Intellect, Substance, and Motion in al-Fārābī's Cosmology

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by

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Abstract

This dissertation offers a new and comprehensive analysis of Abū Naṣr al-Fārābī's (d. 950) cosmology by focusing on various important issues that have been largely neglected by the modern scholarship. It provides an examination of the physical, metaphysical, and astronomical aspects of al-Fārābī's cosmology by adopting a multidisciplinary approach that takes into account the history of philosophy and the history of astronomy. Accordingly, my dissertation explores how al-Fārābī attempted to reconcile features of Ptolemaic astronomy with Aristotelian and Neoplatonic theories, an endeavor which resulted in the formulation of innovative cosmological ideas. Chapters I and II provide background information on al-Fārābī's activity as a commentator and his relation to the Greek commentatorial tradition and assess the relevant primary sources. In addition, they examine al-Fārābī's approach to cosmology and his scientific method in terms of both the Ptolemaic astronomical tradition and the Aristotelian corpus. Chapter III addresses problems related to the structure of al-Fārābī's cosmology, especially the origin of his ennadic cosmological model and his spherology. Particular attention is devoted to the question of how Aristotle's unmoved movers and Ptolemy's astronomical theories are reconciled. Chapters IV, V, and VI analyze the place of celestial matter, intellect, and motion respectively in al-Fārābī's cosmology and attempt to redefine the second teacher's relation to the various trends of Greek philosophy. The study stresses al-Fārābī's connection with the Neoplatonic and Peripatetic currents, particularly with thinkers such as Alexander of Aphrodisias, Themistius, and Proclus. As a corollary, it challenges the Mahdian political interpretation of al-Fārābī's philosophy and of the latter's alleged debt to Middle Platonism. Throughout the dissertation, emphasis is placed not only on the Greek philosophical antecedents, but also on the factors proper to the Arabic-Islamic context that can best explain the development of al-Fārābī's cosmological ideas. The debate over the creation of the world, the influence of al-Kindī and Abū Bakr al-Rāzī, the development of the astronomical *hay'a* tradition in Islam, the impact of the translation movement from Greek to Arabic, and al-Fārābī's influence on Ibn Sīnā, are some of the internal Arabic-Islamic elements that are highlighted in the analysis. Ultimately, this study aims to provide a clearer understanding of al-Fārābī's role in the formation of medieval Arabic cosmology.

Résumé

Cette thèse présente une analyse novatrice et exhaustive de la cosmologie d'Abū Naṣr al-Fārābī (mort 950) en exposant divers concepts issus de ses ouvrages. Les deux premiers chapitres récapitulent la contribution d'al-Fārābī à la tradition des commentaires grecs et arabes, évaluent les sources premières, et examinent la méthode cosmologique du deuxième maître, autant vis-à-vis de la tradition astronomique ptoléméenne que vis-à-vis du corpus aristotélicien. La place de l'astronomie, de l'astrologie, de la physique et de la métaphysique dans la méthode cosmologique, et l'importance de la démonstration et de l'analogie, sont examinées afin de reconstituer la méthodologie employée par al-Fārābī. La structure de sa cosmologie, et en particulier la question de l'origine de son modèle ënnadique, ainsi que la relation entre les moteurs immobiles aristotéliciens et les théories cinétiques ptoléméennes sont soulevées dans le chapitre III. Les chapitres IV, V, et VI, étudient, quant à eux, la matière céleste, l'intellect, et le mouvement des astres, tout en délinéant l'influence que les auteurs grecs eurent sur al-Fārābī. L'analyse montre les liens étroits qui unissent al-Fārābī aux mouvances péripatéticienne et néoplatonicienne de l'antiquité, et particulièrement à Alexandre d'Aphrodise, Themistius, et Proclus. Conséquemment, l'auteur critique la thèse Mahdienne selon laquelle la philosophie d'al-Fārābī serait principalement redevable à la philosophie politique du moyen-platonisme. L'accent est placé non seulement sur les correspondances entre le deuxième maître et ses prédécesseurs grecs, mais aussi sur les facteurs internes au contexte arabo-islamique qui sont susceptibles de fournir une lecture plus juste du développement de sa pensée. Le débat concernant l'origine du monde, l'influence d'al-Kindī et d'Abū Bakr al-Rāzī, la formation d'une tradition astronomique propre au monde islamique (*'ilm al-hay'a*), l'impact du mouvement de traduction du grec à l'arabe, sont pris en compte. Cette thèse a pour but principal d'élucider et d'expliquer le rôle joué par al-Fārābī dans le développement de la cosmologie arabe médiévale.

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To my parents, my sister,

And my wife Eurydice,

Πηγή ζωής

TABLE OF CONTENTS

Abbreviations:

CAG=Commentaria in Aristotelem graeca

Alexander of Aphrodisias:
Mabādi'=Mabādi' al-kull

Neoplatonica arabica:
Maḥḍ al-khayr =Kalām fī maḥḍ al-khayr
Theology=Theology of Aristotle

Al-Fārābī:
Aghrāḍ=Fī aghrāḍ al-ḥakīm fī kull maqālah min al-kitāb al-mawsūm bi-al-ḥurūf
Ārā'=Mabādi' ārā' ahl al-madīnah al-fāḍilah
Daʿāwā=Al-daʿāwā al-qalbiyyah
Fuṣūl=Fuṣūl munṭazaʿah
Iḥṣā'=Kitāb iḥṣā' al-ʿulūm
Ithbāt=Risālah fī ithbāt al-mufāraqāt
Jamʿ=Kitāb al-jamʿ bayna ra'yay al-ḥakīmayn
Jawābāt=Jawābāt li-masā'il su'ila ʿanhā
K. al-mūsīqā=Kitāb al-mūsīqā al-kabīr
Siyāsah=Al-siyāsah al-madaniyyah
Taʿlīqāt=Kitāb al-taʿlīqāt
ʿUyūn=ʿUyūn al-masā'il

Ibn Sīnā:
Shifā'=Kitāb al-shifā'
Najāh=K. al-najāh

I. INTRODUCTION AND PRELIMINARY REMARKS

1. AIMS OF DISSERTATION

The principal objective of this dissertation is to provide a new, in-depth, and systematic analysis of several key aspects of al-Fārābī's cosmology.[1] Al-Fārābī (d. 950), also known as the 'second teacher' or 'second master' (after Aristotle), is unanimously considered one of the great Arabic philosophers of the medieval period, yet many dimensions of his work remain poorly known.[2] One of them is his contribution to cosmology and the role he played in the development of one of the most influential cosmological models of the Arabic philosophical tradition. In spite of several recent monographs on this thinker, and with the exception of Davidson's book, no study has so far provided substantial insight into the sources underlying his cosmology and its significance in the development of Arabic thought.[3]

My dissertation proposes to analyze al-Fārābī's cosmology by bringing together the history of philosophy and the history of astronomy and by interpreting its sources, structure, and major concepts in connection with the ancient Greek and early Arabic scientific and philosophical traditions. Emphasis will be placed on explaining how physics, metaphysics, and astronomy interact in al-Fārābī's works and how Ptolemaic astronomical elements are reconciled with Aristotelian and Neoplatonic theories.

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[1] It should be made clear from the outset that al-Fārābī does not use a specific Arabic term to convey our modern notion of 'cosmology.' Rather, as this study will show, the cosmology of medieval thinkers such as al-Fārābī consisted of various disciplines, especially astronomy, astrology, physics, and metaphysics. It is insofar as these thinkers attempted to provide a systematic and rational interpretation of the cosmos using these various sciences that one may legitimately speak of a 'medieval cosmology.'

[2] I will not provide any biographical information on al-Fārābī, because very little is known about his life, and because even that which is known is subject to doubt. Gutas 1982a sifts through the historical facts and the legendary accounts and is for the time being the most thorough introduction to al-Fārābī's life.

[3] Galston 1990, Davidson 1992, Fakhry 2002, Vallat 2004, and Colmo 2005. Davidson's book is an important contribution to the subject, but it focuses mostly on the Agent Intellect and says little about other aspects of al-Fārābī's cosmology. Furthermore, it discusses chiefly the cosmologies of Ibn Sīnā and Ibn Rushd. Finally, Davidson does not address the astronomical elements in these thinkers' cosmologies or the question of how they relate to their metaphysical theories.

In Chapter II, I focus on the second teacher's approach to cosmology and his understanding of how the various sciences can contribute to the study of the heavens. After a survey of the sources that were available to al-Fārābī, which helps to contextualize his work in light of the Greek legacy and the Arabic intellectual climate of his day, I define the place that astronomy, astrology, physics, and metaphysics play in al-Fārābī's cosmology and address questions related to his conception of the scientific method and the relation between scientific practice and theory.

In Chapter III, I provide an overview of al-Fārābī's spherology and of the basic components that constitute his cosmological model. This section not only provides the reader with a general sense of the structure of al-Fārābī's cosmology as it can be reconstructed from the sources, but it also addresses the question of the origin of, and antecedents for, al-Fārābī's ennadic or decadic cosmological scheme. In order to shed light on this issue, I examine some of the Greek sources that are likely to have influenced al-Fārābī's model, and which include the Aristotelian corpus and later Peripatetic and Neoplatonic commentaries. I argue that al-Fārābī's theories show a remarkable degree of continuity with the works of certain Greek thinkers, such as Alexander of Aphrodisias (fl. c. 200 CE) and Simplicius (fl. 500-550), and that he carries on their project of harmonizing various and often conflicting philosophical trends.

The remaining sections of this dissertation (Chapters IV, V, and VI) examine in detail al-Fārābī's theories of heavenly substance, intellection, and motion. The basic reason behind my selection of these three themes is that they are conceptually significant in the history of ancient and medieval cosmology, and, moreover, they are often intricately connected. This is definitely the case in al-Fārābī's philosophy; one cannot be properly explained without reference to the other two. In particular, al-Fārābī's theories of celestial substance and motion are dependent on his complex theory of celestial intellection, which I treat in detail in Chapter V. In these chapters, my analysis is confined to the superlunary world and only incidentally touches on the question of how the separate intellects and the heavenly bodies affect sublunary existents. It is therefore not a primary objective of this study to examine the connection between the Agent Intellect and human noetics, a subject which has already been studied by modern historians.[4]

Another, somewhat secondary, aim of this dissertation is to study the cosmological sections of texts that have traditionally been attributed to al-Fārābī or associated with the Fārābīan corpus, but whose authenticity has been put into question by modern scholars. The most important works in this category are the *Jamʿ*, the *Jawābāt*, the *Taʿlīqāt*, the *ʿUyūn al-masāʾil*, and the *Daʿāwā*.[5] The reason for studying these texts is twofold. First, they present highly original cosmological ideas that are related to al-Fārābī's and Ibn Sīnā's philosophies, but which have never been studied critically. Second, I believe that it is only through a detailed examination of their contents that the question of their authorship will be definitively settled. While I cannot offer a comprehensive treatment of these works, a comparative study of their cosmological theories can shed some light on the problem of their authorship and represent a starting-point for future research. This is all the more justified by the very large place devoted to cosmology in these treatises.

I also intend to challenge the political-reductionist reading of al-Fārābī's philosophy that has until very recently been predominant in modern studies on this thinker, and, by the same token, to contribute to the rehabilitation of the cosmological and metaphysical sections of his works, which up to now have been relatively neglected.[6] I have not devoted a special section of my dissertation to fulfill

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[4] See Lucchetta in al-Fārābī 1974; Walzer 1974; Hamzah in al-Fārābī 2001b; and especially Davidson 1972 and 1992.

[5] For information on the *Fuṣūṣ al-ḥikam*, which is now attributed to Ibn Sīnā, as well as the *Taʿlīqāt*, the *ʿUyūn*, and the *Daʿāwā*, see Khalil 1941-1946; Alon 2002, 794-830; Michot 1982; Davidson 1987, 148, 215, 237, 353-355, 360; and Vallat 2004, 379-390. For the *Jamʿ* and the *Jawābāt*, see Walzer 1950; Lameer 1994, 25-39; M. Rashed 2008, 55-58; and D'Ancona 2006, especially 380, note 6.

[6] This political approach has its roots in the scholarship of Leo Strauss and has been practiced most assiduously by M. Mahdi, J. Parens, C. Butterworth, C. Colmo and others. For a less reductionist

this objective, but I believe that the analysis provided throughout will stand as the best evidence to undermine the political-reductionist thesis.

I argue that al-Fārābī's cosmology need not necessarily be interpreted in light of his political philosophy to be coherent, and that it may be seen as a self-contained system that perpetuates a long philosophical tradition harkening back to Aristotle's *De caelo* and other works. It reflects a valid scientific approach to the world and cannot be defined merely as a 'political cosmology' or as a metaphor for the way society is structured. Moreover, I situate al-Fārābī's theories in the context of the late-antique Peripatetic and Neoplatonic traditions rather than Middle Platonism, as Mahdi in particular had. Finally, I stress the parallels between al-Fārābī's celestial and human noetics and conclude that his cosmological theories are connected primarily to his psychology and only secondarily to his political doctrine. Al-Fārābī's cosmological theories are complex and draw on a rich and diverse philosophical heritage that rarely bears a concrete link to political philosophy.

If that is the case, then the cosmological and metaphysical dimensions of al-Fārābī's works may be studied for their own sake and cannot be satisfactorily understood if one sees them merely as a backdrop for a discussion of human politics. My approach partly relies on the works of T.-A. Druart, D. Gutas, P. Vallat, D. Reisman, C. D'Ancona, and many others who have analyzed al-Fārābī's output in connection with late-antique thought rather than through the narrow lens of political theory.[7] Ultimately, however, my aim is more to contribute to rehabilitating al-Fārābī as a metaphysician and cosmologist than to dwell on the lack of any political dimension in his cosmology.

Some of the basic reasons for conducting research on al-Fārābī's cosmology will have emerged clearly by now. A thorough analysis of its sources, structure, and

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approach, but one which nonetheless focuses on al-Fārābī's political ideas, see O'Meara 2003. Unlike Mahdi, O'Meara connects al-Fārābī's political theories to Neoplatonism rather than Middle Platonism.

[7] Gutas' 2002 article is a cogent criticism of Strauss' and Mahdi's positions, and his views represent a starting-point and guideline for my own research. See especially p. 19 ff.; pp. 23-24 deal specifically with al-Fārābī and refute the "political" reading of his works.

function will prove to be a valuable contribution to the modern understanding of al-Fārābī's place in the history of Arabic thought and the history of medieval cosmology in general. In that sense, my study inscribes itself in the recent upsurge of interest for ancient and medieval cosmology.[8] Cosmology plays a key role in the second teacher's oeuvre, not only for its own sake, but also in relation to other aspects of his philosophy, such as his physics, psychology, and prophetology.

Moreover, the scholarship on al-Fārābī is very imbalanced and has in general focused on his 'political philosophy' and to a lesser extent on his logic to the exclusion of other fields, with the effect that his cosmology has not received the scholarly treatment it deserves and remains inadequately understood. Both the sources behind al-Fārābī's metaphysics and cosmology and the reasons that motivated the elaboration of these disciplines are marginally or inadequately treated in the modern literature. As D. Gutas writes, "...the prevalence of the Straussian interpretation of al-Fārābī has had a chilling effect on mainstream studies of this very significant philosopher..."[9] This is regrettable, because al-Fārābī appears to have exercised a profound influence on subsequent Arabic thought, and his ideas resurface in some of its crucial stages. His cosmological system is *mutadis mutandis* the one adopted by Ibn Sīnā; it is (in its Avicennian form) the main object of attack of al-Ghazālī's *Tahāfut*; and it is this same system that is in turn defended and criticized by Ibn Rushd and Maimonides.

In this regard, some of the conclusions reached in this study can be fruitfully applied to Ibn Sīnā's (d. 1037) cosmology, which in many respects follows that of al-Fārābī. It is not an exaggeration to say that al-Fārābī's work profoundly influenced some of Ibn Sīnā's cosmological theories and served as one of its main models. Throughout my discussion, I will stress the connection between the two philosophers and provide hypothetical explanations for the divergences in their

[8] One may cite, among many other works, Taub 1993, Grant 1994, Lerner 1996, Rudavsky 2000, Harrison 2003, Clay 2003, Betegh 2004, Obrist 2004, Wilberding 2006, Eastwood 2007, and Yousef 2008.
[9] Gutas 2002, 24; see also Gutas' 2003 review of Mahdi's book entitled *Alfarabi and the Foundation of Islamic Political Philosophy*.

doctrines.[10] Particularly interesting, I think, is to witness how they developed quite similar, yet subtly distinct, concepts of celestial substance, intellection, and causality. For these reasons this study will also be of benefit to students of Ibn Sīnā's cosmology.

Finally, my research will seek to clarify the problem of al-Fārābī's allegiance to the various trends of Greek philosophy and the controversial question of the place of Neoplatonism in his cosmology. As Chapter II shows, Al-Fārābī's conception of astronomy and its method was profoundly shaped by Aristotle's *Organon*, and especially the *K. al-burhān*. Chapter III also argues that the main structure of the second master's cosmology is essentially Aristotelian and modelled on Book Lambda. This being said, al-Fārābī also introduces foreign elements derived from a variety of other sources, such as Alexander's *Mabādi'*, Ptolemy's *Almagest*, possibly Simplicius' *In de caelo*, and the *Neoplatonica arabica*. Chapters IV and V reveal the extent to which al-Fārābī's theories of celestial substance, intellection, and creation incorporate Neoplatonic material and are dependent on the Arabic *Neoplatonica*, especially the *Proclus arabus*. Thus, in many respects, my conclusions agree with the recent contributions of T.-A. Druart, M. Geoffroy, G. Freudenthal, D. Reisman, and P. Vallat, which have all emphasized the Neoplatonic element in al-Fārābī's thought. This being said, my analysis aims to provide a more nuanced picture of the interactions between Aristotelianism and Neoplatonism in al-Fārābī's cosmology than has hitherto been presented.

[10] In doing so, I follow several recent comparative studies of al-Fārābī's and Ibn Sīnā's philosophy: Davidson 1992; Wisnovsky 2003b, especially 145-161 and 219-227; Bertolacci 2001 and 2005a.

2. SURVEY OF SCHOLARSHIP AND METHOD

Past studies on al-Fārābī's cosmology have generally focused on specific issues, notably the role of the celestial bodies in sublunary change,[11] his treatises on astrology,[12] the concept of emanation,[13] and the Agent Intellect.[14] An obvious desideratum is therefore to provide a general study of the neglected themes in al-Fārābī's cosmology by taking into account as many of his writings as possible, by analyzing their content, and by clarifying the links that exist between them. In fact, a purely internal examination of the Fārābīan corpus can provide substantial insight into the matter, because al-Fārābī discusses cosmological issues at length in many of his writings, particularly in the two emanationist works, the *Ārā'* and the *Siyāsah*.[15] Other works, especially the *Risālah fī al-ʿaql*, the *K. al-mūsīqā*, the *K. al-burhān*, two treatises on astrology,[16] and the *Fuṣūl*, also contain valuable material. Throughout my discussion, I provide many translations and analyses of passages that have never been studied before, especially from the *K. al-burhān* and *K. al-mūsīqā*, two very interesting works that contain much information on al-Fārābī's philosophical method.

This straightforward textual approach, however, is not without its shortcomings and pitfalls. First, it is undermined by the uncertainty that reigns over the dating and chronology of the Fārābīan corpus. While it is generally accepted that the *Ārā'* and the *Siyāsah* were composed during a late stage of al-Fārābī's life, there is no sure sense of how these two treatises relate to the second master's other

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[11] Druart 1981 and Davidson 1992.
[12] Druart 1978 and 1979.
[13] Galston 1977, Ivry 1990, Marquet 1987 and 1990, Druart 1992, and Fakhry 2002.
[14] Davidson 1992.
[15] For the *Siyāsah*, I have used Najjār's edition (al-Fārābī 1964). An English translation of the first section of this work can be found in McGinnis and Reisman 2007, 81-104. For the *Ārā'*, I have relied on both Nādir's (al-Fārābī 1982) and Walzer's (al-Fārābī 1985a) editions. The latter contains some lacunae and has been criticized (see Mahdi 1990a), but it occasionally provides a better reading than the former. Unless otherwise stated, all English translations are taken from McGinnis and Reisman 2007 for the *Siyāsah* and Walzer's translation for the *Ārā'*.
[16] Al-Fārābī wrote two treatises on valid and invalid propositions in astrology: *Maqālah fīmā yaṣiḥḥu wa-mā lā yaṣiḥḥu min aḥkām al-nujūm* (al-Fārābī 1987a) and *Maqālah fī al-jihah allatī yaṣiḥḥu ʿalayhā al-qawl fī aḥkām al-nujūm* (al-Fārābī 1976). For more information on the editions and translations of these treatises, see Druart 1978, 43, note 1.

works. The problem of the evolution of the Fārābīan corpus is thus one that must be taken into consideration when one conducts an internal study of his thought. Second, there is marked disagreement concerning al-Fārābī's position on many crucial philosophical issues, a question which is directly related to the problem of the authenticity of his works. Nowhere is this problem more forcefully expressed than in his cosmogony, where one finds an apparent contradiction between the creationist account articulated in the *Jamʿ* and the *Jawābāt* and the emanationist view formulated in the *Ārā'*, the *Siyāsah*, and other treatises. This has led some scholars to suppose that the *Jamʿ* and the *Jawābāt* were not written by al-Fārābī. In addition, the authenticity of the *Taʿlīqāt*, the *ʿUyūn*, and the *Daʿāwā* has also been questioned. This seriously limits the number of texts liable to provide authentic information on al-Fārābī's cosmology, but it also stresses the desideratum for an analytical and comparative study of these works.

The internal study of the Fārābīan corpus is coupled with an examination of the Greek and Arabic philosophical sources, both those that are known to have been used by al-Fārābī and those that present a doctrinal interest for the matter at hand despite the absence of a clear textual link. This comparative approach is necessary not only because the Greek texts provided al-Fārābī with the essential building-blocks of his cosmological system, but also because a comparative analysis of common themes in the Greek and Arabic contexts is a requisite to assess al-Fārābī's originality in his reworking of the tradition that reached him.

Throughout my analysis, I begin by identifying the Greek and Arabic sources that may have influenced al-Fārābī and that stretch from the Aristotelian corpus to the late-antique Neoplatonic commentaries of Proclus (d. 485) and Simplicius and, in the Arabic milieu, to the works of al-Kindī (d. after 870) and Abū Bakr al-Rāzī (d. 925). I pay particular attention to the form in which al-Fārābī read these texts, since the process of translation from Greek to Arabic was often accompanied by a fair amount of adaptation and transformation of the doctrinal material. This is the case, for instance, of the *Neoplatonica arabica*,[17] which sometimes combines material from Plotinus' and Proclus' works in an inextricable way. Nevertheless, my aim is also to show that although al-Fārābī depends heavily on the ancient tradition, especially Alexander and Proclus, he endows the cosmological concepts he inherited with new meaning and redefines their role in his philosophy. Whether it is Aristotle's celestial matter, Ptolemy's kinematic model, or Proclus' theories of intellection, al-Fārābī creatively modified and adapted these theories in order to integrate them in a harmonious synthesis, which is nevertheless not free of tensions. In my analysis, I try to present al-Fārābī as an innovative thinker and an important agent in the history of medieval cosmology, rather than a mere receptor of the Greek tradition.

In addition to discussing the links that connect al-Fārābī to previous Greek thinkers, I also attempt to analyze al-Fārābī's theories within the context of early Arabic philosophy, theology, and science. I try to identify some of the historical, social, and intellectual factors that shaped al-Fārābī's cosmology, as well as some of the thinkers who may have influenced him during certain periods of his life. An interpretation of al-Fārābī's cosmology that combines these cultural and intellectual factors together with a study of the Greek sources can best explain the complexity of his thought.

It is from this perspective that I address the question of how al-Fārābī's cosmology connects with the debate on the creation and eternity of the world, a central issue in Arabic thought.[18] I put forth in Chapter IV a tentative developmentalist hypothesis based on biographical, historical, and doctrinal

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[17] I use this formula to refer to the corpus of Neoplatonic texts translated and adapted into Arabic. The corpus consists of the *Plotiniana arabica* (which itself consists mainly of the *Theology of Aristotle*, the *Sayings of the Greek Sage*, and the *Epistle on Divine Science* spuriously attributed to al-Fārābī), and the *Proclus arabus*, which is composed of the excerpts assembled in Endress 1973 and two adaptations based on Proclus' *Elements of Theology*, the *Kalām fī maḥḍ al-khayr*, or *Liber de causis*, and the *Liber de causis II*. The most recent and up-to-date information on these texts is to be found in Aouad 1989, Thillet and Oudaimah 2001-2002, and D'Ancona and Taylor 2003.

[18] Several recent monographs and articles have been devoted to the concepts of creation and eternity in Arabic philosophy, especially in connection with Ibn Sīnā's works; see, for instance, Janssens 1997, İskenderoğlu 2002, and Acar 2005. In comparison to later thinkers, al-Fārābī has received little attention; see M. Rashed 2008.

elements according to which al-Fārābī's views on celestial substance and the question of the creation of the world underwent a significant evolution. According to this interpretation, some of al-Fārābī's cosmological theories can be construed as responses or reactions to some of al-Kindī's and Abū Bakr al-Rāzī's doctrines, while others may have arisen out of his association with the Christian Peripatetic thinkers of Baghdad. Al-Fārābī's philosophical formation and his relation to pre-existing philosophical systems are singled out as important factors in the understanding of his thought.

Another example of my method pertains to al-Fārābī's conception of the astronomical method and its role in his cosmology, which I examine in connection with both the Greek background and the development of the *hay'a* astronomical tradition. My analysis suggests that al-Fārābī at once inherited and perpetuated some aspects of the ancient attitude toward astronomy, but also anticipated several features that later became hallmarks of the Arabic *hay'a* tradition. The relation between the early Arabic *falāsifah* and *ʿilm al-hay'a* still awaits detailed examination, and I hope that my dissertation will encourage others to investigate this question more systematically.

The desire to analyze al-Fārābī's cosmology in terms of both ancient Greek philosophy and astronomy and the Islamic milieu of his day has led me to rely on a wide range of secondary sources. With regard to the Greek background, I would like to mention S. Fazzo's, R. W. Sharples', and I. Bodnár's studies on Alexander's cosmology, as well as those by C. Genequand and A. Hasnawi on the Arabic Alexander.[19] I have also greatly benefited from the various contributions by G. E. R. Lloyd, R. Sorabji, C. Wildberg, S. Sambursky, A C. Bowen and other scholars who have focused on various issues in ancient Greek cosmology and astronomy.[20] R. Sorabji's recently published *The Philosophy of the Commentators* proved to be of

[19] Fazzo and Wiesner 1993, Hasnawi 1994, Genequand's introduction to, and commentary on, the *Mabādi'* in Alexander 2001, Fazzo 2002, and Sharples 2003.

[20] Sorabji 1988 and 2005, Wildberg 1988, Sambursky 1962, Verrycken 1990a and 1990b, and de Haas 1997.

invaluable help in finding specific elements in the labyrinth that is the late-antique commentatorial output.

For al-Fārābī's philosophy in general, I have relied on a wide array of secondary sources, including several important recent studies.[21] These helped me to delineate the philosophical background that shaped al-Fārābī's thought. More important for my purpose are the various contributions that touch upon al-Fārābī's cosmology.[22] None of these publications, however, provides a thorough analysis of the sources and philosophical significance of al-Fārābī's cosmological doctrines. Madkour's classic study entitled *La place d'al-Fārābī dans l'école philosophique musulmane* is today outdated and in need of serious revision as far as the sections on cosmology and metaphysics are concerned. Walzer offers detailed treatment of the second teacher's cosmological theories, but his remarks are in the form of a commentary and are restricted to the *Ārā'*. In addition, his ideas suffer from several major flaws, some of which are discussed in my own analysis. Netton's treatment of al-Fārābī's cosmology is confined to the concept of emanation and, moreover, makes use of texts which are unlikely to have been composed by the second teacher. De Smet and Genequand briefly compare al-Fārābī's cosmology to other intellectual movements, namely Shīʿī thought and the works of the Arabic Alexander respectively. Druart offers important insight into al-Fārābī's conception of astronomy and astrology, but her remarks are limited to two short treatises (see section II.4.3). Finally, Davidson's book entitled *Alfarabi, Avicenna, and Averroes, on Intellect*, which was published in 1992, represents an important contribution to the study of medieval Arabic cosmology, but it devotes only twenty-nine pages to al-Fārābī and focuses chiefly on the Agent Intellect and its influence on the sublunary world.

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[21] Kraemer 1992; Alon 2002; Druart 1987a, 1987b, 1992, and 1999; Gutas 2002; D'Ancona 1995 and 2006; Reisman 2005; Davidson 1992; Galston 1977 and 1990; Mahdi 1967 and 2001; Geoffroy 2002; Freudenthal 1988 and 1990; Vallat 2004; Bertolacci 2001, 2005a, and 2006; Menn 2008; and M. Rashed 2008.

[22] Walzer's commentary on the *Ārā'* in al-Fārābī 1985a; Madkour 1934; Druart 1978, 1979, and 1981; Arnaldez 1976; Netton 1989; Davidson 1992; Maróth 1995; Marquet 1987; and De Smet 1995.

If one looks at the existing scholarship in a critical manner, two points are worth noting. First, no monograph has been written that deals with al-Fārābī's cosmology in depth, a fact which is highly surprising considering its pivotal role in the history of Arabic science and philosophy. Neither the major philosophical concepts (e.g., matter, intellection, motion), nor the astronomical material underlying his cosmology has been analyzed extensively in the modern literature devoted to this thinker.

Second, al-Fārābī's cosmology has traditionally been considered exclusively in terms of the legacy of Greek philosophy, and in general little attention has been paid to the social, cultural, and intellectual factors proper to Arabic culture that may have influenced his ideas. The Islamic-Arabic background in which the various features of al-Fārābī's cosmological system took root has either been omitted or misconstrued in modern studies. A typical example is embodied in Walzer's commentary on the *Ārā'*, which on the one hand posits hypothetical (and not clearly identified) Greek sources for al-Fārābī's cosmological theories, thus bypassing the possibility of Arabic-Islamic precedents, and on the other hand formulates a series of hypotheses on the Islamic, and more particularly Shīʿī, nature of al-Fārābī's philosophy that rely on very little evidence. Although Walzer's hypotheses have subsequently been dismissed by scholars, recent contributions, such as M. Maróth's article entitled "The Ten Intellects Cosmology and its Origin,"[23] have perpetuated Walzer's approach, which relies almost single-handedly on a source-hunting method and does not interpret al-Fārābī's ideas in its Arabic context.

In contrast to most previous studies on al-Fārābī's cosmology, I endeavour to take into consideration several aspects of the history of Arabic science and adopt an interdisciplinary approach. My intention is to analyze the second teacher's cosmology from both the perspective of the history of philosophy and the history of

[23] Maróth 1995.

astronomy and cosmology.[24] This method has the advantage of combining several fields (astronomy, physics, and metaphysics) that have evolved in separate directions over time, but which originally in al-Fārābī's worldview were seen as essentially connected to one another.

Furthermore, a study of al-Fārābī's cosmology would not be complete without an examination of the astronomical texts that were accessible to him, such as the *Almagest* and the *Planetary Hypotheses*, since these are likely to inform us of some of its essential features. This method is also justified by the obvious interest that al-Fārābī entertained for astronomy and astrology, as his commentary on the *Almagest* and his various treatises on astrology indicate. The necessity to include the astronomical tradition is well illustrated by the question of celestial motion and of al-Fārābī's allegiance to the Ptolemaic legacy. To what extent is al-Fārābī's cosmology Ptolemaic? Does he adhere to the Ptolemaic theories of eccentrics and epicycles? If so, then one is faced with the corollary problem of having to explain how al-Fārābī harmonized these Ptolemaic elements with the other Aristotelian and Neoplatonic theories he endorsed.

For this endeavour, modern works on ancient and medieval cosmology and astronomy were an enduring source of inspiration, from Duhem's outdated *Le Système du monde* to the more recent studies by G. E. R. Lloyd, M.-P. Lerner, L. Taub, E. Grant, and A. Bowen among others.[25] Recent monographs on the cosmology of individual Greek and Arabic thinkers, such as Wilberding's study of Plotinus' cosmology, published in 2006, and Wiesner's dissertation on al-Kindī's cosmology, were helpful, and testify to a rising interest in ancient cosmology.[26] With regard to

[24] Precedents for this approach may be found in Carmody 1952, Langermann 1991, Wiesner 1993, Grant 1994, and Siorvanes 1987 and 1996.
[25] Duhem 1913-1959; Wright 1973; Grant 1978 and 1994; Lloyd 1978; Lerner 1996; and Bowen 2002 and 2007.
[26] Wiesner 1993; Wilberding 2006.

Arabic astronomy, the groundbreaking works of H. A. Wolfson, B. Goldstein, A. I. Sabra, G. Saliba, F. J. Ragep, and R. Morelon were essential.[27]

Al-Fārābī's astronomical output has, to my knowledge, been studied only by A. Kubesov in several books and articles written in Russian.[28] The most important of these are *Astronomiia v trudakh al-Fārābī*, which is a general study of al-Fārābī's cosmology with a special emphasis on his astronomy, and a translation of al-Fārābī's commentary on Ptolemy's *Almagest* entitled *Sharḥ kitāb al-majisṭī*. Unfortunately, Kubesov's work is almost exclusively based on a manuscript in the British Library that purports to be al-Fārābī's commentary on Ptolemy's *Almagest*, but which was later shown to be by Ibn Sīnā.[29] As a result Kubesov's studies are of little or no use to the student of al-Fārābī's cosmology.

The foregoing considerations stress the need for a new analytical study of al-Fārābī's cosmology. This dissertation, which would not have been possible without the works of the scholars mentioned above, will attempt to fill this void. In spite of unavoidable shortcomings, I hope that it will contribute to a better understanding of al-Fārābī's philosophy and of the ideas that this important thinker bequeathed to the history of Arabic thought.

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[27] Wolfson 1929, 1958, and 1962; Lloyd 1978; Sabra 1984, 1996, 1998; Saliba 1991, 2000, and 2007; Ragep 1993 and 2001; Morelon in Ptolemy 1993, Morelon 1996a, 1996b, and 2004, and his edition of Thābit ibn Qurra's works (see Ibn Qurra 1987).
[28] Kubesov 1975 and 1981.
[29] More will be said about the history of the British Library manuscript in my discussion of the sources.

II. AL-FĀRĀBĪ'S APPROACH TO COSMOLOGY

1. THE DUAL LEGACY OF GREEK ASTRONOMY AND PHILOSOPHY

Knowledge of the sources accessible to al-Fārābī helps to delineate some of the main influences on his cosmology. What is immediately striking when one glances at al-Fārābī's position in the history of thought is that he inherited what seems to be a dual cosmological tradition, an astronomical one embodied in the Ptolemaic works, and a philosophical one contained in the Aristotelian corpus and its commentaries, as well as in the Neoplatonizing works of the *Proclus arabus* and *Plotinus arabus*. This duality is reflected in the Fārābīan corpus itself: while al-Fārābī's (no longer extant) commentary on the *Almagest* was inscribed in the astronomical tradition of his day, his emanationist treatises are more in the vein of philosophical works such as Aristotle's *Metaphysics* and *De caelo* and Proclus' *Elements of Theology*. Hence, one may from the outset raise the question of how al-Fārābī conceived of this heritage, whether he attempted to achieve a reconciliation of these two disciplinary traditions, and the degree to which he succeeded in doing so. In turn, this raises the question of the place occupied by astronomy on the one hand, and physics and metaphysics on the other, in al-Fārābī's approach to cosmology. These questions will be treated in Chapters II and III of this dissertation.

Like most medieval cosmologists, al-Fārābī relied primarily on Aristotle's *De caelo*, *Physics*, and *Metaphysics*, which had been translated into Arabic at least once before or during his lifetime.[30] We know that the second master wrote commentaries on these texts, none of which has survived, except for the *Aghrāḍ*, which is not strictly speaking a commentary, and a short excerpt in Latin on the *Physics*.[31] These Aristotelian works provided medieval thinkers with a coherent and elaborate cosmological model, whose various theories, however, were not always

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[30] For the history of the translation of these texts in Syriac and Arabic, see Peters 1968; Endress 1966 and 1995; Martin 1989; Bertolacci 2001 and 2005b; Hugonnard-Roche 2003; and Thillet 2003.

[31] For the *Aghrāḍ*, see Gutas 1988, 240-242; Druart 1982; and Bertolacci 2005a. For the surviving excerpt on Aristotle's *Physics*, see Birkenmajer 1935.

seen as compatible. Many if not most of the cosmological issues studied by al-Fārābī, such as the substance of the heavenly bodies, the organization of the heavenly spheres, their intellection and motion and their relation to God, have their starting-point in these seminal works. But as we shall see, in many instances al-Fārābī goes beyond Aristotle by developing interpretations that either are not completely spelled out in the Aristotelian texts or are nowhere to be found in them. Salient examples of this departure from the Stagirite are his theories of heavenly form and matter, the nature of the sphere-souls' intellection, and the causal relation between the sphere-souls and the separate intellects (see Chapters IV and V).

In addressing these topics, it is clear that al-Fārābī relied on a much broader spectrum of sources. Some of them consisted of ancient commentaries (about which more will be said later on), while others belonged to the *Neoplatonica arabica*. Indeed, the *Neoplatonica arabica* contains several relevant passages on cosmology, which deal with the nature of the stars, the effect of intellect on soul, the influence of the celestial bodies on the sublunary world, not to mention the many excerpts that discuss the creation of the world. That al-Fārābī was familiar with some of these texts can be ascertained by the fact that he sometimes quotes from them directly and mentions their title; this is the case of the *Theology* (see section IV.3.1.1).

The importance of these Neoplatonic works in al-Fārābī's philosophy has also been vindicated by recent studies,[32] which have shown that they were instrumental in shaping some of his interpretations of Aristotle's metaphysics and psychology. As we shall see, nowhere is this Neoplatonic dimension more explicitly and forcefully expressed than in al-Fārābī's cosmology and in his conception of the relation between God and the world. As a result, his theories sometimes depart significantly from Aristotle's doctrine. What remains to be clarified, however, is the extent of al-Fārābī's acquaintance with these Arabic Neoplatonic sources, whether he genuinely ascribed some of these works to Aristotle or did so only for polemical reasons, and

[32] Freudenthal 1990, Genequand's study in Alexander 2001, Geoffrey 2002, D'Ancona 2003 and 2006, and Vallat 2004.

the degree to which the corpus he consulted differs from the recension now in our possession.

In addition to this philosophical corpus, al-Fārābī had access to Ptolemy's works. Both the *Almagest* and the *Planetary Hypotheses* were translated into Arabic and were in theory accessible to the second teacher.[33] Apart from the fact that al-Fārābī is supposed to have written a commentary on the *Almagest*, the impact of Ptolemy's theories can be felt throughout his corpus, especially in the emanationist works. The arrangement and order of the planets as al-Fārābī describes them, the idea that there are two primary motions in the heavens and that a single, universal motion from east to west is shared by all the spheres, and the mention of epicycles and eccentrics are elements that appear in al-Fārābī's works and which he may have culled either directly from the Ptolemaic texts or through the mediation of Arabic astronomical works. In addition to these Ptolemaic writings, it is also possible, as we shall see, that al-Fārābī had access to excerpts of Geminus' *Introduction to the Phainomena* and Simplicius' commentary on the *De caelo*, which contain several interesting passages on the astronomical method, although these works are not mentioned by the bio-bibliographers in their surveys of the Arabic translations.

The works of Arabic astronomers of the eighth, ninth, and tenth centuries, such as those by al-Battānī, al-Farghānī, Yaʿqūb ibn Ṭāriq, and Thābit ibn Qurra also represent a potentially important astronomical source from which the second teacher may have benefited.[34] Their works enable us to gauge the progress achieved in mathematical astronomy and observation during the early Islamic period and also indicate the extent to which Ptolemaic material had been assimilated and naturalized within an Islamic tradition.

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[33] For the Arabic translations of the *Almagest*, see Ibn al-Nadīm 1970, vol. 2, 639; Toomer 1984, 2. For the *Hypotheses*, see Ptolemy 1967, 1993, and Morelon 1999. In the case of the *Hypotheses*, there is no direct evidence from al-Fārābī's corpus that he knew or read this work. However, it would be surprising if he ignored the existence of the *Hypotheses*, since it was known to earlier and contemporary astronomers.

[34] For a survey of the sources of early Arabic astronomy and of the early practitioners of this science, see Nallino 1944, Pingree 1973, Morelon 1996a and 1996b, Saliba 1994a and 2007.

For this reason, it is not possible to know how much of al-Fārābī's knowledge of Ptolemy's astronomy is derived from these sources. This is the case, notably, of the *Planetary Hypotheses*, which is not mentioned directly by al-Fārābī, although it seems to underlie many of his ideas. Indeed, there is no proof that he read or even knew this work, in spite of the fact that it had already been translated into Arabic and had a profound impact on the development of Arabic astronomy and cosmology. But the *Hypotheses* contains several concepts that are discussed by al-Fārābī, such as power (*quwwah*), celestial matter, and the animate nature of the heavenly bodies, and it shares with al-Fārābī's treatises a concern for the physical organization of the heavenly spheres. These theories, however, were so widespread in late-antique and medieval cosmology that one cannot conclude on the basis of these parallels that the second teacher relied directly on the *Hypotheses* to elaborate his cosmology. He may have become familiar with some of its theories through the works of fellow astronomers, who had already adopted the basic structure of the Ptolemaic cosmos.[35]

In any case, al-Fārābī does not refer by name to any Arabic astronomer, and for this reason we may surmise that he had direct access to Ptolemy's works, including the *Hypotheses*. Like most Greek and Arabic thinkers, he must have regarded Ptolemy as the foremost authority in this field, in the same manner that he held Aristotle as the sole authority in the study of logic. This desire to return to the sources, so to speak, is in fact typical of al-Fārābī's approach to philosophy and to much of the *falsafah* tradition.

In view of the foregoing remarks, there is no doubt that al-Fārābī's cosmological horizon extended well beyond the Aristotelian theories presented in the *De caelo* and *Metaphysics* and encompassed a fair number of other philosophical

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[35] This being said, it is unclear to what extent early Arabic astronomers (i.e., Arabic astronomers prior to Ibn al-Haytham) attributed a corporeal quality to the system of nested spheres described in Book II of the *Planetary Hypotheses*. More research must be carried out to assess this matter. Nonetheless, it is quite clear that these authors were aware of the complex interaction existing between physics and mathematics in the elaboration of astronomical models, as the work of Thābit ibn Qurra testifies (see Rashed and Morelon *EI*[2]).

and astronomical works. Furthermore, the integration of Ptolemaic elements in al-Fārābī's philosophical treatises (see Chapter III) suggests that he desired to some extent to reconcile his philosophical ideas with the most up-to-date astronomical knowledge of his day. Like Aristotle, who had drawn on the astronomical theories of Eudoxus and Callipus, and Ibn Sīnā, who was himself a practicing astronomer and devoted a part of his *K. al-shifā'* to commenting on and revising the *Almagest*,[36] al-Fārābī was genuinely interested in astronomy and reflected on how it might relate to other aspects of philosophy . Like Ibn Sīnā, but unlike Aristotle, who confined himself to the findings of contemporary astronomers, al-Fārābī even wrote independent treatises on astronomy and astrology.

In addition to the Greek sources, al-Fārābī could also use as models the efforts of previous Arabic philosophers toward cosmological synthesis, notably those of al-Kindī and al-Rāzī. Al-Kindī seems to have been particularly interested in this field, as his numerous writings on astrology, astronomy, and cosmology testify.[37] Like al-Fārābī, al-Kindī is said to have commented on the *Almagest*. Like al-Fārābī, he integrates a large share of astronomical, and more specifically Ptolemaic, material in his treatises. Finally, both thinkers were obviously cognizant of the *Neoplatonica arabica*, since many Neoplatonic elements resurface in their works, and both attempted to provide a seamless cosmological picture that integrated astronomical and metaphysical material from a wide range of sources.

As for al-Rāzī, it is well known that he developed an extremely original cosmology, which is based on Platonic rather than Aristotelian sources. Unlike al-Kindī and al-Fārābī, al-Rāzī does not base his cosmology on a theory of causality that traces everything to God, the First Cause. Rather, his five eternals (God, soul, matter, space, and time) assert the eternity *and* uncausedness of a plurality of cosmic principles, a rare position in the Arabic tradition. Although few writings by al-Rāzī have survived, it seems nevertheless that he was not as interested as al-Kindī and al-

[36] For an assessment of Ibn Sīnā's astronomical works, see Ragep and Ragep 2004.
[37] See the treatises in al-Kindī 1950-53 and 1997; al-Kindī's treatises on these subjects are listed by Ibn al-Nadīm 1970, vol. 2, 615-622.

Fārābī in the nature of the celestial bodies and astronomy. Yet al-Rāzī may have been instrumental in shaping some of al-Fārābī's theories, be it only in an indirect and negative manner (see Chapter IV.2.1.2).

Although al-Fārābī does not mention al-Kindī and al-Rāzī by name in his discussions on cosmology, it is likely that he knew their doctrines well. Not only did these thinkers circulate in the same cultural and geographical sphere, but many of al-Fārābī's theories may be seen as responses to the ideas developed by these earlier thinkers, especially the questions of celestial matter and creation. After all, al-Kindī and al-Rāzī were the main Arabic models that al-Fārābī could have turned to in his youth, and it has even been speculated by some scholars that al-Fārābī may have studied with al-Rāzī at one point in his life.[38] As we shall see, the question of celestial matter illustrates this point well: while al-Fārābī may have adopted some features of al-Kindī's theory of matter in his earlier works, he seems in his mature works to have made special efforts to avoid some of its metaphysical implications. In any case, it will be worthwhile in the chapter on matter to compare al-Fārābī's cosmological ideas to those of these two thinkers.

Finally, it is important to mention the theological background, both Christian and Islamic, which may have nourished some of al-Fārābī's ideas. Al-Fārābī's formative years, spent in the company of the Baghdad Christian commentators and philosophers, not only influenced his understanding of Aristotle, but may also have been decisive in shaping some of his cosmological, and more specifically, cosmogonical ideas. It is well known that al-Fārābī in the *Jamʿ* attributes a creationist position to Aristotle, a view which may also be implicit in another treatise that al-Fārābī wrote to refute Philoponus' criticism of Aristotle's aether theory (see section IV.3.1). Assuming for the time being that these treatises are authentic, can the view they put forth be attributed to the influence of theological

[38] This hypothesis has been advanced by F. W. Zimmermann and was communicated to me by Professor Menn during a conversation. Furthermore, M. Rashed (2008) believes that some of al-Fārābī's arguments exposed in the treatise *On Changing Beings* may be seen as a response to Kindīan theories.

ideas on al-Fārābī's early formation? As we shall see in Chapter IV, this seems a likely hypothesis.

On the other hand, al-Fārābī's more mature cosmological views such as the ensoulment of the heavenly bodies and the existence of separate intellects as expressed in the emanationist texts, the *Ārā'* and *Siyāsah*, and the *Risālah fī al-ʿaql*, are not reconcilable with the orthodox theological understanding of the universe. Nevertheless, as S. Pines, H. A. Wolfson, and A. Dhanani have shown,[39] *kalām* was already actively engaged in physical and cosmological pursuits during al-Fārābī's life, and it is reasonable to speculate that the latter was cognizant of their position on important topics such as the creation of the universe, the nature of celestial matter, and the ontological status of the celestial bodies. It is thus not unlikely that al-Fārābī's mature cosmological theories may have been shaped partly as a reaction to *kalām* ideas. The dialectic between the doctrines of the philosophers and those of the theologians is, I think, an important dimension of the early history of Arabic cosmology in general,[40] and may enrich our understanding of al-Fārābī's philosophy in particular. This being said, it is objectively difficult to establish concrete links and textual parallels between al-Fārābī and the *mutakallimūn* on cosmological subjects.

In fact, when it comes to the structure of al-Fārābī's cosmology, it is quite clear that it follows the Greek-Arabic philosophical and astronomical traditions and bears little connection with *kalām* cosmology. Early *kalām* cosmology was based on passages from the Qur'an and *ḥadīth*, which described the cosmos as consisting of seven superimposed earths and heavens, with God's throne (*ʿarsh*) and footstool (*kursī*) occupying the space above it.[41] It is only gradually that elements of Ptolemaic astronomy infiltrated this cosmovision and were equated to some of its features. In later *kalām*, for instance, the throne and footstool became associated with the eighth and ninth celestial spheres of the Ptolemaic universe, although it is unclear when

[39] Pines 1936, Wolfson 1976, and Dhanani 1994.
[40] As an illustration of this dialectic, see Adamson 2003.
[41] See, for instance, verses 2:29, 17:44, 23:86, and 65:12: "It is God Who created seven heavens, and of earths their like..."

exactly this trend began.[42] In contrast to these models, al-Fārābī relies primarily on Greek texts from natural philosophy and astronomy, and the presence of theological elements in his cosmology appears to have been very limited.[43]

This brief overview of the Greco-Arabic textual and historical context places al-Fārābī at the confluence of various scientific and philosophical traditions, all of which, it may be surmised, left an imprint on the second master's thought. It is this diversity of outlooks and sources that compelled al-Fārābī to achieve a synthesis that would encompass elements from the Greco-Arabic astronomical and philosophical traditions. In the following paragraphs, I want to discuss in greater detail al-Fārābī's handling of the texts and his commentatorial activity.

[42] See Heinen 1982, 76 ff.; and Huart *EI²*.
[43] Perhaps the most striking one is the equation al-Fārābī makes between the separate intellects and the angels of the Islamic tradition (al-Fārābī 1964, 32).

2. Al-FĀRĀBĪ AND THE GREEK AND ARABIC COMMENTATORIAL TRADITIONS

Arabic bio-bibliographic sources provide most of our information on al-Fārābī's activity as a commentator of the Aristotelian corpus.[44] Ibn al-Nadīm, for instance, reports that al-Fārābī wrote commentaries on the *Categories*, the *De interpretatione*, the *Posterior Analytics*, the *Topics*, and the *Rhetoric*,[45] while in his *Tarīkh al-ḥukamā'*, Ibn al-Qifṭī[46] mentions commentaries on the *Physics*, *De caelo*, and *Meteorology*, three works that surely contained a wealth of information on al-Fārābī's cosmology, but which unfortunately have not survived. As can be seen from these reports, al-Fārābī assiduously studied the most important works of the Aristotelian corpus, with a special emphasis on the *Organon*. In the Arabic historiographical tradition, al-Fārābī is said to have mastered the teaching of Aristotle and to have achieved the highest peak of wisdom, as his honorific title of 'second teacher' or 'second master' attests. This at once shows the importance of al-Fārābī's commentatorial works and his status as an interpreter of the Stagirite in the Arabic-Islamic tradition, and the very fragmentary state of our knowledge of this aspect of his philosophy.

It is well known that al-Fārābī's commentaries had a profound impact on subsequent thinkers, such as Maimonides and Ibn Sīnā, the latter reporting in his autobiography that he could only grasp the real subject-matter of the *Metaphysics* after having chanced upon al-Fārābī's *Aghrāḍ*.[47] At the other side of the medieval Muslim world, Ibn Bājjah, Ibn Rushd, and Maimonides made extensive use of the Fārābīan commentaries in their cosmological, psychological, and logical writings, developing and criticizing some of his ideas in the process.

The extant commentaries and works by al-Fārābī on the *Organon* are valuable not only for their capacity to help us understand later Arabic and Jewish thought;

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[44] Some of the main sources for al-Fārābī's life and works are: Ibn al-Nadīm 1970, Ibn al-Qifṭī 1903, al-Bayhaqī 1935, Ibn Abī Uṣaybiʿah 1965, and Ibn Khallikān 1977-78.
[45] Ibn al-Nadīm 1970, vol. 2, 599-602, 629.
[46] Ibn al-Qifṭī 1903, 279-280.
[47] Gutas 1988, 28; see also al-Bayhaqī 1935, 16, who reports the anecdote; and Bertolacci 2001, 2005a.

they also provide insight into his method as a student of philosophy and into the evolution of his doctrine.[48] Although little is known about the chronology of al-Fārābī's works, it may be assumed that al-Fārābī wrote most of his commentaries during an early phase of his life, perhaps when he was studying under Yuḥannā ibn Ḥaylān and possibly Abū Bishr Mattā.[49] The practice of writing commentaries was very common in the Christian intellectual milieu that al-Fārābī frequented in Baghdad, and it may be regarded as a continuation of the Alexandrian academic tradition. Yuḥannā ibn Ḥaylān and Yaḥyā ibn ʿAdī, a teacher and student of al-Fārābī respectively, were very active as translators of, and commentators on, the Aristotelian corpus.[50] Thus one may surmise that most of al-Fārābī's commentaries were written during the Baghdad period, when he mingled with the Christian Peripatetics.

This represents the first hint that al-Fārābī's doctrine should not be seen as monolithic and fixed in time, and that it may have undergone significant development throughout his life. Furthermore, al-Fārābī's commentatorial works illustrate the way in which he transformed some of Aristotle's ideas. For instance, al-Fārābī's summaries of the *Prior Analytics* (*K. al-qiyās al-ṣaghīr* and *K. mudkhal al-qiyās*) and his commentaries on the *De interpretatione* (*K. al-ʿibārah*) and *Rhetoric* show the extent to which he departed from the Stagirite and elaborated on several concepts merely alluded to in the original Greek texts.[51] This suggests that al-Fārābī's other commentaries on the *De caelo* and *Physics* may have contained the seeds of the cosmological theories he developed in his later treatises and that they were not slavish paraphrases of Aristotle's works.

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[48] See the various extant commentaries and treatises on the *De Interpretatione*, the *Prior Analytics*, and the *Posterior Analytics* in *Al-manṭiq ʿinda al-Fārābī* (1985b), as well as Rescher in al-Fārābī 1963, Zimmermann in al-Fārābī 1981, Black 1982, and Lameer 1994.

[49] See Gutas 1982a and 1982b.

[50] For Yaḥyā' ibn ʿAdī's activity as a commentator, see Endress 1977; Kraemer 1992, 108 ff. For a general survey of the translations and translators, see Peters 1968.

[51] For the *K. al-qiyās al-ṣaghīr*, see al-Fārābī 1963, Gyekye 1972, and Lameer 1994; for the *K. al-ʿibārah*, see Zimmermann's analysis in al-Fārābī 1981, and Black 2006; for the *Rhetoric*, see al-Fārābī 1971, Black 1990, and Aouad 1992.

Needless to say, the loss of al-Fārābī's commentaries on the *Physics*, *De caelo*, and *Meteorology* represents a tremendous impediment to our understanding of this philosopher's cosmology. The loss of the *De caelo* is particularly acute due to the place that this work traditionally occupies in the cosmological systems of ancient and medieval thinkers. This is all the more true in the case of al-Fārābī, since he has often been credited with the creation of a new cosmological model based on a synthesis of Aristotelian, Ptolemaic, and Neoplatonic ideas, which exercised a strong and lasting influence on subsequent thinkers. Ibn Sīnā and Ḥamīd al-Dīn al-Kirmānī, to name but two thinkers, adopted some of the key features of al-Fārābī's cosmology. Although they introduced modifications in al-Fārābī's scheme, their concept of a heaven divided in nine sections, each containing a separate intellect responsible for the causation and motion of the sphere beneath it is directly indebted to the philosophy of the second master.[52]

The loss of al-Fārābī's commentaries on the *Physics* and *De caelo* also renders an assessment of his relation to the ancient commentators more difficult. It was customary for ancient commentators to discuss the views of previous or contemporary exegetes in their own account. The *De caelo* in particular was one of the most hotly debated texts and became a locus of scholarly contention in the late-antique period. The Greek philosopher Simplicius offers a good example of this practice: a wealth of information about other thinkers (e.g., Alexander, Philoponus) can be extracted from his commentary on this work. Because many of al-Fārābī's most important commentaries have vanished, we have only limited information about his exegetical method and the degree of his reliance on previous commentators. This problem is compounded by the fact that al-Fārābī is usually reticent to mention previous thinkers by name and to acknowledge the debt he owes them.[53] In consequence, it is sometimes difficult to gauge the originality of his ideas.

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[52] For al-Kirmānī, see De Smet 1995, 282-284, 380; and De Smet 2007, 488, and note 33. More will be said about Ibn Sīnā's cosmology later on.

[53] For example, it will be shown that al-Fārābī's doctrine of celestial matter in his emanationist works owes an unquestionable debt to the cosmology of Alexander of Aphrodisias; yet his name is not

Nevertheless, it can be ascertained from the bio-bibliographic sources that al-Fārābī had access to several Greek commentaries on logic, natural philosophy, and metaphysics, since these works were rendered in Arabic either before or during his life. For example, he may have read all or part of Alexander's, Themistius', Philoponus' commentaries on the *Physics*, as well as Alexander's and Themistius' commentaries on the *De caelo* and on parts of the *Metaphysics*.[54] This information is crucial to understand some of the ideas developed by al-Fārābī in his cosmology, which sometimes build upon the theories that Alexander and Themistius had put forth in their attempt to solve the aporias in Aristotle's works. When one realizes that some of the Arabic translators of these Greek commentaries belonged to the same Baghdadi circle as al-Fārābī himself and knew him either in the capacity of master or pupil,[55] then the "connection" between al-Fārābī and these Greek commentators acquires a new significance.

In addition to his commentaries on Aristotle, al-Fārābī is credited by the bio-bibliographers with a commentary on Ptolemy's *Almagest*, entitled *Sharḥ al-majisṭī*.[56] It was long believed that the *Sharḥ* had survived in two manuscripts: both Brockelmann and Sezgin provide references to two manuscripts, one in the British Library and the other in the Majlis Library in Tehran.[57]

To my disappointment, I realized over time that these two ascriptions are erroneous. In a book review of Sezgin's *GAS* published in 1980, Goldstein had already pointed out that the British Library manuscript ascribed to al-Fārābī is in fact by Ibn Sīnā and is similar to another manuscript attributed to Ibn Sīnā in the Bibliothèque

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mentioned by al-Fārābī. This need hardly surprise us, since al-Fārābī rarely refers to other thinkers in his works, except when these are meant to summarize the doctrine of a particular philosopher, like the *Philosophy of Plato* and the *Philosophy of Aristotle*.

[54] See the relevant sections in Peters 1968; Badawī 1987, 114, 117-118; Goulet and Aouad 1989, 129; Martin 1989; and Luna 1989; Brague's introduction in Themistius 1999.

[55] This is the case, for example, of Abū Bishr Mattā and Yaḥyā ibn ʿAdī respectively.

[56] See al-Qifṭī 1903, 279, ll. 17-18; and Ibn Abī Uṣaybiʿah 1965, 608.

[57] Sezgin, 1967-, vol. 5, 195.

Nationale in Paris.[58] I was myself able to consult the British Library manuscript and to confirm that although al-Fārābī is mentioned twice as its author in the first folios, a comparison with Ibn Sīnā's commentary on the *Almagest* as it appears in the mathematical section of the *K. al-shifā'* reveals that he must be considered the author of this treatise. As for the Tehran manuscript, I was sent the wrong microfilm by the Majlis Library, and upon clarification it appeared that it possessed no such *Sharḥ* attributed to al-Fārābī. The conclusion, then, is that al-Fārābī's commentary has not come down to us, although it is possible that an authentic copy of it will appear in the foreseeable future.[59]

The loss of the *Sharḥ* raises the question of whether al-Fārābī actually wrote such a commentary, especially when it is realized that the reports of medieval bio-bibliographers are often dubious. Although no definitive answer can be put forward, there does not seem to be any a priori reason to reject the authenticity of this attribution. As the examples of Ibn Sīnā and Naṣīr al-Dīn al-Ṭūsī show, it was common for medieval philosophers to practice astronomy and to summarize, comment upon, and criticize Ptolemy's *Almagest*. Moreover, al-Fārābī's *Sharḥ* is attested by several different authors, such as al-Qifṭī and Ibn Abī Uṣaybiʿah. Finally, part of al-Fārābī's commentary was apparently criticized by a later scholar interested in astronomy.[60] In the absence of any decisive evidence pointing to the contrary, I will assume that al-Fārābī was indeed the author of such a commentary.

Despite the loss of al-Fārābī's *Sharḥ*, several points concerning his astronomical activity may be inferred from his authorship of such a commentary.

[58] Goldstein 1980, 342.
[59] In consequence, the studies of al-Fārābī's cosmology conducted by the Russian historian A. Kubesov cannot be used. Kubesov, who wrote several articles and a book on al-Fārābī's astronomy and cosmology, and who also translated the *Sharḥ* into Russian, relied almost exclusively on the British Library copy of the *Sharḥ*, which was listed as a work by al-Fārābī in the library catalogue. In spite of this, Kubesov must be given credit for being virtually the only scholar to have studied the astronomy and cosmology of early Arabic *falāsifah*. Sabra 1998, 316-317, stresses the desideratum to study these works.
[60] A certain Abū al-Fatḥ Aḥmad ibn Muḥammad ibn al-Sarī (d.1153) wrote a treatise entitled *Qawl fī bayān mā wahama fīhi Abū Naṣr al-Fārābī ʿinda sharḥihi al-faṣl al-sābiʿ ʿashar min al-maqālah al-khāmisah min al-majisṭī wa sharḥ hādhā al-faṣl*, as reported by F. Sezgin in *GAS* 1967-, vol. 5, 195.

First, although al-Fārābī was chiefly dedicated to other sectors of philosophy such as psychology and logic, he was sufficiently interested in astronomy to write an entire treatise on Ptolemy's *Almagest*. In that sense, al-Fārābī continues a tradition that harkens back at least to Proclus' *Hypotyposis* and Simplicius' commentary on the *De caelo* (which contains numerous digressions on Ptolemy's astronomy) and, in the early Islamic period, also includes al-Kindī.[61]

Second, al-Fārābī was cognizant of the various planetary theories devised by Ptolemy to explain the celestial phenomena, as well as with the technical terminology involved in such queries. In fact, technical astronomical formulae such as 'epicycles' (*aflāk al-tadwīr*) occasionally appear in al-Fārābī's philosophical treatises.[62] The bio-bibliographic references to al-Fārābī's *Sharḥ* thus agree with the rest of the evidence in pointing to the second teacher's genuine interest in mathematical astronomy.

Despite this information, it is difficult to define the exact nature of al-Fārābī's astronomical activity. Did al-Fārābī limit himself to writing a commentary, or did he, like Ibn Sīnā, participate in astronomical observations and the collection of data? Al-Fārābī's remarks in the *K. al-mūsīqā* on the value of observation and experience in astronomy and on the relation between theory and practice suggest that his astronomical interest may have included a practical dimension.[63] This is also supported by his protracted sojourn in Baghdad, a city which in the ninth and tenth centuries was a center for astronomical research, in spite of the absence of well-documented observatories.[64] Nevertheless, the available evidence does not allow us to confirm this hypothesis.

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[61] Rosenthal 1956; Rescher 1964, 45; and Adamson 2007a, 8.
[62] See for example, al-Fārābī 1982a, 73; and al-Fārābī 1985a, 129.
[63] See section II.4.5.1 of this dissertation.
[64] For the history and role of observatories in Islamic civilization, see Sayılı 1960. Although there is no solid evidence for the existence of observatories in ninth- and ten-century Baghdad, we know that astronomical observations were carried out in this city, some of which were sponsored by the ʿAbbāsid caliphs; see King 1997, 130-131.

3. COSMOLOGY IN AL-FĀRĀBĪ'S PHILOSOPHICAL TREATISES

Fortunately, al-Fārābī also discusses aspects of his cosmological doctrine in his own works, and thus one does not depend exclusively on his commentaries. His so-called 'emanationist' or 'political' works,[65] the *Ārā'* and the *Siyāsah*, for example, provide plenty of information on the structure of his cosmology. These treatises are divided in two main sections: the first one deals broadly speaking with metaphysical and cosmological issues; the second focuses on human psychology, prophetology, and the organization of society. This structure is not fortuitous: the microcosm of human societies is meant to reflect the order of the universe.[66] Partly for this reason, al-Fārābī devotes many pages of his works to the celestial bodies, which, together with the separate intellects, are the main entities that lie beyond the sphere of the moon, and which are in a sense the counterparts of the beings in the sublunary realm.

The cosmological information in the *Siyāsah* and the *Ārā'* focuses especially on the intellection of the heavenly bodies, their status in the hierarchy of existents, and their influence on the world of generation and corruption. Other treatises by the second master also shed valuable light on these subjects. This is the case, for example, of the *Risālah fī al-ʿaql*, the *K. al-mūsīqā*, the *Fuṣūl*, the *Iḥṣā'*, the *Jamʿ*, the *Jawābāt*, two treatises on astrology, and some of al-Fārābī's logical works. In addition, the *Ithbāt*, the *Taʿlīqāt*, the *ʿUyūn*, and the *Daʿāwā*, despite their potentially spurious nature, also serve as convenient points of comparison. All of these works

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[65] The scholars who choose to emphasize the Neoplatonic dimension of the *Ārā'* and *Siyāsah* often refer to them as 'emanationist treatises,' whereas those who privilege their political dimension call them 'political works.' Since my analysis focuses chiefly on the first part of these works, which discusses metaphysics and cosmology, I will use the former expression exclusively.

[66] Mahdi 2001, 59-60, claims that the structure of these two treatises is unique, but this is not entirely correct. As Maróth (1995, 105-106) and Genequand (Alexander 2001, 21-22), note, the *Ārā'* and *Siyāsah* are quite close in structure to Alexander's *Mabādi'*, which must have been known to al-Fārābī and which he may likely have used as a model. Themistius' *Paraphrase* of Book Lambda (Themistius 1999, 94 and passim), although a very different type of work, also compares the cosmos to a human polity on numerous occasions. Another hypothesis has been advanced by Ulrich Rudolph in a lecture given at McGill University on October 14 2008. Rudolph argues that the *Ārā'* may have been based partly on Arabic theological treatises, which present a similar structure that begins with God and superlunary cosmology and gradually shifts to a discussion of human affairs.

contain valuable astronomical material, but in general their primary aim is to discuss the inner nature of the heavens and the metaphysical principles that govern them in the tradition of the *De caelo* and *Metaphysics*.

All in all, the existence of these treatises, as well as later reports about al-Fārābī's theories by Ibn Rushd, Maimonides, and others, enable one to reconstruct a relatively satisfactory image of al-Fārābī's approach and contribution to cosmology, although some links are inevitably missing. In addition, a comparative analysis between the various types of works of the Fārābīan corpus (commentaries, philosophical treatises, classifications of the sciences) yields interesting information concerning the evolution of his cosmology and its relation to such issues as the eternity of the world, the place of politics in his philosophy, and the chronology and authorship of his output.

4. THE PLACE OF ASTRONOMY IN AL-FĀRĀBĪ'S COSMOLOGY

4.1 Duhem and Instrumentalism vs. Realism

The previous section helps to contextualize al-Fārābī's thought and to clarify its relation to the Greek heritage. One important aspect of this heritage is the corpus of astronomical texts, which plays an important role in al-Fārābī's cosmology. Like many Greek philosophers, al-Fārābī believes that it is necessary to take into account the findings achieved by astronomers in order to elaborate a valid cosmological model. Before defining the place of astronomy in al-Fārābī's philosophy in greater detail, however, it is necessary to describe and criticize the interpretive framework that prevailed for most of the twentieth century in the study of the history of cosmology. This digression is essential in order to avoid certain pitfalls and develop an accurate understanding of al-Fārābī's conception of astronomy and its connection with the other philosophical disciplines.

Ever since the work of P. Duhem at the beginning of the twentieth century and until quite recently, it has been common practice in the history of astronomy and cosmology to distinguish between a physical, realist approach, and a mathematical, instrumentalist one. This conceptual framework was developed by P. Duhem in his famous works *Sōzein ta phainomena* and *Le système du monde*. According to Duhem's interpretation, ancient Greek astronomy was characterized by a fundamental tension between mathematics and physics. The mathematicians' approach, which was later called the "instrumentalist" approach, consisted in explaining the motion of the planets through geometrical figures and in a purely abstract manner, regardless of whether the models put forth actually corresponded to physical reality. In contrast, the physicists developed a "realist" model, which aimed to offer a physical explanation of the universe according to which its various parts (spheres, eccentrics, epicycles, etc) were all endowed with a physical, corporeal existence that corresponded to reality.

Duhem made the instrumentalist model the quasi-exclusive privilege of Greek scientists and thinkers such as Hipparchus, Ptolemy, and Proclus, which he opposed to the physical cosmology of philosophers like Aristotle.[67] J. L. E. Dreyer, a contemporary of Duhem, also held that a "physical system" of the cosmos prevailed from Aristotle to Aristarchus and was replaced by a more mathematical type of astronomy after Apollonius, Hipparchus, and Ptolemy.[68]

In addition, Duhem was particularly biased against Arabic astronomers and minimized their contributions to this field.[69] He contrasted a Greek astronomy generally characterized by instrumentalism and a genius for abstract, geometrical theorizing, to an Arabic astronomy that was essentially realist and obsessed with the physical structure of the world. According to Duhem, in their quest to provide a physical, concrete basis to their astronomical theories, the Arabs became "slaves of their imagination."[70]

Since Duhem, many recent accounts of the history of ancient and medieval astronomy have been influenced by his framework, and some historians have persistently presented the tension or gulf between a mathematical and physical trend in astronomy and cosmology as characterizing the entire development of these disciplines from Plato and Aristotle up to Galileo. D. R. Dicks in his book *Early Greek Astronomy to Aristotle* and S. Sambursky in *The Physical World of Late Antiquity* follow Duhem, Dreyer, Heath, and Clagett in defining the history of Greek astronomy up to Aristotle as an instrumentalist exercise focusing on purely geometric models, a view also held by David Lindberg in his recent study *The Beginnnings of Western Science*.[71] Surveys of Medieval Latin cosmology, such as M.-P.

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[67] Duhem 1990, 3-27, and especially 27-28. It should nonetheless be noted that Duhem partially revised his position in *Le système du monde*, which sets this dichotomy much less starkly than *Saving the Phenomena*.
[68] Dreyer 1953. The first edition of Dreyer's book was published in 1906, that is, two years before Duhem's *Saving the Phenomena*, published in 1908. In spite of this, one can see that these scholars shared a common set of ideas on the history of astronomy.
[69] See Ragep 1990 for a criticism of Duhem's view of Arabic astronomy.
[70] Duhem 1990, 28; Duhem 1913-1959, vol. 2, 118; and Ragep 1990, 208-211.
[71] Dicks 1970, 150, 153, 176, 217; Sambursky 1962, 133-134; Lindberg 2007, 90-92. These historians consider the early Greek astronomers' theories, and especially those of Eudoxus, as purely

Lerner's *Le monde des sphères* and B. Obrist's *La cosmologie médiévale: textes et images*, seem to reproduce this picture in their treatment of ancient Greek cosmology.[72] Hence, to a greater or lesser extent, many later scholars have perpetuated Duhem's dichotomy between instrumentalism and realism and do not attempt to provide a more nuanced explanation of the relation between mathematical and physical theories in ancient astronomy.

This approach, however, was seriously undermined decades ago by other scholars. O. Pedersen, on the basis of the discovery of the lost parts of the *Planetary Hypotheses* made by Hartner and Goldstein,[73] cautioned against interpreting Ptolemy's astronomy purely in instrumental terms.[74] At about the same time, L. Wright and G. E. R. Lloyd argued in groundbreaking articles that the dichotomy between instrumentalism and realism was not supported by sufficient data and

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geometrical constructions. In this respect, they are perpetuating a view that was common during the first part of the twentieth century (as Wright 1973, 165 also explains). Lindberg, however, provides a more nuanced assessment of Ptolemy due to his inclusion of the *Planetary Hypotheses* in his survey.

[72] Lerner (1996, 86-87) speaks not only of the difference between a physical and a mathematical method in ancient astronomy, but also of an opposition between what he views as the purely mathematical methodology of the astronomers and the theology-based approach of the philosophers; this seems to be an oversimplification. Obrist (2004, 40 ff., 91-92) also follows the traditional interpretation and defines ancient Greek astronomy as being purely geometrical. Her study does not satisfactorily account for the importance of physical and metaphysical theories in the works of its practitioners.

[73] Hartner 1964, and Goldstein in Ptolemy 1967.

[74] Pedersen 1974, 395, writes the following: "It is often said that the *Almagest* deals with theoretical astronomy in a purely mathematical and formalistic way, as if Ptolemy were uninterested in the question of the physical relevance of his geometrical models. But, as we have seen, there is a picture of the physical structure of the universe behind the *Almagest*. Thus the fixed stars are supposed to exist in a particular sphere concentric with the earth. As for the planets, Ptolemy usually describes their motion by means of the purely mathematical concept of a circle, referring but rarely to material spheres [...] But this should not make us think that he belongs to what has been called the mathematical school of astronomers. We know from his *Planetary Hypotheses* that the doctrine of spheres was, in fact, an essential part of his astronomy and that Ptolemy is one of the sources of the many Medieval speculations on how the geometrical models could be transformed into a machinery of spheres and how the theories of the individual planets could possibly be compatible from this physical point of view." And shortly thereafter, he adds: "Thus the new-found section of the *Hypotheses* has revealed the very remarkable fact that it is in fact Ptolemy himself who is responsible for what history has called the Ptolemaic system of the world. He was not a purely mathematical astronomer interested only in the description of heavenly motions. He also felt it his duty as an astronomer to give an account of the physical structure of the universe, combining the traditional conception of a universe as composed of closely fitting spheres with his own theory of planetary motions. This gives him a new place in the history of astronomy and points to the conclusion that the often mentioned difference between a mathematical and a physical school of astronomers is smaller than we have been used to think."

emerged as a result of Duhem' s bias toward the sources.[75] They convincingly showed that towering figures such as Eudoxus and Ptolemy, who had traditionally been labeled as instrumentalists, also betrayed a concern for the physical modelling of the cosmos, and that both trends were inextricably linked in ancient Greek astronomy. This is also one of the central conclusions of Taub's book entitled *Ptolemy's Universe*, which examines the place that metaphysics and physics occupy in Ptolemy's astronomical method.[76]

As far as the history of Arabic astronomy is concerned, it has been rightly pointed out that Duhem's thesis had a negative effect on its general understanding, and it is still possible to find references to the Duhemian paradigm in the contemporary literature.[77] Fortunately, this distorted image has been rectified, thanks largely to the work of B. Goldstein, A. I. Sabra, F. J. Ragep, and G. Saliba. Not only have these scholars criticized Duhem's methodology and thesis,[78] but they have also highlighted the important role played by Arabic astronomers in the history of science. Moreover, their research has shown that the relation between mathematics and the other philosophical sciences in the works of Arabic astronomers is much more complex than was previously thought and that a dichotomy between instrumentalism and realism is too coarse a framework to rightly appreciate the history of astronomy in Islam. Finally, their conclusions show that Ptolemy's methodology and epistemology were not opposed to those of Arabic astronomers, but rather set a precedent for them.[79]

4.2 Reformulating the Problem

What emerges from this overview is, on the one hand, that the concepts of realism and instrumentalism are, to a large extent, modern constructs projected backward

[75] Wright 1973 and Lloyd 1978.
[76] Taub 1993.
[77] For example, Endress 2003, 122, inexplicably defines Ibn Rushd's astronomical system as "instrumentalist."
[78] See Ragep 1990 and Goldstein 1997.
[79] See Ragep 1993, vol. 1, 27-29, for example, where the similarities between Ptolemy's *Hypotheses* and al-Ṭūsī's *Tadhkirah* are highlighted.

in time, and that they provide a dichotomic, and necessarily simplistic, image of ancient and medieval cosmology. On the other hand, and as a result of the influence of Duhem's thesis, the true issues at stake in ancient and medieval astronomy still remain to be precisely identified and analyzed.

That the theoretical questions underlying the work of ancient and medieval cosmologists are at once more numerous and complex than was previously thought cannot be doubted. The question is no longer to which model, between a mathematical one and a physical one, a thinker adheres. Rather, the more pressing query is to understand how the various physical, metaphysical, and mathematical assumptions and hypotheses interact with one another to form a wide range of astronomical methods and approaches. Recent studies have shown, for instance, the profound links that exist between a thinker's philosophical allegiance and his understanding of astronomy.[80] The key issues are thus multiple and infringe on the fields of epistemology, natural philosophy, and metaphysics among others. Relevant questions according to this new approach would be: what impact do physical and metaphysical assumptions (such as the perfection of circular motion) have on an astronomer's methodology? How does he explain the relation between physics, mathematics, metaphysics, and astronomy? How does he define the subject matter of astronomy? How are the causes of celestial motion explained, and what is the role played by a theory of causation in his account? To what extent is knowledge of celestial phenomena possible? To what degree are observation and experience required? It is only by trying to answer such questions that one may hope to better understand the astronomical method of thinkers like Ptolemy, Proclus, al-Kindī, al-Fārābī, and others.

Thanks to these new avenues of interpretation, recent scholarship has provided a much more nuanced and accurate picture of the theory and practice of astronomy. It is possible, for example, to offer a relatively detailed account of

[80] See Taub 1993 for Ptolemy; Siorvanes 1996 for Proclus; Evans and Berggren 2006 for Geminus; and Bowen 2007 for Geminus and Ptolemy.

Geminus', Ptolemy's, or Arabic astronomers' conception of the astronomical method by omitting any reference to realism or instrumentalism.[81] As a result, it is also easier to compare Arabic and Greek astronomers and to identify some common attitudes vis-à-vis astronomy.

In the case of al-Fārābī, we know that he had access to some of the seminal texts dealing with the method and epistemology of astronomy, such as the *Almagest*, and possibly the *Planetary Hypotheses* and Proclus' *Hypotyposis*. In addition, there are strong reasons to believe, as we shall see shortly, that al-Fārābī could have consulted Geminus' *Introduction to Astronomy*, and that he read parts of Simplicius' commentaries, which contain much information on Geminus and other Greek scientists. The following paragraphs will examine several aspects of al-Fārābī's approach to cosmology in the light of these considerations. Several key issues will be examined: the relation between astronomy and astrology, the epistemic foundations of astronomy according to al-Fārābī, and the role of physics and metaphysics in the astronomical method. These various lines of inquiry can provide a much more accurate and nuanced picture of al-Fārābī's relation to the Greek heritage and of his conception of the astronomical method than would the dichotomic approach championed by Duhem and his followers.

4.3 The Relationship between Astronomy and Astrology

Before any aspect of al-Fārābī's cosmology is addressed, it is important to define or at least clarify the role that astronomy, astrology, and other philosophical disciplines play in his approach to cosmology. Ancient and medieval cosmologists did not distinguish these fields as clearly as we do today, but many of them were conscious of a fundamental epistemological gap between a more mathematical and empirical approach on the one hand (astronomy) and a more speculative one on the other (astrology).

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[81] Taub 1993, Ragep 1993, Morrison 2005, Evans and Berggren 2006, Bowen 2007.

In the history of Islamic thought, the turning point for the emancipation of astronomy from astrology is usually said to have occurred in the eleventh century as a result of both the advances made in mathematical astronomy and the theorizing and debating that developed around the question of the classification of the sciences. Al-Bīrūnī and Ibn Sīnā are often hailed as key figures in this transition, because they were very critical of astrology and regarded it as logically unsound. In fact, they were among the first to separate astrology from astronomy and to view the latter as an independent field of research, which they called *ʿilm al-hay'a*. In so doing, they departed from the earlier classifications of the sciences of al-Khwārizmī, al-Fārābī, the Ikhwān al-Ṣafā' and others, who combined astrology and astronomy in one science known as *ʿilm al-nujūm*.[82] From al-Bīrūnī and Ibn Sīnā onward, *ʿilm al-hay'a* (a name which gradually replaced *ʿilm al-nujūm*) was used to refer exclusively to mathematical astronomy. According to Ibn Sīnā, astronomy (*ʿilm al-hay'a*) is defined as a mathematical science (*riyāḍiyyah*) that is exclusively concerned with the external aspects of superlunary phenomena, while astrology (*aḥkām al-nujūm*) is classified as a physical science (*ṭabīʿiyyah*).[83]

It is not often realized, however, that a century before Ibn Sīnā, al-Fārābī already attempted to establish an epistemological distinction between astronomy and astrology, as well as between the valid and invalid parts of astrology. As al-Fārābī explains in the *Iḥṣā'*, the "science of the stars" (*ʿilm al-nujūm*) refers to both astronomy and astrology.[84] But he then makes a distinction between mathematical astronomy (*al-ʿilm al-nujūm al-taʿlīmī*) on the one hand, and astrology (*ʿilm aḥkām al-nujūm*) on the other, and considers them two different branches of *ʿilm al-nujūm*. The first branch, astronomy proper, investigates the exterior aspects of the heavenly bodies, those that pertain to numbers and measurements, such as the sizes, distances, and motions of the planets. The second branch, astrology, focuses on the heavenly indications and signs that enable humans to predict future events and to

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[82] Ragep 1993, vol. 1, 34-35; Bosworth 1963, especially 101 and 110, where al-Fārābī's *Iḥṣā'* is briefly compared to al-Khwārizmī's *Mafātīḥ al-ʿulūm*.
[83] In the *Risālah fī aqsām al-ʿulūm al-ʿaqliyyah* (Ibn Sīnā 1999, 120-121). It is interesting to note that many Latin thinkers also classified astrology as a physical science (see Lindberg 2007, 270-277).
[84] Al-Fārābī 1949, 84.

know past and present events. The distinction al-Fārābī makes in the *Iḥṣāʾ* is conceptual, epistemological, and terminological, but he does not take the extra step to isolate astronomy from astrology, and his classification of the sciences presents them as two sub-sections of a single, integrated science. In that sense, it differs significantly from Ibn Sīnā's classification.

Al-Fārābī elaborates on the various sub-branches of astrology in two treatises that he wrote to this effect: the *Risālah fī faḍīlah al-ʿulūm wa al-ṣināʿāt*, also known as the *Maqālah fīmā yaṣiḥḥu wa lā yaṣiḥḥu min aḥkām al-nujūm*, and the *Maqālah fī al-jihah allatī yaṣiḥḥu ʿalayhā al-qawl fī aḥkām al-nujūm*.[85] T.-A. Druart has shown in her articles that al-Fārābī was very critical of the subject matter and method of astrology and made pioneering efforts to disentangle its more scientific parts from the purely speculative dimension attached to it.[86] In his two treatises, al-Fārābī argues that only some aspects of astrology are permissible, namely, those that study the physical influence of the heavenly bodies on sublunary beings (e.g., the effect that the sun has on growth and corruption). Other aspects of astrology are considered invalid, because they rest on an inadequate empirical foundation. For example, al-Fārābī ridicules the claim that an eclipse is supposed to announce the death of a king when observed in the heavens. According to him, this method is based on flawed analogical reasoning and is not grounded in a valid scientific approach.[87]

What al-Fārābī categorically rejects is the claim that astrology can lead to the knowledge of future events and hence that it represents a form of divination. These valid and invalid aspects of astrology correspond to a distinction in epistemology and method: while astronomy studies what is necessary, the valid aspect of astrology studies what is possible and occurs for the most part, and its invalid aspect

[85] Al-Fārābī 1976 and 1987; for information on the editions and content of these two treatises, see Druart 1978 and 1979.
[86] Druart 1978 and 1979; see also Saliba 1991, 68-69.
[87] Al-Fārābī 1987a, sections 23-24.

studies what is purely hypothetical.[88] Hence, the invalid part of astrology should be avoided altogether, as it does not fall within the realm of true scientific practice. For these reasons, it is not surprising that al-Fārābī excludes invalid astrological pursuits entirely from his philosophical works. When it is realized that al-Kindī had legitimated the wholesale practice of astrology, al-Fārābī's critical analysis of this discipline acquires additional value.[89]

While the distinction between valid and invalid branches of astrology may seem odd to a modern reader and appear to undermine the previous point made concerning al-Fārābī's critical ability to distinguish between astronomy and astrology, his conceptualization of these sciences is in fact grounded in a rigorous epistemological method. The valid aspects of astrology are restricted to the physical influences of the heavenly bodies on the sublunary world; as al-Fārābī explains in the *Nukat*, the scientist can rely on observation and experience (*tajribah*) to explain them.[90] This sub-branch of astrology would nowadays correspond to biology, meteorology, or another natural science, and it is easy to understand retrospectively why Ibn Sīnā transferred astrology to natural philosophy.[91] On the other hand, purely hypothetical predictions based on invalid analogies are rejected as scientifically unsound, because they cannot be vindicated by experience.

What we should retain, then, is not so much the terminological and categorical ambiguity that characterizes al-Fārābī's division of astronomy and astrology, but rather his keen insight in exposing the different epistemic foundations of these disciplines and his indubitable influence on and anticipation of Ibn Sīnā's attitude vis-à-vis the same issue. Moreover, al-Fārābī's treatment of

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[88] Druart 1978, 44. Many Latin thinkers made a similar distinction between a valid and an invalid branch within astrology; see Lindberg 2007, 270-277.

[89] For al-Kindī, see Walzer 1957, 227; and Wiesner 1993, 11, 32, and especially 107 ff. Al-Kindī's various treatises on astrology are listed by Ibn al-Nadīm 1970, vol. 2, 621-622. Some titles, such as the *Indications of the Two Maleficent Planets in the Sign of Cancer* and the *Obtaining Indications about Happenings from Eclipses*, indicate clearly that al-Kindī was much less critical than al-Fārābī when dealing with astrology.

[90] See al-Fārābī 1976, section 3, and Druart 1979.

[91] Ibn Sīnā 1999, 120-121.

astrology in these treatises provides a framework for the cosmology exposed in his philosophical works: the condemned aspects of astrological practice find no place in the *Ārā'* and the *Siyāsah*, for example, whereas al-Fārābī does discuss in these same works the physical influence that the planets have on generation and corruption.[92] In this regard, it should be remembered that al-Fārābī, like al-Kindī before him, makes the planets efficient causes for the generation and corruption of sublunary beings. In light of these remarks and of Druart's work on this topic, Nallino's assertion that al-Fārābī's refutation of astrology is "childish" and inefficient cannot be accepted.[93]

Unlike astrology, astronomy is not only fully accepted by al-Fārābī, but also seems to have occupied an important role in his work and in his approach to cosmology. There is, of course, the *Sharḥ kitāb al-majisṭī*, an entire commentary (albeit no longer extant) that al-Fārābī devoted to Ptolemy's seminal work, which is sufficient in itself to testify to the importance of the astronomical discipline in al-Fārābī's system. As we shall see shortly, other works also make evocative references to the science of astronomy. Conversely, al-Fārābī never refers to the invalid aspects of astrology, i.e., to divination, to strengthen or illustrate a philosophical point. In brief, there can be no doubt that al-Fārābī distinguished between astronomy and astrology, both in terms of their divergence in subject matter and method, in theory and practice. Nowhere are there signs of confusion between these two disciplines in his work; on the contrary, he is intent in criticizing one while fully endorsing the other.

From a historical perspective, however, in maintaining that astronomy and astrology are part of the same overarching discipline, al-Fārābī is closer to the ancient Greek world than to the *hay'a* tradition of the post-eleventh century. In spite of his seminal importance in the history of astronomy, Ptolemy fully endorsed astrology, as can be seen in the voluminous work he devoted to this subject, the

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[92] Al-Fārābī 1985a, 135 ff.
[93] See Nallino 1944, 25.

Tetrabiblos. Moreover, the Greek terms ἀστρονομία and ἀστρολογία can both mean astronomy, and like the Arabic *ʿilm al-nujūm*, they have an inherent ambiguity in that they can also refer to astrology. As can be seen from the various entries in Liddell and Scott and *Brill's New Pauly*, Greek authors often used these terms very loosely and without distinguishing clearly between the two disciplines. And it would appear that the Greeks did not have at their disposal a specific term that embraced the purely mathematical aspects of astronomy until the end of antiquity.[94] The fact that al-Fārābī never wrote a book such as the *Tetrabiblos* and that he meticulously defined the border between astronomy and astrology, as well as between the various parts of astrology itself, show that he anticipated in many ways the subsequent breakdown of *ʿilm al-nujūm* achieved by Ibn Sīnā and later *hay'a* practitioners.

4.4. The Subject-Matter of Astronomy

In the *Iḥṣā'*, which contains al-Fārābī's most systematic description of the sciences, al-Fārābī classifies astronomy as a mathematical science, together with arithmetic, geometry, music, optics, and other disciplines.[95] He also divides the subject matter of astronomy into three parts. The first deals with the exterior aspects of the heavenly bodies, such as their shapes, positions, and sizes. It also includes an examination of the earth and asserts its stationary position in the world. The second part deals with all aspects of celestial motion, both the general motion shared by all the celestial spheres and the particular motions of the planets. The third part focuses on the earth and related geographical, climatological, and demographical questions. I provide a translation of the relevant passage, which is of direct interest to us:

> Mathematical astronomy [*ʿilm al-nujūm al-taʿlīmī*] examines three aspects of the celestial bodies and the earth:
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> First, [it examines] their shapes, the positions of some of them vis-à-vis others, and their order in the world, as well as the sizes of their bodies, the relations that exist between

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[94] Krafft 2002-, and Hübner and Hunger 2002-.

[95] Al-Fārābī 1949, 43; see also the *Introductory Risālah on Logic* (al-Fārābī 1957, 232).

> them, and the measures of the distances between them. [It also shows] that the earth as a whole does not move from its center or in its center.
>
> Second, [it examines] how many motions the celestial bodies have and the fact that all of their motions are circular. [It studies] those [motions] that are common to the planets and other non-planetary bodies, and those [motions] common to all the planets as well as those that are specific to each. [It also examines] the number of each kind of these motions, the directions toward which they move, and from which direction each one of these motions originates. It also makes known the means to establish the place of each star one by one in the parts of the zodiac at each moment and with the totality of its kinds of movements.
>
> It investigates also into everything that is concomitant with the celestial bodies and each one of their motions in the zodiac and what pertains to the relation between them due to their conjunction, separation, and the diversity of their places.
>
> In brief, [it examines] everything that pertains to their motions insofar as it relates to the earth, like the eclipse of the sun. [And it investigates] everything that occurs to them on account of the place of the earth among them in the world, such as the eclipse of the moon. [It looks into] the number of these attributes, in what state and at what time and how often they appear, like the rising and setting of the sun and other such things.
>
> Third, it studies the inhabited and uninhabited regions of the earth. It establishes how many parts are inhabited and how many are its major regions which are the climes, and it classifies the places that happen to be inhabited at a particular time, as well as the place of each inhabited region and its organization in the world. Moreover, it studies what necessarily affects each one of the climes and inhabited zones due to the common revolution of the world in the universe, which is the cycle of day and night, on account of the position of the earth: like the rising and setting of the sun, the length of days and nights, and other similar things. All of this is comprised by this science.[96]

Al-Fārābī's general description of the subject-matter of astronomy is historically significant, for it anticipates the later descriptions found in *ʿilm al-hay'a*. The scheme outlined above reflects what was later known in *hay'a* works as a distinction between *hay'at al-arḍ* and *hay'at al-samā'*, the former belonging to al-Fārābī's third part, the latter to the first and second parts.[97] The inclusion into astronomy of what today belongs to the disciplines of geography and climatology is one of the marking features of this classification.

However, I am mostly interested here in the first two parts of astronomy described by al-Fārābī, which focus on the superlunary world. Al-Fārābī's outline of the subject-matter of astronomy betrays his belief that astronomy focuses on bodies, a notion that will appear in *hay'a* works as well. Yet astronomy is limited to

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[96] Al-Fārābī 1949, 84-86, my translation.

[97] Al-Ṭūsī's *Tadhkirah*, for instance, is divided into these two main sections of *hay'a*; see Ragep 1993, vol. 1, 36.

studying the exterior aspects and properties of the celestial bodies, and it is not suited to examine their substance. In fact, al-Fārābī says nothing about the inner nature of the spheres or about aether, the simple element of the heavens. This explains why he classifies astronomy as a mathematical science, since according to him the mathematical sciences study those aspects of bodies that can be abstracted from matter.[98]

That the investigation into the celestial substance is reserved for physics, not astronomy, is confirmed by another section of the same work. There al-Fārābī explains that the second part of the physical science must investigate "whether simple bodies exist, and if they do what kind of bodies they are, and how many they are?"[99] By "simple bodies," al-Fārābī means not only the four sublunary elements (fire, air, earth, and water), but also aether, the Aristotelian first body or fifth element, which is conceived of as a simple, incorruptible substance; in fact, Aristotle's discussion of aether in *De caelo* I.2 is explicitly mentioned.[100]

According to al-Fārābī, astronomy and physics are therefore separate sciences, which nevertheless study two different aspects of the same subject matter, i.e., the celestial bodies. While astronomy studies the exterior aspects of the planets, such as their motions, sizes, and distances, physics inquires into their substance, what they are made of, and how this substance relates to the sublunary elements.

It is notable that al-Fārābī's presentation of the subject-matter of astronomy and physics agrees with Aristotle's, Geminus', and Simplicius' views on the subject. These thinkers make a distinction between the physical study of the cosmos (embodied in the *De caelo* tradition) and the astronomical approach, which discusses

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[98] See his discussion of this topic and of Aristotle's and Plato's views on mathematical objects in his *K. al-burhān* (al-Fārābī 1985b, vol. 4, 68-69).
[99] Al-Fārābī 1949, 96. In this passage, al-Fārābī divides physics into eight parts, the second of which inquires into the bodies that are simple, as opposed to the fifth part that inquires into composite bodies.
[100] Al-Fārābī 1949, 96.

the celestial bodies by abstracting them from their matter.[101] This position is also encountered several centuries later in the work of *hay'a* practitioners like al-Ṭūsī. As Ragep writes, for Ṭūsī "...it was for *ʿilm al-hay'a* to examine the outward manifestations of simple bodies, whereas it was for *al-samāʾ wa-ʾl-ʿālam* to investigate their essential nature."[102]

A word must be said about al-Fārābī's conception of astronomy as a mathematical science. Plato in *Republic* VII, Aristotle in *Metaphysics* XII.8.1073b and possibly in *Physics* II.2,[103] Ptolemy in the *Almagest*, and Simplicius in his commentary on *Physics* II.2, had all classified astronomy as a mathematical science.

This is not to say, however, that these thinkers conceived of mathematics identically and that they used it in a similar way in connection with astronomy. There is in fact a great diversity in their approaches, which is due among other things to the status of mathematics in their philosophy. In the case of Plato, for example, mathematics is inextricably linked to his theory of the forms and of an ideal world beyond the realm of sense-perception. Mathematical objects have a privileged status due to their immateriality and their ontological proximity to this purely intelligible dimension, although Plato did not go as far as Speusippus in making them the primary entities of his metaphysical doctrine. This explains why Plato in the *Republic* argues that astronomy should be studied "by means of problems, as we do geometry."[104] For Plato, astronomy is non-physical and does not deal primarily with bodies; rather, its deals with "true numbers" and "geometrical figures."[105] If this mathematical approach to astronomy is adopted, it can lead us closer to the divine world, and, moreover, it should play an important role in the curriculum of the guardians.

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[101] See Aristotle, *Physics* II.2, as well as Simplicius' commentary on this passage, and his report of Geminus' commentary on a work by Poseidonius, in Simplicius 1997, 290,1-293,15.
[102] Ragep 1993, vol. 1, 39.
[103] See the recent article by Mueller 2006.
[104] *Republic*, VII.530b.
[105] *Republic*, VII.529d.

In the case of Aristotle, his intention in defining astronomy as a mathematical science is grounded in methodological issues rather than metaphysical ones. Aristotle believes that astronomy is primarily interested in the exterior aspects of the celestial bodies, which it studies regardless of their inner nature and composition. In contrast to the physicist, it is the privilege of the mathematician to be able to conceive of objects without their matter. As for Ptolemy, he had a completely different conception of the mathematical dimension of astronomy. He may, in many ways, have been influenced by the Platonic and Neoplatonic tendency to treat mathematics as a special discipline that bears a close relation to the ideal world of *nous*. But Ptolemy's interest in mathematics is overwhelmingly tied to his methodological commitments and his conception of scientific accuracy. Ptolemy undermines physics and metaphysics as cosmological disciplines on the grounds that they provide inaccurate or unverifiable insights into the universe. Mathematics, on the other hand, is able to formulate proofs that are logically compelling and demonstrative in essence. This accounts for Ptolemy's interest in observation and in the accumulated planetary data of past astronomical endeavours. Ptolemy's interest in mathematics is therefore methodological and epistemological, and he sees this science as the foundation of sound astronomical practice.[106]

Al-Fārābī's conception of the relation between mathematics and astronomy is likely to have been inherited from the Alexandrian school tradition, and it may best be described as a hybrid between the Aristotelian and Ptolemaic positions on this issue. On the one hand, al-Fārābī broadly follows Aristotle's classification of the sciences and the idea that astronomy focuses on the exterior aspects of the celestial bodies and treats them as entities abstracted from matter. As for the inner nature of the heavens, it is addressed by physics, not astronomy, as the *De caelo* had made clear. On the other hand, al-Fārābī emphasizes the observational and empirical dimensions of astronomy, and in that sense he is much closer and directly indebted to Ptolemy (see section II.4.5.1). As his (now lost) commentary on the *Almagest* and

[106] For the place of mathematics in the *Almagest*, see Pedersen 1974, 47-94.

his various treatises on algebra and geometry show,[107] al-Fārābī was genuinely interested in the various branches of mathematics, and, as a corollary, in the mathematical dimension of astronomy.

4.5. The Astronomical Method

One of the main questions addressed by al-Fārābī in the first introductory section of the *K. al-mūsīqā* concerns the epistemological foundations of the particular sciences, such as music. In order to strengthen his arguments, al-Fārābī compares music to other sciences such as astronomy and medicine, and by so doing provides insight into their method and epistemology as well. Al-Fārābī begins by classifying the sciences in various categories depending on the method required to establish their first principles. There are sciences, he tells us, whose first principles are acquired intuitively and from a very young age. There are other sciences some of whose first principles are acquired in this manner while others are derived from separate sciences. Finally there are sciences that rely on both methods and in addition establish first principles through experience.[108] Al-Fārābī does not provide specific examples for the three categories he posits. But it becomes clear shortly afterwards that astronomy belongs to the third category, which means that some of its principles are innate to humans, some are derived from other sciences, whereas still others are reached as a result of experience. In the following paragraphs, I discuss the latter two methods, namely, experience, and the transfer of principles from one science to another.

4.5.1 Experience (*tajribah*)

Al-Fārābī's *K. al-mūsīqā*, together with his *K. al-burhān*, contains his most systematic and detailed exposition of the importance of experience, observation, and induction in philosophy. Experience (*tajribah*) in particular is treated in some length in the *K.*

[107] See especially Freudenthal 1988 and 1990.
[108] Al-Fārābī 1960, 96.

al-mūsīqā.[109] There al-Fārābī explains that it is grounded in the repeated sensation (*iḥsās*) of facts, and that it occurs when the intellect (*ʿaql*) "acts" (*yafʿal*), that is, when the intellect makes a universal judgement on the basis of these facts. As a result, experience can produce certain knowledge and provides us with some of the first principles necessary for demonstration. As al-Fārābī puts it, "the things (*ashyāʾ*) acquired through experience (*tajribah*) become first principles (*al-mabādiʾ al-ūlā*) in demonstrations (*barāhīn*)."[110] Throughout his account, al-Fārābī refers to Aristotle's *Posterior Analytics* for support. He even quotes Aristotle as stating that "sensation (*ḥiss*) is used in the principles of demonstration," but he adds immediately afterward that by "sensation" Aristotle here means the kind of knowledge that leads immediately to experience.[111]

Al-Fārābī provides more specific information on the role of experience in astronomy. At one point he writes that "the situation of this science [the musical science] is like that of other sciences in which many of the principles [*mabādiʾ*] are acquired through the experience of sensibles [*tajribah al-maḥsūsāt*], as in astronomy [*ʿilm al-nujūm*] and most of optics and medicine…"[112] And shortly afterward, he adds that "many of the principles of astronomy are acquired by the observer as a result of an act of sensation through observations by means of instruments [*kathīr min mabādiʾ ʿilm al-nujūm taḥṣulu lil-nāẓir fīhi ʿan al-iḥsās bi-al-arṣād bi-al-ālāt*]."[113] According to al-Fārābī, then, the astronomer may derive astronomical principles from the "experience of sensibles" and from "instrumental observations." A similar point appears in the *K. al-burhān*, where al-Fārābī describes experience (*tajribah*) as a source of knowledge for mathematical astronomy (*ʿilm al-nujūm al-taʿlīmī*).[114]

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[109] Al-Fārābī 1960, 92-96 in particular. *Tajribah* corresponds to Aristotle's ἐμπειρία, which is described in several of his works, for instance in *Prior Analytics* 46a18-21 and *Posterior Analytics* 100a3-9. Al-Fārābī and Ibn Sīnā nevertheless developed their own concept of experience, which plays a special role in their philosophy; see McGinnis 2003, 2008 and Janssens 2004 for its place in the method of *falsafah*.

[110] Al-Fārābī 1960, 95-96, my translation.

[111] Al-Fārābī 1960, 96, my translation.

[112] Al-Fārābī 1960, 100, my translation.

[113] Al-Fārābī 1960, 101, my translation.

[114] Al-Fārābī 1985b, vol. 4, 71.

Now Janssens argues in his article "Experience in Classical Arabic Philosophy" that experience and observation are two different concepts for al-Fārābī. "It is clear," he writes, "that experience is not opposed to observation, but is closely linked with it: they both pay special attention to things, or events. But experience transcends observation, in that, contrary to the latter, it does not simply notice particulars, but in addition tries to establish a kind of universality out of a number of particulars."[115] Janssens is undoubtedly right in attributing to experience a claim to universal knowledge, and he adduces a number of convincing passages from al-Fārābī's works to buttress his point. However, the problem is that Janssens does not define observation, nor does he give the Arabic term that would correspond to this concept. In fact, al-Fārābī does not use a special word for observation in the works studied by Janssens and in the *K. al-mūsīqā*. True, in the latter work, he refers to the "instrumental observations" (*al-arṣād bi-al-ālāt*) of the astronomers, but it is unlikely, I think, that *arṣād* here refers to a full-blown theory of observation in the way that *tajribah* refers to a theory of experience.

On the other hand, al-Fārābī distinguishes between experience (*tajribah*) and induction (*istiqrā'*) in the *K. al-mūsīqā*,[116] in a manner reminiscent of the other texts discussed by Janssens. What, then, is the difference between the two concepts? As Janssens explains, experience involves a judgement of the intellect which can extract universal knowledge from specific events or facts and lead to certainty, whereas induction cannot provide universal and certain knowledge. "Experience," says al-Fārābī in the *K. al-burhān*, "is what produces certitude of knowledge through a universal judgement."[117] The role of intellect in experience is underlined in the *K. al-mūsīqā*, which defines *tajribah* as "the determination of the sensation of various things a repeated number of times in order that the intellect may act with a special

[115] Janssens 2004, 50.
[116] Al-Fārābī, 1960, 94-96. This passage may have been inspired by *Posterior Analytics* I.31, where Aristotle explains that sense-perception *per se* cannot lead to certain knowledge and demonstration. See also Aristotle's discussion of induction in *Prior Analytics* II.23, which he contrasts to demonstrative syllogisms.
[117] Al-Fārābī 1985b, vol. 4, 24-25, translated in Janssens 2004, 52.

act and reach certainty…"[118] It is not completely clear in this quotation what this "special act" (*fiʿl khāṣṣ*) of the intellect is supposed to be, but when juxtaposed to the previous passage, one may conclude that it consists in a judgment.

Confirmation of this appears in the definition of *tajribah* found in al-Fārābī's *Talkhīṣ jawāmiʿ kitāb al-nawāmis li-Aflāṭūn*, which closely mirrors the one in the *K. al-burhān*: "the meaning of experience is the attentive consideration of the particulars of a thing, more precisely forming a judgment about the thing's universality inasmuch as experience finds that universality in these particulars."[119] The "special role" of the intellect in experience, then, is to form a judgment of the particular sensations and extract a universal meaning out of these particulars. In contrast to experience, induction does not involve the intervention of the intellect and simply consists in the observation and gathering of data. Moreover, it does not produce universal, certain knowledge.

It is interesting that Ibn Sīnā in his *K. al-burhān* also provides an elaborate discussion of the distinction between induction and experience in connection with the acquisition of first principles.[120] In many respects, such as their mutual endorsement of experience as a valid method of investigation (one that is in fact more valid than induction), al-Fārābī's and Ibn Sīnā's accounts share many parallels.

