

## RECENSIONI





T. Kouremenos, *Plato's Forms, Mathematics and Astronomy*

by

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Theokritos Kouremenos' new book on a subject traditionally debated in Platonic studies consists of a short introduction, two chapters, the first dealing with Platonic forms and the second with Plato's astronomy, a brief bibliography, predominantly of the recent scholarship in English, along with several classic works in other languages, and an index of passages. A general index and name index are not provided.

This is the third monograph on science and philosophy in the age of Plato and Aristotle published by the author, an expert in this field, in nine years<sup>1</sup>. These three slim books, wonderfully written and beautifully produced, are closely linked in various ways. Thus, the 2018 book is as controversial as the 2010 work<sup>2</sup>, while repeating and developing main points of that of 2015, namely: 1) that, according to Plato, the objects of mathematics are forms albeit studied in a different way than in dialectics, and 2) that, further, all forms studied by dialectics, including ethical forms, are forms of mathematical objects. The second thesis constitutes quite a radical view that, once proven or confirmed, would change the whole picture of Platonic mathematics and dialectics, as known from his dialogues and the oral teaching. Yet the first thesis has been repeatedly expressed in scholarship since the 1880s. At the turn of

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<sup>1</sup> T. Kouremenos, *Heavenly Stuff: The Constitution of the Celestial Objects and the Theory of Homocentric Spheres in Aristotle's Cosmology*, Steiner, Stuttgart 2010; Id., *The Unity of Mathematics in Plato's "Republic"*, Steiner, Stuttgart 2015.

<sup>2</sup> Two of three reviews on it, being equally critical, disagree with its main conclusions: K. Bemer, «Bryn Mawr Classical Review» 6/25 (2012): <http://bmcr.brynmawr.edu/2012/2012-06-25.html> [23.10.2019]; A. P. Gregory, «Classical Review» 62 (2012), pp. 414-415, while the third is purely descriptive and lacks any judgement: A. Falcon, «Isis» 103/1 (2012), p. 167.

the 20<sup>th</sup> century it was new and radical, as it rejected both the ancient consensus from Aristotle via Posidonius and most of the Middle Platonists to the last Neoplatonists (Syrianus, Proclus, Asclepius), and the modern one – Brandis, Ueberweg, Zeller – according to which Plato posited as the objects of mathematics the intermediates between the forms and sensibles. But after this alternative thesis had been put forward by H. Jackson (1882), developed by J. Cook Wilson (1904) and supported by W. D. Ross, F. M. Cornford, and H. Cherniss, to name just a few, it aged without becoming true or, at least, generally accepted. A large number, if not most, specialists on Plato consider that the intermediates which have been criticized and refuted on numerous pages of Aristotle's *Metaphysics* were a part of Plato's theory that has been modified and rejected by Speusippus and Xenocrates.

Kouremenos' economical way of dealing with this tradition<sup>3</sup>, directly opposite to his first thesis and undermining the second, cannot but surprise. In his *Introduction* (p. 3), briefly mentioning the intermediates, he refers to his 2015 book, where a footnote refers further to J. Brentlinger's 1963 paper «For a survey of older literature against intermediates in Plato's ontology» (p. 14, n. 9), though this paper begins by saying «So far as I know only Cherniss has denied that Plato held a theory of intermediates»<sup>4</sup>! The next section where Kouremenos recalls the intermediates is the one-page-long chapter “The forms of artifacts”, to which he appends a footnote (p. 24, n. 37), almost literally repeating his above mentioned note in the 2015 book. Some other passages leave the impression that he admits the existence of intermediates (p. 34, 36), yet how this can be reconciled with his persistent claim that mathematics is about forms, remains unclear. This cannot satisfy specialists and misleads non-specialists.

The situation with recent studies does not differ much. Whereas M. Burnyeat, an authority in Platonic mathematics, explains why «About Forms the mathematicians need neither know nor care»<sup>5</sup>, Kouremenos,

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<sup>3</sup> For bibliography on the subject, see e.g.: H. Krämer, *Gesammelte Aufsätze zu Platon*, ed. by D. Mirbach, De Gruyter, Berlin-Boston 2014, p. 41, n. 34; C. Lattmann, *Mathematische Modellierung bei Platon zwischen Thales und Euklid*, De Gruyter, Berlin-Boston 2019, pp. 310-315.

<sup>4</sup> J. A. Brentlinger, *The Divided Line and Plato's "Theory of Intermediates"*, «Phronesis» 8 (1963), pp. 146-166. To be sure, further on some other opponents of this theory appear.

