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## Book Reviews

### **Ptolemy's Philosophy: Mathematics as a Way of Life**

By Jacqueline Feke. Princeton University Press. ISBN 978-0-691-17958-2. 256 pp.

With *Ptolemy's Philosophy: Mathematics as a Way of Life*, Jacqueline Feke aims to pursue and broaden Lidia Taub's research on Ptolemy's philosophy<sup>1</sup> and to propose "the first ever reconstruction and intellectual history of Ptolemy's general philosophical system" (p. 2). The book substantially reworks her doctoral thesis<sup>2</sup> and completes it with her latest research.<sup>3</sup>

As the Introduction (chapter 1, pp. 1–9) announces, the major claim defended in the book is that Ptolemy "was very much a man of his time" (p. 3) and his philosophy "is most similar to middle Platonism" (p. 3) with its syncretic and eclectic tendencies whose ambition is to reunify classical and Hellenistic philosophy in a unitary all-embracing mathematical *weltanschauung*. This statement is anything but simple to prove considering that Ptolemy's "philosophical claims lie scattered across his corpus and intermixed with technical studies in the exact sciences" (p. 1). Further, Ptolemy says nothing in his works "concerning any philosophical allegiance [and] he does not align himself with a philosophical school" (p. 2). Therefore "in order to discern where his philosophical ideas came from, one must mine his corpus, extract the philosophical content, and, with philological attention, relate his ideas to concepts presented in texts that are contemporary with his own" (p. 3).

The book is structured in two parts distributed over nine chapters. The first part (chapters 2–4), which constitutes the main body of the book, describes Ptolemy's philosophical system while the second part (chapters 5–8) closely examines the philosophical ideas contained in some specific works of the extant Ptolemaic *corpus*. The conclusion (chapter 9) then sketches the influence of Ptolemy's philosophical ideas, especially the claim of the indisputability of mathematical demonstration, on medieval and modern thought.

After the Introduction, the second chapter ("Defining the Sciences", pp. 10–25) undertakes a careful examination of *Almagest* I, 5.7–6.11 and asserts that the distinction between *the* mathematical, *the* physical and *the* theological proposed by Ptolemy, although Aristotelian, is not Aristotle's (p. 19). In particular, it is not a re-proposal of *Metaphysics* E1 as claimed by Boll more than a century ago.<sup>4</sup> While the Aristotelian distinction is in fact based on the ontological properties of the object studied (separability/inseparability, movability/immovability), the Ptolemaic distinction is based on a criterion of perceptibility that combines epistemological and ontological considerations. I would put into question this last statement. Perceptibility seems to be only one of the two criteria proposed by Ptolemy, the other being the 'elevation of the object'.

<sup>1</sup> Taub, L., 1993. *Ptolemy's Universe: The Natural Philosophical and Ethical Foundations of Ptolemy's Astronomy*. Chicago: Open Court.

<sup>2</sup> Feke, J., 2009. *Ptolemy in Philosophical Context: A Study of the Relationships between Physics, Mathematics, and Theology*. Ph.D. diss., University of Toronto.

<sup>3</sup> Feke, J., 2012. "Mathematizing the Soul: The Development of Ptolemy's Psychological Theory from *On the Kriterion and Hegemonikon* to the *Harmonics*." *Studies in History and Philosophy of Science* 43, pp. 585–94; Feke, J., 2014. "Metamathematical Rhetoric: Hero and Ptolemy against the Philosophers." *Historia Mathematica* 41, pp. 261–76; Feke, J., 2012. "Ptolemy's Defense of Theoretical Philosophy." *Apeiron* 45, pp. 61–90.

<sup>4</sup> Boll, F., 1894. "Studien über Claudius Ptolemäus: Ein Beitrag zur Geschichte der griechischen Philosophie und Astrologie." *Jahrbücher für classische Philologie*, supplement 21, p. 71.