Experience is important, for it produces phronesis (*taʿaqqul*), as al-Fārābī suggests in the *Kitāb al-millah*,[121] and it also plays a role in the theoretical sciences. Yet it is difficult to apply al-Fārābī's comments on induction and experience to astronomy, for he provides no clue on how to do so. But it is possible that he conceived of induction as being limited to observations, the "instrumental observations" conducted by the astronomer, which after some time form the basis on which experience can develop. A possible example could occur when the

[118] Al-Fārābī, 1960, 95, my translation.
[119] Al-Fārābī 1998, 124; translated in Janssens 2004, 50.
[120] See the insightful articles by Jon McGinnis (2003, 2008), which focus on Ibn Sīnā's criticism of these two concepts in Aristotle and their place in his own philosophy.
[121] Janssens 2004, 48.

astronomer, having observed the sun, moon, and stars a repeated number of times, is able through experience to anticipate some of their motions.

The emphasis on experience found in the *K. al-mūsīqā* also appears in other works by al-Fārābī. In one of the two treatises on astrology already discussed, al-Fārābī explains that experience is necessary to understand the effects of the celestial bodies on sublunary existents, especially the manner in which the celestial bodies transmit heat to plants and other organisms.[122] In this context, experience enables valid astrological inquiries to take place, i.e., those that study the things that occur with regular frequency. The epistemological importance of experience is also highlighted in the *K. al-millah*, where it is presented as a source of knowledge for the practicing physician.[123] Finally, the *Risālah fī al-khalā'* shows that al-Fārābī did not hesitate to carry out practical experiments to solve physical questions such as the existence of the void.[124]

The foregoing shows convincingly that al-Fārābī regarded experience and induction as important features of the philosophical method in general and of the astronomical method in particular. Al-Fārābī's statements in the *K. al-mūsīqā* reveal the essentially inductive quality of his approach to astronomy and other sciences such as music and medicine, an attitude that can be explained by the influence of the *Posterior Analytics*, a work quoted several times in the *K. al-mūsīqā*. The importance this text played in shaping al-Fārābī's methodology appears clearly when he writes that "the first principles of certain demonstrations in every science

[122] Al-Fārābī 1976, sections 3-4, translated in Druart 1979, 48-50.

[123] Al-Fārābī 2001a, 105 (translated by C. E. Butterworth): "Clearly, he [the physician] could not have acquired this determination [how to cure a particular person] from the books of medicine he studied and was trained on, nor from his ability to be cognizant of the universals and general things set down in medical books, but through another faculty developing from his pursuit of medical practices with respect to the body of one individual after another, from his lengthy observation of the states of sick persons, from the experience acquired by being occupied with curing over a long period of time, and from ministering to each individual." This passage may be based on Aristotle, who also uses the medical art as an example in *Metaphysics* I.1.981a1 ff.

[124] Al-Fārābī 1951, for an edition and English translation of this text.

only reach the soul through the sensation [*iḥsās*] of individual and particular things, as has been shown in the *Posterior Analytics* [*anālūṭīqā al-akhīrah*]."[125]

Together with al-Fārābī's *K. al-burhān*, the *K. al-mūsīqā* testifies to the profound impact that the *Posterior Analytics* had on the second master, and it is probably al-Fārābī's thorough acquaintance with this text that can best explain the main differences between him and previous Arabic thinkers like al-Kindī. In the context of the particular sciences, especially astronomy, it leads him to emphasize the value of experience and the inductive approach and probably played a decisive role in the conceptual and epistemological differentiation he made between astronomy and astrology.

Another point of interest in the *K. al-mūsīqā* is the distinction between the theoretical and practical sides of astronomy. The theoretical astronomer, al-Fārābī tells us, need not know how to use astronomical instruments, as long as he can rely on someone else to do the observations for him.[126] It is not completely clear whether for al-Fārābī experience corresponds to theory and observation or induction to practice, but what is certain is that astronomical theory depends to some extent on the empirical collection of data. As he explains, if, for some reason, the theorist is not able to benefit from the help of an observer or does not possess the required technology to carry out the observations himself, then he must rely on the findings of his predecessors and can only provide limited theoretical insight into his subject. Thus although al-Fārābī distinguishes between theory and practice and values the former more than the latter, he nevertheless admits that theory can achieve only limited progress if it is not supported by adequate practice and observation.

Al-Fārābī's discussion of experience, observation, and induction has several precedents in ancient philosophy and science, but I will limit myself here to those

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[125] Al-Fārābī 1960, 92, my translation.

[126] Al-Fārābī 1960, 100-101. The *K. al-burhān* (al-Fārābī 1985b, vol. 4, 75) also contains an interesting section on the relation between the practical and theoretical dimensions of the sciences and mentions astronomy as an example.

that relate directly to astronomy. Aristotle alludes to the importance of observation in Lambda 8.1073b1-20, a passage which betrays his belief that astronomy undergoes periodic progress thanks to the gradual accumulation of astronomical data. An even more striking precedent occurs in *Prior Analytics* I.30.46a19-22, where Aristotle states that "astronomical experience supplies the principles of astronomical science."[127] In Ptolemy's *Almagest*, observation is defined as one of the methodological pillars of astronomy, and one on which mathematical theories rely.[128] As for the Arabic world, Wiesner has stressed in her dissertation on al-Kindī's cosmology the important function that sense-perception, induction, and experience play in this philosopher's approach to physics and cosmology.[129]

Furthermore, historians of Arabic astronomy have convincingly shown that Muslim astronomers not only inherited Ptolemy's outlook, but also developed it considerably, placing a new emphasis on the value of precise observation. This trend was to flourish especially after the eleventh century, and it culminated in the achievements of the Marāgha School. However, it is also perceptible at an earlier stage. Already during the ninth and tenth centuries, Thābit ibn Qurra, al-Battānī, and al-Farghānī were scrutinizing the heavens, and their works show that they understood the value of precise observations in advancing astronomical knowledge.[130] Important observatories were built during this period, such as those in Damascus and Baghdad under the reign of al-Ma'mūn, which allowed for accurate and systematic surveys of heavenly motions to be made. As a result, Arabic astronomers corrected or refined a significant amount of the Ptolemaic data.

[127] Translated by A. J. Jenkinson in Aristotle 2001.
[128] Ptolemy 1984, I.1 H8, alludes to the work of previous scientists and the importance of empiricism; I.2 H9 refers more directly to the role of observation: "We shall try to provide proofs in all of these topics by using as starting-points and foundations, as it were, for our search the obvious phenomena, and those observations made by the ancients and in our own times which are available" (translated by G. J. Toomer); see also IV.1 H266, and Goldstein 1997, 1-2.
[129] Wiesner 1993, 35-38.
[130] For the role of observation in Arabic astronomy, see Goldstein 1972; Sabra 1971 and 1998, 290 ff.; Morelon 1994; Saliba 2007, Chapter 3; and Ragep 2008.

In light of these trends, it is not surprising that al-Fārābī makes experience and observation one of the methodological foundations of astronomy. It is clear that al-Fārābī considers astronomy to be, at least partially, an empirical science, which relies on the accumulation of data through observation and induction. Particularly noteworthy is his mention of "instruments" (*ālāt*), which betrays a keen interest in the quantitative dimension and practical side of the astronomical science. This emphasis on the empirical aspect of astronomy is inscribed in al-Fārābī's general conception of the origin and gradual development of philosophy as exposed in the *K. al-ḥurūf* and *Fī ẓuhūr al-falsafah*. It should also be interpreted in connection with his logical treatises, especially the *K. al-burhān*.

4.5.2 Astronomy and Physics

Besides experience and observation, al-Fārābī mentions in the *K. al-mūsīqā* a third source from which the principles of astronomy are derived, namely, natural philosophy. He explains that in order to account for certain celestial phenomena, such as the planetary motions and their causes, astronomers must borrow physical principles from natural philosophy. As al-Fārābī writes:

> Moreover, the case when we are unable to perceive certain harmonies is like the case in which many of the sciences have their first principles [*mabādi'uhā al-uwal*] proven in other sciences, and the practitioner of this science takes an accepted principle which has been established in these [other] sciences. When he is asked to prove it, he refers to the specialists of these sciences, and so does the astronomer [*munajjim*] when he wants to explain the causes [*asbāb*] of the various motions of the celestial bodies that appear through observations [*arṣād*]. He can only explain these causes, like the eccentrics and epicycles, when it is posited that these planetary motions are in themselves regular [*mustawiyyah*]. He cannot prove [*laysa yumkinu an yatabayyana*] this at all in astronomy, but only by borrowing accepted [premises] [*musallamatan*] from the natural scientists...[131]

[131] Al-Fārābī 1960, 102, my translation.

This passage explicitly and vividly describes the dependence of astronomy on physics. It does not on the other hand describe in any detail the nature of the premises and principles that are borrowed from natural philosophy. But al-Fārābī does provide a hint when he mentions that the celestial motions are regular (*mustawiyyah*). Although it is not spelled out, the assumption is that the heavens are a made of a simple element that possesses a unique motion, namely, the circular motion, which, in its constancy and harmony, befits the divine or semi-divine nature of the heavens. This idea harkens back to Plato's *Timaeus*, but it was elaborated in full by Aristotle in the *De caelo*, and it subsequently became one of the fundamental philosophical assumptions underlying the works of many ancient and medieval astronomers. Aristotle's discussion of aether in the *De caelo* is one that falls within the purview of physics, since it connects the various motions (rectilinear and circular) with different types of elements and bodies. Aristotle concludes his exposition by equating circular motion with a unique, incorruptible element, which he calls aether.

Al-Fārābī probably had *De caelo* I.2-4 in mind when he wrote this passage of the *K. al-mūsīqā*, for there he accepts the correlation made between the simplicity of aether and the regularity of circular motion. Al-Fārābī's argument may thus be reconstructed as follows: astronomy is unable to account for the heavens' regular and uniform motions if it does not refer to physics, which alone can explain the cause of this phenomenon through a discussion of simple bodies (especially aether) and the principles of motion and rest.

What this means is that astronomy is dependent on other sciences for some of its principles and is thus not a completely self-contained discipline. Experience and observation, as well as the mathematical theories built on their data, are insufficient for one to acquire a comprehensive knowledge of the heavenly phenomena. Mathematics is not, as Ptolemy believed, the golden means and the only legitimate method at the disposal of the astronomer. Nor is it the only path that leads to divine knowledge. Although problems pertaining to the exterior qualities of the celestial bodies, such as the sizes and distances of the planets, can be solved by astronomers using a combination of observation and mathematical theories, knowledge of the causes and devices responsible for celestial motion requires that one transfer physical principles to astronomy, where they are used as first principles (*mabādi' uwal*, which corresponds to the Greek ἀρχαί). Also of interest is the term *asbāb* (causes), which reveals a concern for causality and in a sense marks the explanatory limit of the astronomical discipline. I will return later on to this important notion.

The importance al-Fārābī bestows on physical principles has one further implication. It suggests that he has in mind an astronomical account that is in accordance with physical reality. This can be vindicated *a posteriori* by the fact that al-Fārābī considered the celestial orbs and the various devices, such as the eccentrics and epicycles, to be real, corporeal entities. This viewpoint transpires in his general account of the structure of the heavens in the *Ārā'*, as well as from specific passages where he explicitly refers to these entities as "bodies" (*ajsām*) (see Chapter III).

Al-Fārābī's position on astronomy and physics is indebted to a long Greek tradition, a starting-point of which is Aristotle's *Physics* II.2, which provides a discussion of the relation between astronomy, physics, and mathematics. According to the traditional interpretation (illustrated in Ross' commentary), Aristotle concludes that astronomy is more physical than mathematical, but this view has recently been challenged.[132] In any case, regardless of whether Aristotle ultimately defines astronomy as a mathematical or a physical science, he stresses the strong connection between astronomy and physics due on the one hand to the corporeality and perceptibility of the heavenly bodies and on the other to their having motion. However, Aristotle does not claim in this passage that astronomy is in any way dependent on physics. As for Ptolemy, it is well known that although he claimed to ground his method entirely in mathematics, he at times relied strongly on physics

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[132] See the recent article by Mueller published in 2006.

to elaborate his proofs and explanations. This can be seen, for instance, in his treatment of the heavens' sphericity and his mention of aether in Chapter I.3 of the *Almagest*.

It is nevertheless in the work of Geminus that al-Fārābī's view finds a much closer parallel. Al-Fārābī's general position concerning the importance of natural philosophy in astronomy is mirrored in Geminus' *Introduction to the Phainomena* and especially in his shorter treatise entitled *Concise Exposition of the Meteorology of Poseidonios*.[133] In these treatises, Geminus (or Poseidonios as reported by Geminus) makes the following points: astronomy and physics focus on different aspects of the celestial bodies, the former on their motion and exterior characteristics, the latter on their substance; both sciences use a different method to prove the same thing; but because the astronomer cannot know the true nature of superlunary things, he must take his first principles from physics; finally, there is an emphasis on the study of causes.[134] The dependence of astronomy on physics is clear when Geminus writes "that he [the astronomer] must take from the physicist the first principles, that the motions of the stars are simple, uniform, and orderly..."[135]

As we have seen, all of these points may be found in al-Fārābī's writings. Al-Fārābī considers that astronomy and physics study different aspects of the same subject-matter. He also presents physics as one of the sources from which astronomical principles are derived. Finally, he cautions that astronomers can acquire only partial knowledge of the causes of celestial phenomena. These glaring parallels suggest that al-Fārābī is indebted to a particular trend of Greek astronomical theory, which is perhaps most plainly embodied in Geminus. Did al-Fārābī read part of the Arabic translations of Geminus' works? This hypothesis is reinforced by the fact that, as Evans and Berggren write, Geminus' "remarks

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[133] Both texts have been translated into English and analyzed by James Evans and J. Lennart Berggren in Evans and Berggren 2006; see also Bowen 2007, especially 331 ff.
[134] Evans and Berggren 2006, 53-58, 252-255; see also Bowen 2007.
[135] Evans and Berggren 2006, 254-255. This quotation resembles al-Fārābī's statement in the *K. al-mūsīqā*.

constitute the clearest statement of this relationship [i.e., between astronomy and physics] we find in any of the Greek astronomical writers."[136]

Moreover, we know that Geminus' *Introduction* was translated into Arabic and Hebrew[137]; this means that this work or other writings by Geminus could very well have been the direct model for al-Fārābī's conception of the astronomical method. Hence, regardless of the impact that the *Almagest* and other Ptolemaic works had on al-Fārābī, in this particular instance the second master is much closer to Geminus than to Ptolemy. This suggests that the Greek astronomical sources transmitted to the Arabic world were more diverse than previously accepted.

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[136] Evans and Berggren 2006, 252.
[137] Todd 1989, 473, who mentions that some of the Hebrew translations were based on Arabic versions.

5. THE PLACE OF METAPHYSICS IN COSMOLOGY AND THE DIFFERENT TYPES OF PROOFS

It soon becomes apparent, however, that astronomy and physics can only yield limited insight into cosmological queries, because according to al-Fārābī the principles and causes of the celestial bodies are immaterial and cannot be studied by natural philosophy or mathematics. Metaphysics on the other hand can provide knowledge of these immaterial causes and thus complete the inquiry into celestial substance.[138] As al-Fārābī explains in the *Philosophy of Aristotle* in behalf of the Stagirite,

> he [Aristotle] had to investigate also whether the substances of the heavenly bodies consist of a nature or a soul or an intellect, or something else more perfect than these. These matters are beyond the scope of natural theory. For natural theory includes only what is included in the categories; and it has become evident that there are here other instances of being not encompassed by the categories: that is, the Active Intellect and the thing that supplies the heavenly bodies with perpetual circular motion.[139]

In this passage al-Fārābī explains that metaphysics is necessary for two things: to define the true substance of the celestial bodies (which could very well be an immaterial principle like intellect) and to identify their cause of motion, which one presumes is "something" exterior to them. Here we see that the physical definition of the celestial bodies as being made of aether does not stand for a full definition of their substance, since aether constitutes only the corporeal aspect of their substance, which in addition may contain immaterial principles such as soul or intellect. On al-Fārābī's reckoning, knowledge of the heavens' substance and causes must depend on metaphysics, which alone can investigate into these immaterial principles.

[138] More precisely, the part of metaphysics that deals with incorporeal substances. See the *Iḥṣā'* (al-Fārābī 1949, 99) and Druart 1987a, 39.
[139] Al-Fārābī 1969, 129, translated by M. Mahdi.

The approach underlying this view is explained in more detail in the *Fuṣūl*, where al-Fārābī advises the student of theoretical philosophy to "[ascend] little by little in the things that need matter to be understood and conceived of until he comes to the celestial bodies."[140] Then he adds:

> When he ends up at the celestial bodies, the rational soul, and the active intellect, he [the philosopher] transfers again to another rank. So it is necessary for him to inquire theoretically into the principles of their existence until he becomes aware of principles that are not natural...He also comes to a midpoint between two sciences—the science of natural things and the science of what is after the natural things—in the ranking of investigation and instruction.[141]

That the heavenly bodies mark the boundary between material and immaterial things and thus between physics and metaphysics is also underlined in the *Taḥṣīl*, where one finds the following statement:

> When one finally comes to enquire into the heavenly bodies and investigate the principles of their being, this inquiry into the principles of their being will force him to look for principles that are not natures or natural things, but beings more perfect than nature and natural things. They are also not bodies or in bodies. Therefore one needs another kind of investigation here and another science that inquires exclusively into beings that are metaphysical. At this point he is again standing between two sciences: the science of nature and the science of what is *beyond* natural things in the order of investigation and instruction and *above* them in the order of being.[142]

Finally, in the *Fuṣūl*, the celestial bodies are said to represent a distinct genus of beings. Al-Fārābī writes, "There are three genera of existing things: those devoid of matter, celestial bodies, and material bodies."[143] And shortly after, he adds that "there are three worlds: spiritual, celestial, and material."[144] The latter statement is somewhat peculiar, because the orthodox Peripatetic tradition divides the world in

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[140] Al-Fārābī 2001a, 61, translated by C. Butterworth.
[141] Al-Fārābī 2001a, 62, translated by C. Butterworth.
[142] Al-Fārābī 1969, 21-22, translated by M. Mahdi.
[143] Al-Fārābī 2001a, 45, translated by C. Butterworth.
[144] Al-Fārābī 2001a, 45, translated by C. Butterworth.

two dimensions, the superlunary and sublunary. This "two-sphere universe," as T. Kuhn has called it, is one of the most recognizable features of medieval Aristotelian cosmological models. But al-Fārābī is asserting here in a somewhat Platonic manner that the celestial bodies represent an intermediary world between the world of intelligible beings and that of corruptible existents.[145] Al-Fārābī's use of the term "world" (*ʿālam)* should probably not be taken literally, but it does underscore the special status of the celestial bodies and their remoteness from the realm of generation and corruption. Although the notion of an intermediate celestial world is proper to this passage of the *Fuṣūl*, the idea that the celestial bodies constitute a distinct category or genus of existents is found in al-Fārābī's other writings. In the *Siyāsah*, which is also known by the more appropriate name *Principles of Beings*, the celestial bodies constitute one of six genera (*ajnās*) of bodies.[146]

The main idea that emerges from these passages is that the heavenly bodies occupy an intermediate position between the natural world and the intelligible world. For this reason, it is necessary to combine physics and metaphysics if one wants a complete definition of their substance (*jawhar*) and principles (*mabādiʾ*). This is all the more necessary since al-Fārābī believes that the celestial bodies possess intellects (*ʿuqūl*), which are immaterial and represent the true substance of the planets (see Chapters III.3. and V). Hence, although both physics and metaphysics study the heavenly bodies, only the latter science can provide true knowledge of these principles, which are immaterial and therefore lie beyond the realm of nature.

The necessity of including metaphysics in the study of superlunary causes also has a bearing on the astronomical method. As we have seen, al-Fārābī holds observation and experience in high esteem. These produce some of the principles of astronomy and enable the development of scientific progress over time. However, the empirical method has a limit within cosmology, which is fixed among other

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[145] This passage in the *Fuṣūl* is also reminiscent of Neoplatonic cosmology, especially that of Proclus. Siorvanes 1996, 267 explains that for Proclus, "the heavenly objects may be divine, but they stand between the intelligible and the sensible." They are "intermediaries" (278).
[146] Al-Fārābī 1964, 31.

things by the nature of the subject-matter. It is understandable that observation is of no use when the causes of visible phenomena (here the planets and their motion) are themselves invisible and can only be conceived intellectually. The study of these causes falls, arguably, outside astronomy, but it has an impact on the kinds of things the astronomer can legitimately seek to know and on the mode in which he knows them, especially when it comes to celestial motion.

This explains why al-Fārābī believes that astronomy, like any secondary or particular science, is dependent on metaphysics for some of its principles. Al-Fārābī follows Aristotle in holding that a science cannot establish its first principles. And just as astronomy derives some of its premises from physics and geometry,[147] so it derives some of its other premises from metaphysics.

This view appears clearly in al-Fārābī's general discussion of the sciences in his *K. al-burhān*. In this work, al-Fārābī outlines a complex model to explain the various interactions between the sciences and argues that metaphysics or "first philosophy" (*al-falsafah al-ūlā*) is the universal science that provides the particular sciences with their principles. He writes that "the particular sciences (e.g., physics, mathematics) are all below First Philosophy, participating in it in so far as all their subjects are below the Absolute Existent. This science will employ universal premises which all the particular sciences employ in the way we have described, while the particular sciences employ premises which are demonstrated in that science [First Philosophy]."[148] And further on al-Fārābī notes that metaphysics is the science that "gives the highest causes of existence."[149] These points are echoed in the *Aghrāḍ*, where al-Fārābī explains that it is metaphysics that provides the principles and subject-matters of the particular sciences.[150]

[147] For the latter science, see al-Fārābī 1985b, vol. 4, 65.
[148] Al-Fārābī, 1985b, vol. 4, 65, translated in Endress 2003, 139; see also al-Fārābī 1985b, vol. 4, 70.
[149] Al-Fārābī, 1985b, vol. 4, 70.
[150] Al-Fārābī 1982b, 42 in Druart's translation; McGinnis and Reisman 2007, 80.

Furthermore, in the *K. al-burhān*, al-Fārābī follows Aristotle's distinction in *Posterior Analytics* I.13 between knowledge of the fact and of the reasoned fact, known in Arabic as *inna* and *lima* (or *innī* and *limmī*) proofs. On the basis of this distinction, al-Fārābī argues that knowledge of the cause together with knowledge of the existent is always preferable to knowledge of the existent alone.[151] Now metaphysics is the science which *par excellence* is able to provide this kind of certain knowledge, since it studies the most fundamental causes of being. Moreover, al-Fārābī holds that the premises borrowed from metaphysics by more particular sciences such as physics and astronomy can be used to explain the causes (*asbāb*) of things. As al-Fārābī writes, "the prior sciences provide the posterior sciences with knowledge of the causes or of the causes and existence together..."[152] This explains why the proper cosmological method must rely not only on physics and astronomy but also on metaphysics in order to provide a comprehensive account of the universe that includes a causal explanation of its hidden principles.

The application of the *innī* /*limmī* distinction to astronomy and to al-Fārābī's classification of the sciences raises several problems. First, it should be noted that Arabic astronomers interpreted this conceptual distinction in an idiosyncratic way. As Ragep notes, "In contrast with Aristotle, Arabic mathematical astronomers do not see themselves as giving proofs of the reasoned fact but rather of the fact. These "facts," however, are not observations but rather the configuration (*hay'a*) of the simple bodies."[153]

On the one hand, this point could very well apply to al-Fārābī, for as we have seen he believes that astronomy is dependent on the other sciences and derives some of its principles and proofs from them. This suggests that its capacity for *limmī* explanation is limited. On the other hand, it may be inferred from al-Fārābī's statements in the *K. al-mūsīqā* that astronomy is able to offer some kind of causal

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[151] Al-Fārābī 1985b, vol. 4, 26 ff. For a discussion of these proofs in Aristotle and the Greek and Arabic commentators, see Lettinck 1994, 105-113.
[152] Al-Fārābī 1985b, vol. 4, 66, my translation.
[153] Ragep 1993, vol. 2, 387. See pages 386-388 for a discussion of the *innī*/*limmī* proofs in al-Ṭūsī's astronomy.

explanation, since he mentions there the *asbāb* of celestial motion, by which he means the various devices (eccentrics and epicycles) that can be used to account for the motions of the planets. Here he seems to be alluding to an astronomical account that transcends the mere observation of the phenomena, and one which can explain *why* motion occurs.

This passage also connects with al-Fārābī's claim in the *K. al-burhān* that premises borrowed from prior sciences can be used as proofs of the reasoned fact in posterior sciences.[154] In the case of astronomy, it entails that physical or metaphysical principles be transferred to this science. But it is not completely clear whether this proof of the reasoned fact is established within astronomy or imported from outside. Furthermore, it may be doubted to what extent eccentrics and epicycles correspond to a proof of the reasoned fact and what their explanatory value is in a discussion of celestial motion.

This picture is further complicated by the fact that according to al-Fārābī the various sciences can prove the same thing in different ways. Astronomy and physics, for instance, can muster different proofs and use a different method to establish the same conclusion. In the *K. al-burhān*, al-Fārābī provides the example of the sphericity of the heavenly bodies to illustrate this.[155] He begins by explaining that when a thing has several causes (i.e., the four Aristotelian causes), then these causes can be demonstrated either by one or several sciences. If the four causes cannot be proven by one science, then various sciences might be required to provide knowledge of the different causes. Hence, physics, which studies bodies that are enmattered and insofar as they are in motion, and mathematics, which studies the qualities of bodies abstracted from their matter, can identify the causes of the same thing, which is why al-Fārābī concludes that the sciences can collaborate together and study the same object from different angles. For al-Fārābī, there is therefore no contradiction and opposition between the methods of physics and astronomy. He writes: "For this

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[154] Al-Fārābī 1985b, vol. 4, 66.
[155] Al-Fārābī 1985b, vol. 4, 68.

reason, it is possible for mathematics and physics to cooperate in [the examination of] a single thing, and for the former to provide a cause, and the latter to provide another cause. In this fashion the sphericity of the world and the sun and the moon is examined by both mathematics and physics."[156]

In using this particular example, al-Fārābī is following Geminus as reported by Simplicius in his commentary on *Physics* II.2, and Simplicius himself.[157] But al-Fārābī's account differs in one important respect from the one found in Simplicius. According to Geminus, the mathematician is not interested in causes: "the former [the physicist], with an eye to productive power, often touches on causes. But the latter [the astronomer], when he is constructing proofs from what impinges on a heavenly body from outside itself, does not pay any great attention to causes, as for example when he is presenting the earth or the spherical bodies as spherical."[158] Al-Fārābī and Geminus thus seem to disagree on this point, for as we have seen, al-Fārābī believes that the physicist and astronomer both give an aetiological account of the sphericity of the heavenly bodies and the earth, although they examine different causes.

These comments shed some light on the questions of celestial motion discussed in the *K. al-mūsīqā* and of the various types of proofs that can be used in cosmology. In relation to the question of celestial motion with which we are concerned, it is not implausible that al-Fārābī would have considered that astronomy, physics, and metaphysics can all provide an aetiological account of celestial kinematics by studying the celestial bodies from different angles and by identifying different causes: physics through the concept of simple bodies and aether; astronomy by using the eccentrics and epicycles; and metaphysics by revealing the fundamental causes and principles of the heavens, which are the sphere-souls and separate intellects. Now there is no reason why any of these proofs should not be *lima* proofs, since they all identify and reveal some of the causes at

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[156] Al-Fārābī 1985b, vol. 4, 68, my translation.
[157] Simplicius 1997, 290,25 ff.
[158] Simplicius, *Physics* commentary, 292,9 ff.; translated by Barrie Fleet in Simplicius 1997, 47.

play behind the phenomenon of celestial motion. Since astronomy can address the same questions as these other sciences (e.g., motion) but treats them in a manner proper to it, it would seem that it is indeed possible for astronomers to provide causal explanations of superlunary phenomena. I will return to the relation between these various accounts of causality in my discussion of celestial motion in Chapter VI.

In spite of these inherent difficulties, the previous considerations also enable us to better understand the very important concept of 'cause' (*sabab*), which appears in various contexts in al-Fārābī's writings. In astronomy, *sabab* may refer to an 'explanation' or 'interpretation' of a planet's motion by referring to the various devices that carry it along, such as the epicycles and eccentrics. It is unclear at this point to which extent Greek and Arabic astronomers would also have considered these models to be 'causes' of a planet's motion; this subject requires more sustained research. However, it is likely that al-Fārābī's use of the term *asbāb* in the passage from the *K. al-mūsīqā* quoted above is intended to convey the dual meaning of 'explanation' and 'cause.' Not only was there a semantic overlap between the two concepts in Arabic philosophy, but al-Fārābī clearly ascribes corporeal existence to the eccentrics and epicycles. This suggests that the latter are not merely abstract devices, but that they play a role in the actualization of planetary motions.

This view is also reinforced by the fact that in al-Fārābī's philosophical works *sabab/asbāb* usually designates the causes or principles (*mabādi'*) of existence of lower entities. By way of illustration, God is described as a "proximate cause [*al-sabab al-qarīb*] of the existence of the secondary causes [i.e., the separate intellects or *thawānī*]."[159] The separate intellects themselves are "causes [*asbāb*] of the existence of the celestial bodies,"[160] and, in this particularly case, they are also final causes of motion for the spheres. Hence, the term 'cause' surely has a different meaning in a metaphysical and an astronomical context, in the sense that the eccentrics and

[159] Al-Fārābī 1964, 31.
[160] Al-Fārābī 1964, 31.

epicycles are not principles of existence in the way that the separate intellects are. Nevertheless, the fact that al-Fārābī describes these devices as causes suggests that they have an efficient role to play in the motion of the planets. This would not be surprising, in view of the fact that al-Fārābī's entire physical and metaphysical system is articulated around an elaborate theory of causality that begins with God, described as the First Cause, and ends with the lower spheres of the elements and prime matter. This being said, the terms 'principle' and 'cause' refer primarily to immaterial and metaphysical beings (God and the separate intellects) that convey existence to lower entities. This explains why metaphysics is the only science that can enlighten us on these fundamental causes.

The emphasis on causality, then, is common to al-Fārābī and some of the ancient Greek astronomers, such as Geminus. But al-Fārābī endows this term with a crucial metaphysical meaning that is lacking in the passages composed by the Greek astronomer, at least in the ones that have come down to us. And whereas Geminus refers only to physics as the science on which the astronomer must rely in order to complete his inquiry and says nothing about metaphysics, al-Fārābī presents metaphysics as the ultimate cosmological discipline, which can explain the most fundamental causes of celestial phenomena and which also provides the other sciences with some of their principles.

It should be noted, however, that al-Fārābī also believes that metaphysics can benefit from astronomy and the other particular sciences. In fact, the relation between astronomy, physics, and metaphysics is not unilateral but rather reciprocal. If astronomy depends on metaphysics and physics for some of its principles, it appears that astronomy can also benefit these sciences by providing them with premises concerning certain existents, i.e., the celestial bodies, with which physics and metaphysics also deal. In the *K. al-burhān*, al-Fārābī writes that "things that are proven in astronomy are used as first premises in metaphysics and physics."[161] Al-Fārābī elaborates this point shortly afterwards by adding that

> The prior sciences provide the posterior sciences with knowledge of the causes or knowledge of the causes and existence (*wujūd*) together, whereas the posterior sciences provide the prior sciences with knowledge of the existents alone. For example, the art of astronomy provides physics and metaphysics with [the knowledge of] many aspects of the existents that are comprised by them...[162]

Al-Fārābī is once more following the Aristotelian distinction between proof of the fact and proof of the reasoned fact. Particular, posterior sciences like astronomy can benefit metaphysics by providing it with knowledge of certain existents and thus by helping it to formulate demonstrations of the fact, or *innī* proofs. Hence, whereas the premises borrowed by astronomy from metaphysics can be used as causes (*asbāb*), the premises that metaphysicians borrow from astronomers can only be used as "evidential proofs" (*dalā'il*), to use Marmura's translation.[163] It should also be noted that al-Fārābī's view on the interconnection between astronomy and metaphysics is reflected in Themistius' paraphrase on the *Metaphysics*, parts of which were translated into Hebrew and Arabic.[164] As for Ibn Sīnā, he follows al-Fārābī's view in the *Metaphysics* of the *Shifā'* and even makes an emphatic statement as to the benefit that metaphysics can derive from astronomy.[165]

It is possible that al-Fārābī's classification of the sciences and his belief that some sciences are subordinated to others was inspired by Aristotle's *Posterior Analytics*, especially I.5.74a38-I.7.75b20, I.13.78b35-79a15 and I.27.87a32-38. Aristotle

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[161] Al-Fārābī 1985b, vol. 4, 66, my translation. The Arabic reads: "*fa-li-dhālika tustaʿmalu ashyā'u tubarhanat fī ʿilm al-nujūm muqaddamāt uwal fī al-falsafah al-ūlā wa fī al-ʿilm al-ṭabīʿī.*"
[162] Al-Fārābī 1985b, vol. 4, 66, my translation.
[163] For an overview of the influence of Aristotle's *Posterior Analytics* in Arabic thought, see Marmura 1990.
[164] Themistius 1999, VIII.5, p. 101 (translated by R. Brague): "Si j'ai dit que la science des astres est très unie à la philosophie, c'est seulement parce qu'elle seule cherche la substance sensible éternelle. Quant au reste des mathématiques, leur recherche porte sur les accidents qui affectent les corps."
[165] Ibn Sīnā 2005, 14-15.

in general maintains the autonomy of the sciences, but in some passages he also hints at their interconnection and seems to subordinate some sciences to others (e.g., optics to geometry). While he may have been inspired by this work, al-Fārābī nevertheless goes beyond it and provides a different classification of the philosophical disciplines. On the one hand, al-Fārābī greatly develops the concept of the "cooperation of the sciences" (*mushtarakah al-ʿulūm*), which is crucial to understand his classification and how first principles are established. On the other hand, al-Fārābī devises a pyramidal and highly hierarchical classification of the sciences. He presents metaphysics as the first universal science, which encompasses all the other particular sciences, and in so doing he set a profoundly influential model for subsequent Arabic thinkers.

Retrospectively, it is also easier to highlight the differences between Ptolemy's method and al-Fārābī's. This difference is in part rooted in their classification of the sciences. It should be remembered that according to Ptolemy, mathematics is the highest science because it alone can provide certain knowledge. Physics is hindered by the preponderance of obscure matter in its subject, while metaphysics cannot reach true knowledge and can only yield speculative hypotheses. Of all the theoretical sciences, then, mathematics is best equipped to lead to demonstration and to a conception of the divine nature.[166]

In opposition, al-Fārābī adopts a very different position, according to which astronomy is confined to studying certain aspects of the cosmos and must yield priority to other disciplines when it comes to defining the ultimate causes and substance of celestial beings. Moreover, al-Fārābī develops the idea, which is not formally accepted by Ptolemy, in spite of his occasional implementation of it, that astronomy is dependent on other sciences, which provide it with the necessary principles to establish certain proofs. Hence, according to al-Fārābī, astronomy is

[166] The key passage appears at the beginning of the *Almagest*: I.1 H5-H8. In spite of his claims for the superiority of mathematics, Ptolemy does not hesitate to borrow certain ideas from physics in order to strengthen his arguments. An example of this occurs in I.3 H14, when Ptolemy uses Aristotle's theory of aether and simple body in order to prove the sphericity of the heavenly sphere.

located below physics and metaphysics in the hierarchy of the sciences. The two latter sciences are more qualified to study the fundamental principles of the heavenly bodies. At the same time, the subordination of these sciences to one another ensures their cooperation within the cosmological context.

The previous analysis should compel us to re-examine some aspects of al-Fārābī's affiliation to the Aristotelian, Platonic, and Neoplatonic traditions. In his description of the astronomical methodology, al-Fārābī appears as a thorough Aristotelian, and more specifically, as a careful reader of the *Posterior Analytics*. He is one of the earliest thinkers in Islamic thought to emphasize the importance of observation and experience, and to praise the empirical approach in the sciences. I endeavoured to show how al-Fārābī's understanding of the astronomical method was influenced not only by the theories of ancient astronomers, such as Geminus and Ptolemy, but also by the theories developed by Aristotle in his *Posterior Analytics*. Al-Fārābī is remarkable in having attempted to apply some of Aristotle's methodological ideas to sciences such as music and astronomy. He perceived the significance of the inductive approach and experience in particular in the search for first principles, and he reflected deeply on the relation between practice and theory.

Al-Fārābī here departs markedly from many Platonists and Neoplatonists for whom all true knowledge consists in insights into the intelligible and immaterial world, and who in general discarded the realm of sense-perception. This basic attitude can be witnessed in connection with astronomy in the opening pages of Proclus' *Hypotyposis*, for example.[167] In contrast to these thinkers, al-Fārābī condones the study of the physical, perceptible world and shows a genuine interest in the practical aspects of astronomy, music, and the other arts. In addition, his use of mathematics within astronomy is informed more by the scientific method of Ptolemy than the metaphysics of the Platonists and Neoplatonists, who had often elevated mathematics and numbers to a divine or quasi-divine status.

[167] See Lloyd 1978, 207, for a translation and discussion of this text.

Al-Fārābī conceived of mathematics as a useful tool and method to investigate the world around us, but there is no suggestion, whether in his mathematical or philosophical treatises, that he raised mathematics to a special metaphysical status. In fact, al-Fārābī in the *K. al-burhān* sides with Aristotle on the issue of the nature of mathematical objects and defends the view that they may be abstracted from matter only in the mind, but not in reality.[168] This view is also clearly expressed in the *Aghrāḍ*, where al-Fārābī states that "although mathematics is higher than natural science—since its subjects are abstracted from matter—it most certainly should not be called the science of metaphysics because its subjects are abstracted from matter only by human imagination, not actually."[169] On this point, al-Fārābī departs not only from the Greek Neoplatonists, but also from al-Kindī, who was apparently influenced by Proclus' commentary on Euclid's *Elements*, and according to whom mathematical objects enjoy an intermediary position between physical objects and intelligible beings.[170] Moreover, as Freudenthal has shown, al-Fārābī endeavoured to develop an analytical approach to mathematics for didactic reasons (in addition to the synthetic, deductive method inherited from Euclid), and he strongly believed in the pedagogical virtue of proceeding gradually from concrete physical bodies to more abstract geometrical entities in the teaching of mathematics.[171] In his approach to, and use of, mathematics, al-Fārābī is thus much closer to the Peripatetic and Alexandrian scientific traditions than to the Neoplatonists.

The above conclusions agree with and strengthen the contentions of various other scholars. In two recent articles, J. McGinnis and F. J. Ragep emphasized the importance of induction, experience, and observation in the works of Ibn Sīnā and Arabic astronomers respectively and stressed the discernment with which the

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[168] Al-Fārābī 1985b, vol. 4, 68-69.
[169] In McGinnis and Reisman 2007, 79.
[170] See the very interesting article by D. Gutas on the role of mathematics in al-Kindī's philosophy in Gutas 2004, especially 204-205, 208.
[171] See Freudenthal 1988 and 1990.

Muslims received, criticized, and tested the knowledge of the Greeks.[172] Ragep's paper in particular enables us to contextualize al-Fārābī's position vis-à-vis Greek Neoplatonic attitudes toward astronomy and to better assess the differences between their approaches. In this respect, it would seem that al-Fārābī participated in the development of the Arabic-Islamic astronomical tradition, which in many ways drastically revised the Greek legacy.

Yet at the same time, it must be said that al-Fārābī's contention that metaphysics is the universal science on which all the other sciences depend has certain implications in his philosophy that appear connected to the legacy of Neoplatonism in Islam and depart quite radically from an Aristotelian framework. For al-Fārābī's point is obviously not limited to issues of methodology, but also suggests that there is a direct continuity between the physical and incorporeal planes, between the physical beings and the intelligible beings. And indeed, al-Fārābī's cosmology posits a whole series of immaterial, noetical, and demiurgic entities between the First Cause and the planets, which are directly responsible for the latter's existence and motion.

In this respect, al-Fārābī's cosmology is much more reminiscent of that of Proclus than that of Aristotle or Ptolemy. Although there is no evidence to suggest that al-Fārābī shared Proclus' bias toward Ptolemaic astronomy—quite the contrary—it is undeniable that he manifests in his cosmology what may be called a 'metaphysical' approach to the cosmos, i.e., he upholds the idea that the heavenly substance and the cause of its existence can only be explained completely by metaphysics. In this picture, astronomy should be seen as only one component of the cosmological approach, whose foundations rest ultimately on first philosophy. Again, these remarks should not obscure the fact that al-Fārābī also had a genuine interest in mathematical astronomy, as the previous paragraphs have shown.

[172] McGinnis 1993 and Ragep 2008. Ragep discusses some of the theological and social reasons that may be responsible for the gap between the Greek Neoplatonists and the early Arabic thinkers in their approach to the physical world.

Another important conclusion pertains to the relation, and more specifically, the compatibility between the various disciplines that constitute al-Fārābī's 'cosmology.' There is no reason to doubt that al-Fārābī conceived of these various disciplines as working together and in harmony and as covering different aspects of the superlunary cosmos. Here I anticipate slightly the forthcoming chapters, but I think it is worth stressing right away that al-Fārābī's willingness to harmonize astronomy, physics, and metaphysics can be seen in the cosmological descriptions of the *Ārā'* and *Siyāsah*. Most of their essential structural features, such as the presence of nine spheres (which correspond to the known planets of the time together with the sphere of the fixed stars and the outermost sphere) and of other subordinate corporeal devices (eccentrics, epicycles, etc),[173] are derived from Ptolemy's astronomy and are combined with metaphysical concepts (e.g., the heavenly intellects) and physical concepts (e.g., the simple heavenly substance and the primacy of circular motion).

On several key points, then, al-Fārābī is following the most up-to-date astronomical knowledge of his time, which he may have acquired by studying and commenting on the *Almagest* or by consulting the work of contemporary astronomers. But he thoroughly integrates these elements within a broader physical and metaphysical framework, which suggests that his basic intention was to provide a unified and coherent cosmology.

[173] See Chapter III.

6. PARALLELS WITH THE LATER *HAY'A* TRADITION

The idea that physics and metaphysics can be a source of astronomical principles is found several centuries later in the works of two of the most important *hay'a* practitioners, Naṣīr al-Dīn al-Ṭūsī and Mu'ayyad al-Dīn al-ʿUrḍī.[174] At the beginning of his *Tadhkirah*, for example, al-Ṭūsī explains that "those of its [astronomy] principles that need proof are demonstrated in three sciences: metaphysics, geometry, and natural philosophy."[175] As we have seen, al-Fārābī also believes that these three sciences provide some of the principles of astronomy, and he mentions geometry and physics explicitly. Furthermore, although al-Ṭūsī does not elaborate on the metaphysical principles he has in mind, like al-Fārābī he nevertheless subordinates some sciences to others and integrates astronomy in a hierarchy that culminates with metaphysics, which is seen as the first and primary science.

On the relation between astronomy and physics, al-Fārābī and al-Ṭūsī share a number of ideas. Besides viewing physics as a source from which astronomical principles are derived, they were both concerned about the physicality of the astronomical model they discuss. Hence al-Ṭūsī writes: "Restricting oneself to circles is sufficient in the entirety of this science [astronomy] for whoever studies the proofs. However, one who attempts to understand the principles [*mabādi'*] of the motions must know the configuration [*hay'a*] of the bodies [i.e., must understand their physical configuration]."[176] Al-Ṭūsī then goes on to describe the deferent, concentric, and eccentric as orbs (*aflāk*) and the epicycle as a sphere (*kurah*). And he also mentions the surface and thickness of these bodies, thus providing a detailed description of the physical features of his model.

Al-Fārābī does the same in the *Ārā'*, although his description is less detailed and occurs in a different context, namely, in a philosophical treatise.[177] By noting

[174] For the former, see Ragep 1993, 38-46; for the latter, see Sabra 1998, 307-308, 313.
[175] Translated in Ragep 1993, vol. 1, 90.
[176] Ragep 1993, vol. 1, II.5 [10].
[177] See in particular al-Fārābī 1985a, 119-131, which provides a physical description of the cosmos.

these parallels, I am not arguing that al-Ṭūsī read or even knew about al-Fārābī's works, but am merely trying to point out some similarities in their conception of the astronomical method. It is nevertheless possible that Ibn Sīnā mediated between al-Fārābī and al-Ṭūsī, although extensive research is required to confirm this hypothesis.

The emphasis placed by the *hay'a* practitioners and by al-Fārābī on the role of physics does not stem from a purely methodological concern about first principles. It also indicates a desire to provide a comprehensive cosmological picture, i.e., one that can simultaneously account for the mathematical theories behind celestial phenomena *and* for the physical arrangement of the spheres and planets. These thinkers believed that the physical laws at play in the superlunary realm had to be understood in order to elaborate a valid astronomical model. Arabic astronomers considered that Ptolemy had not achieved a satisfactory synthesis between the mathematical theories put forth in the *Almagest* and the physical descriptions of the cosmos found in the *Planetary Hypotheses*, and they wanted to combine both dimensions in a more coherent manner.

In this respect, F. J. Ragep writes: "In accepting that astronomy was based on both mathematical and physical principles, Arab astronomers reached a rather simple conclusion—the mathematical models had to be consistent with the physical principles."[178] And A. I. Sabra, who has called this project the "kinematic-modeling project"[179] of the later *hay'a* tradition, writes: "...the program consisted in seeking, or urging to seek, a reconciliation between the Ptolemaic "mathematical" hypotheses

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[178] Ragep 1990, 210; see also Ragep 1993, 26-27, on the similarities between al-Ṭūsī's and Aristotle's approach in Book Lambda of the *Metaphysics*.

[179] Sabra 1998, 295. According to Sabra, the astronomical tradition that developed subsequent to Ibn al-Haytham's work was intent to reconcile Ptolemy's mathematical model as exposed in the *Almagest* with the physical model of the *Planetary Hypotheses*. Arabic astronomers strived to complete what they saw as Ptolemy's unfinished project of providing a valid physical foundation to the theoretical edifice contained in the *Almagest*. We are not concerned here with Saliba's criticism of Sabra's article (Saliba 2000), and Sabra's response to Saliba's attack (Sabra 2000). Saliba rejects some of Sabra's arguments, but his criticism does not seem to invalidate Sabra's interpretation of the main motivation behind the *hay'a* project. Saliba, like Sabra, defines the *hay'a* project as an attempt to reconcile the physical and mathematical models put forth by Ptolemy (Saliba 2000, 338).

assumed to be already supported by observational tests...and adopted theories of cosmology and physics or natural philosophy."[180] Arabic astronomers did not want to *substitute* a physical model for Ptolemy's mathematical theories. In other words, they were not seeking to replace the 'instrumentalist' model with the 'realist,' physical model, as Duhem claimed. Rather, their ambition was to achieve a thorough reconciliation between physical and mathematical theories and to ground astronomical theorizing in a valid set of physical principles, which would provide a scientifically valid cosmology.[181] By so doing, they hoped to bring the Ptolemaic project to its logical completion.[182]

Ragep's and Sabra's insights into the classical and post-classical *hay'a* tradition are helpful to contextualize the cosmological work of previous Arabic thinkers such as al-Fārābī and Ibn Sīnā. In many ways al-Fārābī's approach is not unlike that of these later *hay'a* practitioners. He shares with them the idea that astronomy derives some of its principles from physics, that a valid astronomical model must exhibit a harmony between the mathematical theories and the physical principles, and that ultimately it is metaphysics that represents the crowning science under which astronomy is subsumed. Like these thinkers, al-Fārābī was conversant with both the *Almagest* and the *De caelo* traditions and tried to integrate

[180] Sabra 1998, 300; Sabra 1998, 294: "...Islamic astronomers before and after Ibn al-Haytham knew Ptolemy not only as the author of the *Almagest* but also of the *Planetary Hypotheses*, and it was only natural that this fact would suggest to them that a theory of celestial motions could not be complete or completely satisfying unless it was embedded in an acceptable cosmological scheme that successfully represented these motions in terms of solid orbs and spheres similar to those described in Ptolemy's latter work."

[181] This point is stressed by Sabra 1998, 295, when he writes: "Referring to the equant hypothesis as an example, the aim of Arabic astronomers was *not* to get rid of the *mathematical effect* of the hypothesis...Nor was it simply to produce the same effect by some combination of properly uniform motions of abstract points and abstract circles...but to accommodate the hypothesis into a configuration (*hay'a*) of physical orbs and spheres...Only thus would the offending feature of the hypothesis be removed, and a *physically* plausible and satisfying description of what actually took place in the heavens be accomplished."

[182] Some scholars might disagree with Sabra and accuse him of oversimplifying a complex and variegated tradition. Moreover, they might object to the way in which Sabra defines the relation between physics and mathematical astronomy. See R. Rashed 2007, for instance, who claims that Ibn al-Haytham's aim was to devise a model of celestial motion that would be purely geometrical and abstract.

their various and sometimes conflicting theories into a unified picture of the cosmos.

There are also, of course, substantial differences between these thinkers' approach to cosmology. For example, we have seen that Ibn Sīnā and later astronomers radically separate astrology from astronomy, whereas al-Fārābī conceptually distinguishes between the two but subsumes both under a single discipline. Moreover, there is no evidence that al-Fārābī wanted to modify or criticize Ptolemy's astronomy the way later *hay'a* practitioners did. We cannot know whether al-Fārābī was conscious of any shortcomings in Ptolemy's works and whether he believed that it was the task of Arabic thinkers to complete the astronomical project begun by Ptolemy. Finally, al-Fārābī's works do not display the level of synthesis of the later *hay'a* works. These factors emphasize the gap between al-Fārābī and thinkers like Naṣīr al-Dīn al-Ṭūsī.

In spite of this, it is intriguing to realize that al-Fārābī was one of the various links in the chain that goes from Geminus and Ptolemy through al-Bīrūnī and Ibn Sīnā to al-Ṭūsī and al-ʿUrḍī and the Marāgha School of the thirteenth and fourteenth centuries. More specifically, there are obvious similarities between the astronomical outlook of Geminus, al-Fārābī, al-Ṭūsī and al-ʿUrḍī, which enable one to establish a certain continuity between these thinkers. If al-Fārābī did not belong to the *hay'a* tradition, he may nevertheless be said to have anticipated some of its essential features.

7. DEMONSTRATION AND ANALOGY IN AL-FĀRĀBĪ'S COSMOLOGY

7.1 The Evidence For and Against Demonstration

An important question pertains to the nature of the epistemological criteria that are deemed appropriate to carry out cosmological inquiries. We have seen that metaphysics is responsible for identifying and defining the causes of the celestial bodies, but one may raise the question of how al-Fārābī exposes his cosmological ideas in his philosophical treatises. More precisely, what is the role of demonstration and of the other methods of argumentation employed by al-Fārābī? The mathematical language of astronomy is adapted to studying problems that involve observations, calculations, and measures, such as the positions, sizes, and distances of the planets. It is clear, however, that the inquiry into invisible things, e.g., the causes of the celestial bodies, cannot be carried out through mathematics, since the philosopher is dealing in this case with entities that cannot be perceived and measured. But this raises the question of whether the physical and metaphysical approaches display the same concern for demonstrative rigor as the mathematical one.

Here one is faced with a problem, because al-Fārābī's theoretical views on demonstration are difficult to reconcile with the method and style of his treatises. In other words, al-Fārābī does not systematically apply his theory of demonstration in his cosmological and metaphysical works. Before I analyze the style and method of his emanationist treatises, it is necessary to examine whether any proof of a cosmological nature is possible according to al-Fārābī, and if so, what kind of proof it is. This is all the more important considering that some medieval thinkers denied that cosmological aporias could be settled by human reason.[183]

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[183] In a recent article published in 2008, M. Rashed provides a detailed treatment of this question by examining several works of the Fārābīan corpus, particularly the lost treatise *On Changing Beings* and the *K. al-jadal*. M. Rashed is mostly concerned with the nature of al-Fārābī's proofs, and his article succeeds in reconstructing some of them using the various excerpts and quotations that have survived in the works of later authors.

In an interesting section of *The Guide of the Perplexed*, Maimonides argues that Aristotle's arguments in the *De caelo* completely lack the certainty associated with the demonstrative method; and he adds that Aristotle himself was aware of this, yet wanted to convince his audience through rhetorical and dialectical means that the universe is eternal.[184] Maimonides' stance on this particular issue seems to be that demonstrative arguments cannot be adduced to prove or disprove conundrums pertaining to the heavens, since these lay well beyond the human ken. As Maimonides writes in the *Guide of the Perplexed*,

> ...it is impossible for us to accede to the points starting from which conclusions may be drawn about the heavens; for the latter are too far away from us and too high in place and in rank. And even the general conclusion that may be drawn from them, namely, that they prove the existence of their Mover, is a matter the knowledge of which cannot be reached by human intellects.[185]

Maimonides' criticism of Aristotle raises the very important question of the types of proofs and methods used by medieval authors in their handling of cosmological problems. What was al-Fārābī's position and how do Maimonides' comments on the limits of human knowledge relate to his philosophy?

There are no statements by al-Fārābī that immediately come to mind that would allow one to conclude that he shared Maimonides' apparent distrust of the demonstrative method in cosmology. Nor is there any indication that al-Fārābī limits demonstration to the mathematical method proper to astronomy, as Ptolemy

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[184] Maimonides 1963, II.15.33a-b. This passage is reminiscent of some aspects of Philoponus' criticism of Aristotelian cosmology.

[185] Maimonides 1963, II.24.54b. Naturally, this passage should not be taken as representing Maimonides' last word on the topic, since as is well known the *Guide* is a multi-layered and esoteric text. In any case, past scholarship has often portrayed Maimonides as a somewhat radical skeptic (see for instance Pines 1979, who emphasizes the aporetic aspect of Maimonides' thought). This picture, however, is progressively changing and a new and more balanced assessment of Maimonides' attitude vis-à-vis cosmological and metaphysical knowledge can be found in recent scholarship. See Kraemer 1991; Ivry 1991; and especially Langermann 1991, and Rudavsky 2000, 24-30 (the last two references also provide a re-assessment of Maimonides' attitude toward astronomy). S. Pessin's talk at a conference at Marquette University in June 2008 similarly undermined the aporetic interpretation of Maimonides' philosophy and stressed the possibility of human knowledge of celestial and divine matters.

did. Before we turn to a study of al-Fārābī's works, it should be noted that Maimonides himself provides evidence for the fact that al-Fārābī would not have agreed with him. This is made clear when Maimonides writes:

> However, you know Abū Naṣr's [al-Fārābī's] interpretation of this example, what he made clear with regard to it, as well as the fact that he considered disgraceful the notion that Aristotle could have doubted of the eternity of the world. *He had an extreme contempt for Galen because of the latter's saying that this was an obscure question with regard to which no demonstration is known. As Abū Naṣr holds, it is clear and manifest, being proved by demonstration that the heavens are eternal* whereas that which is within them is subject to generation and passing-away.[186]

According to Maimonides, then, al-Fārābī believes that it is possible to settle cosmological issues (in this case, the question of whether the world is created *ex nihilo* or eternal) through demonstrative proof. Both thinkers disagree on this crucial point: whereas Maimonides uses philosophical arguments that are as close as possible to demonstration but in essence dialectical or rhetorical to try to convince the reader of a particular cosmological view and ultimately relies on scripture as the decisive criterion, al-Fārābī believes that it is possible to formulate demonstrative arguments to settle these matters. This, at any rate, is what is stated in the *Guide of the Perplexed*.

This important testimony by Maimonides is partially vindicated by the information that can be gleaned from al-Fārābī's corpus. We know that al-Fārābī paid particular attention in his works to the various types of argumentation at the disposal of the philosophers (dialectical, rhetorical, etc), as his commentaries on the *Organon* and his writings on language theory show. In these texts, al-Fārābī carefully distinguishes between demonstration on the one hand, which is the privilege of the philosophers, and dialectical, rhetorical, and poetical arguments on the other, which are used by theologians and other groups.

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[186] Maimonides 1963, II.15.33b, translated by S. Pines (emphasis mine). See also Vajda 1965, who proposes to trace Maimonides' quotation to al-Fārābī's *K. al-jadal*, 232-233.

It is in these logical works that one must look for further hints of al-Fārābī's position concerning the role of demonstration in cosmology. In the *K. al-jadal*, one finds a very pertinent passage, which may or may not be the one implicitly referred to by Maimonides above. In this passage, al-Fārābī describes two ways of approaching the question of the eternity of the world. He writes:

> 'Is the world eternal *a parte ante* or not?' [*Topica*, I.11.104b14-16]...This example he [Aristotle] proposes is very dialectical under one aspect, since when we say "is the world eternal *a parte ante* or not?", insofar as we employ this wording, it is not possible at all that we produce a certain syllogism, neither of the fact that it is eternal *a parte ante* nor of the fact that it is not eternal *a parte ante*. For our word "the world" is an ambiguous word and, moreover, taken as indefinite. So, if the world is taken in its entirety in such a way, [it will be found to have] many parts, one of which is clearly not eternal *a parte ante*, another such that it is possible to produce about it a syllogism showing that it is eternal *a parte ante*, and another of unclear status. Thus, when we take the world in its entirety, it is sometimes eternity *a parte ante* which is imagined, and sometimes incipience, so that we always produce opposed syllogisms. The only way then is to examine, for each of its parts, whether it is eternal *a parte ante* or not, and in how many ways a thing can be eternal *a parte ante*, and in how many ways it is said to be not eternal. This is the method leading to the production of its demonstration, whereas according to the first method, it is not possible to produce its demonstration, the syllogisms produced being opposed syllogisms in each case.[187]

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[187] *K. al-jadal*, 232b (al-Fārābī 1987b, vol. 1, 431) translated into English in M. Rashed 2008. This passage, which is obviously of primary importance to understand al-Fārābī's method, was also quoted and translated in French by D. Mallet (in al-Fārābī 1999c, 32). Mallet's French translation is very close to M. Rashed's English one, but interprets al-Fārābī as discussing only dialectical arguments and not demonstrative ones. I agree with M. Rashed, who proposes to read the second method outlined by al-Fārābī as a scientific or demonstrative one, which should be contrasted to the first, dialectic method. M. Rashed rightly refers to the paragraph immediately following this passage (232b-233b), in which al-Fārābī criticizes Galen for having failed to grasp this distinction and for having limited himself to dialectic in treating the question of eternity. Additional evidence can be gathered from the *Taḥṣīl*, where al-Fārābī makes a similar point. He begins by stating that the goal of the theoretical sciences is "to make the beings and what they contain intelligible with certainty" (al-Fārābī 1969, 12, translated by Mahdi). It is clear that al-Fārābī is referring to demonstration here, which alone can lead to certainty. But a few lines afterwards, he adds the following: "The attainment of certain truth is aimed at in every problem. Yet frequently we do not attain certainty. Instead we may attain certainty about part of what we seek, and belief and persuasion about the rest" (ibid.). As in the *K. al-jadal*, then, al-Fārābī accepts and commends the use of demonstration, but cautions that certainty may only be achieved concerning one or a few aspects of any given problem. Hence, it would seem that al-Fārābī endorsed demonstration, but that he was also fully aware of the discrepancy between theory and practice and of the necessity of adapting the philosophical method to the types of problems examined.

In this passage, al-Fārābī begins by expressing doubt as to whether syllogistic reasoning can solve the question of the eternity of the world. He explains that if taken as a whole, the question can only lead the inquirer into conflicting opinions, and this is the problem of the dialectical approach. But true demonstration is ultimately possible if one breaks down the initial proposition into components that are then analyzed individually. His conclusion is explicit: "this is the method [*ṭarīq*] leading to the production of its demonstration [*burhān*]."

This statement thus supports Maimonides' testimony in an unequivocal way. Although the *K. al-jadal* does not reveal al-Fārābī's own position concerning the question of the eternity of the world, it conveys his belief that this problem can be solved through demonstration. Moreover, al-Fārābī encourages the philosopher to break down the initial question into its constitutive elements and to inquire into the various parts that make up the world systematically. This injunction should be connected to what was said previously about the subordination and cooperation of the various sciences in al-Fārābī's conception of the cosmological method.[188]

Further evidence for al-Fārābī's position may be gleaned from non-logical texts as well. M. Rashed's recent study of al-Fārābī's lost *On Changing Beings* shows how this treatise originally contained several rigorous demonstrative arguments aimed at Philoponus and at establishing the eternity of time and motion, and hence, of the world.[189] Rashed's detailed analysis of the various synthetic and analytic proofs developed by al-Fārābī provides additional solid evidence for this thinker's belief in the possibility of settling cosmological problems through demonstration. In the *Jamʿ*, which, it should be noted, is a problematic work as far as the question of authenticity is concerned, al-Fārābī explains that Plato and Aristotle gave "clear and persuasive proofs" (*ḥujaj wāḍiḥah muqniʿah*) and demonstrations (*barāhīn*) to settle

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[188] Al-Fārābī's other logical works, such as the *K. al-qiyās al-ṣaghīr*, or *Short commentary on the Prior Analytics*, also contain information on the cosmological method (see al-Fārābī 1963, 74-78, 81-88). In this work, however, al-Fārābī does not discuss the demonstrative proof required to establish scientific knowledge.

[189] See M. Rashed 2008.

cosmological questions such as the creation of the world, although he does not elaborate on this statement.[190]

The importance of demonstration (*burhān*) is emphasized in al-Fārābī`s other works as well. In the *Ārā'* he writes: "It follows necessarily from the specific being of the First that all the other existents which do not come into existence through man's will and choice are brought into existence by the First in their various kinds of existence, some of which can be observed by sense-perception, whereas others become known by demonstration [*wa baʿḍuhu maʿlūm bi al-burhān*]."[191] Although al-Fārābī does not identify these "other existents," there is little doubt that they include both the celestial bodies and the immaterial beings below the One, the separate intellects.

This is confirmed in another passage of the same work, when al-Fārābī states that among the common first intelligibles that humans acquire are "the principles which are used for knowing the existents which are not the objects of man's actions, and their primary principles and ranks: such as the heavens and the first cause and the other primary principles and what happens to come to be out of those primary principles."[192] Here, al-Fārābī unambiguously states not only that knowledge of the heavens is possible, but that the "first intelligibles" that lead to such knowledge are commonly shared by humans. Finally, after having listed the various things that "the people of the excellent city ought to know," which include knowledge of the First Cause, of the immaterial existents, and of the heavenly bodies, al-Fārābī explains that "these things can be known in two ways: either by being in their souls as they really are or by being impressed on them through affinity and symbolic representation...The philosophers in the city are those who know these things through strict demonstrations [*bi-barāhīn*] and their own insight..."[193]

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[190] Al-Fārābī 2001a, 158, translated by C. Butterworth.
[191] Al-Fārābī 1982a, 55; and al-Fārābī 1985a, 88-89.
[192] Al-Fārābī 1982a, 103; and al-Fārābī 1985a, 205.
[193] Al-Fārābī 1982a, 146-147; and al-Fārābī 1985a, 277-279.

The foregoing discussion of the role of demonstration in cosmology should also be connected to the *K. al-burhān*. Like its original Greek counterpart, the *Posterior Analytics*, the *K. al-burhān* is primarily devoted to the *qiyās burhānī* and reveals the extent of al-Fārābī's interest in the theory behind demonstrative reasoning.[194] More specifically, al-Fārābī develops the theory of the *burhān muṭlaq* (absolute or unconditional demonstration), which combines knowledge of the existent and knowledge of the cause, or put another way, consists in knowledge of the fact as well as the reasoned fact.[195] And he makes it clear that this is the method that should be used in the theoretical sciences, such as physics and metaphysics.[196] Now since the substance of the heavens, the existence of the separate intellects, and the creation or eternity of the world are questions that belong to physics and metaphysics, al-Fārābī must have believed, at least in theory, that these questions ought to be answered using the demonstrative method.

On the basis of the evidence contained in al-Fārābī's logical and non-logical treatises and of M. Rashed's recent article, one may conclude that the second master considered demonstration not only possible, but also the proper method to use in cosmological inquiry. As G. Endress writes, "al-Fārābī added to earlier concepts of philosophy in Islam the radically Aristotelian concept of philosophy as a demonstrative science which proves universally what in the particular sciences is deduced by particular "indications" or "signs…""[197] Al-Fārābī accepted Aristotle's concept of demonstrative proof and considered it philosophy's task to provide certain knowledge of, among other things, cosmological questions like the eternity of the world.[198]

[194] Al-Fārābī 1985b, vol. 4, 21 ff.
[195] Al-Fārābī 1985b, vol. 4, 26.
[196] Al-Fārābī 1985b, vol. 4, 59.
[197] Endress 2003, 138.
[198] In view of the substantial evidence to this effect, it is hard to understand the thesis defended by many scholars, according to which al-Fārābī rejected the demonstrative method and adopted rhetoric or dialectic as his principal means of philosophical argumentation. Mallet (1996 and al-Fārābī 1999c) is quite representative of this trend in the French scholarship. In a similar vein, Galston 1990 defines al-Fārābī's metaphysics as a veiled form of dialectic. But other more radical interpretations have also been advanced, in which al-Fārābī's alleged lack of interest in the demonstrative method is combined with the claim that he downplayed the importance of

This assessment of al-Fārābī's method, however, is complicated on several counts. First, there are passages in his works that suggest that only a limited knowledge of the immaterial existents is possible for humans. This is problematic, because as we have seen, the celestial bodies have immaterial causes and principles, which one must know in order to fully grasp the nature of the heavens. Although this kind of evidence does not contradict al-Fārābī's belief in demonstration, it raises the question of whether the human inquiry into the cosmos is after all limited. Second, al-Fārābī barely uses demonstrative arguments in his emanationist treatises. This discrepancy between theory and practice must be accounted for. Third, al-Fārābī relies heavily on non-demonstrative methods such as analogy. What is the function of these methods in the context of his cosmology? In the following paragraphs, I attempt to shed light on these questions.

In some passages, al-Fārābī displays a marked skepticism towards the possibility of acquiring direct knowledge of superlunary beings and especially of God, and one gets the impression that he denies humans full access to the divine world.[199] For example, in the *Jamʿ*, he writes:

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metaphysics or even substituted political science to metaphysics. This position, which is influenced by the work of L. Strauss and M. Mahdi, is articulated quite strongly in J. Parens' *An Islamic Philosophy of Virtuous Religions*. Parens argues that al-Fārābī was fully aware of the limits of metaphysics and thus promoted politics as the key science. He writes: "These limitations of the theoretical sciences no doubt contributed to Alfarabi's conviction that political science or political philosophy may offer a superior frame for philosophy as a whole than metaphysics" (Parens 2006, 116). As for C. Colmo, he argues in *Breaking with Athens: Alfarabi as Founder* that al-Fārābī's philosophical language is not essentially different from the rhetorical and metaphorical language he attributes to religion. Accordingly, al-Fārābī's philosophy should itself be construed as a kind of religious imagery. What is important in this Mahdian approach is the correlation that is made between al-Fārābī's alleged belief in the limits of metaphysical knowledge or in the impossibility of a demonstrative method and the subsequent establishment of the political science as the most important discipline in his philosophy. In his recent book on al-Fārābī, P. Vallat has mounted a very solid and convincing refutation of these views (Vallat 2004, especially 85-129). Through detailed argumentation, Vallat demonstrates that al-Fārābī's language, far from being merely rhetorical, reflects a precise ontological and epistemological system that finds its roots in the Neoplatonic tradition. Moreover, Vallat concludes that it is metaphysics, not politics, which forms the foundation of al-Fārābī's philosophy.

[199] This skeptical streak in al-Fārābī's philosophy has been recognized for some time. Already in 1979, Pines published an article on al-Fārābī's psychology and metaphysics in which he argued that Maimonides' skepticism toward the possibility of metaphysical knowledge stemmed partly from his reading of some of al-Fārābī's writings, especially his commentary on the *Nicomachean Ethics*. According to Pines, in this work, which incidentally has not survived, the second teacher denied the

> Thus we say: since the Creator, may his Majesty be dignified, differs in substance and essence from anything else in that He is of a more venerable, more excellent, and higher species, nothing is analogous to, resembles, or is similar to His substance...Yet, despite this, we cannot avoid describing Him and applying to Him some of these synonymous utterances. It is therefore necessarily requisite for us to know that with each utterance we state as one of His attributes, He remains in essence remote from the idea we conceptualize from that utterance...[200]

And later on:

> ...one should know that necessity dictates applying synonymous utterances from physics and logic to those subtle and venerable ideas that are exalted above all descriptions and divergent from all the things that come into being and exist naturally...Since necessity stands as an obstacle and intervenes between us and that, we limit ourselves to existing utterances, forcing ourselves to bear in mind that the divine meanings we express by means of these utterances are of a more venerable species and are other than we imagine and conceptualize.[201]

Furthermore, in the *K. al-mūsīqā*, al-Fārābī explains:

> And the method that the theorist who cannot discern these harmonic beings [i.e., some musical notes] will use to represent them is the method through which he conceives things that cannot be perceived by the senses, such as the soul, the intellect, prime matter, and all of the separate existents. Indeed those things cannot be used or studied that cannot be imagined at all; since their imagining is not possible through the senses, another method was devised in order to imagine them, and this is what is called the method of comparison [*muqāyasah*] and the method of analogy [*munāsabah*]...[202]

This attitude is expressed in the emanationist treatises as well:

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immortality of the human soul and its capacity to apprehend metaphysical beings. Pines' method and conclusions have nevertheless been criticized by Vallat (2004, 102 ff.).

[200] Al-Fārābī 2001a, section 67, 161, translated by C. Butterworth.

[201] Al-Fārābī 2001a, 162-163, translated by C. Butterworth.

[202] Al-Fārābī 1960, 105, my translation.

> It is difficult and hard for us to apprehend it [the First Cause] and to represent it to ourselves because of the weakness of our intellectual faculties, mixed as they are with matter and non-being: we are too weak to think it as it really is.[203]

And:

> The pleasure which the First enjoys is a pleasure whose character we do not understand and whose intensity we fail to apprehend, except by analogy [*bi-l-qiyās*] and by relating it to the amount of pleasure which we feel.[204]

Two points are noteworthy in these passages. First, they show al-Fārābī's awareness of the limits of human knowledge of metaphysical things and especially of God. This feature of al-Fārābī's epistemology has already been noted by some scholars, who have compared it to the *via negativa* of Christian theology or the aporetic ontology of Neoplatonism.[205] Second, these excerpts present analogical reasoning as a privileged method for acquiring insight into the intelligible world. In the *K. al-mūsīqā*, for instance, al-Fārābī advises the aspiring musical theorist to rely, like the metaphysician, on analogy in order to acquire some knowledge of the intelligible things that lay beyond the realm of sense-perception. What is particularly noteworthy in this passage is the epistemological function that analogy fulfills: it is described as a bridge between the physical and the metaphysical worlds and as one of the only means available to us to glimpse into the intelligible world. These works argue that the only way to know intelligible beings, in this earthly life at least, is through analogy.[206] But although they clearly stress the value of

[203] Al-Fārābī 1985a, 78-79.
[204] Al-Fārābī 1985a, 84-85. For equivalent statements in the *Siyāsah*, see al-Fārābī 1964, 46-47, 49-50.
[205] See for instance Reisman 2005, 58. This skeptical streak in al-Fārābī's thought may find its origin in the far-reaching influence of the *Neoplatonica arabica* in the early centuries of Islam, which promoted the Neoplatonic doctrine of the transcendence and ineffability of the One; see for example proposition 5 of the *Maḥḍ al-khayr* (Badawī 1977, 8) and proposition 1 of the *Liber de causis II* (Thillet and Oudaimah 2001-2002, 318). Al-Fārābī seems to share with some earlier Neoplatonic thinkers the belief that some intelligible entities are inaccessible to the human mind (at least through discursive thought), and he also shares a penchant for analogical language when it comes to describing these immaterial beings. As Vallat (2004, 275 ff.) has shown, analogy plays a crucial role in al-Fārābī's metaphysics and definitely points to a Neoplatonic influence. See also Booth 1983, who devotes a chapter to al-Fārābī in his book *Aristotelian Aporetic Ontology in Islamic and Christian Thinkers*.
[206] See Vallat 2004, 230-231, for a discussion of analogy in al-Fārābī's epistemology.

analogical reasoning, they offer virtually no indication on the nature of this method and how it should be carried out.

An important question at this point is whether al-Fārābī's skepticism about the knowability of God and some of the intelligible beings applies to the celestial bodies as well. Maimonides' statement in the *Guide* at II.25.54b, which I have quoted above, seems to deny humans substantial, if not partial, astronomical and cosmological knowledge.[207] Al-Fārābī does not openly deny that such knowledge is possible, but the previously quoted excerpts combined with the absence of elaborate demonstrations and the frequent use of analogical language in the emanationist treatises could betray such an attitude on the part of the second teacher. In fact, God, the separate intellects, and the celestial bodies share a common mode of exposition in his treatises, which relies heavily on analogy (see section II.7.2).

Answering this question would require an extensive study of al-Fārābī's epistemology that would lead me far away from my topic. Suffice it to say here that there are several reasons to believe that al-Fārābī considered it possible for humans to acquire knowledge of the heavens. The passages quoted above mention immaterial beings, especially God, but the celestial bodies are corporeal and as such can be perceived and studied by the senses, as al-Fārābī explains in the *Taḥṣīl*.[208] Moreover, al-Fārābī greatly values the empirical and inductive approach in astronomy, a fact that did not escape Averroes, who stresses the importance al-Fārābī placed on sense-perception in his cosmological method.[209] In addition, al-Fārābī suggests in his works that natural science leads to metaphysics and can provide some kind of knowledge of the heavens and of the immaterial beings. In the *Philosophy of Aristotle*, for example, the transition between the study of motion and the knowledge of an unmoved mover is brought out in his discussion of the

[207] Again, the recent interpretations of Langermann 1991 and Rudavsky 2000, 24-30, should be taken into account when forming a judgment of Maimonides' cosmology.
[208] Al-Fārābī 1969, 20.
[209] See M. Rashed 2008, 23-25.

Physics.[210] True, al-Fārābī is here describing Aristotle's methodology, but M. Rashed has shown that al-Fārābī adopted this analytical approach in his own works, although he also develops some purely synthetic and deductive arguments.[211]

Thus we may conclude that the doubts al-Fārābī entertained concerning the limitations of human knowledge are restricted to the immaterial beings and especially God, or apply only to a much lesser extent to the heavenly bodies. Moreover, al-Fārābī's skepticism seems counterbalanced by the value he places on experience, observation, and the analogical method, which allow one to obtain some kind of metaphysical and cosmological knowledge.

How do these remarks on the knowability of the cosmos and the metaphysical beings relate to our previous discussion of demonstration? The juxtaposition of passages in al-Fārābī's corpus that on the one hand legitimate certain knowledge and on the other hand stress the limited insight one can get of immaterial beings, as well as the uneasy coexistence in his works between the ideal of demonstration and the reliance on analogy, represent some of the most problematic aspects of al-Fārābī's cosmology and metaphysics and are difficult to harmonize. It is very possible that his genuine interest in Aristotle's syllogistics was offset by a penchant for the aporetic doctrine of the Neoplatonists. This in turn may have led him to follow the Neoplatonists in using analogy as a privileged mode of philosophical reflection. Alternatively, al-Fārābī may have realized how rarely Aristotle's syllogisms fulfill the criteria of demonstration, and he may for this reason have investigated other non-demonstrative philosophical techniques like analogy. I will return shortly to al-Fārābī's use of analogy in a cosmological context.

Apart from the potential influence of Neoplatonic aporetics and al-Fārābī's interest in analogy, I believe there are other factors that can adequately explain the lack or quasi-lack of demonstrative arguments in the emanationist treatises. These

[210] Al-Fārābī 1969, 102-103.
[211] M. Rashed 2008.

factors are related to the structure, genre, and especially the function of these works. Before I enter this discussion, however, I think it worthwhile to expose and address the modern political interpretation of the *Ārā'* and the *Siyāsah*, which explains their cosmology purely in terms of political theory. Although Gutas' articles and Vallat's monograph are sufficient to justify a revision of the predominantly political reading of these treatises that has prevailed during the last decades, I would like to add a few remarks concerning some of the arguments originally developed by M. Mahdi, since these are directly relevant to al-Fārābī's cosmology and were instrumental for subsequent political interpretations of it.[212]

In the first place, Mahdi contends that the *Ārā'* and the *Siyāsah*, which he calls "political treatises," do not present al-Fārābī's true metaphysics and cosmology and should be interpreted as metaphors or imitations developed for the inhabitants of the virtuous city. As Mahdi writes, these treatises "do not ...embody either Alfarabi's theoretical philosophy or his practical philosophy but are only examples of the kind of regimes that can be constructed by political philosophy."[213] In other words, the cosmology described by al-Fārābī fulfills a pedagogical function and is completely devoid of a scientific basis. It may be called, as Mahdi suggests, a "political cosmology."[214] Second, Mahdi underlines that al-Fārābī's style in the two treatises is assertoric rather than demonstrative, an opinion which stems from Mahdi's belief that most medieval Arabic philosophical texts are rhetorical and poetic in essence rather than demonstrative.[215] Accordingly, al-Fārābī does not attempt to prove the ideas he puts forth through philosophical reasoning, but merely states his views in short, descriptive sentences.

I wish to address the two claims separately. To begin with, it must be said that the cosmological and metaphysical model presented in the *Ārā'* and *Siyāsah* are unlikely to have been shaped by the putative political dimension that Mahdi

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212 Gutas 2002 and Vallat 2004.
213 Mahdi 2001, 7.
214 Mahdi 2001, 82, 121-122, 124.
215 This generalization is formulated in Mahdi 1990b, 77-78.

attributes to these works.[216] The main problem with this view is that it does not rely on any significant evidence from the works themselves: al-Fārābī nowhere states explicitly that his cosmology and metaphysics, which together form the first part of the emanationist treatises, should be construed as a metaphor, nor is there any other obvious reason why they should be.[217]

Second, al-Fārābī addresses the same cosmological issues, uses the same style, and develops the same theories in some of his other treatises, such as the *Risālah fī al-ʿaql*. As we shall see, some of the cosmological ideas contained in the *Ārāʾ*, the *Siyāsah*, and the *Risālah fī al-ʿaql*, such as the creation of the celestial bodies by the separate intellects, are identical. This is particularly noteworthy since the *Risālah fī al-ʿaql* bears no obvious relation to politics. Hence, nothing sets the cosmological chapters of the *Ārāʾ* and *Siyāsah* in a category of their own that would allow one to conclude that they differ in essence from al-Fārābī's other writings.

Third, as will become clear in the forthcoming chapters, the cosmological ideas presented in the *Ārāʾ* and *Siyāsah* are in direct continuity with the Greek philosophical (and especially commentatorial) tradition. A study of some of the key cosmological concepts that al-Fārābī discusses, such as substrate, form, and intellect, indicate that he engages critically with the Greco-Arabic views on these issues and that he elaborated his theories through a process of criticism and assimilation, the product of which appears in these texts.

Fourth, the very fact that Ibn Sīnā adopted the main features of al-Fārābī's emanationist cosmological system, and that al-Ghazālī deemed it necessary to devote an entire book to refuting them, indicates that these thinkers did not interpret al-Fārābī's cosmology metaphorically. The impact it had on subsequent thinkers (especially Ibn Sīnā and al-Kirmānī) decisively shows that it was interpreted as a valid cosmological system by these later thinkers.

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[216] Mahdi 2001, 9.

[217] Many points in my discussion follow Gutas' 2003 critique of Mahdi's political interpretation of al-Fārābī.

Finally, the fact that al-Fārābī's treatises incorporate much of the astronomical knowledge of his time (see Chapter III) indicates that his cosmological model is grounded in a rigorous scientific approach. For all of these reasons, it would seem that Mahdi's hypothesis of a "political cosmology" does not rely on sufficient evidence and must be rejected.[218]

The other point about the lack of a demonstrative method in the emanationist works is more difficult to address. We have seen in the previous paragraphs that at least in theory al-Fārābī adopted Aristotle's syllogistics and theory of demonstration and applied it to cosmological problems. But the question remains as to why the *Ārā'* and *Siyāsah* are devoid of extensive demonstrative proofs. For example, al-Fārābī, unlike Ibn Sīnā, does not demonstrate the existence of the separate intellects, nor does he try to justify their number and explain why there cannot be an infinite series of intellects.[219] And unlike al-Kindī, al-Fārābī does not provide any argument concerning the ensoulment and rationality of the celestial spheres. It must be acknowledged, then, that for whatever reason, al-Fārābī is not concerned about providing demonstrative proofs in these treatises. The following remarks aim to shed light on the factors that can explain this.

That the *Ārā'* and *Siyāsah* do not contain extensive demonstrations is not very surprising considering the obvious summary-like format and didactic function of these works. Whether these treatises are the embodiment of years of oral teaching and transmission, as Vallat suggests,[220] or were designed to convey in

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[218] Mahdi himself writes "that it is perhaps not quite fair to speak of "political cosmology" or "myth," that is, of a cosmos or a human body presented with no attention to the scientific accounts of the cosmos or of the human body. For it is precisely the *relationship* between science and the city that is at issue...Differently stated, the integrity of scientific knowledge should be maintained even when it is used to help form the opinions of the citizens" (Mahdi 2001, 11). From Mahdi's own admission, then, there is no reason not to take the cosmology developed in these works as a serious and genuine attempt on the part of al-Fārābī to provide a valid "scientific" worldview.

[219] The only exception is to be found in the *Ithbāt* (al-Fārābī 1999d, 4 ff.), which provides several proofs for the existence of the separate intellects, although it says nothing about their number. The *Ārā'* and the *Siyāsah* do not address this issue.

[220] Vallat 2004, 12.

summary form the gist of al-Fārābī's mature philosophy, it is clear that their format, style, and structure are not adapted to contain long arguments. In this respect, the emanationist treatises are not a unique phenomenon, but belong to a common genre of medieval Arabic literature, which is characterized by this particular mode of exposition and which privileges a descriptive style over a demonstrative one. For example, the *hay'a basīṭah* genre that developed in Arabic astronomy deliberately shunned demonstration. As F. J. Ragep writes: "Since a *hay'a basīṭah* work was an account meant to give a general overview of astronomy, it was generally held that it should be devoid of mathematical proof."[221]

In the philosophical tradition, short treatises such as Ibn Sīnā's *Dānesh-nāmeh* and *K. al-najāh* are also common and were meant to fulfill a similar function. This does not mean that these works are unscientific, but merely that their primary aim is didactic. If al-Fārābī's *Ārā'* and *Siyāsah* were truly designed to give an overview of his philosophy or if they are the product of oral transmission, then it is understandable that they would shun elaborate demonstrations, something that would detract from their clarity and structure. Seen from this perspective, it would seem that the *Ārā'* and *Siyāsah*, far from being exceptions, belong to a well-established scientific and philosophical tradition in medieval Arabic literature. They convey in a simple form knowledge that has been established and proved in other works.

Furthermore, Mahdi's emphasis on the lack of demonstration in the *Ārā'* and the *Siyāsah* is not entirely correct, since in many instances al-Fārābī does provide arguments to support his metaphysical ideas. For example, in the *Ārā'*, al-Fārābī demonstrates in some depth that God must necessarily be a unique being with no associates, that He cannot have a contrary, that He is not divisible, etc.[222] His argumentation in these passages is not devoid of rigor and of a certain deductive quality. The metaphysics he elaborates begins with the postulate of a unique,

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[221] Ragep 1993, 36.
[222] See al-Fārābī 1982a, 37-46.

uncaused, and transcendent being. This entity, whose existence and oneness are established through logical arguments, occupies the very top of the metaphysical hierarchy. Below it and belonging to the realm of the visible heavens are the various planets. These lower beings can be observed and studied by astronomers. The next logical step is to provide an interpretive link between the One, who has been shown to exist necessarily, and the various heavenly bodies, which are perceptible and whose existence can be established by sense-perception. Epistemologically, one may say that al-Fārābī's cosmological system is basically an attempt to clarify the nature and structure of the realm that lies between the First and the heavenly bodies. And as M. Rashed's recent article shows, al-Fārābī relied on both analytic and synthetic arguments to settle this problem.[223]

According to al-Fārābī, then, the universe can be studied through the combined methods of observation and experience on the one hand, and philosophical deduction on the other. Both enterprises begin at opposite ends of the ontological spectrum, that is, either with the perceptible particulars of the sublunary world or God and the metaphysical entities of the superlunary world. But these two approaches meet mid-way when the immaterial beings whose existence has been posited by deduction from the One meet the various visible heavenly beings (e.g., the moon and stars), whose existence is a matter of scientific observation. As I have already shown, al-Fārābī stresses the interconnections between astronomy and metaphysics and argues that these sciences can mutually benefit each other. In this respect, his position recalls a passage in Themistius' *Paraphrase of Book Lambda*, and it will also be defended by Ibn Sīnā in the *Shifā'*.[224] To say that al-Fārābī's cosmology is not based on a scientific approach is thus to underestimate the value he places on this interdisciplinary method, which combines induction and deduction, and which integrates physics and metaphysics in a common endeavour. In spite of what Mahdi thinks, al-Fārābī's cosmology shows a remarkable concern for the scientific and demonstrative method.

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[223] M. Rashed 2008, especially 37-38, 42-43, 54.
[224] Themistius 1999, 101-103; Ibn Sīnā 2005, 14-15.

This having been said, it is undeniable that al-Fārābī falls short of providing adequate demonstrative proofs for the existence of all the immaterial beings and invisible causes in his cosmology. In particular, al-Fārābī does not justify the necessity of the plethora of heavenly intellects he posits, a point for which he and Ibn Sīnā will be severely criticized by al-Ghazālī in the *Tahāfut*. But if the claims by Mahdi and others seem partially justified in this respect, the cause for this is not al-Fārābī's lack of a sound methodology or the desire to develop a poetical or rhetorical cosmology that would be subservient to his political doctrine. Rather, this peculiarity of al-Fārābī's emanationist treatises is to be explained in terms of their genre, function, and readership. In addition, I think that it can be explained by another important concept in al-Fārābī's methodology, namely, analogy. In order to better understand this concept, it is necessary to analyze al-Fārābī's terminology and method in the emanationist texts in more depth, as well as his theories concerning the evolution of language.

7.2 Transference (*nuqlah*) as a Cosmological Method

7.2.1 Transferred Terms and al-Fārābī's Cosmological Terminology

During the ninth and tenth centuries, Arabic philosophical terminology was slowly crystallizing as a result of the translation movement from Greek to Arabic. Al-Fārābī flourished during this transitional period, and his contribution to the formation of a distinctive Arabic philosophical vocabulary was significant, as modern studies have shown.[225] Al-Fārābī also developed a quite complex theory of language, which can be found in his works on logic and in the *K. al-ḥurūf*.

Al-Fārābī derives much of his technical terminology from the Arabic translations of Greek works that he read. For his cosmology and natural philosophy,

[225] Zimmermann in al-Fārābī 1981, Abed 1991, Langhade 1994, Lameer 1994, Alon 2002, Kennedy-Day 2003, Black 2006, and Menn 2008.

he had access to a wealth of technical terms transliterated or translated from Greek works such as the *De caelo*, the *Meteorology*, and the *Physics*. The Arabic *ṣūrah* corresponds to the Greek μορφή, *hayūlā* and *māddah* to ὕλη, *mawḍūʿ* to ὑποκείμενον, and *ṭabīʿah* to φύσις. Likewise, *falak*[226] renders the Greek σφαίρα or κύκλος, while *kawkab* is, like the Greek ἀστήρ, a generic term that can refer to the stars, the planets, and the sun.[227] Hence, the basic conceptual and terminological framework that al-Fārābī utilizes in his description of the cosmos is indebted to the ancient and late-antique philosophical and astronomical traditions and ultimately to Aristotle and Ptolemy. These examples show the terminological continuity that exists in ancient Greek and early Arabic cosmology and natural philosophy.

Al-Fārābī's linguistic theory and his conception of the historical formation of a specialized philosophical terminology have a direct bearing on the study of his cosmology, and may help to explain his method and style in the emanationist works. Al-Fārābī believes that the specialized terminologies of the sciences are elaborated gradually over a certain historical period. It is often the case that terms used in a popular context acquire a specialized meaning over time. *Jawhar*, for example, which for the masses can designate a precious stone, acquired the meaning of 'substance' as a result of the development of the philosophical discipline.[228]

Jawhar is an example of what al-Fārābī calls a "transferred term" (*al-ism al-manqūl*). Al-Fārābī describes this linguistic phenomenon in detail in some of his logical works, as in his commentary on Aristotle's *De interpretatione* and in its appending treatise on the same subject entitled *Short Treatise on Aristotle's* De interpretatione.[229] In the latter work, al-Fārābī defines "transferred terms" (*al-asmāʾ al-manqūlah*) as follows:

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[226] Hartner *EI²*.
[227] Kunitsch and Knappert *EI²*.
[228] Al-Fārābī 1970, sections 68-69, pp. 101-102.
[229] This treatise has been translated and published by F. W. Zimmermann after al-Fārābī's commentary in al-Fārābī 1981, 220 ff.

> A term is transferred if a word generally known to have been the signifier of a certain thing ever since it was first introduced is later taken and used to signify a certain other thing, but remains the common name of the first and the second. This situation arises when discoveries are made by developing disciplines...The discoverer then transfers to them the names of similar things generally known; for every new thing he introduces the name of the known thing he thinks most closely akin to it.[230]

Shortly thereafter (section 53), al-Fārābī again mentions *jawhar* as an example to explain the relation between transference and homonymy: "Transferred terms are often used homonymously in the fields to which they have been transferred, like the term *jawhar*, which is transferred to the theoretical sciences and used homonymously there." This passage is important, for it shows that according to al-Fārābī, transferred terms possess an intrinsic homonymous quality.[231]

A passage in the *Iḥṣā'* provides a relevant case study of how certain terms come to be transferred and enter the methodology of the philosophers: "Indeed, shape, form, and design [*al-ṣīghah, al-ṣūrah, wa al-khalqah*] are almost synonymous [*mutarādifah*] terms that the masses [*jumhūr*] use to indicate the shapes of animals and artificial bodies. But by way of similarity [or analogy] [*ʿalā ṭarīq al-tashbīh*], they were transferred [*nuqilat*] and were made into nouns that refer to the faculties [*quwwā*] and things whose status in the natural bodies is that of shapes, forms, and designs in artificial bodies"; and he adds, "this is because it is customary in the arts [or sciences, *ṣanā'iʿ*] to transfer by means of similarity to the objects they contain [i.e., study] the names which have been established by the masses."[232]

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[230] Al-Fārābī 1981, 48, pp. 227-228, translated by F. W. Zimmermann. Transferred terms are also briefly discussed in the *Introductory Sections on Logic* (al-Fārābī 1955, 274-275).

[231] Al-Fārābī does distinguish, however, between the homonymy of transferred terms and other types of homonyms by introducing a chronological distinction. In this regard, he writes: "The difference between transferred and homonymous terms is that the homonymy of the homonym has been with it from the moment it was first introduced, so that none of its two significations preceded the other in time, while with the transferred term one of the two significations preceded the other in time..." (al-Fārābī 1981, section 49, pp. 228-229, translated by F. W. Zimmermann).

[232] Al-Fārābī 1949, 95, my translation.

Here we notice that al-Fārābī establishes a connection between the process of transference and the concept of similarity (*tashbīh*). The two previous passages indicate that some transferred terms are homonymous, or that they point to similar characteristics in the various subjects they qualify. It is this similarity between the two things compared that enables transference to occur. These excerpts also point to al-Fārābī's awareness of the intrinsic ambiguity of philosophical terms, and of transferred terms in particular, and to his desire to systematize and clarify the philosophical terminology as much as possible.[233]

In light of the previous paragraphs, it is likely that al-Fārābī would have considered the technical terms he uses in his physics and cosmology to fall in the category of transferred terms. After all, *jism*, *ṣūrah*, *mawḍūʿ*, and *nafs* have a popular meaning that harks back to the invention of language, and it is only at a specific point in time that they acquired a more technical meaning. These terms had prior significations before they were applied to cosmology or physics: for example, *ṣūrah* may refer to the shape or contour of a thing, while *mawḍūʿ* is a grammatical term meaning 'subject.' It is only through a gradual process that they were transferred from a popular usage to a more specialized semantic sphere.

That these transferred terms constitute the nomenclature of philosophers is confirmed when al-Fārābī writes that "transferred terms are used in sciences and other disciplines for things whose knowledge is peculiar to specialists."[234] Furthermore, al-Fārābī distinguishes between transferred terms and metaphors, which, unlike the former, are "not used in any science."[235]

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[233] On this subject and for homonymous terms in general, see Menn 2008. Menn provides an in-depth study of al-Fārābī's discussion of particles and philosophical terms in the *K. al-ḥurūf* and of its relation to *Metaphysics* Book Delta. Menn's arguments are very convincing, but he does not address how the general conception of being as expressed in the *K. al-ḥurūf* relates to al-Fārābī's emanationist treatises.

[234] Al-Fārābī 1981, 231, translated by F. W. Zimmermann. Ibn Sīnā in the *Shifāʾ* (Ibn Sīnā 2005, 125) refers several times to terms that are "transferred" (*nuqila*) in a manner that recalls al-Fārābī's comments, but it is not possible on the basis of this passage to conclude that he shared al-Fārābī's theory of transferred terms.

[235] Al-Fārābī 1981, 231.

What we know from al-Fārābī's conception of the history of philosophy, its origin and gradual development through time, allows us to conclude that the concept of *ism manqūl* must have been very important in his method, since he viewed the process of transfer as one of the inevitable and essential corollaries of the empirical development of the sciences. These remarks on the formation of a technical philosophical language should be read in conjunction with al-Fārābī's account of the development of philosophy and logic in the *Fī ẓuhūr al-falsafah* and *K. al-ḥurūf*.[236]

Moreover, al-Fārābī's conception of the evolution of languages and especially of the role of transferred terms helps to understand the nature of his cosmological terminology and the emphasis he places on analogy. More precisely, it explains why the terminology in the *Ārā'* and the *Siyāsah* is ambiguous: the cosmological accounts they contain abound with transferred terms, which establish analogical relations between superlunary and sublunary beings. In fact, the notion of transferred terms goes hand in hand with the method of analogy or transference (*nuqlah*), which al-Fārābī appears to be using in these works. It is to the latter technique that we must now turn.

7.2.2 Transference (*nuqlah*)

In the *Ārā'* and the *Siyāsah*, as well as in other works such as the *Risālah fī al-ʿaql*, al-Fārābī often relies on similarity and analogy[237] to describe metaphysical,

[236] The former text, which has survived in Ibn Abī Uṣaybiʿah's *'Uyūn al-anbā'*, has been translated by F. Rosenthal (1975, 50-51); see also Rescher's comments in al-Fārābī 1963. As for the latter text, see al-Fārābī 1970 and Langhade 1994.

[237] It is very difficult to establish a clear distinction between these two concepts in al-Fārābī's philosophy, and it is unclear to me to what extent they overlap. The ambiguity surrounding analogy and similarity partly stems from al-Fārābī's own terminology and his failure to provide clear definitions. As Alon's *Lexicon* shows, al-Fārābī uses a whole array of terms to express these concepts, some of which have a common root. *Qiyās*, *ishtibāh*, *tamthīl*, *tanāsub*, *munāsabah*, may all mean "analogy," while "similarity" is expressed by *shibh* or *tashābuh.* Another hint at their connection appears in al-Fārābī's definition of analogy in one version of the *K. al-ḥurūf*: "Analogy, which is a similarity in ratios, consists of the excesses, deficiencies, and equalities that possess a similarity, be they of different genera" ("*wa al-tanāsub, huwa tashābuh al-nisab, an takūna al-ziyādāt aw al-naqṣānāt aw al-musāwāt allatī lahā mutashābihah wa in kānat fī ajnās mukhtalifah*"). Although al-Fārābī's definition

cosmological, and psychological beings or concepts. In the *Ārā'*, for instance, al-Fārābī explains that terms such as "life" and "wisdom" can only be predicated of God by analogy with things in this world.[238] God, indeed, is living and wise, but not in the same way that sublunary existents are, since God is immortal and eternal and has the "most perfect existence,"[239] while the latter are mortal and perishable. Through analogy with things already known to humans, one can get insight into God's essence, although it will necessarily be a limited form of knowledge. This type of analogy relies on the notion of common or homonymous names (*al-asmā' al-mushtarakah*), which express the perfections that pertain to God in an absolute sense, and which common objects have in a relative and derived sense.[240]

In these same works, al-Fārābī explains that this analogical method is made possible by transferring terms from one realm to another, that is, from the human realm of sense-perception to the intelligible realm of the divine. More specifically, the common names used in everyday speech can be transferred (*nuqila*) to other more perfect metaphysical beings and the First Cause itself. "When names like these are transferred [*nuqilat*] and applied to the First," al-Fārābī writes, "we have in mind to denote by them the relation the First has to other things by virtue of the existence which has been emanating from it."[241] And in the *Siyāsah*, he writes:

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refers primarily to Euclidean geometry, it is also useful in the wider context of his philosophy, for it stresses the close connection between similarity and analogy. I owe this citation to Vallat 2004, 276-277, who took it from an unpublished edition of the *K. al-ḥurūf*. Vallat reaches the same conclusion as me on the relation between similarity and analogy (see pp. 275-278).

[238] Al-Fārābī 1985a, 75-77.

[239] Al-Fārābī 1985a, 77; see also the *Siyāsah* (al-Fārābī 1964, 46-47, 49-50).

[240] See al-Fārābī 1964, 50-51; al-Fārābī 1985a, 120-121; Vallat 2004, 275 ff.; and Menn 2008. Whereas Vallat's account puts the emphasis on the Neoplatonic background of al-Fārābī's theories and connects al-Fārābī to thinkers like Proclus, who also relied extensively on similarity and analogy, Menn proposes to construe al-Fārābī's theories on philosophical terminology and his doctrine of being as an original interpretation of Aristotle's *Metaphysics*, particularly Book Delta. Menn's interpretation is interesting in that it highlights the importance of Book Delta in the development of al-Fārābī's philosophy in general. Many of the concepts I discuss in the context of al-Fārābī's cosmology, such as transference, homonymy, and analogy, are alluded to or described by Aristotle in this part of the *Metaphysics*. For instance, in Delta 16 Aristotle mentions terms such as "perfect" and "good," which can be "transferred" (μεταφέροντες and κατὰ μεταφορὰν) from one context to another. Al-Fārābī conceives of transference in a different manner, yet it is tempting to view Book Delta, in addition to Aristotle's logical treatises, as a possible model for some aspects of al-Fārābī's method.

[241] Al-Fārābī 1985a, 100-101.

> Now, these terms are applied to the First in the most prior and true manner and to anything else only by posteriority, but it is not unacceptable if our application of these terms to the First came after our application of them to something else—for clearly our application of many of them to the First is only by way of transferring them [*ʿalā jihah al-naql*] from something else to It and after we had applied them to something else for a time...[242]

From these quotations, we can see that the homonymous and transferred terms that al-Fārābī defines in his works on logic, as in his commentary on the *De interpretatione*, are actually implemented and used in his philosophical discussions of God and other metaphysical beings in the *Ārā'* and the *Siyāsah*. This suggests the existence of a close connection and continuity between al-Fārābī's logical and linguistic treatises and his metaphysical and cosmological works.

Given the importance these transferred terms play in al-Fārābī's descriptions of the First Cause, it is not surprising that he uses the same technique to describe the celestial bodies. In the *Ārā'* and the *Siyāsah*, he compares the forms and substrates of celestial bodies to those of sublunary bodies. The heavenly substrates "resemble" (*tushbihu*) the sublunary material substrates[243] and the souls of the heavenly bodies "resemble" (*tushbihu*) or are "like" (*ka*) the sublunary forms.[244] Throughout his discussion, al-Fārābī deploys an analogical language or language of similarity, which is based especially on the *shīn-bā-hā* root, and which stresses the parallels between superlunary and sublunary bodies without establishing an identity between them.[245]

To understand the function and scope of al-Fārābī's analogical language in a cosmological context, we must turn to some of his other logical works. In the *K. al-*

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[242] Al-Fārābī 1964, 51.
[243] Al-Fārābī 1985a, 120-121.
[244] Al-Fārābī 1964, 41, and al-Fārābī 1985a, 120-121.
[245] It is worth reiterating here that terms from the *shīn-bā-hā* root also appear in al-Fārābī's discussion of the technique of transference. This common terminology suggests a close connection between transference, similarity, and analogy. See Vallat 2004, 226 ff., 307 ff., who mentions the *shīn-bā-hā* root several times in his discussion of analogy.

qiyās al-ṣaghīr, which according to Lameer is a summary of his commentary on the *Prior Analytics*,[246] al-Fārābī devotes an entire section to the epistemological status of inference.[247] More precisely, al-Fārābī focuses on a technique he calls *nuqlah*, "transference," which Rescher translates as "inference by transfer" or simply "analogy," and Gyekye as "analogical inference."[248] Al-Fārābī also ascribes this technique to a contemporary group of scholars, most likely theologians, who call it "inference from the evident to the absent" (*wa huwa alladhī yusammīhi ahl zamāninā al-isdidlāl bi-al-shāhid ʿalā al-ghā'ib*).[249]

In the *K. al-qiyās al-ṣaghīr* al-Fārābī provides an in-depth analysis of this type of inference, its aim, the conditions necessary for its conclusions to be valid, and how it may be put into syllogistic form. As he himself puts it, the aim of this section of the treatise is to "discuss the 'transfer' from a judgment by [immediate] sensation in some matter [*amr*], or [direct] knowledge about it by some other approach, to another matter outside the realm of [immediate] sensation."[250] In essence, *nuqlah* consists in ascribing a certain quality to a thing that is not known to us on the basis of other things that are known to us to possess this quality. Naturally, the two objects compared must present a valid commonality for transference to be effective. More specifically, this is how al-Fārābī defines the technique of transference:

> The manner of this "transfer" is: that it is known by sensation that a certain "matter" [*amr*] is in a certain condition, and that a certain "thing" is present in a certain "matter"; and so the intellect consequently transfers this condition or thing from this [known] matter to

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[246] Lameer 1994, 13-20.
[247] Al-Fārābī 1963, see especially 266,13-268,20.
[248] Gyekye 1972, 33; Rescher in al-Fārābī 1963, 93.
[249] Al-Fārābī 1963, 266,15, with Rescher's translation; and al-Fārābī 1985b, vol. 2, 45, for the Arabic version. The theological background of al-Fārābī's account of *istidlāl* has been studied extensively by Lameer 1994, 204 ff.. In contrast, Rescher (al-Fārābī 1963), and Gyekye (1972 and 1989) emphasize the link between *nuqlah* and ancient Greek logic. The former proposes to trace analysis and synthesis to Aristotle's *Prior Analytics*, the latter to the works of Sextus Empiricus and Pappus of Alexandria. Lameer rejects any connections with Aristotle's works and restricts his analysis of *nuqlah* to *kalām* (see especially pp. 206-207), although he agrees with Gyekye in regarding the work of Pappus as a possible precedent (p. 216).
[250] Al-Fārābī 1963, 266,13-14, translated by N. Rescher.

> some other [unknown] matter similar to it, and thus judges with respect to it [i.e., the other, unknown, "matter"] upon this [known] basis.[251]

Al-Fārābī then goes on to explain that there are two kinds or modes of transference, analysis (*taḥlīl*) and synthesis (*tarkīb*), and that, if correctly conducted, these can be put into first figure syllogisms.[252] Analysis begins with the thing that is sought, whereas synthesis begins with the observed and known. In other words, analysis entails moving backward from the conclusion to the premises, whereas synthesis proceeds from the premises to the conclusion.[253] As Lameer points out, the practical difference between these two modes of inference is somewhat "superficial," since both rely on the data provided by induction and are analytical in essence.[254]

On the basis of the studies conducted by Rescher, Gyekye, and Lameer, I would like to suggest that al-Fārābī viewed transference and analogical reasoning as a technique that could sometimes be applied to philosophical inquiries, and more precisely, to cosmology. There are many indications that would seem to justify this view. First, it should be noted that although al-Fārābī mentions the theologians in his discussion, he does not confine this technique to the theological context. He merely remarks that the *mutakallimūn* call it by another name (*al-isdidlāl bi-al-shāhid ʿalā al-ghā'ib*) than the term he himself uses (*nuqlah*). Moreover, al-Fārābī's comments in the introduction and conclusion of the treatise reveal that he viewed the content discussed in this work as genuinely Aristotelian, although he explicitly says that the examples are chosen for a contemporary audience. Hence, nothing in the *K. al-qiyās al-ṣaghīr* suggests that *nuqlah* cannot or should not be used by non-theologians. Al-Fārābī is, I think, perfectly aware of the non-demonstrative quality of transference, but this is not a sufficient reason to conclude that he did not endorse it to a certain extent.

