

Ahmad Dallal, *Islam, Science and the Challenge of History*, New Haven & Londra: Yale University Press, 2010, 239 pages, ISBN-10: 0300177712.

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Despite being a multidisciplinary subject stretching just over a millennium, Islamic science has yet to witness the attention it deserves. Islamic science began to receive any interest whatsoever in the nineteenth century and until the 1950's, the subject was yet to come into its own—with proper institutional support and self-conscious method. However, after the 50s, the question whether or not Copernicus was aware of the revisionary work Islamic astronomers undertook regarding the Ptolemaic model raised fresh enthusiasm and concern for some time. With groundbreaking studies and a cadre of newly trained students, historians of Islamic science responded; enabling the academy to see what they had seen all along: Islamic science was a unique area of study with its own issues and concerns.

Ahmad Dallal's book, *Islam, Science and the Challenge of History* (Yale: 2010) opens by noting the lack of studies on the history of Islamic science (e.g countless number of scientific manuscripts are yet to be published), but the author believes that the existing literature allows for a certain amount of generalized reflection on the road thus travelled (p. xi). Having worked in classical and modern history of science for over twenty years by first contributing his own original research on the history of astronomy under George Saliba, Dallal is suitably qualified to provide a standing evaluation of the field.

The book, consisting of four main chapters, was first presented as a part of Yale University's 2008 Terry Lectures. In the first chapter, "Beginnings and Beyond," Dallal presents an assessment of the formative period of Islamic science. He summarizes the motivations and strategies behind the translation movement, which introduced Greek science to the Muslim world. The author rightly points to the work of Dimitri Gutas and George Saliba by emphasizing their departure from the orientalist tradition that dominated the field in the previous period. Gutas argued that the rise of Arabo-Islamic science was mainly due to the adoption of an "imperial ideology," beginning with the Abbasid caliph al-Manşūr's need to transfer necessary knowledge conquest. Oppos-

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ing this argument, Saliba argues that translation was the result of a larger process of “Arabization” of administrative structures, beginning with the Umayyad caliph ‘Abd al-Malik in the eighth century. While acknowledging Gutas’ attention to the significance of political astrology, Saliba claims politics was not the primary motive for astrology’s formation despite having an impact on the development of this science. Combining the insights of both historians, Dallal concludes that the process of translation emerged as a result of both theoretical and scientific inquiry as well as social, political and practical needs (pp. 14-17). Dallal then discusses the social and theoretical context of science in the world of Islam. Referring to the opinions of scholars such as George Maqdisi and Sonja Brentjes, the author highlights that considering the examples of observatories and hospitals, knowledge transmission from teacher to student should not be ignored, with regard to the theoretical structure of Islamic science.

Although Dallal does not cover in detail whether or not the exact sciences were taught in madrasas, he does indicate that the exact and religious sciences overlapped in madrasa curriculum in regard to calculating Islamic inheritance and timekeeping (*‘ilm al-mīqāt*) (p. 22). Dallal states that Islamic science was not only nourished by the Greek tradition but also to a considerable extent by Persian and Indian sources. For example he notes that the oldest manuscript concerning astronomy is the translation of *Zij al-Sindhind* from India by Muḥammad ibn Ibrāhīm al-Fazārī and Ya‘qūb ibn Ṭāriq (p. 29). Undoubtedly, understanding this hybrid knowledge emerging during the formation and development of Islamic science provides important clues about scientific culture in the history of Islam. Indicating the preliminary effects of Indian and Persian traditions on Islamic science, Dallal rightly implies that studies on the early period of Islamic science and philosophy need to focus more on the interaction of different traditions other than the Greek alone.

The first chapter also presents a panorama of the subfields of Islamic science including astronomy, medicine and optics. However, the most interesting section highlights the formation of new sciences and reformulation of existing ones. For example, algebra is important because it is a new area developed by al-Khwārazmī. But al-Ṭūsī’s book about trigonometry is also important because it extends its own relationship with astronomy. al-Ṭūsī deals with trigonometry for the first time as an independent field (pp. 39-42). Dallal refers not only to the theoretical aspects of Islamic science, but also to practical and technical aspects of its development. Areas such as land measurement, inheritance calculation, irrigation technology, and calendar preparation are some examples of the use of Islamic science for practical needs. At the end of this chapter, Dallal makes some remarks on the sociology of Islamic science. He mentions that the “consumer base” of scientific knowledge ex-

panded, which is actually related to an increase in professionalization in scientific activities. In other words, he implies that there were scholars who had an average level of scientific experience as well as prominent “full-time” experts in certain areas. This naturally reflected a sociological structure distributing different types of knowledge at different levels (p. 49).