<sup>5</sup> M. Burnyeat, *Plato on Why Mathematics is Good for the Soul*, in T. Smiley (ed.), *Mathematics and Necessity: Essays in the History of Philosophy*, Oxford University Press-British Academy, Oxford 2000, pp. 1-81, at pp. 34-35.

citing Burnyeat's paper several times, does not go into his arguments and insists that mathematics studies forms. Meanwhile, Burnyeat's arguments deserve attention, as one of them, for example, concerns Plato's usage of the word "itself" (αὐτό), which Kouremenos unreservedly takes as denoting forms in such locutions as «the square itself» or «the diagonal itself» (p. 16). Burnyeat demonstrates that this is not true, that the word "itself" does not necessarily mean a Platonic form – everything depends on the larger context that in the case of "the diagonal itself" and "the square itself" is mathematics, not metaphysics<sup>6</sup>. Now, Burnyeat or N. Denyer, who develops his arguments<sup>7</sup>, may well be wrong, and Kouremenos may be right. He just needs to prove it to the readers.

According to the view shared by the author, differences between mathematics and dialectic in the *Republic* Books VI-VII are epistemological: they both study the same subject, mathematical forms, albeit mathematics indirectly and dialectic directly. Objections to this have been formulated long ago, one of them being that the two upper epistemological segments on the divided line (διάνοια and νοῦς) correspond to two ontological levels, because for Plato, as for many pre-Socratics, like is known by like (Aristot., *De an.*, 404b 16-18). As Plato himself says, «geometry and the studies that accompany it are, as we see, dreaming about being, but the clear waking vision of it is impossible for them as long as they leave the assumptions which they employ undisturbed and cannot give any account of them» (*Resp.*, 533c-d, transl. P. Shorey). In the epistemological context the contrast between ὑπάρ and ὄναι denotes two states of mind, corresponding to knowledge and not (yet) knowledge (*Meno*, 85c-86a; *Resp.*, 476c-d). Why should mathematics that was always regarded by Plato as propaedeutic (cf. *Euthyd.* 290c: those geometers and astronomers, who are not utter blockheads must hand their discoveries over to the dialecticians, who will find proper use for them), and that in the *Republic* was even denied the name ἐπιστήμη (533d), study forms, discovered by Plato and available only to dialectic invented by him?

Thus, Kouremenos' first thesis is by no means convincing, nor does he spend much space on it. From chapter 1.1.4 he builds on it his second thesis: «the cave simile seems to hint that all forms are of mathematical

<sup>6</sup> M. Burnyeat, *Plato*, cit., pp. 36-37.

<sup>7</sup> N. Denyer, *Sun and Line: The Role of the Good*, in G. R. F. Ferrari (ed.), *The Cambridge Companion to Plato's Republic*, Cambridge University Press, Cambridge 2007, pp. 284-309, at pp. 304-305.

objects» (p. 20). Since the cave simile that occupies an entirely disproportional place in contemporary Platonic scholarship «seems to hint» many opposing things, it is worth tracking how Kouremenos develops his argument. More often than not, he introduces a new point through expressions indicating that he is reading between the lines: «forms of mathematical objects seem to be the only existing forms», «Plato perhaps endorses implicitly», «it is quite likely... that Plato presupposes tacitly», «Numbers as intelligible beings are not said to be forms, but this can be plausibly assumed to be implicit», «But Plato could have hinted at it», and so on. It is true, many passages in Plato's dialogues only allude to his doctrines presented elsewhere; some of the allusions concern his oral teaching, some remain unclear to us. But if the idea that all forms are of mathematical objects really belonged to Plato, being a part of the theory so important to him, it would not have possibly remained implicit, unnoticed either by his students and followers or by Platonic scholars. Sir David Ross once remarked: «Now anyone who is familiar with Plato's writings knows that he is nothing if not explicit. The point which he wishes to make, he makes very clearly and usually with a certain amount of repetition to drive it home»<sup>8</sup>. Kouremenos may disagree with this, but he cannot expect his readers to accept an interpretation of Plato as a subtle dogmatist only hinting at one of his central ideas.

According to Plato, the dialectician is capable of giving an account of the being of each individual thing, whether perceptible or not, and these beings are eternal and unique forms. Since there are as many forms as there are common names (*Resp.*, 590a), or kinds of natural things (Aristot., *Metaph.*, 1070a 18-19), any enumeration of them would by necessity be selective. Kouremenos' selection consists of the forms that are easy to interpret mathematically (e.g. equality), further, forms of values, forms of perceptible things, and number-forms. Treating all of them in one section (chapter 1.3), he does not tell the reader how deeply problematic the whole field of mathematical interpretation of Platonic forms is, instead attempting to cross it via a precarious pathway of assumptions.

