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Reseñado por MUSTAFA YAVUZ
Istanbul Medeniyet University, TU
mustafay007@gmail.com

In recent decades, interest in the history and philosophy of the natural sciences has increased significantly. This interest has made scholars aware of the existing knowledge gap in these areas and has brought a kind of 'pressure' for more articles and books on the subject. Indeed, it also motivates academics to start new projects related to these disciplines. Volumes like this are much needed for scholars in the field, given the high amount of information they contain.

This rich volume aims at stimulating the field by presenting current research papers on Avicenna's influence on the fields of physics and cosmology. In order to achieve this goal, this work contains thirteen articles related to the reception of the Persian philosopher's thought in these areas in the Middle Ages. The book revolves around the three different languages and cultures which were crucial for the reception of Avicenna's thought. Hence, the volume is arranged in three main sections focusing on the Arabic, Hebrew and Latin traditions. It also contains an *Index of Avicenna's Works with Passages Cited* and an *Index of Names*.

The introduction is rather short compared to other sections of the book. It covers the general topics presented in the volume. The first six chapters deal with the Arabic tradition; the next two have to do with the Hebrew reception of Avicenna, and the last five analyse the Latin reception of Avicenna's physics and cosmology.

In the first chapter, Jon McGinnis examines the reception of Avicenna's theory of motion in the Post-Classical Islamic World. In his analysis, McGinnis compares Avicenna's *al-Shifa'* and *al-Isharat*. He claims that *al-Isharat*, was the primary vehicle for the transmission of Avicennian natural philosophy in the Mashriq, and thus the most important Avicennian work in the eastern part of the Arabic-writing world.

McGinnis suggests that in the *Isharat* Avicenna shifts from kinematics (the study of motion) to dynamics (the study of force) because he was addressing a different audience. For this remark, he refers to Dimitri Gutas's observation that Avicenna's audience for *Isharat* may have been the *mutakallimun*, not the *falasifa*. This would explain why Avicenna initiated *Isharat* by discussing the body (ğism) rather than nature and motion. Indeed, if Avicenna was writing for the *mutakallimun*, this would give a hint as to why he left nature and motion unstudied in this work, since these notions were criticized by some *mutakallimun* regarding causation. After citing al-Abhari's *Hidayat al-Hikma*, the important madrasa text which was built on an account of *Isharat*, McGinnis provides al-Abhari's and

Avicenna's almost identical definitions of motion. McGinnis states that, unlike Avicenna, al-Abhari thought that the definition of motion was not necessarily circular. This can be explained by the fact that he was not reading the *Shifa* but *Isharat*, as well as works of Abu al-Barakat (p. 15). However, Avicenna's gloss could be subject to the same criticism, concludes McGinnis: apparently, the sophisticated account of motion was replaced with a simpler one in *Isharat*. Aside from the notions of motion and time, the author also touches upon the difference between fact (*inna*) and reason (*lima*), for which he refers to *Kitab al-Burhan* III. 3. I would nonetheless highlight the importance of *Isharat* IX. 5 as a passage in this respect.

McGinnis continues his exposition with another milestone, Mulla Sadra, who repeated al-Abhari's definition of motion as something gradually emerging from potency to act. Mulla Sadra also established two different senses of motion relying on Avicennian temporal theory, i.e., *haraka tawassutiyya* (used to define time) and *haraka qatiyya* (defined by time). The author also traces Avicenna's influence to Fadl-i Haqq Hayrabadi (d. 1861), one of the last representatives of the Tabiiyyat Tradition. McGinnis characterises him as a flatfooted thinker who did not appreciate his predecessors, since according to him counting time is something known by everybody, and so there is no need to define it. In the final paragraph, McGinnis's concluding remarks include that Avicenna's distinction between mental and extra-mental existence is something we can extract from his account of motion. In my opinion, there will be more papers in future concerning the physical (or natural) topics in the Avicennian tradition.