*Almagest* I, 5.7–6.11 really displays two inversely proportional criteria: while perceptibility decreases from physics to theology, the elevation of the object, quite obviously, decreases from theology (“somewhere up in the highest reaches of the cosmos”) to physics (“below the lunar sphere”). This reasoning seems to have a certain similarity with the description of the world’s body in *Timaeus* 31 b-c<sup>5</sup> where Plato proposes two inversely proportional criteria for the elements composing the world: visibility (ὄρατόν) and tangibility (ἄπτόν).

The third chapter (“Knowledge and Conjecture”, pp. 26–51) takes into account the most markedly epistemological passage of the *Proem* to the *Almagest* (I 6.11-21). It is here that one understands how Ptolemy’s position is somewhat ‘subversive’ compared to his predecessors. The relevant claim concerns the epistemological status of mathematics with respect to physics and theology: while the latter do not have a scientific character and produce only conjecture (εἰκασίαν), mathematics, on the other hand, is certain and unshakable (βεβαίαν καὶ ἀμετάπιστον) and proceeds through the indisputable demonstrations of geometry and arithmetic (ἀποδείξεως δι’ ἀναμφισβητήτων ὁδῶν γιγνομένης, ἀριθμητικῆς τε καὶ γεωμετρίας). Compared to the Platonic and to the Aristotelian epistemology this represents a decisive breakthrough: mathematics is no longer ancillary to philosophy but rather the only knowledge that can provide certainty by means of both arithmetical and geometrical demonstrations. Among the many points of interest in this chapter (the link between Alcinous and Ptolemy, the isagogic character of the preface, etc.), it is worth mentioning the analysis (pp. 40–44) of the affirmation of the indisputability of mathematics contained in the Ptolemaic text. By comparing the wording of this passage in the Greek corpus, Feke shows how Ptolemy’s account (already stated by Hero in the preface to *Metrica* III) does not come directly from the classical tradition but is the result of post-Hellenistic reflections on the status of well-founded knowledge, and in particular the shift from the indisputability of premises to the indisputability of demonstrations. What Feke does not explain, in this interesting reconstruction, is that Hero’s and Ptolemy’s accounts are not identical: while the latter in fact says that both arithmetical and geometrical (ἀριθμητικῆς τε καὶ γεωμετρίας) demonstrations provide certainty, Hero’s account attributes this property only to the geometrical ones (μόνης προσδεῖσεται γεωμετρίας) and explicitly states that no other techniques or sciences can provide it (ὅπερ τῶν ἄλλων τεχνῶν ἢ ἐπιστημῶν οὐδεμία ὑπισχνεῖται). This different approach to the ‘canon of rigour’ has important consequences in the demonstrative procedures adopted by the authors, as for example in the practise of the so-called method of analysis and synthesis.

The fourth chapter deals respectively with *Almagest* I 4.6-5.7 and *Almagest* I 6.21-8.16. These difficult passages link the affirmation of the epistemological supremacy of mathematics over physics and theology with practical philosophy, extending the argument to ethical considerations: the result is the affirmation that the good life is intrinsically linked to the practise of mathematics. This reasoning is difficult to fathom and presents both textual and philosophical problems. However, the analytical reading and the conceptualisation proposed by Feke provide a clear understanding of the meaning of Ptolemy’s statements. Particularly effective is the argument that shows the weakness of the translation proposed by Toomer of *Almagest*, I 4.18-5.2: Feke points out that αὐτῶν in the sentence τὰς μὲν πράξεις ἐν ταῖς αὐτῶν τῶν φαντασιῶν ἐπιβολαῖς ῥυθμίζειν should refer not to “affairs” but to “theories” in the preceding sentence. In fact, as Feke rightly says, “impressions of actions do not order actions; impressions of higher order phenomena, such as theories, order actions”.

