

THE UNIVERSITY OF CHICAGO

ASTROLOGY IN THE SERVICE OF THE EMPIRE:
KNOWLEDGE, PROGNOSTICATION, AND POLITICS AT THE OTTOMAN COURT,
1450s–1550s

A DISSERTATION SUBMITTED TO
THE FACULTY OF THE DIVISION OF THE HUMANITIES
IN CANDIDACY FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

DEPARTMENT OF NEAR EASTERN LANGUAGES AND CIVILIZATIONS

BY

AHMET TUNÇ ŞEN

CHICAGO, ILLINOIS

AUGUST 2016

Copyright © 2016 Ahmet Tunç Şen

All rights reserved

Table of Contents

Acknowledgments.....	v
Abbreviations.....	x
Notes on Transcription and Dates.....	xi
Abstract.....	xiii
Introduction—The Study of “Wretched Subjects” in the Early-Modern Ottoman History....	1
Sources and Their Problems	15
Theses Proposed in the Dissertation	27
Chapter One—The Most Mathematical of all Occult, the Most Occult of all Mathematical Sciences: The Epistemological Status of Astrology in the Medieval Islamic Intellectual Context.....	32
I. 1. Introduction.....	32
I. 2. Astrology and its Branches	36
I. 3. Astrology in the Medieval Islamic Classification of the Sciences.....	59
I. 4. Polemics Against Astrology and Astrologers.....	79
Chapter Two—How to be a <i>Munajjim</i> in the Ottoman Realm, 1450s–1550s: Vocational Training, Sources of Learning, and Venues of Knowledge.....	104
II. 1. Introduction.....	104
II. 2. State of the Field and the Problems of Terminology	110
II. 3. What did a <i>Munajjim</i> Need to Know?	119
II. 4. The Venues of Training on Astrologically Valid Knowledge.....	138
Chapter Three—Royal Patronage of Astrology, the Office of the Court <i>Munajjims</i> , and the Special Case of the Reign of Bāyezīd II (r. 1481-1512).....	164
III. 1. Introduction.....	164
III. 2. The Royal Patronage of <i>Munajjims</i> at the Ottoman Courts and the Reign of Bāyezīd II (r. 1481-1512)	171
III. 3. The Motives and Ramifications of Bāyezīd II’s Celestial Pursuits.....	198
III. 4. Individual Stories of Select <i>Munajjims</i>	213
Chapter Four—Chronicling the Past, Mirroring the Present, Divining the Future: <i>Taqwīms</i> (Almanac-Prognostications) in the Ottoman context.....	237
IV. 1. Introduction.....	237
IV. 2. <i>Taqwīm</i> as a special form of writing, <i>Taqwīm</i> as a specific genre in medieval and early modern Islamic literary tradition	241
IV. 3. <i>Taqwīm à l’Ottoman</i>	262
IV. 4. <i>Taqwīms</i> and Ottoman History Writing.....	279
IV. 5. <i>Taqwīms</i> and Contemporary Recognition.....	293

Chapter Five—From Bolstering Royal Claims to Expressing Self-Aggrandizement: Political and Personal Dynamics of Casting Horoscopes	305
V. 1 Introduction.....	305
V. 2. Nativity Books as a Means of Self-Propaganda.....	310
V. 3. Choosing the Most Auspicious Time for the Sultan and the Self.....	317
Conclusion	336
Appendix A: The list of astral experts at Bāyezīd II’s court, 1503-1512.....	340
Appendix B: The list of books on <i>‘ilm al-nujūm</i> and <i>‘ilm al-hay’ā</i> at the Palace library (1502-3).....	342
Appendix C: The list of examined extant <i>taqwīms</i> from the mid-fifteenth to the early-seventeenth century.....	353
Bibliography	364

Acknowledgments

I have accrued many debts in the long process of working on this dissertation. It is now a great pleasure to thank these people and institutions that offered their time, support, and guidance over the many years of my training, research, and writing.

First and foremost, I would like to thank the members of my dissertation committee, Professors Cornell H. Fleischer, Hakan T. Karateke, and John E. Woods for their constant support in the past years. I am greatly indebted to Cornell H. Fleischer, my dissertation advisor, who is indeed the main reason for me to have come to Chicago to pursue doctoral studies in early modern Ottoman cultural and intellectual history. Throughout this long journey I have continuously enjoyed his intellectual guidance, true mentorship, unique historical and philological erudition, and unwavering encouragement. I am also grateful to Hakan T. Karateke for his readiness to help in all sorts of academic and moral challenges over the past years of dissertation research and writing. I owe a lot to John E. Woods for his genuine interest in my project and generously sharing his unmatched knowledge on sources and problems of the post-Mongol Persianate world.

As a graduate student at the University of Chicago I have benefitted over the past eight years from the knowledge of model scholars and great teachers. Although not directly involved in my dissertation research and writing, I would like to extend my thanks to Professors Ahmed El Shamsy, Franklin Lewis, Fred Donner, Holly Shissler, Orit Bashkin, and Persis Berlekamp for their contribution to my scholarly formation and for being always ready to offer their intellectual and moral support. I cannot express enough my gratitude to

ostād Saeed Ghahremani and *al-ustādha* Kay Heikkinen for spending many hours to introduce me to the beauty and challenges of Persian and Arabic.

As my formal training was not in the history of science, the suggestions, comments, and questions I received from several prominent scholars in this field were immensely helpful to review and sharpen my views expressed in the dissertation. Although they did not have the chance to read the dissertation partly or *in toto*, I should thank Professors İhsan Fazlıođlu from Istanbul Medeniyet University, Jamil Ragep from McGill University, Robert Morrison from Bowdoin College, and Sonja Brentjes from Max Planck Institute for our informal conversations during conference meetings or through e-mail exchanges, by means of which have I greatly benefited from their vast knowledge and insights about the history of science in the post-classical Islamicate realm. Benno Van Dalen and Julio Samsó also timely shared through e-mail a number of unpublished works that enriched my arguments in the final stages of dissertation writing. Needless to say all shortcomings and errors that remain in this dissertation are my sole responsibility.

I would never have been able to finish this dissertation without the financial support of various institutions. The Division of the Humanities at the University of Chicago supported the first five years of my PhD studies in Chicago and granted in my final year the much-needed dissertation writing fellowship that permitted me to timely finish the dissertation. The generous supports of the American Research Institute in Turkey and the Social Science Research Council enabled me to conduct my research in the manuscript libraries and archives in Turkey and major European cities.

Speaking of the libraries and archives, I should thank to numerous scholars, librarians, and archivists in different corners of the world for allowing me to have access to the much-needed primary source materials. Zeynep Çelik Atbaş and her collaborators at the Topkapı Palace Museum Library provided a peaceful environment to discover the gems of their manuscript collection. Buket Özdemir from the Topkapı Palace Museum Archive made available to me several important documents despite the ongoing cataloging process in the Palace archive. Tahsin Tahaoğlu from the Boğaziçi University Kandilli University Library provided me with the images of texts now held in the rich astrological collection of that library. I am extremely grateful to İsmail Erünsal and Kenan Yıldız for generously sharing with me several important *tereke*s of the past *munajjims* and *muwaqqits* that they chanced upon during their own research. Marlis Saleh, now the director of the Middle East Collection at the Regenstein Library, made available many treasures kept at the “cage.” Without the help of the staff at the Ottoman Archives of the Prime Minister’s Office, Süleymaniye Library, Center for Islamic Studies (İSAM) in İstanbul, Library of Istanbul Archaeology Museums, Istanbul University Rare Works Library, Istanbul İsmail Hakkı Konyalı Library, Bibliotheca Medicea-Laurenziana in Florence, Bibliothèque Nationale de France in Paris, Bibliotheca Apostolica Vaticana in Rome, British Library in London, and Bodleian Library in Oxford, the research of this dissertation would have never been possible.

Various parts of this dissertation have been presented and discussed in front of different audiences. I am particularly thankful to the organizers and participants of the Early Modern Workshop, the Middle East History and Theory Workshop, and the Franke Institute for Humanities Dissertation Writing Group at the University of Chicago.

As a graduate student it is a big fortune to receive guidance and moral support from intellectual *ağabey*s and *ablas*. I am lucky to have found around a great many of them and I now would like to express my thankfulness to Abdurrahman Atçıl, Ertuğrul Ökten, Evrim Binbaş, Günhan Börekçi, Hasan Karataş, Kaya Şahin, Judith Pfeiffer, Matthew Melvin-Koushki, Nikolay Antov, Nükhet Varlık, and Sinan Ciddi for their willingness to listen and offer advice.

I have also enjoyed the company of friends and peers in Chicago and elsewhere, who helped and supported me in the past eight years in various ways. Mehmet Kuru, Aykut Mustak, and Emre Erol, the members of my old crew from Sabancı University have witnessed the every little bit of joy and misery during this long journey. I cannot express enough my gratitude to *aziz* Bill Walsh, who was always ready to offer his tremendous linguistic skills and historical knowledge to correct and refine my narrative. I was extremely lucky to have spent my entire PhD life working closely with Christopher Markiewicz on thematically and periodically overlapping subjects. With his critical insights and generosity to share his knowledge, Chris has contributed to this dissertation much more than he now probably thinks. I am also thankful to Basil Salem, whose true friendship to taking up the different sorts of existential crises caused by the ups and downs of a graduate student's life was one of the most rewarding experiences of my PhD life in Chicago. I would also like to extend my thanks here to Alidost Numan, Amir Toft, Annie Green, Andrea Brown, Carlos Grenier, Claire Roosien, Emin Lelić, Ercüment Asil, Fatih Kurşun, Ferenc Csirkes, Hasan Siddiqui, Hasan Umut, İpek Hüner-Cora, Jeremy Vecchi, Maddy Elfenbein, Mehmetcan Akpınar, Michael Bechtel, Mohamad Ballan, Nagihan Gür, Nicole Beckman Tessel, Pascal

Held, Richard Heffron, Sam Hodgkin, Süleyman Dost, Theodore Beers, Toygun Altıntaş, Yaşar Tolga Cora, and Zahit Atçıl for their friendship and collegiality I have greatly enjoyed over the past years.

This long journey could not have been completed without the unwavering support of my family in Turkey. I am sure they had a difficult time to understand why my absence has prolonged this much but they have always maintained their faith in me despite the emotional burden of physical distance. A few futile words cannot pay, of course, my debt to their patience and perseverance but I would like to thank my parents, my elder sisters, my brother-in-laws, and my nephew and niece for keeping up my spirits throughout.

Finally, it is more than pleasure to acknowledge my incalculable debt to Sümeyye, my wife and fellow traveller in life, who has been the mainstay of this dissertation. I am eternally thankful to her for her constant presence, affection, and patience to keep sharing all the joys and challenges of life with me. It is to her that this worthless dissertation is lovingly dedicated.

Abbreviations

BEA	The Biographical Encyclopedia of Astronomers
BML	Biblioteca Medicea Laurenziana
BnF	Bibliothèque Nationale de France
BOA	Başbakanlık Osmanlı Arşivleri
EI ²	Encyclopedia of Islam, second edition
EI ³	Encyclopedia of Islam, third edition
EIr	Encyclopaedia Iranica
IRCICA	Research Centre for Islamic History, Art, and Culture in Istanbul
İA	Milli Eğitim Bakanlığı İslam Ansiklopedisi
İÜ	İstanbul Üniversitesi
OALT	Osmanlı Astronomi Literatürü Tarihi
OASTLT	Osmanlı Astroloji Literatürü Tarihi
SK	Süleymaniye Kütüphanesi
TDVİA	Türkiye Diyanet Vakfı İslam Ansiklopedisi
TOEM	Tarih-i Osmanî Encümeni Mecmuası
TSMA	Topkapı Sarayı Müzesi Arşivi
TSMK	Topkapı Sarayı Müzesi Kütüphanesi
TTK	Türk Tarih Kurumu

Notes on Transcription and Dates

For the Romanization of texts written in Arabic, Persian, and Ottoman Turkish, I used a slightly modified version of the conventional transliteration system established by the *IJMES* (*International Journal of Middle Eastern Studies*). The modification I applied is as follows: In for [ح] in Ottoman Turkish I used [h] instead of [h].

For the ease of readers, I have included the transliterations of all passages that I partially or fully translated from primary sources. Some of my readings are necessarily tentative, thus I will appreciate if the wider scholarly community may offer alternative readings to my work.

Turkish words in Arabic and Persian texts, and some of the common appellations still used in modern Turkish are transliterated according to the conventions of modern Turkish. Hence *Beg* not *Bīg*; *Paşa* not *Pāshā*; or *Çelebi*, not *Çelebī*. This holds true for the Anglicized versions of the place names.

I follow the rules of Arabic transliteration whenever I refer in the main text to some terms or concepts common in all three languages. The reader will thus find *taqwīm* and not *takvim*; *munajjim* not *müneccim*; *muwaqqit* not *muvakkit*; ‘*ulāmā*’ not *ulema*; or *mudarris* not *müderriş* when these words are used in the main body in isolation from particular text or context. The use of original words for the terms instead of their equivalence in English is a deliberate choice for the purposes of this dissertation, as words and phrases commonly used in English do not always fully capture their historical and cultural nuances. For the extended quotations from original sources provided in the footnotes, however, I transliterate the words according to the language conventions in which the original passage was written. Therefore the readers should not consider it an inconsistency to find in these quoted passages such multiple uses as *taqwīm* (Arabic),

taqvīm (Persian), and *taḳvīm* (Ottoman Turkish), because each one is transliterated according to the transliteration conventions of the language in which the original passage is written.

With regard to the names of individuals transliterated in the Roman alphabet, I also try to follow the transliteration conventions of the language that predominated in the context of the concerning individual's activity. Thus, the names of those individuals particularly tied to the Ottoman context are transliterated using the Turkish guidelines, and others according to their own contentions. (Hence *Meḥmed II* not *Muḥammad II*; *Ṭaşköprizāde* not *Ṭāshkuprīzāda*; *Yūsuf b. 'Ömer el-Sā'atī* not *Yūsuf b. 'Umar al-Sā'atī*; or *Shukrullah Shirvānī* not *Shirwānī*). It is not always easy, however, to detect in which linguistic context did the individual flourish. This is especially true for the period (i.e. from the mid-fifteenth to the mid-sixteenth century) and subject matter (i.e. émigré scientists and *munajjims*) examined in this dissertation. The constant flow of scholars from one particular geographic context to another where the cultural and linguistic boundaries were much more fluid than currently presumed present a major challenge. Could we really assume, for instance, Qāḏīzāda-i Rūmī or 'Alī Qūshjī as "Ottoman" astral experts, while the whole cultural and political concept of "Ottoman" was still in the making and while these individuals are known to have gained prominence in different politico-cultural contexts? Keeping this challenge always in mind, in such cases where the name and epithet of the individual give an idea about his linguistic background and context, I follow the transliteration conventions of that particular language. (Hence *Salmān-i 'Ajam*, not *Selmān-i 'Acem*; *Necmeddīn b. Seyyid Muḥammed* from Bursa, not *Najm al-Dīn b. Sayyid Muḥammad*, or *Mevlānā Kūçek el-Amāsī*, not *Mawlānā Kūchak al-Amāsī*).

Dates are given according to the Common Era unless otherwise is specifically noted.

Abstract

This dissertation explores the intellectual, cultural, and political history of knowledge in the late-medieval and early modern Ottoman context by examining the fifteenth- and sixteenth-century Ottoman astrological corpus. This corpus consists primarily of *taqwīms* (almanac-prognostications), occasional horoscopes, textbooks imparting astrological principles, and the examples of the *zīj* literature written in Persian and Ottoman Turkish. This dissertation argues that exploring hitherto neglected astrological sources and visiting the lives of hitherto marginalized astral experts (*munajjims*) provides important insights into the intersecting dynamics of science, politics, and culture in the late-medieval and early modern Ottoman and Islamicate culture.

This study consists of three major parts, each undertaken with a combination of different historiographical approaches. The first part (Chapter 1) examines the intellectual and cultural history of astrological practice in the late-medieval and early modern Islamicate culture. I argue that contrary to the scholarly convictions in the historiography of Arabic science, astrology retained its prestigious status as a learned discipline with complex astronomical and mathematical underpinnings. The heightened interest during this period in the eastern Islamic lands in conducting observational enterprises and updating the available celestial data in the astronomical tables was inextricably related to the need for undertaking more accurate practice of astrology.

The second part (Chapter 2 and Chapter 3) of the dissertation focuses on the social history of *munajjims* in the Ottoman realm and tries to understand the complex social and patronage dynamics within which they functioned. By tracking their career trajectories from their

vocational training to professional service, this part addresses several questions about the contents, mechanisms, and institutional structures of learning and practicing astrologically valid knowledge.

The third, and the last, part (Chapter 4 and Chapter 5) examines in a detailed fashion the personal and political implications of the ever-changing textual contents and constituents of almanac-prognostications (*taqwīm*) and other occasional horoscopes. By documenting the political significance and public recognition of astrological prognostications, this part demonstrates the ability of often-marginalized astrological texts to provide surprising complementary details about the early modern Ottoman political culture.

Introduction—The Study of “Wretched Subjects” in the Early-Modern Ottoman History

In 1950, George Sarton, who is usually considered the true founder of the modern academic discipline of the history of science, wrote a brief review of a book on Mandaean astrology. Reflecting the general scholarly biases of his time, Sarton dismissed the work as a “wretched collection of omens, debased astrology and miscellaneous nonsense ultimately derived from Arabic, Greek, Persian and of all the superstitious flotsam of the Near East.”¹ For Sarton, modern historical scholarship should not take seriously the astrological and cognate divinatory texts, unless they are instrumentally used to illustrate the progress of human civilization. For instance, in his own three-volume magnum opus, *Introduction to the History of Science*, Sarton justified the reasons he had to refer in his study to astrology and other “intellectual delusions” by saying that it is not possible to outline “the progress [of humanity] without giving ... a brief account of the intellectual delusions, which often delayed our advance or threatened to sidetrack it.”²

No later than a year after Sarton published his book review, another important historian of science Otto Neugebauer, himself the leading authority on ancient mathematics and astronomy, wrote a one-page long reply to Sarton under the title “The Study of Wretched Subjects.” In his short but influential reply Neugebauer condemned his colleague’s stance and

¹ George Sarton and Frances Siegel, “Seventy-Sixth Critical Bibliography of the History and Philosophy of Science and of the History of Civilization,” *Isis* 41/3-4 (1950), 328-424, these words are found on page 374. The work reviewed by Sarton was Ethel Stefana Drower’s study entitled “The Book of the Zodiac: Sfar Malwa[^]sia.”

² George Sarton, *Introduction to the History of Science*, v. 1 From Homer to Omar Khayyam (Baltimore: The Williams and Wilkins Company, 1927).

pointed out the importance of studying these texts, which, he wrote, provide “an insight into the daily life, religion and superstition, and astronomical methods and cosmogonic ideas” of individuals living in the past. For Neugebauer, Sarton’s words destroy the very foundations of historical and philological studies, that is, “the recovery and study of the texts as they are, regardless of our own tastes and prejudices.”³

Although it is difficult to say that Neugebauer’s insightful remarks have decisively won the battle in modern scholarship, over the last few decades a substantial amount of literature has accumulated especially in European historiography, acknowledging the significance of astrological sources for historical purposes. Since astrology, as a focal point of medieval and early modern worldview, had repercussions in a wide array of contexts ranging from social and political to intellectual and cultural, different studies have highlighted diverse aspects to which the study of astrological practice and textual, as well as visual artifacts could be applied. Several studies have examined, for instance, the courtly interest in astrology from the perspective of the political and ideological claims of medieval and early-modern dynasties.⁴ Historians of science scrutinized the influence of astrological concerns and activities on the development of new astronomical theories and instruments.⁵ Cultural and intellectual historians have explored the

³ Otto Neugebauer, “The Study of Wretched Subjects,” *Isis* 42/2 (1951), 111.

⁴ While the literature on the topic is vast, I find the following monographs useful due to their relevance with regard to the questions about the courtly patronage of astrology in the early modern Ottoman context: Hillary M. Carey, *Courting Disaster: Astrology at the English Court and University in the later Middle Ages* (New York: St. Martin’s Press, 1992); Monica Azzolini, *The Duke and the Stars: Astrology and Politics in Renaissance Milan* (Cambridge, Mass.: Harvard University Press, 2013); Darin Hayton, *The Crown and the Cosmos: Astrology and the Politics of Maximilian I* (Pittsburgh, Pa.: University of Pittsburgh Press, 2015).

⁵ For the role of astrological preoccupations in Copernicus’ scientific endeavors, see: Robert S. Westman, *The Copernican Question: Prognostication, Skepticism, and Celestial Order* (Berkeley: University of California Press, 2011). The same also applies for Kepler, another

complex social and intellectual dynamics underlying the scientific enterprises of past astrologers and their professional careers.⁶ Many social and religious historians have delved into the heated debates among the learned individuals of the medieval and early modern times as regards to the epistemological validity and religious permissibility of astrology.⁷ The role accorded to the astrological theory and practice within the broader religious and apocalyptic discussions of the late medieval and early modern European world has also received substantial scholarly consideration.⁸ Last but not least, the ways through which astrological symbolism was visually expressed have grasped the attention of art historians.⁹

important figure of the so-called “Scientific Revolution.” See: Patrick Boner, *Kepler’s Cosmological Synthesis: Astrology, Mechanism, and the Soul* (Leiden: Brill, 2013). Galileo’s astrological activities at the court of Cosimo II de Medici has also been examined in the following study: Mario Biagioli, *Galileo, Courtier: The Practice of Science in the Culture of Absolutism* (Chicago: The University of Chicago Press, 1993).

⁶ The leading example is Anthony Grafton’s micro historical study of a Renaissance astrologer’s life. See: Anthony Grafton, *Cardano’s Cosmos: The Worlds and Works of a Renaissance Astrologer* (Cambridge, Mass.: Harvard University Press, 1999).

⁷ For a compact analysis of the conflicting views of some of the leading Renaissance thinkers, see: Steven Vanden Broecke, *The Limits of Influence: Pico, Louvain, and the Crisis of Renaissance Astrology* (Leiden: Brill, 2003).

⁸ See especially the following works: Laura Ackerman Smoller, *History, Prophecy, and the Stars: the Christian Astrology of Pierre D’Ailly, 1350-1420* (Princeton, N.J.: Princeton University Press, 1994); Paola Zambelli (ed.), *“Astrologi hallucinati”: Stars and the End of the World in Luther’s Time* (Berlin; New York: W. de Gruyter, 1986).

⁹ The pioneering work in this area is Aby Warburg’s brief examination of the astrological iconography of the Schifanoia Palace. See: Aby Warburg, *Italienische Kunst und Internationale Astrologie Im Palazzo Schifanoja Zu Ferrara ; Piero Della Francesca’s Constantinsschlaecht in Der Aquarellcopie von Johann Anton Rambouse* (Roma: Maglione & Strini, 1922). For a concise but inspiring analysis of the power of astrological symbolism in the Renaissance thought and art, see: Eugenio Garin, *Astrology in the Renaissance: the Zodiac of Life*, tr. by Carolyn Jackson and June Allen (London; Boston: Routledge & Kegan Paul, 1983). For the impact of astrological science upon the Renaissance visual culture, see: Mary Quinlan-McGrath, *Influences: Art, Optics, and Astrology in the Italian Renaissance* (Chicago: The University of Chicago Press, 2013).

In the Ottoman, and to a certain extent Islamic studies, however, the old Sartorian reluctance has dominated the field, preventing scholars from recognizing astrology as a legitimate object of historical study, and astrological texts as valuable historical documents. This modern scholarly disdain has several reasons, the foremost of which is the “embarrassment factor” that pushes researchers, especially the historians of science and intellectual historians, to pass over astrological materials in silence, lest these texts and documents reproduce the Orientalist perceptions as regards to the overall incompatibility of exact, rational sciences with Islamic doctrines.¹⁰ Ever since the late nineteenth century when French orientalist Ernest Renan gave his controversial lecture “*L’islamisme et la Science*” in which he argued that Islam is inherently irrational and essentially incapable of producing real “science”, “Muslim” scholars and modern historians of “Arabic” sciences have gone to great lengths to disprove this line of thinking.¹¹ Although the scholarship that has pointed out the global importance of the “scientific” achievements attained in the Islamicate past, especially in the so-called post-classical era, is a welcome development that helps unseat the established misperceptions and Orientalist biases about the perennial question of science *vs.* religion (or read Islam), the excessive emphasize upon the “legitimate sciences” —legitimate in the sense of modern, positivist, progressive scientific standards— has inevitably led to the marginalization of astrological materials in relevant historical studies.

¹⁰ I borrowed this term from Ann Geneva, who raised it as one of the major factors of the unfair treatment of astrological materials in modern Anglo-Saxon academic environment. See Ann Geneva, *Astrology and the Seventeenth Century Mind: William Lilly and the Language of the Stars* (Manchester: Manchester University Press, 1995), 3.

¹¹ For the English translation of Ernest Renan’s lecture, see Sally P. Ragep’ translation *Islam and Science. A Lecture presented at La Sorbonne 29 March 1883 by Ernest Renan*, accessible at: https://www.mcgill.ca/islamicstudies/files/islamicstudies/renan_islamism_cverson.pdf

With respect to the trends in modern Ottoman studies, the dearth of scholarly interest in Ottoman astrological materials is not surprising indeed, given the fact that throughout the almost century-long history of modern Ottoman historiography, cultural and intellectual history as well as the history of science have attracted much less attention as opposed to the political, social, and economic history.¹² Up until October 2015 the only attempt to produce a general survey book on the history of science in the Ottoman world was that of Adnan Adıvar's brief survey, *La Science chez les Turcs Ottomans*, which he first published in 1939 with a certain teleological bent characteristic of the time.¹³ It is true that since the publication of Adıvar's book, many individual contributions have appeared in the history of astronomy, mathematics, medicine, geography, or applied sciences; and from the mid-1980s on, thanks to the collaborative research projects coordinated by the Research Centre for Islamic History, Art, and Culture (IRCICA) in Istanbul, a series of reliable bio-bibliographical catalogs have been produced to inventorize all the available scientific manuscripts from the Ottoman period.¹⁴ In all these scholarly efforts, however,

¹² For the brief history of the trends in modern Ottoman historiography, see: Oktay Özel and Gökhan Çetinsaya, "Türkiye'de Osmanlı Tarihçiliğinin Son Çeyrek Yüzyılı: Bir Bilanço Denemesi," *Toplum ve Bilim* 91 (2001-2), 8-38.

¹³ Adnan Adıvar, *La Science chez les Turcs Ottomans* (Paris: Maisonneuve, 1939). The work was translated in the early 1940s into Turkish with substantial additions. See: Adnan Adıvar, *Osmanlı Türklerinde İlim* (İstanbul: Maarif Matbaası, 1943). In October 2015, Miri Shefer-Mossensohn published the second derivative work—with limited use of new primary sources—on the Ottoman scientific enterprises. See: Miri Shefer-Mossensohn, *Science among the Ottomans: The Cultural Creation and Exchange of Knowledge* (Austin, TX: University of Texas Press, 2015). In between the works of Adıvar and Shefer-Mossensohn, one may also consider consulting Ekmeleddin İhsanoğlu's collected essays in *Science, Technology, and Learning in the Ottoman Empire* (Aldershot, UK: Ashgate Variorum, 2004).

¹⁴ Up until 2011, IRCICA completed the following published catalogues: *History of Astronomy Literature during the Ottoman Empire* (in 1997) in two volumes, *History of Mathematical Literature during the Ottoman Empire* (in 1999) in two volumes, *History of Geographical Literature during the Ottoman Empire* (in 2000) in two volumes, *History of Music Literature during the Ottoman Empire* (in 2003) in one volume, *History of Military Art and Science*

astrology and sister divinatory sciences have received the minimum possible scholarly attention. It is highly telling that in his preface to the latest issue of the IRCICA's catalog series, which was published in 2011 with the aim of introducing Ottoman astrological lore, Ekmeleddin İhsanoğlu expressed, as the editor of the catalogue series, a late apology for having deliberately dismissed such a rich body of astrological materials for so long:

“While we were preparing the first two volumes on astronomy we had chosen to leave aside the works on astrology on account of the latter generally being considered as an ‘occult science.’ This was due to our understanding of the sciences at the time: our intention was to exclude astrology from the body of sciences that are based on observation and experiment and to consider it a ‘pseudo-science.’ But quite a long time passed since then, and given the maturity presently reached in history of science studies we believe that it was not the right choice and we are compensating for it now as we complete the series.”¹⁵

The scientific activities among the Ottomans, including the so-called “pseudo-scientific” practices of astrology and divination, did not only escape the attention of the Ottoman historians. The broader and more established field of the history of science, learning, and knowledge in the past Islamic societies has also generally underestimated the Ottoman scientific enterprises at the expense of underlining the “Arabic” scientific production during the so-called “classical” era or the “Golden Age.” Although in the past two decades a number of important works have appeared that are critical of the infamous “decline paradigm,” the narrative that still prevails —maybe less so in the current academic environment than in more popular media— is the one recounting that

Literature during the Ottoman Empire (in 2004) in two volumes, *History of the Literature of Natural and Applied Sciences during the Ottoman Empire* (in 2006) in two volumes, *History of the Literature of Medical Sciences during the Ottoman Empire* (in 2008) in four volumes, and *History of Ottoman Astrology Literature* (in 2011) in one volume.

¹⁵ *Osmanlı Astroloji Literatürü Tarihi ve Osmanlı Astronomi Literatürü Tarihi Zeyli/History of Ottoman Astrology Literature* (from now on *OASTLT*), ed. Ekmeleddin İhsanoğlu (İstanbul: IRCICA, 2011), xxvii.

roughly between the ninth and twelfth centuries, the intellectual and scientific activities in the Islamic world peaked and yielded the most important scientific achievements of the Islamic civilization, and that this scientific vitality and productivity was gradually replaced, from Ghazālī (d. 1111) onwards, by religious conservatism and traditionalism.¹⁶

Interesting enough, the available scholarship on the history of astrology in the pre-modern Islamic world does not escape the established Golden Age rhetoric. Over the past few decades, thanks especially to the meticulous efforts of David Pingree, Richard Lemay, Charles Burnett, Michio Yano, and Keiji Yamamoto, some of the major texts of Islamic astrological canon such as the works of Mashāʾllāh (d. 815), Abū Maʿshar (d. 886), al-Qabīṣī (d. 967), and Kūshyār (d. 1029) have been edited, annotated, and translated into English or Latin.¹⁷ Moreover, David Pingree has shed much light upon the transmission of astrological theories and concepts from the Indian, Sassanian, and Hellenistic traditions into the early Islamic realm.¹⁸ The controversial status of astrologers in medieval Islamic society, their courtly presence and services for their clients have also been treated in a few case studies that I will discuss in greater detail in the third chapter. However, with their implicit focus upon “Arabic” astrological sources produced in the so-called “classical” period of Islamic history, these valuable contributions either

¹⁶ For a succinct evaluation of the problems of the decline paradigm in modern studies on the history of science in the Islamic context, see: Sonja Brentjes, “The Prison of Categories—‘Decline’ and its Company,” in *Islamic Philosophy, Science, Culture, and Religion: Studies in Honor of Dimitri Gutas*, ed. Felicitas Opwis and David Reisman (Leiden: Brill, 2012), 131-56.

¹⁷ See the Bibliography for the complete list of edited-published astrological sources.

¹⁸ David Pingree, “Indian Influence on Sassanian and Early Islamic Astronomy and Astrology,” *Journal of Oriental Research* [Madras] 34-35 (1964-1965), 118-126; *idem.*, “Māshāʾallāh: Some Sasanian and Syriac Sources,” in *Essays on Islamic Philosophy and Science*, ed. G.F. Hourani (Albany, NY: State University of New York Press, 1975), 5-14; *idem.*, “From Alexandria to Baghdād to Byzantium. The Transmission of Astrology,” *International Journal of the Classical Tradition* 8 (2001), 3-37.

intentionally or accidentally reproduce the narrative of the “Golden Age.” Even the encyclopedic works of Manfred Ullmann and Fuat Sezgin on the major astrological sources in the Islamic past easily manifest that the production of astrologically significant materials after the twelfth century in languages other than Arabic is not necessarily deemed worthy of examination.¹⁹

Reproducing the “Golden Age” rhetoric is not the only pitfall of current scholarship. The astrological texts that have been edited and studied so far seem mostly to be textbooks that impart the basic theoretical knowledge about the universal rules and principles of the nature and characteristics of the planets, zodiacal signs, and other celestial phenomena. We should not forget, however, that astrology was an applied science that drew on sophisticated astronomical and mathematical knowledge, and was put in use for concrete purposes. Therefore these textbooks, albeit their immense value in regard to their content, present very little on how astrology was actually practiced for specific occasions. For that purpose one should look at a wide array of texts ranging from the *zīj*es (astronomical handbook of tables) that provided necessary mathematical-astronomical information for making astrological calculations, to other and more context-dependent forms of astrological production like annual almanac-prognostications (*taqwīms*) and occasional horoscopes.²⁰ These types of sources are crucial, because they illustrate how astrology was put into concrete practice in a particular milieu; as such they are by nature responsive to and representative of their immediate historical, political, and cultural contexts. Moreover, these texts provide invaluable information for inquiries into the

¹⁹ Manfred Ullmann, *Die Natur- und Geheimwissenschaften im Islam* (Brill; Leiden, 1972), 271-358; Fuat Sezgin (ed.), *Geschichte des arabischen Schrifttums*, Band 7: Astrologie-Meteorologie und Verwandtes bis ca. 430 H. (Brill: Leiden, 1979).

²⁰ Relevant information on modern studies about the *zīj*es is given in the first chapter where I will discuss in greater detail the importance of these texts for astrological calculations.

cross-cultural scientific exchanges and developments, as they document which astronomical sources (*zījēs*) and astrological theories were utilized by different *munajjims* at different times.

I should note here that in terms of the availability of extant astrological materials from diverse genres, historians from other subfields of the Islamic studies are not as fortunate as their Ottomanist counterparts. The amount of *taqwīms* (almanac-prognostications), occasional horoscopes, and manuals for astrological practice currently held in major manuscript libraries in Turkey and elsewhere outnumber any set of extant astrological materials from other parts and periods of the Islamic past. For example the best bibliographical sources on surviving Ottoman *taqwīms*, IRCICA's *Osmanlı Astroloji Literatürü Tarihi* and the two volumes of *Kandilli Rasathanesi El Yazmaları Kataloğu*, list more than 200 almanac-prognostications composed during the period 1421-1850.²¹ This list is far from complete, as many *taqwīms* have been certainly lost altogether and/or some additional ones doubtless survive undiscovered within obscure collections. IRCICA's same catalogue also locates a handful of nativities produced for members of the Ottoman house. We should add to these manuscript sources related archival documents now kept primarily in the Prime Ministry Ottoman archives (*Başbakanlık Osmanlı Arşivleri*), and to a lesser extent in the Topkapı Palace Museum Archive (*Topkapı Sarayı Müzesi Arşivi*). These archival documents include petitions written by the court *munajjims*, registers of expenses listing their salaries, and brief astrological memos delivered by astrologers at the behest of different parties from the ruling elites.

²¹ Günay Kut, *Kandilli Rasathanesi el yazmaları : Boğaziçi Üniversitesi Kandilli Rasathanesi ve Deprem Araştırma Enstitüsü astronomi, astroloji, matematik yazmaları kataloğu 1 – Türkçe Yazmalar* (İstanbul: Boğaziçi Üniversitesi Yayınevi, 2007); *Ibid.*, *Kandilli Rasathanesi el yazmaları : Boğaziçi Üniversitesi Kandilli Rasathanesi ve Deprem Araştırma Enstitüsü astronomi, astroloji, matematik yazmaları kataloğu 2 – Arapça ve Farsça Yazmalar* (İstanbul: Boğaziçi Üniversitesi Yayınevi, 2013); *OASTLT*.

In terms of the distribution of astrological sources across time, the quantity and variety of available materials significantly increases from the late seventeenth century onwards but there is still a considerable amount of surviving texts and documents from the period covered throughout this dissertation. One may question here why I chose this particular period while the source pool is obviously much deeper and wider for later centuries.

It is indeed not arbitrary to select 1450s and 1550s as the two ends of the chronological scope of this project. The period stretching from the Ottoman conquest of Constantinople in 1453 to the eventual “classicization” of the imperial bureaucratic organization and the emergence of a distinctive “Ottoman” culture by the 1550s was the crucial formative stage for the structuring of the empire in the spheres of political, ideological, cultural, and intellectual life. This process, however, was not a linear one. On the contrary, it was marked by a “multiplicity of competing or contradictory cultural and social ideals and assumptions” that were constantly shaped and reshaped by the pressing political and religious dynamics of the time.²² Mehmed the Conqueror’s (r. 1444-46, 1451-1481) attempts to fashion an imperial identity and culture upon the conquest of Constantinople, the fierce succession struggle between his sons Cem (d. 1495) and Bāyezīd II (r. 1481–1512), the alarming—in the eyes of contemporary Ottoman ruling elites—rise of the Safavids as the ultimate political embodiment of the widespread messianic currents, the sudden territorial expansion during the reign of Selīm I (r. 1512-1520) toward the traditionally Islamic territories, and the grand religio-political ambitions of Süleymān to establish

²² What Cornell Fleischer has proposed for describing the vibrancy and significance of the first three decades of Süleymān’s reign can in fact be easily extended into this century-long period starting from the Ottoman conquest of Constantinople. See: Cornell H. Fleischer, “The Lawgiver as Messiah: The Making of the Imperial Image in the Reign of Suleyman,” in *Soliman le magnifique et son temps*, ed. Gilles Veinstein (Paris: La Documentation Française, 1992), 159-177.

universal rule, particularly identifiable during the first half of his reign, all brought novel issues and problems, leaving their traces upon contemporary history writing, epistolographic documents, legal texts, hagiographical accounts, literary works, and an array of astrological and prognostic materials.²³

This period also coincided with the growing encroachment, especially in the Eastern Islamic domains, of messianic discourse into the political, intellectual, and religious life that was often validated by the principles of occult sciences, particularly the science of the letters. Concerning the role of this ideological trend in Timurid, Ottoman, Safavid, and Mughal political and cultural contexts, the last decade has witnessed the publication of several important studies.²⁴ In this growing literature, this period is sometimes even defined as the “Messianic Age” that

²³ For the impact upon history writing, see: Kaya Şahin, *Empire and Power in the Reign of Süleyman: Narrating the Sixteenth-Century Ottoman World* (New York: Cambridge University Press, 2013); for legal writings, see: Snjezana Buzov, “The Lawgiver and His Lawmakers: The Role of Legal Discourse in the Change of the Ottoman Imperial Culture.”(Ph.D. Dissertation, University of Chicago, 2005).

²⁴ One of the pioneering studies is that of Jean Aubin’s “Le mécénat timouride à Chiraz,” *Studia Islamica* 8 (1957), 71-88. The rest is mostly from the last decade: Cornell H. Fleischer, “Mahdi and Millenium: Messianic Dimensions in the Development of Ottoman Imperial Ideology,” in *The Great Ottoman-Turkish Civilization. Vol. 3, Philosophy, Science and Institutions*, ed. by Kemal Çiçek (Ankara: Yeni Türkiye, 2000), 42-54; *idem.*, “Seer to the Sultan: Haydar-i Remmal and Sultan Süleyman,” in *Cultural Horizons. A Festschrift in Honor of Talat S. Halman* vol. 1 (New York: Syracuse University Press, 2001), 290–300; *idem.*, “Ancient Wisdom and New Sciences: Prophecies at the Ottoman Court in the Fifteenth and Early Sixteenth Centuries,” in *Falnama: The Book of Omens* ed. by Massumeh Farhad and Serpil Bağcı (Washington: Smithsonian Institution, 2009), 231-245; İhsan Fazlıoğlu, “Forcing the Boundaries in Religion, Politics and Philosophy-Science in the Fifteenth Century” (Paper presented at the Conference Before the Revolutions: Religions, Sciences and Politics in the Fifteenth Century, Berlin, January 13-15, 2005); Evrim Binbaş, “Sharaf al-Dīn ‘Alī Yazdī (ca. 770s-858/ca. 1370s-1454): Prophecy, Politics, and Historiography in Late Medieval Islamic History.” (Ph.D. Dissertation, The University of Chicago, 2009); Azfar Moin, *The Millennial Sovereign: Sacred Kingship and Sainthood in Islam* (New York: Columbia University Press, 2012); Matthew Melvin-Koushki, “The Quest for a Universal Science: The Occult Philosophy of Şa‘īn al-Dīn Turka Isfahani (1369-1432) and Intellectual Millenarianism in Early Timurid Iran.” (Ph.D. Dissertation, Yale University, 2012).

hosts messiahs and mystics, and “comprehends in its various iterations everything from metaphysics, cosmogony to numerology, astrology and magic.”²⁵ It is true that Islamic history is replete with periods of millenarian activity and heightened apocalyptic expectations.²⁶ However, the fifteenth-and early-sixteenth-century chapters of this history are quite unprecedented, because this transitional era that follows the devolution of the Abbasid and Chingizid models of rule and preluding the consolidation of the “territorial” Muslim empires of the Ottomans, Safavids, and Mughals provided a suitable political and cultural environment for the messianic movements to gain a stronger foothold.²⁷ Moreover, the turn of the tenth century Hijra by 900 (1494/1495 in Common Era) might have also intensified the expectations about the imminence of the end of the first Islamic millennium, and thus the end times.

Despite the current promising status of the studies on the impact of messianic claims couched in occult scientific discourse, modern scholars may rush either to stretch their claims without necessarily drawing upon substantial empirical evidence, or to put everything in the same basket without paying required attention to important epistemological nuances between different (occult) “scientific” practices. Azfar Moin, for instance, says at the beginning of his study that this was a period in which “future was as important as the past, divination as important as genealogy, and astrology as valuable as history.”²⁸ Although such an inspiring remark aptly

²⁵ Shahzad Bashir describes this era as such. See: Shahzad Bashir, *Messianic Hopes and Mystical Visions: the Nūrbakhshīya Between Medieval and Modern Islam* (Columbia: University of South Carolina Press, 2003), 31. See also Matthew Melvin-Koushki, “The Quest for a Universal Science,” 5-6.

²⁶ See: David Cook, *Studies in Muslim Apocalyptic* (Princeton, N.J.: Darwin Press, 2002).

²⁷ For the importance of the fifteenth century in term of political experimentation and ideological innovation, see: John E. Woods, *The Aqqyunlu: Clan, Confederation, Empire*, revised and expanded edition (Salt Lake City: The University of Utah Press, 1999), 1-10.

²⁸ Azfar Moin, *The Millennial Sovereign*, 11.

points out the urgency of taking astrological sources seriously, the author does not examine in his own study the extant Safavid and Mughal astrological sources, and relies almost exclusively upon contemporary chronicles, literary writings, and visual materials where one can relatively easily find astral/cosmological references.

I do not intend to undermine here the importance of non-astrological texts to appraise the popular dissemination and political adaptation of astrological theories and metaphors. Quite the contrary, these non-technical texts are crucial to measure the extent of the permeation of astrological theories into more popular variants of the writing culture. For instance, in his *Risālat al-hudā*, Muḥammad Nūrbakhsh (d. 1464) deployed the views of Ptolemy and Naṣīr al-Dīn Ṭūsī (d. 1274) to bolster his claim of the Mahdi status.²⁹ The ceremonies at the court of Mughal emperor Humāyūn (r. 1530-1540; 1555-1556) were organized based on astrological/cosmological principles.³⁰ Many rulers in the post-Timurid era including some of the Ottoman sultans were touted, on the basis of astrological principles, as the *ṣāhib-qirān* (lord of

²⁹ Shahzad Bashir, “The Risalat al-Huda of Muhammad Nurbaks (d. 869/1464). Critical Edition with Introduction,” *Rivista degli Studi Orientali*, 75/1-4 (2001), 87-137. For the early Islamic use of astronomical knowledge for messianic claims, see David Cook, “Messianism and Astronomical Events during the First Four Centuries of Islam,” in *Mahdisme et Millenarisme en Islam*, ed. by Mercedes Garcia-Arenal (Aix-en-Provence: E’disud, 2001), 29-51. This seems also true for early modern European religious context. See: Paola Zambelli (ed.), *Astrologi hallucinati. Stars and the End of the World in Luther’s Time* (Berlin; New York: de Gruyter, 1986); Zambelli, “Fine del mondo o inizio della propaganda?” *Scienze, credenze, occulte, livelli di cultura. Convegno Internazionale di Studi* (Firenze: Olschki, 1982), 291-368; Robin Bruce Barnes, *Prophecy and Gnosis: Apocalypticism in the Wake of the Lutheran Reformation* (Stanford: Stanford University Press, 1988).

³⁰ Eva Orthmann, “Court Culture and Cosmology in the Mughal Empire: Humayun and the Foundations of the Din-i Īlahi,” in *Court Cultures in the Muslim World: Seventh to Nineteenth Centuries*, ed. by Albrecht Fuess and Jan-Peter Hartung (London: Routledge, 2011), 202-220.

the auspicious conjunction) and *Mahdī* of end times.³¹ The narratives of the dreams of sovereignty circulating at the time in both oral and written forms were full of astral imagery, such as Fazlullāh Astarābādī's (d. ca 1394) famous dream of the seven stars or the well-known dream of 'Oṣmān Ghāzī, the eponymous founder of the Ottomans, who saw the full moon rising from the bosom of his shaykh and inclining towards his own.³²

Notwithstanding these valuable non-technical sources into which astrological concepts and discussions easily penetrated, it is my contention that without exerting an equal effort to examine the surviving astrological and other prognostic materials, such claims about the so-called “the science of the millennium,” which, according to Moin, encouraged individuals to speculate “astrological” (and other “rational”) techniques to predict cosmic changes remain hyperbolic.³³ We should therefore endeavor to prove whether the astrological materials produced and/or circulated at the time were really informed by, and did further promote, these broader messianic and millenarian currents.

This was in fact the initial question that had inspired me to explore fifteenth and sixteenth-century Ottoman astrological materials. I began to explore these texts with a view

³¹ In addition to Fleischer's studies cited above, see especially Barbara Flemming, “Sāhib-ḳirān und Mahdī: Türkische Endzeiterwartungen im ersten Jahrzehnt der Regierung Süleymāns,” in *Between the Danube and the Caucasus*, ed. by György Kara (Budapest: Akadémiai Kiadó, 1987), 43-62. For the status of *sāhib-qirān* and its growing importance in the vocabulary of sovereignty, see Naindeep Singh Chann, “Lord of the Auspicious Conjunction: Origins of the Sahib-Qiran,” *Iran and the Caucasus* 13 (2009), 93-110; Christopher Markiewicz, “The Crisis of Rule in Late Medieval Islam: A Study of Idrīs Bidlīsī and Governance at the Turn of the Sixteenth Century.” (Ph.D. Dissertation, University of Chicago, 2015), 311-318.

³² Cf. Shahzad Bashir, *Fazlallah Astarabadi and the Hurufis* (Oxford: Oneworld, 2005), 11 and Caroline Finkel, *Osman's Dream: The History of the Ottoman Empire* (New York: Basic Books, 2005), 2.

³³ Moin, 9. For a similar critique of the work, see Ali Anooshahr, “Review of *The Millennial Sovereign: Sacred Kingship and Sainthood in Islam*,” *The Medieval History Journal* 18/1 (2015), 183-191.

toward examining their function vis-à-vis the contemporary millenarian and messianic debates. Having completed extensive research on surviving astrological materials and documents kept in several manuscript libraries and archival sites in Turkey and Europe, I reached the decisive conclusion that the Ottoman astrological sources I examined rarely echo millenarian expectations and messianic claims. There are, of course, occasional remarks from astral experts, eulogizing the reigning Ottoman sultans as the messianic savior (*Mahdī*) of the time and the *ṣāhib-qirān* of the age, but except for very rare cases, these sycophantic remarks are not accompanied by detailed justifications of the astrological reasoning. What is channeled through these astrological materials, especially through the annual almanac-prognostications (*taqwīm*), is rather an overwhelming sense of order designed by Divine power and orchestrated by the reigning sovereign.

Despite the fact that available Ottoman astrological materials fall short of revealing millenarian and messianic debates, these sources are still invaluable for providing colorful insights into the political, cultural, and intellectual/scientific realities of the time. In fact, the possibility of weaving together such diverse historiographical coordinates is the most inspiring and promising aspect of studying these hitherto neglected astrological materials and visiting the hitherto marginalized lives of these astral experts (*munajjims*).

Sources and Their Problems

The sources perused throughout this dissertation can be grouped into two main categories: astrological and non-astrological sources. The astrological corpus includes *taqwīms* (annual almanac-prognostications), extant horoscopes in the form of manuscripts or archival

memos and reports produced for the occasions of the birth of a sultan, construction of an imperial complex, or commencement of a military campaign, and other relevant texts through which astrologically valid information was conveyed. This last group specifically includes astrological textbooks, the *zīj* literature, and treatises on astronomical instruments utilized by *munajjims* to equip themselves with the necessary skills and knowledge for practicing astrology.

The overwhelming majority of these astrological texts remain in manuscript form and some of them have not even been properly catalogued. In view of the heavy reliance of this study on unpublished manuscript sources, I should say that there is an immediate need for scholarly editions of several works cited throughout this dissertation. My project is in fact only a modest attempt to provide for future studies a useful inventory of available materials and a number of working assumptions regarding the possibilities these texts present modern historians.

Among these extant materials, *taqwīms* stand as the genre *par excellence* for the production and presentation of learned astrological knowledge. To a modern reader, a *taqwīm* may sound nothing different than a calendar, but one should resist understanding medieval and early modern *taqwīms* as such. They are rather almanacs produced on a yearly basis to systematically combine astronomical, astrological, and calendric information. The detailed examination and discussion of the textual components of the *taqwīms* will be provided in the fourth chapter but it should be noted from the outset that these texts were routinely produced by astral experts, around the time of the solar year-transfer, that is, the Spring Equinox and the beginning of the new solar year in early March. The almanac-maker (usually but not necessarily a *munajjim*) calculates, first, the degree of the ascendant (*tāli* /horoscopus) at the particular

moment Sun completes its yearly rotation and enters the sign Aries.³⁴ Counting on this degree, he determines other astrological variables and starts interpreting the fortunes of people from different social categories and of earthly affairs. These detailed predictions were followed by the laborious tabulation of astronomical, astrological, and calendric information for each solar month of the upcoming year. He would then place ephemeris tables to demonstrate the daily celestial positions, to mark the corresponding days in different chronology systems used at the time, and to write down astrological remarks for the overall fortunes of each month.

Although the earliest available textual example of an Ottoman *taqwīm* dates back to the time of Mehmed I (r. 1413-1421), it should be noted that *taqwīm* was an older and universal genre regularly practiced in the Medieval Islamic society. In addition to those texts surviving — albeit limited— from the pre-Ottoman Islamic world, there are numerous references to the phenomenon from at least tenth century onwards. Yet the surviving Ottoman corpus outweighs all other sets of extant *taqwīms* from different Islamic societies, and thus coalesces a substantial body of material that enables us to systematically examine its structural development and functioning from the late fifteenth century on.³⁵

The existence of this rich corpus of source material is not completely unknown to modern scholars. In the 1950s and 60s, Osman Turan and Nihal Atsız published certain sections, particularly the historical chronology tables of some of the mid-fifteenth century Ottoman *taqwīms*. As prominent Turkish scholars of the positivist-nationalist historiography, they were of the opinion that these *taqwīms* were full of astrological credulity, thus had no historical value

³⁴ The ascendant (*tālī*) is the point of the ecliptic rising on the eastern horizon at the given moment. See: David King and Toufic Fahd, “al-Ṭālī,” *EI²*, Online version.

³⁵ See Appendix C for the complete list.

except for the parts devoted to the narration of universal history.³⁶ That was the justification they used when explaining why they published only the sections on chronology and ignored the remaining portions, which usually constituted more than 95% of these accounts.

The selective publication of the chronology sections of earlier *taqwīms* had two negative consequences in the scholarship. First, by giving the impression that *taqwīms* were produced only to provide chronological and calendrical information, these studies allowed for the rich astrological components of these texts to go unnoticed. Secondly and more importantly, they left a false and ahistorical impression that these standard chronology tables were incorporated into all extant *taqwīms*. However, the systematic investigation of *taqwīms* from the fifteenth to the seventeenth centuries clearly reveals that these chronological lists, and several other sub-sections once frequently used in earlier *taqwīms*, ceased to exist identifiably from the 1500s onwards. This change in the structure of the *taqwīms*, which was also accompanied by other sorts of variation in the language, size, and even *mise-en-page*, provides a unique opportunity to historicize these documents and discuss the wider cultural and ideological issues of the time that had repercussions upon the changing tastes and dynamics of *taqwīm* writing.

In addition to tracing the changes in the structural elements of the *taqwīms*, tracking the deviations in the contents, expressions, and even the tone of detailed astrological predictions also helps us historicize these documents. It is true that as a general rule these predictions are couched in very generic narrative elements with the heavy use of impersonal pronouns, platitudes, and

³⁶ Osman Turan, *İstanbul'un Fethinden Önce Yazılmış Tarihî Takvimler* (Ankara: TTK Basımevi, 1954); Nihal Atsız, "Fatih Sultan Mehmed'e Sunulmuş Tarihi Bir Takvim," *İstanbul Enstitüsü Dergisi* 3 (1957), 17–23; *idem.*, *Osmanlı Tarihine ait Takvimler* (İstanbul: Küçükaydın Matbaası, 1961); *idem.*, "Hicri 858 Yılına Ait Takvim," *Selçuklu Araştırmaları Dergisi* 4 (1975), 223–83.

repetitive remarks. Therefore it is difficult, and precarious indeed, to haphazardly attribute each and every prediction to an actual historical occasion. What I would like to offer as a sound methodology to deal with the problems caused by repetitive remarks and boilerplate narrative progression is to treat *taqwīms* as a cluster of texts and read them in juxtaposition with one another. Comparisons made between the *taqwīms* written by a single author across time, or between the *taqwīms* written for a single year by different authors can help us identify more accurately the deviating elements in these predictions. Another comparative method that can provide us even more precise answers about the real value and public recognition of the astrological predictions is reading them in parallel with contemporary historical narratives to detect whether the prognostications expressed in almanacs really influenced contemporary discourse or even manipulated certain political and imperial decisions. As will be detailed in Chapter 4, the Ottoman ruling elites took these astrological predictions seriously to the extent that the remarks of the *munajjims* on *taqwīms* could call off a campaign or determine the timing of an open battle.

Taqwīms are also crucial for illustrating the scientific horizons of astral experts, as they reveal which specific astronomical tables and/or astrological sources were consulted by the *munajjims* for undertaking astrological calculations. Unfortunately, many of the surviving *taqwīms* from the period bear no autograph; therefore it is not always possible to determine their authors. Moreover, relatively better-known *munajjims* during the time in question left too little autobiographical information that would have otherwise made it possible to fully reconstruct their scientific inspirations. Yet, through a systematic examination of references in often-anonymous *taqwīms* and other horoscopes as well as such circumstantial sources as book

inventories from the period, one can clearly delineate the preferences of Ottoman astral experts and how they changed over time. This kind of knowledge is extremely valuable from the perspective of the history of science and social history of knowledge, which I will specifically visit in chapters 2 and 3 as part of my general discussion on *munajjims*' vocational training and the impact of the post-thirteenth century Persian astral tradition on the formation of the Ottoman canon.

Last but not least, *taqwīms* allow for an investigation of how *munajjims* thought about their own craft. In the introductory passages preceding the astrological prognostications, *munajjims* often delved into a brief discussion on the epistemological limits of astrology. These authentic remarks will complement my discussion in the first chapter on the true place and epistemological status of astrological science in the late-medieval and early-modern Islamicate context.

Aside from almanac-prognostications, there are a few horoscopes from the period in question that were produced for such occasions as the birth of the sultan, the construction of an imperial building, or the start of a military campaign. Unfortunately, despite frequent references in contemporary sources to the prevalence of the practice, very few horoscopes have survived. This raises the question of whether the horoscopes produced for such specific occasions were deliberately destroyed upon their presentation in an effort to maintain a certain level of secrecy. The question is not entirely groundless; traces of such concern for secrecy can in fact be found among some extant Ottoman archival documents, which survived *contra* their authors' explicit requests for their destruction. For example on one such occasion, Ḥaydar the geomancer reiterates *à la* Mission Impossible that the geomantic report he is sending to Süleymān to

confidentially inform the sultan of the potential calamitous activities of the Prince Bāyezīd (d. 1561) in cooperation with the Safavid ruler Shāh Tahmāsb (r. 1524-1576) should be destroyed or at least concealed immediately after reading.³⁷

Yet it is difficult to argue that these privacy concerns hold true for all types of astrological production, some of which were not immediately confidential and significant. As for the problem of documentation one should also take into consideration the oral nature of astrological counseling. There are numerous examples of court *munajjims*, who were in close proximity to the rulers and other patrons, conveying their astrological interpretations verbally. Apart from certain implications in the Ottoman historical narratives as regards to the verbal character of astrological communications, the European historiography has unequivocally documented that astrological predictions were often expressed verbally, lest the written explanations fall in the hands of dangerous rival parties.³⁸

Regarding the discussion on the relative scarcity of extant horoscopes and other confidential astrological reports from the period in question, it should also be noted that since early 2010s there has been an ongoing cataloging project at the Topkapı Palace Museum Archive to identify, classify, and digitize all the available loose documents (*evrāk*). When I was conducting my research in Istanbul in 2014-2015, only a few volumes of catalogs were ready that contained information on mostly eighteenth century documents. At the time I was

³⁷ TSMA E. 1698: “*sa ‘ādetlü sulṭanumuñ mürüvvetinüñ āsārından şöyle ricā iderüm ki rızā-yı haqq için bu garīb-i bī-kes ve bī-hāminüñ aḥkām remillerimi bir kimesneye göstermeyüb müṭtāla ‘a kılduḡda nihān ve maḥv idesiz ki bir kimesne aḥvāle muṭṭali ‘ olmaya.*”

³⁸ Monica Azzolini, *The Duke and the Stars*, 4. Hillary Carey also points to the fact that most of the horoscopes are written without textual appendix and only as diagrams, hinting that they were probably expressed on the spot. See Hillary M. Carey, “Astrology at the English Court in the Later Middle Ages,” in *Astrology, Science, and Society: Historical Essays*, ed. Patrick Curry (Woolbridge: Boydell Press, 1987), 41-56.

conducting my research in Istanbul, the Topkapı Palace archive was not even open to researchers, but the directors, who knew my research interests, kindly shared with me a few interesting documents that they had recently chanced upon during their ongoing cataloging work. These documents include a couple of petitions written by anonymous *munajjims* at the time of Bāyezīd II, which I will occasionally refer to throughout the dissertation. The presence of these hitherto unknown documents is highly encouraging; it is an indication that the current scarcity of evidence about secret astrological and/or other prognosticative correspondences can be slightly rehabilitated in the near future when the information on all the available documents in the Palace archives is finally established with full precision.

In addition to *taqwīms* and extant horoscopes, I will also occasionally refer to the major examples of the post-thirteenth century Persian *zīj* literature, several treatises on astronomical instruments, and manuals imparting fundamental astrological teachings, all of which provide important details about both the real epistemological status of astrology in the period in question and the social history of the Ottoman *munajjims*' training. The *zīj* literature is particularly useful and its candidness in revealing the astrological implications of celestial knowledge produced through the systematic study of the heavens will greatly help to understand the necessary scientific context in which *taqwīms* functioned. The *zīj*es that will be particularly mentioned throughout the dissertation include: i) the Ilkhanid tables (*Zīj-i Īlkhānī*) produced in the mid-thirteenth century by Naṣīr al-Dīn Ṭūsī and his collaborators as part of the brief observational enterprise at the Maragha observatory; ii) several commentaries and later editions of the Ilkhanid tables including the works of 'Alī-Shāh Būkhārī (d. later than 1291), Shams al-Dīn Wābkanawī (d. 1320), Niẓām al-Dīn Nīsābūrī (d. 1328/9), or Jamshīd al-Kāshī (d. 1429); iii) Ulugh Beg

tables (*Zīj-i Ulugh Beg* or *Zīj-i Jadīd-i Sulṭānī*) compiled in the mid-fifteenth century as the result of the systematic observation program at the Samarqand observatory, and iv) relatively minor attempts in both the Iranian and Ottoman world such as the *zīj* of Rukn al-Dīn Āmulī (d. later than 1455) or that of Mevlānā Kūçek (d. later than 1478).

While *taqwīms*, horoscopes, and other technical texts funneling astrologically valid knowledge constitute the first group of sources that I define as “astrological materials”, the second group consists of non-astrological materials, including: i) archival registers of palace expenses where useful information about the salaries and professional status of court *munajjims* can be found; ii) contemporary chronicles, historical narratives, and biographical dictionaries that provide anecdotal evidence about the social and personal dynamics of astrological practice; and iii) books on the classification of sciences and select examples of the *kalām* literature in which a thorough discussion on the epistemological status of astrological knowledge can be found.

The Ottoman experience of astrological practice is unique in the sense that unlike other parts and periods of Islamic history where the existence of *munajjims* could only be reconstructed through unreliable anecdotal evidence the courtly presence and service of *munajjims* is documented in the Ottoman case on the basis of hard, archival evidence. This evidence is gleaned primarily from the registers of palace payments and budgets, some of which were already published thanks to the scholarly efforts of Ömer Lütfi Barkan and Halil Sahillioğlu. The earliest of such registers of payment that furnished information about a *munajjim* dates back to 1478, listing only one *munajjim* under the rubric of the loosely defined

müteferrika status.³⁹ From the crucial period of Bāyezīd II's reign —crucial in the sense of cultivating astrological knowledge and institutionalizing the patronage of the *munajjims*— we have a large register of gifts and payments recording the names of all individuals who received cash and/or other kinds of gift on various occasions. This register is generous enough for our purposes as it clearly documents the names of court *munajjims* and other astral experts presenting the court with the *taqwīms*. The same register also alludes to the status of their professional careers—whether listed under the *müşāherehorān* [monthly salaried officials] status or not—and makes evident the amount they received.⁴⁰

The use of these archival records is twofold. First, it is possible to create a prosopographical list of those *munajjims* tied to the Ottoman court during the period in question. Unfortunately, these archival records do not allow modern researchers to delve into the personal lives of the astral experts as they only provide information, if we are lucky, on their names, status, and salaries and/or gifts received. This information is still invaluable though; because one can combine this archival evidence with the information gleaned from manuscript sources to closely track the careers of, at least, certain *munajjims*. The second and more important use of

³⁹ Ahmed Refik (Altınay), “Fatih Devrine ait Vesikalar” *TOEM* VIII-XII/49-62 (1335/1919); for the *müteferrika* corps see: İsmail H. Uzunçarşılı, *Osmanlı Devletinin Saray Teşkilatı*, (Ankara: Atatürk Kültür, Dil ve Tarih Yüksek Kurumu, 1984), 428-431; Tayyib Gökbilgin, “Müteferrika,” *İA*; Erhan Afyoncu, “Müteferrika,” *TDVİA*.

⁴⁰ For the *müşāherehorān* see, Linda Darling, “Ottoman Salary Registers as a Source for Economic and Social History,” *Turkish Studies Association Bulletin* 14/1 (1990), 13-33. The accounts for the years 909 and 910 are already published. Ömer Lütfi Barkan, “İstanbul Saraylarına Ait Muhasebe Defterleri,” *Belgeler* IX/13 (1979), 1-380; Mustafa Açıkgöz, “II. Bayezid Devri İnamat Defteri (Muharrem-Zilhicce 910/Haziran-Mayıs 1504-1505)” (MA Thesis, Marmara University, 1995). Based upon this register İsmail Erünsal brought together all the poets and authors that received gifts upon presenting to the palace their most recent literary works. See: İsmail E. Erünsal, “Türk Edebiyatının Arşiv Kaynakları I: II. Bayezid Devrine Ait bir İnamat Defteri,” *İÜEF Tarih Enstitüsü Dergisi* 10-11 (1981), 303-347.

the archival evidence is that these documents scattered across different periods lucidly portray how the “office” of the court *munajjims* constantly underwent changes from the late-fifteenth through the mid-sixteenth century in terms of the number of personnel and the amount of their salaries. This provides substantial insights into the dynamics of patronage at the courts of different Ottoman sultans, a question I will particularly tackle in the third chapter.

Aside from the archival documents, I will occasionally have recourse to contemporary chronicles, biographical dictionaries, and other narrative sources to reconstruct the personal dynamics of astrological practice. Quite surprisingly, Ottoman narrative sources from the period in question provide very little anecdotal information concerning the lives of *munajjims*. First of all, there is no such source in the early-modern Ottoman literary culture that one may compare to the *Faraj al-mahmūm* of Ibn Ṭāwūs (d. 1266), a thirteenth-century biographical dictionary written specifically on the lives of *munajjims*, or the *Chahār maqāla* of Niẓāmī-i Arūḏī (d. later than 1156), who dedicates one of his four chapters to anecdotes solely about practicing *munajjims*.⁴¹ Although one can find frequent references, in the late-fifteenth and sixteenth-century Ottoman chronicles and historical narratives, to the *munajjims*’ calculation of astrologically auspicious moments, these brief remarks do not reveal the identity of these astral experts or imply any court intrigue they partook. Famous examples of the sixteenth-century

⁴¹ Ibn Ṭāwūs, *Faraj al-mahmūm fī tārikh ‘ulamā’ al-nujūm* (al-Najaf: al-Maṭba‘ah al-Ḥaydarīyah, 1948-9). For a partial English translation of the text, see Zeina Matar, “The Faraj al-Mahmūm of Ibn Ṭāwūs: A Thirteenth Century Work on Astrology and Astrologers.” (Ph.D. Dissertation, New York University, 1987). For the *Chahār Maqāla*, see Edward G. Browne, *Revised Translation of the Chahār Maqāla (“Four Discourses”) of Niẓāmī-i ‘Arūḏī of Samarqand, followed by an abridged translation of Mīrzā Muḥammad’s notes to the Persian Text* (London: Cambridge University Press, 1921). In addition to Browne’s translation, I will also refer to the Persian edition of the text. See: Niẓāmī ‘Arūḏī, *Chahār maqāla*, ed. Muḥammad Qazvīnī (Tīhrān: Kitābfurūshī-i Zavvār, 1954).

Ottoman biographical dictionaries of scholars or poets such as ʿAṣḥab al-ʿUlūm’s (d. 1561) *al-Shaqāʾiq al-nuʿmāniyya fī ʿulamāʾ al-dawla al-ʿuthmāniyya*, ʿĀṣiḳ Çelebi’s (d. 1572) *Meṣāʾirüʾş-şuʿarāʾ*, or Laṭīfī’s (d. 1582) *Tezkiretüʾş-şuʿarāʾ* also furnish scant information on the lives of *munajjims* or other names involved in astral activity. While the *tezkires* of poets often provide more personal details, these collections by nature contain information only about those individuals that have composed poetry. Thus, except one or two cases, it is difficult to find in these sources useful information to reconstruct the lives and careers of the court *munajjims*.

Finally, for the discussion on the epistemological status of astrology in the eyes of contemporary learned individuals, which I will undertake especially in the first chapter, I will delve into numerous examples of the *taṣnīf al-ʿulūm* (classification of the sciences) genre and a few select *kalām* texts produced in the late-medieval Turko-Persian intellectual context. The dominant narrative in the current scholarship resorts to a rather thick definition of astrology and tends to describe it as an unsophisticated occult craft and/or a folk practice of magic without necessarily taking into consideration the complex cosmological, astronomical, and mathematical underpinnings of learned astrological pursuits. There is in fact a rich literature on how astrologers were attacked and condemned —mostly by theologians and jurists— in medieval Islamic society. Despite the fact that these studies focusing upon the views of Ibn Sīnā (d. 1037), Ghazālī, Ibn Taymiyya (d. 1328), Ibn Qayyim al-Jawziyya (d. 1350), or Ibn Khaldūn (d. 1406) have contributed to our understanding of the arguments directed against the practice of astrology in the Islamicate world, they nevertheless fail to differentiate the vehement attacks toward astrologers, who were often charged with the alleged belief in astral determinism, from the more neutral, if not always tolerant, assessment of astrological/cosmological principles. The

perspective brought by some of the Ottoman sources including ʿAṣṣafī’s encyclopedic work, *Miftāḥ as-sa’āda wa miṣbāḥ as-siyāda*, or Mü’eyyedzāde’s (d. 1516) *kalām* text, *al-Ḥawāshī ‘alā Sharḥ al-Mawāqif* challenges this dominant narrative, which facilely assumes that traditional scholars categorically dismissed astrology as a valid and religiously licit branch of knowledge.

Theses Proposed in the Dissertation

I should underline at the very outset that this dissertation strives not for writing the history of astrology in the Ottoman realm, but rather for exploring the astrological knowledge produced and circulated in the Ottoman realm to scrutinize its broader cultural, intellectual, political, and social implications. Therefore, although I will have to refer, every now and then, to the complex methods and techniques appealed by the *munajjims* for practicing their own craft, I have no intention of testing the veracity of their planetary calculations and/or astrological interpretations on the basis of modern astral knowledge. This kind of endeavor would have certainly been useful from a mere history of science perspective, yet my own academic formation does not allow me to undertake such a demanding business.

In the light of my preoccupation in the past few years with the Ottoman astrological lore, I will advance a number of theses, instead of a single grand claim, that touch upon different historiographical coordinates in Ottoman as well as Islamic studies.

- I. The Ottoman astrological materials, which have long been neglected by both conventional Ottoman historians and historians of scientific enterprises in past Islamic societies, provide important insights into the intersecting layers of science, politics, and

culture in the late-medieval and early-modern Islamicate and/or Ottoman context. This is the richest astrological corpus surviving from any part or period of Islamic history. Unlike astrological textbooks of earlier periods in Islamic history that were produced primarily to instruct the universally applicable rules of the astrological craft, the extant Ottoman astrological texts such as the complete set of almanac-prognostications and a few scattered occasional horoscopes are the applied forms of astrological knowledge into concrete occasions. Hence they are inherently sensitive to their immediate historical, political, and cultural realities. The systematic examination of their contents enables one to closely track the scientific inspirations, cultural orientations, and socio-political contentions, which were subject to change over time.

II. The epistemological status of astrology in the pre-modern Islamicate context was much more complex than assumed by modern historians of science. The widely accepted model in the current historiography of science that asserts a strict separation between *‘ilm al-hay’ā* (lit. science of the configuration of the entire universe), *‘ilm al-nujūm* (lit. science of the stars), and *‘ilm aḥkām al-nujūm* (lit. science of the judgments of the stars) on the basis of earlier Arabic sources fails to notice the complex dynamics of the astral production in the post-thirteenth century Turko-Iranian context. While many astral experts from the period were definitely aware of the nuances between the astronomical investigation of the heavens (i.e. *hay’ā* and *nujūm*) and astrological interpretations of the celestial knowledge (i.e. *aḥkām*), they still recognized the strong dependence of astrology on the detailed knowledge of mathematical and astronomical state of the heavens.

III. The heightened interest in the post-thirteenth century Persianate East in establishing observatories, conducting systematic observational enterprises, and updating the available data on the motions of planets was intimately related to the need for more precise astronomical information to undertake more accurate astrological practice. While the current state of the field is not mature enough to make bigger claims, it seems plausible to argue, on the basis of promising evidence in the *zīj* literature, that not unlike in the early modern Europe, the urge to practice a mathematically precise and scientifically valid astrology was closely linked to the contemporary renaissance of mathematics and astronomical instrumentation in the eastern Islamic lands.

IV. The late-fifteenth and early-sixteenth century Ottoman context is a perfect laboratory to trace the impact of the Persian astral tradition upon the formation of the Ottoman astral corpus and professional cadres under the aegis of the court. The curious stories of astral experts as well as the scientific manuscripts and instruments, moving from the *diyār-ı 'Acem* into the *diyār-ı Rūm*, stand as one of the most illuminating chapters of the history of scholarly mobility and circulation of knowledge in the late-medieval and early modern Islamicate world.

V. The practice of learned astrology required the courtly patronage. For the cultivation of astral sciences in the Ottoman context, credits should go to Bāyezīd II, whose significance in the cultural and political transformation of the Ottoman polity has largely

escaped the attention of modern historians. Bāyezīd II's genuine learned interests in personally studying the astral sciences and patronizing an unprecedented number of astral experts facilitated the formation of the Ottoman astral canon and institutionalization of the office of the court *munajjims*, which would function as the prime mechanism of would-be *munajjims*' vocational training and professional service.

VI. Modern scholarship presumes a vague definition of astrology and regards such diverse practices of celestial magic, talisman making, or mystical/numerological interpretation of celestial phenomena as its inextricable constituents. While these practices of “magic” essentially require the knowledge about the qualities and characteristics of the celestial objects, to equate the learned practice of astrology—which was rather an applied science for predictive purposes—with magic would not always do justice to the actual contents and discussions in the Ottoman astrological materials explored in this dissertation.

VII. The details from the lives of Ottoman astral experts (*munajjims*) clearly portray the learned character of the astrological craft. Although majority of the modern scholarship imagines *munajjims* as back-street charlatans or magicians promoting the idea of astral determinism, the real agents were well trained in the diverse branches of mathematical, natural, and traditional sciences. Moreover, the great majority of the trained *munajjims* was aware of the epistemological problems inherent in the art of astrology and often expressed in their writings the limits of this science. Some of these experts even relinquished their craft due to spiritual anxieties, wishing to steer clear of challenging

God's omniscience and omnipotence.

VIII. Besides the fact that overwhelming majority of the *munajjims* serving the Ottoman court was self-critical about the epistemological limits of their craft, several *madrasa*-educated scholars and *'alims* had a somewhat lenient attitude towards the practice of astrology as long as certain fundamental principles of Islamic belief were preserved. Some of these scholars, like Mü'eyyedzāde (d. 1516), were even keenly interested in studying and practicing the science itself. The strict objections raised against the practice of astrology by the earlier Hanbali jurists such as Ibn Taymiyya or Ibn Qayyim al-Jawziyya did not take hold among the Ottoman scholars. Quite the contrary, these names were sometimes explicitly criticized for their redundant counter arguments.

IX. Intriguingly, the most severe objections against the practice of astrology came from eminent Sufis who vilified astrologers on account of their claims and methods, though they did not necessarily reject the fundamental cosmological principles underlying the practice of astrology. This brings the immediate need to appreciate the nuances inherent in the polemical literature, which often heavily criticizes astrologers without necessarily denouncing some of the scientific principles upon which astrological practice relied.