The second chapter on the Arabic reception of Avicenna is authored by Dimitri Gutas, who focuses on a special phrase: *al-Hikma al-Mutaaliya*. He begins by pointing out that this sentence is only used in the *Isharat*, whereas it is missing in Avicenna's later works. According to Gutas, this sentence has been repeatedly misunderstood. To show this, he provides several examples of mistranslations of «*al-hikma al-mutaaliya*», including Spanish and French ones.[1] According to Gutas, the passage where Avicenna uses *hikma al-mutaali* has syntactical, lexical and textual problems. Regarding the syntax, he notes that it was already adequately explained by Razi and Tusi. Gutas also mentions two lexical problems which change the meaning of the sentence. Yet given the difficulty of transferring thoughts into words, this should not surprise us. Regarding the textual problems, Gutas emphasizes the need for a critical edition of *Isharat* which separates the direct transmission of the text and the lemmata embedded in Tusi's commentary. In the remaining pages of this chapter, Gutas examines the similarities and the differences between Razi's and Tusi's reception *al-hikma al-mutaaliya.* He concludes by remarking that it is by means of studies on the reception and interpretation of Avicennian thought that we obtain the best chart for the development of philosophy in the Mashriq.

[1] I would like to add that in the Turkish translation of Isharat, the correspondent phrase «aşkın hikmet» can be translated in English as «transcendent wisdom» as well, which fits with the use that Mulla Sadra or Ibrahim Kalın made of it.

The third and the fourth chapters examine topics discussed by Fakhr al-Din al-Razi, one of the most famous figures among the followers of Avicenna. In the third chapter, Jules Janssens discusses Avicennian elements present in some special topics of al-Razi's *al-Mabahit al-Mashriqiyya* regarding place, void and directions. Janssens investigates Chapters 16 to 24 in the light of a comparative method with which he contrasts some parts of the *Mabahit* and the *Sama*. Then – line by line – he shows the parallels in the arguments and in the wording. Janssens highlights that al-Razi combined two arguments of Avicenna into one.[2] In order to argue for his method, Janssens uses Avicenna's *Sama*, *Nağat*, and *Isharat*. Janssens's method may be useful in answering two questions, namely: 1) how and what al-Razi commented on among Avicenna's arguments; and 2) when it comes to natural philosophy, what was followed (and how) in the later Islamic tradition. However, there is a question which is left open in his conclusions and it is a very important one, the type of question of the sort of «what is what?».

The second chapter on al-Razi is by Peter Adamson, who begins with the existence of time in Fakhr al-Din al-Razi's *al-Matalib al-Aliya*. Adamson indicates that philosophers are largely unaware of the work of Fakhr al-Din al-Razi, a view I disagree with, at least regarding Turkish academia. However, I agree with him on the issue that there is an immense need for translations and editions, which is also the case for many historical texts. Adamson focuses on the treatment of time in *Matalib*, and traces al-Razi's arguments in *Matalib* to Avicenna's *Nağat* and *Physics*. Adamson also outlines the arguments on time in *al-Matalib al-Aliya* as an appendix of his chapter. This chapter (Ch. 4) together with the previous one (Ch. 3) and the next one (Ch. 5) establish a methodological and epistemological foundation for an investigation into the Arabic reception of Avicenna's notions of place, void, and time, and whether they are dependent on the mind. These three chapters, in my opinion, also constitute the core of the volume's section dealing with the Arabic reception of Avicenna. It is thanks to these contributions that we are able to read about an interpretation of medieval Arabic philosophy which discusses time, its real or mental existence, and its priority or posteriority to motion.

Andreas Lammer contributes a chapter, which is almost equal in size to the two preceding chapters. Lammer focuses on Sayf al-Din al-Amidi, who is not well-known by modern scholars. He also provides – in an appendix – the Arabic text with a facing English translation. At the beginning of his chapter, Lammer goes back to Greek philosophy, namely Plato and Aristotle, which I agree is a necessary method for some topics, especially if we consider the transmission of knowledge as a process. Then he moves to the writings of philosophers in the Arabic tradition. Lammer's clear investigation on Amidi as a figure of the Avicennian tradition results in this interesting chapter in which we find his views of time, such as whether it is considered as a substance, and whether time is the

[2] I have in fact found something similar when comparing Avicenna's *Kitab al-Nabat* to Nicolaus Damascenus's *De plantis*.

magnitude of existence or the magnitude of motion. Thus the questions he responds to would be 'what is time?' and 'how does it act?'.