The second chapter of the book is titled “Science and Philosophy.” Dallal states that Islamic intellectual history on relationship between science and philosophy has been read with two opposite approaches thus far. The first claims that Islamic science does not have a theoretical angle and is only a continuation of Greek science without any conceptual or theoretical contribution. This approach overemphasizes the practical aspects of Islamic science. The second approach claims that the main motivation of the developments in astronomy are due to the philosophical, as was emphasized by Islamic astronomical historians (p. 55). Considering the fact that the relationship between science and philosophy is so versatile and complicated, Dallal prefers to limit his comments on astronomy. There he summarizes the discussion between those handling astronomy with mathematical orientation and those handling it as mere handmaiden to natural philosophy and metaphysics.

Firstly summarizing Aristotelian natural philosophy and Ptolemaic astronomy, Dallal argues that one of the most significant debates in the history of Islamic astronomy have to do with the fact that the models set forth by Ptolemy include items not congruent with Aristotelian natural philosophy. Dallal says that historians of science explain the varying responses to Ptolemaic astronomy by either appealing to the mathematically oriented school which was dominant in the Islamic eastern world, or the philosophy-centered school set forth on Aristotelean philosophy which developed in the western Islamic world. Dallal mentions he will propose a slightly different classification for such reactions (p. 64). Considering the innovation and epistemological coherence found in the new Islamic astronomy, and arguments raised by astronomers and philosophers such as al-Birūnī, Ibn Sinā, Ibn al-Haytham, al-Ṭūsī, Quṭb al-Dīn al-Shīrāzī and ‘Alī Qūshjī, Dallal explains a “conceptual separation” between science and philosophy (p. 99).

Ahmad Dallal brings new approach by arguing that it will be more useful to consider the classification of sciences provided by Ibn Khaldūn’s *Muqaddimah* in order to understand the proper relationship between science and philosophy. On this reading, philosophers’ conceptualization of ‘*aql*’ in Islamic intellectual history was based on metaphysics, and therefore all sciences were legitimate insofar as they embodied ‘*aql*’ as the universal principles of all sciences. On the other hand, Dallal argues that ‘*aql*’ was not defined in the *kalām* tradition such as Mu’tazilites and Ash’arites. There, ‘*aql*’ is only practical and instrumental. Dallal refers to the

opinions of Ibn Taymiyyah and Ibn Khaldūn in this regard and underlines that Ibn Khaldūn set forth “procedural reason”, which means that reason has no metaphysical existence, building itself within history (p. 108). According to Dallal, sciences were carried out according to a rationality shaped by historical and intellectual contexts within which they are produced, not with an assumption of universal reason bringing all of them together (p. 109).

In his third chapter titled “Science and Religion,” Dallal states that the relationship between religious and scientific knowledge has a versatile and dynamic structure being reshaped in different social and cultural contexts. According to Dallal, the orientalist understanding which considers science and religion completely converse to each other is wrong, however it is just as problematic to believe that they are completely compliant with one another. Besides, the fact that numerous scholars dealt with both religious and intellectual sciences throughout Islamic history indicates that religious and scientific knowledge are intertwined to a great extent and could shape each other (p. 111). Referring to Saliba’s work as an example, Dallal suggests that emergence of the discipline named *‘ilm al-hay’a* (theoretical astronomy) occurred, as a result of religious criticisms to astrology, with its partition from astronomy (p. 114). Dallal mentions that it is required to understand how scientific knowledge is used and positioned in relation to religious sciences in order to make better generalizations concerning the subject, and focuses on the fields of Qur’anic exegesis and theology (*kalām*). Explaining the subject with examples from al-Rāzī’s interpretation, Dallal indicates how existing philosophical and scientific knowledge was often found in Quranic interpretations. For example, Surat-Al-Baqarah verse 22 mentions that the earth is a bed to men and Rāzī interprets this verse that the world does not move. According to him, if the world could move, it would move either linearly or circularly. In case of moving linearly, the world would fall more quickly than men as it is heavier and that would require the men to be separate from the earth. If it is moving circularly, the men could not reach their destination if they moved in the opposite direction of the earth’s movement (p. 124).