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[251] Al-Fārābī 1963, 266,16-18, translated by N. Rescher.
[252] Al-Fārābī 1963, 267,20 ff.; and al-Fārābī 1985b, vol. 2, 46 ff.
[253] Lameer 1994, 216.
[254] Lameer 1994, 215-216.

Second, al-Fārābī's discussion of transferred terms in some of his logical works may be seen as a propaedeutic to the more complex method of transference (not of terms, this time, but of concepts and ideas) described in his *K. al-qiyās al-ṣaghīr*. According to al-Fārābī there is a natural progression from the phenomenon of transferred terms (*asmā' manqūlah*) to the analogical technique of transference (*nuqlah*). Conversely, one may view transferred terms are the result of transference.[255]

Third, in the *K. al-qiyās al-ṣaghīr* al-Fārābī provides a cosmological example to illustrate the use of *nuqlah*. He writes: "This [transference] occurs [for example] when one knows by sensation that some corporeal substances, like the animals and similar things, are created, and consequently the intellect transfers the createdness from the animals or plants, and thus judges about the sky and stars that they are [also] created."[256] What is important here is *not* the conclusion reached concerning the createdness of the celestial bodies; al-Fārābī informs the reader at the beginning of the treatise that his examples are chosen on the basis of their intelligibility and familiarity to a contemporary audience, in this case probably the *mutakallimūn*. For this reason it is not possible to ascribe to al-Fārābī the philosophical positions that are reflected in the conclusions of these examples.[257] Rather, what is significant is the fact that al-Fārābī chooses a cosmological example to illustrate the use of transference, which proves the applicability of *nuqlah* to cosmology. And although al-Fārābī does not overtly claim to use this specific technique himself, the analogical language used in the *Ārā'* and *Siyāsah* suggests that he may to a certain extent have accepted analogy as a valid philosophical method for the study of the heavens.

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[255] The common root *n-q-l* seems to support this view.
[256] Al-Fārābī 1963, 266,18-20, translated by N. Rescher.
[257] The warning that appears at the beginning of the *Short Commentary* can be compared to what al-Fārābī says in the *Jamʿ* about the cosmological examples given in Aristotle's *Topics*: "It has escaped those who disagree [those who claim that Aristotle asserts the eternity of the world] that, first, what is set forth as an example does not stand as a belief and, also, that Aristotle's purpose in the *Topics* is not to explain about the world; instead, his purpose is to explain about syllogisms composed of widely-held premises" (al-Fārābī 2001a, 154, translated by C. Butterworth). In illustrating his logical explanations with cosmological examples, al-Fārābī is in fact perpetuating a long tradition that harkens back to Aristotle's *Topics* and *Posterior Analytics*.

Some of his statements in these works go hand in hand with the cosmological examples given in the *K. al-qiyās al-ṣaghīr* and are grounded in the assumption that the superlunary and sublunary bodies, simply by virtue of being bodies, possess similar characteristics and principles. The form, matter, and ensouled nature of sublunary bodies can be known through experience and then "transferred" to other remote substances, such as the stars and planets.[258] It should be noted, moreover, that terms from the *shīn-bā-hā* root appear both in al-Fārābī's descriptions of the celestial bodies in the *Ārā'* and *Siyāsah* and in his exposition of *nuqlah* in the *Short Commentary*. Hence, terms expressing similarity connect al-Fārābī's logical treatises to his cosmological treatises and may indicate a possible use of transference in the latter works.[259]

This perhaps explains why al-Fārābī argues for a greater tolerance (*musāmaḥah*) toward the use of these analogical techniques, as Gyekye remarks.[260] And, as Rescher notes, al-Fārābī may have been responsible for developing the concept of transference to a considerable degree, since it is not to be found in such

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[258] Ibn Rushd adopts a similar view and also justifies the use of analogical reasoning in cosmological inquiries. In his *Jawāmiʿ* 42.4-10 on the *De caelo*, he writes that "the things from which are acquired the premisses by which man scrutinizes many of the things concerning the heavenly body and through which he aspires to know their causes are [themselves] derived from the things which most closely resemble them, viz. the animate bodies, and especially man..." And in his *Talkhīs* 196.13-18 on the same work, he adds that "clearly this statement about directions in the heavens with reference to those extant in animals is ambiguous, as also the concept of "ensouled" applied to the heavens. Still, generally accepted premisses may be employed in demonstration in a certain way, especially in matters for which no other deduction is possible..." (both passages are translated by G. Endress in Endress 1995, 31). Unlike al-Fārābī, however, Ibn Rushd insists on the ambiguity of this approach. In the *Jawāmiʿ*, he notes that "this kind of statement is ambiguous" [*yuqāl bi-al-tashkīk*] and therefore "weak" (Endress 1995, 31). Another difference, which seems to contradict the preceding point, is that Ibn Rushd believes that the premises derived from the study of sublunary existents may nevertheless be used to form a "demonstration" and a "deduction." Al-Fārābī, on the other hand, does not express such a view. See also Hyman's comments in Ibn Rushd 1986, 28-29.

[259] Lameer 1994, 207-208, briefly mentions the terms *shabīh* and *tashābuh* in his treatment of transference; see also al-Fārābī 1985b, vol. 2, 45-46.

[260] As Gyekye 1989, 138, writes: "In the purely dialectical part of the treatise where al-Fārābī discusses Induction, Transfer (that is, analogical reasoning), and the Example, he is mainly concerned with the nature of the assumptions upon which some of our discourses are based. In this part al-Fārābī is at pains to emphasize the need for 'tolerance' (*musāmaḥah*), that is to say, a less rigid approach, with regard to the certainty of knowledge that is possible in such subjects as jurisprudence, rhetoric, poetry, ethics, politics, metaphysics, and theology because the truths of the premises of the arguments in these subjects cannot be established with certainty, and hence their conclusions would not be certain."

an elaborate form in Aristotle or other Greek authors.[261] Al-Fārābī's method in this respect would not be wholly alien to that of the theologians; the analogical method was of interest to all of them, albeit for different reasons. While perfectly aware of its non-demonstrative character, al-Fārābī may have to some extent condoned the use of transference in cosmology.

I am not arguing that al-Fārābī in the *Ārā'* and *Siyāsah* applies *nuqlah* in the full-fledged form in which he describes it in the *K. al-qiyās al-ṣaghīr*, nor that he would have been willing to admit the similarities between his approach and that of the theologians. Rather, I am suggesting that he may have accepted and even encouraged the use of analogical reasoning to a certain extent in the practice and teaching of his cosmology.

This hypothesis coincides with G. Freudenthal's conclusions in his studies on al-Fārābī's commentary on the First Book of Euclid's *Elements*, which deals with some of the conceptual problems related to mathematical entities.[262] Freudenthal argues that although al-Fārābī's theory of geometry is largely based on Aristotelian empiricism, it criticizes and attempts to elaborate on some aspects of Aristotle's theories by drawing on Galenic and Neoplatonic ideas. Notably, al-Fārābī stresses two different, yet complementary, ways of approaching the problem of the relation between abstract geometrical entities (points, line, etc) and physical bodies. One consists in analysis, i.e., proceeding from the consequences to the first principles, and the other in synthesis, the opposite method, which involves moving from the first principles to the consequences and putting the elements in "the order in which they exist."[263]

[261] Rescher (al-Fārābī 1963, 93 note 2) mentions *Topics* 108b10-14 and *Prior Analytics* II.25 as possible starting points for al-Fārābī's transference. Again, it is worth pointing to the potential influence of Book Delta, particularly Delta 16, as well. The fact remains, however, that al-Fārābī devotes a whole section of his commentary to a theory that is not explicitly spelled out by Aristotle. As Rescher (al-Fārābī 1963, 43) notes, al-Fārābī's discussion of transference goes "so far beyond its Aristotelian original ...as to qualify, in effect, as an entirely fresh approach to the subject." This illustrates al-Fārābī's willingness to depart from his models.
[262] Freudenthal 1988 and 1990.
[263] This is what al-Fārābī himself says in his *K. al-mūsīqā*, as reported in Freudenthal 1990, 55; see also Freudenthal 1988, 110 and 124 ff.; al-Fārābī 1960, 185-188, 211.

As it turns out, the methods of analysis and synthesis mentioned by Freudenthal have an ambiguous relation to those discussed by al-Fārābī in his *K. al-qiyās al-ṣaghīr*, and, as Freudenthal himself remarks, these techniques may originally derive from different Greek sources and prototypes.[264] Perhaps the most obvious difference is that analysis in geometry consists in abstraction and is thus not an analogical mode of reasoning in the way that analysis in transference is. Moreover, there is a difference in the status of the studied objects as well. Mathematical entities can be completely abstracted from matter (although they have no real existence outside of matter), but the existents mentioned in al-Fārābī's logical treatises, such as the celestial bodies, are corporeal, and there is no suggestion that transference can be applied to completely immaterial beings.

In spite of these significant differences, however, there is a striking parallel in al-Fārābī's method and approach to these subjects, namely, that induction and sense-perception represent a starting-point that can provide insight into unknown things. Al-Fārābī's cosmological example in the section on *nuqlah* and his analogical language in the emanationist treatises illustrate how it is possible to ascribe certain properties to the heavens on the basis of the experience we have of sublunary bodies. Likewise, in his commentary on geometry he advises the student to begin with bodies and progressively move to more abstract entities such as lines and points. Hence, in geometry, analysis implies a shift from physical three-dimensional

[264] Freudenthal 1988, 129-133. In fact, analysis and synthesis are very complex subjects in the history of philosophy and science and have been studied extensively by modern scholars. In spite of this, the relation between analysis in mathematics, logic, and metaphysics is still very obscure. I refer the reader to Beaney's 2007 article and bibliography, which discusses in lucid manner the different functions of this concept in the ancient, medieval, and modern periods; see also Hintikka and Remes 1974. With regard to Arabic philosophy, analysis and synthesis have been studied mostly in a mathematical context (see Rashed 1991, and Bellosta 1991 for a discussion of these concepts in the works of Ibn al-Haytham and Ibn Sinān respectively). Freudenthal rightly suggests, I think, that analysis and synthesis in a geometrical context and in a logical context stem from different traditions. The concepts discussed by Freudenthal are definitely the ones that appear in al-Fārābī's *K. al-mūsīqā* (al-Fārābī 1960, 185-188, 211), and they are also similar to the ones analyzed in M. Rashed 2008, 37-39, 42-43, 54. In contrast to analysis and synthesis in geometry, music, physics, and metaphysics, the concepts of analysis and synthesis in al-Fārābī's logical works, and in his discussion of *nuqlah* in particular, have their own characteristics. Freudenthal is to my knowledge the only scholar to have addressed the relation between these various uses of analysis and synthesis in al-Fārābī's corpus; but this topic definitely requires more research.

bodies to abstract mathematical entities, and in cosmology, transference enables one to progress from the sublunary bodies and their principles (form, matter, and substrate) to the celestial bodies.

Regardless of the disciplinary difference between the two texts, similar epistemological assumptions are made: sense-perception and our experience of reality are a foundation for further knowledge. Moreover, for obvious pedagogical reasons, one may begin one's inquiry from sensible objects and gradually progress toward entities that are more abstract or remote from the human ken. Hence, although analysis in al-Fārābī's geometry and logic is conceptually dissimilar and may stem from different textual traditions, it is characterized in practice by a similar approach.

On the basis of these remarks, it is possible to establish a link between al-Fārābī's emphasis on observation and experience, his empirical understanding of the evolution of language, and the value he places on analogical methods, which take physical reality as a starting-point. All of these notions testify to a remarkable 'empirical' concern in al-Fārābī's approach to science. We see how conscientiously al-Fārābī followed Aristotle's directive in *Physics* I.1.184a.16-17 to "start from the things more knowable and obvious to us and proceed towards those which are clearer and more knowable by nature."[265] On the other hand, if al-Fārābī may be said to operate within a fundamentally Aristotelian framework and more specifically within the framework constructed by the *Posterior Analytics*, he in many ways goes beyond his model in developing concepts that are only briefly mentioned by the Stagirite.

The foregoing analysis enables us to understand why al-Fārābī in his emanationist treatises relies so ostensibly on analogical language to describe the celestial bodies. Analogy (such as the method of transference discussed above) possesses undeniable didactic qualities according to al-Fārābī. It begins with things

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[265] Translated by R. P. Hardie and R. K. Gaye in Aristotle 2001.

closest to human experience, such as bodies, and is able to gradually lead the student to an understanding of entities remote from the senses. Al-Fārābī stresses the didactic quality of analogical reasoning in the *K. al-ḥurūf*, when he writes that

> these aspects of similarity (*shibh*) have a certain utility when the student is taught an art due to the speed with which he grasps these notions (*maʿānī*) when their explanation is made with words that resemble those that express notions known by him before receiving this art.[266]

D. Black reaches a similar conclusion concerning al-Fārābī's use of analogy in education in her book *Logic and Aristotle's* Rhetoric *and* Poetics *in Medieval Arabic Philosophy*.[267] As for G. Freudenthal's research, it shows that analysis in geometry, like analysis in transference, possesses an undeniable didactic quality. He writes: "to the claim that there is no systematic, intellectual, way leading from the world of sensible to that of intelligible, the *Commentary* answers that geometry is a decisive counter-example: the intelligible objects of geometry are obtained from the sensible body through analysis...To the teachers of geometry, it shows how to guide the student from the sensible objects to the knowledge of the intelligible, ideal, geometrical objects."[268]

Whether it is analysis in geometry or transference in logic, al-Fārābī displays a highly sensitive awareness of the didactic potential of these techniques. If we recall that the *Ārā'* and the *Siyāsah* may have been transmitted orally by the second teacher or written expressly for didactic purposes, then the role of analogy in these works acquires additional significance. Like the intelligible objects of geometry, the celestial bodies are far removed from the human ken and border on the intelligible world. However, through analogy and by relying on things known through experience, it is possible to acquire insight into their nature. This method may have

[266] Al-Fārābī 1970, section 157, p. 160, 1-4, my translation. Although al-Fārābī in this passage is explaining the various possible ways in which philosophers can use philosophical terminology, it is clear from the foregoing that al-Fārābī endorses this particular method.
[267] Black 1990, 176-177.
[268] Freudenthal 1990, 60.

been suggested to al-Fārābī partially by Ptolemy's *Almagest* and *Planetary Hypotheses*. In these works, Ptolemy sometimes resorts to analogy in order to facilitate the reader's grasp of celestial phenomena. For example, in a passage of the *Hypotheses* he compares the power of the stars to the power of birds in order to better explain their kinematic properties.[269] Before Ptolemy, analogy was also a prominent technique in the teaching of ancient cosmology, as M. R. Wright has shown.[270]

An interesting question is whether analogy is able to produce new knowledge or simply represents a method of teaching things that have been ascertained through other types of discourses, such as demonstration. Al-Fārābī's inclusion of transference in his commentary on the *Prior Analytics* and the possibility of shaping analogical reasoning into syllogistic form do not prove analogy's capacity to produce true knowledge. Rhetorical arguments, for instance, can be turned into syllogisms whose conclusions are untrue. Yet the extensive use al-Fārābī makes of analogy in his metaphysics and cosmology suggests that it may have an important philosophical or scientific role.

Black addresses this question briefly in her book on the Arabic *Organon*. She begins by describing the ambiguous relation that exists between analogy and demonstration in the works of several Arabic philosophers. "The Arabic philosophers," she writes, "are not entirely unaware of the apparent dependence of philosophy upon analogical reasoning, and Fārābī and Avicenna both attempt to address the difficulties this seems to entail."[271] Black's subsequent discussion of the epistemic value of analogy in al-Fārābī's philosophy ends hesitantly, no doubt as a result of the conflicting evidence in his corpus.[272] Although al-Fārābī developed a

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[269] See Taub 1993, 114; and Murschel 1995, 38-39.

[270] See Wright 1995, who devotes a whole chapter to "Models, myths and metaphors" in ancient cosmology. As Wright writes, "In the general context of ways of representation [in ancient cosmology] comes a wealth of imagery—metaphor, simile, analogy and *paradeigma*—to try to explain the constituents of the cosmos, with the variety and complexity of their phenomena, in simpler terms, and to reconcile the reality of how things are with the perception of them by eyes and ears and the senses generally" (52).

[271] Black 1990, 175.

[272] As Black (1990, 176) notes, al-Fārābī in some works seems to describe analogy as a demonstrative method, while in others he regards it as a rhetorical method.

concept of “scientific analogy,” its use would apparently be limited to the “facilitating of conception,” that is, *taṣawwur*. In no cases can scientific analogy “engender an act of scientific assent.”[273] Yet shortly afterwards, Black writes: “it is far from clear that all of the uses of analogy in philosophy are merely instances of the clarification of a meaning, which in no way aim at producing assent to a conclusion.”[274] And she suggests that analogy, while not representing a demonstrative method *per se*, is nonetheless closely related to *taṣdīq* and demonstrative reasoning.[275]

Al-Fārābī does not elaborate much on the epistemological value of transference beyond its didactic quality. However, his comments in the *K. al-qiyās al-ṣaghīr* suggest that it may be a perfectly valid form of reasoning. Al-Fārābī explains the conditions that must obtain for the method of transference to work: if the thing compared in the ‘absent’ and the ‘present’ is valid, then the conclusion of the transference will be valid, and may be formulated in a first figure syllogism.[276] In addition, the emphasis that al-Fārābī puts on the methodological value of experience and observation adds weight to the possibility that transference may be a viable technique, since it is grounded in our empirical knowledge of reality. Perhaps for this reason, Gyekye considers transference a quasi-demonstrative method and describes it as a “logic of scientific discovery.”[277] And M. Rashed notes that “the whole method of analysis-synthesis, then, far from being a mere didactic way of exposition, has a deep heuristic value.”[278] Transference and analogy, then, may possess a demonstrative or semi-demonstrative quality that enables them to produce knowledge.

The above discussion shows that al-Fārābī’s use of analogy in the emanationist works differs in many crucial ways from imitation (*muḥākāt*), which is

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273 Black 1990, 177.
274 Black 1990, 177.
275 Black 1990, 178.
276 Al-Fārābī 1963, 95.
277 Gyekye 1972, 36-37.
278 M. Rashed 2008, 37, note 50.

merely a translation into another form (namely, symbols and images) of opinions that may or may not be correct. Whereas transference is a logical mode of reasoning, has didactic value, is potentially knowledge-producing, and corresponds to an ontological reality, imitation is merely representative and is not based on valid logical criteria. This may be seen when al-Fārābī states in the *Philosophy of Aristotle* that

> ...image-making and imitation [*muḥākāt*] by means of similitudes [*mithālāt*] is one way to instruct the multitude and the vulgar in a large number of difficult theoretical things so as to produce in their souls the impressions of these things by way of their similitudes. *The vulgar need not conceive and comprehend these things as they are*. It is enough if they comprehend and intellect them by means of what corresponds to them.[279]

And in the *Ārā'* al-Fārābī writes that "the faculty of representation [*al-quwwah al-mutakhayyilah*] also imitates [*tuḥākī*] the rational faculty by imitating those intelligibles which are present in it with things suitable for imitating them. It thus imitates the intelligibles of utmost perfection, like the First Cause, the immaterial things and the heavens..."[280] In these passages, the connection between imagination and imitation appears clearly, and these two concepts should be contrasted with the analogical technique of transference described by al-Fārābī in his logical treatises.

One of the upshots of the previous point is that the cosmological model al-Fārābī sets forth is not to be seen as an image or imitation devoid of scientific value but as a valid attempt to use the various philosophical methodologies accessible to him in order to provide an accurate and rational interpretation of the cosmos. It is also possible to conclude that there has been some confusion in the modern scholarship between the techniques of imitation/representation on the one hand, and of analogy/transference on the other, which al-Fārābī was careful to distinguish. This confusion has unjustly contributed to the belief that al-Fārābī's

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[279] Al-Fārābī 1961, 85; and al-Fārābī 1969, 93, translated by M. Mahdi (my emphasis).
[280] Al-Fārābī 1985a, 219.

cosmological ideas in the emanationist works are to be interpreted as mere images or imitations of deeper truths.

As the previous analysis has shown, al-Fārābī's cosmological method does not rely on imitation (*muḥākāt*), which is the product of the imaginative faculty (*takhayyul*) in man, and which simply substitutes an image or symbol for an intelligible. Rather, it is grounded in analogy and possibly transference (*nuqlah*), which are logical tools that build on empirical knowledge and experience and thus involve intellect (*ʿaql*). Whereas imitation plays a key role in al-Fārābī's prophetology, political theories, and poetics, for instance, analogy is described in his commentary on the *Prior Analytics* and in the metaphysical and cosmological sections of his philosophical treatises, together with other forms of analogical reasoning. Hence, analogy represents, in addition to experience and induction, one of the main tools of al-Fārābī's cosmology and philosophy.

This being said, analogy also plays an important role in al-Fārābī's rhetoric and poetics,[281] and the relation between these rhetorical and poetic forms of analogy and the ones discussed and implemented in al-Fārābī's other works remains ambiguous. It is perhaps too early to make a final judgment on this question. Yet I believe that al-Fārābī probably distinguished between various forms of analogy, some of which he regarded as philosophically unacceptable and downright rhetorical, others as inclining toward the realm of demonstration. At any rate, al-Fārābī perceived the didactic utility of analogy. Moreover, he construed transference as a natural outcome of the evolution of philosophical terminology and of its transmission from one culture to another. Finally, according to al-Fārābī, analogy is a privileged means of getting insight into immaterial entities, as many passages of his works show. These points underscore the importance of analogy in the second master's method.

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[281] See Black 1990; Vallat 2004, 318 ff.. In fact, al-Fārābī wrote a short treatise on this subject entitled *Treatise on Analogy and Poetical Composition* (al-Fārābī 1987b, 504-506).

In conclusion, it is possible that al-Fārābī's emphasis on this technique is symptomatic of a certain skeptical outlook toward the possibility of metaphysical knowledge. It is perhaps *because* al-Fārābī was skeptical about human knowledge of the metaphysical world that he emphasized techniques such as experience and analogy, which are essentially inductive in nature and grounded in perceptible reality.

8. CONCLUSION

The previous analysis has, I hope, clarified some aspects of al-Fārābī's approach to cosmology, despite the tensions that his works display. We have seen that there is no contradiction between the various methods of astronomy, physics, and metaphysics in al-Fārābī's cosmology. All are meant to operate in harmony and toward a common goal, namely, knowledge of the heavenly world. This is made possible by the fact that these disciplines study different aspects of the heavens: astronomy studies the exterior qualities of the celestial bodies, such as their sizes, relations, distances, etc, and aims to account for their particular motions; physics studies their substance and provides some of the principles used in astronomy; metaphysics investigates their causes, completes the investigation of their substance, and also provides some of the foundational principles used in astronomy and physics. Where astronomy and physics stop their inquiry, metaphysics begins its own. This, of course, suggests that the distinction between an instrumentalist and a realist approach that would be opposed to one another in al-Fārābī's cosmology is not pertinent; both the mathematical and the physical-metaphysical aspects are integrated in one common endeavour.

Al-Fārābī's cosmological approach is thus an illustration on a smaller scale of his belief in the subordination of the sciences, that is, the idea that the sciences are hierarchically organized and dependent on one another, while at the same time collaborating toward a common end. This position, which is partly indebted to the *Posterior Analytics*' exposition of the relation between the various sciences and the conditions for certain knowledge, was characteristic of the Peripatetic circle that flourished in tenth-century Baghdad. As P. Adamson notes, "the topic of the subordination of the sciences receives a detailed treatment by some figures in the Arabic tradition, especially al-Fārābī, whose *Attainment of Happiness* is devoted precisely to explaining how knowledge of the various sciences may be achieved, and how the sciences interrelate."[282] Unlike al-Kindī's methodology, which stresses the

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[282] Adamson 2007b, 357.

"epistemic gap"[283] between sensation and intellect, and thus between physics and metaphysics, al-Fārābī's methodology shows "no radical disjunct between the sciences."[284]

Not only are the various sciences to work hand in hand, but the methods proper to each are not contradictory; rather, they are integrated in a methodological continuum that begins with experience and observation and ends with the deductive reasoning proper to syllogistics. It is significant that al-Fārābī emphasizes the value of observation and experience in the philosophical method in general and in the astronomical method in particular. In this regard, he departs significantly from thinkers such as Proclus and embodies some of the important changes toward scientific methodology that were materializing in the Arabic-Islamic world.

The question of al-Fārābī's language and of the epistemological criteria set by these various philosophical disciplines is quite intricate. Although in some works al-Fārābī adopts the Aristotelian distinction between demonstrative and non-demonstrative knowledge, and although he apparently believes that it is possible to offer demonstrative proofs of metaphysical and cosmological matters, al-Fārābī only partially elaborates demonstrative arguments in his existing philosophical works. Whether this is due solely to the nature of the works (their format and purpose), to an exaggerated emphasis on analogical techniques, or to deeper aporetic convictions entertained by al-Fārābī is not completely clear, although I have argued that these hypotheses may explain this fact much more convincingly than the 'political interpretation' of Mahdi, Parens, and others.

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[283] Adamson 2007b, 362.
[284] Adamson 2007b, 358.

III. THE STRUCTURE OF AL-FĀRĀBĪ'S COSMOLOGY

1. STARS, PLANETS, AND SPHERES

Al-Fārābī's cosmological descriptions are very brief and tantalizing, and there are many issues that he leaves unsettled. However, by gathering and comparing the various passages that deal with this subject it is possible to provide a sketch of the structure of the universe as he conceived it. According to al-Fārābī, the heavens are divided into what he calls "systems" or "clusters" (sing. *jumlah*, pl. *jumal*),[285] a term which, to my knowledge, does not have an astronomical or philosophical pedigree. There are nine *jumal*, which correspond to the nine main celestial spheres (s. *kurah*/pl. *kurāt* or *ukar,* and s. *falak*/pl. *aflāk*) inherited from the Ptolemaic model.[286] Al-Fārābī uses *falak* and *kurah* interchangeably to refer to the spheres together with the planets or stars they carry around in a circular motion.[287] It is notable that for al-Fārābī each sphere, despite its invisibility, is a "spherical body" (*jism kurī*).[288] *Kawkab* (pl. *kawākib*) may refer to the planets, including the sun and the moon, and the fixed stars; the most accurate English translation therefore depends on the context.

Even more ambiguous than *kawkab* is the term *jism samāwī*, whose philosophical implications will be analyzed shortly. This term, usually translated as 'celestial body' or 'heavenly body,' may refer to the sphere alone, the sphere with its planet, and also to the planet alone. Because al-Fārābī uses this term in a wide variety of contexts, it is difficult to provide a general translation. For example, in the *Ārā'* he states that "the celestial bodies (*al-ajsām al-samāwiyyah*) are nine

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[285] This term appears in the *Ārā'* (al-Fārābī 1985a, 188-119).
[286] The outermost starless sphere was accepted by most Arabic philosophers and astronomers, probably on the basis of certain passages of Ptolemy's *Planetary Hypotheses* (see Ptolemy 1967, 38-42). Some late-antique Greek commentators, such as Ammonius and Simplicius, seem to have taken into consideration the possibility of its existence without endorsing it systematically (Simplicius 2004a, 462,20-25). By the time of Ibn Sīnā, however, belief in the existence of this sphere is firmly established, and its discovery is attributed to Ptolemy himself; see the *K. al-najāh* (Ibn Sīnā 1985, 303), the *Dānesh-nāmeh* (Ibn Sīnā 1986, 142), and the *Metaphysics* of the *Shifā'* (Ibn Sīnā 2005, 317). For a discussion of how this ninth sphere is responsible for the daily rotation of the heavens, see Ragep 1993, vol. 2, 409.
[287] See al-Fārābī 1964, 32, where the two terms are used interchangeably.
[288] Al-Fārābī 1985a, 118-119.

altogether,"[289] which implies that the term celestial body here refers to the main spheres or systems together with their planets or stars. In another instance, al-Fārābī writes that the second sphere or system (the sphere of the fixed stars) "is one body, which contains a number of bodies [the fixed stars] which have a common motion…" [290] In this passage, the term *jism* is used equivocally to refer to the sphere of the fixed stars and the fixed stars themselves.

Hence, although there is a conceptual distinction between sphere, planet, and star, this is not always reflected linguistically, and these various elements are often subsumed under the generic term *jism samāwī*. Al-Fārābī's choice of terms (*jism samāwī*, *kawkab*, *falak*, *kurah*) overlaps with the terminology of Arabic astronomers, thus showing that his cosmology shares some common roots with this science.

Al-Fārābī establishes a hierarchy among the various cosmic systems. The spheres are organized in ranks (*marātib*) in a descending order of excellence.[291] The farthest, outermost sphere, also called the first heaven (*al-samā' al-ūlā*) and the first body (*al-jism al-awwal*), is nobler in rank than the other spheres, which it encompasses and whose daily rotation from east to west it causes.[292] Below it is the sphere of the fixed stars (*kurat al-kawākib al-thābitah*), which is characterized by its dual motion and by the fact that the stars are "fixed" and hence do not change position vis-à-vis one another. Next are the seven planetary spheres, whose order according to al-Fārābī is the following: the first sphere, which is closest to the earth, is occupied by the moon, the second by Mercury, the third by Venus, the fourth by the sun, the fifth by Mars, the sixth by Jupiter, the seventh by Saturn. This order was the one recommended by Ptolemy, and it was subsequently adopted by most Arabic astronomers.[293] Thus at the very bottom of the hierarchy is the sphere of the moon that surrounds the spheres of the four elements and the earth. In brief, seven of the

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[289] Al-Fārābī 1985a, 115.
[290] Al-Fārābī 1985a, 119-121.
[291] Al-Fārābī 1985a, 114-115.
[292] It is this sphere that some Arabic astronomers call "sphere of spheres" (*falak al-aflāk*) and the "encompassing sphere" (*al-falak al-muḥīṭ*).
[293] This order appears in Ptolemy's *Hypotheses*; see Ptolemy 1967, 6a.

nine spheres contain a planet (including the sun and the moon), one the stars, and one is starless and planetless.

Al-Fārābī's account of the organization of the heavenly spheres is brief and raises numerous questions. For example, he says nothing about the spatial relations of the spheres, whether these are in contact or not. This problem was to become a controversial issue in Medieval Latin cosmology, but it does not seem to have interested early Arabic cosmologists much. Moreover, it is unclear at first whether the nine "systems" (*jumal*) each consist of a single sphere or contain several other spheres, that is, whether they consist only of a planet-bearing sphere or of a planet-bearing sphere together with other secondary or subordinate spheres responsible for the planet's motion.[294] This point is of crucial importance to understand al-Fārābī's theories of celestial motion and to define his place in the history of astronomy.

Closely related to it is the question of whether al-Fārābī's cosmology is homocentric, like Aristotle's, or indebted to the Ptolemaic model of eccentric and epicyclic motion. This question may appear odd if it is assumed that al-Fārābī must have necessarily adopted the latter due to his and his contemporaries' acquaintance with the *Almagest* and *Planetary Hypotheses*. But one must remember that the number of post-Ptolemaic thinkers who either neglected or rejected the Ptolemaic model is by no means insignificant and includes Alexander of Aphrodisias, Themistius, and (although this is much more controversial) Proclus in the Greek tradition, and Ibn Rushd, al-Bitrūjī, and other Andalusian thinkers in the Islamic tradition. The evidence for al-Fārābī's adherence to a Ptolemaic model must therefore be discussed and established and should not be taken for granted.

H. A. Davidson has written that "the version of the [astronomical] scheme presupposed by Alfarabi gave its attention to the primary celestial spheres and

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[294] By secondary or subordinate spheres I mean either the counteracting spheres of the Eudoxan-Aristotelian model or the eccentrics and epicycles of the Ptolemaic model. In both cases, these spheres play an essential role in explaining the particular motions of each planet.

ignored the subordinate spheres..."[295] While this may be true to some extent, there are many hints suggesting that al-Fārābī also included these subordinate spheres in his cosmology and that they played an important role in his explanation of celestial motion. In the *Ārā'*, al-Fārābī writes that "the third system to the ninth system [i.e., the "planetary spheres," including those of the sun and the moon] each contain bodies [*ajsām*] whose motions are several and different..."[296] It is clear that the plural *ajsām* here must include the subordinate spheres, since these systems only contain one planet, the sun, or the moon, and therefore the reference to several bodies and several motions would not be justified if al-Fārābī was referring only to the planet.

The existence of these subordinate spheres in al-Fārābī's cosmology is confirmed by the evidence concerning eccentrics and epicycles. First, we know that al-Fārābī wrote a commentary on the *Almagest*, which must have discussed at length the function of epicycles and eccentrics in planetary motion. Both in the *Almagest* and the *Planetary Hypotheses*, Ptolemy posits a variety of devices responsible for the particular motions of the planets, the two most important of which are the eccentrics and epicycles. Now it is unlikely that al-Fārābī's commentary would have amounted to a wholesale rejection of these theories, and it is much more plausible to think that he endorsed the main features of Ptolemy's account. Considering that al-Kindī before him and Ibn Sīnā after him followed Ptolemy's astronomy, it would be all the more surprising if al-Fārābī had rejected it. While the commentary cannot constitute a proof of al-Fārābī's allegiance to the Ptolemaic system, it nevertheless points in this direction.

This hypothesis is also supported by several passages in the Fārābīan corpus, although it must be said that these are sparse and yield little information. In the *K. al-mūsīqā*, al-Fārābī makes an explicit reference to the Ptolemaic theories of

[295] Davidson 1992, 45.

[296] Al-Fārābī 1982a, 69, my translation. Here is the Arabic: "*wa al-thālith, wa mā baʿduhu ilā tamām al-tisʿah, yashtamilu kull wāḥid minhā ʿalā ajsām kathīrah mukhtalifah fī ḥarakāt mā...*" Walzer's edition and translation of this passage in al-Fārābī 1985a, 119-121, which differs from Nādir's, cannot be correct, since it ascribes only "one body" (*jism wāḥid*) to each system, which nevertheless consists of a planet and several spheres. Walzer nevertheless provides the alternative reading "*minhā ʿalā ajsām kathīrah*," which is given by Nādir and should be preferred.

eccentrics and epicycles in the course of an argument designed to show that the astronomer must rely on physical principles in order to explain the causes of the planets' motions. Al-Fārābī states that the astronomer "can only explain these causes, such as the eccentrics and epicycles, if he posits that these planetary motions are in themselves regular."[297] One may surmise that although al-Fārābī is making a general statement about the astronomical method, he would have endorsed the eccentrics and epicycles which he mentions in this passage. At any rate, this passage shows that al-Fārābī was aware of the existence of these astronomical devices.

The *Ārā'* also contains relevant information. At one point, al-Fārābī describes one kind of celestial body as "a sphere or a corporeal circle" (*kurah aw dā'irah mujassamah*).[298] Shortly thereafter, he again mentions other "corporeal circles" besides the main sphere: "Each of the spheres and the 'corporeal' circles [*dawā'ir mujassamah*] in them has an independent motion of its own…" [299] There is little doubt that the formula "*dawā'ir mujassamah*" refers to the eccentrics and epicycles contained by the main spheres and which are responsible for the particular motions of each planet. The term *dā'irah* is the counterpart of the Greek κύκλος, which may or may not convey a sense of corporeality; but by specifying that these are "corporeal" (*mujassamah*) circles, al-Fārābī asserts his position in regard to the physical existence of the subordinate spheres.[300]

Finally, in the same section of the *Ārā'*, al-Fārābī also discusses the shifting positions of the celestial bodies, mentioning the fact that the heavenly bodies "…sometimes come together [*tajtamiʿu*] and sometimes separate [*taftariqu*]…",

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[297] Al-Fārābī 1960, 102.
[298] Al-Fārābī 1985a, 128-129; in al-Fārābī 1982a, 23, Nādir provides a different reading, which seems much less plausible since it would imply a definition of *kurah*, of what a sphere is, which seems superfluous.
[299] Al-Fārābī 1985a, 128-129, translated by Walzer: *wa li-kull wāḥid min al-ukar wa al-dawā'ir al-mujassamah allatī fīhā ḥarakah ʿalā ḥiyālihā…*" Nādir gives the same reading in his edition (al-Fārābī 1982a, 23).
[300] Ibn Sīnā also clearly ascribed corporeal existence to the eccentrics and epicycles, as can be seen in the *K. al-ishārāt wa al-tanbīhāt* (Ibn Sīnā 1951, 419/168-169).

"...sometimes come near [*taqrubu*] some bodies on the lower level and sometimes recede [*tabʿudu*] from them..."[301] By an interpretive stretch, these remarks could apply to a system of homocentric spheres, in which case "come together" and "separate" would merely mean that the planets are aligned vertically or not. However, it is much more likely that they refer to a Ptolemaic conception of celestial motion whereby the planets conjoin and separate as a result of the motions of epicycles and eccentrics.

Apart from these rare excerpts, al-Fārābī does not elaborate a detailed epicyclic or eccentric model in his philosophical works.[302] In spite of this, however, the evidence in the *Ārā'*, the *Siyāsah*, and the *K. al-mūsīqā*, coupled with the fact that al-Fārābī commented on the *Almagest*, enable us to conclude that al-Fārābī's cosmology included epicycles and eccentrics and is thus closer to Ptolemy's model as depicted in the *Almagest* and *Planetary Hypotheses* than to Aristotle's homocentric system. This basic fact has not always been recognized in past studies of the second master.[303] It should be noted that al-Fārābī's illustrious predecessor, al-Kindī, also adopts a Ptolemaic model for his celestial kinematics and often mentions the eccentrics and epicycles in some of his treatises, such as *On the Proximate Efficient Cause*.[304]

On the basis of the evidence discussed above, it would seem that al-Fārābī regarded the eccentrics and epicycles as physical entities embedded within the main sphere of each system. At this point, it is worth reiterating the fact that al-Fārābī conceives of the spheres as spherical bodies (sing. *jism kurī*),[305] and although he does not say so himself, it would seem that not only the main spheres, but also the

[301] Al-Fārābī 1985a, 130-131.
[302] Reference to epicycles also appears in the *Taʿlīqāt* (al-Fārābī 1992, section 68, p. 55), where the author explains that "the planets are in themselves also moving around their own centers in epicyclic spheres" (*wa al-kawākib ayḍan fī dhātihā mutaḥarrikah ʿalā marākizihā anfusihā fī aflāk tadāwīrihā*). But this treatise is probably inauthentic, as will be shown later on.
[303] In his classic but outdated work on al-Fārābī entitled *La place d'al-Fārābī dans l'école philosophique musulmane*, I. Madkour presents al-Fārābī's spherology as Aristotelian and does not recognize its basic Ptolemaic character. He says nothing about eccentrics and epicycles. See Madkour 1934, 90-94.
[304] In McGinnis and Reisman 2007, 12-13.
[305] Al-Fārābī 1985a, 118-119.

subordinate spheres comprised by a system should be described as such. This explains why al-Fārābī asserts that there are several bodies (*ajsām*) within a system and that these bodies have several different motions, since he is referring in this instance not only to the planet, but also to the subordinate spheres necessary to explain each planet's particular motions. These subordinate spheres are themselves endowed with their own motions. We may conclude that the term "system" (*jumlah*), which al-Fārābī uses to describe the various parts of the cosmos, refers to the main spheres together with the smaller subordinate spheres they contain.

There is thus an obvious harmony between what can be inferred about al-Fārābī's astronomical allegiance to the Ptolemaic system and the physical model of the cosmos he hints at in his emanationist treatises. There is no reason to think that al-Fārābī conceived of these elements as being in conflict with one another; rather, he successfully integrates the astronomical features inherited from the Ptolemaic tradition in his physical-metaphysical system. But al-Fārābī's belief that the celestial bodies, including the spheres, are corporeal raises several difficulties, which will be addressed in the following paragraphs.

2. THE CELESTIAL BODIES, CORPOREALITY, AND NATURE

The Arabic terminology used by al-Fārābī indicates that the heavenly bodies are corporeal: *jism samāwī* (pl. *ajsām samāwiyyah*) literally means "celestial body." The term *jism* is, together with *jirm* and *badan*, the main Arabic word used in natural philosophy to render Aristotle's σῶμα. Unlike Greek, however, which possesses generic terms like οὐράνιοι that refer exclusively to the celestial bodies in opposition to sublunary bodies, the Arabic *jirm* and *jism* can indicate both the sublunary and the superlunary body. *Jism samāwī* (pl. *ajsām samāwiyyah*) is the expression most commonly used by al-Fārābī to refer to the spheres and planets of the firmament.

But what kind of bodies are the celestial bodies? The use of the term and concept of body (*jism*) to describe the planets and spheres raises multiple questions, the most prominent being the relation between nature, matter, and corporeality, as well as the way in which superlunary bodies relate to sublunary bodies. Al-Fārābī inherited these issues and problems primarily through the *De caelo* and *Physics* and the commentaries written on these works, and in all probability he devoted considerable space to these questions in his own commentaries. Unfortunately, in his extant treatises, al-Fārābī does not provide satisfactory definitions of these concepts and of the way in which they relate to one another in a cosmological context. In spite of this, a few hints can be gleaned from his writings.

Al-Fārābī's most systematic discussion of body and corporeality appears in his commentary on a mathematical work by Euclid, which has been studied in depth by G. Freudenthal.[306] This work, combined with the relevant passages that can be collected from his other philosophical treatises,[307] reveals that al-Fārābī closely followed Aristotle's definition of body, but that he also departed from it in a few subtle ways as a result of his exposure to Neoplatonic doctrine. For our purpose,

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[306] See Freudenthal 1988.
[307] Al-Fārābī 1962, 91; al-Fārābī 1969, 98, 100; al-Fārābī 1991, 34; and Alon 2002, 558.

what is important is that al-Fārābī defines body as that which has extension in space.[308] In this sense, the celestial bodies are corporeal, for in the *Ārā'* al-Fārābī says that they have shapes (*ashkāl*), volumes (*aʿẓām*), and sizes or measures (*maqādīr*).[309] Moreover, they have the noblest corporeal qualities: spherical shape, luminosity, and circular motion.[310] On the other hand, al-Fārābī rejects the claim of the Pythagoreans that they produce a celestial harmony.[311] Finally, al-Fārābī tells us in the *Siyāsah* that the celestial bodies can be defined in terms of the Aristotelian categories, of which they only possess the most excellent.[312]

Hence, at first glance it would seem that the *ajsām samāwiyyah* are regular corporeal bodies, albeit of a nobler kind than the sublunary ones, and that, as such, they fall within the purview of natural philosophy. This is implied in the *Siyāsah*, where al-Fārābī divides bodies into six genera, the celestial bodies representing the first genus. This corporeal dimension also explains why according to the *Iḥṣā'* and the *Philosophy of Aristotle*, some aspects of the celestial bodies are studied by physics, more specifically by the part of physics that focuses on simple substances, foremost among which is the celestial substance.

However, as we have seen, al-Fārābī complicates the picture by introducing immaterial causes responsible for the existence of the celestial bodies, which shifts their inquiry to an intermediate status between the natural and the divine, between physics and metaphysics. This raises the question of the relation between the corporeal celestial bodies and the incorporeal and immaterial principles that are responsible for their existence. As we will see, al-Fārābī oscillates between these two aspects of the heavenly bodies (their corporeal qualities and their immaterial

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[308] See the various sources collected by Alon 2002, 558.
[309] Al-Fārābī 1949, 84; and al-Fārābī 1985a, 123-125.
[310] Al-Fārābī 1985a, 123-125.
[311] In the *K. al-mūsīqā* (al-Fārābī 1960, 89) he writes: "*wa mā yaʿtaqiduhu āl fīthāghūras fī al-aflāk wa al-kawākib annahā tuḥdithu bi-ḥarakātihā naghaman ta'līfiyyatan fa-dhālika bāṭil, wa qad lukhkhiṣa fī al-ʿilm al-ṭabīʿī anna alladhī qālūhu ghayr mumkin wa anna al-samāwāt wa al-aflāk wa al-kawākib lā yumkin an taḥdutha lahā bi-ḥarakātihā aṣwāt*." This statement can be connected with a passage in Simplicius' commentary on the *De caelo* devoted to the same issue (Simplicius 2004a, Chapter 2.9). Aristotle himself had refuted the Pythagorean doctrine of the harmony of the spheres in *De caelo* II.9.
[312] Al-Fārābī 1964, 53-54.

causes), with the immediate result that it becomes very difficult to understand the role devoted to celestial matter in this picture, as well as the kind of corporeality that the celestial bodies have.

To give but one striking example, all bodies, according to al-Fārābī, are composed of form and matter, two of the six principles that make up his ontology.[313] But al-Fārābī says virtually nothing in his mature or emanationist treatises about the nature of celestial matter and he even describes the celestial substrate as being immaterial, which leaves the reader quite perplexed as to which category of bodies the spheres and planets fall into. In the *Ārā'*, he claims that the heavenly bodies emit light and possess corporeal qualities[314]; but at the same time, he defines them as immaterial beings closer to the divine realm than to the world of material and corporeal existents.

In that sense, al-Fārābī departs from a well-established philosophical tradition that had connected corporeality and perceptibility with materiality. According to this view, the stars and planets are perceptible bodies and so they must be composed of matter. The idea that the celestial bodies are material (whether composed of the same matter or a different matter than sublunary beings) is rooted in a basic assumption according to which everything that is perceptible to the senses must be material. Aristotle articulates this view in the *De caelo* when he writes: "Now since the universe is perceptible it must be regarded as a particular; for everything that is perceptible subsists, as we know, in matter."[315] Several centuries later, Philoponus echoes this view in his attack against a group of unnamed philosophers. He writes: "it is quite ridiculous...to say that the heavens are immaterial (ἄυλον). For they are not intelligible, but perceptible."[316]

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[313] Al-Fārābī 1964, 31.
[314] Al-Fārābī 1985a, 122-123.
[315] *De caelo*, I. 9.278a11 ff., trans. Stocks in Aristotle 1941. See also *Metaphysics* I.8.990a1-5.
[316] In Philoponus' *Against Aristotle*, as reported by Simplicius in his *De caelo* commentary, 133,21-29. It is likely that Philoponus' criticism is addressed to Proclus and other Neoplatonists, who often describe the heavens as being immaterial (ἄυλον).

Nevertheless, on the basis of the heavenly bodies' corporeal qualities which are described in the *Ārā'*, it would seem that al-Fārābī considered the celestial bodies to be perceptible and corporeal. But it is difficult in his cosmology to connect these qualities with materiality, since he says nothing about celestial matter in his emanationist treatises and even seems to reject it entirely, a fact which leads to a real tension in his cosmology. I shall return to the question of the celestial bodies' materiality and examine it in detail in Chapter IV of this dissertation.

Nature (*ṭabīʿah*), like matter, is an ambiguous concept in al-Fārābī's cosmology. Although he provides several definitions of this term in the context of his physics, no single one of them adequately describes the heavenly substance. Like Aristotle in *Physics* II.1 and *Metaphysics* V.4, al-Fārābī holds the view that "the term nature applies to both matter and form," although "form is more appropriately called by this name."[317] In the *Philosophy of Aristotle*, he explains that nature refers primarily to the essence of a composite being, thus reformulating *Metaphysics* V.4.1014b35-37.[318] In addition, al-Fārābī also refers to the Aristotelian definition of nature as a "principle of motion and rest."[319] Finally, natural bodies are described in the *Iḥṣā'* as bodies produced neither by art nor human volition and thus in a sense primary. "The simple natural bodies," al-Fārābī writes "are those the existence of which does not result from bodies other than themselves."[320] In this work, al-Fārābī specifically mentions the heavens (*samā'*) as an example of a natural body.[321]

If we follow al-Fārābī on this question, then bodies can be said to be 'natural' in several ways: a) because they are endowed with a principle of motion and rest; b) because they have form; c) because they have matter; d) because they are compound substances made of form and matter; e) because they are simple, primary entities not produced by artificial and artistic means.

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[317] In the *Siyāsah* (al-Fārābī 1964, 36), translated by Alon (2002, 655).
[318] Al-Fārābī 1961, 89,10-15 and 114,15-22.
[319] Al-Fārābī 1999a, 60, 20; and Alon 2002, 655; but as we shall see, the *ʿUyūn* is probably not authentic.
[320] Al-Fārābī 1949, 83.8.
[321] Al-Fārābī 1949, 91; the corresponding passage seems to be *Physics* II.1.192b12-20.

All of these definitions apply somewhat to the celestial bodies, but in a vague manner, and they reveal very little about the heavenly nature and substance. Indeed, according to al-Fārābī, the heavens are composite (they are made of substrate and form), endowed with a principle of motion (albeit not of rest), and are not artificial, in the sense that they are not produced by other bodies or art. Yet this tells us little about how their nature differs from the nature of sublunary bodies. Moreover, some features in al-Fārābī's description of the celestial bodies promote the view that these beings may in a sense transcend the realm of nature proper (identified with the sublunary realm), on which they act as efficient causes. This is the case, for instance, of al-Fārābī's description of the spheres as rational beings eternally engaged in the contemplation of immaterial principles (see Chapter V.1-2, 4).

In spite of the lack of a clear explanation in al-Fārābī's works of how nature applies to the heavens, it may be assumed that he broadly followed the Peripatetic tradition on this issue, which for centuries had elaborated on some passages of the Aristotelian corpus.[322] Some of the principal cosmological questions discussed in the commentatorial tradition of late-antiquity were how the concept of nature could be reconciled with the ideas of the ensoulment and special material constitution of the heavens, as well as how nature in a sublunary context related to nature in a superlunary context. For instance, Aristotle had defined nature as an internal source of motion in a body,[323] and so the challenge was to explain whether this source was psychological or material and how this definition could be meaningfully applied to the celestial bodies, which appeared to be different from sublunary bodies in many respects, including their circular motion. Moreover, it was unclear how this natural celestial motion could simultaneously be caused by other, non-physical principles such as separate intellects.

[322] Notably on *De caelo* I.2-4, *Physics* II.1, and *Metaphysics* V.4. Aristotle also mentions the "nature of the stars" at *Metaphysics* XII.8.1073a34. The loss of al-Fārābī's commentaries on the first two of these works is particularly acute when treating such questions as the heavenly nature.
[323] As in *Physics* II.1.192b23-24 and *Metaphysics* V.4.1014b19-21.

Some of the sources that discuss these issues in depth are Alexander's *On Fate*, *Quaestiones,* and *Principles of the Cosmos*, Simplicius' commentaries on the *Physics* and *De caelo* (which also preserve excerpts from Alexander's commentaries), and Philoponus' commentary on the *Physics* and his polemical works *Against Aristotle* and *Against Proclus*. These texts show the variety and subtlety of the opinions held by their authors. For our purposes, it is important to note that in spite of the apparent contradictions in the Aristotelian corpus,[324] the concept of nature was often successfully integrated in a cosmological account whereby nature was interpreted in connection with the special celestial element (aether or a refined kind of fire), the celestial soul, or an inclination in the celestial bodies. An example of such an exegetical enterprise can be found in Simplicius' commentary on the *Physics*, where he explains that the celestial nature (by which he means the material constitution of the spheres and their inclination for motion), soul, and intellect all have a part to play in circular motion. Moreover, Simplicius clearly distinguishes between nature and soul and criticizes Alexander for conflating the two concepts.[325]

It is against this exegetical background that al-Fārābī's views on nature in cosmology should be examined. As the definitions listed above show, the second teacher's views on nature are obviously rooted in Aristotle's own works, and one could easily interpret al-Fārābī's statement that the celestial bodies act "by their nature" in light of *Physics* II.1.192b35 ff. as meaning that they act through the properties that make up their nature, e.g., their luminosity and circular motion. But al-Fārābī's comments also bring to mind various passages from the works of Alexander. Alexander not only conceived of the entire heavens as having a nature, but he also described the powers and effects produced by the heavens on the world of generation and corruption as "natural."[326]

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[324] To give but one famous example, in *De caelo* I.2-4 Aristotle explains celestial motion through aether's natural tendency to move in circles, but in *De caelo* II.2 he seems to make soul responsible for causing this same motion.
[325] See the various excerpts collected in Sorabji 2005, vol. 2, 49-53.
[326] This view is articulated in the *Mantissa* and *Quaestiones*; see the fragments collected in Sorabji 2005, vol. 2, 41. It should be noted, however, that the ascription of these works to Alexander has been contested.

Al-Fārābī, probably following Alexander, also presents the celestial bodies as transmitting powers to the sublunary world. In the *Siyāsah*, for instance, he argues that the nature (*ṭabīʿah*) of the celestial bodies is to have powers (*quwwā*) that act on the sublunary world, in a manner which recalls Alexander's own theory of celestial powers.[327] Al-Fārābī even makes the celestial nature responsible for the generation of prime matter: "The substance, nature [*ṭabīʿah*], and activity of the celestial body is such that there immediately follows from it the existence of prime matter."[328] In that sense, al-Fārābī acknowledged the interconnection existing between the celestial and terrestrial realms.

Alexander and al-Fārābī are also similar, moreover, in that they simultaneously elevated the heavenly bodies to a special status in their ontology, the former describing them as divine (probably following Aristotle in *Metaphysics* XII.8.1074b ff. and *De caelo* I.3.270b ff.), the latter connecting them with the causality of the separate intellects and equating each one of them with an angel.[329] As Sorabji explains, for Alexander, nature is thus "a divine power, because derived from the heavenly bodies which are divine."[330] The two ideas of the divinity and ensoulment of the heavens and of a heavenly nature therefore seem to cohabit and even fuse in these two thinkers' cosmologies.

This feature can perhaps be explained by the primacy of soul. In the case of Alexander, as in the case of al-Fārābī, the most likely hypothesis is that the celestial 'nature' may be reducible to the celestial souls, which are responsible for causing the motions that in turn produce the powers (*quwwā*) that emanate on the world of generation and corruption. As mentioned above, we know from Simplicius' account in the *De caelo*, and also from his commentary on the *Physics*,[331] that Alexander equated the celestial soul with the celestial nature.

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327 Al-Fārābī 1964, 55-56.
328 Al-Fārābī 1964, 95.
329 Al-Fārābī 1964, 32.
330 Sorabji 2005, vol. 2, 40.
331 The relevant passage (1219,1-7) is reproduced in Sorabji 2005, vol. 2, 49.

It is perhaps partly as a result of the influence of Alexander's treatises that al-Fārābī chose to define the celestial bodies primarily in light of their soul and intellectual faculties in his cosmological treatises, the *Ārā'* and the *Siyāsah* (see Chapters IV.1.3 and V.1-2, 4). In these works, he seems to reject celestial matter and never equates celestial matter with celestial nature. If the celestial bodies have a nature, therefore, this nature is likely to be of a psychological kind. At any rate, the primacy of soul and the mention of powers emitted from the heavens in Alexander's and al-Fārābī's treatises suggest a link between the two thinkers.[332] Yet the inherent ambiguity of al-Fārābī's language and the brevity of his treatises compel one to examine other cosmological themes (such as celestial substance, soul, intellection, etc) to shed light on the problem of how nature applies to the heavens.

The concept of a celestial nature described in point a) above, that is, in connection with motion, is particularly ambiguous. To say that the heavens have a nature by which they move still begs the questions of what kind of nature they possess and whether this nature is the only source of motion. It is on these questions that the late-antique commentators had disagreed, some explaining the 'natural' motion of the heavens by using Aristotle's aether (thus relying on *De caelo* I.2.269b37 ff.), others making soul the primary principle and the real motive cause of the planets. Al-Fārābī states in the *Ārā'* that the heavenly bodies move "by their nature" (*bi-ṭabīʿatihā*),[333] but it is unclear what "nature" is supposed to mean in this

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[332] There seems to be a difference, however. Whereas Alexander limits nature to soul, al-Fārābī seems to go further and even speaks of a "nature" of the Agent Intellect. "The Agent Intellect," he writes, "is disposed in its nature [*bi-ṭabīʿatihi*] and substance to examine everything that the celestial body prepares and gives…" (al-Fārābī 1964, 55). This mention of a nature in connection with pure intellect is quite surprising, since the Agent Intellect is removed from all materiality and the perceptible world. Al-Fārābī's statement may betray the influence of Neoplatonism, which had a tendency to define nature as a weak imitation of soul, which was itself an imperfect manifestation of intellect. Yet al-Fārābī's last statement should not be construed as referring to the realm of nature as conceived by natural philosophy, but as expressing an inherent power within the Agent Intellect. In that sense, one may perhaps say that the Agent Intellect acts 'through or by its nature' on the sublunary world, a formula that brings to mind the Aristotelian expression "by nature," but which cannot correspond to it since it applies here to an immaterial being as opposed to Aristotle's use of it in *Physics* II.1.192b8-193a1 to denote corporeal substance. If that is the case, then the Agent Intellect would have a nature through which it would act, and which can be equated with its form and essence. Yet the use of such a term in connection with the Agent intellect remains somewhat incongruous.

[333] Al-Fārābī 1985a, 104-105.

sentence, since it is not defined in any way. Does it refer to celestial matter, the heavenly soul, the inclination inherent in the celestial body, or to a mechanical force of some kind? Furthermore, there is the possibility that al-Fārābī wants to oppose motion 'by nature' (*bi-al-ṭabʿ*) to 'natural motion' (*ḥarakah ṭabīʿiyyah*), as did Ibn Sīnā.[334] I will postpone here the discussion of these issues, which will be continued in Chapter VI.

[334] See the *Metaphysics* of the *Shifāʾ* (Ibn Sīnā 1983-86, 382-383).

3. SPHERE-SOULS AND SEPARATE INTELLECTS

The spheres and their planets and stars are not the only entities of al-Fārābī's cosmology. Above them on the ontological scale is a series of celestial intellects. One of the remarkable features of the *Ārā'* and the *Siyāsah*, and of al-Fārābī's cosmology in general, is the explicit distinction that is made between two different sets of celestial intellects. First, there are the immaterial and separate (separate, that is, from any kind of matter and from the heavenly spheres) intellects, which constitute the main vertical line of beings going from the First to the sublunary world, which lies below the last intellect, the Agent Intellect. These separate intellects are ten in number. The first nine separate intellects are called *al-thawānī*, while the last and tenth separate intellect is called the Agent Intellect (*al-ʿaql al-faʿʿāl*).[335] The generic term *al-thawānī* always encompasses the first nine intellects, but bears an ambiguous relation to the Agent Intellect. In fact, in most cases, al-Fārābī makes a terminological distinction between the Agent Intellect and the other separate intellects and enumerates them separately. This distinction has not been emphasized enough in the modern literature on al-Fārābī's cosmology, and the general tendency has been to treat the *thawānī* and the Agent Intellect as belonging to a single group. Yet as we shall see in Chapter V, they present very different characteristics.

The term *thawānī* itself is interesting. It may refer to the intermediate position that these intellects occupy between God and the corporeal world. They are, literally, the "second" in rank after God, called the First Cause. But their name also refers to the fact that they are secondary causes of existence, since they produce the celestial bodies. Ultimately, God is the primary and First Cause responsible for the creation of the entire world, but the *thawānī* are nevertheless the proximate efficient causes of the heavens. Finally, the term *thawānī* may also refer to the twofold intellection of the separate intellects (i.e., their contemplation of God and of their own essence). It is intriguing that the term *thawānī* appears in the *Maḥḍ*

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[335] Al-Fārābī 1964, 31.

al-khayr, the Arabic adaptation of Proclus' *Elements of Theology*.[336] In both texts, the *thawānī* are intellects (*'uqūl*). This terminological parallel is not sufficient to prove that al-Fārābī consulted this source, but the many other similarities existing between the *Maḥḍ al-khayr* and al-Fārābī's theories of celestial intellection (which will be discussed in Chapter V) make this a possibility. In any case, these separate intellects form a distinct set of immaterial existents in the ontological chain that begins with the One and ends with Prime Matter, "the lowest of the possibly existing things."[337] Finally, it should be noted that al-Fārābī, unlike Ibn Sīnā, does not offer any proof concerning the existence of the separate intellects nor any justification concerning their number.[338]

The second set of heavenly intellects consists of the souls that inhere in the celestial bodies and constitute their essence; they are the sphere-souls. Al-Fārābī does not have a technical term to refer to them and simply calls them *anfus al-ajsām al-samāwiyyah* ("the souls of the heavenly bodies"). These souls, al-Fārābī tells us, are intellects, albeit not as pure as the separate intellects.[339] In addition, they are also forms, that is, the forms of the celestial bodies. Although this definition of the celestial soul was relatively widespread in Greek thought,[340] al-Fārābī may have found it fully elaborated in some of Alexander's works, such as the Arabic version of the *On the Principles of the Cosmos*, known as the *Mabādi' al-kull*. The *Mabādi'* explicitly asserts the ensoulment of the spheres and equates their soul with their form.[341]

The distinction between separate intellects and sphere-souls is crucial to understand al-Fārābī's cosmology and may be said to represent a particular

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[336] Taylor 1981, IV.28-30, where there is mention of the *al-'uqūl al-thawānī*. In the *Maḥḍ al-khayr*, this formula refers to separate intellects, but these do not fulfill the same role as in al-Fārābī's cosmology.
[337] Al-Fārābī 1964, 58.
[338] Ibn Sīnā is aware of the need to justify the existence of the unmoved movers, and he devotes several sections of his metaphysical treatises to this effect, as in the *K. al-najāh* (Ibn Sīnā 1985, 314-316), the *Ilāhiyyāt* of the *K. al-shifā'* (Ibn Sīnā 1983-86, 393,5), and the *K. al-ishārāt* (Ibn Sīnā 1951, 402/160 ff.).
[339] See section V.1.
[340] See the overview given in Wolfson 1962 and Endress 1995.
[341] Alexander 2001, 52-53, 82-83, 100-101.

interpretation of Book Lambda.[342] Al-Fārābī, however, says little about the exact number of the sphere-souls. It would seem that he associates one soul per system or main sphere: seven souls for the seven planetary spheres, one soul for the sphere of the fixed stars, and one soul for the outermost sphere or the sphere of spheres, which is starless and planetless.[343] This makes a total of nine sphere-souls, to which correspond the nine *thawānī* (the tenth intellect is occupied exclusively with sublunary phenomena). Hence, although al-Fārābī's cosmology has been called "decadic" (due to the presence of ten separate intellects),[344] it would be more precise to call it an "ennadic" system, because there are nine main celestial spheres, nine sphere-souls, and nine *thawānī*, and because the symmetry breaks down when one comes to the Agent Intellect, which governs not another celestial sphere, but the sublunary realm. The idea of an ennadic system is also reinforced by the differences that distinguish the *thawānī* and the Agent Intellect. As Walzer and De Smet point out,[345] the structure of al-Fārābī's cosmos conforms to Ptolemy's and Arabic astronomers' nine-tiered spherology, and for this reason it is evident that al-Fārābī took purely astronomical considerations into account when elaborating his system.

The theory of the ensoulment of the celestial bodies is one of the cornerstones of al-Fārābī's cosmology, because it plays a crucial role in his explanation of the existence, intellection, and motion of the spheres and planets. For this reason, it is surprising and regrettable that al-Fārābī does not provide more detailed information on the sphere-souls, because he leaves several questions unsettled. Are both the spheres and planets ensouled or are the planets alone ensouled? How many souls does each system possess? Al-Fārābī does not answer

[342] On this point, Ibn Sīnā agrees with al-Fārābī, but Ibn Rushd disagrees with both thinkers. The latter recognizes only the intellects that inhere in the spheres. See Genequand's comments in Ibn Rushd 1984b, 40-41.

[343] There is a strong possibility, however, that al-Fārābī ascribes a soul to each component within a system, i.e., not only to the main sphere, but also to the planet and the smaller spheres responsible for its motion. On this point, however, al-Fārābī's and Ibn Sīnā's cosmologies are particularly ambiguous.

[344] Maróth 1995.

[345] Walzer in al-Fārābī 1985a, 364; and De Smet 1995, 276.

these questions at all in his extant works. Nevertheless, I will have the occasion to return to these issues in the course of my study.

There are, then, nine *thawānī* and nine celestial spheres and sphere-souls, and one Agent Intellect, with a total of nineteen superlunary souls and intellects of different purity and grade.[346] This proliferation of souls and intellects at the superlunary level recalls the metaphysical models of some Neoplatonic thinkers like Proclus, while al-Fārābī's hierarchy of the First Cause, separate intellects, and sphere-souls corresponds essentially (although not numerically) to the triad of One, Intellect, and Soul that can be found in Plotinus' metaphysics.[347] This Plotinian triad is also to be found in most of the *Neoplatonica arabica*, including, and this is more surprising, in the corpora that emerged from Proclus' *Elements of Theology*, such as the *Proclus arabus* and the *Maḥḍ al-khayr*.

Naturally, it may be objected that al-Fārābī is really following Aristotle's (or his understanding of Aristotle's) cosmology as exposed in Book Lambda 7-8, which also presents a First Cause above the heavens (the Unmoved Mover), other lower unmoved movers, and the celestial bodies. This hypothesis may be correct, in spite

[346] Al-Fārābī's celestial scheme shows an ostensible and almost Pythagorean and Platonic concern for numerology and mathematical harmony, despite the difficulty of establishing textual links with these cosmological traditions.

[347] For this reason and as regard the content of al-Fārābī's cosmology, it is difficult to agree with M. Mahdi when he writes that "the complete absence from his [al-Fārābī's] authentic writings of the central Neoplatonic philosophic doctrines—of the One, Intellect, and Soul—should have been sufficient to suggest to students of Islamic philosophy who read him that they were in the presence of a philosopher who made use of certain elements drawn from the Neoplatonic philosophic tradition but whose Neoplatonism must remain suspect" (Mahdi 2001, 3). I think that it is correct to hypothesize that al-Fārābī relied just as much on non-Neoplatonist thinkers such as Alexander than on Neoplatonist ones. But to say that there is a "complete absence of the Neoplatonic philosophic doctrines" is clearly an exaggeration, since the overview of the structure of al-Fārābī's cosmology outlined above emphasizes its triadic nature, namely the One (God), intellect (the separate cosmic intellects), and soul (the sphere-souls). The ontological distinction between a level of intellect and a level of soul in the Neoplatonic fashion is also discussed by al-Fārābī in the *Jamʿ*, where he ascribes this doctrine to Plato as well on the basis of the *Timaeus* (al-Fārābī 2001a, 163). Al-Fārābī's Neoplatonic reading of Plato's cosmology is further revealed when he mentions the soul's emanation (*ifāḍah*) of nature, and the intellect's emanation of the soul. Although al-Fārābī does not construe this term as meaning emanation of being *per se*, the formula nevertheless establishes a strong link with Neoplatonism. Moreover, Chapter V will show that al-Fārābī's theories of intellection are directly modelled on the *Proclus arabus*. Rather than a rejection of Neoplatonism, then, what we witness in the case of al-Fārābī's cosmology is an assimilation and transformation of Neoplatonic ideas.

of the fact that the distinction in the *Metaphysics* between the separate movers, the spheres, and the sphere-souls is not clear and is still a matter of heated debate. Indeed, it is indisputable that Aristotle's description of these various beings in Lambda 7 and 8 is obscure and ambiguous.[348] Moreover, as we shall see in the chapters devoted to intellection and motion, al-Fārābī is indebted to the Neoplatonic tradition in his account of celestial intellection, a fact which strongly suggests that he may have modelled his celestial ontology partly on Neoplatonic sources in addition to Aristotelian ones. Because of the importance of this question, however, I would now like to turn to an in-depth examination of al-Fārābī's sources and try to shed light on the origin of his ennadic model, by focusing especially on the Greek and Arabic versions of Book Lambda and the commentaries attached to this treatise.

[348] It is beyond the scope of this dissertation to analyze this question in any depth and to provide a survey of the Aristotelian scholarship on it. For more information, I refer the reader to some classic studies: Merlan 1946; Owens 1950 (this article provides an overview of the debate before 1950); Wolfson 1958 and 1962; and more recently Broadie 1993; Kosman 1994; Gill 1994; and Beere 2003. What is of interest here is not what Aristotle's original cosmological ideas were like, but how al-Fārābī may have interpreted the *Aristoteles arabus* and used it as a model for his own cosmology.

4. THE ORIGIN OF AL-FĀRĀBĪ'S ENNADIC SCHEME

Having provided an overview of the structure and ontological principles of al-Fārābī's cosmology, I would now like to turn to the question of its sources and its precedents in the Greek tradition. The first steps consist in identifying the most salient features of his model, in analyzing them, and in comparing them to what is known of Greek cosmology. Only then will an assessment of al-Fārābī's originality and of his adherence to the different currents of thought (Neoplatonic, Peripatetic, etc) be possible.

First, the most important features of al-Fārābī's cosmology must be identified. They are: a) al-Fārābī's division of the cosmos into nine principal spheres corresponding to the seven planets, the sphere of the fixed stars, and the outermost sphere, and the postulate of an equivalent number of separate and immaterial intellects that act as causes of motion and existence vis-à-vis these spheres; b) the ensoulment of the spheres, i.e., the theory that the celestial bodies are endowed with a rational soul; c) the nature of the intellection of the heavenly intellects (both the separate intellects and the sphere-souls); d) the relation between motion and intellection.

These questions will be addressed throughout the rest of my dissertation. Broadly speaking, questions b) and c) will be addressed in the section on intellection; question d) in the section on celestial motion; and question a) in the following paragraphs. Because these questions are all interrelated, however, I will have numerous occasions to move back and forth between them. Ultimately, I hope to provide additional insight into the sources that informed al-Fārābī's theories, as well as the role that these cosmological theories play in his philosophy.

Perhaps the most urgent question is the origin of al-Fārābī's division of the cosmos into nine major spheres and nine intellects. The origin of this ennadic cosmological model and the function of the souls and intellects in it represent puzzling issues in the scholarship on al-Fārābī's cosmology and remain some of the most intriguing aspects of his philosophy. Is this model a genuine innovation by al-Fārābī or is it derived from a Greek prototype? Traditionally, al-Fārābī's system has been described as a synthesis of Aristotelian, Neoplatonic, and Ptolemaic elements.[349] But how do these various elements interact? And are there precise precedents in the Greek tradition for this synthesis?

In his commentary on the *Ārā'*, Walzer hypothesized that al-Fārābī based his cosmological model on a nonextant Neoplatonic source, which would have provided him with an already-made cosmological and metaphysical synthesis.[350] However, because Walzer was unable to identify this putative source, his view has been criticized and should no longer be used as a guideline.[351] In his work on al-Kirmānī's cosmology,[352] De Smet has also put forth the hypothesis of the existence of Greek prototypes that would have served as a model for Arabic philosophers. Moreover, De Smet argues that al-Fārābī inherited the Ptolemaic scheme of the planets, into which he basically integrated the Aristotelian theory of the unmoved movers.[353]

At first glance, this hypothesis appears quite reasonable, especially when one remembers that al-Fārābī was conversant with Ptolemaic astronomy. The idea of an eight-sphered or nine-sphered heaven was not only known to al-Fārābī through the *Almagest* and the *Planetary Hypotheses*, but was widespread during his time and in fact constituted one of the main features of the classical Arabic astronomical worldview, as can be seen for instance in al-Farghānī's (fl. 861) *Jawāmiʿ ʿilm al-nujūm wa uṣūl al-ḥarakāt al-samāwiyyah*.[354] Hence, there is nothing surprising in the fact that al-Fārābī would have followed the established astronomical knowledge of his day on this particular point and achieved a synthesis between *Metaphysics* Lambda and

[349] Walzer in al-Fārābī 1985a, passim; Fakhry 2002; Druart 1987a, 1992; and Reisman 2005, 52.
[350] Al-Fārābī 1985a, 363, 365.
[351] See for example Mahdi 1990a.
[352] De Smet 1995.
[353] De Smet 1995, 275-279; see also Walzer in al-Fārābī 1985a, 365 for the Ptolemaic heritage.
[354] Al-Farghānī 1986, 45 ff; unlike al-Fārābī and most of his successors in the Arabic astronomical tradition, however, al-Farghānī only mentions eight spheres.

Ptolemy's cosmological model, just as Aristotle in his day had relied on the model elaborated by Eudoxus and Callipus to devise his spherology.

While this might very well be true, a systematic analysis must be carried out to show exactly how al-Fārābī's ideas relate to the astronomy of the *Almagest* and to the *Metaphysics*. It remains to be shown how his cosmology may have developed out of the Greek texts and especially out of their Arabic translations, which, oftentimes, were closer to being adaptations or reinterpretations rather than mere translations. Furthermore, there is one major problem with the interpretation of Walzer and De Smet. Its implications will be discussed in depth later on, but for the meantime I would like to present its bare outline: *Aristotle posits one unmoved mover per celestial sphere and per celestial motion* in Book Lambda. Now in al-Fārābī's cosmology, it is clear that the planets have more than one motion,[355] yet al-Fārābī posits only one unmoved mover per planetary system, with a total of nine unmoved movers or separate intellects (excluding God and the Agent Intellect).

The problem is compounded by the fact that, as we have seen previously, al-Fārābī probably posits other smaller spheres that are included in each "system," or main sphere, and which each possess a particular motion. How, then, can one separate unmoved mover account for the multiple motions of its corresponding planet or for the motions of the several spheres included in a system? Neither Walzer nor De Smet seems to have taken this problem into consideration. If al-Fārābī had merely applied Aristotle's theory of the unmoved movers to a Ptolemaic model, then he would have included as many movers as the Ptolemaic theories of motion require. But al-Fārābī does not achieve such a synthesis. In order to shed light on this problem, we must begin by analyzing the Arabic sources through which al-Fārābī may have derived some of his ideas. This, I think, is a necessary starting-point to better understand al-Fārābī's cosmological model.

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[355] See Chapter VI, which is devoted to celestial motion, or for immediate reference, al-Fārābī 1982a, 69.

4.1 Al-Fārābī and the Arabic Version of Book Lambda

The most obvious place to begin the inquiry is in Aristotle's Book Lambda, which may have been known to al-Fārābī in at least two different translations. The more important question is the following: is al-Fārābī's hierarchy of the First, the separate intellects, and the sphere-souls derived from Book Lambda, or did he devise this model by synthesizing other, Peripatetic and/or Neoplatonic, elements. Both hypotheses present difficulties. In the case of Book Lambda, one must show that al-Fārābī construed it in a way that resembles his own cosmological scheme.[356] In the case of the Neoplatonic sources, these often discuss Intellect and Soul as self-contained ontological entities, not as particular souls and intellects inhering in the heavenly spheres, so that the transition from this purely Neoplatonic model to al-Fārābī's is neither natural nor obvious.

In order to clarify this question, it seems imperative to closely examine the Arabic versions of Book Lambda and compare them to al-Fārābī's texts. Thanks notably to the works of P. Thillet, M. Geoffroy, and A. Bertolacci,[357] we have a much clearer picture today of the reception of Aristotle's *Metaphysics* in the Arabic world. On the basis of their research, it appears that al-Fārābī could have had access to several translations of Book Lambda, all of which were translated either before or during his life: one by Usṭāth, one by Abū Bishr Mattā, which also contained an incomplete commentary by Alexander of Aphrodisias, and one (possibly) by Isḥāq ibn Ḥunayn.

According to Bertolacci, a terminological comparison between the Arabic translations and al-Fārābī's corpus suggests that al-Fārābī probably used Usṭāth's version of Book Lambda, which is the oldest extant version.[358] Fortunately, this early translation is still partly extant in Ibn Rushd's *Tafsīr* on Book Lambda of the

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[356] This, a priori, is far from certain. Ibn Rushd, for example, in his great commentary on the *Metaphysics*, Book Lambda, interprets Aristotle in a particular way by recognizing only the intellects that inhere in the spheres. See Genequand in Ibn Rushd 1984b, 40-41.
[357] Thillet 2003, Geoffroy 2003, Bertolacci 2005b and 2006.
[358] Bertolacci 2005b, 246, note 56. Ibn Sīnā also used this version; see Geoffroy 2003 and Janssens 2003.

Metaphysics together with a section of Abū Bishr Mattā's translation.[359] In addition, al-Fārābī may have consulted another translation, which was edited by A. Badawī and which has often been called a Neoplatonizing adaptation because it inserts various elements not found in the original Greek and shows some similarity with the *Theology*.[360]

A quick glance at Usṭāth's and Abū Bishr Mattā's translations shows that although they introduce numerous small and not so small departures from the original Greek text, they convey a relatively accurate picture of Aristotle's cosmology as it appears in Book Lambda. For example, in Textus 42, 43, and 44 of the *Tafsīr*, one finds a discussion of the number of unmoved movers, which in Textus 45, 46, and 47 are said to correspond to the number of celestial spheres and whose number is established at 47 or 55.

A few passages in particular explicitly assert the Aristotelian theory of a plurality of unmoved movers: "...then it is necessary that each one of these motions should be caused by something immovable by essence and an eternal substance"[361]; "It is clear that there must be as many substances as there are motions, that they are naturally eternal and immovable in themselves..."[362]; "It must be considered, then, that the unmovable, and also the perceptible, principles, are this many [55 or 47]..."[363] In addition, in Textus 36 the question of the cause of celestial motion is addressed, and the theory that the Unmoved Mover acts as the first object of desire and thought is presented in a manner that mirrors Lambda 7. Finally, Textus 51 defines the First Unmoved Mover as an intellect thinking itself. In spite of the

[359] Ibn Rushd's *Tafsīr* was originally edited by Bouyges in 1948 and has since then been translated in French by Aubert Martin (Ibn Rushd 1984c) and in English by Charles Genequand (Ibn Rushd 1984b). I will be referring to Genequand's translation in my analysis. In this version, Abū Bishr Mattā's translation together with Alexander's commentary spans from Textus 1 to Textus 38 (from about 1069a18 to 1072b18 in the Greek), at which point Usṭāth's translation takes over (Textus 39 to 58). Most of the cosmological-astronomical aspects of Aristotle's account are therefore conveyed through Usṭāth's translation.

[360] Badawī 1947, 1-11.

[361] Ibn Rushd 1984b, 170, textus 43.

[362] Ibn Rushd 1984b, 170, textus 43.

[363] Ibn Rushd 1984b, 184, textus 48.

language difference and the hazards of manuscript transmission, then, Arabic thinkers had access through this translation to some of the most important features of Aristotle's cosmology.

In comparison to Usṭāth's version, the Arabic translation edited by A. Badawī differs quite significantly from the Greek original. Nevertheless, some of the essential features of Aristotle's doctrine in Lambda 7 and 8 come through in the translation: the Unmoved Mover is said to move the spheres only by way of being an object of desire and an object of thought (*wa taḥrīkuhu innamā huwa ʿalā ṭarīq annahu maʿshūq wa maʿqūl…*).[364] Moreover, the heavenly motions are 47 or 55, as are the "unmoved principles" responsible for the spheres' motions.[365] It is noteworthy that the reference to the unmoved movers, described as "principles" (*mabādiʾ ghayr al-mutaḥarrikah*) in this translation, is much more fleeting and obscure than in the Usṭāth translation. In any case, both translations do mention "unmoved principles" or "unmoved movers."

This overview enables us to clarify an important point. If al-Fārābī had access to Usṭāth's translation (and the version given in Ibn Rushd's *Tafsīr* is the closest we can get to the text that al-Fārābī may have used), then he would certainly have concluded that Aristotle posited a whole series of unmoved movers, since this theory is explicitly asserted in this translation.

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[364] Badawī 1947, 5, my translation.

[365] Badawī 1947, 8. The passage immediately preceding the statement on the number of the spheres is missing in the Arabic translation, as is noted by A. Badawī. In this passage, Aristotle provides details about Eudoxus' and Callipus' theories and explains why many more spheres than celestial bodies must be posited in order to properly account for the motions of the planets. Perhaps as a result of this loss in the original manuscript, or perhaps due to the limited astronomical knowledge of the author of this translation, there seems to be a serious confusion in the Arabic. The translation reads: *wa huwa khamsah wa khamsūn aw sabʿah wa arbaʿūn. Fa-ʿadad al-ḥarakāt huwa hādhā, wa kadhālika ʿadad al-jawāhir al-maḥsūsah al-mutaḥarrikah wa al-mabādiʾ ghayr al-mutaḥarrikah.*" (Badawī 1947, 8). The absence of the term sphere (*falak*) and the fact that the translator refers instead to "perceptible substances" (*al-jawāhir al-maḥsūsah)* suggest that he may have misunderstood Aristotle's point here, since the spheres that carry the planets and the other adjacent spheres are not perceptible. There is no mention of "perceptible substances" in the original Greek.

Moreover, al-Fārābī *could* very well have regarded these movers as being separate and not inhering in the spheres.[366] This is confirmed a posteriori by the fact that al-Fārābī identifies the separate intellects as unmoved movers in his *Risālah fī al-ʿaql*.[367] But this view is also implicitly conveyed in the Usṭāth translation. At Textus 41, one reads that "...there is a substance which is eternal, immovable and separate [*mufāriq*] from sensible things [i.e., the first unmoved mover]."[368] Shortly afterwards, in Textus 42, the Arabic Aristotle raises the question of whether "we should posit one such substance or more,"[369] the separability of these substances being assumed. Hence, in addition to the view of several unmoved movers, al-Fārābī may have naturally concluded from the Arabic Lambda that these movers are separate.

However, contrasting evidence may be adduced against the hypothesis that al-Fārābī interpreted Aristotle as postulating several unmoved movers. In some of his other works on Aristotle, al-Fārābī only mentions one unmoved mover. For example, in the *Philosophy of Aristotle*, al-Fārābī writes that

> he [Aristotle] investigated whether or not the principles that move the bodies moving in a circular motion by nature are themselves bodies or whether they are nonbodily essences that are, however, in a material and a body. When he had investigated the case closely, it became obvious to him that that which gives circular motion to the bodies at the limits *is a*

[366] The reason I have stressed the word 'could' is because other thinkers developed divergent interpretations of this text. Ibn Rushd shows much hesitation in his various treatises, but in the *Tafsīr* he seems to opt for only one separate unmoved mover, i.e., God, who is desired by the other intellects inhering in the celestial bodies; see Genequand's introduction (Ibn Rushd 1984b, 40-41). As for Alexander, the evidence is ambiguous. Simplicius in his *De caelo* commentary (Simplicius 2004b, 269,30-270,27) criticizes Alexander for positing only one separate unmoved mover, a fact noted by Sorabji in his preface to the same volume (viii). Genequand (Ibn Rushd 1984b, 41) holds a similar view on Alexander and makes the *Mabādi'* a precedent for Ibn Rushd's position, but Sharples (2003, 198-199) believes that the Greek works of Alexander maintained the existence of several unmoved movers. Upon close examination, however, the passages from Alexander's commentary on the *Metaphysics* adduced by Sharples to prove this point seem to me to be very ambiguous. The question of the number of the separate unmoved movers in the Greek and Arabic Alexander deserves a detailed study.

[367] Al-Fārābī 1938, 34, translated in McGinnis and Reisman 2007, 77.

[368] Ibn Rushd 1984b, 162.

[369] Ibn Rushd 1984b, 168.

> *certain being* [*mawjūd mā min al-mawjūdāt*] that cannot be a nature or a natural thing, or a body or in a body, or ever in a material at all...[370]

And a few pages later, al-Fārābī mentions only a single mover: "...the thing [*al-shay'*] that supplies the heavenly bodies with perpetual circular motion."[371] The point of view expressed in this work can probably be explained by the fact that al-Fārābī's discussion unfolds within the context of natural philosophy and more specifically of Aristotle's *Physics*. If al-Fārābī is commenting on *Physics* 8, then it is normal that he would only allude to one unmoved mover. Yet in the *Risālah fī al-ʿaql*, in a passage dealing with the separate intellects as unmoved movers in which one would expect al-Fārābī to quote Aristotle for support, the only reference one finds appears at the very end of the treatise and is used to establish the identity of God as pure intellect, not to support al-Fārābī's theory of various unmoved movers. Strangely, then, there is no direct and positive evidence in al-Fārābī's works that he interpreted Book Lambda as positing several separate unmoved movers, in spite of the fact that this was probably the case.

But there are other complications. Al-Fārābī posits one mover per principal sphere or system and not, as Aristotle, a mover per motion. If al-Fārābī had read the Arabic translations of Aristotle carefully (which he surely did), he could not have failed to grasp this point, which is conveyed very lucidly by the Usṭāth translation: "It is clear that there must be as many substances as there are motions..." Be it only for this reason, al-Fārābī's model is not completely reliant on Lambda 7 and 8 and shows a marked departure from Aristotle's cosmology. Unlike the Greek and Arabic versions of Book Lambda, al-Fārābī does not posit a mover per motion, but a mover per system or main sphere. Hence, Lambda must be seen as only one of the sources to have informed al-Fārābī's cosmology and one whose contents were transformed and adapted to coexist with other philosophical theories. It is also possible that al-Fārābī's understanding of Aristotelian cosmology evolved over time, and that he moved from the conception of a single unmoved mover in his early works to that of

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[370] Al-Fārābī 1969, 102-103, translated by M. Mahdi (emphasis mine).
[371] Al-Fārābī 1969, 129, translated by M. Mahdi.

multiple unmoved movers in his *Risālah fī al-ʿaql* and in his emanationist treatises. Even then, al-Fārābī is creatively adapting Aristotle's theories to his own cosmology, and not slavishly reproducing a pre-existing model.

The previous analysis has clarified al-Fārābī's understanding of Book Lambda, but it has also created new problems. In particular, two questions remain unanswered: first, on what basis does al-Fārābī describe the unmoved movers as separate substances? We have seen that this view is implicit in Usṭāth's translation, but are there other sources that assert this point more clearly? Second, why does al-Fārābī depart from Lambda and refrain from positing as many unmoved movers as there are celestial motions? A study of the interpretations of Book Lambda achieved by some Peripatetic and Neoplatonic thinkers can shed light on these points.

4.2 Al-Fārābī and the Greek Commentators

4.2.1 Alexander and Themistius

Recent attempts have been made to delineate with greater precision the Greek sources used by al-Fārābī. In an article published in 1995, M. Maróth argued that Alexander's *Mabādi'* and Themistius' *Paraphrase of Aristotle's Book Lambda* exercised a decisive influence on al-Fārābī's cosmology. Maróth contends that Alexander's theories of celestial souls and intellects and Themistius' model of a nine-sphered heaven are key antecedents in the cosmology of Arabic philosophers such al-Fārābī and Ibn Sīnā.[372] Accordingly, these two key texts, when added to the Aristotelian and Ptolemaic legacy, can account for al-Fārābī's 'decadic' scheme and its corollary theories. In the introduction to his translation of the *Mabādi'*, C. Genequand also stresses the relevance of Alexander's work for studying al-Fārābī's cosmology, although the common features he discusses are not the same as those highlighted by Maróth.[373]

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[372] Maróth 1995.
[373] Alexander 2001, 21-22.

Despite several shortcomings, which I will address shortly, Maróth's article sheds valuable light on the relation between al-Fārābī and the work of Peripatetic and Neoplatonic commentators, especially Alexander. It is undeniable that Alexander's *Mabādi'* foreshadows some of the basic ideas of al-Fārābī's cosmology, such as the influence of the heavenly bodies on the sublunary world, the parallel made between the cosmic order and the social order, and the emphasis on the ensoulment of the spheres. More specifically, M. Maróth is right, I think, to trace al-Fārābī's equation between the souls and the forms of the celestial bodies to Alexander,[374] a thinker whom he may have known not only through the *Mabādi'*, but also through other fragments derived from the *Quaestiones*.[375]

In regard to the number of the unmoved movers and spheres in the works of Alexander and Themistius, however, the problem is more complex, and Maróth's arguments rest on shakier grounds. First, Maróth's discussion of this point in the *Mabādi'* remains ambiguous, since it is not completely clear whether according to him the several intellects discussed by Alexander are separate from the spheres or inhere in them. Maróth's analysis is further marred by the fact that he refers to Alexander's commentary on Books Lambda and Nu of the *Metaphysics*, which have been shown to be inauthentic.[376] On the basis of these texts, Maróth argues that Alexander posits 47 or 55 cosmic intellects, which correspond to an equivalent number of spheres and celestial motions.[377]

Maróth's statement that Alexander posits 47 or 55 movers, spheres, and celestial motions is likely to be a misunderstanding that rests on his use of the spurious sections of the *Metaphysics* commentary. In the *Mabādi'*, Alexander does not mention these numbers. Moreover, Maróth nowhere acknowledges the fact that the

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374 Maróth 1995, 108.
375 For the *Quaestiones*, see Alexander 1992b; for its reception in the Arabic context, see Fazzo and Wiesner 1993, Hasnawi 1994, and Sharples 2003.
376 See Dooley's introduction in Alexander 1992a, vol. 1, 3; Alexander 2001, 22, note 38; and Sharples 2003. Only the first five books are by Alexander; the other nine were composed by the twelfth-century commentator Michael of Ephesus.
377 Maróth 1995, 106, 108.

evidence concerning the unmoved movers in the *Mabādi'* is problematic and contradictory, and he unjustifiably projects the information of the spurious *Metaphysics* commentary onto the *Mabādi'*. In fact, the passages of the *Mabādi'* dealing with the unmoved movers are very ambiguous, and it is difficult in the end to establish whether Alexander posits one or several separate unmoved movers. The text contains conflicting evidence that can be used to support both views. In several passages, Alexander argues that since the motion of the heavens as a whole is regular and continuous, there can only be one unmoved mover, which he identifies with God.[378] In contrast, in another passage, he seems to be alluding to several separate unmoved movers.[379] This being said, the balance seems to tilt in favour of there being only one unmoved mover identified with God. This is the conclusion of C. Genequand and G. Endress,[380] who have studied the Arabic version of the text. It should be noted that this reading of the *Mabādi'*, i.e., that there is only one separate unmoved mover that is identified with God, does not completely agree with the information that can be found in Alexander's other works preserved in Greek.[381]

Equally flawed is Maróth's contention that Alexander posits 47 or 55 spheres, a view which again relies on the spurious parts of the *Metaphysics* commentary and which is not developed in the *Mabādi'*. As Genequand notes, the *Mabādi'* seems to put forth a system of eight main celestial spheres.[382] This is confirmed explicitly by the *Quaestiones*, which mentions eight spheres,[383] and implicitly by some passages in Simplicius' commentary on the *De caelo* in which Alexander refers to the "sphere of

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[378] Alexander 2001, 66-71, 87-88.
[379] Alexander 2001, 90 ff.
[380] For Genequand, see Ibn Rushd 1984b, 41; and Alexander 2001, 14: "Thus, on balance and in spite of some uncertainties, the overall evidence definitely weighs against the hypothesis of a plurality of separate movers…" See also Endress 2002; and Sorabji 2005, vol. 2, 340-341, who simply underlines the ambiguity without taking sides.
[381] As I have said before, Sharples believes that the Greek Alexander upheld the theory of several separate unmoved movers; see Sharples 2003, 199, who lists relevant sources.
[382] Alexander 2001, 10, 92-95. Naturally, it is possible and even likely that these eight spheres contain several smaller spheres, but the problem is that Alexander neither says so explicitly in this text, nor how many these spheres would be.
[383] *Quaestio* 1.25.25-30: "There are several spheres of the divine body, and the first and outermost is moved in a simple and single movement by desire for that being; of the seven after it too each is moved by desire and appetition for some being…" (translated by R. W. Sharples). See also Sorabji's preface in Simplicius 2002, x. It is slightly surprising that Maróth does not mention the *Quaestiones* at all.

Saturn" and the "sphere of Venus," thus betraying a simplified spherology which ascribes only a main sphere to each planet.[384] In addition, Bodnár has shown convincingly that Alexander often represents the cosmos as consisting of eight principal spheres, which nonetheless probably comprise several other minor spheres.[385] Hence, Maróth's mention of such a large number of movers and spheres on the basis of the evidence provided by the *Mabādi'* seems unjustified.

Maróth's statements concerning the influence of Themistius' *Paraphrase* on al-Fārābī are even more surprising than his discussion of the *Mabādi'*. Apparently, Maróth was not aware of the existence of Arabic excerpts of this paraphrase, since he writes that it is "among his [Themistius'] works preserved only in Hebrew translation."[386] In fact, R. Brague's edition and translation of the *Paraphrase* based on the Hebrew and Arabic manuscripts was published in 1999, several years after Maróth's article.[387] Yet this does not justify some of Maróth's conclusions. For instance, Maróth mentions that Themistius only posits nine celestial spheres and thus nine celestial movers, and that this innovation was responsible for al-Fārābī's cosmological model.[388] But there is no passage in the Hebrew version, nor in the Arabic version for that matter, which articulates this view, and Themistius plainly develops in Chapter VIII of his commentary a model based on the theories of Aristotle (and indirectly Callipus and Eudoxus), which posits a total of 47 or 55 spheres. In addition, Themistius explicitly states that the number of motions, spheres, and movers must be the same and that therefore the number of movers also amounts to 47 or 55.[389] Finally, although Themistius lived after Ptolemy, he does not mention the Ptolemaic theories of eccentrics and epicycles and most probably

[384] Simplicius 2005, 472,8 ff. and 474,5 ff.
[385] Bodnár 1997, 196-200. Bodnár writes: "My contention then is that Alexander after talking about *the* sphere of Saturn, Jupiter etc., could keep the possibility open to talk, on occasion, about the very same entity as a bundle of different spheres, in whatever pattern they are arranged by a viable astronomical theory" (198).
[386] Maróth 1995, 109-110.
[387] Themistius 1999.
[388] Maróth 1995, 109.
[389] Themistius 1999, 103.

adhered to the homocentric model which he describes in his commentary.[390] How Maróth concludes on the basis of this text that Themistius radically modified the Aristotelian spherology and posits nine spheres and nine unmoved movers is a mystery.

Maróth's comparison between Alexander's, Themistius', and al-Fārābī's cosmologies is therefore undermined by ambiguity and an inaccurate reading of the sources. The picture that emerges on the basis of a fresh examination of the problem is the following. There are few similarities between al-Fārābī and Themistius. Perhaps the main point worth noting is that Themistius posits a plurality of movers. But whereas he mentions 47 or 55 movers, al-Fārābī only speaks of nine celestial movers; and, moreover, Themistius says nothing as to whether these movers are separate or inhere in the spheres.

There are, on the other hand, more important parallels between Alexander and al-Fārābī, although these are not the ones highlighted by Maróth. Alexander appears to have reduced Aristotle's system of 47 or 55 spheres to a simpler system of eight main spheres, although the questions of whether these main spheres contain smaller spheres embedded in them, and if so, how many, must remain open for the time being. In any case, we can see that Alexander effected a simplification of the Aristotelian model that resulted in something much closer to al-Fārābī's own solution.

According to Bodnár, Alexander's attribution of one main sphere to each planet was in fact common practice by his time, and other thinkers, such as

[390] This is also Bodnár's (1997, 203) conclusion and is acknowledged by Brague (Themistius 1999, 102). This being said, there is one odd feature in Themistius' commentary. At one point (Themistius 1999, 88) Themistius seems to make a distinction between the sphere of the fixed stars and the outermost sphere, which, following Aristotle (Λ1072a22-23), he calls the "first heaven." However, for Aristotle the "first heaven" is the sphere of the fixed stars. There are, I think, two possible explanations for this discrepancy: either Themistius interpreted Aristotle through Ptolemy's spherology (as exposed in the *Planetary Hypotheses*), which distinguished between the outermost starless sphere and the sphere of the fixed stars; or the Arabic author responsible for the translation or adaptation of Themistius' paraphrase modified this passage in light of his own understanding of cosmology, which was probably based on the Ptolemaic model.

Adrastus of Aphrodisias and the Platonist Alcinous (who both flourished in the second century CE), had done the same.[391] This way of representing the cosmos, which may have been possible thanks to Ptolemy's work and which may have arisen out of a reaction vis-à-vis the problems inherent in the Aristotelian kinematic model, was transmitted to the Islamic world, since it corresponds to al-Fārābī's spherology in the *Ārā'* and to Ibn Sīnā's spherology in the *Shifā'*, although the two thinkers added an additional sphere. This affiliation with the Greek tradition emphasizes the continuity between Alexander and al-Fārābī and enables us to better grasp the historical origin of the second master's ennadic cosmology.

But this is not all. In spite of the ambiguity of the *Mabādi'* concerning the question of the number of separate unmoved movers, there is a strong possibility that Arabic thinkers such as al-Fārābī and Ibn Sīnā interpreted this text as positing several *separate* movers in addition to the First Unmoved Mover. There is one particular passage in the *Mabādi'* that lends itself to this interpretation:

> Let us posit that the noblest of these things and the most deserving to be the first is the mover of the sphere of the fixed stars [*al-muḥarrik li-kurat falak al-kawākib al-thābitah*] [i.e., Aristotle's First Unmoved Mover]; through the latter it also moves the things moved by it; the following is the mover of the second sphere [*al-muḥarrik lil-kurat al-thāniyyah*], and after it the mover of the third sphere, and so on with all the other things...[392]

In this passage Alexander may be interpreted as positing a separate unmoved mover for each main sphere of his system, although he does not specifically say whether the other movers after the First are separate from or inherent in the celestial bodies. But it is notable nonetheless that Alexander is referring to the main spheres of a simplified model ("the following is the mover of the second sphere..."), and not to the Aristotelian model of 55 spheres. This excerpt thus potentially presents some of the key features of al-Fārābī's and Ibn Sīnā's cosmology.

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[391] Bodnár 1997, 198.
[392] Alexander 2001, 92-95.

In fact, there is a crucial passage in the *Metaphysics* of the *Shifā'* that seems to vindicate this particular reading of the *Mabādi'*. Addressing the thorny question of the unmoved movers in Aristotle's philosophy, Ibn Sīnā writes:

> It is impossible that the first mover of the whole of heaven should be more than one, even though there is for each of the celestial spheres a proximate mover proper to it, and an object of desire and love proper to it, as the First Teacher and *those Peripatetic scholars of attainment after him see it*. *For they deny multiplicity only [in] the mover of all [things] and affirm multiplicity in the movers, both [those] separated [from matter]* [*lil-muḥarrikāt al-mufāriqah*] *and [those] not separated, that specifically belong to each one of the celestial spheres. They thus make the first of the specific separated [entities] the mover of the first sphere*. [This,] for those who preceded Ptolemy, is the sphere of the fixed stars; and, for those who learned the sciences that became manifest to Ptolemy, [it] is a sphere outside the [former] which surrounds it and is without stars. *After this, [they made] the [second of the separated entities] the mover of the sphere that follows the first* in accordance with the difference of the two views, and so on.[393]

Ibn Sīnā in this passage makes clear his belief that not only Aristotle, but also the Peripatetic commentators who came after him, posited several separate unmoved movers (*muḥarrikāt mufāriqah*) to explain celestial motion. He then goes on to add:

> One of his [Aristotle's] followers, who is more sound than [other followers] in what he says, declares and states in his treatise on the *Principles of the Whole* [*fī risālatihi allatī fī mabādi' al-kull*] that the mover of the entire heaven is one, it being impossible for it to be numerically many, even though for each of the spheres there is a mover and an object of desire specifically its own.[394]

Immediately after this passage, Ibn Sīnā exposes the view of another Aristotelian follower, who posits "the existence of a principle of motion belonging specifically to [each celestial sphere] as being an object of love separated [from

[393] Ibn Sīnā 2005, 317,2-15, translated by M. Marmura, revised by me and emphasis mine.
[394] Ibn Sīnā 2005, 317,20-25, translated by M. Marmura, revised by me.

matter],” and concludes that “these two are the closest among the disciples of the First Teacher to being on the right path.”[395]

Ibn Sīnā is here providing examples of specific thinkers who followed Aristotle in asserting separate unmoved movers in their cosmology, something which he praises highly. Now it is very likely that the first follower described by Ibn Sīnā is Alexander, since the former mentions Alexander’s treatise by its title (*fī risālatihi allatī fī mabādi’ al-kull*). If this is the case, as it seems to be, then this excerpt stands as solid evidence that according to Ibn Sīnā, Alexander develops a theory of multiple separate unmoved movers in his cosmology. Although Ibn Sīnā does not specify that these unmoved movers are *separate* [*mufāriqah*] in his implicit description of Alexander’s work, the general context provided by the other quotations above convincingly indicate that it must be the case and that these movers are indeed separate.

On the basis of the foregoing analysis, it would appear that some Arabic thinkers such as Ibn Sīnā, and potentially al-Fārābī, interpreted the *Mabādi’* as positing separate unmoved movers. When this point is connected with the spherology exposed in the *Mabādi’*, which as we have seen may be construed as positing eight main spheres, we reach a cosmic picture of eight main spheres and eight separate movers that corresponds closely to that of al-Fārābī and Ibn Sīnā, both of whom nevertheless added an extra sphere and an extra mover as a result of the Ptolemaic legacy, as Ibn Sīnā explains in the above quotation. I would argue, then, that in spite of its ambiguity, the *Mabādi’* represents a key source in the development of al-Fārābī’s and Ibn Sīnā’s cosmology and may have contributed to their particular interpretation of Aristotle’s theory of unmoved movers as exposed in Book Lambda.[396]

[395] Ibn Sīnā 2005, 317,30-33, translated by M. Marmura.

[396] This being said, the differences between al-Fārābī and Alexander are also significant: Alexander posits eight spheres, whereas al-Fārābī posits nine; Alexander may have adhered to a homocentric model, whereas al-Fārābī was an exponent of the Ptolemaic one. Moreover, the *Mabādi’* cannot account for the very unique function that al-Fārābī ascribes to the separate intellects. The complex theory of twofold and threefold intellection of the sphere-souls and separate intellects found in al-

4.2.2 Simplicius

Simplicius' commentary on the *De caelo* appears to be an equally promising source in understanding the textual origin of al-Fārābī's cosmology. Although there is no evidence that this work was translated either in full or in part, the influence of Simplicius on Arabic philosophy is acquiring increasing credibility as more and more parallels between his ideas and those of Arabic thinkers are emerging.[397] The present enquiry is a case in point. Like Alexander, Simplicius appears to have drastically altered Aristotle's complex spherology. At one point in his *De caelo* commentary, Simplicius writes the following:

> It has not been shown that it [i.e., the heavens] is one sphere (since he [Aristotle] knows that the planetary is different from the fixed and he knows the division of the planetary into several <spheres>), but that there is one cosmos with a system of eight spheres and not several heavens which fill out more than one cosmos.[398]

Although in this chapter of his commentary Simplicius is discussing the impossibility of there being several worlds, he gives a vital piece of information concerning his, and according to him, Aristotle's, conception of the heavens: these can be reduced to eight main spheres, to a "system of eight spheres." Hence, like Alexander, Simplicius, following what seems to have been a fairly common trend in Greek cosmology,[399] presents a simplified model consisting of eight main spheres,

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Fārābī's cosmology is completely absent in the *Mabādi'*. On the other hand, the central concepts discussed in the *Mabādi'* in connection with motion, namely, impulse (*ishtiyāq*), inclination (*mayl*), imitation (*iqtidā'*) and assimilation (*tashabbuh*), are absent in the Fārābīan corpus, although they play an important role in Ibn Sīnā's account of celestial motion in the *Shifā'*.

[397] As early as 1969, Grignaschi had noted interesting parallels between one of al-Fārābī's epistles and a work by Simplicius (Grignaschi 1969, 185-186). Walzer (al-Fārābī 1985a, passim) also refers to Simplicius on several occasions in his commentary on the *Ārā'*. See also Gätje 1982, Stone 2001, and Wisnovsky 2003b. As Hugonnard-Roche (2003, 289) writes: "On ne trouve pas d'attestation d'une traduction arabe du commentaire de Simplicius [on the *De caelo*] chez les bibliographes arabes, mais on ne devrait pas pour autant en conclure trop rapidement que l'ouvrage ait été totalement inconnu: des recherches restent à faire sur ce sujet." See also Vallat 2004, 368.

[398] *CAG*, vol. 7, 435.1-5; translated by I. Mueller in Simplicius 2004a, 435,1-5. The Greek reads ἓν ὀκτάσφαιρον ἑνὸς κόσμου for "one cosmos with a system of eight spheres."

[399] See the previous section on Alexander, and Bodnár 1997.

which, one assumes, contains several other components, such as planets, stars, and perhaps smaller counteracting spheres or epicycles, depending on the nature of his spherology.