Chapter One—The Most Mathematical of all Occult, the Most Occult of all Mathematical Sciences: The Epistemological Status of Astrology in the Medieval Islamic Intellectual Context

I. 1. Introduction

It is a truism that astrology is no longer considered legitimate scientific knowledge. When we think about astrology today, negative images flood the mind, from the clichéd daily horoscopes published in newspapers or accessed through mobile apps to backstreet charlatans and psychic shops scattered around metropolitan neighborhoods. With the exception of a few private academies and certificate courses for the teaching of astrological techniques, the discipline has long fallen from its esteemed position in medieval and early modern academic circles.¹

We should not overstate, however, the epistemological prestige once attained by astrology in the ancient, medieval, and early-modern world. Notwithstanding the fact that there were many scholars and learned individuals who regarded it as a serious and valid science, astrology never entirely escaped the critique of staunch opponents. A wide array of literate people in different times and places espoused the invalidity or the limits of the efficacy of this

¹ For the formal study of astral sciences, including astrology, in late medieval and early modern Europe, see Stephen C. McCluskey, *Astronomies and Cultures in Early Medieval Europe* (Cambridge: Cambridge University Press, 1998), esp. 114-131; Michael Shank, “Academic Consulting in 15th-Century Vienna: The Case of Astrology,” in *Texts and Contexts in Ancient and Medieval Science. Studies on the Occasion of John E. Murdoch’s Seventieth Birthday*, ed. Edith Sylla and Michael Mcvaugh (Leiden: Brill, 1997), 245-270; Ann Moyer, “The Astronomers’ Game: Astrology and University Culture in the Fifteenth and Sixteenth Centuries,” *Early Science and Medicine* 4/3 (1999), 228-250; Monica Azzolini, *The Duke and the Stars: Astrology and Politics in Renaissance Milan* (Cambridge: Harvard University Press, 2013), esp. 22-64.

science, coalescing into a rich polemical literature that functioned as a vibrant arena of debate.² The medieval and early-modern Islamic intellectual landscape certainly did not want for these sorts of disputations.³

Despite the fact that the anti-astrology camp seems to have dominated the classical and post-classical Islamic intellectual realm, featuring a constellation of stellar names from diverse fields of knowledge, including al-Fārābī (d. 950), Ibn Sīnā (d. 1037), Ibn Taymiyya (d. 1328), and Ibn Khaldūn (d. 1406), the firmament of proponents was studded with luminaries like Fakhr al-Dīn Rāzī (d. 1209) and the Ikhwān al-Ṣafā' (ca. tenth century). From a historian's point of view, it is of utmost importance, as Richard Lemay has aptly remarked, to take each case separately and treat the particular historical and personal contexts for that specific individual's acceptance or rejection of astrology.⁴ Yet it is also useful to assemble together the standard arguments deployed by different parties in order to establish certain patterns in the argumentation and easily trace the diverging elements for a more accurate historical analysis.

What is more important, and particularly lacking in the literature on the epistemological status of astrology in medieval Islamic thought is to explore how the practitioners themselves

² On the debates regarding the status of astrology in the ancient and early medieval world, see A. Long, "Astrology: Arguments pro and contra," in *Science and Speculation: Studies in Hellenistic Theory and Practice*, ed. Jonathan Barnes *et al.* (Cambridge; New York: Cambridge University Press, 1982), 165-193. For a relevant discussion in the late-fifteenth and early-sixteenth century Italian context, see Remo Catani, "The Polemics on Astrology 1489-1524," *Culture and Cosmos* 3/2 (1999), 16-30.

³ While this question will be examined in detail below, useful summaries of the relevant debate in the medieval Islamic intellectual context can be found in Manfred Ullmann, *Die Natur- und Geheimwissenschaften im Islam* (Leiden: Brill, 1972), esp. 271-277; George Saliba, "Astronomy and Astrology in Medieval Arabic Thought," *Les Doctrines de la Science de l'Antiquité à l'Âge Classique*, ed. Roshdi Rashed et Joël Biard (Leuven: Éditions Peeters, 1999), 131-164

⁴ Richard Lemay, "Religion vs. Science in Islam. The Medieval Debate Around Astrology," *Oriente Moderno* 19/3 (2000), 557-575.

defined and approached their own craft. The relevant discussions in current historiography have been dominated by an externalist perspective that gives precedence to the views of non-astrologers instead of authentic practitioners.⁵ Needless to say, the ways in which *munajjims* discussed and practiced their craft are crucial: they provide strong insights into how astrology was actually defined and perceived as a science at the time by its own executors.

This chapter primarily aims at discussing the contentious character of astrology in the medieval Islamic intellectual landscape, which resonates well with the relevant discussion in the fifteenth- and sixteenth-century Ottoman milieu. The debate on the real value and true place of astrology was indeed complicated, and it would not do justice to the wide array of sources at hand that often conflict with one another if we strictly insist on a single narrative out of many potential explanations.

The complicated nature of astrology in the medieval Islamic intellectual context stemmed mainly from its epistemological status, as it was:

- i) Considered among the sciences of the ancients (*'ulūm al-awā'il*), which traditional scholars (*'ulamā'*) often took with a grain of salt⁶,

⁵ For noteworthy exceptions that focus upon how practitioners defended or reflected upon their own craft, see Peter Adamson, “Abū Ma‘šār, al-Kindī and the Philosophical Defense of Astrology,” *Recherches de théologie et philosophie médiévales* 69/2 (2002), 245-270; Charles Burnett, “The Certitude of Astrology: The Scientific Methodologies of al-Qabīṣī and Abū Ma‘šār,” *Early Science and Medicine* 7/3 (2002), 198-213; Anne Regourd, “L’Épître ayant pour objet la mise à l’épreuve de ceux qui n’ont d’astrologue que le nom d’al-Qabīṣī (IVe/Xe s.),” *Politica Hermetica* 17 (2003), 24-53.

⁶ On the (controversial) status of ancient/foreign sciences in medieval Islamic thought, see the classic work of Ignaz Goldziher, “Stellung der alten islamischen Orthodoxie zu den antiken Wissenschaften,” in *Abhandlungen der Königlich Preussischen Akademie der Wissenschaften* VIII (1916), 3-46. This article was translated by Merlin Swartz as “The attitude of orthodox Islam toward the ‘ancient sciences’,” in *Studies on Islam* ed. and tr. Merlin Swartz (New York and Oxford: Oxford University Press, 1981), 185-215.

- ii) Dependent upon the unwavering mathematical knowledge of the heavens but applied to understand the ever-changing physical nature of the sub-lunar world,
- iii) Susceptible to interpretation as an activity that would undermine the belief in God's omnipotence.

Besides these restraints caused by the entangled epistemological structure of astrology (which I will explain in further detail below), there were other complications derived from the checkered and at times conflicting approaches toward the practice. It is true that numerous *'ālims* and devout Muslims denounced astrology on religious grounds but it is also true that there were many traditional scholars who saw no problem with practicing astrology as long as certain boundaries with respect to the Islamic dogma of *tawḥīd* were preserved. Moreover, there were certain *munajjims* who were highly skeptical about the premises of astrological science, whereas several other experts considered astrology the noblest of all disciplines. In view of all these complications, the discussion on the real epistemological status and validity of astrology is replete with conflicts and contradictions even within the oeuvre of a single author.

In order to grapple with such complications, my analysis will proceed in the light of three different, yet interrelated, sets of questions: i) What did the practice of astrology really correspond to as a science in the eyes of its practitioners and external interpreters? ii) Where was it situated in the “taxonomy of science” (*taṣnīf al-'ulūm*) tradition and to what extent were Ottoman interpretations different from established conventions? iii) Which particular groups were more skeptical about the practice and what were their major lines of argument?

I. 2. Astrology and its Branches

The modern semantic and epistemic distinction between astronomy and astrology does not fully capture the disciplinary boundaries existed in the pre-modern world. This is no surprise for a student of the history of science in the ancient or medieval world, because the available literature generally assumes that in both Greek and Latin literature, the strict semantic distinction between *astronomia* and *astrologia* was not fully established until the fourteenth century.⁷ Rather, these two concepts were often used interchangeably to denote an all-encompassing category of the “science of the stars.” Even Ptolemy, the leading authority in astral sciences in the late antique and medieval eras, did not employ a strict terminological distinction, though he definitely implied a division on the grounds of the subject matter and objectives of two distinct types of activities: one that investigates the movements of celestial bodies and the planetary aspects, and the other exploring the changes that emerged in the terrestrial realm as a result of the vicissitudes in the configuration of heavenly objects.⁸

This division in terms of the subject matter is best manifested through Ptolemy’s two separate books, each covering one of the two divisions. His *Almagest* treats the subjects that we can simply define as “astronomical”, his *Tetrabiblos* matters “astrological.” It is also worth noting that the term Ptolemy used to define the science we now categorize as astrology was

⁷ S. Pines, “The Semantic Distinction between the terms Astronomy and Astrology according to al-Biruni,” *Isis* 55/3 (1964), 343-9. For a similar discussion in Chinese astral literature in early imperial China, see Daniel Morgan, “Knowing Heaven: Astronomy, the Calendar, and the Sagecraft of Science in Early Imperial China.” (Ph.D. Dissertation, The University of Chicago, 2014), 23-25.

⁸ Ptolemy, *Tetrabiblos*, ed. and tr. by F. E. Robbins (Cambridge: Harvard University Press, 1940), x-xi.

“prognostication through *astronomy*” (ἄστρονομίας προγνωστικὸν).⁹ For Ptolemy, the premises of the second category of the science of the stars are by nature weak and unpredictable, whereas the one examining the physical qualities and movements of celestial objects is an unvarying, self-sufficient science.

In the medieval Islamic intellectual framework, where the adoption and adaptation of pre-Islamic scientific traditions of the Hellenistic, Sassanian, Indian, and Mesopotamian world were accompanied by the consolidation of the realities inherent to Islamic society, this semantic distinction in approaches to celestial knowledge became further obscured. According to George Saliba, as early as the second century of the Hijra, the weak semantic distinction in the Greek and Latin tradition was replaced in Arabic scientific lore by a new category, “*ilm al-hay’a*” (the science of the configurations [of the stars]) that would gradually transform into the science of the structure of the entire Universe.¹⁰ For Saliba, this term was coined by the experts of celestial knowledge in early Islamic society, who tried to detach themselves, and their own intellectual spheres, from the pursuits of astrologers. Saliba argues that this new semantic category had no exact equivalent in pre-Islamic civilizations and that it grew out of cultural-religious dynamics intrinsic to the Islamic civilization, to wit, the tensions between the religiously-minded elites and the advocates of “foreign sciences” (*‘ulūm al-awā’il*).¹¹ For Saliba, the introduction and subsequent appropriation of *‘ilm al-hay’a* ushered in an increasing use of the term “*‘ilm* [or

⁹ Ibid., xi.

¹⁰ George Saliba, “Islamic Astronomy in Context: Attacks on Astrology and the Rise of the *Hay’a* Tradition,” *Bulletin of the Royal Institute of Inter-Faith Studies*, 4/1 (2002), 25-46. For a nuanced discussion on the category of *‘ilm al-hay’a*, see F. Jamil Ragep, “Astronomy,” *EP*, Online version.

¹¹ Saliba, “Islamic Astronomy in Context: Attacks on Astrology and the Rise of the *Hay’a* Tradition.”

ṣināʿat *aḥkām al-nujūm*” (“the science [or the art] of the decrees of the stars”), which was to label strictly astrological activities. Hence, *ʿilm al-nujūm*, the once-overarching category of the science of the stars that corresponds to the *astronomia* or *astrologia* of the earlier Greek and Latin traditions, gradually disappeared.

Notwithstanding the significance of Saliba’s emphasis upon the emergence of a novel semantic category, his explanatory model has several pitfalls. First of all, the distinction between *ʿilm al-hayʿa* and *ʿilm/ṣināʿat aḥkām al-nujūm* that Saliba clearly detects in the classical Arabic sources was not strictly drawn in the post-classical Persian astral tradition. As will be demonstrated below, especially texts on applied celestial knowledge produced in the post-thirteenth-century Persianate world often promoted the deployment of the category of “the science of the stars” (*ʿilm al-nujūm*) as an umbrella term betokening practical celestial pursuits, including astrology. Furthermore, Saliba’s rigid distinction on the mere grounds of semantic categories inevitably leads one to fail to notice the fluidity of activities the astral experts actually undertook. As already evident from Ptolemy’s obvious implication in his introduction to the *Tetrabiblos*, practitioners were already aware of the inherent nuances between “astronomical” (read scientific or computational) and “astrological” (read prognosticative or interpretive) facets of studying the heavens, even though they did not always use separate terms to refer to these activities. One thing that is for sure, however, was that the experts were also cognizant of the heavy interdependence of mathematical/astronomical and astrological knowledge. What Saliba sees as a crystal-clear distinction between “*hayʿa*”, “*nujūm*”, and “*aḥkām*” was indeed considered by many astral experts as inextricable and complementary spheres of the unified body of celestial knowledge. The concept that *aḥkām* is a natural sequel to *nujūm* and *hayʿa* was, as

Nallino rightfully asserts, “common to all the Muslim *munajjims* and is accepted also by some philosophers.”¹² In that regard, *munajjims* acknowledged and often made explicit that, without the working knowledge on the forms and physical structures/qualities (i.e. *hay’a*) of the celestial objects, it is impossible to make the necessary calculations as to the motions and positions of the heavenly bodies, and that without the knowledge gleaned from mathematical operations about the motions and positions of the stars (*a’māl-i nujūmī*), it is not possible to interpret the indications of celestial configurations.

We should, however, note that not all astral experts were eager to practice, or at least write about, different variants and genres of celestial knowledge including astrology. For example even a cursory look at the oeuvre of the luminaries of the Samarqand mathematical-astronomical school such as Qāḏīzāda-i Rūmī (d. later than 1440) or ‘Alī Qūshjī (d. 1474) clearly demonstrates that these names did not produce a single text on *aḥkāḡ*, although the *Zīj-i Ulugh Beg*, like many other *zīj*es, has specific sections exclusively upon horoscopic astrology.¹³ As we will see further below, some of the Ottoman court *munajjims* were also distressed for being compelled to practice *aḥkāḡ*.

The heavy dependence of *aḥkāḡ* upon detailed technical and computational knowledge of *hay’a* and *nujūm* is best exemplified in some of the technical treatises produced in the post-thirteenth-century Persianate realm. The significance of this particular milieu can hardly be exaggerated in regards to the cultivation of astral sciences and the production of the authoritative

¹² Carlo Alfonso Nallino, “Sun, Moon, and Stars (Mohammedan),” in *Encyclopedia of Religion and Ethics*, ed. James Hastings (New York: C. Scribner, 1970), 88-101.

¹³ See F. Jamil Ragep, “Qāḏīzāda al-Rūmī: Ṣalāḡ al-Dīn Mūsā ibn Muḡammad ibn Maḡmūd al-Rūmī,” in *BEA*, ed. Thomas Hockey *et al.* (New York: Springer, 2007), 942; İhsan Fazlıođlu, “Qūshjī: Abū al-Qāsım ‘Alā’ al-Dīn ‘Alī ibn Muḡammad Qushči-zāde,” in *BEA*, ed. Thomas Hockey *et al.* (New York: Springer, 2007), 946-948.

texts that would decisively shape the scholarly horizons of the *munajjims* active in the early-modern Ottoman world. The period that witnessed the Mongol expansion toward Western Iran and the integration of the eastern and western ends of the Eurasian landscape also saw an increased level of scientific celestial activities. Although the reasons are not entirely clear why there was such an enthusiasm at that time for constructing state-of-the-art observatories and for assembling therein the leading experts of celestial knowledge from diverse regions, increased contacts with Chinese civilization had a definite positive impact upon the cultivation of observational celestial knowledge. Aydın Sayılı also argues that Turko-Mongol domination over Eastern Islamic dominions might have facilitated celestial enterprises, as many of the patron dynasts and scholars in the region were not thoroughly indoctrinated with more austere Islamic traditions and customs that usually frowned upon the practice of astrology.¹⁴

No matter what the exact factors were that facilitated systematic celestial pursuits in the post-thirteenth-century Persianate sphere, the two most important observatories in all of Islamic history were established in the region, namely the Maragha observatory constructed in today's Azerbaijan in the mid-thirteenth century with the support of the Ilkhanid rulers (particularly that of Hülegü and his son Abaqa Khan), and the Samarqand observatory built on the initiative of Ulugh Beg in the first half of the fifteenth century. Between the construction dates of these two observatories minor observations were also conducted in the region by numerous individual experts including 'Alī-Shāh Būkhārī, Wābkanawī, or Rukn al-Dīn Āmulī, whose scientific activities will be mentioned further below.

In the post-thirteenth-century Persianate East, heightened interest in systematic

¹⁴ Aydın Sayılı, *The Observatory in Islam and its Place in the General History of the Observatory* (Ankara: TTK, 1960), 235.

observational programs (*raṣad*), many of which had to be interrupted due to political turmoil and/or lack of consistent financial support, primarily stemmed from a desire to correct the celestial data (*taṣḥīḥ-i jadval*) conveyed through astronomical tables (*zīj*). At the end of each systematic observation program was produced a new *zīj* with revised figures. The original *Zīj-i Īlkhānī*, for instance, was composed by Naṣīr al-Dīn Ṭūsī at the Maragha observatory with the aim of rectifying the data of previous *zīj*es, but even after Ṭūsī's death in 1274, experts, including his son Aṣīl al-Dīn, retained the observations until the turn of the fourteenth century and prepared newer editions of the text with more accurate data.¹⁵ The program of systematic observation at the Samarqand observatory also aimed to revise the available tables and ultimately yielded the *Zīj-i Ulugh Beg*, which, as we will see in more detail in the next chapter, eventually became the main reference work of Ottoman *munajjims* from the early sixteenth century onwards.

Before detailing the significance of the *zīj*es for astrological purposes, it is in order now to briefly summarize what the learned practice of astrology really involved. Despite modern prejudices assuming that astrology is and was always an unsystematic and vulgar practice bereft of mathematical sophistication, scholars and astral experts in the medieval Islamicate world rarely hesitated to speak of the dependence of astrology upon complex mathematical knowledge of the heavenly spheres. For example al-Bīrūnī, who was not sympathetic toward the practice of astrology, still reminds his readers “no one is worthy of the style and title of astrologer (*munajjim*) who is not thoroughly conversant with geometry (*handasa*), arithmetic (*‘adad*),

¹⁵ Sayılı, 211-218.

hay'a, and *aḥkām al-nujūm*.”¹⁶

The exact scope of learned astrology can best be illustrated by comparing it to more vulgar and lay versions of astrological practice. While the former essentially requires the tedious task of calculating celestial positions and variables according to the exact time and location of the astrological matter in question, the latter does not involve such mathematical sophistication and astronomical rigor. Instead, lay practitioners of astrology often replaced minute scientific calculations with either folk knowledge on the cyclical patterns of celestial and meteorological occurrences or with esoteric and often simple lettrist/numerological explanations ascribed to heavenly objects. For example one of the most common forms of lay astrology, the *malḥama* literature, intends to divine the fortunes of the year in the way the *taqwīms* of the erudite *munajjims* do. In these *malḥama* texts, general prognostications are expressed in the format of protases and apodoses: “If X [a certain type of easily observable celestial phenomenon or a meteorological incident such as a solar eclipse, lunar eclipse, thunder, rainbow, lightning, etc.] occurs on the first day of the month Y, then it signifies...” But unlike *taqwīms* in which *munajjims* had to carefully calculate in mathematical terms the exact celestial configuration at the time of the solar revolution, *malḥama* texts do not exert any such effort.¹⁷

¹⁶ Bīrūnī, *The Book of Instruction in the Elements of the Art of Astrology*, ed. and tr. Robert Ramsay Wright (London: Luzac & co., 1934), 1.

¹⁷ I should make a distinction here between the texts that belong rather to the genre of apocalyptic *malāḥim* and those *malḥama* texts used for interpreting the signs of celestial and meteorological phenomenon for divinatory purposes. The first kind of literature dates as far back as the time of the Prophet Muhammad and is oriented toward debating, on lettrist grounds, the imminence of the End Times and predicting the fate of dynasties as well as individuals. It is the second group of texts with which we are concerned here. On the importance of the first group of texts, see Muhammad Ahmad Masad, “The Medieval Islamic Apocalyptic Tradition: Divination, Prophecy and the End of Time in the Thirteenth Century.” (Ph.D. Dissertation, Washington University in St. Louis, 2008).

In a similar fashion, a set of texts that I classify as “lay textbooks” intends to give instructions about casting birth horoscopes on the basis of a newborn’s ascendant/horoscopus (*tāli*). As we will see in more detail below, the mathematical computation of the degree of the ascendant is central to any serious astrological endeavor. Once the *munajjim* establishes its degree, which corresponds to the first astrological house, he or she can easily calculate the remaining astrological houses (which is called “equalization of the houses”) and establish other necessary astrological variables. In the *taqwīms*—which were in fact nothing but horoscopes cast on the basis of the celestial map at the exact moment of the revolution of the year—and other horoscopes, *munajjims* always start with computing the degree of the ascendant. In the set of these folk nativity texts, however, the authors suggest simple lettrist and numerological explanations to designate the degree of the ascendant, without any mathematical or astronomical basis. In one particular example attributed to a certain Ḥayreddīn Konevī, produced likely in the late sixteenth or early seventeenth century, the author says the following as regards to the procedures underlying his astrological practice:

“If you would like to know the ascendant/fortune of a person, to predict his/her path and length of life, and to learn about his/her well-being or sickness, add the numerical value of his/her name to the value of the name of his/her mother. Then subtract the sum by twelve. If the remainder is one, then his/her ascendant is in Aries; if it is two, then it is in

Among the earliest examples of the second genre in Ottoman-Turkish literature, one should name Yazıcı Selahaddīn’s *Şemsiyye* written in verse in 1408-9, Aḥmed Bīcan’s half-verse, half-prose *Melḥāme* completed in 1466, Ebrī Ḥāce’s *Melḥame-i Ibn ‘Adil* produced in the last quarter of the fifteenth century, and the *melḥāme/rūznāme* text attributed to Shaykh Vefā (d. 1491). See Mehmet Terzi, “Yazıcı Salih (Selahaddin) Kitabı’ş-şemsiyye (Melhame-i Şemsiye) Dil Özellikleri, Metin, Söz, Dizin.” (Ph.D. Dissertation, Malatya İnönü University, 1994); Faysal Okan Atasoy, “Melhame-yi Şeyh Vefa: Giriş-Metin-Sözlük.” (M.A. Thesis, Marmara University, 2001); Şeref Boyraz, *Fal Kitabı: Melhemeler [sic] ve Türk Halk Kültürü* (İstanbul: Kitabevi, 2006); Ayşe Aydın, “Ebri Hâce İbn-i Adil (Giriş-İnceleme-Metin-Dizinler).” (Ph.D. Dissertation, Sakarya Üniversitesi, 2011).

Taurus...’’¹⁸

In its simplest and broadest sense, the science of astrology, be it the learned version of the erudite *munajjims* or the lay one devoid of mathematical refinement, relied upon the basic Hermetic concept and fundamental Aristotelian principle, “as above, so below.” That is to say, what happens in the terrestrial world (i.e., *‘ālam al-kawn wa-l-fasād*, the world of generation and corruption) is necessarily linked to the celestial world. What I define here as “learned astrology”, however, was the scientific practice sensitive to the idea that every individual celestial configuration in a given time at a specific location had a particular influence on the sublunary world and that that influence could be explained and further predicted through the careful mathematical and astronomical study of celestial bodies, movements, and positions. For learned astrology, the examination of the celestial world and the ability to map individual celestial configurations required a solid training in the mathematical sciences (i.e. *al-‘ulūm al-riyādiyya* or *quadrivium*, composed of geometry [*handasa*], arithmetic [*a‘dād*], *hay’a*, and music [*mūsīqī*]), because in the Aristotelian concept of knowledge, which was widely adopted in the medieval Islamicate intellectual setting, mathematics is the language of the celestial realm.¹⁹

¹⁸ British Library Add. 5983, 17b: “*dilerseñ kīm bir kişinüñ ṭālī ‘ün bilesün ve ānuñ sergüzeştün bilesün ve ‘ömrün ve ḥastalığın bilesün ve kaç yaşıdan berüsi var bilmek dilesen kendü adun ve anasu adun ḥisāb idesün. On ikişer on ikişer tarḥ idesün, göresün kaç ḳalursa, eger bir ḳalursa Ḥamel’dür ... iki ḳalursa Sevr...*”

¹⁹ The Aristotelian division of knowledge corresponds to the tripartite division of the entire universe into the divine, celestial, and terrestrial realms. Accordingly, there is a threefold division of the speculative sciences (*al-‘ulūm al-ḥikamiyya al-naẓariyya*) into Metaphysics (*al-‘ulūm al-ilāhiyya*), Mathematical Sciences (*al-‘ulūm al-riyādiyya*), and Natural Sciences (*al-‘ulūm al-ṭabī‘iyya*). The mathematical sciences deal with the celestial objects, their physical structures, motions, sizes, etc.; whereas the natural sciences study the “matter” and changes in the terrestrial realm. For a brief discussion of how the threefold division of the episteme parallels

In other, and mathematically less informed forms of astrology, however, a minimally sufficient knowledge of the qualities of celestial phenomena is wedded to a crude mystical and numerological interpretation of the cosmos. One can refer here to Ibn ‘Arabī’s teachings as the prime example of what Titus Burckhardt calls “mystical astrology.”²⁰ The basic idea behind it is to establish an interpretive framework of correspondences between the seven planets, 12 signs, 28 lunar mansions, and numerous other heavenly bodies, designed by God and operated through the mediation of spirits, angels, and hidden saints (*rijāl al-ghayb*). Each zodiacal sign is attributed to a particular angel, whereas each one of seven planets, all of which were considered cosmic intermediaries between the immutable world of the archetypes and the earthly center, was associated with a particular prophet residing there and a particular prophetic epoch/cycle occurring in the human history.

This should not leave an impression, however, that mystical astrology and learned astrology were mutually exclusive, and that *munajjims* trained in the mathematical and astronomical foundations of astrological practice were entirely aloof to the mystical interpretations of celestial configurations. Quite to the contrary, *munajjims* might have often resorted to discussions on the influence of hidden spirits (*rijāl al-ghayb*) by associating each day of the year with one particular spirit. In his introduction to the *taqwīm* (almanac-prognostication) of the year 967/1560, for instance, Yūsuf b. ‘Ömer el-Sā‘atī (d. later than 1560), one of the court *munajjims* at the time, says by explicitly referring to the *shaykh al-muḥaqqiqīn* and *quṭb al-‘arifīn Muḥyī al-dīn al-‘Arabī* that each day of the month, the hidden spirits, which are grouped

the different realms of the universe, see İhsan Fazlıoğlu, “Osmanlı Felsefe-Biliminin Arka Planı: Semerkand Matematik-Astronomi Okulu,” *Divan İlmi Araştırmaları Dergisi* 14 (2003), 1-66.

²⁰ Titus Burckhardt, *Mystical Astrology according to Ibn ‘Arabi*, translated from French by Bulent Rauf (Louisville, KY: Fonsvitae, 2001).

into seven categories, move from one direction to another. As Yūsuf *munajjim* lays out, these hidden spirits include one *quṭb*, two *imāms*, four *awṭād*, seven *budalā*, twelve *ruqabā*, forty *nujabā*, and three hundred *nuqabā*, all of which makes three hundred and sixty-six, to wit, a full solar year. If one wishes to supplicate their help wherever she or he tends towards, then one should say the necessary prayer after performing ablutions and offering a two-rakat prayer.²¹

The more mathematical and technical forms of astrology that try to calculate and interpret celestial influences of particular moments upon terrestrial events are composed of different branches and genres of writing. *Mawālīd* (genethliology, or natal astrology), for instance, specifically deals with interpreting the celestial configuration at the moment of an individual's birth to predict the course of his or her life. Closely related to the *mawālīd* genre, the anniversary horoscopes of the birth of individuals (*tahāwīl sinī l-mawālīd*) or the revolutions of solar years (*tahvīl-i sāl-i ālem*) were routinely prepared in order to interpret the fortunes of the upcoming

²¹ Kandilli Rasathanesi Kütüphanesi Ms. 546, 1b-2a: “[Ş]eyhü’l-muhakkiḳīn ve kuṭbü’l-‘ārifīn Şeyh Muhyiddīn ‘Arabī qaddasallāh sirrahu al-‘azīz ricālū’l-gayb ve ervāḥ-ı muḳaddesenüñ seyri beyānında şöyle buyurmuşlardır ki her gün ki aydan geçer gayb erenleri ve ervāḥ-ı muḳaddese etrāf-ı ‘ālemüñ bir tarafına müteveccih olurlar. Cemī’ yılda bu tarīḳ üzerine seyr iderler tā kıyāmete deġin bunlar munḳaṭi’ olmazlar. Bu ricāl-i gayb ve ervāḥ-ı muḳaddese didiġimiz yedi ṭabaḳadur dirler. Evvelkisine kuṭb dirler, ol bir kimesnedür ki mevzi’-i nazarı ḫaḳdur. İkincisine imāmān dirler, añlar iki şaḥş dururlar, birisi kuṭbuñ şāġ yanunda olur mevzi’-i nazarı ‘ālem-i melekūta ya’nī ‘ālem-i gayb ve birisi kuṭbuñ şol yanunda olur mevzi’-i nazarı ‘ālem-i mülkedür ya’nī ‘ālem-i zāhir, bu ol birinden a’lādur. Üçüncüsüne evtād dirler, anlar dāḫi dört kimesnelerdür ki ‘ālemüñ dört köşesini ḫıfz iderler, birisi şarkı ve birisi garbı ve birisi cenūbı ve birisi şimāli. Dördüncüsüne budalā dirler, anlar yedi kimesnedür. Beşincisine ruḳabā dirler, anlar dāḫi on iki kimesnedür lā şekk. Altıncısına nucebā dirler, anlar daḫi kırk kimesnedür. Yedincisine nuḳabā dirler, anlar dāḫi üç yüz kimesnedür. Bunlaruñ cemī’isi üç yüz altmış altı kimesnedür nitaki bir yıl dāḫi üç yüz altmış altı gündür...Pes her kim ki bu virde müdāvemmet ider olsa, eyle gerekdür ki ol kimesne ol cānibe müteveccih ola ki ricāl-ı gayb ve ervāḥ-ı muḳaddese daḫi ol taraḫa müteveccihdür dirler. Ol vaḳt du’ā oḳumaġa meşġul olalar, gerekdür ki ābdest alub bir ḫāli mekāna varub iki rek’at namāz kılub bu virde meşġul olalar ḫużūr-ı ḳalble ve du’ānuñ ḳabul olmasına i’tikād ideler, ḫiç şekk getürmeyeler.”

Interestingly enough, in none of the other eight extant *taqwīms* that Yūsuf *munajjim* composed does such a section on *ricālu’l-gayb* take place.

year for a single individual or society in general. It is this particular branch that formed the essence of the *taqwīm* genre, which I will explore in more detail in the fourth chapter. Another common astrological practice is *ikhtiyārāt* (“Elections”), which is concerned with the choice of the auspicious moment for doing a particular activity or avoiding a specific action. The repertoire of activities ranges from quotidian matters such as when to go to the public bath or cast a talisman to issues concerning imperial policies like when to embark upon a military campaign or lay out the construction of a civic building. Furthermore, *Masā’il* (“Interrogations” or horary astrology) is applied to interpret the exact timing and subject matter of a question the client asks the *munajjim*. In this particular genre, the celestial configuration of the exact moment when the client poses the question is crucial for the astrological interpretation. The questions asked by the querent touch on many quotidian aspects of life including marriage, travel, and household affairs. Last but not least, historical astrology, which was especially popular under the early Abbasids, focuses upon planetary conjunctions, particularly of Saturn and Jupiter, to explain the cycles of change in terrestrial events such as the rise of the prophets, turns of dynasties, or succession of rulers.²²

Although each of these branches and genres of astrological practice might have had recourse to different techniques, what is central to all of them is the need to determine the exact celestial configuration at a particular moment in a given locality, be it a moment of birth,

²² This summary on the astrological branches was written based upon the following studies: Charles Burnett, “Astrology,” *EP*, Online version; Carlo Alfonso Nallino, “Sun, Moon, and Stars (Mohammedan);” David Pingree, “Astrology,” in *Dictionary of the History of Ideas* v. 1, ed. Philip P. Wiener (New York, 1973-4), 118-26.

revolution of the year, or an auspicious moment to embark upon a specific activity.²³ In order to make an astrological judgment for the relevant time and latitude of the particular location, the *munajjim* had to establish the degree of the ascendant/horoscopus (*ṭāli*'), which then was followed by equalizing the cusps of other astrological houses and locating relevant astrological variables (*dalāil*). The determination of the *ṭāli*' was so crucial in astrological predictions that in vernacular Turkish the word gradually transformed into *ṭālih*, signifying fortune and luck.²⁴

For these sorts of mathematical and astronomical operations (*a 'māl-i nujūmī*), *munajjims* may have utilized instruments like astrolabes, but given the unaffordable costs of personally possessing sizeable and accurate astronomical instruments, for the most part they determined planetary positions by appealing to the astronomical tables (*zīj*) already in circulation.²⁵ Despite the reluctance of modern scholarship to emphasize the role of astrological purposes in *zīj* production, these texts were *munajjims*' indispensable tool for making the necessary calculations before conveying astrological interpretation.²⁶ It would not be far-fetched to liken medieval *zīj*es

²³ In birth horoscopy, for instance, prorogators like *haylāj* and *kadkhudāh* as well as *tasyīr* were to be determined; whereas in *ikhtiyārāt* the relative motions of the moon were given precedence.

²⁴ Meniški clearly points out in his *Thesaurus Linguarum Orientalium* that, as early as the seventeenth century, *ṭālih*, as the transformed version of *ṭāli*', was documentedly in use in vernacular Turkish. See his *Thesaurus linguarum orientalium Turcicae-Arabicae-Persicae = Lexicon Turcico-Arabico-Persico* (İstanbul: Simurg, 2000): “*ṭali*’”, vulg. *talih*. 1) part. Oriens, prodiens; 2) *pl. ṭawāli*'. Primum diluculum; 3) Horoscopus. 4) Sors, fortuna.

²⁵ For the use of astronomical tools, specifically of astrolabes, in astrological problems see: Josep Casulleras, “The Instruments and the Exercise of Astrology in the Medieval Arabic Tradition,” *Archives Internationales d’Histoire des Sciences* 63, no. 170-171 (2013), 517-540. It is one of the standard themes in the writings of astral experts that conducting a celestial observation with reliable instruments is a costly business that required the financial support of a patron ruler. See, e.g., fn. 33 or 37 below.

²⁶ On the dynamics of *zīj* production, see Edward S. Kennedy, “A Survey of Islamic Astronomical Tables,” *Transactions of the American Philosophical Society*, New Series, 46/2 (1956), 123-177; David A. King, Julio Samsó, Bernard R. Goldstein, “Astronomical Handbooks and Tables from the Islamic World (750-1900): an Interim Report,” *Suhayl: International*

to modern computer programs with which one could have manually designated planetary positions. Since the practice of any kind of learned astrology rested upon the careful designation of the celestial configuration at a particular time for a given location, *zīj*es provided the *munajjims* with the necessary data and/or methods to make their own computations.

The most important set of data *zīj*es presented was the tables listing the motions of planets in sexagesimal numbers. These tables particularly helped *munajjims* to compute the true longitude of each planet (*taqwīm al-kawākib*) in a given moment, necessary for making subsequent astrological calculations.²⁷ The data covered in the *zīj*es show significant variances due to the quality and length of the conducted observations. Almost all *munajjims* genuinely knew that in order to obtain more accurate results from the observations, at least thirty years of systematic observation should be undertaken, because Saturn, the outermost planet in traditional cosmology, takes around thirty years to complete its rotation through the ecliptic.²⁸ Another factor that determined the accuracy of observations was the soundness of astronomical instruments available in the site of observation. The contention of the experts was such that the

Journal for the History of the Exact and Natural Sciences in Islamic Civilisation 2 (2001), 9-105; Benno Van Dalen, *Islamic Astronomical Tables: Mathematical analysis and historical investigation* (Farnham, Surrey: Ashgate, 2013).

²⁷ Benno Van Dalen, “An Introduction to the Mathematics of Islamic Astronomy and Astrology” (Unpublished paper). I am grateful to Benno Van Dalen for sharing his unpublished work with me. Edward Kennedy also details, on the basis of Jamshīd al-Kāshī’s *Zīj-i Khāqānī*, the mathematical procedures involved in astrological operations. See Edward Kennedy, “On the Contents and Significance of the Khāqānī Zīj by Jamshīd Ghiyāth al-Dīn al-Kāshī,” in *Islamic Mathematics and Astronomy* v. 84, ed. Fuat Sezgin (Frankfurt am Main: Institute for the History of Arabic-Islamic Science at the Johann Wolfgang Goethe University, 1998).

²⁸ Aydın Sayılı, *The Observatory in Islam, passim*. It is mentioned in Ḥasan Beg Rumlu’s *Aḥsan al-tawārikh* that Shāh Ismā‘īl decided to build a new observatory upon seeing the remnants of the Maragha observatory; but as his *munajjim* told him that it required at least thirty years of operation to have better observational results, he abandoned his plans to construct the observatory. See *Ibid.*, 166.

bigger the instruments, the more accurate the observations could be.

These rather theoretical remarks are best exemplified in the introductory prose sections of *zījes* where the authors explain the reasons and occasions for conducting a systematic observation and thus composing a new *zīj*. In the *Zīj-i Īlkhānī*, for instance, Naṣīr al-Dīn Ṭūsī explicitly writes that it is crucial to observe and calculate the positions of celestial objects if one wants to have foreknowledge about earthly matters such as the security of the country, warfare and peace among rulers, the health and disease of individuals, the circumstances of agricultural production and market prices, weather conditions, and the fortunes of newborns. According to Ṭūsī, astrological judgments about these matters could only be arrived at with a precise knowledge of celestial positions, and the knowledge of celestial positions could only be calculated by systematic observation.²⁹ Once the positions of celestial objects in each and every day were established through laborious observation, this information was recorded in tables. By utilizing the data and methods covered in these tables are *taqwīms* produced on a yearly basis, designating the positions of celestial bodies across the year and deriving related astrological predictions. Ṭūsī shares his wish that his new *zīj* would become the main reference work for

²⁹ BML Or. 24, 3b: “*Sukhan dar raṣad-i siṭāragān va anki raṣad va zīj va taqwīm cha bāshad: ... bi-dānistān-i raṣad-i mavzi ‘-i siṭāragān bar āsumān va payvastān-i īshān ba-yakdigar va judā shodan va miqdār-i davrī-yi īshān az yakdigar va az zamīn va miqdār-i ravish-i īshān ma ‘lūm shavad va az dānistān-i ān hukm tuvān kard ki ba ‘d az īn dar ‘ālam cha khāhad būd az amīnī va parīshānī va ṣulḥ-i pādīshāhān bā-yakdigar va ḥarb va gardīsh-i rūzgār va tandorostī va bīmārī-i khalq va vabā va farāḥī va tangī-i narkhhā va bārandagī va khushgī va digar ḥalḥā va hamchunīn ḥāl-i har farzandī ki dar vujūd āyad va dirāzī-i ‘omr va kūtāhī va nik-bakhtī va bad-bakhtī va tandorostī va ranjūrī va tuvāngarī va ...ranj u rāḥat ki badū rasad. Īn hama az mavāzi ‘-i siṭāragān tuvān dānist va mavzi ‘-i siṭāragān ki har vaqt har yakī kojā bāshand natuvān dānist tā ravish-i īshān nadānand.*”

munajjims in preparing their almanac-prognostications (*taqwīm*) and casting horoscopes.³⁰

Despite Ṭūsī's expectations about the prospect of his work, contemporary *munajjims* and subsequent generations of astral experts did not much favor the original *Zīj-i Īlkhānī*, due mostly to the limited timespan of actual observations in its preparation. Many practicing *munajjims* at the time complained about the extreme inconsistencies (*tafāvut-i fāḥish*) frequently emerging between observed celestial phenomena and ones calculated on the basis of Ṭūsī's tables. 'Alī-Shāh Bukhārī, a noted astral expert from the late thirteenth century Iran, whose astrological *summa*, *Aṣmār va ashjār*, later became one of the favorite texts of Ottoman *munajjims*, narrates in his *Zīj-i 'umda-i Īlkhāniyya* that one day a group of people approached him and asked his sincere opinions about the *Zīj-i Īlkhānī*. In 'Alī-Shāh Bukhārī's narrative, the people are apparently highly critical of Ṭūsī's *zīj*, saying that when they tried to calculate the true longitude of the Sun (*taqvīm-i Shams*) to determine the degree of the ascendant, there emerged extreme discrepancies, to their chagrin, between the calculations made on the basis of Ṭūsī's *zīj* and those on earlier available tables.³¹

'Alī-Shāh Bukhārī, however, seems to have been sympathetic toward Ṭūsī's *Zīj*. He maintains that the reason Ṭūsī intended to undertake a systematic observational enterprise in the

³⁰ Ibid., 3a: “*umidvāram ki muvāfiq-i riżā-yi ū bāshad tā ba-davlat-i ū munajjimān ba'd az īn zīj taqvīmihā va ṭāli'hā birūn mī āvorand va nām-i īshān tā hazārān sāl dar jihān bāqī bāshad...*”

³¹ Fateme Savadi and Sajjad Nikfahm Khubravan, “Ḥarakat-i vasaṭ-i kavākib dar *Zīj-i Īlkhānī* va naqdhā-yi vārid bar ān,” [The Mean Motion of the Planets in the *Zīj-i Īlkhānī* and its criticisms] in *Ustād-i bashar: Pajūhashhāyi dar zandagī, rūzgār, falsafa va 'ilm-i Khwāja Naṣīr al-Dīn Ṭūsī* [The Teacher of the Humankind: Essays on Life, Times, Philosophy and Scientific Achievements of Khwājah Naṣīr al-Dīn Ṭūsī], ed. Hosein Masoumi Hamedani and Mohammad Javad Anvari (Tehran: Miras-e Maktoob, 1391/2012), 455: “*Vaqtī jamā'atī-yi kūtāh-naẓarān ... goftand banda rā ki i'tiqād-i to bar īn raṣad-i jadīd charā chunīn muḥkam ast ki dar taqvīm-i āfitāb tafāvut-i fāḥish ast chunān ki ṭāli'-i tahvīl-i sāl-i 'ālam ba-nisbat bā zījā-yi qadīm ta ba dah burj mī rasad va az īn gūna tashnī' mi gardand.*”

first place was his realization that there were many inconsistencies between the calculated celestial positions on the basis of *zīj*es in circulation and those observed in person, particularly lunar and solar eclipses as well as conjunctions. Ṭūsī then assembled in Maragha an impressive number of astral experts from adjacent regions and collected a rich body of the state-of-the-art astronomical instruments, but he did not live long enough to personally complete the observation program.³² As Alī-Shāh Bukhārī underlines, preparing a *zīj* is a hefty business that requires the systematic observation of the stars (*raṣad*). *Raṣad*, however, is contingent upon many factors including the existence of sufficient financial means, physical space, human resources, precise instrumentation, and plentiful amounts of time to conduct different sets of observation with patience.³³ He concludes his exposition here by saying that every new *raṣad* is more accurate than the previous one, due likely to better instrumentation and longer observation. In view of the deficiencies of Ṭūsī’s tables, another and more accurate *raṣad* should be implemented so that the future course of worldly affairs could be predicted after the ascendant of each year is designated and the celestial positions are determined.³⁴

As Alī-Shāh Bukhārī’s anecdote implies, there were many experts at the time who were critical of Ṭūsī’s elaboration in the *Zīj-i Īlkhānī*. Wābkanawī, for instance, details in his *Zīj-i*

³² Ibid.: “*Chūn bi-sālhā tafāvut-i fāhish dāda būd dar mavāzi ‘-i kavākib, raṣad farmūd kardan va agharcha ālat va ‘adat-i bisyār dāsht ki az aṭrāf-i mamālik jam ‘ karda būdand chandīn nav ‘-i digar basākht va yaqīn ast ki ān cha khāja ra muyassar shoda būd. Hīch šāhib-i raṣadi rā nashoda bāshad. Ammā rūzgār vafā nakard ki ba-itmām rasānīde.*”

³³ Ibid: “*hīch shakk nīst ki sākhtan-i zīj kāri-yi ‘aẓīm ast va ta ‘alluq ba-raṣad-i kavākib dārad va raṣad-i kavākib mavqūf ba-māl va jāh va yārān va ālāt-i šahīḥ va ruzgār-i dirāz va farāgat va asl-i albāb-i shakhṣī ki dhihn-i šāfi va ṭab ‘-i salīm darad.*”

³⁴ Ibid; “*Pūshida nīst ki har raṣadī ki karda-and kāmiltar az raṣad-i pīshar ast...Pas vājib konad ki raṣad-i ākhir akmal bāshad va ba-kusūfāt va miqdār-i sā ‘āt va rū ‘yat-i ahilla šihhat-i in raṣad ma ‘lūm mī shavad va dar umūr-i ‘ālam har ḥālī ki az ṭālī ‘-i sāl va avzā ‘-i kavākib mutavaqqa ‘ ast mavjūd mī gardad.*”

muhaqqaq-i Īlkhānī the extent of inconsistencies between the observed celestial phenomena and their respective values calculated with reference to the Ilkhanid tables. In one of his examples, Wābkanawī says that in the year 684 A.H. (1285 in Common Era) a conjunction between Jupiter and Saturn occurred in the ninth degree of Aquarius. However, the difference between the actual observed time of this conjunction and the time previously calculated on the basis of the *Zīj-i Īlkhānī* was around fifteen days. As Wābkanawī himself clearly underlines, the conjunction of the two superior planets is of extreme astrological significance, for it rules worldly phenomena.³⁵ Hence the implication is that the inaccuracies led by impaired celestial data would inevitably cause unfavorable consequences.

The observation program at the Samarqand observatory in the mid-fifteenth century had the similar intention of rectifying the celestial data tabulated in the available *zījes*. As it will be detailed in the second chapter, the *munajjims* serving the Ottoman court were aware of the Ulugh Beg tables as early as the late 1460s, although they seem to have favored, at least until the 1510s, different editions and commentaries of the *Zīj-i Īlkhānī* corpus. From especially the second decade of the sixteenth century on, Ottoman *munajjims* utilized the *Zīj-i Ulugh Beg* almost exclusively for their calculations. However, the Ulugh Beg tables were also not exempt from the criticism of some astral experts, due to the same reason: discrepancies emerging between observed and calculated celestial phenomena. In the mid-1480s, for instance, Khiṭābī *munajjim*, a

³⁵ Ibid: “*tafāvuthā-yi fāhish dar taqāvīm-i kavākib paydā āmada tā ba-ghāyatī ki dar qirān-i ‘ulviyayn ki madār-i ahkām-i ‘ālam bar u ast dar do novbat ki qirān kardan chandīn tafāvuthā-yi fāhish mushāhada oftād. Maṣalan chunān ki dar shuhūr-i sana 684 hijrī īn qirān dar nohom daraja-i Dalv vāqi ‘shod. Az maḥsūb tā mar’ī bi-nisbat bā zījī ki mashūrtarīn va mu’tabartarīn zījā ast dar īn bilād va mutadāvil dar miyān-i khalq, qarīb-i 15 rūz tafāvut kard.*” See also Mohammad Mozaffari, “Wābkanawī’s Prediction and Calculations of the Annual Solar Eclipse of 30 January 1283,” *Historia Mathematica* 40 (2013), 235-261.

Persian émigré at the court of Bāyezīd II (r. 1481-1512), about whom more information will be provided in the third chapter, made solar observations in Istanbul to test the data provided by three popular *zīj*es of the time: the *Zīj-i Īlkhānī*, the *Zīj-i Ulugh Beg*, and the *Zīj-i Jāmi* ‘ of his master Rukn al-dīn Āmulī.³⁶ Based upon his calculations, and of course thanks to his intellectual proximity to his own teacher, he found Rukn al-Āmulī’s work more accurate than the others and did indeed use it when preparing his own annual almanac-prognostications. In another case, in an undated short report on the uses of talismans and celestial magic, intriguingly attributed to Ibn Kemāl (d. 1534), the famous *sheikhulislam* of the early years of Suleymān’s reign (r. 1520-1566), the author asks for royal support for undertaking a systematic observational program in Istanbul, because the available *zīj*es in circulation, including the Ulugh Beg tables, fail to produce consistent and accurate results.³⁷ There are doubts about the attribution of this treatise to Ibn Kemāl and the earliest surviving copy of the text with an identifiable colophon dates only to 1596.³⁸ Nonetheless, the treatise was almost certainly written before the 1570s, because at that

³⁶ Mortaza Somi and Mohammad Bagheri, “Risāla-i tashrīḥ al-ālāt fī sha‘n al-imtiḥānāt az Sayyid Munajjim Ḥusaynī,” *Mirāth-i ‘Ilmī-yi Islām va Īrān*, 2/1 (1392/2013), 181-205.

³⁷ SK Esad Efendi Ms. 3782, 89a: “*Bi-ḥasebu’n-nücūm birçaḡ maḡal vardur ānı daḡı ‘ale’l-icmāl āsitāne-i keyvān-eyvāna ve ‘atebe-i şāḡib-ḡırān-ı yūnāna ‘arz itmek vācibdür. Ol cümleden birisi budur ki ḡāliyā isti ‘māl itdügimiz zīcler raşadları ḡasebince biri birine muḡteliflerdür zīrā mu ‘teber olan ḡāliyā zīc-i Ulug Bīgdür ki ānūñ dāḡı rü ‘yete muvāfiḡ ve ḡārice muḡābıḡ gelmez ba ‘zı yerleri vardur. Nitekim isti ‘māl idenleriñ ma ‘lūmudur. Ve ‘ālem ḡālkı bir zāc-i [zīc?] cedīde ziyāde muḡtāc olmuşlardur. Bu cihetdendür ki ehl-i nücūmuñ mudakḡıḡıkları ve aşḡāb-ı taḡvīmiñ muḡakḡıḡıkları daḡı aḡḡāmında ḡāḡı ḡaḡā itmek vāḡı ‘olub bilmeyenler ol ḡaḡāyı mustaḡrice nisbet iderler amma zīcden olduğın kimse bilmez ... velḡāşıl bu aşl a ‘māl-i ‘aḡīme ve umūr-ı cesīme mu ‘āvenet-i şāḡib-ḡırān-ı zamān ve ḡimāyet-i ḡāḡān-ı Süleymān-mekān olmayınca zuḡūra gelmek mümkün deḡıldür.”*

³⁸ There are six known copies of this short treatise, the earliest of which is located as SK Esad Efendi Ms. 3782. Other copies include SK Hacı Mahmud Efendi Ms. 5584, SK Reisülküttab Ms. 1199 (two different copies in the same volume), SK Şehid Ali Paşa Ms. 2795, and Cidde Camiat Abdülaziz Ms. 1378.

time an observatory was built in Istanbul on the initiative of the famous *munajjim* Taqī al-dīn (d. later than 1585) and with the support of Sultan Murād III (r. 1574-1595) and his chief advisor Sa‘deddīn (d. 1599).³⁹ It would be intriguing for a number of reasons to have a prominent “religious” scholar at the caliber of Ibn Kemāl penning such a text on celestial magic, but regardless of the question of its authorship, the treatise is still an important source showing unequivocally that the *zīj*es were definitely used for astrological and divinatory purposes, and that the accuracy of astronomical data covered in these tables was the primary concern of the *munajjims*.

Aside from the *zīj*es, several other works written on astronomical instruments or astrological techniques also clearly demonstrate that learned astrological practice certainly demanded astronomical and mathematical know-how. Rukn al-dīn Āmulī, a relatively significant astral expert from Shīrāz from the first half of the fifteenth century, provides us with the most

Given that the autograph copy is not available and none of the extant copies survives from his lifetime, we have every reason to question the attribution of the authorship of this short treatise to Ibn Kemāl. However, all the relevant modern studies that try to establish the complete oeuvre of this prolific *‘ālim*, who composed more than two hundred works in almost every branch of knowledge, include this text as an authentic work of Ibn Kemāl. See: Nihal Atsız, “Kemalpaşaoğlu’nun Eserleri I,” *Şarkiyat Mecmuası* 6 (1966), 71-112; “Kemalpaşaoğlu’nun Eserleri II,” *Şarkiyat Mecmuası* 7 (1972), 83-135; Yekta Saraç, *Şeyhülislam Kemal Paşazade. Hayatı, Şahsiyeti, Eserleri ve Bazı Şiirleri* (İstanbul: Risale, 1995); Şamil Öçal, *Kışladan Medreseye: Osmanlı Bilgini Kemalpaşazade’nin Düşünce Dünyası* (İstanbul: İz, 2013).

There is also circumstantial evidence that Ibn Kemāl was interested in sister divinatory practices like bibliomancy and lettrism. For instance, he presented Selīm I a short report in which he interpreted the numerological significance of a Quranic verse (21: 105) as a good omen and clear victory of the Ottoman sultan against the Mamluks that would happen after 1514. See: Mustafa Kılıç, “İbn Kemal’in Mısır fethine dair bir risale-i acibesi,” *Diyanet* 26/1 (1990), 111-120.

³⁹ Taqī al-Dīn also emphasized the need for revising tables (*zīj*) when he approached the sultan and expressed his demand to establish an observatory for conducting a systematic observational enterprise. See Aydın Sayılı, “Alâuddin Mansur’un İstanbul Rasathanesi Hakkındaki Şiirleri,” *Belleten* v. 20, n. 79 (1956), 411-484; Remzi Demir, *Taḳiyüddīn’de matematik ve astronomi: Cerîdedü’-d-dürer ve ḥarîdetü’-l-fiker üzerine bir inceleme* (Ankara: Atatürk Kültür Merkezi Başkanlığı, 2000).

succinct expression of the reliance of astrology upon mathematical and astronomical knowledge. In his treatise on the uses of the astrolabe (*Risāla panjāh bāb*), Rukn al-Dīn says that he has spent most of his life studying philosophical sciences (*‘ulūm-i ḥikmī*), especially the mathematical sciences (*‘ulūm-i riyāzī*) including *hay‘a*, *handasa*, and *ḥisāb*. There is no doubt for Rukn al-Dīn that the “fruit” and reward of studying these sciences, aside from acknowledging God’s omnipotence and his cosmic design, is to be able to make (astrological) judgments (*‘ilm-i aḥkām*) and accurately measure the time. This, however, relies upon the ability to observe the stars, calculate the mean motions of planets, and designate the ascendants of the hour. The astrolabe is, for Rukn al-Dīn, the best instrument to perform these sorts of astronomical operations, which are necessary for casting horoscopes and practicing electional astrology.⁴⁰

As Rukn al-Dīn makes it explicit in his text, *munajjims* had to undertake these complex astronomical operations before articulating astrological interpretations. The entire *taqwīm* genre, which I will delineate in the fourth chapter, provides an example *par excellence* of how *munajjims* pronounced their astrological predictions only after they laid out the necessary astronomical indicators by making demanding calculations on the basis of the *zīj*es. Aside from the *taqwīm*s, extant birth horoscopes also serve as a strong example. In the surviving horoscope of Mīrzā Rustam b. ‘Umar Shaykh prepared in 1419, the *munajjim* Yaḥyā b. ‘Imād—who was

⁴⁰ SK Ayasofya Ms. 2667, 2a-2b: “*ki chūn dar akṣar-i avqāt ishtigāl-i in faqīr bi-‘ulūm-i ḥikmi būda bi-takḥṣīs ‘ilm-i hay‘a va handasa va ḥisāb ki az uṣūl-i ‘ilm-i riyāzī and ... Muqarrar ast ki samara-i in ‘ulūm ba’d az vasīla bi-ma’rifatillāh ‘ilm-i aḥkām va ma’rifat-i avqāt ast. Va ān mavqūf ast bi-ma’rifat-i raṣad-ī sitāragān ve istikhrāj-i taqvīm-i kavākib va ṭavālī ‘-i sā‘at. Va bihtarīn ālatī ki ḥukamā’ az jihat-i in ‘amāl vaṣ’ karda-and uṣṭurlāb ast ki istikhrāj-i taqvīm-i kavākib va ṭavālī’ va ma’rifat-i avqāt va masāḥat az u ma’lūm mi shavad. Va rasā’il ki dar ma’rifat-i an navashta and dar a’māl-i masā’il-i ān ri’āyat-i tartīb nakarda and va istikhrāj-i taqvīm-i kavākib va bāqī a’māl-i nujūmi ki dar ṣūrat-i ṭālī ‘-i vilādat ve ikhtiyārāt badān muḥtāj mi shavand nayāvorda.”*

likely the son of the *munajjim* who prepared the famous Mīrzā Iskandar horoscope—first lays out in a very detailed fashion the necessary mathematical and astronomical information about the celestial configuration at the time of Rustam’s recorded birth date. This part constitutes the first sixty-three folios of the eighty-four-folio manuscript. As his wordings clearly suggest in the section where he shifts to the astrological interpretation of these celestial indications, a *munajjim* can only start the *aḥkām* after he or she carefully determines the zodiacal degree of the ascendant, equalizes all the remaining astrological houses, tabulates the true longitudes of seven planets as well as the fixed stars and astrological lots, establishes the prorogators (e.g., *haylāj*, *kadkhudā*, *tasyīrat*, *intihā’āt*), designates the ascendants of the revolutions, and undertakes all other sorts of operations upon which relied the science of the judgments of the stars.⁴¹ In the eyes of Yahyā *munajjim*, and in fact many other astral experts from the period, to interpret the decrees of the stars was in fact the desired end of calculating planetary positions.⁴²

One can easily find among the writings of those *munajjims* serving the Ottoman court a similar attitude toward *nujūm* and *aḥkām*. In the few extant annotated Ottoman birth horoscopes descending from the late-fifteenth and the first half of the sixteenth century, which I will mention in more detail in the fifth chapter, the *munajjims* first sketch in a detailed fashion the celestial map at the time of the reported birth. Once all the relevant signs are established, he or she starts deriving the astrological decrees. For example, the birth horoscope of Meḥmed II produced by

⁴¹ Huntington Library Ms. HM71897, 64b: “*Chūn fārigh koshtūm az a’ māl-i ḥisābī va zavābiḥ-i nujūmī va qavānīn-i ‘ilm-i riyāzī ki ān istikhrāj-i tavārīkh ast va taṣḥīḥ-i daraja-i ṭālī’-i humāyūn va tasviyat al-buyūt va taqāvim-i kavākib-i sab’a va sābita va siḥām va ‘urūd va ab’ād-i īshān az dā’ira-i mu’addal al-nahār va maṭālī’-i mamarr va maṭālī’ va mughayyab va ‘urūd-i āfāq-i ḥādīṣa va maṭālī’-i muṣaḥḥaḥa va maṭrāh-i shī’ā’āt va maṭāriḥ-i anvār va ta’yīn-i haylājāt va ‘aṭāyā’-i kadkhudāhāt va tasyīrāt va intihā’āt va ṭavālī’-i taḥvīlāt va firdārāt va sā’ir a’ māl ki madār-i aḥkām-i nujūmī bar ān ast.*”

⁴² Ibid: “[A]ḥkām ki samara va natāyīj-i īn dalā’il ast.”

Khiṭābī in the late 1470s clearly employs this structure. Khiṭābī elaborates in the first two hundred folios of the horoscope the demanding celestial data at the time of Meḥmed II’s reported birth.⁴³ In a similar vein, in the horoscope Lütfullāh *munajjim*, one of the court *munajjims* in the early 1530s prepared for a certain Maḥmūd b. Muḥammed, he explicates and tabulates in sixty-five full folios the astronomical indications and values of the celestial configuration at the time of his nativity, which apparently occurred on 12 Muḥarram 895/December 6, 1489.⁴⁴ The copy seems to be incomplete, as it does not include the ensuing *aḥkām* part. It is also probable that Lütfullāh provided the astrological interpretation verbally. No matter what the actual content of the *aḥkām*, this surviving horoscope clearly shows us that detailed astronomical calculations made on the basis of available *zīj*es constitute the fundamentals of learned astrological practice.⁴⁵

Despite the fundamental agreement of astral experts upon the premise that valid *aḥkām* depended strongly upon accurate knowledge of *nujūm*, many of them also acknowledged the epistemological nuances between the two. As briefly noted before, not all experts were eager to draw astrological decrees from the celestial positions they could successfully calculate. Moreover, the great majority of *munajjims* were genuinely aware of the limits of the *aḥkām* as a practice. In the next section, in addition to presenting the personal opinions of certain *munajjims* vis-à-vis the scientific restraints of the *‘ilm-i aḥkām (al-nujūm)*, I will discuss how the nuances

⁴³ TSMK Yeni Yazmalar Ms. 830, 200a: “*Faṣl fī al-aḥkām: chūn az taṣḥīḥ-i daraja-i tāli‘ va ta’yīn-i haylāj va kadkhudhāhāt va ‘urūd-i āfāq-i kavākib va tasyīr-i avtād fāriḡh shodīm khāstīm ki aḥkām-i duvāzdah khāna ra mujmalan bayān konīm. Ba’d az ān aḥkām-i har sāl ra ‘alā’t-tafṣīl irād konīm.*”

⁴⁴ Kandilli Observatory Library Ms. 325.

⁴⁵ One specific chapter of Lütfullāh’s horoscope is called “calculating the true longitudes of seven planets at the time of birth by using the information in the Ulugh Beg tables prepared according to the observational enterprise in Samarqand.” (*dhikr-i istikhrāj-i taqvim-i kavākib-i haftgāna az zīj-i sulṭānī bi-raṣad-i Samarqand bar vaqt-i vilādat.*) Ibid., 9a-10b.

between *aḥkām* and *nujūm/hay‘a* were interpreted and reinterpreted in the highly complex taxonomy-of-science tradition in medieval Islamic writing.

I. 3. Astrology in the Medieval Islamicate Classification of the Sciences

Reluctance toward the practice of *aḥkām* finds poignant expression in a pardon letter written by an anonymous *munajjim* who seems to have served the Ottoman court around the turn of the sixteenth century. In this undated letter located in the folder of written communications from the time of Bāyezīd II (r. 1481-1512), the anonymous *munajjim* asks in Persian for the sultan’s sympathy and forgiveness, because, as he admits, he has recently failed to present him with annual almanac-prognostications (*taqwīm*). The *munajjim* mentions two reasons for his recent inattentiveness. Firstly, he says, his attention has recently geared more toward medicine (*ṭibb*) than *nujūm*. Secondly and more strikingly, he maintains that since becoming older and closer to death, dealing with *nujūm*, especially the *aḥkām* has been giving him more grief and uneasiness. In the last part of his letter, the *munajjim* again proffers his apology and desperately pleads with the sultan to reemploy him in his service.⁴⁶

As a vivid testimony to the personal reflections of a practicing *munajjim* about his own craft, the letter unequivocally documents that in the eyes of the practitioners, the boundaries between *aḥkām* and *nujūm* were in fact quite evident, and that the controversial nature of astrological practice on religious grounds was fraught to the extent that practitioners might even think of abandoning their major source of income. This letter, however, is not the only instance

⁴⁶ TSMA E. 10159/145: “*dar īn ayyām muyassar nashod ki bi-istikhrāj-i taqvīm mashgūl shavad ... az chand jihat yakī az ishtigāl bi-muṭāla‘a-i ṭibbiyya ammā māni‘-i kullī ān ast ki īn kamīna rā vaqt-i irtihāl nazdīk ast va ishtigāl bi-nujūmiyyāt siyammā bi-aḥkāmash mustalzīm-i qasāvat-i qalb ast ... in kamīna rā ‘afv farmāyand va az rujū‘-i khidmāt ki inshirāḥ-i ṣadr va tanavvur-i qalb bi-ān ast īn kamīna rā maḥrūm nagodhārand.*”

where a practicing *munajjim* implies his disdain, or at least skepticism, toward astrology. In many examples of the *taqwīm* genre one can find similar remarks where *munajjims* carefully draw attention to the epistemological limits of *aḥkām* as a science.

One of the standard arguments frequently repeated, often almost verbatim, in different *taqwīms* by various *munajjims* is the inability of human perception and experience to understand the infinite amount and kinds of celestial influence upon the sublunary world. For many astral experts, knowledge of celestial configurations derived through experience (*tajriba*) and observation does not suffice to meet the virtually limitless occasions where astrological predictions may be applied.⁴⁷ For example, in the *taqwīm* produced for the year 900/1495, the anonymous *munajjim* rhetorically asks which created being in the world is capable to fully comprehend the numerous celestial influences constantly descending upon the terrestrial realm. Hence, says the anonymous *munajjim*, experts in astrology (*arbāb-i aḥkām*) cannot escape from making mistakes. Yet, past authorities of this science exposed several points by means of analogical reasoning (*qiyās*) and experience (*tajriba*), and reached the conclusion that the terrestrial objects are indeed obedient to the forms of the world of the spirits. As Ptolemy already demonstrated and Abu Ma‘shar later commented upon, according to this anonymous *munajjim*, the forms in the world of composition are administered by the celestial forms.⁴⁸

⁴⁷ Tzvi Langermann has also demonstrated in one of his recent studies that the category of experience (*tajriba*) had a significant place in late medieval and early modern epistemological discussions, particularly in the fields of applied arts and sciences including astrology. See: Tzvi Langermann, “From My Notebooks. On *Tajriba/Nissayon* (“Experience”): Texts in Hebrew,, Judeo-Arabic, and Arabic,” *Aleph* 14/2 (2014), 147-176.

⁴⁸ TSMK R. 1711/1, 3a: “*har laḥza va lamḥa aṣarhā-i nāma‘dūd va nazarhā-i nāmahdūd az ‘ālam-i ‘ulvī ba-qarargāh-i suflī nāzil mī shavad ki kodām maḥlūq rā quvvat-i idrāk va irāda-i an jumla tavānad bovad? Pas bar īn muqaddima ma‘lūm mī shavad ki arbāb-i aḥkām rā sahvā-i bisyār oftad. Ammā ba-īn ma‘nā hama bar sabīl-i qiyāsāt va tajriba ustādān-i īn ‘ilm hama*

One can find the exact same argument, expressed in slightly different fashion, in at least ten different *taqwīms* produced between the years 901/1496 and 937/1531.⁴⁹ In the *taqwīm* of the year 907/1502, for instance, the anonymous *munajjim* says that astrological indications such as the projections of the rays (*maṭāriḥ-i aṣḥi‘a*), the terminal signs (*intihā‘āt*), the progressions

sukhanhā gofta and va bāz namūda and ki ṣuvar-i ajsād rā muṭī‘ and bar ṣuvar-i ‘ālam-i arvāḥ rā chunān ki Baṭlamyūs dar kitāb-i Ṣamara āvorda and va sharḥ-i ān rā ustād Abū‘l-Ma‘shar Balkhī ... chunīn karda ast ‘al-ṣuwar allatī fī ‘ālam al-tarkīb mutī‘[at]un li ṣ-ṣuwar al-falakiyya.’”

⁴⁹ See TSMK B. 313, 1b-2a (*taqwīm* of 901/1496); TSMK B. 320, 2a (*taqwīm* of 907/1502); TSMK B. 321, 1b (*taqwīm* of 907/1502); TSMK EH. 1712, 1b (*taqwīm* of 909/1504); TSMK R. 1711, 172a (*taqwīm* of 915/1510); TSMK EH. 1710, 9b-10a (*taqwīm* of 919/1513); TSMK R. 1711, 249b-250a (*taqwīm* of 920/1514); TSMK R. 1711 (*taqwīm* of 923/1517); TSMK EH. 1695, 1b (*taqwīm* of 925/1519); TSMK R. 1711, 366b (*taqwīm* of 937/1531).

Just to exemplify these slight differences in the expressions, here are two passages, one from the *taqwīm* of the year 901/1496, and the latter from the *taqwīm* of the year 919/1513:

TSMK B. 313, 1b-2a: “[A]mmā īn jumla dar fikr-i insān bar sabīl-i taḥqīq va tadqīq mumkin nīst zīrā har laḥza āsārḥā-i nā-ma‘dūd va har lamḥa nazarḥā-i nā-maḥdūd az ‘ālam-i ‘ulvī ba-qarargāh-i suflī nāzil mī shavad. Pas kodām makhluq rā quvvat-i idrāk va iḥātat-i ‘aql va taḥayyulāt ast ki chandīn āsār tavānad kashf kardan? Bar īn muqaddima ma‘lūm ast ki aṣḥāb-i aḥkām az sahv va khaṭā khālī nabāshad. Va līkin bar sabīl-i qiyās va tajriba ustādān-i īn ‘ilm-i sharīf sukhanhā gofta and va bāz namūda and ki ṣuvar-i ajsād muṭī‘ and bar ṣuvar-i ‘ālam-i arvāḥ. Chunān ki ḥukamā‘-i rabbānī dar kutub-i khod āvorda and ‘al-suwar allatī fī ‘ālam al-tarkīb mutī‘atun al-ṣuwar al-falakiyya.’ Va ṭarīq-i tarkīb-i ajsād va nuqūsh rā bar vajhi āsān namūda and va marāḥim-i subḥānī ba-ḥarakāt-i sayyārāt ki sabab-i mudabbir-i ‘ālam-i tarkīb and bi-amrillāh ta‘ālā. Chunān ki dar kalām-i qadīm bar ān nāfiq ast: wa-l-mudabbirātu amrān wa sh-shams wa l-qamar wa n-nujūm musakḥkhar ast bi-amrihi.”

TSMK EH. 1710, 9b-10a: “[A]mmā har chand ki īn anvā‘ dar vaḥ‘-i bashar bar sabīl-i taḥqīq va tadqīq namī āyad zīrā ki har laḥza va lamḥa āsārḥā-i nā-maḥdūd va nazarḥā-i nā-ma‘dūd az ‘ālam-i ‘ulvī ba-qarargāh-i suflī nāzil mī shavad. Kodām makhluq rā quvvat-i idrāk va iḥātat-i ‘aql ast ki īn qadr āsār va dalā‘il tavānad dānistan? Pas az in muqaddima ma‘lūm shod ki aṣḥāb-i aḥkām az sahv va khaṭā khālī nabāshad. Va līkin bi-ṭarīq-i khāṣṣa va ghalaba al-ḥann va al-qiyās va tajriba ustādān-i in ‘ilm bāz namūda mī shavad va ḥukamā‘ gofta and ki ṣuvar-i ajsād muṭī‘ and bar ṣuvar-i arvāḥ. Chunān ki Baṭlamyūs dar kitāb-i Ṣamara āvorda ast ki ‘al-ṣuwar allatī fī ‘ālam al-tarkīb mutī‘atun li ṣ-ṣuwar al-falakiyya.’ Va sharḥ-i īn kalima Khāja Naṣīr al-Dīn Ṭūsī va Abū Ma‘shar Balkhī chunīn karda ast va aṣḥāb-i ṭilsimāt gofta and ki bā har burji va bā har daraja ṣūratī ṭulū‘ konad va taṣavvur-i ‘ālam-i tarkīb-i nabātāt va ḥayyānāt mī khāhad.”

(*tasyīrāt*), astrological lots (*sihām*), or the weakness and strength of the stars (*ẓa‘af va quvva-yi kavākib*) are so numerous that it is a tedious task to successfully locate each and every one of them. Therefore, this science can explain very little about the future course of worldly affairs. Besides, such an intellectual endeavor is rested purely upon experiential (*tajrubī*) and speculative (*ẓannī*) grounds. He concludes this section by referring to a *hadīth*, a favorite one indeed among *taqwīm* composers: “Whatever Allah willed to be, shall be, and whatever Allah did not will to be, shall not be.”⁵⁰

It is clear from these remarks repeated almost verbatim by different *munajjims* that in the eyes of many practitioners astrology (*aḥkām*) was a science based rather upon conjecture and experience than unwavering mathematical proofs and geometrical demonstrations (*burhān-i handasī*). The underlying empiricism, however, is impossible to fully attain, because the effects in the terrestrial realm of celestial configurations are countless, whereas the empirical data demonstrating these causalities is by nature episodic and fragmented. Moreover, the limited mental faculty of human beings is insufficient for understanding the infinite quantities and varieties of celestial influence upon the inhabited world. Moreover, no individual can assemble all the necessary experiential knowledge of celestial influences during his short lifespan. Yet, owing to the earlier observations and accumulated empirical results of previous generations of learned experts, and further applying analogical reasoning, one can still interpret how the future course of affairs in the sublunary world will run, though these interpretations are contingent. Due

⁵⁰ TSMK B. 320, 2a: “*bā sāir dalāil va shavāhid va maṭāriḥ-i ash‘ia va anvār va intihā‘āt va tasyīrāt va sihāmāt va mudabbirāt va qavāsīm va ẓa‘af va quvva-yi kavākib va dalāil ki iḥṣā-yi ān kamā yanbaghī muta‘adhdhir va imtizāj kamā ḥaqqahī muta‘assir. Binā bi-ḥasb-i ghālib-i ẓann va tajārib īn fann shamma va dharra az umūr-i aḥvāl-i ‘ālam bāz namūd mī shavad. Mā shā‘allāh kāna wa mā lam yashā‘ lam yakun.*”

mostly to these internal restraints caused by the epistemological ambit of astrology, *munajjims* often adopt discreet language in their predictions and emphasize the highly probabilistic character of their craft by frequently employing such qualifications as “*mumkin ast ki*”, “*yumkin...*”, “*yahtamilu*”, “*ihtimāl-i...*”, or “*umīd ast ki.*”

The epistemological controversies inherent in the practice of *aḥkām* are also present in the rich taxonomy-of-science tradition that flourished in the Islamicate culture especially after the tenth century as a response to the need of defining and classifying the increased amount of knowledge in circulation.⁵¹ By epistemological controversies I do not refer here to the religious sensitivities of pious Muslims. What is rather at stake here are the tensions deeply rooted in the science of *aḥkām* due to the discrepancies related to its subject matter, methods, and objectives. A great majority of heavenly experts acknowledged that the knowledge necessary for *aḥkām* was dependent upon the unchanging and prestigious mathematical knowledge of the celestial spheres. In fact, as evident from the works of Ptolemy, the authoritative pre-Islamic sources adopted in the Islamicate realm barely distinguished between mathematical/astronomical and astrological celestial activities. On the other hand, the same experts were already aware of the limits of the practice of *aḥkām*, as it fundamentally dealt with understanding and predicting the affairs that occur in the ever-changing terrestrial realm. Due to these dual characteristics of the science of *aḥkām*, encyclopedists and classifiers of knowledge in medieval Islamicate world struggled to situate it in a consistent manner.

⁵¹ On the development of the “writerly culture” corollary to the introduction and further spread of paper technology by the second century Hijri, see: Shawkat M. Toorawa, *Ibn Abī Ṭāhir Ṭayfūr and Arabic writerly culture: a ninth-century Bookman in Baghdad* (New York: Routledge, 2005). On the rise and dynamics of the *taṣnīf al-‘ulūm* literature and the Arabic encyclopedism, see Gerhard Endress (ed.), *Organizing Knowledge: Encyclopaedic Activities in the Pre-Eighteenth Century Islamic World* (Leiden: Brill, 2006).