Dallal puts forward new arguments regarding *kalām* which became more systematic over time. It begins to take over and include many philosophical discussions. Dallal disagrees Abdulhamed I. Sabra’s argument that *kalām* became systematized as a quintessential Islamic philosophy replacing the Aristotelean philosophy. Dallal specifically rejects Sabra’s thesis by contesting his reading of al-Ījī’s *al-Mawāqif*, which undergirds Sabra’s argument (p. 134). Finally, addressing the problem of causality in this chapter, Dallal argues that al-Ghazālī’s arguments regarding causality attempted to separate the natural sciences, at least its experimental aspect, and mathematics, from metaphysics (p. 140). In other words, he claims that *kalām* does

not have an objective to impose an “Islamic” metaphysics (p. 144). As we saw earlier, by referring to Ibn Khaldūn, Dallal asserts he is also breaking the bond between science and metaphysics (p. 144). Dallal concludes this chapter by summarizing the two results of this process as follows: (1) Scientific activities were recovered from the burden of metaphysical discourse and principles since al-Ghazālī made one of the most important impacts. (2) With the newly- emerged epistemology, science attempted to be converted into a “culturally neutral or universal activity” as seen more clearly in Ibn Khaldūn (pp. 146-147).

Dallal dedicates the last chapter of the book to the trajectory of Islamic science in the modern era, with the title of “In the Shadow of Modernity.” It is not possible to expect such a complicated and versatile issue to be given its due in a single chapter but Dallal’s answers to difficult questions deserve much praise. Dallal mentions that the adventure of modern science in the Muslim world taken on a different nature from the classical culture of Islamic science. Stating that the title of this chapter could also be “Islamic science after the fall,” he tries to explain the absence of science in Islamic world. Dallal suggests that the ultimate objective of having such discussions is to contribute to the formation of modern Islamic discourses on science (p. 150). This issue necessarily requires dealing with the decline paradigm. Dallal agrees that there was a decline in the history of Islamic science but this is not cultural or epistemological, but rather could be seen as a mark of particular historical, social, political and economic factors (p. 154).

The shift is marked by the presence of an interesting correlation between the relative decline in scientific activities and an incline in the interest in cosmology. Dallal highlights the shift from traditional philosophical cosmology to religious or Sufi cosmology (p. 154). Besides, he underlines that the decline in scientific activities in Islamic world must be thought alongside colonialism (p. 156). Summarizing, with some statistical data, the deficiency and scarcity of investment of the today’s Islamic world in scientific activities, Dallal explains shortly when and how the relation of the Islamic world with modern science started, with the help of the Copernican astronomy and Darwinism. Based only on the Arabic world, Dallal does not make an explanation that can be generalized to the entire Islamic world. For example, he says Copernican astronomy was introduced to discussion in the nineteenth century (p. 162). However, we know that the introduction of Copernican astronomy to the Islamic world dates back to the 1660’s, thanks to İbrahim al-Zigetwārī.

Addressing the opinions of some Muslim intellectuals on modern science, Dallal suggests that one of the most important reasons for Muslim intellectuals to accept Western science easily is the fact that they have an approach that can be summarized in the way that science was produced in historical continuity and that this

production cannot be attributed to any culture, on the contrary, it must be accepted universally (p. 162). However, it is considerable that he explains the difference of science in modern times from previous periods as such: Seeing science as a means of power rather than a system of thought (p. 162).

Another important subtitle that Dallal touches upon in this chapter is "Qur'an and Science." He states that some trends have developed which consider the Qur'an as a science book, seeking the findings of modern science in it, or which perceive the Qur'an as the marker of modern science. Dallal mentions that while there was no concern of ensuring the wedding of science with religion in the times when Muslims were active in terms of scientific activity, this turned into an important agenda in the modern era (p. 170). Criticizing the opinions of Ziauddin Sardar and Seyyed Hossein Nasr with respect to modern science, Dallal summarizes the most important problem of those attempting to form an Islamic discourse with regards to science in the modern era as follows: "Ignorance of, indifference to or even outright abuse of history" (p. 176).

Ahmad Dallal's fluent book is a useful study for general readers and specialists of the field in the sense that it provides a nice summary on the history of Islamic science, and offers eye-opening, novel arguments and questions. However, it encounters some problems by trying to fit such a wide time span in a single book. For example, the first three chapters are related to the classical period of Islamic science while the last one is about the modern period, but the early modern period which could create the connection between these two periods and which corresponds to encounter in Islamic world with European science, as well as to the process of conversion of existing scientific culture, is under represented. One of the important reasons for that is the insufficient amount of the literature with respect to the history of early modern science in Islamic societies. Another issue is that some subjects are handled very briefly as the book attempts to touch upon many subjects. Moreover, the references to the history of Islamic technology are too scarce to reflect the existing literature. Lack of bibliography list at the end of the book is a shortcoming that could be addressed to the publisher. As a conclusion, Dallal's book is a remarkable source not only because it reviews the existing literature with a critical perspective but also because it indicates the areas and subjects of history of Islamic science that must be studied.