But there is another passage in Simplicius' commentary that suggests that he may have accepted a ninth starless sphere. Simplicius writes:

> When I was present in Alexandria, our master Ammonius observed Arcturus using an armillary sphere and found that it had moved forward so much with respect to its position at the time of Ptolemy as to require that it had one degree of contrary motion in one hundred years. So perhaps it would be truer to say that the starless sphere which contains <all the spheres>, of which it seems there was no knowledge at the time of Aristotle, carries around all the other <spheres> with its single simple motion from the east.[400]

In this passage, Simplicius refers to a starless sphere that would be located beyond the sphere of the fixed stars. Although he is not consistent in upholding the existence of this ninth sphere, it would seem nevertheless that Simplicius and perhaps his master Ammonius devised a system of nine main celestial spheres that is identical to the one later adopted by al-Fārābī and Ibn Sīnā. Furthermore, Simplicius discusses in several parts of his commentary the way in which the Ptolemaic theories of the eccentrics and epicycles, or other aspects of Ptolemaic astronomy, can be integrated in this basic framework.[401] That Simplicius thought highly of Ptolemy's achievement is witnessed by his calling Ptolemy "the best of the astronomers."[402] Hence, both Simplicius' spherology and his attempt to reconcile some aspects of Ptolemaic astronomy with Aristotelian cosmology anticipate the efforts of al-Fārābī and other Arabic *falāsifah*.

In addition, Simplicius posits several unmoved movers, and he criticizes Alexander for interpreting Aristotle as positing only one. In one passage of his

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[400] Simplicius 2004a, 462,20-25, translated by I. Mueller.
[401] Simplicius 2005, Chapters II.10, 11, and 12. However, as Sorabji notes in the preface (1-2), Simplicius ascribes the invention of the eccentrics to Pythagoras.
[402] Simplicius 2004a, 456,22.

commentary, for example, he writes, *pace* Alexander, that "...Aristotle does not say that the mover of the revolving body is single, but rather that while the single movement of the fixed [sphere] is caused by the first substance, each of the wandering spheres is moved by an unmoved, eternal substance."[403] Although he does not say so explicitly, Simplicius probably regarded these movers as separate from the celestial bodies, since he criticizes Alexander expressly for his belief in one separate mover, i.e., for recognizing the existence of the first unmoved mover only. In spite of the fact that Simplicius does not specify the number of unmoved movers in his commentary, it is possible to connect this text with the other excerpts discussed above and to hypothesize that he may have ascribed one separate mover to each main sphere, i.e., eight movers excluding God. This being said, his claim that "each of the wandering spheres" (τῶν δὲ πλανωμένων σφαιρῶν ἑκάστην) is moved by an unmoved mover is ambiguous, since Simplicius could be referring in this passage to the main spheres alone or to all the spheres associated with a planet.

Regardless of this ambiguity, Simplicius' work should be seen, together with Alexander's *Mabādi',* as a major precedent for al-Fārābī's model. Simplicius develops a simplified cosmological model consisting of eight or nine main spheres and may have posited an equivalent number of separate unmoved movers. The similarities between the views of the two thinkers are reinforced by the fact that Simplicius, following his master Ammonius, conceives of God as not only a final cause, but also as an efficient cause of creation.[404] God is responsible for the world's (beginningless) generation and sustenance, which is also the view put forth by al-Fārābī in his later emanationist treatises. The world is eternal, yet it depends causally on God for its existence, and it is being continuously sustained in existence by the First Cause.

These parallels strongly suggest the possibility that al-Fārābī was acquainted with the works of thinkers from the Ammonian school, and especially with

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[403] Simplicius 2004b, 270,15 ff., translated by R. J. Hankinson; and *CAG*, vol. 7, 270,15 ff. for the Greek.

[404] For a clear statement of this view, see Simplicius 2004b, 271,12-20. For discussions of final and efficient causality, see R. Sorabji's preface in the same work, p. x; R. J. Hankinson's introduction, 7, in Simplicius 2002; Wisnovsky *EI*^{2}, 2003a, and 2003b; Bertolacci 2005a, 2006; and the relevant articles in *Aristotle Transformed*, edited by R. Sorabji.

Simplicius, who was one of its outstanding members. Apart from the many astronomical parallels highlighted above, these thinkers conceived of Aristotle's God as an efficient cause in addition to a final cause. Perhaps the main difference in their cosmologies is that al-Fārābī makes each separate intellect an efficient cause for the existence and sustenance of its corresponding sphere, while Simplicius seems to reserve efficient causality to God alone. It is difficult to know when the transition from a single efficient cause responsible for the existence of the world as a whole (Simplicius) to the theory that each separate mover or intellect is an efficient cause of existence for each main sphere (al-Fārābī) occurred.

What seems clear, however, is that al-Fārābī's theory is an accentuation of the Neoplatonic tendency of seeing the Aristotelian Unmoved Mover as an efficient cause of creation. Al-Fārābī applies to each separate intellect of his cosmology what Ammonius and Simplicius say about God. In addition, I will argue in the chapter on intellection that al-Fārābī may have been influenced by the noetical theories of Proclus, which ascribe efficient causality to a plethora of noetic entities. But whether al-Fārābī was responsible for this specific doctrinal modification within an Aristotelian framework should remain an open question for the time being.

5. A NEW PROBLEM AND SEVERAL ANSWERS

What emerges clearly from the foregoing discussion is that Alexander's and Simplicius' works anticipate several important aspects of the ennadic system developed by al-Fārābī and later by Ibn Sīnā. The key sources in this picture are Aristotelian and Neoplatonic. The ultimate model for the theory of the separate intellects is Aristotle's Book Lambda, which ascribes a mover to each celestial sphere. As we have seen, al-Fārābī had access to Arabic versions of Aristotle's *Metaphysics* that state this view, and in addition he devoted at least one short treatise to the *Metaphysics*, entitled *The Aims of Aristotle's* Metaphysics, which testifies to his familiarity with this work.[405] However, he may have interpreted the cosmological sections of Book Lambda through the lens of later texts, such as Simplicius' commentary on the *De caelo* and Alexander's *Mabādi'* and *Quaestiones*, which combine some of the metaphysical theories of Book Lambda with a revised astronomical model. Al-Fārābī's fundamentally Aristotelian cosmological picture was thus shaped considerably by the infiltration of Alexander's and the Neoplatonists' ideas. Examples are the simplification of his cosmos to nine main spheres, the existence of an equivalent number of separate unmoved movers, and the notion that the first separate mover, i.e., God, is an efficient cause of creation in addition to being a final cause of motion.

Yet despite these important clarifications, there remains a crucial problem, which is not fully accounted for by the sources, and which modern scholars have apparently failed to notice. Why is there no correlation in al-Fārābī's system between the number of separate intellects and the number of planetary motions and spheres, considering that these intellects are defined by al-Fārābī as movers (sing. *muḥarrik*) in the *Risālah fī al-ʿaql*?[406] In other words, why does al-Fārābī posit only ten separate intellects, in spite of the fact that he recognizes a greater number of celestial motions? If he were truly following the model given in Book Lambda 7-8,

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[405] Al-Fārābī 1982b; and Bertolacci 2001 and 2005a; McGinnis and Reisman 2007, 78-81.
[406] Al-Fārābī 1938, 34.

then he would, like Aristotle, have posited as many movers as there are celestial spheres and motions. Themistius in his *Paraphrase*, for instance, follows Aristotle in arguing that there are 47 or 55 spheres, and then states that "it is necessary that the number of motions be equal to the number of spheres that move, and that the number of motive causes be equal to the number of motions."[407] Why does al-Fārābī depart from the Stagirite and his commentator Themistius on this point and limit the number of movers to nine (excluding the First Cause and the Agent Intellect)?

There are, I think, two plausible answers. The first one is that al-Fārābī conceives of the separate intellects primarily as causes of being and only secondarily as causes of motion. Now each intellect is responsible for producing a main sphere, which may include, as we have seen, stars or a planet as well as other minor spheres embedded within it; that is, each intellect produces a "system" (*jumlah*) to use al-Fārābī's terminology. Unlike in Aristotle and other Greek thinkers where the relation between the spheres and the separate intellect(s) is chiefly one of motion, al-Fārābī establishes a relation of essential causality between them, arguing that each separate intellect causes the existence of its corresponding celestial system. This is why he begins his account in the *Ārā'* by explaining how the spheres are caused, and only afterwards addresses the question of their motion.[408] This also explains why in the *Risālah fī al-ʿaql*, al-Fārābī describes the separate intellects as "movers," but instead of proceeding to a discussion of motion (as one would expect), he focuses solely on the question of the existence and causation of the spheres.[409]

It is this very emphasis on the demiurgic activity of the separate intellects that may explain why al-Fārābī only posits a specific number of such intellects, which does not correspond to the number of planetary motions. By definition, the separate intellects have a dual intellection, and as a result of this dual intellection, they can only produce two distinct causes: one is the cause of the existence of another intellect; the other is the cause of the existence of a main sphere together

[407] Badawī 1947, 19; Themistius 1999, 103.
[408] Al-Fārābī 1985a, 101-135.
[409] Al-Fārābī 1938, 34-35.

with its sphere-soul, i.e., a system. What this means is that the intellects can only produce a limited number of effects, tied as they are to laws of causality. Now if al-Fārābī had wanted to assign an efficient cause to each corporeal component in the heavens (i.e., to all the spheres, planets, and stars), he would have had to introduce a whole plethora of intellects, which would have significantly complicated his account and even represented a threat to its coherence. Moreover, the relation between these many intellects would have been difficult to explain. One can imagine all kinds of problems associated with such an account, e.g., considering that there is a decreasing nobleness of the intellects, how could an intellect responsible for producing a minor sphere within a planetary system simultaneously cause the existence of an intellect which in turn would be responsible for causing a lower yet more important sphere, etc.

It appears that al-Fārābī's priority in devising his system was not the question of celestial motion but of providing a clear and coherent explanation for the existence of the heavens. His main consideration was thus of an ontological order and focuses on the relation between the spheres and the intellects. This shows the gap between the projects of Aristotle in Lambda 7 and 8 and that of the Greek commentators on the one hand, and that of al-Fārābī on the other.

A second line of interpretation focuses instead on the question of motion and has as its starting-point a passage that appears in the metaphysical section of Ibn Sīnā's *K. al-shifā'*. Ibn Sīnā begins by stating the following:

> In sum, it is inevitable that each [of the spheres] that moves for a rational end should have an intellectual principle that intellectually apprehends the First Good and that the essence [of this intellectual principle] is separated [from matter].[410]

[410] Ibn Sīnā 2005, 325,20-23, translated by M. Marmura.

Having associated one separate intellect or mover per sphere, Ibn Sīnā then goes on to discuss whether a separate intellect should be ascribed only to the main spheres or to each individual sphere, including the subordinate ones:

> Thus, the number of the separate intellects after the First principle would be the same as the number of movements. If, in the case of the spheres of the wanderers, the principle of the movement of the spheres[411] of each planet therein is a power emanating from the planets, then it would not be unlikely that the separate [intellects] would have the same number as the number of these [planets]—not the spheres—and their number would be ten, after the First. Of these, the first would be the unmoved mover that moves the sphere of the outermost body, then the one similar to it [that moves] the sphere of the fixed stars, then the one that is like it [that moves] the sphere of Saturn, and so on, terminating in the intellect that emanates on us—namely, the intellect of the terrestrial world, which we call the active intellect. If, however, this is not the case, but each moving sphere has a rule governing its own motion and every star, then these separate [intellects] would be of a greater number. It would follow, according to the doctrine of the First Teacher, that there would be something close to fifty and over, the last being the active intellect. But you have known, from what we have said in the Mathematics, what we have attained in ascertaining their number.[412]

This passage is of primary importance for several reasons. First, it shows that Ibn Sīnā was conscious of the basic tension under discussion, which he probably inherited alongside al-Fārābī's cosmology. In this passage, Ibn Sīnā envisages the possibility of two systems of celestial motion. In the first one, only one separate intellect per main sphere (or system) is posited, and the motion of the other subordinate spheres is explained in terms of a power (*quwwah*) that is emanated (*tafīḍu*) from the planet. In the second model, all the spheres, both the main ones *and* the subordinate ones, are moved by an unmoved mover, as in Aristotle's model,

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[411] Here Marmura translates this term in the singular, although the Arabic gives *kurāt*. This has the unfortunate effect of changing the entire meaning of the sentence, since Ibn Sīnā's point here is based precisely on the distinction between the main spheres of the planets and the other subordinate spheres that they contain.
[412] Ibn Sīnā 2005, 325,30-326,8, translated by M. Marmura, but slightly revised by me.

which attributes a mover per motion and per sphere.[413] Ibn Sīnā's account enables us to confirm not only that the coexistence of these various kinematic models was seen as a genuine problem by medieval Arabic cosmologists, but also that each one of them represented a valid explanation of celestial motion.

Second, it suggests that Ibn Sīnā's awareness of this problem was shared by his predecessor al-Fārābī, although no comparable passage can be found in the second teacher's works. Third, the *Shifā'* passage vindicates the reading that was proposed earlier concerning the main spheres and subordinate spheres in al-Fārābī's system. It indicates that besides the main planetary orbs or sphere, al-Fārābī and Ibn Sīnā posited smaller, subordinate spheres and combined both types of spheres into a single unit whose existence is caused by a separate intellect. Although Ibn Sīnā does not indicate his preference for either system in this passage, it is well known that he followed al-Fārābī and opted for the first theory of ten separate intellects.

Finally, and this is the most important point, this passage enables us to explain why al-Fārābī and later Ibn Sīnā greatly reduced the number of movers and posited only one separate intellect per system, and not per sphere or motion: they may have developed a particular theory of celestial motion that did not require the 47 or 55 movers mentioned by Aristotle, and which in contrast involved the existence of powers emanating from the planet embedded in each system.[414] It is possible that al-Fārābī devised a kinematic model akin to the one described by Ibn Sīnā in this passage. Apart from his postulation of just nine intellects involved in planetary motion, this view seems supported by al-Fārābī's use of the concept of *quwwah* in his cosmology. But more will be said about this in Chapter VI.

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[413] And this would be true regardless of whether one adheres to a homocentric or Ptolemaic model. What is important here is the attribution of one mover per sphere and motion, regardless of whether these spheres are counteracting spheres, eccentrics, etc.

[414] This point will be examined in more detail in the chapter on motion. For the time being, I will also assume that Ibn Sīnā adopted a similar ennadic cosmological model, although I will challenge this hypothesis in Chapter VI.

The two interpretations I have proposed, which, it should be noted, are not mutually exclusive, can account satisfactorily for the fact that al-Fārābī departs from Book Lambda and does not posit a separate principle per heavenly motion and per celestial sphere, but simply one separate intellect per "system." By making each intellect the efficient and final cause of the corporeal and incorporeal elements of a celestial system, al-Fārābī is displaying a great economy of intelligible principles, a kind of Ockham's razor adapted to his cosmology. Unlike Proclus, who posits a plethora of immaterial, intelligible principles, al-Fārābī, I believe, aims to establish a balance between the deductive and the inductive, between experience and observation on the one hand and theoretical thought on the other, and both are to meet midway methodologically in his cosmology. Understandably, al-Fārābī does not want to posit more principles than are necessary to explain the world of nature and the existence of the heavens. He achieves a much more unified synthesis between induction and deduction than does Proclus, for example, whose innumerable deities and other intelligible principles do not have an exact corporeal counterpart. The symmetry in al-Fārābī's system between the intelligible entities and the created, visible effects of these entities (embodied in the heavenly bodies), suggests a careful and well-thought-out theorizing of this problem in his philosophy.[415]

Whether related to issues of existence or motion or both, al-Fārābī's choice to limit the number of separate intellects and unmoved movers to nine (excluding the Agent Intellect) was to have a lasting influence in Arabic philosophy. Al-Fārābī was the first thinker in the Arabic tradition to propose this new cosmological model. In order to achieve it, he probably relied on the works of ancient thinkers, such as Alexander and Simplicius, who anticipated his simplified spherology. Indeed, the presence of nine systems or main spheres, the theory of the ensoulment of the spheres, the existence of separate intellects responsible for their motion and

[415] Ibn Sīnā definitely inherited al-Fārābī's approach, for as he explains on several occasions, the number of unmoved movers or separate intellects must be established by the art of astronomy and therefore through observation. The number of unmoved movers is intimately connected with the number of perceived planetary motions and celestial bodies. See Ibn Sīnā 2005, 14-15; 326,7-8.

existence, the attempt to reconcile Ptolemaic theories of motion with metaphysical ideas, are features that can be traced partially to works such as Alexander's *Mabādi'* and Simplicius' commentary on the *De caelo*. Ultimately, some of these features harken back to Aristotle's Book Lambda, but it is clear that al-Fārābī's interpretation of this text was mediated by several layers of subsequent exegesis, both Peripatetic and Neoplatonic.

Despite the variety of the sources underlying al-Fārābī's cosmology, all are integrated in a unified and coherent system. No philosopher before him seems to have devised such a clear and condensed synthesis of Aristotelian, Neoplatonic, and Ptolemaic elements. This suggests that although several aspects of al-Fārābī's cosmology can be found in the Greek tradition, there is no reason to doubt the originality of his cosmological project. Al-Fārābī was responsible for elaborating a profoundly innovative synthesis of the various trends that flourished in late antiquity.[416] In his desire for philosophical reconciliation, he may be seen as continuing the effort of late-antique thinkers such as Ammonius and Simplicius. These hypotheses will be further substantiated by the analysis of al-Fārābī's theories of celestial substance, intellection, and motion.

[416] Maróth (1995, 111) holds a similar view, although I disagree with the reasoning and analysis leading to his conclusion.

IV. CELESTIAL MATTER

1. THE NATURE OF CELESTIAL MATTER

1.1 Al-Fārābī's Terms for Matter and the Peripatetic Terminology

We have seen in Chapter II that the vocabulary used in the *Ārā'* and *Siyāsah* to describe the celestial bodies is ambiguous because it possesses a marked analogical quality. Form, matter, soul, and substrate are used both in a sublunary physical context and in a superlunary cosmological context in al-Fārābī's philosophy, and, as such, they are homonymous terms. But the terminological ambiguity of these treatises may also be due to the fact that al-Fārābī had to adapt Arabic words to express certain cosmological concepts that he developed from his contact with the Greek commentatorial tradition. It seems that he was the first or one of the first Arabic philosophers to endow common Arabic words with a specific cosmological and metaphysical meaning: this seems to be the case of substrate (*mawḍūʿ*).

Al-Fārābī's hylic vocabulary testifies to the extent to which he was aware of terminological issues. While al-Kindī often uses the transliterated term *hayūlā* to render the Greek ὕλη, his *Risālah fī ḥudūd al-ashyā'* also includes entries for *ʿunṣur*[417] and *ṭīnah*,[418] terms whose exact meaning are difficult to establish despite al-Kindī's definitions. In fact, al-Kindī does not appear to have been very discriminating in his choice of terms. Al-Fārābī on the other hand shows a particular awareness of the semantic nuances of Arabic. In the *K. al-ḥurūf*, he explains that *ʿunṣur* may refer to both 'element' and 'matter' and is therefore an ambiguous term, which is why he avoids it.[419] In most of his writings, al-Fārābī uses *hayūlā* and *māddah* (pl. *mawādd*),[420]

[417] Al-Kindī often uses this term in his philosophy; see for example al-Kindī 1950-53, 219-220 and 257.
[418] The term *ṭīnah* is of Qur'anic origin, and connotes concrete, physical matter. See Wolfson 1947-48.
[419] Al-Fārābī 1970, section 156, p. 159.
[420] *Mawādd* occurs in many places in the Fārābīan corpus: al-Fārābī 1964, 41; al-Fārābī 1938, 19; al-Fārābī 1970, 99-100; al-Fārābī 1991, 34; al-Fārābī 1992, 63. Ibn Sīnā also uses this plural, as in the *Kitāb al-najāh* (Ibn Sīnā 1985, 312, l. 13). It is difficult to perceive any difference in meaning between *māddah* and *hayūlā*. One is tempted to distinguish between a notion of physical, corporeal matter (*māddah*)

although the latter term is by far the most common. Unlike *hayūlā*, which is a transliteration of the Greek ὕλη, *māddah* is an Arabic term meaning 'stuff' or 'substance.'

Al-Fārābī's choice of terms is certainly not random. The fact that he avoids *ʿunṣur*, for example, is significant, because this term often expressed the concept of intelligible matter in the Pseudo-Empedoclean tradition and the early Arabic doxographies.[421] Al-Kindī uses it in a somewhat idiosyncratic fashion to refer to "the matter of everything,"[422] and it is not impossible that his definition was influenced by Pseudo-Empedoclean or Ismāʿīlī ideas. In opposition, al-Fārābī uses the same word (*māddah*) for both terrestrial and celestial matter. For example, in the *Iḥṣā'* and the *Against Philoponus*, *māddah* refers to Aristotle's aether.[423] By doing so, he might have wanted to distinguish clearly his conception of matter from the intelligible matter of these Neoplatonizing traditions. In addition, unlike *ʿunṣur*, the term *māddah* does not entail any possible confusion between matter and the sublunary elements, often called *ʿunṣur* (pl. *ʿanāṣir*).

This suggests that al-Fārābī wanted to maintain the characteristic Peripatetic division of the cosmos into two spheres on the basis of a radical difference between superlunary and sublunary matter. By al-Fārābī's time, a rich vocabulary had developed to mark the difference between these two matters. Some called it aether, others pure fire, first substance, or the fifth nature. Quite surprisingly, however, al-Fārābī consciously avoids these terms in his personal works. At first glance, it is puzzling that in the numerous cosmological passages of his emanationist treatises, which discuss the heavenly bodies in depth, al-Fārābī never mentions the terms

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and one of material potency (i.e., matter as potency=*hayūlā*), but this distinction does not seem to be vindicated by the textual evidence in any consistent fashion. One of the reasons for this is that in the sublunary world, there is an almost perfect equation between matter, possibility, and potency.

421 De Smet 1998 discusses *ʿunṣur* in depth. See also Rudolph 1989, 37; Jolivet 1995; and Netton's and Gardet's articles in *EI*².

422 Al-Kindī 1950-53, 166.

423 Al-Fārābī 1949, 96 and Mahdi 1967, passim.

'ether,' 'first body,' and 'fifth nature.' Even in his "curricular works,"[424] there is a glaring omission of this terminology. Yet we know that al-Fārābī knew the doctrine of aether, since he mentions the *De caelo* several times in his corpus and even wrote a (no longer extant) commentary on it.

The complete omission of this terminology need not indicate that al-Fārābī rejected the theory of aether. Combined with the evidence drawn from his treatises, however, it raises the possibility that he substantially transformed Aristotle's doctrine.[425] If one approaches al-Fārābī's philosophy with the assumption that he merely received and preserved a genuine model of the Aristotelian cosmos, then this omission proves difficult to explain. Conversely, if one assumes that al-Fārābī creatively transformed the theories that reached him, then the omission of this terminology may point to a redefinition of celestial matter in al-Fārābī's cosmology. It is inconceivable that if al-Fārābī adhered to the Aristotelian theory of the fifth substance, he would not have defined or described it at least once in his works. Al-Fārābī addresses the question of heavenly substance in virtually all of his personal works, but what he says in them shows a reticence to accept the Aristotelian theory of aether and a desire to provide a different interpretation of celestial substance. It is to al-Fārābī's ideas on celestial matter and substance that I would now like to turn.

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[424] I borrow this classification from Reisman 2005, 69, note 9. The curricular works are those in which al-Fārābī exposes the doctrine of other philosophers, especially Aristotle. They can be compared to al-Fārābī's other, assumedly more mature, emanationist treatises.

[425] The question of how to interpret Aristotle's aether is controversial and puzzled most of the late-antique commentators, just as it puzzles modern historians. Exactly what kind of matter aether is, the role it plays in celestial motion, the extent to which it is reconcilable with the theory of unmoved movers in Book Lambda, and whether there are several grades of aether are questions that are still unclear. Throughout intellectual history, evidence gleaned from various Aristotelian texts was assembled to defend very different interpretations. On the one hand Aristotle calls aether the "first body" and often discusses it as if it were another element, albeit with different properties, as in *De caelo* I.2-4. Moreover, the celestial bodies are visible, and Aristotle equates visibility and materiality. These points suggest that Aristotle conceived aether as something material and corporeal. On the other hand, in *Metaphysics* XII.2.1069b25, he suggests that the heavens may have matter that should be understood exclusively as potency for motion in place, while at VIII.4.1044b5-8 he suggests that some natural and eternal beings may have no matter, or, again, only matter for motion in place. This ambiguity in Aristotelian doctrine was used as the starting point for subsequent Peripatetic and Neoplatonic exegesis on the question of celestial matter. For more information on aether and its relation to other aspects of Aristotelian cosmology, see Jaeger 1948; Moraux 1963; Moraux' introduction in Aristotle 1965; Strohmaier 1996; and Guthrie 2000, xv ff.

But first it is necessary to assess and criticize Walzer's interpretation of celestial matter in the *Ārā'*.

1.2 Criticism of Walzer's Theory of Intelligible Matter

Walzer's commentary on the *Ārā'* represents the only attempt to explain al-Fārābī's ideas on celestial substance as they appear in his emanationist treatises.[426] Although Walzer's work has been seriously criticized by later scholars,[427] it must be praised for having identified some of the key problems in al-Fārābī's cosmology and attempted to solve them in terms of both the Greek heritage and the Islamic context. In spite of the fact that Walzer's two principal theses concerning the *Ārā'*, namely, that it is completely dependent on a lost Greek source and that it embodies hidden Shī'ī doctrines, have been rightly rejected, his attempt to account for some of the main contradictions in al-Fārābī's theories through careful source criticism deserves attention. This is the case in particular with his theory of al-Fārābī's intelligible matter, which is very compelling in spite of the fact that it does not hold together under close scrutiny.

Having realized that al-Fārābī does not adopt a conventional view of heavenly matter as aether,[428] Walzer argues that the second master developed a concept of intelligible matter, which he derived from Neoplatonic sources. He writes: "Al-Fārābī is quite aware that Aristotle had introduced a fifth element, aether, being the element from which the stars are made, but he deliberately abandoned the Peripatetic dogma by substituting for aether the 'quinta essentia,' the neo-Platonic 'spiritual intelligible matter', the *noētē hylē*, and making it in turn

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[426] Arnaldez 1976, 60 argues that al-Fārābī adopted the aether theory in his emanationist treatises, but no arguments are given in support of this view. As we shall see, al-Fārābī departs significantly from Aristotle's "first body" as presented in the *De caelo*.
[427] See, for instance, Mahdi 1990a, who discusses the several shortcomings of Walzer's edition, translation, and commentary in depth.
[428] Walzer in al-Fārābī 1985a, 11. This also is the opinion of De Smet: "La notion aristotélicienne de la quintessence, rejetée par Plotin et les néoplatoniciens ultérieurs, est absente chez Kirmânî, ainsi que chez Fârâbî" (De Smet 1995, 314, note 9).

the 'cause' of the four elements."[429] Intelligible matter has a complex history both in the Greek and Arabic traditions, which probably finds its source in the Neoplatonic exegesis, and in particular in Plotinus' interpretation, of Aristotle's brief and tantalizing mention of this term in his *Metaphysics*.[430] Regardless of the question of origins, Walzer's arguments seem to rest on insufficient textual evidence. The first and perhaps the main objection to Walzer's argument is that al-Fārābī never mentions intelligible matter. To my knowledge, not once does this expression or any other identical to it (such as 'intellectual,' 'spiritual,' or 'conceptual matter'), appear in the Fārābīan corpus. This is particularly problematic, because the Arabic thinkers who do develop such a concept use specific terms to refer to it, such as *ʿunṣur awwal* and *hayūlā ūlā wahmiyyah*.[431] Hence, although al-Fārābī expressly treats the problem of celestial substance, he deliberately refrains from using a type of terminology associated with intelligible matter, which would surely have been known to him.

Moreover, Walzer seems to have misunderstood the exact status of intelligible matter in the Neoplatonic legacy that he claimed was bequeathed to al-Fārābī. He unjustifiably equates intelligible matter with celestial matter, thus passing over the fact that for most Neoplatonists intelligible matter is *not* the matter

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[429] Walzer in al-Fārābī 1985a, 370; see also 375-376.
[430] *Metaphysics* VIII.6.1045a33 ff.. Intelligible matter has recently been the subject of several studies in the Arabic tradition, notably by D. De Smet, who devotes a long chapter to the genealogy of this concept in the Neoplatonic background and its naturalization in the Islamic context. See De Smet 1995 and especially De Smet 1998, 96 ff.; Jolivet 1995; Walker 1993, 54, and 1999, 95-97; and Gardet *EI²*. These studies shed light not only on the impact of this concept in Islamic philosophy, but also on the question of its mode of transmission from the Greek to the Arabic world. For the Shīʿī tradition, see Corbin 1971-72, vol. 3, 323-329; vol. 4, 200, 267 ff. Whether the connection between Shīʿī philosophy and intelligible matter was originally a factor that influenced Walzer's contention that al-Fārābī developed such a theory is a question worth asking. Since Walzer is keen to interpret al-Fārābī as a crypto-Shīʿī, one wonders if he consciously advanced his theory of intelligible matter as an attempt to strengthen the link he sees between the second master and Shīʿīsm. It is more likely, however, that Walzer's ascription of the theory of intelligible matter to al-Fārābī rests on another presupposition and contention. In his commentary, Walzer is particularly eager to relate al-Fārābī to the Neoplatonic background of late-antique philosophy and to define him as a Muslim representative of this Greek school. Since intelligible matter plays a significant role in the systems of Plotinus, Iamblichus, and Proclus, Walzer uses this opportunity to emphasize the links between these thinkers and al-Fārābī, but provides no satisfactory analysis of the sources al-Fārābī could have used.
[431] These terms appear in the doxography of Pseudo-Ammonius (Rudolph 1989, 37) and the *K. al-iṣlāḥ* of Abū Ḥātim al-Rāzī (1998, 39) respectively. In the first work, which ascribes the doctrine of intelligible matter to Empedocles, *ʿunṣur awwal* is described as "the first of the simple intelligible [things]" (*awwal al-basīṭ al-maʿqūl*).

of the heavens. According to Plotinus, for example, the heavens are made of a pure kind of fire, but intelligible matter belongs to the intelligible world that is emanated directly from the One and represents a proto-stage of the formation of the Intellect. Hence, for Plotinus, intelligible matter pertains to the level of the Intellect, whereas celestial matter is emanated from the World Soul and is below it in the hierarchy of being. Intelligible matter is, as its name indicates, beyond the realm of the corporeal and the perceptible and thus beyond the heavens which are under the level of the Soul, the true beginning of corporeal, physical matter. This is also how most thinkers in the Arabic tradition seem to have understood intelligible matter: they make it an emanation of the First Cause, sometimes even, as in the case of the *Doxography* of Pseudo-Ammonius, the very first intelligible being to proceed from God.[432]

That Walzer's theory contains a major flaw in this regard cannot be denied. He does not explain how and why intelligible matter should be conceived of as a perceptible thing, which it surely is if it is the matter of the heavens. Nor does he address the question of exactly how al-Fārābī would have effected this conceptual transition from the Neoplatonic model he posits. For these reasons and despite the temptation of attributing this theory to al-Fārābī, a temptation that naturally occurs when one is faced with the ambiguity of the second master's ideas on celestial substance, it is necessary for the time being to reject Walzer's contention as unsound.[433] His interpretation is undermined partly because he endeavoured to ascribe a positive meaning to the views that al-Fārābī communicates through analogical language. However, I think that greater attention should be paid to the nature of al-Fārābī's philosophical terminology in these passages and especially to his use of analogy.

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[432] The entry on Empedocles reads: "*fa-abdaʿa al-shay' al-basīṭ alladhī huwa awwal al-basīṭ al-maʿqūl wa huwa al-ʿunṣur al-awwal…*" (Rudolph 1989, 37).

[433] De Smet 1995, 283 argues that the concept of intelligible matter is not found in the systems of the *falāsifah*. This is one of the differences between al-Kirmānī and al-Fārābī: "Kirmânî se distingue donc de Fârâbî pour autant qu'il admet une matière spirituelle dans le monde intelligible…" (314).

It is now time to turn to a fresh examination of what al-Fārābī says about celestial substance in his corpus. The problem is rendered quite complex by the fact that the second master's views on the topic are not consistent and are even at times contradictory. For this reason and in order to offer a comprehensive account of the problem, I have decided to divide my survey into two sections. First, I will examine the few passages in which al-Fārābī seems to uphold an Aristotelian theory of celestial matter, as well as "literal" hylomorphic theory about heavenly substance. Second, I will analyze what appears to be a modified view of celestial matter based on the concept of substrate, which is articulated in the emanationist works. Later testimonia are also taken into account. It is notable that these two views never appear alongside each other in the same work, but correspond to two groups of texts. This suggests the possibility of a shift or evolution in the second master's doctrine over time.

1.3 The Nature of Celestial Matter: A Survey

1.3.1 The Fārābīan Corpus

1.3.1.1 The *Iḥṣā al-ʿulūm*

Al-Fārābī states in the *Iḥṣā*' that the second part of the physical science studies simple substances, whether these exist, how many they are, and other such questions. According to al-Fārābī, the term "simple bodies" (*ajsām basīṭah*) encompasses not only the four sublunary elements, fire, air, earth, and water, but also the matter of the heavens, which in the Peripatetic tradition is considered a fifth simple substance. As al-Fārābī says, physics studies "the heavens and its various parts as being made of a certain one matter [*māddah mā fīhā wāḥidah*]."[434] The inclusion of the celestial substance in the inquiry of the physical science is in line with the *De caelo* tradition of the late-antique period, which al-Fārābī here follows. In fact, he refers explicitly to the first book of Aristotle's work: *wa huwa fī al-juz' al-*

[434] Al-Fārābī 1949, 34.

awwal min al-maqālah al-ūlā min kitāb al-samā' wa al-ʿālam.[435] Furthermore, the use of the term *māddah* to signify celestial matter is important because it is one of the very rare places where al-Fārābī refers unambiguously to the heavens as being material. As we shall see, al-Fārābī avoids the notion of a material heaven in his emanationist works.

1.3.1.2 The *Philosophy of Aristotle*

This work, which purports to provide an overview of Aristotle's philosophy, contains an important passage expressing al-Fārābī's understanding of Aristotle's aether theory. Al-Fārābī writes that "he [Aristotle] explained that there are five *primary simple bodies* that constitute the world...One of them is the outermost body that moves in a circular motion: the remaining four have common material but are different in their forms: the fifth differs from these four in both its material [*māddatihi*] and its form [*ṣūratihi*], and is the cause [*sabab*] of the existence of these four..."[436]

Although this might seem like a faithful exposition of Aristotle's theory of the elements, there are in fact a few notable points that particularize al-Fārābī's summary and signal a departure from Aristotle. First, it is clear that al-Fārābī attributed to Aristotle the view that the heavenly bodies are material and composite, because, according to his account, aether possesses a different "form" and a different "material" than the sublunary elements. This is slightly surprising, since Aristotle does not specify anywhere in his works that aether is a compound of form and matter, and in fact he presents the fifth element as an absolutely simple substance. Al-Fārābī's wording here can perhaps best be explained in terms of the influence of ancient commentators, who often debated about whether or not the heavenly bodies are simple substances. In any case, aether is defined in this passage as a composite substance.

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[435] Al-Fārābī 1949, 34. This passage and the one preceding it are in brackets in the Arabic edition and do not appear in all the manuscripts.
[436] Al-Fārābī 1961, 99; and al-Fārābī 1969, 104, translated by M. Mahdi.

Second, the idea that aether is the "cause" (*sabab*) of the other sublunary elements also appears as an addition to the original Aristotelian doctrine.[437] True, Aristotle in the *De generatione* II.10 explains that the sun plays an important role in the generation and corruption of sublunary bodies. But he does not explicitly make the heavens the cause for the existence of the sublunary elements and sublunary matter. Hence, this passage does not merely convey Aristotle's ideas but also betrays a subtle transformation of the Aristotelian doctrine.

1.3.1.3 The *Jamʿ*

There are no explicit references to the nature of celestial matter in the *Jamʿ*, but there is nevertheless a passage in which al-Fārābī ascribes the theory of God's absolute creation of matter to Aristotle on the basis of the *Theology*. The implications of this attribution will be discussed later on.

1.3.1.4 The *Against Philoponus*

This treatise offers interesting but ambiguous information about al-Fārābī's understanding of the aether theory. The context is a defense of Aristotle's cosmology against Philoponus' attacks. Philoponus criticizes Aristotle's aether theory in order to undermine his doctrine of the eternity of the world. Al-Fārābī retorts that Aristotle's intention is not to prove the eternity of the world but merely to explain the difference between aether and the other four elements. At one point in the treatise, al-Fārābī says:

> Thus by some of those statements Aristotle explained that the form [*ṣūrah*] of that part of the world which is the body that moves with a circular movement is not the same as the form of any other part of the world; by others it becomes evident that not even its material [*māddah*] is the same as the material of [any other part of the world]; and by [still] others it

[437] Davidson 1992, 48, 63-64, has already noted this particularity of al-Fārābī's interpretation of aether.

> becomes evident that its material is not the same as the material of anything at all of the bodies in general, whether parts of the world or a body whose position is outside of these.[438]

In this passage al-Fārābī explicitly refers to some well-known Aristotelian theses: that the heavens are made of a unique element that is different from sublunary elements, and that the heavens move in a circular motion. What is more surprising is al-Fārābī's mention of both the form (*ṣūrah*) and matter (*māddah*) of the heaven, which implies a hylomorphic composition in the superlunary world, and which would seem to go against the notion of the perfect simplicity of the heavenly bodies. This passage is to be compared to al-Fārābī's description of the *De caelo* in the *Philosophy of Aristotle*, where he also mentions the form and matter of the heavens. Despite the polemical nature of the *Against Philoponus*, one may safely conclude that al-Fārābī is not only defending Aristotle's cosmology against the attacks of the Christian philosopher-theologian, but that he himself adhered to the aether theory or a variant of it.

Hence, the *Iḥṣā'*, the *Philosophy of Aristotle*, and the *Against Philoponus* have in common the fact that they explicitly ascribe matter (*māddah*) to the heavens and refer to Aristotle's aether theory as it is discussed in the *De caelo*, sometimes mentioning this work by its title. In these works, al-Fārābī exposes and, one assumes, endorses this vital feature of Aristotelian cosmology.

1.3.1.5 The *Ārā'* and the *Siyāsah*

A more elaborate and very different view of celestial matter is presented in the *Ārā'* and the *Siyāsah*. In the *Ārā'*, al-Fārābī provides a general description of the organization and nature of the celestial bodies. These bodies, he tells us, possess a form (*ṣūrah*), which is also their soul (*nafs*), and a substrate (*mawḍū'*) in which this form inheres. Although these celestial substrates can be compared to the sublunary substrates of material beings, they are not *stricto sensu* material, but rather resemble

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[438] Al-Fārābī 1972, 273; and Mahdi 1967, 254, translated by M. Mahdi.

matter. As al-Fārābī writes, the celestial bodies "have substrates that resemble [*tushbihu*] the matters laid down to bear the forms [*al-mawādd al-mawḍūʿah li-ḥaml al-ṣuwar*]."[439] Unlike the sublunary material substrates, which can receive many contrary forms, the celestial substrates can receive only a unique form and do not suffer from the contrariety associated with matter, i.e., change and corruption. This unique form is different in each celestial body and is essentially an intellect (*ʿaql*).[440]

Now the terms "matter" (*māddah*) and "substrate" (*mawḍūʿ*) are common in al-Fārābī's physics and were part and parcel of the technical philosophical vocabulary of his day. Al-Fārābī follows the Peripatetic tradition according to which sublunary beings are a compound of matter and form. Their matter is defined as a substrate that receives form. In the *Ārā'* al-Fārābī explains these principles by citing the stock example of the wooden bed: matter is the wood of the bed, form its shape. He then writes: "Matter, then, serves as substratum for the subsistence of form….,"[441] meaning that the form of the bed inheres in its matter. Both form and matter make up a compound and as such are indistinguishable one from another. Hence, in the sublunary world, substrate and matter are closely related and even identical.[442]

In the cosmological context of the *Ārā'*, however, the relation between form, matter, and substrate is not the same as in sublunary physics. Al-Fārābī does not explicitly ascribe matter to the celestial bodies and uses the term *mawḍūʿ* instead of

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[439] Al-Fārābī 1985a, 120, translation by Walzer, but revised by me. The use of analogy in this passage makes it clear that Walzer's translation of the previous sentence *wa hādhihi tujānis al-mawjūdāt al-hayūlāniyyah* as "These celestial bodies belong to the same genus as the material existents…" is an inadequate literal rendition of al-Fārābī's argument. Since the heavenly bodies belong to another genus than the sublunary existents, as the *Siyāsah* (al-Fārābī 1964, 31) states, a more accurate translation of *tujānis* would be "resemble" or "are like."

[440] Walzer in al-Fārābī 1985a, 120-123: the substrates do not "prevent their forms from thinking and from being intellect in their essences."

[441] Al-Fārābī 1985a, 109.

[442] Nevertheless, al-Fārābī sometimes maintains a distinction between matter and substrate in the sublunary world. An instance of this occurs in the *Risālah*, where he defines substrate both as a body (i.e., the matter of a body) and a power or capacity in a body: *wa ẓāhir anna al-mawḍūʿāt…immā ajsām wa immā quwwā fī ajsām…* (al-Fārābī 1938, 33). A few lines below, al-Fārābī mentions that the celestial bodies provide the Agent Intellect with both the matters (*mawādd*) and the substrates (*mawḍūʿāt*) necessary for it to act (al-Fārābī 1938, 34). Hence, the definition of substrate seems broader than that of matter, even in the sublunary world where the two concepts are intricately related.

māddah throughout his account. Moreover he simply notes that the celestial substrates "resemble" the sublunary matters (*mawādd*) in their capacity to receive form, thus resorting to analogical language to compare them. But the analogy between heavenly and sublunary substrates ends here, for besides this capacity to receive form, the two types of substrates share nothing else. The sublunary substrates are material precisely by virtue of their capacity to receive different forms. As al-Fārābī writes, "...what has a contrary has a matter common to it and to its contrary."[443] Contrariety and potency affect sublunary substrates, but the celestial substrates are affected by neither. Because the heavenly bodies do not accept contrary forms, they cannot be made of the same potential matter that composes sublunary beings. Moreover, the form of the heavenly body is also essentially different from that of sublunary beings, since in the case of the former it is unique and is a soul, whereas in the case of the latter it may be replaced by an opposite one.

Hence, substrate and matter are synonymous when applied to sublunary existents, but they must be distinguished in a cosmological context. Al-Fārābī also gives many hints through his metaphysical account that substrate is semantically broader than matter, for example when he discusses the essence of God. He explains that "[God's] existence is devoid of every matter and every substrate [*bal wujūduhu khalwun min kull māddah wa min kull mawḍūʿ*]."[444] In another passage, al-Fārābī reiterates this distinction: the heavenly body "is distinct from the First and from the ten 'separate' intellects which are free from matter and any substratum [*yufāriqu al-awwal wa al-ʿishrah al-mutakhalliṣah min al-hayūlā wa min kull mawḍūʿ*]."[445] These passages show that a thing may be in a substrate while not at the same time being in matter, and that al-Fārābī is careful to distinguish between them.

Al-Fārābī's description of heavenly substance in the *Ārā'* is inherently ambiguous. He says neither that these substrates are completely immaterial, nor

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[443] Al-Fārābī 1985a, 114-115.
[444] Al-Fārābī 1985a, 58-59.
[445] Al-Fārābī 1985a, 123.

that they are material. As we have remarked above, the terminology usually associated with the Aristotelian concept of heavenly matter ('ether,' 'first body,' 'fifth nature') is absent in al-Fārābī's accounts, and the *Ārā'* is not an exception to this rule. The general impression we get from the *Ārā'* is that the heavenly substrates somehow resemble material substrates, but are not identical to them. On the one hand, al-Fārābī compares the heavenly bodies to the sublunary compounds, and stresses that the former are also distinguished from God and the separate intellects because of their substrate. This suggests that the heavenly substrates are in a sense material, perhaps made of a different matter than sublunary matter. On the other hand, he explains that the only thing that the heavenly and sublunary substrates have in common is their capacity to receive form, and that the heavenly substrates have neither privation nor contrariety, which would seem to point to their lack of materiality. Moreover, he never uses the terms *māddah* or *hayūlā* to describe the heavenly bodies.

One therefore perceives some hesitation in al-Fārābī's account of the nature of heavenly matter in the *Ārā'*. While he does not openly commit himself to the view of an immaterial heaven, he also does not develop a doctrine of a separate kind of celestial matter on the model of Aristotle's aether. From the information in the *Ārā'*, one could conclude that the heavenly bodies either have no matter or possess a matter which is essentially different from that of perishable beings.[446] In any case, this basic tension in the *Ārā'* provides no evidence for and even invalidates Walzer's thesis of intelligible matter.

One finds a similar but more pronounced trend in the *Siyāsah*. The indecision displayed by al-Fārābī in the *Ārā'* seems to have been resolved in this work, because his position concerning celestial substance is articulated in a more lucid and forceful manner. The trend toward the denial of heavenly matter that was noticed in the *Ārā'*

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[446] This conclusion is in fact quite close to the way in which Themistius interpreted Aristotle's aether. In his *Paraphrase of Book Lambda*, Themistius writes: "Il faut en effet, ou bien, que l'on dise qu'ils [the celestial bodies] n'ont pas de matière du tout, ou que l'on dise que la matière qui est la leur est autre que la matière des choses qui admettent la génération et la corruption" (translated by R. Brague in Themistius 1999, 122).

reaches a much more consummated stage in the *Siyāsah*. Having explained at the beginning of his treatise that form and matter are among the six principles of being and that they are in bodies but are not themselves bodies,[447] one would expect al-Fārābī to apply these principles to the orbs and planets, since these are after all bodies (*ajsām*). But as in the *Ārā'*, al-Fārābī uses analogical language and explains that the heavenly bodies consist of a soul and a substrate that merely resemble sublunary entities: they "resemble the substances composed of matter and form (*tushbihu al-jawāhir al-murakkabah min māddah wa min ṣūrah*).[448] Here, however, al-Fārābī plainly asserts that "the heavenly substrates are not material (or are not matters)" (*ghayra anna mawḍūʻātahā laysat mawādd*)[449] and that they are free from any aspect of deficiency that is in sublunary matter.[450] Al-Fārābī also repeats the argument of the *Ārā'* that the heavenly substrates can only receive one form and that this form is a soul.

The *Ārā'* and *Siyāsah*, then, not only avoid ascribing matter (*māddah*) to the heavenly bodies, but even argue that the heavenly bodies are immaterial.[451] While this idea is only implicitly suggested in the *Ārā'*, it is clearly asserted in the *Siyāsah*. Moreover, the two treatises conspicuously rely on analogical language. All in all, the style and ideas developed in these two works are strikingly close in spirit and suggest that they were written during the same period.[452]

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[447] Al-Fārābī 1964, 31.
[448] Al-Fārābī 1964, 53.
[449] Al-Fārābī 1964, 41.
[450] Al-Fārābī 1964, 41.
[451] This is also Druart's conclusion: the celestial bodies, she writes, "have neither form nor matter in the proper sense and, therefore, are not subject to the hylomorphic composition" (Druart 1999, 218b).
[452] Mahdi 2001, 4 writes that "the cosmology and the politics presented in them [the *Ārā'* and the *Siyāsah*] differ in the two works…" In spite of Mahdi's claim, al-Fārābī's descriptions of the heavenly bodies show a remarkable degree of consistency. This will also be the case with regards to intellection in Chapter V.

1.3.2 The Works of Uncertain Authenticity

1.3.2.1 The *Taʿlīqāt*

The *Taʿlīqāt*, which as its name indicates is a somewhat random collection of notes on various philosophical issues, displays a clear interest in cosmology and in the celestial bodies in particular. One of the most intriguing aspects of this work is its claim that the souls of the heavenly bodies are forms and that they possess the faculty of imagination, a thesis famously attributed to Ibn Sīnā, but which al-Fārābī seems to have rejected (see Chapter V).[453] The author also mentions explicitly the hylomorphic composition of the celestial bodies. He explains that because the stars are affected by multiplicity, they must be composed of matter and form: *fīhā tarkīb min māddah wa ṣūrah*.[454] Yet the celestial bodies are the noblest of "material things" (*al-māddiyyāt*).[455] In addition, he says that the forms of the celestial bodies are "dependent upon their matters" (*mawqūfah ʿalā mawāddihā*).[456] This use of the plural form of the noun *māddah* raises several questions. Is the author implying that the spheres and heavenly bodies posses different types or degrees of matter? Or that the heavens as a whole are composed of various different elements? No definitive answer can be given on the basis of these laconic statements. But the previous remarks suffice to show the gap between this work and al-Fārābī's emanationist treatises, since the latter refuse to use the term *māddah* to describe the celestial bodies.

[453] Al-Fārābī 1992, 52, 56, 58.
[454] Al-Fārābī 1992, 47.
[455] Al-Fārābī 1992, 38.
[456] Al-Fārābī 1992, 63.

1.3.2.2 The *Daʿāwā*

In the *Daʿāwā*, a work which has been attributed to al-Fārābī in the Arabic tradition,[457] one finds a wealth of comments on the celestial bodies, a fact which testifies to the author's interest in cosmology. The *Daʿāwā* puts forth a cosmological model based on the concept of emanation that closely resembles both al-Fārābī's and Ibn Sīnā's emanationist schemes. More specifically, the process through which the heavenly bodies are produced is reminiscent of their metaphysics: it is the separate intellects, which, by contemplating their essence and God, cause a lower separate intellect and a heavenly body to exist. The author writes:

> *wa huwa* [the first separate intellect created by God] *ayḍan wāḥid lā kathrata fīhi illā ʿalā al-wajh al-madhkūr wa yūjadu ʿanhu min ḥaythu huwa mumkin al-wujūd ʿāqil li-dhātihi al-falak al-aʿlā bi-māddatihi wa ṣūratihi allatī hiya nafsuhu wa innahu yūjadu ʿan hādhā al-thānī ʿaql ākhar wa falak dūna al-falak al-aʿlā...*[458]

What is immediately noticeable in this passage is the specific technical vocabulary used to describe the separate intellects, a vocabulary which is found throughout the treatise and which is usually associated with Ibn Sīnā and his circle. This is obvious, for instance, from the author's extensive use of such terms as "necessary of existence" (*wājib al-wujūd*) and "possible of existence" (*mumkin al-wujūd*).[459]

For our purpose, however, the most important feature of this excerpt consists in the reference to the composition of the sphere. The outermost sphere, which is produced by the intellection of the first emanated being, is composed of form (*ṣūrah*) and matter (*māddah*). The reference to heavenly matter reappears in another passage, where the author explains that the heavenly bodies cannot have

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[457] The treatise, however, opens with these words: "*Al-daʿāwā al-qalbiyyah al-mansūbah ilā arisṭū mujarradah ʿan al-hujaj li-abī naṣr al-Fārābī...* (al-Fārābī 1930, 2). This raises the question of how medieval thinkers perceived the authorship of this treatise.

[458] Al-Fārābī 1930, 4-5.

[459] Al-Fārābī 1930, passim 2-4.

the same matter as sublunary elements, nor can they have the same form, or else they would be perishable. Hence, they possess an essentially different kind of matter, which represents a "fifth nature" (*ṭabīʿah khāmisah*).[460] The formula used here is a direct reference to Aristotle's aether. It shows that the *Daʿāwā* ascribes a hylomorphic constitution to the heavens and refers explicitly to its matter (*māddah*).

1.3.2.3 The *ʿUyūn al-masāʾil*

The *ʿUyūn* shares the *Taʿlīqāt*'s and *Daʿāwā*'s views on celestial substance. The celestial bodies are described as hylomorphic beings that consist of form and matter, the former principle being equated with soul. In addition, like the *Daʿāwā*, the *ʿUyūn* explains that both the celestial form and matter are different from their sublunary counterpart,[461] and that they represent a "fifth nature." (*ṭabʿ khāmis*)[462] The cause of this form and matter is a separate intellect. It is noteworthy nevertheless that the intellects produce both the form and matter of the spheres by intelligizing their own essence. Thus, one cause is given to account for the dual principles of form and matter.

This brief overview shows that on the one hand the *Taʿlīqāt*, the *Daʿāwā*, and the *ʿUyūn* present a certain uniformity in their theory of celestial substance, and on the other hand that this theory contrasts with the ideas contained in the *Ārāʾ* and *Siyāsah*. These three works stress the hylomorphic composition of the spheres, repeatedly refer to celestial matter, mention the fifth nature of the heavens, but say nothing about substrate. As we shall see, their treatment of other cosmological concepts (intellection, motion, imagination) also differs from the content of al-Fārābī's emanationist treatises.

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[460] Al-Fārābī 1930, 8.
[461] Al-Fārābī 1999a, 40.
[462] Al-Fārābī 1999a, 42.

1.3.3 Later Testimonia

1.3.3.1 Al-Ghazālī and the *Tahāfut al-falāsifah*

It has often been noted that the *Tahāfut* is interesting not only for the arguments it contains, but also for the information it provides concerning the doctrines of previous thinkers, especially those of the *falāsifah*. An important section of this work is devoted to cosmological issues such as the concept of the emanation of the heavens, the eternity of the world, and the existence of a superlunary matter different in essence from the four sublunary elements. Al-Ghazālī sets out to refute what he considers to be the heretical or misinformed views of the philosophers on these topics. Hence, despite its polemical character, al-Ghazālī's work can provide insight into al-Fārābī's cosmology, if one assumes that he is included in the group of *falāsifah* criticized by al-Ghazālī.

One passage is particularly relevant to our purpose. Al-Ghazālī finds fault with the *falāsifah*'s belief that the heavenly spheres are hylomorphic and composed of form (*ṣūrah*) and matter (*hayūlā*) and that these are caused to exist by an immaterial intellect.[463] According to al-Ghazālī, the *falāsifah* cannot adequately explain their creation by the separate intellects, which are by essence simple and cannot provide the two causes (formal and material) necessary for the coming into existence of the spheres, or in another instance, for the coming into existence of all the different stars.[464] This point is one of many that are used to build an overarching argument against the *falāsifah*'s theory of creation as eternal causality.

Now al-Ghazālī states at the beginning of the *Tahāfut* that he will limit his refutation to the theories of al-Fārābī and Ibn Sīnā: "The most reliable transmitters and verifiers among the philosophers in Islam are al-Fārābī Abū Naṣr and Ibn Sīnā. Let us then confine ourselves in refuting what these two have selected and deemed

[463] Al-Ghazālī 1997, 73 and 76.
[464] Al-Ghazālī 1997, 76.

true of the doctrines of their leaders in error."[465] Yet we have seen that unlike Ibn Sīnā, al-Fārābī does not hold a standard hylomorphic view on the celestial substance, and he substitutes immaterial substrate for matter in his emanationist works. Moreover, al-Ghazālī describes a threefold mode of intellection to explain the causation of the spheres that was developed by Ibn Sīnā, not by al-Fārābī, who endows the separate intellects with twofold intellection only (see section V.3 on intellection).[466]

Hence, one may conclude that al-Ghazālī's depiction of al-Fārābī's theory of celestial substance and intellection is inaccurate, to the point where it may be wondered whether the entire *Tahāfut* is not really a refutation of Avicennian philosophy. Al-Ghazālī is really criticizing Ibn Sīnā's doctrine and his mention of al-Fārābī at the beginning of the work merely serves to strengthen the polemical scope of his treatise. There is little if no effort on the part of al-Ghazālī to distinguish between the theories of these two thinkers. This conclusion also seems supported by the fact that al-Fārābī's name is mentioned only twice, while Ibn Sīnā's appears more than ten times. Moreover, it is Ibn Sīnā, not al-Fārābī, who is implicitly addressed throughout the entire work.

1.3.3.2 Maimonides' *Guide of the Perplexed*

Maimonides' *Guide of the Perplexed* contains an interesting and somewhat puzzling quotation allegedly borrowed from al-Fārābī's commentary on the *Physics.* In the context of a polemical argumentation against the eternalists, Maimonides refers to the authority of the second master to lend weight to his claim that since the stars are immobile and the spheres are mobile, they must be made of different matter. He writes:

> For the fact that a sphere is always in motion and a star is always fixed proves that the matter of the stars is not the matter of the spheres. In fact, Abū Naṣr [al-Fārābī] in his glosses

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[465] Al-Ghazālī 1997, 4-5.
[466] Al-Ghazālī 1997, 76.

> on the "Akroasis," [*Physics*] has made a statement of which the literal text is as follows. He said: There is a difference between a sphere and the stars, for a sphere is transparent whereas the stars are not transparent. The cause for this lies in the fact that there is a difference between the two matters [*al-māddatayn*] and the two forms. But this difference is small. This is literally the text of his statement.[467]

There are a few odd features about Maimonides' citation that need elucidation. First, although the mention of al-Fārābī undoubtedly strengthens the claim that Maimonides is trying to make, there is a discrepancy between the contexts of their arguments. Maimonides infers the need for various celestial matters from the contrast between mobile spheres and immobile stars. His is thus an argument based on motion. Al-Fārābī, on the other hand, comes to the same conclusion on the basis of a distinction between transparent and non-transparent heavenly bodies. Maimonides acknowledges this when he writes: "I, however, do not say "small," but say that they [the two matters] are very different. For I do not infer this from the fact of transparency but from the motions."[468]

Obviously, what is of interest and value here for Maimonides is al-Fārābī's concept of different grades of celestial matter, not the reasoning he develops to reach this conclusion. This disregard for the context from which arguments are borrowed is typical of polemical works. Of much greater interest, however, is the content of the cosmological idea that Maimonides ascribes to the second master, an idea that not only contradicts the previous passage quoted from the *Iḥṣā'*, which refers to "a certain one matter," but also fits very awkwardly with al-Fārābī's other theories of celestial substrate in the *Ārā'* and *Siyāsah*.

Maimonides' quotation brings to mind certain Greek theories of celestial matter, such as the one developed by Philoponus, who argued that the heavens are composed of various elements and do not form a homogenous whole. In the Arabic

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[467] Maimonides 1963, vol. 2, 309, translated by S. Pines. For an analysis of Maimonides' theory of celestial matter, see Glasner 2000, especially 320-323.
[468] Maimonides 1963, vol. 2, 309.

tradition, Abū al-Barakāt al-Baghdādī apparently held such a view as well.[469] But as far we know, al-Fārābī never adhered to a Philoponian conception of celestial matter, and this is clear from his refutation of the Grammarian's cosmological theories in his treatise *Against Philoponus*, as well as from the theories in his personal works. Nor does what we know about al-Fārābī's background allow us to conclude that he adhered to kalāmic views on matter. How are we, then, to interpret this passage?

Since al-Fārābī's commentary on the *Physics* has not survived, except in a few fragments in Latin,[470] there is no way of verifying Maimonides' quotation. Although Maimonides' exaggerated emphasis on the fact that he is quoting al-Fārābī "literally" and the polemical use he makes of this quotation are a bit suspect, we cannot nevertheless dismiss his testimony as wholly unsound.

The more likely hypothesis is that al-Fārābī may indeed have upheld such a conception during a period of his life, perhaps when he was a young student of philosophy in Baghdad. The fact that Maimonides discusses this view in the midst of arguments designed to prove the createdness of the world shows that this type of theory of celestial matter fitted well in a creationist account, to which al-Fārābī may have adhered to at one point in his life, as the *Jamʿ* suggests. On the other hand, it is difficult to imagine how it could be adjusted to an eternalist framework, since different grades of matter would seem to indicate different grades of perfection and purity among the celestial bodies, a notion that does not serve to support the argument in favour of the eternity of the world. In any case, Maimonides' testimonium indicates that at one point in his life, al-Fārābī upheld the view that the heavenly bodies consist of different grades of matter.

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[469] See Pines 1979, vol. 1, 179-180.
[470] See Birkenmajer 1935.

1.3.3.3 Ibn Rushd's *Middle Commentary on the De caelo*

A diametrically opposed testimonium is presented by Ibn Rush in his middle commentary on the *De caelo*, one of three Averroistic commentaries on this work to have survived. In his discussion of celestial hylomorphism, Ibn Rushd surveys the views of previous thinkers and writes that "Alexander acknowledged in his commentary on *Metaphysics* XII that the heavenly body is simple and not composed of matter and form [*ghayr murakkab min māddah wa ṣūrah*]. In his commentary on *De caelo* Themistius also said that the heavenly body does not have a substrate [*lā mawḍūʿ lahu*], as did Abū Naṣr [al-Fārābī]."[471]

Although this quotation is a precious testimony for my overarching argument, it is not without its ambiguities. The most obvious yet crucial point is that Ibn Rushd in this passage ascribes the theory of immaterial and non-hylomorphic heavenly bodies to al-Fārābī, a report that corroborates the evidence found in the *Ārā'* and the *Siyāsah*. If the celestial bodies are devoid of "substrate," as Ibn Rushd tells us on al-Fārābī's behalf, then obviously they cannot possess any kind of matter, for matter always functions as a substrate for form. Because Ibn Rushd makes a point to cite al-Fārābī together with the Greek thinkers (but he does not, significantly, mention Ibn Sīnā, whose theory of celestial substance is more explicitly hylomorphic), one must presume that he found al-Fārābī's position on this issue noteworthy enough to mention him by name. In fact, as we shall see in a subsequent section of this thesis, the connection that Ibn Rushd establishes between Alexander, Themistius, and al-Fārābī is substantiated both historically and doctrinally: the former by what we know of the transmission and reception of the texts written by these Greek authors in al-Fārābī's Baghdad, the latter by a comparison of al-Fārābī's and Alexander's theories of substrate (see section IV.2.1.1). Hence, Ibn Rushd seems to be well informed both in terms of the historical connection between the Greek and Arabic philosophers and of the content of their ideas.

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[471] In Ibn Rushd's *Talkhīs*, 183,15-17; translated in Endress 1995, 36, revised by me.

On the other hand, what is slightly surprising about Ibn Rushd's report is that it uses the term "substrate" (*mawḍūʿ*) instead of the term "matter" (*māddah*). As I have explained before, al-Fārābī's theory as it appears in the *Ārāʾ* and the *Siyāsah* is that the heavenly bodies are deprived of "matter," but not of a certain "substrate." Ibn Rushd could not have failed to grasp this distinction if he had read al-Fārābī's emanationist works carefully. This naturally raises the question of the work that Ibn Rushd has in mind when making this statement. This question is all the more relevant when one compares Ibn Rushd's quotation to Maimonides' on al-Fārābī's *Physics* and gauges how completely contradictory their two reports are. Maimonides refers to al-Fārābī's theory of several matters in the celestial realm, whereas Ibn Rushd claims that al-Fārābī's celestial bodies are devoid of substrates! In any case, Ibn Rushd explicitly notes that Alexander, Themistius, and al-Fārābī agreed on the fact that the heavenly bodies are not composed of matter.[472]

1.3.4 Conclusion

Several conclusions may be drawn on the basis of the previous survey. First, al-Fārābī's doctrine of celestial matter is not homogeneous and presents many different aspects that sometimes seem contradictory. In his Aristotelian or curricular works, al-Fārābī articulates a theory of matter that is quite close to the aether of the *De caelo* tradition. Accordingly, the celestial bodies are made of a different matter (*māddah*) than that of the sublunary bodies, which is characterized by its incorruptibility. In the (assumedly later) emanationist works, al-Fārābī never mentions matter (*māddah*) explicitly, but introduces the concept of immaterial substrate (*mawḍūʿ*) instead. There is a clearly definable trend in the *Ārāʾ* and *Siyāsah* to minimize the association between the heavenly bodies and matter. In contrast to both of these groups, the *Taʿlīqāt*, *Daʿāwā* and the *ʿUyūn* present numerous similarities. Like the emanationist treatises, they equate the celestial form with soul. However, unlike them, they refer explicitly to the hylomorphic composition of the

[472] This is also how Wolfson (1929, 596) understood this passage.

spheres and especially to celestial matter (*māddah* and *ṭabīʿah khāmisah*), and not to immaterial substrate.

Second, al-Fārābī relies heavily in the emanationist treatises on analogical language based on the *shīn-bā-hā* root, which helps to emphasize the remoteness of the heavenly bodies from the sublunary bodies, while at the same time offering a means of comparing the two. On the one hand, then, al-Fārābī completely omits in these two treatises the standard Arabic hylic terminology associated with aether or celestial matter. On the other hand, the analogical approach seems proper to the *Ārā'* and *Siyāsah* and is absent from al-Fārābī's other (curricular) works.

Third, anticipating on my analysis slightly, the status of heavenly substance and its mode of production are markedly different: matter is created absolutely and out of nothing in the *Jamʿ*, while it is created through the intermediary of the intellects in the emanationist treatises and in some of the 'spurious' works.

Finally, the later testimonia make very different statements about al-Fārābī's theories of celestial matter, and this in consequence strengthens the contradictions in the Fārābīan corpus. While Ibn Rushd confirms the theories expounded in the emanationist treatises, Maimonides refers to a completely different view based on a gradation of celestial matter, which he supposedly found in al-Fārābī's *Physics* commentary.

Al-Fārābī's contention that the heavenly bodies, in spite of their being bodies, are immaterial, appears at first glance as an unexpected and intriguing departure from the Greek cosmological traditions of antiquity, which had ascribed some kind of matter to the heavens, whether aether (Aristotle), a refined version of the four elements with a predominance of fire (Plato, Proclus, Simplicius), or even the same elements as those that exist in the sublunary world (Philoponus). These traditions, which take their starting-point in Aristotle's *De caelo* or Plato's *Timaeus*, underwent significant transformation during the late-antique period and acquired a great degree of interpretive diversity. In some cases, the departures had been so drastic that thinkers such as Xenarchus in the Peripatetic school and Plotinus in Alexandria felt entitled to challenge the seminal views of Aristotle on aether. But regardless of how subversive their criticisms were, these thinkers usually upheld a theory of celestial matter. Even Philoponus who rejected wholesale Aristotle's cosmology and mounted the most serious rebuttal against it argued that the spheres were composed of a mixture of the four elements.

What is more, al-Fārābī's position is also in disagreement with that of his predecessors in the Arabic tradition. Al-Kindī, for instance, refers several times to the fifth substance of the heavens in his corpus[473] and provides a definition of matter in his *Risālah fī ḥudūd al-ashyā'* that reveals his adherence to a literal understanding of celestial hylomorphism. Al-Kindī writes that "*falak* [the celestial sphere] is matter [*ʿunṣur*] which has a form [*ṣūrah*]."[474] This definition makes it clear that al-Kindī applies hylomorphism to the heavens in a literal manner and adopted a theory of celestial substance that was dependent on the *De caelo* tradition. Ibn Sīnā and Maimonides, to name but two major post-Fārābīan thinkers, also explicitly uphold the materiality of the heavens and talk at length about the hylomorphic composition of the celestial bodies and the matter (*māddah*) of the spheres.[475]

It is possible that al-Fārābī is not actually saying that the heavens are immaterial, but rather composed of a different matter than sublunary matter.[476]

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[473] See al-Kindī 1950-53, vol. 2, 55; Atiyeh 1966, 73-74; and Adamson 2007a, Chapter 4.

[474] Al-Kindī 1950-53, 169. Al-Kindī further defines *ʿunṣur* as the "matter of all matter," a formula which is tantalizingly reminiscent of the term for intelligible matter used in the Pseudo-Empedoclean sources, but which in this context can only be construed as referring to the physical, concrete matter of all corporeal things. Al-Kindī also uses the plural *ʿanāṣir* to refer to the four elements fire, air, earth, and water in his *K. fī ibānah*, 219-220. That al-Kindī uses the same term to signify both terrestrial elements and the matter of the heavenly spheres is interesting, and may betray the influence of Philoponus, who held the view that the heavens were made of the same elements as sublunary beings, albeit of a purer kind.

[475] See Ibn Sīnā's *Al-samā' wa al-ʿālam* in the *Shifā'* (Ibn Sīnā 1983-1986, 15,6, and 30 passim; 31,2-3), the *Risālah al-ʿulwiyyah*, passim; the *K. al-najāh* (Ibn Sīnā 1985, 313); the *Metaphysics* in the *Shifā'* (Ibn Sīnā 2005, 312, 324, 330, 331, 334); and M. Rashed 2004, 41. For Maimonides, see Wolfson 1929, 103, 605-606; and Glasner 2000.

[476] Walzer (al-Fārābī 1985a, 375-377) also presents this view, which he somehow juxtaposes with his theory of intelligible matter.

After all, Proclus often calls the heavenly bodies "immaterial" (ἄυλον), although in other instances he endows them with a material substrate made of a refined version of the elements, especially fire.[477] This, however, is not what emerges from the accumulated evidence presented above. Not only does al-Fārābī fail to introduce a clear account of heavenly matter, but he specifies that the celestial substrates are not material (*laysat mawādd*). These substrates are presented as being closely related to the celestial soul, to the extent that one even wonders if they are not to be seen as a part of it, just as al-Fārābī calls *mawḍūʿ* certain faculties of the human soul.[478] Moreover, he avoids the standard Peripatetic vocabulary connected to heavenly matter ('first body,' 'ether,' 'fifth nature,' etc). Finally, al-Fārābī does not make correlative arguments between matter and motion, such as the one that appears in *De caelo* I.2-4. As we shall see in the section devoted to celestial motion, al-Fārābī nowhere claims that celestial matter possesses in itself a kinematic quality, but instead he makes soul the main cause of motion.

The theory of immaterial celestial bodies was not unknown in the ancient and medieval periods, as is attested by Philoponus' criticism aimed at some thinkers who did not adhere to the view of a material heaven.[479] Hence, al-Fārābī could be seen as continuing an exegetical tradition on the question of aether that he inherited from the late-antique world, and which had culminated in the attacks of Xenarchus and later Philoponus.[480] Instead of matter, al-Fārābī introduces the concept of immaterial substrate as the other principle that, together with soul, constitutes the composite nature of the heavenly bodies.

[477] Siorvanes 1987, 234-237, 239-246.
[478] See the *Risālah*, for example (al-Fārābī 1938, 22).
[479] Philoponus' *Against Aristotle,* apud Simplicium in his *De caelo* commentary, 133,21-29.
[480] See Sambursky 1962, 124-127, 154 ff.; Wildberg 1988; Verrycken 1990b; M. Rashed 2004.

2. AN EVOLUTION IN AL-FĀRĀBĪ'S COSMOLOGY?

The previous survey of the passages dealing with celestial matter in the Fārābīan corpus has brought to the fore a tension in al-Fārābī's various theories of celestial substance. To recapitulate, the differences between these works may be summarized as follows: the *Ārā'* and the *Siyāsah* a) equate the forms of the heavenly bodies with their souls; b) ascribe to them an immaterial substrate; c) use analogical language to describe the celestial bodies. These points, which do not appear in any other work by al-Fārābī, are opposed to the more 'standard' descriptions given in the *Iḥṣā'*, the *Philosophy of Aristotle*, and the *Against Philoponus*, which a) explicitly mention the matter (*māddah*) of the heavens and omit to mention substrate (*mawḍūʿ*); b) do not equate the celestial form with soul, and do not even mention the soul of the heavenly bodies; and c) shun analogical language.

The evidence that can be gleaned from later sources seems to intensify this contradiction: while Ibn Rushd refers to al-Fārābī's view that celestial bodies lack substrate, and therefore matter, Maimonides quotes al-Fārābī as upholding a theory of multiple types of celestial matter in his commentary on the *Physics*. To this basic problem is added the further well-known conflict between the creationist view expressed in the *Jamʿ* and the eternalist position defended in the emanationist works, both resulting in different explanations for the creation of matter. These facts strongly suggest the possibility of an evolution in al-Fārābī's cosmological theories. This hypothesis is strengthened by the realization that these doctrinal dissimilarities never appear within the same work.

Broadly speaking, then, it is possible to isolate three different groups of works: on the one hand, there are the *Fuṣūl*, the *Ārā'*, the *Siyāsah* (supported by Ibn Rushd's quotation), all of which display a certain homogeneity in describing the study of the celestial bodies as part of metaphysics, in stressing the matterlessness of their substance, and in emphasizing their noetic or soul-like nature. That these works possess marked similarities in their treatment of celestial substance strengthens the hypothesis offered by scholars that they all belong to a late phase of al-Fārābī's life.[481] On the other hand, the *Iḥṣā'*, *Philosophy of Aristotle*, *Against Philoponus*, and Maimonides' quotation referring to the commentary on the *Physics*, all stress the materiality of the heavens and their physical nature. These works could belong to an earlier stage than the other group.[482] Finally, there are the *Dāʿāwā*, the *Taʿlīqāt*, and the *ʿUyūn*, which possess their own distinct features and must be isolated from the rest of the Fārābīan corpus.[483]

The study of the chronology and evolution of Fārābī's works is still at a relatively early stage. However, it is probably not a coincidence that the previous categorizing of al-Fārābī's works on the basis of the cosmological doctrines they contain accords with the chronological hypotheses so far advanced by scholars. The previous analysis of matter also seems to substantiate the hypothesis of an evolution in al-Fārābī's philosophy, which has already been suggested by historians with regards to other aspects of the second master's philosophy.[484] When Maimonides quotes al-Fārābī's commentary on the *Physics* and refers to a view which conflicts explicitly with the evidence found in the emanationist texts, it seems likely that the reason for this is that al-Fārābī's ideas evolved over time, and that his theories on celestial matter in his *Physics* commentary were probably not the same as those that he later developed in the *Ārā'* and the *Siyāsah*. It can be assumed that al-Fārābī modified his doctrine either when he came in contact with

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[481] See Alon 2002, vol. 2, 824-826, who explains that Dunlop, Najjar, Rosenthal, and Walzer all seem to agree that these works are al-Fārābī's last compositions. See also Galston 1990, 4, note 2, who provides a clear overview of past scholarly opinions on the topic, and Reisman 2005, 54-55.
[482] Alon 2002, 825. The *Iḥṣā'*, it was argued by Heinrichs, belongs to an earlier period, after the *Poetics*, but before the *Philosophy of Aristotle*.
[483] The position of the *Risālah* in this chronology is uncertain, but the cosmological views developed in this treatise, i.e., the emphasis on the intellectual nature of the heavenly bodies and their relation to the separate intellects, as well as the analogical language it displays, connect it to the emanationist works. This suggests, I think, a late date for its composition.
[484] This hypothesis may underlie Druart's (1987a, 28) argument about the various categories of texts in the Fārābīan corpus. Davidson 1992, 73, however, is more explicit: "I would accordingly conjecture that Alfarabi worked from different oral or written philosophic sources and summaries at different times, and that the position he took at any one time reflects the texts then before him." Street 2004, 542 has come to the same conclusion with regards to al-Fārābī's logical works: "Alfarabi modified his logical doctrines throughout his life…" This developmentalist hypothesis, unfortunately, has not been the object of much scholarly attention.

new sources, or because he developed new interpretations of Aristotle's cosmology, or both.

A developmentalist hypothesis could also explain why the *Jamʿ* offers a non-eternalist creationist account, while the *Ārā'* and the *Siyāsah* have moved beyond this interpretive framework. Finally, it has the advantage of accounting not only for the discrepancies within the Fārābīan corpus, but also for the contradictory reports made by later authors on al-Fārābī's theories. As we know from the examples of al-Ashʿarī, al-Ghazālī, and even Ibn Sīnā,[485] developments and shifts in doctrine, and even intellectual crises, were not rare phenomena in the history of Islamic thought.

In the following paragraphs, I will try to substantiate the developmentalist hypothesis by identifying and analyzing some of the historical and doctrinal reasons that can explain the evolution of al-Fārābī's theories of matter. I will begin by analyzing some of the sources that may have inspired al-Fārābī's theory of celestial substrate. I will also consider the negative influence that some thinkers may have had on al-Fārābī's philosophy. Finally, the relation between celestial matter and prime matter will also be examined.

2.1 Hypothetical Reasons behind the Evolution of al-Fārābī's Hylic Theories

In the following paragraphs, I will examine what I believe are four convincing reasons why al-Fārābī may have engaged in a revision of his position on the question of celestial substance in his later works, and why he may have moved away from the theory he had adopted in the *Jamʿ* and the *Against Philoponus*. First, al-Fārābī was positively influenced by the commentaries of Alexander of Aphrodisias

[485] Bertolacci 2001, 259, detects "an evolution in Avicenna's knowledge of Aristotle's *Metaphysics*." See Wisnovsky 2003b, Chapters 9 and 14, which also argue for a developmentalist account of Avicennian metaphysics, and Gutas 2001 with respects to Ibn Sīnā's theory of *ḥads*. As for Wāṣil ibn ʿAṭā (the alleged founder of Muʿtazilism), al-Ashʿarī, and al-Ghazālī, traditional Arabic accounts of their lives have recorded their shifts in allegiances and even their psychological crises. While these accounts should not be taken literally and may contain mythical episodes, they do illustrate the fact that these thinkers' doctrines were shaped and evolved over long stretches of time.

and Themistius, which provided him with new exegetical possibilities on the question of celestial matter. Second, al-Fārābī was negatively influenced by the severe criticisms that Aristotle's theory of aether incurred at the hands of Philoponus. Moreover, some of the most prevalent Greek and Islamic precedents for the view of a material heaven (those of Philoponus and al-Rāzī) were not doctrinally satisfactory to al-Fārābī because they clashed with other aspects of his thought. Third, al-Fārābī's emanationist treatises are marked by a depreciation of matter in general. Fourth, Aristotle's aether was difficult to reconcile with the Ptolemaic theories of celestial motion.

2.1.1 Substrate (*mawḍūʿ*) and the Greek Commentators

First, we must examine al-Fārābī's relation to the Greek commentatorial tradition, because the idea of replacing the concept of matter with the concept of substrate (both are not semantically identical) probably stemmed from al-Fārābī's exposure to previous Greek interpretations of Aristotle's aether. What are the potential precedents for al-Fārābī's interpretation of celestial matter as immaterial substrate in the *Ārā'* and *Siyāsah*? Walzer posited a lost Greek source to explain the fundamental aspects of al-Fārābī's philosophy. As we shall see shortly, there is little reason to posit a no-longer extant source when in fact al-Fārābī could have relied on texts that have survived until our present day.

Although the concepts of matter (ὕλη) and substrate (ὑποκείμενον) figure in most ancient debates about the nature of the heavens and were part and parcel of the Greek philosophical terminology that was translated into Arabic, no Muslim thinker before al-Fārābī makes such ample use of substrate (*mawḍūʿ*) in his cosmology.[486] This point suggests that al-Fārābī was well informed about the cosmological debates of late antiquity and that he knew some of the commentaries written on the *De caelo*, *Physics*, and *Metaphysics*, which also made ample use of this concept and discussed its relation to matter. In fact, an examination of the works of

[486] As far as I know, al-Kindī does not use the concept of substrate (*mawḍūʿ*) in a cosmological context.

ancient commentators immediately reveals a doctrinal link between al-Fārābī, Alexander of Aphrodisias, and Themistius on the question of celestial matter and substrate. There follows a brief overview of celestial matter in these thinkers' cosmology and its relation al-Fārābī's.

The connection between substrate and matter is established by Aristotle in certain passages,[487] which later provided a starting-point and justification for exegetical elaborations on the issue of celestial matter. Alexander of Aphrodisias and Themistius were both interested in clarifying the nature of celestial matter as it appeared in the Aristotelian corpus, but in the process of interpreting Aristotle, they reached a very different view than that of their master. Alexander and Themistius appear in many passages to reject the idea that the heavens are material. Building upon certain passages of the Aristotelian corpus in which Aristotle seems to hint at the possibility that the heavens are immaterial,[488] the later commentators developed a new interpretation of celestial substance that moved away from the *De caelo* model and exploited other concepts such as substrate and soul. Whether the commentators were conscious that they were in fact departing from Aristotle's teaching is more difficult to answer.

An example of this exegetical trend in relation to celestial matter appears in Alexander's commentary on the *Metaphysics*, where he claims that "...the substrate in the divine [bodies] is not matter...,"[489] and that "...the body that moves in a circle is also a natural body, but matter is not the substrate for this body."[490] In another passage dealing with the relation between form, matter, and body, Alexander writes: "In this connection, one might inquire about the forms in the divine bodies, for these forms are neither enmattered nor perishable and are separable in thought

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[487] See for example, *Physics* I.6.189a35; *On generation and Corruption* II.1.329a30-33; *Metaphysics* I.2.983a30, VII.3.1029a20-26, and XII.2.1069b3-8.
[488] See, for example, *Metaphysics* VIII.4.1044b7-8.
[489] "τὸ γὰρ ἐν τοῖς θείοις ὑποκείμενον οὐχ ὕλη," *CAG*, vol. 1, 22.2-3; translated into English by W. E. Dooley in Sorabji 2005, vol. 2, 369.
[490] "ἐπεὶ καὶ τὸ κυκλοφορικὸν σῶμα φυσικὸν μέν, οὐ μὴν ὕλη τὸ τούτῳ ὑποκείμενον," *CAG*, vol. 1, 169.18-19; translated into English by W. E. Dooley in Sorabji 2005, vol. 2, 369.

from their underlying body."[491] Finally, in the *De mixtione*, Alexander writes that "...the whole divine body, which is active, is unmixed and unable to be reciprocally acted on by the body acted on by it; for only enmattered bodies can be acted on."[492] As I. Bodnár writes in his article on Alexander's cosmology, "...the celestial element, which Alexander tends to call θεῖον σῶμα, divine body, is removed from the components of the ever-changing sublunary world to the extent that it can be a legitimate question whether the substrate of celestial bodies can be called matter..."[493]

Themistius also proposes a similar reading of Aristotle's aether when he writes in his commentary on the *De caelo*: "The body which rotates has no contrary, as will become clear shortly. Nor does it have any substrate, for elsewhere it was stated that it lacks matter."[494] This view is also envisaged, but not endorsed, in his paraphrase on Aristotle's *Metaphysics* Lambda, where he suggests that the celestial bodies may be pure forms devoid of matter or that they may contain matter in an equivocal sense.[495] It should be mentioned that Proclus also states on numerous occasions that the heavens are immaterial (ἄυλον), although he develops in parallel a theory of celestial matter which is based on Plato's account in *Timaeus* 40A, according to which the celestial bodies are composed of a pure version of the four elements, with a predominance of fire.[496] To my knowledge, however, Proclus does not include substrate in his discussion of the celestial bodies. Hence, the similarities between Alexander's, Themistius', and al-Fārābī's interpretation of celestial substance are striking and suggest a possible textual link between these thinkers.[497]

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[491] "ἐπιζητήσαι τις ἄν πρὸς τοῦτο περὶ τῶν εἰδῶν τῶν ἐν τοῖς θείοις σώμασιν. ταῦτα γὰρ οὔτε ἔνυλα οὔτε φθαρτὰ καὶ χωριστὰ τῇ ἐπινοίᾳ τοῦ ὑποκείμενου αὐτοῖς σώματος," *CAG*, vol. 1, 375.37-376.2; translated into English by W. E. Dooley in Sorabji 2005, vol. 2, 369.
[492] *De mixtione*, 229.3-9, translated into English by Robert Todd in Sorabji 2005, vol. 2, 366.
[493] Bodnár 1997, 190.
[494] *In caelo*, *CAG*, vol. 5, 14.12-15, in the Latin version; translated into English by R. Sorabji in Sorabji 2005, vol. 2, 369, revised by me.
[495] Themistius 1999, X.12, p. 122, translated by R. Brague: "Il faut, en effet, ou bien, que l'on dise qu'ils [the celestial bodies] n'ont pas de matière du tout, ou que l'on dise que la matière qui est la leur est autre que la matière des choses qui admettent la génération et la corruption."
[496] Siorvanes 1987, 234-237, 239-246.
[497] My analysis of the link between al-Fārābī and the Greek commentators should ideally be complemented by a study of al-Fārābī's interpretation of the *De caelo*. There is a twofold problem,

Although the descriptions of aether in the *De caelo* make it extremely unlikely that Alexander and Themistius are correct in construing Aristotle's theory in this fashion,[498] their views represent an interesting exegetical development on celestial matter in late antiquity.[499] However, it may be asked how literally one should construe Alexander's statements that the celestial bodies are immaterial? Can it not be said that the heavenly body consists of another type of matter? In fact, Alexander and Themistius seem in other instances to posit the existence of some kind of matter in the heavens that they associate with the potency of motion in place. Alexander in the *Quaestiones* I.10 and I.15 argues that the heavens are material, albeit made of a matter which shares nothing in common with sublunary matter: he therefore posits the existence of two matters, one sublunary, and one heavenly.[500]

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however: first, al-Fārābī's commentary on the *De caelo* has not survived; second, there is no reliable edition of the Arabic translation of this work made by Ibn al-Biṭrīq. Yet it is likely that a close examination of the doctrines conveyed in the Arabic *De caelo* could yield interesting information concerning the cosmology of the *falāsifah* in general and al-Fārābī's theory of celestial substance in particular. An indication of this is Endress' statement (2007, 346) that Ibn al-Biṭrīq's version "...gave a specifically Neoplatonic slant to the Aristotelian text: rendering Aristotle's θεῖον σῶμα by *al-jirm al-karīm* or *al-jirm al-rūḥānī*, "the noble, spiritual body..." For more information on the Arabic *De caelo*, see Endress 1966.

[498] Not only is aether presented as the "first body," but Aristotle in *De caelo*, I.9.278a11 clearly correlates perceptibility and materiality in the heavens. Moreover, without a certain matter, the motion of the spheres would be difficult to explain.

[499] Simplicius argues in his commentary on the *De caelo* (*CAG*, vol. 7, 133,29 ff.) that by "immaterial," these philosophers really mean to say that celestial matter is different from and "surpasses" the matter of generation and corruption. However, this interpretation seems to be influenced by Simplicius' own view on the topic and to make a serious concession to the 'materialistic' understanding of celestial matter as defended by Philoponus.

[500] See Fazzo 2002, 113 ff. Fazzo provides an in-depth analysis of Alexander's views on celestial matter in the *Quaestiones*. Although she emphasizes the complexity of the topic and acknowledges the contradictions between Alexander's views in his commentary on the *Metaphysics* and in this work (123), she does not attempt to explain this discrepancy. In any case, it should be stressed that the authorship of the *Quaestiones* is uncertain, and so this raises the possibility that the theories expressed in them are not those of Alexander. See also Bodnár 1997, 190-191, and notes 3 and 4. In any case, only fragments of the *Quaestiones* were translated into Arabic, and there is no indication that I.10 and I.15., the two sections that focus on the question of celestial matter in most detail, were among the passages translated. On the other hand, the translation of Alexander's *Metaphysics* is attested by Ibn al-Nadīm. The important point here is not so much to define exactly what Alexander's and Themistius' views are as to show that they could have served as a starting-point for al-Fārābī's own theory.

Hence, it is difficult to reconstruct Alexander's true theory and it is unclear whether he held a consistent and homogeneous view on this problem throughout his life. In any case, the important point for my argument is that their views were very likely known to al-Fārābī as a result of the Greek to Arabic translation movement and may have served as the starting-point for the second master's own interpretation of the problem. Whatever Alexander's true position on the issue, the fact remains that his statements may have opened new interpretive perspectives on celestial matter that al-Fārābī would not have had access to by reading the *De caelo*.

There is nevertheless a significant difference between Alexander's and Themistius' views on celestial matter, which is important to underline due to its connection with al-Fārābī's theory. Themistius not only states that the heavens are immaterial, but he also seems to exclude the possibility of their having a non-material substrate, since he equates substrate with matter. This view is apparent in his statement: "Nor does it [the celestial body] have any substratum, for elsewhere it was stated that it lacks matter."[501] Alexander, on the other hand, explicitly refers to a celestial substrate that is not matter, but which is meant to act *as* matter for the celestial bodies. He thus replaces the concept of celestial matter with that of celestial substrate, while keeping a conceptual distinction between the two concepts. As Alexander explains in his *Metaphysics* commentary, "The term 'substrate' (*to hupokeimenon*) has greater extension than the term 'matter' (*hule*), for the substrate in the divine [bodies] is not matter."[502] Alexander does not say in this passage what exactly is the nature of this substrate. But since we know that he equates the nature of the celestial bodies with their soul, it may be hypothesized that this notion of substrate should be construed in connection with his psychology, since it is somewhat similar to the potential intellect in humans, which, while immaterial, acts as a substrate for the intelligible forms.

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[501] *In caelo*, *CAG*, vol. 5, 14.12-15; translated in Sorabji 2005, vol. 2, 369.
[502] *CAG*, vol. 1, 22.2-3; translated by W. E. Dooley in Sorabji 2005, vol. 2, 369. See also Fazzo 2002, 123.

On the issue of celestial matter Alexander's and al-Fārābī's interpretations are exactly the same. Both reject the straightforward notion that the heavens are material, and both use substrate (ὑποκείμενον/*mawḍūʿ*) as a substitute for matter. Substrate in their philosophy is a broader concept than matter, since some things can have a substrate without having matter.[503] In addition, Alexander and al-Fārābī seem to reject any correlation between celestial matter and celestial motion.[504]

The previous analysis has revealed a possible link between Alexander, Themistius, and al-Fārābī on the question of celestial matter. This connection acquires additional plausibility when one takes into account the fact that many of Alexander's and Themistius' works are known to have been translated into Arabic.[505] The evidence of this transmission, however, is complicated. First, there is no way of knowing if the idea of an immaterial heaven was developed in Alexander's commentary on the *De caelo*, since it has survived neither in Greek nor in Arabic. As for the works previously discussed, Ibn al-Nadīm mentions only Alexander's and Themistius' commentaries on Book Lambda of the *Metaphysics*, and al-Fārābī in the *Aghrāḍ* confirms that his knowledge of their commentaries was limited to this book, at least during the time he was writing that treatise.[506] There is therefore no proof that al-Fārābī had access to Alexander's entire commentary on the *Metaphysics*. This is problematic insofar as the passages discussed above belong not to Lambda but to other books of this work.

This being said, the lists compiled by the Arabic bio-bibliographers are not exhaustive, and we know that al-Fārābī had access to Themistius' paraphrase of

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[503] I have already shown this previously in section IV.3, but the relevant evidence may be reiterated. For instance, in the *Risālah*, al-Fārābī explains that the "substrates [*mawḍūʿāt*] on which the Agent Intellect acts are either bodies or powers [*quwwā*] in bodies..." (al-Fārābī 1938, 33-34, my translation). From this passage, it may be seen that the concept of substrate is broader than the concept of body and that some substrates may be *in* bodies without necessarily being corporeal or material. Moreover, al-Fārābī claims that each faculty of the human soul may in fact be seen as a "substrate" (*mawḍūʿ*) for the faculty above it, including the immaterial faculty of the acquired intellect (al-Fārābī 1938, 22).

[504] For Alexander, see Bodnár 1997, 190, note 1; for al-Fārābī, see Chapter VI on motion.

[505] Badawī 1987, 114, 117-118; Luna 1989, 250.

[506] Al-Fārābī writes: "...there is an incomplete commentary on Lambda by Alexander of Aphrodisias and a complete commentary by Themistius..."; translated by McGinnis and Reisman 2007, 78.

Book Lambda and to his commentary on the *De caelo*.[507] Recent research has also shown that the number of ancient texts transmitted to the Arabic world was much greater than previously thought.[508] Moreover, I think there is a likely possibility that al-Fārābī may have read Alexander's commentary on the *Metaphysics* in full later on in his life. We know that the emanationist works were composed toward the end of his life, and so the comment in the *Aghrāḍ* may not apply to this later period. Finally, there are the salient doctrinal parallels between Alexander and al-Fārābī, which suggest that the latter may have read at least parts of Alexander's commentary on books other than Lambda.

Furthermore, it is important to realize that the Arabic translators of these works were in direct contact with al-Fārābī and gravitated to his circle. Thanks to Ibn al-Nadīm, we know that Abū Bishr Mattā translated part of Alexander's and Themistius' commentaries on the *Metaphysics* and that the latter translation was copied and perhaps corrected by Yaḥyā ibn 'Adī.[509] It is noteworthy that both Abū Bishr Mattā and Yaḥyā ibn ʿAdī were acquaintances of al-Fārābī: the former was his teacher in Baghdad, while the latter was one of his students. In fact, there is a passage in Abū Bishr Mattā's preserved commentary on Aristotle's *Physics* II.7-9 that shows a marked similarity with the Greek commentators' views on celestial matter. In his answer to a question addressed to him concerning Aristotle's theory of the four causes, Abū Bishr says:

> The Sun and man are equally one and the same with respect to the form of body [that is, inasmuch as they are bodies], but the Sun is bereft of all other causes, because it is unaffected by whatever it affects *since it has no matter; however, it has something like matter*—where 'matter' is that which is susceptible to affectation—and so it might receive the transmitted form that is simple.[510]

What is of interest here is the parallel between Abū Bishr's statement concerning the immateriality of the sun and Alexander's theories of celestial matter

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[507] *CAG*, vol. 5, and Zonta 1994.
[508] See Peters 1968, Hasnawi 1994, Wisnovsky 2003b, and Bertolacci 2006.
[509] Ibn al-Nadīm 1970, vol. 2, 606.
[510] Translated by McGinnis and Reisman 2007, 123, emphasis mine.

on the one hand, and the parallel between Abū Bishr's and al-Fārābī's views on the other hand. Abū Bishr and al-Fārābī both reject the concept of celestial matter, and both suggest that the heavenly bodies are made of something that is "like" or "resembles" matter.[511] The similarity of their statements on celestial matter, the close historical links between Abū Bishr and al-Fārābī, and the former's role in the translation of Greek commentaries definitely point to a continuous line of thought stretching from Alexander to the second teacher and the Baghdad philosophers of the tenth century.

2.1.2 Philoponus and Abū Bakr al-Rāzī: A Negative Influence

In opposition to the positive precedent set by Alexander, there was the negative influence that some of al-Fārābī's predecessors may have had on the development of his thought, especially Philoponus and al-Rāzī. If we look back at the various theories on celestial matter that were accessible to al-Fārābī, it appears that many of them would have been unsatisfactory to the second teacher. Philoponus, al-Kindī, and al-Rāzī, whose works were well-known to al-Fārābī, developed different versions of how matter relates to cosmogony and eternality. But these models presented serious obstacles to al-Fārābī's twin commitments to the eternality and causality of the world and matter. The incompatibility of these thinkers' doctrine of matter with al-Fārābī's mature metaphysics may have prompted him to move away from the commonly held notion of the materiality of the heavens and to adopt a different exegetical approach, which was partially suggested to him by the *Neoplatonica arabica* and by Alexander's and Themistius' commentaries.

Philoponus in particular may have had a strong impact on the second teacher, who was well acquainted with his criticism of Aristotle's cosmology. As Wildberg explains, the *Against Aristotle* shaped subsequent debates over the creation

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[511] I was not able to check the Arabic version of Abū Bishr's commentary, but I suppose that the Arabic may be similar to the expression used by al-Fārābī, perhaps "*ka al-maddāh*" or an equivalent expression.

of the world in Islam.[512] Moreover, we also know that al-Fārābī addressed Philoponus' critique of Aristotle's cosmology in several of his works, including the no longer extant commentaries on the *Physica* and *De caelo*, in the *On Changing Beings*,[513] and in the still extant *Against Philoponus*.[514] That al-Fārābī devoted such effort to refuting Philoponus' views shows that these must have played an important role in the development of his own cosmological ideas, possibly inciting him to move away from Aristotle's theory of aether in his later years. Philoponus' arguments concerning the corruptibility of the heavens were never endorsed by al-Fārābī, even in the *Jamʿ* and the *Jawābāt*, which put forth a creationist view. Nevertheless it is possible that they brought to his attention some of the problems inherent in the Aristotelian doctrine of aether later on in his life.

Muslim and Christian theologians, whose views were often indebted to Philoponus' arguments, also combated the theory that the heavens are made of a different matter than the sublunary world. Most Muslim theologians held the view that the heavens are material, yet they ascribed neither eternity nor incorruptibility to this matter. According to the occasionalists, for example, the world is composed of atoms and accidents that are created each instant through divine power.[515] The celestial world does not escape God's fiat and is essentially composed of the same elements as the sublunary world. Hence, the Aristotelian dichotomy between an incorruptible heaven and a lower world of change and corruption is rejected, as is the notion of a simple heavenly substance.[516] It is possible that the first opposition that a thinker such as al-Fārābī encountered when he upheld a theory of eternal celestial substance was that of the *mutakallimūn*.

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[512] Wildberg 1988, 3. For information on the excerpts of Philoponus' works preserved in Arabic and their impact on Islamic thought, see Kraemer 1965; Davidson 1969; Pines 1972; Hasnawi 1994; Wisnovsky 2001; Hugonnard-Roche 2003, 288-289; and M. Rashed 2004.
[513] The remaining fragments of this work have been recently analyzed in M. Rashed 2008.
[514] Mahdi 1967, 236.
[515] For an in-depth treatment of this topic, see Pines 1936, and Dhanani 1994.
[516] Abū al-Barakāt, for example, believed, like Maimonides, that the heavens are composed of several matters. For the former, see Pines 1979, vol. 1, 170-180, vol. 5, 214-215; and for the latter, Glasner 2000.

The second doctrine al-Fārābī may have had to contend with is al-Rāzī's idea of an eternal, uncaused matter. According to al-Rāzī, matter represents one of the five, eternal and uncaused principles of the universe, together with time, soul, space, and God. At the moment of creation, the demiurge allowed soul to mingle with matter, and all the corporeal existents of the universe, including the stars and planets, resulted from this unfortunate alliance. Al-Rāzī conceives of prime matter (or "absolute matter," *hayūlā muṭlaqah*) before creation as an amorphous mass of atoms. At the moment of creation, this prime matter combines with void to form the bodies of all created beings. At the end of time, all matter will return to this amorphous primal state.[517]

There are a few striking features of al-Rāzī's account, all of which would have been unacceptable to al-Fārābī. The first and most obvious is the idea, directly derived from Plato, of the existence of an eternal and uncaused primal matter, existing beyond the demiurgic power of God. This view could not be accepted by al-Fārābī, who makes the entire universe and all its existents causally dependent on the First Cause.

The second feature of al-Rāzī's account of creation is the homogeneity of matter, the idea that the matter of all the existents is essentially the same, i.e., atomistic, and that there is no hierarchy based on hylic distinctions. There is no dichotomy in al-Rāzī's universe between two opposed or essentially different types of matter, a terrestrial and heavenly.[518] This again is alien to al-Fārābī's Aristotelian division of the cosmos in two distinct entities, the higher level of the eternal heavenly bodies and the lower level of perishable beings. In this respect, al-Rāzī's

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[517] For al-Rāzī's metaphysics, see Pines 1936, 49; Gaudefroy-Demombynes 1941; Fakhry 1968; and McGinnis and Reisman 2007, 44-49, who translate other Arabic thinkers' accounts of al-Rāzī's philosophy.

[518] On the one hand, this view of matter has affinities with the prime matter of the Ikhwān al-Ṣafā' and of many Ismāʿīlī thinkers. Although prime matter in their philosophy does not consist of atoms, it represents the material matrix out of which all the existents, heavenly and terrestrial, are made. On the other hand, if al-Rāzī's doctrine of matter at first glance appears to be closer to the *kalām* doctrine of occasionalism and atomism, it diverges from it radically in that prime matter is posited as an eternal, uncaused substance that lies outside the creative power of God.

doctrine also contrasts from its Platonic source, since Plato also establishes a qualitative difference between the heaven and the sublunary world on the basis of a hylic hierarchy.[519]

Finally, al-Rāzī's idea that all matter resolves itself into absolute prime matter at the end of time does not fit into al-Fārābī's eternalist framework as exposed in the emanationist works. In fact, al-Fārābī is supposed to have written a treatise refuting some aspects of al-Rāzī's metaphysics, and it is possible that this work focused partially on his theory of matter.[520]

Hence, it is clear that Philoponus' and al-Rāzī's hylic theories could not be reconciled with some of the basic physical and metaphysical tenets in al-Fārābī's philosophy. These two thinkers, who uphold a blatantly "materialistic" theory of celestial substance (elemental for Philoponus and atomistic for al-Rāzī), may have prompted al-Fārābī to move away from these trends and to minimize the materiality of the heavens in his later emanationist treatises.

As for al-Kindī's position, although al-Fārābī may have been influenced by it during his creationist period, the second teacher elaborates a completely new system in his emanationist treatises. Al-Fārābī develops an eternalist model which makes al-Kindī's reliance on the absolute will of God to explain the perishability of heavenly matter irrelevant. In al-Fārābī's emanationist scheme, celestial substance becomes both incorruptible and removed from the direct control of the First Cause. Its eternal generation and sustenance depends on the separate intellects, which continuously emanate the substance of the celestial bodies. The elaborate causal system contained in these treatises highlights the breadth of al-Fārābī's philosophical development when compared to the *Jamʿ* and the *Against Philoponus*.

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[519] In the *Timaeus* (31B-32B, and especially 40A) the heavens are said to be made of a pure version of the four elements with a preponderance of fire.

[520] This work is mentioned by al-Qifṭī in the *Tarīkh al-ḥukamā'* (al-Qifṭī 1903, 280) under the title *Al-radd ʿalā al-Rāzī* and by Ibn Abī Uṣaybiʿah 1965, 608, under the title *Kitāb al-radd ʿalā al-Rāzī fī al-ʿilm al-ilāhī*. For information on the polemic between al-Rāzī and al-Fārābī, see Najjar 2004, 31.

Whether in the polemics of Philoponus and the *mutakallimūn*, in the Platonic model of al-Rāzī, and in the creationist theories of al-Kindī, the idea of a material heaven presented insurmountable philosophical difficulties for al-Fārābī, since they required drastic concessions to be made at the metaphysical level, such as the belief in the uncaused status of prime matter (al-Rāzī), the intrinsic perishability of the heavens (Philoponus), or the non-eternity of the world (al-Kindī).

Retrospectively, it appears that none of these models presented the synthesis that al-Fārābī was to achieve between the eternality and incorruptibility of celestial substance and its causedness by higher principles. Thus, when he moved away from the creationist non-eternalist paradigm of the *Jamʿ*, al-Fārābī was faced with the difficult task of reconciling the special status of celestial substance (an Aristotelian position he seems to have adhered to throughout his life) with an account of its eternal generation. His immediate predecessors (al-Kindī and al-Rāzī) could not provide the adequate exegetical solution to this problem. In each of the legacies of these various thinkers, and for different reasons, a thorough reconciliation of these various doctrinal components could not be satisfactorily realized.

It therefore appears as no surprise that al-Fārābī opted for a different solution, which the commentaries of Alexander, Themistius, and the *Neoplatonica arabica* helped him to develop. By dispensing with the materiality of the spheres, by introducing the concept of an immaterial substrate, by emphasizing the noetic nature of the heavenly bodies, and by ascribing eternal efficient creation to each separate intellect, al-Fārābī could bypass the problems he perceived in these thinkers' doctrine and paint a cosmological picture that included both Aristotle's eternality thesis and the derived and caused status of celestial substance: the celestial bodies of al-Fārābī's emanationist cosmos are eternal and incorruptible yet dependent on higher principles for their existence. Moreover, the celestial bodies' immateriality means that the problems associated with Philoponus' criticisms of

Aristotle's aether do not apply. This exegetical synthesis testifies to al-Fārābī's creativity and his innovative use of tradition.

2.1.3 Prime Matter and Heavenly Substance: The Baseness of *hayūlā*

At the doctrinal level, there is another aspect of al-Fārābī's philosophy that deserves investigation, because it bears a direct relation to the problem at hand: the status of prime matter. Regardless of whether ancient Greek and medieval Arabic philosophers established a radical or relative difference between heavenly and terrestrial matter, most of them agreed in establishing prime matter as the foundational principle out of which all types of matter arise, including celestial matter.

This is the case, for example, of Philoponus, who develops a concept of prime matter as three-dimensional corporeal extension, and which therefore encompasses the celestial bodies within its scope.[521] For al-Rāzī, ultimate prime matter is not substantially different than the atomic matter which later constitutes the things of the earth and heavens. As for Ibn Sīnā and Ibn Rushd, they develop a theory whereby prime matter and the corporeal form are at the basis of all corporeal existents, including the celestial bodies, which also require corporeal form.[522] Other Arabic intellectual traditions like Ismailism and the Pseudo-Empedoclean tradition also establish a direct connection between prime matter and celestial matter, the former being the matrix out of which all the corporeal beings, heavenly and sublunary, are formed.[523]

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[521] For Philoponus' conception of prime matter, see de Haas 1997 and the relevant sections in Sorabji 2005, vol. 2; for celestial matter, see Sambursky 1962, 154 ff.; and Wildberg 1988, 236; M. Rashed 2004.