As it was mostly the case in Greek and Latin tradition in the ancient world and the early Middle Ages, fuzzy borders between astronomy and astrology and the use of the overarching semantic category of “the science of the stars” are also found in pre-tenth century Arabic sources. Notwithstanding the nuances between them, Abū Bakr al-Khwārizmī (d. 847) in his *Mafātīḥ al-‘ulūm*⁵², the Ikhwān al-Ṣafā’ in their epistles (ca. tenth century)⁵³, and al-Fārābī (d. ca. 950) in his *Iḥṣā’ al-‘ulūm* all treat ‘ilm al-nujūm as a single category.⁵⁴ Yet al-Fārābī, despite his approaching it as a single science, grouped it into two main categories in a way that resonates well with Ptolemy’s discussion in his *Almagest* and *Tetrabiblos*: the first part (*aḥkām al-nujūm*) investigates and interprets the indications of celestial objects for predicting future events as well as for interpreting past and present occurrences, whereas the second part (‘ilm al-nujūm al-ta’līmī) studies the measurable features of the heavenly objects including their sizes, motions, or distances from one another. Al-Fārābī’s implications are quite clear that from a philosophical point of view only the second category of the science of the stars is valid. However, he never rejects the fundamental cosmological axiom of celestial causation on the sublunary world. Quite the contrary, he agrees with the idea that men of knowledge can rely upon experience (*tajriba*) and observation to study the physical influence of celestial objects on the terrestrial world. However, echoing the arguments that would later be proffered by Ottoman *munajjims* in their

⁵² Abū Bakr al-Khwārizmī, *Mafātīḥ al-‘ulūm* (Beirut: Dār al-kutub al-‘ilmiyya, n. d.).

⁵³ It is worth noting that the title of the epistle is not “‘ilm al-nujūm” but rather “*aṣṭrunūmiyā*.” See *On Astronomy: An Arabic Critical Edition and English Translation of Epistle 3*, ed. Jamil Ragep and Taro Mimura (Oxford: Oxford University Press, 2015). One can also find the rare use of the word *aṣṭrunūmiyya* in Shams al-Dīn Muḥammad b. Maḥmūd Āmulī’s (d. 1352) encyclopedic *Nafāyis al-funūn fī ‘Arāyis al-‘uyūn*. In his case Āmulī describes as “*astar(a)nūmā*” what the category of ‘ilm al-hay’a usually covers in the classification of sciences genre. See: Āmulī, Shams al-Dīn Muḥammad b. Maḥmūd, *Nafāyis al-funūn fī ‘Arāyis al-‘uyūn*, v. 3, ed. Abū’l-Ḥasan Sha’rānī (Tehrān: Kitābforūshī-ye Islāmīya, 1377-79/1957-59), 26.

⁵⁴ Al-Fārābī, *Iḥṣā’ al-‘ulūm*, (Beirut: Dār wa Maktabat al-Hilāl, 1996).

taqwīms, al-Fārābī finds the empirical foundation of astrology ineluctably inadequate.⁵⁵

Al-Fārābī's elaboration in his *Iḥsā' al-'ulūm*, in which he distinguishes the mathematical investigation of heavenly objects from the astrological study of celestial influences, prefigures the subsequent semantic and categorical distinction between *'ilm al-hay'a* and *'ilm aḥkām al-nujūm*. The real sea change came, however, with Ibn Sīnā, who brought a relative clarity to the astronomy-astrology debate after he systematically classified them into different epistemological units within the Aristotelian concept of knowledge. According to Ibn Sīnā, *'ilm al-hay'a* was an independent science whose subject matter and objectives were primarily defined by the use of mathematical demonstrations. For that reason, in his *Risāla fī aqsām al-'ulūm al-'aqliyya* he groups this science under the rubric of the mathematical sciences (*al-ḥikmat al-riyādiyya*), which primarily concerned with studying the empirical aspects of celestial phenomena.⁵⁶ Astrology (*aḥkām al-nujūm*), however, was classified as one of the branches of the natural sciences (*al-ḥikmat al-ṭabī'iyya*) next to medicine and divinatory arts such as oneiromancy (*'ilm al-ta'bīr*) or

⁵⁵ Al-Fārābī also treats the question of the efficacy and epistemology of astrology in a separate treatise called "Risāla fī mā yaṣiḥḥu wa-mā lā yaṣiḥḥu min aḥkām al-nujūm." Here he states that the celestial objects influence the sublunary world not by their motions but by their light. Their effect, however, does not concern coincidental events such as the death of an individual at a particular moment of a celestial object's movement. If such events could have been determined by such celestial configurations, then this would have upend social affairs, because in a world where everything is inevitable and determinable, then there is no need for individual effort. See "Bemerkungen des Abū Naṣr über die Richtigen und Falschen astronomischen entscheide," in *Al-Fārābī's Philosophische Abhandlungen*, ed. Fr. Dieterici (Leiden: Brill, 1892), Arabic original 104-112; German translation 170-186. See also Therese-Anne Druart "Al-Farabi's Causation of the Heavenly Bodies," in *Islamic philosophy and mysticism*, ed. Morewedge, Delmar: 1981, 35-45; Joel Kraemer, *Humanism in the Renaissance of Islam: The Cultural Revival during the Buyid Age*, Second Revised Edition (Leiden: Brill, 1992), 160; Damien Jones, *Method, Structure, and Development in al-Fārābī's Cosmology* (Leiden: Brill, 2012), esp. 44-57.

⁵⁶ Ibn Sīnā, "Risāla fī aqsām al-'ulūm al-'aqliyya," in *Tis' rasā'il fī l-ḥikma wa-l-ṭabī'iyyāt* (Cairo: Maṭba'at Hindīyah, 1908), 105-6, 111.

physiognomy (*‘ilm al-firāsa*).⁵⁷ In that regard, Ibn Sīnā takes the earlier discussion of al-Fārābī one step further and essentially decouples the two sciences by deconstructing the sweeping epistemological unit of the “science of the stars.”

The Avicennan epistemological model deeply influenced the later development of the *taṣnīf al-‘ulūm* genre, including the Ottoman examples. Even some leading experts of astral sciences in the post-classical Islamicate world such as Naṣīr al-Dīn Ṭūsī and Quṭb al-Dīn Shīrāzī (d. 1311) alluded to the same hierarchical classification in their own discussions with regard to the boundaries between *hay‘a* and *aḥkām*. Ṭūsī for instance reiterated in his *Nasirean Ethics* that *‘ilm-i hay‘a* is part of the mathematical sciences (*‘ulūm-i riyāzī*), as it seeks knowledge of the motions and relative positions of celestial bodies.⁵⁸ The science that aims at interpreting this knowledge in order to predict what will happen in the sublunary world, however, falls, according to Ṭūsī, into the category of the natural sciences, as these sciences are concerned with “matter” which is subject to change and corruption.

One can also find in Quṭb al-Dīn Shirāzī’s (d. 1311) encyclopedic work *Durrat al-tāj* the exact same categorization. Interestingly, Shirāzī uses *‘ilm al-hay‘a* and *‘ilm al-nujūm* interchangeably in his exposition on the mathematical sciences (*‘ulūm-i riyāzī*). For Shirāzī, the third branch of the mathematical sciences, which he calls *‘ilm-i hay‘a* and sometimes *‘ilm-i nujūm*, is the knowledge of the relative positions of the celestial objects, their motions, sizes, and physical features. As Shirāzī clearly underlines, the *aḥkām-i nujūm* is not within the purview of this branch. He later briefly mentions it as part of the natural sciences along with medicine,

⁵⁷ Ibid., 108-111.

⁵⁸ Naṣīr ad-Dīn Ṭūsī, *The Nasirean Ethics*, tr. G. M. Wickens (London: George Allen & Unwin Ltd., 1964), 27.

agriculture, physiognomy, dream interpretation, alchemy, and talismans.⁵⁹

Aside from the Maragha circle, the Avicennan epistemological hierarchy was also adopted in the Mamluk intellectual realm. In his *Irshād al-qāṣid ilā asnā al-maqāṣid*, the leading thirteenth-century Mamluk encyclopedist and noted physician al-Akfānī (d. 1348) closely follows the Avicennan/Aristotelian classification system by grouping the *‘ilm al-hay’a* into the mathematical sciences and the *aḥkām al-nujūm* into the natural sciences. According to al-Akfānī, the major aim in *aḥkām* is to interpret the influences of celestial configurations upon terrestrial occurrences (*al-istidlāl bi-t-tashakkulāt al-falakiyya ‘alā al-ḥawādith al-suflīyya*).⁶⁰ The importance of this science stems from its utility to interpret the fortunes of countries, rulers, and other individuals. By having recourse to this type of knowledge, one can also determine the most auspicious moment to embark upon an activity. *‘Ilm al-hay’a*, on the contrary, is the science of the celestial and terrestrial objects that studies their physical structures as well as the movements of celestial orbs and stars, their numbers and positions. Al-Akfānī also acknowledges that *‘ilm al-hay’a* is a noble science with respect to its subject matter and soundness of its proofs. Moreover, this science helps the experts to measure time, which is important not only for observing religious rituals and facilitating social transactions but also for practicing medicine, astrology, magic, and husbandry.⁶¹ At the end of his discussion on the benefits of the *‘ilm al-hay’a*, al-Akfānī discusses the extent to which one’s occupying oneself with the “science of the stars” (*‘ilm al-nujūm*) could be considered licit. His use of the term “science of the stars” here

⁵⁹ Quṭb al-Dīn Shīrāzī, *Durrat al-tāj*, ed. Muḥammad Mushkāt (Tehran: Intishārāt-i Ḥikmat, 1369/1990), 73-75.

⁶⁰ al-Akfānī, *Irshād al-qāṣid ilā asnā al-maqāṣid*, ed. ‘Abd al-Laṭīf Muḥammad al-‘Abd (Cairo: Maktabat al-Anjulū al-Miṣrīyah, 1978), 117.

⁶¹ Ibid., 143: “*wa bi-n-nisba ilā dabṭ al-aḥwāl al-azmina fihā yata’alliq bi-l-‘ibādāt wa-l-mu’āmalāt wa aḥwāl al-ṭibb wa aḥkām al-nujūm wa a’ māl al-siḥr wa-l-filāḥa.*”

seems to comprise both *hay'a* and *aḥkām*, for he groups astral activities into five major categories:

i) Obligatory (*wājib*): when astral knowledge is put into practice to measure time for the observation of religious rituals.

ii) Recommended (*mandūb*): when astral knowledge is sought to study heavenly objects as the proofs of the existence of the omnipotent God.

iii) Permissible (*mubāḥ*): when practitioners use astral knowledge for astrological purposes while acknowledging that celestial bodies are influential only by divine providence not through their independent power.

iv) Disapproved (*makrūh*): when astrology is practiced with the belief in the unmediated power of heavenly bodies that act as independent agents.

v) Forbidden (*maḥzūr*): when astrology is practiced with strict belief in astral determinism maintaining that celestial objects rule terrestrial events through their independent nature, and they thus qualify for being worshipped. As al-Akfānī makes it clear, the last category corresponds to blasphemy.⁶²

As is evident from al-Akfānī's classification, in addition to the epistemological nuances

⁶² Ibid., 143-144.

between *aḥkām* and *hay‘a*, the practice of astrology is further classified on the grounds of religious belief. While the attacks toward astrology on religious grounds will be discussed in more detail in the next section of this chapter, I should say that al-Akfānī’s position, leaving a legitimate place for the practice of astrology as long as the belief in the omnipotent God is not infringed upon, was quite widespread among both the authentic practitioners of astrology and the external supporters of the practice.

Ṭaşköprizāde, the most famous Ottoman encyclopedist of the sixteenth century, was a prime example of such a supporter. Like al-Akfānī and the earlier Avicennan tradition, Ṭaşköprizāde also acknowledges the differences between *aḥkām* and *hay‘a* by putting the former into the derivative natural sciences while classifying the latter among the mathematical sciences. In his introduction to the discussion on the *aḥkām al-nujūm*, he repeats al-Akfānī verbatim and says that *aḥkām* is a science deployed to interpret the influence of celestial objects upon terrestrial events through studying the positions and relative aspects of the celestial bodies.⁶³ For Ṭaşköprizāde, *‘ilm aḥkām al-nujūm* is different from *‘ilm al-nujūm*, which he uses interchangeably with *‘ilm al-hay‘a*. Accordingly, the former is applicable to the occurrences in the world of generation and corruption, which are subject to change; whereas the latter rests upon mathematical demonstrations. By just studying the *‘ilm al-hay‘a* can one acknowledge the unquestionable reality of God’s omnipotence and the validity of the following Quran verse: “Who remembers Allah while standing or sitting or [lying] on their sides and gives thought to the creation of the heavens and the earth, [saying], ‘Our Lord, You did not create this aimlessly’” (Q

⁶³ Ṭaşköprizāde, *Kitāb Miftāḥ as-sa‘āda wa mişbāḥ as-siyāda*, v. 1 (Hyderabad: Osmania Oriental Publications Bureau, 1977), 312: “*al-istidlāl bi-t-tashakkulāt al-falakiyya min awḍā‘ ihā... ‘alā al-ḥawādith al-wāqi‘a fī ‘ālam al-kawn wa-l-fasād.*”

3:191).⁶⁴

Interestingly however, among the sub-branches of the *'ilm al-hay'a*/*'ilm al-nujūm*, Ṭaṣkōprīzāde mentions several practices that have strong astrological implications. One sub-branch of the *'ilm al-hay'a*, according to Ṭaṣkōprīzāde's classification, is the science of the conjunctions (*'ilm al-qirānāt*) that aims to understand the astrological influences of planetary conjunctions.⁶⁵ He even refers here to several historical events such as the Noah's flood, Alexander's rule, Chinggis Khan's rise, or Timur's emergence, all of which transpired at the time of the occurrence of a specific conjunction.⁶⁶ In a similar vein, he says that the science of the *zīj*es and the *taqwīms* (*'ilm al-zījāt wa-t-taqāwīm*), which studies the movements of the stars to calculate the true longitudes of the stars, the ascendants, and particular celestial positions, has two specific aims. The first, central aim is to measure time and direction of the *qibla*. The other aim, however, is purely astrological, as this science also studies how to interpret the influences of these celestial positions upon the world of generation and corruption. He nevertheless comments upon the weakness of the scientific premises and assumptions underlying the second variant of

⁶⁴ Ibid., 347.

⁶⁵ Ibid., 359: “*yabḥathu fī hadhā-l-‘ilm ‘an al-aḥkām al-jāriya fī hadhā-l-‘ālam bi-sabab qirān al-sab‘a kullihā aw ba‘ḍihā fī daraja wāhida min burj Mu‘ayyan.*”

⁶⁶ Ibid., 359-360: “*wa a‘lamu anna arbāb al-nujūm za‘amū anna al-kawākib al-saba‘a ... matā ijtama‘ū fī burj wāhid yakūn sababan li-ḥādīth ‘aẓīm ... fī ‘ālam al-kawn wa-l-fasād ka-ḥudūth ṭūfān ‘aẓīm minhā ṭūfān Nūḥ ‘alayhissalām aw-tabaddul milla ka-ba‘tha al-anbiyā aw-dawla ka-ghalaba Iskandar wa-Chingīz Khān wa-Tīmūr wa-amthālihīm.*”

One can find a similar ambiguity in Nev‘ī Efendi's (d. 1599) overall attitude towards *aḥkām*. Although Nev‘ī Efendi seems to denounce the astrological practice of celestial knowledge, which he defines as phantasmagorical, some of the anecdotes he recounts in the relevant passage implies that Nev‘ī Efendi, who did indeed pen an astrological text, used to associate major politico-historical events as the rise of Chinggis Khan with astral configurations. See: Nev‘ī Efendi, *Netā‘icū'l-fünūn ve meḥasinü'l-mütün*, ed. Gisela Procházka-Eisl and Hülya Çelik (in collaboration with Adnan Kadrić) (Harvard University, The Sources of Oriental Languages and Literatures Series, 2015), 141-147.

the science of the *zīj*es.⁶⁷

Ṭaşköprizāde's skepticism did not only bear upon the invalidity and deficiencies of the scientific premises of *aḥkām*. He was equally critical of the strong anti-astrological camp, though he puts his criticism in a subtle way. In the specific section where he addresses the '*ilm aḥkām al-nujūm*', Ṭaşköprizāde says that many '*ālims* have vehemently declared this science unlawful, whereas some others were more permissive and only denounced the belief in the idea that the stars have influence via their own independent nature. Ṭaşköprizāde seems to have sided with the latter position, for he immediately refers here to al-Shāfi'ī, who adopted a more tolerant attitude towards astrology. As al-Shāfi'ī allegedly said, if the *munajjim* firmly believes that there is no effective agent in the universe except God the omnipotent, then there is no harm in dealing with astrology.⁶⁸ As a counter example to al-Shāfi'ī, Ṭaşköprizāde specifically mentions the author of the *Miftāh dār as-sa'āda*, who was none other than the famous Mamluk jurist Ibn Qayyim al-Jawziyya (d. 1350). According to Ṭaşköprizāde, Ibn Qayyim al-Jawziyya has blown his attack on

⁶⁷ Ibid., 353: “*wa huwa 'ilm yata'arraf minhu maqādīr ḥarakāt al-kawākib siyammā al-saba'a al-sayyāra wa taqwīm ḥarakātihā wa ikhrāj al-tawālī' wa ghayr dhalik ...wa manfa'atuhu: ma'rifat mawḍi' kull wāḥid min al-kawākib siyammā al-saba'a bi-n-nisba ilā falakihā wa ilā falak al-burūj wa intiḡālātihā wa rujū'ihā wa istiḡāmatihā wa tashrīqihā wa taghrībihā wa zuḥūrihā wa khafā'ihā fī kull zamān wa makān li-yata'arraf bi-ma'rifat hadhi-l-umūr al-ittiṣālāt bayn al-kawākib min al-muḡārana wa-l-muḡābala wa-t-tarbī' wa-t-tathlīth wa-t-tasdīs wa ya'rif kusūf al-shams wa khusūf al-qamar wa mā yajrā hadhā-l-majrā wa-l-gharaḡ al-akhīr min ma'rifat hadhi-l-umūr ma'rifat amrayn: amma ma'rifat al-sā'āt wa fuṣūl al-sana wa samt al-qibla wa awḡāt al-ṣalāt wa amma ma'rifat al-aḥkām al-jāriya fī 'ālam al-'anāṣir bi-sabab tilka al-awḡā' illā anna al-gharaḡ al-aṣlī lābudd an yakūn al-amr al-awwal idh huwa al-muhimm fī-t-ṭab' wa-l-'ādat wa-sh-shar' wa ammā ma'rifat al-aḥkām fa-ma'a kawnihā madkhūla al-ṣiḡḡa fī-sh-shar' ... mabnī 'ilm al-aḥkām 'alā-d-dalā'il al-wāḡhiyya wa-l-barāḡīn aḡ-ḡa ṭfa allatī lā tufīdu shubḡa faḡḡan 'an ḡann faḡḡan 'an yaḡīn.”*

⁶⁸ Ibid., 312-3: “*wa a'lamu anna kathīran min al-'ulamā' 'alā taḡrīm 'ilm al-nujūm muṭlaḡan, wa ba'ḡhum 'alā taḡrīm i'tiḡād anna al-kawākib mu'aththira bi-dh-dhāt, wa qad dhukira 'an al-Shāfi'ī raḡimahallāḡ annahu ḡāla: in kāna al-munajjim ya'taḡid anna lā mu'aththir illallāḡ lakin ajrā Allāḡ ta'ālā 'ādatahu bi-annihī yaḡa'a kadhā 'inda kadhā wa-l-mu'aththir huwa Allāḡ fa-hadhā 'indī lā ba's bihi.”*

astrology out of proportion.⁶⁹

I will further detail below the austere stance of Ibn Qayyim al-Jawziyya and his master Ibn Taymiyya (d. 1328), who seem not to have found much recognition in the fifteenth- and sixteenth-century Ottoman scholarly context. Before moving to the next section, I should note that the Avicennan model that categorizes the *‘ilm aḥkām al-nujūm* as a derived natural science and the *‘ilm al-hay‘a* as a mathematical science was not the only paradigm adopted for classifying sciences in the post-classical period. Fakhr al-dīn Rāzī’s juxtaposition of *aḥkām* as an inextricable part of the mathematical sciences and his emphasis upon the utility of astrological practice were also influential upon some of the *‘ālims* and classifiers of knowledge active in the Ottoman world.

In his encyclopedic work *Jāmi al-‘ulūm*, which is also known as *Kitāb-i sittīnī* as a reference to the number of sciences covered in the text, Rāzī addresses sixty different sciences from among all the available rational (*‘aqlī*) and traditional (*naqlī*) knowledge. In this inventory of sciences Rāzī elaborates major principles (*uṣūl*) of each science as well as their applications (*furū*).⁷⁰ Although his collection lacks a thorough discussion of the logic of his own classification, the order and organization of the sciences listed in the work implies that in the mind of Rāzī *aḥkām* was intimately related to *hay‘a* and other mathematical sciences. Unlike the Avicennan tradition where the *‘ilm aḥkām al-nujūm* is categorized as one of the subdivisions of the derived natural sciences (*‘ilm al-ṭabī‘iyyāt*) together with dream interpretation, medicine, or

⁶⁹ Ibid., 313: “*wa fī hadhā-l-bāb aṭnaba ṣāhib Miftāḥ dār as-sa‘āda li-annahu afrāṭa fī-ṭ-ṭa‘n.*”

⁷⁰ Fakhr al-Dīn Rāzī, *Jāmi‘ al-‘ulūm ya Ḥadāyiq al-anwār fī ḥaqāyiq al-asrār ma‘rūf bih Kitāb-i Sittīnī*, ed. Muḥammad Ḥusayn Tasbīḥī (Tehran: Kitābkhānah-i Asadī, 1346/1967-8). See also: Živa Vesel, *Les encyclopédies persanes: essai de typologie et de classification des sciences* (Paris: Editions Recherche sur les civilisations, 1986), 35-6. Vesel says some versions of the work cover 60 sciences whereas other editions address 40 or 57.

alchemy, Rāzī categorically detaches *aḥkām* from the group of occult practices and puts it immediately after the mathematical sciences that include, in his exact order, geometry (*‘ilm al-handasa*), geodesy (*‘ilm al-masāḥa*), mechanics (*‘ilm jarr al-athqāl*), war machines (*‘ilm ālāt al-ḥurūb*), Indian arithmetic (*ḥisāb al-Hind*), mental calculation (*al-ḥisāb al-hawā’ī*), algebra (*al-jabr wa l-muqābala*), arithmetic (*‘ilm al-arithmāṭiqī*), magic squares (*‘ilm a’ dād al-wafq*), optics (*‘ilm al-manāẓir*), music (*‘ilm al-mūsīqī*), and *‘ilm al-hay’a*.⁷¹ In his elaboration on the *‘ilm-i aḥkām-i nujūm*, Rāzī does not explain in detail why there is a need for mathematical knowledge in the practice of *aḥkām*, and rather goes on to explain the natures of the stars, astrological signs and houses, and the corresponding points of exaltation (*sharaf*) and descent (*hubūṭ*).⁷² Yet his deliberate decision to juxtapose it with the mathematical sciences, as opposed to following the Avicennan convention, is a strong indication of his acknowledgement of the *aḥkām*’s mathematical underpinnings.

The impact of Rāzī’s classification upon the scholarly preferences in the Ottoman world can be detected from the early fifteenth century onwards.⁷³ For instance Muḥammed Şāh Fenārī (d. 1436), the son of the influential scholar Mollā Fenārī, wrote a detailed encyclopedic work

⁷¹ Rāzī, 184-6. Matthew Melvin-Koushki also points out the distinguishing characteristic of Rāzī’s classification and discusses this particular text as one of the milestones of what he calls the “mathematicalization of the occult sciences in the High Persianate Tradition.” See Matthew Melvin-Koushki, “Powers of One: The Mathematicization of the Occult Sciences in the High Persianate Tradition.” (Forthcoming in *Intellectual History of the Islamicate World*). I would like to thank Dr. Melvin-Koushki for allowing me to use his unpublished paper.

⁷² Rāzī, 184-6.

⁷³ For the general influence of Rāzīan thought upon the scholarly life in the Ottoman lands in the fourteenth and fifteenth centuries, see Ömer Türker and Osman Demir, *İslam Düşüncesinin Dönüşüm Çağında Fahreddin er-Râzî* (İstanbul: Klasik, 2011).

modelled upon Rāzī's *Jāmi' al-'ulūm*.⁷⁴ In contrast to his predecessor and exemplar, however, in his *Anmūzaj al-'ulūm* Muḥammed Şāh Fenārī addresses a total of hundred sciences by adding several new branches especially in the natural and mathematical sciences. One of his additions was his chapter on the *'ilm al-ikhtiyārāt* that he put immediately after the section on *'ilm al-nujūm* and right before the chapter on *'ilm al-uşṭurlāb*. Intriguingly, Muḥammed Şāh Fenārī does not refer separately to *'ilm aḥkām al-nujūm* but discusses it within his treatment of *'ilm al-nujūm*. When one looks at the contents of the chapter on *nujūm*, it is clear that he gives pride of place to astrological issues such as the indications of the zodiacal signs, planets, and their exaltations as well as descents and other positions.⁷⁵ It is also worth noting that like Rāzī, Muḥammed Şāh Fenārī separates astrology from other occult practices by situating it into other mathematical sciences.

The curious use of *'ilm al-nujūm* as a broader category to denote practical celestial activities including astrology also surfaces in a number of texts and treatises written in Persian in the late-fifteenth- and early-sixteenth-century Ottoman milieu. One of them is a compendium of sciences completed and presented to the reigning sultan Bāyezīd II in September 1489 by Shukrullāh Shirvānī, who was among the Persian émigré scholars/natural philosophers serving the Ottoman court at the time. In this text, entitled *Riyāḍ al-qulūb*, Shirvānī discusses eight disciplines ranging from Sufism and physiognomy to *'ilm al-hay'a* and *'ilm al-nujūm*.⁷⁶ In his

⁷⁴ The work has yet to be prepared as a critical edition. For a brief discussion on its importance and contents, see Kemal Faruk Molla, "Mehmed Şah Fenārī'nin Enmûzecu'l-Ulûm Adlı Eserine Göre Fetih Öncesi Dönemde Osmanlılar'da İlim Anlayışı ve İlim Tasnifi," *Divan: İlmî Araştırmalar* v. 10, no. 18 (2005), 245-273.

⁷⁵ SK Hüsrev Paşa Ms. 482, 181a-182b.

⁷⁶ SK Ayasofya Ms. 4024. Other sciences include Logic (*mantiq*), Arithmetic (*hisāb*), Poetry (*shi'ir*), and Riddles (*mu'ammā*).

presentation, *‘ilm al-hay‘a* is a science that studies the elements and structures of celestial as well as terrestrial bodies. The primary aim of this science is pietistic indeed, as it helps one to reflect upon and realize the wisdom of God underlying the creation of the universe. He then goes over fundamental geometrical and astronomical principles, starting from what a point, a line, or matter is.⁷⁷ Immediately after this chapter on *‘ilm al-hay‘a*, Shirvānī starts explaining *‘ilm al-nujūm*, which, for him, is the noblest of all knowledge after the religious sciences. What Shirvānī refers to as *‘ilm-i nujūm*, however, is none other than astrology in the modern sense, as he clearly says that this is a science appealed to especially by rulers and sultans out of a desire for foreknowledge of celestial influences upon worldly affairs.⁷⁸ He then explicates how to denote the degrees of zodiacal signs and planets in sexagesimal numbers. This is followed by the description of the movements of the planets and the influences of planetary aspects. He then delves into a discussion on how to calculate the horoscope of the solar revolution each year and draw astrological decrees out of the celestial positions at the designated time. Finally he elaborates the astrological significance of the lunar motions across the Zodiac and provides detailed suggestions for electional purposes.⁷⁹ All in all, Shirvānī’s discussion in his encyclopedic work perfectly exemplifies how the practice of *aḥkām al-nujūm* relied upon the technical and mathematical knowledge of *nujūm*.

One can easily extend examples demonstrating that in the eyes of many contemporary

⁷⁷ Ibid., 39b-62a.

⁷⁸ Ibid., 62b: “*ba‘d az ‘ulūm-i dīnī hīch ‘ilm a‘lā az ‘ilm-i nujūm nīst...va muḥtāj ilayhi mulūk va salāṭin-ast chūn bi-vāsiṭa-i ta‘ṣīr-i qirānāt va kusūfat va sāir ḥālāt-i kavākib dar ‘ālam-i kavn va faṣād vaqāyi‘ va zalāzil va ṭūfānāt va muḥārabāt va qaḥṭ va vabā va amsāl-i ān vāqi‘ mī-shavad. Agar kasī īn ‘ilm rā dānad va ān ḥālāt ra dar yābad va ri‘āyat namāyad umīd ki az āfāt sālim mānad.*”

⁷⁹ Ibid., 62b-80b.

astral experts and natural philosophers *aḥkām* of the stars essentially entailed the scientific knowledge of *nujūm* and that the broader category of *‘ilm al-nujūm* naturally paved the way to astrological preoccupations.⁸⁰ For example, one of Rukn al-Dīn Āmulī’s students, Khiṭābī *munajjim*, who arrived at the Ottoman lands in the late 1470s wrote—as his first piece to present an Ottoman prince—a philosophical treatise entitled *Jāmi‘ al-qismayn*.⁸¹ As the title implies, Khiṭābī reviewed in this work the two specific branches of speculative philosophy: *ḥikmat-i*

⁸⁰ In his *al-Zij al-mujmal*, for instance, Mevlānā Kūçek introduces *‘ilm al-nujūm* as one of the three most exalted sciences next to the *‘ilm al-hay‘a* and the revealed sciences (*‘ilm al-sharāyi‘*). For him, astrological tasks are among the constituent bodies of this *‘ilm*. See TSMK R. 1713, 2b-11a. In a similar vein, Mīrim Çelebi, about whom more information will be provided in the third chapter, says in his commentary on the Ulugh Beg tables that the noblest of all mathematical sciences is *‘ilm-i nujūm*. By attaining the honor of this knowledge can one understand the nature of the movements of the stars, their positions, and their stations on each and every one of the astrological signs, and calculate five daily prayers, azimuth of the qibla, and other directions. See SK Ayasofya Ms. 2697, 2a: “*sharīftarīn nav‘i az anvā‘-i riyāzī‘ ‘ilm-i nujūm-ast ki nafs-i insāni rā az iqtināh-i ān sharaf iṭṭilā‘ bar māhiyat-i ḥarakāt-i kavākib dar ṭūl va ‘arż va kayfiyat-i avzā‘ ve maqāmāt-i har yak dar burūj va nitaqāt va ma‘rifat-i avqāt-i ṣalavāt va samt-i qibla va sā‘ir jihat ḥāṣil mī shavad.*” Another contemporary astral expert, Efezāde, says in his commentary of Ṭūsī’s treatise on the uses of astrolabe (*Risāla biṣṭ bāb fī ma‘rifat-i usṭurlāb*) that the importance of *‘ilm-i nujūm* derives from its pietistic, astronomical, and astrological purposes. For him, the primary operations one can carry out with the astrolabe include calculations of important parameters such as the true longitudes of the planets (*taqvīm-i kavākib*) and the ascendants of the hours (*ṭavāli‘*). See SK Ayasofya Ms. 2641, 2b-3a: “*ḥikmāt-i āfarinash-i aflāk va anjum ve ārāstan-i ṭāq-i haft va hashtom ān-ast ki ... sabab-i niẓām-i ‘ālam ve intizām-i umūr-i bani Ādam bāshad va ū rā vājib-ast ki ba‘d az ma‘rifat-i vājibu‘l-vujūd nazar konad ba-īn kunbad-i kubūd ki ... vaqt-i vujūd va nuḥūs va su‘ūd dar ikhtiyār-i amr-i mardūd ve maḥmūd va dar ṣalāḥ-i a‘māl va falāḥ-i aḥvāl-i khod avqāt-i sharīfa va sā‘āt-i laṭīfa guzīn konad tā hama kārhā-yi dunyavī va ukhravī bar mūjab-i ḥikmat-i amalī bāshad va az ‘aṭiyya-i khod bahramand va savadmand bovad va īn jumla bi-‘ulūm-i riyāzī‘ ḥāṣil-ast ki usūl-i ū ‘ilm-i hay‘at va handasa va ḥisāb-ast va muqarrar-ast ki ṣamara-i īn ‘ulūm ba‘d az vasīla bi-ma‘rifatillāh ‘ilm bi-samt-i qibla va ayyām va ma‘rifat-i avqāt va shuhūr va a‘vām-ast va inhā mavqūf-ast bi-ma‘rifat-i raṣad-i sitāragān va sā‘āt va maṭālī‘ va istikhraj-i taqvīm-i kavākib va ṭavāli‘*”

⁸¹ Ayasofya Ms. 2414M, 19b-20a: “*muḥarrir-i in suṭūr va muqarrir-i īn mazbūr...Ḥusām b. Shams al-dīn al-khaṭīb al-mushtahir bi-Khiṭābī al-Gilānī...‘ijāla al-vaqt rā dar ta‘riḥ-i sana 884 hijriyya dar baldat al-muvahhidīn-i Ṭoḳat...bi-ḥasb-i vasīla-i idrāk-i sa‘ādat-i taqabbul-i turāb-i sidda-i rāfi‘a-i pādishāh va pādishāhzāda-isulṭān abū‘l-muzaffar Bāyezīd...ta‘līf kard.*”

riyāḍī (mathematical sciences) and *ḥikmat-i ṭabīʿī* (natural sciences). More precisely, he first elaborated *ʿilm-i nujūm*, and like Shukrullāh Shirvānī, delved solely into an astrological discussion, laying out the qualities and indications of the twelve astrological houses. For him, *ilm-i nujūm*, which is more exalted and prestigious than *ʿilm-i ṭibb*, is useful, divine knowledge that helps human beings understand the impact of the motions of the celestial objects on the sublunary world, guard themselves against harm and destruction—as ordered in the Quran—and learn about divine decrees upon their personal lives.⁸²

One last striking example that seems to have followed Rāzī’s classification and discusses *nujūm*, including the *aḥkām*, as part of the mathematical sciences is the unique catalogue of the Ottoman palace library prepared in 909/1502-3 by the chief librarian of the time, ʿĀṭūfī (d. 1541). In this voluminous inventory, ʿĀṭūfī, a noted physician and learned natural philosopher, recorded approximately 7,200 titles in 5,700 volumes, grouping them in different clusters of disciplines. The inventory starts with copies of Quran, followed by Quranic exegesis (*tafsīr*) and recitation (*qiraʿat*), Hadith, Principles of Religion and Theology (*uṣūl al-dīn, kalām*), Jurisprudence (*uṣūl al-fiqh, fiqh*), Sufism (*tasawwuf*), Medicine (*ṭibb*), History and Political Thought, Poetry, Grammar and related Linguistic Sciences, Occult Practices, Mathematical Sciences, Philosophy, and other Revealed Books. Interesting for our purposes here, ʿĀṭūfī’s gallery on the occult sciences, which includes oneiromancy, physiognomy, alchemy, geomancy, divination, talismans, lettrism, and magic does not have a single reference to an *aḥkām* text,

⁸² Ibid., 23b: “*fāida* [-i ʿilm-i nujūm]: *har chand az taqdīr va qaḍā imkān-i ḥurūj nīst amma bi-muʿaddā ʿwa lā tulqū bi-aydikum ilāʿt-tahlukaʿ va sharr iḥtirāz wājib-ast va bi-qadr-i vas ʿ sa ʿy lāzim cha fahvā-yi ʿlaysa liʿl-insān illā mā sa ʿy ʿ rā ishārat hamīn-ast va īn ma ʿnā bi-ṣūrat nayāyad illā az idrāk-i natāyij-i ḥarakāt-i ajrām-i samāwī ya ʿnī sayr-i ajrām-i mustanīra dar aqsām-i ajsām-i mustadīra va ān duvāzdah dar duvāzdah-ast ki az ṣuvar-i zāyijāt-i ṭavālī ʿ makhṣūṣ mī-shavad ki īn ma ʿnā ra iṣṭilāḥ-i ahl-i shar ʿ ṣūrat-i taqdīr khānand.”*

because ‘Āṭūfī deliberately collects those titles on celestial knowledge, including strictly astrological ones, under the rubric of mathematical sciences, which contains ‘ilm al-nujūm, ‘ilm al-hay’a, ‘ilm al-ḥisāb, ‘ilm al-handasa, ‘ilm al-mūsīqī, and ‘ilm al-shataranj.⁸³

‘Āṭūfī’s clarity vis-à-vis the complicated status of astrology, which, as we have already seen so far, constantly oscillates between the natural or occult sciences (*al-‘ulūm al-ṭabī‘iyya*) and the mathematical sciences (*al-‘ulūm al-riyāḍiyya*) finds its most evident expression in his deliberate decision to situate Fakhr al-Dīn Rāzī’s book on celestial magic, *al-Sirr al-maktūm fī mukhāṭabat al-nujūm*, among the titles in the natural/occult sciences while listing the same author’s work on electional astrology, *Ikhtiyārāt al-aḥkām al-‘alāiyya min al-‘ālam al-samāwiyya*, under the rubric of astral and mathematical sciences. I believe these two works provide a convenient gateway to move into the next and final section of this chapter, where I will talk about the attacks addressed toward astrology in view of its epistemological invalidity and religious impermissibility.⁸⁴ In this section I will not only mention the major arguments arrayed against the practice of astrology but also highlight the urgency of the need to distinguish the

⁸³ Library of the Hungarian Academy of Sciences, Ms. Török F 59, 313.

⁸⁴ While there was no question about the authenticity of Rāzī’s authorship as regards to the *Ikhtiyārāt al-aḥkām al-‘alāiyya*, the other work on celestial magic, *al-Sirr al-maktūm*, was doubted for a long time as an authentic work of Rāzī. But thanks especially to the studies of Živa Vesel, it is no longer open to doubt. See: Živa Vesel, “The Persian Translation of Fakhr al-Dīn Rāzī’s *al-Sirr al-Maktūm* (‘The Occult Secret’) for Iluttmish,” in *Confluence of Cultures: French Contributions to Indo-Persian Studies*, ed. Françoise ‘Nalini’ Delvoye (New Delhi and Tehran: Manohar, Centre for Human Sciences, and Institut Français de Recherche en Iran, 1995), 14-22; *idem.*, “Le *Sirr al-Maktūm* de Fakhr al-Dīn Rāzī (m. 606H/1210) face à la Ghāyat al-Ḥakīm,” in *Images et Magie: Picatrix entre Orient et Occident*, ed. Jean-Patrice Boudet, Anna Caiozzo, and Nicolas Weill-Parot (Paris: Honoré Champion Éditeur, 2011), 77-93. Ayman Shihadeh also confirms that since there are references to the *al-Sirr al-maktūm* in at least three different works of Rāzī, there is no question that the text belongs to him, though he apparently wrote it at a relatively early stage of his career. See Ayman Shihadeh, *The Teleological Ethics of Fakhr al-Dīn Rāzī* (Leiden: Brill, 2006), 8, fn. 22.

weighty charges levelled against *munajjims* from softer charges attributed to the discipline of the *‘ilm aḥkām al-nujūm*.

I. 4. Polemics Against Astrology and Astrologers

Aside from categorizing *‘ilm aḥkām al-nujūm* as part of the mathematical sciences – unlike the more conventional Avicennan tradition– Rāzī is important for having composed individual treatises on electional astrology and celestial magic, in which he devoted his efforts to prove the utility and validity of studying celestial objects for astrological purposes. In his *Ikhtiyārāt al-aḥkām al-‘alā’iyya min al-‘ālam al-samāwiyya*, a popular textbook on electional astrology dedicated to Kharazmian ruler ‘Alā al-Dīn Tekish (r. 1172-1200), Rāzī discusses in two main parts (*maqālāt*) the general theoretical considerations (*dar kulliyāt*) and detailed practical applications (*dar juz’iyyāt*) of electional astrology. In the first part, he specifically addresses the arguments raised by the opponents of astrology who consider *ikhtiyārāt* a futile and irreligious endeavor. According to these people, *ikhtiyārāt* bears no utility, because, among many other reasons, it is not possible to divert a divine decree.⁸⁵ Moreover, the Prophet Muhammad averred that whoever believes in the stars falls into unbelief (*kufṛ*). Had the belief in the stars been righteous, the practice of astrology would not have been unbelief.⁸⁶

Rāzī refuted the first argument by alluding to a discussion on the free will of individuals. As he maintained, each and every thing God created in this world is the cause of something else. For instance, eating brings satiation, medicine balances bodily humors, worship secures eternal

⁸⁵ TSMK Revan 1705, 7a: “*Dalīl-i chahārom: daf‘-i taqdīr-i ilāhī mumkin nīst. Pas ikhtiyār bī-fā’ida bovad.*”

⁸⁶ Ibid: “*Dalīl-i panchom: Muṣṭafā ‘alayhissalām mī farmāyad ki ‘man āmana bi-n-nujūm fa-qad kafara.’ Agar nujūm ḥaqq būdī kufṛ nabūdī va chūn ḥaqq nabūd dar vay hīch fā’ida nabāshad.*”

salvation, and disobedience invokes punishment. We, as human beings, are not capable of avoiding the divine decree, but to say that we should abandon electing moments is akin to saying we should stop eating bread, drinking water, or obeying God's rules. Because according to the opponents' argument, if I was born a lucky person by divine decree, then I cannot turn to an ill-fated individual regardless of my obeying God's orders or not. Such a statement, however, is far from being rational and religious, and thus a corrupt (*bāṭil*) one.⁸⁷

As for the second argument, Rāzī said that believing in (the existence of) the stars entails believing in the existence of the Creator. This is not unbelief (*kufr*); on the contrary it is even a higher degree of belief in the living, most intelligent, omnipotent, and eternal God.⁸⁸ For Rāzī, the study of the heavens varies with respect to the goals and scope of the activity conducted. Foremost is the contemplative study of the stars as signs of God's wisdom and limitless power. Second is its practical use to measure time and direction for religious purposes such as calculating the time of the five daily prayers, the first day of each month, or the direction of the *qibla*. For Rāzī, like Ibn al-Akfānī, these two types of celestial activity are compulsory (*vājib*). The loosely-defined third type of celestial enterprise is examination of the amount, sizes, and rotations of heavenly objects for a mixture of scientific and pietistic purposes. The fourth activity

⁸⁷ Ibid., 8b-9a: “*Hargiz daf‘-i taqdīr-i ilāhī maqdūr-i bashar nīst va likin īzad ta ‘ālā har chīzī rā sabab-i chīzī digar nihāda ast. Chunān ki nān khordan rā sabab-i sīri karda ast va dārū khordan rā sabab-i zā‘il kardan-i khalthā karda va ‘ibādat kardan rā sabab-i najāt karda va ma‘ṣiyat rā sabab-i ‘iqāb karda. Pas az ān ki mā taqdīr-i khodā rā man‘ natavānam kardan lāzim āyad ki bi-tark-i ikhtiyār bagūyīm bāyad ki bi-tark-i nān vā āb khordan bagūyīm va bi-tark-i ṭā‘at kardan va farmān bardārī bi-jāy āvordan bagūyīm va gūyīm ki agar taqdīr-i khodā ta ‘ālā chunān ast ki man az nīk-bakhtān bāsham bad-bakht nashovam, agar ṭā‘at konam va agar nakonam. Pas hamchunān ki īn sukhan az ‘aql va shar‘ dūr ast, su‘āl-i sā‘il hamchunān bāṭil ast.*”

⁸⁸ Ibid., 9a: “[A]gar kasī īmān āvord ba-nujūm az ān jihat ki hastī-i īshān dalīl ast bar hastī-i afarīdkār-i ḥayy va ‘ālim va qādir va qadīm. Īn kufr nabovad balki ‘ayn-i īmān bovad balki ‘ālītar darāja-i bovad dar īmān.”

is tracking the influences of celestial phenomena upon the terrestrial realm by essentially acknowledging that these influences occur not by the nature of the stars but solely by the divine power. This is, for Rāzī, neither unbelief nor an error. The fifth pursuit is arguing that the stars affect terrestrial events through their own independent nature. According to Rāzī, such an argument is a mistake *per se* but does not stand as an example of *kufr*. Finally, the sixth type clearly corresponds to unbelief: arguing that the stars are the real generators of the things (*mudabbirāt*) in the universe and that astral worship is obligatory upon human beings.⁸⁹ Therefore for Rāzī, and in fact for other seemingly tolerant figures including al-Shāfi‘ī, al-Akfānī, or aṣṬköprizāde, the study of heavens may lead one either to piety or unbelief depending on the purposes and scope of the celestial activities one undertakes.⁹⁰

Rāzī also emphasizes the experiential and conjectural nature of astrological practice in his works on philosophical theology (*al-Maṭālib al-‘āliyya*) and celestial magic (*al-Sirr al-maktūm fi mukhāṭabat al-nujūm*). As he puts it forward, no truly erudite *munajjim* claims to attain absolute

⁸⁹ Ibid., 9a-10a: “*Naẓar dar nujūm bar shash qism ast: Avval ān ast ki dar hastī-i īshān naẓar konand tā bi-vāsiṭa-i ān āfarīdkār rā va ‘ilm va qudrat-i bi-nihāyat-i ū rā badānand. Qism-i dovvom ān ki dar ḥarakāt-i īshān naẓar konand tā avqāt-i namāz va rūza va rakāt va hajj va samt-i qibla badānand va naẓar kardan dar sitāragān badīn har do vach vājib ast. Qism-i sovvom ān ki dar maqādir-i ajrām va ab‘ād va davrī-yi īshān az ikhtilāf va tafāvut naẓar konand chunān ki dar kitābhā-yi ‘ilm-i hay‘at bayān-i ān karda ast va naẓar dar sitāragān az īn vajh pasandīda bāshad zīrā ki har kasī ki īn ‘ilm bihtar dānad āsar-i ḥikmat-i khodā ta‘ālā dar āsumānhā va zamīnhā bihtar dānad. Qism-i chahārom ān ki i‘tiqād dārānd ki īn sitāragān rā hīch āsar nīst darīn ‘ālam bi-ṭab‘ līkin chunān ki īzād ta‘ālā az rāh-i ‘ādat-i ṭulū‘-i āfitāb rā sabab-i rūshani-yi ‘ālam karda ast va ghurūb-i ū rā sabab-i tāriki-yi ‘ālam gardānida va ... hamchunān ki naẓarhā-yi īn sitāragān rā az rāh-i ‘ādat na az rāh-i ṭab‘īyat asbāb-i sa‘ādat va nuḥūsat karda ast va ittifāq ast jumla-i mutakhaṣṣiṣān va mutakallimān rā ki i‘tiqād darīn ‘ilm badīn vajh na-kufr ast va na-zālāl ast. Panchom ān cha ki i‘tiqād dārānd ki īn sitāragān bi-ṭab‘ mu‘aththir-and darīn ‘ālam va īn i‘tiqād har chand khaṭā ast ammā kufr nīst. Shashom ān cha ki i‘tiqād dārānd ki īn sitāragān mudabbir-i ān ‘ālam-and sa‘ādat va nuḥūsat juz‘ az fayz-i īshān ḥāṣil nashavad va bar mā ‘ibādat-i īshān vājib-ast, īn i‘tiqād kufr-i ṣarī ḥast.*”

⁹⁰ Ibid., 10a: “*Pas ma lūm shod ki īmān bi-nujūm kay īmān bovad va kay kufr bovad.*”

knowledge about the future, for they all know that their craft could only allow them to propose plausible conjectures. Ultimately everything lies subject to the will and power of the God, and the celestial objects operate not as the active efficient causes (*fā'il-i mukhtar*) but rather as the intermediaries between God and sublunary events. Astrology is only forbidden when astral determinism that ascribes independent power to celestial objects is in question.⁹¹

Despite such careful remarks of Rāzī and many other genuine astral experts with respect to the limits and true nature of astral causality, the risk of undermining the idea of God's omnipotence and *shar'ī* traditions was alarming to the opponents of astrology. This potential danger pushed many jurists and scholars to frown upon the practice of astrology, notwithstanding the fact that they never denied the fundamental causality between celestial phenomena and terrestrial matters. As Lynn Thorndike, one of the pioneer scholars of the history of magic and astrology, had aptly said long ago, before the gradual acceptance of Isaac Newton's *Principia Mathematica* beginning in the eighteenth century, the universal law of nature was indeed astrological, as the idea of correlation between terrestrial events and celestial configurations was widely accepted.⁹² Even the staunchest opponents of astrology in the medieval and early-modern context did not question this cosmological assumption.

When we look at the writings of the most ardent opponents of astrology in medieval Islamicate culture, such as Ibn Sīnā, Ghazālī, Ibn Taymiyya, Ibn Qayyim al-Jawziyya, or Ibn Khaldūn, it appears clear that none of them in fact denied the unbroken chain of causation

⁹¹ Also see Robert G. Morrison, *Islam and Science: the Intellectual Career of Nizām al-Dīn al-Nīsābūrī* (London: Routledge, 2007), 66; Eva Orthmann, "The Charm of Suspicious Calculations: Islamic Astrology in the Debates of Controversial Literature," *Beiruter Blätter* 10-11 (2002-3), 110-118.

⁹² Lynn Thorndike, "The True Place of Astrology in the History of Science," *Isis* 46/3 (1955), 273-278.

flowing from God through the celestial bodies to the terrestrial realm. Ibn Sīnā, for example, accepted the general astrological assumption that the events in the sublunary world are determined by celestial causes. He rejected the hyperbolic claims of *munajjims* to fully understand the dynamics underlying this causality and to predict future events, because for Ibn Sīnā the humans are simply incapable of tracking the innumerable causes.⁹³ In his *Ihyā' al-'ulūm*, Ghazālī also mentioned the link between the occurrence of terrestrial events and the effects of intermediary causes in the celestial realm. Despite the fact that in the first book of the *Ihyā'* he labeled the astrological craft as a useless and blameworthy science, for Ghazālī, only the ignorant who have “no glimmer of the marvels of God’s creation and the scope of His power” would reject the causal connection. As he later wrote in the thirty-second book of the *Ihyā'*, those people who know God’s actions ought to be aware that the planets are subject to God’s command: “The conviction that the stars are causes that have effects...by the creation of God is not damaging to religion but it is truth.”⁹⁴ In a similar fashion, in one of his *fatwas* where he vehemently derided the practice of astrology, Ibn Taymiyya clearly acknowledged that “[the stars] have an influence, that which is known by the senses and by these other affairs, this is true.”⁹⁵ Moreover, Ibn Khaldūn also admitted the theoretical as well as practical possibility of celestial influence upon terrestrial events, explicitly remarking in his discussion on prophecy and

⁹³ Avicenne, *Réfutation de l'astrologie*. Édition et traduction du texte arabe, introduction, notes et lexique par Yahya Michot (Beirut-Paris: Albouraq, 2006), 77.

⁹⁴ Frank Griffel, *Al-Ghazālī's Philosophical Theology* (New York: Oxford University Press, 2009), 243-4.

⁹⁵ Yahya J. Michot, “Ibn Taymiyya on Astrology: Annotated Translation of Three Fatwas,” *Journal of Islamic Studies* 11/2 (2000), 158.

divination that celestial positions (*wad' falakī*) play a role in the appearance of prophets.⁹⁶

What were, then, the major issues at stake that compelled several men of knowledge to denounce the craft? What kind of arguments did opponents raise for refuting astrological claims?

The arguments to which opponents of astrology appealed make many different claims, ranging from the social problems potentially caused by the belief in astrology to the methodological and epistemological issues inherent in the science of astrology. At the centre of these arguments, however, lays the essential charge of associating the practitioners of the craft with astral determinism. In these counterarguments, the *munajjims* are often relegated to the status of magicians and street diviners, who are accused of endowing celestial objects with independent creative powers. Simultaneously, the learned practice of astrology is easily stripped of its mathematical/astronomical garb and presented as a naïve and simplistic species of magic.

In terms of the potential social problems the belief in astrology might engender, the opponents of astrological practice referred to the detrimental consequences of false expectations caused by *munajjims*' predictions and the damaging of moral and religious values. For example, Ibn Khaldūn wrote that astrological predictions often pave the way for expectations of a political crisis in a dynasty. This inevitably encourages the rivals and enemies of the reigning dynasty to revolt against it. Ibn Khaldūn further added, without providing any specific example, that he had personally observed many incidents of this sort.⁹⁷ As regards to moral issues, Ibn Taymiyya alluded, in one of his *fatwas*, to the problems caused by women's frequenting the diviners' shops and sitting close to young men, who were present there with the sole intention of approaching

⁹⁶ Ibn Khaldūn, *The Muqaddimah: An Introduction to History*, v. 1, tr. Franz Rosenthal (Princeton; New Jersey: Princeton University Press, 1958).

⁹⁷ Ibn Khaldūn, *The Muqaddimah* v. 3, 262-3.

those women.⁹⁸ Apart from these two issues, the opponents were annoyed by the fact that in their search for divine support, society in general, and the ruling elites in particular, depended more on astrologers than the *'ulamā'*. As Ibn Qayyim al-Jawziyya made it explicit in his *Miftāḥ dār al-sa'āda, munajjims* were encroaching “the sphere of human activity wherein should predominate the authority of the *'ulamā'*.”⁹⁹

Aside from these potential social problems, the opponents of astrological practice also frequently referred to the limits of the scientific premises of astrology. It is quite interesting that the arguments raised by the opponents with respect to the weak scientific methods of astrology parallel the critical self-reflections of *munajjims* about their own craft, which I already discussed above. The famous opponents of astrology like Ibn Khaldūn or Ibn Qayyim al-Jawziyya often emphasized the conjectural (*takhmīnī*) nature of astrological practice in view of the impossibility of knowing and observing all the effective celestial causes upon the terrestrial realm. Ibn Qayyim al-Jawziyya specifically pointed out the *zīj* literature and rhetorically asked how a *munajjim* could know which table to trust when *zījes* differed significantly in the values they provided about the positions of the planets.¹⁰⁰ For Ibn Khaldūn, due to the difficulty of obtaining thorough celestial information and additional problems related to the instruction of astrology, such as the scarcity of erudite masters, one should not waste his/her time learning astrology, which is already

⁹⁸ Yahya J. Michot, “Ibn Taymiyya on Astrology: Annotated Translation of Three Fatwas,” 188. Similar argument was also raised in some examples of the Medieval *hisba* manuals that aimed at inspecting the market transactions. See: George Saliba, “The Role of the Astrologer in Medieval Islamic Society,” 61.

⁹⁹ John Livingston, “Science and the Occult in the Thinking of Ibn Qayyim al-Jawziyya,” *Journal of the American Oriental Society*, 112/4 (1992), 601.

¹⁰⁰ *Ibid.*, 602.

a very complicated subject with numerous branches and subcategories.¹⁰¹

Another sub-theme frequently visited by the opponents of astrology is the claim regarding the prophetic nature of celestial knowledge. It is not uncommon to see *munajjims* attributing their craft to the prophet Idrīs, who was often identified as Hermes Trismegistus and/or Biblical Enoch.¹⁰² The Ottoman astrological materials, especially those composed prior to the last quarter of the fifteenth century, also often mention Idrīs as the discoverer of the secret knowledge of the stars.¹⁰³ The leading opponents of astrology, however, energetically criticized this argument. Ibn Khaldūn, for example, stated that despite the common views of some weak-minded people, the knowledge of celestial powers and influences were not revealed.¹⁰⁴ Ibn Taymiyya also treated this issue separately in one of his long *fatwas*. As he put it forward, there

¹⁰¹ Ibn Khaldūn, *The Muqaddimah* v. 3, 265. Ghazālī also thinks that spending years studying astrology is wasting one’s lifetime in vain. See: Carlo Nallino, “Astrologia e astronomia presso i Musulmani,” in *Raccolta di scritti editi e inediti*, v. 5, Astrologia, astronomia, geografia, ed. Maria Nallino (Rome: Istituto per l’Oriente, 1944), 33.

¹⁰² David Pingree, “The Šābians of Ḥarrān and the Classical Tradition,” *International Journal of the Classical Tradition* 9/1 (2002), 8-35

¹⁰³ In the historical chronology sections of the earliest *taqwīms*, the date the science of the stars was revealed to Idrīs is particularly specified: “*nuzūl-i ‘ilm-i nujūm ba-Idris*” or “*‘Idris peygāmbere gökden nücūm iñeli*.” The latest *taqwīm* in which I was able to find a substantial reference to Idrīs is the Arabic almanac of the year 983 now preserved as BnF Arabe Ms. 2570. There (20a) Idrīs is defined as the “*kāshifu ‘ilm al-nujūm wa-l-aḥkām*.”

Some of the contemporary astrological textbooks written in plain Turkish also refer to him whenever the author felt the need to justify the validity of astrology, and thus underline the prophetic value of this science. For example a late-fifteenth century astral expert named Nücūmī wrote a simple astrological textbook that he dedicated to Prince Cem around the late 1460s or early 1470s. In this text entitled *Mezzāku’l-uşşāk fī ‘ilmi’l-āfāk*, in addition to widely adopting Fakhr al-Dīn Rāzī’s arguments in favor of the astrological practice, the author discusses at length the significance of Idrīs for the cultivation of astrological knowledge and says that the science of the stars is a miracle bestowed upon him. See Kandilli Ms. 372, 63b: “*Bu ‘ilm-i şerīf ḥod ma’lūmdur ki ‘Idris nebī ‘aleyhisselām ḥazretiniñ ‘ilm-i mu’cizesidür, ḥaḳ te’ālā ... āñā ‘ilm-i nücūmda otuz şuhūf göndermişdür ve ba’z-ı ḥukemā dirlər ki otuz şuhūfuñ onı ‘ilm-i şerī’at idi ve onı ‘ilm-i nücūm ve onı gayr-ı ‘ulūmda idi*.”

¹⁰⁴ Ibn Khaldūn, *The Muqaddimah* v. 3, 262-3.

is no authentic tradition about the revelation of the science of the stars to Idrīs. Moreover, even if some part of this science was taken from a Prophet, it now contains more lies and vain elements. Finally, he refers to the standard two-tiered division of the science of the stars—i.e., the one depending on computation (*hisāb*) and the other on (astrological) judgments (*aḥkām*)—and states that the second belongs to the field of magic. Since it is impossible for any of the Prophets to have been a magician, then there is no way, according to Ibn Taymiyya, this science was revealed to the prophet Idrīs.¹⁰⁵

As is evident from this brief discussion of the prophetic roots of astrology, while *munajjims* might have at times resorted to the strategy of tracing their controversial craft back to the prophet Idrīs, the opponents of astrology often turned to the key strategy of identifying *‘ilm aḥkām al-nujūm* as a sort of applied magic, which they thought asserted astral determinism and thus undermined the fundamental pillars of Islamic faith. In almost all textual examples where jurists, theologians, and other Shariah-minded scholars attacked astrology, this deliberate maneuver comes to the fore, associating *‘ilm aḥkām al-nujūm* with astral determinism and the *munajjim* with a magician or diviner. Ibn Taymiyya’s relevant *fatwas*, for instance, are filled with remarks where the Hanbali jurist declares those who are keenly interested in astrological practice as unbelievers. For Ibn Taymiyya, whoever believes that planets and other celestial objects administer the destiny of individuals, and whoever seeks the aid of celestial power through invocation, is a corrupt associationist (*mushrik*).¹⁰⁶ Ibn Qayyim al-Jawziyya also spilled much ink to charge different kinds and levels of astrological activity with astral determinism and hence unbelief. For Ibn Qayyim al-Jawziyya, *munajjims* lay claim to God’s omnipotence, and

¹⁰⁵ Michot, “Ibn Taymiyya on Astrology: Annotated Translation of Three Fatwas,” 170-175.

¹⁰⁶ *Ibid.*, esp. 160-170.

therefore deserve such harsh treatments as severing their hands from their arms and tearing their “lying tongues” from their mouths so that they could no longer “trade on the gullibility of the *umma*.”¹⁰⁷

It is quite intriguing that despite such severe charges of astral determinism, *munajjims* always refrained in their writings from implying any sense of astral determinism. On the contrary, they often subsumed celestial influences under the will of God and emphasized the fact that the entire cosmic order was in the full control of the divine power. One can easily see in the Ottoman astrological corpus of the fifteenth and sixteenth centuries that when expressing their astrological predictions, *munajjims* inserted at regular intervals such clauses, provisions, and Quranic verses as “*bi-idhnillāh*” [with the permission of God], “*Allāhu a‘lam*” [God is the most knowing one], “*indahu mafātiḥ al-ghayb*” [with Him are the keys of the unseen], “*lā ya‘lamu al-ghayb illallāh*” [No one knows the unseen except God], “*Mā shā‘allāh kāna wa-mā lam yashā‘ lam yakun*” [Whatever Allah willed to be, shall be, and whatever Allah did not will to be, shall not be]. While one may interpret the insertion of these remarks as a simple trick to escape the charge of infidelity, what seems more plausible though, on the basis of the previous discussion with respect to the *munajjim*’s critical self-reflections, is that for many *munajjims* astral determinism was in fact almost never an issue.¹⁰⁸ Rather, they genuinely and deliberately

¹⁰⁷ Livingston, “Science and the Occult in the Thinking of Ibn Qayyim al-Jawziyya,” 601.

¹⁰⁸ One exception may be Abū Ma‘shar, the most famous astrologer in all of Islamic history, who was an ardent proponent of astral determinism, although he also employed in some of his writings the same alibi of God’s omnipotence. As an indication of his belief in astral determinism and his tendency to assign anthropomorphic qualities to the heavenly bodies, Abū Ma‘shar defines astrology in his *Kitāb al-milal wa-d-duwal* as the science of interpreting the indications of the “celestial” or “rational” personalities” (*al-ashkhāṣ al-‘ulwiyya* or sometimes *al-ashkhāṣ al-‘aqliyya*), not as the craft of interpreting the influences of the celestial bodies (*al-ajrām al-‘ulwiyya*). See *Abū Ma‘shar on Historical Astrology: The Book of Religions and*

made the celestial effects subsidiary to God's unlimited power.

Although the views quoted here originate almost solely from the austere Hanbali jurists, and may thus seem not representative of the entire cultural and intellectual spectrum, a closer examination of other well-known names who were either integral members of or influential upon the fifteenth- and sixteenth-century Ottoman scholarly context also reveals similar patterns.

One of these names is Sayyid Sharīf-i Jurjānī (d. 1413), who was profoundly influential on the development of the Ottoman higher education curricula through the dissemination of his works in the fields of grammar, jurisprudence, and especially *kalām*.¹⁰⁹ His magnum opus in the field of *kalām* entitled *Sharḥ al-Mawāqif*, a massive commentary on his master 'Aḏūd al-Dīn al-Ījī's (d. ca 1355) relatively short tract on theology, became a key text upon which numerous commentaries and super-commentaries were written by the Ottoman 'ulamā' in the fifteenth and sixteenth centuries.¹¹⁰ In one part of his lengthy commentary, Jurjānī specifically takes the case of *munajjims*. For Jurjānī, *munajjims* constitute a group that denies the omnipotence of God. As he maintains, *munajjims* believe that stars rule the terrestrial events by means of their positions in the Zodiac or the planetary aspects among one another. He refers here to the key concept "mudabbir" and associates *munajjims* with the belief that celestial objects act and rule

Dynasties (On the Great Conjunctions), ed. Keiji Yamamoto and Charles Burnett, 2 Vols (Leiden: Brill, 2000).

¹⁰⁹ On Sayyid Sharīf-i Jurjānī, see Josef van Ess, "Jurjānī, Zayn al-Dīn Abu'l-Ḥasan 'Alī b. Moḥammad b. 'Alī al-Ḥosaynī," *Elr*, Online edition. On Jurjānī's impact upon the Ottoman higher education, see: Shahab Ahmad and Nenad Filipovic, "The Sultan's Syllabus: A Curriculum for the Ottoman Imperial Medreses," *Studia Islamica* 98-99 (2004), 183-218.

¹¹⁰ M. Sait Özervarlı, "Osmanlı Kelam Geleneğinden Nasıl Yararlanıyoruz?" in *Dünden Bugüne Osmanlı Araştırmaları: Tespitler – Problemler – Teklifler, Sempozyum*, ed. Ali Akyıldız et al. (İstanbul: İSAM, 2007), 197-213.

independently.¹¹¹ While targeting these alleged claims of *munajjims*, Jurjānī resorts to one of the most common arguments used in the polemical literature as to the disparate fates of twins. Accordingly, Jurjānī questions how it could be possible for the twins to have different courses of life while they are born at the same time, and thus have apparently the same ascendant. Jurjānī concludes that contrary to what the *munajjims* strongly hold, a minor change in the configuration of celestial positions does not have any substantial impact on terrestrial events.¹¹²

Curiously enough, Jurjānī’s critical remarks on the practice of *munajjims* did not go unchallenged in the early-sixteenth century Ottoman scholarly circles. Mü’eyyedzāde ‘Abd al-Raḥmān (d. 1516), who was one of the key “scholar-bureaucrats” of the time, wrote a brief super-commentary on Jurjānī’s text in which he heavily criticized the stance of his intellectual predecessor vis-à-vis the real scope of the practice of astrology.¹¹³

Mü’eyyedzāde’s significance in the sixteenth century Ottoman scholarly establishment can in fact be hardly exaggerated. He was an integral part of the immediate intellectual circle of Bāyezīd II from the latter’s governorate years in Amasya on. His influence upon the prince, and their debauchery and orgies of drug use in Amasya irritated Sultan Meḥmed II, who eventually

¹¹¹ Seyyid Şerif Curcāni, *Şerhu’l-Mevâkif (Mevakif Şerhi)* v. 3, edited and translated by Ömer Türker (İstanbul: Türkiye Yazma Eserler Kurumu Başkanlığı, 2015), 101-3: “*al-fırqa al-thāniyya min al-munkirīn li-shumūl qudratillāh ta ‘ālā al-munajjimūn qālū al-kawākib hiya al-mudabbirāt amran li-dawarān al-ḥawādith al-sufliyya ma ‘a mawāḍi ‘ihā fī al-burūj wa awḍā ‘uhā ba ‘ḍihā ilā ba ‘d wa ilā al-sufliyyāt.*”

¹¹² Ibid., 103: “*Wa-al-jawāb anna al-dawarān lā yufīd al- ‘illiyya siyammā idhā taḥaqqāqa al-takhalluḥ kamā fī tawā ‘mayn aḥadahumā ghāyat al-sa ‘āda wa-l-ākhar bi’l- ‘aks wa la yumkin an yuḥāl bi-dhalika ‘alā mā baynahumā min al-tafāwut fī waqt al-wilāda li-anna al-tafāwut bi-qudrat daraja wāḥida lā yū ‘jab taghayyur al-aḥkām ‘indahum.*”

¹¹³ I borrowed this term “scholar-bureaucrat” from Abdurrahman Atçıl’s study on the formation of the Ottoman scholarly establishment in the fifteenth and sixteenth centuries. See: Abdurrahman Atçıl, “The Formation of the Ottoman Learned Class and Legal Scholarship, 1300-1600.” (Ph.D. Dissertation, The University of Chicago, 2010).

decided to take measures and send his own men to Amasya to execute all the mischievous people surrounding the young prince. With the help of Bāyezīd, Mü'eyyedzāde first escaped to Aleppo, and then went to Shiraz where he studied for a few years with the luminary scholar Jalāl al-Dīn Dawānī (d. 1502). Upon hearing the death of Mehmed II and the subsequent enthronement of his benefactor Bāyezīd II, he returned back to the Ottoman lands with an *ijāza* he secured from Dawānī.¹¹⁴ After holding a few teaching and administrative positions in Istanbul and Edirne, he was first promoted to professorship at one of the *Saḥn madrasas*, which was later followed by his promotion to chief military judgeships of Anatolia and Rumelia. During his eight-year tenure as a *mudarris* at the *Saḥn*, and his even longer administrative service as the military judge (*qāḍī al-ʿaskar*) of Anatolia and then of Rumelia, Mü'eyyedzāde had the opportunity to teach new generations of scholars and administer appointments in the scholarly bureaucracy.¹¹⁵ There are a number of extant archival documents from early to mid-sixteenth century, enlisting plenty of scholars as the *mülāzım* of Mü'eyyedzāde.¹¹⁶ As such, they manifest that Mü'eyyedzāde shaped the formation and functioning of the Ottoman scholarly hierarchy of

¹¹⁴ For the critical edition and contextual reading of the *ijāza*, see Judith Pfeiffer, “Teaching the Learned: Jalāl al-Dīn al-Dawānī’s *Ijāza* to Mu’ayyadzāda ʿAbd al-Raḥmān Efendi and the Circulation of Knowledge between Fārs and the Ottoman Empire at the Turn of the Sixteenth Century,” in *The Heritage of Arabo-Islamic Learning. Studies Presented to Wadad Kadi*, ed. Maurice A. Pomerantz and Aram A. Shahin (Leiden: Brill, 2016), 284-332.

¹¹⁵ On Mü'eyyedzāde’s life and works, in addition to Pfeiffer’s work cited above, also see Tayyib Gökbilgin, “Müeyyed-zāde,” *İA*; Cemal Kurnaz, “Osmanlı Tarihinde İz Bırakan Amasyalı bir Aile: Müeyyedzādeler,” in *I. Amasya Araştırmaları Sempozyumu Bildirileri* (Amasya: T.C. Amasya Valiliği, 2007), 647-666.

¹¹⁶ TSMA E. 5375; TSMA E. 5605; TSMA E. 9555; TSMA E. 9802; TSMA E. 10053. In all these short registers recording the *mudarris* appointments in the early sixteenth century, there is detailed information about the students and *mülāzıms* of Mü'eyyedzāde that include such names as Muḥammed Çelebi b. Müftī ʿAlī, Kireçizāde Aḥmed, Mevlānā Süleymān, Maḥmūd Çelebi, Mevlānā Muḥammed Çelebi, Mevlānā Dāvud or Mevlānā ʿAcem Muḥyiddīn, all of which seem to have held teaching offices throughout their career either in one of the *Saḥn madrasas* or other high-ranking teaching institutions.

the time.

Due mostly to his busy administrative schedule, he was not prolific as a writer and his entire oeuvre consists only of his *fatwas* along with a few separate theological tracts. In one of these tracts, *al-Ḥawāshī ‘alā Sharḥ al-Mawāqif*, which he presented to Bāyezīd II sometime between 1480s and 1502, Mü’eyyedzāde challenges the arguments proposed by Jurjānī against the claims of *munajjims*. Mü’eyyedzāde first starts with reminding that in none of the astrological texts (*kutub al-tanjīm*) could one find a single remark stating the celestial bodies are the single, efficient causes (*al-fā’il*) of the terrestrial events. All *nujūm* books rather say, according to Mü’eyyedzāde, that just like chilling is the natural sequence of drinking water or eating scammony (*saqmūniyā*) helps digesting, the celestial phenomena prepare the necessary conditions for the subsequent occurrence of the influence. As Mü’eyyedzāde underlines, even the most pious people do not deny this interdependence of celestial and terrestrial phenomena. In fact the entire cosmic configuration is yet another sign of God’s wisdom and knowledge, and its denial makes an individual an unrighteous person.¹¹⁷

Having laid out the general principles about the cosmological underpinnings of the astrological practice in the introduction to his critique, Mü’eyyedzāde treats particular arguments of Jurjānī. As regards to the question of the dissimilar fates of twins. Mü’eyyedzāde says that

¹¹⁷ SK Ayasofya Ms. 2283, 8a-8b: “*aqūl yanbaghi an ya ‘lam awwalan anna laysa fī kutub al-tanjīm mā yadullu ‘alā kaww al-fā’il li’l-ḥawādith al-sufliyya al-ajrām al-‘ulwiyya bal qālū bi-tarattub al-ūlā ‘alā al-thāniya kamā yatarattub al-tabrīd ‘alā shurb al-mā’ wa’l-ishāl ‘alā’l-saqmūniyā wa sā’ir al-umūr ‘alā asbābihā siwā kāna shartan fī al-ta’thīr aw mu‘addan li’l-qābil aw fā’ilan ḥaqīqiyān aw ‘illat ‘ādiyya wa hadhā’l-qadr mimmā lā yunkiruhu fī irtibāṭ ba’d al-sufliyyāt bi-ba’ḍihā wa li-hadhā lā inkār fī al-milla al-qawīma li-‘ilm al-ṭibb ma’a ibṭinā’ihi ‘alā tarattub aḥwāl badan al-insān ‘alā al-asbāb al-ṭabī’iyya fa-lam yunkir bi-irtibāṭ al-sufliyyāt bi’l-‘ulwiyyāt bal naj’al dhalika min adilla ‘ilmīhi wa-ḥikmatīhi ta’ālā wa-ja’aluhum mukhālīfan fī hadhihi’l-mas’ala iftarā’ alayhim.”*

what really matters in the astrological interpretation is not the time of birth but rather the time of conception (*misqat al-nutfa*). For Mü'eyyedzāde, all the authoritative sources, which he unfortunately did not specify within the text itself, agree upon this fundamental principle. Moreover, for Mü'eyyedzāde, Jurjānī's statement as to the insignificance of the minor differences in celestial degrees in terms of the overall outcome of events in the terrestrial world falls far from reality. He exemplifies a hypothetical situation in which one's ascendant is located in the last degree of a particular astrological sign, whereas the ascendant of other is in the first degree of the next sign. In that case, Mü'eyyedzāde argues, all the concomitant variables such as the owner of the triplicity (*muthallatha*), terms (*ḥadd*), decans (*wajh*), some of the prorogators including the *haylāj* and *kadkhudāh*, the ruling planet of the ascendant (*al-mustawlī 'alā al-ṭāli'*), the cardines (*awtād*), the cusps of the astrological houses, and relevant issues that one should take into consideration for astrological interpretation will be entirely different.¹¹⁸ Mü'eyyedzāde even insults Jurjānī in a pedantic manner for his ignorance in this branch of knowledge, as he says that Jurjānī improperly uses some of the key astrological concepts such as the exaltation and descension of zodiac signs.¹¹⁹

What we have here is, thus, a valuable example of a learned Ottoman 'ālim conversant in

¹¹⁸ Ibid., 9a-b: “*thumma qawl al-shāriḥ al-tafāwut bi-qadr daraja wāḥida lā yūjab taghayyur al-aḥkām bi-ittifāq fimā baynahim ghayr ṣaḥīḥ ammā awwalan fa-li-annahu ... yakūn ṭāli' aḥadahumā al-daraja al-akhīra min burj wa ṭāli' al-ākhar al-daraja al-ūlā mimma yalayhu fī ḥīn yakhtalifu burj al-ṭāli' wa ṣāḥib al-muthallatha wa-al-ḥadd wa-al-wajh wa ba'ḍ al-kadkhudāhāt wa-al-haylājāt wa-al-mustawlī 'alā ṭāli' wa ghayr dhalika wa hakadhā naqūl fī sā'ir al-awtād wa marākiz al-buyūt al-ukhra fa-'alā hadhā yaqa'u taghayyur fāḥish fī al-aḥkām ma'a kawn al-tafāwut bi-qadr daraja wāḥida.*”

¹¹⁹ Ibid., 10b: “*thumma fī qawl al-shāriḥ fī ja'l ba'ḍ al-daraj sharafan wa ba'ḍahā wabālan zalāl fāḥish idh laysa fī 'urfihim ja'l ba'ḍ al-daraj wabālan qat'an bal al-daraja al-muqābila li-daraja al-sharaf yusamma daraja hubūt lā daraja wabāl wa-al-wabāl innamā yusamma bihi al-burj al-muqābil li-bayt al-kawkab lā ghayr.*”

astrological lore to the extent of criticizing some of the stellar names of Islamic philosophy and theology on account of their objections against the astrological practice. As we will see in more detail in the next chapter, Mü'eyyedzāde's rich library was replete with almost all the canonical works of Islamic astrological and astronomical tradition. There is definitely a need for further research to explore the curricular and extra-curricular activities of some of Mü'eyyedzāde's students in order to better evaluate the extent of the interest of *madrassa*-affiliated scholars in astrological pursuits. Although Mü'eyyedzāde's prominent status in the late-fifteenth and early-sixteenth century Ottoman intellectual context enables one to argue that his positive attitude toward the practice of astrology represents the general attitude of scholars at the time, there were other figures that were highly sceptical about the assertions of the *munajjims*.

