-à-vis the geometric ideal. Furthermore, the *Elements* fails to utilize what Proclus, in the *Commentary on the Parmenides*, identifies as our true access to an unhypothetical first principle: the so-called «one of the soul». Based on the *De Providentia*, this «one of the soul» can be partially identified with the will. The essay thus complements its negative argument regarding the *Elements* with a positive argument demonstrating how the will in Proclus can serve as a viable ground for knowledge.

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Carlos Steel, *Proclus on the Usefulness of Mathematics for Theology*

Despite Proclus' programmatic declarations in the introduction of his *Commentary on Euclid* that mathematics «prepares intellectual insight for theology» and should be used as a «stepping-stone» to a higher world, this chapter cautions against overemphasizing the theological purpose of his geometrical arguments. Such declarations have led to a neglect of the real import of Proclus' technical geometrical discussions, with some arguing that geometry for him constituted the core of higher theurgy. This chapter argues that scholars should not be misled by Proclus' Neoplatonic claims about mathematics as a bridge to theology. The theological speculations present in his work are best understood as digressions that illustrate how it is possible, from our discursive perspective (the proper domain of mathematics), to gain an intellectual insight into the divine causes. Specifically, the chapter examines the crucial difference between the technical 'textual' analysis and the speculative approach (*theoria*) to reality.

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Alain Lernould, *The General Mathematics according to Proclus*

Above the particular mathematical sciences – namely, arithmetic, geometry, music, and the spherical sciences – Proclus introduces General Mathematics in the first Prologue of the *In Euclidem*. This concept is distinct from mathematics in general and represents a transcendent genre that surpasses the specific mathematical sciences. This chapter aims to demonstrate how General Mathematics constitutes an ultimate degree within the discursive sciences in the ascent towards the Intellect and the divine. By occupying this position, it offers the soul the highest level of rigorous, discursive knowledge before the non-discursive apprehension of the divine. The analysis will show how this General Mathematics serves a crucial role in the Neoplatonic hierarchy, linking the demonstrable principles of specialised mathematics to the ultimate, unified truths of the Intellect.

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Marije Martijn: *Relations that Are Given and Established. Proclus' Use of Analogical Reasoning in Theology*

This chapter addresses the pivotal role of analogical reasoning in Proclus' understanding of theology. Analogy, defined as drawing conclusions about a less known «target domain» based on a similarity with a better known «source domain», is central to scientific reasoning in all sciences, and a fortiori in theology. The chapter will discuss Proclus' definition of analogy, its relation to mathematical analogy or proportionality, and the different kinds of analogy he distinguishes within theological contexts. A main challenge for analogical reasoning is the justification of the assumed similarity between the source and target domains. Proclus' primary justification is ontological, relying on the processes of emanation and reversion as themselves establishing necessary analogical relations. However, the author notes that Proclus' framework also contains problematic forms of analogy, specifically symbolic and literary analogies, for which the ontological justification does not seem to hold. In these cases, Proclus seems to introduce a separate category: a real relation of similarity that does not pre-exist but is established by an initiate (a philosopher or priest), underscoring a different, creative dimension of theological understanding.

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Miriam Cutino, *The Divine Arithmos in Proclus' Metaphysical System*

This investigation studies the articulation of the universal ontological hierarchy (*taxis*) in Proclus' *Platonic Theology*, a metaphysical system defined by the fundamental existential value of unity. The *taxis* is comprised of three different forms of order – *seira*, *diakosmesis*, and *diakosmos* – and the chapter aims to show how the structure of Proclus' divine *diakosmoi* is articulated on a mathematical analogy. This analogy establishes a correspondence between the Pythagorean divine number (*arithmos*) and each level of ontological reality. The analysis focuses on the ontological significance of the term *diakosmos* as both number and paradigmatic cause of unification. The essay also concentrates on the term *arithmos* itself, which is presented as the first «otherness» (*heterotes*) introduced by the intelligible-intellectual world. This interpretation connects Proclus' use of *arithmos* to its meaning in the works of Iamblichus and Syrianus' *Commentary on Aristotle's Metaphysics*, highlighting how number serves to mediate the initial unity of being by introducing multiplicity or difference.