[522] See Wolfson 1929, 100-104; Hyman 1977, and his comments in Ibn Rushd 1986, 29-32; and Stone 2001.

[523] For a brief overview of prime matter in Arabic philosophy, see Gardet *EI*^{2}. The idea that prime matter is one of the highest ontological principles can be found in many Ismāʿīlī, Pseudo-Empedoclean, and early doxographic sources. In some cases, prime matter is even described as an intelligible principle or an intelligible form emanating directly from the One or the Intellect. See Abū Ḥātim al-Rāzī 1998, 30-31; the entry on Empedocles in the *Doxography of Pseudo-Ammonius* in Rudolph 1989, 37. Jābir ibn Ḥayyān's view seems quite unique, although it also posits one source for all matter. He makes substance or dust (*al-habā'*) the stuff out of which everything is made (see Haq 1994, 55).

Al-Fārābī in contrast has a completely different view on the subject. Prime matter in his system is exclusively confined to the sublunary world, where it serves as the source out of which the four elements arise; it has no role whatsoever in the superlunary world. A clear indication of this is that its existence is dependent on the rotating activity of the celestial bodies, which are explicitly described as the causes of the existence of prime matter. In the *Siyāsah*, for example, al-Fārābī writes: "The substance, nature, and activity of the celestial body is such that there immediately follows from it the existence of prime matter [*al-māddah al-ūlā*]."[524] This view is reiterated in the *Risālah fī al-ʿaql*, when al-Fārābī writes: "Indeed it has been ascertained in the book entitled *On Generation and Corruption* that the celestial bodies are the first efficient causes/principles of these [sublunary bodies] and it is them therefore that provide the Agent Intellect with the matters and substrates in which it acts."[525]

According to al-Fārābī, then, it is not prime matter which is a cause or a principle for the celestial bodies; rather, it is the celestial bodies themselves and their circular motions that are a principle for the appearance of prime matter in the sublunary world.[526] While these quotations do not in themselves prove the immateriality of the spheres, they nevertheless suggest a conscious distancing on the part of al-Fārābī from what appears to have been a relatively common position in Greek and especially Arabic thought, namely that prime matter is the ultimate principle from which the materiality of all things, including the celestial bodies', derives.[527]

The *Theology* also presents a similar view: "...all bodies, by reason of their being bodies, are of one matter"; "...because the matter of all bodies is one" (Lewis 1959, 183-185). A quick glance at these sources suffices to stress the gap between their conception of prime matter and al-Fārābī's.

[524] Al-Fārābī 1964, 55; see also al-Fārābī 1964, 55.

[525] Al-Fārābī 1938, 33-34.

[526] That prime matter is restricted to the sublunary world is explicitly stated in the *Siyāsah*: *...fa-al-māddah al-ūlā hiya bi-al-quwwah jamīʿ al-jawāhir allatī taḥta al-samāʾ* (al-Fārābī 1964, 54).

[527] The causality of prime matter in al-Fārābī's and Ibn Sīnā's philosophy was already noticed by Duhem (1913-59, vol. 4, 474, 488-490), who nevertheless did not explain its relation to the matter of the heavenly bodies. See also Davidson 1992, 47-48.

Moreover, one notices a clear depreciation of matter in general in al-Fārābī's emanationist treatises, in a way that sometimes recalls Plotinus. On one occasion prime matter is described as the basest and "lowest of existents."[528] It is situated below even the simple elements in al-Fārābī's ontological hierarchy. Although al-Fārābī does not equate matter with evil, there is nonetheless the idea that matter is inevitably accompanied by potency, imperfection, and a base form of existence. The low status of prime matter and matter in general in al-Fārābī's ontology goes hand in hand with his desire to remove the celestial bodies as much as possible from any kind of materiality and substantial imperfection.

When compared to the views of his contemporaries, such as the Ikhwān al-Ṣafā' and Abū Bakr al-Rāzī, Ismāʿīlī thinkers such as Abū Ḥātim al-Rāzī and al-Sijistānī, as well as those in the Pseudo-Empedoclean tradition, and even in comparison to the view of al-Kindī, al-Fārābī's position on the status of prime matter appears unconventional, yet closer to Aristotle's original doctrine.[529] Al-Fārābī, unlike these thinkers, relegates prime matter to the very bottom of his ontological hierarchy and establishes a radical dichotomy between prime matter and the superlunary world. One of the implications of this position is that there is no relation whatsoever between prime matter and the substance of the celestial bodies. The further implication, then, is not only that the substance of the celestial bodies is different from sublunary substances, but also that it cannot in any way be derived from prime matter or a material principle, since al-Fārābī does not explicitly mention any other "source" or "origin" for matter besides prime matter. As we shall see, the cause emanating from the separate intellects and responsible for the existence and corporeality of the celestial spheres is not described as a material cause. This raises the intriguing question of how al-Fārābī would explain the

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[528] Al-Fārābī 1964, 58. This bi-polar ontological hierarchy with the First Cause at one extreme and prime matter at the other is reminiscent of Proclus. Moreover, al-Fārābī, like Proclus but unlike Plotinus, does not explicitly connect matter with evil.

[529] This conclusion may be reached, in spite of the fact that scholars still disagree on the exact nature of prime matter in Aristotle's philosophy. For an incisive discussion of this question, see Charlton 1992, 129-145. Charlton also provides a useful summary of the previous scholarship on the topic on pp. 146-147.

perceptibility of the heavens and the fact that they possess obvious corporeal qualities.

2.1.4 Aether and Motion

Finally, a word here must be said about the relation between aether and the Ptolemaic theories of celestial motion, although this subject will be treated in more depth in Chapter VI. As I explained previously in Chapter III, al-Fārābī adopts many features of Ptolemaic planetary theory, including, it would seem, the eccentrics and epicycles. It is possible that al-Fārābī may have perceived an inherent tension between Aristotle's aether theory and the Ptolemaic model, between the idea exposed in *De caelo* I.2-4 of a fifth nature possessing inherent circular motion and the existence of multiple and different celestial movements. Al-Fārābī may have been influenced by some passages of Philoponus' *Contra Aristotelem*, which uses the Ptolemaic theories of eccentrics and epicycles to undermine the notion of a special element possessing a propensity for regular, circular motion. As R. Sorabji writes, "he [Philoponus] also exploits the theory of epicycles, worked out by Hipparchus and Ptolemy, to argue that since they make celestial motions eccentric and complex, the case for the fifth element, with its simple rotation, is already refuted."[530]

Evidence for this is mostly of a negative nature: in his personal works al-Fārābī never establishes a correlation between celestial matter and celestial motion, and thus avoids explaining the movements of the spheres by reference to material causes.[531] His account, as we shall see in the section devoted to motion, is exclusively based on the noetic qualities of the celestial souls and in that sense perpetuates the 'vitalist' or 'psychological' trend adopted by many Neoplatonists before him. One may surmise that the difficulty involved in reconciling the kinematic implications of aether and the Ptolemaic theories of the particular motions of the spheres

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[530] In Philoponus 1987, 22.

[531] Al-Fārābī's treatise *Against Philoponus* establishes a correlation between aether and circular motion (see al-Fārābī 1967, 253-254), but the second teacher's aim in this treatise is clearly apologetic, i.e., to explain Aristotle's theory of the elements and defend it against what he sees as an unjustified attack mounted by Philoponus. More will be said about this treatise in section VI.3.1.

represents yet another reason for al-Fārābī's reticence to adopt a clearly recognizable aether theory in his emanationist treatises.

3. MATTER, CREATION, AND EMANATION: A SHIFT IN PARADIGMS

The possibility of an evolution in al-Fārābī's cosmology is not only apparent in the question of celestial substance. It is also supported by the contradictory views that exist in al-Fārābī's corpus on the question of the relation between matter and creation. In fact, as it stands today, the Fārābīan corpus adopts two 'paradigmatic' interpretations of the relation between creation and matter, which are mutually irreconcilable and are based on different premises. I use the word 'paradigm' in order to stress the pre-existent conceptual framework these interpretations imply, and also to emphasize the fact that a quite radical breaking away from the first paradigm must have necessarily occurred in al-Fārābī's cosmology in order for him to have developed the features proper to the second.

In order to better understand this problem, it is necessary to contextualize it in terms of both the legacy of Greek philosophy and of the Arabic-Islamic background in which al-Fārābī flourished. More precisely, one must look into the debate over the eternity and creation of the universe. While this debate was acute in the late-antique tradition, it acquired a new relevance in the Islamic cultural milieu as a result of certain developments proper to this civilization, such as the appearance of an influential class of theologians (*mutakallimūn*) at the social and intellectual levels and the emphasis on the absolute simplicity of God and His transcendence from the world at the creedal level.

I do not want to argue that there is an exact correlation between al-Fārābī's theories of celestial substance and his views on the creation of the world. However, the two questions may be connected, since the status of matter in any system depends partly on its theory of creation and vice versa. For example, the postulation of an eternal and uncaused prime matter (as was done by Abū Bakr al-Rāzī) clashed with the *kalām* notions of God's uniqueness and of His absolute demiurgic power. Conversely, the standard Christian and Muslim theological creationist account makes matter directly dependent on God's creative act. Hence, we must ask ourselves what the prevalent views of celestial matter were like in the tenth century and how they were integrated in a creationist or eternalist picture. How did al-Fārābī respond to these interpretations? A contextualization of this problem in terms of both Greek and Arabic intellectual history leads to the realization that al-Fārābī's cosmology may have undergone an important transformation when it comes to the relation between creation and matter.

3.1 Aristotle's Aether and Creation: An Unlikely Harmony

To begin with, we must examine al-Fārābī's understanding of Aristotle's theory of celestial matter and its relation to the eternity of the universe, because these concepts are directly relevant to al-Fārābī's own philosophy. The important point for our purpose is that al-Fārābī was acquainted with Aristotle's theory of aether as a fifth substance or element endowed with special properties, such as incorruptibility. Not only did al-Fārābī write a commentary on the *De caelo*, but, as we have seen previously, he also discusses Aristotle's aether theory in several of the works that have come down to us, such as the *Philosophy of Aristotle*, the *Iḥṣā'*, and the *Treatise Against Philoponus*.

At this point, I would like to argue that the theory of aether, at least as it is exposed in Aristotle's original system, *in principle* represents an obstacle to al-Fārābī's cosmology and metaphysics. In fact, Aristotle gives no indications in the *De caelo* nor in any other work that aether is caused and essentially dependent on higher principles for its existence. Surprisingly, al-Fārābī does not present this as a potential problem, nor does he ever mention the uncausedness of matter in Aristotle's philosophy. This suggests that al-Fārābī's understanding of Aristotle's first body was different from the original doctrine developed by the Stagirite, or else al-Fārābī would not have failed to address this point.

The reason for this may lie in al-Fārābī's peculiar conception of Aristotle's cosmology, which subsumes the question of the causedness of matter under the broader problem of the creation of the universe. This leads al-Fārābī to consider celestial matter from a very different perspective than Aristotle in at least one major respect: according to al-Fārābī, matter is always caused. Unlike Aristotle, al-Fārābī does not adhere to the notion of an uncaused *and* eternal celestial matter. If we look at al-Fārābī's theories of celestial substance in his corpus, it readily appears that either matter is subordinated to a creationist account in which the entire universe (including matter) is produced out of nothing by a demiurgic God (the *Jamʿ* and the *Jawābāt*), or matter is integrated in a causal scheme which, while it ensures its temporal eternity, subordinates it to the causality of the First Cause (*Ārā'* and *Siyāsah*). My point is that in both cases the status and nature of celestial matter is directly connected to the issue of the creation of the world. Hence, the two models that can be found in the Fārābīan corpus (non-eternal creation *ex nihilo* and causative emanation) can be interpreted as two solutions to the problem (from the monotheistic perspective) of the uncaused status of aether that one finds in Aristotle's cosmology.

However, the sources and motivations behind each model and the corollary theory of celestial matter that accompanies them seem to have been of a very different kind. There are strong reasons to believe that al-Fārābī interpreted Aristotle through a Neoplatonic lens during a period of his life. Whether this was a conscious and deliberate departure from Aristotle or an accidental one due to his philosophical formation and intellectual context is a difficult and controversial question. In any case, it is well known that al-Fārābī ascribes some blatantly Neoplatonic theories to the Stagirite, such as the belief that God is the efficient cause of the world. But this particular idea is very differently expressed by al-Fārābī in his various works, and the difficulty of reconciling his views is such that there is still widespread scholarly disagreement on two points. First, some scholars have argued against the authenticity of the *Jamʿ* and the *Jawābāt*, the two works in which al-Fārābī defends a non-eternalist view of creation. Secondly, there are those who think that while the *Jamʿ* is authentic, al-Fārābī quotes the *Neoplatonica arabica* purely for polemical reasons and with full cognizance of their spurious character. I do not have the space here to provide an in-depth discussion of these views and will limit myself to a few comments.

M. Rashed in his very recent article has argued that both the *Jamʿ* and the *Jawābāt* must be inauthentic since they convey a view of creation and time that cannot be reconciled with al-Fārābī's other works,[532] and he lists several reasons to support this view, some of which are not entirely convincing.[533] Rashed in addition relies on and fully endorses the more sustained criticism against the authenticity of these works that is found in Lameer's book entitled *Al-Fārābī and Aristotelian Syllogistics*. While Lameer considers the *Jamʿ* completely spurious, he argues that the *Jawābāt* somehow reflects al-Fārābī's doctrine and may be the work of a student or a later scribe.[534]

On my view, Lameer's arguments are not convincing enough to decisively exclude these works from the Fārābīan corpus.[535] This being said, I partially endorse

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[532] M. Rashed 2008, 55-58.

[533] For example, M. Rashed (2008, 57) argues that the verb *qāla*, which introduces al-Fārābī's answer on creation in question nine of the *Jawābāt*, "reflects a redactor's intervention." This seems to me to be an exaggeration, as this practice was extremely common in medieval Arabic philosophical literature. M. Rashed also mentions the "crypto-atomism" implied in question 9, which he regards as anti-Fārābīan. I am not sure what M. Rashed means by crypto-atomism, since the author of the *Jawābāt* explicitly mentions the hylomorphic constitution of the world.

[534] Lameer 1994, 23-39. In this chapter of his book, Lameer discusses the authenticity of three works: the *ʿUyūn*, the *Jamʿ*, and the *Jawābāt*. My own assessment of these sources is diametrically opposed to that of Lameer. While Lameer defends the authenticity of the *ʿUyūn*, I believe that a close examination of its cosmology and metaphysics decisively shows that it should be attributed to Ibn Sīnā's circle. On the other hand, Lameer excludes the *Jamʿ* and the *Jawābāt* from the Fārābīan corpus, but I believe that these works are somehow connected to al-Fārābī. Some of Lameer's arguments are not entirely convincing and have been criticized by Mallet in his introduction to the most recent edition of the *Jamʿ*; see Mallet in al-Fārābī 1999c, 37-40. Najjar, the other editor of the *Jamʿ*, also upholds its authenticity, as do most other scholars on al-Fārābī. Menn 2008, 71, note 16, leaves this question open.

[535] Several points seem to connect the *Jamʿ* and the *Jawābāt* to al-Fārābī. They show a conspicuous interest for questions of logic and terminology, for the different types of philosophical discourses, for the "virtuous city," and for cosmology, all of which are themes dear to al-Fārābī. For example, questions 12 and 22 of the *Jawābāt* discuss ambiguous and common terms, which are also analyzed in some of al-Fārābī's logical treatises, such as the *K. al-ʿibārah* and its appending treatise, as well as the *Siyāsah* (al-Fārābī 1964, 49-52 and al-Fārābī 1981). Moreover, in question 36 of the same work, the author defines *hayūlā* as the "lowest and basest of existents" (*al-hayūlā ākhir al-huwiyyāt wa akhassuhā*) in a manner that is almost identical to what al-Fārābī says in the *Siyāsah* (al-Fārābī 1964, 58: *wa al-māddah al-ūlā akhass al-mawjūdāt al-mumkinah*). These are meagre elements indeed, but they suggest that one should be cautious in assessing the authorship of these treatises.

Lameer's and M. Rashed's hypothesis that the *Jawābāt* may have been composed or compiled by a student of al-Fārābī. I will put forth shortly two hypotheses concerning these works' authorship, one of which follows and elaborates the line of thought of Lameer and Rashed, and the second of which relies on a developmentalist hypothesis and makes the young al-Fārābī the author of these works. Like all hypotheses at this point in time, they are necessarily tentative. But they have the advantage of explaining the discrepancies in al-Fārābī's doctrine by making use of the biographical and historical data we possess on al-Fārābī's philosophical formation. For the time being I will assume that these works were indeed written by al-Fārābī and will return to the question of their authenticity at a later stage.

Furthermore, other scholars argue that the *Jamʿ*, while authentic, makes ample use of the *Neoplatonica arabica* and ascribes a creationist doctrine to Aristotle for purely polemical reasons and does not reflect al-Fārābī's true philosophical views.[536] Accordingly, although he cites the *Theology* on numerous occasions, al-Fārābī was perfectly aware of its spurious character and mentions it solely in order to buttress his contention about the concordance between Plato's and Aristotle's philosophy.[537]

I agree that al-Fārābī's aim in the *Jamʿ* is primarily polemical. After all, he announces his intention plainly at the beginning of the work: it is to correct the common misconception that philosophy (especially that of Plato and Aristotle) is not homogeneous and presents an irreconcilable variety of doctrines. However, the questions of the polemical nature of the *Jamʿ* and of al-Fārābī's particular portrayal of Aristotle's philosophy are related but not identical. I believe that there is no reason a priori to doubt the validity of the views al-Fārābī puts forth and the sources he adduces to support his claims; and this for several reasons.

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[536] Mahdi in al-Fārābī 1969, 4; and Galston 1977, 19.
[537] This view concerning al-Fārābī's use of the *Theology* has been defended by Galston 1977, 16; Druart 1987a and 1992; Butterworth 2001, 122; and Zimmermann 1994, 180-181.

First, al-Fārābī's attempt to provide a seamless and harmonizing account of Plato's and Aristotle's philosophical doctrine is not an isolated and peculiar endeavour in the history of Greco-Arabic philosophy; rather, it continues a trend initiated in the late-antique period, which harks back to thinkers such as Porphyry, Ammonius, and Simplicius. Ammonius was famous in the Greco-Arabic tradition for having written a treatise with the intention of showing that Aristotle's Unmoved Mover is also an efficient cause of creation and is thus not radically different from Plato's Demiurge.[538] Ammonius' treatise, which was translated into Arabic, is mentioned by al-Fārābī in the *Jamʿ*,[539] and, as A. Bertolacci has shown, it had a significant influence on another work that he wrote.[540] In the Arabic tradition, al-Kindī continues this harmonizing trend. His work provides a conciliatory reading of Plato and Aristotle thanks to the *Neoplatonica arabica*.[541] Hence, from a historical point of view, al-Fārābī's *skopós* in the *Jamʿ* had several precedents in the Greek and Arabic traditions, and in following them he was merely perpetuating a well-established practice.

Moreover, contrary to what has been claimed by some historians,[542] al-Fārābī adopts a similar harmonizing stance in some of his other works, such as the *Taḥṣīl*, where one reads: "So let it be clear to you that, in what they [i.e., Plato and Aristotle]

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[538] This treatise is mentioned by Ibn al-Nadīm (1970, vol. 2, 610) in the *Fihrist* under the title *Exposition of Aristotle's Doctrines about the Creator*. For the Greek-Arabic background, see Mahdi 1967; Verrycken 1990a; Najjar 2004, 30; Bertolacci 2005a; and D'Ancona 2006. For the harmonizing projects of late-antique Neoplatonism and their influence on Arabic thought, see Wisnovsky 2003b and 2005, and D'Ancona 2005.
[539] Al-Fārābī 2001a, 157. Proof that the harmonizing project was widely embraced by al-Fārābī's time is found in the following statement: "Ammonius has a separate epistle that mentions the arguments of these two sages [Plato and Aristotle] affirming [the existence] of the Artisan, which we need not present here since it is so well known."
[540] Bertolacci 2005a stresses the impact of Ammonius' treatise on al-Fārābī and even identifies it as one of the main sources behind the *Aghrāḍ*.
[541] D'Ancona 2003, 84, 88-90; and D'Ancona and Taylor 2003, 627-628. Due to his involvement in the compilation of some texts of the *Neoplatonica arabica*, al-Kindī may have been aware of the true origin of the *Theology*. As Zimmermann 1986 has shown, by al-Fārābī's time the corpus had undergone a quite radical transformation, so I think that the same conclusion cannot be made in his case.
[542] See Mahdi's introduction to his translation of the *Philosophy of Aristotle* (al-Fārābī 1969, 3-10), where he claims that al-Fārābī departs from other Arabic thinkers in rejecting the harmonizing reading of Plato's and Aristotle's philosophy. This idea is endorsed by M. Rashed (2008, 56, note 111).

presented, their purpose is the same, and that they intended to offer one and the same philosophy."[543]

Third, recent research has emphasized the central role that the *Neoplatonica arabica* played in al-Fārābī's understanding of Aristotelian metaphysics and psychology in his other treatises. For example, in a recent article, M. Geoffroy describes the *Theology* as one of the key sources behind the noetical theories of the *Risālah fī al-ʿaql*.[544] G. Freudenthal also mentions the Neoplatonic influence in al-Fārābī's treatment of mathematical objects.[545] And P. Vallat's book on al-Fārābī stands as strong testimony to the survival of Neoplatonic elements in his metaphysics.[546] Furthermore, in the course of this research, I will show that Arabic Neoplatonic texts such as the *Maḥḍ al-khayr* and the *Theology* were influential in shaping some of al-Fārābī's noetical and cosmological theories. This suggests that al-Fārābī's interpretation of Aristotle's doctrine may have been colored by Neoplatonic exegesis.[547]

Fourth, al-Fārābī in the *Jamʿ* explicitly defends the authenticity of the *Theology*. When discussing the possibility of the existence of separate forms, al-Fārābī points to the discrepancy between the relevant theories in the *Metaphysics* and the *Theology*, and dismisses the idea that some of these texts may be apocryphal. He writes: "That some of these statements be by Aristotle and others not is even more inconceivable, since the books [i.e., the *Metaphysics* and the *Theology*] that convey them are too famous for one to think that they may be apocryphal."[548]

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[543] Al-Fārābī 1969, 50, translated by M. Mahdi.
[544] Geoffroy 2002.
[545] Freudenthal 1988 and 1990.
[546] Vallat 2004.
[547] In spite of Mahdi's and Druart's claims to the contrary, the Neoplatonic heritage can be witnessed even in al-Fārābī's exposition of Aristotelian philosophy. In the *Philosophy of Aristotle*, for example, al-Fārābī's account of the Agent Intellect and of its role in the creation of sublunary entities and in human intellection is informed by Neoplatonic exegesis on the topic (see al-Fārābī 1969, 127 ff.).
[548] Al-Fārābī 1999c, 66, pp. 142-145, my translation from the French text. This passage represented a problem for the scholars who argued that al-Fārābī was fully aware of the real provenance of the *Theology*. Perhaps for this reason, unnecessarily complicated and unconvincing interpretations of this passage have been put forward, which cannot be sustained in light of the new edition established by Najjar and Mallet.

For all of these reasons, one may justifiably reject the view that al-Fārābī used the *Theology* purely for polemical motivations and with full cognizance of its inauthenticity. It is unlikely, I think, that al-Fārābī would have relied so heavily on apocryphal sources to interpret Aristotle, whom he viewed as the pinnacle of philosophy, if he had been aware of their true origin. All of this strongly suggests that al-Fārābī somehow associated at least parts of the *Neoplatonica arabica* with the name of Aristotle. I therefore agree with H. A. Davidson, C. D'Ancona, and P. Vallat, who see no valid reason to doubt al-Fārābī's position in the *Jamʿ* or the use he makes of the *Neoplatonica arabica*.[549]

Regardless of this issue, it is undeniable that the creationist paradigm exposed in the *Jamʿ* fulfills at least one crucial function in the context of al-Fārābī's philosophy: it provides an explanation for the origin of matter. In other words, it defines God as the direct and absolute efficient cause of matter (both superlunary and sublunary, no differentiation between the two is made in this work). For this idea, al-Fārābī could rely on a relatively long exegetical tradition and on certain Neoplatonizing texts that transformed the Aristotelian God, who is primarily a final cause of motion, into an efficient cause responsible for the world's creation. In so doing, these texts also transformed the status of celestial matter, which from being both eternal and uncaused in Aristotle's system acquired the status of a created substance. This exegetical departure helps to understand why al-Fārābī did not conceive of Aristotle's theory of aether the way Aristotle himself conceived it or the way it is generally interpreted by modern historians of philosophy. A glimpse into this 'creationist' interpretation of matter can be obtained from some of al-Fārābī's works.

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[549] Davidson 1992, 55; D'Ancona 2003, 97-99, especially note 258; and Vallat 2004, 82, 368.

3.1.1 The *Jamʿ* and the *Jawābāt*

An example of the exegetical trend discussed above occurs in the *Jamʿ*, where al-Fārābī not only asserts Aristotle's belief in the creation of the world by God,[550] but also explicitly ascribes to the Stagirite the theory of the creation of matter on the authority of the *Theology*: *wa hunāka* [in the *Theology*] *tabayyana anna al-hayūlā abdaʿahā al-bāri'… lā ʿan shay', wa annahā tajassamat ʿan al-bāri' jalla jalāluhu wa ʿan irādatihi thumma tarattabat*.[551] The specific use of the verb *abdaʿa* ("he created absolutely") and the expression *lā ʿan shay* ("not from a thing") make it clear that al-Fārābī means that the existence of matter *per se* (prime matter) is essentially dependent on God's absolute creative act. This idea is of great importance to the author, for he accuses other religious groups (for example, the Jews and the Mazdeans) of upholding the eternity of matter. He then adds in a fashion slightly reminiscent of the activity of the demiurge in the *Timaeus* that this matter is made corporeal (*tajassamat*) and is organized (*tarattabat*) by God.[552]

Moreover, al-Fārābī says that the world as a whole, or more precisely, the heavens (*falak*), were created absolutely (*ibdāʿ*), all at once (*dufʿatan*), and not in time (*bi-lā zamān*), and that time is the "number of the celestial motion" (*ʿadad ḥarakah al-falak*) and resulted from it.[553] In addition to being created, al-Fārābī asserts that the world, and therefore all matter, will come to an end: "whatever comes from a thing will inevitably corrupt [*yafsudu*] and return to that thing…," and "the world is innovated out of nothing and will thus revert to nothing…"[554]

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[550] God is described as an absolute creator (*mubdiʿ*) and an artisan (*ṣāniʿ*) of the world (al-Fārābī 1999c, 130-131).
[551] Al-Fārābī 1999c, 130-131.
[552] The idea that al-Fārābī's account in the *Jamʿ* is partially influenced by the *Timaeus* is proven by the fact that he mentions this work several times. Al-Fārābī invokes the authority of Plato, for instance, to explain the necessary existence of an efficient cause of the world's creation (al-Fārābī 1999c, 132-133). The Platonic connection may also be seen in al-Fārābī's use of the term *ṭīnah*, which may have been influenced by the matter or receptacle (ἐκμαγείον) of *Timaeus* 50C, and which, to my knowledge, is not used by al-Fārābī in his other works (al-Fārābī 1999c, 133-135). However, *ṭīnah* could also derive from the Qur'ān, which uses this root.
[553] Al-Fārābī 1999c, 128-129, my translation.
[554] Al-Fārābī 1999c, 136-137, my translation.

It should be noted that the concept of divine will is stressed throughout the cosmogonical account of the *Jamʿ*. The author describes God as "the ruler or organizer (*mudabbir*) of the world." He also states that "He is ignorant not even of a grain of mustard," which is an obvious reference to *sūrah* "The prophets" (21.47) and *sūrah* "Luqmān" (31.16) in the Qur'an, that "not one part of the world escapes his providence (*ʿināyah*)," and that "the universal providence encompasses all particulars." Finally, in his account of matter, the author specifies that matter was created and made corporeal "through God's will" (*ʿan irādatihi*).[555] According to the *Jamʿ*, then, God creates through will and has knowledge of all particulars.

The *Jawābāt*, like the *Jamʿ*, does not discuss celestial matter specifically, but it provides a similar position on the question of the creation of the world and matter. In section nine of this treatise, the author explains that the entire world is composed of form (*ṣūrah*) and matter (*māddah*), that it was created all at once and not in time (*fa-kawnuhu kāna dufʿatan bi-lā zamān*), in spite of the fact that the beings it contains were created in time (*fī zamān*).[556] In addition, the author states that the world will undergo corruption (*fasād*) and that this passing away too will not be in time. Unlike the *Jamʿ*, however, question nine of the *Jawābāt* develops an argument, or rather a proto-argument, to explain why the world is generated and destroyed. The world is composed (*murakkab*) of form and matter, and because every composition (*tarkīb*) undergoes dissolution (*taḥlīl* or *inḥilāl*), the world too will undergo composition and dissolution. This argumentative skeleton and its corresponding terminology are nowhere to be found in the *Jamʿ*, although the author's digression concerning the presence of a unifying cause in all multiplicity definitely goes in the same direction.[557]

As M. Rashed notes in his article, the similarity between the *Jamʿ* and the *Jawābāt* on the question of creation is striking.[558] The brief overview given above

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[555] Al-Fārābī 1999c, 128-138, my translation.
[556] Al-Fārābī 1987a, 281-283.
[557] Al-Fārābī 1999c, 130-131,
[558] M. Rashed 2008, 57.

suffices to show that the creationist view developed in the *Jawābāt* closely mirrors the one conveyed in the *Jamʿ* and vice versa. Not only the ideas, but the terms as well, are the same: God is *mubdiʿ* and creates through *ibdāʿ*, the world is created *dufʿatan* and *bi-lā zamān*, and the world will also undergo corruption (*fasād*). The doctrinal and terminological similarities of these two texts suggest that one account may have been modelled on the other, and thus that they should be seen as forming a single unit, at least when it comes to cosmology.

Having outlined the main features of the *Jamʿ* and *Jawābāt*, I now want to identify and analyze some of the sources that underlie these accounts. One of the obvious sources, and one which is mentioned in the *Jamʿ*, is the *Timaeus.* The author's claims that God makes matter corporeal and organizes it, that time came into existence together with the world, and that time is measured by the celestial motions, are elements that may have been taken from this Platonic dialogue. For example, at 38B, Timaeus says that "time came to be together with the universe," which echoes the statement in the *Jamʿ* that time results from the creation of the heavens. In spite of these parallels, there are nevertheless major differences between the *Jamʿ* and the *Timaeus*. While the Demiurge in the *Timaeus* fashions the universe out of pre-existing substances and takes the realm of ideas or forms as a model, the Creator of the *Jamʿ* creates the world *ex nihilo* and in an absolute manner. Moreover, whereas the *Timaeus* upholds the eternity *a parte post* of the material universe and the immortality of the celestial gods, the *Jamʿ* stresses the future destruction of the world.

In spite of these important divergences, which are conspicuous to a modern reader, there is much evidence in the *Jamʿ* that suggests that the author interpreted Plato differently on these two issues, and in a way that could enable him to use Plato's authority to reinforce his own creationist position. This appears when the author claims that Plato was among the sages who developed "proofs" (*ḥujaj*) showing that the world was created *ex nihilo* and that it will return to non-existence.[559] Furthermore, he explains that Plato disagreed with other thinkers and religious groups who upheld the eternity of matter (*qidam al-ṭīnah*) and who construed creation as a (possibly eternal) organization of this primal stuff.[560] We can see here that the author of the *Jamʿ* pits Plato against those who believe in eternal matter, and in so doing he reveals his adherence to a particular exegetical school that interpreted the cosmogony of the *Timaeus* literally, that is, as positing a beginning to creation. But the author of the *Jamʿ* goes even further in this exegetical direction, since he is unwilling to interpret creation as a mere organization of a pre-existing matter that occurred in time or with time (a possible reading of the literalist interpretation of the *Timaeus*), and conceives of it as absolute creation from nothing, a view which he also ascribes to Plato. I will return briefly to this interpretation of the *Timaeus* later on in my discussion of Philoponus.

In addition, it has already been noted by F. W. Zimmermann and D. Mallet that the account in the *Jamʿ* relies on the *Neoplatonica arabica*, particularly the *Theology* and the *Proclus arabus*.[561] The reliance on the *Neoplatonica arabica* is perhaps most conspicuous not in the choice of nouns used to describe God and His act of creation (*khāliq*, *bāri'*, *mubdiʿ*), for these nouns are common to the Islamic theological and philosophical tradition as a whole, but rather in the statements that creation did not occur in time and that it occurred all at once. These formulas can be found repeatedly in the various Neoplatonic texts.[562] Even the idea of creation *ex nihilo* (which the *Jamʿ* conveys with the expression *lā min shay'*), is also to be found in the *Neoplatonica Arabica*, as in recension L of the *Theology* (i.e., the *Long Theology* contained in the Leningrad MS. and still unpublished), although it is only implicit in the short recension.[563]

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[559] Al-Fārābī 1999c, 136-137.
[560] Al-Fārābī 1999c, 134-135.
[561] See Zimmerman 1986, 178 ff.; and the notes to Mallet's edition and translation of this work in al-Fārābī 1999c.
[562] For the *Theology*, see Lewis 1959, 63, 229-231, 243, 263, 275, 281, 353-357, 431; and Badawī 1955, 24-27, 70. For the *Risālah fī al-ʿilm al-ilāhī*, see Badawī 1955, 174-177. For the *Maḥḍ al-khayr*, see Taylor 1981, 74. And for the *Liber de causis II*, see Thillet and Oudaimah 2001-2002, 326, 330.
[563] Zimmermann 1986, 178 ff.

The *Jamʿ* and the *Jawābāt* should be compared to the cosmogony of the tenth-century Baghdad Peripatetics, who were also influenced by the *Neoplatonica arabica* and who were active in the same intellectual environment as al-Fārābī. These Baghdad thinkers were either contemporaries of al-Fārābī or lived shortly after his death, and many knew him directly. In addition, they were all imbued with Aristotelian philosophy and often endeavoured to reconcile some of its theories with other theological or Neoplatonic ideas. In the following paragraphs, I survey the creationist positions of some prominent Baghdad thinkers of the tenth century. This comparative approach can yield interesting information about the content and authorship of the *Jamʿ* and *Jawābāt*.

In one of his epistles devoted to the question of the creation of the world,[564] Ibn Suwār (b. 943) explains that the term *muḥdath* when applied to the world should not be understood as expressing creation in time. God is only essentially and causally prior to the world, but not temporally prior. As in the *Jamʿ*, Ibn Suwār argues that God's actions occur "all at once and not in time" (*dufʿatan fī ghayr zamān*), and he defines time as the number of the celestial motion (*ʿadad ḥarakah al-falak*). Taking Proclus as a model, Ibn Suwār also establishes a distinction between the temporal perpetuity of the world and the atemporal eternity of God.[565] From this it is clear that Ibn Suwār believed in the infinity of time and conceived of the world as being without a temporal beginning and end.

Many of these ideas reappear in the works of Abū Sulaymān al-Sijistānī (d. 985), Ibn Zurʿah (d. 1008), and al-ʿĀmirī (d. 991).[566] According to S. Pines, Ibn Zurʿah upheld the eternity of time and the world, which implies that he may also have believed in eternal creation. This position is defended more explicitly by Abū Sulaymān al-Sijistānī. Al-Sijistānī considers time eternal, and God's act of creation an eternal act. As Joel Kraemer notes, al-Sijistānī believes that God's power is

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[564] Namely, the *Maqālah fī anna dalīl Yaḥyā al-Naḥwī ʿalā ḥadath al-ʿālam awlā bi-al-qubūl min dalīl al-mutakallimīn aṣlan*. This text has been analyzed and translated into English by Lewin (1954) and subsequently published in Arabic by A. Badawī (see Ibn Suwār 1977).
[565] Ibn Suwār 1977, 247; and Lewin 1954, 92 for the English translation. See also Kraemer 1986, 166 ff.
[566] Kraemer 1986, 169-170, 200.

"spread throughout the world permanently," and he conceives of creation as "a non-temporal, eternal process."[567] He also defines time as "the number of the motion of the diurnal sphere in respect of before and after."[568]

Al-ʿĀmirī's position on creation is more ambiguous than Ibn Suwār's and al-Sijistānī's and it is ultimately unclear whether he was an adherent of eternal time and eternal creation or not. For example, in his work entitled *On the Afterlife* (*Kitāb al-amad ʿalā al-abad*), al-ʿĀmirī interprets Plato's *Laws* as defending atemporal creation. He writes: "Plato says [i.e., in the book of the *Laws*] that the world had a causative beginning, but not a temporal beginning."[569] And al-ʿĀmirī holds like the author of the *Jamʿ* that creation was not in time (*lā fī zamān*). The problem is whether al-ʿĀmirī understood this atemporal creation as being eternal or not, and thus whether he also conceived of time and the world as being eternal. Everett K. Rowson, who has provided a detailed study of al-ʿĀmirī's *On the Afterlife*, underlines the ambiguity of al-ʿĀmirī's text and leaves the question open.[570] The case for al-ʿĀmirī's eternalism nevertheless seems supported by the statement that "God wills to emanate [*ifāḍah*] His beneficence."[571] The term *ifāḍah* here *could* refer to an emanationist relation between God and the world, in which case the positing of a beginning to creation would be unlikely. This interpretation also seems supported by the later accusation of eternalism (*qidam*) that a certain al-Jarīrī levelled against al-ʿĀmirī.[572] Perhaps partly for these reasons, Joel Kraemer lists al-ʿĀmirī as an eternalist in his book *Philosophy in the Renaissance of Islam*.[573] At any rate, and whatever al-ʿĀmirī's true position may be, one clearly sees the gap between the explicit statements in the *Jamʿ* and the ambivalence of the *On the Afterlife*.

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567 Kraemer 1986, 197 and 224.
568 Kraemer 1986, 166.
569 Rowson 1988, 87.
570 Rowson 1988, 258-262.
571 Rowson 1988, 87.
572 See Rowson 1988, 23-24, 257-262.
573 Kraemer 1986, 200, 220.

Finally, Ibn ʿAdī, a Jacobite student of al-Fārābī, represents the most problematic, but also the most interesting, case.[574] He wrote a wide array of theological and philosophical texts that were aimed at different audiences and were composed during different periods of his life. The information that can be collected from his corpus is thus not entirely consistent. For example, in the text that contains his answers to the philosophical questions asked by the Jewish thinker Ibn Abī Saʿīd, Ibn ʿAdī calls God an efficient cause and explains that God caused the world's existence atemporally. Moreover, he defines time as the number of motion.[575] Shlomo Pines, the editor of this text, infers from these remarks that Ibn ʿAdī believed in the temporal eternity of the world, which would also entail a belief in eternal creation. I am not sure whether Pines' conclusion is supported by sufficient evidence, since atemporal creation does not necessarily entail the eternity of time. As we have seen, the author of the *Jamʿ* believes in atemporal creation, but he also believes in the beginning and end of the world and hence of time. In any case, if Pines is right, then Ibn ʿAdī's position in this correspondence would be close to that of the other Peripatetic thinkers.

However, in various theological treatises that he wrote, Ibn ʿAdī explicitly defends the view that the world is not eternal and that it is temporally finite. In one treatise, he states that "the world was created after having been non-existent."[576] In another treatise, in which he refutes the view that God is deprived of the attribute of power (*qudrah*), he argues that according to Aristotle, the things are "originated after non-existence and corrupt after having existed." And he adds: "for this reason, it is impossible that there be among them eternal and non-generated things."[577] Moreover, Yaḥyā explains that God created the world through his act (*fiʿl*), not his nature (*ṭabʿ*). If the world had been created through his nature, then God could not have preceded it, but God did precede the world. In addition, God could have

[574] Netton 1992 examines some of the historical and doctrinal relations between Ibn ʿAdī and al-Fārābī, but his study does not focus on cosmology.
[575] Pines 1955, 114, 117-118.
[576] Taken from Platti 1983, 106, my translation from the French text.
[577] Périer 1920b, 90 ff.

decided not to create the world had He wanted to.[578] The non-eternity of the world is also stressed in his discussion with al-Miṣrī: "the existents as a whole are not eternal, but created...and only God is eternal."[579] Finally, in a third treatise, Ibn ʿAdī calls God not only the Creator of all things, but also their "sustainer" (*rāziq*) and "destroyer" (*mumīt*), thus revealing his belief in the world's eventual termination.

In view of the foregoing, it is not surprising that in spite of some hesitation, both Augustin Périer and Emilio Platti, who have written classic monographs on Ibn ʿAdī's thought, have concluded that he rejected the theory of an eternal universe and of eternal creation.[580] Although Ibn ʿAdī does not elaborate much on his cosmological ideas, it would seem nonetheless that in many of his works he defended the theory of a temporally finite world that came into existence after not having existed.

I am aware of the rather schematic nature of the overview provided above. Unfortunately, this is inevitable due to the fact that most of the works of the Baghdad Peripatetics are still in manuscript form and await editing. Hence, I had to rely on the few studies and edited texts that are accessible in the secondary literature. In any case, this overview shows the diversity and complexity of the cosmological views of the Baghdad Peripatetic thinkers. It also enables us to conclude that there are several doctrinal and terminological similarities, but also crucial differences, between these thinkers and the author of the *Jamʿ* and *Jawābāt*. First, it is clear that these thinkers were engaged in a process of harmonization, which aimed at reconciling various intellectual currents, both religious and philosophical. As we have seen, Ibn ʿAdī claims that Aristotle's views on creation are fully compatible with Christian dogma. And Ibn Suwār is said to have composed a treatise entitled *Agreement between the Opinions of the Philosophers and the Christians*.[581]

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[578] Périer 1920b, 90 ff.
[579] Platti 1981-82, 106.
[580] Platti 1983, 106-107; Périer 1920a, 85.
[581] Ibn al-Nadīm 1970, vol. 2, 632-633.

This is also visibly what the author of the *Jamʿ* and the *Jawābāt* is trying to do; but I will return to this point later on.

Second, the definition of time as the measure or number of celestial motion, and the idea that creation occurs not in time (*bi-lā zamān*) and all at once (*dufʿatan wāḥidatan*) are common features in many of these accounts, which can probably be explained by the wide diffusion of the *Neoplatonica arabica* in tenth-century Baghdad. As has been shown previously, this corpus is at the origin of many of the ideas used by the Baghdad thinkers. Hence, we may conclude with some certainty that the author or authors of the *Jamʿ* and the *Jawābāt* belonged to this Baghdad circle and interacted with some of its members, and that all of these thinkers used the *Neoplatonica* to elaborate their cosmogony.

However, there are also major differences between the *Jamʿ* and the *Jawābāt* on the one hand, and the works issuing from the Baghdad Peripatetic circle and the *Neoplatonica arabica* on the other. One major difference is that time and the world (not only the intelligible world, but the world taken as a whole) are clearly said to be eternal in the *Neoplatonica arabica* and in the works of the Baghdad Peripatetics, Ibn ʿAdī being a possible exception. The eternalist view is articulated in the *Theology*[582] and the *Liber de causis II*.[583] Following this model, Ibn Suwār explicitly refers to the temporal eternity of the world, as do Ibn ʿAdī (in his correspondence), Abū Sulaymān al-Sijistānī, and probably Ibn Zurʿah and al-ʿAmīrī.[584] The evidence suggests that these thinkers regarded creation as an eternal process, although they do not necessarily use the emanationist vocabulary of the *Neoplatonica arabica*.

In contradistinction, the *Jamʿ* and the *Jawābāt* say nothing about eternity, but instead they state that the world will come to an end and is thus of finite duration. Although the creation and destruction of the world do not occur in time, the world is temporally finite and has a beginning and an end. Both texts strongly emphasize

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[582] Lewis 1959, 185; and Badawī 1955, 126.
[583] Thillet and Oudaimah 2001-2002, 326.
[584] See Ibn Suwār 1977, 247; Pines 1955, 117-118; Kraemer 1986, 196-200.

this idea, which is absent in the *Neoplatonica arabica* and the works of the Baghdad Peripatetics, with the exception of Ibn ʿAdī's theological treatise.[585]

A second crucial difference is that the *Jamʿ* mentions God's will (*irādah*) as the cause of the organization of matter and of the creation of the world, thereby departing markedly from the Neoplatonists' view of the One's relation to the world. Al-Sijistānī expressly opposes the idea that God creates through volition.[586] And according to the *Theology*, the One emanates the lower entities by necessity, without the mediation of thought or will, and in this respect it faithfully reproduces Plotinus' doctrine of the One.[587] Ibn ʿAdī (and it must be noted, al-ʿĀmirī),[588] on the other hand, defend divine will and omniscience.

Hence, the differences between these sources are at least as important, if not more so, than their similarities. Surprisingly, however, scholars have stressed only the parallels between the *Jamʿ* and the *Jawābāt* and the *Neoplatonica arabica*, not the differences. In addition, the creationist picture of the *Jamʿ* has never been carefully analyzed beyond its Neoplatonic elements. But upon careful examination, it appears that in essence the *Jamʿ* and *Jawābāt* are much closer to the monotheistic position on creation than to the Neoplatonic one. The emphasis they place on the necessary corruption of all created beings, on divine will and omniscience, and on the direct creation of prime matter reveals a conspicuous desire on the part of the author to clarify his stance vis-à-vis these controversial aspects of the Greco-Islamic debate on cosmogony. The place of matter in particular was highly debated, and many Christian and Jewish theologians in addition to philosophers (e.g., Abū Bakr al-Rāzī) had defended the view of the eternity of matter or of its pre-existence before creation.[589]

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[585] Al-Fārābī 1999c, 136-137; al-Fārābī 1987a, 283.
[586] Kraemer 1986, 223-224.
[587] Lewis 1959, 275, 321, 393-395.
[588] Rowson 1988, 86-87.
[589] See Sorabji 1988, 193 ff. For an in-depth study of the place of matter in Philoponus' cosmology in connection with the theme of creation, see Pearson 1999.

Approached from this angle, the *Jamʿ* and the *Jawābāt* should be connected first and foremost with the Christian and Islamic theological traditions, and only secondarily with the Neoplatonic philosophical tradition embodied in the *Neoplatonica arabica*. Besides the parallels with Ibn ʿAdī's works, this hypothesis is reinforced by what I will call the latent Philoponian content of the *Jamʿ* and *Jawābāt*. Indeed, the key ideas in these two works have very close precedents in Philoponus' writings.[590] There is a passage from the *Contra aristotelem* that Simplicius reports in his commentary on the *Physics* and which reads as follows:

> God not only produces the forms of the things directly generated by him, but is believed to originate and to create even matter itself...Therefore, if the things generated by nature are generated out of existing things, it does not necessarily follow that the things directly generated by God are generated out of existing things as well, given that nature on the one hand needs some time and a process of generation in order to create each of the physical objects and that God on the other hand gives existence to the things directly generated by him without a time lapse and without a process of generation, that is to say without a gradual forming and shaping of the objects. For mere willing suffices for him to give substance to things.[591]

And also:

> For the things created by God immediately are neither generated out of something pre-existent nor by way of a process of generation or a stretch of time. For God brought into existence both matter itself and time simultaneously together with the universe, so that motion did not pre-exist the world in time.[592]

[590] In his very interesting analysis of creation and cosmogony in the works of Greek and Arabic thinkers, Rowson mentions the *Jamʿ* several times and compares it to Philoponus' position on creation (see Rowson 1988, 252-261). To my knowledge, Rowson is the only scholar to have made this connection and to have alluded to the 'theological' affiliations of this work. He also identifies some of the key issues in Arabic discussions of cosmogony in general. Rowson's analysis is nevertheless not exempt of a certain ambiguity when it comes to al-Fārābī and to the relation between the *Jamʿ* and the other works of the Fārābīan corpus.
[591] Simplicius, in his commentary on the *Physics*, 1141,15-30; translated by C. Wildberg in Philoponus 1987.
[592] Simplicius, *Physics* commentary, 1142,21-25; translated by C. Wildberg in Philoponus 1987.

Finally, Simplicius' *De caelo* commentary reports the following statement by Philoponus: "anything generated is brought into being only in so far as it is generated without existing previously."[593] These excerpts adequately show the parallels between the views of Philoponus and the author of the *Jamʿ* and the *Jawābāt*. These short and very condensed passages of Philoponus' *Contra aristotelem* contain most, if not all, of the features that characterize the creationist account in the Arabic texts: the direct creation of (prime) matter, the absolute creation of the world out of nothing and not in time, the will of God, and the idea that motion and hence time follow, or are an outcome of, the creation of the world. This last point on the creation of time together with the world is explained in more detail in a passage of Philoponus' *Against Proclus*, where he states: "by a temporal beginning I mean, as has been repeatedly stated, not one that has taken place within a part of time, time already being in existence, but [for a thing] to begin existing along with time, which had not previously existed."[594] Philoponus and the author of the *Jamʿ* and the *Jawābāt* thus have an identical conception of the relation between time and creation. The creation of the world itself is atemporal, and time comes to be together with the world. In view of these parallels, it is likely that these passages or equivalent ones from the *Against Aristotle* and *Against Proclus* were known to the author of the *Jamʿ* and the *Jawābāt*, for important sections of Philoponus' works were translated into Arabic and had a significant impact on Muslim philosophers and theologians.[595]

The little we know about the extant Arabic translations of works by Philoponus seems to confirm this interpretation. Some years ago, Pines edited and translated several Arabic excerpts that originally belonged to a treatise by Philoponus on the finitude of the world's power.[596] In these excerpts, which were accessible to thinkers of tenth-century Baghdad, one reads that the world is *muḥdath*, that it came "into existence after not having existed," and that "as Plato says, time and the heaven have come into existence together—for time is the

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[593] Simplicius, *De caelo* commentary, 136,25; translated by C. Wildberg in Philoponus 1987.
[594] Philoponus 2005b, 158,25-159,1, translated by M. Share.
[595] See Kraemer 1965; Davidson 1969, and Davidson 1987, 86-116; Pines 1972; Philoponus 1987; Hasnawi 1994; and Wisnovsky 2001.
[596] Pines 1972.

measure of the motion of the heaven—and if time has a beginning prior to which no time existed, then the heavens too have a beginning prior to which they did not exist."[597] This excerpt anticipates several features of the *Jamʿ* and the *Jawābāt*, notably the view that the world had a beginning and was created out of nothing, and that time is "the measure of the motion of the heaven" and came into existence together with the heavens.

Finally, the *Jawābāt* provides us with another link to Philoponus. Question nine develops at length the concept of composition (*tarkīb*) to show that the world had a beginning and must have a cause. Now this concept definitely has its origin in some of Philoponus' proofs of the world's finitude, and as Davidson has shown, it was subsequently adopted by Saadia, al-Kindī, and other Arabic and Jewish authors.[598] And indeed, this passage in the *Jawābāt* recalls one of al-Kindī's arguments for creation, which is itself directly indebted to Philoponus, although al-Kindī's proof is structurally much more elaborate than the one that can be found in the *Jawābāt*. In both cases, the proof relies on the concept of the world's composition of form and matter.[599] Here again one witnesses a direct connection between the author of the *Jawābāt*, Philoponus, and other Arabic authors close to the theological tradition.

In fact, al-Kindī, who was himself close to *kalām* in many ways and who was profoundly influenced by Philoponus, would have agreed with virtually every aspect of the creationist account developed in the *Jamʿ* and the *Jawābāt*.[600] He too upholds that time is the number of motion and that it is concomitant with body and motion, that the world is created and will pass away, that God created the world through his

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[597] Pines 1972, 296, 303, translation by Pines, slightly revised by me.
[598] Davidson 1969, 1987, 86-116.
[599] Davidson 1969, 371-373, and 1987, 106-116.
[600] For a recent analysis of al-Kindī's relation to the Muʿtazilites, see Adamson 2003; for an in-depth study of the question of the world's creation in *kalām*, see Alousī 1968.

will, and even, in spite of what some modern historians have said, that creation did not occur in time.[601]

What conclusions can we extract from the previous analysis? The creationist accounts in the *Jamʿ* and the *Jawābāt* are identical, but the latter develops the important concept of composition (*tarkīb*), which does not appear in the *Jamʿ*. For this reason, and because the terms and concepts otherwise used in these works were widespread during the ninth and tenth centuries as a result of the diffusion of the *Neoplatonica arabica*, it may be doubted, in spite of what Lameer suggests, whether question nine of the *Jawābāt* is derived from and dependent on the *Jamʿ*. In any case, both texts share a common textual background and may be the work of a single author, who developed a very peculiar view of creation by combining elements from Plato, from the *Neoplatonica arabica*, from Philoponus, and possibly from al-Kindī, and who thus managed to strike a balance between Neoplatonic, and theological tenets. Although this author shares numerous terms and concepts with the Baghdad Peripatetics, he differs from most of them in stressing the destruction of the world and its temporal finitude and in making the divine will the main cause of creation.[602] Ibn ʿAdī may be the only author to whom the cosmogony of the *Jamʿ* and *Jawābāt* is connected, since as we have seen he defends creation *ex nihilo* and the temporal finitude of the world in several of his treatises. On fundamental issues, then, the *Jamʿ* and *Jawābāt* are inscribed in the Greco-Arabic theological tradition, and more specifically, in the Philoponian tradition, which had numerous ramifications in Arabic thought.

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[601] It is often stated in modern studies that al-Kindī defends creation in time. But here again one must distinguish between creation *in* time and creation *with* time. Al-Kindī clearly defines time as being concomitant with body and motion, and, moreover, in his epistle entitled *Fī kammiyyah kutub Arisṭūṭālīs* he explains that God's act of creation does not require time (al-Kindī 1950-1953, 375); see also Jolivet's (1993) analysis of the relation between time and creation in al-Kindī's philosophy.

[602] It would seem that Mahdi's assertion (1967, 236) that the Christian Peripatetics of Baghdad belong to the "pro-Philoponus camp" is invalid, or at least very inaccurate, since, as we have seen, some of these thinkers (e.g., Ibn Suwār) depart from Philoponus and prefer to follow the *Neoplatonica arabica* on many crucial points. Pines (1972, 312-313, note 266) had already expressed doubts concerning this view: "As far as I can see, no definitive pronouncement can be made for the time being as to the position of the Christian philosophic school of Baghdad with regard to the controversy over Philoponus. As Professor Mahdi would certainly agree, the question requires further study."

Lameer and M. Rashed could very well be right in identifying the author of these two books as a student of al-Fārābī. In light of the previous discussion, it is nevertheless possible to refine their hypothesis. We have seen that the only Baghdad author whose views are somewhat close to those of the *Jamʿ* and the *Jawābāt* is Yaḥyā ibn ʿAdī. Now Yaḥyā was al-Fārābī's most eminent student. He was a Monophysite who studied several years with the second master and then founded his own philosophical school. One assumes that he was well-acquainted with the *Neoplatonica arabica*, and being a Christian, he surely had a strong knowledge of the Christian and Islamic theological traditions, and more specifically of the work of Philoponus. This seems attested by the fifty or so treatises composed by Ibn ʿAdī on various theological and Christological issues, and whose titles have been listed by Gerhard Endress in his critical bibliography of Ibn ʿAdī's works.[603] His familiarity with these sources is strengthened by the fact that he translated dozens of works from Syriac into Arabic.

For all of these reasons, ibn ʿAdī appears as a likely candidate for the composition of the *Jamʿ* and *Jawābāt*. And even if he was not the sole author, he may very well have been instrumental in the composition or compilation of these works. This hypothesis is supported by an interesting piece of information that appears in al-Bayhaqī's *Tatimmat ṣiwān al-ḥikmah*. Al-Bayhaqī writes that Ibn ʿAdī was the most talented student of al-Fārābī and that "he would write compendia of al-Fārābī's works" (*wa kāna yulakhkhiṣu taṣānīf Abī Naṣr*).[604] Could the *Jamʿ* and/or the *Jawābāt* be among the compendia referred to by al-Bayhaqī? It is difficult to decide. In any case, both the content of his thought and the biographical data in our possession combine to make Ibn ʿAdī a possible agent in the history of the transmission of these texts.

But I would like to suggest another hypothesis, namely, that the *Jamʿ* and the *Jawābāt* could belong to an early stage of al-Fārābī's life, when he was studying with the theologians in Baghdad. The foregoing analysis indicates that it is in the

[603] Endress 1977.
[604] Al-Bayhaqī 1935, vol. 1, 90; and Endress 1977, 5.

Christian and Muslim theological environment of late ninth- and tenth-century Baghdad, and more particularly in the legacy of Philoponus' thought in Islam, that one must look into in order to solve the problem of the authorship of these works. Now many links connect al-Fārābī to this background: he studied with Christian Aristotelians in Baghdad[605]; he was familiar with some arguments of Philoponus' *Against Aristotle* and *Against Proclus*; he also knew, one assumes, the main lines of al-Kindī's cosmology, which was itself influenced by *kalām*; and he read the *Neoplatonica arabica*, which, it should be remembered, was partially copied and assembled by Christians. Moreover, it is possible that Abū Bishr Mattā and Yuḥannā ibn Ḥaylān set an example for al-Fārābī by attempting to reconcile aspects of Aristotle's philosophy with a Christian view of creation inspired by Philoponus, although the fragmentary state of their works does not enable one to confirm this.

The previous hypothesis not only agrees with our biographical data on al-Fārābī and his connection with the Christian scholars of Baghdad. It would also explain why he later eagerly engaged in refuting the views of al-Kindī and Philoponus, something which might have occurred as a result of his heightened awareness of new aspects of Aristotle's philosophy.[606] And it would also explain his thorough knowledge of the *mutakallimūn*'s arguments for creation as can been in some of his logical works.[607] Finally, as we have seen, the idea of a quite radical evolution in al-Fārābī's cosmology is also supported by the discrepancies in his views on celestial matter.

In light of the foregoing, it is not unreasonable to surmise that if the *Jamʿ* and the *Jawābāt* were indeed composed by al-Fārābī, or if they contain a substantial amount of his authentic doctrine, then they must belong to an early phase of his life, when he was learning philosophy and logic in the Christian circle of Baghdad. This

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[605] For information on al-Fārābī's Christian teachers, see Zimmermann in al-Fārābī 1981, cv ff.; Gutas 1982a; and Habby 1997.
[606] M. Rashed 2008 argues that some of al-Fārābī's arguments in his *On Changing Beings* were addressed to al-Kindī in addition to Philoponus.
[607] This is clear from the cosmogonical examples he uses in his *K. al-qiyās al-ṣaghīr* to illustrate his discussion of the syllogisms. See also Davidson 1987, 134-137.

interpretation has the advantage of integrating these two works in a developmental and chronological perspective that accords with the biographical data on al-Fārābī. The developmentalist theory seems to me to be a more promising line of approach than the traditional distinction made between an esoteric and an exoteric dimension in al-Fārābī's works or the a priori assumption that the *Jamʿ* and the *Jawābāt* must be spurious because they conflict with al-Fārābī's other works.[608]

The previous analysis and the emphasis I placed on the 'theological connection' also helps to explain the very loose quotations the author of the *Jamʿ* draws from the *Theology*. In the context of the *Jamʿ*, the references to the *Neoplatonica arabica* aim at establishing the existence of a creator and the creation of the world *ex nihilo*. But other key features of the *Neoplatonica*, such as emanation and the temporal eternity of the world, are completely left out. The author's main intention is thus to establish a doctrine that is in perfect agreement with the theological view of creation described by Philoponus, and which leaves out those elements incompatible with Philoponus. The compatibility between the material extracted from the *Neoplatonica* and the main points of Philoponus' account on creation suggests that the author of the *Jamʿ* and the *Jawābāt* is adapting the *Neoplatonica* to his own needs and to a cosmogony mostly derived from other sources.

Furthermore, the *Neoplatonica arabica* may be a crucial piece of evidence to explain the discrepancy between Philoponus' and al-Fārābī's interpretation of Aristotelian cosmology. Whereas Philoponus knew perfectly well that Aristotle maintained the eternity and uncausedness of matter and of the universe as a whole, al-Fārābī construed Aristotle's position on these questions through the lens of the Neoplatonizing works and, following Ammonius, ascribed efficient causality to the Unmoved Mover. This is why al-Fārābī probably misunderstood some aspects of

[608] Another attempt to interpret the *Jamʿ* has been made by Galston 1990 in her book *Politics and Excellence*. Galston's thesis that al-Fārābī had a "masterplan" that he realized in his various writings and whose aim was to induce dialectic knowledge in the reader seems very unconvincing to me. For a condensed statement of this thesis, see Galston 1990, 220.

Philoponus' attacks on Aristotelian cosmology: the Aristotle they read was quite different. Hence, when al-Fārābī in the *Jamʿ* criticizes those scholars who misinterpret Aristotle's statements on time and deny him any belief in creation,[609] it is likely that he includes Philoponus himself in this group, not realizing that his own reading of Aristotle is mediated by a long line of Neoplatonists, from Ammonius to al-Kindī. The irony then is that the author of the *Jamʿ* was deeply influenced by Philoponus, but at the same time misunderstood the latter's criticism of Aristotelian cosmology, which he construed through a thick stratum of Neoplatonic exegesis. This reading of this passage of the *Jamʿ* and of the relation between al-Fārābī and Philoponus seems substantiated by al-Fārābī's treatise entitled *Against Philoponus*, to which I shall return shortly.

One question remains unclear. Al-Fārābī does not address the issue of celestial matter expressly in the *Jamʿ*, and mentions only prime matter (*al-hayūlā*). Hence, it is not possible to know whether he interprets celestial matter in an Aristotelian or theological way, and whether he regards it as a substance that is in itself corruptible or whether its corruptibility is due to the will of God.[610] The idea put forth in the *Jamʿ* and the *Jawābāt* that the world will corrupt (*yafsudu*) is of little relevance, since it does not inform one of the nature of celestial matter nor how the world will be destroyed. On this question, the author of the *Jamʿ* could have followed either al-Kindī or Philoponus. Al-Kindī combined the thesis of the world's destruction with a variant of Aristotle's aether theory. According to al-Kindī, celestial matter is itself imperishable and a different 'fifth' element, but will come to an end due to God's will, which is able to override the natural imperishibility of aether. Philoponus, on the other hand, argued that the heavens are made of the same perishable elements as sublunary bodies and are thus intrinsically corruptible. Unless the world (including the heavens) is maintained in existence by God in a

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[609] Al-Fārābī 1999c, 128-129.

[610] The relation between creation, eternality, and the corruptibility of celestial matter is a complicated issue in ancient and medieval thought, which I can only address here in connection with al-Fārābī's own position. For more information in the Greek-Arabic context, see Adamson's (2007a, 80 ff.) useful discussion.

"super-natural" (*huper physin*) way, it will naturally come to end due to the finite power it possesses.[611]

There are good reasons to think that although al-Fārābī mentions the createdness of matter in this work, he regards it as something that is in itself incorruptible. This view could be supported by passages not only from the *De caelo*, but also by the precedent of al-Kindī, who maintained both the creation and destruction of the world and the existence of an incorruptible fifth element in the heavens that is nonetheless subjected to God's power.[612] This view is conveyed in al-Kindī's statement that the celestial bodies "will not undergo generation (*kawn*) and corruption (*fasād*) until their creator destroys them (*ḥattā yudaththiruhā mubdiʿuhā*), if He wills, all at once (*dufʿatan*), just as he created them..."[613] According to al-Kindī, celestial matter is intrinsically incorruptible, but God has the power to destroy it all at once, just as he created the world all at once.

It is possible that the *Jamʿ* and *Jawābāt* adopt this view as well. In the *Jawābāt*, it is said that the world's destruction will occur atemporally, like its creation, which rules out the possibility of the world's slow temporal decay. In the *Jamʿ*, al-Fārābī refers to the will (*irādah*) of God, describes Him as willing (*murīd*), and stresses that nothing escapes his providence (*ʿināyah*).[614] Hence, one assumes that God not only creates and organizes matter, but also causes its destruction, which would mean that the cause for the perishability of matter is not intrinsic to it but a direct effect of God's power. Third, one of the most common arguments to prove the world's intrinsic perishability, which was developed by Philoponus several centuries earlier, namely, that a finite body cannot possess infinite power and must therefore naturally come to an end unless it is maintained in existence in a "super-natural"

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[611] Philoponus 2005b, 237, 10-15 and 240, 20-25.
[612] Al-Kindī 1950-53, 194, 210, 219-229, 242, 253; and Adamson 2007a, 85, ff. As Adamson (2007a, 87) writes, "Thus al-Kindī sides against Philoponus and with Aristotle and Simplicius over the issue of the composition of the heavens, insisting that they have an incorruptible nature."
[613] In the *Risālah fī kammiyyah kutub Arisṭūṭālīs* (al-Kindī 1950-1953, 377, my translation).
[614] Al-Fārābī 1999c, 146-147.

way (*huper physin*) by an exterior cause, is nowhere to be found in the *Jamʿ*.[615] Since al-Fārābī was acquainted with Philoponus' arguments, it would be surprising had he chosen not to include this argument had his real intention been to establish the intrinsic perishability of celestial matter and the world. Finally, an examination of the *Treatise against Philoponus*, a polemical work composed to refute some of Philoponus' arguments, shows that al-Fārābī may have combined Aristotle's aether theory with creationism, and it thus provides additional information on how to read the *Jamʿ*.

The previous remarks indicate that al-Fārābī's concept of celestial matter during the period of composition of these works could have been influenced by the *Neoplatonica arabica* and by al-Kindī and was unlike the theological view (indebted to Philoponus' works) according to which all matter is inherently perishable and made of the four sublunary elements. Since al-Fārābī in all of his other works endorses Aristotle's commitment to the specificity and permanence of celestial matter, it would be very surprising indeed if he had chosen to follow Philoponus on this point. Yet the dearth of information on this question in the *Jamʿ* and the *Jawābāt* suggests caution, especially considering the fact that Maimonides, as we have seen, ascribes a different hylic theory to al-Fārābī than the one that can be found in his emanationist treatises.

3.1.2 The *Against Philoponus*

Against Philoponus offers additional but ambiguous information about al-Fārābī's position vis-à-vis Aristotle's aether theory and the debate over the creation of the world, which might very well represent a certain departure from the *Jamʿ* and the *Jawābāt*.[616] Al-Fārābī's argument is that Aristotle's comments about aether and the elements are not intended to prove the eternity of the world (as Philoponus

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[615] This argument on finitude appears in Philoponus' *Against Proclus* and is designed to establish the world's generation, its natural corruption, and the necessity for an exterior agent. See Philoponus 2005b, Chapter 6, especially 83-87.

[616] C. Wildberg has collected and translated all the known fragments of Philoponus' *Against Aristotle* (see Philoponus 1987, and also Wildberg 1988).

contends), but rather to differentiate between the various simple elements, that is, between the four sublunary elements on the one hand, and the fifth celestial element on the other.[617]

Apart from this straightforward fact, which is stated by al-Fārābī at the beginning of the treatise, this text is particularly difficult to interpret due to its obscure and polemical character. According to M. Mahdi, who edited the Arabic version and translated it into English,[618] al-Fārābī intends to undermine Philoponus' criticism by showing that there is no contradiction between aether and the creation of the world, and that these notions can be easily reconciled. This treatise, as Mahdi understands it, argues that Aristotle's *De caelo* is essentially a discussion about the elements and does not articulate Aristotle's belief in the uncreatedness and eternity of the world. As Mahdi writes, "He [al-Fārābī] does not believe that the first body as established by Aristotle is necessarily incompatible with the doctrine of the creation of the world."[619] This may be echoed by al-Fārābī himself in the first sentence of his work, where he quite surprisingly asserts that "none of Aristotle's statements in *On the Heaven and the World* that John the Grammarian intended to destroy were intended by Aristotle to establish the eternity of the world."[620]

There is, however, a fundamental ambiguity in this treatise, which is not highlighted by M. Mahdi in his introduction. It concerns al-Fārābī's intention and his exact doctrinal position vis-à-vis Philoponus' critique of Aristotelian cosmology. Is al-Fārābī's aim in this treatise to defend Aristotle's thesis of the eternity of the world by arguing that, *pace* Philoponus, there is no real link between aether and eternity in the *De caelo* and that aether is not meant in any way to represent a proof for eternity? Or is his aim to show, as in the *Jamʿ*, that Aristotle held a creationist and non-eternalist doctrine and thus that Philoponus has completely

[617] It is interesting that the debate thus centers on the notion of *skopós* (aim or intention, and by extension subject-matter) of the work, which was also a notion important to Simplicius and many other Greek thinkers. Apparently, the *skopós* of the *De caelo* was particularly debated in late antiquity, as is apparent from Simplicius' survey of the issue in the prologue to his *De caelo* commentary.
[618] See Mahdi 1967 and al-Fārābī 1972.
[619] Mahdi 1967, 238.
[620] Mahdi 1967, 253.

misinterpreted the *De caelo*? In other words, is al-Fārābī defending Aristotle from the perspective of an eternalist or a non-eternalist?

The relation between the concepts of eternity, creation, and the incorruptibility of aether are ambiguous in this treatise, to say the least. As Mahdi points out, "Alfarabi does not commit himself either way on the question of the eternity of the world."[621] Although Mahdi does not address this question in any depth, he seems to opt for the view that al-Fārābī combines aether with a theory of eternal causation and creation.[622] Mahdi may very well be right in construing the text in this manner. This interpretation would connect the *Against Philoponus* not only to the later emanationist treatises, but also to other no longer extant works, such as the *On Changing Beings*, in which al-Fārābī is said to have defended the thesis of the eternity of the world.[623] Moreover, it would mean that al-Fārābī had departed from the position defended in the *Jamʿ* and the *Jawābāt* when he wrote this work.

I would like to propose another way of reading the *Against Philoponus*, by following and developing a line of interpretation suggested to me by C. D'Ancona in one of her articles.[624] For the time being, the following interpretation is not designed to replace the previous hypothesis of eternal creation, but to help us maintain a broader interpretive framework in the absence of additional evidence. There are several reasons to believe that al-Fārābī upholds a creationist and non-eternalist position in this treatise. First, it must be remembered that he ascribes such a view to Aristotle in the *Jamʿ*, and so it is possible that the *Against Philoponus* belongs to the

[621] Mahdi 1967, 252.
[622] Mahdi 1967, 236: "He [al-Fārābī] upholds Aristotle's position that the world as a whole is not subject to generation and destruction. And he reconciles this position with the doctrine of the creation of the world by proposing with Ammonius that Aristotle's doctrine of movement and time does not exclude the possibility that the world as a whole, together with time, were created from nothing by a God who is the world's final and efficient cause."
[623] Ibn Rushd mentions this treatise on several occasions in his corpus. The relevant passages have been collected by Steinschneider (1869/1966, 119-123), but they provide little insight into the original work. M. Rashed 2008 provides an in-depth study of these excerpts and is able to reconstruct some of al-Fārābī's arguments.
[624] D'Ancona 2006, 401-405.

same period and was written with a similar intention in mind. In fact, there is a passage in the *Jamʿ* that strongly tilts in this direction:

> What also leads them in this presumption [those who claim that Aristotle was an eternalist] is what he mentions in the book *On the Heavens* about the whole having no temporal beginning, for they presume that he is there speaking about the world's being eternal. That is not the case, since he had already explained in that and in other books about physics and theology that time is only the number of the motion of the celestial sphere and is generated from it.[625]

This passage of the *Jamʿ* is important insofar as it throws light on al-Fārābī's aim and method in the *Against Philoponus*. In both cases, his aim may be similar in that he wants to refute the view of those who ascribe the eternalist thesis to Aristotle on the basis of concepts found in the *De caelo*: time in the *Jamʿ*, the elements and aether in the *Against Philoponus*. Moreover, his strategy is also similar in that he argues that these people have misinterpreted the concepts of time and aether as well as Aristotle's aim, and that they have erroneously inferred their conclusions about eternity. Although he does not mention any name, al-Fārābī in the *Jamʿ* may have implicitly included Philoponus as one of the thinkers who wrongly claim that Aristotle was an eternalist. The *Against Philoponus* may thus be seen as continuing al-Fārābī's warning in the *Jamʿ* and as representing a more elaborate attempt to refute Philoponus' position.

Second, al-Fārābī in the *Against Philoponus* apparently rejects any kind of correlation between aether and eternity in the *De caelo*, an attitude which would be very difficult to justify if he were indeed defending Aristotle from an eternalist perspective. True, Aristotle does not prove the eternity of the world using the aether theory in a demonstrative manner, but he establishes on numerous occasions direct connections between the two theories, arguing that aether is by nature incorruptible and eternal and in essence divine. Now the basic idea of these passages seems to have been accurately conveyed by the Arabic translators, if one may judge

[625] Al-Fārābī 2001a, section 55, 154, translated by C. Butterworth.

by the edition prepared by A. Badawī. For example, one reads: "*wa ʿalā hādhā al-mithāl bi-ʿaynihi yanbaghī an yuʿtaqada anna hādhā al-jirm al-karīm* [aether] *ghayr kā'in wa lā fāsid*...,"[626] and "*fa-ammā hādhā al-jirm al-awwal al-sharīf fa-lam yatakawwan min shay' albattatah*."[627] This evidence would be difficult to dismiss for anyone thoroughly acquainted with the *De caelo*, as surely Philoponus and al-Fārābī were.

Now it is significant that the arguments al-Fārābī puts forth in his refutation do not focus on the eternity of the world, but rather on Philoponus' discussion of Aristotle's theory of the elements, of the distinction between them, and of their various motions. Al-Fārābī is therefore primarily concerned with defending these aspects of Aristotle's physics and his aether theory, but surprisingly he says nothing about the further eternalist implications that aether conveys in Aristotle's cosmology. What we seem to witness on the part of al-Fārābī, then, is an endorsement of the aether theory with an adamant effort to cancel its connections with the eternity thesis.[628] Oddly, a similar conclusion, but in connection with motion, can be made about al-Fārābī's other critical writings on Philoponus, such as the *On Changing Beings*.[629]

As I have intimated above, one reason that could justify this approach would be that al-Fārābī is combining aether with a non-eternalist creationist picture, which he also ascribes to Aristotle. If this were true, then one would have to connect the *Against Philoponus* to the *Jamʿ* and the *Jawābāt*. Indeed, an eternalist reading of the *Against Philoponus* would be difficult to reconcile with the parallels between this treatise and the *Jamʿ* and with the peculiar insistence al-Fārābī shows to dissociate

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[626] Badawī 1961, 139, thus accurately reproducing the original text at 270a12 ff., which reads: "It is equally reasonable to assume that this body will be ungenerated and indestructible..." (transl. By J. L. Stocks).
[627] Badawī 1961, 140.
[628] This seems to have puzzled R. Sorabji, who writes (Philoponus 1987, 20): "Surprisingly, he [al-Fārābī] thinks that Philoponus is wrong to ascribe to Aristotle belief in the eternity of the physical world."
[629] As M. Rashed (2008, 36) writes, "...there is no evidence that al-Fārābī tried to give a *positive* proof of the eternity of the heavens [in the *On Changing Beings*]," a fact which M. Rashed describes as a "curious absence." This being said, however, al-Fārābī definitely seems to defend the eternity of motion and time in this work.

aether from eternity.[630] This being said, it is also possible, as mentioned before, that in the *Against Philoponus* al-Fārābī had already moved toward a conception of eternal creation, in which case the aether theory, which al-Fārābī endorses in this treatise, would be integrated in a causal scheme possibly similar to the one presented in his emanationist treatises. Yet this does not explain why al-Fārābī would reject the connection between aether and eternity, which is explicit in the *De caelo*. Moreover, the discrepancy between aether as it is presented in this treatise and the very different theories of celestial substance that appear in the *Ārā'* and *Siyāsah* suggests that these works belong to quite different periods in al-Fārābī's life. In style, tenor, intention, and content, the *Against Philoponus* is much closer to the *Jamʿ* than it is to the emanationist treatises.

If we accept the creationist, non-eternalist interpretation of the *Against Philoponus*, then al-Fārābī's cosmological stance in the *Jamʿ*, in the *Jawābāt*, and in the *Against Philoponus* would be similar: he combines a creationist and non-eternalist view of the universe with a theory of incorruptible celestial matter. This enables us to understand why al-Fārābī in the *Against Philoponus* simultaneously refutes the correlation made by Philoponus between aether and eternity, and yet seems to defend the existence of the fifth element as put forward by Aristotle in the *De caelo*. While in agreement with Philoponus on the question of creation, al-Fārābī opposed Philoponus on the question of aether, which, like al-Kindī, he managed to reconcile with his cosmogonical account. The irony is that al-Fārābī's account of creation was itself deeply influenced by Philoponus during this early phase. And it is precisely because al-Fārābī was able to reconcile these two ideas (creation and aether) and attributed this view to Aristotle, that he misunderstood Philoponus' attack on Aristotelian cosmology, which partially rested upon the correlation made between aether and eternity.

This interpretation of the *Against Philoponus* naturally raises the question of al-Fārābī's interpretation of the Arabic version of the *De caelo*, a clearer

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[630] D'Ancona 2006, 404-405, implicitly comes to the same conclusion.

understanding of which would throw much light on the problem. Is it possible that some of the crucial passages in al-Fārābī's version of the Arabic *De caelo* connecting aether to the eternity thesis were left out, adapted, or modified by the translators? Is it possible that this very compatibility between creation and aether was already expounded in the version consulted by al-Fārābī? Clearer knowledge of the Arabic versions of the *De caelo* accessible to al-Fārābī could go a long way in explaining the formation of his views on aether and its relation to cosmogony. Unfortunately, the Arabic *De caelo* has not yet been properly edited and little work on this seminal text has been conducted.[631]

Despite this gap in our knowledge, one may accept the possibility that during this period of his life al-Fārābī adhered to a conception of heavenly matter and creation that was quite close to that of al-Kindī. Al-Kindī adopts Aristotle's postulate of a 'first body' or 'fifth element' that is in essence incorruptible, but he subjects this theory to the more fundamental belief in the creationist act of God.[632] In other words, celestial matter is incorruptible during the period of time allotted by God. It was created by God and will ultimately be destroyed by Him. Causally, it relies absolutely on the First Principle. Since al-Fārābī nowhere rejects the aether theory to uphold the corruptibility of heavenly matter in his works, even in his argumentation in *Against Philoponus* and in the *Jamʿ* where he seems to defend the creation of the world *ex nihilo*, one must conclude that he never adopted this Philoponian view. The parallels between al-Kindī and al-Fārābī on this topic naturally raise the question of the former's influence on the latter, a question which is rendered more complex by the fact that they had access to many similar sources, such as Alexander and pseudo-Alexander, the *Theology*, and other texts from the *Neoplatonica arabica*. Although al-Fārābī does not mention al-Kindī by name, it is undeniable that his views as expressed in the *Jamʿ* and in the treatise *Against Philoponus* betray some similarity to al-Kindī's and that the latter may have been the

[631] There is a very corrupt edition that has been published by Badawī in 1961, but it is generally considered unreliable. Endress 1966 represents the only general study of the transmission of the *De caelo* and its reception in the Arabic world. Further research on this subject is a desideratum.

[632] See al-Kindī's treatise entitled *On the Proximate Efficient Cause* in McGinnis and Reisman 2007, 12.3, p. 5; and Adamson 2007a, 86-88.

source for al-Fārābī's understanding of celestial matter and creation during this period of his life. Naturally, it is also possible that the two thinkers developed similar views because they relied on identical sources (Philoponus and the *Neoplatonica arabica*) to interpret Aristotle's cosmology.

3.2 Moving Away from the Creationist Paradigm: *The Philosophy of Aristotle*

As we have seen in an earlier section, the *Philosophy of Aristotle* articulates a revised version of the Aristotelian theory of aether. On the one hand, like the *Against Philoponus*, it contrasts aether to the other four elements, thus establishing a radical distinction between sublunary and superlunary matter in the Peripatetic tradition. On the other hand, it mentions the form and matter (the hylomorphic nature) of aether and also defines it as the cause of the other elements, thereby departing slightly from the *De caelo*. But what is the origin and cause of aether in this treatise?

Al-Fārābī says very little about the question of the creation or eternity of the world in the *Philosophy of Aristotle.* This is not surprising if we realize that this work focuses chiefly on the logical, physical, and psychological doctrine of the Stagirite, although the question remains why al-Fārābī is almost completely silent about Aristotelian metaphysics.[633] Nevertheless there are a few hints in the text that suggest that al-Fārābī has moved toward an eternalist position. In one passage, al-Fārābī mentions the infinite number of moved things[634]; in another, he describes the "perpetual circular motion" (*al-ḥarakah al-mustadīrah al-dā'imah*) of the celestial bodies.[635] In addition, al-Fārābī discusses the role of the Agent Intellect and the celestial bodies in sublunary generation and corruption, a theory which is characteristic of his emanationist treatises.[636] These hints definitely point to an eternalist position, although it may be said that they do not constitute decisive evidence for it. Nevertheless, they suggest that the way in which al-Fārābī

[633] The hypothesis that the work is incomplete has been advanced, but it is generally accepted that al-Fārābī intended to treat this subject in another work.
[634] Al-Fārābī 1969, 102.
[635] Al-Fārābī 1961, 130; and al-Fārābī 1969, 29, for Mahdi's translation.
[636] Al-Fārābī 1969, 128.

interpreted Aristotle's cosmology had evolved by the time he was writing the *Philosophy of Aristotle*.

If this is the case, then it would mean that al-Fārābī rejected the creationist non-eternalist position he combines with aether in the *Jamʿ*, the *Jawābāt*, and the *Against Philoponus* and was moving toward a conception of eternal causality, in a fashion akin to that expounded in the emanationist treatises. This in turn would mean that al-Fārābī's understanding of Aristotelian cosmology was gradually changing, an observation that T. Street has made in regard to al-Fārābī's logical works.[637] True, al-Fārābī says nothing about creation, whether eternal or non-eternal, in the *Philosophy*. But I doubt that the reason for this lies in al-Fārābī's interpretation of Aristotle's cosmology as postulating an eternal and uncaused world, in the way that modern historians interpret Aristotle. Rather, as was previously mentioned, it is probably due to the fact that in this treatise al-Fārābī restricts his discussion to natural philosophy and omits metaphysics. This also seems supported by the negative fact that al-Fārābī in his entire corpus never makes matter eternal *and* uncaused; so that the basic assumption in this work must be that celestial matter (and the world) is perpetually caused or emanated. Hence, the account of matter in the *Philosophy*, as implicit as it is, nevertheless shows a certain kinship with the *Ārā'* and the *Siyāsah*. On the topic of creation and celestial matter, the *Philosophy* may be seen as a transitional work between the *Jamʿ* and the emanationist treatises.

3.3 The Emanationist Paradigm: Substrate, Causality, and Emanation in the *Ārā'* and *Siyāsah*

If al-Fārābī's understanding of Aristotelian cosmology during one period of his life was a creationist and non-eternalist one, and thus if Aristotle's celestial matter was construed in light of this interpretive lens, al-Fārābī's other works indicate that his

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[637] Street 2004, 536: "Alfarabi's attitude to Aristotle seems to have become clearer over time, and in consequence his position changes from one work to another."

understanding of the relation between celestial matter and creation was not always the same. This, we have seen, is already apparent in the *Philosophy of Aristotle*, where one encounters Aristotle's aether with no suggestions that this theory should be combined with a creationist and non-eternalist view. In fact, it seems that by the time al-Fārābī was writing this work he had a more accurate understanding of Aristotle's philosophy, since he adheres to an eternalist position concerning the world and matter.

The departure from the creationist paradigm expressed in the *Philosophy of Aristotle* is nevertheless much more forcefully expressed, and more fully consummated, in the *Ārā'* and *Siyāsah.* In these treatises, al-Fārābī not only rejects the concept of aether and provides a new formulation of the composition of the celestial bodies; he also redefines the mode of production of celestial substance, shifting from a non-eternalist creationist paradigm to one of eternal causality. How is creation redefined in these works? What is the function of the concept of substrate developed by al-Fārābī and how does it relate to this new cosmological model? The following paragraphs aim to provide an answer to these questions.

In a previous section I attempted to explain why al-Fārābī may have been tempted to move away from his early theories of celestial substance as expressed in the curricular works, and why he may have adopted Alexander's concept of celestial substrate instead. Moreover, I presented arguments to support a developmentalist hypothesis according to which al-Fārābī's cosmology underwent a shift from a non-eternalist creationist paradigm which combines Philoponian, Neoplatonic, and Kindīan elements to a revised causative model of eternal creation and celestial substance in the emanationist treatises. Although equally reliant on Arabic Neoplatonic sources, the latter model presents a completely different explanation of how celestial substance relates to God and the universe. While in the *Jamʿ*, matter is created directly by God alongside the rest of the world, in the *Ārā'* and the *Siyāsah*, it is the separate intellects that are responsible for the production of the celestial bodies: celestial substance is therefore created through an intermediary, the *thawānī*. And in turn it is these celestial bodies that are responsible for the generation of sublunary prime matter. Hence, in this system God is not directly involved in the creation of matter.

It is difficult at first glance to establish any direct link between al-Fārābī's new theory of celestial substance (i.e., soul and immaterial substrate) and the concept of eternal causation. One does not entail the other, and there may in fact be no correlation between the two. A proof of this is that Ibn Sīnā in the *K. al-shifāʾ* upholds both a theory of eternal emanation and the materiality and hylomorphism of the celestial bodies. Yet in the case of al-Fārābī, the concept of substrate fits nicely in his account of eternal causation, and there are reasons to believe that it actually possesses a special role in this new cosmic picture. The following section is devoted to explaining the implications that al-Fārābī's new concept of substrate has at the metaphysical level and how it relates to creation.

To begin with, we must examine how the language of creation used in the *Ārāʾ* and *Siyāsah* to explain the production of the celestial bodies differs from the one used in the *Jamʿ*. There are several major differences. First, God in the *Ārāʾ* and the *Siyāsah* is not an absolute creator in the way He is presented in the *Jamʿ*. In fact, al-Fārābī in his emanationist treatises completely omits the Arabic roots *b-d-ʿ*, *b-r-ʾ*, and *kh-l-q*, which are used repeatedly in the *Jamʿ* to convey God's act of absolute creation. This omission is surprising and suggests a radical departure from theological and some philosophical (e.g., al-Kindī) accounts of creation. Al-Fārābī replaces this vocabulary with terms expressing emanation and causality. Hence, God, the First Cause, is said to "emanate" (*yafīḍu*) all of the existents, while these are "necessarily entailed" (*lazima ʿan*) by God.[638]

Second, while God creates through volition in the *Jamʿ*, it is through intellection that He emanates the various other beings in the *Ārāʾ* and the *Siyāsah*. "The First," al-Fārābī writes in the *Ārāʾ*, "is in its substance actual intellect [*ʿaql bi-al-*

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[638] Al-Fārābī 1985a, 88-89, 94-95.

fiʿl].”[639] Al-Fārābī takes over this idea from Aristotle’s *Metaphysics*, but unlike Aristotle, he connects intellection with creation. In so doing, al-Fārābī was probably inspired by passages of the *Proclus arabus*, which equate intellection and emanation in the intellectual beings, although the First Cause itself is said to be beyond intellect.[640] Third, the First Cause directly produces only a single being, the first separate intellect, while the heavenly spheres and their souls are produced by the other separate intellects. More specifically, it is by thinking their own essence that they cause the existence of the spheres and sphere-souls.

The most common term found in al-Fārābī’s emanationist treatises to express the relation between the separate intellects and the spheres is *lazima ʿan*, “to necessarily entail,”[641] a formula which expresses the logical connection of the heavenly bodies to the separate intellects and the necessity of their dependence upon higher principles. In addition, al-Fārābī sometimes uses the verb *fāḍa*, which unlike *lazima* has been traditionally interpreted as referring to the concept of emanation and the ‘flowing of being.’[642] It is notable that al-Fārābī usually prefers to restrict the use of the term *fāḍa* to signify God’s creation of the first separate intellect or of the world as a whole.[643] In spite of this, *lazima ʿan* and *fāḍa* are the two most common verbs that the second teacher uses to describe the creation of the celestial bodies. Both terms express the concept of an eternal and permanent creation, but while the former puts the emphasis on the causal relation between the separate intellects (cause) and the spheres (effect), the latter underlines the role

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[639] Al-Fārābī 1985a, 70-71; see also the *Siyāsah* (al-Fārābī 1964, 45); and the *Risālah fī al-ʿaql* (al-Fārābī 1938, 35-36).

[640] *Maḥḍ al-khayr*, VIII, *Liber II*, I, XXII. These texts follow Plotinus in *Enneads* V.3.11, where the One is said to be beyond intellect.

[641] For example, al-Fārābī 1985a, 100; and al-Fārābī 1964, 32. Although *lazima* is close to *laḥiqa* in meaning, only the former appears in al-Fārābī’s cosmology. This may be due to the fact that *lazima* emphasizes concomitance whereas *laḥiqa* stresses consequence, as Goichon remarks in connection with Ibn Sīnā’s vocabulary (Goichon 1938, 364-365).

[642] Al-Fārābī 1964, 53; Goichon 1938, 290-291; Fakhry 2002. There is some disagreement in the secondary literature about the place of emanation in al-Fārābī’s philosophy; see Netton 1989; Galston 1997; Druart 1987a, 1992. On my view, the question of al-Fārābī’s allegiance to Neoplatonism cannot be reduced to the question of emanationism; in this respect, many recent studies have underlined al-Fārābī’s debt to the Neoplatonists without addressing the issue of emanation *per se*; see Geoffroy 2002; Freudenthal 1988; and Vallat 2004.

[643] Al-Fārābī 1985a, 88-9, 100-101; and al-Fārābī 1964, 47.

that the intellects play as constant purveyors of existence. Again, al-Fārābī never uses the term *ibdāʿ* to refer to the creation of the sphere-souls by the separate intellects.

This being said, it is unclear to me whether the root *f-y-ḍ* is really meant to convey a special concept of creation, i.e., of creation as emanation. Even if it were, it is hard to see to what extent its meaning would differ from that of the root *l-z-m*. Al-Fārābī himself seems to use these verbs synonymously, and he does not provide definitions on the basis of which one could distinguish them. His basic motivation in using these terms seems to be the same, namely, to emphasize the causal dependence of all things on God and to present God as the First Existent and the First Cause.

In spite of this ambiguity, the presence of the term *fāḍa* is important insofar as it establishes a terminological link between al-Fārābī and the Arabic Neoplatonic texts, since this verb also appears in the *Theology*,[644] the *Maḥḍ al-khayr*,[645] and the *Liber de causis II*.[646] These three texts, together with other works of the *Neoplatonica arabica*, form a bridge between the Greek Neoplatonists and al-Fārābī, and it is perhaps on these grounds that one may say that these thinkers share a common conception of emanation. Regardless of the importance one should attach to this terminological similarity, the rest of the dissertation will show the many parallels that exist between al-Fārābī and Proclus. In this respect, the attempts by Mahdi, Galston, and others to downplay the 'Neoplatonic connection' of al-Fārābī's theories of creation appear unfounded. I will have more to say about these Neoplatonic texts in the chapter on intellection.

Perhaps as a result of the use of common sources or of a direct reliance on al-Fārābī's works, Ibn Sīnā's language of creation is similar in many respects. As

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[644] Lewis 1959, 231; and Badawī 1955, 27.
[645] Badawī 1977, 24; Taylor 1981, 321.
[646] Thillet and Oudaimah 2001-2002, 330.

Janssens' article reveals,[647] Ibn Sīnā uses a wide range of terms to express creation and emanation at the cosmological level. When it comes to the heavenly bodies, Ibn Sīnā, like al-Fārābī, relies heavily on *lazima ʿan*,[648] a term whose use in this cosmological context may have been suggested to him by the work of the second master. *Fāḍa* usually signifies the emanation of the whole world from God.[649] As for *ibdāʿ*, Ibn Sīnā applies it to the creation of the first intellect or of all the separate intellects by God; this term expresses absolute creation without an intermediary.[650] Ibn Sīnā seem to have been relatively consistent in limiting this term to God and not using it to describe the creative activity of the separate intellects, although he occasionally defines the creation of the spheres as *ibdāʿ*.[651] But the use of this term is one of the main differences between the two thinkers.

It may be noticed that al-Fārābī's account of the creation of the spheres does not ascribe a special material cause for the celestial bodies that can be distinguished from the cause of their soul. Al-Fārābī explains the creation of the heavens as follows: by thinking the first, the separate intellects cause another intellect to exist; by thinking their own essence, they cause the existence of a sphere together with its sphere-soul. Hence, it is notable that al-Fārābī ascribes only one cause to the composite of soul and body. In contrast, Ibn Sīnā mentions three causes: one for the intellect, one for the sphere-soul, and a third cause that is responsible for the production of the matter (*māddah*) and corporeality of the celestial bodies[652]; the latter is therefore a material cause. This third material cause emanating from the separate intellects is lacking in al-Fārābī's account. This is yet another proof that the material dimension of the celestial bodies is downplayed in al-Fārābī's cosmology.

Despite the lack of an identifiable material cause in the heavens, however, the heavenly bodies are corporeal and, as such, are not completely simple

[647] Janssens 1997.
[648] Ibn Sīnā 1951, 427/173; Ibn Sīnā 1983-86, 406,15; Ibn Sīnā 1985, 314; see also Goichon 1938, 364-365.
[649] For example, Ibn Sīnā 2005, 327,16-17.
[650] Ibn Sīnā 1951, 385/153; Ibn Sīnā 1983-86, 406,15; Goichon 1938, 19; and Janssens 1997, 472. For a detailed analysis of Ibn Sīnā's language of creation, see Janssens 1997.
[651] An example occurs in Ibn Sīnā 1985, 314.
[652] Ibn Sīnā 1951, 430-174; Ibn Sīnā 1985, 313-314; and Ibn Sīnā 2005, 330,39-331,4.

substances. In this respect, one of the differences between al-Fārābī's and Alexander's concepts of substrate appears clearly. Although Alexander defines the celestial body as a soul inhering in a substrate and although there is some ambiguity as to whether this substrate is to be understood as completely immaterial or as a second type of matter,[653] he is consistent in claiming the absolute simplicity of the heavenly spheres. For example, in the *Mabādi'*, it is written: "As for the divine body, since it is simple—because it could not be eternal if it were composite—and its motion is also one and simple, it does not have any nature at all other than the soul..."[654] Alexander establishes a direct equation between simplicity of substance and soul: because the celestial bodies are essentially a form or soul, they are devoid of multiplicity.

Al-Fārābī has a very different view on this issue. According to him, the fact that the heavenly bodies consist of substrate and soul is used to argue *against* their simplicity. Unlike Alexander who makes soul the simple substance of the spheres, al-Fārābī emphasizes the duality of soul and substrate and presents them as the two components of the orbs' substance. He writes: "The substance (*jawhar*) of each one of the heavens [i.e., main spheres] (*samāwāt*) is composed (*murakkab*) of two things: a substrate (*mawḍūʿ*) and a soul (*nafs*)."[655] The use of the adjective *murakkab* here is noteworthy, because it is often employed in physics to signify the composite nature of sublunary bodies. In this context, the term suggests a parallel between the sublunary hylomorphic beings and the celestial bodies, both being composed of a duality of principles. In view of this distinction, it is surprising that al-Fārābī does not posit a separate cause for the soul and substrate of the spheres.

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[653] This depends on whether one relies on the commentary on the *Metaphysics* or the *Quaestiones*. In the latter work, Alexander seems to argue for the existence of a celestial matter that is different from the sublunary matter. See section IV.6.1.
[654] Alexander 2001, 17-19; see also 52-53.
[655] Al-Fārābī 1964, 53, my translation: "*wa jawhar kull wāḥid min al-samāwāt murakkab min shay'ayn: min mawḍūʿ wa min nafs*."

Furthermore, in the *Ārā'*, al-Fārābī specifies that the celestial body "thinks with an intellect that is not identical with its entire substance."[656] And he adds that "because it [the celestial body] also thinks its substrate which is not intellect, that part of its essence which it thinks is not entirely intellect..."[657] This passage is important because it shows that in the celestial bodies the concept of substance is broader than that of intellect. The celestial bodies are primarily intellects, but their complete substance also includes substrates. These substrates are responsible for making the heavenly substance composite. This explains why al-Fārābī mentions the "things" (*ashyā'*) and parts (*ajzā'*) that constitute the heavenly substance.[658]

The conclusion is that al-Fārābī never describes the heavenly bodies as beings that are simple in substance, in the manner that Alexander does in the *Mabādi'*. This is one of the notable differences in these two thinkers' treatment of the concept of substrate: for Alexander, the substrate does not prevent the spheres from being simple bodies; for al-Fārābī, it is the main reason why they are composed.[659]

This point could remain a minor interpretive divergence in these thinkers' concept of substrate; but when related to broader issues, such as the question of the eternity and causation of the world, it acquires a new significance. Alexander's universe is in many ways like Aristotle's: it is both eternal and uncaused. The cosmological priority for Alexander was probably to isolate the celestial bodies from the sublunary world and stress their divinity, and this is why he might have wanted to make a strong case for the simplicity of their substance, as opposed to the composite nature of sublunary beings.

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[656] Al-Fārābī 1985a, 123.

[657] Al-Fārābī 1985a, 123, translated by Walzer, revised by me.

[658] Al-Fārābī 1964, 53.

[659] The fact that the heavenly bodies are composed and yet that only one cause is posited for their existence was obviously problematic for Ibn Sīnā, who revised al-Fārābī's model in light of his elaborate theory of causality. The result was that two distinct causes are assigned to the heavenly bodies in Ibn Sīnā's cosmology. See section V.3.5.

Al-Fārābī, on the other hand, has a deeper aim in mind when he mentions the composite nature of the orbs. Since his universe is causally dependent on the First Cause, all the existents in the universe must be integrated in the causal chain that begins with God. Now according to al-Fārābī, one of the direct consequences of a thing's being caused is that it is composite, i.e., it is itself made of a plurality of things that are united through its cause. No absolutely simple being can be caused. God, being the only absolutely simple being, is uncaused. Because the celestial bodies are part of God's causal scheme, they must by the same token be composite. The notion of composition is usually associated with matter, since matter together with form makes up a composite matter. Matter is also a principle of potency and indeterminacy, which can receive a plurality of forms and enable any possible existent to actual become x or y. But the view that the heavenly bodies are immaterial raised a fundamental problem that called for a solution on the part of al-Fārābī. If the heavenly bodies are not literally hylomorphic, then they must be seen as simple entities, like God and the intellects. Since al-Fārābī wants to avoid this conclusion, he is compelled to introduce a second principle (besides soul) to justify the composite nature of the spheres, and this principle is substrate. Substrate, then, fulfills the requirement for the compositeness of the heavenly bodies.[660]

The correlation between causality and complexity[661] (in itself a very Neoplatonic idea) explains why al-Fārābī has no problem with and even fully endorses the view of the compositeness of the heavenly bodies, and thus goes against a well-established tradition that viewed the heavenly bodies as simple entities. Having rejected the heavenly bodies' materiality, al-Fārābī must seek this multiplicity elsewhere, and he finds it in this duality of substrate and soul and in the

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[660] To be more precise, the problem of the compositeness and multiplicity of the spheres is solved by al-Fārābī in two ways: first, as has just been said, by means of the substrate, which together with form represents the "composite" nature of the heavenly bodies. But there is a second way in which the spheres may be said to be multiple and composite: they possess several objects of thought and are thus characterized by a complex intellection (more will be said about this in Chapter V).

[661] Al-Fārābī states this relation explicitly in the *Risālah*, in the context of his discussion of the separate intellects: "…it [the separate intellect] has a principle [i.e., a cause], since whatever is divisible has a cause that makes it a substance" (al-Fārābī 1938, 35; translated in McGinnis and Reisman 2007, 77). For a comparison of al-Fārābī's and Proclus' theories of causality, see Wisnovsky 2003b, 110-111.

intellection of the spheres. Hence, substrate fulfills the same function as matter in this case, namely, it makes the celestial substance a composite substance, although it possess none of the negative attributes of matter, nor even its usual cosmological characteristic, circular motion. It is noteworthy, moreover, that no specific cause is ascribed to this substrate in the way that Ibn Sīnā ascribes a specific material cause to the matter of the spheres.

The substitution of immaterial substrate for matter in the heavenly substance also helps to explain why al-Fārābī describes the celestial souls as intellects, and not, as Ibn Sīnā, as "corporeal souls" endowed with imagination.[662] In Ibn Sīnā's cosmology, the sphere-souls are not properly speaking intellects and do not have pure intellection, due to their material and corporeal dimension. Rather, they are characterized by imagination. Ibn Sīnā stresses this point in numerous places in his cosmology.[663] Al-Fārābī, on the other hand, calls the sphere-souls intellects and endows them only with intellection.[664] The main reason for this difference lies in the divergent explanation that both thinkers give concerning the substance of the celestial body, which is truly material for Ibn Sīnā, and merely a composite of immaterial substrate and soul for al-Fārābī. This is one of the salient differences in these two thinkers' treatment of the celestial substance.

One of the consequences of al-Fārābī's adoption of substrate is, therefore, that it makes the material cause superfluous and does not lead to a duality of causal principles, one of which (the material cause) would be necessary to explain the corporeality of the sphere, the other of which (the formal cause) would account for the soul and form of the sphere. It thus differs from Ibn Sīnā's cosmology, which, in addition to the two formal causes of the separate intellect and the sphere-soul, adds a third material cause to explain the materiality of the spheres.

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[662] Ibn Sīnā describes the celestial soul as "corporeal" (*jismāniyyah*) in the *Shifā'* (Ibn Sīnā 2005, 312,5-6).

[663] In the *Shifā'* (Ibn Sīnā 1983-86, 383,14 ff., 387,5). For more information, see the upcoming chapter on intellection.

[664] See for example al-Fārābī 1964, 34.

Moreover, al-Fārābī's theories greatly emphasize the noetic nature of the celestial bodies. Because substrate does not represent a material principle opposed to the psychological nature of the spheres, the celestial bodies acquire an existence that is almost completely noetic or intelligible. This particular understanding of celestial substance as soul and immaterial substrate may be seen as belonging to al-Fārābī's general strategy to make intellect and form the main principles of his cosmology. The absence of matter (the normal Aristotelian principle of individuation) means that the differentiation of the celestial bodies occurs purely as a result of their intellection and the hierarchy of their objects of thought, not of a decreasing nobleness of their matter (see section V.9). What distinguishes the celestial bodies is not their having different matters, but their having different objects of thought and desire: each sphere aspires to imitate its corresponding separate intellect, and it is the hierarchy of the separate intellects that dictates the hierarchy of the celestial bodies. For example, the outermost sphere is nobler than the sphere of the sun, because it intelligizes the first separate intellect, which is closer to the One than the separate intellect corresponding to the sphere of the sun.[665]

Furthermore, the notion of substrate in the celestial bodies serves to establish a bridge between heavenly and human intellection in the emanationist treatises and the *Risālah fī al-ʿaql*. It is notable that the concept of substrate also figures prominently in al-Fārābī's noetics, a subject to which the second master is known to have dedicated several treatises.[666] In the *Risālah fī al-ʿaql*, which provides a detailed examination of the various meanings of the term 'intellect' and the stages of human intellection, al-Fārābī explains that the potential intellect, which is "a certain soul, or a part of a soul, or one of the faculties of the soul,"[667] enables human beings to abstract the forms from the material objects they apprehend. This potential intellect is succeeded by the active and acquired intellects, and finally by the separate Agent Intellect, which is also the tenth cosmic intellect that governs

[665] This hierarchy is clearly expressed in al-Fārābī 1985a, 114-115.
[666] Alon 2002, 810-811.
[667] Al-Fārābī 1938, 12; translated in McGinnis and Reisman 2007, 71.

the sublunary world and ends the cycle of emanation. What is of particular concern here is the fact that the material intellect is described as being "like a kind of matter" (*shabīhah bi-māddah*)[668] and as being "itself that which is like matter and substrate" *(...al-dhāt allatī tushbihu māddatan wa mawḍūʿan...)*[669] for the forms it receives and for the intellects above it, especially the active intellect, which acts like a form on the potential intellect.[670]

In another passage of the *Risālah fī al-ʿaql*, a-Fārābī goes even further and explains that each intellect is like a substrate for the intellect above it and a form for the intellect below it. Even the acquired intellect *(ʿaql mustafād*), the highest human intellectual faculty, is like a substrate for the forms it receives (*wa al-ʿaql al-mustafād shabīh bi-mawḍūʿ...).*[671] A similar description of the human intellect occurs in the *Ārā'*, where al-Fārābī calls each faculty of the soul "matter" for the faculty above it and form for the faculty below it.[672] These passages are all characterized by the use of analogical language, which compares the faculties of the human soul to a substrate or matter for higher faculties.[673]

That any part of the human soul may represent a substrate in which higher principles can act recalls the heavenly substrate, which is also acted upon by the higher faculty of the sphere-soul, i.e., its purely intellectual part. The function of substrate in these passages is meant to introduce a notion of multiplicity in the human soul and the heavenly body, as well as a faculty that is not material strictly speaking, but possesses some of the characteristics of matter, such as receptivity.