One of these names is Sinān Paşa (d. 1486), a noted scholar and grand vizier who owed much of his fame to his prose and verse writings in Turkish.¹²⁰ Early in his career, Sinān Paşa gained prominence as an erudite mathematician but toward the end of his life he decided to turn towards the Sufi path. After his initiation to the Sufi way, he wrote in ornamental Turkish three different works on Sufism and ethics. One of these texts is *Ma'ārifnâme*, a work on ethics in which Sinān Paşa wove together several issues important for helping an individual to conduct a pious life in both this world and Hereafter. He devoted one particular section of this work to the elaboration of the controversial status of *munajjims* and physicians (*işāretü ḥālī'l-müneccim ve'ṭ-ṭabīb*).¹²¹ The central argument in this relatively long passage is that in order to be an upright

¹²⁰ For the life and works of Sinān Paşa, see Fatih Köksal, "Sinan Paşa'nın Nesri ve Nesir Üslubu," *Doğu Akdeniz Üniversitesi Türk Dili ve Edebiyatı Bölümü Dergisi* 1 (1998), 83-97; Aylin Koç, "Sinan Paşa" *TDVİA*.

¹²¹ Sinan Paşa, *Maârif-nâme: Özlü Sözler ve Öğütler Kitabı*, ed. Mertol Tulum (Ankara: TTK, 2013), 480-492.

Muslim one should not pay attention to the words of *munajjims*—nor physicians. God is the only healer and source of wisdom; the supplication should be addressed solely to Him.

For Sinān Paşa, most *munajjims* are fools to dare claim to know the unseen (*ghayb*), because the ability to know the unseen is a divine gift not granted to ordinary people. According to Sinān Paşa, the majority of *munajjims* worship celestial powers (*'abede-i tab'*) and keenly observe astral bodies (*ḥarase-i kevākib-i seb'a*). They fail to understand, however, the influences caused by the (positions of the) stars. Sometimes *munajjims* draw a judgment based upon a particular celestial position, but another configuration immediately renders its effect void. Sometimes *munajjims* interpret a particular planetary aspect as an auspicious sign but it ultimately turns out to be disastrous. For him, those who are straight in manner and sound in piety do not ever need a *zīj* or *taqwīm*. Yet, as he underlines, this does not mean that pious people deny the existence of celestial phenomena and their influence upon terrestrial events. On the contrary, they are aware that all the generated things in the universe are dependent on one another. God the Omnipotent created numerous stars and scattered them in the sky, some of which are beneficent and some malefic. Some of them are related to living creatures and some to deceased ones. Some have positive effects on the prosperity of the world, and some others act to destroy it. Every single celestial object has peculiar characteristics, and the world of generation and corruption runs on this celestial influence. Even the roaming of an ant on earth is caused by a particular celestial situation, and the death of a mosquito is affected by the adversity of its ascendant. Whatever particular happens in this world corresponds to a special configuration in the celestial orbs. This does not mean, however, that the celestial bodies are the real efficient causes (*esbāb-ı mü'essirāt, 'ilel-i mūcibāt*). All the things that occur in this world are due only to

His actions.¹²²

Upon recalling the basic cosmological principles and reemphasizing the definitive causal link between the celestial and terrestrial spheres, Sinān Paşa correlates the science of the *munajjims* to some other divinatory practices including omoplatoscopy (*‘ilm al-aktāf*), ornithomancy (*‘ilm al-ṭīra*), or palmomancy (*‘ilm al-ikhtilāj*).¹²³ For Sinān Paşa, the most prestigious ones among these divinatory sciences are geomancy and *nujūm*. None of these divinatory sciences were invented without purpose. Most of them were originally created by divine inspiration but they were eventually distorted at the hands of ignorant people. It is difficult

¹²² Ibid., 480-486 [although the original work was written in verse and the modern edition of it followed the same pattern, I turn it here into prose for the ease of denotation]: “*Ekser müneccim olanlar gabī olurlar, onlar kaçan ‘ālim-i gaybī olurlar? O daḥı Allāh’un bir mevhibesidür, kime gerekse müyesser olmaz ... Ehl-i tencīmüñ çoğı ‘abede-i ṭab’ olur ve ḥaraṣe-i kevākib-i seb’a olur. Sevābit ḥālünden o kadar ḥaberi olmaz ve onun evzā’ından gelen eṣeri tamam bilmez. Gāh olur ki bir vaz’ ile ḥükm ider bir vaz’-i āḥar onu bozmuş olur, hemīn bu vaz’ ı görür vaz’-i āḥar oña muḥālif olmuş olur. Bazısı teslīsī nef’ diyü i’tikād ider şerr çıkar ve baz’ı terbi’i şerr diyü ḥükm ider ḥayr çıkar. ...[Ş]unlar ki erbāb-ı dīn-i kavīm olurlar, onlar dā’imā bī-zīc ve takvīm olurlar. Pes bunlaruñ inkārılarınuñ ma’nāsı ve sözlerinüñ fehvāsı bu değıldür kim bunlar kevākibüñ evzā’ ve ḥālātına ve o ḥālātuñ süfliyyāta irtibāṭātuna inkār iderler. Nice inkār iderler ki bu Allāh te’ālānuñ bir kudret-i ‘acībe ve ḥikmet-i garībesidür ki cümle ‘ālemüñ aḥvāli birbirine muḥtelif ve her birini āḥara murtabıf yaratmışdur. Şöyle ki semāda kevākib-i menşüre yaratmışdur ki kimisi şirrīre ve kimisi ḥayyīredür ... Bazısı nücüm-ı şābitedür, her birinüñ ṭab’ında bir ḥāṣṣa şābitedür ... Kimisi ‘ālemün ‘imāretin sever ve kimisi ḥarāb olub yıkılmasın ister ... Fi’l-cümle her birinüñ ḥılkatında bir ḥikmet vardur mu’ammā ... Cümlesinüñ ictimā’ından bir ḥālet-i mutavassıta peydā olur şöyle ki ‘ālem-i kevn ü fesād şu görünen üzerine hüveydā olur. Ḥattā bir karıncanuñ yerde ḥareketi semāda bir ḥālet hey’etinden olur ve bir ba’ūzanuñ bundan vefātı ṭālī’inde bir ulu nuḥūsetden olur. Her ne cüz’i ki bundan buluna felekte bir vaz’ olur ki oña muvāfık olur ve her ne ḥādīse ki yerde belire gökte bir ḥālet-i ḥādīse olur ki oña muṭābık olur. Bunun sebebi bu değıldür kim nüfūs-ı felekiyye esbāb-ı mü’essirāt ola ve evzā’-ı ‘ulviyyāt ilel-i mücibāt ola. Bilki Allāhtan gayrına çāre yoktur te’sīr olmaz, mümkün değıldür mümkünde icād bulunmaz ... Bundan ulu kudret mi olur ki yalnūz evzā’-i felekiyye değıl her mevcūdda cemī’-i mevcūdātuñ tefāşilinüñ ‘alāmātı bilinür ve her bir zerrede cemī’-i kāinatıñ aḥvālinüñ işārātı añlanur?”*

¹²³ For a superb exploration of numerous divinatory sciences appealed to in Islamic history and culture, see Toufic Fahd, *La divination arabe, études religieuses, sociologiques et folkloriques sur le milieu natif de l’Islam* (Leiden: Brill, 1966).

now, according to Sinān Paşa, to find an erudite *munajjim* who can accurately calculate the celestial configurations and deduce their astrological indications. One cannot, however, partake in the sphere of occult matters only by technical knowhow. It also requires having mystical leanings and following an abstinent and pious life. The esoteric sciences (*al-'ulūm al-rūḥāniyya*) are so numerous that no one could ever be the master of all. What the so-called masters of esoteric sciences say is all false and corrupt. One cannot haphazardly divine occult matters; there should be no room in such an enterprise for conjectures and speculations. This is the reason why the Prophet Muhammad warned his people not to believe in and appeal to *munajjims*. Another reason for the Prophet's admonition was that most of the *munajjims* at the time were disgraceful soothsayers of the community of Arabs, many of whom were from among the infidels. As Sinān Paşa highlights, it is not proper to turn to the words of oracles instead of obeying the master of the revelation. Not all sciences enhance one's intellectual strength; some of them exacerbate the ignorance. The implications in his discussion are clear that Sinān Paşa regarded astrology as one of them.¹²⁴

¹²⁴ Sinan Paşa, *Maârif-nâme*, 486-492: “*Meşelâ bir koyun kemiğine bakarlar nice türlü hükmler iderler ve her yerde nice 'acüzeler olur ki arpa salmak ile mugayyebâti bilürler. 'Arab'da bir tâ'ife olur imiş ki bir kuşuñ vaz'ına bakarlarmış, onun evzâ'ından hezâr aḥkâm-ı şaḥîḥa iderlermiş ... Daḥı nice bunun gibi 'ulūm vardır ki her birini bir tâ'ife kendü kesbi için san'at idinmişdür ve her birini bir kavm mugayyebâtdan haber virmek için âlet idinmişdür. Gâyet reml veya nücüm daḥı onların birisidür ve bu ikisi aralarında ulusıdır. Cümlesinüñ aşlı vardır ber 'abeş konulmayub durur, ekşerinüñ ibtidâsı bir ilhām-ı rabbānî ile olub durur. Şoñra nâ-ehillere düşmüş bozulmuşdur, hemîn aşlından bir cüz'ice eşer kalmışdur. Şimdi nice müneccim bulunur ki evzâ'-i felekiyyeyi gökçek zabt ide ve ona tefrî' itdüğü aḥkâmı bî-ḥabḥ ide ... Mugayyebâta hükm eylemek kuru kavāid ve uşul bilmek ile olmaz ve o 'ilimleri 'amele getürmek mücerred ebvâb ve fuşul bilmek ile olmaz. Onlarda elbetde bir nūrānî ḥâlet gerek ve onlarda her dem perhîz ve riyâzet gerek ... Fî'l-cümle 'ulūm-i rūḥāniyenüñ envâ'ı çoktur, eğerçi değme yerde onun tamām biliri yoktur. Ekşer-i kelimâtı ekâzib ve türrehâtdur ve ekşer-i aḥkâmı ebâḥıl ve muzahrafâtdur. 'Ulūm-i gaybîyyede recm bi'l-gayb yaraşmaz ve aḥbâr-ı mugayyebâtda zann ve taḥmîn yaşımaz. Bu cihetden ötürüdür ki şâḥib-i şerî'at ... müneccimlere inanmayun diye*

It is quite surprising to see that Sinān Paşa, an erudite mathematician who later turned into a Sufi, pairing astrology with magic and divination, and charging *munajjims* with astral determinism. As I will mention in more detail in the third chapter, Mīrim Çelebi (d. 1525), one of the key astral experts who provided astrological service to the late-fifteenth- and early-sixteenth-century Ottoman court, is considered to have studied mathematical sciences with him just before Sinān Paşa initiated into Sufism. It is highly likely that Sinān Paşa's critical phraseology about *munajjims* was a product of his late introduction to the Sufi path, as we have ample evidence from the period in question that to scorn for *munajjims* was a theme frequently visited by eminent Sufis. The Sufi disdain toward *munajjims* did not always entail, however, a discomfort with fundamental astrological presumptions. As evident from Sinān Paşa's long discussion paraphrased above, in which he went on to say that even the most insignificant issues in the sublunary world such as the death of a mosquito are ruled by the commensurate positions of the celestial bodies, the astral causality between the celestial objects and terrestrial events was barely questioned.¹²⁵

Like Sinān Paşa, several prominent Sufis active in the Ottoman world during the period in question expressed their contempt for *munajjims* and their truth claims. One of them was the famous Ḥalvetī shaykh İbrahīm-i Gülşenī (d. 1534), a curious episode about whom at the court of the Aqqyunlu sultan Ya'qūb (r. 1478-1490), before Gülşenī's move to the Ottoman domain, involves sultan's *munajjims* and Gülşenī's critique of them. According to the story recounted in

emr itdi ve halkı onlara mürāca'at itmeyün diyü zecr itdi. Ve bir sebep daḥi bu idi ki ekser müneccimler o zamānda 'Arab içinde kehene-i fecere olurlar idi ve ekser gaybdan haber verenler o 'aşrda zümre-i keferi olurlar idi. Vahy dururken erbāb-ı kehānete varmak edeb deḡil idi. Şāhib-i risāleti koyub şāhib-i cehālete varmak de'b deḡil idi. Her 'ilm şöyle deḡildir ki 'āliminüñ kadrini ve celālini arturur, nice fenn olur kim şāhibinüñ cehāletini arturur.'

¹²⁵ Sinān Paşa, *Maārif-nāme*, 486.

his *menākıbnāme* written by Muhyī-i Gülşenī (d. 1604), when Sultān Ya‘qūb’s second cousin Bayandur ibn Rustam decided to attack the forces of the sultan, Ya‘qūb’s *munajjims*, who received, according to the narrative, hundreds of thousands of *aķçes*, apparently interpreted the astrological signs of the moment as an omen of the approaching defeat of the sultan. When these court *munajjims* saw Shaykh İbrahīm-i Gülşenī accompanying the sultan, they wondered but asked: “Why did not you just leave when his defeat is obvious according to our astrological calculations? As the *munajjims* of the sultan we had no other choice but to accompany him.”¹²⁶ Gülşenī in his reply told them that what he noticed in the “divine astrolabe” (*uurlāb-ı ilāhī*) was rather the victory of the sultan and the death of Bayandur. Thereby, according to Gülşenī, the *hadīth* of the Prophet, “all astrologers are liars”, would prove true.¹²⁷ When the *munajjims* insisted on their interpretation, Gülşenī challenged them by asking: “If your predictions will turn out wrong, would you let me have your salaries cut in substance?”¹²⁸ The *munajjims* apparently panicked before Gülşenī’s self-confidence and determination, and pleaded with him not to do so. Seeing the *munajjims* stepping back, Gülşenī said: “Had your craft leaned on reliable proofs, you would not have started doubting your interpretations.”¹²⁹ Eventually Gülşenī heard that Ya‘qūb defeated Bayandur, and his predictions proved true.

Needless to say, this little anecdote recounted in a hagiographical work should not be

¹²⁶ Muhyī-i Gülşenī, *Menākıb-ı İbrahīm-i Gülşenī*, ed. Mustafa Koç and Eyyüp Tanrıverdi (İstanbul: Türkiye Yazma Eserler Kurumu Başkanlığı, 2014), 121: “*Hele biz zarar ile giderüz, siz niye ihtiyar itdüünüz ki sultānuñ inhiżāmı muķarrerdür ki biz nücūmda tecrube ve seyr ile ma‘lūm itdük.*”

¹²⁷ Ibid.: “*Uşurlāb-ı ilāhīde böyle müşāhede olur ki Bayındır maķtūl olup sultān manşūr ve mużaffer gele ki ‘kullu munajjimin kadhdhābun’ hadīsi şıhḥāt bula.*”

¹²⁸ Ibid.: “*Anlar yine i tıkadları üzere ba‘zı kelimāt idicek, şeyḥ dimiş ki ‘Eger sözünüz yalan olursa ‘ulūfenizi kat‘ itdüreyim mi?’*”

¹²⁹ Ibid.: “*Müneccimler tazarru‘ idüp dimişler ki ‘Meded! Kimseye bunu söyleme ve öyle eyleme!’ diyicek şeyḥ dimiş ki ‘Eger sizūñ ‘amelüñüz kat‘ı olsa, şimdi tereddüd ve şübhe tārī olmazdı.’*”

taken at face value, as it serves to proving the mental superiority of İbrahīm-i Gülşenī as a Sufi master. Yet it still gives colorful insights into both contemporary Sufi attitudes toward the practice of astrology and the potential rivalries between men of competing fields of expertise. The story of İbrahīm-i Gülşenī is not the only case where the authority of *shaykhs* and *darvishes* to foretell the future through more esoteric and intuitive means clashed with the authority of *munajjims* who needed recourse to other, more technical, means to interpret the future course of events. For example, the Bayramī shaykh İbn İsā Saruhānī (d. 1559-60), who flourished during the reign of Süleymān the Magnificent, frequently derided *munajjims* in his relatively popular *jifr* book, *Rumūzü'l-künūz*.¹³⁰ In this enigmatic work originally composed in 1558 and widely copied afterwards with many different addenda, Saruhānī prognosticates on the principles of *ilm al-jifr* about the fate of the Ottoman dynasty until the year 2035 Hijra — or until 3000 in certain copies. For Saruhānī, what is incumbent upon the sultans and princes is to spend more time with shaykhs and gnostics, and to completely disregard the words of *munajjims* and geomancers. According to Saruhānī, unlike real men of wisdom, such people are deprived of the divine qualities of *karāma* and *walāya*. Therefore all the things they say are nothing but chimerical thoughts.¹³¹

¹³⁰ For Saruhānī, see: Cemal Kurnaz and Mustafa Tatçı, “İbn İsa,” *TDVİA*. One particular copy of the text available at the BnF was briefly examined by Işık Tamdoğan-Abel in the following study: “Le future dans le *Rumuz-ı Kunuz* de Mejededdin Ibn Isa: Une utopie, une prophétie, un livre à mystères,” in *Melâmis-Bayrâmis: études sur trois mouvements mystiques musulmans*, ed. Nathalie Clayer, Alexandre Popovic, Thierry Zarcone (Istanbul: Isis, 1998), 145-152. Another copy of the text available at the National Library of Turkey was transcribed in the following study: Ayhan Özgül, “İlyas b. İsâ-yı Saruhânî'nin ‘Rumûzü'l-Künûz’ adlı eserinin transkripsiyonu ve değerlendirilmesi.” (MA Thesis, Kırıkkale University, 2004).

¹³¹ İsmail Hakkı Konyalı Kütüphanesi Ms. 153, 12b: “*Pādişāh ve şehzāde[ye] münāsib olan budur ki gāhī insān-ı kāmīl birle muşāhebet ide, zāhiriñ ve bātınıñ āmilin bilüb kendü dahı kāmīl insān ola. Kav̄l-i müneccimīne i tibār kılmaya ve remmāl aḥkāmına mültefit olmaya. Bular evhām-ı ḥayālātdadur. Keşf-i kerāmāt ve taşarruf-ı velāyet bulārdan zuhūr itmez. Ve bu ‘ilmi*

The most intriguing case of the rivalry between the Sufi shaykhs and the experts of astral sciences is an anonymous letter located now in the Archive of the Topkapı Palace Museum.¹³² In this undated letter, the anonymous author, who speaks in the idiom of a highly self-confident and assertive Sufi shaykh using alchemical jargon, writes that as far as he has heard, the Ottoman Sultan Bāyezīd II had sunk his teeth into learning *‘ilm al-hay‘a* along with another formidable branch of natural philosophy (*hikmat*), which he does not explicitly name.¹³³ In his opinion, however, Bāyezīd did not have sufficient erudition, and his attempt was made solely on the basis of experience (*tecrife*). It is the author’s desire to remind the sultan, whom he characterizes as a zealous servant in the path of Islam, of the transitory nature of life and the insignificance of worldly possessions.¹³⁴ He then says that he has decided, in accordance with the portents in his dream, to send Bāyezīd one of his disciples to inculcate in him his real essence. The training should continue, the shaykh argues, until Bāyezīd attains the spiritual stage that his disciple has already reached at the hands of the master. Once Bāyezīd reaches that stage, then he, the author, will write a talismanic note for the sultan, whereby Bāyezīd could gain real access to the secrets he has been searching for.¹³⁵ To justify his preference to send his disciple instead of being physically in the sultan’s immediate presence, the anonymous shaykh also says that he is afraid

görü̇b anlaruñ ‘ilmine kıyās itmeyüb keşf-i rumüz ve künüz esrār-ı ilāhīdür diyü i ‘tikād idüb ehlerinden dūr olmayalar.”

¹³² TSMA E. 6172.

¹³³ Ibid., “[...] *Mālik-i memleket-i Rūmiyye kim āl-i ‘Osmāniyeden Sulṭān Bāyezīd’dür. Şöyle istimā‘ olundı ki şina‘at el-hey’ete ve bir hikmete ki hikmeti muhībdır ṭālmış ammā tecrife tarīkiyleymiş vukūf yogımış.”*

¹³⁴ Ibid., “[...] *Benüm üzerime lāzım oldu ki añā şefaḳat idüb tenbīh eyleyem ... metā‘-i dūnyā ḳalīdür biz bundan rahīl üzerineyüz. İstihāre itdüm ḳayr şunda gördüm ki şakirdlerimden birini gönderem. Vara, añā māddeyin ta ‘līm eyleye.”*

¹³⁵ Ibid., “[şakird] *benden gördüğü mertebeye dek tedbīr eyleye. Ol mertebeye vāşıl olıcaḳ bañā i ‘lām eyleye ben bir remz yazam ki kāşif ola ... tā ki ṭārḫ-i iksire şāliḳ ola.”*

of interacting with the sultan, as wise men should refrain from consorting with rulers, for the ruler may abuse the knowledge imparted because they are not like wise men.¹³⁶

Besides providing evidence for how relationships between Sufis and sultans were initiated and negotiated, and alluding to the contemporary recognition of Bāyezīd II's deep celestial interests, which I will further discuss in more detail in the third chapter, this letter unequivocally shows that the mystical and intuitive expertise of individuals with overt Sufi leanings might have contradicted the technical scientific expertise of the *munajjims*. The way the anonymous author uses the concept of experience (*tecribe*) is particularly worth pondering here. Although this concept had various connotations in medieval Islamic intellectual context, it is usually associated among Sufi circles with a special mode of knowing based on intuition. However, the author of this short report, despite speaking with a certain Sufi tone, belittles it, as this is, as far as he has heard, how Bāyezīd II has been accustomed to methodically studying the science of the stars and the other formidable branch of natural philosophy left unspecified. What the author means by the term thus seems to be related to a kind of knowing based not on intuition or personal inspiration, but rather on bookish learning, observation, and perhaps even empirical study.

These several lines of arguments issued by a wide range of opponents, including the Hanbali jurists of the Mamluk times or the pan-epistemic Sufis in the Ottoman realm have manifested that the real source of apprehension is found rather in the alleged claims of *munajjims* than the epistemological foundations of the astrological science itself. In different examples of

¹³⁶ Ibid., “[...] *pūşīde olmaya ki eger andan kōrkmasam Allah rızāsıyçün ta’līm itmekden ben kendüm varurdum ammā hekīm olan imtinā’ ider hākime musāhebet eylemekden, hākīm kendü gibi hekīm olmaz.*”

the polemical literature, *munajjims* were often characterized and caricatured as outrageous quacks and/or magicians, shamelessly asserting the idea of astral determinism and even the star worshipping. However, as we have already seen in the authentic writings of the *munajjims* who served the Ottoman court, the real practitioners of the “learned”/mathematical astrology were also unsympathetic toward the deterministic fatalism of the stars. For a more accurate assessment of identities and claims of the *munajjims*, we should try to answer —on the basis of hard, authentic evidence— what it really meant and entailed in the designated past to be an erudite *munajjim*. This question will guide the discussion in the following two chapters.

Chapter Two—How to be a *Munajjim* in the Ottoman Realm, 1450s–1550s: Vocational Training, Sources of Learning, and Venues of Knowledge

II. 1. Introduction

In an intriguing passage on the “discovery” of the Antilles in his *Kitāb-ı Bahriye*, the famous sixteenth-century Ottoman seafarer and naval captain Pīrī Reis (d. 1554) introduces Christopher Columbus as “a Genoese *munajjim*.”¹ In this text, which Pīrī Reis started writing in the 1510s and finished in the late 1520s upon the request of grand vizier İbrahīm Paşa (d. 1538), Columbus is described as a *munajjim* possessing a legendary book that descended from the time of Alexander and comprised of the secrets of the “science of the sea” (*deryā ʿilmi*). According to Pīrī Reis, no patron in Europe had paid attention to Columbus and the book he held. Eventually, the Spanish ruler decided to invest in him and provided the necessary material support for his voyage. By means of the information covered in this book was Columbus able, according to Pīrī Reis, to sail out west into the Atlantic and reach the Antilles.

It is difficult to ascertain whether Pīrī Reis was aware of Columbus’s genuine interests in astral sciences and occult lore when designating him a *munajjim*. The vast literature on Columbus underlines that he was marked in his own time for his deep literacy in these fields of

¹ *Kitab-ı Bahriye = Book of Navigation*, ed. Bülent Arı (Ankara: Republic of Turkey, Prime Ministry, Undersecretary of Navigation, 2002), 77: “Ceneviz’de bir münecim var imiş, nām ile Kōlon aña dirler imiş. Ānuñ eline girür bir hoş kitāb, qalmış İskender’den ol da irtiyāb. Cümle deryā ʿilmini bir bir tamām, cem ʿ idüb yazmışlar imiş iy hümmām. Ol kitāb gelmiş bu Efrenc iline, bilmemişler līkin ānuñ hāline. Bulur okur bu Kōlon āñu iy yār, varur İspanya begine āñu sunar. Takrīr ider cümle aḥvāli āña, ol daḥi gemi virür şöñra buna. Ol kitāb ile ʿamel ider iy yār, varub Antilyeyi ider āşikār. Daḥi şöñra durmaz açar ol ili, şimdi meşhūr eylemişdür ol yolu.”

knowledge.² According to his son's biography, Columbus studied for a while at the University of Pavia where he gave himself to the study of astronomy and geometry that he would later put into the service of his nautical activities and apocalyptic concerns. Aside from the necessary technical astronomical and mathematical numeracy for cosmography and navigation, he was particularly moved by the Joachimite eschatological lore. He had strong belief in his own role in fulfilling a number of prophecies before the coming of the Antichrist and the end of the world. He worked for a number of years on collecting materials for a volume called the *Book of Prophecies* that he intended to prove his destined role in his own vision of history but he never finished it. Given all the contemporary information about Columbus's life and his intellectual and professional pursuits, it is all the more interesting to find an early sixteenth-century Ottoman seafarer and cartographer defining his Genoese colleague with the epithet *munajjim*.

No matter what Pīrī Reis had in mind when describing Columbus as a *munajjim*, it is worth mentioning this curious fact to start penetrating the late fifteenth- and early sixteenth-century Ottoman social and cultural context, which this chapter and the following will try to examine with a view toward discussing the role of *munajjims* therein. What made an individual qualify for *munajjim* status in the Ottoman world in the period? What constituted the intellectual capital a practicing *munajjim* needed? In what specific fields of knowledge was a *munajjim* supposed to be learned? What are the books and instruments a would-be *munajjim* was expected to possess? Where could one acquire the required knowledge? Were there any institutional means for a would-be *munajjim* to receive training in the essentials of the science? Would a

² This part is based particularly on Pauline Mofitt Watts, "Prophecy and Discovery: On the Spiritual Origins of Christopher Columbus's "Enterprise of the Indies"," *The American Historical Review* 90/1 (1985), 73-102; Abbas Hamdani, "Columbus and the Recovery of Jerusalem," *Journal of the American Oriental Society* 99/1 (1979), 39-48.

madrasa welcome him? What role did courts play in the training and subsequent professional career of a *munajjim*? What were the factors in the making and breaking of his career? Were there any considerable differences between the categories/professions of *munajjim* or *muwaqqit*?

Notwithstanding the difficulties resulting from scattered, and in most cases limited, evidence that one can glean from contemporary sources, I will strive to present the complex social history of *munajjims* in the Ottoman world based upon authentic writings of practicing *munajjims*, archival documents, and biographical remarks in contemporary narrative sources. Available sources do not allow us to reconstruct a full biography of any practicing *munajjim* in the Ottoman milieu in the concerning period, depicting all the details of his training, professional networks, and the ups and downs of his career. Hence, in the absence of a single convenient individual upon whom to focus, I will adopt throughout this and the next chapter an eclectic approach, using instances from the lives of various practitioners.

The relevant archival documents mostly comprise salary registers that list the names and wages of palace personnel. These registers often include information on the *munajjims*. From the late fifteenth to the mid-sixteenth century, there are a handful of such surviving registers that can help us track the fluctuating status and pay scale of court *munajjims*. In that respect, compared to other studies on the social and cultural history of *munajjims* in the medieval and early modern Islamicate world that are based exclusively upon anecdotal evidence, the case of *munajjims* in the Ottoman realm presents us with an invaluable opportunity to substantiate the courtly presence and service of astrologers with hard, archival evidence. There are, however, two important pitfalls of the available archival sources. First, these registers, by nature, contain information only about those practitioners affiliated with the dynastic court; thus the *munajjims*

who did not enjoy dynastic patronage or who flourished elsewhere were naturally excluded. Second, these registers indeed provide very limited information on the lives of *munajjims*. More often than not they reveal only the names of those practitioners and the amounts of the allowances they received. Therefore, the archival evidence alone is insufficient to illuminate the social and cultural history of Ottoman *munajjims*, their training, the scope of their professional service, and possible scholarly rivalries among different experts.

The authentic writings of *munajjims*—including *taqwīms*, horoscopes, and treatises of various kinds—will also be used in this chapter and the next to supplement the data provided by the archival documents. These astrological sources are crucial for establishing the contours of the scientific canon utilized by practicing *munajjims* in the Ottoman capital at the time. Nevertheless, one should also keep in mind that these sources, especially the *taqwīms* and horoscopes, most of which remain anonymous, bear very few personal details that can help us lay out the mechanisms of *munajjims*' training and the entangled dynamics of their professional service.

For delving into *munajjims*' personal lives, contemporary narrative sources, including chronicles and biographical dictionaries may provide insightful details. Yet in the fifteenth- and sixteenth-century Ottoman case, historical narratives and biographical sources provide surprisingly little information. Notwithstanding that Ottoman chronicles and historical narratives are replete with remarks on the calculation of astrologically auspicious moments computed and interpreted by *munajjims* before an imperial activity was undertaken, these rather vague remarks do not reveal the identities of experts.

In a similar vein, *munajjims* were not among the favorite subjects of contemporary

biographers. As already mentioned in the Introduction,, fifteenth- and sixteenth-century Ottoman writing culture is devoid of sources with full anecdotes on *munajjims* like *Faraj al-mahmūm* of Ibn Ṭāwūs (d. 1266) or the *Chahār maqāla* of Niẓāmī-i Arūḏī. The only known Ottoman attempt to compile a special biographical dictionary of famous experts of celestial knowledge from the Babylonians up to the Europeans was the *Ṭabaḳāt-ı müneccimîn* of Süleymān Su‘dī Efendi (d. 1896), but since his purpose was undoubtedly different the text provides very little useful information on *munajjims* in the Ottoman realm.³ Canonical examples of sixteenth-century Ottoman biographical dictionaries of scholars and poets such as Ṭaşköprizāde’s (d. 1561) *al-Shaqā’iq al-nu‘māniyya fī ‘ulamā’ al-dawla al-‘uthmāniyya*, Laṭīfī’s (d. 1582) *Tezkiretü’ş-şu‘arā’*, or ‘Aşık Çelebi’s (d. 1572) *Meşā’irü’ş-şu‘arā’* also furnish limited information on the lives of astral experts. While the *tezkires* of poets often provide more personal details, these collections by nature contain biographical information only about those individuals composing poetry. Thus, it is difficult to find in these sources evidence on the lives and careers of the *munajjims* whose names are recorded in the archival registers.

Facing these shortcomings of the available sources from the period, I will combine all the available evidence drawn from distinct types of sources on different individuals in order to shed

³ Süleyman Sûdî Efendi, *Tabakāt-ı Müneccimîn*, ed. Salim Aydüz (İstanbul: Fatih Üniversitesi Yayınları, 2007). For a textual example comparable to Niẓāmī-i Arūḏī’s *Chahār maqāla*, one may speak of Kefeli Hüseyn’s (d. 1601) *Rāznāme*, in which Hüseyn compiles stories and anecdotes pertaining to the practice of bibliomancy that he has read, personally witnessed, or heard from others. One of his anecdotes in the compilation is related to a certain ‘Abdül‘azīz *müneccim*, who decided later in his life to abandon astrology after realizing the severity of Prophet’s saying, “all *munajjims* are liars.” As ‘Abdül‘azīz renounced the ‘useless’ craft and promised himself not to take an astrolabe in his hand anymore, he opened the Divān of Hafez and found the following verse: “Hold the forelock of a moon-faced, don’t tell a story/For good and evil fortune derives from the impact of Venus and Saturn.” See Kefeli Hüseyn, *Rāznāme*, transcription and facsimile prepared by İ. Hakkı Aksoyak (Cambridge: Harvard University the Department of Near Eastern Languages and Civilizations, 2004), 147.

light upon the fundamental question this and the next chapter tackle: What did becoming a *munajjim* in the late-fifteenth and early-sixteenth century Ottoman world entail? The possible answers require investigating several ancillary questions, on three of which will I focus in this chapter and the next: i) What did a *munajjim* need to know, ii) Where could he learn the things he needed to know, and iii) Where and how could he put into practice the things he knew?⁴ In this chapter I will particularly delve into the books in circulation that were frequently used by practicing *munajjims* at the time and discuss the extent of the role of the *madrassa* and mosque in the instruction of astrologically valid knowledge. The next chapter will scrutinize the dynamics of courtly patronage and examine the impact of the office of court *munajjims* upon the pedagogical needs and professional careers of practitioners.

Although these questions may signal that these two chapters will be descriptive narratives instead of historical ones, these points should rather be regarded as themes to be followed to unveil the particular context of the Ottoman world in the late fifteenth and the first half of the sixteenth century with an eye toward tracking the special case of *munajjims*. The significance of the period derives from the fact that it marks a turning point not only for the appropriation and subsequent codification in the Ottoman world of the post-thirteenth century astral tradition of the Persianate East but also for the growing systematization of the patronage of astral expertise through the institutionalization of the permanent office of court *munajjims*. While the initial attempts of Mehmed II (r. 1444-46 and 1451-81) played a definite role in the process, the lion's

⁴ Although I have not come across any reference to a female *munajjim* in Ottoman sources, there were known female *munajjims* in the Islamic realm, the most famous of whom was *al-Bībī al-munajjima*, the mother of the thirteenth-century chronicler Ibn Bībī and a working astrologer at the court of Jalāl al-Dīn Khwārazm-shāh (r. 1220-1231). See Sara Kuehn, *The Dragon in Medieval East Christian and Islamic Art* (Leiden: Brill, 2011), 135.

share of the credit should go to Bāyezīd II (r. 1481-1512), whose keen interest in learning and cultivating different forms of celestial knowledge facilitated the adoption of the necessary technical know-how and the institutionalization of the patronage of *munajjims*. The scope and impact of Bāyezīd II's patronage will be discussed in detail in the next chapter.

II. 2. State of the Field and the Problems of Terminology

It is a challenging task to accurately translate the term *munajjim* into English. The difficulty derives from discrepancies between the connotations of the term in past sources and modern scholarship. As already implied in Pīrī Reis's curious use of the word to describe Columbus, the category of *munajjim* referred to a profession that is much more inclusive than that rendered by the modern term "astrologer." The expertise of *munajjims* not only consisted of astrology but might have also entailed mastery over other implications of celestial knowledge, including cosmography, geography, navigation, time reckoning, and calendar conversion. It is true that in the medieval Islamic world there were other types of nomenclature reflecting further specializations in the broader discipline of celestial knowledge such as the category of *muwaqqit*, which, especially from the thirteenth century onwards, came to denote the timekeeper at the grand Friday mosques.⁵ Moreover, not all individuals conversant in the theoretical iterations of celestial knowledge were eager to practice astrology. In that regard, modern scholars, especially those studying the history of scientific tradition in the Islamic world, are often confounded in

⁵ David King, "On the role of the *muezzin* and the *muwaqqit* in Medieval Islamic Society," in *Tradition, Transmission, Transformation: Proceedings of two conferences on Pre-modern Science held at the University of Oklahoma*, ed. by F. Jamil Ragep and Sally Ragep (Leiden: Brill, 1996), 285-346; *idem.*, "Mamluk astronomy and the institution of the *muwaqqit*," in *The Mamluks in Egyptian politics and society*, ed. by Thomas Philipp and Ulrich Haarmann (Cambridge University Press, 1998), 153-162.

choosing the best title to identify the past experts of celestial knowledge.

What sort of label should we use to describe, for instance, Naṣīr al-Dīn Ṭūsī or Wābkanawī (known in his own time as *shams al-munajjim*), whose scholarly activities were also informed by astrological purposes as we have already seen in the first chapter? The use of “astronomer” does not always solve the problem, for it is indeed a loaded term, deliberately employed in the history-of-science tradition in the Islamic context to carefully detach astrological constituents from the “rational” scientific enterprises of individuals so described. The use of “astrologer” also does not do much justice, given the widespread modern pejorative meanings attached to it, ranging from soothsayer and diviner to quack, calling to mind as it does fortune tellers with no particular qualifications. Take, for instance, the case of the prominent historian of science George Saliba, whose invaluable works on different aspects of theoretical and practical celestial knowledge in pre-modern Islamicate culture have opened new vistas for research. For Saliba, figures like Muḥyī al-Dīn al-Maghribī (d. 1283) or Naṣīr al-Dīn Ṭūsī, who never shied away from following astrological pursuits and who explicitly mentioned the astrological uses of their scholarship even in their strictly astronomical works like *Talkhīṣ-i Majisti* or *Zīj-i Īlkhānī*, still can not be defined simply as “astrologers,” lest the word “astrologer” belittle their scientific values and contributions.⁶ In a similar vein, in the eyes of Saliba and many others, an erudite medieval practitioner of astrology, who was able to make complex mathematical calculations on the basis of astronomical tables and use of instruments, does not qualify as an “astronomer” unless he engaged in the production of texts that may be qualified as

⁶ See for instance: George Saliba, “An Observational Notebook of a Thirteenth-Century Astronomer,” *Isis* 74/3 (1983), 388-401; *idem.*, “Horoscopes and Planetary Theory: Ilkhanid Patronage of Astronomers,” in *Beyond the Legacy of Genghis Khan*, ed. by Linda Komaroff (Leiden: Brill, 2006), 357-368.

“astronomical.”

In order to bypass these terminological problems and attempt to convey a sense of the historical implications of the vocabulary, I will employ the original terms as used in primary sources without translation. From the outset, the readers are advised that the category of *munajjim* as used throughout this dissertation specifically refers to learned experts in mathematical celestial knowledge who were evidently engaged in astrological activity. While the term *munajjim* was also used, as we have already seen in the first chapter, in the polemical literature of non-astral experts to designate unqualified street astrologers or quacks, I should reiterate that my use throughout gives precedence to the practice of learned mathematical astrology.

The social history of *munajjims* in medieval and early-modern Muslim society has been explored so far in a handful of studies. The most well-known of these modern examinations, George Saliba’s oft-cited article “The Role of the Astrologer in Medieval Islamic Society,” discusses the complex role of astrologer in medieval society by relying upon anecdotal biographical and literary sources as well as visual materials.⁷ Reflecting his perspective in another influential article on the definitive separation of *ilm al-hay’a* and *ilm aḥkām al-nujūm*, Saliba’s use of the category of *munajjim* is rather slanted toward a kind of lay practitioner who performed astrology with little or no knowledge of the “scientific” technicalities of celestial knowledge.⁸ Although Saliba acknowledges *munajjims*’ use of astronomical tables and other

⁷ George Saliba, “The Role of the Astrologer in Medieval Islamic Society,” *Bulletin d’études orientales* 44 (1992), 45-67.

⁸ See Saliba, “Astronomy and Astrology in medieval Arabic thought,” in *Les doctrines de la science de l’antiquité à l’âge classique*, ed. Roshdi Rashed and Joël Biard (Leuven: Peeters,

instruments, his study does not primarily discuss the scientific background of astrological practice.

Saliba's survey of the social status and role of astrologers in medieval Islamic society was later expanded by more focused examinations of *munajjims* in particular historical contexts. Miquel Forcada, for instance, takes the case of *munajjims* in the court of Andalusian Umayyad ruler 'Abd al-Rahman II (r. 822-852) and looks for the potential of prosopographical approach for studying the social status of astrologers.⁹ Like Saliba, Forcada relies upon anecdotal biographical sources and anthologies, but, as he admits, the sources he was able to find present far less on the lives and careers of *munajjims* than he expected. In addition to Forcada, the status of astrologers in the medieval and early-modern Indian courtly context became the subject of several articles by David Pingree, S. Rajeswara Sarma, Eva Orthmann, and most recently by Audrius Beinorius.¹⁰ Besides biographical and narrative sources, Beinorius for instance refers to archival evidence such as land grants given to astral experts for correctly predicting eclipses.

1999), 131-164; *idem.*, "Islamic Astronomy in Context: Attacks on Astrology and the Rise of the *Hay'a* Tradition," *Bullettin of the Royal Institute for Inter-Faith Studies* 4/1 (2002), 25-46.

⁹ Miquel Forcada, "Investigating the sources of prosopography: the case of the astrologers of 'Abd al-Rahman II," *Journal of Medieval Prosopography* 23 (2002), 73-100.

¹⁰ See David Pingree, "Astronomy at the Court of Anūpasimha," in *From Astral Omens to Astrology, From Babylon to Bīkāner* (Roma: Istituto Italiano per L'Africa e L'Oriente, 1997), 91-103; S. R. Sarma, "Jyotisarāja at the Mughal Court," in *Studies on Indian Culture, Science, and Literature: Being Prof. K. V. Sarma felicitation volume presented to him on his 81th birthday*, ed. by N. Gangadharan, S.A.S. Sarma and S.S.R Sarma (Chennai: Sree Sarada Education Society Research Centre, 2000), 363-371; Eva Orthmann, "Circular Motions, Private Pleasure, and Public Prognostication in the Nativities of the Mughal Emperor Akbar," in *Horoscopes and Public Spheres. Essays on the History of Astrology*, ed. by G. Oestmann, H. D. Rutkin and K. von Stuckrad (Berlin: Walter de Gruyter, 2005), 101-114; *idem.*, "Sonne, Mond und Sterne: Kosmologie und Astrologie in der Inszenierung von Herrschaft unter Humayun," in *Die Grenzen der Welt: Arabica et Iranica ad honorem Heinz Gaube*, ed. L. Lorn *et al.* (Wiesbaden, Reichert, 2008), 297-306; Audrius Beinorius, "On the social and religious status of an Indian astrologer at the royal court," *Acta Orientalia Vilnensia* 9/2 (2008): 39-55.

Moreover, both Sarma and Orthmann briefly discuss the office of *jyotiṣarāja* or *joṣirāya*, the Hindu astrologer installed at the Mughal court by Akbar.

The relevant literature is even broader as regards to the courtly patronage of *munajjims* and the services they offered. The early Abbasid court has already been spotlighted by modern scholars for its immense interest in the cultivation of astrological knowledge and patronage of *munajjims*. The works of Dimitri Gutas, David Pingree, and more recently Antoine Borrut, use authentic textual materials composed and/or translated at the time by the practicing experts.¹¹ While Pingree, from the more technical perspective of the history of science, focuses more upon the dimension of textual transmission, Gutas and Borrut have interpreted the early Abbasid support for astrology on political grounds and convincingly demonstrated the deployment of astrological knowledge against the backdrop of the Abbasid political claims and legitimacy issues. Local dynasties, like the Hamdanids in Aleppo in the tenth century, also have received scholarly attention, and a few scholars have remarked upon the services of al-Qabīsī (d. 967), one of the noted and prolific *munajjims* at the court of Sayf al-Dawla (r. 945-967).¹² The Rasulid dynasty in Yemen has also been studied with respect to the interest of several rulers in the

¹¹ Dimitri Gutas, *Greek Thought, Arabic Culture. The Graeco-Arabic Translation Movement in Baghdad and Early 'Abbasid Society (2nd-4th/8th-10th centuries)* (London: Routledge, 1998); David Pingree, "Kanaka: An Indian (?) Astrologer at Hārūn al-Rashīd's Court," in *From Astral Omens to Astrology, From Babylon to Bīkāner* (Roma: Istituto Italiano per L'Africa e L'Oriente, 1997), 51-63; Antoine Borrut, "Court Astrologers and Historical Writing in Early Abbasid Baghdad: An Appraisal," in *Contexts of Learning in Baghdad from the 8th-10th Centuries*, ed. J. Scheiner and Damien Janos (Princeton: The Darwin Press, 2014), 455-501.

¹² Anne Regourd, "L'Épître ayant pour objet la mise à l'épreuve de ceux qui n'ont d'astrologue que le nom d'al-Qabīsī (IVE/Xe s.)," *Politica Hermetica* 17 (2003), 24-53; Charles Burnett, "Al-Qabīsī's Introduction to Astrology: From Courtly Entertainment to University Textbook," in *Studies in the History of Culture and Science: a Tribute to Gad Freudenthal*, ed. R. Fontaine et al. (Leiden: Brill, 2011), 43-69.

Al-Qabīsī's discussion here of what constitutes a true *munajjim* also points to the need of knowing the mathematical and technical intricacies of the craft.

services and expertise of *munajjims*.¹³ One important aspect of the Rasulid period was the personal investment of some of its rulers in studying different branches and genres of celestial knowledge. In the Andalusian and North African context, in addition to Forcada's study cited above, Julio Samsó's works have shed light upon the production and uses of different genres of celestial knowledge in the courtly context.¹⁴ Sonja Brentjes has published important survey studies on the cultivation of mathematical and ancient sciences (*al-'ulūm al-awā'il*) in late-medieval Islamic courtly culture, though her studies are not particularly informed by the cases of *munajjims*.¹⁵ Thomas Allsen's work on the cultural life under the Mongols also touches upon the cultivation of astral sciences at the court of Ilkhanid rulers and discusses the extent of cross-cultural scientific exchanges between Iranian and Chinese realms.¹⁶ Several Turkish-speaking scholars have documented the presence of *munajjims* at the courts of post-Mongol Turko-Persian dynasties, including the Ilkhanids, Rum Saljuqs, and Aqquyunlus on the basis of mere anecdotal

¹³ Daniel Martin Varisco, *Medieval Agriculture and Islamic Science: the Almanac of a Yemeni Sultan* (Seattle: University of Washington Press, 1994); Petra Schmidl, "Magic and Medicine in a 13th-century Treatise on the Science of the Stars. The *Kitāb al-Tabṣira fī 'ilm al-nujūm* of the Rasulid Sultan al-Ashraf 'Umar," in *Herbal Medicine in Yemen. Traditional Knowledge and Practice and Their Value for Today's World*, ed. Ingrid Hehmeyer and Hanne Schonig (Leiden: Brill, 2012), 43-68.

¹⁴ Julio Samsó, "The Early Development of Astrology in al-Andalus," *Journal for the History of Arabic Science* 3 (1979), 228-43; *idem.*, "Astrology in Morocco towards the end of the Fourteenth Century and the Beginning of the Fifteenth Century," in *From Māshā'allāh to Kepler: Theory and Practice in Medieval and Renaissance Astrology*, ed. Charles Burnett and Dorian Gieseler Greenbaum (Ceredigion, Wales: Sophia Centre Press, 2015), 407-424.

¹⁵ In addition to her work cited above, see "Patronage of the mathematical sciences in Islamic societies: structure and rhetoric, identities, and outcomes," in *The Oxford Handbook of the History of Mathematics*, ed. Eleanor Robson and Jackie Stedall (Oxford: Oxford University Press, 2008), 301-28; *idem.*, "Ayyubid Princes and their Scholarly Clients from the Ancient Sciences," in *Court Cultures in the Muslim World: Seventh to Nineteenth Centuries*, ed. Albrecht Fuess and Jan-Peter Hartung (London: Routledge, 2010), 326-56.

¹⁶ Thomas T. Allsen, *Culture and Conquest in Mongol Eurasia* (New York: Cambridge University Press, 2011), esp. 161-175 and 203-207.

evidence gleaned from chronicles and historical narratives.¹⁷ Timurids, particularly the court of Mīrzā Iskandar b. ‘Umar Shaykh (d. 1415), have received a remarkable amount of scholarly attention, especially by art historians, thanks to his surviving illuminated horoscope, but I should note here that the genuine celestial and other scientific activities at his court have yet to be thoroughly examined.¹⁸ The court of Sultan Ḥusayn Bayqara has also been briefly discussed in the context of an astrological compendium, *Lavāyih al-Qamar*, compiled by Ḥusayn Vā‘iz-i Kāshifī (d. 1505) at the request of Husayn Bayqara’s grand vizier.¹⁹ Sayılı’s seminal work on observatories in Islamic history tries to depict the role of courtly patronage at the time of the

¹⁷ Kazım Paydaş, “Ak-koyunlu Devlet Teşkilatı” (Ph.D. Dissertation, Ankara University, 2003), 174-6; Osman Turan, *Türkiye Selçukluları Hakkında Resmi Vesikalar: Metin, Tercüme ve Araştırmalar* (Ankara: TTK, 1958); Tülay Metin, “Selçuklular Zamanında Müneccimliğe Dair Bazı Tespitler,” *International Journal of History Studies* 6/3 (2014), 239-252; Mustafa Uyar, “İlhanlı (İran Moğolları) Ordularının Savaş Öncesinde Yaptığı Stratejik Hazırlıklar ve Savaş Sırasında Yaptıkları Hileler,” *Gazi Eğitim Fakültesi Dergisi* 29/4 (2009), 440.

¹⁸ See Zeren Akalay, “An Illustrated Astrological Work of the Period of Iskandar Sultān,” in *Akten des VII. Internationalen Kongresses iranische Kunst und Archäologie, 7-10 September 1976* (Berlin: Dietrich Verlag, 1976), 418-425; Laurence P. Elwell-Sutton, “A Royal Tīmūrid Nativity Book,” in *Logos Islamikos: Studia Islamica in Honorem Georgii Michaelis Wickens*, ed. Roger M. Savory and Dionisius A. Agius (Toronto: Pontifical Institute of Mediaeval Studies, c1984), 119-134; Fateme Keshaverz, “The Horoscope of Iskandar Sultan,” *Journal of Royal Asiatic Society* 2 (1984), 197-208; Sergei Tourkin, “Iskandar-sultan und sein Geburtsbuch,” in *Orakel. Der Blick in die Zukunft. Ausstellungskatalog Museum Rietberg Zürich*, ed. A. Langer and A. Lutz (Zürich, 1999), 180-189; *idem.*, “Medical Astrology in the Horoscope of Iskandar Sultan,” in *Sciences, Techniques et Instruments dans le Monde Iranien*, ed. N. Poujarvady and Z. Vesel, (Teheran: IFRI, 2004), 105-109; Anna Caiozzo, “The Horoscope of Iskandar Sultān as a Cosmological Vision in the Islamic World,” in *Horoscopes and Public Spheres: Essays on the History of Astrology*, 115-144. For the occultist interests of Mīrzā Iskandar, see Jean Aubin, “Le mécénat timouride à Chiraz,” *Studia Islamica* 8 (1957), 71-88; Evrim Binbaş, “Timurid Experimentation with Eschatological Absolutism: Mīrzā Iskandar, Shāh Ni‘matullāh Walī, and Sayyid Sharīf Jurjānī in 815/1412,” in *Unity in Diversity: Mysticism, Messianism and the Construction of Religious Authority in Islam*, ed. Orkhan Mir-Kasimov (Leiden: Brill, 2014), 277-306, especially 290-293 for the discussion of the *Dībācha* of Jāmi‘ al-sultānī, a book on astronomy attributed to Mīrzā Iskandar.

¹⁹ Sergei Tourkin and Živa Vesel, “The Contribution of Husayn Vā‘iz-i Kashifī to the Transmission of Astrological Texts,” *Iranian Studies* 36/4 (2003), 589-599.

Ilkhanids, Timurids, and the late-sixteenth century Ottomans, but since his primary concern was to demonstrate the mathematical and astronomical achievements attained at the observatories, his discussion on the courtly patronage of *munajjims* in the post-thirteenth century Turko-Persian zone is rather limited.²⁰ Salim Aydüz's work in Turkish on the office of *müneccimbaşı* in the Ottoman context still remains the most comprehensive study on the history of court *munajjims*, producing a detailed and useful list of names employed as court *munajjims* throughout the entire course of Ottoman history.²¹ However, the vast scope of his study (from the sixteenth to the early twentieth century) inevitably led to omissions, including some of *munajjims* active at the late fifteenth- and early sixteenth-century Ottoman court. Moreover, his insistence on the term *müneccimbaşı* is not always historically accurate, especially for the period prior to the mid-sixteenth century. Last but not least, Aydüz pays no attention to the original writings of *munajjims*, nor the books they potentially read, which makes it difficult to accurately reconstruct through his study the intellectual and scientific trajectories of practicing experts. One may also consider consulting Avner Ben Zaken's study on the courtly context of astrological production in the late sixteenth- and seventeenth-century Ottoman context, though the scope of his scholarship does not particularly cover the issues that are central to this chapter.²² One should include Gülçin

²⁰ Aydın Sayılı, *The Observatory in Islam and its Place in the General History of the Observatory* (Ankara: TTK, 1960).

²¹ Salim Aydüz, "Osmanlı Devleti'nde Müneccimbaşılik Müessesesi," *Bellekten* 70 no. 257 (2006), 167-264 [based upon his MA Thesis, "Osmanlı Devleti'nde Müneccimbaşılik ve Müneccimbaşılar," (Istanbul University, 1993)].

²² See Avner Ben-Zaken, "The Heavens of the Sky and the Heavens of the Heart: The Ottoman Cultural Context for the Introduction of Post-Copernican Astronomy," *British Society for the History of Science* 37/1 (2004), 1-28; *idem.*, *Cross-Cultural Scientific Exchanges in the Eastern Mediterranean, 1560-1660* (Baltimore: Johns Hopkins University Press, 2010), esp. Chapter 1 on the social and political context in which Taqī al-Dīn functioned. There are, however,

Tunali's studies on a mid-nineteenth century Ottoman court *munajjim*, whose surviving notes greatly help us understand the quotidian concerns of an astral expert.²³ Finally, Stephen Blake has published a derivative account of the services of *munajjims* in three early modern Muslim empires, the Safavids, Ottomans, and Mughals.²⁴ While Blake's study is based almost entirely upon previous secondary literature with no or very little original contribution, his emphasis upon the computation of time as the broader field of expertise of *munajjims* is worth mentioning.

As is evident from this general overview, the literature on the social and cultural history of *munajjims* in the medieval and early-modern Islamic context draws exclusively on anecdotal evidence extracted from contemporary narrative sources. In dearth of surviving textual materials composed by *munajjims* themselves and related archival documents, these narrative sources are sometimes the only means to understand and reconstruct the entangled social environment in which *munajjims* functioned. However, modern scholars should not forget the fact that anecdotes about *munajjims* were also imbued with a certain didactic tone due mostly to the controversies and polemics over astrology. They may either tend to ridicule *munajjims* through narrating their failures or overstate the significance of their service by underlining their accurate calculations and correct judgments. Therefore, for a more nuanced and balanced picture of the history of *munajjims* in a given historical context, the writings of astral experts in diverse branches of knowledge—celestial and otherwise—should be taken into consideration. Thereby one may find

numerous problems in Ben-Zaken's handling of sources, which Sonja Brentjes and Max Lejbowicz detail in their review in *Aestimatio* vol. 10 (2013), 1-24.

²³ Gülçin Tunali, "An Ottoman Astrologer at Work: Sadullah el-Ankaravi and the Everyday Practice of Ilm-i Nücum," in *Les Ottomans et le temps*, ed. François Georgeon and Frédéric Hitzel (Leiden: Brill, 2012), 39-60; *idem.*, "Osmanlı Siyaset Kültürünü Anlamada Kaynak Olarak İlm-i Nücûm: Sadullah el-Ankaravî," *TALİD* 2/1 (2004), 183-195.

²⁴ Stephen Blake, *Time in early modern Islam: Calendar, Ceremony, and Chronology in the Safavid, Mughal, and Ottoman Empires* (New York: Cambridge University Press, 2013).

the opportunity to describe more accurately the intellectual and scientific basis of their practice, the sources and authoritative texts they utilized, and the personal and social issues involved in their training and professional service.

II. 3. What did a *Munajjim* Need to Know?

As mentioned in the above discussion of the secondary literature regarding the history of *munajjims* in medieval and early modern Islamic world, modern scholars put emphasis on the broader social contexts as well as restraints in which *munajjims* had to operate. The services *munajjims* provided, their clientele, and the cultural and religious objections they confronted get the lion's share of attention, whereas the scientific constituents of their practice are seldom regarded as a valid object of inquiry. This indifference in the secondary literature is categorically tied to modern widespread assumptions as to the futility of *munajjims* as a social category and the insignificance of their field of expertise. As a natural corollary to the general lack of interest in what the *munajjims*' expertise really entailed, there is no serious investigation on how they practiced their business.

I will start with delineating the required body of knowledge that those *munajjims* serving the late-fifteenth and early-sixteenth century Ottoman court needed to know. By looking at the contents of their own writings, foremost among which are almanac-prognostications (*taqwīm*) and horoscopes, and extracting scholarly references therefrom, I will first lay the necessary groundwork and prepare a comprehensive list of authoritative texts heavily quoted by the

Ottoman *munajjims* of the time.²⁵ I believe it is important to establish such a descriptive list from the very outset to familiarize readers with the titles and brief descriptions of the books that will occasionally be referred to throughout.

The inventory of texts appealed to by *munajjims* in the Ottoman world of the late-fifteenth and the first half of the sixteenth century includes: i) strictly astrological textbooks where one might find standard rules and basic astrological principles on the nature and characteristics of planets, signs of the zodiac, and certain celestial degrees, as well as specific techniques in different branches of astrological practice; ii) other types of works that are often defined in the literature as “astronomical” or “mathematical” such as the *zīj* literature (astronomical handbooks of tables) or treatises on the use of astronomical instruments, all of which naturally cover information crucial for astrological practice. As will be discussed in greater detail below, *zīj*es stood as the number one item in the paraphernalia of a practicing *munajjim*, for they provided, like a medieval version of a modern computer software, the necessary data and parameters for determining in mathematical terms the celestial configuration in a given time for a specific location, which constituted the crux of astrological practice.

This detailed sketch of the intellectual framework will be followed by a discussion on practicing *munajjims*' social environment, in which they received their training. The major question that will be tackled is the role of institutional structures such as the *madrassa*, mosque, and, most importantly, the court in the production, study, and circulation of astrologically valid knowledge. While the focus will be upon the gradual establishment of the office of court *munajjims* in the Ottoman bureaucratic structure that contributed to the institutionalization of

²⁵ By “Ottoman” *munajjims*, I refer to those astral experts serving the Ottoman courts, regardless of their ethno-religious backgrounds.

astral instruction from the late fifteenth century onwards, I will try to assess the extent to which astrological production and consumption penetrated into more traditional institutional settings like the *madrassa* and/or mosque. I believe the discussion here on Ottoman *munajjims* will also be useful for scholars elsewhere in Islamic studies, grappling with questions about the social and cultural history of knowledge in the medieval and early-modern periods.

The rich amount of surviving Ottoman astrological materials, particularly the annual almanac-prognostications (*taqwīm*) and partially the occasional horoscopes, which I will treat in greater detail in chapter four and five, enables us to track the scholarly references of contemporary astral experts. The *taqwīm* genre in particular, with its numerous extant examples, helps us chart in a systematic fashion, and even on a yearly basis, the changing scientific horizons and intellectual trends among practicing Ottoman *munajjims*. The preparation of these texts required the astral expert's making detailed mathematical and astronomical computations of the celestial positions at the exact moment of the year-transfer, necessary for deriving astrological judgments. For that purpose, a well-trained *munajjim* needed to be knowledgeable in two specific genres: i) a valid *zīj* to calculate the celestial positions in a given time for a given locality (i.e., the moment of the year-transfer or birth, or any other occasion for which a horoscope was to be cast), and ii) a working astrological textbook that describes the dispositions of planets and signs as well as the indications of celestial positions. Having an astronomical instrument that would help the practicing *munajjim* determine the required celestial positions more swiftly and accurately was optional, for it might have been unaffordable for many a

practitioner.²⁶ There is no need here to discuss in greater detail the significance of *handasa* (geometry), *ḥisāb* (arithmetic), and especially the *hay'a* texts that constitute the necessary groundwork for any serious astral endeavor. The erudite practitioners of mathematical astrology, which correspond to my own definition of *munajjim* in this dissertation, could easily be assumed as learned individuals in all branches of the *al-'ulūm al-riyādiyya*. Yet being an arduous student of *hay'a* texts does not always make one a *munajjim*, not because those who were conversant in *'ilm al-hay'a* were unable to make astrological calculations, but because many a time some of them remained aloof from the interpretive astrological practice. For instance among those ten groups that Abū Ma'shar criticizes on account of their negative perceptions of astrology, one particular group was composed of learned people, who studied the heavens (*qawm nazarū fī al-'ilm al-kullī, a'nī fī 'ilm al-aflāk wa-ḥālātihā*) but who believed that “the planets have no indications for the things that come to be in this world.”²⁷

One of the striking aspects of the surviving Ottoman *taqwīms* is that the *munajjims* usually cite which particular *zīj* they consulted to make their celestial calculations before casting and interpreting their annual or occasional horoscopes. A close examination of the *zīj*es explicitly quoted in the extant fifteenth- and sixteenth-century *taqwīms* clearly reveals that the three *zīj*es most preferred in the Ottoman milieu up until the 1570s were produced in the post-thirteenth

²⁶ In expressing the urgency of the patronage of rulers, *munajjims* often refer to the financial difficulty of possessing large astronomical instruments without the support of the sovereigns. See for instance Rukn al-Āmulī's *Panjāh Bāb* or the *Risāle-i tūsimāt* attributed to Ibn Kemāl, already discussed in the first chapter.

On the use of instruments for astrological purposes, in addition to Josep Casulleras's work cited above, also see: Josefina Rodrigues Arribas, “Medieval Jews and Medieval Astrolabes: Where, Why, How, and What for?” in *Time, Astronomy, and Calendars in the Jewish Tradition*, ed. Sacha Stern and Charles Burnett (Leiden: Brill, 2013), 221-272.

²⁷ Quoted in George Saliba, “Islamic Astronomy in Context: Attacks on Astrology and the Rise of the *Hay'a Tradition*,” 31.

century Persianate East as the fruits of systematic observation programs: the Ilkhanid tables (*Zīj-i Īlkhānī*) of Naṣīr al-Dīn Ṭūsī, the Testified Ilkhanid tables (*Zīj al-muḥaqqaq al-sultānī*) of Shams al-Dīn Muḥammad Wābkanawī, and the Ulugh Beg tables (*Zīj-i Jadīd-i Gurgānī* or *Zīj-i Ulugh Beg*).²⁸

We have a limited number of surviving *taqwīms* survived from the pre-1490s and those extant ones rarely cite the name of the *zīj* utilized. Among approximately ten *taqwīms* from the period that have fully or partially come down to us, only two of them have explicit references to a specific *zīj*. The *taqwīms* of the years 1438 and 1468 cite *al-Zīj al-Shāmil* that Edward Kennedy defines in his comprehensive list of astronomical tables as an anonymous work, though the author has greatly adopted the parameters of Abū al-Wafā' al-Būzjānī (d. ca. 970) and his collaborators in the *al-Zīj al-Wāḍih*.²⁹ From 1489 to 1510 we have around 30 *taqwīms*, and based upon the evidence gleaned from these texts, Shams al-Dīn Wābkanawī's "Testified Ilkhanid tables" (*Zīj al-muḥaqqaq al-sultānī*) seems to have dominated the contemporary setting, as 16 out of 30 *taqwīms* from the period were based upon it.³⁰ Nine *taqwīms* at the time made use of the Ulugh Beg tables, and only two of them preferred the original Ilkhanid tables. Among the remaining three *taqwīms* from the period, two of them do not specify the *zīj* they used but the *taqwīm* produced in the year 1489 by Khiṭābī, about whom more details will be provided in chapter three, was compiled on the basis of his own master Rukn al-Dīn Āmulī's *Zīj-i Jāmi* '-i

²⁸ According to Aydın Sayılı, after Ṭūsī's death in 1274, the astral experts at the Maragha Observatory, including Aṣīl al-dīn Ḥasan, kept working on the new editions of the *Zīj-i Īlkhānī*. Therefore, some of the *zīj*es cited in the Ottoman *taqwīms* as the *Zīj-i muḥaqqaq-i Īlkhānī* might be indeed referring to the different editions of the Ilkhanid tables rather than Wābkanawī's work.

²⁹ Edward S. Kennedy, "A Survey of Islamic Astronomical Tables," *Transactions of the American Philosophical Society*, New Series, 46/2 (1956), 129.

³⁰ See fn. 26.

Sa‘īdī.³¹

From the 1510s until the late-sixteenth century—when the most famed Ottoman astral expert of all times, Taqī al-dīn prepared novel tables on the basis of a limited observation program in the newly established Istanbul observatory— practicing Ottoman *munajjims* almost exclusively utilized and cited the Ulugh Beg tables.³² According to the data extracted from surviving copies of *taqwīms*, around thirty-seven extant copies descended from the period 1511 and 1588, twenty-three of them were evidently compiled on the basis of the Ulugh Beg tables, whereas Wābkanawī’s tables were favored only by five. The earliest reference to the data produced in the brief life of the Istanbul observatory by Taqī al-dīn and his collaborators is in the *taqwīm* produced for the year 1573. As the reference to this *zīj* reads (“*Zīc-i cedīd-i muḥakkaḳ-ı mudakkaḳ-ı Sa‘deddīnī*”), the entire project seems to have been referred to at the time by the name of its primary patron, Sa‘deddīn, the private mentor of sultan Murād III (r. 1574-1595).³³

As discussed in greater detail in the first chapter, the available literature on the *zījes* has barely discussed the practical astrological purposes to which the tables were put. Although leading historians of science like Edward Kennedy and David King definitely point in their

³¹ More information on Kḥiṭābī is available in chapter 3.

³² For the observation program conducted and the *zījes* produced by Taqī al-Dīn and his collaborators in the Istanbul observatory that could operate only for a few years in the 1570s, see Sayılı, “Alaaddin Mansur’un İstanbul Rasathanesi Hakkındaki Şiirleri,” *Bellekten* 20 (1956), 411-84; *idem.*, *The Observatory in Islam*, 289-305; Sevim Tekeli, “Meçhul bir Yazarın İstanbul Rasathanesinin Âletlerinin Tasvirini Veren Âlât-ı Rasadiye li Zīc-i Şehinşahiye adlı makalesi,” *Araştırma* 1 (1963), 71-122; Süheyl Ünver, *İstanbul Rasathanesi* (Ankara: TTK, 1969); Remzi Demir, *Takiyüddin’de Matematik ve Astronomi: Ceridetü’l-dürer ve haridetü’l-fiker üzerine bir İnceleme* (Ankara: Atatürk Kültür Merkezi Başkanlığı, 2000); Mustafa Kaçar, M. Şinasi Acar ve Atilla Bir (ed.), *XVI. Yüzyıl Astronomu Takiyüddin’in Gözlem Araçları* (İstanbul: İş Bankası Kültür Yayınları, 2011).

³³ According to *Shahinshāhnāme* of Seyyid Loḳmān, urād III’s court historiographer’ Taqī al-dīn’s request to build an observatory and thus revise available celestial data was brought to the attention of the sultan by none other than Sa‘deddīn. See Sayılı, *The Observatory in Islam*, 291.

studies to the contents of *zīj*es that are particularly related to astrological practice, they cannot help but say “there is precious little evidence how these works were used in practice.”³⁴ In this regard, the surviving Ottoman *taqwīms* provide that “precious little evidence” on the deployment of *zīj*es for astrological purposes.

It is, however, difficult for a non-historian of science to fully reconstruct the ways *munajjims* deployed *zīj*es when they made necessary celestial calculations for computing the horoscope of a given time for a given locality. While it is obvious that practicing *munajjims* had to consult the tables that tabulate the detailed celestial data and parameters for the mean motions of planets in sexagesimal numbers, they do not go into the essential details about the particularities of this operation in their writings.³⁵ The standard phrase they use in the surviving *taqwīms* reads that they “computed” (*istikhrāj*) the planetary positions at the time (of the year-transfer) according to a certain *zīj* (*bi-mūjab-i zīj-i...*). The explicit reference to the *zīj* is also repeated in the section where the *munajjim* calculates the solar and/or lunar eclipse that he expects to occur in the upcoming year.

In his yet-unpublished study on the mathematics of Islamic astrology, Benno Van Dalen

³⁴ David A. King, Julio Samsó, Bernard R. Goldstein, “Astronomical Handbooks and Tables from the Islamic World (750-1900): an Interim Report,” *Suhayl: International Journal for the History of the Exact and Natural Sciences in Islamic Civilisation* 2 (2001), 9-105.

³⁵ Anthropological studies on the working methods of modern practicing astrologers also reveal that there are two distinct phases in their operation, one technical and the other interpretive. While they use certain tools and methods to make necessary calculations, they say that when it comes to interpreting the chart of the querent, certain metaphysical issues are at stake. As one of the interviewed astrologers says, “much of what we do for a client has nothing to do with the specific configuration we are looking at, but rather, with the fact that the chart, and ultimately God or gods through the patterns of the chart, affirms the right of the person to be what he or she is.” See Darrelyn Gunzburg, “How do Astrologers Read Charts?” in *Astrologies: Plurality and Diversity*, ed. by Nicholas Campion and Liz Greene (Ceredigion: Sophia Centre Press, University of Wales, 2011), 181-200.

outlines the methods by which *munajjims* in the Islamic past could compute the planetary positions and data in horoscopes.³⁶ As Van Dalen demonstrates, the computation of the true longitudes of planets (*taqwīm al-kawākib*) lies at the center of every astrological activity. In order to calculate the longitudes of planets at the desired moment, *munajjims* had to consult the tables in *zīj*es for the mean motions and equations of each planet. These equations are complex trigonometric functions and their calculation requires frequent recourse to sine tables, multiplication, and division. Apart from computing the true longitudes of planets, another crucial method used for astrological calculations was computing the position of the ascendant (*tāli*‘, pl. *tāwāli*‘) at a given time. According to Van Dalen’s study, *munajjims* often used the oblique ascension functions (*maṭāli*‘ *al-burūj*) to calculate the ascendant. While many *zīj*es include *maṭāli*‘ *al-burūj* tables, the treatises on some astronomical instruments also provide information on how to calculate these oblique ascension functions as a step toward computing the ascendant. After the degree of the ascendant is determined, which also marks the beginning of the First astrological house (Arabic: *bayt*, pl. *buyūt*; Persian: *khāna*), the Seventh—immediately opposite one—is also established as the Descendant. Then are determined the other two “pivots” (*waṭad*), the upper Mid-Heaven (the Medium Coeli, or literally the middle of the sky) and the lower Mid-Heaven (the Imum Coeli), former corresponding to the tenth house and the latter the fourth house.

Once all the twelve astrological houses are determined, the horoscope becomes ready to be interpreted astrologically. Each astrological house is associated with certain aspects of life.

³⁶ See Benno Van Dalen, “An Introduction to the Mathematics of Islamic Astronomy and Astrology” (Unpublished paper). I am grateful to Benno Van Dalen for sharing his unpublished work with me.

The first House is associated with the personality and demeanour of the native (or the individual for whom a horoscope is cast), the second describes material goods and financial matters, the third concerns the siblings and short trips, and so on. The houses are not only influenced by the Signs passing through them, but also by the planets associated with each sign through a complex system of Lords/Rulers (*ṣāhib*), Exaltations (*sharaf*), Terms (*ḥadd*), Triplicities (*muthallatha*), or Decans (*Wajh*).³⁷ These parameters can also be determined from astrological tables.

We should note here that not all extant *zījes* that Kennedy, King, Samsó, and Van Dalen surveyed were products of detailed and systematic observation programs conducted in observatories. Therefore they were not identical in terms of their scope, precision, number of tables and parameters. However, the accuracy of the celestial data and planetary parameters like the mean motions of planets is intimately related to the quality and scope of the observational program preceding the preparation of tables. To update and correct imprecise celestial data and parameters was always the stated reason for the construction of a new observatory that would ideally house more sizeable instruments and conduct a longer observation program. Precision was evaluated at the time based upon the greater size of the tools, and a thirty-year observation program was deemed required for a fuller assessment and computation of the motions of planets. Practicing *munajjims* often confronted inconsistencies between the calculated times of certain phenomenon such as eclipses or conjunctions, and personally observed values. Such discrepancies prompted new generations of astral experts to run a more accurate observational program with the financial support of the ruling elites. The history of making and unmaking of observatories in the post-thirteenth century Turko-Persian politico-cultural context presents a

³⁷ Laurence Elwell-Sutton (ed.), *The Horoscope of Asadullāh Mīrzā: A Specimen of Nineteenth-Century Persian Astrology*, tr. and ed. by L. P. Elwell-Sutton (Leiden: Brill, 1977), 57-59.

perfect picture of the real functions of observatories vis-à-vis the professional needs of professional *munajjims* to improve available planetary data. To better understand and substantiate the problems underlying the inaccurate celestial data, it is worth quoting fully here Wābkanawī's criticism of the *Zīj-i Ilkhānī*:

“Therefore, the positions of planets calculated on the basis of the *zīj*es which are fashionable and current among people in this day do not agree with the observed positions of the planets. Because (in the case of) those great men who constructed those Tables, despite their perfect knowledge and abundant properties and the order of the king, their life failed them to attempt to complete (i.e. they died before completing) those important affairs. For this reason, as the occasion arose, they appealed to (the results of) the old observations; and in the course of time, those necessary fractions added up to integers. And (as a result), notable divergences in the positions of the planets have appeared to such an extent that in the case of the conjunctions of the two superior planets (i.e. Jupiter and Saturn)—on which the world's commandments depend, at the two times when they were in conjunction with each other, some obvious divergences were observed. For example, in the year 684 H [1285 in Common Era], the conjunction took place in the ninth degree of Aquarius (9°). The difference between the calculated (time of the conjunction) based on the *zīj* that is the most famous and reliable in these regions as well as in common use among people (i.e. the Ilkhanid Tables) and the (time when it was) observed was close to fifteen days. I mean, according to that *zīj*, the conjunction should have occurred in the ninth hour of daylight on Wednesday, the twentieth (day) of (the month) Shawwāl in that year (19 December 1285), but according to observation, it took place on the night of the fifth day of the month Dhu al-Qa'da (1 January 1286). Again, according to the same *zīj*, in the months of the year 705 H, the conjunction should have taken place at the end of Libra (29°), but according to the observation, it occurred during daylight on Friday, the thirteenth day of the Jumādā al-Ākhir (31 December 1305) in the second degree of Scorpio (2°). There was a difference between the calculated (time) and the observed (time) of about eighteen days, and the degree of conjunction, *juzw-i qirān*, fell under another sign. Since then, around that date, they (i.e. Saturn and Jupiter) formed two other conjunctions, which (the calculations) based on that *zīj* did not predict.”³⁸

³⁸ Quoted in Mohammad Mozaffari's “Wābkanawī's Prediction and Calculations of the Annual Solar Eclipse of 30 January 1283,” *Historia Mathematica* 40 (2013), 239-40.