Here is one of them. Plato often talks about geometrical equality, but why is equality as a form necessarily of a mathematical object? Nowhere is this said, so all the examples listed by Kouremenos in his half-page treatment of the problem (p. 53) are purely hypothetical.

<sup>8</sup> W. D. Ross, *Plato's Theory of Ideas*, Clarendon Press, Oxford 1951, p. 59. Cf. «The interpreters of Plato must allow for his Emersonian habit of hitting each nail in turn as hard as he can» (P. Shorey).

A reference to the *Phaedo* (74a ff.), where Plato introduces a form of equality, does not help either, for there is nothing here about mathematics, only about perceptible things, sticks and stones. The same perceptible things figure in the relevant passage of Aristotle's *On Forms* (fr. 3 Ross), to which Kouremenos refers as if its author were Alexander of Aphrodisias, not Aristotle. Since the only Aristotelian fragment that appears in the whole book is fr. 53 Rose on the progress of mathematics, Kouremenos' treatment of Platonic forms in isolation from the evidence of Aristotle's lost works, specifically of *On Forms*<sup>9</sup>, is inadequate and insufficient. Meanwhile, in the fragments of *On Forms* mathematics occurs only once, in the "argument from the sciences": if medicine is the science of health ἀπλῶς, and geometry of equal ἀπλῶς and of commensurate ἀπλῶς, then there are health, equal, and commensurate themselves, and they are forms (fr. 3 Ross). It is disputed whether these examples come from Aristotle or Plato or the Platonists; in any event, what follows from them is that the form of equal can be reached both via sticks and stones and via geometric concepts, not that it is the form of a mathematical object. In his middle and late periods, Plato often discussed ethical forms – goodness, beauty, justice – resorting to such concepts as unity, harmony, proportionality, due measure, and the like, which can be mathematically expressed. This does not make these forms, let alone all ethical forms, forms of mathematical objects.

The starting point of the second chapter, which is more repetitive than the first and contains considerable chunks of the 2015 book, is again the cave. As the sun is a metaphor of the Good, Plato's «imagery in the simile of the cave hints that he accords a special role within this family to astronomy, and to the forms this branch of mathematics really studies, for paving the way to the Good» (p. 83). In the *Republic* the Good symbolizes the unity of the mathematical sciences that was motivated by Plato's belief in the unity of all forms. It is worth noting at this point that Kouremenos' title should be taken as *Plato's forms, Plato's mathematics and Plato's astronomy*, for this is the real subject of his book, in which the mathematicians are almost never allowed to express themselves. Otherwise, they would have objected that it was not Plato who «envisaged the unity of mathematics», it was his friend, the brilliant mathematician Archytas, who first formulated the unity of the "sister sciences" of the quadrivium (47 B 1), for which the application of mathematical methods was common. Unlike Kouremenos, Plato did not try to conceal this (*Resp.*, 530d:

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<sup>9</sup> It is mentioned once in a footnote (p. 16, n. 16).

ἀδελφαὶ ἐπιστῆμαι), even though he certainly disagreed with Archytas' claim that a real understanding of the nature of the universe and every individual thing in it has been achieved by οἱ περὶ τὰ μαθήματα (47 B 1), not by (dialectical) philosophers.

For confirmation of the special relations between astronomy and dialectic Kouremenos first turns to the *Phaedo*, where «the heavens are implicitly assumed to also have a privileged relation to the Good» (p. 86), then to the *Republic*, *Timaeus*, and *Laws*, concluding that Plato prepared yet did not share the view of Philip of Opus, who in the *Epinomis* substituted astronomy for philosophy as the highest wisdom. Platonic mathematical astronomy starts from observations but has to proceed further through problems, as in geometry (pp. 108-109). The author takes these problems to be construction problems and constructs the remainder of the chapter on this interpretation. However, Προβλήμασιν ἄρα, ἣν δ' ἐγώ, χρώμενοι ὥσπερ γεωμετρίαν οὕτω καὶ ἀστρονομίαν (*Resp.*, 530b) cannot possibly mean “construction problems”, if only because Plato never used πρόβλημα in this technical sense (πρόβλημα is not attested in Euclid's *Elements*), and because at 531c he again employs the word in its general sense: the method of the Pythagorean harmonic scientists (i.e. of Archytas) «exactly corresponds to that of the astronomer; for the numbers they seek are those found in these heard concords, but they do not ascend to generalized problems (ἀλλ' οὐκ εἰς προβλήματα ἀνίσσιν) and the consideration which numbers are inherently concordant and which not» (transl. P. Shorey).

I did not notice any errors in the book, either in English or in Greek.

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