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668 Al-Fārābī 1938, 13, my translation.
669 Al-Fārābī 1938, 14, my translation.
670 For another description of the potential intellect as material intellect, see al-Fārābī 1985a, 198-203, passim.
671 Al-Fārābī 1938, 22; translated in McGinnis and Reisman 2007, 74.
672 Al-Fārābī 1985a, 174-175. Apparently, Themistius develops a similar analogy; see Duhem 1913-59, vol. 4, 386, 397.
673 As we learn from al-Fārābī's (1938, 13-15) discussion, the difference between the potential intellect and other 'regular' material substrates is that the former entirely fuses with the form it receives and becomes indistinguishable from it, whereas the latter only receive forms on their exterior surface, i.e., these material substrates do not fuse completely with their forms in that the material cause and the formal cause remain distinct (e.g., the shape and the matter of a wooden bed). Al-Fārābī's description of the potential intellect is indebted to the Aristotelian notion that mind and object of mind become one in the act of intellection.

Both the heavenly bodies and the various intellectual faculties in humans are substrates in their capacity to receive form from a higher agent, and yet they are strictly speaking immaterial.

This parallel in the cosmology and noetics of al-Fārābī is strengthened by the fact that the heavenly bodies possess a rational soul, which, like the human rational soul, is primarily defined by its intellection and its being a source of perfection. This kinship is emphasized in the *Siyāsah* when al-Fārābī writes that "the celestial souls...have only the soul that intellectualizes, which in some sense is congeneric with the rational soul [in humans]."[674] Hence, although human and heavenly souls and intellects are not identical, they share a number of similarities and are defined through a common terminology in al-Fārābī's philosophy. Moreover, substrate plays an important role in the ontological structure of soul in al-Fārābī's psychological and cosmological accounts.

The common terminology, conceptual framework, and analogical approach employed by the second master in his discussions of human and celestial intellection indicate an overlap between the cosmological and psychological disciplines in al-Fārābī's philosophy.[675] Moreover, the evidence suggests that al-Fārābī found in the concept of substrate a solution to the problem that the omission of heavenly matter posed for him, and that he may have derived this concept from psychology in addition to metaphysics. Although the concept of substrate is common in ancient Greek debates about the nature of heavenly substance (as Alexander's works testify), al-Fārābī goes beyond the metaphysical sources by establishing parallels between human and celestial noetics. The concept of substrate, which is usually associated with discussions of the human intellect, gets transferred to the sphere-souls, which are also said to possess substrates on which

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[674] Al-Fārābī 1964, 34; translated in McGinnis and Reisman 2007, revised by me.

[675] The idea that al-Fārābī's psychology and noetics are a bridge between the cosmological and human levels has been noted by several scholars, including Madkour 1934, 145; Lucchetta in al-Fārābī 1974; and Hamzah in al-Fārābī 2001b, 45. However, these scholars have focused chiefly on the role of the Agent Intellect and not on that of the heavenly souls. Moreover, although my argument agrees with their basic view of an ontological link between the superlunary and sublunary souls, it goes further in positing a transfer of noetic and psychological notions to the cosmic level.

the higher intellectual faculties act. Al-Fārābī's celestial noetics thus seems to exploit ideas from his human psychology and noetics.[676]

What is particularly interesting in this respect is that modern studies have shown that al-Fārābī's noetics, like his cosmology, was influenced to a great extent by the work of Alexander of Aphrodisias.[677] The idea that the potential intellect is a 'material' intellect, which can best be defined as a substrate for forms, finds an exact parallel in the psychological writings of the Greek commentator. In fact, as far as we know, Alexander is the first to have described the potential intellect as a material intellect.[678] Whether al-Fārābī developed his view of celestial substrate from Alexander's writings on noetics and psychology in addition to the already discussed passages of Alexander's commentary on the *Metaphysics* is a point worth considering, and, in my view, a highly likely one. According to Genequand, Alexander was the first to provide a systematic treatment of the celestial souls by applying concepts taken from the *De anima*,[679] and this approach represents an interesting precedent to al-Fārābī's own approach.[680] If that is the case, then Alexander and al-Fārābī's method of studying the celestial bodies would be very similar indeed.

It is undeniable, however, that these two thinkers had different philosophical priorities and aims. For Alexander, it was to stress the divinity and life-power of the celestial bodies in order to better explain their impact on the sublunary world, a view that fits well with his theory on providence. For al-Fārābī, it

[676] It is worth asking oneself if al-Fārābī would have considered the term "substrate" a transferred term (*al-ism al-manqūl*) from psychology, assuming that this science was elaborated before cosmology.
[677] For information on Alexander's psychology and noetics, see Fotinis in Alexander 1980, Shroeder 1989, Blumenthal 1996, and for the various levels of intellect Gilson 1929, Rahman 1958, and Davidson 1992. In spite of Finnegan's thesis (Finnegan 1957) that al-Fārābī was not influenced by Alexander's psychology, there are convincing reasons to think that the opposite is true. Jolivet 1977, 218, note 33 rightly calls for a revision of Finnegan's position, and Geoffroy 2002 reinstates Alexander's *De anima* as one of the crucial sources in al-Fārābī's theories of human intellection. The above analysis also seems to confirm this. See also the sections on al-Fārābī in Davidson 1992.
[678] See Alexander's commentary on the *De anima* in Alexander 1980, 105.
[679] Alexander 2001, 6.
[680] According to Steinschneider (1869/1966, 117), al-Fārābī composed a commentary on Alexander's *De anima*; this is yet another connection between the two thinkers.

centered on the problem of celestial matter and substance and its relation to the question of God's unicity and causality, as well as the intellection of the heavenly bodies. Hence, the use that al-Fārābī makes of these psychological concepts at the cosmological level is proper to his philosophy and fulfills specific requirements in the evolution of his thought.

The foregoing analysis of substrate has shown that this concept fulfills a positive function in al-Fārābī's cosmology and that it represents a highly original and creative interpretation of the question of celestial substance. Although probably based on Alexander's and Themistius' commentaries, this concept is nevertheless transformed by al-Fārābī to address particular issues in his philosophy.

3.4 Conclusion

In the previous paragraphs, I have attempted to support the hypothesis of an evolution in al-Fārābī's cosmological theories by pointing to the various doctrinal contradictions that exist in his works, by suggesting some of the causes and reasons that triggered this evolution, and by explaining how al-Fārābī assimilated and subsequently transformed the philosophical concepts he inherited from Greek philosophy. This process resulted in a new and creative cosmological model. I argued that it is in the ancient Greek commentatorial tradition, and in particular in the commentaries of Alexander and Themistius, as well as in the *Neoplatonica arabica*, that al-Fārābī may have found the inspiration to redefine the nature of celestial matter and integrate it in a framework characterized by eternal creation. He combined this theory with the concept of causality as expressed in the *Neoplatonica arabica*. These sources, when combined with the negative influence that thinkers such as Philoponus and al-Rāzī exercised on his philosophical formation, also explain why al-Fārābī broke away from an Aristotelian theory of celestial matter and adopted the concept of substrate instead in his later emanationist works.

Nevertheless, my analysis has shown that al-Fārābī's use of the concept of immaterial substrate is highly original and has various metaphysical and epistemological implications. First, al-Fārābī's new theory of celestial substance is perfectly adapted to the prominence of the noetical principles that govern the superlunary cosmos. It leads to a noeticization of the heavenly bodies, which are defined primarily in terms of their rational soul. Second, it enables al-Fārābī to reject any material causality in the heavens, while at the same time accounting for the compositeness of the heavenly bodies, an essential feature of his cosmology and an important requirement of his theory of causality. Third, al-Fārābī's account of the sphere-souls and of the role of substrate betrays the influence of human psychological concepts, with the result that the heavenly and human intellects present numerous parallels and a similar structure.

These points enable us to conclude that some of al-Fārābī's cosmological ideas show a marked continuity with the ancient Greek cosmological tradition. Not only are the questions addressed by al-Fārābī (the relation between matter and the First Cause; the nature of celestial substance; the relation between the celestial bodies and human psychology) often similar, but the sources on which he relies in order to build his own interpretation belong to the Peripatetic and Neoplatonic background of late antiquity. In particular, Alexander, Themistius and the *Neoplatonica arabica* provided al-Fārābī with the tools to fashion a new and original synthesis. In regard to celestial matter, it is possible to surmise that al-Fārābī moved from a hylomorphic conception of the celestial bodies (the curricular works) to a more Neoplatonizing and psychological one (in the emanationist treatises), where celestial substance is primarily defined in terms of soul. It is undeniable that al-Fārābī in this respect is an assiduous continuator of a Neoplatonic tradition that privileges soul, intellect, and form over matter. Moreover, al-Fārābī is one of the first thinkers to have provided such a complex interpretation of the relation between celestial substance, creation, and intellection in the history of medieval cosmology.

V. INTELLECT AND INTELLECTION

1. GENERAL PRESENTATION OF THE CELESTIAL SOULS AND INTELLECTS

The ensoulment of the heavenly spheres is a central tenet in al-Fārābī's cosmology. This idea, as is well known, harkens back to Greek thinkers such as Pythagoras, Plato, Aristotle, Alexander, Proclus, and Simplicius.[681] Plato, for instance, (or rather the characters of his dialogues) asserts his belief in the ensoulment of the heavens in several of his works, such as in *Timaeus* 36E-39A and *Laws* 896B-897C and 967D-E, a view reproduced by the author of the *Epinomis* (981E, 983A-C). The evidence in Aristotle is somewhat more ambiguous, but several passages in his works seem to defend a similar view.[682] At any rate, his later commentators took it for granted that Aristotle upheld the ensoulment of the heavens.[683] The *Neoplatonica arabica,*[684] al-Kindī's treatises,[685] and especially the *Mabādi' al-kull* attributed to Alexander attest that this theory was transmitted to the Arabic world and became widespread during the early centuries of Islam.[686] It is probably due to the latter work that the theory of sphere-souls became so popular in Arabic thought, since this treatise appears to have been known by many Syriac and Arabic authors and extensively articulates this theory. To modern readers, the ensoulment of the heavens represents one of the most interesting and curious aspects of ancient and medieval cosmology. Some of the metaphysical implications of this idea in al-Fārābī's philosophy will now be analyzed.

We have seen in the previous chapters that because al-Fārābī uses terms associated with sublunary physics to describe the celestial bodies in his emanationist texts, these terms should be interpreted with care as they possess a

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[681] See Wolfson 1962, who traces the continuity of the idea of an ensouled heaven from the Greek to the Islamic period via the church fathers.
[682] See *De caelo* II.2, 12; and *Metaphysics* XII.8.1074b1-15, where Aristotle endorses the age-old view that the celestial bodies are gods.
[683] See Simplicius 2004a, 378,1-382,1.32, who also discusses the view of Alexander on this subject.
[684] For example, in the *Theology* (see Lewis 1959, 77, 181).
[685] Al-Kindī 1950-53, passim, and Gobillot 2002.
[686] Alexander 2001, 46-47, 52-53, and passim.

marked analogical quality and have only a vague relation to the concrete constitution of the heavenly spheres. Despite their equivocity, however, the terms 'matter,' 'substrate,' and 'form' represent the basic framework of al-Fārābī's cosmology, and are designed to facilitate or make possible a description of something (i.e., the heavens) whose essence is remote from human conception. Upon closer examination, however, it becomes clear that substrate and especially form refer to concepts that al-Fārābī holds to be fundamental, namely, soul and intellect. Soul and intellect emerge as the primary principles of his cosmology. This is not surprising considering that the First Cause is "in its substance actual intellect [*ʿaql bi-al-fiʿl*]"[687] and that the superlunary beings ultimately proceed from it.

I have already provided an overview of the two sets of celestial intellects in al-Fārābī's cosmology (the separate intellects and the sphere-souls) in Chapter III of this dissertation. Unlike the separate intellects, the sphere-souls are not separate from the spheres, but inhere in them. In addition, al-Fārābī, following Alexander, describes the sphere-souls as the forms of the celestial bodies, an idea that is later taken up by Ibn Sīnā as well.[688] Unlike the separate intellects, the sphere-souls do not participate in the causation or creation of other intellects or celestial bodies in the cosmic emanationist scheme. However, they play a crucial role in the coming to be of sublunary bodies by preparing matter in a way that enables it to receive the sublunary forms.

In his human psychology, al-Fārābī makes an ontological and epistemological distinction between soul (*nafs*) and intellect (*ʿaql*). When it comes to the celestial bodies, however, al-Fārābī equates both concepts: the spheres have souls that are in essence intellects. The distinction is thus merely terminological. The souls of the heavenly bodies can be identified as intellects since they are rational souls that have intellection as their principal activity. This appears clearly in the *Ārā'* and the *Siyāsah*, where al-Fārābī explains that the heavenly substrates "do not prevent their

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[687] Al-Fārābī 1985a, 70-71.

[688] Ibn Sīnā 1985, 314; Ibn Sīnā 2005, 311,31-32.

forms [i.e., the celestial bodies' souls] from thinking and from being intellects [ʿ*uqūlan*] in their essences"[689]; that "despite the fact that the soul that is in each of them [the celestial bodies] is something existing in a substrate, it is [...] an actual intellect..."[690]; and that "the celestial souls have neither sensory perception nor imagination; rather, they have only the soul that intellects..."[691] Moreover, al-Fārābī repeatedly mentions the fact that the celestial bodies "contemplate" (ʿ*aqala*) the higher principles.[692]

Unlike al-Kindī, his predecessor, al-Fārābī does not endow the heavenly bodies with the senses of sight and hearing.[693] The sphere-souls possess the rational faculty only, and have neither sensation nor imagination. The usual argument for justifying sensation at the celestial level, and the one that appears in al-Kindī's works, is that if the celestial bodies are the best and noblest of bodies, they must possess the most excellent senses (sight and hearing), or else simple perishable animals in the sublunary world could be said to be nobler on this ground.[694]

Al-Fārābī does not explain why he rejects this argument and the theory of celestial sensation, but his position indicates that intellection is the key differentia that sets the heavenly bodies apart from other living beings. One may explain the discrepancy in the two thinker's cosmologies by arguing that al-Kindī and al-Fārābī might have consulted different sources and thus reached different conclusions on this topic. However, we know that both had access to a common Neoplatonic

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[689] Al-Fārābī 1985a, 121-123; translated by Walzer, slightly revised by me.
[690] Al-Fārābī 1964, 53; translated in McGinnis and Reisman 2007, revised by me. This Arabic passage lacks felicity of expression, but the general meaning, i.e., that the sphere-souls are intellects, is clear.
[691] Al-Fārābī 1964, 34.
[692] See for example al-Fārābī 1964, 34 passim. Unlike al-Fārābī, Ibn Sīnā maintains a sharp distinction between soul and intellect in his cosmology and does not define the sphere-souls as intellects (*Shifāʾ*, Ibn Sīnā 1983, 383,14 ff., 387,5). The reason for this may be that Ibn Sīnā ascribes imagination, knowledge of particulars, and a certain degree of corporeality to the sphere-souls. This implies that they cannot be pure intellects. As Ibn Sīnā explains in the *Shifāʾ* (Ibn Sīnā 2005, 312,4 ff., translated by M. Marmura): "As for the motive soul, it is—as this became evident to you—corporeal, transformable, and changeable, and it is not denuded of matter; rather, its relation to the heavenly sphere is the same as the relation of the animal soul that belongs to us..."
[693] For al-Kindī's view on this issue, see Wiesner 1993, 79 ff.; for a survey of this question in the Greek and early Arabic background, see Wolfson 1962 and Walzer in al-Fārābī 1985a, 366.
[694] This argument has its roots in ancient Greek thought. Some thinkers such as Plutarch of Chaeronea ascribed hearing and sight to the heavenly bodies. See Wolfson 1962, 77-79.

heritage that sometimes ascribed sensation to the heavenly bodies; and al-Fārābī surely came across this doctrine in some of the texts issuing from this Neoplatonic corpus, such as the *Theology*.[695] It seems more likely that he rejected celestial sensation as a result of the exclusive emphasis he places on the intellectual and rational nature of the spheres, through which he addresses more fundamental cosmological issues such as substance, existence, and motion.

Another significant feature of al-Fārābī's description of the celestial souls is his rejection of imagination (*takhayyul*). Unlike both al-Kindī and Ibn Sīnā, al-Fārābī limits the activity of the celestial souls to intellection alone and deprives them of the imaginative faculty. Again in this case, he does not explain why the planets are deprived of imagination. This is all the more surprising when one realizes the important role that imagination plays in al-Fārābī's political and psychological theories. One of the reasons for this could lie in his belief that imagination replaces reason in the non-rational animals.[696] Since the planets are rational beings, they do not need imagination to achieve perfection. It is notable that the *Taʿlīqāt* and the *ʿUyūn* deviate from the rest of the Fārābīan corpus and ascribe imagination to the heavenly bodies. This is, I think, a strong indication of the apocryphal nature of these works.

In addition, al-Fārābī says virtually nothing about will (*irādah*) and desire (*shawq*, *tashawwuq*), two concepts that were often used in ancient and medieval cosmology to explain the motion of the heavenly bodies. According to this theory, the spheres desire to imitate the perfection of the immaterial movers, and in so doing produce the circular motion of the heavens. In the early Arabic tradition, al-Kindī, al-Sijistānī, and Ibn Sīnā endow the celestial bodies with will (*irādah*).[697] The concept of will, which is also adopted later by al-Bitrūjī and Ibn Rushd in the West,[698]

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[695] Lewis 1959, 75-79.
[696] Al-Fārābī 1964, 33.
[697] Walzer 1957, 230; Ibn Sīnā 1983-86, 383,11-13, 391.10; al-Sijistānī 1974a, 370, and 1974b, 374-375.
[698] For al-Bitrūjī, see Samso 1992, 8 ff.; and for Ibn Rushd, Carmody 1952, 580-581.

seems to have been prevalent in Arabic cosmology, and thus it is surprising to realize that al-Fārābī makes so little use of it.

Although no definite explanation comes to mind, it may be hypothesized that al-Fārābī considered will proper to the human soul and unnecessary to explicate heavenly motion.[699] It is also possible that in spite of the fact that al-Fārābī omits to mention will in his treatises, it nevertheless played a role in his theory of celestial motion, about which he says relatively little. This seems supported by his strong belief in the rationality of the celestial bodies; since these have reason, one assumes that they have the faculty of choice (*ikhtiyār*) and are thus endowed with will (*irādah*). This point should be borne in mind when analyzing the second master's theory of celestial motion, which presents multiple ambiguities.

The foregoing comments point to the intellective nature of the spheres according to al-Fārābī: these possess rational thought alone and are deprived of sensation and imagination.[700] As we shall see, however, the sphere-souls are not perfect intellects and are lower in rank than the separate intellects. Unlike the *thawānī*, they are not pure intellects because they have a certain substrate that introduces an element of multiplicity in their essence that is absent in the case of the *thawānī*. In the *Ithbāt*, a writing whose ascription to al-Fārābī is dubious, it is said that the heavenly bodies do not possess a "pure intellect" (*'aql ṣirf*).[701] The *Siyāsah* provides a longer explanation as to why the sphere-souls are not completely *nous*, which rests on the notion of multiplicity. Before analyzing al-Fārābī's theories of celestial intellection, we must inquire into the relation between form and intellect.

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[699] For example, in the *Philosophy of Aristotle* (al-Fārābī 1969, 129) he writes about "will, volition, and choice" that "...it is these that make up the *human* will."
[700] In this respect, al-Fārābī's theory of the celestial bodies is quite different from the one that can be found in the *Theology*, where the celestial bodies are said to have soul, but not intellect, and do not engage in rational thought; see Lewis 1959, 77.
[701] Al-Fārābī 1999d, 46.

2. SOUL AS FORM

The most important assertion made by al-Fārābī concerning the substance of the celestial bodies (besides the claim that they possess an immaterial substrate) is that their soul is identical to form. If the heavenly bodies are "like" sublunary beings in that they have a substrate, albeit non-material, they are also "like" them in that they possess a form, which al-Fārābī always identifies with their soul.[702] Unlike sublunary substrates, however, which can receive a variety of forms, the heavenly bodies only ever possess a single irreplaceable form. Al-Fārābī's identification of form with soul in the spheres establishes a parallel with humans, who possess a rational soul that is the form of their body, according to the Aristotelian formula.

The identification of soul with form has a long and complex history in ancient Greek thought, which begins with Aristotle's assertion in *De anima* II.1 that "the soul must be a substance in the sense of the form of a natural body having life potentially within it."[703] Most of the Peripatetic and some of the Neoplatonic philosophers who flourished after the Stagirite accepted this equation and attempted to address some of the problems raised by it and to reconcile those problems with other aspects of their philosophy.[704] A further level of exegetical difficulty was created by Aristotle's definition of soul as an actuality in *De anima* II.1.412a.28-29, and more precisely, as the "first grade of actuality of a natural body possessing life potentially in it."[705] Subsequent thinkers exerted much effort to clarifying the relation between soul, form, substance, and the various grades of

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[702] Al-Kindī (d. after 870) and Abū Sulaymān al-Sijistānī (d. 985) were two other early Arabic thinkers who also upheld the doctrine of the ensoulment of the spheres. Al-Sijistānī, like al-Fārābī, equates superlunary soul and form. In his treatise entitled *Maqālah fī anna al-ajrām al-ʿulwiyyah dhawāt anfus nāṭiqah*, al-Sijistānī (1974a, 370, my translation) asserts that "the soul [of the celestial bodies], which is their form, move them through volition..." (*fa-al-nafs, allatī hiya ṣūratuhā, tuḥarrikuhā bi-ʾl-irādah...*). Did al-Sijistānī derive the equation between form and soul from al-Fārābī's works or from another text, such as the *Mabādiʾ*? The temporal and geographic connections between these two Muslim thinkers suggest that the former hypothesis could be true, although it is not possible to prove it.

[703] *De anima* II.1.412a20-21, translated by J. A. Smith in Aristotle 2001.

[704] See Fotinis in Alexander 1980, 163-183 for a discussion of the relation between soul and form from Aristotle to Alexander; for an overview of the various interpretations of the *De anima* in late-antique philosophy, see Blumenthal 1996; Davidson 1992, Chapter 2, "Greek and Arabic Antecedents," also provides information on the Greek background of al-Fārābī's, Ibn Sīnā's, and Ibn Rushd's theories.

[705] Translated by J. A. Smith in Aristotle 2001.

actuality, a task rendered more difficult in the Neoplatonic context by the postulation of various super-cosmic and encosmic souls and by new definitions of potency and actuality. As R. Wisnovsky explains, one witnesses a gradual shift in the definition of the soul's actuality, which begins with Alexander's and later Ammonius' commentatorial works, and continues well into the Islamic period, culminating in the works of Ibn Sīnā. From its early interpretation as "completeness" and "endedness," actuality (*entelekheia*) acquired the new and important meaning of perfection (*teleiotês*). As Wisnovsky has shown, the evolution of these interpretations was partly due to new exegetical projects devised by the Greek and Arabic philosophers, but it was also informed by the linguistic and textual accidents inherent in the process of translating from Greek to Arabic.[706]

Al-Fārābī was obviously aware of the crucial passages of the *De anima* cited above, and in addition, he may have known Alexander's commentary on the *De anima*, his *De intellectu*, and Themistius' paraphrase of the *De anima*, all of which were translated into Arabic.[707] But the origin of al-Fārābī's conception of celestial soul as form should probably be sought elsewhere, since Aristotle himself does not, to my knowledge, make this connection in a cosmological context. Moreover, the *De anima* and its commentaries are primarily interested in the human soul and intellect. For this reason, I will limit my discussion in the following paragraphs to soul and form in the superlunary world, thereby bypassing the complex history of interpretation that was weaved around these passages of the *De anima*.

It is most likely in Alexander's *Mabādi'*, a cosmological work already discussed in Chapter III, that al-Fārābī found a precedent for the equation between sphere-souls and forms. In the *Mabādi'*, this identification is made explicitly on numerous occasions.[708] Since al-Fārābī seems to have relied on this text quite heavily in addressing other issues, it is reasonable to hypothesize that this is also

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[706] Wisnovsky 2003b, Chapter I.2-6.

[707] Davidson 1992, 7-9, goes over these important texts; see Gätje 1971 for a study of the reception of Aristotle's psychological theories in Arabic philosophy.

[708] Alexander 2001, 52-53, 100-101; and Sharples 2003, 199.

where he derived the idea of describing the sphere-souls as forms. Alexander, in fact, was famous in antiquity for making soul the true nature of the celestial bodies, thus greatly emphasizing their psychological qualities and downplaying their material qualities.[709]

In the course of my analysis of al-Fārābī's analogical method and of the concept of substrate in Chapters II and IV, I raised the question of how literally al-Fārābī's use of hylomorphic terminology in a cosmological setting should be construed. I concluded that there are valid didactic and epistemological reasons that justify al-Fārābī's adoption of this analogical language, and that it is meant to correspond to an ontological reality. What is immediately noticeable in al-Fārābī's mention of the heavenly form is that it is accompanied by the same qualifications as his discussion of substrate and is conveyed through the same analogical terminology. In the *Ārā'*, for example, al-Fārābī explains that the heavenly bodies have "things that are like forms" (*...wa ashyā' hiya lahā ka-al-ṣuwar...*),[710] which leads Walzer to conclude that the spheres have "quasi-forms."[711] In the *Siyāsah*, it is said that the celestial souls are similar to forms (*tushbihu al-ṣuwar*) because they reside in a substrate.[712] The question nevertheless remains as to whether these celestial forms are really forms and can legitimately be said to inhere in "immaterial substrates," since al-Fārābī elsewhere tells us that form must necessarily inhere in matter to exist. In order to answer this question, we must examine what al-Fārābī says about the separability of form.

The passages in the Fārābīan corpus dealing with the question of the separability of form show definite tensions and are not easy to reconcile. On the one hand, al-Fārābī is quite clear that form and matter are principles that pertain to the sublunary world alone, and thus one assumes that they have no place in the heavens. He explains that form cannot exist without matter and must inevitably

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[709] See Simplicius' *De caelo* commentary (Simplicius 2004a, 380,30-382,10).
[710] Al-Fārābī 1985a, 120.
[711] Walzer in al-Fārābī 1985a, 121 and 336.
[712] Al-Fārābī 1964, 41.

inhere in a material substrate. In talking about the First Cause, for example, al-Fārābī asserts that it does not have form, "because form can exist only in matter."[713] In the *Siyāsah*, al-Fārābī writes "that forms do not subsist by themselves, as they need a subject in order to exist, and their subject is matter."[714]

The *Siyāsah* provides additional information on the more specific relation between form and soul. In one passage, al-Fārābī distinguishes between the forms that inhere in the matter of concrete objects, which he calls *ṣuwar*, and the forms that enter the various faculties of the human soul as a result of abstraction, which he calls "imprints" (*rusūm*). He then adds that although these imprints are "like forms in matters, they are definitely not called forms, except in an equivocal manner [*illā ʿalā sabīl al-tashbīh*]." Even more important for our purpose is al-Fārābī's statement that the imprints of the intelligibles are "most unlike forms" and that "in the case of the actual intellect's becoming like the Active Intellect, the intellect is not a form nor even *like* a form." And al-Fārābī concludes that it is only by homonymy (*ishtirāk*) that one may call the human intellect a form in this case.[715] What this shows is that the human intellect and *a fortiori* the celestial souls and intellects are not real forms *stricto sensu*, but rather they can be called forms in an equivocal or homonymous manner. These passages from the *Siyāsah* suggest that form can only truly exist in sublunary material substrates and that by comparison even the human intellect should not be regarded as a real form.

On the other hand, in the *Risālah fī al-ʿaql* al-Fārābī unambiguously posits the existence of immaterial forms. For example, he writes: "In the case of existing things that are forms that neither *are* in matters nor *were ever* in matters."[716] The possibility that forms can exist without an accompanying matter is also asserted in

[713] Al-Fārābī 1985a, 59.
[714] Al-Fārābī 1964, 36-37: *fa-inna al-ṣuwar laysa lahā qiwām bi-dhawātihā wa hiya muḥtājah ilā an takūna mawjūdah fī mawḍūʿ*.
[715] Al-Fārābī 1964, 37-38.
[716] Al-Fārābī 1938, 20; translated in McGinnis and Reisman 2007, 73: *fa-idhā kānat hāhunā mawjūdāt hiya ṣuwar lā fī mawādd wa lam takun qaṭṭu ṣuwaran fī mawādd*.

another passage: "What Aristotle calls the 'Active Intellect' in Book III of *De anima* is a separate form [*ṣūrah*] that has never been and never will be in matter."[717]

Besides the *Risālah fī al-ʿaql*, al-Fārābī defends the existence of separate forms in some of his other works. In the *Jamʿ*, whose authenticity, it should be stressed, is always problematic, al-Fārābī refers to the authority of the *Theology* to argue that Aristotle agrees with Plato in positing spiritual forms devoid of matter.[718] In the *Philosophy of Aristotle*, he describes the Agent Intellect as "a separate form of man."[719] Although he does not mention the *Theology* by name in this case, it is clear that this text or other material from the *Neoplatonica arabica* is lurking in the background, because the idea of separate forms seems to have been a salient trait in this corpus.[720]

These passages show that al-Fārābī follows many Greek and Arabic thinkers of a Neoplatonic background in positing the existence of superlunary forms that can exist separately from matter. It then becomes easier to understand how separate intellects like the Agent Intellect may be defined as pure forms and how the souls of the heavenly bodies may be defined as forms inhering in immaterial substrates. Although the celestial bodies are not pure forms and pure intellects like the *thawānī*, they are nonetheless closer to form than matter, to the intelligible than the corporeal.

Al-Fārābī believes that matter, as well as the compound of form and matter, represent the essence and substance of a thing, but following Aristotle he stresses that form remains primary in expressing these concepts.[721] Hence, just as form

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[717] Al-Fārābī 1938, 24, translated in McGinnis and Reisman 2007, 74: *wa al-ʿaql al-faʿʿāl alladhī dhakarahu Arisṭāṭālīs fī al-maqālah al-thālithah min kitāb al-nafs huwa ṣūrah mufāriqah lam takun fī al-māddah wa lā takūnu aṣlan*. Walzer's conclusion that "the separate intellects are then, in his [al-Fārābī's] view, without forms as well…" (al-Fārābī 1985a, 336) is not valid if one takes into consideration the *Risālah fī al-ʿaql*.
[718] Al-Fārābī 1999c, section 66, pp. 142-145.
[719] Al-Fārābī 1969, 127, translated by M. Mahdi.
[720] See for example the excerpts in Endress 1973, 12-21, many of which aim to prove the existence of spiritual forms (*ṣuwar rūḥāniyyah*).
[721] See al-Fārābī 1964, 36, 39; Abed 1991, 69 ff. and 82.

expresses essence in the sublunary world, it would seem that heavenly 'form' or its equivalent, i.e., soul or intellect, is the essence of the celestial bodies. In fact, there is nothing surprising in this conclusion, since according to al-Fārābī, the essence of a rational animal is its rational soul, which is also its form. Since the celestial bodies are rational beings, this means that their essence can be primarily defined in terms of soul. What appears from the foregoing remarks is that soul and form enjoy a kind of ontological priority over other concepts and are that by which the heavenly bodies are defined in an absolute sense.[722]

Moreover, we have seen in Chapter IV that for al-Fārābī substrate is semantically broader than matter, which again suggests that the forms of the heavenly bodies may inhere in substrates which need not be material. Thus, in al-Fārābī's cosmology, form may exist without matter and may refer primarily to intellect, in spite of the fact that the analogical quality of the concept of form in a superlunary context cannot be ignored.

This conclusion is noteworthy, because the equation of soul and form in the heavenly realm was not explicitly made by Aristotle, who is in general unwilling to speak of forms in the superlunary world. Furthermore, he says virtually nothing about the sphere-souls in the *Metaphysics*, and what he says about them in the *De caelo* is ambiguous and difficult to reconcile with his other views.[723] It is in the work of later thinkers such as Alexander that one finds a clear identification of superlunary soul with form, and it is probably by reading the Arabic adaptations of such works that al-Fārābī derived his theory of celestial form. As for the *Neoplatonica arabica*, P. Adamson notes that form plays an important role in the ontology of the Arabic adaptor of the *Theology*, and is sometimes used to refer to the intelligible

[722] The identity between form and soul in the cosmological passages of the *Ārā'* and *Siyāsah* finds a parallel in al-Fārābī's noetics. For example, in his discussion of the human intellectual faculties in the *Risālah fī al-ʿaql* (al-Fārābī 1938, 22), al-Fārābī explains that each level of the human intellect may be conceived of as "form" for the intellect below it and as "substrate" for the intellect above it. Like substrate, form is a concept that appears both in al-Fārābī's cosmology and noetics, and one which is used to describe the various faculties of the intellect.

[723] Aristotle alludes to the ensoulment of the celestial bodies in *De caelo* II.2 and II.12. Aristotle also addresses this issue in II.1, but his comments there are much more ambiguous.

world of soul and intellect.[724] In the early Arabic tradition, immaterial and intelligible forms are also a hallmark of the Pseudo-Empedoclean and Ismāʿīlī currents, which made extensive use of works such as the *Theology*. Sometimes, form is said to be the first thing created by God and the principle that subsequently fashions the universe.[725] Although al-Fārābī does not adhere to these metaphysical theories, it is not unreasonable to speculate that he may have been influenced by the emphasis they place on form.

If form can exist on its own in the superlunary world, then why introduce the concept of immaterial substrate in the celestial bodies? If al-Fārābī's intention is to noeticize the celestial bodies, then why not define them simply in terms of soul and form and omit substrate altogether? The reason, I think, is twofold. First, it is clear that al-Fārābī felt compelled to account for the visibility of the heavenly bodies. This problem does not apply to the separate intellects, since these are immaterial beings that lie beyond human sensation; hence their perfect identity with form. But no one can deny that some of the celestial bodies are visible, and this raises a difficulty that is not encountered with the rest of the superlunary beings. Traditionally, visibility was associated with materiality, and so al-Fārābī may have considered it unacceptable to define the planets purely as intelligible beings, since this would have eliminated all grounds for their visible quality. But with the principle of substrate, which is intimately linked to the celestial intellect although itself "not completely intellect," the corporeality and corollary perceptibility of the heavenly beings could be accounted for to a certain degree.

Al-Fārābī's solution nonetheless seems unsatisfactory, since the celestial substrates are themselves immaterial.[726] There still remains a tension in al-Fārābī's account of the celestial bodies, since it is not explained how they can be simultaneously immaterial and visible. As for the second reason, we have already

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[724] Adamson 2002, 140. See *Theology*, X.192 (Lewis 1959, 395), where it is said that God originated the "minds and souls" through form; see also Lewis 1959, 207, 281 for the *Theology* and *Sayings of the Greek Sage*, and Endress 1973, 12-21 for the *Proclus arabus*.
[725] Altman and Stern 1958; Jolivet 1995; De Smet 1995, 219, and De Smet 1998.
[726] Al-Fārābī 1985a, 122-123.

noted that al-Fārābī's breakdown of the sphere-souls in the two components of form and substrate has the important function of introducing an element of multiplicity in the celestial substance in order to justify the causal hierarchy between beings and explain the spheres' procession from the separate intellects.

One must conclude that in spite of its marked analogical quality, form is one of the key concepts of al-Fārābī's celestial noetics, and one which he uses to define the essence of the celestial bodies and the separate intellects: form and immaterial substrate in the former; pure form in the latter. Moreover, form is also a bridge between celestial and human souls, especially between the Agent Intellect and the rational human intellect, and thus between cosmology and noetics.[727] The emphasis placed on the soul-like, immaterial quality of the celestial substance and the insertion of noetic and psychological principles in a cosmological context may be traced to the influence of the Arabic Alexander and the various trends emerging from the *Neoplatonica arabica*. These ideas are nevertheless discussed in a particular way in al-Fārābī's writings, which reveals a conceptual and terminological overlap between the physical, psychological, and metaphysical disciplines.

[727] See Jolivet 1977, 215-218, who has already stressed the primacy of form in al-Fārābī's psychology and metaphysics.

3. THE SEPARATE INTELLECTS

Al-Fārābī's theory of celestial intellection is one of the most fascinating aspects of his cosmology and has received some attention from scholars, who have traditionally interpreted it as a synthesis of Aristotelian and Neoplatonic doctrines.[728] In spite of this, the sources underlying his celestial noetics are still obscure, and the role these theories play in his philosophy remains imperfectly understood. It is worth pointing out that al-Fārābī's theories are often inaccurately described in the secondary literature, to the point that his cosmology becomes distorted.[729] In the following paragraphs, I provide a detailed analysis of the sources, characteristics, and function of al-Fārābī's doctrine of celestial intellection.

It is doubtful whether al-Fārābī's treatment of the heavenly souls and intellects has an exact precedent in the Greek sources. However, his theories may have been inspired by some aspects of Proclus' metaphysical noetics, which were known to Arabic philosophers via the translations and adaptations of parts of the *Elements of Theology*. These adaptations have survived in different forms: there are the excerpts assembled and studied by G. Endress[730]; the *Liber de causis*, known in Arabic as the *Kalām fī maḥḍ al-khayr*[731]; and the *Liber de causis II*, which has recently been edited and which presents several divergences from its better known homonym.[732] The *Maḥḍ al-khayr* and the *Liber II*, which consist of 31 and 29 propositions respectively as opposed to Proclus' original 211, deal mostly with the structure of the intelligible world and the relation between the One and the emanated entities. In the following paragraphs, I analyze al-Fārābī's theories in

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[728] See, for example, Demidčik 1975 (as reported by Maróth 1995, 104, note 5); Walzer's commentary in al-Fārābī 1985a; and Reisman 2005, 56.

[729] Here are a few examples: Maróth 1995, 103 wants to provide a "combined view" of Ibn Sīnā's and al-Fārābī's cosmology. In fact, he describes Ibn Sīnā's theories and assumes that they can be applied to al-Fārābī. The problem is that there are crucial differences between the two thinkers. Another example is Walzer (al-Fārābī 1985a, 344 and 363), who confuses the order according to which each sphere and intellect is produced by the intellect above it. Finally, Marquet 1987, 66, also confuses the intellection of the separate intellects and the sphere-souls.

[730] Endress 1973.

[731] For the Arabic edition, see Badawī 1977, 1-33; and Taylor 1981. The most up-to-date and detailed study on this work is to be found in D'Ancona 1995, and D'Ancona and Taylor 2003.

[732] Thillet and Oudaimah 2001-2002.

connection with this Neoplatonic heritage and show that the *Proclus arabus* must be seen as one of the main sources used by al-Fārābī. In doing so, however, I emphasize the creativity al-Fārābī displayed in borrowing, adapting, and transforming these theories.

3.1 The Twofold Intellection of the Separate Intellects

The separate intellects, like God and the sphere-souls, have intellection (*taʿaqqul*) as their principal activity. However, unlike God, who contemplates only his essence, and the sphere-souls, which think of three different objects, the intellection of the separate intellects focuses on two objects: God, and their own essence. This model is developed in some detail in the *Ārāʾ*[733] and the *Siyāsah*,[734] and it also appears briefly in the *Risālah fī al-ʿaql*, where al-Fārābī posits the existence of immaterial movers for the celestial spheres that are essentially intellects: "Now, since the mover of the first heaven is neither matter nor in matter, it necessarily follows that it is an intellect in its substance, in which case it contemplates itself and the very thing that is the principle of its existence."[735]

This passage from the *Risālah fī al-ʿaql* shows convincingly that al-Fārābī had already developed his theory of celestial intellection during the period of composition of this treatise. In turn, this indicates that Mahdi's claims about the specificity of the cosmological doctrine of the *Ārāʾ* and the *Siyāsah* is unfounded, since the same theories appear in other non-"political" works by al-Fārābī, such as the *Risālah fī al-ʿaql*. In any case, the previous remarks show that the separate intellects, like the sphere-souls, possess a certain plurality due to their having two objects of thought, yet their plurality is not as great as that of the sphere-souls. The Neoplatonic doctrine of simplicity dictates that the higher one goes in the ontological hierarchy, the simpler the concept of being manifests itself, until one

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733 Al-Fārābī 1985a, 100-105; 116-117.
734 Al-Fārābī 1964, 52.
735 Al-Fārābī 1938, 35; translated into English in McGinnis and Reisman 2007, 77, revised by me. The Arabic reads: *wa idh muḥarrik al-samāʾ al-ūlā lā māddata wa lā fī māddah lazima ḍarūratan an yakūna ʿaqlan fī jawharihi fa-huwa yaʿqilu dhātahu wa dhāt al-shayʾ alladhī huwa mabdaʾ wujūdihi*.

reaches the First Cause that is absolutely simple. Conversely, as one descends this ontological ladder, the more multiplicity one encounters. Al-Fārābī's theories of celestial intellection adhere to this basic causal and hierarchical framework.

The first created being, or the first intellect, is conceived of in similar terms by al-Fārābī and the Arabic adaptors of Proclus. On this point, they depart from the historical Proclus, for whom the One first emanates Being, then Life, then Intellect. The elimination of these intermediary entities between the One and Intellect is, together with the equation of God and Pure Being, the most notable and radical transformation undergone by the Greek Proclus in the Arabic context.[736] This being said, the Arabic adaptors and al-Fārābī follow Proclus quite closely in their conception of the intellect's substance, activity, and multiplicity. On this latter point, Proclus himself was dependent on Plotinus' discussion of Intellect in the *Enneads*.[737] In the *Elements*, Proclus argues that the Primal Intellect is not purely simple, because it is composed of the duality of Finitude-Infinity. He then goes on to show that every intellectual being subsequent to the first Primal Intellect possesses a certain plurality in its essence due to its thinking its own essence as well as its causes and effects. Hence, while the Primal Intellect derives its multiplicity from its being composed of Finitude and Infinity, the subsequent intellects are affected by multiplicity as a result of their various objects of thought. As Proclus writes in proposition 167, "each subsequent intelligence knows simultaneously itself and its priors, so that its object is in part itself but in part its source."[738]

These ideas reappear in most works forming the Arabic Neoplatonic corpus. In proposition 4 of the *Maḥd al-khayr*, it is said that the first originated being (i.e., Intellect) "receives multiplicity," because it is "composed of finitude and infinity."[739] In the *Liber II*, the intellect is "multiple [*kathīr*] because of the virtues it receives

[736] See D'Ancona 1995, especially 53-73, 73-97, and 121-155.
[737] See, among other sections, V.1.5, V.3.11, V.3.12, V.3.15, and V.4.2.
[738] Proclus 1963, 167.20-25, translated by Dodds.
[739] Taylor 1981, IV.10-13.

from the First Cause."[740] More important for our purposes is the link between intellection and complexity in the other intellectual beings. In one of the propositions of the *Proclus arabus* edited by G. Endress, the author discusses the intellection of the intellectual beings and concludes: "It has been established by now that there exists a knowledge that knows its essence and knows what is above it, without the knower and the known being like one thing."[741] This theory also appears in the *Maḥd al-khayr*, where one finds the assertion that the intellects know what is above them and what is below them through their own substance.[742] In a way, this does not mean that a real complexity affects the intellects, since the knowledge of each intellect is nothing but knowledge of itself, of its own essence. In other words, the various kinds of knowledge of the intellects can be reduced to knowledge of their own essence. Accordingly, the adaptor of the *Maḥḍ al-khayr* concludes that "the intellect and the intelligible things...are one."[743] Yet at the same time intellect is not completely simple in the way that the First Cause is simple. The very fact that it possesses a cause suggests that it cannot be completely simple and that it contains multiplicity in its essence. Hence, the adaptors of the *Maḥḍ al-khayr* and of the *Liber II* seem to oscillate in their descriptions of the intellect, which is not simple when compared to the One, but whose various kinds of knowledge can nevertheless be subsumed under its essence.

The idea that the essence of intellect is characterized by plurality is found in al-Fārābī's metaphysics as well, and it is derived not from the Finitude-Infinity contrast that characterizes the Primal Intellect, but rather from the multiple objects of intellection of the subsequent intellectual beings. In al-Fārābī's cosmology, each separate intellect reflects on God and its own essence and therefore has a dual intellection. This duality prevents the intellects from being absolutely simple. As al-Fārābī says, "”there is a multiplicity in the very being of each of them [the separate intellects], since anything that intellects some other given thing does itself, in a

[740] Thillet and Oudaimah 2001-2002, XIX.
[741] Endress 1973, 35-36 in the Arabic text, my translation.
[742] Badawī 1977, VII.
[743] Badawī 1977, XII, translated in Taylor 1981.

certain manner, become that other thing while simultaneously being its own proper self."[744] The intellects represent a first degree of plurality in the metaphysical world, and, in spite of being immaterial and completely intelligible, they are below the First Cause in the ontological hierarchy and are the first deficient beings. On the question of the plurality of the intellects' essence and the cause for this plurality, al-Fārābī is relying directly on the *Proclus arabus*.

3.2 Knowledge of the Cause, of the Effect, and of the Essence

A common feature in the Greek Proclus and the *Neoplatonica arabica* is the relation established between knowledge of the cause and knowledge of the self on the one hand, and knowledge of the self and knowledge of the effect on the other. This is a crucial concept for Proclus and many Neoplatonists, because it creates a noetical link between the various metaphysical entities and implements the fundamental rule that the effect be in a sense like the cause and the cause like the effect. In proposition 167 of the *Elements*, for instance, Proclus explains that each intellect knows itself and its prior cause, and that by knowing its prior cause it knows its own essence.

The gist of this idea appears to have been conveyed by the Arabic adaptors and translators of Proclus. In proposition 167 of the *Proclus arabus*, one reads in respect to the intellectual beings: *in ʿalima mā fawqahu ʿalima dhātahu ayḍan.*[745] The *Theology of Aristotle* also contains a similar passage in which the adaptor discusses the 'mind's' (Intellect's) knowledge of the One and of itself. The adaptor argues that since the Intellect knows God, Who is its cause, it must necessarily know itself as well. He writes: "If we concede to you that the mind knows and desires God Almighty, we concede also that when it knows Him it knows itself." And he adds shortly after: "If…we concede that the mind knows God Almighty, then it knows His

[744] Al-Fārābī 1964, 40.
[745] Endress 1973, 35 of the Arabic text.

powers too. And if the mind knows His powers, it knows itself…”[746] The *Maḥḍ al-khayr* makes a similar point in regard to the nature of the intellectual beings: “every intelligence…knows what is below it because it is a cause of it and knows what is above it because it acquires the virtues from it.”[747] And the *Proclus arabus* asserts: “As for the rest of the things endowed with knowledge [or science] (*ʿilm*), each one of them knows its essence and knows what is above it (for this is also knowable). I say that it knows what is above it and knows those things that are below it.”[748]

The connection between knowledge of the cause and knowledge of the essence is nowhere stated explicitly by al-Fārābī, who appears to have maintained a distinction between these two kinds of knowledge. His aim was perhaps to strengthen the duality of the intellects’ intellection, which would have been somewhat fuzzy if he had collapsed both types of knowledge into one. However, we cannot completely exclude the possibility that al-Fārābī would have accepted the theory that by knowing their cause, i.e., God, the intellects know their essence, for nothing of what he says contradicts this view. Moreover, Ibn Sīnā adopted it later on, arguing that each intellect can know its essence either in itself (as possible of existence) or through its cause (as necessary of existence). But Ibn Sīnā develops in this respect a threefold model of intellection, while al-Fārābī defends a twofold model, which does not contain the logical distinction between “possible” and “necessary” later made by Ibn Sīnā.

Moreover, it should be noted that in al-Fārābī’s system, each intellect does not contemplate the intellect located immediately above it, but rather the First Cause. This is slightly odd, because according to al-Fārābī, each intellect is directly caused by the intellect above it, so that its proximate efficient cause is another intellect rather than the First Cause. Al-Fārābī’s view can perhaps be explained by the propensity among monotheistic philosophers to emphasize the causal primacy of God to the detriment of the other metaphysical beings and to limit the demiurgic

[746] Lewis 1959, 309.
[747] Taylor 1981, VII.1-5.
[748] Endress 1973, 35 of the Arabic text.

role of these other beings. By making each intellect reflect on God rather than a higher intellect, al-Fārābī suggests that God is indeed the First Cause of all beings, even the ones at a distance from His immediate emanation. But in this particular case, this theory is hard to reconcile with some of al-Fārābī's other statements on the importance of the separate intellects in the creation of the heavens, a topic which will be addressed shortly.

Al-Fārābī is more straightforward when it comes to the relation between knowledge of the essence and knowledge of the effect, and here one can be quite sure that he rejected this theory. In the *Siyāsah*, for instance, he writes that "it is not part of their nature [the separate intellects'] to gain the splendour, beauty, and adornment of existence by contemplating anything existing below them, or anything that comes to be out of each of them, or anything that is consequential to the existence of each of the existing beings; none of that is associated with any one of them or inheres in any one of them."[749] In the *Ārā'*, al-Fārābī also states somewhat mysteriously that "what it [the first separate intellect] thinks of its own essence is no more than its essence."[750] Here the emphasis may serve to indicate that the essence of the separate intellect does not contain or embrace the cognition of lower beings. The radical detachment of the separate intellects from what lies beneath them seems appropriate to the mode of their intellection, which focuses on the unchanging and eternal principle that is the First Cause. This restriction of the intellects' cognition to a higher principle is not surprising in view of the fact that al-Fārābī also rejects the idea that the sphere-souls know what lies beneath them (see the forthcoming section).

It would seem, then, that according to al-Fārābī, God is the only intellect that has knowledge of its effects, whereas the other separate intellects of the superlunary world are ignorant of what lies beneath them. In the *Siyāsah*, al-Fārābī maintains that God knows all things through His essence. As he puts it, "The First

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[749] Al-Fārābī 1964, 40; translated in McGinnis and Reisman 2007, revised by me.
[750] Al-Fārābī 1985a, 100-101.

contemplates Itself, which, in a certain way, is all of the existents."[751] Whether this knowledge is universal or of some other kind is not indicated, but it could also be a knowledge which is neither of particulars nor of universals, and one which only God as First Cause can have. In making God cognizant of all the effects that derive from His essence, it is possible that al-Fārābī is here following Themistius' interpretation of Aristotle's Prime Mover as it appears in his paraphrase of Book Lambda.[752] At any rate, al-Fārābī departs from the Greek Proclus and the *Neoplatonica arabica* on the question of the celestial intellects' knowledge of the effects.

3.3 Intellection and Actuality vs. Potency

The relation between actuality and potency is an interesting question concerning which al-Fārābī is in complete disagreement with the *Neoplatonica arabica*. In the *Theology*, the adaptor argues that the higher mode of thought, that is, the mode of thought attributable to the incorporeal entities such as intellect and soul, is potency, not actuality. As he writes, potency is, "in the high intellectual substances, that which manifests and perfects activity, whereas in the corporeal substances it is activity that perfects potency and brings it to the limit."[753] The *Maḥḍ al-khayr* also articulates a similar idea, which can be traced back to several propositions of the *Elements of Theology*, especially propositions 78, 91, and 92. The Neoplatonic idea that potency surpasses actuality ultimately has its roots in the *Enneads*, but the adaptors of the *Theology* and the *Maḥḍ al-khayr* were obviously keen to elaborate on this theory.[754] As Adamson notes in his study of the Arabic Plotinus, the Arabic term *quwwah*, and the equivalent Greek term δύναμις, should probably be translated as "power" rather than as "potentiality." In the context of Neoplatonic philosophy, *quwwah* is not meant to express Aristotle's concept of potentiality, but rather a power that transcends actuality and causes actuality in lower beings. For instance,

[751] Al-Fārābī 1964, 34.
[752] Brague in Themistius 1999, 37-38.
[753] Lewis 1959, 75, revised by me. See also Adamson 2002, 94 ff. Cf. with Proclus' discussion of actuality and potency in propositions 77-79.
[754] See for instance, *Enneads* V.3.15.

the Intellect may be said to possess a potency or power that causes the actuality of the Soul.[755]

Regardless of the question of the exact and best translation of *quwwah*, al-Fārābī categorically rejects the idea of a potency or power that would transcend actuality. He follows Aristotle in holding that everything above the sphere of the moon is in a state of constant and perfect actuality (*fiʿl*), and he opposes this eternal actuality to the potency (in the sense of potentiality) of the sublunary existents. God, to begin with, is "actual intellect" (*ʿaql bi-al-fiʿl*).[756] The souls of the heavenly bodies are, for their part, "in no way and at no time in potentiality. On the contrary, they are always in actuality."[757] Finally, although al-Fārābī does not state this explicitly in his works, it is obvious that the separate intellects are in a state of complete actuality as well, since they are above the sphere-souls in the hierarchy of being. In addition, like the First, they are immaterial and constantly actualized by their intellection. Their only deficiency derives from their having multiple objects of thought. Al-Fārābī thus restricts potency to the sublunary world and, more specifically, to sublunary matter. On this issue he thus follows Aristotle and the Peripatetic tradition rather than the *Neoplatonica arabica*.

3.4 Intellection, Emanation, and Creation

On the question of the creative or causative power of the separate intellects, we reach one of the crucial issues in the development of al-Fārābī's cosmology. Although the second teacher articulates a cosmological model that in many ways is indebted to Aristotle's Book Lambda, there was no precedent in the Aristotelian tradition for transforming each separate unmoved mover into an intellect responsible for creating other intellects as well as the visible heavens. One may legitimately hypothesize that al-Fārābī turned to Neoplatonic, and more specifically Proclean, sources to draw the inspiration he needed to elaborate this aspect of his

[755] Adamson 2002, 94-102.
[756] Al-Fārābī 1985a, 70-71.
[757] Al-Fārābī 1964, 34.

philosophy. This hypothesis seems supported by the wide circulation of Arabic versions derived from Proclus' *Elements* in tenth-century Baghdad and by the emphasis on demiurgic intellectual substances in Proclus' metaphysics.

According to al-Fārābī, the production of the spheres occurs as a result of, or rather through, the intellection of the separate intellects. By reflecting on the First Cause or God, Who is the ultimate principle of their existence, each intellect produces a lower intellect, and by thinking its own essence, it produces a sphere and its soul. It should be noted that since intellection is the only activity that characterizes the separate intellects, it is necessarily as a result of their intellection that they may cause lower beings to exist. This picture is the one that appears in al-Fārābī's emanationist treatises, the *Ārā'*[758] and the *Siyāsah*,[759] as well as in the *Risālah fī al-ʿaql*.[760]

Now according to proposition 193 of the *Elements*, each soul has its origin in an intellect and proceeds from an intellect. The link between the souls and intellects is also discussed in propositions 166 and 182. And again in proposition 160, Proclus writes that the "divine intelligence... produces the others from its own being."[761] Intellect is therefore a demiurgic principle in Proclus' metaphysics, and one responsible among other things for the existence of soul. Furthermore, Proclus explains that creation occurs through intellection. For each intellect, he says, "its creative activity is thinking, and its thought is creation [ἡ ποίησις ἐν τῷ νοεῖν καὶ ἡ νόησις ἐν τῷ ποιεῖν]."[762]

Proclus provides further information on the various intellects considered as minor demiurges in his commentary on the *Timaeus*. This subject has been covered in detail by J. Opsomer, and I refer the reader to his various articles on Proclus and

[758] Al-Fārābī 1985a, 100-105; 116-117.
[759] Al-Fārābī 1964, 52.
[760] Al-Fārābī 1938, 35.
[761] Proclus 1963, translated by Dodds.
[762] Proclus 1963, 174.8-9, translated by Dodds.

demiurgy.[763] What is important for our purposes is that Proclus recognizes a whole series of secondary demiurges below the main Demiurge mentioned in the *Timaeus.* These demiurges are intellectual beings that are responsible for the creation of the lower entities such as the souls. For Proclus, then, there is a variety of creator-gods who create through intellection. These beings are not merely intermediaries, but demiurges in the true sense.

This aspect of Proclus' philosophy was considerably watered-down by the Muslim and Christian adaptors who received and studied the Greek Neoplatonic works. Their priority as monotheists was to preserve or re-establish the divine omnipotence and the absolute priority of God in matters of creation. This they did in two ways. First, they used the root *b-d-ʿ* to express God's absolute creation of intellect or of the world as a whole. Indeed, God is presented as the sole innovator of the world, and a whole array of traditional Arabic terms is used to describe his demiurgic power, such as *mubdiʿ*, *bādiʾ*, and *khāliq*.[764] Second, intellect itself is stripped of any real demiurgic ability and is described as an intermediary through which God's creation or emanation filters. In one passage of the *Maḥḍ al-khayr*, for instance, God is said to create the "being of soul," while intellect is merely responsible for endowing it with intellective powers.[765] The *Liber II*, the other known recension of the *Maḥḍ al-khayr*, states that the First Cause "created the intellect without any intermediary and created soul and nature through the intermediary of intellect."[766] The *Theology* and the *Sayings of the Greek Sage* uphold a similar view.[767]

Just how al-Fārābī relates to the Greek and Arabic Proclus on this particular issue is a delicate question. Al-Fārābī's position seems to be a subtle compromise of various views and is difficult to pinpoint. Here a short digression is called for in order to explore the language of creation al-Fārābī applies to the separate intellects.

[763] Opsomer 2000 and 2001; Dillon 2000, 344-345.
[764] In the *Theology*; see Badawī 1955, 24-27.
[765] Taylor 1981, III.12-15.
[766] Thillet and Oudaimah 2001-2002, proposition XXII.
[767] Lewis 1959, 281, 291.

The most common verb found in al-Fārābī's treatises to express the relation between the separate intellects and the sphere-souls is *lazima ʿan*, "to necessarily entail."[768] In the *Ārā'*, for instance, it is said that "as a result of its [the second existent or the first intellect after God] thinking of the First [God], a third existent follows necessarily [*lazima ʿan*] from it."[769] In the *Siyāsah*, one reads that "the existence of each one of the celestial bodies is a necessary consequence [*yalzamu ʿanhu*] of them [the separate intellects]."[770] The verbal construction *ḥaṣala ʿan* is also used in the *Siyāsah* in a similar context, and it conveys virtually the same meaning as *lazima ʿan*.

In addition, on one occasion, al-Fārābī explicitly states in the *Siyāsah* that the intellects "emanate" the spheres and sphere-souls: "each one [of the separate intellects] emanates [*yafīḍu*] the existence of each heaven from its [own] existence."[771] Now it is noteworthy that McGinnis and Reisman do not translate the term *yafīḍu* as "emanate" in their anthology of Arabic texts, but as "bestow the existence of."[772] The important point, which is not apparent from McGinnis' and Reisman's translation, is that al-Fārābī uses the exact same terms to express creation from God and from the intellects; these come from the roots *l-z-m* and *f-y-ḍ*. God "emanates" and "necessarily entails" the first intellect, and by extension all of the existents, but each separate intellect also "emanates" and "necessarily entails" another intellect and a sphere. Terminologically and conceptually, there is therefore nothing that distinguishes God's and the intellects' mode of creation. The only difference is one of scope and extent.

This parallel is strengthened by the fact that in both the First Cause and the separate intellects, creation or emanation occurs through, or as a result of, intellection. Each intellect is characterized by a unique intellection, and thus produces effects that are suited to its own nature and being. In this regard, al-Fārābī

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[768] For example, al-Fārābī 1985a, 100; and al-Fārābī 1964, 32.
[769] Al-Fārābī 1985a, 100-101.
[770] Al-Fārābī 1964, 32.
[771] Al-Fārābī 1964, 53.
[772] McGinnis and Reisman 2007, 94.

is much closer to the Greek Proclus, who posits a multiplicity of intellectual beings who create through their intellection, than to the Arabic texts, although Proclus dissociates the First Cause and Intellect in a way which al-Fārābī does not. It is striking that on this point al-Fārābī departs radically from the adaptors of the *Neoplatonica arabica*, who used a specific terminology, such as the terms *khalq* or *ibdāʿ*, to differentiate God's mode of creation from that of the lower entities.[773] One never encounters this root in relation to God's creation in al-Fārābī's writings.

Now the term *lazima* expresses logical entailment first and foremost, but derivatively it may also convey a sense of causality. In this regard, the separate intellects are causes of existence for the lower celestial beings. In fact, al-Fārābī describes them explicitly as "causes" (*asbāb*) in one instance.[774] Accordingly, each intellect is an efficient cause that produces and sustains the existence of a lower intellect, a sphere, and a sphere-soul. In addition, and this is noteworthy, there is no suggestion in the Fārābīan texts that these intellects are merely intermediaries through which the being of the First Cause is transmitted. The expression "through the mediation of" (*bi-tawassuṭ*), which appears frequently in the *Theology* and the *Maḥḍ al-khayr*, is omitted in the Fārābīan texts. As previously intimated, the *Neoplatonica arabica* frequently stresses the instrumentality and mediation of Intellect, or of the various intellects, in the unfolding of God's primal emanation. But al-Fārābī seems to have disliked the idea of mediation as expressed in these texts, and in many ways he is closer to the Greek Proclus who regarded the various intellectual beings as demiurges.[775]

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[773] Badawī 1955, 24-27.
[774] Al-Fārābī 1964, 31.
[775] My point here is that although Proclus believes in the existence of a plethora of intermediaries between the One and the sublunary world, he also describes these intellectual beings as demiurges and thus ascribes to them a certain degree of independence vis-à-vis their higher principles. In contrast, the *Neoplatonica arabica* describe the intellects (as well as the soul) solely as mediators of the One's (God's) absolute creative act (*ibdāʿ*). In endowing the separate intellects with the responsibility of emanating the spheres and sphere-souls, as well as the lower intellects, by omitting the notion of mediation (*tawassuṭ*), and by using the same language of causality and emanation to describe God's mode of creation and the intellects' mode of creation, it seems to me that al-Fārābī is closer to the Greek Proclus, or at least that he stands midway between the Greek and Arabic Proclus on this issue.

There is, finally, another statement in the *Siyāsah* that stresses the importance of the separate intellects as purveyors of existence. At point, al-Fārābī writes that "on its own it [i.e., each separate intellect] is capable of bringing something else into being without seeking the help of any instrument or circumstance beyond its own substance."[776] The formula *fī ījād ghayrihi* ("bringing something else into being") seems to imply something more than mere entailment or causality, and suggests the presence of an actual power in the separate intellects that can give being to other entities. It indicates the active, creative role of the intellects in the production of the lower existents in the ontological hierarchy. It is noteworthy that al-Fārābī also uses the root *w-j-d* in connection with God's creation of the world, as can be seen for instance in the *Ārā'*.[777]

Here one can see plainly the difference that distinguishes al-Fārābī's separate intellects from the description of intellect found in the *Neoplatonica arabica*. In the latter corpus, intellect is presented as an intermediary that mediates God's emanation of being and whose main function is to transmit form to the lower entity of soul. This view appears clearly when the Adaptor writes, "The true One originated the being of the intellect, and the intellect originated the form of the soul from the being which was originated from the true One through the intermediary of the being of the intellect."[778] In contrast, the separate intellects are not presented as mediators of God's being (although they very well may be understood as such), but as causes of existence for the sphere-souls and spheres.

The above-quoted passage from the *Siyāsah* contains another point of importance: the intellects themselves do not need an instrument and an intermediary to assist them in the production of the lower entities. According to al-Fārābī, the intellects can "bring into being" other existents without relying on anything else but their own substance, that is, without intermediaries. Hence, we see not only that for al-Fārābī the separate intellects are not intermediaries in God's

[776] Al-Fārābī 1964, 40-41.
[777] Al-Fārābī 1985a, 88-89.
[778] *Theology*, X.3,12, translated by Adamson 2002, 141.

creation in the way that the primal intellect is portrayed as an intermediary in the *Neoplatonica arabica*, but also that they themselves do not need any intermediaries to produce other celestial beings. This again is contrary to the Arabic Neoplatonic texts, which describe soul as the intermediary between intellect and nature.[779]

Al-Fārābī's use of the root *f-y-ḍ* to express God's emanation of the world as a whole nevertheless raises the question of how this divine emanation is received and transmitted by the various links of the metaphysical hierarchy. For some of al-Fārābī's other comments suggest a different model of creation, which fits awkwardly with the previously discussed role of the intellects in creation. In these other passages, al-Fārābī explains that the being emanating from God is received by all the various strata of existents that lie between Him and the sublunary world. Hence, in the *Ārā'*, he says: "It follows necessarily from the specific being of the First that all the other existents which do not come into existence through man's will and choice are brought into existence by the First in their various kinds of existence..."[780] And also: "But the substance of the First is also such that all the existents, when they emanate from it, are arranged in an order of rank, and that every existent gets its allotted share and rank of existence from it."[781]

These quotations present a different model according to which God is the only true source of emanation, while each being receives the divine emanation that filters through it in accordance with its rank. It is in these moments that al-Fārābī is closest to the Plotinian theory of emanation conceived of as a flowing or cascading of being that pours downward through the various levels of the intelligible and corporeal world. In fact, very close statements can be found in the *Neoplatonica* as well, such as the following in the *Maḥḍ al-khayr*: "For the First Good pours forth goods on all things in one emanation, except that every one of the things receives of that emanation in accordance with its potentiality and its being."[782] And in the *Liber*

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[779] Thillet and Oudaimah 2001-2002, proposition XXIII.
[780] Al-Fārābī 1985a, 88-89.
[781] Al-Fārābī 1985a, 94-95.
[782] Taylor 1981, 19.10-15.

II, one reads: “For each thing is capable of receiving the good of the First Cause only according to its capacity and depending on the existence of the cause in it.”[783]

Let us briefly recapitulate the many points discussed so far. Taking into consideration the different contexts, the *Elements*, the *Proclus arabus*, the two versions of the *Maḥḍ al-khayr*, and the *Theology* anticipate several crucial features of al-Fārābī’s celestial noetics. The idea that the First Cause emanates a single intellect; that the intellectual beings have several objects of thought that lie both outside their essence and within it; that this intellection leads to their having multiplicity; and that the intellects’ creation or emanation occurs through their intellection are all ideas that al-Fārābī borrowed directly from the Greek or Arabic Proclus. On other issues, however, such as the existence of superlunary potency and the idea of absolute divine creation (*ibdāʿ*), al-Fārābī departs from the Arabic corpus of Neoplatonic works. This shows that al-Fārābī did not slavishly follow the *Neoplatonica arabica* and that he critically selected certain theories and adapted them to his own cosmology.

Perhaps the most important and interesting issue in this context is the relation between the creation and emanation of God and of the intellects. All in all, al-Fārābī appears to be making a compromise between the various different views on demiurgy and emanation found in the Greek Proclus and the Arabic Proclus. Unlike the *Neoplatonica arabica*, al-Fārābī does not stress the absolute creation of God and omits the *b-d-ʿ* root. Moreover, he uses the same emanative and causative vocabulary to express God’s creation and the intellects’ creation, and he presents the intellects as having a genuine role in creation and as being more than mere mediators of God’s emanation. On the other hand, he follows the Greek and especially the Arabic Proclus in conceiving of God’s creation as a single emanation or pouring forth that filters through all beings according to their capacity to receive this emanation. Al-Fārābī’s account thus oscillates between the monotheistic belief in an omnipotent creator and the Proclean idea of several intellectual demiurgic

[783] Thillet and Oudaimah, 2001-2002, 332-333, my translation.

deities, and although it displays a synthetic quality and much originality in its attempt to reconcile these views, it can only be considered mildly successful in terms of its logical and conceptual coherence. It is not surprising that al-Ghazālī was later able to find many flaws in this system.

From a historical and textual perspective, however, al-Fārābī only had access to the Arabic works on Proclus, and we can be quite sure that he did not read the original Greek works. But the theories the Arabic works contained were by no means completely homogeneous and compatible, and they in fact convey subtly different positions on the role of the intellectual beings in creation. In spite of their efforts, the Arabic adaptors were not able to eliminate all the allusions to the secondary demiurges that one finds in the *Elements*. Al-Fārābī inherited the tensions he found in these texts, which also appear in his own writings and which are due to the hybrid nature of the *Neoplatonica arabica*. We know that this corpus combines material from Proclus and Plotinus in an almost inextricable fashion. And it is safe to hypothesize that al-Fārābī would have been at a loss to distinguish between Plotinus' and Proclus' doctrine, and in addition he had no way of comparing the original Greek texts with the Arabic adaptations. The latter were all that al-Fārābī had to work with.

The previous analysis has shown that al-Fārābī's cosmology and metaphysics are to a certain extent genuinely Neoplatonic. It is not so much the concept of emanation *per se*, as all the other parallels, which indicate al-Fārābī's allegiance to Neoplatonic metaphysics. Although it was previously thought that early Arabic philosophers such as al-Kindī, al-Fārābī, and Ibn Sīnā did not know or did not use the *Maḥḍ al-khayr*,[784] the foregoing analysis indicates that it represents a key source in the elaboration of al-Fārābī's celestial noetics, and, through al-Fārābī's works, of Ibn Sīnā's as well.[785]

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[784] D'Ancona and Taylor 2003, 637.

[785] This conclusion is also supported by Zimmermann's (1986, 178) remark that al-Fārābī's quotations from the *Theology* in the *Jamʿ* rely instead on passages culled from Proclus' *Elements of Theology*, as Vallat (2004, 73) also shows. These major parallels with the *Neoplatonica arabica* are strengthened by

4. THE SPHERE-SOULS

4.1 The Threefold Intellection of the Sphere-souls

The intellects of the heavenly bodies, which we have called sphere-souls, have three objects of thought. First and foremost, they reflect upon God as the ultimate cause of the universe. Second, they contemplate the separate intellects, the *thawānī*, which are causally closer to them, and which are responsible for their existence. Finally, the heavenly bodies think about their own essence.[786] This threefold mode of intellection introduces an element of multiplicity in the heavenly bodies and prevents them from being completely simple substances. Al-Fārābī, following Aristotle, equates thought and the object of thought in the divine essence.[787] In the case of the celestial bodies, however, the relation between the intellect and the object of thought is different for two reasons. First, the heavenly bodies are not thinking one object, but three different objects simultaneously. Second, they contemplate objects that are exterior to their own essence, namely, the First Cause and the separate intellects.

Al-Fārābī's theory of the threefold intellection of the heavenly souls represents one of the most original and interesting features of his cosmology. It is essential in explaining not only the motion of the spheres, but also the status of the heavenly bodies as intermediate beings between the more perfect separate intellects and the sublunary world. But how did al-Fārābī come up with this theory?

To begin with, one finds in Proclus the idea that the souls and intellects are intimately connected and that in a certain way the souls, or at least some souls,

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other terminological similarities, such as the common use of the term *al-thawānī*, which means "secondary intellects" in the *Maḥḍ al-khayr*, and which al-Fārābī uses to refer to the nine cosmic intellects (see Badawī 1977, proposition 9, p. 13, and passim). The impact of Proclus' ideas on Arabic thought is still difficult to delineate, but the evidence for it is slowly accumulating.

[786] Al-Fārābī 1985a, 122-123; and al-Fārābī 1964, 34.

[787] Al-Fārābī 1985a, 70-73.

participate in the nature of intellect. This view is articulated in propositions 174, 193, 207, and 208 of the *Elements*. In addition, as we have seen in the previous section, the souls are directly produced by the intellects. Again, al-Fārābī follows Proclus in subjecting soul to intellect and in making the sphere-souls dependent on the separate intellects for their existence. The parallel is strengthened even more by the fact that in the *Elements* some of these souls are meant to inhere in corporeal bodies, by which Proclus means the planets and spheres. For instance, proposition 196 states that "every participated soul makes use of a first body which is perpetual."[788]

Furthermore, proposition 201 of the *Elements* explains that each soul is characterized by a "threefold activity," which reflects its intermediary status between the intelligible and the corporeal worlds. This threefold activity of the souls is due to their godlike nature, to their intellectual nature, and to their having self-motion. Al-Fārābī does not reproduce this exact scheme in his treatises, but he probably derived the idea of the three-fold intellection of the sphere-souls from the Arabic adaptation of this passage. A likely vehicle of transmission for this last theory is the *Maḥḍ al-khayr*. In proposition 3 of this work, the Arabic adaptor discusses the nature of soul and says: "Every noble soul possesses three actions [or operations] [*afāʿīl*]: a spiritual (*nafsānī*) action, an intellectual [*ʿaqlī*] action, and a divine [*ilāhī*] action."[789] The adaptor goes on to explain that these actions are made possible by powers [*quwwā*] invested in the Soul by the First Cause and the Intellect, which enable the Soul to act on the world of nature and know things. At the end of this proposition, the author provides a similar statement about the threefold power in the soul: "soul has three actions [*afāʿīl*] because it has three powers [*quwwan*]: a divine power, an intellectual power, and an essential power [*quwwah dhātiyyah*]..."[790]

What is significant for our purpose is not so much the notion of *quwwah* (which here is to be understood in the sense of power or capacity, not possibility),

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788 Proclus 1963, 196.18-19, translated by Dodds.
789 Badawī 1977, 5, my translation.
790 Badawī 1977, 6.

but the idea that soul is divided into three aspects, one connected to the First Cause (*ilāhī*), one to Intellect (*ʿaqlī*), and one to its own essence (*nafsāniyyah* or *dhātiyyah*). The *Maḥḍ al-khayr*'s division of the soul into these three different aspects corresponds in al-Fārābī's cosmology to the souls' objects of thought: God, intellect, and their own essence. This passage shows such striking resemblance to al-Fārābī's theory that there can be little doubt that it represents its point of origin.

4.2 The Knowledge of the Sphere-souls

As with the separate intellects, in the case of the sphere-souls one must examine the objects of their intellection. First, is the intellection of the sphere-souls discursive or non-discursive? Second, al-Fārābī limits the objects of the sphere-souls' intellection to three, but the question remains as to whether by contemplating their own essence the sphere-souls know what lies beneath them. In other words, do they know the particulars of the sublunary world (either *qua* particulars or universals) in addition to the First Cause and the separate intellects?

Al-Fārābī describes the sphere-souls as being in a state of constant and continuous intellection. As he writes, the sphere-souls are "always contemplating what they contemplate," and the "objects of their intellects are present in them from the very beginning."[791] Al-Fārābī then compares the sphere-souls to human souls. Unlike the former, the latter "are at first in potentiality and then later in actuality."[792] In the case of human intellection, which is discursive and moves from one object to another, it is clear that the intellect identifies with only one particular object at any given time, because it cannot think many objects simultaneously. However, the sphere-souls intellect several objects simultaneously, and, moreover, these objects, namely, God and the separate intellects, are themselves eternal and unchanging. Clearly, for al-Fārābī, the intellection of the sphere-souls is non-discursive, continuous, and simultaneous.

[791] Al-Fārābī 1964, 34, translated in McGinnis and Reisman 2007, revised by me.
[792] Al-Fārābī 1964, 34.

As for the question of the heavenly bodies' knowledge of particulars, it was frequently addressed in late-antique cosmological works and is intricately tied to the theme of divine providence (*ʿināyah*). A salient example is the Arabic translation of Alexander's *De providentia*, which discusses this question at length. This trend continued in the early Arabic context, and al-Kindī for instance devoted several sections of his treatises to the questions of the celestial bodies' knowledge and providence.[793] Al-Fārābī, in comparison, says little about this subject, but what he does say seems to exclude the possibility of heavenly knowledge of particulars. For instance, in the *Siyāsah* he writes that "the celestial souls definitely do not contemplate the majority of the intelligibles that humans contemplate from things in matter because they are far too high in rank by virtue of their substance to contemplate the intelligibles that are below them."[794] This quotation seems to limit the intelligibles of the sphere-souls to eternal, immaterial principles, a view that agrees fully with al-Fārābī's belief that the sphere-souls are always in actuality "due to the fact that the objects of their intellect are present in them from the very beginning [*awwal al-amr*]."[795] Indeed, if the sphere-souls knew particulars, their thought would be discursive and constantly changing from one object to another. Alternatively, there is the possibility that the heavenly bodies know particulars in a universal way, but al-Fārābī says nothing that could be used in support of this view.

The previous comparison between the *Proclus arabus* and al-Fārābī's writings convincingly shows that the second master applied some of the Neoplatonic theories of intellect and soul to the sphere-souls of his cosmological model. What we witness therefore is an adaptation of fundamentally Neoplatonic noetic theories to fit an Aristotelian cosmological framework of unmoved movers and celestial spheres. Al-Fārābī did not merely borrow these Neoplatonic theories, but creatively transformed them to fit other aspects of his cosmology and metaphysics. Regardless

[793] See Alexander 2003; the various cosmological treatises in al-Kindī 1950-53, especially the *On the Proximate Efficient Cause of Generation and Corruption*; and Wiesner 1993, 41-107.
[794] Al-Fārābī 1964, 34.
[795] Al-Fārābī 1964, 34.

of the recension in which al-Fārābī read the *Proclus arabus*, this corpus, and especially proposition 3 of the *Maḥḍ al-khayr* and the Arabic version of proposition 201 of the *Elements*, represents one of the key sources for his theories of the sphere-souls' intellection.

Before concluding this section, we may point to a tension in al-Fārābī's account of celestial intellection. On the one hand, al-Fārābī tells us that the sphere-souls are always in actuality. Al-Fārābī places great emphasis on this idea: the heavenly souls are "never potential" (*wa dhālika annahā lam takun bi-al-quwwah aṣlan...*) and "always [or eternally] actual" (*bal hiya bi-al-fiʿl dā'iman*).[796] The intelligibles in them are continuously actualized and have been so "from the start" (*min awwal al-amr*). This equation between intellection and actuality harkens back to Aristotle's account of God as *nous* and pure actuality in Book Lambda 7 and 9, and it is clear that al-Fārābī is here following a well-established tradition.

However, we have seen that the substance of the heavenly body is broader than the concept of intellect and that it is in a sense composite because it includes substrate. If the substance of the heavenly body as a whole is composite and not pure intellect, then it is difficult to understand how it could be said to be in a state of eternal actuality, for its substrate would possess some degree of potentiality. Perhaps the answer is that only the intellectual part is in actuality, whereas the composite substance as a whole is not. Another (more satisfactory) possibility is that because the substrate is not regarded as being truly material, it is being continuously actualized by the intellection of the soul. In any case, the celestial soul may be said to be the actuality of the celestial body in an Aristotelian sense, with the difference that the intellection of the celestial soul is continuous and non-discursive and that the celestial body is imperishable and eternal.

In conclusion, the previous analysis of intellect and soul reveals that al-Fārābī knew the Neoplatonic, and more specifically, the Proclean, noetical theories

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[796] Al-Fārābī 1964, 34.

contained in the *Neoplatonica arabica*, and that he applied some of these theories to his treatment of the cosmological beings. This statement nevertheless needs to be qualified in two respects. First, al-Fārābī was very critical of the theories he borrowed from these works. Some of them he accepted entirely, such as the idea that God emanates and causes the entire world as well as a specific intellectual being, that this intellectual being (as well as all the subsequent intellectual beings) is multiple due to its various objects of thought, that the intellects in turn cause and emanate the existence of the souls, and that emanation or creation occurs through intellection. On the other hand, he rejects other theories, e.g., the relation between knowledge of the essence and of the effect and the intellectual beings' knowledge of what lies below them, the existence of a superlunary potency that is higher than actuality, and the idea that intellect is a mere intermediary in creation.

Secondly, we can see that al-Fārābī did not passively reproduce these theories in his works, but that he transformed them to make them compatible with other aspects of his philosophy. His noetical theories are fundamentally Neoplatonic, and more specifically Proclean, but he adapts them to fit an Aristotelian cosmological framework of spheres, sphere-souls, and unmoved movers. This is illustrated, for instance, in al-Fārābī's description of the separate intellects as causative, emanative entities in their own right and not merely as intermediaries in God's creation. Al-Fārābī thus makes the intellects responsible for the creation of the visible heavens, a task which was traditionally ascribed to soul in the Greek Neoplatonic tradition. Here we see that al-Fārābī is inserting these noetical theories within a Ptolemaic and Aristotelian astronomical and spherological model, which establishes a direct relationship between the number of separate intellects and the number of spheres. Another example is the threefold intellection of the sphere-souls, whose basic features can be found in the *Elements* and in the *Maḥḍ al-khayr*, but which in al-Fārābī's cosmology acquires a completely new meaning due to his particular emanative scheme and his theory of motion (see Chapter VI).

5. THE THREEFOLD INTELLECTION OF THE AGENT INTELLECT

An interesting feature of al-Fārābī's cosmology is the discrepancy between the first nine separate intellects and the last separate intellect, the Agent Intellect (*al-ʿaql al-faʿʿāl*). What is of concern here is not the Greek antecedents for the theory of the Agent Intellect in Arabic philosophy, nor the unique role played by this intellect in the processes of sublunary change and in human intellection. These topics have already been discussed by Davidson and other scholars,[797] and could very well form the subject-matter of a new monographic study. Rather, I will limit my comments to the relation between the Agent Intellect and the other superlunary intellects and souls, and to a few peculiar features concerning the nature of the Agent Intellect's intellection. These features have not been dealt with sufficiently in the modern literature. My goal is to emphasize the divergence between the intellection of the Agent Intellect and that of the other superlunary intellects and explain why these intellects may be considered two different classes of beings.

Al-Fārābī explains that the Agent Intellect has a threefold intellection instead of a twofold intellection like the other separate intellects. Its intellection is thus much closer to that of the sphere-souls. This, at any rate, is what one reads in the *Siyāsah*: *wa ammā al-ʿaql al-faʿʿāl fa-innahu yaʿqilu al-awwal wa al-thawānī kullahā wa yaʿqilu dhātahu…*[798] Hence, unlike the *thawānī*, the Agent Intellect does not have two, but three objects of thought: the First, the *thawānī* (i.e., the nine separate intellects below God), and its own essence. In terms of the structure of its intellection, this makes the Agent Intellect closer to the sphere-souls than to the separate intellects. However, although the Agent Intellect and the sphere-souls all have three objects of thought, the former is distinguished from the latter in having all the *thawānī* as a single object of thought (*…wa al-thawānī kullahā…*). In contrast, each sphere-soul contemplates the intellect immediately above it. The conclusion is that the Agent

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[797] Finnegan 1957; Rahman 1958; Walzer 1974; Luccheta in al-Fārābī 1974; Davidson 1972 and 1992; and Hamzah in al-Fārābī 2001b; Geoffroy 2002.

[798] Al-Fārābī 1964, 34.

Intellect has a unique kind of intellection, which sets it apart from the other celestial intellects.

Al-Fārābī does not explain why the Agent Intellect has a unique intellection, nor is there any particular reason that could immediately justify this view. However, at least one hypothesis can be advanced. Al-Fārābī tells us that the separate cosmic intellects and the heavenly bodies are organized hierarchically depending on their nobility and purity. The Agent Intellect is the tenth separate intellect and lies below the nine *thawānī*, although it is higher in rank than the celestial bodies. Moreover, as a result of its lower rank and its remoteness from the One, it does not produce another separate intellect and a sphere but instead governs the sublunary world. This is, at least outwardly, the most conspicuous difference between the Agent Intellect and the *thawānī*.

Now the separate intellects are all alike in that they are all immaterial and pure intellects, so that the substance of the Agent Intellect is really the same as that of the *thawānī*; they are immaterial forms and intelligible beings. Their only deficiency lies in their having multiple objects of intellection. Hence, it is at this level only that al-Fārābī can establish a distinction between these intellects and justify the fact that the Agent Intellect is the last and lowest in the series. This he does by introducing a threefold intellection in the Agent Intellect, thus setting it apart from the *thawānī*, which only have a twofold intellection. This threefold intellection means that the Agent Intellect has a lower status than the *thawānī* because it possesses a higher degree of multiplicity. It is this greater degree of multiplicity attached to its threefold intellection that can best account for the special status of the Agent Intellect and for the fact that it cannot emanate another separate intellect.

There is, however, another peculiar feature about the threefold intellection of the Agent Intellect. Not only does this intellect mirror the sphere-souls due to its threefold intellection, but it can also be compared to the human intellect, which in al-Fārābī's noetics possesses three faculties: potential, active, and acquired. The parallel between these three human noetical faculties and the three objects of thought reflected upon by the Agent Intellect is strengthened by the fact that the Agent Intellect is responsible for the actualization of man's intellect. It is thanks to the Agent Intellect that man can reach the state of the acquired intellect. Moreover, al-Fārābī writes that the Agent Intellect "belongs to the same species as the acquired intellect" in man (*wa al-ʿaql al-faʿʿāl huwa min nawʿ al-ʿaql al-mustafād…*).[799] This statement is at first sight surprising, because the sphere-souls are said in another passage to belong to a different species than man's intellect, and so a fortiori the separate cosmic intellects should be very different than the human intellect.[800] But in light of the role of the Agent Intellect in human cognition and in the actualization of the human intellects, it is understandable that al-Fārābī would want to stress the kinship between them. Hence, it would seem that the unique status of the Agent Intellect is also due to its epistemological connection with man's rational soul. In fact, if the Agent Intellect were radically different from human souls, then the acquisition of knowledge by humans would be more difficult to explain, especially considering that it is the principal agent in man's cognition according to al-Fārābī. This suggests that al-Fārābī may have intended to model his cosmology closely on his psychology and to elaborate a celestial noetics that is as symmetrical as possible to his human noetics.

Thanks to the previous analysis, it is easier to understand why al-Fārābī in the *Siyāsah* lists the Agent Intellect as a principle that is distinct from the other separate intellects (*thawānī*).[801] Although all of the immaterial beings share a common essence (namely, intellect), the Agent Intellect nevertheless fulfills functions that are unique to it and thereby acquires a special status in al-Fārābī's cosmology.

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[799] Al-Fārābī 1938, 27; translated in McGinnis and Reisman 2007, 75.
[800] Al-Fārābī 1964, 33.
[801] Al-Fārābī 1964, 31.

6. IBN SĪNĀ'S TRANSFORMATION OF AL-FĀRĀBĪ'S THEORY

The idea that al-Fārābī's theory of celestial intellection was the direct model for Ibn Sīnā's own theory has been acknowledged but insufficiently stressed by modern scholars. In general, the emphasis is placed on the differences rather than the similarities between their theories: the "dyadic" scheme of al-Fārābī is opposed to the "triadic" scheme of Ibn Sīnā.[802] Yet al-Fārābī's cosmology represents the main source from which Ibn Sīnā derived his own conception of celestial intellection. Not only do these two thinkers present an almost identical account of the relation between the sphere-souls and separate intellects, but in addition intellection plays an equally important role in their explanations of celestial causality and motion.

This being said, there are also crucial differences, which suggest that Ibn Sīnā significantly transformed al-Fārābī's theories. First, Ibn Sīnā applies threefold intellection to the separate intellects, not to the sphere-souls, which in his system possess only a twofold intellection.[803] While this has long been recognized, the basic motive underlying Ibn Sīnā's decision to transfer threefold intellection from the sphere-souls to the separate intellects has not been accounted for properly; I will address this point shortly. Second, Ibn Sīnā integrates this noetic theory in a causal framework that relies on the Avicennian distinction between necessary and possible of existence. Rather than assigning three different objects of thought to the separate intellects, he assigns only two (the First Cause and their own essence), but breaks down the intellection of the intellects' essence into a duality based on a logical modality: the separate intellects contemplate their essence as necessary of existence in relation to the First, and as possible of existence in itself.[804] What we witness here is a transfer of the metaphysical distinction Ibn Sīnā makes between 'possibility' and

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[802] It is commonly mentioned in general surveys of Islamic thought that al-Fārābī developed a theory of twofold intellection as opposed to Ibn Sīnā's threefold intellection. See for example Marmura in Ibn Sīnā 2005, xxi.

[803] A clear account of the threefold intellection of the separate intellects appears in the *Metaphysics* of the *Shifā'* (Ibn Sīnā, 2005, 330.8-35).

[804] Ibn Sīnā, 2005, 330.11-16.

'necessity' to his cosmology in order to explain intellection and creation in the superlunary beings.

But why did Ibn Sīnā modify al-Fārābī's theory? I believe that he was motivated by specific philosophical considerations that pertain to the ambiguities of al-Fārābī's account of celestial substance. Ibn Sīnā probably wanted to correct what may have appeared to him as a logical flaw in the Fārābīan system, namely, the discrepancy between the fact that the separate intellects have only a twofold intellection, but that they are supposed to emanate 1) a lower intellect, 2) a sphere-soul, and 3) a corporeal sphere. In al-Fārābī's system the sphere-soul and the sphere itself may be conceived of as forming one single entity and one substance, since the sphere, in spite of being corporeal, is described as being an immaterial substrate. And so al-Fārābī ascribes only one cause for the existence of both the soul and the body of the sphere.

Ibn Sīnā may have rightly considered al-Fārābī's cosmology confusing on this issue and preferred to assign a distinct cause for the form and another distinct cause for the matter of the celestial bodies. In opposition to al-Fārābī, Ibn Sīnā upholds the hylomorphic composition of the heavenly spheres in an explicit manner, which requires him to posit two individual causes to account for their form and matter, in addition to a third cause for another separate intellect. This appears clearly in the *Shifā'* when Ibn Sīnā writes: "Because there is beneath each intellect a sphere with its matter [*māddah*] and its form [*ṣūrah*], which is the soul, and also an intellect below it, there is beneath each intellect three things in existence. It follows necessarily, then, that the possibility of the existence of these three from the first intellect with respect to innovative creation is due to the above mentioned triadic order."[805] By positing this third cause to explain the corporeality and materiality of the spheres, Ibn Sīnā achieves a radical modification of the Fārābīan model, which may in some regards be seen as a philosophical improvement made possible by his more elaborate theory of causality. The theory of celestial intellection offers a

[805] Ibn Sīnā 2005, 330,39-331,4, translated by M. Marmura.

striking example of how Ibn Sīnā assimilated and transformed ideas first developed by al-Fārābī. Ibn Sīnā displays the same remarkable degree of creativity in his treatment of the theories he inherited from his predecessor than al-Fārābī did toward the Greek material he studied.

7. INTELLECTION AND SUBSTANTIALIZATION (*TAJAWHUR*)

Tajawhur (derived from the verb *tajawhara*) is a concept that is encountered in al-Fārābī's and Ibn Sīnā's philosophies and which can be translated as "substantialization" or "to become a substance." As Goichon notes in her *Lexique* of Ibn Sīnā's terminology, however, the exact meaning of this concept is difficult to pinpoint.[806] One of the problems is this concept's ubiquity and the variety of contexts in which it is found. Al-Fārābī uses *tajawhur* in both a sublunary physical context and a superlunary metaphysical context and uses it to describe entities as varied as the human soul, the celestial bodies, the separate intellects, and the First Cause itself. Another difficulty is that al-Fārābī applies the concept of *tajawhur* to beings that are already substances, and, what is more, to substances that have attained their highest state of perfection, such as the celestial bodies. It would seem, then, that *tajawhur* can be envisaged both as a process and as a state, depending on which beings it is applied to. Finally, while *tajawhur* may correspond to the Greek terms οὐσιότης and οὐσιώσις, it is difficult to find an exact precedent for it in ancient philosophy. The most likely hypothesis is that al-Fārābī's understanding of this concept was shaped by late-antique interpretations of Aristotle's concept of actuality. The following paragraphs will attempt to shed light on these issues and to clarify al-Fārābī's use of this term in a cosmological context.

In the *Ārā'*, al-Fārābī explains that human beings are substantialized by virtue of their thought or speech (*nuṭq*), and he opposes this mode of substantialization to God's unity and perfection.[807] On the one hand, this statement should be interpreted in the context of al-Fārābī's anthropology, according to which humans are distinguished from the other sublunary existents because they possess rational thought. This difference enables them to achieve a perfection that is not possible for the other non-rational sublunary beings. On the other hand, al-Fārābī opposes human perfection to divine perfection, because human thought or speech is

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[806] Goichon 1938, 52.
[807] Al-Fārābī 1985a, 92-93.

a discursive activity, and so it is clear that the substantialization of human beings consists of a process that unfolds in time and involves change. More specifically, it is a process which requires the cultivation of the rational soul of human beings throughout their lives by means of study or reflection. In Aristotelian terminology, one could say that *tajawhur* occurs when humans actualize their potentiality for knowledge. Thus, al-Fārābī opposes the changing substantialization of humans to the immutable and eternally perfect divine essence.

In contrast, *tajawhur* in the superlunary world does not seem at first glance to imply a change of any kind. This is because all of the superlunary beings are in their state of utter perfection and do not suffer from potentiality, except the celestial bodies which have a potentiality for circular motion. In another passage of the *Ārā'*, al-Fārābī explains that the heavenly spheres become "substantialized" (*tajawhara*) by virtue of their souls. The celestial bodies are said to "have…things [intellects] that are like forms and through which they [the celestial bodies] become substantialized (*wa ashyā' hiya lahā ka-al-ṣuwar bihā tatajawharu*).[808] This statement is mirrored in the *Siyāsah*: *wa bi-hādhā* [the soul] *tajawhara al-ajsām al-samāwiyyah*.[809] Finally, in the *Risālah fī al-ʿaql*, al-Fārābī says something quite similar, but the emphasis this time is on the agency of the separate intellects:

> Every celestial body is set in motion only by a mover that is neither a body nor in a body in any way. [This mover] is the cause of [the celestial body's] existence, inasmuch as it is that by virtue of which [the celestial body] is a substance [*tajawhara*], but its level, in terms of the existence that is [the celestial body's] substance, is the same as that body.[810]

At the cosmological level, then, the verb *tajawhara* explains how the substance of the heavenly bodies is constituted through the activity of the soul and, more specifically, through intellection (*taʿaqqul*) and the contemplation of the separate intellects. The *Ārā'*, the *Siyāsah*, and the *Risālah fī al-ʿaql* all develop this

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[808] Al-Fārābī 1985a, 120.
[809] Al-Fārābī 1964, 34.
[810] Al-Fārābī 1938, 34.

concept of *tajawhara* based on the intellection of the celestial souls. We can see the narrow link that al-Fārābī perceives between *tajawhur* and soul in both the sublunary and celestial contexts. *Tajawhur* seems to be used primarily in relation to animated beings and especially to indicate the role of the rational soul in actualizing the potentialities inherent in them.

There is an important difference, however, between human *tajawhur* and celestial *tajawhur*. Whereas human intellection is constantly shifting from potentiality to actuality, thereby implying a gradual and chronological substanlialization, celestial intellection is always actualized and constant, which means that the celestial substance itself is always actualized and in a state of utter perfection. As al-Fārābī asserts in the *Siyāsah*, "the celestial bodies are, in their substances, always in a state of final perfection." As a result, the planets have motions that "come out of their final perfections" and that are "never interrupted, not even for an instant."[811] In this sense, it would seem that *tajawhur* in the superlunary world does not refer to a process, but rather to a state, that is, to the conditions required for the heavenly substance to exist. Whereas human beings would still exist *qua* humans even if they did not assiduously cultivate their rational soul and 'substantialize' themselves through study or contemplation, the celestial bodies would not be the exalted beings they are if they ceased to perform the eternal contemplative activity in which they are engaged.

In *De anima* II.1, Aristotle had established an identity between soul, form, and actuality when he wrote that the soul "is the first grade of actuality of a body."[812] While al-Fārābī's concept of *tajawhur* may be construed as the actualization of the soul in an Aristotelian sense, it is more likely that it was informed by late-antique Neoplatonic trends, which gradually came to see the soul as a source of perfection for the body by interpreting *entelekheia* as *teleiotês*.[813] More specifically, al-Fārābī seems to be following Proclus' distinction between various grades of perfections and

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[811] Al-Fārābī 1964, 102.
[812] Translated by J. A. Smith in Aristotle 2001.
[813] Winosvsky 2003, Chapter I.

applying these notions to his cosmology, although there are differences in the way in which these two thinkers define these grades of perfections.[814] As a result, al-Fārābī believes that the heavenly souls are not only actual, but also a source of eternal perfection for the heavenly bodies.

Yet, and this seems slightly contradictory, al-Fārābī's concept of substantialization also seems to be connected at another level with deficiency and imperfection. The substantialization of the heavenly bodies is a result not just of their intellection, but more specifically of their contemplating several objects of thought. In the *Siyāsah*, al-Fārābī explains that the heavenly bodies are more deficient than the separate intellects because the "plurality by which they substantialize themselves is greater than that of the *thawānī*" (*al-kathrah allatī bihā tajawharahā azyad mimmā tatajawharu bihi al-thawānī...).*[815] The celestial bodies thus share the concept of substantialization with the separate intellects, but the latter become substantialized through an intellection that implies a lesser degree of multiplicity than that of the sphere-souls.[816] God, on the other hand, does not rely on other things that substantialize his essence. In fact, al-Fārābī uses the verb *tajawhara* negatively speaking about God in order to stress that the First Cause does not need any exterior agent for its substance to be complete, one, and perfect.[817] The First Cause, unlike everything else, is autonomous and does not depend on exterior things to achieve its perfection. In the celestial bodies, however, *tajawhur* and *nuqṣān* are intricately connected, since the intellection that leads to the substantialization of the spheres is multiple. This fragmented intellection introduces a certain deficiency in the substance of the spheres, and this is why, according to al-Fārābī, the celestial bodies are the "first of the deficient existents."[818]

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[814] For a comparative analysis of Proclus' and al-Fārābī's theories of actuality as perfection, see Wisnovsky 2003, 108-112.
[815] Al-Fārābī 1964, 41.
[816] Al-Fārābī 1964, 40.
[817] Al-Fārābī 1985a, 66-67, 92-93.
[818] Al-Fārābī 1985a, 131.

In conclusion, then, it would seem that al-Fārābī develops a quite original interpretation of substantialization in his cosmology, which refers simultaneously to a state of perfection in the celestial bodies, i.e., to their eternal actuality and continuous contemplation of the higher immaterial principles, and at the same time to the complexity and deficiency which characterize their nature as caused existents. While the meaning of *tajawhur* varies subtly depending on the context in which it is found, it would seem that for al-Fārābī it is closely connected with the concepts of soul and intellection. The links that exist between *tajawhur*, intellection, perfection, and deficiency in the superlunary and intelligible beings suggest a Proclean antecedent, although there is no good reason not to credit al-Fārābī with a personal formulation of this concept.

8. PARALLELS BETWEEN THE HUMAN AND CELESTIAL INTELLECTS

Al-Fārābī also uses the concept of substantialization in his human psychology. For example, in the *Risālah fī al-ʿaql*, he explains that when a person reaches the stage of the acquired intellect, "the substance of man, or man by virtue of what constitutes his substance, becomes the closest thing possible to the Active Intellect" (*fa-yaṣīru ʿinda dhālika jawhar al-insān aw al-insān bimā yatajawharu bihi aqrab shay' ilā al-ʿaql al-faʿʿāl…*).[819] Like the celestial bodies, then, human beings become substantialized through intellection, and more specifically by cultivating their rational soul until it becomes an acquired intellect and establishes contact with the Agent Intellect. In both cases, the realization of the substance that is the human and celestial intellect is brought about through the contemplation of higher principles.

The connection between al-Fārābī's cosmology and psychology is laid out in the *Taḥṣīl*, where he writes that

> the inquiry into the rational animal will thus lead him [the philosopher] to a similar conclusion as the inquiry into the heavenly bodies. Now he acquaints himself with incorporeal principles that are to the beings below the heavenly bodies as those incorporeal principles (with which he became acquainted when investigating the heavenly bodies) are to the heavenly bodies. He will acquaint himself with the principles for the sake of which the soul and the intellect are made, and with the ends and the ultimate perfection for the sake of which man is made.[820]

What is interesting in this passage is al-Fārābī's emphasis on intellection as perfection and an end in both human and heavenly beings. What unites humans and heavenly bodies is the possession of a rational soul that enables them to fulfill their nature and complete their perfection, the former by reaching a noetic state in close contact with the Agent Intellect, the latter by reflecting on the highest principles and eternally revolving in circles. This, perhaps, is why al-Fārābī applies the same

[819] Al-Fārābī 1938, 31; translated in McGinnis and Reisman 2007, 76.
[820] Al-Fārābī 1969, 22, translated by M. Mahdi.

term and concept of “substantialization” (*tajawhur*) to both the human and celestial intellects.[821]

Another indication of the affinity between human and celestial psychology is the fact that al-Fārābī applies the same concepts of form and substrate to both types of souls. For example, in the *Risālah fī al-ʿaql*, he compares the various stages of the human intellect to form and substrate and applies the same concepts to the celestial bodies in the *Ārā’* and the *Siyāsah* (see section IV.1.3.1.5). This practice can ultimately be traced to Aristotle’s *De anima* III.4-5. Unlike Aristotle, however, al-Fārābī makes it clear that his hylomorphic descriptions are analogical. In any case, the use of a common terminological and conceptual framework in the two contexts explains why al-Fārābī discusses human and celestial psychology in the same works and even in the same passages.[822]

This raises the question of the exact relation between the celestial and human souls. In al-Fārābī’s ontological hierarchy, human beings are the only sublunary existents to possess reason. And it is by virtue of their rational soul that humans are connected to the higher levels of the universe and are distinguished from the other animals. However, al-Fārābī does not say that heavenly and human intellects are identical, but that they are “congeneric” (*mujānisah*).[823] Although ambiguous, this term suggests that by virtue of their rationality, both types of souls belong to a common genus.

In other instances, however, the idea that human and celestial souls are essentially different is articulated quite strongly. In one passage, al-Fārābī explains that the heavenly souls differ from the human souls “in species” (*fī al-nawʿ*) and that the former are detached and separated from the latter “in their substances.”[824] This can be explained by the fact that the heavenly intellects are “always actual” (*dā’iman*

[821] For *tajawhara* and the human mind, see al-Fārābī 1985a, 92; for the celestial intellects, see al-Fārābī 1985a, 120-121.
[822] See for example al-Fārābī 1938, 34-35; and especially al-Fārābī 1964, 33-34.
[823] Al-Fārābī 1964, 34.
[824] Al-Fārābī 1964, 33.

bi al-fiʿl),[825] whereas the human souls pass from a state of potency to one of actuality. Moreover, both types of souls contemplate different intelligibles: the celestial souls, al-Fārābī writes, "definitely do not contemplate the majority of the intelligibles that humans contemplate from things in matter because they are too far in rank by virtue of their substance to intellect the intelligibles that are below them."[826] Finally, whereas human intellects need to abstract forms from their matters before they can be apprehended as intelligibles, the celestial souls do not need to pass through this process of abstraction. These points seem to establish an important epistemological gap between celestial and human souls, and connect with the previous remarks concerning the limits of human knowledge of the cosmos (see section II.7). They also suggest that it is not possible for the human intellects to reach the level of the celestial intellects. Moreover, in this case as well as in the case of form and matter, the most appropriate way of expressing the relation between the celestial and sublunary souls seems to be through analogy. Both types of souls are rational, but they merely 'resemble' one another in possessing rationality. One may perhaps conclude that they share a common genus but differ in species.

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[825] Al-Fārābī 1964, 34.
[826] Al-Fārābī 1964, 34; translated in McGinnis and Reisman 2007, revised by me.

9. HEAVENLY SUBSTANCE, GENUS, AND SPECIES

Before I move on to discuss the theme of intellection in the works of uncertain authenticity, I would like to address a last point of considerable significance in medieval cosmology, namely, the relation between the substance, genus, and species of the celestial bodies, and examine under what form this problem appears in al-Fārābī's works.[827] In the *Ārā'* al-Fārābī writes that "all these bodies [i.e., the celestial bodies] have one and the same genus while differing in species. But in each of these different species only one body can exist and no other can share that species with it."[828] A similar view appears in the *Treatise on the One and Unity*, where al-Fārābī explains that moonness (*qamriyyah*) belongs to the moon alone, which is the single existent of a single species.[829] The justification for making each celestial body a unique species is that its substrate can only receive one form and cannot have other forms opposed to the one it already has.