The *munajjims* active in the late-fifteenth and early-sixteenth century Ottoman milieu seem to have been aware of the problems of the *Zīj-i Īlkhānī*, as they rather preferred the revised tables of Wābkanawī before they eventually opted for the Ulugh Beg tables. But even the Ulugh Beg tables were not free from deficiencies, and throughout the sixteenth century certain practicing astral experts appealed to the court and attempted to persuade the reigning sultans to establish an observatory. The talismanic treatise attributed to Ibn Kemāl, mentioned in the first chapter, clearly reveals that long before Taqī al-dīn approached Murād III (r. 1574-1595) and his chief adviser Sa‘deddīn in the late sixteenth century, some of the practitioners issued demands for a systematic observational program in the Ottoman capital to correct the available planetary data.³⁹

Besides the ability to extract the necessary celestial data out of *zīj*es, *munajjims* also had to have a sound knowledge of the nature and inclinations of planets, signs, astrological houses, and planetary aspects. Although there were several alternative textbooks and *summae* of astrological principles circulating at the time, the particular texts and names quoted heavily in the Ottoman *taqwīms* and a few surviving horoscopes—whenever there emerges a need to justify a specific celestial indication—could be grouped as follows:

- i) *Kitāb al-thamara* (known in Latin as *Centiloquium*): One hundred astrological aphorisms attributed to Ptolemy but originally composed in Arabic in the early tenth century by a certain Abū Ja‘far Aḥmad b. Yūsuf (d. ca. 944). Later translated into Persian by different parties including Naṣīr al-Dīn Ṭūsī. It is mostly through the Persian

³⁹ SK Esad Efendi Ms. 3782, 89a. See fn. 37 in Chapter 1.

translation of Ṭūsī that the Ottoman *munajjims* adopted the text, though a few experts were able to quote certain aphorisms in the original Arabic.⁴⁰ As the simplified and easily practicable version of Ptolemy's major astrological work *Tetrabiblos*, *Kitāb al-thamara* became a standard textbook for astrological instruction, especially in the fields of birth horoscopes and interrogations.⁴¹

ii) Naṣīr al-Dīn Ṭūsī's *Sī faṣl* or *Mukhtaṣar dar ma'rifat-i taqvīm*: a short textbook in Persian that informs in brief thirty chapters the students and general reading public about the use of sexagesimal numbers, general characteristics of planets, signs, and the indications of planetary aspects. The text was one of the widely copied scientific works of the time, as there is rich manuscript evidence of its circulation in Anatolian and Iranian lands from late thirteenth century onwards. It was translated into Turkish as early as the late fourteenth century by Aḥmed-i Dā'ī (d. later than 1421).⁴² Some of the names from the Fenārī Circle of the early fifteenth-century, such as 'Abdulwājid b. Muḥammad (d. 1435), also wrote commentaries.⁴³

⁴⁰ Richard Lemay, "Origin and Success of the Kitāb Thamara of Abū Ja'far Aḥmad ibn Yūsuf ibn Ibrāhīm," in *Proceedings of the First International Symposium for the History of Arabic Science: April 5-12, 1976*, ed. Ahmad Y. al-Hassan et al. (Aleppo: University of Aleppo, 1978), 91-107. For Ṭūsī's Persian translation of *al-Thamara*, see *Sharḥ-i Samarah-i Baṭlamyūs dar aḥkām-i nujūm*, ed. Khalīl Akhavan Zanjānī (Tehran: Āyīnah-i Mīrās, 1999).

⁴¹ In the eyes of noted intellectual and literary figures in the medieval Islam such as al-Tawḥīdī (d. 1023), *Kitāb al-thamara* is a kind of book all learned men should "absorb themselves in its reading." Quoted in Richard Lemay, "Religion vs Science in Islam. The Medieval Debate around Astrology," *Oriente Moderno* 19/3 (2000), 573.

⁴² Aḥmed-i Dā'ī, *Muhtasar fī ilm el-tencim ve marifet el-takvim (risale-i si faṣl)*, ed. T. N. Gencan and M. Dizer (Istanbul: Boğaziçi Üniversitesi Kandilli Rasathanesi, 1984).

⁴³ *OALT*, v. 1 (Istanbul : İslâm Tarih, Sanat ve Kültür Araştırma Merkezi, 1997), 22-24.

iii) Kūshyār ibn Labbān (d. 1029) and his *Mujmal al-uṣūl fī aḥkām al-nujūm* (*Compendium of Principles in Astrology*, also called *al-Mudkhal fī ṣināʿat aḥkām al-nujūm*): a detailed textbook, imitating Ptolemy's *Tetrabiblos*, teaching in four major chapters (*maqāla*) the fundamental elements of astrology and methods for practicing its different branches such as Genethliology/horoscopic astrology and Catarchic/electional astrology.⁴⁴

iv) Abū Rayḥān al-Bīrūnī and his *Kitāb al-tafhīm li-awāʿil ṣināʿat al-tanjīm* (*Book of Instruction in the Elements of the Art of Astrology*): a compendium of astronomical and astrological knowledge in both Arabic and Persian renditions, necessary for establishing the precise technique and terminology for the practice of judicial astrology.⁴⁵

v) Abū Maʿshar al-Balkhī (d. ca. 886): Ottoman *munajjims* often cite his name in their *taqwīms* and horoscopes, but they do not explicitly quote any of his well-known treatises such as *Kitāb al-mudkhal al-kabīr* (*General Introduction to Astrology*), *Kitāb al-milal wa'l-duwal* (*Book on Religions and Dynasties*), or *Kitāb al-ulūf* (*Book of Thousands*). Nor are these titles available in the library catalog of the Ottoman palace or the inventories of other private collections prepared in sixteenth century.⁴⁶

⁴⁴ Kūshyār ibn Labbān's *Introduction to Astrology*, ed. Michio Yano (Tokyo: Tokyo University of Foreign Studies, 1997).

⁴⁵ al-Bīrūnī, *The Book of Instruction in the Elements of the Art of Astrology*, ed. and tr. Ramsay Wright (London: Luzac & Co., 1934).

⁴⁶ For Abū Maʿshar's biography and works, see David Pingree, "Abū Maʿshar al-Balkhī, Jaʿfar ibn Muḥammad," in *Dictionary of Scientific Biography*, v. 1, 32-39. Many of his extant works have been translated and published as critical editions. See David Pingree, *The Thousands of Abu*

vi) Abū'l-Maḥāmīd b. Mas'ūd al-Ghaznawī (fl. 1170) and his *Kifāyat al-ta'lim fī ṣinā'at al-tanjīm* (*Sufficiency of Learning in the Art of Astrology*): One of the most popular textbooks among the Ottoman *munajjims* which, in the manner of Bīrūnī's *Tafhīm*, brings together in Persian two major bodies (*jins*) of necessary knowledge: 'ilm-i hay'a and 'ilm-i aḥkām. Each body is divided into further chapters and subsections.⁴⁷

vii) 'Alā' al-Dīn 'Alī-Shāh b. Muḥammad b. Qāsim al-Khawārazmī al-Bukhārī and his *Kitāb Aṣmār va Ashjār dar Aḥkām-i Nujūm* (also known as *Thamarat al-shajarah*): composed of five *shajarahs* written in Persian, each touching upon a particular aspect of judicial astrology such as the horoscope of the year transfer (*dar aḥkām-i tāli '-i taḥvīl-i sāl*), horoscope of birth (*dar aḥkām-i tāli 'hā-yi mavlūd*), and special methods for calculating horoscopes.⁴⁸

viii) Shahmardān b. Abī'l-Khayr Rāzī (d. later than 1072) and his *Rawḍat al-munajjimīn*: an extensive introduction in Persian to astrological rules written in fifteen

Mashar (London: Warburg Institute, 1968); *The abbreviation of the Introduction to Astrology together with the medieval Latin translation of Adelard of Bath*, ed. and tr. by Charles Burnett, Keiji Yamamoto, and Michio Yano (Leiden: Brill, 1994); *On Historical Astrology: the Book of Religions and Dynasties (on the great conjunctions)*, ed. by Keijo Yamamoto and Charles Burnett (Leiden: Brill, 2000).

⁴⁷ Not much is known about the life of Ghaznawī. For the copies of the text see C. A. Storey, *Persian Literature: A Bio-Bibliographical Survey*, v. 2, p. 1 (London: Luzac, 1927), 46-47. Ghaznawī says in the introduction to his manual that the aim of his volume is to make readers acquainted with the knowledge on the configuration of the celestial spheres and corresponding astrological indications. British Museum Or. 11630, 1b: “*garāz-i kitāb shinākhtan-i hay'at va aḥkām ast.*”

⁴⁸ For the copies of the text see C. A. Storey, *Persian Literature: A Bio-Bibliographical Survey*, v. 2, p. 1 (London: Luzac, 1927), 62.

maqālas for beginners by a secretary (*dabīr*).⁴⁹

As for those titles on more specific branches of astrology like interrogations (*masā'il*) and elections (*ikhtiyārāt*), one should also mention the *Kitāb al-masā'il* of Ya'qūb b. 'Alī al-Qaṣrānī. Unfortunately not much is known about him, although later sources including Fakhr al-Dīn Rāzī cite him among other astrological authorities from the early Abbasid period, including Abū Ma'shar, 'Umar b. al-Farrukhān al-Ṭabarī (d. 815-6), or Sahl b. Bishr (fl. 821-850).⁵⁰ His compilation on horary astrology (*masā'il*), which aims at treating a wide array of questions of a querent by interpreting the astrological significance of the time that particular question is posed, seems to have been quite popular in the early-modern Ottoman realm. Mīrim Çelebi, one of the most important astral experts in the early sixteenth-century Ottoman world, about whom more information will be provided next chapter, says in his treatise on horary astrology that curious readers should consult Qaṣrānī's compilation for further reading about the topic.⁵¹ In addition to Qaṣrānī, Fakhr al-Dīn Rāzī's influential work on electional astrology, *al-Ikhtiyārāt al-'alā'iyya fī aḥkām al-samāwiyya*, of which Rāzī himself prepared both Arabic and Persian renditions during

⁴⁹ For the copies of the text see C. A. Storey, *Persian Literature: A Bio-Bibliographical Survey*, v. 2, p. 1 (London: Luzac, 1927), 45. See also the facsimile edition: *Rawzat al-munajjimīn*, ed. by Jalīl Akhavan Zanjānī (Tehran: Markaz-i Intishār-i Nusakh-i Khaṭṭī, 1989).

⁵⁰ The canon used by Rāzī consists of the works of Ptolemy, Vettius Valens (d. ca 175), Abū Ma'shar (d. 886), Dorotheus of Sidon (d. ca 75), 'Umar b. al-Farrukhān (d. 815-6), al-Sijzī (d. ca 1020), al-Qaṣrānī, Abū Ja'far Muḥammad b. Ayyūb al-Ṭabarī (ninth-tenth century A.D.), Kūshyār (d. 1029), and Sahl ibn Bishr (d. ca 845). See TSMK Revan Ms. 1705, 2a: "*Pas kitābha-yi ustādān chūn Baṭlamyūs va Vālīs va Abū'l-Ma'shar al-Balkhī va Ya'qūb b. 'Alī al-Qaṣrānī va Muḥammad b. Ayyūb al-Ṭabarī va Kūshyār ibn Labbān ba-shahri al-Jīlī va Sahl bin Bishr jam' kardam.*"

⁵¹ SK Bağdatlı Vehbi Ms. 2005, 47b: "*īn qadr dar ma'rifat-i aḥkām kifāyat bāshad va agar kasī ziyada az īn khāhad ba-mukhtaṣar-i Qaṣrānī ki bi-masā'il-i Qaṣrānī mashūr ast murāja'at namāyad.*"

his own lifetime, were also often cited by *munajjims* in the late-fifteenth and early-sixteenth century Ottoman realm.

The inventory of authoritative sources relies mostly upon the detailed examination of the exact references in extant Ottoman *taqwīms*, horoscopes, and a few surviving textbooks written by indigenous Ottoman astral experts from the period in question. Unfortunately, in none of the authentic writings of Ottoman *munajjims* at the time can one easily find a ready-made bibliography of useful sources.⁵² Therefore I had to distill information from surviving astrological materials of the time and prepare a tentative list of sources frequently cited in contemporary astrological writings. One may refer here to Ṭaşköprizāde's encyclopedic work in which he lists the useful texts for different branches of astrological practice but since he repeats almost verbatim the discussion in the encyclopedic work of the Mamluk encyclopedist Ibn al-Akfānī (d. 1348) instead of representing the exact preferences of his own time and realm, his inventory does not always overlap with the actual references of *munajjims* in the Ottoman milieu.

Another important source for our purposes here is the inventory of the palace library, which was compiled by the chief librarian 'Āṭūfī in 1502-3 to list the names of around 5,700

⁵² In his introduction to the *al-Ikhtiyārāt al-'alā'iyya fī aḥkām al-samāwiyya*, Fakhr al-Dīn Rāzī quotes a handful of texts that he personally utilized in writing his own work. It is difficult to find in the authentic writings of Ottoman *munajjims* anything similar to Rāzī's bibliographical enterprise. The canon used by Rāzī consists of the works of Ptolemy, Vettius Valens (d. ca 175), Abū Ma'shar (d. 886), Dorotheus of Sidon (d. ca 75), 'Umar b. al-Farrukhān (d. 815-6), al-Sijzī (d. ca 1020), al-Qaṣrānī, Abū Ja'far Muḥammad b. Ayyūb al-Ṭabarī (ninth-tenth century A.D.), Kūshyār (d. 1029), and Sahl ibn Bishr (d. ca 845). See TSMK Revan Ms. 1705, 2a: "*Pas kitābha-yi ustādān chūn Baṭlamyūs va Vālīs va Abū'l-Ma'shar al-Balkhī va Ya'qūb b. 'Alī al-Qaṣrānī va Muḥammad b. Ayyūb al-Ṭabarī va Kūshyār ibn Labbān ba-shahri al-Jīlī va Sahl bin Bishr jam' kardam.*"

volumes and 7,200 titles in various branches of knowledge housed in the imperial treasury.⁵³ ‘Āṭūfī’s catalogue is replete with treatises and textbooks on astrological principles as well as astronomical tables and instruments, and the relevant section of the inventory is given in full as Appendix B to this dissertation. Even a cursory look at the list of items available in the imperial treasury will demonstrate that the inventory perfectly reflects the trends of the *munajjims* active in the Ottoman realm. First of all, the collection of *zīj*es in the palace library neatly represents the general leanings among practicing *munajjims* toward the post-Maragha *zīj* tradition in Persian. Among the twenty-five copies of *zīj*es and their commentaries listed in ‘Āṭūfī’s inventory—with the exception of the two copies of al-Bīrūnī’s *al-Qānūn al-Mas‘ūdi*, which can indeed be regarded as a *zīj*—there are five copies of *Zīj-i Īlkhānī* along with another five copies of Nīsābūrī’s *Kashf-i ḥaqā’iq* and two copies of Jamshīd al-Kāshī’s *Zīj-i khāqānī fī takmīl-i Zīj-i Īlkhānī*, both of which were expositions of the Ilkhanid tables. The catalogu also includes five copies of the *Zīj-i Ulugh Beg* together with two copies of ‘Alī Qūshjī’s commentary on the Ulugh Beg tables and one copy of that of Mīrim Çelebi.

As for manuals and textbooks on astrological rules, Ṭūsī’s *Sī faṣl* seems to have enjoyed most popularity. There are, by my count, 13 copies of the text along with later commentaries, including Khiṭābī’s lengthy *Muwaddih al-rusūm fī ‘ilm al-nujūm*, which he presented to Mehmed II in December 1479. Next comes the *Kitāb al-thamara* with seven copies (one cited in the *tārīkh* section of the inventory), almost exclusively in Persian. That the available *Thamara* copies in the palace library were written in Persian provides yet another strong proof for the ascendancy of the Persian astral tradition within Ottoman circles. As for the books of Abū Ma‘shar, there are at

⁵³ Library of the Hungarian Academy of Sciences, Ms. Török F 59.

least five titles recorded with explicit reference to his name, but as their titles are too generic (e.g. *Muntakhab Kitāb Abī Ma‘shar fī aḥkām al-nujūm*), it is difficult to establish which Abū Ma‘shar texts were in question. In addition to Ṭūsī, (Pseudo-) Ptolemy, and Abū Ma‘shar, the library catalogue has at least five copies of the *Kitāb al-tafhīm* of al-Bīrūnī and the *Mujmal al-uṣūl* of Kūshyār. Ghaznawī’s *Kifāya* is also cited at least for two times.

An important aspect of the collection is that since the imperial library was accessible to the court *munajjims* at the time, the holdings at the treasury not only reflect but also likely shaped the scholarly preferences of practicing *munajjims*. For instance through the end of Bāyezīd II’s reign, one of the court *munajjims* approached the sultan in an undated, anonymous Persian petition, asking to gain access to some of the items in the treasury (*khizāne*). The requested items include a sumptuous astrolabe (*ustūrlāb-i tām*), the Ulugh Beg tables (*Zīj-i Ulugh Beg*), *Kitāb-i Majisṭī* of Naṣīr al-dīn Ṭūsī, and the horoscope of the sultan (*ṭāli‘-i ḥazret-i ‘ālem-panāhī*) along with those of his sons, Ḳorkud and Aḥmed.⁵⁴ The anonymous *munajjim* also reassures the sultan that if the horoscopes are not currently available, he could produce (new) ones for each as long as he is informed of the exact birth-dates of the sultan and his sons.

Interestingly enough, the extant probate inventories of some of the deceased court *munajjims* from much later periods also corroborate that the books deemed important by astral experts in the late fifteenth and the first half of the sixteenth century still had greater influence in the scholarly horizons of practitioners in the following centuries. For example, in the estates of

⁵⁴ TSMA E. 10159/6: “*Kitāb-i zīj-i Ulugh Bīgi va kitāb-i Majisṭī va ustūrlāb-i tām bā-ṭāli‘-i ḥazrat-i ‘ālam-panāhī bā-ṭāli‘-i mavlūd-i sulṭān Qurkhut va ṭāli‘-i mavlūd-i sulṭān Aḥmad dar khizāna būda amr farmāyand ki badīn kamīna badahand va agar ṭāli‘hā ma‘lūm nabāshad tārikh-i vilādathā taslīm namāyand tā ba‘d az istikhrāj kayfiyyat-i ṭāli‘-i har yak rā chunāncha az dalāil-i nujūmī ma‘lūm shavad ba-‘arz rasānida shavad.*”

the deceased *müneccimbaşı* Hālil Efendi (d. 1773) are found at least two copies of the *Zīj-i Ulugh Beg*, Abū Ma‘shar’s *aḥkām* treatises, al-Bīrūnī’s *Tafhīm*, Ghaznawī’s *Kifāyat*, ‘Alī-Shāh’s *Aṣmār va Ashjār*, Turkish translation of al-Qaṣrānī’s *Kitāb al-Masā’il* (“*Terceme-i Qaṣrānī*”) along with several horoscopes (*tāli’-i mevlūd*) and unspecified works on preparing *taqwīms* (*Aḥkām-ı kulliya fī al-taqāwīm* and *İstikhrāj al-taqwīm min al-zīj*).⁵⁵ In a similar vein, the probate inventory of the deceased *ser-müneccim* Mūsāzāde Muḥammed ‘Ubeydullāh Efendi (d. 1782) lists among his books at least three copies of the *Zīj-i Ulugh Beg*, two copies of Mīrim Çelebi’s commentary on the Ulugh Beg tables, one copy of Nīsābūrī’s commentary on the Ilkhanid tables, two copies of the commentary on Ptolemy’s *Tetrabiblos* (*Sharḥ-i arba ‘a maqālāt*), Ghaznawī’s *Kifāyat*, at least two copies of Qaṣrānī’s *Kitāb al-masā’il*, Alī-Shāh’s *Aṣmār va ashjār*, Kūshyār’s *Mujmal al-uṣūl*, and several unspecified treatises on birth horoscopy (*aḥkām-ı mevālīd*).⁵⁶ Even in the private collection of the nineteenth century chief *munajjim* al-Sayyid Muḥammed Sa‘dullāh Efendi (d. 1848) is there one copy of an unspecified commentary on the *Zīj-i Ulugh Beg*.⁵⁷ The books possessed by the late-eighteenth and early nineteenth-century court *munajjims* not only included these cited sources but also works on ‘ilm al-hay’a (like *Tahrīr al-Majisī* of Ṭūsī or *Mecmū‘a-i Chaghmīnī*), ‘ilm al-raml (including one particular text attributed to Ṭūsī), ‘ilm al-jifr, and other examples of the *zīj* tradition including the *zīj* of Ibn al-Shāṭir and more recent European achievements (*terceme-i zīj-i Frengī* and sometimes specifically recorded

⁵⁵ D. BŞM. MHF. 55:34. I would like to thank Hakan Kırkoğlu for informing me of the presence of such an inventory in the archives.

⁵⁶ KA 502, 21b.

⁵⁷ KA 1650, 52b.

as *Zij-i Lālant*).⁵⁸ All in all, these probate inventories are useful to portray the extent of the canonization of astrologically valid knowledge in the early-modern Ottoman intellectual context.

II. 4. The Venues of Training on Astrologically Valid Knowledge

How and where could a would-be *munajjim* get a good acquaintance with any set of these texts listed above? In the absence of a running observatory in the Ottoman world in the late fifteenth and first half of the sixteenth century, were there any institutional means of vocational training? Could a student learn astrologically valid knowledge in a *madrasa*? What role did the offices of *muwaqqit* and court *munajjims* play in the transmission of astrologically valid knowledge down the generations?

The observatories that were sporadically founded in the medieval Islamic domains, especially in the eastern lands, provided the most important institutional framework for bringing together experts with varying specializations in the mathematical-astral sciences and spurred the accumulation of useful texts in a particular location. From the reign of al-Ma'mūn onwards, and accelerating especially in the post-Mongol era, the eastern Islamic lands witnessed the

⁵⁸ Jérôme Lalonde's (d. 1807) tables started to be used in the Ottoman realm from the late eighteenth century onwards, though some of the Ottoman court *munajjims* were already familiar with contemporary European astronomy and astrology in the seventeenth century. Müneccimbaşı Muḥammed b. 'Alī (d. 1631) says in the introduction to his derivative textbook on astrological principles that he prepared it on the basis of Arabic, Persian, and European sources. See Kandilli Rasathanesi Library Ms. 371, 1b: "[B]uyurdular ki bize aḥkām-ı nücūmda aḥkām-ı 'āleme müte'allik ve aḥkām-ı ṭāli'e müttefik bir Türkī kitāb terceme olunmasıçün emr-i şerīfleri şadır olmağın bu fakīr-i pür-taḫşīr Muḥammed b. 'Alī re'is el-müneccimīn daḫi 'Arabī ve Fārsī ve *Frengī* kitābların zübdelerin cem' ve tahrīr idub..."

For the curious story of the Turkish translation of Noël Durret's *Novae motuum caelestium ephemerides Richelianae* by Ibrāhīm Efendi al-Zigetvari Tezkireci in the year 1660, see Avner Ben-Zaken, "The heavens of the sky and the heavens of the heart: the Ottoman cultural context for the introduction of post-Copernican astronomy," *British Society for the History of Science* 37/1 (2004), 1-28.

establishment—and subsequent demolition—of a number of observatories. As already discussed earlier with respect to the production of *zīj*es, the fundamental purpose of constructing a new observatory and running a fresh observational program was to rectify existing tables indispensable for astrological practice. Yet due to irregular financial support, tumultuous political circumstances, and social and religious tensions vis-à-vis the moral licitness of practicing astrology, many of the established observatories operated only for a limited period of time.⁵⁹ One exception is the Maragha observatory, which, after its construction in 1259, was able to survive until 1316 thanks mostly to its being funded by more stable *waqf* revenues.⁶⁰

Observatories provided a convenient space to facilitate private instruction and apprenticeship between experienced experts and aspiring students of celestial knowledge, some of whom were connected by family ties.⁶¹ Some of these institutions were also accompanied by *madrāsas* where different matters related to the *al-‘ulūm al-riyāḍiyya* were evidently instructed. Thanks to the surviving letters of Jamshīd al-Kāshī and the *ijāza* given to Faṭḥullāh Shirvānī (d.

⁵⁹ For a brief discussion on possible reasons for the construction and subsequent destruction of observatories in the Islamic realm, see İhsan Fazlıoğlu, “Osmanlı Felsefe-Biliminin Arka Planı: Semerkand Matematik-Astronomi Okulu,” *Divan İlmi Araştırmaları Dergisi* 14 (2003), esp. 12-14.

⁶⁰ For the exceptional status of the Maragha observatory see Sayılı, *The Observatory in Islam*, 207-223.

⁶¹ The most prominent example seems to be the al-Kāshī family, different members of which served different courts in the Timurid realm. Maḥmūd b. Yaḥyā b. al-Ḥasan al-Kāshī named (*al-mulaqqab bih*) ‘Imād al-munajjim was the author of the famous horoscope of Mīrzā Iskandar b. ‘Umar Shaykh prepared in 1411. Another horoscope, hitherto unknown, was apparently produced on 15 Muḥarram 822/February 11, 1419 for Mīrzā Rustam b. ‘Umar Shaykh. The *munajjim* authoring this horoscope is a certain Yaḥyā b. ‘Imād b. Yaḥyā al-munajjim al-Kāshī, who is probably the son of the *munajjim* that prepared Mīrzā Iskandar’s horoscope. See Huntington Library Ms. HM71897. I am grateful to Evrim Binbaş for informing me about the text and generously sharing with me the images of the manuscript. The famous astral expert in the Samarqand observatory, Jamshīd al-Kāshī b. Mas‘ūd b. Maḥmūd al-Kāshī also seems to be related to the previous two. Fatema Keshaverz argues that Jamshīd al-Kāshī was the grandson of ‘Imād al-munajjim, the author of Iskandar’s horoscope.

1486) by his master Qāḏīzāda-i Rūmī, we have substantial evidence to shed light upon the instruction of theoretical as well as practical celestial knowledge in Samarqand observatory and the accompanying *madrasas*. While none of these sources specifically refer to the teaching of a dedicated astrological textbook in the classroom, Jamshīd al-Kāshī's letters provide evidence that the students, among whom, says al-Kāshī, were plenty of *munajjims* and *mustakhrijes* (i.e., calculators), engaged in the use of the *zīj* and addressed problems with respect to calculating the degree of the ascendant (*tāli*):

“Another day, when arriving at the school, His Majesty [Ulugh Beg] had met a student at the door, holding a book. He [i.e., the King] had asked him what book it was, [The student,] kissing the book, had presented it [to his Majesty]. Opening the book, [His Majesty] had chanced on a chapter [entitled] “On the curiosities of the astrolabe,” [beginning with this problem]: [Let us suppose that] the Sun is, e.g., in 10 degrees of Aquarius, with a certain altitude, and the ascendant of time is a certain degree [of the ecliptic]; then [the ascendant of the time when] its [i.e. the Sun's] altitude [is the maximum altitude of the ecliptic at that moment] is a quadrant [in advance of the Sun's position], i.e., in 10 degrees of Taurus. After one month, the Sun having described one sign [of the Zodiac], while having the same altitude as on that [previous] day, how could the ascendant be exactly the same as it was in that day? After having entered [the classroom, His Majesty] had presented that problem for discussion.”⁶²

As regards to the institutional sites for the study and transmission of astrologically valid knowledge in the late fifteenth- and early sixteenth-century Ottoman milieu in which there was no observatory, the *madrasa* and mosque seem reasonable candidates. However, as it will be demonstrated in detail below, the evidence for the instruction of astrologically valid knowledge

⁶² Mohammad Bagheri, “A Newly Found Letter of Al-Kāshī on Scientific Life in Samarqand,” *Historia Mathematica* 24 (1997), 245. This is one of Kāshī's two extant letters written, according to Bagheri, prior to the one published separately by Aydın Sayılı and Edward Kennedy. See Edward S. Kennedy, “A Letter of Jamshīd al-Kāshī to His Father: Scientific Research and Personalities at a Fifteenth Century Court,” *Orientalia* 29 (1960), 191-213; Aydın Sayılı, *Uluğ Bey ve Semerkanddeki İlim Faaliyeti Hakkında Gıyasüddin-i Kaşî'nin Mektubu: Ghiyāth al-Dīn al-Kāshī's Letter on Ulugh Beg and the Scientific Activity in Samarqand* (Ankara: TTK, 1960).

in these locations is so tenuous that it is difficult to propose them as established institutional structures for the production and instruction of the knowledge necessary for astrological practice.

The question with regards to teaching in *madrasas* of the so-called “rational” sciences (*al-‘ulūm al-‘aqliyya*) and/or the “the sciences of the ancients” (*‘ulūm al-awā’il*)—besides the transmitted and/or traditional sciences (*al-‘ulūm al-naqliyya*)—has indeed attracted the attention of many modern scholars. This specific question is by nature tied to the broader issue of the origins and functions of the *madrasa* in the medieval Islamic social and intellectual world. The publication in 1981 of George Makdisi’s seminal book, *The Rise of Colleges: Institutions of Learning in Islam and the West*, engendered a new wave of scholarly interest in discussing the true place and functions of the *madrasa* in medieval Islamic world, although one can easily trace the vast literature on medieval *madrasas* much earlier.⁶³ Makdisi’s insistence on the definition of the *madrasa* as a “college of law” and his strong focus on its institutional character with a strictly defined curriculum of traditional Islamic sciences were later criticized on different grounds by an array of scholars, including Jonathan Berkey, Michael Chamberlain, and Daphne Ephrat.⁶⁴ While it is not the primary aim of this section to detail the individual criticisms of these revisionist

⁶³ George Makdisi, *The rise of colleges: institutions of learning in Islam and the West* (Edinburgh: Edinburgh University Press, 1981). Even Aydın Sayılı’s dissertation that he defended in 1941 as the first Ph.D. in the new academic discipline of history of science deals primarily with the question of educational institutions in the medieval Islamic world. See Aydın Sayılı, “The Institutions of Science and Learning in the Moslem World.” (Ph.D. Dissertation, Harvard University, 1941). Also see Abdul Latif Tibawi’s study: A. L. Tibawi, “Origin and Character of al-Madrasah,” *Bulletin of the School of Oriental and African Studies*, 25 (1962), 225-238.

⁶⁴ Jonathan Berkey, *The transmission of knowledge in Medieval Cairo: a social history of Islamic education* (Princeton: Princeton University Press, 1992); Michael Chamberlain, *Knowledge and social practice in medieval Damascus, 1190-1350* (Cambridge: Cambridge University Press, 1994); Daphna Ephrat, *A learned society in a period of transition: the Sunni ‘ulama’ of eleventh-century Baghdad* (Albany: State University of New York Press, 2000).

scholars, suffice it to say that Makdisi has often been criticized for his tendency to describe *madrassa* as the only means of learning and education in the medieval Islamic world. Later critics reminded Makdisi, however, that the *madrassa* was not the only form of education and knowledge transfer, and in fact, in the medieval Islamic world, *personae* were much more important than *loci*.⁶⁵ Therefore, according to later generations of scholars, what really mattered in medieval Islamic learning was not the name of the *madrassa* whence an individual graduated but rather those of the professors (*mudarris*) under whom one studied certain books and topics.

At first glance, the revision of Makdisi's position may seem welcome with respect to those studies tackling the question of the place of the so-called "rational" sciences in the learning regimes of medieval Islamic society. Since education was performed through more personal mechanisms and the issue at stake was what individual *mudarrises* would assign, as revisionist scholars have argued, one could then easily assume that depending on the intellectual proclivities of individual *mudarrises* and students, books and subjects on natural-philosophical and mathematical knowledge might well have been studied in *madrasas*.

The flip side of the coin, however, is the risk of reinforcing some of the established scholarly convictions, which assume that genuine interest in non-religious, "rational" sciences in the medieval Islamic world were only held by certain curious individuals in discrete episodes without any consistent institutional basis. According to this blueprint, which is also quite widespread even among the historians of science in the Islamicate context, the instruction of natural, philosophical, and mathematical sciences in the medieval Islamic world did not enjoy much scholarly and institutional recognition, and therefore, was almost always restricted to

⁶⁵ Berkey, *The transmission of knowledge in Medieval Cairo*, 23.

limited circles consisting of a few “enlightened” figures. Consequently, the shift from Makdisi’s excessive emphasis on the *madrasa* as the sole institution for the instruction of “religious” sciences to the revisionist emphasis upon the personal nature of education had no real positive impact regarding the question of the role of educational institutions in sustaining the “scientific” education in the medieval Islamic world. Not unlike George Makdisi, the revisionist scholars also do not have much to offer to the question Abdelhamid Sabra had raised earlier: “How did a significant scientific tradition maintain itself for such a long time largely outside the only stable institution of higher learning in medieval Islam?”⁶⁶

In the last two decades, however, several important works have been published that discuss the penetration of mathematical and astral sciences into the *madrasa* setting. In his work on Nizām al-Dīn Nīsābūrī (d. 1328-9), the fourteenth-century polymath from the immediate circle of Naṣīr al-Dīn Ṭūsī’s student Quṭb al-Dīn Shirāzī, Robert Morrison clearly demonstrates that the teaching of mathematical and celestial knowledge including *‘ilm al-hay’a* gradually penetrated into the *madrasa* curriculum in the Islamic East from the thirteenth century onwards.⁶⁷ Likewise, Sonja Brentjes, Sally Ragep, İhsan Fazlıoğlu, and late Cevat İzgi documented on the basis of manuscript evidence that certain books on *ilm al-hay’a* and other branches of the *al-‘ulūm al-riyādiyya* were definitely taught in certain *madrasas* especially in the

⁶⁶ A. I. Sabra, “The Appropriation and Subsequent Naturalization of Greek Science in Medieval Islam: A Preliminary Statement,” *History of Science* 25 (1987), 234. In fact Sabra himself seems not affirmative about the institutional nature of scientific instruction, as he tends to state that institutional basis had no real significance and that the accomplishments made by Muslim scholars had no relation to place. Sabra even argues that religious institutions rather stood as obstructions to authentic scientific inquiries. See his “Situating Arabic Science: Locality *Versus* Essence,” *Isis* 87/4 (1996), 654-70.

⁶⁷ Robert G. Morrison, *Islam and Science: the Intellectual Career of Nizām al-Dīn al-Nīsābūrī* (London: Routledge, 2007).

post-thirteenth century world.⁶⁸ For Ragep, Fazlıođlu, and İzgi, the greater number of surviving copies of titles such as Chaghmīnī’s *al-Mulakhkhaş fī al-hay’a al-basīta* or Qāđīzāda-i Rūmī’s later commentary on Chaghmīnī’s text (*Sharḥ al-mulakhkhaş fī al-hay’a*), some of which were even copied by *mudarrises* across diverse regions and periods is a strong indication that these books were transmitted through formal *madrasa* education.⁶⁹ Besides such quantitative evidence and manuscript records, various other sources from the period also evince that theoretical celestial works were studied within the institutional structure of *madrasas*. In addition to the letters of Jamshīd al-Kāshī or the *ijāza* of Faḥḥullāh Shirvānī, Ṭaşkōprīzāde himself narrates in an autobiographical passage that while he was a *madrasa* student in the first half of the sixteenth century, he studied ‘Alī Qūshjī’s book on ‘ilm al-hay’a (*Kitāb al-faḥiyya*) at the feet of Mīrim Çelebi (d. 1525).⁷⁰ Ṭaşkōprīzāde also details in his encyclopedic work on the taxonomy of knowledge the books that should be instructed in different branches of mathematical and astral sciences to meet varying levels of pedagogical needs. As this shows, mathematical and theoretical celestial knowledge, which was not the major objective of instruction in *madrasas* at

⁶⁸ Cevat İzgi, *Osmanlı Medreselerinde İlim*, vol. 1 (İstanbul: İz, 1997), see especially 189-453; Sonja Brentjes, “On the Location of the Ancient or ‘Rational’ Sciences in Muslim Education Landscapes (AH 500-1000),” *Bulletin of the Royal Institute for Inter-Faith Studies*, 4/1 (2002), 47-71; *idem.*, “Reflections on the Role of the Exact Sciences in Islamic Culture and Education between the Twelfth and the Fifteenth Centuries,” *Études des sciences arabes*, ed. by Mohammad Abattouy (Casablanca: Foundation du Roi Abdul-Aziz al Saoud, 2007), 15-33; İhsan Fazlıođlu, “Osmanlı Felsefe-Biliminin Arka Planı: Semerkand Matematik-Astronomi Okulu,” *Divan İlmi Araştırmaları Dergisi* 14 (2003), 1-66; Sally P. Ragep, “Maḥmūd ibn Muḥammad ibn ‘Umar al-Jaghmīnī’s *al-Mulakhkhaş fī al-hay’a al-basīta*: An Edition, Translation, and Study.” (Ph.D. Dissertation, McGill University, 2014).

⁶⁹ Cevat İzgi meticulously establishes, on the base of paratextual evidence from extant manuscripts, the names of *mudarrises* that copied *al-Mulakhkhaş fī al-hay’a al-basīta* or any of its later commentaries. See especially 370-392.

⁷⁰ Ṭaşkōprīzāde, *al-Shaqā’iq al-nu‘māniyya*, 327. More information on Mīrim Çelebi will be provided in the third chapter of this dissertation.

their very foundation around the tenth century, began to percolate into some of the established institutions from the thirteenth century onwards.

The recent scholarship on the penetration of mathematical and theoretical astral sciences into *madrasas* is crucial in the sense that it can save us from a historiography that gives credence to an episodic history of science or a great-men narrative in the medieval Islamicate context, which is to say a kind of historiography “based on chance and accident rather than a more plausible story of individual effort sustained within an enduring social context.”⁷¹ Yet when the question is about the instruction of a contentious subject like “astrology” in the *madrasa* setting, the picture is much more complicated.

It is in fact quite difficult to find strong traces of strictly astrological instruction in the *madrasa* setting, given the fact that the craft itself was a highly controversial one even in the eyes of its past practitioners. As we have already seen in the first chapter, even some practicing Ottoman *munajjims* were skeptical about the scientific premises of *aḥkām al-nujūm* and felt uneasy at being compelled to undertake astrological tasks. Besides such personal reservations, the institutional charters and endowment deeds (*waqfiyya*) administering, or at least reflecting, the contours of instruction in high-ranking *madrasas* also provide little to no evidence as to the instruction of astrologically valid knowledge in Ottoman institutions of higher education. For example, multiple versions of the *waqfiyya* of the Fatih mosque complex produced in the course of late fifteenth and early sixteenth century do not reveal that texts or subjects associated with

⁷¹ Sally Ragep, “Maḥmūd ibn Muḥammad ibn ‘Umar al-Jaghmīnī’s *al-Mulakhkhaṣ fī al-hay’ā al-basīṭa*: An Edition, Translation, and Study,” 154.

astrological pursuits were to be instructed in any of the eight *madrasas* (*Sahn-ı semān*).⁷² Nevertheless, some of the extant *waqfiyyas* make explicit references to the competence of instructors in the elusive category of the “rational sciences” (*mebādī ve muḳāddemāt-ı ‘akliyyāt*) when they describe the qualifications to be looked for in the *Sahn mudarrises* that would teach there. Yet the insertion of the phrase “useful sciences” (*‘ulūm-ı nāfi‘a*) implies the exclusion of astrology, given that astrology was often categorized in the classical taxonomy of sciences tradition as a worthless endeavor.⁷³ In a similar vein, in the *waqfiyya* administering the functions and functionaries of the Süleymaniye complex in the mid-sixteenth century, one can find such stipulations stating that *mudarrises* that are learned in both transmitted and rational sciences will receive sixty silver *akçes* per diem;⁷⁴ however, the details of the components of the rational

⁷² Tahsin Öz, “Zwei Stiftungsurkunden des Sultans Mehmed II. Fatih,” *Istanbul Mitteilungen* 4 (1935); Vakıflar Umum Müdürlüğü, *Fatih Mehmed II Vakfiyeleri* (Ankara: Vakıflar Genel Müdürlüğü, 1938); Osman Nuri Ergin, *Fatih İmareti Vakfiyesi* (İstanbul, 1945). For the problems of different editions of the *waqfiyya* of the Fatih complex, see Kayoko Hayashi, “Fatih Vakfiyeleri’nin Tanzim Süreci Üzerine,” *Bellesten* v. 72 n. 263 (2008): 73-94; Ahmet Beyatlı (ed.), *Fatih Sultan Mehmed’in 877/1472 tarihli vakfiyesi* (Ankara: TTK, 2013), vii-xiii.

⁷³ *Fatih Mehmed II Vakfiyeleri* (Ankara: Vakıflar Genel Müdürlüğü, 1938), 262-263: “*ol pādīshāh-ı lebīb medāris-i ‘āliye vezāyifini bu minvāl üzere tertīb buyurdılar ki cāmi‘-i şerīflerine cenāheyn vāki‘ olan medāris-i semāniyeden her biri için ... seccāde-nişin-i şadr-ı ifāde olmağa istihkākı zāhir, mebādī ve mukaddemāt-ı ‘akliyyāt ve nakliyyāta nazīri nādīr, esbāb-ı liyākat-makām tadrīsī cāmi‘, ‘ulūm-ı nāfi‘a tahşiline şarf-ı ‘ömr-i ‘azīz eylemiş bir müderris-i bāri‘ ta‘yīn oluna.*” See also Ekmeleddin İhsanoğlu, “Fatih Külliyesi Medreseleri Ne Değildi: Tarih yazıcılığı bakımından tenkit ve değerlendirme denemesi,” in *İstanbul Armağanı*, vol. 1: *Fatih ve Fatih* (İstanbul: İstanbul Büyükşehir Belediyesi Kültür İşleri Daire Başkanlığı, 1995), 105-36.

In the imagination of some late sixteenth-century Ottoman learned individuals such as Muştafā ‘Ālī, *‘ilm al-hay‘a* was taught in the *Sahn-ı semān* during the reign of Mehmed II. See *Künhü’l-Ahbār*, c. 2 *Fatih Sultan Mehmed Devri* (1451-1481), ed. by M. Hüdai Şentürk (Ankara: TTK, 2003), 152. It is interesting to see Muştafā ‘Ālī stating that people of knowledge received much more benevolence and recognition during the time of Mehmed II thanks to the auspicious influences of the stars at the time (*ol devr-i laṭīfün nücumı te’sīrātından*). *Ibid.*, 3.

⁷⁴ *Süleymaniye Vakfiyesi*, ed. Kemal Edib Kürkçüoğlu (Ankara: Vakıflar Genel Müdürlüğü, 1962), 32: “*medāris-i mezkūre ve mecālis-i ma‘mūreniñ her birinde efāzıl-ı ‘ulemā‘-i dīn-perver ve ekābir-i fuželā-i hikmet-güster-i hünerverden miftāh-ı künüz-ı ḥakāyik, keşşāf-ı rumüz-ı*

sciences remain unspecified. Specifically in the *waqfiyya* of the Süleymaniye complex, which also housed a medical school, the stipulations about the potential *mudarris* at the medical school (*‘ilm-i tıbb için binā olunan medrese-i tayyibe*) naturally refer to competence in medical sciences. No matter how widespread the use of celestial knowledge for medical purposes was at the time, there is no specific mention of it in the relevant section of the *waqfiyya*

Another institutional setting where the instruction of astrologically valid knowledge might have taken place was the mosque, especially those grand imperial mosque complexes that often employed personnel to perform tasks for computing time (i.e., *muwaqqits*) in a designated space (i.e. *muwaqqitkhāna*). In the surviving *waqfiyyas* of both the Fatih and Süleymaniye complexes mentioned above, a post is reserved for a *muwaqqit* to make the necessary temporal calculations for daily prayer times, length of days, beginning of months, and related occasions.⁷⁵ As the phraseology in the Süleymaniye *waqfiyya* manifests, the *muwaqqit* needs to be acquainted with the generals and particulars of the “science of the stars” (*sā’ir ‘ilm-i nücūma müte’allik külliyāt ve cüz’iyyāt-ı ma’ārif ve vākıf ve ‘ārif*). In return for his services, he would receive ten silver *ağçes* a day. Neither of these *waqfiyyas*, however, specifies a designated space for the *muwaqqitkhāna*, though subsequent anecdotal and surviving physical evidence from other grand-mosque complexes clearly reveal that there was often a small building adjoining the complex

değāyik, takī ve nakī, zekī ve zekī, ‘ālim u ‘āmil ve fāzıl u kāmīl, zū-fünūn... bir müderris ola ki ifāde-i ‘ulūm-ı dīniyye ve ifāza-ı ma’ārif-i yakīniyye birle talebe-i ‘ilm ve müsta’idleri mahzūz ve behremend idüb vech-i ma’hūd üzere eyyām-ı tahşilde dersşāneye hāzır olub tedrīs-i kütüb-i mütedāvile-i makbūle ve müzākere-i fünūn-i ma’kūle ve menkūleye iştigālde ihtimām iderlerse vazīfe-i yevmiyyeleri altmış ağçe ola.”

⁷⁵ *Ibid.*, 34: *‘amel-i sā’āt ve mevākit-i şalavat ve mekādīr-i şeb u rüz ve nuzūl ve ‘urūc-i seyyārāt-i seb’a ve menāzil-i burūc ve değāyik u dūrūc-i mesīr-i Āfitāb ve izdiyād ve intikāş-ı māhitāb ve sā’ir ‘ilm-i nücūma müte’allik külliyāt ve cüz’iyyāt-ı ma’ārif ve vākıf ve ‘ārif ... bir kimesne muvaqqit olub evkāt-ı ezānı mü’ezzinlere ta’yīn idüb tenbīh eyleye ... vazīfesi on ağçe ola.”*

that was used by timekeepers to keep their instruments and notebooks, and make their necessary horologic calculations.⁷⁶ In light of the allusions of later sources, we can claim that these designated small spaces were also used as meeting places where the *muwaqqit* could discuss with his fellows and/or would-be experts the intricacies of the science of the stars.⁷⁷

In the broader field of the history of science in the Islamicate context, the services of timekeepers and their instruments have been discussed almost exclusively from a mathematical and astronomical point of view. In his seminal work on the role of *muwaqqits* in the Mamluk era,

⁷⁶ Süheyl Ünver, “Osmanlı Türkleri İlim Tarihinde Muvakkithaneler,” *Atatürk Konferansları V* (1971-1972), 217-257; Salim Aydüz, “Osmanlı Astronomi Müesseseleri,” *TALİD* 2/4 (2004), 411-453; *idem.*, *İstanbul Muvakkithaneleri ve Muvakkitleri* (İstanbul Büyükşehir Belediyesi Strateji Geliştirme Daire Başkanlığı Stratejik Planlama Müdürlüğü Proje İstanbul, 2009).

⁷⁷ Cevat İzgi notes that in many treatises on simple astronomical instruments that were primarily used for computing prayer times and determining *Qibla*, the authors often address the aspiring students (*tālibler*) and novices (*mübtediler*). Although such remarks do not include an explicit reference to the whereabouts of the training, that some of the authors of these were *muwaqqits* gives rise to thoughts that the physical space of *muwaqqitkhāna* might have been used for instructing students. See İzgi, *Osmanlı Medreselerinde İlim* vol. 1, 428-450. There are also manuscript evidence of possession statements or colophons documenting that in addition to the standard *zīj* literature, *muwaqqits* also held works specifically on the *aḥkām al-nujūm*. A copy of ‘Alī-Shāh’s *Asmār va ashjār*, now housed as SK Ayasofya Ms. 2688, was possessed by a certain Emīn Muḥammed, who apparently worked as a *muwaqqit* in Edirne (*Emīn Muḥammed el-muvaqqit fī belde-i Edirne*). In a similar vein, the Turkish translation of Qaṣrānī’s *Kitāb al-masā’il* was completed in the late seventeenth century by Kasımpaşalı ‘Osmān b. Muḥammed (d. later than 1691), who was the *muwaqqit* at the time of the Fatih mosque complex. See SK İzmir Ms. 479, 3a: “*bu muhtaşarın muharriri el-‘abd el-ḥaḳīr müstemend Osmān b. Muḥammed el-muvaqqit bi-cāmi’-i sulṭān Muḥammed ḥān Kasımpaşalı dimekle ma’rūftur.*” One copy of Mīrim Çelebi’s commentary on the Ulugh Beg tables apparently passed into the hands of Süleymān Dürrī (d. 1860), who was the *muwaqqit* of the Fatih Mosque complex. See SK Hamidiye Ms. 848, frontispiece: “*tamallakahu al-faḳīr al-ḥaḳīr Süleymān Dürrī, muvaqqit-i Fātih.*” A copy of the *mecmū’a* incorporating Mīrim Çelebi’s treatises on various astronomical instruments was owned, and later donated in the year Jumādā I 960/1553 to the Muradiye mosque, by a certain Emrullāh b. Aḥmed b. Maḥmūd, who was apparently the *muwaqqit* of the complex at the time. See TSMK Hazine Ms. 1760, frontispiece: “*Emrullāh b. Aḥmed b. Maḥmūd qad waqafa wa ḥasaba hadihi’l-majmū’a li-man yastahiq muṭāla’ahu waqfan ṣaḥīḥan shar’iyyan wa ḥasaban ṣarīḥān mar’iyyan wa sharaṭa ḥāfiz al-kutub li-man yakūn muwaqqitan li-jāmi’ al-jadīd sulṭān Murād Khān b. Muḥammad Khān fī madīna Edirne al-maḥmiyya...taḥrīran fī al-yawm al-thālith min Jumādā al-awwal li-sana sittīn wa tis’a mi’a.*”

David King underlines that there was no single surviving astrological text from the Mamluk times, and that *muwaqqits* in large mosque complexes were not engaged in any form of astrological practice.⁷⁸ Sonja Brentjes, however, later demonstrated on the basis of biographical evidence from the Mamluk era historian al-Sakhawī (d. 1497) that some of the *muwaqqits* and *mu'adhdhins* in the Mamluk world certainly undertook astrological pursuits.⁷⁹ In fact, the expertise of computing “time” and “location” enjoyed by astral experts had manifold uses that range from making calculations for more “sacred” purposes such as five daily prayers and the direction of *qibla* to more “profane” objectives like the computation of “auspicious moments” and “horoscopes” for the desired locations. One obvious difference between the *muwaqqit* and *munajjim* might be that the expertise of a *muwaqqit* in calculating time for the five daily prayers would not require a careful observation and computation of the movement of all seven planets and calculations on the basis of the Sun and Moon would be sufficient. In the case of the *munajjims*, however, a full comprehension of the movements of the planets and knowledge of the fixed stars was required. Yet as manifest in the Süleymaniye *waqfiyya* as to the desired features of an erudite *muwaqqit*, most of the experts had mastery over the knowledge of all seven planets and other celestial phenomena.

In addition to the anecdotal evidence purported by Sonja Brentjes, surviving Ottoman materials once again provide the hard evidencet to illuminatre the astrological preoccupations of several *muwaqqits*. As is clear thanks to some of the surviving Ottoman *taqwīms* in the sixteenth

⁷⁸ King, “On the role of the muezzin and the *muwaqqit* in Medieval Islamic Society.” See also his “The Astronomy of the Mamluks,” *Isis* 74 (1983), 531-555.

⁷⁹ Sonja Brentjes, “Shams al-Dīn al-Sakhāwī on *Muwaqqits*, *Mu'adhdhins*, and the Teachers of Various Astronomical Disciplines in Mamluk Cities in the Fifteenth Century,” in *A Shared Legacy, Islamic Science East and West*, Homage to professor J. M. Millás Vallicrosa, ed. Emilia Calvo *et al.* (Barcelona: Universitat de Barcelona, 2008), 129-50.

century, *muwaqqits* often engaged in the production of annual almanac-prognostications. A certain Necmeddīn b. Seyyid Muḥammed from Bursa (d. later than 1553), who from at least 1526 to 1529 held the office of the timekeeper in the Old Mosque in Edirne, kept compiling *taqwīms* with detailed astrological predictions, two of which have survived into our own time.⁸⁰ The other extant *taqwīms* of Necmeddīn enable us to follow his career. From 1535 up until 1553, he worked as the *muwaqqit* of the Fatih Mosque Complex in Istanbul.⁸¹ Unfortunately we are bereft of any evidence that explains the exact occasions of his appointment from one position to another. Curiously, during roughly his earlier tenure as the *muwaqqit* of the Old Mosque in Edirne, Necmeddīn was also listed among the monthly-salaried court *munajjims*.⁸²

It is quite interesting to see Necmeddīn listed as a court *munajjim* in the relevant registers from the late 1520s and early 1530s. Did he hold dual offices at the time, or did the court temporarily appoint him in between his two tenures as the *muwaqqit* of imperial mosque complexes? Drawing solely upon his autographs in surviving almanac-prognostications and scattered archival information, it is difficult to reach a definitive conclusion as to the exact trajectory of Necmeddīn's career. Yet it is certain through his extant almanac-prognostications that, *contra* David King's arguments in the Mamluk context, Ottoman *muwaqqits* were documentedly involved in astrological practice. In addition to the case of Necmeddīn b. Seyyid Muḥammed, another example of the astrological engagement of *muwaqqits* is Yūsuf b. 'Ömer el-Sā'ātī, who composed his oldest surviving almanac-prognostication in 1511 while he was the

⁸⁰ Arkeoloji Müzesi, 19b: “*istakhrāju wa ḥarrarahu al-faqīreddīn b. Seyyid Muḥammed al-muwaqqit fī jāmi‘ al-‘atīa bi-maḥrūse-i Edirne.*”

⁸¹ BnF Turc 183, 14b: “*istakhrāju al-‘abd al-faqīr Necmeddīn b. Seyyid Muḥammed al-muwaqqit bi-jāmi‘ Sulṭan Muḥammed.*”

⁸² KK 1764, 26 (dated March 1527): “*‘ādāt-i Necmeddīn munajjim ki dar rüz-ı navrüz taḳvīm āvord, 1000 [aḳçe].*”

muwaqqit of the Fatih mosque complex.⁸³ Within the next three years, Yūsuf *munajjim* was promoted to the office of the court *munajjims*, as we see him autographing his almanac prognostications from 1514 onwards with the signature “*al-munajjim fi bāb al-sultān.*”

Given these two documented cases of *muwaqqits* providing astrological advice, and the stipulations of Fatih and Süleymaniye *waqfiyyas* where an individual conversant in the broader category of the “science of the stars” is expected to work as a *muwaqqit*, we have enough reason to assume that the post of *muwaqqit* in major imperial complexes also helped practicing astral experts to secure stable financial means. These posts often offered commensurate, and sometimes even better, remuneration compared to those provided by the office of court *munajjims*. For example, according to the detailed account book of the Ayasofya complex from the late 1480s, a *muwaqqit* was qualified to earn thirteen *aḳçes* a day, an amount slightly more than the salary of the only *munajjim* listed in the sole surviving payment register from the time of Mehmed II’s reign, who was receiving ten *aḳçes* per diem in 1478.⁸⁴ In the late 1540s when the number of court *munajjims* gradually dropped from four to two—hinting at the overall decline in the extent of the courtly patronage of celestial expertise in the course of the sixteenth century—the amount received by one of those two *munajjims* was only six silver *aḳçes*, much less than a *muwaqqit* of the Süleymaniye complex at the time would make.⁸⁵

⁸³ TSMK A. 1960, 28a: “*istikhrāj az ‘af ‘ibādillāh wa’ḥwajihum Yūsuf b. ‘Ömer el-sā‘ātī al-muwaqqit fi’l-jāmi‘ al-jadīd al-sultān Muḥammed Khān.*”

⁸⁴ Ömer Lütü Barkan, “Ayasofya Cami’i ve Eyüb Türbesinin 1489-1491 yıllarına ait muhasebe bilançoları,” *İÜ İktisat Fakültesi Mecmuası* 23/1-2 (1962-3), 349. Cf. Ahmed Refik (Altınay), “Fatih Devrine ait Vesikalar,” *Tarih-i Osmani Encümeni Mecmuası*, v. 8-11, no. 49-62 (1335/1919), 1-58.

⁸⁵ MAD 7118. According to this register covering the years 1548 and 1549, Yūsuf b. ‘Ömer was receiving twelve *aḳçes*, whereas ‘Alī, who is known as Riyāzī, was making only six *aḳçes* a day,

Such circumstantial and thin evidence on the status of *muwaqqits* and instruction of rational sciences in the *madrasa* and/or mosque environment is not a proof to the formal teaching of strict astrological knowledge in these institutional settings. In fact, had manuals and textbooks on astrological principles been instructed in the *madrasa* setting, one would have expected to find many more surviving copies of these texts. Notwithstanding the fact that there was no formal instruction of strictly astrological texts in the *madrasa* setting, astrological practice itself—as well as the sister category of divinatory sciences—was an integral part of the daily lives of at least some of those *mudarrises*, who might have approached these sciences either as a legitimate field of knowledge and/or as a tool for entertainment and leisure-time activity to appeal from time to time to cope with the perennial question of predicting the unforeseeable future. The interest of at least some *mudarrises* in these practices can easily be corroborated by an array of surviving evidence gleaned from paratextual notes in manuscripts, inventories of private book collections, and contemporary biographical and autobiographical accounts.

The circulation of astrologically informed texts among *mudarrises* in the course of the late fifteenth and the first half of the sixteenth century is documented by ownership notices in manuscripts or inventories of private book collections. For example, the almanac-prognostication (*taqwīm*) produced for Meḥmed II for the year 872/1468 seems to have possessed by a certain Ca‘fer b. ‘Ivaż, who was the *mudarris* of the Torumtay *madrasa* in Amasya around the mid-sixteenth century. It is not clear how this presentation copy produced for the sultan passed later into the hands of a petty ‘*ālim* from Anatolia but Ca‘fer not only recorded his own name on the frontispiece as the owner of the copy but also made intriguing calculations as to the exact

a fact that seems to have irritated him. More details on Riyāzī’s life and resentment could be found in Chapter 3 and 5.

number of years remained until the end of the world. According to the contents of these notes he apparently put them in 959/1551-2, about 87 lunar years after the original composition of the *taqwīm*. In the chronology section of the *taqwīm* is written that 4,570 years have elapsed since Noah's flood. Ca'fer *mudarris* here adds 87 years (28 years till the turn of 900, and additional 59 years up until his own day) and finds a total of 4,656 years that have fully passed. He then writes that there is a 1,200-year difference between [the birth of] Adam (i.e., the Creation) and the flood of Noah. He adds it to the previous 4,656 and reaches 5,856. According to the belief of the world's having a 7,000-year lifespan, which Ca'fer *mudarris* seems to have embraced, there were then 1,144 years left till the end of the world.⁸⁶ This mid-sixteenth-century scholar from Amasya presents us a unique case of a *mudarris* engaging an astrological text with contemporary debates on the age of the world and the timing of the apocalypse.⁸⁷

⁸⁶ Bodleian Arch. Sel. 31, 1a: “*müddet-i dünyā yedi biñ yıl imiş, bu taqdırce bākī 1,144 yıl daħi vardır ki yedi biñ yıl tamam ola vallāhu ‘ālem.*” The sources of the belief establishing the age of the world as 7000 years seem to be related to the *hadith* literature, some of which were even collected by prolific jurists and theologians as al-Suyūṭī (d. 1505). In the astral lore, however, the world year concept and the chronological calculations from the Flood onwards are not explainable by any single derivation. On the complexity of the issue and available sources, see Edward Kennedy, “The World-Year Concept in Islamic Astrology,” in *Studies in the Islamic Exact Sciences*, ed. David King and Mary Helen Kennedy (Beirut: American University in Beirut, 1983), 351-371.

The life span of the world

⁸⁷ Although debates and expectations about the imminency of the apocalypse was a theme frequently visited in the fifteenth and sixteenth century Ottoman realm by contemporary literati and individuals with overt Sufi leanings, astrological texts from the period, with the possible exception of popular *malhama* literature, are surprisingly little informed by the apocalyptic discourse. For examples of the penetration of apocalyptic discourse into the textual outputs from the period, see Cornell H. Fleischer, “The Lawgiver as Messiah: The Making of the Imperial Image in the Reign of Suleyman,” in *Soliman le magnifique et son temps*, ed. Gilles Veinstein (Paris: La Documentation Française, 1992), 159-177; *idem.*, “Mahdi and Millennium: Messianic Dimensions in the Development of Ottoman Imperial Ideology,” in *The Great Ottoman-Turkish Civilization*. Vol. 3, *Philosophy, Science and Institutions*, ed. by Kemal Çiçek, 42-54; Barbara Flemming, “Sāhib-ķırān und Mahdī: Türkische Endzeiterwartungen im ersten Jahrzehnt der

There were several other *madrassa*-affiliated individuals, who were actively interested in the composition of astrological texts, particularly of annual almanac-prognostications (*taqwīm*). Mīrim Çelebi, for example, about whom more details will be presented in the next chapter, used to write almanac prognostications while he was a *mudarris* in the teaching institutions of Bursa and Edirne. In a similar vein, Qāḍī-i Baghdād (d. later than 1512), who escaped first to Mardin, then to the Ottoman lands in western Anatolia after Shah Ismā‘il’s progress towards ‘Irāq-i ‘Ajam and his concomitant persecution of Sunni scholars, produced in the year 913/1508 a decorated almanac-prognostication while he was the *mudarris* of the Sultaniyye *madrassa* in Bursa.⁸⁸ The production of almanac-prognostications by *mudarrises* remained a standard phenomenon well into later centuries. Apparently, a seventeenth-century *taqwīm* in Arabic from around the year 1628 with surprisingly candid astrological predictions about sultan Murād IV (r. 1623-1640) was written by the *mudarris* of the *madrassa* of Sarghatmish in Cairo.⁸⁹

The period also witnessed the penetration of astrologically valid books into the private collections of scholars as well as *madrassa* libraries. Through a few curious archival registers that list the titles of surviving items in the private collections of the ‘*ulamā*’ or the *madrassa* libraries is possible to more accurately evaluate which astrologically valid books were favored by contemporary scholars.

The most important of these records is the detailed inventory of books prepared a few

Regierung Süleymāns,” in *Between the Danube and the Caucasus*, ed. by György Kara (Budapest: Akadémiai Kiadó, 1987), 43-62.

⁸⁸ Qāḍī-i Baghdād, *Taqwīm*, British Library Or. 6432/2. Qāḍī-i Baghdād’s name is recorded on the contemporary register of gifts and payments as the recipient on April 25, 1508 of 1,500 silver *aḳçes* for his debut presenting the sultan with his *taqwīm* (*ibtidā’-i ‘ādet-i Mevlānā Sinān Qāḍī-i Baghdād ... ki taqwīm āvord*) Atatürk Kitaplığı Muallim Cevdet O. 71, 263.

⁸⁹ The University of Michigan Library Islamic Manuscripts Ms. 794: “*hadhā taqwīm Mawlānā al-sayyid al-majīd ṣāhib al-faḍl al-zā’ir mudarris al-Sarkhatmishiyya.*”

years after the death of Mü'eyyedzāde 'Abd al-Raḥmān that enumerates all the titles retrieved from his massive 7,000-volume collection.⁹⁰ As already discussed in greater detail in the first chapter, Mü'eyyedzāde's significance rests upon his long teaching and administrative service at the highest ranks of the *'ilmiyya* hierarchy that enabled him to, teach new generations of scholars and administer appointments in the scholarly bureaucracy. Given his vast impact on the formation of the next generation of Ottoman *'alims*, it may be quite telling to reconstruct the intellectual predilections of Mü'eyyedzāde. In addition to his own but limited writings, one of which was already introduced in the first chapter, the inventory of books that lists the titles of surviving items from his *bibliotheca* gives us a special opportunity to delve into the intellectual world of an influential early sixteenth-century Ottoman scholar.

As a student primarily of Jalāl al-Dīn Dawānī (d. 1502), who showed a marked interest in mathematical-philosophical quests in addition to his intensive study of traditional Islamic sciences, it is unsurprising to see Mü'eyyedzāde paying special attention to books on different branches and genres of celestial knowledge, ranging from *hay'a* and *aḥkām* to celestial magic and other occult practices.⁹¹ According to the *ijāza* given to him on 11 Jumādā I 888/17 June 1483, Dawānī licensed him to transmit books in the fields of both transmitted (*naqlī*) and rational (*'aqlī*) sciences. The *ijāza* identifies four texts that Mü'eyyedzāde studied with Dawānī and two of these texts are specifically on theoretical astronomy and geometry. The first one is Qāḍizāda al-Rūmī's commentary on Chaghmīnī's *al-Mulakhkhaṣ fī'l-hay'a* that Mü'eyyedzāde read "from

⁹⁰ TSMA D. 9291/1-2.

⁹¹ There is no monograph on Dawānī in English. For monograph-length studies on his life and works, see Harun Anay, "Celâleddin Devvânî. Hayatı, Eserleri, Ahlâk ve Siyaset Düşüncesi." (Ph.D. Dissertation, Istanbul University, 1994); Stephan Pohl, "Theosophie und Theologie im nachmongolischen Iran: Leben und Werk des Ğalâladdîn al-Dawwânî (gest. 902/1502)." Unpublished work, Bochum, 1997.

its beginning to its end.” The other one is Ṭūsī’s *Tahrīr Iqlīdīs*, an expositional work on Euclidian geometry.⁹²

The inventory of surviving books from Mü’eyyedzāde’s massive library is quite representative of almost all the canonical works of Islamic *corpus astronomicum* and *corpus astrologicum* that contemporary *munajjims* in the Ottoman realm also preferred. As an avid collector and reader of *zīj*es, Mü’eyyedzāde seems to have collected in his library more than fifteen volumes of *zīj*, which include at least two copies of the Ulugh Beg tables, two copies of the Ilkhanid tables, two copies of unspecified commentaries on the Ilkhanid tables, two copies of Wābkanawī’s tables, one of which he purchased in the town of Ladik in late 1477,⁹³ one copy of Jamshīd al-Kāshī’s *Zīj-i Khāqānī*, one copy of an unspecified commentary on the Ulugh Beg tables, one copy of *al-Zīj al-Shāmil*, and one copy of the *zīj* of Mevlānā Kūçek Yezdānbaḥş, which was composed and presented in Amasya to Bāyezīd II in the year 1477. Based upon his personal notes on the single surviving manuscript copy of this last *zīj*, Mü’eyyedzāde seems to have possessed it soon after it was composed. He apparently made several astrological calculations in light of the tables offered by Mevlānā Kūçek. Apart from the *zīj* tradition of the Islamic East, Mü’eyyedzāde was also interested in astronomical tables prepared in the western end of the Mediterranean. Although it is not specified in the inventory, around the year 1502 the Jewish émigré-scholar Moses Galeano prepared the Arabic translation of Abraham Zacuto’s (d.

⁹² Judith Pfeiffer, “Teaching the Learned: Jalāl al-Dīn al-Dawānī’s *Ijāza* to Mu’ayyadzāda ‘Abd al-Raḥmān Efendi and the Circulation of Knowledge between Fārs and the Ottoman Empire at the Turn of the Sixteenth Century,” in *The Heritage of Arabo-Islamic Learning. Studies Presented to Wadad Kadi*, ed. Maurice A. Pomerantz and Aram A. Shahin (Leiden: Brill, 2016), 284-332.

⁹³ Now available at SK Ayasofya Ms. 2694.

1515) *Almanach Perpetuum* and dedicated it to none other than Mü'eyyedzāde.⁹⁴

In addition to the *zīj* corpus, Mü'eyyedzāde was almost equally interested in other branches and genres of celestial knowledge. In terms of more theoretical astronomical works (i.e., *'ilm al-hay'a*), his library housed copies of the Islamic corpus of the *Almagest* commentaries (e.g., Ṭūsī's *Tahrīr al-Majisī*, Qāḍīzāda's *Hāshiyā li-Majisī*, or other unspecified copies like *Kitāb-i Majisī*), and theoretical astronomical works produced especially in the post-thirteenth century Persianate East, including Chaghmīnī's *al-Mulakkhaṣ fī'l-hay'a al-basīṭa*, Ṭūsī's *Tadhkira fī al-hay'a*, Quṭb al-Dīn Shirāzī's *Tuḥfa al-shāhiyya*, and Qāḍīzāda's commentary on Chaghmīnī's work. With respect to treatises on instruments used for celestial observation and calculation, the inventory contains several copies of astrolabe treatises, including Ṭūsī's *Risāla-i Bīst Bāb fī dar ma'rifat-i usṭurlāb* and another book on observational methods (*Kitāb a'māl-i raṣadiyya*).

Regarding strictly astrological textbooks, one can find almost all the canonical works in Mü'eyyedzāde's voluminous library including (Pseudo-) Ptolemy's *Thamara*, Ṭūsī's *Sī faṣl*, Kūshyār's *Mujmal*, Bīrūnī's *Tafhīm*, Shāhmardān-i Rāzī's *Rawḍat al-munajjimīn*, 'Alī-Shāh's

⁹⁴ María José Parra Pérez, "Estudio y edición de las traducciones el árabe del Almanach perpetuum de Abraham Zacuto" (Ph.D. Dissertation, Universitat de Barcelona, 2013). I would like to thank Julio Samsó for bringing this study to my attention.

On Zacuto and the influence of his *Almanach*, see José Chabás and Bernard R. Goldstein, *Astronomy in the Iberian Peninsula: Abraham Zacut and the Transition from Manuscript to Print* (Philadelphia: American Philosophical Society, 2000). On Galeano and his scientific activities during his sojourn in the Ottoman capital, see Tzvi Langermann, "From My Notebooks: A Compendium of Renaissance Science: *Ta'alumot Hoḳmah* by Moses Galeano," *Aleph* 7 (2007), 285-318; *idem.*, "From My Notebooks: Medicine, Mechanics and Magic from Moses ben Judah Galeano's *Ta'alumot Hoḳmah*", *Aleph*, 9/1 (2009), 353-377; Robert Morrison, "An Astronomical Treatise by Mūsā Jālīnūs alias Moses Galeano," *Aleph* 11/2 (2011), 385-413; *idem.*, "A Scholarly Intermediary between the Ottoman Empire and Renaissance Europe," *Isis* 105 (2014), 32-57.

Aṣmār va ashjār, and unspecified works of Abū Ma‘shar. Last but not least, Mü‘eyyedzāde’s collection also contains works on celestial magic and other divinatory practices including the *Shams al-ma‘ārif* of al-Būnī, *al-Sirr al-maktūm* of Fakhr al-Dīn Rāzī, *Ghāyat al-Hakīm* attributed to al-Qurṭubī (d. 964), and generic titles on talismans (*Risāla fī ‘ilm al-ṭilsim*), oneiromancy, and lettrism (*‘ilm al-jifr*).

There is definitely a need for further research to explore the curricular and extra-curricular activities of Mü‘eyyedzāde’s students as well as many other Ottoman ‘ālims from the sixteenth century in order to better evaluate the extent of the interest of traditional *madrasa*-educated scholars in celestial matters. The case of Mü‘eyyedzāde may seem rather exceptional, especially given his close proximity to Bāyezīd II whose immense astral interests will be discussed in further detail in the next chapter. Nevertheless, we still have evidence, albeit sporadic, that among the *mudarrises* of the first half of the sixteenth century were there certain individuals seeming curious about, if not deeply learned, in related fields of knowledge.

The two detailed inventories of the library of the *Saḥn madrasas*, one produced in the late fifteenth century containing 1241 volumes, the other compiled on 21 Rebī‘ūl-Āḥir 968/9 January 1561 enumerating 1770 volumes (with additional donated items), demonstrate that besides numerous works on sciences that were traditionally taught in *madrasas*, there were also several books important for astrological practice present at the time in the *madrasa* library.⁹⁵ The book holdings at the library of the *Saḥn madrasas* include volumes donated in the course of the late fifteenth and first half of the sixteenth century by different contributors including several

⁹⁵ The first of these catalogues is available at BOA. D. HMH. SFTH. 21941-B, and the other at TSMA D. 9559. Both of these catalogues have been introduced and partially discussed by İsmail Erünsal in his “Fatih Camii Kütüphanesine Ait En Eski Müstakil Katalog,” *Erdem* v. 9, n. 26 (1996), 659-665.

prominent scholars of the time and Meḥmed II himself. The introductory remarks of the first *defter*, which was written during the time of Bāyezīd II, makes it explicit that the register was prepared, first, to physically inspect the items in the library that had been donated by Meḥmed II, and second, to add to the already available inventory those books recently donated by various scholars.⁹⁶ The second *defter*, which was compiled in the year 1561 by one of the *Sahn mudarrises* at the time, Mevlānā Ḥācı Ḥasanzāde Efendi, was written with a similar aim of inspecting the items in the library and registering recent donations in the inventory.⁹⁷

Each inventory is divided into separate sections based upon the donations of individual benefactors. In each section, titles are classified according to disciplines, and the information on each item includes brief notes on the contents and material features of the volume (i.e., the number of folios, type of paper and script, etc.). The first category is *tafsīr* (Quranic exegesis) and it is followed in order by *hadith*, *uṣūl* [*al-fiqh*] (Principles of Islamic Jurisprudence or Legal Theory), *furūʿ* [*al-fiqh*] (Branches of Islamic Jurisprudence or Substantive Law), *kalām* (Islamic Scholastic Theology), Arabic language, and logic. The last category is often assigned to the miscellaneous works (*tafşıl al-kutub al-mutafarriqa*), which may list, depending on the intellectual proclivities of the donator, books on Sufism, history, medicine, mathematics, *ʿilm al-hayʿa* and *ʿilm al-nujūm*.