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Philippe Hoffmann, *Les structures numériques des ordres divins dans la Théologie platonicienne de Proclus. De la triade à l'heptomade et à la dodécade*

To examine the relationship between 'science' and 'theology' in Proclus' thought, this chapter proposes to study the arithmological structures at work in the organisation of scientific theology as set out in a veritable *summa* by the Platonic Theology, which brings together all the dogmas extracted from a comprehensive reading of Plato's dialogues. We thus study the way in which the divine orders are structured, those of the intelligible gods, the intelligible-intellectual gods and the intellectual gods. The first two orders are organised into triads, each term of the triad being itself triadic. The third order, that of the intellective gods, is more complex due to an increase in multiplicity: it is organised according to a heptomadic structure. The intellective heptomad is constructed as: two triads augmented by a monad: the triad of the «fathers» (Cronos/Rhea/Zeus), flanked by the anonymous triad of 'immaculate' gods plus a 'separative' monad, the triadic core of this heptomad depending on the previous triads to ensure the 'mimetic' continuity of the processive system. The order of the intelligible-intellectual gods occupies, structurally, the middle position in the set of three divine orders. Below, the order of hypercosmic gods and that of hypercosmic-encosmic gods are organised according to a dodecad. The procession of gods is thus structured, starting from the One-Good, according to an arithmetic series: 1-3-7-12, which resembles the beginning of Hofstadter's series described by modern mathematics.

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Gerd Van Riel, *Proclus' Potamology: The role of Rivers in the Underworld*

This chapter explores Proclus' interpretation of the role of rivers (potamology) in Plato's eschatological myths of the Underworld, specifically Lethe, Styx, Acheron, Pyriphlegethon, and Cocytus (as laid down in *Phaedo* and *Republic X*). The later Neoplatonists, including Proclus, rejected merely physical or solely allegorical readings. Instead, they combined a literal interpretation (at a cosmological level) with a moral message regarding the destiny of the soul. The role attributed to these rivers provides valuable insight into the interaction between body and soul, as well as the complex relationship between cosmology, theology, physics, and ethics within Proclus' comprehensive philosophical framework. By examining Proclus' «potamology», the chapter illuminates how he integrates mythological elements into his scientific and ethical account of human existence and the cosmos.

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Emilie Kutash, *Proclus' 'Theological' Spherical Cosmic Whole and His Scientific Innovative Astronomy*

Proclus rejected the traditional celestial spheres of Eudoxus and Aristotle and also rejected Ptolemy's mechanical attempts to model irregular planetary movements using epicycles and eccentrics. Instead, he returned to Plato's emphasis on the invisible world, allowing his science to be governed by his Platonic theology. He envisioned a limited space that everywhere conforms to the cosmic spherical whole, thus requiring all motion to entail a circular trajectory in ultimate reversion to the One Being (a placeholder for Eternal Unity). Anomalies were due to 'self-moving motion' away from the center. Crucially, Proclus viewed the planets not as passive bodies, but as self-moving entities with independent trajectories through dimensional space. Their erratic movements were complex, occurring in longitude, latitude, and depth, ultimately resulting in a spiral – a mean between purely circular and rectilinear movements. This unique theory, based on higher theological principles, accounted for the anomalies that troubled other astronomers and resulted in an innovative physical account. Copernicus later employed one of Proclus' theories of combined motions. Proclus even questioned the parallel postulate, which is characteristic of linear space, in a way that suggests analogies to Einstein's curved space and space-time continuum, highlighting his innovative scientific foresight.

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Mariella Menchelli, *Historical and Traditional Divergences in Proclus' Commentary on Alcibiades I and Commentary on the Timaeus between the Middle Byzantine Period and the Age of the Palaiologoi*

The philosophical reception and reading of Proclus' commentaries on Plato's dialogues in Byzantium are closely linked to the transmission of Neoplatonic manuscripts. This chapter focuses on key witnesses from the early Palaeologan period, when these materials were copied and studied by the philosophical circles of Constantinople and Thessaloniki. The Naples collections, BN, provide crucial examples. Proclus' *Commentary on Plato's First Alcibiades*, Neap. BN III.E.17, is partly a *codex unicus*, copied by Georgius Pachymeres himself. Proclus' *Commentary on Plato's Timaeus*, Neap. BN III.D.28, was written by John Katrarios and belongs to the ϕ -branch of the textual tradition, shared with ms. Chigi R VIII 58 and the "new" Patmos Eileton 897. The Patmos scroll, a paper *volumen* from the eleventh century (the era of Psellos), is an exceptional witness discovered in the 1980s and is notable for its rich *apparatus* of mathematical *scholia*. The aim of this chapter is to explore these three witnesses – the *In Alc.* copied by Pachymeres, the *In Tim.* copied by Katrarios, and the Patmos scroll – to highlight their importance for the textual history and interpretation of Proclus' work in Byzantium.

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