One may wonder, however, whether al-Fārābī posits a common substrate for all the celestial bodies, and if so, on what grounds. As has been explained, al-Fārābī does not develop a theory of celestial matter that can account for the common qualities shared by the celestial bodies, such as perceptibility and corporeality. Moreover, even if it is assumed that the celestial bodies must possess some kind of matter (or else they would not possess these corporeal qualities), al-Fārābī refrains from positing one common matter or substrate that is shared by all the celestial bodies. Finally, the fact that each celestial body has only one form and can only accept that particular form suggests that its substrate is unique.

But if this is true, it is not clear how the heavens as a whole can be said to be a homogeneous body or even constitute several bodies of the same genus, since the concept of a genus implies a matter common to several species. If the celestial

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[827] For a discussion of this issue in medieval Latin cosmology, see Grant 1994, 220-223. Surprisingly, Grant devotes very little space to this important question.
[828] Al-Fārābī 1982a, 69; al-Fārābī 1985a, 120-121. Both editions give the same Arabic reading.
[829] Al-Fārābī 1989, 56.

spheres have nothing in common (neither form nor substrate), then on what basis are they characterized by genus and differentiae? Why should the same term "*jism samāwī*" be applied to all of them? On the other hand, that the celestial bodies cannot be completely different from one another is clear from the fact that similar things can be predicated of them, like eternity, perceptibility, circular motion, etc. Thus, they are not what al-Fārābī would call "perfectly different."[830] This question is left unresolved by al-Fārābī, but a hypothetical explanation may be advanced.

Several hundred years after al-Fārābī, Ibn Rushd faced the same conundrum of how to explain the genus and species of the celestial bodies, and he came up with an interesting solution. Ibn Rushd, like al-Fārābī, sometimes describes the celestial bodies as being matterless.[831] Unlike al-Fārābī, however, he infers from this that the heavenly bodies have no common genus, although they do differ in species.[832] In spite of this, Ibn Rushd still has to account for the differences between the species of the celestial spheres. A recent article by Di Giovanni[833] provides an insightful analysis of the way in which Ibn Rushd solved this problem. Di Giovanni explains that Ibn Rushd has recourse to synonymic analogy to explain how the term 'species' can be predicated of the celestial bodies "according to different degrees of being by which the same essence is realized."[834] Ibn Rushd's solution relies on the celestial intellects, which are the same in essence but possess different degrees of being. It is this discrepancy in the nobility and order of the intellects that provides the differentiae that distinguish the celestial bodies. Matter plays little if no role at all as a criterion of differentiation.

[830] In the *K. al-jadal*, he writes: "The perfectly different are two things that share neither one single predicate, nor one single subject"; translated in Alon 2002, 584.
[831] Wolfson 1929, 607-608; Hyman's introduction in Ibn Rushd 1986, 34; and Di Giovanni 2006, 438, 440-443.
[832] Ibn Rushd seems to have changed his mind on this issue, sometimes arguing that each celestial body is the unique existent of its species, other times arguing that the celestial bodies belong to one species; see Di Giovanni 2006, 448.
[833] Di Giovanni 2006.
[834] Di Giovanni 2006, 439.

Di Giovanni's article provides a convenient starting-point for a possible interpretation of this issue in al-Fārābī's cosmology. Since al-Fārābī does not endow the celestial bodies with a common matter and hence does not describe them as belonging to a single genus on this basis, it follows that the celestial bodies' similarities and differences must be based on the concept of the celestial soul alone. Here we see that al-Fārābī's approach to the problem is essentially the same as that of Averroes. The only thing that the celestial bodies have in common is this rational soul or intellect, an intellectual nature which they also share with the First Cause and the secondary intellects. Moreover, in spite of the fact that the substrate is adapted in each case to the specific soul of the celestial body, the various sphere-souls participate in a common contemplation of the First Cause and thus resemble one another in this intellective activity. Intellect is common to all the celestial bodies, and, what is more, the intellects of all the celestial bodies contemplate God. It would seem, then, that the common intellectual nature and intellection of the heavenly bodies can justify al-Fārābī's claim that they all belong to a single genus.

The differentiae, however, still have to be accounted for. In Ibn Rushd's account, the quasi-differentiae that distinguish the celestial intellects are their varying degrees of nobility that result from the notions of priority and posteriority.[835] The further away the intellects are from their originative source, the more imperfect their intellection. Al-Fārābī maintains a certain hierarchy in the heavenly souls, but one does not find the notions of priority and posteriority in his treatises. Rather, the main criterion of differentiation in al-Fārābī's cosmology appears to be the different objects of thought that are contemplated by the heavenly souls besides the First Cause. Each sphere-soul contemplates a unique separate intellect responsible for its existence, as well as its own essence. Hence, the second and third objects of thought of the sphere-souls are not common, but individualized and adapted to each celestial body.

[835] Di Giovanni 2006, 461.

I would argue that it is this difference in the objects of intellection that results in the particularity and differentiae of each celestial body. Put another way, the unique soul, and hence form, of each celestial body would, together with its unique intellection, be the defining criteria that distinguish the various heavenly species. Hence, we see that al-Fārābī's and Ibn Rushd's lines of reasoning follow a similar course on this issue, but that the latter focuses on the degrees of ontological excellence of the celestial bodies by using the priority-posteriority distinction, whereas the former relies on the distinction between objects of intellection to reach the same conclusion. This difference in the approaches of Ibn Rushd and al-Fārābī is significant and may be explained by the fact that Ibn Rushd interprets Aristotle's unmoved movers as being inherent in the spheres, whereas the second master maintains an ontological distinction between the separate intellects and the sphere-souls.

Al-Fārābī's omission of celestial matter need not, therefore, be seen as an insurmountable impediment to the notions of celestial genus and species. Al-Fārābī's answer to this traditional problem, even if it is not explicitly formulated in his works, may be reconstructed along this line.

10. INTELLECTION AND IMAGINATION IN THE *TAʿLĪQĀT*

10.1 Intellection

To my knowledge, no in-depth study has been devoted to the *Taʿlīqāt*, in spite of the many interesting metaphysical and cosmological themes it discusses. Although Al-Yasin, who provided an Arabic edition of this work in 1992, attributes the treatise to al-Fārābī, other scholars have questioned this attribution.[836] In the following paragraphs, I provide an overview and analysis of several topics: celestial intellection; celestial imagination; the relation between human and celestial imagination; and the relation between imagination and creation in the sublunary world. Hopefully, this will shed some light on the problem of attribution, to which we shall return at the end of this analysis.

Like the *Ārāʾ* and *Siyāsah*, the *Taʿlīqāt* presents the heavenly bodies as ensouled beings that possess rational thought. The celestial bodies are composed of form and matter, the former principle being identified with their soul (*nafs*) or intellect (*ʿaql*),[837] while the latter principle introduces an element of multiplicity that makes the heavenly souls deficient and imperfect compared to the separate intellects and the First.[838] These souls, and the heaven as a whole, desire to attain perfection by contemplating God, the noblest object of thought.[839] The circular motion of the heavens results from this intellection and from the spheres' desire to imitate the higher principles. Besides the sphere-souls, there are "efficient intellects" (*al-ʿuqūl al-faʿʿālah*), which differ from the sphere-souls by being simple in essence.[840]

So far, the cosmological picture that emerges from the *Taʿlīqāt* contains a First Cause, separate intellects, and sphere-souls, and it thus bears a marked

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[836] Michot 1982; Vallat 2004, 387.
[837] As in the *Ārāʾ* and *Siyāsah*, these two terms are used interchangeably to refer to the sphere-souls.
[838] Al-Fārābī 1992, section 27, p. 47.
[839] Al-Fārābī 1992, sections 43-44, p. 50, section 56, p. 52, and section 63, p. 54.
[840] Al-Fārābī 1992, section 27, p. 47.

resemblance to the *Ārā'* and *Siyāsah*. However, the author of the *Taʿlīqāt* seems to have been preoccupied by issues that did not interest al-Fārābī much. It was noted before that al-Fārābī provides little information about the nature of the intellection of the celestial spheres, for example, whether their intellection is discursive or non-discursive, how it differs from the intellection of the separate intellects, and whether it is potential or actual.

The *Taʿlīqāt*, on the other hand, provides more insight into these noetical questions. One reads that the "intellects of the planets are in potency, not in actuality, and that their intellection does not occur at once, but rather they think one thing after another…" (*ʿuqūl al-kawākib bi-al-quwwah lā bi-al-fiʿl fa-laysa lahā an taʿqila dufʿatan bal shay'an baʿda shay…*).[841] According to the author, then, the thought of the celestial bodies is discursive, which means that it moves from one object of thought to another because it cannot encompass all the intelligibles at once. This creates an element of multiplicity that makes the sphere-souls deficient, because "wherever there is plurality, there is deficiency."[842] Moreover, the celestial souls are potential. Whether this potency is due to the discursive nature of the celestial souls' thought or to their composite hylomorphic nature is not specified. In any case, this view goes against the more common Aristotelian idea that everything above the sphere of the moon is in a perpetual state of actuality.

The themes discussed in the *Taʿlīqāt*, such as the notions of discursive thought vs. non-discursive thought and potency vs. actuality, also figure prominently in the *Neoplatonica arabica*. But it is notable that the authors of these works provide different answers to these problems. In the *Theology*, for example, discursive thought is associated with actuality, and non-discursive thought (a higher intellective mode) with potency. Hence, potency is considered to be more perfect than actuality. As the Adaptor (to use Adamson's term) writes, potency "manifests

[841] Al-Fārābī 1992, section 27, p. 47.
[842] Al-Fārābī 1992, section 27, p. 47.

and perfects activity."[843] In contrast, the *Taʿlīqāt* associates discursive thought with potency, not actuality. Moreover, this potency is described as a source of imperfection and deficiency in the heavenly bodies. The two works therefore adopt a different view on the potency-actuality question. Whereas potency corresponds to a higher form of (non-discursive) intellection for the Adaptor, it entails discursiveness, plurality, and deficiency for the author of the *Taʿlīqāt*.[844]

Another significant difference between the *Taʿlīqāt* and al-Fārābī's emanationist works concerns the number of the contemplated objects. Whereas the sphere-souls in the *Ārā'* and *Siyāsah* have three objects of thought (God, the separate intellects, and their own essence), those of the *Taʿlīqāt* seem to limit their contemplation solely to the First. This appears clearly in section 56, which states that the "heavens and stars intelligize the First," and in section 58, when the author notes that it is sufficient to posit a single mover to explain the various heavenly motions.[845]

This overview indicates that al-Fārābī would have disagreed with many of the ideas developed in the *Taʿlīqāt*. As we have seen, he considers that the heavenly souls have non-discursive thought, since their intellection occurs "all at once" (*dufʿatan*). Moreover, al-Fārābī would have rejected the notion that the heavenly souls are affected by potentiality; according to him, they are eternally in actuality, and actuality is a higher principle than potency. Their only deficiency derives from the plurality of their intellection, which introduces complexity in their essence and sets them apart from the First (who is absolutely simple) and the intellects (which have a lesser degree of complexity). Unlike the author of the *Taʿlīqāt*, then, al-Fārābī combines non-discursive thought with actuality in the celestial bodies.

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843 Lewis 1959, 75, translated by Lewis. See also Adamson 2002, 94 ff.

844 Again, this might be explained by the fact that *quwwah* in the *Neoplatonica arabica* often refers to 'power' and not to 'potentiality' in the Aristotelian sense.

845 Al-Fārābī 1992, section 56, p. 52: "*al-falak wa al-kawākib taʿqilu al-awwal*," and section 58, p. 53: "*wa yakfī fīhā muḥarrik wāḥid...*"

10.2 Imagination

One of the fundamental doctrines of the *Taʿlīqāt* is the ascription of imagination to the celestial bodies. Whereas al-Fārābī explicitly asserts in his emanationist works that the sphere-souls are devoid of the faculty of imagination, the *Taʿlīqāt* devotes several paragraphs to this topic and its implications at the celestial and sublunary realms.[846] Imagination appears as an essential aspect of the activity and knowledge of the heavenly souls. According to the author, the sphere-souls "first intellect things and then imagine them."[847] In humans, this pattern is inverted and intellection is said to follow imagination. The dual nature of celestial thought (intellection and imagination) and especially the fact that imagination is said to follow intellection are intriguing ideas, which may have their origin in some passages of the *Neoplatonica arabica*, but which I was not able to identify with any precision.

The main question at this point is the reason that would have led the author of the *Taʿlīqāt* to stress the imaginative faculty of the planets. What is the benefit of having celestial souls that possess imagination in addition to intellection? The answer to this question lies in the special powers conferred to the heavenly bodies as a result of their imagination. The peculiarity of the *Taʿlīqāt* in this respect is that heavenly imagination acquires a demiurgic power that intellection alone does not have. Because of their imagination, the heavenly bodies become key agents and causes in the generation of beings in the sublunary world. The author writes that "the imagination of the celestial bodies becomes a cause for the creation of things" (*al-kawākib tatakhayyalu al-ashyāʾ, fa-yaṣīru takhayyuluhā sababan li-ḥudūth ashyāʾ…*).[848] For example, when the heavenly bodies imagine heat in the air, then heat is produced in the air.[849]

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[846] See in particular sections 55 and 78.
[847] Al-Fārābī 1992, section 55, p. 52: "*al-falak yaʿqilu hādhihi al-ashyāʾ thumma yatakhayyaluhā…*"
[848] Al-Fārābī 1992, section 78, p. 57.
[849] Al-Fārābī 1992, section 78, p. 58.

Furthermore, the author explains that the creation that occurs through the celestial bodies' imagination is different than the one that results from their motion: "*kammā anna ḥarakatahā takūn sababan li-ḥudūth ashyā' ukhar...*,"[850] and: "*wa qad tatakhayyalu fa-tuḥdithu shay'an lā bi-tawassuṭ al-ḥarakah, aw maʿa tawassuṭ al-ḥarakah*."[851] The celestial bodies have, therefore, a dual demiurgic power that can be expressed through motion or through imagination. The idea that the movements of the heavenly bodies have a direct influence on sublunary beings harkens back to Aristotle, according to whom the sun is an efficient cause that plays a crucial role in sublunary generation.[852] Many subsequent thinkers, including al-Kindī and al-Fārābī, generalize this principle and make all the planets efficient causes that act on the sublunary world. But the claim that celestial imagination itself is a cause of sublunary existence that operates in isolation from heavenly motion appears unprecedented and testifies to the original reworking of cosmological ideas achieved by the author of the *Taʿlīqāt*.

Even more surprising is the assertion made by the author that the imagination of the heavenly bodies is a cause for the appearance and actualization of "imaginables" (*takhayyulāt*) in human souls.[853] Hence, the heavenly bodies' imagination can act on the human soul in addition to natural phenomena. One of the implications of this theory is that it establishes a direct epistemological link between human souls and heavenly souls, a link which is traditionally reserved in Arabic philosophy to the Agent Intellect. Here it appears that the heavenly souls have partially appropriated the role played by the Agent Intellect as an agent of human thought, although the author does mention the Agent Intellect in another passage on human noetics.[854] This important development suggests that the psychology and epistemology developed by the author of the *Taʿlīqāt* depart in many ways from standard aspects of Arabic Peripatetic teaching.

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[850] Al-Fārābī 1992, section 78, p. 57.
[851] Al-Fārābī 1992, section 78, p. 58.
[852] See *De generatione* II.10.
[853] Al-Fārābī 1992, section 78, p. 57.
[854] Al-Fārābī 1992, section 78, p. 58.

One cannot refrain from comparing the theory of imagination put forth in the *Taʿlīqāt* to al-Fārābī's theory of human imagination. It is well known that imagination is an important faculty in al-Fārābī's epistemology, psychology, and prophetology. Among other things, it is what enables the prophet to transform the intelligibles and demonstrative knowledge in general into a metaphorical language accessible to the masses. However, the differences between these theories seem greater than their similarities. In al-Fārābī's philosophy, the Agent Intellect is the only superlunary entity to act on human reflection; the other heavenly bodies are not instrumental in this process. Moreover, the Agent Intellect is responsible for transmitting intelligibles, not imaginables, to the human rational soul, and as a corollary, imagination is a faculty developed only by humans. In that sense, what is particularly compelling about the *Taʿlīqāt* is that it provides a link between human and celestial imagination, arguing that the imagination of the celestial bodies is directly responsible for the images in man's mind.

This brief analysis shows that the theory of celestial intellection developed in the *Taʿlīqāt* is significantly different than the one that can be found in the *Ārā'* and *Siyāsah*, or, for that matter, in the rest of al-Fārābī's corpus. In particular, the ascription of imagination to the heavenly bodies and the emphasis on its causative power, and the primacy of potency over actuality are sufficient to undermine the ascription of this treatise to al-Fārābī. But the theories developed in the *Taʿlīqāt* are only remotely reminiscent of Ibn Sīnā's cosmology, despite the hypothesis, already put forth by Michot, that this work could belong to the Avicennian corpus.[855] Ibn Sīnā also attributes imagination to the sphere-souls, but he does not ascribe the demiurgic power of the celestial souls to their imaginative faculty explicitly, nor does he connect celestial and human imagination in such a marked fashion. For this reason, it would perhaps be precocious to attribute this version of the *Taʿlīqāt* to Ibn Sīnā, since it could very well have been composed by one of his disciples or by a later scholar influenced by his philosophy. Only future research will be able to settle this question decisively.

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[855] Michot 1982.

11. INTELLECTION AND IMAGINATION IN THE *ʿUYŪN*

The status of the *ʿUyūn*, like that of the *Taʿlīqāt*, is very uncertain, and its ascription to al-Fārābī has been challenged by scholars.[856] Although the translation and reception of this treatise in the Medieval Latin context has been studied,[857] there is to my knowledge no existing in-depth treatment of its content. My aim in this section is to help palliate this lack by discussing some of its crucial cosmological themes.

That the author of the *ʿUyūn* was interested in cosmology is reflected in his protracted discussions of various cosmological subjects: the celestial bodies' creation, nature, motion, and influence on the sublunary world are examined in detail. It would not be an exaggeration to say that the *ʿUyūn* is essentially a cosmological-metaphysical treatise, which also contains interesting digressions on physical and psychological topics.

Like al-Fārābī and the author of the *Taʿlīqāt*, the author of the *ʿUyūn* takes it for granted that the celestial bodies are ensouled beings that possess intellection as their principal activity and rotate in a perfect circular motion. Moreover, in sections 7 and 8, the creation of the spheres is explained in much the same manner as in the other treatises examined thus far: it is the intellection of the separate intellects that causes the existence of the spheres and the other lower intellects.[858] It is notable, however, that the author does not indicate the total number of separate intellects and spheres; he claims not to be able to answer this question precisely, but only in a general manner (*ʿalā ṭarīq al-jumlah*).[859] Moreover, although his account of celestial intellection is compatible with the emanationist model of the *Ārāʾ* and *Siyāsah*, the *ʿUyūn* does not display the standard emanationist vocabulary (*fāḍa, inbajasa, ṣudūr*)

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[856] Goichon 1937, 226 ff.; Cruz Hernandez 1950-51; Alonso Alonso 1959; and more recently Lameer 1994, 23-25, take it to be a genuine Fārābīan work. Serra 1993, 51 rejects al-Fārābī's authorship and ascribes it to Ibn Sīnā's circle. Vallat 2004, 383, classifies it as a genuine work but remains skeptic.
[857] Serra 1993.
[858] Al-Fārābī 1999a, 58-59.
[859] Al-Fārābī 1999a, section 9, p. 59.

found in Arabic Neoplatonizing texts, but uses the verb *ḥaṣala/yaḥṣulu* throughout the treatise to describe the creation or actualization of the spheres from the separate intellects.

There are several other features in the *ʿUyūn* that deserve attention. First, it is notable that the separate intellects possess a twofold intellection, which is described using Avicennian metaphysical terminology. The author writes: "Multiplicity is produced in the first created being (*al-mubdaʿ al-awwal*) accidentally because it is possible of existence in itself and necessary of existence through the One, because it knows its essence and it knows the One..."[860] Again, in section 8, it is said that "another intellect is produced by the first intellect as a result of its being necessary of existence and cognizant of the One...and the first intellect in its being possible of existence and cognizant of its own essence produces the first heaven with its matter and form, which is its soul."[861] Although the vocabulary of "possible" and "necessary of existence" is Avicennian, the fact that only one cause is responsible for the form and matter of the spheres differs from Ibn Sīnā's cosmology. On the other hand, it corresponds to al-Fārābī's account in the *Ārā'* and *Siyāsah*, where by thinking the One, the first intellect produces the second intellect, and by thinking its own essence, it produces both the immaterial and corporeal components of the first heaven.[862] Moreover, like al-Fārābī's treatises, the *ʿUyūn* explains that the twofold intellection of the separate intellects results in their having multiplicity (*kathrah*), albeit by accident (*bi-al-ʿaraḍ*).[863]

Second, the *ʿUyūn* provides interesting information on the nature of the sphere-souls' cognitive faculties. In the first place, the celestial bodies are said to have knowledge of both universals and particulars: *wa li-ajrām al-samāwāt maʿlūmāt kulliyyah wa maʿlūmāt juz'iyyah...*[864] It is then specified that this dual knowledge entails that the celestial bodies undergo a kind of change or transition (*intiqāl*), since they

[860] Al-Fārābī 1999a, section 7, p. 58, my translation.
[861] Al-Fārābī 1999a, section 8, p. 59, my translation.
[862] Al-Fārābī 1985a, 100-101.
[863] Al-Fārābī 1999a, 58.
[864] Al-Fārābī 1999a, section 10, p. 59.

must pass from one cognitive state to another, from the particular to the universal or more likely from one particular object to another. This transition occurs through imagination (*ʿalā sabīl al-takhayyul*).[865] Furthermore, this intellectual imagination produces a corporeal imagination (*al-takhayyul al-jismānī*),[866] which is defined as the cause of celestial motion, which is itself a cause of sublunary change. These ideas are quite original and find no parallel in the other texts analyzed thus far.

Section 10 of the *ʿUyūn*, which contains most of the information on the sphere-souls' knowledge, is very condensed and laconic, and leaves many questions unanswered. For example, the mention of a transition (*intiqāl*) in the intellection of the celestial bodies is problematic, because it would imply potency, a fact that is not accounted for by the author. Moreover, knowledge of particulars suggests a discursive mode of thought, whereas knowledge of universals could be non-discursive. No clarifications are given concerning this point either. It will be remembered that the author of the *Taʿlīqāt* addresses these issues expressly and defines the celestial bodies' thought as discursive and potential.[867] Since the *ʿUyūn* attributes particular objects of thought to the celestial bodies, one assumes that their intellection is also discursive and affected by potentiality.

Moreover, no precise information is given in the *ʿUyūn* concerning the universal objects intellected by the sphere-souls. Although these may be the separate intellects or God Himself, they could just as well be the universal principles of sciences or Platonic ideas like 'human' or 'horse.' The *ʿUyūn*'s lack of precision on this question differs greatly from al-Fārābī's and Ibn Sīnā's accounts, which identify the objects of the sphere-souls' intellection precisely. It also deviates from the *Taʿlīqāt*, which specifies that "the spheres and planets intelligize the First..."[868]

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[865] Al-Fārābī 1999a, section 10, p. 59.
[866] Al-Fārābī 1999a, section 10, p. 60.
[867] Al-Fārābī 1992, section 27, 47
[868] Al-Fārābī 1992, section 56, 52.

From the overview provided above, one may conclude that the *ʿUyūn* and *Taʿlīqāt* share several features but also develop unique theories. For example, like the *Taʿlīqāt*, the *ʿUyūn* ascribes imagination to the sphere-souls. In the *ʿUyūn*, however, this imagination is not described so much as a faculty that can be clearly distinguished from rational thought, as a process of transition between two cognitive states; it is the means (*ṭarīq*) between two kinds of rational thought, the universal and particular. Imagination fulfills no such function in the *Taʿlīqāt*, although the assertion that "the spheres think these things [particulars?] and then imagine them"[869] definitely indicates a change or transition as well. In any case, the *Taʿlīqāt* distinguishes imagination from intellection and presents them as two different faculties. Moreover, the theory of imagination as a demiurgic power, which is fully developed in the *Taʿlīqāt*, finds no counterpart in the *ʿUyūn*. Whereas the *Taʿlīqāt* stresses the direct impact of celestial imagination on sublunary things and on human thought, the *ʿUyūn* presents this imagination as an indirect cause of sublunary change that operates through the mediation of celestial motion.

The conclusion, then, is that although the cosmological material in the *Taʿlīqāt* and the *ʿUyūn* overlaps to a certain extent, these treatises present two different cosmologies. They possess common themes, such as imagination, but also substantial differences that point to a different authorship. Moreover, their content is closer to Ibn Sīnā's cosmology than to that of al-Fārābī. From a cosmological perspective and on doctrinal grounds, they cannot be attributed to the second master. This being said, a closer examination between these works and Ibn Sīnā's cosmology is required in order to settle the question of their authorship in a definitive manner.

[869] Al-Fārābī 1992, section 55, 56.

12. CONCLUSION

The foregoing analysis has shed light on the sources and function of al-Fārābī's celestial noetics. It complements the work already achieved by Davidson on some aspects of the *falāsifah*'s cosmology. Unlike Davidson, however, who presents Alexander's and Themistius' commentaries on the *De anima* as the most important sources to understand al-Fārābī's and Ibn Sīnā's celestial noetics, I believe that it is the *Neoplatonica arabica*, and especially the *Proclus arabus*, which represents the main source for these thinkers' doctrines of celestial intellection.[870] While heavily dependent on the *Neoplatonica arabica*, al-Fārābī's theories were adapted to fit his cosmological model, which is in essence a fusion of Book Lambda and Ptolemaic astronomy. Using these texts, al-Fārābī applies to each intellect and soul in his cosmology some of the characteristics of the Neoplatonic doctrine of intellect and, more precisely, some of Proclus' ideas on the secondary intelligible beings as expressed in the *Elements of Theology*. I have tried to show how al-Fārābī creatively adapted and transformed the material he found in the Greco-Arabic sources, and how these concepts acquired a new meaning in his cosmology as a result of their association with other theories. The interconnections between these various elements will be further studied in the chapter on celestial motion.

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[870] This difference can be explained once again by the fact that Davidson is primarily interested in the genealogy and the development of the theory of the Agent Intellect from the Greek context to the Arabic one. In this respect, he is certainly right to regard the commentaries of Alexander and Themistius as key sources. The focus of my analysis, however, is mostly on the other nine separate intellects (or *thawānī*) and the sphere-souls.

VI. CELESTIAL MOTION

1. GENERAL PRESENTATION

Any attempt to construct a viable cosmological system must include an account of the causes of the celestial bodies' movements. The theories of Plato in the *Timaeus* and of the author of the *Epinomis*,[871] Aristotle in the *De caelo*, *Metaphysics*, and *Meteorologica*, and of Ptolemy in the *Almagest* and *Planetary Hypotheses*,[872] presented medieval philosophers and astronomers with a variety of cosmological ideas and became the most influential models for celestial motion in the Middle Ages. The popularity of some of these texts, such as the *Metaphysics* and the *Planetary Hypotheses*, was partly due to their successful synthesis of astronomical theories and physical and metaphysical principles. They could therefore provide a comprehensive picture of the heavens and a clear explanation of the causes of celestial phenomena.

Medieval cosmologists' reception of these texts was nevertheless enriched and mediated by the commentatorial tradition that flourished in the late-antique period. During this time, many interpretations of celestial motion were developed, some of which were basically a reworking of Aristotle's or Plato's theories, while others appeared to present radically new solutions. Thus, celestial motion could be caused by a natural inclination in the heavenly body, by matter, by soul, by will, and even, according to Philoponus' original idea, by a force or impetus that God imparted to the universe at the instant of creation.

[871] This dialogue was most likely not composed by Plato, although it is often included in editions of Plato's complete works.

[872] No edition of the entire Arabic version of the *Planetary Hypotheses* exists to this day. For my research, I relied on the reproduction of some of the Arabic MSS. by Bernard Goldstein (Ptolemy 1967), the complete Spanish translation executed by José García Blanco and Aurora Cano Ledesma (Ptolemy 1987), and Régis Morelon's French translation of Book One (Ptolemy 1993).

These remarks help to situate Arabic cosmologists as the inheritors of a long tradition of debate in this discipline. Al-Fārābī and Ibn Sīnā had access not only to Aristotle and Ptolemy, but also to Philoponus' refutation of Aristotelian dynamics. In the case of al-Fārābī, it is even possible that he may have known some elements of the Syriac tradition in cosmology due to his association with Nestorian translators and philosophers, although this is unverifiable.[873] As may be expected of someone writing in the tenth century CE, that is, chronologically in-between Ptolemy and mature expressions of the *hay'a* tradition (al-Ṭūsī, al-ʿUrḍī), al-Fārābī's theory of motion displays an interesting synthesis of astronomical and philosophical ideas. On the one hand, he discusses themes that overlap with the science of mathematical astronomy, such as the general and particular motions of the planets. On the other hand, he also examines the physical and metaphysical implications of heavenly motion, such as its causes and effects, the relation between circular motion and the perfection of the heavenly bodies, motion and intellection, and differences in spatial relation as a kind of deficiency. It is the fusion of these various elements derived from a variety of philosophical and astronomical sources that makes al-Fārābī's cosmological system a perfect illustration of the cosmopolitanism of medieval Islamic intellectual history.

Considering the richness of this philosophical background, it is disappointing to realize that al-Fārābī does not devote much space in his extant works to celestial motion. It should be borne in mind, however, that the works in which extensive analyses of this topic surely occurred, namely, his commentaries on the *De caelo* and the *Almagest*, have not survived. This means that any reconstruction of al-Fārābī's theories is based solely on the passages that can be gleaned from his extant works and on a certain amount of conjecture.

[873] Hugonnard-Roche (2007, 289-291) notes that Ptolemy, along with other Greek scientists, was already studied by Syriac authors during the sixth to eighth centuries. The Syriac corpus contained cosmological works like the *De mundo* and Alexander's *On the Principles of the Cosmos*, the latter of which was probably used by al-Fārābī in its Arabic version. It is interesting that these works were somehow attributed to Aristotle in the Syriac tradition. But al-Fārābī surely knew the real author of the *Principles*, since the name of Alexander appears explicitly at the beginning of the Arabic translation.

It is therefore understandable, albeit not quite correct, for Walzer in his commentary on the *Ārā'* to argue that one of the characteristics of al-Fārābī's cosmology is that it does not provide a clear and comprehensive account of celestial motion.[874] Again, this statement should be qualified in light of the fragmentary nature of the Fārābīan corpus. Nevertheless, it is true that compared to contemporary medieval astronomers, whose main concern was to make intelligible the various trajectories of the planets in the firmament, al-Fārābī is quite laconic on the subject of motion in his extant philosophical works.

Two reasons may be given to account for this fact. First, al-Fārābī surely discussed the issue of celestial motion in depth in his commentary on the *Almagest.* On the other hand, he might have considered that it was neither the function nor the *skopós* of his philosophical treatises to address such a topic. As al-Fārābī explains in the *Iḥṣā'*, investigation into the variations of the heavenly bodies' movements is one of the main tasks of mathematical astronomy. But as we have seen, al-Fārābī's cosmology extends beyond the astronomical discipline to embrace physics and metaphysics as well. In his metaphysical treatises, al-Fārābī's approach to the cosmos does not privilege an in-depth treatment of celestial motion, because he is more concerned with other cosmological problems, such as substance, existence, and intellection. And since the substance and existence of the heavenly spheres are no doubt points of greater interest for al-Fārābī than the question of motion, it is understandable that he would have relegated the latter to a secondary place in his philosophical treatises. Second, it is possible that al-Fārābī did not have a complete theory of celestial motion, or that he experienced difficulty in reconciling the various and often contradictory theories of his predecessors, especially those of Aristotle, Ptolemy, and Alexander of Aphrodisias. This would also explain why al-Fārābī would have been reluctant to discuss this topic in detail.

Despite all of this, Walzer's claim is partially inaccurate. In many places in the *Ārā'*, al-Fārābī does make brief but interesting comments on celestial motion,

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[874] Al-Fārābī 1985a, 363.

both on its cause and its nature.[875] It is notable that none of these passages is analyzed by Walzer in any depth, nor is there any mention in his commentary of relevant sections from al-Fārābī's other works. What is striking therefore is not so much al-Fārābī's lack of interest in this subject as Walzer's reticence to discuss it.[876] Besides the *Ārā'*, interesting information also appears in the *Siyāsah*, the *Risālah fī al-ʿaql*, the *K. al-mūsīqā*, the *ʿUyūn*, and the *Taʿlīqāt*. There follows a detailed examination of the celestial dynamics contained in these works and how these relate one to another

[875] For example, al-Fārābī 1985a, 116-117 and 125-133.
[876] An example of this is his notes on Chapter 7, section 8-9, which focus on the motion of the heavenly bodies. Walzer avoids analyzing the theories developed in these paragraphs (see al-Fārābī 1985a, 377-378).

2. TWO BASIC MOTIONS IN THE HEAVENS

According to al-Fārābī, all the heavenly spheres are endowed with circular motion, the most perfect type of motion.[877] Each sphere (*kurah*) possesses at least two different movements, except the outermost sphere, also called the first heaven (*al-samā' al-ūlā*) and the first body (*al-jism al-awwal*), which possesses only one movement.[878] The motion of the first heaven is regular and has a period of revolution that elapses in a day and a night. This regular circular motion is imparted by the first sphere to all the other spheres below it, with the result that all the heavenly spheres share a common circular movement from east to west.[879] However, the other spheres also have their own particular motions.[880] For example, the sphere of the fixed stars (the second heavenly sphere after the first heaven), shares the motion of the outermost sphere and also possesses a second motion proper to it, the precession. As for the other seven planetary spheres below the sphere of the fixed stars, they participate in the general motion of the first sphere, but in addition have many other particular easterly motions that distinguish them. It is these particular motions that explain the unique trajectories of the planets, the sun, and the moon in the firmament. Finally, al-Fārābī believes, like Aristotle,[881] that heavenly motion gives the measure of time and that it is something eternal and constant.[882]

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[877] Al-Fārābī 1969, 102-103; and al-Fārābī 1985a, 124-125. I have already discussed the philosophical implications that underlie such a view in the section on methodology. It is worthwhile reiterating that the assumption of the perfection of the superlunary bodies entails that all heavenly motions be circular despite their variations in velocity and direction.

[878] Al-Fārābī 1985a, 118-119.

[879] Al-Fārābī 1964, 55. The problem of explaining how this outermost sphere imparts motion to the other spheres preoccupied the minds of many philosophers and astronomers: is it through direct physical contact, through soul, or through a power that acts at a distance? Whatever the cause, this ninth starless sphere was made responsible for the general westward motion of the entire heavens. This idea, however, was not accepted by everyone, and Ibn Rushd and the Ikhwān al-Ṣafā', for instance, rejected this ninth sphere and preferred to conceive of the heavens as a single animated being moving with one motion (for a discussion of this issue in Arabic astronomy, see Ragep 1993, 409). Al-Fārābī for his part uses the term *quwwah* to describe the action of the outermost sphere on the other spheres without specifying the source from which this power derives. More will be said about this concept shortly.

[880] Al-Fārābī 1985a, 128-129.

[881] *De caelo* I.9.279a15 and II.4.287a24-27.

[882] Al-Fārābī 1964, 34, 65. The eternity of the sphere-souls' intellection, rather than their motion, is stressed in the first passage, but the two concepts are intricately connected. And according to al-Qifṭī (1903, 280), al-Fārābī wrote a work entitled *Kitāb fī anna ḥarakah al-falak sarmadiyyah*. The idea that

This basic account is indebted to Ptolemaic astronomy. The idea that the heavens have two basic motions is developed in Chapter I.8 of the *Almagest*, and it was subsequently accepted as a fundamental tenet of Ptolemaic astronomy by many Arabic and Latin authors.[883] According to Ptolemy, there is first the universal motion (*ḥarakat al-kull* or *ḥarakat al-kulliyyah*)[884] from east to west in which all the spheres participate, and, second, there are other motions from west to east proper to the planetary spheres. Moreover, as in al-Fārābī's account, the *Almagest* in VII.2-3 ascribes two motions to the sphere of the fixed stars, one being a motion from east to west, the other a motion from west to east known as precession.

There is some ambiguity, however, as to what causes the universal westward motion in Ptolemy's model. In the *Planetary Hypotheses*, Ptolemy describes the heavens as a cosmic animal (*ḥayawān kullī*),[885] which suggests that the universal motion may be regarded as a kind of power animating a single organism, analogous to the motive power in animals. But as Saliba has pointed out, Ptolemy in the same work posits the existence of a ninth sphere in order to account for the precession of the sphere of the fixed stars. This ninth sphere is also presumably responsible for imparting the universal motion to the other spheres.[886] Al-Fārābī, in contrast, never compares the heavens to a single animal, and he believes that they are made of several distinct and independent units or systems. For this reason, he makes the power (*quwwah*) of the ninth outermost sphere responsible for transmitting the daily westward motion to the lower spheres.

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time issues from celestial motion also appears in the *Jamʿ* (al-Fārābī 1960, 101 and al-Fārābī 2001a, 154), which is otherwise known for its exposition of a creationist view.

[883] Al-Farghānī, for instance, who came from the same region as al-Fārābī, discusses the two heavenly motions in his work entitled *Jawāmiʿ ʿilm al-nujūm wa uṣūl al-ḥarakāt al-samāwiyyah* (see al-Farghānī 1986, 15 ff. and 45 ff.). This work was quite influential in both the Arabic and Latin worlds and was used as a handbook for centuries subsequent to the author's death.

[884] Ptolemy 1987, 92; Ptolemy 1993, 18-19, 56-57.

[885] Ptolemy 1967, 36.

[886] The ambiguous relation between the idea of a universal motion moving the heavens as a cosmic animal and the ninth sphere is discussed in Ragep, 1993, vol. 2, 409; and Saliba 1994b, 118-121, and note 19. It is unclear at this stage how Ptolemy viewed this issue; a systematic edition and analysis of the *Planetary Hypotheses* is required to answer this question.

Besides the general motion of the first sphere, which is transmitted to the rest of the celestial spheres, al-Fārābī believes like Ptolemy that each planet possesses several motions that are proper to it and that can explain its particular trajectory in the heavens. In the *Ārā'*, for example, al-Fārābī explains that while the first heaven has one motion and the sphere of the fixed stars has two motions, the third to ninth spheres possess "numerous different motions" (*ḥarakātuhā kathīrah mukhtalifah*).[887] This view also appears in the *Siyāsah*, where it is said that the celestial bodies revolve around the earth "with many kinds of motions,"[888] as well as in a short passage of the *K. al-mūsīqā*.[889]

Each celestial motion has its own velocity. This is justified by al-Fārābī in two ways.[890] First, he argues that each sphere possesses an essential motion that differs from that of the other spheres and whose speed is fixed and does not change. Hence, the speed of each sphere is essentially different to begin with and remains so for all time. The second factor is the varying positions of the planets, which create variations in the speed of the spheres. The idea of various celestial motions and velocities plays an important role in al-Fārābī's cosmology, because it explains how the influences coming from the heavens can be responsible for the diversity of sublunary existents. The changing relations between the planets and spheres are also, according to al-Fārābī, the only accidents that affect the heavenly bodies and make them "the first of the deficient existents."[891] However, al-Fārābī stresses that it is an insignificant accident that does not pertain to their substance. What is noteworthy about al-Fārābī's account of the variations in the speed of the spheres is that it does not presuppose any metaphysical premise, such as will or intellect.

Although al-Fārābī follows Ptolemy and contemporary Arabic astronomers in positing two basic types of celestial motions, his views on the particular motions of the planets are ambiguous and difficult to reconstruct. There is no explanation in

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[887] Al-Fārābī 1982a, 69; and al-Fārābī 1985a, 121.
[888] Al-Fārābī 1964, 55.
[889] Al-Fārābī 1960, 102.
[890] Al-Fārābī 1985a, 128-131.
[891] Al-Fārābī 1985a, 131.

these texts as to how these different motions occur and what their causes are. To say that each sphere has a motion that is essential and specific to it does not in any way clarify the nature of its cause: is this cause mechanical or spiritual? Is it due to desire (*ishtiyāq*), intellection (*taʿaqqul*), propensity or inclination (*mayl*), or matter (*māddah*)? Or are these motions caused exclusively by eccentrics and epicycles? The following section examines the relevant passages in al-Fārābī's works and attempts to reconstruct the most accurate picture possible of his celestial kinematics.

3. THE CAUSES OF CELESTIAL MOTION

3.1 Nature and Motion: An Impasse

I have already broached the issue of celestial nature in Chapter III.2 of this dissertation. Here I wish to provide additional remarks about its relation to celestial motion. Al-Fārābī states in the *Ārā'* that the heavenly bodies move "by their nature" (*bi-ṭabī'atihā*)[892] and that they "have a common nature [*ṭabī'ah mushtarakah*] through which, by virtue of the motion of the first body, they all come to move round in a circular motion in one day and one night, as a result of the motion of the first body among them."[893] And he adds: "For this movement of what is below the First Heaven is not brought about by compulsion, since it is impossible that there should be anything in the heaven which takes place by compulsion."[894]

Al-Fārābī adopts in these passages a well-known ancient Greek cosmological tenet according to which celestial motion is essentially harmonious and natural and devoid of compulsion. Al-Fārābī opposes motion 'by nature' to motion 'by compulsion,' limiting the latter concept to the sublunary world. This basic opposition harkens back to Aristotle's theory of the elements as exposed in *De caelo* I.2-4, according to which the basic, primary elements all possess a natural motion (such as the downward motion of earth and the upward motion of fire) and cannot move in the opposite direction except through compulsion. Aristotle concludes *De caelo* I.2 by positing the existence of a fifth element, aether, which possesses circular motion by nature.

In the late-antique exegetical tradition that developed in an attempt to clarify and explain the works of Plato and Aristotle, there was much disagreement as to what constitutes natural motion in the heavens and how it is caused. Celestial motion could be interpreted in light of many different principles such as matter,

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[892] Al-Fārābī 1985a, 105.
[893] Al-Fārābī 1985a, 132-133, translated by Walzer, revised by me.
[894] Al-Fārābī 1985a, 132-133.

inclination, or soul, depending on whether Aristotle or Plato was chosen as a model. Furthermore, even within the Aristotelian corpus, the *De caelo* seemed to posit two alternative models depending on whether one made aether (I.2-4) or soul (II.2) the primary cause of motion. These contradictions were magnified when one confronted the *De caelo* to the evidence contained in *Physics* VIII and *Metaphysics* XII.7-8, which argues that the heavens require an exterior source of motion. Furthermore, the latter text also introduced the theory of several unmoved movers moving the various spheres as final causes through love and contemplation.

The confusion that emerged as a result of these conflicting views is reflected in the works of late-antique thinkers, who struggled to come up with a conciliatory and harmonizing account of these various trends.[895] Philoponus, for example, held different positions throughout his life and his conception of the nature of the heavens evolved accordingly. As a young man, he conceived of heavenly motion as being caused by both matter and soul, while later in his career he turned to a more physical-theological account to explain the revolution of the heavens by developing the impetus theory: it is the power invested in matter by God at the moment of creation that is responsible for the motion of the spheres.[896] By contrast, Alexander of Aphrodisias equated celestial nature with soul, so that he conceived of celestial motion as being caused essentially by the will and desire of the heavenly souls. Simplicius disagreed with Alexander, because he regarded nature as a potency to suffer change, not to cause it, and therefore posited a distinction between nature and soul, arguing that the heavenly bodies move as a result of their soul acting *through* their nature.[897]

The previous remarks show the great semantic flexibility of the concept of 'nature' in an ancient cosmological setting and the diversity of opinions held by the

[895] The relation between nature, aether, soul, inclination, and other concepts in an ancient cosmological context is very intricate, and I can only offer a glimpse here into its history. For further information, see Sambursky 1962; Wildberg 1988; Sorabji 1988; Verrycken 1990b; and Pearson 1999. Sorabji 2005, vol. 2, Chapter 1, especially 33-56, compiles some of the most relevant passages from the primary sources.
[896] See Wildberg 1988, 240 ff.; Pearson 1999.
[897] Both views are exposed in Simplicius' *De caelo* commentary (Simplicius 2004a, 380,1.30 ff.).

commentators on the question of what constitutes natural motion in the heavens.[898] It is possible that this lack of uniformity in the commentatorial tradition impacted negatively on al-Fārābī, who does not define celestial nature in an adequate manner in his personal treatises. In spite of this, however, a few important points can be extracted from al-Fārābī's works.

To begin with, al-Fārābī rarely ascribes a natural motion to celestial matter, and when he does so, these passages always belong to his explanatory or apologetic works on Aristotelian philosophy and never to his own autonomous treatises. Perhaps the most striking example of this occurs in the *Against Philoponus*, a treatise devoted to defending Aristotle's theory of the elements, where the second teacher states that "he [Aristotle] begins with that part of the world which, by its nature [*bi-ṭabīʿatihi*], moves with a circular movement."[899]

Another similar statement appears in the *Philosophy of Aristotle*, where al-Fārābī explains that "he [Aristotle] investigated whether or not the principles that move the *bodies moving in a circular motion by nature* are themselves bodies or whether they are nonbodily essences that are, however, in a material and a body."[900] Al-Fārābī was thus aware that Aristotle had endowed the celestial element with a natural circular motion, but, surprisingly at first glance, he seems to have completely neglected this idea in his later cosmological works. In fact, as we have already seen in the chapters on matter and intellection, al-Fārābī makes soul the main principle of his cosmology in his later period, and it is likely as a result of this that he neglects the correlation established in the *De caelo* between aether and circular motion.

Furthermore, as we shall see shortly, al-Fārābī makes the celestial souls the proximate movers of the spheres and planets. Hence, it is possible that al-Fārābī

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[898] For this reason, Wolfson's (1929, 77-78) distinction between two types of accounts of celestial motion in the medieval period, one based on soul, the other based on nature, appears artificial due to the equivocity of the term 'nature' and the overlapping of these two concepts.
[899] Al-Fārābī 1967, 253-254.
[900] Al-Fārābī 1969, 102-103, translated by Mahdi, emphasis mine.

would agree with Alexander in construing celestial nature in a psychological manner, that is, as being reducible to the celestial souls. Nevertheless, the passage from the *Ārā'* quoted above mentions a nature that is shared by all the spheres and which enables the universal motion imparted by the outermost sphere to occur. This idea is not easy to reconcile with a psychological account of celestial nature, since the power transmitted by the first sphere to the other spheres below it could very well be of a mechanical kind, or it could be that the nature of the celestial bodies in this case refers to a propensity they may have to follow this universal motion.

Here it is worth pointing out that *ṭabīʿah* also had a more specific astronomical meaning, which seems to correspond quite well to al-Fārābī's statement, namely, the idea of a simple, regular motion from east to west shared by all the spheres.[901] As Ragep and Pingree explain, regularity or homogeneity appears to have been the most important criterion in the astronomical tradition for ascribing natural motion to the celestial bodies.[902] Hence, Ptolemy in the *Planetary Hypotheses* explains the regularity and harmony of the spheres' motions by referring to their *ṭabīʿah*.[903] Al-Fārābī's mention in the *Ārā'* of a "common nature [*ṭabīʿah mushtarakah*]" of the spheres through which they follow the motion of the outermost sphere may definitely be construed in this sense and could be based directly on the *Hypotheses*.

Here too we are faced with the problem of understanding what Ptolemy means by nature, since he accepts the existence of aether and in addition posits planetary souls.[904] However, since *ṭabīʿah* is defined primarily by the regularity of the celestial motions in an astronomical context regardless of whether soul is taken as a cause of motion, and since Ptolemy mentions aether several times in the *Planetary Hypotheses*, sometimes even explicitly in connection with the nature of the

[901] Pingree and Haq *EI²*.
[902] Pingree *EI²* and Ragep 1995, vol. 2, 380.
[903] Ptolemy 1967, 36; Pingree *EI²*.
[904] See Pingree and Haq *EI²*; Sambursky 1962, 133 ff.; Murschel 1995.

spheres,[905] it is reasonable to conclude that Ptolemy made aether responsible for this natural celestial motion. As for al-Fārābī, he says nothing about a special heavenly element. Yet his use of the concept of nature in the astronomical section of his treatise could stem from this astronomical tradition and signify simply the harmonious, regular motion shared by the spheres, regardless of its ultimate principle.

Unlike Ibn Sīnā, al-Fārābī does not seem to distinguish clearly between motion "by nature" (*bi al-ṭabʿ*) and "natural motion" (*ḥarakah ṭabīʿiyyah*) and only uses the terms *ṭabīʿah* and *ṭabīʿī* in his works.[906] He may, however, have been aware of the difference between the two concepts. This seems supported by his statement in the *Ithbāt* that celestial motion is "not natural" (*ghayr ṭabīʿiyyah*),[907] a view which is reiterated in the *Daʿāwā* when the author writes that "the motion of the celestial body is spiritual, not natural" (*wa inna ḥarakatahu nafsāniyyah lā ṭabīʿiyyah*).[908] If these two texts are authentic, then this would mean that motion 'by nature' (*bi-al-ṭabīʿah*), the expression which appears in the *Ārāʾ*, should be opposed to 'natural motion' (*ḥarakah ṭabīʿiyyah*) when talking about the heavens.[909] On the other hand, al-Fārābī's mention of nature in connection with celestial motion may serve simply to emphasize the notion of cosmic harmony: every part of the universe obeys a divine order or providence and fulfills the particular role that is assigned to it; nothing occurs through compulsion or randomness.

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[905] Ptolemy 1967, 36, ll. 6-7.

[906] According to Ibn Sīnā in the *Metaphysics* of the *K. al-shifāʾ*, heavenly motion is not "natural" (*ṭabīʿī*) but occurs "by nature" (*bi-al-ṭabʿ*) (Ibn Sīnā 1983-86, 382, 383; Ibn Sīnā 2005, 308); Hasnawi 1984. For a discussion of this distinction in al-Ṭūsī's astronomy, see Ragep 1993, vol. 2, 380. The term *ṭabʿ* is nevertheless used repeatedly by al-Fārābī in other contexts in the *Ārāʾ*; see Walzer's comments in al-Fārābī 1985a, 393-394.

[907] Al-Fārābī 1999d, 6.

[908] Al-Fārābī 1930, 7. This text, however, shows greater similarities to Ibn Sīnā's doctrine and should probably be attributed to his circle.

[909] This, however, seems unlikely, since the usual opposition is between *bi-al-ṭabʿ* and *ṭabīʿī*. Moreover, al-Fārābī nowhere explicitly articulates this distinction in his corpus. Finally, the authenticity of the *Ithbāt* still has to be established. For all of these reasons, it seems more reasonable to credit Ibn Sīnā with this distinction.

Overall, al-Fārābī's mention of a celestial 'nature' (*ṭabīʿah*) is of very little help to understand the causes of celestial motion.[910] The only thing that may be established with some certainty is that al-Fārābī believes heavenly motion takes place 'by nature' as opposed to 'by compulsion.' But what is meant by the concept of 'nature' in this context is not clear. Is it to be equated with a celestial power, an inclination inherent in the celestial bodies, or a psychological principle? Moreover, does the first heaven move by virtue of an exterior agent or on its own?

3.2 *Quwwah*

Quwwah is another concept that al-Fārābī mentions in connection with celestial motion, and one which is not properly defined in his works. To my knowledge, it appears only twice in al-Fārābī's writings in relation to the motion of the celestial bodies: in the *K. al-ʿibārah* and in the *Siyāsah*.[911] Both occurrences will be examined below.

Like the concept of nature (φύσις), *quwwah* (δύναμις in Greek) has a rich history in ancient philosophy. Plato mentions the "powers" of the celestial bodies on numerous occasions in his works, as does the author of the *Epinomis*.[912] In Ptolemy's *Planetary Hypotheses*, which may have been influenced by the Platonic tradition in this regard, power (*quwwah* in the Arabic) refers to the planets' ability to rotate in circles. According to Murschel, Ptolemy's *quwwah* should be associated with the psychological faculty of the planets, although it does not necessarily involve any intellectual activity.[913] *Quwwah* is also a central philosophical concept in the Greek and Arabic Aristotle, where it may be translated as 'potency,' 'ability,' or

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[910] If we accept the above hypothesis that al-Fārābī's use of *ṭabīʿah* in the *Ārāʾ* passage may be informed by the astronomical tradition, then it is not surprising that it says nothing about the ultimate causes of celestial motion; on this point in the *hayʾa* tradition, see Ragep 1995, vol. 1, 45-46, and vol. 2, 380.

[911] Al-Fārābī 1981, 94,10; and al-Fārābī 1964, 55. Al-Fārābī also uses *quwwah* frequently in his discussion of the human soul. In this context, *quwwah* means faculty, as in *al-quwwah al-nāṭiqah*, the rational faculty.

[912] See for instance *Timaeus* 38D; *Epinomis* 986B-C.

[913] Murschel 1995, 38-39.

'power' depending on the context. More specifically, however, *quwwah* appears in Aristotle's discussion of the Unmoved Mover in the *Physics* and *Metaphysics*, where it serves to designate the continuous power and actuality of God.[914] Finally, it is also used by the author of the *Maḥḍ al-khayr* in connection with the various activities of soul, and in the *Theology* to signify the power emanated from the soul onto the world of nature.[915] Although al-Fārābī may have derived the notion of *quwwah* from any of these sources, the astronomical context in which he uses this term establishes a connection with the *Physics* and *Metaphysics* on the one hand and Ptolemy's *Planetary Hypotheses* on the other.

In al-Fārābī's cosmology, it is clear that *quwwah* does not mean potency in the sense of possibility, but power.[916] It is a 'power' or 'ability' for only one type of activity in which the spheres are continuously engaged, namely, circular motion.[917] Unlike sublunary bodies, whose *quwwah* embraces the opposites of action and inaction, the heavenly bodies' power is only for action. In his *K. al-ʿibārah*, al-Fārābī writes: "There is another kind of power [*quwwah*], namely, readiness for one of the opposites alone, such as the power of circular motion, which is in the heavenly bodies."[918] As al-Tahānawī's *Iṣṭilāḥāt al-ʿulūm al-islāmiyyah* reveals, this meaning of *quwwah* as power and its association with the continuous circular motion of the heavens were widespread in the Arabic cosmological tradition.[919]

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914 Endress 2002, 23. The relevant passages in Aristotle are: *Physics* III.5, VIII.6 and 10, and *Metaphysics* XII.7.1073a3-11.

915 See section V.3.2 of this dissertation; Lewis 1959, 77; and the *Theology* in D'Ancona 2003, 250.

916 That the spheres are free of potency in the sense of possibility is made clear when al-Fārābī, referring to Aristotle's view, writes that "as regards agents, possibility is in such agents as—unlike the heavenly bodies, which perform an action of permanent motion—are not in action permanently" (al-Fārābī 1981, 93,24). It would seem, then, that al-Fārābī distinguishes between a possibility of action, which the heavenly bodies lack, and a possibility of existence, which the heavenly bodies have in virtue of their causes, i.e., the separate intellects.

917 Ibn Sīnā also discusses *quwwah* in his cosmology (Ibn Sīnā 2005, Book 9, Chapter 2, passim). In Ibn Sīnā's system of celestial dynamics, *quwwah* is connected with inclination (*mayl*) and intention (*maʿnā*). "Power," says Ibn Sīnā, "imparts motion only through the mediation of inclination. Inclination is the idea [*maʿnā*] sensed in the mobile body" (Ibn Sīnā 2005, 308,20-21). Anawati translates *quwwah* as "puissance" in the French version of the *Shifāʾ*.

918 Al-Fārābī 1981, 94,10, translated by Zimmermann.

919 See the article on *quwwah* by de Boer in *EI²*. Al-Tahānawī gives an almost identical description of how *quwwah* relates to celestial motion, but in addition he calls it the "origin of an act" (*mabdaʾ al-fiʿl*), and also a "cause" (*sabab*).

But what exactly is the function of *quwwah* in al-Fārābī's cosmology? In order to answer this question, we must look at the other instance in which al-Fārābī mentions this term. In the *Siyāsah* he writes: "All [the celestial bodies] are connected to the power [*quwwah*] of the first heaven, which is one, and consequently they all move by virtue of the motion of the first heaven. They have other powers [*quwwā*] by virtue of which they are distinct from one another and by virtue of which their motions differ."[920]

The first appearance of the term *quwwah* in this passage expresses a force or impetus that is transmitted by the first heaven to the other spheres below it. This power should not necessarily be construed as a psychological one and may simply be regarded as a mechanical force transmitted as a result of the proximity of the spheres. The problem is that, as we shall see shortly, al-Fārābī considers soul the main principle of celestial motion; so that there is the possibility that *quwwah* should be interpreted in relation to soul, and more particularly to the souls of the planets. It is perhaps in this manner that the second reference to the *quwwā* of the celestial bodies should be construed, since in this case it is more difficult to explain this power in purely mechanical terms. Al-Fārābī states that the planets have "other powers" which belong to them and are responsible for their particular motions, and it is possible in this case that these powers are produced as a result of the contemplation of each celestial soul.

The *Planetary Hypotheses* mentions the 'power' of the planets on several occasions.[921] Ptolemy presents it as a vital force or psychological faculty associated with the celestial bodies, which are described as animated, living beings. As A. Murschel writes, "Ptolemy also claims that the celestial bodies maintain a faculty (*quwwa*) which may be compared to the human faculties of vision and intelligence, but his use of such a comparison does not imply that he believed that the planets

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[920] Al-Fārābī 1964, 55.
[921] Ptolemy 1987, 92, 98-99, 103.

have the ability to see or perform some mental function."[922] Nevertheless, as we shall see shortly, al-Fārābī and Ibn Sīnā likely interpreted this power in connection with soul and its intellective activity, an interpretation that would have seemed all the more natural to them since Ptolemy himself asserts the ensoulment of the spheres.[923] However, since al-Fārābī does not provide more information, it is unclear at this point whether *quwwah* should be interpreted as a power emanating from the celestial soul, a disposition in the celestial body as a whole, or simply a mechanical force transmitted from one sphere to another, although I favour the first option.

3.3 Intellection as a Cause of Motion: the *Ārā'*, the *Siyāsah*, and the *Risālah fī al-'aql*

Given that al-Fārābī does not develop an elaborate theory of celestial matter and that he nowhere establishes a correlation between matter and motion in the heavens, it is not surprising that celestial matter is not presented as being the main cause of motion of the heavenly bodies. In other words, when al-Fārābī writes that the spheres move "by their nature," it is unlikely that he is thinking of a physical principle or a special heavenly element that would possess an inherent circular motion. In that sense, he departs from Aristotle's *De caelo* I. 2-4 as it was interpreted by many Greek and Arabic philosophers.

In contradistinction to the correlation made in the *De caelo* between aether and circular motion, Plato's *Laws* and *Timaeus*, the *Epinomis*, and Aristotle's *Metaphysics* (assuming here that the spheres of Lambda 7 and 8 are ensouled) develop a different interpretation of celestial dynamics, which makes soul the main cause of heavenly motion. This psychological theory, which was later adopted and developed by many thinkers such as Alexander of Aphrodisias, Themistius, Simplicius, and Proclus, and which influenced Ptolemy in the *Planetary Hypotheses*,

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[922] Murschel 1995, 38.
[923] Ptolemy holds that "the planets are ensouled (*mutanaffisa*) and are moved with a voluntary motion" (Murschel 1995, 39). What kind of psychological functions the spheres have according to Ptolemy is nevertheless unclear and requires more detailed research.

emphasizes the activity of the heavenly souls as movers of the spheres, either through desire, will, intellection, power, or a combination of these concepts.[924]

The few relevant passages that can be gleaned from al-Fārābī's works show that he belongs partially to this 'psychological' trend, which makes soul the main cause of celestial motion.[925] In the *Siyāsah*, he writes that the celestial bodies "move in circular fashion by virtue of their [souls]" (*wa ʿanhā tataḥarraku dawran*).[926] The exact process through which motion occurs is not further described by al-Fārābī in this passage, and the reader may wonder at the role that the sphere-souls and separate intellects play respectively. Moreover, it is notable that this is the only piece of evidence in the "emanationist" works that explicitly connects heavenly soul and motion.

The *Ithbāt* provides much more information on this topic. This short treatise is designed to provide proofs for the existence of the immaterial, metaphysical beings. Al-Fārābī begins by discussing the existence of God and the separate intellects, and then lists three proofs for the existence of the celestial souls (*al-nufūs al-samā'iyyah*) based on motion.[927] The first one argues that natural motion (*al-ḥarakah al-ṭabīʿiyyah*) occurs only when a thing is in a non-natural state and seeks to return to its natural state, which is rest. But rest does not apply to the heavens, whose motion therefore cannot be natural. The second proof affirms that a body's natural motion seeks a place according to the shortest and most direct path, which is necessarily rectilinear. The heavens, in contrast, always move in circles. The third argument opposes the mechanical motion of the natural elements that can never avoid their goal with the free, volitional motion of the heavens. Al-Fārābī concludes by saying that circular motion is "not natural, but arises from soul and choice" (*fa-hiya idhan ghayr ṭabīʿiyyah fa-hiya nafsāniyyah ikhtiyāriyyah*).

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[924] Sambursky 1962, 142-146; Sorabji 2005, vol. 2, 344-346.
[925] Davidson 1992, 44-45, who limits his study to al-Fārābī's *Ārā'* and *Siyāsah*, had already noted that both al-Fārābī and Ibn Sīnā make soul the main cause of celestial motion.
[926] Al-Fārābī 1964, 34.
[927] Al-Fārābī 1999d, 6.

It is notable that al-Fārābī's proofs are mostly negative. He does not positively show that the celestial souls must exist, but rather infers this from the impossibility of conceiving of celestial motion as a natural phenomenon. If celestial motion is not natural, then it must be psychological. Regardless of the philosophical value of these arguments, they reveal al-Fārābī's belief in the ensoulment of the spheres and in the spiritual cause of celestial motion. In addition, the *Ithbāt* is the only text that explicitly mentions the choice (*ikhtiyār*) of the heavenly bodies.

So far I have discussed the role of the sphere-souls in motion, but what about the separate intellects? The *Risālah fī al-ʿaql* sheds light on this question, although it is far from offering a systematic treatment of it. Toward the end of the treatise, which is primarily devoted to a discussion of the various definitions of 'intellect' elaborated by philosophers and theologians, al-Fārābī reveals his adherence to Aristotle's theory of the unmoved movers. He writes:

> Every celestial body is set in motion only by a mover [*muḥarrik*] that is neither a body nor in a body in any way. [This mover] is the cause of [the celestial body's] existence, inasmuch as it is that by virtue of which [the celestial body] is a substance, but its level, in terms of the existence that is [the celestial body's] substance, is the same as that body. The mover of the more perfect of [the celestial bodies] is the more perfect in terms of existence, and the more perfect in terms of existence is the mover of the first heaven.[928]

Al-Fārābī then goes on to identify the movers with the separate intellects: "Now, since the mover of the first heaven is neither matter nor in matter, it necessarily follows that it is an intellect in its substance..."[929] Al-Fārābī's priority in this entire passage is noetics and ontology rather than motion per se; he expounds on the ontological and intellective role of the separate intellects but says little about their being causes of motion. Nevertheless, al-Fārābī's identification of each separate intellect (*ʿaql*) as a mover (*muḥarrik*) of a celestial sphere is important

[928] Al-Fārābī 1938, 34; translated in McGinnis and Reisman 2007, 77.
[929] Al-Fārābī 1938, 34; translated in McGinnis and Reisman 2007, 77.

because it proves his reliance on Aristotle's theory of unmoved movers in Book Lambda.

In contrast to the *Risālah fī al-ʿaql*, the description of the relation between the spheres and the separate intellects in the *Ārā'* and the *Siyāsah* is limited to ontology and intellection. But these works do not contradict the *Risālah*. It is even possible to apply to them the theory of motion that one finds in the latter text and thus to define the separate intellects as unmoved movers. Nevertheless, the *Risālah* is crucial in that it represents the only instance in the Fārābīan corpus where al-Fārābī uses the term *muḥarrik* to describe the separate intellects, thereby explicitly revealing his belief in the existence of several separate unmoved movers.

Yet the main principle of celestial motion is not explained in the *Risālah*. As I have just noted, this is probably due to the fact that it is a treatise on intellect and intellection, not on cosmology and natural philosophy. Al-Fārābī introduces the separate intellects and the heavenly bodies in his discussion merely to explain their ontological relation. However, by combining the various hints in the *Ārā'*, the *Siyāsah*, and the *Risālah*, all of which are compatible, it is possible to reconstruct the following kinematic model: each celestial body possesses a rational soul (*Ārā'*; *Siyāsah*), which enables it to contemplate entities exterior to it in addition to its own essence (*Ārā'*; *Siyāsah*). Since the separate intellects are described as separate movers of the spheres (*Risālah*), and since they are contemplated by the sphere-souls (*Ārā'*; *Siyāsah*), one may conclude that they act as final causes of motion for the spheres by being an object of thought. Furthermore, since the First Cause (God) is also contemplated by the sphere-souls and is described as an object of desire and love (*Ārā'*; *Siyāsah*), it also acts as a final cause of motion for the celestial spheres.

More should be said about this last point. In the *Ārā'* al-Fārābī mentions the "love" (*ʿishq*) that the heavenly bodies share with the *thawānī* for the One.[930] In another passage, God is described as the "first object of love and the first object of

[930] Al-Fārābī 1985a, 122-123.

affection" of the separate intellects.[931] In a similar vein, the *Siyāsah* presents God as the "First Beloved" (*al-maḥbūb al-awwal*) and the "First Desired" (*al-maʿshūq al-awwal*).[932] Although al-Fārābī does not connect desire, intellection, and motion explicitly in his works, one may easily and justifiably make the link between these various concepts. In this picture, God and the separate intellects are constantly contemplated and desired by the sphere-souls and act as unmoved movers and final causes of motion. As a result, the heavens engage in eternal circular motion.

We can conclude, then, that it is primarily the intellection of the sphere-souls that is responsible for the revolutions of the spheres, and more precisely, their intellection of the First Cause and the separate intellects, which act as final causes of motion. Although al-Fārābī does not describe this intellective process in detail, the various elements he provides in his corpus enable one to reconstruct a fairly convincing picture of his celestial kinematics. This picture is strengthened by the fact that al-Fārābī does not ascribe matter, inclination, and imagination to the spheres, which are other potential causes of motion in the Greco-Arabic tradition. Conversely, he stresses their purely intellectual nature and defines their main activity as intellection. This makes intellection the principal cause of celestial motion.

3.4 Al-Fārābī and the Arabic Versions of Book Lambda on Motion

We know that al-Fārābī had access to Book Lambda of the *Metaphysics*, the *Physics*, and the *De caelo*, and thus that he was in possession of the principal Aristotelian texts dealing with celestial motion. As I have already stressed, al-Fārābī, unlike

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[931] Al-Fārābī 1985a, 119.

[932] Al-Fārābī 1964, 52. In spite of these statements, al-Fārābī does not develop the concepts of imitation (*iqtidāʾ*) and assimilation (*tashabbuh*), which play an important role in the systems of many Greek and Arabic thinkers. For example, Alexander mentions them several times in the *Mabādiʾ* (Alexander 2001, 54-55, 70-71). Abū Sulaymān al-Sijistānī in his treatise on the celestial bodies explains that the souls of the planets desire (*yatashawwaqu*) the virtues (*faḍāʾil*) of the higher principle and "move the celestial bodies through will in order to imitate the First Cause…" (*…tuḥarrikuhā bi-al-irādah li-al-tashabbuh bi-al-ʿillah al-ūlā…*) (al-Sijistānī 1974a, 370; 1974b, 374-375).

Aristotle and many other Greek and Arabic thinkers, does not correlate celestial matter and celestial motion. Moreover, despite the ambiguity in the *De caelo* as to whether the movement of the spheres is caused by aether or soul, al-Fārābī does not hesitate to make soul the main cause of celestial motion. In his cosmology, the concept of soul plays a central role not only in his ontology but in his theories of motion as well. One must conclude, then, that the *De caelo* had very little influence on al-Fārābī's understanding of Aristotelian celestial kinematics and in the elaboration of his own cosmology.

This is definitely not the case of the Arabic version of Book Lambda, which may be seen as one of the foundational texts of al-Fārābī's cosmological system, be it only for the fact that it develops a theory of motion on the basis of heavenly intellection and desire and that it posits separate unmoved movers in addition to the First Unmoved Mover, two key features that are found in al-Fārābī's model as well. The challenge, however, is to assess the degree of resemblance between al-Fārābī's theories and those that appear in the Arabic Aristotle. I have already shown previously in section III.4 that the theory of several separate movers is conveyed in the Arabic translations, and that in addition al-Fārābī probably relied on commentatorial works such as Simplicius' commentary on the *De caelo* and Alexander's *Mabādi'*, which may also defend this doctrine. However, to what extent is al-Fārābī's theory of motion as intellection foreshadowed in these works?

The theory that motion is caused by desire and intellection is explicitly articulated in Abū Bishr Mattā's and Usṭāth's Arabic translations of Lambda. In Textus 36, one reads that the First Unmoved Mover "imparts motion in the same way as the object of desire and the intelligible which is not moved; the first of these are the same"[933]; and in Textus 37, that "the principle [of motion] is intellectual

[933] Ibn Rushd 1984b, 148.

representation...” and that “it [the Unmoved Mover] imparts motion as object of love...”.[934]

One finds in the other translation of Book Lambda published by Badawī some departures from the original Greek, which are even more pertinent to the problem at hand. For example, whereas the Greek text makes a general statement about the identity of the objects of desire and the objects of thought at XII.7.1072a26-28, the Arabic has: “The principle of love is only that which is contemplated from the First Cause” (*wa ibtidā’ al-ʿishq innamā huwa mā yuʿqal min ʿillah al-ūlā*),[935] thus explicitly identifying the first intelligible with God, as well as love with intellection. Equally significant is the sentence immediately following: “The motion of each intellect is [derived] from the contemplated thing...” (*fa-kull ʿaql faḥarakatuhu min al-shay’ al-maʿqūl...*). This passage, which finds no parallel in the original Greek, is important insofar as it establishes a direct connection between intellection and motion. Although it is not clear which intellect is referred to here, it is easy to imagine that medieval thinkers could construe this passage as applying to the intellects of the spheres. This excerpt may be compared to the Textus 37 in Ibn Rushd’s *Tafsīr* and especially to the statement that “the principle [of motion] is intellectual representation,” although it departs more drastically from the Greek and states in an even more forceful manner the kinematic implications of intellection.

All in all, then, the Arabic versions of Lambda that have come down to us can account for some of the essential features of al-Fārābī’s celestial dynamics. Not only do they mention the existence of separate unmoved movers, but they also present intellection as the principal cause of motion. God and potentially the other separate intellects stand as objects of desire and intellection for the sphere-souls. The translation of Abū Bishr Mattā and the one in Badawī both establish a direct

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[934] Ibn Rushd 1984b, 151. That the principle that is “intellectual representation” is a principle *of motion* is stressed by Ibn Rushd in his commentary on the same page: “...the principle of this motion in the celestial body is intellectual representation. He [Aristotle] says that to make it known that the principle of this motion is not imagination, nor sense-perception, but intellectual representation and the desire moving this body locally comes from the intellectual representation.”
[935] Badawī 1947, 5.

connection between celestial motion and intellection, which is less forcefully conveyed in the Greek original. It is possible that these passages provided an impetus for al-Fārābī's own theory of intellection as a cause of motion, a theory that he could have refined using some of the Neoplatonic sources he had access to, especially Proclus and Simplicius, who also explain the motions of the celestial bodies in terms of soul. However, other aspects of al-Fārābī's doctrine, such as the radical distinction between sphere-souls and separate intellects, and the presence of only ten separate intellects, are not explicitly articulated in the Arabic versions of Book Lambda.

There is, moreover, a very important astronomical-metaphysical difference between Book Lambda and al-Fārābī's account. In Aristotle's cosmovision, the outermost sphere, i.e., the sphere of the fixed stars, is moved by the First Unmoved Mover, that is, God, who stands at the apex of the hierarchy of movers. In Lambda 7.1072a22-24, Aristotle singles out this outermost sphere as the first thing moved, which then presumably communicates its motion to the other lower spheres. In contrast, in al-Fārābī's cosmology, the outermost starless sphere has the first separate intellect as mover. This means that no special relation is established between God and the outermost sphere in the manner achieved by Aristotle in Book Lambda. In al-Fārābī's system, God may be said to move all the spheres and hence the entire heavens by acting as a beloved, a final cause, which is eternally contemplated and taken as model by the sphere-souls.

It should be noted, however, that the idea that God is the mover of the heavens as a whole is difficult to reconcile with al-Fārābī's statement in the *Siyāsah* to the effect that the outermost sphere transmits a power (*quwwah*) to the other lower spheres. The problem is that if all the planetary spheres contemplate God, then it seems useless to posit a transmission of power from the outermost sphere to the other spheres in order to explain the regular diurnal motion of the heavens. This might just as well be explained by the common notion that the spheres have of the First Cause. However, as I will try to explain below, it is possible that al-Fārābī, and later Ibn Sīnā, combined the theory of contemplation derived from Book Lambda with a theory of emanating celestial powers and that both have a role to play in their kinematics.

To conclude, one may agree with Walzer's statement according to which God in al-Fārābī's system is not described as the First Unmoved Mover, if by this is understood the fact that God is not responsible for moving the outermost sphere specifically.[936] However, al-Fārābī does state that the sphere-souls have God as an object of thought and love, and since the contemplation of the first principle and the secondary intellects is presented as the main cause of celestial motion, then God must also act as a final cause of motion for the entire heaven in this model. In this regard God is the First Unmoved Mover, and Walzer's claim does not hold.

3.5 *Quwwah*, Intellection, and the Particular Motions of the Planets

The sources and concepts discussed up to this point can explain al-Fārābī's belief that soul and intellect are the basic principles underlying the motion of the heavens, but they leave unanswered the question of exactly how the particular motions of the planets occur. Since al-Fārābī does not posit one separate intellect per sphere and per motion, as Aristotle does, how is a plurality of motion justified? This problem is compounded by the ambiguity of al-Fārābī's description of the sphere-souls: does each component within a system (planet, eccentric, etc) possess a distinct soul, or is the planet the only celestial body to be ensouled? Alternatively, is the celestial soul diffused throughout the entire system? In most instances, al-Fārābī mentions the "souls of the celestial bodies" (*anfus al-ajsām al-samāwiyyah*) without providing further details. Finally, what is the relation between the celestial powers (*quwwā*) and motion, a point about which al-Fārābī says almost nothing? Hence, the existing evidence in al-Fārābī's corpus concerning the particular motions of the planets appears to be very limited and undermined by several difficult questions.

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[936] Walzer stresses this point twice in his commentary; see al-Fārābī 1985a, 352, 363.

In spite of this, it is possible to formulate an interpretation of this issue by taking as a starting-point a passage in Ibn Sīnā's *Shifā'*, which has already been mentioned in Chapter III, but which should also be examined here due to its importance. When addressing the question of celestial motion, Ibn Sīnā considers two possibilities: either each sphere, including the subordinate ones, possesses its own autonomous motion, in which case one must posit, like Aristotle, one separate intellect per sphere and per motion with a total of 55 unmoved movers; or one posits that the planet is responsible for the motion of the subordinate spheres, in which case the number of separate intellects can be limited to ten. As Ibn Sīnā writes:

> If, in the case of the planetary orbs [*aflāk al-mutaḥayyirah*], the principle [*mabda'*] of the movement of the spheres [*kurāt*] of each planet therein is a power [*quwwah*] emanating [*tafīḍu*] from the planets, then it would not be unlikely that the separate intellects would have the same number as the number of these planets—not the spheres—and their number would be ten, after the First. Of these, the first would be the unmoved mover that moves the sphere of the outermost body, then the one similar to it [that moves] the sphere of the fixed stars, then the one that is like it [that moves] the sphere of Saturn, and so on, terminating in the intellect that emanates on us [i.e., the Agent Intellect]. If, however, this is not the case, but each moving sphere has a rule governing its own motion and every planet, then these separate [intellects] would be of a greater number. It would follow, according to the doctrine of the First Teacher, that there would be something close to fifty and over, the last being the active intellect. But you have known, from what we have said in the Mathematics, what we have attained in ascertaining their number.[937]

In this important passage, Ibn Sīnā explains how the plurality and specificity of the planetary motions is possible even if one posits only ten separate intellects, that is, one separate intellect per main sphere (excluding the Agent Intellect). In this picture, the main cause of motion appears to consist of the power (*quwwah*) that the planet transmits or emanates (*tafīḍu*) to (one assumes) the other spheres or components within the main sphere, such as the eccentrics and epicycles.

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[937] Ibn Sīnā 2005, 325,31-326,1, translated by Marmura, but revised by me. The exact same passage appears in the *K. al-najāh* (Ibn Sīnā 1985, 310). Mention of emanations from the celestial souls can also be found in another passage of the *Najāh* (Ibn Sīnā 1985, 296).

Ibn Rushd's *Talkhīṣ mā baʿda al-ṭabīʿah* describes a very similar theory and indicates that this view was held by at least some thinkers in the history of philosophy. Ibn Rushd writes:

> As to [the question of] whether it is possible to posit fewer movers than the number [which we have indicated, i.e., 47 or 55], as some of them think [i.e., some of the philosophers of the past], this is because they assign to each [main] sphere only one mover which moves the planet only, from which [i.e., the planet] then emanates powers [*quwwā*] that coordinate the other motions which characterize this planet and which occur due to it...[938]

And Ibn Rushd to defend a more Aristotelian approach by adding: "but we have shown this to be impossible."[939]

The view criticized by Ibn Rushd shows obvious parallels with the one described by Ibn Sīnā in his *Shifā'* and *Najāh*, and although the Commentator does not name the thinkers he intends to refute, it is possible that he has not only Ptolemy in mind, as Walzer notes,[940] but also and more specifically al-Fārābī and Ibn Sīnā.

Ibn Sīnā and Ibn Rushd present two different and apparently independent models of celestial motion, one of which depends on the Aristotelian theory of the unmoved movers and the other of which maintains the existence of ten unmoved movers but in addition relies on the Ptolemaic conception of a vital power transmitted from the planetary soul to the other corporeal components associated with a planet. We thus seem to be faced with two alternative kinematic models, which I have summarized below:

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[938] Ibn Rushd 1958, 134, section 22.
[939] Ibn Rushd 1958, 134, section 22.
[940] Al-Fārābī 1985a, 365. I follow Walzer in regarding Ptolemy's *Planetary Hypotheses* as a key source in understanding al-Fārābī's and Ibn Sīnā's views on celestial motion, and I therefore disagree with Maróth's statement (Maróth 1995, 108-109) to the effect that the *falāsifah*'s kinematics bears no relation to Ptolemy. However, it is still unclear to me to what extent the *falāsifah* endorsed this theory of psychological power.

a) Either one assumes that each component within a system is ensouled and that motion ensues as a result of this celestial soul's contemplation of, and desire for, its corresponding unmoved mover, with a total of unmoved movers equalling the number of spheres and motions.
b) Or one holds that motion results from the planetary soul's transmission of powers to the other corporeal components within its system; this view is then reconciled somehow with the theory of nine separate intellects that act as unmoved movers.[941]

Here, however, we reach a set of difficult questions: which model is endorsed by Ibn Sīnā? What exactly is this theory of emanating powers? Can it be applied to al-Fārābī's cosmology? And exactly what relation does it bear to Ptolemy's theory of dynamis/*quwwah* in the *Planetary Hypotheses*? More broadly, to what extent are Ptolemy's kinematic theories in the *Planetary Hypotheses* similar to al-Fārābī's and Ibn Sīnā's theories?

In order to answer these questions, it is necessary to establish how many separate intellects the *falāsifah* posit, as well as to examine carefully the relation between the souls and bodies of the planets and spheres. More specifically, we must understand how the celestial soul as a principle of motion can operate in conjunction with other immaterial and material principles to cause the particular motions of the planets. This task is delicate in view of the facts that neither al-Fārābī nor Ibn Sīnā provides much information on these topics and that no thorough edition of the entire *Planetary Hypotheses* exists.[942] In the following paragraphs, I will focus mostly on Ibn Sīnā's theories and then address the question of how the evidence that can be gleaned from his works may apply to the second teacher's thought.

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[941] The Agent Intellect is omitted here, because it does not act as an unmoved mover for a celestial sphere.
[942] This will shortly change, however. A French translation is being prepared by R. Morelon, while J. Ragep and A. Jones are working on a new edition and English translation of this important text.

A comparison between the *Planetary Hypotheses* and the *falāsifah*'s works yields several important results. First, Ptolemy rejects Aristotle's unmoved movers as they are conceived by the Arabic *falsafah* tradition. The movers (sing. *muḥarrik*) mentioned in the Arabic version of the *Hypotheses* refer instead to the main celestial spheres of the planets and not to the immaterial principles first formulated by Aristotle in Book Lambda and endorsed later on by the *falāsifah*.[943] This represents a crucial difference between our authors. While for al-Fārābī and Ibn Sīnā, the movers are either the celestial souls (the proximate movers) or the immaterial intellects (the remote movers), the latter acting as final causes and objects of contemplation and desire for the celestial souls,[944] for Ptolemy a 'mover' is a main sphere that carries the planet around.

In this respect, it might appear surprising at first glance that in attempting to settle the number of the unmoved movers, Ibn Sīnā refers to a theory which seems to be taken from Ptolemy's *Planetary Hypotheses*, since Ptolemy himself says nothing about immaterial unmoved movers. What this means, however, is that the theory of the ten unmoved movers, which is in essence an adaptation of the Aristotelian cosmology in Book Lambda 7 and 8, is combined with the Ptolemaic doctrine of psychological powers; the model elaborated by Ibn Sīnā (which corresponds to b) above) is therefore a hybrid of two theories stemming from two very different traditions, the Peripatetic and the Ptolemaic.

Second, Ptolemy explains the particular motions of the planets through the concept of a "vital power" or "psychological power or faculty" (*quwwah nafsāniyyah*). Ptolemy's theory of planetary power is exposed in Book II of the *Planetary Hypotheses*, where the term *quwwah* (*dynamis* in Greek) appears repeatedly in his

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[943] Ptolemy 1967, 42.
[944] The *Dānesh-nāmeh* provides a clear explanation of how both the sphere-souls and the separate intellects can be called "movers" of the spheres; see Ibn Sīnā 1986, 242-243.

discussion.[945] Ptolemy regards the celestial bodies as ensouled beings, each behaving independently from the other by virtue of its respective psychological powers.

In one passage, Ptolemy compares the relation between the soul and body of each planet to the relation between the soul of a bird and its various bodily parts. Just as the animal soul transmits an emission (*inbiʿāth*) to the various limbs and muscles that make up the body of the animal, so the soul of each planet sends emissions that move the various corporeal parts attached to this planet.[946] While it is unclear to what extent Ptolemy wants us to construe this analogy literally, it adequately reflects his theory of celestial kinematics, which presupposes the existence of a motive power inherent in each planet. As Murschel explains, "Each planet...has the power to direct its own motions and the motions of the adjacent celestial bodies within its own system...The planet's psychic faculty sends motive emissions to the epicycle, then to the deferent, then to the outermost of that planet's celestial bodies, which is concentric with the earth."[947] Except for the absence of the unmoved movers, Ptolemy's theory thus seems to correspond to one of the two kinematic models described by Ibn Sīnā in the *Shifā*' and *Najāh*. At any rate, one may speculate that Ibn Sīnā's mention of powers emanating from the planetary souls was inspired by the *Planetary Hypotheses*.

Now it should be noted that Ibn Sīnā uses the conditional mode throughout this passage in the *Shifā'* and presents both kinematic theories as equally possible. Yet modern scholars have almost unanimously ascribed the theory of ten separate intellects to Ibn Sīnā.[948] Upon consideration, however, this seems unjustified, for to my knowledge Ibn Sīnā does not explicitly posit ten separate intellects in the *Metaphysics* of the *Shifā'* and in the *Najāh*. Rather, his comments on the separate

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[945] Ptolemy 1967, 36, 40-41; see also Murschel 1995, 38-39.

[946] Ptolemy 1967, 40-41. For more information on the concepts of "action at a distance" and "moving soul" (*al-nafs al-muḥarrikah*) in astronomy, see Ragep 1993, vol. 2, 409-410. Ragep's discussion focuses on al-Ṭūsī's astronomy, but it is strikingly close to what we find in Ptolemy and Ibn Sīnā; this raises the possibility of a direct continuity of the concept of psychological power in the works of these thinkers.

[947] Murschel 1995, 39.

[948] See, for instance, Goichon 1937, 236-237; Leaman 2002, 20.

intellects always leave the question of their number open to discussion, and in those passages of the *Shifā'* and *Najāh* where he mentions ten intellects, it is not as a fact but as a hypothesis among others. For these reasons, I will leave both possibilities open for the time being and assume that Ibn Sīnā could have adhered to either model. It should be noted that in contrast to Ibn Sīnā, al-Fārābī clearly mentions ten separate intellects.[949]

The immediate upshot of this is that Ibn Sīnā's, and hence al-Fārābī's, theories of celestial kinematics seem to depend on the number of posited unmoved movers or separate intellects. Since this latter point is left unsettled by Ibn Sīnā (at least in the works discussed above), any immediate conclusion seems premature. If one accepts that Ibn Sīnā posits only ten intellects, then this would mean that he also adhered to the theory of powers emitted by the planetary souls. But this in turn seems contradicted by the way in which Ibn Sīnā explains the particular planetary motions, which relies on the contemplation of each sphere for a separate intellect. As Ibn Sīnā writes in the *Shifā'*, "It thus remains for each [of the spheres] to have an imitation of a separate, intellectual substance that belongs specifically to it; and that the [celestial] motions and their states will have differences that belong to them because of this…"[950] And also: "It has become true to us through the art of the *Almagest* that [there are] numerous celestial motions and spheres, differing in direction, speed, and slowness. It thus follows necessarily that for each movement there exists a mover which is other than [the mover] existing for the other…"[951] And, finally, Ibn Sīnā states:

> If such, then, is the case, the celestial bodies share in the circular motion only through the desire of a common object of love and differ only because, after that First, their principles that are loved and desired would differ. If the manner in which each desire necessitates a movement in this situation becomes problematic for us, this must not influence what we

[949] Al-Fārābī 1985a, 114-115. It is perhaps by overestimating the closeness of al-Fārābī's and Ibn Sīnā's cosmologies that modern scholars systematically ascribe ten intellects to the latter.
[950] Ibn Sīnā 2005, 325,2-5.
[951] Ibn Sīnā 2005, 317,34-39.

> know—[namely], that the motions differ because of the differences in the objects of desire.[952]

These passages show clearly that Ibn Sīnā explains the particular motions of the planets and spheres through the theory of the contemplation of each sphere for an unmoved mover. One may summarize Ibn Sīnā's view as follows: each sphere possesses a distinct separate intellect or unmoved mover, which it contemplates and desires, and this explains the diversity of the planetary motions. There is no need in this picture for powers to be transmitted to the spheres by the planetary souls.

Because Ptolemy's kinematic theory is independent of the Aristotelian tradition of the unmoved movers, and because Ibn Sīnā stresses the latter concept to a great extent in his metaphysical writings, it would seem that the evidence indicates that although Ibn Sīnā was aware of Ptolemy's theory of planetary psychological powers, he rejected it in favour of the doctrine contained in Book Lambda.[953] This conclusion also seems supported by the fact that Ibn Sīnā ascribes a celestial soul not only to the planets, but also to each heavenly body, whether main sphere, eccentric, or epicycle. This view appears clearly, for instance, in the *K. al-ishārāt wa al-tanbīhāt*,[954] but it can also be inferred from Ibn Sīnā's frequent descriptions of the spheres as rational beings that move as a result of will in the *Shifā'*.[955] The view that each sphere is ensouled (and not merely each planet) would render the Ptolemaic theory of planetary power superfluous, since each sphere would be able to produce its own particular motion through its contemplation of the unmoved mover. In other words, if each component of a planetary system possesses a contemplative soul, then it becomes pointless and redundant to want to explain the motion of each sphere as resulting from powers transmitted from the planetary

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[952] Ibn Sīnā 2005, 323,20 ff.

[953] That is, in favour of the doctrine of having an unmoved mover for each sphere, with the difference, of course, that Ibn Sīnā's spherology would not be homocentric, but derived from Ptolemy.

[954] Ibn Sīnā 1951, 419/168.

[955] Ibn Sīnā 2005, 308,35-38; 311,27: "If, then, this is the state of affairs, then the celestial sphere [*falak*] moves by the soul..."; see also 317,25-35, where Ibn Sīnā quotes Themistius approvingly in support of the view that each sphere (*kull falak*) has an inherent principle of motion (i.e., a soul).

soul, for this theory would seem to rely on the requisite that only the planet is ensouled and that it alone can move the corporeal components of its system.

Furthermore, it must be realized that the model outlined by Ibn Sīnā is not completely modelled on the *Planetary Hypotheses*, since it introduces nine unmoved movers in the picture (excluding the Agent Intellect). Regardless of the role of the planetary souls and their powers, one may legitimately wonder at the function that these nine separate unmoved movers are supposed to fulfill in this kinematic model. The only solution I can envisage is that Ibn Sīnā somehow wanted to reconcile the Ptolemaic theory of planetary powers with Aristotle's theory of the unmoved movers. Accordingly, the planetary souls would contemplate their corresponding unmoved mover and then emanate powers to the corporeal components responsible for the particular motions of the planets. This, in fact, seems to correspond to Ibn Rushd's statement that "they assign to each [main] sphere only one mover which moves the planet only, from which [i.e., the planet] then emanates powers [*quwwā*]." This seems to be the only way of combining the two theories of emanating planetary powers and unmoved movers.

Moreover, there are a few elements that can lead one to think that Ptolemy did influence Ibn Sīnā's understanding of celestial powers and how the celestial souls relate to the celestial bodies. Ibn Sīnā in general discusses the celestial souls primarily in connection with the separate intellects and says very little about the way in which the former are supposed to act on the celestial body. Nevertheless, a few points may be noted.

In the *Shifā'*, Ibn Sīnā presents each celestial soul as the proximate mover (*al-muḥarrik al-qarīb*) of a celestial body.[956] Moreover, in the *K. al-najāh*, Ibn Sīnā, probably inspired by Ptolemy's analogy between the heavens and the sublunary animals, compares the relation existing between the celestial soul and the celestial

[956] In the *Shifā'* (Ibn Sīnā 2005, 307,15 ff.).

body to the one existing between the human soul and the human body.[957] Finally, Ibn Sīnā mentions celestial powers on numerous other occasions in the *Shifā'* and *Najāh*.[958] In one instance, he even mentions powers transmitted by the celestial souls, although there is no specification that these powers emanate only from the planetary souls, as seems to be the case in Ptolemy's cosmology.[959] Nonetheless, it is possible that the *Planetary Hypotheses* is the source from which Ibn Sīnā developed his own theory of celestial power.

We can conclude from the foregoing that Ibn Sīnā's cosmology seems to display two kinematic models and two explanations of how the particular motions of the planets occur, which do not seem to be entirely compatible and which represent a real difficulty in interpreting this thinker's cosmology. Ibn Sīnā could have followed either model, and one may also find evidence in his works that seems to support both possibilities. However, Ibn Sīnā's repeated statements to the effect that the particular heavenly motions occur as a result of each sphere's contemplation of a distinct mover seems to argue for his adherence to a revised version of the Aristotelian account. One is then faced with the question of how many spheres and unmoved movers Ibn Sīnā's model contains, a question which I will not attempt to answer here.[960]

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957 Ibn Sīnā 1985, 298.

958 Ibn Sīnā mentions a psychological power (*quwwah nafsāniyyah*) attached to bodies (Ibn Sīnā 2005, 331,30-40). Since this expression is the same as the one that is found in the *Planetary Hypotheses*, and, moreover, since it appears in a cosmological context, it is possible that Ibn Sīnā had something close to Ptolemy's theory in mind. In another passage, Ibn Sīnā explains that soul can only act in the body in which it inheres, and he writes: "For it has become evident in every respect that the celestial powers [*quwwā samāwiyyah*] that are impressed in their [individual] bodies act only through the mediation of their bodies" (Ibn Sīnā 2005, 332,22-4). Finally, Ibn Sīnā also refers to powers emanated by the celestial souls (Ibn Sīnā 2005, 308,20-38).

959 For an account of the relation between soul, power, and inclination in the realization of celestial motion, see Ibn Sīnā 2005, 308,20-38.

960 Again, I wish to stress that the frequently stated view that Ibn Sīnā posits ten separate intellects should probably be revised in light of Ibn Sīnā's astronomical output and doctrine. It seems to me that Ibn Sīnā leaves this question open, although part of the textual evidence points to the existence of a larger number of unmoved movers. In the long quotation from the *Shifā'* given at the beginning of this section, Ibn Sīnā claims to have answered this question in the "Mathematics," by which I assume he means the astronomical part of the *Shifā'*, i.e., his commentary on the *Almagest*. This would mean that according to Ibn Sīnā, the question of the number of separate intellects hinges upon the question of the number of spheres and celestial bodies, an endeavour which must be tackled by the mathematical sciences. If that is the case, then Ibn Sīnā may have followed the number of spheres

The question of how the theory of emanating powers outlined by Ibn Sīnā in the *Shifā'* and *Najāh* applies to al-Fārābī's cosmology is ambiguous. First, al-Fārābī, unlike Ibn Sīnā, explicitly posits ten separate intellects, nine of which correspond to the nine celestial systems. If we follow the logic of Ibn Sīnā's explanation of the two possible kinematic models, then this would mean that al-Fārābī made the planetary souls responsible for the motions of the other corporeal components within its planetary system, since the number of separate intellects would not correspond to the number of spheres and motions. This seems supported by the *Siyāsah*, which presents the *quwwā* of the planets as being responsible for their unique, particular motions.[961]

Moreover, these powers can be transmitted from one celestial body to another, and al-Fārābī gives the example of the primary universal motion that is communicated by the first outermost sphere to the other spheres. Although al-Fārābī does not explain how these powers come to be, the presence of ten separate intellects, celestial souls, and transmitted powers in his account of celestial kinematics would seem to indicate its connection with the model described by Ibn Sīnā in the *Shifā'*.

The problem, however, is that al-Fārābī does not say that the celestial powers emanate from the celestial souls, and, moreover, he does not provide the justification for adopting the theory of the ten separate intellects that Ibn Sīnā gives in the *Shifā'* (i.e., that only ten intellects may be posited if one adheres to the theory of emanating powers from the planetary souls). Furthermore, al-Fārābī's comment on the power of the outermost sphere can be construed in purely mechanical terms,

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posited by Ptolemy in the *Planetary Hypotheses*, which total 41 or 29, depending on which model is adopted (see Morelon 1999, 112). In turn, this would mean that one unmoved mover should be attributed to every one of these spheres. I was unable, however, to identify with any precision the passage in the "Mathematics" refered to by Ibn Sīnā.

[961] Al-Fārābī 1964, 55; see the section on *quwwah* above.

and this presumably is how Aristotle understood the common motion of the heavens to occur.[962]

How, then, are we to understand al-Fārābī's remarks concerning the celestial powers (*quwwā*)? Is it conceivable that al-Fārābī juxtaposed a mechanistic model alongside an intellective one in his celestial kinematics? Or must these various powers emanating from the celestial bodies be construed in the sense in which Ibn Sīnā presents it in his *Shifā'* in spite of the lack of clear indications to this effect in al-Fārābī's treatises? In this case, one would also have to reconcile this view with al-Fārābī's theory of intellection as a source of motion. If feasible, this interpretation would have the merit of connecting al-Fārābī's concepts of intellection (*ta'aqqul*) and power (*quwwah*) with his spherology and provide a convincing explanation of how multiple motions are possible within a model that posits only nine unmoved movers (excluding the Agent Intellect).[963] Decisive evidence for this interpretation is nonetheless still lacking in al-Fārābī's and Ibn Sīnā's cosmologies.

It is nonetheless tempting to surmise that al-Fārābī's cosmology may have been one of the first to attempt the very synthesis of Aristotelian and Ptolemaic elements described by Ibn Sīnā. For al-Fārābī's cosmology contains all of the elements that characterize this model: not only the ten separate intellects, but also the complex theory of celestial intellection, the ensoulment of the celestial bodies, and the theory of celestial powers.

Nevertheless, in the picture of celestial kinematics that can be reconstructed from al-Fārābī's works, the relation between the body and soul of each planet remains very ambiguous, and one still has to explain how the celestial souls'

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[962] See *Metaphysics* XII.8.1073b25-27.

[963] It is easier to see now that making intellection into a principle of motion significantly facilitated the task of explaining a plurality of heavenly motions. In comparison, the aether theory developed in *De caelo* I.1-2 appears much more rudimentary. It is challenging to imagine how one homogenous and unchanging element may be responsible for a variety of motions, if it is assumed that aether is the main cause of motion. In contrast, the concept of intellection provides more leeway to develop a nuanced and flexible theory of multiple motions, as can be witnessed by al-Fārābī's and Ibn Sīnā's works.

intellectual contemplation of the separate intellects can achieve motion in a physical body. Al-Fārābī's theory on this particular point is all the more vulnerable to criticism since he defines the souls of the celestial bodies themselves as intellects devoid of imagination and possessing only rational thought (see Chapter V.1 and 4). It is also unclear whether al-Fārābī would have agreed with Ibn Sīnā in regarding all the celestial bodies (spheres and planets) as being ensouled, although I think that he would have.[964] Finally, the most important shortcoming of al-Fārābī works is that they do not attempt to explain how just ten unmoved movers can cause the various, particular motions of the planets.

It is perhaps these shortcomings in al-Fārābī's legacy that can explain Ibn Sīnā's choice to address these difficult issues in the *Shifā'* and to defend a different theory of the celestial soul. According to Ibn Sīnā, the celestial soul is primarily engaged in the conceptualization of particulars and is corporeal and inextricably linked to the celestial body whose form it constitutes.[965] In fact, as I have said above, Ibn Sīnā compares the relation between the celestial soul and body to our own soul and body in a manner reminiscent of Ptolemy's analogy between the macrocosm and the microcosm in the *Hypotheses*. This analogy is absent from al-Fārābī's writings, which in general stress the transcendence of the celestial bodies.

I will conclude by saying that al-Fārābī's theory of the particular motions of the planets may have included powers emanating from the celestial souls, but relied primarily on the concept of intellection. Intellect and intellection are foundational concepts in al-Fārābī's cosmology, and so it is not surprising that he would have endeavored to explain the particular motions of the planets by relying on them. As for how exactly this theory worked in its details, it is not possible to say. Additional research on Ibn Sīnā's celestial kinematics seems a requisite to understand how the early *falāsifah* envisaged this problem.

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[964] This might be inferred from the fact that the outermost sphere is starless and planetless and yet is placed in the same category of ensouled celestial body as the planetary spheres; see al-Fārābī 1985a, 118-123.

[965] Ibn Sīnā 2005, 312,4 ff.

In spite of this, the foregoing analysis enables us to conclude that al-Fārābī's, and especially Ibn Sīnā's, accounts of celestial kinematics appear as original and very loose adaptations of Book Lambda, which are supplemented generously with noetical theories derived from various Neoplatonic sources as well as (potentially) Ptolemaic ideas. In fact, al-Fārābī quotes Book Lambda at the end of the *Risālah fī al-ʿaql*, thus dissipating any doubt one may have concerning the importance of this treatise in his cosmology.[966] Yet al-Fārābī's celestial kinematics appears as a creative reworking of the Stagirite's model in light of the Neoplatonic concept of intellection and possibly the Ptolemaic theory of psychological powers. Moreover, we have seen that the Arabic translations of Book Lambda introduce elements foreign to the Greek text, which emphasize the relation between intellection and motion. Although Book Lambda remains the basic framework, there are crucial differences between Aristotle and al-Fārābī, which suggest a reworking rather than a mere reproduction of the Aristotelian model. As far as I can tell, al-Fārābī's and Ibn Sīnā's syntheses of these Aristotelian, Ptolemaic, and Neoplatonic theories and their position vis-à-vis the problem of celestial motion were innovative and do not have an exact precedent in the Greek and Arabic traditions.

[966] Al-Fārābī 1938, 35-36.

4. CELESTIAL MOTION AND THE CLASSIFICATION OF THE SCIENCES

We have seen on the one hand that al-Fārābī adopts the Ptolemaic theories of eccentrics and epicycles, which he views as subordinate components encompassed by a main sphere or "system," which also contains the planet. On the other hand, al-Fārābī develops a theory of motion that synthesizes information from the Arabic Lambda and from Ptolemaic and Neoplatonic sources. The main idea is that soul, and more precisely, intellection, is the main cause of motion of the celestial bodies.

The juxtaposition of these two interpretive theories of celestial motion in the Fārābīan corpus raises the question of their compatibility. What is the role of devices such as eccentrics and epicycles, which according to al-Fārābī have a corporeal existence, if motion is caused by the soul of the heavenly bodies? This problem is all the more acute since in the *K. al-mūsīqā*, al-Fārābī, following a Greek custom, defines the eccentrics and epicycles as "causes" (*asbāb*) of motion. But if soul is the cause of motion, to what extent can these eccentrics and epicycles also be called causes? This question is particularly relevant to the systems of medieval philosophers, who were often metaphysicians and astronomers all at once. Al-Fārābī does not provide any clue as to how one should go about solving this aporia. But I would like to suggest a very tentative interpretation, which has the merit of reconciling these two theories and avoiding any contradiction. Moreover, the answer sketched below may apply to other thinkers' cosmologies, such as Ibn Sīnā's, who also presents a dual psychological and eccentric-epicyclic model of celestial motion.

Calling eccentrics and epicycles "causes" betrays on the part of a medieval astronomer or philosopher, and here al-Fārābī, a concern for the reasons that lay behind celestial motion. But this concern might best be called relative, since the primary object of inquiry is not the cause of celestial motion *per se*, but of the particular motions of the planets. Hence, the theory of eccentrics and epicycles does not address the question: Why does the celestial sphere move? Or even: Why does this planet move in a circular fashion? But rather: Why does this planet move in this particular way, following this particular trajectory? To this question, the astronomer answers: because of the eccentric and/or epicycle that carry the planet along. In this instance, eccentrics and epicycles appear as the immediate and proximate causes of a particular planetary motion. But it is clear that the same explanation cannot account for celestial motion in general, especially if the question is asked from a metaphysical perspective, i.e., what is the essential cause of celestial motion?

To many ancient and medieval thinkers, the regularity and harmony of the celestial rotations had to be explained by a principle that was more basic and endowed with a greater causal and interpretive force. Physics could provide such an explanation by referring to the elements and their corresponding motions and by arguing for the uniqueness of the celestial substance and its inherent propensity for circular motion. And indeed, it is precisely to this type of argument that al-Fārābī is alluding to in his *K. al-mūsīqā*, where he explains that the astronomer must rely on physical principles (see section II.4.5.2).

Alternatively, an even more fundamental explanation of celestial motion could be given by metaphysics through the concepts of soul and intellect. Hence, to the question, why do the celestial bodies move?, the philosopher could answer: because they are animated and rational beings that move by virtue of will. The celestial bodies move as a result of their intellection of, and desire for, the First Cause. It is to this explanatory mode that al-Fārābī alludes fleetingly in the *Siyāsah*, when he states that "they [the celestial bodies] move in circular fashion by virtue of their [souls]."[967]

Now there is no reason why the metaphysical explanation of celestial motion *per se* should be in any way incompatible with the subordinate and more specific question of why particular planets move in particular ways. To perceive any

[967] Al-Fārābī 1964, 34.

contradiction between these two accounts is, I think, to establish artificial boundaries between disciplines and modes of argumentation that were seen as complementary by medieval practitioners. Thus, when al-Fārābī presents intellection and Ibn Sīnā intellection and imagination as the main principles underlying celestial motion in their philosophical treatises, they are approaching the question of celestial kinematics from a metaphysical perspective, i.e., with the intention of clarifying the fundamental cause of celestial motion *per se*, a question whose answer requires investigation into the essence of the celestial bodies and the immaterial causes that govern them (see section II.5). And indeed, analysis of this type appears in the metaphysical sections of al-Fārābī's and Ibn Sīnā's writings, as is attested, for instance, by the *Shifā'*.[968] If then asked why the planets each possess trajectories that are proper to them, they would have on the one hand mentioned the particular intellection or imagination proper to each celestial body,[969] and on the other hand referred the inquirer to their astronomical writings, arguing that this question primarily falls within the purview of the astronomical discipline, and that it is the *skopós* of astronomy rather than metaphysics or natural philosophy to address this point. Indeed, according to their classification of the sciences, astronomy is the discipline that studies the various particular celestial motions.[970]

If al-Fārābī and Ibn Sīnā do not provide an elaborate and unified account of celestial motion using soul, eccentrics, and epicycles in the same work, except briefly (as the passage of the *Shifā'* discussed in the previous section shows), it is surely not because they viewed these concepts as paradoxical or irreconcilable, but rather because they viewed them as belonging to different disciplines and genres. The questions of the essential cause of celestial motion and of the particular motions of the planets should not be treated within the same work. Thus, the problem pertains more to the literary *skopós* of these works and to these thinkers'

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[968] Ibn Sīnā 2005, Book Nine.
[969] Ibn Sīnā 2005, 317,34-39.
[970] In the *Iḥṣā'*, for example, al-Fārābī subsumes the study of the various celestial motions under the subject-matter of astronomy; see section II.4.4 of this dissertation.

classification of the sciences than to the incompatibility of the various scientific disciplines.