Although in any private collection of a scholar the number of items that could be associated with astrologically valid knowledge is unsurprisingly limited in contrast to the books

⁹⁶ BOA. D. HMH. SFTH. 21941-B, 2a: “*Mecmūʿ-ı kütüb-i sulṭāniyye yedi yüz toksan altı ve sâbıkan mütevellî olan Mevlānā Yegānoĝlı virdüĝi bedeller kırk bir ʿaded ve sâʿir mevālî-i kirām vakf itdikleri kitāb cümle üç yüz seksen tokuz ve defter-i ʿatîkde bulunmayub kitābhānede mevcūd olan kitāblar on beş ʿaded, cemʿen: 1241.*”

⁹⁷ TSMA D. 9559, 1a: “*Semāniye müderrislerinden Mevlānā Ḥācı Ḥasanzāde Efendi yoklayub yazdıĝı kitāblar defteridür...*”

on traditional sciences, the inventories are still important for proving the presence of such works among the holdings of the *mudarrises*. For example among the forty-one items granted to the *madrassa* by Mevlānā Aḥmed Çelebi b. Yegān (d. first half of the sixteenth century), the greater majority of items are related to *uṣūl al-fiqh* and *furū‘ al-fiqh* but he seems to have possessed a copy of ‘Abdulwājid b. Muḥammad’s (d. 1435) commentary on Ṭūsī’s *Sī faṣl*.⁹⁸ Mevlānā Muḥyiddin from Alanya (d. first half of the sixteenth century) also seems to have had a copy of Ṭūsī’s *Sī faṣl*, as this was one of his sixty-five donations to the *madrassa*.⁹⁹ The most comprehensive set of books donated by a scholar descends from Ḥalebīzāde (d. later than 1540), who gave 333 volumes to the *Sahn* library. Among these items the ones that deserve particular mention are as follows:

- i) A *majmū‘a* containing various works on judicial and horoscopic astrology as well as sections from Rāzī’s book on celestial magic, *al-Sirr al-Maktūm*, and the sayings of the ninth-century Jewish astrologer Māshā’llāh.¹⁰⁰
- ii) Another *majmū‘a* consisting of textbooks on the use of astronomical instruments and application of astrological principles as well as geometry and ‘*ilm al-hay‘a*.¹⁰¹

⁹⁸ BOA. D. HMH. SFTH. 21941-B, 35b: “*Kitāb Sharḥ Sī faṣl li-Mawlānā Wājid, Dimaṣḳī niṣfindan kırılmış, kırmızı cildlü, yüz tokuz varak*”

⁹⁹ Ibid., 49a: “*Kitāb risāle-i Sī faṣl min ‘ilm al-nujūm, Dimaṣḳī niṣfina saru kāğıd, muḳavva cildlü, yigirmi dört varak*”

¹⁰⁰ TSMA D. 9559, 75a: “*Kitāb majmū‘ fīhi...faṣl fī ma‘rifat masīr al-Shams wa’l-Qamar wa’l-kawākib wa aḥkāmihā wa faṣl fī ma‘rifat sinnī al-‘ālam bi-ḥasb ṭawāli ihā min al-burūj ... wa ba‘z fawā‘id min al-sirr al-maktūm li’l-imām Rāzī ...wa faṣl min kalām Māshā’llāh yata‘alliq bi’n-nujūm wa kitāb dalā’il al-shuhūr al-Rūmiyya wa’l-‘Arabiyya wa kitāb yata‘alliq bi’n-nujūm ... wa fawā‘id tata‘alliq bi’n-nujūm.*”

iii) Nīzām al-Dīn al-Nīsābūrī's commentary on Ṭūsī's *Sī faṣl*.¹⁰²

Such examples as to the literacy of some of the sixteenth-century *mudarrises* in the field of astrological knowledge could easily be extended with further archival, manuscript, and literary evidence. According to the *waqfiyya* of the books donated by a certain Mawlānā Shaykh Ishāq b. ʿAbd al-Razzāq, a mid-sixteenth-century scholar in Istanbul, one copy of *Kitāb al-Thamara*, one copy of an unspecified commentary on Ṭūsī's *Sī faṣl*, and two copies of a treatise on the astrolabe were possessed by him along with many other works on philosophy, medicine, and *ʿilm al-hayʿa*.¹⁰³ Another lesser-known mid-sixteenth-century *mudarris* that showed a marked interest in the relevant lore was Żaʿifī (d. later than 1557), who, around the late 1540s, personally copied,—either for his own personal interest or for the use of broader readership—texts on astronomical instruments, astrological principles, and divinatory practices. Quite intriguingly, on one of the folios of this *mecmūʿa*, Żaʿifī recorded a short note on the application of a simple prognostication technique to calculate whether an individual who asks for the benevolence of an influential person would attain his desire or not. According to his prognostication, the matter he has requested from Rüstem Paşa, the grand vizier of the time, would eventually turn out well after a certain level of suffering and uncertainty.¹⁰⁴ Apart from archival and manuscript evidence,

¹⁰¹ Ibid., 75b: “*Kitāb majmūʿ fīhi kitāb Iqlīdis wa kitāb ḥall shukūk Iqlīdis wa risāla fī ṣuwar al-kusūf li-ibn al-Haytham ... maqāla lahu fī samt al-qibla biʿl-ḥisāb ... wa risāla fīʿl-uṣṭurlāb wa kitāb al-mudkhal fī ʿilm al-nujūm wa risāla fī aḥkām al-nujūm ... wa risāla fīʿl-uṣṭurlāb.*”

¹⁰² Ibid., 77a: “*Kitāb sharḥ Sī faṣl fī ʿilm al-nujūm li-Nīzām al-Dīn al-Aʿraj, tamam-ı Dimaşķī tamamından kırılmış ... muḳavva cildlü ... taʿlīķ ḥattla yazılmış, otuz varak*”

¹⁰³ See Ömer Lütü Barkan, Ekrem Hakkı Ayverdi, *İstanbul Vakıfları Tahrir Defteri: 953 (1546) tarihli* (Istanbul: Baha matbaası, 1970), 439-40. See also Faruk Bilici, “Les bibliothèques vakıf-s à Istanbul au XVI^e siècle, prémices de grandes bibliothèques publiques,” *Revue des mondes musulmans et de la Méditerranée* 87-88 (1999), 39-59.

¹⁰⁴ See Kandilli Rasathanesi Library Ms. 123, 3a: “*Benüm ḥācetüm fulan kātında ḥāşıl olur mı olmaz mı? Kendü ismiñ ḥisāb eyle ve ol ḥācet taleb itdügiñ ismin ḥisāb eyle. Daḫı cümle eyle, üç*

contemporary literary sources also document the preoccupation of some *mudarrises* with astrological and other divinatory curiosities. In the *Leṭā'if* compilation of Zāṭī (d. 1546), one of the most prominent poets of the sixteenth century, there are anecdotes about *Sahn mudarrises*, who frequented Zāṭī's geomancy shop located in the Beyazıt neighborhood of Istanbul to have Zāṭī cast their lots and read their fortunes.¹⁰⁵

Despite all the evidence on the appeal of *mudarrises* to astrological and other divinatory practices, the sporadic appearance of the phenomenon does not necessarily help us decisively argue that astrologically valid knowledge and divinatory sciences were formally instructed in the *madrasas* and/or the mosque complex.¹⁰⁶ It is thus safe to conclude here that although

tarh eyle. Bir alsa hāşıl olmaz, iki alsa hāşıl olur, üç alsa zahmetle hāşıl olur. Meselā: Muḥammediñ Rüstemden hāceti revā olur mı? 'Aded-i Rüstem 700, 'aded-i Muhammed 92, [iki 'adedi cem' idüb] üç tarh etdiñ 3 bāqī qaldı. Hāceti zahmetle revā olur diriz." The hypothetical Muḥammed and Rüstem in this short note are likely referring to Zā'ifī (whose real name is none other than Muḥammed) and the grand vizier of the day, Rüstem Paşa. As far as Zā'ifī's *Münşeat* collection is concerned, around exactly this time, he sent Rüstem Paşa two separate letters, asking for his help to be appointed to the *Sahn madrasas*. See TSMK Revan Ms. 822, 192a-193a, 194a-194b.

¹⁰⁵ One particular story is related about Muḥammed Shāh Çelebi (d. 1532-3), one of the *mudarrises* of the *Sahn* at the time who apparently asked Zāṭī to prepare and interpret for him a *wafq* (magic square) table. See Mehmed Çavuşođlu, "Zatı'nin Letayifi I," *İÜEF Türk Dili ve Edebiyatı Dergisi* 18 (1970), 1-51.

¹⁰⁶ The details provided by the *Kevākib-i Seba'a*, the most comprehensive study of the teaching curriculum in the Ottoman *madrasas* written in the first half of the eighteenth century at the request of the French ambassador in Istanbul, also establish that no formal class was taught in the *madrasas* on astronomical instruments or astrological techniques. The text, however, intriguingly mentions that *madrasa* students would like to take the weekly vacation days (Tuesday and Friday) as an opportunity to study treatises on astrolabes and divinatory practices. It is interesting to note here that the hands-on study of the science of the astrolabes and quadrants was required to be performed in the open air; thus students preferred working on these subjects during the summer. The passage also demonstrates the desire of students to deal with occult practices but their instructors would not allow them. See Nasuhi Ünal Karaarslan (ed.), *18. Asrın Ortalarına Kadar Türkiye'de İlim ve İlmeye Dair bir Eser: Kevākib-i Seb'a Risālesi* (Ankara: TTK, 2015), 77-78: "Ve ma'lūm ola ki 'ulemā ṭullābıñ ṭabāyi'ine melāl gelmeyüb dā'imā 'ilme müteşevvik olmak için yevm-i şüleşā ve yevm-i cum'ayı hāşılı haftada iki günü ta'fil i'tibār itmışlerdir. Bu

astrological and cognate divinatory practices might have been a regular component of urban social life around the *madrassa* and the mosque, one cannot speak of formal instruction of these sciences at the educational institutions of the time. Unlike some contemporary European universities where there were chairs for astrological instruction, the astrological practice in the Ottoman (and Islamic) dominion seems to have lacked such an important component.

Where could, then, would-be *munajjims* and aspirants of astrological practice obtain their knowledge? As George Saliba outlines in his influential article on the role of *munajjims* in the medieval Islamic world, private tutoring was the most common method in the early-modern Ottoman context for the training in and transmission of astrologically valid knowledge. One-on-one teaching, however, does not necessarily contradict the institutional character of education. Instead, private tutoring often took place within the semi-institutional framework of the court. In the next chapter I will discuss in detail fashion the gradual formation of the office of court *munajjims* in the Ottoman palace by the reign of Bāyezīd II and its impact upon the vocational training and later professional careers of practicing *munajjims*.

iki günde t̄ullāb ba'z-ı levāzımātını rü'yet ider ve yaz günü ise ba'z-ı mesīre maḥallere seyre giderler ve anda daḥı yine pek boş durmayub ḥisāb ve 'ilm-i hendese ve usturlāb ve rub' ve mesāḥa ve 'ilm-i ḥisāb-ı hindī ve kıptī ve zencī ... ve ba'z-ı bu mişillü müstākilen derse muḥtāc olmayan 'ilmi müzākere iderler. Ve kış günü ise gicelerde şoḥbet idüb ba'z-ı mu'ammā ve elgāz ve muḥāzārāt ve tārīḥ ve edebiyāt ve 'arūz ve devāvīn müzākere iderler ba'zısı 'ulūm-ı garībeye daḥı mürāca'at ister amma müşkil olmaḡla ḥāceler izin virmezler.”

Chapter Three—Royal Patronage of Astrology, the Office of the Court *Munajjims*, and the Special Case of the Reign of Bāyezīd II (r. 1481-1512)

III. 1. Introduction

Having overviewed the sources *munajjims* needed for their training, and the limited role of the *madrasa* as well as the *muwaqqitkhāna* in the production and circulation of astrologically valid knowledge, it is in order now to focus upon the royal court, which was the single most important institutional form for the patronage of *munajjims* and transmission of relevant knowledge in the early modern Ottoman world. We should, however, keep always in mind the multifarious nature of the court in the medieval and early modern era. The “court” in the medieval context generally refers to the extended household of a ruler, accompanied by his family members, entourage, and servants in various capacities; whereas the early modern court has often been considered more than a household. It was indeed “an abstract totality”, composed of individuals “in service to, but not necessarily in immediate attendance upon, a sovereign.”¹ Nevertheless, despite the gradual development of the early modern court out of the medieval royal household, the personal interests and cultural affinities of the ruler often shaped, in both cases, the contours of the court life. Hence, one should be careful to differentiate between the court cultures of different rulers even under the single dynasty.

Moreover, in the context of the patronage of arts and sciences in any court culture, one

¹ Bruce T. Moran, “Courts and Academics,” in *The Cambridge History of Science*, vol. 3 *Early Modern Science*, ed. Katharine Park and Lorraine Daston (New York: Cambridge University Press, 2008), 251-271. For the discussion on the transformation of the medieval royal household to the early modern court, see Ronald G. Asch and Adolf Birke (ed.), *Princes, Patronage, and the Nobility: The Court at the Beginning of the Modern Age, c. 1450-1650* (Oxford: Oxford University Press, 1991).

should also distinguish between the courtly patronage of individual experts in a particular craft and the systematic institutional support for their expertise. As Sonja Brentjes aptly remarks in her examination of the courtly patronage of mathematical sciences in the medieval and early-modern Islamic world, one of the key aspects of the patronage culture was that “[r]uler supported scholars, not disciplines.”² The royal support for individual experts consequently fostered the cultivation of that particular expertise but Brentjes’s remarks are important for drawing attention to the impermanent nature of scientific patronage that was shaped largely by the intellectual proclivities of individual patron rulers. We should thus keep it in mind that in the pre-nineteenth century Ottoman context where it is difficult to speak of a deliberate state policy or a powerful artisanal/entrepreneurial medium for the support of scientific and technological advancement, individual patronage of rulers was the key mechanism for the astral experts to pursue their aspirations.³ Yet patronage itself was by nature shaped by the immediate needs and inclinations of the sovereigns. The preferences of patron rulers, or princes, were subject to change as their tastes and immediate concerns mutated. Therefore, *munajjims*, like many other artists and individuals from diverse fields of expertise, were vulnerable to these fluctuating dynamics of the complex patronage culture.

The appeal to the expertise of *munajjims* is indeed one the salient themes of court life

² Sonja Brentjes, “Courtly Patronage of the Ancient Sciences in Post-Classical Islamic Societies,” *al-Qantara* 29 (2008), 410.

³ The influence of wealthy urbanites and learned individuals in the production of scientific knowledge and material technology still waits to be thoroughly studied in the early modern Ottoman context. For some initial remarks on the question, see Miri Shefer-Mossensohn, *Science among the Ottomans. The Cultural Creation and Exchange of Knowledge* (Austin, TX: University of Texas Press, 2015), esp. 121-141. See also: Bekir Harun Küçük, “Early Enlightenment in Istanbul.” (Ph.D. Dissertation, University of California, San Diego, 2012), esp. 104-126.

throughout the medieval and early-modern era in the entire Eurasian landmass, and the Muslim dynasties were also not exempt from this trend notwithstanding the constant objections raised from different social circles against the practice of astrology.⁴ As already mentioned in the previous chapter, the millennium-long history of the courtly interest in the service of *munajjims*, from the Abbasids to the Mughals, has been discussed usually in discreet episodes by having recourse to scattered anecdotal evidence in biographical dictionaries, *ādāb* works, chronicles and other historical accounts.

From the perspective of the patron rulers, employing an individual *munajjim* or a legion of them had several important facets. First of all, the expertise of *munajjims* that incorporated mathematical competence, calendrical knowledge, and astrological know-how with ancillary familiarity with topographical matters had numerous practical benefits in the making of necessary temporal and spatial calculations. Though more substantial evidence is required for laying out the exact scope of services they offered as individuals learned in the broader discipline of mathematical sciences (*al-‘ulūm al-riyādiyya*), the wide-ranging expertise of *munajjims* must have been demanded in an array of fields such as calendar conversion and taxation, land survey and navigation, temporal assignments for undertaking imperial enterprises, and of course

⁴ Aside from the studies briefly mentioned in the second chapter on the courtly patronage of astral experts in the medieval and early-modern Islamicate culture, there is a vast literature in European and East Asian historiography. The following works I find particularly useful for many overlapping issues: Hilary M. Carey, *Courting Disaster: Astrology at the English Court and University in the Later Middle Ages* (New York: St. Martin's Press, 1992); Anthony Grafton, *Cardano's Cosmos: The Worlds and Works of a Renaissance Astrologer* (Cambridge, Mass.: Harvard University Press, 1999); David W. Pankenier, *Astrology and Cosmology in Early China: Conforming Earth to Heaven* (New York: Cambridge University Press, 2013); Monica Azzolini, *The Duke and the Stars: Astrology and Politics in Renaissance Milan* (Cambridge, Mass.: Harvard University Press, 2013); Darin Hayton, *Crown and the Cosmos: Astrology and the politics of Maximilian I* (Pittsburgh, Pa.: University of Pittsburgh Press, 2015).

prognosticating the future course of actions. In especially regard to the system of time reckoning, the challenging task of intercalation and establishing harmony among different calendar systems was vital to regulate the social and economic life. For instance the discrepancy between solar and lunar calendars periodically invoked financial hardships due to the concomitant discordance between tax revenues and salary payments. While the former was collected according to the solar calendar, the latter was made based upon lunar months.⁵ This explains why from especially the late-sixteenth century on was there a visible concern in the financial branch of the Ottoman bureaucracy as to intercalating different calendars.⁶ In addition to the problems derived from the discrepancy between solar and lunar calendars, determining the first day of each month also often arose contradictions. In establishing the first day of any lunar month, and thus the beginning of Ramađān for instance, *ehl-i şer'* preferred methods that solely depended upon observing the position of the moon with naked eyes; whereas *ehl-i nücüm* had recourse to

⁵ For the classical study on the financial problems caused by the discrepancy between the solar and lunar years, see Halil Sahilliođlu, "Années siviş et crises monétaires dans l'Empire ottoman," *Annales. Économies, Sociétés, Civilisations* 24/5 (1969), 1071-1091, also published in English as "Siviş year crises in the Ottoman Empire," in *Studies in the Economic History of the Middle East*, ed. A. Cook (London: Oxford Universtiy Press, 1970), 230-252.

⁶ One contemporary evidence of this concern in the financial bureaucracy is a short treatise written in Sha'bān 989/December 1572 by a certain Seyfullāh Çelebi *defteri*. As evident from his epithet, he was from the finance department of the bureaucracy. The text he wrote was aimed at intercalating solar and lunar calendars to reduce the financial problems. See SK Hacı Mahmud Efendi Ms. 6344, 85b-88b. For another textual example of intercalation composed in the early eighteenth century, see: Salim Aydüz, "İsmet Mehmed Efendi (ö. 1747) ve *Tedahül-i Seneye Dair Risalesi*," *Kutadgubilig* 15-16 (2009), 223-264.

The indication of dates in zodiacal/astrological terms in some of the surviving bureaucratic documents hints that the scribal unit at the court was really utilizing the calendrical knowledge produced by the court *munajjims*. One entry from a *ru'us* register recorded on 16 Dhū'l-hijja 953/February 7, 1547 specifies the date as the 28th degree of Aquarius. See Nejat Göyünç, "XVI. Yüzyılda Ruus ve Önemi," *İÜEF Tarih Dergisi* XVII/22 (1967), 24: "yigirmi sekiz burc-ı delv, yedi Şubat,"

demanding astronomical and mathematical calculations.⁷ While this minor discrepancy did not have consequences as severe as those caused by the problem of harmonizing dates between different calendar systems, it still had an inevitable impact upon the accuracy (or lack thereof) of the chronological information of events given in historical narratives and chronicles.⁸

The practical benefits of employing *munajjims* by nature included their service of partaking in the interpretation of, and the advice on, the short and long-term political and military decisions through astrological reasoning. Besides the appeal to *munajjims*' interpretations and predictions about the intended imperial actions, the royal patronage of *munajjims* also mattered as an important political instrument and even a powerful medium of

⁷ There is a vast literature on the scientific calculations of the lunar crescent visibility in different contexts of the medieval Islamicate culture. For a useful summary of the discussion, see: David King, "Lunar Crescent Visibility Predictions in Medieval Islamic Ephemerides," in *Quest for Understanding: Arabic and Islamic Studies in Memory of Malcolm H. Kerr*, ed. S.M. Seikaly, R. Baalbaki, and P. Dodd (Beirut: American University of Beirut, 1991), 233-251.

In the absence of *muwaqqits* and/or other astral experts in certain provincial areas, it was mainly the judges and their deputies who were responsible for establishing the first day of the month by observing and recording, in front of witnesses, the first visibility of the crescent. For a rich documentation of evidence culled from Ottoman local court records, see Rifat Özdemir, "Çeşitli Kültürlerde Zamanı Ölçme Faaliyetleri ve Bu Konuda Osmanlı Mahkemelerinin Uygulamaları II," *Türk Dünyası Araştırmaları* 144 (2003), 559-590.

The implications of the temporal conflicts between the calculations of the *ehl-i şer'* and *ehl-i nücüm* need to be further investigated. The question is still valid in the Islamic World today, as at the beginning of Ramadan each year debates emerge about the beginning of the holy month and the ensuing festival. For an initial discussion on the scope and implications of such conflicts see King, "On the role of the muezzin and the *muwaqqit* in Medieval Islamic Society."

⁸ For cases of such conflicts in chronology, see Nicoara Beldiceanu et Irène Beldiceanu-Steinherr, "Considérations sur la chronologie des sources ottomanes et ses pièges," in *Studies in Ottoman History in Honour of V. L. Ménage*, ed. Colin Heywood and Colin Imber (Istanbul: Isis, 1994), 15-29; Colin Heywood, "The Shifting chronology of the Chyhyryn campaign (1089/1678) according to the Ottoman literary sources, and the problem of the Ottoman calendar," in *The Ottoman Empire. Myths, Realities and "Black Holes."* Contributions in honour of Colin Imber, ed. E. Kermeli and Oktay Özel (Istanbul: Isis, 2006), 283-295; Nicolas Vatin, "L'Homme d'État Ottoman, Maître du Temps: La Crise de 1566," in *Les Ottomans et le temps*, ed. by François Georgeon and Frédéric Hitzel (Leiden: Brill, 2012), 77-98.

propaganda.⁹ This ideological aspect of the patronage of *munajjims* has, however, dual implications: on the one hand, *munajjims*' interpretation of worldly events on astrological grounds and their sycophantic remarks for the reigning sovereign with full of heavenly metaphors, touting him as the supreme one among others certified by celestial portents, endowed the ruling party with irrefutable divine significance and recognition. On the other hand, the support given for a specific group of experts helped the sovereign easily disseminate his own image as a generous patron of knowledge. If the patron was also interested in the science itself, then it was even possible for him to reach his contemporaries as a learned ruler and even the idealized philosopher-king.¹⁰

The reasons of the royal appeal to celestial expertise, particularly to astrology, are captured succinctly by Shukrullāh Shirvānī (d. later than 1504-5), who in September 1489 presented Bāyezīd II a compendium of sciences entitled *Riyāḍ al-qulūb*, in which he discusses the true meaning and benefit of *'ilm al-nujūm* as follows:

“There is no discipline, save the religious sciences, nobler than *'ilm al-nujūm* ... Rulers and sultans have need of it because incidents like earthquake, flood, war, famine, plague and others occur in the sublunary world due to the influence of the conjunctions, eclipses, and various planetary aspects. If one is knowledgeable in this science and closely tracks these celestial phenomena, one may hope to be secure from all harm.”¹¹

⁹ See especially Darin Hayton's book on the uses of astrology for the purposes of imperial propaganda during the reign of the Holy Roman emperor Maximilian I (r. 1493-1519).

¹⁰ For the role of patronizing sciences, particularly the science of the stars, in the image-making of sovereigns in the late medieval and early-modern context, see: Robert Westman, “The Astronomer's Role in the Sixteenth Century: A Preliminary Study,” *History of Science* 8 (1980), 105-147, esp. 121-7; Mario Biagioli, *Galileo, Courtier: The Practice of Science in the Culture of Absolutism* (Chicago: The University of Chicago Press, 1993), esp. 1-11.

¹¹ SK Ayasofya Ms. 4024, 62b. “*ba'd az 'ulūm-i dīnī hīch 'ilm a'lā az 'ilm-i nujūm nīst...va muhtāj ilayhi mulūk va salāṭīn ast chūn bi-vāsiṭa-i ta'sīr-i qirānāt va kusūfat va sāir ḥālāt-i kavākīb dar 'ālam-i kavvān va faṣād vaqāyī' va zalāzil va ṭūfānāt wa muḥārabāt va qaḥṭ va vabā va amsāl-i ān vāqi' mī shavad. Agar kas īn 'ilm rā dānad va ān ḥālāt ra dar yābad va ri'āyat namāyad umīd ki az āfāt sālim mānad.*”

I will further substantiate below the practical benefits and symbolic meanings of the *munajjims*' services for the dynastic court when I will introduce the specific case of the reign of Bāyezīd II and the personal stories of the experts active at the courts of Ottoman sultans. I should note here that as manifested in the above summary of the existing literature on the presence of *munajjims* in the medieval and early-modern court life, the Ottoman case was no exception. While it is possible to argue, on the basis of anecdotal and epistolographical evidence, that there were also court *munajjims* in the earlier and contemporary dynasties such as the Abbasids, Rum Saljuqs, Ilkhanids, or the Aqquyunlus, the Ottomans provide us a rare opportunity to document the continuous and regulated service of *munajjims* through a unique set of archival and manuscript materials.¹² The gradual establishment of the office of court *munajjims* by the time of Bāyezīd II as an identifiable unit in the Ottoman bureaucratic structure was an important step in the institutionalization of the patronage of *munajjims* that significantly facilitated the vocational instruction of astrologically useful knowledge in the early-modern Ottoman realm.

It is the primary aim of this chapter to delineate the extent and ramifications of the unprecedented celestial interests at the court of Bāyezīd II that facilitated the influx of astral experts and expertise into the Ottoman capital from especially the Iranian world. While the efforts at his time were not always retained in the same extent by his successors, and the courtly

¹² *Insha* manuals produced in the Saljuq or Timurid times often include specific sections on how to properly address the *munajjims*, who are generally listed among other court personnel as physicians or scribes. See for instance Ḥasan b. 'Abdī'l-Mu'min el-Khūyī's *Gunyatu'l-kātib wa munyatu't-tālib* or Kāshifī's *Makhzan al-inshā*. The former was published by Adnan Sadık Erzi: *Selçukîler Devrine Aid İnşa Eserleri. Gunyatu'l-kātib ve munyatu't-tālib. Rusūmu'r-resā'il ve nucūmu'l-fazā'il* (Ankara: TTK, 1963). See also: Turan, *Türkiye Selçukluları Hakkında Resmi Vesikalar: Metin, Tercüme ve Araştırmalar*. The latter was located at BnF Ancient Fonds Persan Ms. 73. I would like to thank Colin Mitchell who has kindly let me know about the latter copy and its relevant contents.

enthusiasm for the expertise of *munajjims* seems to have gradually waned, if not entirely disappeared, by the second half of the reign of Süleymān —until it would be temporarily revived at the time of Murād III (r. 1574-1595)— Bāyezīd II’s input left a decisive imprint on the ways astrology was practiced in the Ottoman world in the following centuries. In parallel with these discussions, I will also insert the personal stories of a number of practitioners from the period in question to put more flesh on the bones of what has been described about the complex social history of the *munajjims*.

III. 2. The Royal Patronage of *Munajjims* at the Ottoman Courts and the Reign of Bāyezīd II (r. 1481-1512)

The earliest hard evidence of a *munajjim* at the service of an Ottoman ruler only dates to the first half of the fifteenth century, yet it does not strain credibility to assume that there were *munajjims* functioning ad hoc around the ruling party from its early days on. While there are *taqwīms* that came down to us from the time of Mehmed I (r. 1410-1421), the earliest extant *taqwīm* featuring the autograph of a *munajjim* is from the reign of Murād II (r. 1421-1451).¹³ In the year 842/1439, a certain Ībrahīm b. *shaykh al-munajjimīn wa-r-rammāl*, known also as Ibn al-Jamāl, presented the sultan with a *taqwīm* in Persian in which he conveys his astrological predictions as to the fortunes and mishaps of the upcoming year.¹⁴ The wording of his autograph

¹³ According to Nihal Atsız’s study on the earliest Ottoman *taqwīms*, the 824/1421 *taqwīm* is housed as SK Muhtelit 1227. Unfortunately, there is no such collection today in the Süleymaniye Library and my research there did not yield any positive result to have access to this copy. Atsız published in his book the chronology section of the *taqwīm* without paying any attention to the astrological and calendric contents of it. See: Nihal Atsız, *Osmanlı tarihine ait takvimler* (İstanbul: Küçükaydın Matbaası, 1961), 3-57.

¹⁴ BnF Supp. Pers. 367.

does not allow us to detect whether he was a designated court *munajjim* or a freelance expert presenting the sultan with his text, but the surviving manuscript definitely evinces the proximity of a certain astrologer-cum-geomancer to a reigning Ottoman ruler.

There are also few available *taqwīms* from the time of Meḫmed II, yet none of them bears an autograph that could enable us to identify a name of a *munajjim* at his court. Some of the contemporary and near-contemporary literary sources refer to a group of *munajjims* around Meḫmed II whom he would consult to designate the auspicious time for important military expeditions or construction of imperial buildings. One of these contemporary sources is Cardinal Isidore (d. 1463), the Greek metropolitan of Kiev who, as an eyewitness to the siege of Constantinople, says in one of his letters to Pope Nicholas V that Meḫmed asked his “Persian” *munajjims* (*astrologi persiani*) to designate the auspicious time for the siege.¹⁵ Somewhat similar stories may be found in the Ottoman sources. Tursun Bey (d. 1491?), for instance, briefly mentions that the *munajjims* calculated an auspicious moment for the construction of the fortress in the Bosphorus (i.e., Rumelihisarı) before the siege of Constantinople.¹⁶ In a similar vein, Tācizāde Ca’fer Çelebi (d. 1515) relates that the *munajjims* calculated the favorable moment to begin the assault.¹⁷ Yet none of these Ottoman sources specifies the ethno-geographic affiliations

¹⁵ Quoted in Agostino Pertusi, *La caduta di Costantinopoli*, vol. 1 (Rome, Fondazione Lorenzo Valla, 1976), 75: “Ha infatti a sua disposizione astrologi persiani molto scrupolosi, ed è appoggiandosi ai loro suggerimenti e alle loro decisioni che spera di riuscire ad ottenere il dominio supremo ed assoluto.”

¹⁶ Tursun Bey, *Tarih-i Ebü'l-Feth*, ed. Mertol Tulum (İstanbul: İstanbul Fetih Cemiyeti, 1977), 44: “vaқта ki ol mevzi’-i maḫlūbı ḫıyām-ı devlet ile muḫayyem ve kudūm-ı mübārek ile mükerrem kıldı, mehere-i mühendisīn ve kümmel-i müneccimīn müşāveresi ile mahall ü sā’at ihtiyār olunub kal’e bünyādın urdular.”

¹⁷ Tacizade Cafer Çelebi, *Mahruse-i Istanbul Fethnamesi* (İstanbul: Ahmed İhsan ve Şurekası Matbaacılık Osmanlı Şirketi, 1331/1915-6), 10: “Her çend ecrām-ı ‘ulvī ‘ālem-i süflīde mü’essir-i ḫaḫīkī deḡil idüḡi beyyindir fe-ammā cümle ‘ālem ger bālā ve ger zīr çün musaḫḫar-ı emr-i

of the *munajjims*.

Meḥmed II's favorite son Cem Sultan (d. 1495) also appears to have developed an interest in the science of the stars in the course of his life. In an astrological work entitled *Miftāḥ al-nujūm*, which is composed in Turkish and presented in Bursa in Dhū'l-qa'da, 874/May 1470, the author Yaḥyā b. Ḥusayn Yaḥyā says that he used to deliver each year a *taqwīm* to the house of Cem Sultan, who eventually became interested in learning the intricacies of the science of the stars and requested a book simple enough to teach him the basics of it.¹⁸

As part of his broader imperial ambitions and cultural orientations toward utilizing the intellectual traditions greatly esteemed at his time, “regardless of the linguistic or religious context of their origin,” Meḥmed II was eager to patronize men of knowledge with varying expertise, including the masters of celestial knowledge, from different demographic quarters.¹⁹ His attempts to attract leading astral experts of his time from the Persianate East were commented upon by later historians including Idrīs Bidlīsī (d. 1520), who says in his *Hasht Bihisht* that the sultan invited 'Alī Qūshjī and promised him to establish in Istanbul a scholarly

taḳdīrdir; aḥyānen maḥā'il-i ilāhī ve delā'il-i sa'ādet-i nāmūtenāhī olmak ... 'aḳlen cāiz olduḡu sebebden mehere-i 'ulūm-ı nūcūm Şāhiñ ḥurūci için bir vakt-i ḥuceste-fercām ve sā'at-ı sa'ādet-encām iḥtiyār itmışlerdi. Ol vakt-i mübārekde ḥazret-i salṭanat-penāh ... Esed burcundan Güneş tulu' ider gibi dārü'l-ḥilāfeden taşra geldi.”

¹⁸ TSMK Revan Ms. 1704, 4b-5a: “Çün kemterin bende-i dergāha ḥūkm-i ḥümāyūn naffadhahallāhu ta'ālā dāimā taḳvīm irsāl itmeḡe nefāz bulmuşdı. Maẓmūn-ı şerifinden şöyle fehm olındı kim ḥazret-i 'ālī-menḳabet ḥātır-ı müniri kim cām-ı cihānnümā andan bir şemme mutaşavverdür, bu 'ilm-i şerife şurū' itmekliḡe tergib olmuş. Benāber ān bu nüshanuñ te'lifin vācib ve lāzım görüb 'arz-ı ḥümāyūna merfū' oldı.”

¹⁹ For that regard, Maria Mavroudi aptly says that the cultural orientations at the court of Meḥmed II were “neither East nor West, not simply because these labels did not exist in the same way they do now, but especially because he was only doing what princes before and after him often did.” See: Maria Mavroudi, “Translations from Greek into Arabic at the Court of Mehmed the Conqueror,” in *The Byzantine Court: Source of Power and Culture*, ed. Ayla Ödekan et al. (Istanbul: Koç University Press, 2013), 207.

environment where he could keep running his unfinished observation program.²⁰ Mehmed II's genuine interest in recruiting 'Alī Qūshjī seems to have related to the political prestige and instrumentality accorded to the courtly patronage of the science of the stars in the late-medieval and early-modern Turko-Persian cultural zone. Yet the urgent need of the sultan to welcome an astral expert of the caliber of 'Alī Qūshjī and the wide authority warranted him to reorganize the entire Ottoman scholarly hierarchy (*'ilmiyya*) are strong indications of the inadequacy of the systematized celestial pursuits in the Ottoman world in the last quarter of the fifteenth century.²¹

At the time when 'Alī Qūshjī and his entourage arrived in Istanbul, systematic scholarly activity on celestial knowledge was only premature in the Ottoman lands.²² Several treatises of Ṭūsī such as his introductory textbook on the astrological indications of planets, zodiac signs and planetary aspects (*Sī faşl*), his *Zīj-i İlkhānī*, or his memoir on astronomy (*al-Tadhkira fī 'ilm al-hay'a*) were already in circulation in the lands of *Rūm* throughout the fourteenth and first half of the fifteenth century. The Fenārī circle in western Anatolia, including such members as the stellar scholar Mollā Fenārī (d. 1431) and 'Abdulwājīd b. Muḥammad (d. 1435), was also well informed about the scientific output of the Maragha tradition.²³ Yet anecdotal and archival

²⁰ Idrīs Bitlīsī, *Hasht Bihisht*, SK Esad Efendi Ms. 2198, 33b-34a, quoted in Tofiq Heiderzaideh, "Ali Kuşçu'nun Astronomi Eserleri" (Master's thesis, Istanbul University, 1997), 15.

²¹ For an overview of 'Alī Qūshjī's move to the Ottoman capital and his short tenure there as well as his administrative service, see: Süheyl Ünver, *Ali Kuşçu hayatı ve eserleri* (İstanbul: Kenan Matbaası, 1948); Heiderzaideh, "Ali Kuşçu'nun Astronomi Eserleri," especially 13-17.

²² For a general overview of the contours of scientific activities in the pre-sixteenth century Ottoman realm, see: İhsan Fazlıoğlu, "Osmanlılar (İlim ve Kültür. 1. Düşünce Hayatı ve Bilim. Kaynaklar)," *TDVİA*.

²³ 'Abdulwājīd b. Muḥammad was born in Khūrasān and came to the lands of *Rūm* in later fourteenth century. In addition to his treatise on the uses of astrolabe, he also penned a commentary on Ṭūsī's *Sī Faşl*. See: *OALT*, v. 1 (Istanbul: İslâm Tarih, Sanat ve Kültür Araştırma Merkezi, 1997), 22-24. See also: İhsan Fazlıoğlu, "İthaf'tan Enmûzec'e Fetih'ten önce

evidence about scholars over the fifteenth century indicates that Ottoman territory was not the best place at the time for a would-be astral expert to excel in the science of the stars. For instance Qāḏīzāda-i Rūmī, one of the intellectual founders of the Samarqand observatory, grew up in Bursa and received his first education within the Fenārī circle, but his master Muḥammed Şāh Fenārī, the son of renowned Mollā Fenārī, still felt compelled to suggest him to go to Iran and Central Asia to further his quests in astral lore.²⁴ In a similar vein, a certain ‘Abd al-Raḥmān *munajjim* (d. later than 1510), about whom more details will be found below, was recommended around the 1480s by his primary patron Şehzāde Aḥmed to go to the Iranian lands (*diyār-ı ‘Ajam*) to advance his knowledge in the discipline.²⁵ Besides hinting at the embryonic level of systematic astral production in the Ottoman territories throughout the fifteenth century, these details also suggest that in the eyes of the fifteenth-century scholars born in the Ottoman lands, the Persianate east was the main point of reference and locus where one could gain a good command of the science of the stars.

Objections may be raised here with regards to ascribing astrological interests to Qāḏīzāda-i Rūmī or ‘Alī Qūshjī. Such a reservation is not altogether groundless, as the entire oeuvre of Qāḏīzāda-i Rūmī and ‘Alī Qūshjī does not include a single text that one could easily

Osmanlı Ülkesi’nde Matematik Bilimler,” in *Uluslararası Molla Fenârî Sempozyumu (4-6 Aralık 2009 Bursa): bildiriler = International Symposium on Molla Fanârî (4-6 December 2009 Bursa): proceedings*, ed. Tevfik Yücedođru *et al.* (Bursa: Bursa Büyükşehir Belediyesi, 2010), 131-163; Jamil Ragep, “Astronomy in the Fenārī-Circle: The Critical Background for Qāḏīzāde al-Rūmī and the Samarqand School,” in Yücedođru *et al.*, *Uluslararası Molla Fenârî Sempozyumu*, 165-176.

²⁴ İhsan Fazlıođlu, “Kadıızade-i Rumi,” *TDVİA*.

²⁵ ‘Abd al-Raḥmān Munajjim, *Jawhar ḥifẓ al-şihḥat fī al-ṭibb*, SK Ayasofya Ms. 3635, 2b.

define as strictly an astrological work.²⁶ Yet, as far as the present level of research on these two big names is concerned, their works did not entail a categorical rejection of astrological premises. Moreover, as already mentioned in the first chapter, the end product of the observations at the Samarqand observatory, the Ulugh Beg tables, which Qāḏīzāda-i Rūmī and ‘Alī Qūshjī contributed significantly as the key collaborators in the observatory, is replete with information and data addressed to astrological purposes, especially for casting birth and yearly horoscopes.²⁷ Also interesting is the fact that the activities at the Samarqand observatory were interpreted by some of his contemporaries, like Šā’in al-Dīn Turka Iṣfahānī (d. 1432), as being responsible for the “renaissance of ‘astrology.’”²⁸ Last but not least, the anecdotes narrated in some of the contemporary biographers about the use of divinatory practices in the presence of Ulugh Beg and ‘Alī Qūshjī, or Qūshjī’s curious attendance in the Otlukbeli campaign as one of the close courtiers of Meḥmed II hint at the commonality of such preoccupations among individuals that are strictly defined in modern historiography as enlightening scientists.²⁹

²⁶ In addition to Ünver and Heiderzaidēh’s works cited above, see: İhsan Fazlıoğlu, “Qūshjī,” in *BEA*, ed. Thomas Hockey *et al.* (New York: Springer, 2007), 946-948; Jamil Ragep, “Freeing Astronomy from Philosophy: An Aspect of Islamic Influence on Science,” *Osiris* 16 (2001), 49-71.

²⁷ Especially the fourth chapter of the *Zīj-i Ulugh Beg* (“*Maqāla-i chahārom dar bāqī a ‘māl-i nujūmī*”) is reserved entirely for the techniques used in horoscopic astrology such as *namūdārāt*, *firdārāt*, or *tasyīrāt*. In fact the tables given in the second (“*Maqāla-i dovvom dar ma ‘rifat-i avqāt va ṭāli ‘-i har vaqt*”) and the third (“*Maqāla-i sivom dar ma ‘rifat-i ravash-i sitāragān va mavāzi ‘-i īshān dar ṭūl va ‘arż va tavābi ‘-i ān*”) chapters were also set out for astrological purposes. See *Uluḡ Beḡ’in Astronomi Cetvelleri = Zīc-i Uluḡ Bey*, 2 volumes, ed. and tr. Mustafa Kaçar and Atilla Bir (Ankara: Kültür ve Turizm Bakanlığı, 2012).

²⁸ Quoted in Fleischer, “Ancient Wisdom,” 231; Melvin-Koushki, “The Quest,” 64.

²⁹ ‘Alī Qūshjī’s presence in the Otlukbeli campaign is documented by the colophon of the autograph copy of his *al-Risāla al-fathīyya* that he finished and presented the day Meḥmed II defeated the Aqquyunlu Uzun Ḥasan at Otlukbeli. SK Ayasofya Ms. 2733 (quoted in Ünver, 30): “*farigha al- ‘abd al-mu ‘allif min taḥrīrihi fī awāsīṭ rabī ‘ al-awwal sana thamāna wa sab ‘aīn wa thamānami ‘a* (RA 878) *kataba hadha l-aṣṭar al-mushawwasha al-faqīr al-ḥaqīr ‘Alī bin*

Despite the allusions in contemporary and near-contemporary narrative sources to a number of (Persian) *munajjims* at the court of Meḥmed II and his genuine interest in the cultivation of the science, the archival records from the period rather tell a different story. There is in fact not much available in terms of archival documents from the time of Meḥmed II, though a relatively detailed payroll book from the year 883/1478 lists the names of palace personnel, including *munajjims*. Contrary to what is depicted by literary sources of the time, there was only one *munajjim*, Mevlānā Kūçek Yezdānbaḥş, who received ten *aḳçe* per diem, which was equal to the pay range of a messenger or a gatekeeper but significantly lower than that of a falconer or storyteller.³⁰ Mevlānā Kūçek is listed in the register under the loosely defined *mutafarriqa* corps, which also implies that there was not a special designated unit for the *munajjims* within the nascent bureaucracy of the time and that the lines between *ad hoc* function and formal office are still difficult to distinguish.³¹

Muḥammad al-Qūshjī wa huwa mu'allif hadhi l-nuskha wa kātibuhā yawm al-ẓafar al-sultān al-a'ẓam abū l-faṭḥ sultān Muḥammad khan khalladallāh mulkahu 'alā Uzun Ḥasan fī navāhī-i Tarcān fī maqām-ı Otbilegī qarīb-i Qubāsivrī."

In his *Asar-ı Bakiye*, Salih Zeki (d. 1921), one of the most important mathematicians of the late Ottoman period and the first modern Turkish scholar showing interest in the history of science in the Ottoman past, also mentions Qūshjī's engagement with astrological practice on the basis of a holograph copy of a *mecmū'a* now located at SK Hamidiye Ms. 1446. See: Salih Zeki, *Asar-ı Bakiye* vol. 2 (İstanbul: Matbaa-ı Amire, 1329), 198.

One of the relevant anecdotes mentioned in the chronicle of Khāndamir (d. later than 1550) goes on to say that one day Ulugh Beg, while in the presence of his student 'Alī Qūshjī, asks a certain geomancer to foretell what is going to happen in his life. The geomancer was reluctant first to speak in front of 'Alī Qūshjī whom he barely knew, but after Ulugh Beg reassured him about Qūshjī's trustworthiness, he went on to say that Ulugh Beg would kill one of his two wives and then divorce the second one.

³⁰ Ahmed Refik (Altınay), "Fatih Devrine ait Vesikalar," *Tarih-i Osmani Encümeni Mecmuası* vol. 8-11 no. 49-62 (1335/1919), 1-58.

³¹ For the *mutafarriqa* corps, see İsmail H. Uzunçarşılı, *Osmanlı Devletinin Saray Teşkilatı* (Ankara: Atatürk Kültür, Dil ve Tarih Yüksek Kurumu, 1984), 428-431; Tayyib Gökbilgin, "Müteferrika," *İA*.

The real patron of celestial knowledge in the burgeoning Ottoman polity was Bāyezīd II. In fact the institutionalization of the patronage of *munajjims* in the growing bureaucratic structure of the Ottoman polity by the late fifteenth century was intimately related to the keen interest and personal investment of Bāyezīd II in the cultivation of celestial knowledge. While Mehmed II's learned character and curiosity towards philosophical and mathematical pursuits as well as the Greek/Byzantine heritage are relatively well-known phenomenon, the cultural and intellectual orientations of his son Bāyezīd II have largely been ignored in modern historiography. In fact, the long rule of Bāyezīd and his cultural policies have been systematically downplayed in the available literature in contrast to the "heroic" reigns of his father, and those of his immediate successors, his son Selīm I (r. 1512-1520) and grandson Süleymān (r. 1520-1566).

Bāyezīd's so-called "pious" personality is often held responsible for isolating the Ottoman Empire from the cultural and intellectual achievements attained in contemporary Europe.³² He is usually contrasted to his father Mehmed II and thus condemned for hampering the perpetuation of the cultural orientations and political ambitions prevalent at his time.³³ As evidence for Bāyezīd's culpability in the so-called intellectual and scientific setback at the turn of the sixteenth century, modern scholars often refer to the story of Leonardo da Vinci whose

³² Sidney Nettleton Fisher, *The Foreign Relations of Turkey, 1481-1512* (Urbana, IL: University of Illinois Press, 1948); Selâhattin Tansel, *Sultan II. Bâyezîd'in Siyâsî Hayatı* (İstanbul: MEB Devlet Kitapları Müdürlüğü, 1966); V. J. Parry, "The Reigns of Bāyezīd II and Selim I, 1481-1520," in *A History of the Ottoman Empire to 1730*, ed. M. A. Cook (Cambridge: Cambridge University Press, 1976), 54-78; Şerafettin Turan, "Bāyezīd II," *İA*; Feridun Emecen, *İmparatorluk Çağının Osmanlı Sultanları* (İstanbul, İSAM Yayınları, 2011).

³³ For a review and critique of the studies that contrast the reign of Bāyezīd II to his father, see Cihan Yüksel Muslu, "Ottoman-Mamluk Relations and the Complex Image of Bāyezīd II," in *Conquête ottoman de l'Égypte (1517): Arrière-plan, impact, échos*, ed. Benjamin Lellouch and Nicholar Michel (Leiden: Brill, 2013), 51-76.

plea to Bāyezīd to construct a bridge over the Golden Horn fell on deaf ears.³⁴ Bāyezīd's selling of the paintings and disposing of Christian relics kept by his father in the palace is yet another favorite story.³⁵ He also allegedly turned down Christopher Columbus when the Genoese navigator approached him as a potential patron before embarking upon his costly expeditions, but it should be noted that the earliest available reference to such criticism directed against Bāyezīd for denying Columbus is only from the first half of the nineteenth century.³⁶

Bāyezīd II has also long been criticized for failing to take necessary measures against the emerging Safavid threat, with which his son Selīm was left to deal during both his governorship in Trabzon and his sultanate in Istanbul.³⁷ One could note further reasons for the scholarly disdain for the reign of Bāyezīd II, including his inability to achieve a decisive victory against the Mamluks, and his elimination of Meḥmed II's (and modern historiography's as well) favorite son Cem Sultan (d. 1495) after a long struggle that soon gained an international character with the involvement of the Pope and several European powers. All these reasons have coalesced in contemporary scholarship with an image of Bāyezīd II as the weakest link in the so-called

³⁴ The undated letter sent by Leonardo is now housed at the Archive of the Topkapı Palace Museum (TSMA E. 6184). According to the letter, Leonardo also proposed to devise for the sultan a number of other tools, such as a new kind of windmill and a sort of pump to empty out the water in the vessels. See also: Semavi Eyice, "II. Bāyezīd Devrinde Davet Edilen Batılılar," *Belgelerle Türk Tarihi Dergisi* 19 (1969), 23-30.

³⁵ Julian Raby, "A Sultan of Paradox: Mehmed the Conqueror as a Patron of the Arts," *Oxford Art Journal*, 5 (1982), 3-8.

³⁶ Cevat İzgi, *Osmanlı Medreselerinde İlim* vol. 2 (İstanbul, İz Yayıncılık, 1997), 240.

³⁷ The available scholarly conviction on Bāyezīd's idleness vis-à-vis the emerging Safavid power is based primarily on the *Selīm-nāme* literature, the earliest examples of which emerged as early as the later years of Selīm's reign. The purpose of these works is to valorize Selīm and single him out as the only member of the Ottoman house that took serious the emerging Safavid problem. However, archival documents from the reign of Bāyezīd II clearly show that he was also closely following the Safavid problem and taking active measures, although he did not initiate an open battle. See for instance: Feridun Emecen and İlhan Şahin, *II. Bāyezīd dönemine ait 906/1501 tarihli ahkam defteri* (İstanbul: Türk Dünyası Araştırmaları Vakfı, 1994).

Ottoman golden age from the mid-fifteenth to the mid-sixteenth century.

Despite the conventional representation of Bāyezīd II's reign as a failure on a range of fronts, several cultural and literary historians were aware that he was an avid patron of the arts and *belles-lettres*.³⁸ He is generally considered the founding patron of Ottoman dynastic history writing, having eagerly commissioned the first dynastic histories of the Ottoman rule.³⁹ Modeled in the main on Timurid precedents, the voluminous histories of figures like Idrīs Bitlīsī, who wrote in Persian, and Ibn Kemāl (d. 940/1534), in embellished Turkish, helped not only carve a prominent place for the Ottoman house in the universal unfolding of events but also spotlight the rule and court of Bāyezīd II as supreme among all the previous and contemporary sovereigns.⁴⁰ In addition to his active involvement as patron of the first dynastic histories of the Ottoman house, Bāyezīd II also lavishly supported a number of poets, calligraphers, and numerous artisans whom we can document thanks to the invaluable register of gifts and payments that

³⁸ İsmail E. Erünsal, "Türk Edebiyatının Arşiv Kaynakları I: II. Bāyezīd Devrine Ait bir İnamat Defteri," *İÜEF Tarih Enstitüsü Dergisi* 10-11 (1981), 303-348; Julian Raby and Zeren Tanındı, *Turkish Bookbinding in the 15th Century: The Foundation of an Ottoman Court Style* (London: Azimuth editions on behalf of l'Association Internationale de Bibliophile, 1993); Hilal Kazan, *XVI. Asırda Sarayın Sanatı Himayesi* (İstanbul: İrcica, 2010); Zeren Tanındı, "II. Bāyezīd'in Sanatlı Kitapları," in *Kasayid-i Efsahi der medh-i Sultan Bāyezīd* (İstanbul: Sakıp Sabancı Müzesi, 2012), 7-33.

³⁹ Halil İncalcık, "The Rise of Ottoman Historiography," in *Historians of the Middle East*, ed. Bernard Lewis and P. M. Holt (London: Oxford University Press, 1962), 152-167; V.L. Ménage, "The Beginnings of Ottoman Historiography," in *Ibid.*, 168-179; Cornell H. Fleischer, *Bureaucrat and Intellectual in the Ottoman Empire: The Historian Mustafa Ali (1541-1600)* (Princeton, N.J.: Princeton University Press, 1986), 238-239.

⁴⁰ İncalcık, "The Rise of Ottoman Historiography;" Sara Nur Yıldız, "Ottoman Historical Writing in Persian, 1400-1600," in *Persian Historiography*, ed. Charles Melville (New York: I.B. Tauris, 2012), 436-502; Vural Genç, "Acem'den Rum'a: İdris-i Bidlisi'nin Hayatı, Tarihçiliği ve Heşt Behişt'in II. Bāyezīd Kısmı (1481-1512)." (Ph.D. Dissertation, Istanbul University, 2014); Christopher Markiewicz, "The Crisis of Rule in Late Medieval Islam: A Study of Idrīs Bidlīsī and Governance at the Turn of the Sixteenth Century." (Ph.D. Dissertation, University of Chicago, 2015).

record in great detail the names of all individuals receiving allowances from the sultan from 1503 to 1512.⁴¹ One remarkable but lesser known aspect of Bāyezīd II's patronage and cultural politics is his benefaction towards the experts of astral knowledge.

While there was only one *munajjim* listed in the sole surviving register of payments from the later years of Meḥmed II's reign, by the time of Bāyezīd II, the number, status, and salaries of the *munajjims* dramatically changed. Another payroll book – which must have been drafted sometime between 1490 and 1500, according to internal evidence – lists six *munajjims* that receive in sum 6068 *aḳçes* monthly, making an average daily salary of a court *munajjim* 33.7 *aḳçes/day*.⁴² Unfortunately the list does not specify the names of these *munajjims*, yet groups them as an individual unit (*cemā'at-i mūneccimīn*) under the rubric of the monthly salaried palace personnel (*müşāhereḥorān*).⁴³ The famous register of allowances that thoroughly covers the last decade of the reign of Bāyezīd II also corroborates the information given in the payroll book. According to this voluminous register, at least 19 different names are recorded as *munajjims*, *muwaqqits* (time-keepers) or individuals presenting the court at different times with a

⁴¹ Atatürk Kitaplığı Muallim Cevdet O. 71. Various scholars have mined this voluminous register for different purposes. In addition to the works of Erünsal and Kazan cited above see Rıfki Melül Meriç, *Türk Nakış Tarihi Araştırmaları* (Ankara: Ankata Üniversitesi İlahiyat Fakültesi, 1953]; *idem.*, “Bāyezīd Camii Mimarı, II. Bāyezīd Devri Mimarları ile Bazı Binalar, Bāyezīd Camii ile ilgili hususlar, san'atkarlar ve eserleri,” *Ankara Üniversitesi İlahiyat Fakültesi Türk ve İslam Sanatları Tarihi Enstitüsü Yıllık Araştırmalar Dergisi* II (1958), 4-76. The records for the first two years are also available as transliterated texts. See Ömer Lütfi Barkan, “İstanbul Saraylarına ait Muhasebe Defterleri,” *Belgeler*, 9/13 (1979), 1-380; Mustafa Açıkgöz, “II. Bāyezīd Devri İnamat Defteri (Muharrem-Zilhicce 910/Haziran-Mayıs 1504-1505)” (MA Thesis, Marmara University, 1996).

⁴² TSMA D. 9587, available as a transcribed document in Ömer Lütfi Barkan, “H. 933-934 Tarihli Bütçe Cedveli ve Ekleri,” *İktisat Fakültesi Mecmuası* 15 no. 1-4 (1953-1954), 309.

⁴³ For the *müşāhereḥorān* status, see Linda Darling, “Ottoman Salary Registers as a Source for Economic and Social History,” *Turkish Studies Association Bulletin*, 14/1 (1990), 13-33.

taqwīm.⁴⁴ Within these 19 names, at least five of them are listed under the monthly salaried palace personnel (*müşāherehorān*) rubric. Based upon these two registers, then, it is possible to deduce that there were five or six *munajjims* permanently employed at the court of Bāyezīd II at different times of his relatively long reign.

In terms of the number of *munajjims* who found steady employment at the Ottoman court, Bāyezīd's reign supersedes not only those of his predecessor but also his successors'. For example, in a register from around the year 1514 during the reign of Selīm I, the unit of court astrologers (*cemā'at-i müneccimān*) is composed of four *munajjims*.⁴⁵ Two different pay registers from the first years of the reign of Süleymān also list four *munajjims* under the rubric of the unit of court astrologers (*cemā'at-i müneccimān*). These *munajjims* are Seyyid İbrahīm b. Seyyid Müneccim, İshāq, Salmān-i 'Ajam, and Yūsuf b. 'Ömer el-Sā'atī, each receiving 15, 14, 13, and 10 *akçes* per diem respectively.⁴⁶ In another register prepared slightly after these two registers, all three *munajjims* are listed with the exception of Salmān-i 'Ajam.⁴⁷ It is also worth noting here that all these three *munajjims*, Seyyid İbrahīm b. Seyyid Müneccim, İshāq, and Yūsuf b. 'Ömer el-Sā'atī had started their careers during the reign of Bāyezīd II. Other archival documents from the later periods of the reign of Süleymān also confirm that the number of court *munajjims* remained stable for a while, before it dropped, by the later years of his reign, to two with further

⁴⁴ See Appendix A for the entire list of *munajjims*, *muwaqqits*, and other individuals cited in the register who presented the court with an annual almanac-prognostication and/or were rewarded for unspecified reasons.

⁴⁵ TSMA D. 5475, available as a transcribed document in Ömer Lütfi Barkan, "H. 933-934 Tarihli Bütçe Cedveli ve Ekleri," 313. Unfortunately their names and salaries are left unspecified.

⁴⁶ TSMA D. 9706; TSMA D. 10141.

⁴⁷ TSMA D. 7843, available as a transcribed document in Ömer Lütfi Barkan, "H. 933-934 Tarihli Bütçe Cedveli ve Ekleri", 323.

decreases in the amount of *munajjims*' salaries.⁴⁸ As we will see in more detail below in the special case of 'Alī *munajjim* (better known as Riyāzī), the apparent decrease in the salaries and status by the mid-sixteenth century caused distress and uneasiness among some of the practitioners.

The unprecedented extent of the cultivation of celestial knowledge during Bāyezīd II's reign was intimately related to his personal intellectual aspirations. From his years as governor in Amasya to his relatively long sultanate in Istanbul, Bāyezīd II actively sought expertise in the science of the stars, surrounded himself with a sizeable group of *munajjims* and scholars with deep astral curiosities, commissioned a number of treatises on different branches and genres of celestial knowledge, and spent his personal spare time on studying different forms and genres of the science itself. It was during his reign, for instance, that modest celestial observations with novel instruments were conducted in Istanbul. The Persian émigré *munajjim*, Khiṭābī-i Lāhijānī, whose works I will mention in greater detail below, conducted these observations in early 1480s

⁴⁸ BOA KK 1764 lists 4 *munajjims* between the years 933/1526-7 and 942/1535-6, but it is not certain whether these *munajjims* are members of the office or the register only records the names of experts presenting the court with a *taqwīm*. The *munajjims* listed in this register are respectively Lūṭfullāh, Yūsuf b. 'Ömer el-Sā'atī (noted as Sinān b. 'Ömer), Musliḥiddīn *ṣākir*-i (student of) *Salmān*, and *Necmeddīn*.

BOA MAD 559, a payroll book listing the names and wages of monthly-salaried palace personnel (*mevācib-i müṣāhereḥorān*), enumerates 2 *munajjims* for the year 942/1535-6 as part of the unit of *cemā'at-i müneccimān*. These two *munajjims* are İṣḫāq and Yūsuf b. 'Ömer el-Sā'atī, receiving 14 and 10 *aḳçes* per diem respectively.

BOA KK 1864 reveals for the year 954/1547-8 only the name of Yūsuf b. 'Ömer el-Sā'atī as a court *munajjim* (*'an müneccimān-i ḥāṣṣa*).

BOA MAD 7118, another payroll book for the monthly salaries of palace personnel, also lists for the year 955/1548-9 two *munajjims* as part of the *cemā'at-i müneccimān*. These two *munajjims* are Yūsuf b. 'Ömer al-Sā'atī and Riyāzī 'Alī, receiving 12 and 6 *aḳçes* per diem respectively.

to test the accuracy of three popular *zīj*es used at the time.⁴⁹ At least two different, extravagant astrolabes were cast for the sultan, one produced in the year 910/1504-5 by another Persian émigré scholar, Shukrullāh Shirvānī, and the second manufactured the following year by an apparently indigenous expert, al-Aḥmar al-Nujūmī al-Rūmī (d. later than 1505-6).⁵⁰ The inventory of the palace library, which was compiled by the chief librarian ‘Āṭūfī, is replete with treatises and textbooks on astrological principles, astronomical tables and instruments copied and dedicated to Bāyezīd II. Some of these items were even composed at the personal request of him.⁵¹

The broad celestial interests of Bāyezīd II were so widely acknowledged during his own lifetime that contemporary émigré scholars and/or statesmen who had access to court circles often noted the sultan’s penchant for astral sciences in their writings. Andrea Gritti (d. 1538), the famous Venetian merchant and statesman who spent much of his early life in Istanbul and had

⁴⁹ Mortaza Somi and Mohammad Bagheri, “Risāla-i tashrīḥ al-ālāt fī sha‘n al-imtiḥānāt az Sayyid Munajjim Ḥusaynī,” *Mirāth-i ‘Ilmī-yi Islām va Īrān*, 2/1 (1392/2013), 181-205. Although the authors attribute the text to Sayyid Munajjim, an important early-fifteenth century astral expert from the Iranian world, this could not be true on the basis of the manuscript evidence of the works of both Sayyid Munajjim and Khitābī of Lāhijān. I will discuss this in more detail below.

⁵⁰ David King, “Two Astrolabes for the Ottoman Sultan Bayezit II,” in *Essays in honour of Ekmeleddin İhsanoğlu*, v. 1, ed. Mustafa Kaçar and Zeynep Durukal (Istanbul: İrcica, 2006), 439-459. David King was not able to reach a decisive conclusion on the name of this scholar from Shirwan due to a paucity of information on Shukrullāh Shirvānī, who is different than Shukrullāh the physician at Meḥmed II’s court. In addition to the astrolabe, Shukrullāh Shirvānī also presented Bāyezīd II with a compendium of sciences (*Riyāḍ al-qulūb*), in which he discusses the meaning and benefits of *‘ilm al-nujūm* from exclusively an astrological perspective. See: SK Ayasofya Ms. 4024, 62b-80b.

⁵¹ Mīrim Çelebi explains in the introduction to his commentary on the Ulugh Beg tables that he composed it upon the request of Bāyezīd II. See: SK Ayasofya Ms. 2697, 3b. In a similar vein, ‘Abdussalām al-Muhtadī says in his *Ma‘rifat ḥaqīqat mawḍū‘at al-kawākib* that he translated the work from Hebrew to Arabic upon the sultan’s personal request (*bi-talqīn al-sulṭān*) See: TSMK A. 3495, 88a.

close ties with the high-ranking members of the Ottoman court, writes in one of his reports to the Venetian senate that the sultan is considered a very learned person in *astrologia* and *theologia*, and that he studies these disciplines ardently in addition to his taking delight in the arts of mechanics and alchemy.⁵² Another contemporary testimony to Bāyezīd’s learned interests comes from one Ibn al-‘Ulayf (d. 925/1520), a noted poet living in Mecca, who had visited Istanbul and presented the sultan a panegyric long before he composed in Mecca a chronicle eulogizing the virtues of the Ottoman dynasty generally and Bāyezīd II specifically. In this chronicle, he details the scholarly character of Bāyezīd II and identifies the sciences the sultan endeavored to learn. Ibn al-‘Ulayf states that in addition to various branches of the religious sciences, including hadith and jurisprudence, Bāyezīd II was also interested in the science of the celestial spheres (*‘ilm al-falak*) and distinguished himself in the science of the stars (*‘ilm al-nujūm*) as well as geomancy (*‘ilm al-raml*).⁵³

It was also the case that many a scholar and *litteratus* often opted to compose a work related to some form and genre of celestial knowledge as an initial attempt to ask for Bāyezīd II’s patronage. Firdevsī-i Ṭavīl (d. later than 1512), for instance, made his debut in 1487 by presenting the sultan with his *Da’vetnāme*, a work on celestial magic, whereas the Persian émigré scholar Qāḍī-i Baghdād, as we have already mentioned before, offered as his first gift to the sultan his almanac-prognostications for the year 913/1508 after taking refuge in the

⁵² Marino Sanuto, *I diarii*, vol. 5, ed. Federico Stefani (Venezia: F. Visentini, 1881), 458: “*Se dice delectarse de le arte mechanice...et haverse etiam delectà d’archimia.... Dicono esser ne la sua leze, in astrologia et theologia, secondo i suo’ auctori arabi et de persian quanto algun altro musulmano, et studia continuamente.*”

⁵³ SK Fatih Ms. 4357, 33b: “*wa qāla lī ba‘ḍ al-fuḍalā’ al-Rūm ... anna al-sultān al-mushārūnilayh ... nazāra fī ‘ilm al-falak wa bara’a fī mā rifat ‘ilm al-nujūm wa-l-raml.*”

Ottoman lands upon the Safavid expansion toward Baghdad around the year 1507-8.⁵⁴

The most intriguing of contemporary testimonies to Bāyezīd II's genuine interest in the science of the stars, as well as in alchemy, is an anonymous letter sent by a seemingly Sufi shaykh that I already introduced in the first chapter.⁵⁵ In this undated letter that casts light upon the learned interests of the sultan, the anonymous author refers explicitly to Bāyezīd's endeavors to learn *ilm al-hay'a* along with another formidable branch of natural philosophy (*ḥikmat*), which he does not explicit.⁵⁶ In his opinion, however, Bāyezīd did not have sufficient erudition and his attempt was made solely on the basis of experience (*tajriba*). It is the author's desire to remind the sultan, whom he characterizes as a zealous servant in the path of Islam, of the transitory nature of life and the insignificance of worldly possessions.⁵⁷ He then says that he has decided, in accordance with the portents in his dream, to send Bāyezīd one of his disciples to inculcate in him his real essence. The training should continue, the shaykh argues, until Bāyezīd attains the spiritual stage that his disciple has already reached at the hands of the master. Once Bāyezīd reaches that stage, then he, the author, will write a talismanic note for the sultan to help him gain

⁵⁴ *Firdevsi-i Tavil ve Da'vetname'si: İnceleme, Transkripsiyon, İndeks, Faksimile ve Mikrofiş*, ed. Fatma Büyükkarcı (Cambridge, MA: Harvard University Near Eastern Languages and Civilizations, 1995); Qāḍī-i Baghdād, *Taqvīm*, British Library Or. 6432/2. Qāḍī-i Baghdād's name is recorded on the contemporary register of gifts and payments as the recipient on April 25, 1508 of 1,500 silver coins for his debut in presenting the sultan with his *taqwīm (ibtidā'-i 'ādat-i Mavlānā Sinān Qāḍī-i Baghdād ... ki taqvīm āvord)* Atatürk Kitaplığı Muallim Cevdet O. 71, 263.

⁵⁵ TSMA E. 6172

⁵⁶ *Ibid.*,: “[...] *Mālik-i memleket-i Rūmiyye kim āl-i 'Osmāniyeden Sulṭān Bāyezīd'dir. Şöyle istimā' olundu ki şina'at el-hey'ete ve bir ḥikmete ki ḥikmeti muḥibdir ṭālmış ammā tecrübe tarīkiyleymiş vukūf yogimiş.*”

⁵⁷ *Ibid.*,: “[...] *Benüm üzerime lāzım oldu ki añā şefaḳat idüb tenbīh eyleyem ... metā'-i dünyā ḳalīldir biz bundan rahīl üzerineyüz. İstiḥāre itdüm ḥayr şunda gördüm ki şākirdlerimden birini gönderem vara añā māddesin ta'līm eyleye.*”

access to secrets.⁵⁸

This letter clearly shows, *inter alia*, that Bāyezīd II's preoccupation with different and less-approved branches of mathematical-philosophical sciences like the science of the stars and alchemy was duly noted by his contemporaries. As the phraselogy used by the anonymous shaykh implies, Bāyezīd II invested his time and energy to scientifically study the secrets of the heavens, which included not only the bookish learning but also the active observation and maybe even empirical study.

As to such a culture of observation and experimentalism at the court of Bāyezīd II, a Jewish émigré scholar close to the intellectual circles around the sultan provides captivating details. At the turn of the sixteenth century, Moses Galeano, or Mūsā Jālīnūs, a Jewish émigré physician and natural philosopher, who had devised a spring-wheeled robot and composed an astronomical book while he was in Istanbul in the proximity of the sultan and Mü'eyyedzāde, compiled a Hebrew-language compendium of knowledge entitled *Ta'alumot Hoḥmah* (Puzzles of Wisdom). In this treatise, Galeano examines several errors and fallacies in the fields of various branches of knowledge including medicine, astronomy, and mechanics, and relates first-hand episodes about the courtly and scholarly culture around the sultan. Thanks to the fascinating studies of Tzvi Langermann and Robert Morrison on Galeano and his *Ta'alumot*, we know that in the presence of Bāyezīd II and his close companion Mü'eyyedzāde were performed various types of experimental operations including alchemical ones.⁵⁹

⁵⁸ *Ibid.*: “[şakird] benden gördüğü mertebeye dek tedbīr eyleye. Ol mertebeye vāşıl olıcaḡ bañā i'lām eyleye ben bir remz yazam ki kāşif ola ... tā ki tarḡ-i iksire şāliḡ ola.”

⁵⁹ Tzvi Langermann, “From My Notebooks: A Compendium of Renaissance Science: *Ta'alumot Hoḥmah* by Moses Galeano;” *idem.*, “From My Notebooks: Medicine, Mechanics and Magic from Moses ben Judah Galeano's *Ta'alumot Hoḥmah*,” Robert Morrison, “An Astronomical

As it is manifested through such variegated contemporary evidence, Bāyezīd II was evidently interested in the cultivation of the celestial knowledge. His enthusiasm, however, was not only limited to patronizing astral experts or supporting those individuals who presented him a text or instrument. The anonymous Sufi shaykh, who complained in his petition about Bāyezīd II's immersing in the study of the heavens, was not wrong in his implications, as at around the second half of the 1490s, Bāyezīd II called upon Mīrim Çelebi (d. 1525) to tutor him in the quadrivium (*al-ʿulūm al-riyādiyya*, i.e., mathematical sciences).

As the paternal great-grandson of Qāḏīzāda-i Rūmī and the grandson on the maternal line of ʿAlī Qūshjī, the two luminaries of the fifteenth-century mathematical-astronomical school of Samarqand, Mīrim Çelebi was the most important astral expert in the Ottoman lands at the turn of the sixteenth century.⁶⁰ Although it is not certain when precisely Mīrim Çelebi was born, it was likely in the early 1470s after ʿAlī Qūshjī settled in Istanbul. Thanks to his ancestral prestige, as early as the late 1480s Mīrim Çelebi started to receive allowances as a member of the *zavāʾidḥorān* class, peculiar to the sons of the prestigious ʿulamāʾ families.⁶¹ Taşköprizāde, who himself became a student of Mīrim Çelebi and read at his feet ʿAlī Qūshjī's treatise on *hayʿa*, *al-Risāla al-faṭḥiyya*, briefly mentions Mīrim's own training, reporting that he became a student of

Treatise by Mūsā Jālīnūs alias Moses Galeano;" *idem.*, "A Scholarly Intermediary between the Ottoman Empire and Renaissance Europe."

In one such episode, an alchemist received the attention of the sultan after promising him that he can turn lead into gold. While the alchemist was conducting his operation, the rabbi Samuel Abulafia, one of the chief Jewish refugees from Spain at Bāyezīd's court, asked Galeano to pass the sultan a note from Abulafia stating that the performance of the alchemist was a fraud. Upon reading the rabbi's note Bāyezīd finally perceived his trickery. The alchemist then took his own life, drinking a lethal poison in the bathhouse. See: Langermann, "From My Notebooks," 311-314.

⁶⁰ İhsan Fazlıoğlu, "Mirim Çelebi," *TDVİA*.

⁶¹ Ömer Lütfi Barkan, "Ayasofya Camii ve Eyüp Türbesinin 1489-1491 yıllarına ait Muhasebe Bilançoları," *İÜ İktisat Fakültesi Mecmuası* 23/1-2 (1962-3), 358.

leading mathematicians of the time including Ḥācezāde (d. 894/1489) and Sinān Paşa (d. 891/1486). Mīrim himself reveals in his commentary on the Ulugh Beg tables that he worked with a certain Ḥāce Aṭā'ullāh (d. later than 1481), who was another Persian émigré scholar practicing astral sciences in the Ottoman capital in the late fifteenth century.⁶²

Upon completing his *madrassa* education, probably in the early 1490s, Mīrim started teaching at several mid-to-high level *madrassas* in Bursa and Edirne. Around this time he was called by Bāyezīd II to be his private tutor and instruct him in the *al-'ulūm al-riyāḍiyya*.⁶³ The reasons are rather obscure about why Bāyezīd II selected Mīrim Çelebi to be his private tutor in *'ulūm al-riyāḍiyya* while Mīrim was only an emerging scholar at the time, holding less prestigious teaching offices, but his exceptional family background must have been influential

⁶² SK Ayasofya Ms. 2697. In this autograph copy of *Dustūr al-'amal va taṣḥiḥ al-jadval*, Mīrim says (2a) that he was at the service of Mavlānā 'Aṭā'ullāh while his master was working on the Ulugh Beg tables. Interestingly, this little detail about 'Aṭā'ullāh is not included in other available copies of Mīrim's own commentary of the *Zīj-i Ulugh Beg*: “[V]a *ḥaẓrat-i marḥūmī Khwāja 'Aṭā'ullāh dar ḥall-i ān say' karda ba'z-i az a'māl-i ān rā bā miṣlihi muvaẓẓaḥ gardānīda būdand va az 'ajāyib-i ittifāqāt, rūzī īn kamīna dar khidmat-i ān marḥūm būdam va īshān 'amalī mī gardand, kamtarīn goftam ki agar īn kitāb rā badīn dustūr sharḥi tamām navashta shavad dar ghāyat laṭāfat khāhad bovad.*”

The copy of the *Zīj-i Ulugh Beg* used evidently by Mīrim is now housed at the Bodleian library within a collection of *nujūm* works. On several folios of the copy does Mīrim have his own marginalia, frequently adding his adjusted numerical values according to the latitude of Istanbul. See Oxford Bodleian Marsh 396.

As for this Persian émigré scholar Ḥāce Aṭā'ullāh, who was likely from Kirmān in origin, there is unfortunately not much information. Ṭaşköprizāde describes him as an expert in the use of the *zīj*es and making *taqwīms*, though he does not provide any extra detail about his background and affiliations. Ṭaşköprizāde also says that he has seen Ḥāce Aṭā'ullāh's works on astrolabe and quadrant. See: Ṭaşköprizāde, *al-Shaqā'iq al-nu'māniyya fī 'ulamā' al-dawlat al-'uthmāniyya*, 135. During my research in the manuscript libraries of Istanbul and Europe, I was able to locate a single treatise on quadrant, written by a certain Ḥāce 'Aṭā'ullāh. See: SK Darülmesnevi Ms. 345. There is a colophon record on the last folio of the copy, yet the part where the date of composition reads is unfortunately cut from the bottom of the folio. The remaining part still allows us to establish the date of its composition as either the year 882 or 883. (1478 or 79).

⁶³ Ṭaşköprizāde, *al-Shaqā'iq al-nu'māniyya*, 198.

for his appointment as the royal tutor for instructing mathematical sciences.