The final four chapters explore Ptolemy’s *corpus* in the light of the philosophical system exposed in the first part: the author shows how the metaphysical, epistemological and ethical ideas proposed in the *Proem* to the *Almagest* supply a key to an adequate reading of his studies on harmonics, astronomy, psychology, astrology, and cosmology. The resulting picture is of a substantial systematicity: in Ptolemy’s works we find an impulse towards the search for harmony, order and symmetry; this research is based on the system-

<sup>5</sup> As far as I know, the only scholar who sees this possible liaison is Vitrac, B., 2008. “Les préfaces des textes mathématiques grecs anciens.” In *Liber amicorum Jean Dhombres*, edited by P. Radelet de Grave, Turnhout: Brepols, p. 528n.

atic application of mathematical methods which are configured as the privileged means for the search for knowledge. However, this is not the result of a merely blind instrumental application, but of a meditated philosophical reflection and an eclectic rethinking of classical and Hellenistic philosophy.

On the whole, *Ptolemy's Philosophy: Mathematics as a Way of Life* is clear and well argued. Feke rarely presents interpretations without first introducing, contextualising and analysing them at both philological and philosophical levels. The philosophical theories of ancient authors are well articulated. The relationships and fractures present in the intricate development of philosophy in the imperial age are well analysed and deeply rooted, especially thanks to a systematic use of the concordances found in the *TLG*. However, some critical aspects should be stressed. Apart from some *lacunae* in the critical apparatus,<sup>6</sup> the least convincing aspect is the author's attitude towards certain works of the Ptolemaic *corpus*, the *Optics* in particular. Ptolemy's works, taken as a whole, can in fact be conceived as a pathway to a comprehensive knowledge of the world. The *Almagest* and the *Harmonics* design the structure of reality; the application of this structure to ethereal spheres is carried out in *Planetary Hypotheses*, and the analysis of its influences in the sublunary world in the *Tetrabiblos*. These researches are then supported by specific extensions that strengthen and complete the already rich picture depicted: among these, *Geography* and *Optics* are of a particular interest. Now, concerning the philosophical analysis of the *Geography* we are referred by the author (p. 7n) to her "Ptolemy's Philosophy of Geography",<sup>7</sup> which should therefore be considered as a sort of appendix to the text under examination (but why not include it directly in the book?). Concerning the *Optics*, Feke's position is far from clear: there are several references to *Optics* (p. 7, 16n, 22n, 125n, 131n) in support of some notions proposed in the text (prime mover, discussion of the common sensibilities, etc.) as well as a number of references to Siebert's *Die ptolemäische "Optik"*<sup>8</sup> that question the authenticity of the text (or better said, the extant text of the *Optics*). In this respect, the author does not take a clear position. If in fact Feke inclines towards its non-authenticity, one cannot see the reason why it should be included as a reference (as well as it would be useless to refer to the Pseudo-Ptolemy *Karpus*). If instead it is Ptolemy's work, it would deserve a careful analysis as well as the *Harmonics* or the *Tetrabiblos*. In addition, an analysis of the *Optics* would be an excellent confirmation of Feke's thesis.

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<sup>6</sup> For example, Heiberg's edition of Ptolemy's works (from which Feke takes the Greek text) is not even mentioned in the final bibliography; the same is true for all reference editions of ancient authors. Instead, a quick reference to the English translation (when existing) is preferred. Moreover, since the book constantly mentions the *Proem* to the *Almagest* (135 references in 234 pages) and the various parts of the proem are translated and analysed in detail in the single chapters, it would perhaps have been useful to include the Greek text of Ptolemy's *Proem* as an *incipit* or an *explicit* to the book with a possible translation. This would have made it easier to comprehend and exhibit an overall view of Ptolemy's argument, indeed a good example of Greek prose that would deserve to be read in its entirety to appreciate its quality. Being about 80 lines, it would certainly not have weighed the text down. Besides, it would have made the reference to it more agile and avoided some tiresome repetitions.

<sup>7</sup> Feke, J., 2018. "Ptolemy's Philosophy of Geography", In Claudio Ptolomeo, *Geografia (Capitulos teóricos)*, edited by Rene Cecena, 281–326. Mexico: Universidad Nacional Autónoma de México.

<sup>8</sup> Siebert, H., 2014. *Die ptolemäische "Optik" in Spätantike und byzantinische Zeit: Historiographische Dekonstruktion, textliche Neuerschließung, Rekontextualisierung*. Stuttgart: Franz Steiner.