Cristina Cerami draws attention to al-Andalus, especially to Averroes. Hers is the longest chapter in this volume, and it deals with the most diverse topics: Averroes's and Avicenna's views on *Physica, De Caelo, De Generatione et Corruptione* and *Meteorologica*. Just like the human mind easily pursues a two-folded way of thinking, also medieval Islamic geography was divided into at least two parts: the *Mashriq* in the East, dominated by the followers of Avicenna, and the Maghreb in the West, dominated by those of Averroes. If we consider Avicenna as a synthesizer – which is quite apparent in his *al-Qanun fi al-Tibb* – then we should think of Averroes as the figure defending a 'pure philosophy' in regard to Aristotle and even a 'pure medicine' drawing on Galen. This was probably the reason Averroes targeted Avicenna, to strengthen pure *falasifa*, and sought to invalidate al-Gazali's allegations against philosophy. As Cerami points out, Averroes's new reading of Aristotle began in the late 1160s. The table she provides to compare Averroes's criticism and her explanations are indeed useful for further study.

Resianne Fontaine authors one of the two chapters on the Hebrew reception of Avicenna's *Physics*. Her chapter is entitled *Avicennian Sources in Abraham Ibn Daud's Natural Philosophy*. She aims to shed light on the issue by contextualising and problematizing the question of Ibn Daud's use of sources. Directly or indirectly, she puts forward that Ibn Daud became acquainted with Avicennian doctrines and his theory of emanation. However, she questions the availability of Avicennian texts in Andalusia, especially in Toledo. Nevertheless, as the reader may easily detect, Fontaine does not provide good evidence on whether Ibn Daud read Avicennian texts (either in Arabic or in Hebrew). Fontaine tries to solve the problem of Avicennian knowledge without Avicenna. To do this, she compares the terminology of some passages. In my opinion, her conclusions are not as strong as needed for her claims.

Gad Fraudenthal is the author of the eighth chapter and he turns the reception of Avicenna into a dilemma: between *bold naturalism* and *fideist literalism.* He first focuses on one of the most radical of medieval Jewish thinkers, Samuel ibn Tibbon, who in his words 'is one of the few true Avicennians in the history of medieval Jewish thought'. Fraundenthal uses the issue of 'gathering of the waters' in medieval Jewish philosophy as a litmus test to distinguish naturalists, semi-naturalists, traditionalists and so on. In addition to Samuel ibn Tibbon, Fraudenthal examines a list of mediaeval Jewish philosophers, focusing on their reception of Ibn Tibbon's Avicennian hypothesis. This chapter is also helpful for understanding the naturalistic views in medieval philosophy regarding the question of whether we should solve cosmological puzzles by using natural philosophy or Scripture. The spiritual and social dangers Maimonides warned us about are valid for any religion which motivates believers through miracles. As Fraudenthal implies, this is a matter of the 'level of naturalism' (p. 306). In other words, to what extent are we naturalists? In this chapter, Fraudenthal also knits a texture where we find Jewish medieval philosophy

fully embracing Avicenna's natural history of the universe and showing that it was understood as something in conformity with Scripture.

Dag Nikolaus Hasse and Andreas Büttner are the authors of the most technical chapter of this volume. This chapter is about some anonymous translations from Arabic into Latin composed in the twelfth century in the Iberian Peninsula, and its purpose is to identify the translators. To this effect, Hasse proceeds by philological analysis (p. 321), whereas Büttner focuses on computational stylometry (p. 357). The work is based on the idea that a comparison of words or small phrases which appear often in the texts of different (known and unknown) translators, would yield some statistical data which would be useful for us in attributing a connection between a known translator and the translation. After some calibrations and precisions, the authors, aware of their limits, present a modest table in conclusion. Apparently, this is the result of teamwork which was also supported by many collaborators. The methodology of studies like this one should be taken as a model for some historical studies in philosophy and science. Since I myself have used some 'similarity analysis' and 'clustering' methods in my biological studies, I value such interdisciplinary methods and works. I truly admire both authors for this work.