During his long service at the court, Mīrim Çelebi not only instructed the sultan in the mathematical sciences but also prepared almanac prognostications, composed textbooks on astronomical instruments, probably gave astrological advice on the spot, and helped train new generation of *munajjims*. As the catalogue of a certain Sotheby's auction documents, Mīrim Çelebi produced at the time almanac-prognostications, two of which apparently survived our time, though they are now preserved in private collections inaccessible to researchers: one for the year 900/1495 and the other for the year 904/1499.⁶⁴ Although we are currently devoid of extant Mīrim Çelebi *taqwīms*, that he composed at the time almanac prognostications is further corroborated by a minor payment register from early sixteenth-century recording Mīrim Çelebi's name as the recipient of 1,000 *ağçes* for a *taqwīm* he presented.⁶⁵ In the year 904/1499, Bāyezīd also asked him to write a commentary on the Ulugh Beg tables to clarify its ambiguous points. In his dedication remarks of the text, which was more an expositional work on the concepts and parameters mentioned in the original Ulugh Beg tables than a revision of celestial data based upon fresh observations, Mīrim praises Bāyezīd II, among other ascriptions, as the most perfect and enlightened of the Caesars of the world (*akmal va a'qal-i qayāşira-i 'ālam*), as powerful as Alexander, who orders the affairs of the world in accordance with the rule of Farīdūn and the precepts of Plato (*dhulqarnayn-shavkatī ki ba-ḥukm-i farīdūnī va ḥikam-i Aflāṭūnī asbāb-i*

⁶⁴ Information is accessible at <http://www.islamicmanuscripts.info/reference/books/Sothebys-19941019/Sothebys-19941019-109-128.pdf>

⁶⁵ TSMA D. 9600. In the voluminous gift register covering the last decade of the reign of Bāyezīd II is Mīrim listed for numerous times but interestingly enough, none of these occasions are related to the presentation of an annual almanac-prognostication.

cihāngīrī sākht), and as the Messianic saviour of the end times (*Mahdī-yi ākhir-zamān*).⁶⁶ He repeats similar remarks in the epilogue (*khātima*) where he identifies Bāyezīd as the *pādishāh* of the inhabited world and the prophesied world ruler (*ṣāhib-qirān*).⁶⁷ Similar titulature is used in his works on astronomical instruments he composed in the first decade of the sixteenth century. For instance, in his work on the uses of the *sine quadrant*, Mīrim expresses his gratitude toward Bāyezīd II who is, as he puts it, the instrument for the prophesied world rule (*vāsiṭa-i ‘aqd-i ṣāhib-qirānī*) and the Messianic saviour in the end times (*Mahdī l-raḥma fī ākhir al-zamān*).⁶⁸ Even though Mīrim does not elaborate in his works on the celestial grounds of the titles he ascribes to Bāyezīd II, his resort to these concepts as a close companion of the ruler and a prominent expert of astral sciences is quite telling as to the extent of the discussion on the vocabulary of sovereignty in the late fifteenth and early sixteenth century Ottoman realm.⁶⁹

In view of the entries of the voluminous gift register covering the period 1503-1512, Mīrim was one of the closest companions of the sultan. Bāyezīd II even sponsored his wedding in 911/1505 and later gave Mīrim’s wife several items of clothing as a gift in the year 915/1510.⁷⁰ Idrīs Bidlīsī, another important contemporary figure close to the courtly environment

⁶⁶ SK Ayasofya Ms. 2697, 2b.

⁶⁷ *Ibid.*, 263b.

⁶⁸ TSMK Hazine 1760, 40b.

⁶⁹ See Christopher Markiewicz’s dissertation that thoroughly discusses the vocabulary of sovereignty in the post-Timurid realm that found immediate reception in the late-fifteenth and early-sixteenth century Ottoman political and intellectual context: Christopher Markiewicz, “The Crisis of Rule in Late Medieval Islam: A Study of Idrīs Bidlīsī and Governance at the Turn of the Sixteenth Century,” esp. 311-341.

⁷⁰ Atatürk Kitaplığı Muallim Cevdet O. 71, 159: *in ‘ām ba-Mawlānā Mīrim Çelebi barāy-i kharj-i ‘urs-i khod fī 26 minhu* (i.e., 26 CA 911/24 November 1505); *Ibid.*, 368: *‘ādat-i boğhcha-i zavja-i Mīrim Çelebi fī 10 minhu* (i.e. 10 Z 915/19 February 1510).

of Bāyezīd II, also acknowledges the great esteem in which sultan held for Mīrim.⁷¹ Further evidence for Mīrim Çelebi's proximity to Bāyezīd as a close courtier is the fact that during the pro-Selīm rebellions of the Janissaries in the capital in late 1511, Mīrim was among those high-ranking individuals who were targeted along with the chief military judge of the time Mü'eyyedzāde (d. 1516), the chancellor Tācīzāde Ca'fer Çelebi (d. 1515), and the chief physician Āhī Çelebi (d. 1524), on the grounds that they supported Bāyezīd's favourite son Aḥmed against Selīm.⁷²

In addition to the *taqwīms*, the commentary on the Ulugh Beg tables, and the works on astronomical instruments, Mīrim Çelebi composed at least two treatises on two specific fields of astrology, namely elections (*ikhtiyārāt*) and interrogations (*masā'il*). Although the colophons in the available copies of these works do not help us establish the date of their composition, Mīrim likely compiled them after the death of Bāyezīd II, as they do not include dedications to the sultan. In fact, Mīrim's astrological works are geared more towards practicing *munajjims* who needed to advance their skills in the relevant techniques. In his work on interrogations (*Ta'sīrāt dar masā'il*), for instance, Mīrim handles all possible questions a client might ask a practicing *munajjim*, ranging from matters related to travelling on board to the fate of purchased slaves. In so doing, Mīrim shows his vast knowledge of the subject and frequently cites such names as Vettius Valens (*Vālis*), Hermes Trismegistus, and Māshā'allāh, as the major authorities on this particular branch of astrological practice. Moreover, he encourages his readers to consult

⁷¹ Vural Genç, "Acem'den Rum'a: İdris-i Bidlisi'nin Hayatı, Tarihçiliği ve Heşt Behişt'in II. Bāyezīd Kısım (1481-1512)," 880: "bi-şoḥbat-i majlis-i humāyūn az sā'ir-i 'ulamā' mumtāz ast."

⁷² Çağatay Uluçay, "Yavuz Sultan Selim Nasıl Padişah Oldu II," *IÜ Edebiyat Fakültesi Tarih Dergisi* 7/10 (1954), 117-142, especially 120-121.

authoritative texts in this discipline such as al-Qaṣrānī's *Kitāb al-masā'il* for further reading. He also mentions astrolabes and quadrants as major tools in the practicing *munajjim*'s toolkit, and argues that one of the most important reasons for inaccurate predictions on the part of *munajjims* are defects in these instruments that impair their accuracy.⁷³

Mīrim Çelebi is also important for having trained several students in this field of knowledge some of which would later fill the professional cadre of court *munajjims* in the sixteenth century Ottoman establishment. One of these students was 'Alī, who made his debut in drafting *taqwīms* in the year 912/1507.⁷⁴ Unfortunately, the gift register does not provide any other details besides his personal name. There is a certain Muṣṭafā b. 'Alī al-muwaqqit (d. 979/1571) who is also considered a student of Mīrim Çelebi.⁷⁵ According to Salim Aydüz and İhsan Fazlıoğlu, Muṣṭafā b. 'Alī al-muwaqqit held the office of chief *munajjim* in the second half of Süleymān's reign, though archival registers we have available from the period do not cite any Muṣṭafā as a court *munajjim* at the time. No matter what his official status was, Muṣṭafā gained prominence especially through his treatises on geography and instruments of timekeeping. He also had close ties with the high-ranking statesmen of the time including İbrahīm Paşa or Ayas Paşa.⁷⁶

⁷³ SK Bağdatlı Vehbi Ms. 2005, 10a: “*dar ma'rifat-i chizihā ki khaṭā dar masā'il az ān jihat vāqi' mī shavad va ān chahār ast avval khaṭā dar masā'il bi-sabab-i khaṭā dar ālat ... chūn uṣṭurlāb va rub' mī bāshad.*”

⁷⁴ Atatürk Kitaplığı Muallim Cevdet O. 71, 211.

⁷⁵ İhsan Fazlıoğlu, “Mustafa b. Ali el-Muvakkit”, *TDVİA*.

⁷⁶ Pınar Emiralioğlu's recent book also briefly discusses Muṣṭafā b. 'Alī al-muwaqqit's geographical treatise entitled *İ'lām el-'ibād fī a'lām el-bilād*. See: Pınar Emiralioğlu, *Geographical Knowledge and Imperial Culture in the Early Modern Ottoman Empire* (Farnham: Ashgate, 2014), 80-82. For the edition of the text, see Yavuz Unat, “Mustafa İbn Ali el-Muvakkît ve İ'lām el-'İbād fī A'lām el-Bilād (Şehirler Aleminde Mesafelerin Bildirimi) Adlı Risalesi,” *Electronic Journal of Oriental Studies* VII/10 (2004), 1-48. Some other treatises of Muṣṭafā b.

Another student of Mīrim, according to some contemporary biographers, was ‘Özrī Çelebi, who is recounted to have excelled as an expert in casting birth horoscopes. ‘Āşık Çelebi (d. 1571) states that ‘Özrī learned the intricacies of astrological practice at the hands of Mīrim Çelebi, but lost his life after Sultan Süleymān got enraged because of his displeasing astrological predictions.⁷⁷ As ‘Āşık Çelebi narrates, ‘Özrī composed his first and the only *taqwīm* while he was the judge of Varna. He delivered it to the palace during the ongoing siege of Rhodes in 1522. In his *taqwīm*, which is unfortunately not extant today, ‘Özrī allegedly predicted that the island of Rhodes would eventually be conquered but the siege would be prolonged and cause the loss of many soldiers. Embittered by the predictions in the *taqwīm*, Süleymān asked his retainers to bring the author of the *taqwīm* into his presence. Upon hearing the sultan’s order, ‘Özrī visited one of his close friends, Muştafā the geomancer, who, according to ‘Āşık Çelebi, was also the student of Mīrim Çelebi (*hācedāşı ve fenn-i nücūmda pādāşı*). They together interpreted ‘Özrī’s horoscope at the time and reached the conclusion that ‘Özrī would die during his visit of the palace. According to ‘Āşık Çelebi’s anecdote, ‘Özrī died exactly as foretold.⁷⁸ While there are

‘Alī al-muwaqqit on astronomical instruments have also been published in Turkey as MA theses. See: S. Ertan Tağman, “Mustafa İbn Ali el-Muvakkit’in Usturlab Risalesi,” (MA Thesis, Ankara University, 2007); Arzu Torun, “Muvakkit Mustafa b. Ali Rûmî’nin Hall-i Daire-i Muaddil’i,” (MA Thesis, Celal Bayar University, 2011).

⁷⁷ Aşık Çelebi, *Meşa’irü’ş-Şuara* vol. 2, ed. Filiz Kılıç (İstanbul: Suna ve İnan Kıracı Vakfı, 2010), 1064.

⁷⁸ *Ibid.*: “Mīrüm Çelebi-i merhūma qarābet takarrübüyle ‘ilm-i nücūma müştegil belki ol fende bir üstād-ı kāmīl imiş...Heyelāc ve mevlūd bilmekde māhir ve bir yıl pādīşāha takvīm virmege kādīr imiş. Varna kādīsı iken Rodos seferinde İstanbul’a varduğda ber-mūcib-āyin-i kavīm-i kadīm pādīşāha şunar bir takvīm içinde ‘kal’a fetḥ olur ammā zamān- i fetḥ inzimām-ı şuhūr ve a’vāmı iktizā ider’ dir. Qalb-i pādīşāhī münkesir olub şāhib-i takvīm kimse gelüb hāzır olsun, yazduğı aḥkāma cevābın virsün ve ille cezāsın bulsın buyururlar. Da ‘vet olunduğda kendi tāli ‘ine reml idüb hācedāşı ve fenn-i nücūmda pādāşı olan Remmāl Muştafā’ya varub ‘arz eyledi. Kendi ve Remmāl Muştafā ittifāk idüb ol seferde mevtin taşrīh iderler ve ḥusūf-ı Kamer vāki ‘ olduğı gice fevt olacağın taḥkīk ve taşhīh iderler. Fī’l-ḥakīka ol ‘aşrda fevti öyle olub ol aḥşām ay

certain doubts about the actual truth-value of this anecdote, it unequivocally shows, by highlighting Mīrim Çelebi as the master of both 'Özrī and his friend Muştafā the geomancer, that in the eyes of later sixteenth century Ottoman learned class, Mīrim Çelebi still remained as the paramount expert of celestial knowledge.

As it is briefly mentioned before, another student of Mīrim Çelebi was Sultan Bāyezīd II. It is difficult to determine with greater certainty how long Mīrim Çelebi tutored the sultan and which books were involved in the study. One indication of the books Bāyezīd II likely studied with Mīrim Çelebi is a group of surviving manuscripts in which are found special inscriptions that curiously impute, in addition to the standard oval seal of the sultan, personal ownership of the book to Bāyezīd II (*şāhibuhu al-sulṭān Bāyezīd b. Muḥammad khan*, or sometimes *min kutub al-sulṭān Bāyezīd b. Muḥammad khan*).

Works in astral lore comprise the overwhelming majority of surviving manuscripts that bear attestation to Bāyezīd's own personal ownership. Those books Bāyezīd II personally possessed and possibly studied, either under the supervision of Mīrim Çelebi or on his own, include:

- i. Naşīr al-Dīn Ṭūsī's *Sī Faşl*⁷⁹,
- ii. (Ṭūsī's) *Zīj-i İlkhānī*⁸⁰
- iii. (Ṭūsī's) *Ṭahrir al-Majisī*⁸¹
- iv. (Ṭūsī's) *Tadhkira fī 'ilm al-hay'a*⁸²,

tutıldı, kendi yatsudan şoñra intikāl idüb şabāh şühedā-yı Rodos'la medfūn ve genc-i nihān gibi maḥzūn olur."

⁷⁹ SK Ayasofya Ms. 2474.

⁸⁰ Bursa Türk ve İslam Eserleri Müzesi Ms. 11. I'm grateful to Zeren Tanındı for sharing the information on this manuscript.

⁸¹ TSMK A. 3328.

- v. ‘Alī b. Aḥmad Balkhī’s (d. ?) astrological introduction in both the Arabic original and a Persian rendition (*Mukhtaṣar madkhal ilā ‘ilm aḥkām al-nujūm*)⁸³,
- vi. The Third Epistle of *Ikhwān al-Ṣafā’* on the science of the stars⁸⁴,
- vii. An anonymous treatise on the uses of astrolabe (*Risāla al-uṣṭurlāb al-musammā bi’l-lubāb fi’n-nujūm*)⁸⁵,
- viii. An introductory work in verse on astronomical/astrological calculation of time (*Kitāb yawāqit al-mawāqit min qibal al-nujūm*)⁸⁶,
- ix. Marrākushī’s (fl. second half of the thirteenth century) *summa* on astronomical instrumentation and computation of time (*Jāmi‘ al-mabādī’ wa’l-ghāyāt fi’ilm al-mīqāt*)⁸⁷,
- x. A collection containing Qusṭā ibn Lūqā al-Ba‘labakkī’s (d. ca. 912-913) treatise on the use of the celestial globe (*Risāla fi’l-‘amal bi’l-kura al-falakiyya*) as well as (pseudo-) Aristotle’s *Risāla al-ghālib wa’l-maghlūb* (The Victorious and the

⁸² TSMK A. 3317. For the critical edition and analysis of the *Tadhkira fi’ilm al-hay’a*, see: *Naṣīr al-Dīn al-Ṭūsī’s Memoir on Astronomy = al-Tadhkira fi’ilm al-hay’a*, 2 vol., ed. Jamil Ragep (New York: Springer-Verlag, 1993).

⁸³ SK Ayasofya Ms. 2702.

⁸⁴ TSMK A. 2128. For the recent critical edition of the *risāla* of Ikhwān al-Ṣafā’, see: *On Astronomia: An Arabic Critical Edition and English Translation of Epistle 3*, ed. Jamil Ragep and Taro Mimura (Oxford: Oxford University Press, 2015).

⁸⁵ SK Ayasofya Ms. 2618.

⁸⁶ SK Ayasofya Ms. 2711.

⁸⁷ TSMK A. 3343. For the facsimile edition of the text, see: *Traité des instruments astronomiques des Arabes composé au treizième siècle par Abū’l-Ḥasan ‘Alī al-Marrākūshī (VII-XIII s.) intitulé Jāmi‘ al-mabādī’ wa-l-ghāyāt*, 2 vol., Frankfurt am Main: Institut für Geschichte der Arabisch-Islamischen Wissenschaften, 1998).

Vanquished), a small treatise on a prognosticative technique employed to predict the outcome of a battle, which was quite popular among *taqwīm* writers.⁸⁸

Bāyezīd’s reading tastes and intellectual aspirations manifested through rich manuscript evidence, archival documentation, and testimony of his contemporaries seem to have embraced both the theoretical and practical iterations of the celestial knowledge including as well the strictly astrological (*aḥkām*) ones. Apart from the books in his own possession that deal in principle with astrological principles, a few surviving archival documents also attest to the fact that Bāyezīd was quite eager to hear the astrological predictions of his *munajjims*. For example the undated, anonymous petition delivered to Bāyezīd II, which I introduced in the first chapter in the context of the discussion on the self-doubts of practicing *munajjims*, is a clear evidence of the sultan’s eagerness to heed the astrological advice. The anonymous *munajjim* asks in Persian for the sultan’s sympathy and forgiveness because, as he admits, he has recently failed to present the sultan with a *taqwīm*.⁸⁹ He also pleads with the sultan to reemploy him in his service, because apparently he lost his position due to his recent negligifcence in preparing *taqwīms*.⁹⁰ As such, the petition is a clear proof that Bāyezīd II inquired after, and waited impatiently for, the astrological counseling of his *munajjims*. Since failing to produce the annual astrological predictions in a timely manner potentially entailed a *munajjim*’s loss of position, Bāyezīd II must have given ears

⁸⁸ SK Ayasofya Ms. 2432.

⁸⁹ TSMA E. 10159/145: “*dar īn ayyām muyassar na shud ki bi-istikhrāj-i taqvīm mashgūl shavad.*”

⁹⁰ *Ibid.*: “*az chand jihat yakī az ishtigāl bi-muṭāla‘a-i ṭibbiyya ammā māni‘-i kullī ān ast ki īn kamīna rā vaqt-i irtiḥāl nazdīk ast va ishtigāl bi-nujūmiyyāt siyammā bi-aḥkāmash mustalzīm-i qasāvat-i qalb ast ... in kamīna rā ‘afv farmāyand va az rujū‘-i khidmāt ki inshirāḥ-i ṣadr va tanavvur-i qalb bi-ān ast īn kamīna rā maḥrūm nagodhārānd.*”

to the astrological advice in the *taqwīms*.

III. 3. The Motives and Ramifications of Bāyezīd II's Celestial Pursuits

What is the significance of Bāyezīd's genuine and documented interest in different forms and genres of celestial knowledge? What could we say about the reasons of his reliance on the study of the heavens? How did his deliberate attempts to pursue and cultivate celestial knowledge result in?

Bāyezīd II was definitely not the first, nor the last Muslim ruler, who showed a keen interest in the production and use of celestial knowledge. As it is discussed in greater detail above, the patronage of *munajjims* was one of the standard themes of court life in medieval and early modern Eurasian context including the Islamicate and Ottoman world. The personal interest of a ruler in learning the science itself is also not entirely unprecedented in the Islamicate culture prior to Bāyezīd II. Aside from the examples in the Abbasid or Fatimid dynasties such as al-Ma'mūn (r. 813-883) or al-Āmir bi-Aḥkāmillāh (r. 1101-1130), Hülegü Khan (r. 1256-1265), for instance, was singled out for his avid interest in the study of the heavens. Writing in the fourteenth century, Abū'l-Qāsim Kāshānī (d. ca. 1337) says that Hülegü, who initiated the construction of an observatory in Maragha, "loved science (*ḥikmat*) and was infatuated with astronomy (*nujūm*) and geometry (*handasiyyāt*)."⁹¹ The Rasulid rulers of Yemen were also quite involved in studying the heavens. Al-Ashraf 'Umar (r. 1295-6), for example, wrote at least two treatises, one on the general principles of astrology (*Kitāb al-tabṣira fī 'ilm al-nujūm*) and another on the use of astrolabes.⁹² The second work was written as an accompanying text to an

⁹¹ Quoted in Thomas Allsen's *Culture and Conquest in Mongol Eurasia* (New York: Cambridge University Press, 2001), 162.

⁹² Schmidl, "Magic and Medicine in a 13th-century Treatise on the Science of the Stars."

actual astrolabe which al-Ashraf ‘Umar constructed.⁹³

The most famous of all the rulers in the Islamic history that showed a marked interest in learning and cultivating celestial knowledge is obviously Ulugh Beg (d. 1449). He gathered around his court in Samarqand a number of experts in mathematical and astral sciences from *diyār-ı Rûm* and *Îrân-zamîn* such as Qāḏīzāda-i Rûmī, Ghiyāth al-dīn Jamshīd al-Kāshī, and ‘Alī Qūshjī, and utilized their efforts to run the celestial observations in the newly established Samarqand observatory. Ulugh Beg is documented in contemporary sources not only as a patron ruler but also as an active member of the scientific enterprises. In the letters of Ghiyāth al-dīn Jamshīd al-Kāshī to his father or the extant *ijāza* given to Faṭḥullāh Shirvānī (d. 1486) by his master Qāḏīzāda-i Rûmī, Ulugh Beg is often pinpointed as an active participant of the classes on mathematical/astronomical matters.⁹⁴ Shirvānī’s *ijāza* even eulogizes Ulugh Beg as the philosopher king (*al-sultān al-faylasūf*) of the time.⁹⁵

We do not have conclusive evidence as to whether Bāyezīd II ever aspired to cast himself as a philosopher-king and create a court reminiscent of Hülegü’s or Ulugh Beg’s, welcoming experts of celestial knowledge from diverse regions. Yet this would not be surprising, considering the admiration for the Persianate, and specifically the Timurid, legacy in certain

⁹³ He ultimately received an *ijāza* from his teachers for making astrolabes skillfully. See *Ibid.*, 44.

⁹⁴ Mohammad Bagheri, “A Newly Found Letter of al-Kāshī on Scientific Life in Samarqand,” *Historia Mathematica* 24 (1997), 241-256; İhsan Fazlıoğlu, “Osmanlı Felsefe-Biliminin Arka Planı: Semerkand Matematik-Astronomi Okulu,” *Divan İlmi Araştırmaları Dergisi* 14 (2003), 1-66.

⁹⁵ Fazlıoğlu, “Osmanlı Felsefe-Biliminin Arka Planı: Semerkand Matematik-Astronomi Okulu,” 43.

areas of the cultural and intellectual life at the Ottoman court during the period in question.⁹⁶ Following the footsteps of his father, by promoting the Ottoman capital as a real haven for the systematic study of the heavens, Bāyezīd II aimed at reinforcing and publicizing the image of his ruling personality as well as the Ottoman dynasty as the most generous, dominant, and exalted power of the time. Indeed, Bāyezīd's sustained efforts to cultivate the science of the stars neatly complement his endeavors to commission the first dynastic histories of the Ottoman House. As Halil İnalcık suggested long ago, Bāyezīd's struggle with his brother Cem Sultan, which soon turned into an international crisis with the involvement of major European actors, and the competition in the east for political, ideological, and cultural supremacy against the Mamluks and various political/religious dispensations of the post-Shāhrukh period required a new evaluation of recent Ottoman achievements as well as Ottoman origins in line with the claims of a universal Muslim empire.⁹⁷ Next to the deployment of history writing and chancellery production for influencing the public opinion, the expertise of the *munajjims* in giving political

⁹⁶ More research is needed to picture more substantially the impact of the Timurid legacy upon the various aspects of the Ottoman cultural and intellectual life. There are yet important studies shedding some light on this research question. For a brief discussion of the scientific continuity between the Samarqand astronomical tradition and the late-fifteenth century Ottoman realm, see J. Michael Rogers, "Centralisation and Timurid Creativity," *Oriente Moderno* 15/2 (1996), 533-555, esp. 535-6. For other aspects of the intellectual and literary life, see Hanna Sohreweite, "Dichter und Gelehrten aus dem Ostem im osmanischen Reich," *Der Islam* 46 (1970), 263-302; Eleazar Birnbaum, "The Ottomans and Chagatay Literature," *Central Asiatic Journal* 20 (1976), 157-190; Michele Bernardini, "Ottoman 'Timuridism': Lāmi'i Çelebi and his *Şehrengiz* of Bursa," in *Irano-Turkic Cultural Contacts in the 11th-17th Centuries*, ed. Éva M. Jeremiás (Piliscsaba: The Avicenna Institute of Middle Eastern Studies, 2003), 1-16. For the artistic nature of the continuity between Timurid and Ottoman cultures, see Gülru Necipoğlu, "From International Timurid to Ottoman: A Change of Taste in Sixteenth-Century Ceramic Tiles," *Muqarnas* VII (1990), 136-170; Lale Uluç, "The Common Timurid Heritage of the Three Capitals of Islamic Arts," in *Istanbul, Isfahan, Delhi. 3 Capitals of Islamic Art: Masterpieces from the Louvre Collection*, exhibition catalogue (Istanbul: Sabancı University Sakıp Sabancı Museum, 2008), 39-53.

⁹⁷ İnalcık, "The Rise of Ottoman Historiography", 164.

and military guidance and in “scientifically” validating the otherwise hyperbolic ideological claims might have mattered during this crucial transitional period of the Ottoman polity from a relatively minor regional power to a dominant political player.

As part of these claims to legitimacy, the court of Bāyezīd seems to have welcomed, if not fully adopted, experimentation with the messianic and esoteric discourse that would become particularly popular in the first two decades of the reign of his grandson, Süleymān.⁹⁸ The astrological writings of Ottoman *munajjims* at the time, however, do not appear to be much influenced by this discourse, with the exception of the works of Mīrim Çelebi, who at times praises the sultan as the prophesied world conqueror and Messianic saviour of the end times. The real source for the articulation of such claims is rather courtly and semi-courtly historical works, exemplified by those of İdrīs Bidlīsī, Ibn Kemāl, and Firdevsī-i Tavīl.

Bidlīsī in his *Hasht Bihisht* singles out Bāyezīd as the messianic renewer (*mujaddid*) of the era, for his “turn” coincides with the turn of the tenth Islamic century.⁹⁹ He heavily resorts to astrological references when celebrating Bāyezīd’s rule as the greatest one of his age. In eight separate discourses İdrīs explains the underlying reasons of Bāyezīd’s distinguished status, and in particularly the sixth discourse he goes into purely astrological details. For İdrīs, Bāyezīd was the ideal ruler because in the eyes of the *munajjims*, Bāyezīd’s horoscope —compared to the

⁹⁸ On the role of messianic and apocalyptic discourse in Ottoman ideology during the first half of the reign of Süleymān, see Cornell H. Fleischer, “The Lawgiver as Messiah: The Making of the Imperial Image in the Reign of Süleyman,” in *Soliman Le Magnifique et son temps, actes du colloque de Paris. 7-10 Mars 1990*, ed. Gilles Veinstein (Paris: La Documentation Française, 1992), 159-77; *Ibid.*, “Shadow of Shadows: Prophecy and Politics in 1530s Istanbul,” *International Journal of Turkish Studies* 13/1-2 (2007), 51-62.

⁹⁹ See Markiewicz’s discussion in his “The Crisis of Rule in Late Medieval Islam,” 378-9. Also see Genç, “Acem’den Rum’a: İdris-i Bidlisi’nin Hayatı, Tarihçiliği ve Heşt Behişt’in II. Bayezid Kısmı (1481-1512)”, 354-355.

horoscope of any other king— is the supreme one in auspiciousness (*tāli`-i humāyūn-i sulṭān bi-itifāq-i munajjimān sa`ādatmandtarīn tāli`hā-yi shāhān ast*).¹⁰⁰ Idrīs goes into further detail here and points out the exact astrological parameters of Bāyezīd’s birth horoscope. According to Idrīs, Venus rules the ascendant (*tāli`*) of the sultan, the planet that signifies the prophethood and sacred law. Other important indications related to the twelve astrological houses also imply for the sultan, as Idrīs maintains, nothing shorter than a steady state of health, strong natural disposition, and perfect rule.¹⁰¹ As Idrīs concludes this section, all of these astrological indications are the signs of Bāyezīd’s preeminence over other rulers in the world.¹⁰²

Apart from Idrīs, Ibn Kemāl also quite frequently employs in his chronicle the term *sāhib-qirān* for designating Bāyezīd II, though he does not necessarily discuss the astrological reasoning of this title.¹⁰³ Most intriguing in this context is Firdevsī-i Ṭavīl’s *Ḳuṭbnāme*, which he composed in 909/1503 as a lengthy history in verse of the recent Ottoman victory in Lesbos against the Venetians. Although it is clear that Firdevsī was not among the favorite littérateurs of Bāyezīd, partly due to his lack of necessary elite identity markers (he preferred to write in plain Turkish), he exerted all his efforts from 893/1488 onwards to catch the attention of the sultan by exploiting Bāyezīd’s interests and promoting his rule. His *Ḳuṭbnāme* was written with similar intent and served to celebrate Bāyezīd’s recent achievements. The real significance of the text

¹⁰⁰ SK Nuruosmaniye Ms. 3209, 497b, quoted in Markiewicz, “The Crisis of Rule in Late Medieval Islam,” 379.

¹⁰¹ *Ibid.*, 497b: “*az kamāl-i intizām va quvvat-i mizāj bi-i`tidāl va az imtidād-i shiḥhat-i badan az bidāyat-i ḥāl mā`lūm mī shavad ki burj va daraja va sāhib-i tāli` ki bi-ta`ayyun Zuhra-i mas`ūd ast ya dar tāli` ast ya bi-naẓar-i sa`ādati-i lāmi` va vufūr-i taqvā va`iffat-i sulṭānī dalīl-i khosh-ḥālī-i rabb-i tāli` ast charā ki kavkab-i nubuvvat va nāmūs-i nabavī Zuhra-i sa`ūd ast va sitāra-i ṣalāḥ va taqvā najm-i mas`ūd-i Nāhīd ast...*”

¹⁰² *Ibid.*: “*va īn jumla dalā`il isti`lā va tafavvuq-i shān-i sulṭānī bar mulūk-i jihān va sabab-i rujhān-i u bar khojasta-tāli`ān-i īn davrān.*”

¹⁰³ Ibn Kemal, *Tevarih-i Al-i Osman 8. Defter*, ed. Ahmet Uğur, *passim*.

derives from Firdevsī's heavy use of apocalyptic imagery with detailed references to contemporary European powers. In the same vein of Idrīs and Ibn Kemāl, Firdevsī attempts to cast Bāyezīd as the prophesied ruler of the age, the *quṭb al-aqṭāb* (pole of the poles) of the time.¹⁰⁴ The notion of the “red apple” (*kızıl elma*) that symbolizes the Ottoman millenarian desire to conquer Rome is also frequently employed in the text.¹⁰⁵

Ḳuṭbnāme was not the only textual evidence for the perpetuation of the millenarian “red apple” discourse at the court of Bāyezīd II. In an anonymous dream report likely written by an individual from the class of frontier *ghāzī*-dervishes, the author states that he saw the sultan Bāyezīd in his dream, sitting next to Seyyid Gāzī, the legendary dervish warrior. Seyyid Gāzī then apparently turned the author and said: “Behold, I have brought Sultan Bāyezīd ready for your service. Let him conquer westwards unto the *red apple* and establish the dominion of Islam.”¹⁰⁶

As these last two examples suggest, the political ambitions and cultural aspirations at the court of Bāyezīd II were not only shaped by the political, ideological, and cultural rivalry within the Islamic world but also formed in relation to contemporary European powers. Although the

¹⁰⁴ *Kutb-nāme*, ed. İbrahim Olgun and İsmet Parmaksızoğlu (Ankara: TTK, 1980), 29-30: “*Bu kiṭābıñ bil sebeb-i te'līfī ne, diyelüm nedür cihet taşnīfine. Ḳuṭbu'l-aqṭābı kılam saña beyān, tā bilesün kimdürür quṭb-ı 'āyān. İşbu 'aşrıñ quṭbı kimdür şerḥ idem, rastını idüb kizb aradan tarḥ idem. Ḳuṭbsuz olmaz zamān añla yakın, quṭba inkār itmegil gāyet saḳın ... Bu zamānıñ quṭbunu añla cedīd, şāh sulṭān āl-i 'Osmān Bāyezīd. Ḳuṭb-ı 'ālem pādīşāhdır bī-gümān, vaşfin işit tā gide şekk ü gümān ... Ḳuṭbu'l-aqṭāb olmasaydı pādīşāh, Lih kralı olmayaydı pes tebāh. Ḳuṭbu'l-aqṭāb olmasa Şeh Bāyezīd, düşmenān görmez idi ḳahr-ı şedīd. Ḳuṭb-ı Şāh emrinde olmasaydı bād, ḳavm-i Efrenk olmaz idi tündbād. Ḳuṭb-ı Şāh emrinde olub deryā vü berḳ, şuda Efrenk oldı ḥarḳ u daḥı garḳ. Ḳuṭbu'l-aqṭāb olmayaydı Şehriyār, dileğince dönmez idi rüzgār...*”

¹⁰⁵ See especially pp. 75-77.

¹⁰⁶ TSMA E. 10818, also quoted in Selahattin Tansel, “Yeni Vesikalar Karşısında Sultan İkinci Bayezid Hakkında Bazı Mütalaalar”, *Belleten* 27/106 (1963), 208: “*İşte sana Sulṭān Bāyezīdi ḳoşduk. Al ilet gün bātısına kızıl elmaya değın fetḥ idüb İslām döşeğın döşesün.*”

majority of scholarship on the reign of Bāyezīd II tends to portray his stance vis-à-vis the political and cultural dynamics in Europe as anemic and idle, this was simply not the case. Especially during the first two decades of his reign when the Cem Sultan affair became an international crisis, Bāyezīd carefully engaged a busy network of spies and informants who acquainted the sultan not just with the political issues but also likely with the cultural preferences at major European courts.¹⁰⁷ One of these courts was that of Mathias Corvinus (d. 1490) with whom we know Bāyezīd had established close relations and exchanged numerous letters based on the principles of “friendship and good neighborhood.”¹⁰⁸ Although the content of these frequent diplomatic correspondences between Bāyezīd and Mathias Corvinus, the ideal Renaissance monarch of his time, are primarily slanted towards political and commercial issues, it is likely that these communications also informed the newly enthroned Ottoman sultan about Corvinus’s court culture, his patronage of astrologers, and the exemplary *Biblioteca Corviniana*, which thus might have served to inspire his Ottoman counterpart to undertake similar pursuits.¹⁰⁹

Apart from the ideological implications and political instrumentality of the royal

¹⁰⁷ Halil İnalçık, “A Case Study in Renaissance Diplomacy: The Agreement between Innocent VIII and Bāyezīd II on Djem Sultan,” *Journal of Turkish Studies* 3 (1979), 209-223.

¹⁰⁸ Tayyib Gökbilgin, “Korvin Mathias (Mátyás)ın Bayezid II’ye mektupları ve 1503 (909) Osmanlı-Macar muahedesinin Türkçe Metni/La traduction des lettres de Korvin Mathias á Bayezid II et le texte turc du traité Hungaro-Ottomans de 1503 (909),” *Bellesten* 87 (1958), 369-390; see also Güneş İşiksel, “Friendship and the Principle of Good Neighborhood between Bayezid II and Matthias Corvinus,” in *Matthias Corvinus und seine Zeit: Europa am Übergang vom Mittelalter zur Neuzeit zwischen Wien und Konstantinopel*, ed. Christian Gastgeber *et al.* (Vienna, Verlag der Österreichischen Akademie der Wissenschaften, 2011), 33-36.

¹⁰⁹ On Corvinus’s patronage of astrologers, see Jean-Patrice Boudet, Darin Hayton, “Mathias Corvin, János Vitéz et l’Horoscope de Fondation de l’Université de Pozsony en 1467,” in *De Bibliotheca Corviniana. Mathias Corvin, les bibliothèques princières et l’origine de l’État moderne*, Actes du colloque international de Paris, 15-17 novembre 2007 (Budapest, 2009), 205-213; Hayton, “Martin Bylica at the Court of Matthias Corvinus: Astrology and Politics in Renaissance Hungary,” *Centaurus* 49 (2007), 185-198.

patronage for *munajjims*, Bāyezīd II might have also deployed the expertise of celestial knowledge for more tangible and mundane aspects of governance such as land and maritime navigation. As briefly mentioned above, the technical know how of the experts of the science of the stars included, besides astrological estimations and predictions, the use of instruments as well as horological, latitudinal and longitudinal calculations. The current state of the literature on the military and maritime history of the Ottoman house does not allow us to draw any firm conclusions about the possibility of interplay between the simultaneous buildup of the navy and the cultivation of the science of the stars at the court of Bāyezīd II.¹¹⁰ However, as studies on the development of the Portuguese naval technology in the later fifteenth century have suggested, the contemporary study of the heavens tallied with the advancement of the nautical sciences.¹¹¹ Indeed, that the Ottoman sixteenth century produced figures like the admiral Seydī ‘Alī (d. 1562), who prolifically wrote on astronomical instruments and mathematical geography, indicates that similar research into the mutual relationship between the science of the stars and the art of navigation in the Ottoman context is a major desideratum.¹¹²

¹¹⁰ Bāyezīd II is also credited for his endeavors to reorganize the Ottoman navy and create a stronger sea force with better technology. See Hans Joachim Kissling, “Betrachtungen über die Flottenpolitik Sultan Bâjezîds II. (1481-1512), *Saeculum* 20 (1969), 35-43; Palmira Brummett, *Ottoman Seapower and Levantine Diplomacy in the Age of Discovery* (Albany, State University of New York, 1994), esp. 89-121.

¹¹¹ Onesimo T. Almeida, “Science during the Portuguese Maritime Discoveries: A Telling Case of Interaction between Experimenters and Theoreticians”, in *Science in the Spanish and Portuguese Empires, 1500-1800*, ed. Daniela Bleichmar *et al.* (Stanford, Stanford University Press, 2008), 78-92.

¹¹² As briefly discussed in chapter two, Pīrī Reis’s use of the epithet *munajjim* for Christopher Columbus neatly exemplifies the intimate connection between the seemingly two separate fields of expertise, i.e., the science of the stars and the art of navigation. In fact, Seydī ‘Alī and his oeuvre wait to be thoroughly studied from the perspective of the intersections among navigation, astronomical instrumentation, and prognostication. In his *Kitābu ‘l-muḥīt*, for instance, Seydī ‘Alī does not shy away from informing his readers (i.e., *mübtediler* [young and inexperienced

No matter what the exact motives of the sultan and his close companions including primarily of Mü'eyyedzāde and Mīrim Çelebi were for the documented astromania at his court, the evident enthusiasm for the study of the heavens at his time paved the way into: i) the systematization of the “office” of court *munajjims* that would routinize the recruitment of experts and facilitate the transmission of astrologically valid knowledge across subsequent generations

seafarers]) about i) the detrimental affects of the apperance of certain stars (e.g. *Şükür yıldızı*), ii) the main characteristics of the planets and the days they rule (e.g., “*her sâ'atüñ şāhibi kankı kevkebdür ma'lüm idinüb kankı sâ'atde sefer olunmağ cāizdür ve kankı sâ'atde cāiz degüldür*”), or iii) the direction in which the *rijāl al-ghayb* would show up in certain days of each month (e.g., “*hazret-i Şeyh Muhyiddīn-i Arabī ... ricālū'l-gayb her ayuñ kankı günlerinde ne cānibdedür ta'yīn itmişdür ma'lüm ola.*”)

In his *Mir'ätü'l-memālik*, Seydī 'Alī also narrates in detail that the Mughal ruler Humāyūn (r. 1530-40; 1555-6) asked him to spend the winter in his palace and teach him how to use *zījes* and *taqwīms* as well as other astronomical instruments. See *Mir'ätü'l-memālik: inceleme, metin, indeks*, ed. Mehmet Kiremit (Ankara: Atatürk Kültür, Dil ve Tarih Yüksek Kurumu, 1999), 109-110: “*Bir yıl bāri bunda bizüm ile ol' diyü ibrām idüb bu kemīne dahı cevāb virüb 'Sa'ādetlü pādīşāhuñ emr-i şerīfi ile deryāya çıkub küffār-ı hāk-sār ile cenk idüb ve tūfān ile diyār-ı Hind'e düşüb benüm der-i devlete varmam lāzımdur ki küffār-ı hāk-sāruñ aḥvālī devletlü pādīşāha ma'lüm olub...'* didükde ‘Pādīşāh hazretlerine elçi irsāl idüb senüñ ‘özrūñ ‘arz olsun’ diyü buyurduklarında ... envā'-ı tazarru' ve niyāz olındukda ruḥṣat ināyet olunub ‘Ammā üç ay birişkāl ya'nī bārān zamānidur. Yollar kışdur. Gidilmek mümkin degüldür. Ol zamāna dek tevakkuf eyle ve ‘amel-i kūsūf ve ḥusūfī zīce ve takvīm-i küllīye mürāca'at ol demden usturlāb ‘ameli ile tarīkin göster ve dāire-i mu'addil risālesin ta'līm eyle. Eger üç aydan evvel olursa dahı ruḥṣatdur’ diyü ‘ahd ü amān idüb bi'z-zarūrī tevakkuf olunup gitmekden me'yūs olub...ammā ne gicemüz gice ve gündüzümüz gündüz, aṣlā rāḥat yüzün görmeyüb āḥir pādīşāha zīkr olan risāle min evvelihī ilā āḥirihī ta'līm olunub ve ‘amel-i kūsūf ve ḥusūfī usturlāb ‘ameli ile gösterilüb ...”

As Seydī 'Alī's remarks demonstrate, seafarers often appealed to the technical texts on the uses of astronomical instruments, calendar conversion, or general astrological principles. One curious marginal note in a surviving *mecmū'a* of astrological and astronomical texts, now housed at the BnF, conveys the invocation of an anonymous seafarer, who supplicates for God's help on behalf of his fellow sea *ghazis*. See BnF Turc Ms. 186, 7a-7b: “[D]u'ā idelüm...ricālū'l-gayb himmetleri ve şefā'atleri üzerümüzze ve üzerünüze ḥāzīr [sic] ve nāzīr [sic] olmaklığıçün ... kāfirde esīr olan müselmānlar ḥaḳḳ sübhānehu ve te'ālā ḥalāşlīḳ [sic] alıvirmeklığıçün, seferimiz dahı mübārek olub gāzīlerümüz ganīme müstagraḳ doyum olmaklığıçün ve ḥaḳḳ sübhānehu ve te'ālā ganīmetler virub āsānlık ile vātanlarına īsāl idüvirmeklığıçün ... ve ḥaḳḳ sübhānehu ve te'ālā gemiciğimizi belā ve ḥaṭādan şaḳlıyüvirmeklığıçün ve küffār-ı hāksār-ı bed-fi'āl[i] ḥaḳḳ sübhānehu ve te'ālā münhezim idüb ...”

of *munajjims*, and ii) the appropriation and further canonization in the Ottoman world of the post-thirteenth century Persian astral tradition that would shape the scientific contours of the practitioners.

As regards to the formation of the office of the court *munajjims*, we lack substantial evidence to illuminate the exact historical context of the transition from ad hoc functionaries to permanent office-holders, but as mentioned before, the earliest archival registers at hand document that during the early years of the reign of Bāyezīd II, the number of *munajjims* receiving regular salaries from the court significantly increased from one to six. Moreover, based upon the same archival registers, the status of *munajjims* within the nascent court bureaucracy also changed. Whereas at the end of Meḥmed II's reign the only *munajjim* listed in the paybook was recorded within the miscellaneous *mutafarriqa* corpus, from the time of Bāyezīd II onwards court *munajjims* started to be listed among other monthly-salaried palace personnel (*müşāhereḥorān*) next to the physicians, chancelleries, or artisans (*ehl-i ḥiref*). Not but not least, compared to the reigns of his predecessor and successors, Bāyezīd II's time was the period during which the amount of salaries court *munajjims* received were at the highest level.

The courtly interest in the services of *munajjims* maintained during the time of Selīm (r. 1512-1520). As far as the contemporary archival and manuscript evidence is concerned, Selīm was not much shorter than his father when affinity toward celestial expertise is in question. At his princely court in Trabzon, for instance, he had one particular *munajjim*, who used to receive 800 *akçes* for his annual presentations of almanac-prognostications.¹¹³ He also seems to have retained, upon his enthronment in the capital in 1512, the *munajjims* active at the court of

¹¹³ TSMA 10184. Unfortunately, the document does not reveal his name, thus we are not in a position to detect whether this particular *munajjim* accompanied Selīm in his move to Istanbul.

Bāyezīd II.¹¹⁴ Contemporary narrative sources also allude to Selīm’s taking the expertise in celestial matters quite serious. For example Ḥakīm Shāh Muḥammad Qazvīnī (d. later than 1523), who emigrated from the western Iran to the Ottoman lands in the early sixteenth century and served Selīm I in the capacity of court physician, goes on to say in his Persian translation-cum-addendum of ‘Alī Shīr Navā’ī’s *Majālis al-naḫā’is* that Selīm inherited from his father the interest in the mathematical sciences (*‘ilm-i riyāzī*).¹¹⁵ Another contemporary source, Keşfi Meḥmed Çelebi’s (d. 1525) *Selīmnāme*, vividly illustrates how Selīm was moved by the advice of the *munajjims*. According to the eyewitness account of Keşfi Meḥmed Çelebi, Selīm was eager to initiate a campaign against the island of Rhodes, but after hearing – or maybe reading – the words of *munajjims* who reached a consensus in their *taqwīms* that the beginning and the middle of the year would be extremely inauspicious, he decided to abandon his campaign plan.¹¹⁶

As for the reign of Süleymān, one would have expected a better documented courtly interest in astrological matters given the increased use of messianic discourse in the articulation of his ideological/imperial claims, the frequent circulation in his palace of key texts of apocalyptic prognostications including ‘Abd al-Raḥmān al-Biṣṭāmī’s *Miftāḥ al-Jifr al-Jāmi*, or the close proximity of a particular geomancer (*remmāl*) to the sultan.¹¹⁷ However, as already

¹¹⁴ TSMA D. 9706; TSMA D. 10141.

¹¹⁵ Ḥakīm Shāh Muḥammad Qazvīnī, *Tazkirah-i majālis al-naḫā’is*, ed. ‘Alī Aşghar Ḥikmat (Tehran: Kitābfurūshī-i Manūchihri, 1363), 360: “*faẓā’il-i ‘ilmī-i ū an ki dar ‘ilm-i riyāzī ki mişl-i salṭanat-i mīrāsī-i ū ast māhir būd.*” It is worth noting here the Qazvīnī’s emphasis upon Selīm’s adoption of the legacy of Bāyezīd II in the cultivation of astral interests.

¹¹⁶ SK Esad Efendi Ms. 2147, 133b: “*ve hem ehl-i nūcūm-ı müttefikün ‘aleyh bu yılıñ evāli ve evāsıtı gāyetde şūm ve nihāyetde mezmūmdur diyü taqvīmlerinde taḫrīr ... kıldılar. Ol sebebden sefer emri te’ḫīr buyuruldu.*” More discussion and the paralel reading of the original *taqwīm* from the year in question will follow in Chapter 4.

¹¹⁷ On the role of ‘Abd al-Raḥmān al-Biṣṭāmī on the formation and articulation of Ottoman dynastic claims in the late fifteenth and early sixteenth century, see: Cornell H. Fleischer,

mentioned in the first chapter, despite several overlapping points between the expertise of a *munajjim* and other types of diviners such as an adept practitioner of the science of letters (*‘ilm al-ḥurūf*) and/or a geomancer, the technical mathematical details of the learned astrological practice were often disregarded in non-astrological divinatory texts. As Ottavia Niccoli’s work on the role of prophetic texts in Renaissance Italy has persuasively demonstrated, such mathematical precision and taxing calculations to determine celestial positions at a particular time for a specific location might have sounded too complex and less prophetic for many a contemporaries.¹¹⁸ It is true that these kinds of texts, like the astrological ones, almost always relied upon the assumed causality between heavenly forces and terrestrial occurrences. Nevertheless, none of the experts of the science of letters or geomancy were willing or capable (or sometimes both) to practice the learned forms of mathematical astrology. In fact, as manifested in *remmāl* Ḥaydar’s surviving treatises and specific reports where he details the application of the science of geomancy, the complicated mathematical calculations of horoscopes or any other celestial position play little to no role.¹¹⁹ In that regard, at the current stage of modern literature and available sources, we can argue that during the time of Süleymān, especially in the first half of his reign, the interest in the study of heavens was rather shifted from the more learned practice of mathematical astrology to the letrist interpretation of the celestial

“Ancient Wisdom and New Sciences: Prophecies at the Ottoman Court in the Fifteenth and Early Sixteenth Centuries,” in *Falnama: The Book of Omens*, ed. by Massumeh Farhad and Serpil Bağcı (Washington: Smithsonian Institution, 2009), 231-245. On the life and importance of Haydar the geomancer, see Fleischer, “Seer to the Sultan: Haydar-i Remmal and Sultan Süleyman,” in *Cultural Horizons. A Festschrift in Honor of Talat S. Halman* vol. 1 (New York: Syracuse University Press, 2001), 290–300.

¹¹⁸ Ottavia Niccoli, *Prophecy and People in Renaissance Italy*. (Princeton, N.J: Princeton University Press, 1990), 194.

¹¹⁹ See for instance SK Laleli Ms. 1532, 45b-108b; TSMK Hazine Ms. 1697; TSMA E. 1698.

knowledge, which does not much require the precise observations and/or calculations. One could even corroborate this shift by tracking the gradual decrease in the number of court *munajjims* during the long reign of Süleymān. While the number of monthly-salaried court *munajjims* was four in the first few years of Süleymān, it first dropped to three in the early 1530s before it was ultimately reduced to two in the late 1540s.¹²⁰

Notwithstanding the gradual decrease in the number of court *munajjims* put on the palace payroll and the concomitant decline in the amount of the production of astrologically valid knowledge, the idea of a permanent “office” of court *munajjims* helped practicing astral experts in two major ways. Firstly, it secured a relatively stable financial means, though by the mid-sixteenth century, it was not very lucrative, much to the chagrin of some contemporary practitioners. Secondly, and more importantly, it provided a sort of “membership card” through which affiliated ones enjoyed easier access to the books and instruments available in the palace treasury. As we have already seen in the second chapter, one of the court *munajjims* asked Bāyezīd II to gain access to some of the items in the treasury (*khizāne*) including the Ulugh Beg tables, the commentary of Naṣīr al-dīn Ṭūsī on Ptolemy’s *Almagest*, the horoscope of the sultan (*tāli’-i ḥazret-i ‘ālem-penāhī*) and an astrolabe.¹²¹ Another archival register prepared on 10 Sha‘bān 910/January 16, 1505 lists for example all the items available at the time in the inner treasury (*ḥazāne-i Enderūn*). Among these listed items are there numerous quadrants (*rub’ dā’ire*), several celestial globes (*hey’et topu*), at least sixteen astrolabes preserved in velvet cases

¹²⁰ BOA MAD 7118. Ḥaydar-ı *remmāl*’s reports and writings in the 1550s also reveal that, compared to the 1520s and early 1530s, the prophetic ambitions and use of prognosticative methods no longer played an important role at the time. See: Cornell H. Fleischer, “Shadow of Shadows: Prophecy and Politics in 1530s Istanbul,” *International Journal of Turkish Studies* 13/1-2 (2007), 61.

¹²¹ TSMA E. 10159/6.

(*on altı büyük ve küçük kadife gülâf içinde suşurlâb*), one European clock (*Frengî sâ'at*), and other sorts of astronomical instruments (*âlet-i rücû'-i kevâkib*).¹²² Given the higher costs of owning such astronomical instruments, the status of court *munajjim* must have mitigated the problems of accessibility.

Although it is not possible to speak of a physical space in the palace specifically designated for the court *munajjims*, bearing the rank of “court *munajjim*” and being listed in the bureaucratic records along with other colleagues might have also promoted the group ethos as much as it provoked professional rivalries. As exemplified further below, many a times members of the “office” were tied to one another through family bonds and/or master-apprenticeship relations. This must have facilitated and even routinized the transmission of the required knowledge to subsequent generations of court *munajjims*.

In terms of the recruitment of adept *munajjims*, especially in the earlier phases of the functioning of the “office” by the late fifteenth century, the émigré scholars coming from the Persianate East seem to have had a decisive role. Despite the valuable contributions of Hanna Sohrweide or Tofigh Heiderzadeh on the Persian émigré scholars and litterateurs in the Ottoman world in the fifteenth and sixteenth century, we are still far from establishing their identities and appreciating their role on the cultivation of cultural and intellectual life in the Ottoman realm.¹²³

Who was Mevlânâ Kūçek Yezdānbağş for instance? Where did he come from? To what extent

¹²² TSMA 10026.

¹²³ Hanna Sohrweide, “Dichter und Gelehrten aus dem Ostem im osmanischen Reich,” *Der Islam* 46 (1970), 263-302; Tofigh Heiderzadeh, “Patronage, Networks and Migration: Turco-Persian Scholarly Exchanges in the 15th, 16th and 17th Centuries,” *Archives internationales d'histoire des sciences* v. 55 n. 155 (2005), 419-434. See also Giv Nassiri's study on the migration of scholars in the Turco-Persian realm prior to the fifteenth century: “Turco-Persian Civilization and the Role of Scholars' Travel and Migration in its Elaboration and Continuity.” (Ph.D. Dissertation, University of California, Berkeley, 2002).

was he related to Mawlānā ‘Aṭa’ullāh, who apparently came to Istanbul from Kirman around the same time? Who constituted those two hundred people that allegedly accompanied ‘Alī Qūshjī in his recounted arrival in early-1470s Istanbul?¹²⁴ What kind of books and instruments did they bring? How did they interact with local scholars and young aspirants of celestial knowledge?

In the current state of scholarship, it is difficult to provide substantial answers to each and every one of these questions. Nonetheless, available manuscript and archival sources suggest that the late-fifteenth century is a vibrant period in terms of the circulation of scholars and intellectuals between the lands of Irān and Rūm. It is true that the history of intellectual exchanges and movement of scholars between these regions could easily be traced back to the thirteenth and fourteenth centuries. Yet, the power struggle in the post-Shāhrukh political context of the late fifteenth-century Iran particularly encouraged an influx of scholars into Ottoman domains (as well as the Indian subcontinent) even as the generous patronage policies of Mehmed II and Bāyezīd II to establish the Ottoman dynasty as a legitimate power offered the intellectual émigrés incentives for migration. Before the gradual territorial and confessional consolidation of the Ottoman and Safavid Empires in the course of the sixteenth century, political instability and confessional ambiguity facilitated the high circulation of scholars from Central Asia and Iran to Ottoman lands in Anatolia and the Balkans. As part of this wave, several Persian émigré scholars that had the expertise in different forms and genres of celestial knowledge ended up in the Ottoman lands, whereas various would-be *munajjims* in the Ottoman lands who were looking forward to advancing their knowledge in astral sciences went to Iran-*zamīn*. It is in order now to share the personal stories of some of the active *munajjims* in the Ottoman realm in the late

¹²⁴ For the story of two hundred people accompanying ‘Alī Qūshjī during his travel to Istanbul, see Süheyl Ünver, *Ali Kuşçi hayatı ve eserleri*, 17.

fifteenth and first half of the sixteenth century. The manuscript and archival evidence on these select names, albeit limited, will help us better substantiate the already raised points as regards to the social history of *munajjims* and the appropriation of the Persian astral tradition in the Ottoman world.

III. 4. Individual Stories of Select *Munajjims*

Unlike contemporary European context in which different stages of the careers of astrologers could easily be reconstructed in light of substantial and diversified source base, it is quite difficult to hear the voices of practicing *munajjims* in the fifteenth and sixteenth century Ottoman realm. Not only the contemporary biographical dictionaries of scholars and/or poets often remain silent about them. In the surviving astrological and other related materials of Ottoman *munajjims* themselves, they reveal too little valuable information about their own lives and careers, their training and scholarly networks, the patrons they served, their success and failures as well personal resentments.

One exception is the story of ‘Abd al-Raḥmān *munajjim*, which presents us an invaluable case to bear witness to the making and breaking of a career of an Ottoman natural philosopher-cum-astrologer by the turn of the sixteenth century. ‘Abd al-Raḥmān also supplies the only detailed autobiographical narrative of a practicing *munajjim* at the time that provides further glimpses of evidence into different aspects of a *munajjim*’s life, from his training and initiation into courtly service to the gradual shift of his scientific preoccupations as a response to the

changing priorities of his patron.¹²⁵

In his medical treatise that he composed in Arabic and presented in February 1502 to Şehzāde Aḥmed (d. 1513), the living eldest son of Bāyezīd II settled in Amasya, ‘Abd al-Raḥmān mentions his training in varying branches of natural philosophy and mathematical sciences, and illustrates his wavering relationship with his major patron, Şehzāde Aḥmed. According to this short autobiographical narrative that he placed in the introduction of the text, he started studying the science of the stars (*‘ilm al-nujūm*) under Mevlānā Kūçek Yezdānbaḥş, whom we have already seen as the only court *munajjim* listed in the detailed register of payments from the later years of Meḥmed II’s reign and as the composer of the *Zīj-i mujmal* that he presented to prince Bāyezīd II in Amasya around the year 1477. Unfortunately ‘Abd al-Raḥmān does not reveal here in which city and under what circumstances this training took place. He further mentions that having completed his initial training in the science of the stars with the only recorded court *munajjim* of the time, he studied medicine for about ten years at the feet of Ḥakīm İşşak, whom he introduces as the Hippocrates of the day, Socrates of the time, Galen of the age, and Ibn Sīnā of the era.¹²⁶

¹²⁵ The *Mücerrebāt* of Muştafā Zekī, one of the chief court *munajjims* in the eighteenth century, provides us with suprising autobiographical details about his life. Apparently he started his service in the office first as a petty scribe (*erḳām kātibi*) putting the *abjad* numerals into the *taqwīms*. Since the date of this text’s composition falls into much later periods than covered in this dissertation, I did not use it here. See: SK İzmir Ms. 485.

¹²⁶ SK Ayasofya Ms. 3635, 2a-2b: “*qad kāna mushtagilan bi-‘ilm al-nujūm wa ta’allama min [al-]ustad al-kāmil al-munajjim Yazdānbakhsh al-mushtahir bi-Kūchak wa ba’dahu ḥaşşala ‘ilm al-ṭibb ‘ashra sana wa qara’a kutub al-ṭibb min a’zam al-ḥukamā’ wa akmal al-fudalā’ wa Buqrāt al-waqt wa Suqrāt al-‘ahd wa Jālinūs al-zamān wa Abū ‘Alī al-dawrān wa-al-ḥakīm al-fādil wa al-ṭabīb al-ḥādhiq al-makhşuş bi-ināyat al-khallāq Kh^wāja Ḥakīm İşşaq,*” Taşköprizāde briefly mentions this Ḥakīm İşşak and says that he was a physician with Christian origins, who studied with the famed Mollā Luṭfī philosophical sciences (*al-‘ulūm al-ḥikamiyya*). He later converted to Islam and abandoned his earlier interests in philosophy and medicine

Later begins his relationship with Şehzāde Aḥmed who took notice of ‘Abd al-Raḥmān and recommended that he go to the Iranian lands (*vilāyat al-‘Ajam*) to advance his knowledge in the science of the stars. Following his patron’s advice, ‘Abd al-Raḥmān went to Iran and studied under a certain Sayyid Ni‘matullāh Shirāzī, whom he describes as the exemplary model of the philosophers, the chief of the *munajjims* (*sayyid al-munajjimīn*), Naṣīr al-Dīn Ṭūsī of the time, and Ptolemy of the age.¹²⁷ Upon improving his expertise in this science at the hands of Ni‘matullāh Shirāzī and getting to grasp its secrets, he returned the princely court of Şehzāde Aḥmed in Amasya, probably in the late 1490s, and started serving him as a *munajjim* in the lower echelons of Aḥmed’s court bureaucracy. However, as he puts it forward, he waited impatiently for five years to receive a promotion, as he thought he deserved a better position with generous allowances due to his prominence in the science of the stars. Nonetheless, he realized that Şehzāde Aḥmed’s attention began to shift at the time from the science of the stars toward medicine. According to ‘Abd al-Raḥmān, the prince started to treat physicians more generously no matter how ignorant they were regarding medical issues.¹²⁸ That is the reason, as ‘Abd al-

(*thumma taraka al-ṭibb wa-l-ḥikma wa ishtaghala bi-taṣānīf al-imām al-Ghazālī...*” See Taşköprizāde, *al-Shaqā’iq al-Nu‘māniyya fī ‘Ulamā’ al-Dawlat al-‘Uthmāniyya*, 321.

¹²⁷ Ibid., 2b-3a: “*fa-‘azama imtithālan bi-amr al-‘āliyya ilā diyār al-‘Ajam ḥattā waṣala li-ajnāb ustād al-kāmil wa al-fāḍil qidwat al-muḥaqqiqīn wa sayyid al-munajjimīn Kh^wāja naṣīr al-zamān wa Baṭlamyūs al-dawrān Sayyid Ni‘matullāh al-Shīrāzī.*”

Although I have had recourse to Reza Pourjavady’s important study on the lives of the philosophers in Shiraz at the turn of the sixteenth century and also looked at Shiraz-based biographical dictionaries, I have not been able to come across any information on Ni‘matullāh Shirāzī. See Reza Pourjavady, *Philosophy in Early Safavid Iran. Najm al-Dīn Maḥmūd al-Nayrīzī and His Writings* (Leiden: Brill, 2011); Mīr Taqī al-Dīn Kāshānī, *Khulāṣat al-Ash‘ār va Zubdat al-Afkār: bakhsh-i Shīrāz va navāhi-i ān* (Tīhrān: Markaz-i Pizhūhishī-i Mīrās-i Maktūb, 2013).

¹²⁸ SK Ayasofya Ms. 3635, 3a-4a: “*thumma jā’a ilā janāb ‘atabaihi al-‘āliyya ... wa tawaqqafa ṣābiran khamsa sinīn wa qad kāna yarjū an yatarāqqī bi-sabab ‘ilm al-nujūm ilā martabaihi al-‘ālī ... wa lam yatayassar fa-rāya ragħbat al-Sultān akthar min ‘ilm al-nujūm ilā ‘ilm al-ṭibb li-*

Raḥmān says, why he decided to compose a medical treatise on the basis of primarily the *Kitāb al-Qānūn fī al-Ṭibb* of Ibn Sīnā¹²⁹ and the *Kitāb al-Mūʿjaz al-Qānūn* of Ibn al-Nafīs (d. 1288). Thereby he could remind the prince of his wide expertise in the natural philosophical sciences and show him that he deserved a higher status in the courtly hierarchy.

It is highly unlikely that ʿAbd al-Raḥmān found what he was hoping for when he presented his derivative medical treatise to the prince. No later than a year, he presented the same treatise to Bāyezīd II by removing the autobiographical remarks and changing the contents of his dedication.¹²⁹ Yet he still seems to have continued his astrological production at the princely court of Aḥmed, as we have available a surviving copy of a Persian *taqwīm* that he presented to the prince in March 1510. In the detailed register of gifts and payments covering the last decade of Bāyezīd II’s reign, ʿAbd al-Raḥmān is also specifically recorded as the *munajjim* of Şehzāde Aḥmed. According to the single reference to him in the register, he received 1,500 *aḳçe*s on August 12, 1509 for an unspecified occasion.¹³⁰

Did ʿAbd al-Raḥmān ever attempt to become one of the court *munajjims* of Bāyezīd II? If not, why did he not strive for attaining a more lucrative and permanent office? If yes, what were

annahu qad kāna yaltafīt ilā al-ashkhāş allatī ya ʿishūn ṭabīban wa lam ya ʿrifū shayʿan min ʿilm al-ṭibb fa-li-dhalika jamʿa al-faqīr jawāhir kulliyāt kitāb al-Qānūn wa ʿntakhaba khulāşat matn al-Mūʿjaz wa ʿkhtāra zubdat sharḥ al-Mūʿjaz al-musammā bi-al-Sadīdī wa sammā hadha ʿl-risāla Jawhar ḥifẓ al-şihḥa wa ʿilāj al-maraḍ li-muṭālaʿa al-sultān al-aʿzam wa al-khāqān al-muʿazzam, mālik riqāb al-umam, mawlā mulūk al-Rūm wa al-ʿArab wa al-ʿAjam wa mazhar al-luṭf wa al-iḥsān, kāsir al-bughy wa al-ʿudwān, nāşir al-ʿadl wa ʿl-anʿām, ẓillullāh fī ʿl-arḍayn, qahramān al-māʿ wa ʿt-ṭīyn wa sharaf al-islām wa al-muslimīn wa murabbī-i şāḥib-i kamāl-i fādīl, rukn al-dawla wa qiwām al-milla wa al-dīnal-sultān al-aʿdal al-aḳḥam wa şāḥib-qirān al-aʿzam al-sultān ibn al-sultān al-Sultān Aḥmed Khān...”

¹²⁹ TSMK A. 2010. The copy is marked with the idiosyncratic seal of Bāyezīd II and listed in ʿĀṭūfī’s catalogue.

¹³⁰ Atatürk Kitaplığı Muallim Cevdet O. 71, 340: “in ʿām be-meẓkūrīn fī 25 Rebīyü ʿl-āḥir sene 915: ʿAbd al-raḥmān, müneccim-i sultān Aḥmed, 1500 [aḳçe].”

the reasons that hampered him from attaining his desire? Was there any set of criteria duly followed in the recruitment of *munajjims* for the imperial service? What could we say about the professional rivalries among practicing *munajjims*, or between *munajjims* and other experts at the court such as physicians or diviners? What are the reasons that helped certain *munajjims* attain promotion while caused others fall from grace? Based upon the nature of often-anonymous astrological sources and a few archival documents from the period, it is not easy to fully reconstruct the dynamics underlying the initiation of *munajjims* into courtly service and their subsequent relations with the patrons as well as rivals. By reading between the lines, however, is possible to provide partial answers.

Around the time ‘Abd al-Raḥmān was about to leave the lands of *Rūm* to further specialize in celestial pursuits in the Iranian lands, an émigré astral expert originally from the Gilan region in Iran arrived in Amasya and approached prince Bāyezīd, who was at the time the governor of the region. The full name of this expert is Ḥusām b. Shams al-Dīn al-Lāhijānī al-Gīlānī but often autographs his works with the name Khiṭābī munajjim al-Ḥusaynī.¹³¹ Khiṭābī has yet to become a subject of an in depth study and the references to his life in the available bio-bibliographical sources along with few other modern studies are rather discordant. Some of these studies assert, as his name suggests, that Khiṭābī was the son of Shams al-Dīn al-Lāhījī (d.

¹³¹ In the copies of his works that I have examined, he always writes his name without using a *shadda*, though he often puts *shadda* for other words where it is necessary. Hence, his pseudonym should be Khiṭābī, not Khaṭṭābī as suggested by *Osmanlı Astronomi Literatürü Tarihi/History of Astronomy Literature during the Ottoman Empire*. There is yet further confusion among other studies such as that of Franz Babinger who thinks the author’s name is Khitāyī. This last proposition could not be true, as Khiṭābī explicitly says in the chronology section of his extant *taqwīm* for the year 895 that the calculation of the “*munajjimān-ı Khitāy*” as to the age of the universe is different from the calculation of the “*munajjimān-ı mā*” by which he refers to the *munajjims* from the *Irān-zamīn*.

1506?), the renowned disciple of Muḥammad Nūrbakhsh and the famous commentator of Shabistarī's (d. 1340) *Gulshan-i Rāz*.¹³² The appeal to astronomical and astrological principles within the Nūrbakhshī circles, exemplified particularly in the *Risālat al-Hudā* of Muḥammad Nūrbakhsh, may lead us to think that Khiṭābī could really be the son of Shams al-Dīn al-Lāhijī al-Nūrbakhshī.¹³³ Yet we do not have decisive evidence neither in Shams al-Dīn al-Lāhijī's own writings including his collection of poems nor in the studies that briefly mention his life.¹³⁴ The major bio-bibliographical source on the history of Ottoman astronomy lists a mid-fifteenth century copy of Ṭūsī's commentary on *Kitāb al-thamara*, as written by Shams al-Dīn al-Lāhijī.¹³⁵ Nonetheless this promising piece of evidence does not turn out to be true, as the colophon of the original manuscript clearly reads that the copy was drafted in the year 854/1450 by someone named Isma'īl b. Yūsuf Lāhijī.¹³⁶ Curiously, the relevant bio-bibliographical source also gives the full name of Khiṭābī as Dallākzāde al-Khiṭābī al-Lāhijānī al-munajjim al-Gilānī by referring to Ṭaşköprizāde, who mentions a certain *khaṭīb* (preacher) named Mawlānā Ḥusām and known as Dallākzāde. However, as Ṭaşköprizāde's related entry describes the person in question as an expert in Quranic recitation without any reference to his astral pursuits, it is highly unlikely that Dallākzāde in Ṭaşköprizāde's biographical dictionary was the same person as

¹³² *OALT*, v.1, ed. Ekmeleddin İhsanoğlu (Istanbul: İrcica, 1997), 63-4.

¹³³ In the justification of his claim to be the *Mahdī*, Muḥammad Nūrbakhsh refers to the astronomical premises of Ptolemy and Naṣīr al-Dīn Ṭūsī. See: Shahzad Bashir, "The *Risālat al-Hudā* of Muḥammad Nūrbakhsh (d. 869/1464). Critical Edition with Introduction," *Rivista degli Studi Orientali* 75/1-4 (2001), 87-137.

¹³⁴ Barāt Zanjānī (ed.), *Divān-i ash'ār va rasā'il-i Shams al-Dīn Muḥammad Asīrī Lāhijī, shāriḥ-i Gulshan-i Rāz* (Tehran: Mu'assasah-i Mutala'at-i Islāmī-i Dānishgāh-i McGill, 1357/1978); Shahzad Bashir, *Messianic Hopes and Mystical Visions: the Nūrbakhshīya Between Medieval and Modern Islam* (Columbia: University of South Carolina Press, 2003).

¹³⁵ *OALT*, v.1, 13-14.

¹³⁶ SK Reisülküttab Ms. 572, 222a.

Khiṭābī.¹³⁷

In a recent study on Khiṭābī's treatise on a novel astronomical instrument that he composed in 887/1483 and presented to Sultan Bāyezīd II, the editors argue without any convincing proof that Khiṭābī is same person as Sayyid Munajjim, a relatively noted figure from the early Timurid context.¹³⁸ Sayyid Munajjim of the Timurid realm, whose real name was Muḥammad al-Ḥusayn, is known as the author of astronomical and astrological works such as *Risāla-i shakl-i mughnī va zillī* and *Latā'if al-kalām fī aḥkām al-'awām*.¹³⁹ As far as the contents of these two works are concerned, Sayyid Munajjim was active in the Timurid realm as early as the turn of the fifteenth century. In the latter text that later gradually became a relatively popular astrological manual, Sayyid Munajjim explicitly mentions his own personal observation of a comet that appeared in the year 803/1400-1 in the direction of *Rūm*.¹⁴⁰ He also clearly writes his real name in the autograph copy of *Risāla-i shakl-i mughnī va zillī* as "Muḥammad al-Ḥusayn, al-mad'uww bi-Sayyid Munajjim." On the contrary, in the copies written by our Khiṭābī, all of which date to the last quarter of the fifteenth century, he writes his name either as Ḥusām b.

¹³⁷ Taşköprüzāde, *Al-shaqā'iq al-nu'māniyya fī 'ulamā' al-dawlat al-'uthmāniyya*, 205.

¹³⁸ Mohammad Bagheri and Mortaza Somi, "Risāla-i tashrīḥ al-ālāt fī sha'n al-imtiḥānāt az Sayyid Munajjim Ḥusaynī," *Mīrāth-i 'ilmī-yi Islām va Īrān*, 2/1 (1392/2013), 181-205.

¹³⁹ The former work was presented in 25 Ramaḍān 837/30 April 1434 to Ulugh Beg. See: SK Yazma Bağışlar Ms. 1362. As for the *Latā'if al-kalām*, I have examined a handful of copies in the manuscript libraries of Istanbul and major European cities, the earliest of which date back to the late sixteenth century. In the text itself Sayyid Munajjim refers to the year 824/1421 as the date he calculated the ascendant for the year. In all copies of *Latā'if* his name is written as Muḥammad al-Ḥusayn al-mad'uww bi-Sayyid (al-) Munajjim.s

¹⁴⁰ Kandilli Ms. 310, 30b. He retrospectively interprets the comet as the indication of Yıldırım Bāyezīd I's defeat at the hands of Timur in the Ankara Battle in 1402 and the following turmoil in the Rūm region for a decade: "*ancha banda dīda ast dar sana salāsa va samāna mi'a* [803] *hijriyya zūnab zāhir shud bi-samt al-ra's-i Rūm. Amīr Tīmūr dar lashkar badān jānib bord va Yıldırım Bāyezīd bagaraft va nāchīz kard ... ve qarīb-i dah sāl dar ān mamlakat nahb u qatl būd miyān-i umarā va farzandān-i ū tā 'āqibat bar yaki qarār garaft.*"

Shams al-Dīn al-Khaṭīb al-mushtahir bi-Khiṭābī al-Lāhījānī or simply as Khiṭābī munajjim al-Ḥusaynī. Given that the Sayyid Munajjim of the Timurid realm was active in the 1400s and that he had a name clearly different from that of Khiṭābī munajjim al-Ḥusaynī who served Bāyezīd II as late as the mid-1490s, it also seems unlikely that the two are the same individual.

Who, then, was Khiṭābī? Unfortunately, he does not give us much information to go on when writing about his family, teachers, and peers. He only refers in his *Risāla tashrīh al-ālāt* to Rukn al-Dīn Āmulī as his master, who we know had composed, based upon his own celestial pursuits in Samarqand, the *Zīc-i Jadīd-i Sa'īdī* in addition to his other extant treatise on the uses of astrolabe (*Kitāb panjāh bāb-ı ustūrlāb*) that he dedicated to Abū'l-Qāsim Bābūr Mīrzā (r. 1449-1457).¹⁴¹ Although the *zīj* of Rukn al-Dīn Āmulī did not obtain popularity among the *munajjims* and *taqwīm* compilers in the Ottoman lands in the late fifteenth and the first half of the sixteenth century, Khiṭābī praises his master's work as one of the three most preferred *zīj*es of the period next to the Ilkhanid and Ulugh Beg tables. He even prefers to use it when he needed to calculate the planetary positions and determine the astrological houses.¹⁴²

It is not certain when exactly Khiṭābī came to the Ottoman realm. The contents of his writings suggest that he first approached Bāyezīd II in the late 1470s while the latter was still the governor of Amasya. He then seems to have visited the capital and appealed to the reigning sultan Mehmed II. One of his earliest works is a treatise on natural philosophy (*'ilm al-ḥikmat*) entitled *Jāmi' al-qismayn* that he hastily composed in the year 884/1479 in Tokat and dedicated

¹⁴¹ For the extant copies of his *Panjāh bāb* see the bibliography. For a brief discussion of the *zīj* of Rukn al-Dīn, see: Aydın Sayılı, *The Observatory in Islam*, 212-216.