Naturally, there remain the questions of what type of causes these various sciences study in connection with celestial motion and exactly what type of proofs they provide. Here we are in much more murky waters. I have already addressed these questions in the section on al-Fārābī's method of astronomy and can only add a few remarks here. Al-Fārābī makes it clear in the *K. al-burhān* that the various sciences can provide different causes of the same thing. And within the context of astronomy, he even gives the sphericity of the world and planets as an example. This question can be treated by astronomy and physics, which both use a different method and examine different causes (see section II.4.5.2).

In the case of celestial motion, however, al-Fārābī does not provide any hints as to whether the same multidisciplinary method applies to this subject as well, although one may hypothesize that it does. Physics, by examining the celestial substance and its implications for motion, may yield knowledge of the material and formal causes of celestial motion; aether is after all regarded as an element or body in the Peripatetic tradition. Building on the insights of physics, astronomy then posits geometric devices (epicycles and eccentrics) to explain the particular motions of the planets. These devices, it should be underlined, are also meant to correspond to a physical reality, and they are presumably made of the same substance as the planets. The eccentrics and epicycles, as well as the main orbs, are efficient causes of motion, since they actually contain and carry the planets and stars along their respective trajectories.

Finally, metaphysics posits soul and intellect as another set of causes, both efficient and final. The planetary soul is a proximate efficient cause, and indeed Ibn Sīnā presents it as a "proximate mover" (*muḥarrik qarīb*) of the spheres. Furthermore, if the *falāsifah* endorsed the theory of powers discussed previously, then it would mean that the celestial soul would be responsible for emitting powers (*quwwā*) to the components contained in the planetary system. Moreover, it thinks the separate intellects, and this intellection of the sphere-souls in turn produces the celestial motion. Finally, the separate intellects themselves, as well as the First Cause, may be regarded as final causes that act upon the sphere-souls as objects of desire.

If this scheme is correct, then al-Fārābī's cosmology, and later Ibn Sīnā's, would posit a whole array of causes superimposed on one another. These causes are at once distinguished and yet intricately connected. They are organized in a hierarchical fashion, in that some are more fundamental than others. Some causes can only appear once others have been identified. This refers back to al-Fārābī's conception of the interconnection and cooperation of the sciences, which has already been dealt with previously. But the model outlined above also has important ramifications as far as the various types of proofs are concerned. For it shows that al-Fārābī and Ibn Sīnā may have accepted various levels of demonstration and of the *lima*-type proofs with regard to celestial motion. Astronomy, by relying on the eccentrics and epicycles, can indeed provide knowledge of the causes (*asbāb*), but this knowledge will be restricted to why certain planets move the way they do and along certain trajectories.[971] A more basic explanation can be given through physics and metaphysics, which explain why the celestial bodies move in the first place, and what they seek to achieve through this motion. In other words, metaphysics can identify the essential causes of celestial motion. Hence, astronomy, physics, and metaphysics can provide knowledge of the causes of celestial phenomena, but these causes are of a different order and correspond to a different type of inquiry. While they are fully compatible, these explanations must be treated in different works and using a different method.

[971] It is still unclear to me, however, whether these astronomical models would stand as *innī* or *limmī* proofs of motion. It would perhaps be more precise to say that the eccentrics and epicycles can be seen as efficient or material causes of motion *qua* corporeal entities, and thus as considered within the physical science. But since these devices are elaborated and studied by the mathematical science of astronomy, it would seem that the latter also has to be credited for the explanation of how the planets move.

In this respect, al-Fārābī may represent an important link in the history of Arabic cosmology, and his influence on Ibn Sīnā is indubitable. Unlike Ptolemy, who in the *Planetary Hypotheses* combines all of these explanations and juxtaposes soul, aether, power, and eccentrics and epicycles as causes of motion, al-Fārābī and later Ibn Sīnā attempted to separate these various explanatory models as much as possible and to develop the various proofs and explanations pertaining to celestial motion in different types of works. In this they followed their particular classification of the sciences, which, although influenced by the *Posterior Analytics*, developed out of their own ideas about the subordination of the particular sciences to first philosophy.

5. CELESTIAL MOTION IN THE *TAʿLĪQĀT*

Like most other philosophical works in the early Arabic tradition, the *Taʿlīqāt* ascribes soul to the heavenly bodies.[972] However, it provides a particular account of celestial motion, the emphasis being not only on the contemplation of the heavenly intellects, but also on their will (*irādah*) and imagination (*takhayyul*). The author writes that "the sphere[s] and planets contemplate the First Principle, such that this intellection generates pleasure and that motion follows out of this pleasure" (*al-falak wa al-kawākib taʿqilu al-awwal, fa-yastafizzuhā al-iltidhādh bi-hādhā al-taʿaqqul fa-tatbaʿuhu al-ḥarakah*). In addition, one reads that the spheres "conceive of the end along with their motions" (*al-falak yataṣawwaru al-ghāyah maʿa tilka al-ḥarakāt*).[973]

These passages reveal that the intellection of the heavenly bodies causes their motion, although this is not achieved directly, but through the intermediary of pleasure (*iltidhādh*). The inclusion of pleasure, which recalls Aristotle's comments in Book Lambda 7 on the pleasure that accompanies contemplation, is here defined as a stage that leads to heavenly motion. Motion is not the cause of pleasure or even synchronic with the pleasure that results from the intellection of the spheres; rather, motion is an outcome of the pleasure and blissful state of the spheres.

In another excerpt, we learn that "the cause of the constant circular motions [of the spheres] is their constant [acts of] willing, for which it is sufficient to posit only one mover that acts through love" (*ittiṣāl al-ḥarakāt al-mustadīrah sababuhu al-irādāt al-muttaṣilah, wa yakfī fīhā muḥarrik wāhid ʿalā sabīl al-ʿishq*).[974] Mention of the spheres' will is reiterated in section 63, together with the concept of *imitatio dei*: "the will of [each] sphere and planet is to perfect itself and imitate the One" (*irādah al-falak wa al-kawākib an tustakmala wa tatashabbaha bi-al-awwal*).[975] Here it is will rather than intellection proper that is described as the main cause of motion, although the

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[972] See for example al-Fārābī 1992, section 27, p. 47, and section 73, p. 56. The author also calls these souls 'intellects' (*ʿuqūl*).
[973] Al-Fārābī 1992, section 56, pp. 52-53, my translation.
[974] Al-Fārābī 1992, section 58, p. 53, my translation.
[975] Al-Fārābī 1992, section 63, p. 54, my translation.

two concepts are not opposed and are usually presented together. The clarity and forcefulness with which these ideas are articulated greatly contrast with the fragmentary and ambiguous information provided by the *Ārāʾ*, the *Siyāsah*, and the *Risālah fī al-ʿaql*. Although the views exposed in the *Taʿlīqāt* are by no means incompatible with these treatises, al-Fārābī omits to include such concepts as pleasure and especially will in his account of celestial dynamics.

The *Taʿlīqāt* also establishes a connection between motion and imagination, an idea which is completely absent in al-Fārābī's cosmology since the second teacher rejects the existence of celestial imagination. As we have seen before, the *Taʿlīqāt* states that the heavenly bodies possess an intellect in potency, not in actuality, which means that their intellection is discursive and must progress from one object to another. Closely linked to this idea is the author's claim that the celestial bodies can only "imagine [*takhayyala*] their individual motions one at a time and not all at once."[976] Hence, the imagination of the celestial bodies is subjected to the same limitation and follows the same pattern as their intellection. "If that were not the case," the author continues, "then the planets would be able to perform all the movements at once, but this is impossible" (*wa illā la-kānat tataḥarraku al-ḥarakāt kulluhā dufʿatan, wa hādhā muḥāl*).[977]

What is noteworthy in these passages is not that the author ascribes imagination to the heavenly bodies, but rather that he seems to make imagination the primary principle or cause of heavenly motion. In other words, a motion that is imagined actually occurs, and this is why the planets cannot imagine all movements at once. Finally, the *Taʿlīqāt* displays other interesting features about the heavens that do not find any parallel in al-Fārābī's works. These include the use of the term *shakhṣ/ashkhāṣ* to refer to the heavenly intellects[978] and the strong connection between motion, imagination, and causation.[979]

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[976] Al-Fārābī 1992, section 27, p. 47, my translation.
[977] Al-Fārābī 1992, section 27, p. 47, my translation.
[978] Al-Fārābī 1992, section 65, p. 54.
[979] Al-Fārābī 1992, section 78, p. 57.

6. CELESTIAL MOTION IN THE *'UYŪN*

Compared to the *Taʿlīqāt*, the *ʿUyūn* contains limited information on the causes of celestial motion, but the theories it develops are nevertheless worth examining. Like the other treatises under examination, the *ʿUyūn* describes heavenly motion as circular and regular[980] and establishes a direct relation between the heavenly bodies' imagination and motion: the former is the cause of the latter. More specifically, however, motion occurs when the sphere-souls' intellectual imagination becomes a "corporeal imagination" (*al-takhayyul al-jismānī*) responsible for accomplishing particular motions.[981] It is these particular, corporeal "imaginings" that translate into the continuous, corporeal movements of the spheres. Moreover, heavenly motion is a motion "in position" (*waḍʿiyyah*), which is opposed to the motion "in place" (*makāniyyah*) of the sublunary bodies.[982] It should be noted that the concept of motion "in place" is typically Avicennian and is not mentioned by al-Fārābī in the works attributed to him.[983]

As in the *Taʿlīqāt*, then, the concept of celestial motion in the *ʿUyūn* is related to the concept of imagination. But here a special concept, "corporeal imagination," is introduced as an intermediary stage between the sphere-souls' psychological faculty and the physical motion of the spheres. To my knowledge, the notion of corporeal imagination is idiosyncratic to this treatise and does not have any equivalent in other Arabic cosmological works.

Besides imagination, the *ʿUyūn* contains other notable kinematic features. In section 13, the necessity of a First Unmoved Mover is introduced on the basis of the impossibility of an infinite regress of movers and moved. This fundamentally Aristotelian argument shows that the author of the *ʿUyūn* was familiar with the *Physics* and the Greek tradition of natural philosophy. The existence of a First

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[980] Al-Fārābī 1999a, section 11, p. 60.
[981] Al-Fārābī 1999a, section 10, p. 60.
[982] Al-Fārābī 1999a, section 12, p. 60.
[983] For some insight into Ibn Sīnā's celestial dynamics and especially his concepts of motion and inclination, see Hasnaoui 1984.

Unmoved Mover suggests, as in Aristotle's cosmological system, that planetary motion occurs as a result of the spheres' desire for the first principle. Furthermore, the author follows the Arabic Peripatetics in making the spheres desire other separate principles, which act as unmoved movers. This appears clearly when the author writes that the motion of the spheres is "psychological, not natural (*nafsāniyyah lā ṭabīʿiyyah*), and is due not to passion (*shahwah*) or anger (*ghaḍab*), but to their desire (*shawq*) to imitate the intellects separated from matter…"[984]

If the celestial dynamics of the *ʿUyūn* harkens back to Book Lambda and follows al-Fārābī's cosmology in many respects, it differs from it in a number of ways. First, it is notable that the author distinguishes between passion (*shahwah*) and desire or love (*shawq*). Al-Fārābī does not make this distinction, but it is well-known that Ibn Sīnā did.[985] The basic idea is to elevate the heavenly bodies beyond the passions of sublunary beings and stress their nobleness. It is a purely intellectual form of love that they experience for the unmoved movers.

Second, the opposition between natural and psychological motion is noteworthy. The author of the *ʿUyūn* contrasts the purely psychological motion of the heavens with the natural motion of sublunary bodies. This connects with the definition of nature he provides as "the principle of motion and rest when these are not caused by an exterior thing or through will."[986] Although al-Fārābī opposes natural motion to spiritual motion in the *Ithbāt* (assuming this work is authentic), the *ʿUyūn*'s view of celestial motion can also be linked to Ibn Sīnā, who also argues in several places that celestial motion is not natural and primarily caused by soul.[987]

The connection with Ibn Sīnā is further reinforced by a crucial concept that appears in the *ʿUyūn*: *mayl*, or inclination. To my knowledge, al-Fārābī does not mention this concept in any of his works. Having explained that the universe is

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[984] Al-Fārābī 1999a, section 17, p. 62, my translation.
[985] Ibn Sīnā 2005, 312-313, 316.
[986] Al-Fārābī 1999a, section 13, p. 60. The Aristotelian theory of the natural motion of the four elements is further developed in section 12.
[987] See the previous section on nature and celestial motion.

contained and has a center and that void does not exist (these are well-known Aristotelian theses), the author then introduces the concept of natural inclination (*al-mayl al-ṭabīʿī*), which he opposes to compulsive or forced inclination (*al-mayl al-qasrī*). The celestial spheres, he says, have "circular inclination by nature" (*wa al-falak bi-ṭabʿihi al-mayl al-mustadīr*).[988] This means that unlike the sublunary bodies, which are characterized by rectilinear inclination and whose motions may be governed by compulsion, circular motion is free of any kind of compulsion.

Finally, the concept of *tashabbuh* should be mentioned here, since it plays an important role in the Arabic tradition. While al-Fārābī does not develop this concept, it plays a central role in the cosmology of such thinkers as Ibn Sīnā and al-Sijistānī.[989] In the *ʿUyūn*, *tashabbuh* is presented as the ultimate aim of the spheres, which consciously seek to attain the perfection of the higher immaterial principles. As rational beings, the spheres contemplate and know the beauty of the separate intellects, and this knowledge translates into a desire to return to their originative source.

As in many other cosmological adaptations derived from Book Lambda, the author of this treatise addresses the question of the object of the spheres-souls' love: is it the First Unmoved Mover, the separate intellects (also acting as unmoved movers), or both at the same time? The author writes that "each celestial body has a special separate intellect that it desires to imitate, and it is not fitting that the love of the entire system (i.e., of all the spheres) be directed at one thing of a single genus. Rather, each celestial body has a special beloved that is different from the object of the other spheres..."[990] This leads one to think that each separate intellect acts as an unmoved mover for its respective sphere. However, immediately after this statement, the author adds that "the totality (*al-kull*) shares a single object of desire, which is the First Beloved (*al-maʿshūq al-awwal*).[991] Here it would seem that all

[988] Al-Fārābī 1999a, section 14, p. 61, my translation.
[989] See for example Ibn Sīnā 2005, 315,15 ff.
[990] Al-Fārābī 1999a, section 17, p. 62, my translation.
[991] Al-Fārābī 1999a, section 17, p. 62, my translation.

the spheres also have a common object of desire, which reigns over each sphere and binds the whole system together.

What the exact relation is between this First Beloved and the separate intellects is not discussed by the author, but the likely interpretation is that both the separate intellects and the First Beloved are responsible for celestial motion: the former for the common, regular, westward motion of the entire heaven; the latter for the particular motions of the planets and spheres.[992]

To conclude, the celestial dynamics found in the *ʿUyūn* constitutes an eclectic system made up of various theories mostly drawn from the Greek and Arabic Peripatetic tradition. Noteworthy are the theories of *takhayyul* and *mayl*, which are grafted onto the basic Aristotelian cosmic scheme depicted in this work. Generally speaking, the *ʿUyūn*'s theories of celestial motion are much closer to Ibn Sīnā's cosmology than that of al-Fārābī. In fact, several points suggest that the author was active in Ibn Sīnā's circle, or that he was particularly influenced by the *shaykh al-ra'īs*. The recognizable Avicennian theories include: the ascription of imagination to the celestial bodies; the distinction between *shahwah* and *shawq*; *tashabbuh*; and the concept of *mayl*. When added to the Avicennian terminology used in the work ("necessary" and "possible of existence," etc), the accumulated cosmological evidence definitely points to Ibn Sīnā or one of his disciples as the author of this treatise.

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[992] This is the view Ibn Sīnā holds in the *Shifā'* (Ibn Sīnā 2005, 323,20-26).

VII. CONCLUSION

With the benefit of hindsight and by virtue of the previous analysis, it is easier to assess al-Fārābī's originality in the history of cosmology and define his adherence to the various philosophical currents of his day. Generally speaking, al-Fārābī was both dependent on the Greek and Greco-Arabic sources and original in the way in which he adapted and transformed the material he found in them. The main features of his cosmology are derived from a set of sources that can now be identified with some certainty: The Arabic versions of Book Lambda, Alexander's *Mabādi'* and the authentic parts of his commentary on the *Metaphysics*, Ptolemy's *Almagest* and *Planetary Hypotheses*, passages from Geminus' works (possibly conveyed through Simplicius), Themistius' and Simplicius' *De caelo* commentaries, and the *Neoplatonica arabica*, especially the *Maḥḍ al-khayr*. It was previously thought that the *Maḥḍ al-khayr* played little or no role in the *falāsifah*'s philosophy, but I adduced, I think, sufficient evidence to show that it in fact represents one of the key sources al-Fārābī utilized to build his theories of celestial intellection.

The nature of these sources and the creative use al-Fārābī makes of them by adapting and transforming their doctrine place him at the confluence of the Peripatetic and Neoplatonic currents and define him as a true continuator of these traditions. It is not Middle Platonism, as the Mahdian thesis would have it, but late-antique Peripateticism and Neoplatonism that form the foundation of his cosmology. It is the works and commentaries of thinkers such as Alexander, Proclus, Simplicius, and Philoponus that provided al-Fārābī with the exegetical possibilities to interpret Aristotle the way he did and enabled him to achieve his own cosmological synthesis.

In some cases, and for lack of a clear precedent, al-Fārābī must be credited with the innovation of important cosmological theories, some of which had a profound and lasting effect on Arabic thought. One such theory is that each separate intellect has demiurgic powers and is responsible for the existence of its corresponding sphere. This, I argued, was made possible by al-Fārābī's application of Proclean noetic doctrines to his cosmology, which also led to a reformulation of the concepts of celestial causation, motion, and substance. Another example is al-Fārābī's theory of motion, which is not explicitly spelled out in his works, but which can be reconstructed using several key passages and later statements by Ibn Sīnā. According to this theory, the sphere-souls' intellection of the separate intellects is directly responsible for producing motion, but this theory may have been combined with the idea of powers emanating from the planets. In this fashion, al-Fārābī and later Ibn Sīnā managed to reconcile and synthesize Aristotelian, Neoplatonic, and Ptolemaic elements in their account of celestial motion.

In this respect, the dissertation emphasized the scientific nature of al-Fārābī's method and especially the important role played by astronomy in his cosmology. Al-Fārābī is one of the first *falāsifah*, together with al-Kindī, to develop a genuine interest in mathematical astronomy. In forming his cosmology, he combines many of its findings with other physical and metaphysical theories, thus providing a complex picture of the relation between the sciences. In this endeavour, he drew on the works of ancient astronomers such as Ptolemy and Geminus, but he was also influenced by the *Posterior Analytics* and by the new Arabic-Islamic attitude toward astronomical observation. By focusing on rarely studied texts, such as the *K. al-mūsīqā* and the *K. al-burhān*, the analysis was able to show that al-Fārābī elaborated a scientific method that privileged induction, observation, and experience, but which ultimately depended on first philosophy, which alone can study the fundamental causes underlying the cosmos. In fact, it is with regard to his conception of the astronomical method that al-Fārābī departs quite radically from the Neoplatonists.

In addition to the question of the sources and of the originality of al-Fārābī's cosmological doctrines, this dissertation has tentatively introduced a developmentalist hypothesis to explain the discrepancies in al-Fārābī's cosmological theories and to address the problem of the authenticity of the Fārābīan writings. By putting the emphasis on the historical and intellectual climate in which al-Fārābī lived and by construing his works in light of such contemporary issues as the debate on the creation and eternity of the world, I argued that al-Fārābī's cosmology may have undergone a quite radical transformation on the questions of cosmogony, eternity, and celestial substance. Whereas some works such as the *Taʿlīqāt*, the *ʿUyūn*, and the *Daʿāwā* should be decisively rejected from the Fārābīan corpus, others, such as the *Jamʿ* and the *Jawābāt* may belong to al-Fārābī's early Baghdad period. By this I mean either that they were composed by al-Fārābī when he was under the direct influence of the Christian Peripatetics, or that they were composed by one of his followers or immediate students, a hypothesis initially formulated by Lameer and M. Rashed. In the latter case, Yaḥyā ibn ʿAdī was identified in Chapter IV as the most likely candidate. This hypothesis, however, does not automatically entail that the content of these two works is spurious or does not faithfully reflect views that al-Fārābī may have held at one point in his life.

I hope to have shown that al-Fārābī stands at a crucial juncture in early Arabic thought and that his works anticipated several important aspects of later *falsafah*, and especially of Ibn Sīnā's cosmology, both in terms of method and content. The chapters on the method of astronomy, on the structure of al-Fārābī's cosmology, on intellection and motion, show that al-Fārābī was the first Arabic thinker to achieve a viable and systematic synthesis of all the cosmological knowledge of his day, both astronomical and philosophical, and that, in so doing, he decisively influenced the course of Arabic thought. Naturally, al-Fārābī's theories are not devoid of tensions and sometimes appear almost experimental, such as his theory of celestial substance and its connection with creation. Ibn Sīnā subsequently built upon, modified, and in a sense perfected from a logical point of view his predecessor's theories. But al-Fārābī must be given credit for having laid the foundations of what later became a very influential paradigm in the history of Islamic and Arabic thought.

I hope that some of the questions which were raised in the course of my analysis but which I could not address due to lack of space will in the near future be studied in more depth. In particular, a detailed analysis of the Greco-Arabic sources and ideas underlying al-Fārābī's theory of the Agent Intellect is a desideratum. A thorough study of the influence of the celestial bodies on the sublunary world and their role in generation and corruption and in the actualization of human thought and imagination is another topic worth examining.

VIII. BIBLIOGRAPHY

Primary Sources in Greek and in Translation

Alexander of Aphrodisias. 1992a. *On Aristotle's* Metaphysics. 5 vols. Translated by William E. Dooley and Arthur Madigan. Ithaca: Cornell University Press.

———. 1992b. *Quaestiones*. Translated by R. W. Sharples. Ithaca: Cornell University Press.

———. 1980. *The* De anima *of Alexander of Aphrodisias: A Translation and Commentary*. By Athanasios P. Fotinis. Washington, D.C.: University Press of America.

Aristotle. 2001. *The Basic Works of Aristotle*. Edited by R. McKeon. New York: The Modern Library (Originally published in 1941 by Random House).

———. 2000. *On the Heavens*. English translation by W.K.C. Guthrie. Cambridge, Mass.: Harvard University Press.

———. 1992 (First published 1970). *Aristotle* Physics *Books I and II*. Translated with introduction, commentary, note on recent work, and revised bibliography by William Charlton. Oxford: University Press.

———. 1975. *Aristotle's* Posterior Analytics. Translated with notes by Jonathan Barnes. Oxford: Clarendon Press.

———. 1965. *Du ciel*. Texte établi et traduit par Paul Moraux. Paris: Les Belles Lettres.

Philoponus, John. 2005a. *Against Proclus's "On the Eternity of the World 1-5"*. Translated by Michael Share. Ithaca, N.Y.: Cornell University Press.

———. 2005b. *Against Proclus's "On the Eternity of the World, 6-8"*. Translated by Michael Share. Ithaca, N.Y.: Cornell University Press.

———. 1994. *Philoponus On Aristotle's* Physics *5-8 with Simplicius On Aristotle on the Void*. Translated by Paul Lettinck and J. O. Urmson. Ithaca, New York: Cornell University Press.

———. 1987. *Philoponus: Against Aristotle, on the Eternity of the World*. Translated by Christian Wildberg. London: Duckworth.

Plato. 1997. *Complete Works*. Edited, with introduction and notes, by John M. Cooper; associate editor, D.S. Hutchinson. Indianapolis, Ind.: Hackett Pub.

Plotinus. 1966–88. *Enneads*. Trans. A.H. Armstrong, Loeb Classical Library, Cambridge, MA: Harvard University Press and London: Heinemann.

Proclus. 2001. *On the Eternity of the World (De aeternitate mundi).* Greek text with introduction, translation, and commentary by Helen S. Lang and A.D. Macro; argument translated from the Arabic by Jon McGinnis. Berkeley, Calif.; London: University of California Press.

———. 1966-. *Commentaire sur le Timée*. Translated by A. J. Festugière. Paris: J. Vrin.

———. 1963. 2nd edition. *Elements of Theology*. Translation, introduction, and commentary by E. R. Dodds. Oxford: Clarendon Press.

Ptolemy, Claudius. 1993. Le traîté I du *Livre des Hypothèses* de Ptolémée. Edited by R. Morelon. *MIDEO* 21: 7-87.

———. 1987. *Las hipótesis de los planetas*. Introduction and notes by Eulalia Pérez Sedeño. Translated by José García Blanco and Aurora Cano Ledesma. Madrid: Alianza.

———. 1984. *Ptolemy's* Almagest. Translated and annotated by G. J. Toomer. London: Duckworth.

———. 1967. The Arabic Version of Ptolemy's *Planetary Hypotheses*. Introduced by B. Goldstein. *Transactions of the American Philosophical Society*, new series, 57/4: 3-55.

Simplicius. 2006. *On Aristotle's On the Heavens 1.10-12*. Translated by R. J. Hankinson. Ithaca, N.Y.: Cornell University Press.

———. 2005. *On Aristotle's On the Heavens 2.10-14*. Translated by Ian Mueller. Ithaca, N.Y.: Cornell University Press.

———. 2004a. *On Aristotle on the Heavens 2.1-9*. Translated by Ian Mueller. London: Duckworth.

———. 2004b. *On Aristotle on the Heavens 1.5-9*. Translated by R. J. Hankinson. London: Duckworth.

———. 2002. *On Aristotle on the Heavens 1.1-4*. Translated by R. J. Hankinson. London: Duckworth.

———. 1997. *On Aristotle Physics 2*. Translated by Barrie Fleet. London: Duckworth.

Primary Sources in Arabic and in Translation

Alexander of Aphrodisias. 2003. *Traité de la providence*. Translated by Pierre Thillet. Lagrasse: Verdier.

———. 2001. *Alexander of Aphrodisias on the Cosmos*. Translation and commentary by Charles Genequand. Leiden: Brill.

Al-Bayhaqī, ʿAlī ibn Zayd. 1935-. *Kitāb tatimmat ṣiwān al-ḥikmah*. Lahore: L. Ishwar Das, Registrar, University of the Panjab.

Al-Fārābī, Abū Naṣr. 2001a. *Alfarabi, the Political Writings: Selected Aphorisms and Other Texts.* Translated and annotated by Charles E. Butterworth. Ithaca, N.Y., and London: Cornell University Press.

———. 2001b. *L'épître sur l'intellect (Al-Risâla fî-l-ʿaql, li-Abû Nasr Al-Fârâbî)*. Traduit de l'arabe, annoté et présenté par Dyala Hamzah. Paris: L'Harmattan.

———. 1999a. *ʿUyūn al-masāʾil*. Edited by F. Dieterici. Reprinted in *Islamic Philosophy*, vol. 12, *Baʿḍ rasāʾil al-Fārābī fī al-falsafah*, 56-65. Frankfurt am Main, Federal Republic of Germany: Institute for the History of Arabic-Islamic Science at the Johann Wolfgang Goethe University.

———. 1999b. *Risālah fī-mā yanbaghī an yuqaddam qabla taʿallum al-falsafah*. Reprinted in *Islamic Philosophy*, vol. 12, *Baʿḍ rasāʾil al-Fārābī fī al-falsafah*, 49-55. Frankfurt am Main, Federal Republic of Germany: Institute for the History of Arabic-Islamic Science at the Johann Wolfgang Goethe University.

———. 1999c. *L'harmonie entre les opinions de Platon et d'Aristote*. Texte arabe et traduction par Fawzi Mitri Najjar et Dominique Mallet. Institut Français de Damas.

———. 1999d. *Ithbāt al-mufāriqāt*. Reprinted in *Islamic Philosophy*, vol. 12, *Baʿḍ rasāʾil al-Fārābī fī al-falsafah*, 41-48. Frankfurt am Main, Federal Republic of Germany: Institute for the History of Arabic-Islamic Science at the Johann Wolfgang Goethe University.

———. 1998. *Talkhīṣ jawāmiʿ kitāb al-nawāmis li-Aflāṭūn*. Edited by Th.-A. Druart in "Le sommaire du livre des lois de Platon," *Bulletin d'études orientales* 50: 109-155.

———. 1992. *Taʿliqāt*. In *Kitāb al-Tanbīh ʿalā sabīl al-saʿādah; al-Taʿlīqāt; Risālatān falsafīyatān*. Edited by J. Al Yasin. [Tehran?]: Intishārāt-i Hikmat.

———. 1987a. *Risālatān falsafīyatān*. Al-risālah 1. *Maqālat Abī Naṣr fīmā yaṣiḥḥu wa mā lā yaṣiḥḥu min aḥkām al-nujūm*; al-risālah 2. *Jawābāt li-masāʾil suʾila ʿanhā*, edited by Jaʿfar Āl Yāsīn. Beyrout: Dār al-Manāhil.

———. 1987b. *Al-manṭiqiyyāt lil-Fārābī*. Vol. 1. Ḥaqqaqahā wa-qaddama la-hā Muḥammad Taqī Dānish'pazhūh. Qum: Manshūrāt Maktabat Āyat Allāh al-ʿUẓmá al-Marʿashī al-Najafī.

———. 1985a. *Al-Farabi on the Perfect State: Abū Naṣr al-Fārābī's* Mabādi' ārā' ahl al-madīna al-fāḍila. A revised text with introduction, translation, and commentary by Richard Walzer. Oxford: Clarendon Press.

———. 1985b. *Al-manṭiq ʿinda al-Fārābī*. Vols. 1, 2, and 4. Edited by Rafīq al-ʿAjam and Majid Fakhry. Beyrut: Dār al-Mashriq.

———. 1982a. *Kitāb ārāʾ ahl al-madīnah al-fāḍilah*. Edited by Albīr Naṣrī Nādir. Beyrut: Dār al-Mashriq.

———. 1982b. *Le traité d'al-Fārābī sur les buts de la* Métaphysique *d'Aristote*. Translated by Th.-A. Druart. *Bulletin de Philosophie Médiévale* 24: 38-43.

———. 1981. *Al-Fārābī's Commentary and Short Treatise on Aristotle's* De interpretatione. Translated with an introduction and notes by F.W. Zimmermann. London: Published for the British Academy by Oxford University Press.

———. 1976. *Maqālah li-Abī Naṣr al-Fārābī fī al-jihah allatī yaṣiḥḥu ʿalayhā al-qawl fī aḥkām al-nujūm*. In *Nuṣūs falsafiyya mihdāh ilā al-duktūr Ibrahīm Madkūr*, 69-74. Cairo: Al-hay'a al-miṣriyya al-ʿāmma li-'l-kitāb.

———. 1974. *Epistola sull'intelletto*. Traduzione, introduzione, e note a cura di Francesca Lucchetta. Padova: Antenore.

———. 1972. *Al-radd ʿalā Yaḥyā al-Naḥwī*. The Arabic Text of Alfarabi's *Against John the Grammarian*. Edited by M. Mahdi. In *Medieval and Middle Eastern Studies: In Honor of Aziz Suryal Atiya*, edited by Sami A. Hanna, 268-285. Leiden: Brill.

———. 1971. *Deux ouvrages sur la rhétorique*. Edited by J. Langhade and M. Grignaschi. Beyrouth: Dar el-Machreq.

———. 1970. *Kitāb al-ḥurūf*. Edited by M. Mahdi. Beirut: Dār al-Mashriq.

———. 1969. *Alfarabi's Philosophy of Plato and Aristotle*. Translated, with an introduction by Muhsin Mahdi. Ithaca, New York: Cornell University Press.

———. 1967. Alfarabi against Philoponus. Text translated by M. Mahdi. *Journal of Near Eastern Studies* 26/4: 233-260.

———. 1964. *Kitāb al-siyāsah al-madaniyyah al-mullaqab bi-mabādi' al-mawjūdāt*. Edited by F. M. Najjār. Beyrut: Al-Matbaʿah al-Kathūlīkīyah.

———. 1963. *Short Commentary on Aristotle's* Prior Analytics. Translated from the original Arabic with introduction and notes by Nicholas Rescher. [Pittsburgh]: University of Pittsburgh Press.

———. 1961. *Falsafat Arisṭūṭālīs*. Edited by M. Mahdi. Bayrūt: Dār Majallat Shiʿr.

———. 1960. *Kitāb al-mūsīqā al-kabīr*. Edited by Ghaṭṭās ʿAbd al-Malik Khashabah. Cairo: Dār al-Kātib al-ʿArabī lil-Ṭibāʿah wa al-Nashr.

———. 1957. Al-Fārābī's Introductory *Risālah* on Logic. Edited by D. M. Dunlop. *The Islamic Quaterly* 3/4: 224-236.

———. 1955. *Introductory Sections on Logic* [*Fuṣūl tashtamilu ʿalā jamīʿ mā yuḍtarru ilā maʿrifatihi man arāda l-shurūʿ fī ṣināʿat al-manṭiq*; text and translation by D. M. Dunlop]. *The Islamic Quaterly* 2: 264-282.

———. 1951. *Risāla fī'l-khalā': Fārābī's Article on Vacuum*. Edited and translated by Necati Lugal and Aydin Sayili. Ankara, *Türk Tarih Kurumu Basimevi*, 1-16, 21-36.

———. 1949. *Iḥṣā' al-ʿulūm lil-Fārābī*. 2 ed. Edited by Osman Amine. Cairo [n.p.].

———. 1938. *Risālah fī al-ʿaql*. Edited by M. Bouyges. Beyrut: Bibliotheca arabica scholasticorum, série arabe, tome VIII, fasc. 1, XXIV.

———. 1930. *Tajrīd risālah al-daʿāwā al-qalbiyyah*. Haydarabad: Matbaʿ al-Majlis Da'irat al-Maʿārif al-ʿUthmāniyyah.

Al-Farghānī, Aḥmad ibn Muḥammad ibn Kathīr. 1986. *Jawāmiʿ ʿilm al-nujūm wa-uṣūl al-ḥarakāt al-samāwiyyah*. Edited and translated by Jacob Golius. Frankfurt am Main: Institut für Geschichte der Arabisch-Islamischen Wissenschaften an der Johann Wolfgang Goethe Universität.

Al-Ghazālī. 1997. *The Incoherence of the Philosophers (Tahāfut al-falāsifah).* Translated by M. Marmura. Provo, Utah: Brigham Young University Press.

Ibn Abī Uṣaybiʿah. 1965. *ʿUyūn al-anbā' fī ṭabaqāt al-aṭibbā'*. Edited by Nizār Riḍā. Beyrut: Dār Maktabat al-Ḥayāh.

Ibn Khalliqān. 1977-1978 [v. 1, 1978]. *Wafayāt al-aʿyān wa-anbāʾ abnā' al-zamān*. 8 vols. Edited by Iḥsān ʿAbbās. Beyrut: Dār Sādir.

Ibn al-Nadīm, Muḥammad ibn Isḥāq. 1970. *The Fihrist of al-Nadīm: A Tenth-Century*

Survey of Muslim Culture. Edited and translated by B. Dodge. New York: Columbia University Press.

Ibn Qurra, Thābit. 1987. *Œuvres d'astronomie*. Texte établi et traduit par Régis Morelon. Paris: Société d'édition Les Belles Lettres.

Ibn Rushd. 1997. *Grand commentaire sur le* Traité de l'Ame *d'Aristote*. Texte latin établi par F. Crawford. [Tunis]: Académie tunisienne des sciences des lettres et des arts Beït al-Hikma.

———. 1986. *Averroes' de substantia orbis*. Critical edition, with English translation and commentary by Arthur Hyman. Cambridge; Jerusalem: Medieval Academy of America.

———. 1984a. *Talkhīṣ al-samā' wa-al-ʿālam*. Taqdīm wa-taḥqīq Jamāl al-Dīn al-ʿAlawī. Fez: Jāmiʿat Sīdī Muḥammad ibn ʿAbd Allāh, Kullīyat al-Ādāb wa-al-ʿUlūm al-Insānīyah bi-Fās.

———. 1984b. *Ibn Rushd's Metaphysics*: *A Translation with Introduction of Ibn Rushd's Commentary on Aristotle's* Metaphysics*, book Lām*, by Charles Genequand. Leiden: Brill.

———. 1984c. *Grand commentaire de la* Métaphysique *d'Aristote* (*Tafsīr Mā baʿd aṭ-ṭabīʿat): livre Lām-Lambda. T*raduit de l'arabe et annoté [par] Aubert Martin. Paris: Belles lettres.

———. 1983. *Kitāb al-samāʿ al-ṭabīʿī*. Edited by Josep Puig. Madrid: Instituto Hispano-Arabe de Cultura: Consejo Superior de Investigaciones Cientificas.

———. 1958. *Talkhīṣ mā baʿda al-ṭabīʿah*. Edited by ʿUthmān Amīn. Al-Qāhirah: Wīzārat al-Tatbīyah wa al-Taʿlīm.

Ibn Sīnā. 2005. *The* Metaphysics *of The Healing: A Parallel English-Arabic Text.* Translated, introduced, and annotated by Michael E. Marmura. Provo, UT: Brigham Young University Press.

———. 1999. *Risālah fī aqsām al-ʿulūm al-ʿaqliyyah*. Edited by Amīn Hundīh, reprinted in *Islamic Philosophy*, vol. 42, *Abū ʿAlī al-Ḥusayn ibn ʿAbdallāh ibn Sīnā, Philosophical Treatises*, 114-129. Institute for the History of Arabic-Islamic Science at the Johann Wolfgang Goethe University, Frankfurt am Main.

———. 1986. *Le livre de science (Dānesh-nāmeh*). Traduit par Mohammad Achena et Henri Massé. Paris: Les Belles Lettres: Unesco.

———. 1985. *Kitāb al-najāh fī al-ḥikmah al-manṭiqiyyah wa-al-ṭabīʿiyyah wa-al-ilāhiyyah.*

Edited by M. Fakhry. Beyrut: Dār al-Afāq al-Jadīdah.

———. 1983-1986. *Kitāb al-shifā'*. Taṣdīr Ṭāhā Ḥusayn; murājaʿat Ibrāhīm Madkūr; taḥqīq, al-Ab Qanawātī, Maḥmūd al-Khuḍayrī, Fuʿād al-ʿAhwānī. Qum, Iran: Maktabat Āyat Allāh al-ʿUẓmā al-Marʿashī al-Najafī.

———. 1951. *Livre des directives et remarques* (*Kitāb al-ishārāt wa al-tanbīhāt*). Traduction avec introduction et notes par A.-M. Goichon. Beyrouth: Commission internationale pour la traduction des chefs-d'œuvre. Paris: Vrin (Collection d'oeuvres arabes de l'UNESCO).

Ibn Suwār, Abū al-Khayr al-Ḥasan. 1977. *Maqālah fī anna dalīl Yaḥyā al-Naḥwī ʿalā ḥadath al-ʿālam awlā bi-al-qubūl min dalīl al-mutakallimīn aṣlan*. In *Al-aflāṭūniyyah al-muḥdathah*, edited by A. Badawī, 243-247. Kuwayt: Wakālat al-Maṭbūʿāt.

Ikhwān al-Ṣafā'. 1957. *Rasāʾil ikhwān al-ṣafā' wa-khillān al-wafā'*. 4 vols. Beyrut: Dār Bayrūt; Dār Ṣādir.

Al-Kindī. 1997. *Œuvres philosophiques et scientifiques d'Al-Kindī*. Translated by Roshdi Rashed. Leiden; New York: Brill.

———. 1950-53. *Rasāʾil al-Kindī al-falsafiyyah*. 2 vols. Edited by Muḥammad ʿAbd al-Hādī Abū Rīdah. Egypt: Dār al-Fikr al-'Arabī.

Al-Kirmānī, Ḥamīd al-Dīn. 1967. *Rāḥat al-ʿaql*. Bayrūt: Dār al-Andalus lil-Ṭibāʿah wa-al-Nashr wa-al-tawzīʿ.

Maimonides. 1963. *The Guide of the Perplexed*. Translated with an introduction and notes by Shlomo Pines; with an introductory essay by Leo Strauss. 2 vols. Chicago: University of Chicago Press.

Al-Qifṭī, ʿAlī ibn Yūsuf. 1903. *Tarīkh al-ḥukamā'*. Edited by J. Lippert. Leipzig: Dieterich'sche Verlagsbuchhandlung.

Al-Rāzī, Abū Ḥātim Aḥmad ibn Ḥamdān. 1998. *Kitāb al-Iṣlāḥ*. Tehran: Muʾassasah-i Muṭālaʿāt-i Islāmī, Dānishgāh-i Tihrān, Dānishgāh-i Mak'gīl.

Al-Rāzī, Abū Bakr Muḥammad ibn Zakariyyā. 1939. *Rasāʾil falsafīyah*. Edited by Paul Kraus. Cairo: Maṭbaʿat Būl Bārbīh.

Al-Sijīstānī, Abū Sulaymān. 1974a. *Maqālah fī anna al-ajrām al-ʿulwiyyah dhawāt anfus nāṭiqah*. In *Ṣiwān al-ḥikmah wa thalāth rasāʾil*. Edited by A. Badawī. Tehran: Bunyād-i Farhang-i Īrān.

———. 1974b. *Maqālah fī al-muḥarrik al-awwal*. In *Ṣiwān al-ḥikmah wa thalāth rasāʾil*. Edited by A. Badawī. Tehran: Bunyād-i Farhang-i Īrān.

Themistius. 1999. *Paraphrase de la* métaphysique *d'Aristote (livre lambda).* Traduit de l'hébreu et de l'arabe. Introduction, notes et indices par Rémi Brague. Paris: Vrin.

Secondary Sources

Abed, Shukri B. 1991. *Aristotelian Logic and the Arabic Language in Alfarabi*. New York: SUNY.

Acar, Rahim. 2005. *Talking about God and Talking about Creation: Avicenna's and Thomas Aquinas' Positions*. Leiden; Boston: Brill.

Adamson, Peter. 2007a. *Al-Kindī*. Oxford: University Press.

———. 2007b. The Kindian Tradition: The Structure of Philosophy in Arabic Neoplatonism. In *The Libraries of the Neoplatonists*, edited by Cristina D'Ancona, 351-371. Leiden; Boston: Brill.

———. 2003. Al-Kindī and the Muʿtazila: Divine Attributes, Creation and Freedom. *Arabic Sciences and Philosophy* 13/1: 45-77.

———. 2002. *The Arabic Plotinus: A Philosophical Study of the* Theology of Aristotle. London: Duckworth.

Afnan, Soheil. 1964. *Philosophical Terminology in Arabic and Persian*. Leiden: Brill.

Alon, Ilai. 2002. *Al-Fārābī's Philosophical Lexicon*. 2 vols. [Cambridge]: E.J.W. Gibb Memorial Trust.

Alonso Alonso, Manuel. 1959. Los "ʿUyūn al-masā'il" de al-Fārābī (tesis fundamentales). *Al-Andalus* 24: 251-273.

Alousī, Husām Muhī Eldīn. 1968. *The Problem of Creation in Islamic Thought: Qur'an, Hadith, Commentaries, and Kalam*. [Bagdad] National Print and Pub. Co.

Altman, A. and S.M. Stern. 1958. *Isaac Israeli: A Neoplatonic Philosopher of the Early Tenth Century, His Works Translated with Comments and an Outline of His Philosophy*. [London] Oxford University Press.

Aouad, Maroun. 1992. Les fondements de la *Rhétorique* d'Aristote reconsidérés par Fārābī, ou le concept de point de vue immédiat et commun. *Arabic Sciences and Philosophy* 2/1: 133-180.

———. 1989. '*La théologie d'Aristote* et autres textes du *Plotinus arabus*.' In *Dictionnaire des philosophes antiques*, I, 541-590. Paris: Éditions du Centre national de la recherche scientifique.

Arnaldez, Roger. 1976. L'âme et le monde dans le système philosophique de Farabi. *Studia islamica* 43: 53-63.

Asín Palacios, Miguel. 1914. *Abenmasarra y su escuela: orígenes de la filosofía hispanomusulmana.* [Madrid: s.n.].

Atiyeh, George N. 1966. *Al-Kindi: The Philosopher of the Arabs*. Rawalpindi: Islamic Research Institute.

Badawī, Abdurrahman. 1987. 2nd edition. *La transmission de la philosophie grecque au monde arabe*. Paris: Vrin.

——— (ed.). 1977. *Al-aflāṭūnīyah al-muḥdathah ʿinda al-ʿarab*. Kuwait: Wakālat al-Maṭbūʿāt.

——— (ed.). 1971. *Commentaires sur Aristote perdus en grec et autres épîtres*. Beyrouth: Dar el-Mashreq.

——— (ed.). 1961. *Arisṭūṭālīs fī al-samā' wa al-athār al-ʿulwiyyah*. Translated by Yaḥyā ibn al-Biṭriq. Cairo: Maktabat al-nahdah al-miṣriyyah.

——— (ed.). 1955. *Aflūṭīn ʿinda al-ʿArab*. Kuwait: Wikālat al-Maṭbūʿāt.

——— (ed.). 1947. *Arisṭū ʿinda al-ʿarab: dirāsah wa-nuṣūṣ ghayr manshūrah*. Kuwayt: Wakālat al-Maṭbūʿāt.

Beaney, Michael. 2007. "Analysis." In the *Stanford Encyclopedia of Philosophy* online: http://plato.stanford.edu/entries/analysis/

Beere, Jonathan. 2003. Counting the Unmoved Movers: Astronomy and Explanation in Aristotle's *Metaphysics* XII.8. *Archiv für Geschichte der Philosophie* 85/1: 1-20.

Bellosta, Hélène. 1991. Ibrāhīm ibn Sinān: On Analysis and Synthesis. *Arabic Sciences and Philosophy* 1/2: 211-233.

Bertolacci, Amos. 2006. *The Reception of Aristotle's* Metaphysics *in Avicenna's* Kitāb al-Shifāʾ*: A Milestone of Western Metaphysical Thought*. Leiden; Boston: Brill.

———. 2005a. Ammonius and al-Fārābī: The Sources of Avicenna's Concept of Metaphysics. *Quaestio* 2: 287-305.

———. 2005b. On the Arabic Translations of Aristotle's *Metaphysics*. *Arabic Sciences and Philosophy* 15: 241-275.

———. 2001. From al-Kindī to al-Fārābī: Avicenna's Progressive Knowledge of Aristotle's *Metaphysics* according to his Autobiography. *Arabic Sciences and Philosophy* 11: 257-295.

Betegh, G. 2004. *The Derveni Papyrus: Cosmology, Theology and Interpretation*. Cambridge, U.K.; New York: Cambridge University Press.

Birkenmajer, Alexander. 1935. Eine wiedergefundene Übersetzung Gerhards von Cremona. *Beiträge zur Geschichte der Philosophie und Theologie des Mittelalters* (Suppl. 3.1): 472-481.

Black, Deborah L. 2006. Knowledge (*ʿilm*) and Certitude (*yaqīn*) in al-Fārābī's Epistemology. *Arabic Sciences and Philosophy* 16: 11-45.

———. 1996. Al-Fārābī. In *History of Islamic philosophy*, edited by S. H. Nasr and O. Leaman, vol. 1, 178-198. London; New York: Routledge.

———. 1990. *Logic and Aristotle's* Rhetoric *and* Poetics *in Medieval Arabic Philosophy*. Leiden: Brill.

———. 1982. 'Logic,' in 'Fārābī,' in *Encyclopedia Iranica*, vol. 9, 213-216.

Blumenthal, H. J. 1996. *Aristotle and Neoplatonism in Late Antiquity: Interpretations of the* De anima. Ithaca, N.Y.: Cornell University Press.

Bodnár, István M. 1997. Alexander of Aphrodisias on Celestial Motions. *Phronesis* 17/2: 190-205.

Boer, Tj. de. "Ḳuwwa." *Encyclopaedia of Islam, Second Edition*. Edited by: P. Bearman, Th. Bianquis, C.E. Bosworth, E. van Donzel and W.P. Heinrichs. Brill, 2009. Brill Online. Mc Gill University. 02 February 2009 <http://www.brillonline.nl/subscriber/entry?entry=islam_COM-0553>

Booth, Edward. 1983. *Aristotelian Aporetic Ontology in Islamic and Christian Thinkers*. Cambridge [Cambridgeshire]; New York: Cambridge University Press.

Bosworth, C. E. 1963. A Pioneer Arabic Encyclopedia of the Sciences: Al-Khwārizmī's *Keys of the Sciences*. *Isis* 54/1: 97-111.

Bowen, Alan C. 2007. The Demarcation of Physical Theory and Astronomy by Geminus and Ptolemy. *Perspectives on Science* 15/3: 327-358.

———. 2002. Simplicius and the Early History of Greek Planetary Theory. *Perspectives on Science* 10/2: 155-167.

Broadie, S. 1993. Que fait le premier moteur d'Aristote? *Revue philosophique de la France et de l'étranger* 183 : 375-411.

Brockelmann, Carl. 1943-49. *Geschichte der arabischen Litteratur*. 2 vols. Leiden: Brill.

Buschmann, Elisabeth. 1979. *Untersuchungen zum Problem der Materie bei Ibn Sīnā*. Europäische Hochschulschriften. Reihe XX, Philosophie, Bd. 38. Frankfurt am Main: P. Lang.

Carmody, Francis J. 1952. The Planetary Theory of Ibn Rushd. *Osiris* 10: 556-586.

Clay, J. S. 2003. *Hesiod's Cosmos*. Cambridge; New York, NY: Cambridge University Press.

Colmo, Christopher A. 2005. *Breaking with Athens: Alfarabi as Founder*. Lanham, etc: Lexington Books.

Corbin, Henri. 1971-72. *En islam iranien*. 4 vols. [Paris:] Gallimard.

Cruz Hernández, Miguel. 1950-1951. El "Fontes quaestionum" ('Uyūn al-masā'il) de Abū Naṣr al-Fārābī. *Archives d'histoire doctrinale et littéraire du Moyen Age* 18: 303-323.

D'Ancona, Cristina. 2006. The Topic of the "Harmony between Plato and Aristotle": Some Examples in Early Arabic Philosophy. In *Wissen über Grenzen: Arabisches Wissen und Lateinisches Mittelalter*, edited by Andreas Speer and Lydia Wegener, 379-406. Berlin; New York: De Gruyter.

———. 2005. Greek into Arabic: Neoplatonism in Translation. In *The Cambridge Companion to Arabic Philosophy*, edited by P. Adamson and R. C. Taylor, 10-32. Cambridge University Press.

———. 2003. *Plotino: La discesa dell'anima nei corpi; Plotiniana arabica*. Edited by C. D'Anconca. Padova: Il Poligrafo.

———. 1995. *Recherches sur le* Liber de causis. Paris: Vrin.

D'Ancona, Cristina and R. C. Taylor. 2003. 'Liber de causis.' In *Dictionnaire des philosophes antiques*, Supplément, 599-647. Paris: Éditions du Centre national de la recherche scientifique.

Davidson, H. A. 1992. *Alfarabi, Avicenna, and Averroes on Intellect*. New York; Oxford: Oxford University Press.

———. 1987. *Proofs for Eternity, Creation and the Existence of God in Medieval Islamic and Jewish Philosophy*. New York: Oxford University Press.

———. 1972. Alfarabi and Avicenna on the Active Intellect. *Viator* 3: 109-178.

———. 1969. John Philoponus as a Source of Medieval Islamic and Jewish Proofs of Creation. *JAOS* 89/2: 357-391.

Demidčik. V. P. 1975. Kosmologiya al-Fārābī i iyo osnovnie istočniki. In *Al-Fārābī, Naučnoe tvorčestvo*, 13-30. Moscow.

De Smet, Daniel. 2007. Les bibliothèques ismaéliennes et la question du néoplatonisme ismaélien. In *The Libraries of the Neoplatonists*, edited by C. D'Ancona, 481-493. Leiden; Boston: Brill.

———. 1998. *Empedocles arabus: une lecture néoplatonicienne tardive*. Brussel, Paleis der Academien: KAWLSK.

———. 1995. *La quiétude de l'intellect: néoplatonisme et gnose ismaélienne dans l'œuvre de Ḥamīd al-Dīn al-Kirmānī (Xe/XIe s.).* Leuven: Uitgeverij Peeters en Departement Oosterse Studies.

Dhanani, Alnoor. 1994. *The Physical Theory of Kalām: Atoms, Space, and Void in Basrian Muʿtazilī Cosmology*. Leiden: Brill.

Dicks, D. R. 1970. *Early Greek Astronomy to Aristotle*. Ithaca, N.Y.: Cornell University Press.

Di Giovanni, Matteo. 2006. Averroes on the Species of the Celestial Bodies. In *Wissen über Grenzen: Arabischen Wissen und Lateinisches Mittelalter*, edited by Andreas Speer and Lydia Wegener, 438-467. Berlin; New York: De Gruyter.

Dillon J. 2000. The Role of the Demiurge in the *Platonic Theology*. In *Proclus et la théologie platonicienne: actes du Colloque international de Louvain, 13-16 mai 1998, en l'honneur de H.D. Saffrey et L.G. Westerink*, edited by A. Ph. Segonds and C. Steel, with the help of C. Luna and A.F. Mettraux, 339-349. Leuven: Leuven University Press.

Dreyer, J. L. E. 1953. *A History of Astronomy from Thales to Kepler*. Second edition. USA: Dover Publications [Originally published in 1906 under the title *History of the Planetary Systems: from Thales to Kepler*. Cambridge: University Press].

Druart, T. A. 1999. "Al-Farabi's Metaphysics." In "Al-Farabi," in *Encyclopaedia Iranica*, vol. IX, fasc. 2, 216-219.

———. 1992. Al-Farabi, Emanation, and Metaphysics. In *Neoplatonism and Islamic Thought*, edited by Parviz Morewedge, 127-149. New York: State University of New York Press.

———. 1987a. Al-Farabi and Emanationism. *Studies in Medieval Philosophy*, vol. 17, 23-43. Washington: The Catholic University of America Press.

———. 1987b. Substance in Arabic Philosophy: Al-Farabi's Discussion. In *Substance. Proceedings of the American Catholic Philosophical Association* (61): 88-97.

———. 1982. ‘Metaphysics,’ in ‘Fārābī,’ in *Encyclopedia Iranica*, vol. 9, 216-219.

———. 1981. Al-Farabi’s Causation of the Heavenly Bodies. In *Islamic Philosophy and Mysticism*, edited by Parviz Morewedge, 35-47. New York: Caravan Books.

———. 1979. Le second traité de Fārābī sur la validité des affirmations basées sur la position des étoiles. *Bulletin de philosophie médiévale* 21: 47-51.

———. 1978. Astronomie et astrologie selon Fārābī. *Bulletin de philosophie médiévale* 20: 43-47.

———. 1977. Un sommaire du sommaire Farabien des « Lois » de Platon. *Bulletin de philosophie médiévale* 19: 43-45.

Duhem, Pierre. 1990. (Originally published in 1908). *Sōzein ta phainomena*: *essai sur la notion de théorie physique de Platon à Galilée*. Paris: Vrin.

———. 1913-59. *Le système du monde: histoire des doctrines cosmologiques de Platon à Copernic*. 10 vols. Paris: A. Hermann.

Eastwood, B. 2007. *Ordering the Heavens: Roman Astronomy and Cosmology in the Carolingian Renaissance*. Leiden [The Netherlands]; Boston, MA: Brill.

Endress, Gerhard. 2007. Building the Library of Arabic Philosophy. Platonism and Aristotelianism in the Sources of al-Kindī. In *The Libraries of the Neoplatonists*, edited by C. D’Ancona, 319-351. Leiden; Boston: Brill.

———. 2003. Mathematics and Philosophy in Medieval Islam. In *The Enterprise of Science in Islam: New Perspectives*, edited by Jan P. Hogendijk and A. I. Sabra, 121-177. Cambridge, Mass.; London: MIT Press.

———. 2002. Alexander Arabus on the First Cause: Aristotle’s First Mover in an Arabic Treatise Attributed to Alexander of Aphrodisias. In *Aristotele e Alessandro di Afrodisia nella tradizione araba: atti del Colloquio La ricezione araba ed ebraica della filosofia e della scienza greche, Padova, 14-15 Maggio 1999*. Edited by Cristina d’Ancona and Giuseppe Serra, 19-75. Padova: Il poligrafo.

———. 1995. Averroes’ *De caelo*: Ibn Rushd’s Cosmology in his Commentaries on Aristotle’s *On the Heavens*. *Arabic Sciences and Philosophy* 5: 9-49.

———. 1977. *The Works of Yaḥyā ibn ʿAdī: An Analytical Inventory*. Wiesbaden: Dr. Ludwig Reichert Verlag.

———. 1973. *Proclus Arabus: zwanzig Abschnitte aus der Institutio theologica in arabischer*

Übersetzung. Beirut: Orient-Institut der Deutschen Morgenländischen Gesellschaft, in Kommission bei F. Steiner, Wiesbaden.

———. 1966. "Die arabischen Ubersetzungen von Aristoteles' Schrift *De caelo*." Inaug. Diss. Frankfurt am Main: Bildstelle der J.W. Goethe-Universität.

Evans, James and J. Lennart Berggren. 2006. *Geminos'* Introduction to the Phenomena: *A Translation and Study of a Hellenistic Survey of Astronomy*. Princeton; Oxford: Princeton University Press.

Fakhry, Majid. 2002. *Al-Fārābī: Founder of Islamic Neoplatonism*. Oxford: Oneworld.

———. 1968. A Tenth-Century Arabic Interpretation of Plato's Cosmology. *Journal of the History of Philosophy* 6: 15-22.

———. 1965. Al-Farabi and the Reconciliation of Plato and Aristotle. *Journal of the History of Ideas* 26/4: 469-478.

Fazzo, Sylvia. 2002. *Aporia e sistema: la materia, la forma, il divino nelle* Quaestiones *di Alessandro di Afrodisia*. Pisa: ETS.

Fazzo, Silvia and Hillary Wiesner. 1993. Alexander of Aphrodisias in the Kindī-circle and in al-Kindī's Cosmology. *Arabic Sciences and Philosophy* 3: 119-153.

Finnegan, James. 1957. Al-Fârâbî et le Περὶ νοῦ d'Alexandre d'Aphrodise. In *Alexander of Aphrodisias in the Arabic Tradition*, collected and reprinted by Fuat Sezgin, 139-159. Frankfurt am Main: Institute for the History of Arabic-Islamic Science at the Johann Wolfgang Goethe University, 2000.

Freudenthal, Gad. 1990. Al-Fārābī on the Foundations of Geometry. In *Knowledge and the Sciences in Medieval Philosophy. Proceedings of the Eighth International Congress of Medieval Philosophy (S.I.E.P.M.), Helsinki 24-29 August 1987*, edited by Monika Asztalos, John Emery Murdoch, and Ilkka Niiniluoto, vol. 1, 54-61. Helsinki: Acta Philosophica Fennica.

———. 1988. La philosophie de la géométrie d'al-Fārābī. *Jerusalem Studies in Arabic* and *Islam* 11: 104-220.

Galston, Miriam. 1990. *Politics and Excellence: The Political Philosophy of Alfarabi*. Princeton: University Press.

———. 1981. Al-Fārābī on Aristotle's Theory of Demonstration. In *Islamic Philosophy and Mysticism*, edited by P. Morewedge, 23-35. New York: Caravan Books.

———. 1977. A Re-examination of al-Fārābī's Neoplatonism. *Journal of the History of Philosophy* 15: 1-33.

Gardet, L. “Hayūlā.” *Encyclopaedia of Islam, Second Edition*. Edited by: P. Bearman, Th. Bianquis, C.E. Bosworth, E. van Donzel and W.P. Heinrichs. Brill, 2009. Brill Online. Mc Gill University. 02 February 2009 <http://www.brillonline.nl/subscriber/entry?entry=islam_SIM-2840>

———. “Ibdāʿ.” *Encyclopaedia of Islam, Second Edition*. Edited by: P. Bearman, Th. Bianquis, C.E. Bosworth, E. van Donzel and W.P. Heinrichs. Brill, 2009. Brill Online. Mc Gill University. 02 February 2009 <http://www.brillonline.nl/subscriber/entry?entry=islam_COM-0308>

Gätje, H. 1982. Simplikios in der arabischen Überlieferung. *Islam* 59: 6-31.

———. 1971. *Studien zur Überlieferung der aristotelischen Psychologie im Islam*. Heidelberg: C. Winter.

Gaudefroy-Demombynes, Maurice. 1941. Er-Razi philosophe d’après des ouvrages récents. *Revue de l’histoire des religions* 124: 142-190.

Geoffroy, M. 2003. Remarques sur la traduction Usṭāṯ du livre Lambda de la « Métaphysique », chapitre 6. *Recherches de théologie et philosophie médiévale* 70/2 : 417-437.

———. 2002. La tradition arabe du *Περὶ νοῦ* d’Alexandre d’Aphrodise et les origines de la doctrine farabienne des quatre degrés de l’intellect. In *Aristotele e Alessandro di Afrodisia nella tradizione araba*, edited by C. D’Ancona and G. Serra, 191-231. Padova: Il poligrafo.

Gill, M. L. 1994. Aristotle on Self-Motion. In *Self-Motion from Aristotle to Newton*, edited by M. L. Gill and J. G. Lennox, 15-34. Princeton: University Press.

Gilson, Étienne. 1929. Les sources gréco-arabes de l’augustinisme avicennisant. *Archives d’histoire doctrinale et littéraire du moyen âge* 4: 5-149.

Glasner, Ruth. 2000. The Question of Celestial Matter in the Hebrew Encyclopedias. *The Medieval Hebrew Encyclopedias of Science and Philosophy*, edited by Steven Harvey, 313-335. Dordrecht; Boston; London: Kluwer Academic Publishers.

Gobillot, Genevieve. 2002. Quelques stéréotypes cosmologiques d’origine pythagoricienne chez les penseurs musulmans au Moyen Age. *Revue de l’histoire des religions* 219/1: 55-87.

Goichon, A.-M. 1938. *Lexique de la langue philosophique d’Ibn Sīnā*. Paris, Desclée de Brouwer.

———. 1935. *La distinction de l’essence et de l’existence d’après Ibn Sīnā*. Paris: Desclée

De Brouwer.

Goldstein, Bernard R. 1997. Saving the Phenomena: The Background to Ptolemy's Planetary Theory. *Journal for the History of Astronomy* 28/1: 1-12.

———. 1980. Book Review of F. Sezgin's *Geschichte des arabischen Schrifttums, vol. VI, Astronomie bis ca. 430 H. Isis* 71/2: 341-342.

———. 1972. Theory and Observation in Medieval Astronomy. *Isis* 63: 39-47.

Grant, Edward. 2004. *Science and Religion, 400 B.C. to A.D. 1550: From Aristotle to Copernicus*. Westport, Conn.: Greenwood Press.

———. 1994. *Planets, Stars, and Orbs: The Medieval Cosmos, 1200-1687*. Cambridge: University Press.

———. 1978. Cosmology. In *Science in the Middle Ages*, edited by David C. Lindberg, 265-303. Chicago; London: University of Chicago Press.

Grignaschi, M. 1969. Al-Fārābī et « L'Epître sur les connaissances à acquérir avant d'entreprendre l'étude de la philosophie. » Turkiyat Mecmuasi XV den Ayri Basim 1969 Istanbul 15: 175-210.

Gutas, Dimitri. 2004. Geometry and the Rebirth of Philosophy in Arabic with al-Kindī. In *Words, Texts, and Concepts Cruising the Mediterranean Sea*, edited by R. Arnzen and J. Thielmann, 195-211. Leuven; Paris; Dudley, MA.: Peeters.

———. 2003. Review of M. Mahdi's *Alfarabi and the Foundation of Islamic Political Philosophy*. *IJMES* 35: 145-147.

———. 2002. The Study of Arabic Philosophy in the Twentieth Century: An Essay on the Historiography of Arabic Philosophy. *British Journal of Middle Eastern Studies* 29/1: 5-25.

———. 2001. Intuition and Thinking: The Evolving Structure of Avicenna's Epistemology. In *Aspects of Avicenna*, edited by R. Wisnovsky, 1-39. Princeton: Markus Wiener.

———. 1999. The 'Alexandria to Baghdad' Complex of Narratives. *Documenti e studi sulla tradizione filosofica medieval* 10: 155-193, Spoleto.

———. 1988. *Avicenna and the Aristotelian Tradition*. Leiden: Brill.

———. 1982a. 'Biography,' in 'Fārābī,' in *Encyclopedia Iranica*, edited by Ehsan Yarshater, vol. 9, 208-213. London: Routledge & Kegan Paul.

———. 1982b. 'Fārābī and Greek Philosophy,' in 'Fārābī,' in *Encyclopedia Iranica*, edited by Ehsan Yarshater, vol. 9, 219-223. London: Routledge & Kegan Paul.

Gutman, Oliver. 2003. *Pseudo-Avicenna:* Liber celi et mundi*: A Critical Edition with Introduction*. Leiden; Boston: Brill.

Gyekye, Kwame. 1989. Al-Farabi on the Logic of the Arguments of the Muslim Philosophical Theologians. *Journal of the History of Philosophy* 27/1: 135-145.

———. 1972. Al-Farabi on 'Analysis' and 'Synthesis.' *Apeiron* 6: 33-38.

Haas, Frans A. J. de. 1997. *John Philoponus' New Definition of Prime Matter: Aspects of its Background in Neoplatonism and the Ancient Commentary Tradition*. New York: Brill.

Habby, Joseph. 1997. Yuḥannā ibn Ḥaylān, maestro di al-Fārābī e l'Organon di Aristotele. In *La diffusione dell' eredità classica nell' età tardoantica e medievale*, edited by A. Valvo, 95-109. Torino: Edizioni dell' Orso.

Haq, Syed Nomanul. 1994. *Names, Natures and Things: The Alchemist Jābir ibn Ḥayyān and his* Kitāb al-Aḥjār (Book of Stones). Dordrecht; Boston: Kluwer.

Hartner, W. "Falak." *Encyclopaedia of Islam, Second Edition*. Edited by: P. Bearman, Th. Bianquis, C.E. Bosworth, E. van Donzel and W.P. Heinrichs. Brill, 2009. Brill Online. Mc Gill University. 23 January 2009 <http://www.brillonline.nl/subscriber/entry?entry=islam_COM-0207>

———. 1964. Medieval Views on Cosmic Dimensions and Ptolemy's *Kitāb al-Manshūrāt*. In *Mélanges Alexandre Koyré*, vol. I, 254-282. Paris: Hermann.

Hasnawi, Ahmad. 2001. La définition du mouvement dans *la Physique* du *Šifa'* d'Avicenne. *Arabic Sciences and Philosophy* 11: 219-255.

———. 1994. Alexandre d'Aphrodise et Jean Philopon: notes sur quelques traîtés d'Alexandre "perdus" en grec, conservés en arabe. *Arabic Sciences and Philosophy* 4: 53-109.

———. 1985. Fārābī et la pratique de l'exégèse philosophique. *Revue de synthèse* 117: 27-59.

———. 1984. *La dynamique d'Ibn Sīnā*. In *Etudes sur Avicenne*, edited by Jean Jolivet and Roshdi Rashed, 103-123. Paris: Les Belles Lettres.

Heinen, Anton M. 1982. *Islamic Cosmology: A Study of as-Suyūṭī's* Al-hayʾa as-sanīya fī l-hayʾa as-sunnīya. Beirut; Wiesbaden: In Kommission bei Franz Steiner Verlag.

———. 1978. Averroes' Idea of Astronomy Being in Agreement with Reality. *Hamdard Islamicus* 1/3: 3-14.

Hilal, Aziz. 2001. Farabi et le problème de l'homonymie accidentelle. *Studia Islamica* 92: 155-165.

Hintikka, Jaakko and Unto Remes. 1974. *The Method of Analysis: Its Geometrical Origin and its General Significance*. Dordrecht; Boston: D. Reidel Pub. Co.

Huart, Cl. "Kursī." *Encyclopaedia of Islam, Second Edition*. Edited by: P. Bearman, Th. Bianquis, C.E. Bosworth, E. van Donzel and W.P. Heinrichs. Brill, 2009. Brill Online. Mc Gill University. 23 January 2009 <http://www.brillonline.nl/subscriber/entry?entry=islam_SIM-4551>

Hübner, Wolfgang and Hermann Hunger. 2002-. 'Astrology.' In *Brill's New Pauly. Antiquity*. Edited by Hubert Cancik and Helmut Schneider; English edition, managing editor, Christine F. Salazar, assistant editor, David E. Orton Brill. Leiden; Boston: Brill.

Hugonnard-Roche, H. 2007. Le Corpus philosophique syriaque aux VIe-VIIe siècles. In *The Libraries of the Neoplatonists*, edited by C. D'Ancona, 279-293. Leiden; Boston: Brill.

———. 2003. '*De caelo*. Traditions syriaque et arabe.' In *Dictionnaire des philosophes antiques*, Supplément, 283-294. Paris: Éditions du Centre national de la recherche scientifique.

———. 1985. L'épitomé du *De caelo* d'Aristote par Averroès. Questions de méthode et de doctrine. *Archives d'histoire doctrinale et littéraire du moyen-âge* 52: 7-39.

Hyman, Arthur. 1977. Aristotle's "First Matter" and Avicenna's and Averroes' "Corporeal Form." In *Essays in Medieval Jewish and Islamic Philosophy*, 335-356. New York: Ktav Publishing House.

İskenderoğlu, Muammer. 2002. *Fakhr al-Dīn al-Rāzī and Thomas Aquinas on the Question of the Eternity of the World*. Leiden; Boston; Köln: Brill.

Ivry, Alfred L. 1991. Neoplatonic Currents in Maimonides' Thought. In *Perspectives on Maimonides: Philosophical and Historical Studies*, edited by Joel L. Kraemer, 115-141. Oxford; New York: Published for the Littman Library by Oxford University Press.

———. 1990. An Evaluation of the Neoplatonic Elements in al-Farabi's and Ibn Sina's Metaphysics. In *Acts of the International Symposium on Ibn Turk, Khwârezmî, Fârâbî, Beyrûnî, and Ibn Sînâ*, 135-147. Ankara: Atatürk Supreme Council for Culture, Language and History.

Jaeger, Werner. 1948. Second edition. *Aristotle, Fundamentals of the History of his Development*. Translated with the author's corrections and additions by Richard Robinson. Oxford: Clarendon Press.

Janssens, Jules. 2004. Experience (*tajriba*) in Classical Arabic Philosophy. *Quaestio* 4: 45-62.

———. 2003. Avicenne et sa « paraphrase-commentaire » du livre Lambda (« Kitāb al-inṣāf »). *Recherches de théologie et philosophie médiévale* 70/2: 401-417.

———. 1997. Creation and Emanation in Ibn Sīnā. *Documenti e studi sulla tradizione filosofica medievale* 8: 455-477.

Jolivet, Jean. 2006. Étapes dans l'histoire de l'intellect agent. In J. Jolivet, *Perspectives médiévales et arabes*, 163-175. Paris: Vrin.

———. 1995. La matière d'en haut. In J. Jolivet, *Philosophie médiévale arabe et latine*, 90-111. Paris: Vrin.

———. 1993. Al-Kindī, vues sur le temps. *Arabic Sciences and Philosophy* 3/1: 55-77.

———. 1977. L'intellect selon Fārābī: quelques remarques. *Mélanges offerts à Henri Laoust*, I, 252-259. Institut Français de Damas. Bulletin d'études orientales, XXIX.

Kennedy-Day, Kiki. 2003. *Books of Definition in Islamic Philosophy*. London; New York: Routledge.

Khalil, Georr. 1941-1946. Farabi est-il l'auteur des *Fuṣūṣ al-ḥikam*? *Revue des études islamiques* 15: 31-39.

King, David A. 1997. "Astronomy in the Islamic World." In *Encyclopaedia of the History of Science, Technology, and Medicine in Non-Western Cultures*, edited by H. Selin, 125-134. Dordrecht; Boston: Kluwer Academic.

Kosman, A. 1994. Aristotle's Prime Mover. In *Self-Motion from Aristotle to Newton*, edited by M. L. Gill and J. G. Lennox, 135-153. Princeton: University Press.

Kuhn, Thomas S. 1962. *The Copernican Revolution: Planetary Astronomy in the Development of Western Thought*. New York: Vintage Books.

Kraemer, Joel. 1992. *Humanism in the Renaissance of Islam: The Cultural Revival during the Buyid Age*. 2nd rev. ed. Leiden; New York: Brill.

———. 1991. Maimonides on the Philosophic Sciences in his *Treatise on the Art of Logic*. In *Perspectives on Maimonides: Philosophical and Historical Studies*, edited by Joel

L. Kraemer, 77-105. Oxford; New York: Published for the Littman Library by Oxford University Press.

———. 1986. *Philosophy in the Renaissance of Islam: Abū Sulaymān al-Sijistānī and his Circle*. Leiden: Brill.

———. 1967. "Abū Sulaymān as-Sijistānī: A Muslim Philosopher of the 10th Century." Thesis (Ph.D.), Yale University.

———. 1965. A Lost Passage from Philoponus' *Contra aristotelem* in Arabic Translation. *JOAS* 85/3: 318-327.

Krafft, Fritz. 2002-. 'Astronomy.' In *Brill's New Pauly*. *Antiquity*. In *Brill's New Pauly*. *Antiquity*. Edited by Hubert Cancik and Helmut Schneider; English edition, managing editor, Christine F. Salazar, assistant editor, David E. Orton Brill. Leiden; Boston: Brill.

Kraus, Paul. 1986. *Jābir ibn Ḥayyān: contribution a l'histoire des idées scientifiques dans l'islam. Jābir et la science grecque.* Paris: Les Belles Lettres.

Kubesov, A. 1981. *Astronomiia v trudakh al'-Farabi*. Alma-Ata: Izd-vo "Nauka" Kazakhskoi SSR.

———. 1975. *Kommentarii k "Al'magestu" Ptolemeia*. Alma-Ata: Nauka.

Kunitzsch, P.; Knappert, J. "al- Nud̲j̲ūm (a.)." *Encyclopaedia of Islam, Second Edition*. Edited by: P. Bearman, Th. Bianquis, C.E. Bosworth, E. van Donzel and W.P. Heinrichs. Brill, 2009. Brill Online. Mc Gill University. 23 January 2009 3 <http://www.brillonline.nl/subscriber/entry?entry=islam_COM-0871>

Lameer, Joep. 1994. *Al-Fārābī and Aristotelian Syllogistics*: *Greek Theory and Islamic Practice*. Leiden; New York; Köln: Brill.

Lange, Marc. 1994. Scientific Realism and Components: The Case of Classical Astronomy. *Monist* 77/1: 111-118.

Langermann, Tzvi. 1991. The 'True Perplexity:' The Guide of the Perplexed, Part II, Chapter 24. In *Perspectives on Maimonides: Philosophical and Historical Studies*, edited by Joel L. Kraemer, 159-175. Oxford; New York: Published for the Littman Library by Oxford University Press.

Langhade, Jacques. 1994. *Du Coran à la philosophie: la langue arabe et la formation du vocabulaire philosophique de Farabi*. Damas: Institut Français de Damas.

Lerner, Michel-Pierre. 1996. *Le monde des sphères*. 2 vols. Paris: Les Belles Lettres.

Leaman, Oliver. 2002. 2nd edition. *An Introduction to Classical Islamic Philosophy*. Cambridge: Cambridge University Press.

Lettinck, Paul. 1994. *Aristotle's* Physics *and its Reception in the Arabic World: With an Edition of the Unpublished Parts of Ibn Bājja's* Commentary on the Physics. Leiden: Brill.

Lewin, Bernhard. 1954. La notion de *muḥdath* dans le *kalām* et dans la philosophie. *Orientalia suecana*, vol. 2, fasc. 2/4: 84-94.

Lewis, G. 1959. *Theology of Aristotle*. Translated into English by Geoffrey Lewis. In *Plotini opera*, edited by Paul Henry and Hans-Rudolf Schwyzer. Paris and Brussels, II, 39-45, 63-81, 135-149, 177-189, 199-211, 219-231, 243-251, 263-275, 285-297, 375-395, 401-409, 431-473, 486-488.

Lindberg, David C. 2007. Second Edition. *The Beginnings of Western Science: The European Scientific Tradition in Philosophical, Religious, and Institutional Context, Prehistory to A.D. 1450*. Chicago; London: The University of Chicago Press.

Listfeldt, H. G. 1974. Some Concepts of Matter of Avicenna, Averroes, St. Thomas and Heisenberg. *Aquinas* 18: 310-321. Rome: Pontificia Universita lateranense.

Lizzini, Olga. 2004. The Relation between Form and Matter: Some Brief Observations on the 'Homology Argument' (*Ilahiyāt*, II.4) and the Deduction of *fluxus*. In *Interpreting Ibn Sīnā: Science and Philosophy in Medieval Islam. Proceedings of the Second Conference of the Ibn Sīnā Study Group*, 175-189, edited by Jon McGinnis. Leiden; Boston: Brill.

Lloyd, G. E. R. 1978. Saving the Appearances. *The Classical Quarterly* 28: 202-223.

Madkour, Ibrahim. 1934. *La place d'al-Fārābī dans l'école philosophique musulmane*. Paris: Adrien-Maisonneuve.

Mahdi, Muhsin. 2001. *Alfarabi and the Foundation of Islamic Political Philosophy*. Chicago; London: University of Chicago Press.

———. 1990a. Al-Fārābī's Imperfect State. *Journal of the American Oriental Society* 110/4: 691-726.

———. 1990b. Philosophical Literature. In *Religion, Learning, and Science in the ʿAbbasid Period*, edited by M.J.L. Young, J.D. Latham, and R.B. Serjeant, 76-103. Cambridge; New York: Cambridge University Press.

Maḥfūẓ, Ḥusayn ʿAlī. 1975. *Al-Fārābī fī al-marāji' al-ʿarabīyah*. Baghdād: Dār al-Ḥurrīyah.

Mahmoud, Fawkia Hussein. The Contingency of the World in Fārābī's Doctrine. In *Acts of the International Symposium on Ibn Turk, Khwârezmî, Fârâbî, Beyrûnî, and Ibn Sînâ*, 151-163. Ankara: Atatürk Supreme Council for Culture, Language and History.

Mallet, Dominique. 1996. *Kalām* et dialectique dans le commentaire des *Topiques* d'Alfarabi. *Bulletin d'études orientales* 48: 165-182.

———. 1990. Le *Kitāb al-taḥlīl* d'Alfarabi. *Arabic Sciences and Philosophy* 4: 317-336.

Marmura, M. E. 1990. The Fortuna of the *Posterior Analytics* in the Arabic Middle Ages. In *Knowledge and the Sciences in Medieval Philosophy*, edited by Monika Asztalos, John E. Murdoch, and Ilkka Niiniluoto, vol. 1, 85-104, Helsinki: Yliopistopaino.

Maróth, Miklós. 1995. The Ten Intellects Cosmology and its Origin. *The Arabist* 13-14: 103-113.

Marquet, Yves. 1990. Descente et remontée chez Fārābī: une filière dédoublée. In *Acts of the International Symposium on Ibn Turk, Khwârezmî, Fârâbî, Beyrûnî, and Ibn Sînâ*, 175-185. Ankara: Atatürk Supreme Council for Culture, Language and History.

———. 1987. La procession des âmes chez Fārābī, ou le dédoublement de l'itinéraire. *Journal asiatique* 275: 65-78.

Martin, A. 1989. '*La métaphysique*. Tradition syriaque et arabe.' In *Dictionnaire des philosophes antiques*, I, 528-534. Paris: Éditions du Centre national de la recherche scientifique.

Martini Bonadeo, Cecilia. 1989. '*La métaphysique.* Tradition syriaque et arabe. Mise à jour bibliographique.' In *Dictionnaire des philosophes antiques*, Suppl., 259-264. Paris: Éditions du Centre national de la recherche scientifique.

McGinnis, Jon. 2008. Avicenna's Naturalized Epistemology and Scientific Method. In *The Unity of Science in the Arabic Tradition: Science, Logic, Epistemology and Their Interactions*, edited by Shahid Rahman, Tony Street, and Hassan Tahiri, 129-153. Dordrecht: Springer.

———. 2006. Positioning Heaven: The Infidelity of a Faithful Aristotelian. *Phronesis* 51/2: 140-161.

———. 2003. Scientific Methodologies in Medieval Islam: Induction and Experimentation in the Philosophy of Ibn Sīnā. *Journal of the History of Philosophy* 41/3: 307-327.

McGinnis, Jon and David C. Reisman (eds.). 2007. *Classical Arabic Philosophy: An*

Anthology of Sources. Translated with introduction, notes and glossary by Jon McGinnis and David C. Reisman. Indianapolis, Cambridge: Hackett Publishing Company.

Menn, Stephen. 2008. Al-Fārābī's *Kitāb al-ḥurūf* and His Analysis of the Senses of Being. *Arabic Sciences and Philosophy* 18: 59-97.

Merlan, P. 1946. Aristotle's Unmoved Movers. *Traditio* 4: 1-30.

Michot, Jean. 1982. Tables de correspondance des 'Taʿlīqāt' d'al-Fārābī, des 'Taʿlīqāt' d'Avicenne et du 'Liber aphorismorum' d'Andrea Alpago. *MIDEO* 15: 231- 250.

Moraux, Paul. 1963. 'Quinta essentia.' In *Pauly-Wissowa-Kroll*, Bd 24/1: 1171-1263.

Morelon, Régis. 2004. Une proposition de lecture de l'histoire de l'astronomie arabe. In *De Zénon d'Elée á Poincaré: recueil d'études en hommage á Roshdi Rashed*, edited by Régis Morelon and Ahmad Hasnawi, 237-251. Louvain: Peeters.

———. 1999. Astronomie « physique » et astronomie « mathématique » dans l'astronomie précopernicienne. In *Les doctrines de la science de l'antiquité à l'âge classique*, edited by R. Rashed and J. Biard, 105-131. Leuven: Peeters.

———. 1996a. General Survey of Arabic Astronomy. In *Encyclopedia of the History of Arabic Science*, 3 vols., edited by R. Rashed, vol. 1, 1-20. London: Routledge.

———. 1996b. Eastern Arabic Astronomy between the Eighth and the Eleventh Centuries. In *Encyclopedia of the History of Arabic Science*, 3 vols., edited by R. Rashed, vol. 1, 20-58. London: Routledge.

———. 1994. Thābit b. Qurra and Arab Astronomy in the 9th Century. *Arabic Sciences and Philosophy* 4/1: 111-141.

Morrison, Robert. 2005. Quṭb al-Dīn al-Shīrāzī's Hypotheses for Celestial Motion. *Journal for the History of Arabic Science* 13/1-2: 21-141.

Mueller, Ian. 2006. Physics and Astronomy: Aristotle's *Physics* II.2.193b22-194a12. *Arabic Sciences and Philosophy* 16/2: 175-207.

Murschel, Andrea. 1995. The Structure and Function of Ptolemy's Physical Hypotheses of Planetary Motion. *Journal of the History of Astronomy*, 26/1: 33-61.

Najjar, Fauzi M. 2004. Al-Fārābī's Harmonization of Plato's and Aristotle's Philosophies. *The Muslim World* 94: 29-44.

Nallino, C. A. 1944. "Astronomi," in *Raccolta di scritti editi e inediti*. Vol. V. Astrologia, astronomia, geografia. Roma: Istituto per l'oriente.

Netton, I. R. "ʿUnṣur." *Encyclopaedia of Islam, Second Edition*. Edited by: P. Bearman, Th. Bianquis, C.E. Bosworth, E. van Donzel and W.P. Heinrichs. Brill, 2009. Brill Online. Mc Gill University. 02 February 2009 <http://www.brillonline.nl/subscriber/entry?entry=islam_COM-1294>

———. 1992. *Al-Fārābī and His School*. London; New York: Routledge.

———. 1989. *Allāh Transcendent: Studies in the Structure and Semiotics of Islamic Philosophy, Theology, and Cosmology*. London; New York: Routledge.

Obrist, Barbara. 2004. *La cosmologie médiévale: textes et images*. Firenze: SISMEL/Edizioni del Galluzzo.

O'Meara, Dominic. 2003. *Platonopolis: Platonic Political Philosophy in Late Antiquity*. Oxford: Clarendon; New York: Oxford University Press.

Opsomer, Jan. 2001. Who in the Heavens is the Demiurge? Proclus' Exegesis of Plato *Tim.* 28C3-5. *The Ancient World* 32/1: 52-70.

———. 2000. Proclus on Demiurgy and Procession in the Timaeus. In *Reason and Necessity: Essays on Plato's Timaeus*, edited by M. R. Wright, 113-145. London: Duckworth; Swansea: Classical Press of Wales.

Owens, Joseph. 1950. The Reality of the Aristotelian Separate Movers. *The Review of Metaphysics* 3/9: 319-337.

Parens, Joshua. 2006. *An Islamic Philosophy of Virtuous Religions: Introducing Alfarabi*. New York: SUNY.

Pearson, Carl William. 1999. "Scripture as Cosmology: Natural Philosophical Debate in John Philoponus' Alexandria." PhD dissertation, Harvard University.

Pedersen, Olaf. 1974. *A Survey of the* Almagest. Odense: University Press.

Périer, Augustin. 1920a. *Yaḥyā ben ʿAdī: un philosophe arabe chrétien du Xe siècle*. Paris: J. Gabalda.

———. 1920b. *Petits traités apologétiques de Yaḥyā' ibn ʿAdī*. Paris: Gabalda.

Peters, F. E. 1968. *Aristoteles arabus*. Leiden: Brill.

Pines, Shlomo. 1987. Some Distinctive Metaphysical Conceptions in Themistius' *Commentary on Book Lambda* and their Place in the History of Philosophy. In *Aristoteles Werk und Wirkung Paul Moraux Gewidmet*, Zweiter Band, herausgegeben von Jürgen Wiesner, 177-204. Berlin; New York: De Gruyter.

———. 1979. The Limitations of Human Knowledge According to al-Farabi, Ibn Bajja, and Maimonides. In *Studies in Medieval Jewish History and Literature*, edited by Isadore Twersky, 84-109. Cambridge, Mass.; London: Harvard University Press.

———. 1972. An Arabic Summary of a Lost Work of John Philoponus. *Israel Oriental Studies* 2: 320-359.

———. 1961. La loi naturelle et la société: la doctrine politico-théologique d'Ibn Zurʿa, philosophe chrétien de Bagdad. In *Studies in Islamic History and Civilization*, edited by Uriel Heyd, 154-191. Jerusalem: Hebrew University.

———. 1955. A Tenth Century Philosophical Correspondence. *Proceedings of the American Academy for Jewish Research* 24: 103-136.

———. 1936/1997. *Studies in Islamic Atomism*. Jerusalem: The Magnes Press, The Hebrew University.

Pingree, D. E. 1973. The Greek Influence on Early Islamic Mathematical Astronomy. *Journal of the American Oriental Society* 93/1: 32-43.

Pingree, D. E. and S. Nomanul Haq. "Ṭabīʿa (a.)." *Encyclopaedia of Islam, Second Edition*. Edited by: P. Bearman, Th. Bianquis, C.E. Bosworth, E. van Donzel and W.P. Heinrichs. Brill, 2009. Brill Online. Mc Gill University. 23 January 2009 <http://www.brillonline.nl/subscriber/entry?entry=islam_COM-1135>

Platti, E. 1983. *Yaḥyā ibn ʿAdī: théologien chrétien et philosophe arabe: sa théologie de l'incarnation*. Leuven: Departement Oriëntalistiek.

———. 1981-1982. *La grande polémique antinestorienne de Yaḥyā b. ʿAdī*. Lovanii: E. Peeters.

Ragep, F. J. 2008. Islamic Reactions to Ptolemy's Imprecisions. In a forthcoming volume on the Ptolemaic tradition edited by Alexander Jones.

———. 2001. Freeing Astronomy from Philosophy: An Aspect of Islamic Influence on Science. *Osiris* 16: 49-71.

———. 1993. *Naṣīr al-Dīn al-Ṭūsī's Memoir on Astronomy (al-Tadhkira fī ʿilm al-hayʾa)*. 2 vols. New York: Springer-Verlag.

———. 1990. Duhem, the Arabs, and the History of Cosmology. *Synthèse* 83: 201-214.

Ragep, F. J. and S. P. Ragep. 2004. The Astronomical and Cosmological Works of Ibn Sīnā: Some Preliminary Remarks. In *Sciences, techniques et instruments dans le monde* *iranien (Xe-XIXe siècle)*, edited by N. Pourjavady and Ž. Vesel, 3-17. Téhéran: Presses Universitaires d'Iran.

Rahman, Fazlur. 1958. *Prophecy in Islam: Philosophy and Orthodoxy*. London: George Allen & Unwin Ltd.

Rashed, Marwan. 2008. Al-Fārābī's Lost Treatise *On Changing Beings* and the Possibility of a Demonstration of the Eternity of the World. *Arabic Sciences and Philosophy* 18: 19-58.

———. 2004. The Problem of the Composition of the Heavens (529-1610): A New Fragment of Philoponus and its Readers. In *Philosophy, Science and Exegesis in Greek, Arabic, and Latin Commentaries*, 2 vols., edited by Peter Adamson, Han Baltussen, and M.W.F. Stone, vol. 2, 35-58. London: Institute of Classical Studies, School of Advanced Study, University of London.

Rashed, Roshdi. 2007. The Celestial Kinematics of Ibn al-Haytham. *Arabic Sciences and Philosophy* 17/1: 7-55.

———. 2001. Al-Qūhī: From Meteorology to Astronomy, *Arabic Sciences and Philosophy* 11/2: 157-204.

———. 1991. L'analyse et la synthèse selon Ibn al-Haytham. In *Mathématique et philosophie de l'Antiquité à l'Âge Classique*, edited by R. Rashed, 131-149. Paris: Éditions du C.N.R.S.

Rashed, R. and R. Morelon. "Thābit b. Ḳurra, Abu 'l-Ḥasan b. Zahrūn al-Ḥarrānī." *Encyclopaedia of Islam, Second Edition*. Edited by: P. Bearman, Th. Bianquis, C.E. Bosworth, E. van Donzel and W.P. Heinrichs. Brill, 2009. Brill Online. Mc Gill University. 23 January 2009 <http://www.brillonline.nl/subscriber/entry?entry=islam_SIM-7507>

Reisman, David C. 2005. Al-Fārābī and the Philosophical Curriculum. In *The Cambridge Companion to Arabic Philosophy*, edited by Peter Adamson and Richard C. Taylor, 52-72. Cambridge: University Press.

Rescher, Nicholas. 1964. *Al-Kindī: An Annotated Bibliography*. [Pittsburgh, Pa.]: University of Pittsburgh Press.

———. 1963. Al-Fārābī on Logical Tradition. *Journal of the history of ideas* 24/1: 127-132.

———. 1962. *Al-Fārābī: An Annotated Bibliography*. [Pittsburgh]: University Pittsburgh Press.

Rosenthal, Franz. 1975. *The Classical Heritage in Islam*. Translated from the German by

Emile and Jenny Marmorstein. London: Routledge and Kegan Paul.

———. 1956. Al-Kindī and Ptolemy. In *Studi orientalistici in onore di Giorgio Levi della Vida*, vol. 2, 436-456. Rome: Istituto per l'Oriente.

Rowson, Everett K. 1988. *A Muslim Philosopher on the Soul and its Fate: Al-ʿĀmirī's* Kitāb al-amad ʿalā l-abad. New Haven, Connecticut: American Oriental Society.

Rudavsky, Tamar. 2000. *Time Matters: Time, Creation, and Cosmology in Medieval Jewish Philosophy*. Albany, N.Y.: State University of New York Press.

Rudolph, Ulrich. 1989. *Die Doxographie des Pseudo-Ammonios: Ein Beitrag zur Neuplatonischen Überlieferung im Islam.* Stuttgart: Deutsche Morgenländische Gesellschaft; Stuttgart: F. Steiner Wiesbaden.

Sabra, A. I. 2000. Reply to Saliba. *Perspectives on Science* 8: 342-345.

———. 1998. Configuring the Universe: Aporetic, Problem Solving, and Kinematic Modeling as Themes of Arabic Astronomy. *Perspectives on Science* 6: 288-330.

———. 1996. Situating Arabic Science: Locality versus Essence. *Isis* 87: 654-670.

———. 1994. Philosophy and Science in Medieval Islamic Theology: The Evidence of the Fourteenth Century. *Zeitschrift für Geschichte der arabischen-islamischen Wissenschaften* 9: 1-42.

———. 1987. The Appropriation and Subsequent Naturalization of Greek Science in Medieval Islam: A Preliminary Statement. *History of Science* 25: 223-243.

———. 1984. The Andalusian Revolt against Ptolemaic Astronomy: Averroes and al-Biṭrūjī. In *Transformation and Tradition in the Sciences*, edited by Everett Mendelsohn, 133-155. Cambridge [Cambridgeshire]; New York: Cambridge University Press.

———. 1971. The Astronomical Origin of Ibn al-Haytham's Concept of Experiment. *Actes du XIIe Congrès International d'Histoire des Sciences*, *T.III A, Paris 1968*. Paris: Albert Blanchard. (Reprinted in A. I. Sabra, *Optics, Astronomy, and Logic in Arabic Science and Philosophy*, Aldershot, Hants: Variorum, 1994).

Saliba, George. 2007. *Islamic Science and the Making of the European Renaissance*. Cambridge, Mass.: MIT Press.

———. 2004. Aristotelian Cosmology and Arabic Astronomy. In *De Zénon d'Elée á Poincaré: recueil d'études en hommage á Roshdi Rashed*, edited by Régis Morelon and Ahmad Hasnawi, 251-269. Louvain: Peeters.

———. 2000. Arabic versus Greek Astronomy: A Debate over the Foundations of Science. *Perspectives on Science* 8: 328-341.

———. 1999. Astronomy and Astrology in Medieval Arabic Thought. In *Les doctrines de la science de l'antiquité à l'âge classique*, edited by R. Rashed and J. Biard, 131-165. Leuven: Peeters.

———. 1994a. Astrology/Astronomy, Islamic. In G. Saliba, *A History of Arabic Astronomy: Planetary Theories during the Golden Age of Islam*, 66-85. New York; London: New York University Press.

———. 1994b. Early Arabic Critique of Ptolemaic Cosmology: A Ninth-Century Text on the Motion of the Celestial Spheres. *Journal of the History of Astronomy* 25: 115-141.

———. 1991. The Astronomical Tradition of Maragha: A Historical Survey and Prospects for Future Research. *Arabic Sciences and Philosophy* 1/1: 67-101.

Sambursky, Samuel. 1962. *The Physical World of Late Antiquity.* Princeton: Princeton University Press.

Sayılı, Aydin. 1960. *The Observatory in Islam and its Place in the General History of the Observatory*. Ankara: Türk Tarih Kurumu Basımevi.

Shroeder, F. M. 1989. *Two Greek Aristotelian Commentators on the Intellect: The* De intellectu *attributed to Alexander of Aphrodisias and Themistius' Paraphrase of Aristotle* De anima 3.4-8. Introduction, translation, commentary, and notes by Frederic M. Schroeder and Robert B. Todd. Toronto: Pontifical Institute of Mediaeval Studies.

Serra, Giuseppe. 1993. Due studi arabo-latini. *Medioevo: rivista di storia della filosofia* 19: 27-66.

Sezgin, Fuat. 1967-. *Geschichte des arabischen Schrifttums*. 12 vols. Leiden: Brill.

Sharples, Robert W. 2003. Pseudo-Alexander on Aristotle, Metaphysics Λ. In *Alessandro di Afrodisia e la "*Metafisica*" di Aristotele*, edited by Giancarlo Movia, 187-219. Milano: Vita e pensiero.

Siorvanes, Lucas. 1996. *Proclus: Neo-Platonic Philosophy and Science*. New Haven: Yale University Press.

———. 1987. "Proclus on the Elements and the Celestial Bodies." PhD dissertation, University of London.

Sorabji, Richard (ed.). 2005. *The Philosophy of the Commentators, 200-600 AD: A*

Sourcebook, 3 vols. Ithaca, N.Y.: Cornell University Press.

———. 1988. *Matter, Space, and Motion: Theories in Antiquity and their Sequel*. London: Duckworth.

Steinschneider, Moritz. 1966 (reprint from 1869). *Al-Farabi (Alpharabius): des arabischen Philosophen Leben und Schriften*. Amsterdam, Philo Pres.

Stone, Abraham D. 2001. Simplicius and Ibn Sīnā on the Essential Corporeity of Material Substance. In *Aspects of Ibn Sīnā*, edited by Robert Wisnovsky, 73-130. Princeton, NJ: Markus Wiener.

Street, Tony. 2004. Arabic Logic. In *Handbook of the History of Logic*, edited by Dov M. Gabbay and John Woods, vol. 1, 523-597. Amsterdam: Elsevier.

Strohmaier, Gotthard. 1996. The Nature of the Supralunar World: From Anaxagoras to ibn al-Haytham. In G. Strohmaier, *Von Demokrit bis Dante*, 30-34. Hildesheim; Zürich; New York: Georg Olms Verlag.

Taub, Liba. 1993. *Ptolemy's Universe*. Chicago: Open Court.

Taylor, R. C. 1986. The *Kalām fī maḥḍ al-khair* in the Islamic Philosophical Milieu. In *Pseudo-Aristotle in the Middle Ages*, edited by Jill Kraye, W.F. Ryan and C.B. Schmitt, 37-52. London: Warburg Institute, University of London.

———. 1981. *The liber de causis* (*Kalām fī maḥḍ al-khair*): A Study of Medieval Neoplatonism. Toronto: School of Graduate Studies, University of Toronto.

Thillet, Pierre. 2003. Remarques sur le livre Lambda de la « Métaphysique ». *Recherches de théologie et philosophie médiévale* 70/2 : 361-401.

Thillet, Pierre and Saleh Oudaimah. 2001-2002. Proclus arabe, un nouveau *Liber de causis*? *Bulletin d'études orientales* 53-54: 293-369.

Todd, Robert B. 1989. 'Geminos.' In *Dictionnaire des philosophes antiques*, 3, 472-477. Paris: Éditions du Centre national de la recherche scientifique.

Trouillard, Jean. 1967-68. La genèse de l'hylémorphisme selon Proclos. *Dialogue: Revue canadienne de philosophie*, VI: 1-17.

Türker, Mubahat. 1968. L'importance et l'origine de la métaphysique chez al-Fārābī. *Ankara Universitesi Dil ve Tarih-Copgrafya Fakültesi Dergisi* xx/1-2: 55-64. Ankara.

Vajda, Georges. 1965. A propos d'une citation non identifiée d'al-Fārābī dans le « Guide des Egarés ». *Journal asiatique* 253: 43-50.

Vallat, Philippe. 2004. *Farabi et l'école d'Alexandrie: des prémisses de la connaissance à la philosophie politique.* Paris: Vrin.

Verrycken, Koenraad. 1990a. The Metaphysics of Ammonius Son of Hermeias. In *Aristotle Transformed*, edited by Richard Sorabji, 199-233. Ithaca: Cornell University Press.

———. 1990b. The Development of Philoponus' Thought and its Chronology . In *Aristotle transformed*, edited by R. Sorabji, 233-74. Ithaca: Cornell University Press.

Walzer, Richard. 1974. Aristotle's Active Intellect NOUS POIETIKOS in Greek and Early Islamic Philosophy. In *Plotino e il neoplatonismo in oriente e in occidente: [atti del convegno] Roma, 5-9 ottobre 1970.* Academia Nazionale dei Lincei, 423-436.

———. 1957. New Studies on al-Kindī. *Oriens* 10: 203-232.

———. 1950. The Rise of Islamic Philosophy. *Oriens* 3: 1-19.

Wiesner, Hillary Suzanne. 1993. "The Cosmology of al-Kindī." PhD dissertation, Harvard University.

Wilberding, James. 2006. *Plotinus' Cosmology: A Study of* Ennead *II.1 (40). Text, Translation, and Commentary*. Oxford: University Press.

Wildberg, Christian. 1988. *John Philoponus' Criticism of Aristotle's Theory of Aether*. Berlin; New York: Walter de Gruyter.

Wisnovsky, Robert. "Yaḥyā al-Naḥwī." *Encyclopaedia of Islam, Second Edition*. Edited by: P. Bearman, Th. Bianquis, C.E. Bosworth, E. van Donzel and W.P. Heinrichs. Brill, 2009. Brill Online. Mc Gill University. 02 February 2009 <http://www.brillonline.nl/subscriber/entry?entry=islam_SIM-7961>

———. 2005. Avicenna and the Avicennian Tradition. In *The Cambridge Companion to Arabic Philosophy*, edited by P. Adamson and R. C. Taylor, 92-137. Cambridge University Press.

———. 2003a. Towards a History of Avicenna's Distinction between Immanent and Transcendent Causes. In *Before and After Avicenna*, edited by David Reisman and Ahmed H. Al-Rahim, 49-68. Leiden: Brill.

———. 2003b. *Avicenna's Metaphysics in Context*. Ithaca, N.Y.: Cornell University Press.

———. 2002. Final and Efficient Causality in Avicenna's Cosmology and Theology. *Quaestio* 2: 97-123.

Wolfson, H. A. 1976. *The Philosophy of the Kalām*. Cambridge: Harvard University Press.

———. 1970. The Identification of *ex nihilo* with Emanation in Gregory of Nyssa. *Harvard Theological Review* 63: 53-60.

———. 1966. Plato's Pre-existent Matter in Patristic Philosophy. In *The Classical Tradition: Literary and Historical Studies in Honor of Harry Caplan*, edited by Luitpold Wallach, 409-420. Ithaca: Cornell University Press.

———. 1962. The Problem of the Souls of the Spheres from the Byzantine Commentaries on Aristotle through the Arabs and St. Thomas to Kepler. *Dumbarton Oaks Papers* 16: 65-93.

———. 1958. The Plurality of Immovable Movers in Aristotle and Averroes. *Harvard Studies in Classical Philology* 63: 233-253.

———. 1947-48. Arabic and Hebrew Terms for Matter and Element with Especial Reference to Saadia. *The Jewish Quaterly Review* 38: 47-61.

———. 1929. *Crescas' Critique of Aristotle: Problems of Aristotle's* Physics *in Jewish and Arabic Philosophy*. Cambridge: Harvard University Press.

Wright, L. 1973. The Astronomy of Eudoxus: Geometry or Physics? *Studies in History and Philosophy of Science* 4: 165-172.

Wright, M. R. 1995. *Cosmology in Antiquity*. London; New York: Routledge.

Yousef, Mohamed Haj. 2008. *Ibn ʿArabī: Time and Cosmology*. London; New York: Routledge.

Zimmermann, Fritz. 1994. Proclus Arabus Rides Again. *Arabic Sciences and Philosophy* 4: 9-51.

———. 1986. The Origins of the So-Called *Theology of Aristotle*. In *Pseudo-Aristotle in the Middle Ages: The Theology and Other Texts*, edited by Jill Kraye, W. F. Ryan, and C. B Schmitt, 110-241. London: The Warburg Institute, University of London.

Zonta, Mauro. 1994. Hebraica veritas: Temistio, parafrasi del *De coelo*. *Athenaeum: Studi periodici di letteratura e storia dell' antichita*, NS LXXXII: 403-428.