The first chapter about the Latin reception of Avicenna is authored by Katrin Fischer, who discusses the Avicennian influence on William of Auvergne's *Primum magisterium*. William of Auvergne had access to the Latin translation of Avicenna's writings on metaphysics and psychology. After showing William of Auvergne's rejection of Avicenna's theory of emanation, Fischer compares the authors in order to show the parallels between them. William of Auvergne is closer to Avicenna than to Aristotle both in content and terminology, and his theory of *potentia* was inspired by Avicenna. Fischer also covers Avicenna's influence on Auvergne's theory of causes and enumerates the attempts and efforts he made in order to distinguish and characterize the types of efficient causes, including necessary and voluntary causes. William of Auvergne also introduced some concepts to leave enough space for nature, humans and God to operate as actors in causality.

Amos Bertolacci studies Albert the Great's harmonizing strategy (p. 400) to mediate between Averroes's and Avicenna's contrasting positions. This strategy has, according to Bertolacci, three levels: material, stylistic and doctrinal. Bertolacci discusses each of these levels in separate sections, and concludes that especially the doctrinal strategy shows a switch in reliance from Avicenna to Averroes. In other words, Albert went from a phase of stronger Avicennian influence to a stage of a more marked Ibn Rushdian one (p. 417). Bertolacci – as a comment – adds that Albert had to acknowledge the importance of Averroes as a very helpful tool for understanding Aristotle. The Latin debate over the relative merits of Averroes and Avicenna is a long one, and the Doctor Universalis was involved in these discussions. In this regard, I would note that Averroes was not targeting Avicenna just to attack him, but because his purpose was the purification of Aristotelian philosophy, which was the true philosophy for him.

Cecilia Trifogli studies Roger Bacon who, unlike his contemporaries, more frequently refers to Avicenna's *Physics*. Bacon's *Communa naturalium* has some parallels with

Avicenna's *Physics* regarding the presentation and the discussion of the Aristotelian material. However, Bacon tended to make more references to Avicenna's *Metaphysics* than to his *Physics* in this work. This was probably because his main interest was to be found in the fundamentals of physics. After some qualitative data, Trifogli has an attractive conclusion, which is that 'in Bacon's view, Avicenna has more authority as a life-scientist than as a physicist' (p. 435). Bacon has Avicenna as the implicit starting point and the explicit end point in his discussions. To have Avicenna on his side, Bacon even denies that Avicenna was a supporter of some controversial views, but was merely a reporter of them (p. 448). It is interesting to read that Bacon applies a kind of exegetical technique to Avicennian texts, which is a witness to his deep knowledge of Avicennian thought.

Jean-Marc Mandosio is the author of the last chapter of the Latin section and of the volume. In this chapter, Mandosio studies Alfred Sareshill (Sareshell) and Avicenna's meteorology. The author mentions some studies on early modern and medieval meteorology, and how the interest in them is growing. Mandosio explicitly shows how Alfred of Sareshill eliminated some details in order to adapt the material so that the Latin reader would enjoy a de-orientalised text. This chapter touches on more physical phenomena in context, and it includes several citations to ancient observations about nature. I would like to add that in fact the interest in history of natural phenomena and in natural philosophy is increasing. For instance, a Pseudo-Aristotelian text *Kitab al-Ahğar* has recently been the subject of study of a postgraduate degree in Turkey. I do not however understand why the author choses 'lofty impressions' as translation of «*al-Athar al-Ulwiyya*» which could provide better translation. Nevertheless, the comparison of Avicenna's and Aristotle's parallel chapters in a list is very useful for the reader and constitutes a sample of how Avicenna re-arranged Aristotelian titles and content.

I highly recommend this fantastic work, especially for those interested in history of philosophy (Arabic, Hebrew or Latin) or history of science. Its only weak point is perhaps that it includes only two chapters on the Hebrew tradition. It would be nice to see this volume followed by another one focusing on the reception of Avicenna's writings on plants and animals.