¹⁴² Bagheri and Somi, 183: “*Va alān zījāti ki dar akthar-i mamālik 'amal karda mī shavad yaki Zīj-i Īlkhānī ast ... va digar Zīj-i ḥaẓrat-i Mīrzā-yi Ulugh Begi ... va digar do Zīj-i Sa'īdī va Karīmī az ān ḥaẓrat-i ustādī Sayyid Rukn al-milla va 'd-dīn Āmulī.*”

to prince Bāyezīd with the hope of entering his service.¹⁴³ As the title of the work suggests, Khiṭābī broadly reviews therein two philosophical disciplines: mathematical sciences (*ḥikmat-i riyāḍī*) and natural-physical sciences (*ḥikmat-i ṭabi‘ī*). As briefly mentioned in the first chapter *Khiṭābī* first elaborates on the science of the stars (*‘ilm-i nujūm*) and delves into an exclusively astrological discussion, laying out the qualities and indications of the twelve astrological houses. For him, *‘ilm-i nujūm*, which is higher in status than medicine (*‘ilm-i ṭibb*), is a useful and divine knowledge that helps human beings understand the impact of the motions of the celestial objects upon the sublunary world, guard themselves against harm and destruction – as ordered in the Qur’ān –, and learn about the divine decree with respect to their personal lives.¹⁴⁴ He then proceeds to medicine and details diseases as well as the required medication for remedying each.

Khiṭābī was apparently in Istanbul by the end of the year 1479. On 11 December 1479, he completed his long commentary on Naṣīr al-Dīn Ṭūsī’s popular treatise, *Risāla-i Sī faṣl*, and dedicated it to the reigning sultan Meḥmed II. Although Khiṭābī says that his main objective in writing the commentary is to make the concepts and the terminology used in Ṭūsī’s text more comprehensible to beginners in this science, he later reveals that his real desire is to attract the

¹⁴³ SK Ayasofya Ms. 2414M, 19b-20a: “*muḥarrir-i īn suṭūr va muqarrir-i īn mazbūr ... Ḥusām b. Shams al-Dīn al-khaṭīb al-mushtahir bi-Khiṭābī al-Gīlānī ... ‘ajala al-vaqt ra dar ta’rīkh-i sana 884 hijriyya dar balda al-muvaḥḥidīn Tokat ... bi-ḥasb-i vasīla-i idrak-i sa‘ādat-i taqabbul-i turāb-i sidda-i rafti‘a-i pādishāh va pādishāhzādai ... sultān Abū l-muẓaffar Bāyezīd ... ta’līf kard.*”

¹⁴⁴ Ibid., 23b: “*har chand az taqdīr va qazā imkān-i khurūj nist amma bi-mu‘addāi ‘wa lā tulqū bi-aydikum ilā t-taḥlika wa sharr’ iḥtirāz vājib ast va bi-qadr-i vas‘ sa‘y lāzim cha faḥvāi ‘laysa li l-inṣān illā mā sa‘y’ rā ishārat hamīn ast īn ma‘nā bi-ṣūrat nayāyad illā az idrāk-i natāyij-i ḥarakāt-i ajrām-i samāvī ya ‘nī sayr-i ajrām-i mustanīra dar aqsām-i mustadīra va ān duvāzdah dar duvāzdah ast ki az ṣuvar-i zāyijāt-i ṭavāli‘ maḥsūs mī shavad ki īn ma‘nā rā iṣṭilāḥ-i ahl-i shar‘ ṣurat-i taqdīr khānand.*”

benevolence of the Ottoman sultan.¹⁴⁵ In fact, Ṭūsī's treatise was already one of the most popular texts of the genre among would-be *munajjims* of the time and Turkish translations of the work appeared as early as the late fourteenth century. In that regard, Khiṭābī's claim to compose a text that would be helpful for novices does not represent the truth. That the work is currently preserved in a single copy and was listed in 'Āṭufī's inventory among the books at the palace library also proves that the text did not enjoy much circulation among the author's contemporaries and subsequent generations. Thus there is little doubt that the aim of Khiṭābī's long commentary on Ṭūsī's *Risāla-i sī faṣl* was rather to secure the support of Meḥmed II by showing off his deep knowledge in celestial matters. He must have attained his desire as he immediately composed for Meḥmed II a voluminous birth horoscope, an imperial copy of which was produced in the year 1480 by the imperial calligrapher and bookbinder, Ghiyāth al-Dīn al-mujallid al-Iṣfahānī.¹⁴⁶

Khiṭābī seems to have secured his place in Bāyezīd II's entourage after the latter's immediate accession upon the death of Meḥmed II in 1481. In January 1483 he presented the new sultan, whom he described as being, among other things, wise and knowledgeable in sciences high and low (*'ārif al-ma 'ārif al-'ulwiyya wa-l-sufliyya*), a copy of his *Risāla tashrīḥ al-ālāt*, together with an instrument for celestial observation.¹⁴⁷ As Khiṭābī states in his treatise,

¹⁴⁵ SK Ayasofya Ms. 2709, 3b: “[T]ā vasīla shavad bar dā 'ī-yi mukhliṣ rā bi-taqbīl-i turāb-i 'ataba-i raḥī'a va talthīm-i rajām-i sidda-i manī'a ... al-sulṭān b. al-sulṭān al-sulṭān Muḥammad b. al-sulṭān Murād Khan.”

¹⁴⁶ TSMK Yeni Yazmalar 830, 264a. This text will be further discussed in Chapter 5.

¹⁴⁷ His remarks in the text hint that he also presents the sultan with an instrument for celestial observation: “*har āyina ālāt-i mav 'ūd-rā bi yumn-i davlat-i qāhira-i ḥazrat-i pādishāhī bi-itmām rasānīda va kayfiyyat-i a 'māl va vaż '-i ān rā darīn risāla mashrūḥ [va] mastūr sākhta shod.*” Khiṭābī's reference here to *al-ma 'ārif al-'ulwiyya wa-l-sufliyya* seems to be related to the classification of theoretical philosophy (*al-ḥikma al-naẓariyya*) into sciences that deal with the

the major objective of the work and the accompanying instrument is to test the accuracy of the three most preferred astronomical tables of the time. According to his calculations, he expects two conjunctions to happen in that year: the first conjunction between Mars and Jupiter, and the second between Saturn and Mars. Along with these two conjunctions, he also expects two full lunar eclipses to occur that year. However, as he says, the calculations based upon the tables of his master Rukn al-Dīn Āmulī and Ulugh Beg were significantly different than the Ilkhanid tables.¹⁴⁸ Khitābī adds that as part of his research, he completed in Istanbul a solar observation and identified a solar eclipse that occurred in October 1482.¹⁴⁹ While his solar observation in Istanbul by the early 1480s is important in its own right, his undertaking to ensure the accuracy of astronomical data is even more significant, since accurate astronomical data was exactly what practicing *munajjims* needed for rigorous calculations, and thus more precise astrological predictions.

Khitābī does not divulge in his *Risāla tashrīḥ al-ālāt* which of these three tables he favors as a practicing *munajjim*, but in drafting the *taqwīm* for the year 894/1489 he relies on his master's work. Only one *taqwīm* survives that was indisputably penned by Khitābī, as it bears his autograph. A thorough discussion on the political and social significance of the *taqwīm* genre in the early modern Ottoman context will be found below in Chapter 4, but suffice it to say here that through detailed astrological predictions about the fortunes of the upcoming year and

knowledge of celestial (*'ulwī*) spheres (*i.e.*, the *quadrivium*) and those that study the changes in the elemental sublunary (*sufli*) world.

¹⁴⁸ Somi and Bagheri, 183: “*chūn dar sana al-tahrīr do qirān iqtidā mī kard yaki miyān-i Marrīkh va Mushtarī va digarī qirān-i nahsayn va do khusūf-i kull mutavālī va dar sāl-i tālī-i īn sāl qirān-i 'ulviyayn vuqū' pazīruft va dar īn qirānāt va khusūfāt az muḥāsaba-i īn zīj-i mazkūr tā muḥāsaba-i zīc-i ilkhānī ikhtilāf-i bisyār zāhir bovad.*”

¹⁴⁹ Ibid., 196: “*chanāncha khusūfī ki vāqi' shod dar shab-i yakshanbih-i chahārdahum māh-i Ramaḍān sana 887 raṣad kardīm bi-ufq-i dār al-saltāna-i Qosṭantīniyya.*”

pointed remarks on titulature, *taqwīms* were instrumental in shaping, representing, and even manipulating public opinion. Besides their obvious practical benefits for calendric and astrological purposes, *taqwīms* also served as tools for bolstering royal claims and promulgating these claims among the elite audience attached to the court. The astrological predictions in *taqwīms* are always biased in favor of the sultan, typically highlighting—in almost a propagandizing manner—the strength, perseverance, and well being of the reigning sultan, who is the single most important element in the functioning of law and order within the universe.

In his extant *taqwīm* from the year 894/1489, Khiṭābī as well eulogizes Bāyezīd II on the occasion of the coming of the new year and expresses his good wishes to the sultan, whom he hails as the “caliph of the All-merciful, shadow of divine affection, strengthener of the world and religion, succor of Islam and all Muslims, glory of kings and sultans, victorious over his enemies by help of the Beneficent King.”¹⁵⁰ He then enumerates the important astrological variables - *tāli* ‘ and other astrological houses —and begins laying out his lengthy predictions on the fortunes of the sultan. According to his predictions, the glory and the majesty of the sultan will remain untarnished, and his health and temperament balanced. The sultan will show sympathy to his subjects, bring civil order under his full control, but at times, especially during the winter, he will be anxious on account of his enemies and opponents.¹⁵¹ Khiṭābī then proceeds to elaborate on the

¹⁵⁰ TSMK Bağdat 310, 4a: “*Khalīfat al-rahmānī, zill-i ‘avāṭif-i ḥazrat-i subhānī, mu‘izz al-dunyā va-d-dīn, mughīth al-islām va-l-muslimīn, shujā‘ al-mulūk va-s-salāṭīn, al-mansūr ‘alā l-a‘dā‘ bi-nuṣrat al-malik al-mannān.*”

¹⁵¹ *Ibid.*,: “*dalālat konad ... bar tazāyud-i ‘azamat va jihānbānī va tazā‘uf-i ḥashmat va kāmrānī-i ḥazrat-i ravza-i khaḍrat-i pādishāhī-i islām-panāhī khalladallāh mulkahu wa sulṭānahu va ḥuṣul-i marām min ḥaythu al-majmū‘ fī tamām al-sana khuṣūṣā **dar faṣl-i bahār** ... dalīl bovad bar ṣiḥḥat va salāmat-i mizāj-i sharīf va bar sarīr-i salṭanat mutamakkin būda dar tadābīr-i mulkī sa‘y namūda va bā a‘ādī va mukhālīfān ba-ṭarīq-i rafq va mudārā sulūk vāqi‘ shodan va andīsha-i umūr-i ‘aẓīma dar zamīr-i munīr āvordan va tavaqquf dar naql va ḥarakat*

fortunes of people from various sectors, including viziers, dervishes, scholars, and many others. His *aḥkām* for the year ends, as usual, with predictions about diseases, meteorological conditions, crops and prices, and wars and battles. He then draws two tables for the horoscopes of the upcoming year: one on the basis of the Chinese-Uighur animal calendar and the other on the basis of his calculations using his master Rukn al-Dīn Āmulī's astronomical tables. Then comes the section on the monthly elaboration of the calendrical information and accompanying astrological judgments. It is worth noting that the predictions he expresses in the monthly sections of his *taqwīm* focus more on possible skirmishes and battles between Turks (*Atrāq*), Arabs (*A'rāb*) and Kurds (*Akrād*). It would not be farfetched to relate these remarks to the repercussions of the then-ongoing Ottoman-Mamluk confrontation.¹⁵² Taking all these elements into consideration, then, Khiṭābī closely follows in his *taqwīm* the standard scheme and conventions of the genre.

Based upon the extant manuscript evidence, Khiṭābī seems to be one of the most active *munajjims* during the first two decades of Bāyezīd II's reign, yet there are several other names who composed *taqwīms* at the time such as 'Abdulkerīm b. Mevlānā Sinān, Ḥamza b. 'Abdulkerīm, and Nūreddīn b. Ḥamza, all of whom seem to be the members of a single family

*va tarahḥum bi-ḥāl-i ra'āyā va tarbiyat-i ḥazrāt-ı avlād-i kirām ... va vuqū'-i muṣālahāt va inqiyād az jānib-i a'ādī ... va dar faṣl-i ṭabistān ... dalīl ast darīn faṣl bar istiqrār bar sarīr-i mulk va maqām va ishtigāl namūdan bi-ḥabṭ-i umūr-i mulkī va andīshīdan-i tadābir-i ḥasana va ihtimāl-i naql va ḥarakat-i qarīb va khāl az taḥayyurī va taraddud-khāṭirī nabūdan ba-jihat-i rij'at-i Zuhra ammā mūjab zarar nashavad va zūd murtafi' gardad va ... farāgat-i khāṭir az ṭaraf-i a'ādī va muḥālifān va talatṭuf bā ḥazrāt-i khudāvandigārzādahā ... **dar faṣl-i kharīf** ... dalālat konad dar īn faṣl ... andīsha-i a'ādī va mukhālifān az ḥamīr-i mubārak khālī nabūdan va imkān-i naql va ḥarakat az īn sabab va tarahḥun va tashaffuq bi-ḥāl-i ra'āya va mavt-i a'ādī va tavaqquf dar umīdhā vallāhū a'lam."*

¹⁵² On the Ottoman-Mamluk warfare during the first decade of Bāyezīd II's reign, see: Cihan Yüksel Muslu, *The Ottomans and the Mamluks: the Imperial Diplomacy and Warfare in the Islamic World* (New York: IB Tauris, 2014), esp. Chapter 5.

interested in astrological practice.¹⁵³ Nevertheless, the lack of archival records and/or other (auto)biographical information from this early period makes it difficult to follow the stages of the careers of Khiṭābī and any other agent.

Surprising enough, in the comprehensive expense register that carefully records the names of individuals receiving gifts and allowances from the palace between the years 1502 and 1512, a certain Sayyid Munajjim is listed for at least thirty different occasions as the recipient of sultanic favor. In fact, as far as the detailed records of this register are concerned, Sayyid Munajjim seems to have enjoyed a status superior to all the other monthly-salaried court *munajjims* and unaffiliated experts presenting the court with almanacs. Unlike many others, he was not only rewarded whenever he presented a *taqwīm*; in certain years he received payments and/or robes of honor on four or five different occasions, most of which are unfortunately not specified.¹⁵⁴ On several occasions (again unspecified) he was even paid 7,000 *aḳçes*, almost equal to the pay scale of high-ranking statesmen. The amounts he received when he presented a *taqwīm* were also always higher than other experts. While he was given 1,500 *aḳçes*, the amounts received by other *munajjims* ranged between 500 and 1,000. Moreover, he was once presented a garment on the occasion of the loss of his son, suggesting that he must have had a close relationship with the sultan, for it was usually Bāyezīd's closest companions who received gifts upon such occasions of death or marriage.

Apart from the information gleaned from the gift register, we know next to nothing about Sayyid Munajjim, which makes this figure all the way more intriguing. Although he was

¹⁵³ These names also go unnoticed in contemporary historical narratives and/or biographical sources. There are five extant *taqwīms* composed by them: TSMK Bağdat Ms. 312, 313, 314, 315, 316.

¹⁵⁴ Atatürk Kitaplığı Muallim Cevdet O. 71, *passim*.

apparently an important courtier of the sultan, as indicated by the amounts and occasions of the gifts he received, none of the biographical sources and/or contemporary narratives mention his name, with the exception of a *waqf* record, dated 894/1489, documenting his estates in the Eyüp neighborhood of Istanbul.¹⁵⁵ The lack of contemporary information as to an important courtier of a sultan suggests that “sayyid (al-) munajjim” was rather the epithet, not the real name of the person in question. We should recall that the real name of the “Sayyid Munajjim” in the early fifteenth-century Timurid realm was Muḥammad al-Ḥusayn. In a similar vein, ‘Abd al-Raḥmān *munajjim* at the court of prince Aḥmed described his master Ni‘matullāh Shirāzī as the chief of the *munajjims* (*sayyid al-munajjimīn*). Therefore *sayyid (al-)munajjim* was likely a label attributed at different times to different *munajjims* either by themselves, their peers, or the court, whose prestige and erudition were deemed superior to their contemporaries. There are other epithets frequently deployed by astral experts in the fourteenth and fifteenth centuries such as *shams al-munajjim* used by Wābkanawī, or *‘imād al-munajjim* used by Maḥmūd b. Yaḥyā b. al-Ḥasan al-Kāshī, the author of Iskandar’s famous horoscope.

Interestingly, one of the *taqwīms* composed in plain Turkish in the year 937/1531 and dedicated to Süleymān was signed by another self-proclaimed *al-sayyid al-munajjim* from Tokat, whose actual name was İbn Seyyid Tāc.¹⁵⁶ If we recall the register of payments from the late 1520s that lists the son of Sayyid Munajjim as the then chief *munajjim*, we can safely argue that by the time this İbn Seyyid Tāc composed his almanac, the “sayyid munajjim” at the court of

¹⁵⁵ Ömer Lütfi Barkan, Ekrem Hakkı Ayverdi, *İstanbul Vakıfları Tahrir Defteri: 953 (1546) tarihli*, Istanbul: Baha matbaası, 1970, 155.

¹⁵⁶ III. Ahmed Ms. 3497, 3a: “*istakhrāju wa katabahu al-faqīr al-muḥtāj ilā shafā‘at nabiyyinā Muḥammad ṣāhib al-mi‘rāj al-ṣalawāt ‘alayhi al-sayyid al-munajjim al-Toqātī al-shahīr bi-Ibn Sayyid Tāj.*”

Bāyezīd II must have already passed away. All things considered, the chief (=sayyid) *munajjim* during the last decade of Bāyezīd II's reign must have been an individual different than those at the Timurid realm or the time of Süleymān.

Could the Sayyid Munajjim at the court of Bāyezīd II be Khiṭābī himself? There is a slight possibility that the two were the same, for the *waqf* record about Sayyid Munajjim that dates back to 894/1489 establishes at least that the two were active at the same time. But we should also add that Khiṭābī never refers to the epithet in the surviving copies of his original texts, therefore we cannot easily assume the two as the same until a new document of evidence provides a fresh perspective.

Regardless of the real identity of this mysterious Sayyid Munajjim of the Bāyezīd' court, the archival records about him document that as part of his service in the capacity of a court *munajjim* he contributed to the training of new *munajjims*. One of his students was his own son, Sayyid İbrahīm, who was evidently active at the Ottoman court until the first half of Süleymān's reign.¹⁵⁷ There is unfortunately no surviving textual product that could be unequivocally attributed to him, but as the son of a prestigious expert as Sayyid Munajjim, he must have received the necessary astrological instruction from his father. Another student of Sayyid Munajjim, manifested through available archival registers, is a certain Receb, who debuted his career as the compiler of a *taqwīm* in the year 1512.¹⁵⁸ As regards to the following steps of Receb's career, there is also no information in contemporary sources, archival and manuscript alike.

¹⁵⁷ TSMA D. 7843, available as a transcribed document in Ömer Lütü Barkan, "H. 933-934 Tarihli Bütçe Cedveli ve Ekleri", 323

¹⁵⁸ Atatürk Kitaplığı Muallim Cevdet O. 71, 499: "Receb şākird-i Seyyid Müneccim; 500; cāme-i mirāhorī 'an kemhā-i Bursa."

With respect to the training of new generations of *munajjims* thanks to the financial and material opportunities made available by the royal patronage and the office of the court *munajjims*, the story of the chain of transmission that ties Mīrim Çelebi from the time of Bāyezīd II to Riyāzī ‘Alī in the later stages of Süleymān’s reign provides captivating details. As mentioned in greater detail above,, Mīrim Çelebi was one of the key figures at the time that helped the production and dissemination of astrologically valid knowledge in the Ottoman capital. Although his status seems to be slightly different than being a mere court *munajjim*, as far the available archival registers are concerned, Mīrim distinguished himself as a prominent expert of celestial knowledge through his textual products and documented service. He prolifically wrote treatises on astronomical instruments and astrological principles, which were significantly copied both at his own time and subsequent periods. In November 1516, for instance, a certain Lütfullāh b. Mübārek copied at least three treatises of Mīrim Çelebi on different types of quadrants.¹⁵⁹ Lütfullāh’s name is not mentioned in contemporary archival and manuscript sources as a student and/or protégé of Mīrim Çelebi. There is one Lütfullāh, however, who became a court *munajjim* in the first decade of the reign of Süleymān. The earliest record that contains a reference to him dates back to 1527 but as the wording in this record suggests (‘*ādet-i Lütfullāh müneccim*’), he should have started his tenure before then.¹⁶⁰ We also see his name in an imperial order sent in April 1578 to the judge of Istanbul. In this report, the judge is asked to procure for Taqī al-Dīn’s newly established observatory in Istanbul the relevant

¹⁵⁹ TSMK Hazine Ms. 1760.

¹⁶⁰ Kamil Kepeci 1764, 25: “‘*ādet-i Lütfullāh müneccim ki der rüz-ı Nevrüz takvīm dāde – 1000 [akçe]*.’”

books of the “late Lütfullāh.”¹⁶¹

The significance of Lütfullāh for our purposes derives from the fact that he was the master of Riyāzī ‘Alī, who was, as listed in the relevant archival document, one of the two court *munajjims* in 1548 and 1549. The story of Riyāzī is important for a number of reasons. First of all, the case of Riyāzī presents us the most detailed information about the life of a practicing *munajjim* from the period. In addition to his being a court *munajjim*, Riyāzī was also a talented poet who found recognition among contemporary biographers. ‘Aşık Çelebi, for instance, introduces Riyāzī as a polymath, who was equally adept in a wide array of disciplines including the science of talismans and magic squares, geomancy, Ptolemaic astrology, Euclidian geometry, spherical astronomy, philosophy, celestial magic, logic, theology, and chronology.¹⁶² For him Riyāzī’s expertise in the science of the stars was so extensive that even the famous Egyptian astronomer Ibn al-Shāṭir (d. ca 1375) was not half as good as Riyāzī (*ānuñ bir şatrı yokdur İbn Şatır*); whereas the most important astrologer in the entire Islamic history, Abū Ma’shar was not even his one hundredth (*Ebū Ma’sher değüldür ‘öşr-i ‘āşir*). He was so proficient in the science of the stars that he did not need to spend much time to calculate the motions of the celestial objects

¹⁶¹ İsmet Miroğlu, “İstanbul rasathanesine ait belgeler,” *Tarih Enstitüsü Dergisi* 3 (1973), 75-82, at 80, document 2: “*İstanbul kâdısına hüküm ki: Müteveffâ Lütfullāh’ın vakfi olan müneccim kitâbları mahmiye-i mezbûrede Mi’mâr Sinân mahallesiniñ imamı ve mü’ezzinlerinde olduğu i’lâm olunmağın alınub raşadhâneye verilmek emredilüb buyurdum ki vardukda te’hîr itmeyüb müteveffâ-yı mezbûruñ nücüma ve ‘ilm-i hey’ete ve hendeseye müte’allık olan kitâbları eğer mezkûruñ ellerindedür ve eğer âhardadur her kimde ise zuhûra getirüb dağı bi’l-fi’l raşad hizmetinde olan Mevlânâ Taķiyüddîn’e cümlesin teslim itdüresün.*” Starting from Adnan Adıvar, the scholarship keeps assuming that this Lütfullāh in question is Mollā Lütfî, who was executed in 1495 on the charge of heresy. As the order clearly reads, however, Lütfullāh in question should be the one who worked as a court *munajjim* at the time of Süleymân.

¹⁶² Aşık Çelebi, *Meşairü’ş-Şuara*, v. 3, 1396-8: “*tılsım u nîrencât ve vefk u reml ve zāyicât-ı Macestî ve Öqlidisi hendese ve Eşkâl-i te’sîs-i hey’et ve hikmet ve teneccüm ve da’vetde ‘aql-ı evvel ve manṭık ve kelâmda ve tevārîh-i eyyâmıda haṭṭı ber-vech-i ekmel idi.*”

and understand their corresponding influence.¹⁶³ Apart from ‘Āşık Çelebi, another late sixteenth century biographer Kınalızāde Ḥasan (d. 1607) also praises Riyāzī as the Jamshid al-Kāshī of the time and Aristotle of the age.¹⁶⁴

As an Istanbul-born son of a *devshirme* (*İstanbullu kuloğlu*), Riyāzī received a standard *madrassa* education of his time before starting to closely study with Lūṭfullāh *munajjim*. The biographical dictionaries do not reveal where this master-apprenticeship relationship between the two took place or the books they studied together. However, as it is clear from the remarks of his contemporaries, Riyāzī received a solid training in different forms and genres of celestial knowledge.

In terms of the texts Riyāzī might have read during his training with Lūṭfullāh *munajjim*, his only surviving textual product, the horoscope he composed around the year 1550 for the construction of the Süleymaniye Complex, provides substantial details. Based upon his explicit references and citations in the text, Riyāzī must have well studied (Pseudo-) Ptolemy’s *Kitāb al-Thamara*, Ghaznawī’s *al-Kifāya*, and the corpus of Kūshyār. He should have also spent much time on studying the *zīj* literature of the Maragha and Samarqand traditions as well as the uses of astronomical instruments. Mīrim Çelebi’s texts that were copied in the 1510s by Lūṭfullāh might have even been used during his training. In fact, there is manuscript evidence that clearly documents Riyāzī’s familiarity with Mīrim’s oeuvre. One of the two surviving manuscripts that I have been able to locate in which Riyāzī ‘Alī’s name is found as the possessor of the text is none

¹⁶³ *Ibid.*: “*hareket-i fikriyye itmedin sükün-i kutb ve hareket-i eflāka müte ‘allik ahvāl-i hod aña meczūmdur.*”

¹⁶⁴ Kınalızade Hasan, *Tezkiretü’ş-Şuara*, ed. Aysun Sungurhan-Eyduran (Ankara: 2009), 351.

other than Mīrim Çelebi's commentary on the Ulugh Beg tables.¹⁶⁵ The other item that apparently passed into Riyāzī's hands is Nizām al-Dīn Nīsābūrī's commentary on the Ilkhanid tables.¹⁶⁶

Aside from illustrating the transmission of the post-thirteenth century Persian astral tradition into the Ottoman world from the late-fifteenth century onwards and its appropriation by subsequent generations of indigenous Ottoman experts, the case of Riyāzī also bespeaks the hardships and anxieties of a practicing *munajjim* whose career fortunes began to shrink by the mid-sixteenth century due to the decline in the extent of the courtly patronage of *munajjims*. The anecdotes shared by contemporary biographers along with Riyāzī's own remarks in the Süleymaniye horoscope reveal an embittered *munajjim* afflicted by the incidents at his time. As 'Āşık Çelebi narrates, Riyāzī apparently composed a talismanic treatise to introduce a novel technique that would help dispel the plague from Istanbul, one of the vexing problems of the time, yet his treatise did not receive any favor from contemporary elites. Reasons unclear, Kınalızāde Ḥasan also mentions that throughout his career Riyāzī did not much enjoy the sultan's grace. Ḥasan even quotes his father Kınalızāde 'Alī, who had once told him that Riyāzī would have been one of the most prominent and proficient experts of the rational and mathematical sciences, had he ever found the opportunity to become close to the sultan.¹⁶⁷

Later in his career Riyāzī considered returning to the judicial and scholarly hierarchy (*'ilmiyya*), and asked for appointment as a *mudarris* or a *qāḍī*. Though 'Āşık Çelebi does not

¹⁶⁵ Now preserved as SK Mehmed Nuri Efendi Ms 151.

¹⁶⁶ Now preserved as SK Fatih Ms. 3421. Robert Morrison also mentions this particular copy in his book on Nizām al-Dīn Nīsābūrī.

¹⁶⁷ Kınalızade Hasan, *Tezkiretü'ş-Şuara*, 351: “*eger muḳārin-i terbiyet ve mülākī-i taḳviyet-i sultān-i cihān olaydı ol fende a 'yān-ı zamāndan olacagina reyb u gümān olmaz idi.*”

present any further detail about Riyāzī's determination to return to the 'ilmiyya hierarchy, Kınalızāde Hasan says that during his attempt to reenter the 'ulamā' bureaucracy, he approached the *shaykhulislam* Ebu's-su'ūd Efendi (d. 1574) as his potential patron and frequented his *majlis*. Upon realizing, however, the non-tenured, erratic nature of a career in judgeship and professorship, he abandoned the 'ilmiyya path and fully allocated his time to composing books. However, as 'Āşık Çelebi mentions, most of his writings remained in draft form. As a matter of fact, apart from the horoscope he prepared in 1550 on the occasion of the construction of the Süleymaniye complex, the available catalogues of major manuscript libraries in and out of Turkey do not yield any other surviving textual product of Riyāzī and there is not any modern scholarly work that ever mentions his name, let alone reconstructs his biography.

In the foundation horoscope for the Süleymaniye complex, which I will discuss in more detail next chapter, Riyāzī occasionally inserts his verses, the contents of which represent his resentment about his life and career. One of these verses reads:

“Riyāzī is distressed due to the evil fortune,
Those ignorant ones attribute his misery to other reasons,
While his fame was as bright as the sun,
Those who are ignorant about the intricacies of (the science of) the stars receive more favours.”¹⁶⁸

Due mostly to this distress and disillusionment regarding his career, he even lately became unwilling to send *taqwīms* to the court. Through the end of his entry on Riyāzī, 'Āşık Çelebi quotes some of his verses, one of which Riyāzī wrote upon the death of his master Lūţfullāh. Here Riyāzī again reveals his anxiety regarding his career and explicits his desire that

¹⁶⁸ SK Yazma Bağışlar Ms. 4034, 5b: “*Bu Riyāzī tāli '-i menhūsdandur bī-ḥuzūr/Gayrıya nisbet ider zulemini ānı bilmeyen/Gün gibi meşhūr iken ol, artuğ alur ḥāşılı/Bu nücūmda āsmāndan rīsmānı bilmeyen.*”

the deceased Lütfullāh's allowances be annexed and added to his own, as there remained in the court only two *munajjims*, one of which is no one but himself:

“Today I, the insignificant mote, were asked
By the sun of the sky of knowledge
Lütfullāh was the chief *munajjim*
He just passed away and left his pension
Who remained now at the imperial court?
As a (Jamshid al-) Kāshī-type observer of stars
I said: It is only (Yūsuf) b. ‘Ömer and I
Who survived this world as the ass and the head.”¹⁶⁹

Riyāzī was not entirely groundless in his resentment. As the available register of payments is concerned that dates just a year before this horoscope was penned, Riyāzī was listed as one of the two court *munajjims* receiving only six *ağçes* a day, whereas his colleague Yūsuf b. ‘Ömer, whom he mocks by saying “ass”, was making twelve *ağçes*. In that regard Riyāzī's pay was extremely low compared not only to his sole coworker but also to other palace staff. For example the daily allowance of the chief physician of the time, Seyyid ‘Alī Kayşūnī, was eighty *ağçes*. Even the *kehhal* (ophthalmologist) Muḥyiddīn or the scribal apprentices in the imperial treasury were making more than Riyāzī.¹⁷⁰

Besides the internal comparison on the basis of this single archival register from the period 1548-9, a broader comparison of the pay scale of Riyāzī with those of previous court *munajjims* in the late fifteenth and the early sixteenth century also illustrates that by the time Riyāzī was hired as one of the two court *munajjims*, the office was no longer a lucrative or

¹⁶⁹ Aşık Çelebi, *Meşairü’ş-Şuara*, v. 3, 1398: “Su’āl itdi bugün ben ‘zerresine/Ma’arîf āsumānınuñ kuyāşı/Ki Lütfullāh idi evvel müneccim/Ma’ādā ‘azm idüb qodı ma’āşı/Ya şimdi kim qalubdur bāb-ı şehde/Raşad-bend-i nücüm-ı qaşr-ı Kāşī/Didüm İbn ‘Ömer’le bendeñüzdüm/İki qalduq cihānda göti başı”

¹⁷⁰ MAD 7118. The former was making eighteen *ağçes* per diem, whereas the scribal apprentices were earning around ten *ağçes* on average.

prestigious profession, though their standard services for preparing *taqwīms* or calculating auspicious moments to initiate an imperial enterprise were still demanded. Therefore, the case of Riyāzī provides us a reasonable *terminus ante quem* to argue that by the mid-sixteenth century, the royal support for *munajjims* in the Ottoman court was on the verge of decline, only to be revived in the last quarter of the sixteenth century.

Before I move to the next chapter I should say that although the discussion throughout the chapter has barely discussed the *munajjims* presence in the marketplace or friendly gatherings (*majlis*), this should not give the impression that there were no other *munajjim* active at the time other than the courtly affiliated ones. Yet the evidence gleaned from literary or archival sources is so thin that it is almost impossible to write their history. In the biographical dictionaries of poets, for instance, there are meager references to a few practicing *munajjims* that do not necessarily discuss the whereabouts and clients of their service. Evliya Çelebi says that the total number of *munajjims* in Istanbul in the seventeenth century was seventy, but his words should be taken with grain of salt, for he often uses the exact same number in his descriptions of other professions.¹⁷¹ The available published *ihtisāb* registers that list a wide range of shops in the marketplace do not present any substantial evidence as regards to the business ventures of *munajjims* and any other type of diviners.¹⁷² Hence, the analysis here has to be rather restricted to

¹⁷¹ Evliya Çelebi, *Seyahatname*, vol. 1, ed. Robert Dankoff, Seyit Ali Kahraman, Yücel Dağlı (İstanbul: Yapı Kredi Yayınları), 292: “*evşāf-ı müneccimān: neferāt 70, pīrleri Hāzret-i İmām ‘Alī’dir Bu müneccimān şınfı taht-ı revānlar üzre usturlābların ve kıble-nümā ve mīkātların ve taqvīm ü zīc kitābların zeyn idüb müneccimbaşı ‘örf-i izāfetiyle ve saçaklı ‘abāyisi ile kadı’asker ile muhteşemāne at başı berāber ‘ubūr iderler.*” Other professions that he says are composed of 70 practitioners include: *āb-ı gülābciyān, simitciyān, ‘adesciyān, şekerciyān, şamgaciciyān, pehlivānān, zerkūbyān, pāsban-i Bezāsten, āteşbāzān, sāzendegān.*

¹⁷² The *hisba* manuals in the medieval Islamic writing that show how the *muhtaşibs* (market inspectors) administer the functioning of the market and upkeep of moral behaviors have

those experts visible only in the courtly setting.

references to *munajjims*. In, for instance, the *hisba* manual of the fourteenth-century Egyptian qāḍi Ibn al-Ukhuwwa (d. 1329), it is said that astrology should be practiced on main streets, not inside shops or in byways. Quoted in Yahya Michot, “Ibn Taymiyya on Astrology: Annotated Translation of Three Fatwas,” 150. I have explored all the *ihtisāb* registers compiled in Ahmet Akgündüz’s study, but could not come across a single reference. See Ahmet Akgündüz, *Osmanlı Devleti’nde Belediye Teşkilatı ve Belediye Kanunları* (İstanbul: Osmanlı Araştırmaları Vakfı, 2005).

Chapter Four—Chronicling the Past, Mirroring the Present, Divining the Future: *Taqwīms* (Almanac-Prognostications) in the Ottoman context

IV. 1. Introduction

Having surveyed the intellectual and cultural history of the science of the stars and the social history of its practitioners (*munajjims*) in the preceding chapters, we now turn to the Ottoman *munajjims*' major textual production, the *taqwīm*, and situate the corpus of these works within its proper historical context. A detailed evaluation of the massive body of Ottoman *taqwīms* would require a separate dissertation unto itself, and such a study is outside the purview of this chapter. Rather, a few carefully chosen aspects of the extant fifteenth- and sixteenth-century Ottoman *taqwīms* will serve to elucidate the significance of this hitherto neglected primary-source material for late-medieval and early-modern Ottoman history. It is the aim of this chapter to redress some of the widespread assumptions about pre-modern *taqwīms* and to encourage future studies to be undertaken on further examples from diverse regions and periods, Ottoman and non-Ottoman alike.

The composition of *taqwīms* constitutes one of the longest enduring textual practices in all of Ottoman history. While the earliest surviving example of a *taqwīm* produced in the Ottoman realm dates to 1421, it is highly likely that they were produced on a regular basis for the Ottoman court prior to the fifteenth century, given the existence of older, non-Ottoman *taqwīm* texts and earlier references to the genre in medieval Islamic writing. Combining, among many other things, astronomical computations, calendric information, and astrological prognostications, the *taqwīm* survived in manuscript and print culture down to the early twentieth

century. We are, thus, speaking of a textual tradition that lasted at least five centuries, leaving behind a multitude of works.

Despite a plethora of Ottoman *taqwīms* in various libraries across the globe, the genre and its astrological constituents have not been adequately examined that.¹ Earlier scholarship has mostly focused upon the non-astrological contents of these texts, such as the chronological lists or calendar tables. Notwithstanding the general scholarly lack of interest in especially the astrological components of the *taqwīm* genre, this chapter argues that a systematic investigation

¹ Although the list of works below may seem substantial at first glance, very few of them actually discuss and use the astrological contents of *taqwīms*. Bernard Carra de Vaux, “Notice sur un calendrier turc,” *Ajab-nāme. A Volume of Oriental Studies presented to Edward G. Browne* (1922), 106–116; Fatin Gökmen, “Eski Türklerde Heyet ve Takvim,” in *İkinci Türk Tarih Kongresi Tutanakları* (İstanbul: Devlet Kitapları, 1937), 833–841; Osman Turan, *İstanbul’un fethinden önce yazılmış tarihî takvimler* (Ankara: TTK Basımevi, 1954); Nihal Atsız, “Fatih Sultan Mehmed’e Sunulmuş Tarihi Bir Takvim,” *İstanbul Enstitüsü Dergisi* 3 (1957), 17–23; *Ibid.*, *Osmanlı tarihine ait takvimler* (İstanbul: Küçükaydın Matbaası, 1961); *Ibid.*, “Hicri 858 Yılına Ait Takvim,” *Selçuklu Araştırmaları Dergisi* 4 (1975), 223–83; Necati Akgür, “Müneccimbaşı Takvimlerinde Tarihleme Yöntemleri,” *Türk Dünyası Araştırmaları* 80 (1992), 99–120; Salim Aydüz, “Osmanlı Devleti’nde Münecimbaşılık,” *Osmanlı Bilimi Araştırmaları* 1 (1996), 159–207; *Ibid.*, “Müneccimbaşı Takvimleri ve Tarihi Kaynak Olarak Değerleri,” *Cogito* 22 (2000), 132–44; Gülçin Tunalı, “Osmanlı Siyaset Kültürünü Anlamada Kaynak Olarak İlm-i Nücum: Sadullah El-Ankaravi,” *TALİD* 3 (2004), 183–94; *Ibid.*, “Sadullah Efendi’nin İlm-i Nücum Kaynaklarından Tanzimat Ankarası’na Bir Katkı,” *Türkiyat Araştırmaları Dergisi*, n.d., 370–92; *Ibid.*, “An Ottoman Astrologer at Work: Sadullah el-Ankaravi and the Everyday Practice of *İlm-i Nücum*,” in *Les Ottomans et le temps*, ed. François Georgeon and Frédéric Hitzel (Leiden: Brill, 2012), 39–60; Marlene Kurz, *Ein osmanischer Almanach für das Jahr 1239/1240 (1824/25)* (Berlin: Klaus Schwarz, 2007); Cornell H. Fleischer, “Ancient Wisdom and New Sciences: Prophecies at the Ottoman Court in the Fifteenth and Early Sixteenth Centuries,” in *Falnama: the Book of Omens*, ed. Massumeh Farhad and Serpil Bağcı (London: Thames & Hudson, 2010), 231–243; Carlos Grenier, “The *Takvim-i Humayun*: An Exploration of the Heritage and Uses of an Ottoman Calendar-Horoscope of 1452” (1st Year Paper, University of Chicago, 2010); Fatih Mehmet Kurşun, “Sultans and Prophets: The Politics of Calendar Writing in the Ottoman Palace from the mid-15th to the mid-16th Century” (2nd Year Paper, University of Chicago, 2011); Gerhard Behrens, “An Ottoman Calendar (takvim) for 1740/41 AD,” *Middle East Studies Online Journal* 4/2 (2011), 1–90; Özgür Türesay, “Le temps des almanachs ottomans: usage des calendriers et temps de l’histoire (1873–1914),” in *Les Ottomans et le temps*, 129–157.

of their astrological and non-astrological constituents provides surprising insights into the political, cultural, and intellectual history of the early-modern Ottoman world. Inasmuch as *taqwīms* were produced and expired annually, a thorough examination of their contents from year to year helps chart a number of intriguing Ottoman realities, including common courtly perceptions of and attitudes toward rival polities, changing vocabulary of sovereignty, the shifting dynamics of the relationships between different social groups, or the scientific models followed in different periods by contemporary men of knowledge.

Notwithstanding the fact that the contents of *taqwīms*, especially the annual astrological prognostications expressed in vague and repetitive terms are often presumed in the available literature as historically useless materials, their relatively static character allows the modern historian to identify with relative ease those aspects of these texts that did vary across time. Gradual changes in style and contents in *taqwīms* allow us to historicize these texts and correlate them with contemporary developments in the Ottoman political and cultural sphere. It is, thus, of great importance to examine *taqwīms* not on an individual basis but rather as a corpus, scrutinizing their evolution over an extensive period of time. By doing so, it is also possible to escape from the trap of haphazardly attributing the references in a random *taqwīm* to contrived historical occurrences. Especially in utilizing the annual astrological predictions, which are more often than not expressed in vague terms, the modern researcher should resist the temptation to take them at face value and read them as an objective index of certain actual historical incidents.

In light of these methodological concerns, this chapter will first give a literary-historical background to the development and dissemination of *taqwīmesque* texts in medieval Islamic writing culture. While the *taqwīm* was employed from at least the ninth century onwards as a

form of writing in different literary traditions, ranging from astronomy and geography to medicine and history, the term increasingly came to denote annual astrological prognostications-cum-calendric information, prepared by experts in the science of the stars before or around the arrival of each solar year. This discussion will include a description of some of the defining features of the *taqwīm* genre. Although *taqwīms* written by various—and often anonymous—*munajjims* in different periods are not entirely identical in terms of their contents and style, the overall similarity of these texts allows us to define a prototypical example and describe its major characteristics to introduce the reader into their general structure.

This overview is followed by a close examination of the corpus of the fifteenth- and sixteenth-century Ottoman *taqwīms*, in which I relate different aspects of *taqwīm* writing to identifiable Ottoman realities at the time. By focusing upon the dynamics of production, circulation, and consumption of *taqwīms*, I attempt to accurately situate them within their proper historical contexts. As part of this overall inquiry, there follow three in-depth analyses. First, the reverse-chronology sections receive a detailed examination in which some of the misconceptions established by earlier scholarship regarding the nature of these chronology tables are addressed and redressed. Next, the astrological contents of *taqwīms*, particularly the detailed annual predictions, are explored in a comparative fashion, raising the question whether it is possible to use these predictions as a window into the political realities and ideological inclinations of their times. The final analysis treats the reception of *taqwīms* by the wider interpretive community and tries to gauge the extent to which annual astrological predictions figured in contemporary public discourse and shaped the imperial decision-making process.

IV. 2. *Taqwīm* as a special form of writing, *Taqwīm* as a specific genre in medieval and early modern Islamic literary tradition

In the three major languages of Islamic Near East, the term *taqwīm* connotes a calendar as we understand it today; in pre-modern times, its meaning was much more complex and varied.² Before characterizing the generic features of the *taqwīm* genre and discussing its significance for modern historical studies, it should be first underlined, for the sake of clarity throughout the chapter, that the term *taqwīm* denotes three distinct yet interrelated types of compositions: i) surveys of knowledge displayed in tables, charts, and diagrams, popular in different genres of medieval and early modern Islamic writing, especially in the disciplines of the astral sciences, medicine, geography, and history; ii) the genre of almanac-prognostications comprised of annual astrological predictions and calendric information (which constitute the central theme of this chapter); and iii) calendars in the modern sense of the word.

The origins of the use of tabular forms in medieval Islamic literary culture are not entirely clear; yet it was largely astral lore, specifically the *zīj* (astronomical tables) literature, that initially stimulated authors from sister disciplines to integrate tables, columns, and charts in their texts.³ The word *taqwīm* in the *zīj* literature is originally used as often paired with any or all

² *Taqwīm* originally had a more spatial meaning, being derived from the Arabic root *qāma*, “to get up; to stand up; to stand erect; to rise.” *The Hans Wehr Dictionary of Modern Written Arabic*, ed. J.M. Cowan Third Edition (Ithaca: Spoken Language Services, 1976), 798. A modern dictionary of Arabic demonstrates its rich accretion of connotations, abstract, metaphoric, and practical, as: “raising, setting up, erection; appraisal, assessment, estimation, rating valuation; correction; rectification, amendment, reform, reformation, reorganization, reshaping, modification, adaptation; rectification, detection (*el.*, *radio*); land survey, surveying; determination of geographical longitude and latitude; geography; stocktaking; almanac; calendar; chronology,” *Ibid.*, 801.

³ Denise Aigle, “L’histoire sous forme graphique, en arabe, persan, et turc ottoman: origins et fonctions,” *Bulletin d’études orientales* 58 (2009), 11–49.

of the planets (i.e. *taqwīm al-kawākib*) to denote the tabulated presentation of their true longitudes.⁴ Modeling likely upon its use in the astral lore, other genres in different disciplines began to employ the term. In the introduction to his geographical compendium *Taqwīm al-buldān*, for instance, Abū'l-Fidā' (d. 1331) explicitly says that he modeled his book upon earlier examples of *zīj*.⁵ The obvious practical advantage of the tabular arrangement of information, for both the readers and authors themselves, drove its dissemination into diverse genres, considerably simplifying the task of finding the desired information in a text, like a specific treatment of a malady in a medical treatise, the mathematical denotation of a celestial position in an astronomical manual, the longitudes and latitudes of a city in a geographical work, or short biographical information on rulers in a historical text.⁶

The scholarship on the use of tabular forms in Islamic manuscripts is unfortunately thin. Denise Aigle, one of the pioneering scholars working on medieval Islamic texts that employed graphic presentations, maintains that the preponderance of tabular organization in different literary genres, particularly in the works related to practical sciences such as medicine, geography, and history, proliferated from especially the thirteenth century onwards.⁷ These texts, regardless of content, usually have the word *taqwīm* as part of their titles. Among the salient examples of this trend, one should name the *Taqwīm al-abdān fī tadbīr al-insān* of Ibn Jazla (d.

⁴ Benno Van Dalen, "An Introduction to the Mathematics of Islamic Astronomy and Astrology." (Unpublished paper).

⁵ Abū al-Fidā' Ismā'īl ibn 'Alī, *Géographie d'Aboulféda; texte arabe publié d'après les manuscrits de Paris et de Leyde par M. Reinaud et M. le baron Mac Guckin de Slane* (Paris: Impr. Royale, 1840), 3.

⁶ Aigle, 16.

⁷ In addition to the above-cited work, see "The Historical *taqwīm* in Muslim East," in *The Mongol Empire between Myth and Reality: Studies in Anthropological History* (Leiden: Brill, 2015), 89–104.

later than 1100), the *Taqwīm al-lisān* of Ibn al-Jawzī (d. 1201), the *Taqwīm al-adwiya* of Ḥubaysh b. Ibrāhīm al-Tiflīsī (d. 1231), the *Taqwīm al-buldān* of Abū'l-Fidā', and even the *Taqwīm al-tawārīkh* of Kātib Çelebi (d. 1657).⁸ Considering the surprising similarities in the tables and layout of the folios in these works and our almanac-prognostications, it is safe to argue that *taqwīm* as the genre of almanac-prognostications should be evaluated within this broader Islamic literary tradition of works employing tabular forms of presentation under the title *taqwīm*.

What *taqwīm* has come to denote as the specific genre of almanac-prognostications, however, is an annual presentation principally combining astronomical, astrological, and calendric information for the upcoming year. Seemingly ubiquitous throughout late-medieval and early-modern Islamicate culture, especially in the central and eastern parts of the Islamic world, these texts were primarily produced by experts in the science of the stars before or around the time of the year-transfer (*taḥvīl-i sāl*), that is, the spring equinox and beginning of the new solar year (*Navrūz*).⁹ The production of these texts required the astral expert's making mathematical and astronomical computations of the true longitudes of the planets (*taqwīm al-kawākib*) necessary to deriving subsequent astrological analyses.¹⁰ As *taqwīms* were annually produced on the occasion of the turn of the new solar year, the defining moment for astronomical calculations is the time when the sun enters the sign Aries. After the *taqwīm*-compiler identifies

⁸ Efraim Lev, "An Early Fragment of Ibn Jazlah's Tabulated Manual 'Taqwīm Al-Abdān' from the Cairo Genizah (T-S Ar.41.137)," *Journal of the Royal Asiatic Society* 24/2 (2014), 189–223.

⁹ M. Hofelich and D. M. Varisco, "Taḳwīm," *EI²*, Online version; Hofelich, "The Making of Taqvim in Iran," In *La science dans le monde Iranien à l'époque islamique*, ed. Ziva Vesel et al. Tehran: Institut Français de Recherche en Iran, 1998, 49-51.

¹⁰ Benno Van Dalen, "An Introduction to the Mathematics of Islamic Astronomy and Astrology" (Unpublished paper)

the ascendant (*tāli*'), establishes all the other astrological houses, and determines further celestial variables at the time of the spring equinox by drawing upon the data and methods provided by astronomical tables (*zīj*) in circulation, he or she prepares the horoscope of the coming year and starts delineating astrological predictions as to its fortunes.¹¹

While *zīj* was the most important, and evidently affordable tool in the *taqwīm*-producer's paraphernalia, the vocabulary used in extant almanacs and other treatises hints that astral experts might have also used astronomical instruments for establishing the celestial map of the desired moment.¹² Astronomical calculations, of course, provide the necessary ground upon which astrological predictions are laid down and calendric tabulations are placed. The general astrological predictions for the upcoming year (*aḥkāṃ-i kulliya* or *aḥkāṃ-i tāli*'-*i sāl-i ālam*) start with often-sycophantic remarks on the fortunes of the reigning sovereign to whom *taqwīm* is dedicated. The ruler, who is often paralleled to the Sun, is always at the center of the analysis, just as the Sun is the mainstay of the entire cosmos. This panegyric is followed by a discussion on the fortunes of other social categories, usually six in number, each theoretically corresponding to one of the seven planets. For example, the section following the fortunes of the ruler describes the conditions of viziers and other statesmen (*aḥvāl-i vuzarā*' *va arkān-i davlat*), the third is on 'ulamā', *shaykhs*, and related people (*aḥvāl-i 'ulamā*' *va fuqahā va mashāyikh-i kibār*), the fourth about governors and men of the sword (*aḥvāl-i umarā-i kibār va sipahsalārān-i 'alī-miqdār*), the fifth on the sultan's women and servants (*aḥvāl-i khavātīn va khuddām*), the sixth on people of the divan including scribes, poets, physicians, and astrologers (*aḥvāl-i ahl-i dīvān*

¹¹ Ascendant is the point of the ecliptic rising on the eastern horizon at the given moment. See: Mohammad Bagheri, "Kūshyār ibn Labbān's Glossary of Astronomy," *SCIAMVS* 7 (2006), 155.

¹² Some stock examples include "*naẓar bi-Āfitāb kardīm ki...*" or "*chūn naẓar kardīm va yaftīm Bahrām rā dar vatad-i rābi...*"

va aṭibbā' va shu'arā' va munajjimān), and the seventh regarding travellers, messengers, and commoners (*aḥvāl-i misāfirān va rasūlān va 'avām al-nās*). Except for predictions about the sultan, the vocabulary used for these social categories is always impersonal and non-specific. The order and composition of these groups varies depending on the individual preference of the almanac maker. There are many instances in which groups are merged together and the *taqwīm*-maker composes this part in fewer than seven separate sections. In any of these cases, however, it is hard not to detect the sultano-centric political philosophy transmitted through the narration of astrological predictions.

Annual predictions about different social categories are followed by forecasts of earthly affairs. These affairs are usually grouped into four categories: wars and battles, meteorological events, crops and prices, and pestilence and disease. From time to time, almanac makers might also include, in addition to the predictions on social categories and earthly phenomena, a separate geographical section in which he or she explains how the fortunes of the upcoming year would look like for the major cities and countries in each of the Seven Climes of traditional geography.¹³

Following these general astrological predictions about the fortunes of the upcoming year, the almanac-producer usually places two charts on two separate pages. The first of these charts is a simple horoscope prepared according to the Chinese-Uighur animal cycle calendar.¹⁴ This chart is more often than not accompanied by a short bit of prose, explaining to which animal cycle the year in question belongs. There might also be a short prognostication of the fate of the year's

¹³ For the understanding of the climates, see: André Miquel, "İklīm," *EF*², Online version.

¹⁴ For Chinese-Uighur animal cycle calendar see: Osman Turan, *On iki hayvanlı Türk takvimi* (İstanbul: Cumhuriyet Matbaası, 1941).

newborns, distinguishing as a general rule between those babies born in the first half of the concerning year and those born in the second half. The second chart (on the following page) is the detailed horoscope computed by the almanac-maker utilizing the *zīj* available. This chart is preceded by a short prose declaration of the expected time and date of the revolution of the solar year according to the lunar Islamic/Hijrī calendar. The date is then converted to other calendric systems used at the time. While the list of calendric systems may vary depending on the period and personal predilections of the *taqwīm* author, the standard set of calendar systems includes three solar calendars: the Greek/*Rūmī*, the Persian/Zoroastrian/*Yazdgirdī*, and the *Jalālī/Malikshāhī*, another solar-based calendar introduced at the time of the Saljuq sultan Malikshāh (r. 1072-1092).¹⁵

After these two charts and their short prose commentaries comes the laborious presentation of the astronomical, astrological, and calendric information for each month of the upcoming year. Here the almanac-maker places ephemeris tables to mathematically demonstrate the positions of the planets in each and every day of the month. Assuming the Sun moves constantly through the zodiac during the year, over one day the sun's position increases by one degree; thus the position of the Sun in the zodiac is equivalent to the date in the schematic calendar. The tables also designate for each month the days of religious/liturgical and meteorological significance for different traditions. In addition to such astronomical and calendric information, the monthly tables also include brief astrological remarks in the form of predictions (*aḥkām*) and advice on auspicious days and times (*ikhtiyārāt*), based on almanac-

¹⁵ For the classical study on the calendars used in the Islamicate world, see: Sayyed H. Taqizadeh, "Various Eras and Calendars used in the Countries of Islam," *BSOAS* 9/4 (1938), 903-922; 10/1 (1939), 107-132; 14/3 (1952), 603-611.

producer's interpretation of the individual horoscope of each month (i.e., the *ṭāli* ' of the time of Sun's entering a new sign during its annual rotation across the ecliptic).¹⁶ Finally the last folio of *taqwīms* is devoted to predicting eclipses in the upcoming year. If there is an eclipse expected to occur in the year, then information about its time, location, and duration is recorded. The reason why information about eclipses is recorded only at the end of *taqwīms* is, as al-Bīrūnī says, the unfavorable character of eclipses that were interpreted as bad omens.¹⁷

It is highly telling to discuss the ways almanac-makers used the term *taqwīm*. Unlike the modern connotations of the word which incline more toward the notion of a calendar, medieval and early-modern Islamicate astral experts often employed the term in conjunction with either a specific planet, as in the case of *taqwīm al-shams*, or planets in general, as in the case of *taqwīm al-kawākib*, denoting “survey of [the true longitude of] the planets.” In this, *taqwīm* likely retains the original spatial connotations of its root, implicitly promising the calculation and tabulation of the true positions of the celestial objects across time, whereby one can easily determine the position of seven planets relative to each other. By contrast, the word *tārīkh* (“dating,” “history”¹⁸) was favored in the astral lore to denote chronology/calendar systems. In the *zīj* literature, and particularly in the two most popular post-thirteenth-century manuals of astronomical tables (i.e., the *Zīj-i Īlkhānī* and the *Zīj-i Jadīd-i Ulugh Beg*), the first chapters (*dar ma'rifat-i tavārīkh*) are often dedicated to describing then-widely-used chronology systems and methods of converting dates.¹⁹

¹⁶ For *ikhtiyārāt* see: David Pingree, “Ektūārāt,” in *EIr*.

¹⁷ Bīrūnī, *The Book of Instruction in the Elements of the Art of Astrology*, ed. and tr. Robert Ramsay Wright (London: Luzac & co., 1934).

¹⁸ Wehr, Cowan, *op cit.*, 12.

¹⁹ Surprisingly, the *Zīj-i Īlkhānī* has not been published in a critical edition. My references are

This summary of the structure of *taqwīms* relies almost exclusively upon the surviving Ottoman examples that constitute the greater majority of extant available Islamic *taqwīms* but it is possible to consider this schema as universally applicable to all available *taqwīms* notwithstanding the cosmetic differences among almanacs in terms of their contents and style. Although the great majority of extant *taqwīms* produced in different regions and periods of the pre-modern Islamicate world are found in Ottoman lands, there is rich documentary evidence for the production and use of this tool in earlier Islamic history and elsewhere. Though modern scholarly attention to the almanacs is quite limited, those few studies dealing with the genre of *taqwīm* demonstrate the likelihood that it originated in the eastern Islamic lands.²⁰

The history of *taqwīms* in the Islamic world is yet to be written. Although the origins of the genre are obscure, Michael Hofelich argues that it developed from Hellenistic precursors dating from the fourth or fifth centuries A.D. In fact, from around 400 B.C. onwards after the Babylonians first invented the concept of the Zodiac, different arrangements of ephemerides for the sun, moon, and planets, and astrological remarks for the days of month emerged.²¹ In addition to the possible Babylonian-Hellenistic vein of influence, the impact of Indian and Sasanian astral knowledge on the formation of Islamic astrology, especially in the courts of the early Abbasid caliphs should also be taken into consideration.²²

from a relatively early copy of the text now housed in Florence, BML Or. 24. For the *Zīj-i Ulugh Beg*, see: *Uluğ Bey'in Astronomi cetvelleri = Zîc-i Uluğ Bey*, ed. Mustafa Kaçar and Atilla Bir (Ankara: T.C. Kültür ve Turizm Bakanlığı, 2012).

²⁰ M. Hofelich and D. M. Varisco. "Taḳwīm"; Hofelich, "The Making of Taqwims in Iran."

²¹ John Steele, "A Late Babylonian Compendium of Calendrical and Stellar Astrology," *Journal of Cuneiform Studies* 67 (2015), 187–215.

²² The most thorough discussion of the circulation of astrological knowledge in early Islam is offered by David Pingree, *From Astral Omens to Astrology: from Babylon to Bīkāner* (Rome: Istituto Italiano per l'Africa e l'Oriente, 1997). See also Pingree, "Astronomy and Astrology in

Thābit b. Qurra, the prolific polymath active at the Abbasid court in the second half of the ninth century, made the first known mention of a *taqwīm*, which he calls *daftar al-sana* (“account of the year”).²³ Two centuries later, al-Bīrūnī also employed these concepts in his astrological compendium, *Kitāb al-tafhīm li-awā’il šinā’at al-tanjīm*. According to al-Bīrūnī, these ephemeral texts, which he also named as *taqwīm* or *daftar al-sana*, were routinely produced each year around the time of *Navrūz*. The major objectives of these annual compositions, according to al-Bīrūnī, were to tabulate the planetary positions and the exact day/time in which the sun enters different signs of the Zodiac, to provide the calendric information for different chronology systems, and to communicate astrological prognostications.²⁴ It also contained, as he described, a brief chronological section at the beginning, informing the readers of the dates of the prophets and distinguished rulers.

I will discuss in greater detail the significance of al-Bīrūnī’s remarks on the use of historical chronologies in almanacs when exploring the role of reverse-chronology tables in Ottoman *taqwīms*. Suffice it to say, the documented integration of historical material into *taqwīms* as early as the late tenth century seems to have been related to the growing popularity of astrological histories, or historical astrologies, in the early Abbasid intellectual realm from the ninth century onwards.²⁵

India and Iran,” *Isis* 54/2 (1963), 229-246; Dimitri Gutas, *Greek Thought, Arabic Culture: The Graeco-Arabic Translation Movement in Baghdad and Early ‘Abbāsī Society (2nd-4th/8th-10th Centuries)*. London: Routledge, 1998, esp. 75-104.

²³ Cited in Ḥākīmī zīdj, ed. and tr. C.A. Caussin de Perceval, in *Le livre de la grande table Hakémitte*, in *Notices et extraits des manuscrits de la Bibliothèque nationale*, vii, Paris 1804, 98.

²⁴ Bīrūnī, *The Book of Instruction in the Elements of the Art of Astrology*, 186-191.

²⁵ In addition to Gutas’s work cited above, see Antoine Borrut, “Court Astrologers and Historical Writing in Early Abbasid Baghdad: An Appraisal,” in *Contexts of Learning in Baghdad from the 8th-10th Centuries*, ed. J. Scheiner and Damien Janos (Princeton: The Darwin Press, 2014), 455-

The early Abbasid period witnessed the pointed cultivation of astral lore and the intellectual and scientific legacies of Greeks, Indians and Sasanians' becoming increasingly appropriated and "subsequently naturalized."²⁶ In addition to the aforementioned Thābit b. Qurra, the courts of the early Abbasid caliphs welcomed a great many astral experts, such as the Banu Nawbakht family, Māshā' Allāh b. Atharī (d. ca. 815-6), 'Umar b. al-Farrukhān al-Ṭabarī (d. 815-6), and most importantly Abū Ma'shar al-Balkhī (d. 886).²⁷ The scholarly efforts of these names helped accumulate different kinds of astrological texts ranging from individual horoscopes prepared for the members of the dynastic family to astrological histories aiming to explain and legitimize the divinely ordained rule of the Abbasid dynasty. It is no surprise that after initiating their new "cycle" (*dawla*), Abbasid caliphs cultivated astrology to bolster their ideological claims. In its simplest term, the genre of astrological histories provided chronological information about events in the distant and recent past, and associated these incidents with celestial phenomena, particularly the conjunctions occurred between Saturn and Jupiter.²⁸

501.

²⁶ Gutas, 75-104. See also: A. I. Sabra, "The Appropriation and Subsequent Naturalization of Greek Science in Medieval Islam," *History of Science* 25 (1987), 223–43.

²⁷ For Nawbakhtīs, see Joel L. Kraemer, "Al-Nawbakhtī, al-Ḥasan b. Mūsā, Abū Muḥammad," *EF*², Online version; Kevin Van Bladel, "The Arabic History of Science of Abū Sahl ibn Nawbaht (fl. ca. 770-809) and its Middle Persian Sources," in *Islamic Philosophy, Science, Culture, and Religion. Studies in Honor of Dimitri Gutas*, ed. Felicitas Opwis and David Reisman (Leiden: Brill, 2012), 41-62; David Pingree, "Abū Sahl b. Nawbakt," *EIr*; Pingree, "Nowbaktī, Ḥasan," *EIr*. For Māshā'allāh, see David Pingree, "Māshā'allāh," in *Dictionary of Scientific Biography*, vol. IX, 159-162; Julio Samsó, "Māshā' Allāh b. Atharī or b. Sāriya," *EF*², Online version, and especially Pingree, *The Thousands of Abū Ma'shar* (London: Warburg Institute, 1968). For 'Umar b. al-Farrukhān, see: David Pingree, "'Umar ibn al-Farrukhān," in *Dictionary of Scientific Biography*, vol. XIII, 538-539. For Abū Ma'shar, see: David Pingree, "Abū Ma'shar al-Balkhī, Ja'far ibn Muḥammad," in *Dictionary of Scientific Biography*, vol. I, 32-39; Charles Burnett, "Abū Ma'shar," *EF*³, Online version.

²⁸ David Pingree, "Ḳirān," *EF*², Online version. See especially Charles Burnett and Keiji Yamamoto, *Abū Ma'shar on Historical Astrology. The Book of Religions and Dynasties (on*

This conjunctionist astrology became popular in the early Abbasid intellectual context owing especially to the works and translations of Māshā' Allāh b. Atharī, who was crucial to channeling the Indian and Sasanian traditions into the Islamic intellectual realm.²⁹ In it, the conjunctions of Saturn and Jupiter betoken the occurrence of major events such as the emergence of a new religious dispensation, a turn of a ruling “cycle” from one dynasty to another, or the replacement of a reigning ruler. There are different types of conjunctions and each type is associated with a different sublunary transition. For instance the regular conjunctions of Saturn and Jupiter that recur at intervals of about twenty years in a different sign (*al-qirān al-aṣḡar*, “the lesser conjunction”) indicate a change of ruler. These conjunctions stay in the same astrological triplicity [i.e., a group of three signs of the Zodiac belonging to the same element] for a long time; however, about every 240 years, they move into a new triplicity. This conjunction (*al-qirān al-awsaṭ*, “the middle conjunction”) was often interpreted as a marker of a more serious change such as the emergence of a new dynasty or a nation. Moreover, the completion of a cycle of shifts through all four triplicities every 960 years (*al-qirān al-akbar*, “the greater conjunction”) was thought to indicate even a more sweeping change such as the advent of a prophet and the establishment of a new religious dispensation.³⁰

The earliest examples of this genre are unfortunately lost; but, on the basis of the surviving texts from the early ninth century examined by Edward Kennedy and his former colleagues, their production involved the detailed computation of birth horoscopes as well as the horoscopes of

Great Conjunctions) (Leiden: Brill, 2000), 582-587.

²⁹ Pingree, “Māshā' Allāh's Zoroastrian Historical Astrology,” in *Horoscopes and Public Spheres: Essays on the History of Astrology*, ed. Günther Oestmann, Darrel H. Rutkin, Kocku von Stuckrad (Berlin: Walter de Gruyter, 2005), 95-100.

³⁰ For a concise summary of the theory, see Borrut, 468-9.

year-transfers of the birthdates (*taḥwīl sinnī al-‘ālam*), which makes them the intellectual cousins, if not sisters, of the *taqwīm* texts.³¹ Antoine Borrut, who most recently pointed out the importance of the genre of historical astrology, argues—without mentioning the contemporary development of the *taqwīm* genre—that these texts gradually diminished and eventually disappeared in later Abbasid history after a new theocentric vision of history started to become the dominant view among the ‘*ulamā*’ and as astrology was allegedly marginalized in Islamic society.³² We are not in a position to detect whether these Abbasid astrological histories, which Antoine Borrut argues gradually lost their significance, were incorporated, in whatever fashion, into later *taqwīm* texts. That the extant *taqwīms* from the Ottoman and non-Ottoman realms with chronology tables almost always exclude Umayyad history by jumping from the narration of Karbala to the emergence of Abū Muslim, suggests that earlier Abbasid astrological histories could indeed have influenced the structure and contents of later *taqwīms*.

Moving forward from the Abbasids, we find contemporary references to *taqwīms* produced in Fatimid Egypt and Syria in the eleventh century.³³ Unfortunately the available catalogue records yield no surviving Fatimid *taqwīms*. The closest relative to a Fatimid *taqwīm* could be the twelfth-century ephemeral almanacs David Pingree and Bernard Goldstein found among the documents of the Cairo Geniza. These texts are Hebrew-alphabet transliterations of works originally composed in Arabic.³⁴ Though most of these documents survive only fragmentarily,

³¹ E.S. Kennedy (and Colleagues and Former Students), “Al-Battānī’s Astrological History of the Prophet and the Early Caliphate,” *Suḥayl* 9 (2009-2010), 13-148.

³² Borrut, 485-7.

³³ Aydın Sayılı, *The Observatory in Islam*, 167.

³⁴ Goldstein, B. and D. Pingree, “Astrological Almanacs from the Cairo Geniza, Part 1,” *Journal of Near Eastern Studies*, 38/3 (1979), 153-175; “Astrological Almanacs from the Cairo Geniza, Part 2,” *Journal of Near Eastern Studies*, 38/4 (1979), 231-256; “Additional Astrological

some of their contents, combining astronomical descriptions of the daily position of the Moon with corresponding astrological analyses, do remind of the *taqwīm* tradition. The astrological components of these documents, however, do not include yearly and monthly predictions, and consist solely of astrological advice (*ikhtiyārāt*) one should keep in mind before deciding to do things like bloodletting, entering baths, or arranging marriages.

The Rasulid period in Yemen (1229–1454) provides the second richest collection of extant *taqwīms* after the Ottoman corpus. In his detailed analysis of the almanac genre during the Rasulid dynasty, Daniel Martin Varisco lists eight surviving Rasulid *taqwīms*, the earliest of which was compiled around the year 1271.³⁵ Varisco’s study is of the utmost importance, for his is one of the rare scholarly attempts to recognize the set of almanac texts as an important historical source per se and contextualize their contents for the social, and particularly agricultural, life of medieval Yemen.

The preponderance of references in contemporary literary sources and other documents from Eastern Islamic lands corroborates the modern scholarly assumption that the *taqwīm* was of Eastern Islamic/Persian origin. Nizāmī-i ‘Aruḏī, for example, briefly mentions the *taqwīm* genre in his *Chahār maqāla*. In the introduction to his third discourse on the “lore of the stars and the excellence of the astronomer in that science,” he briefly summarizes the required qualities one has to have to become an erudite *munajjim*. Quoting al-Bīrūnī’s *Tafhīm*, Nizāmī ‘Aruḏī says “a man does not merit the title of *munajjim* until he has attained proficiency in four sciences: First, Geometry (*handasa*); secondly, Arithmetic (*ḥisāb*); thirdly, Cosmography

Almanacs from the Cairo Geniza,” *Journal of the American Oriental Society*, 103/4 (1983), 673-690.

³⁵ Daniel Martin Varisco, *Medieval Agriculture and Islamic Science: The Almanac of a Yemeni Sultan* (Seattle: University of Washington Press, 1994).

(*hay'a*), and fourthly, Judicial Astrology (*aḥkām*).” For Nizāmī, the most common applications of the science of the stars that incorporate all four of these sub-disciplines are astronomical tables (*zījhā*) and almanacs (*taqwīm*).³⁶ Except for his reference to *taqwīm*s as a practical field of interest for applying the knowledge of the science of the stars, there is no concrete example in Nizāmī’s anecdotes of the actual use of *taqwīm*s that might help clarify how these texts were produced and consumed at the time. However, we have additional hard evidence from post-thirteenth-century Persianate East, showing that *taqwīm* production was already an established tradition among practicing *munajjims*.

In his prologue to the *Zīj-i Īlkhānī*, for example, Naṣīr al-Dīn Ṭūsī (d. 1274) does not shy away from explicating to his audience the real purposes of the tables he and his colleagues prepared at the Maragha Observatory. Unlike modern scholarly treatments of the *zīj* literature that usually disregard the astrological intentions underlying the costly systematic programs of observations, Naṣīr al-Dīn Ṭūsī writes rather explicitly from the very beginning of the text, it is crucial to observe and calculate the positions of the celestial objects if one wants to have foreknowledge about earthly matters such as the security of the country, warfare and peace among rulers, health and disease of individuals, the situation of agricultural production and market prices, meteorology, and the fate of newborns.³⁷ Astrological judgments about these

³⁶ Nizāmī ‘Arūzī, *Chahār maqāla*, ed. Muḥammad Qazvīnī (Tih-rān: Kitābfurūshī-i Zavvār, 1954), 87-88.

³⁷ BML Or. 24, 2b: “**Sukhan dar raṣad-i siṭāragān va anki raṣad va zīj va taqwīm cha bāshad:** ... *bi-dānistan-i raṣad-i mavzi ‘-i siṭāragān bar āsumān va payvastan-i īshān ba-yakdigar va judā shodan va miqdār-i davrī-yi īshān az yakdigar va az zamīn va miqdār-i ravish-i īshān ma‘lūm shavad va az dānistan-i ān ḥukm tuvān kard ki ba ‘d az īn dar ‘ālam cha khāhad būd az amīnī va parīshānī va ṣulḥ-i pādīshāhān bā-yakdigar va ḥarb va gardīsh-i rūzgār va tandarostī va bīmārī-i khalq va vabā va farāhī va tangī-i narkhhā va bārandagī va khushgī va digar ḥalḥā va hamchunīn ḥāl-i har farzandī ki dar vujūd āyad va dirāzī-i ‘omr va kūtāhī va nik-bakhtī va bad-*

issues could only be cast with a precise knowledge of celestial positions, and the knowledge of celestial positions could only be calculated accurately by systematic observation. Once the positions of celestial objects in each and every day are established through laborious observation, this information is recorded in a manual of astronomical tables, i.e., a *zīj* (Ar. pl. *azyaj*). Utilizing the data and methods provided in these tables, *taqvīms* are produced on a yearly basis, designating the positions of celestial bodies across the year, which would allow practicing *munajjims* to calculate the ascendant and make their astrological predictions. Ṭūsī concludes his introduction by saying that he hopes his new *zīj* will become the main reference work for *munajjims* in preparing their almanacs and casting horoscopes.³⁸

Aside from *Zīj-i Īlkhānī*, the real contribution of Naṣīr al-Dīn al- Ṭūsī in the field of almanac-making was his short treatise, *Mukhtasar dar maʿrifat-i taqvīm*, better known as *Risāla-i Sī faṣl*. This work explains concisely the nature of the planets, the characteristics of the signs of the Zodiac, and the influences of different planetary positions, and soon became one of the most sought-after astrological texts in the Central and Eastern Islamic lands. As we have already mentioned, along with the commentaries of later astral experts such as Khiṭābī (d. later than 1495) or Birjandī (d. 1525), the work was translated into Turkish as early as the fifteenth century

bakhtī va tendorostī va ranjūrī va tuvāngarī va ...ranj u rāḥat ki badū rasad. Īn hama az mavāziʿ-ī sitāragān tuvān dānist va mavziʿ-ī sitāragān ki har vaqt har yakī kojā bāshand natuvān dānist tā ravish-i īshān nadānand.”

See also: J. A. Boyle, “The Longer Introduction to the ‘Zij-i-Īlkhani’ of Nasir-ad-Din Tusi,” *Journal of Semitic Studies* 8/2 (1963), 244-254. For the *zīj* literature, see: Edward S. Kennedy, “A Survey of Islamic Astronomical Tables,” *Transactions of the American Philosophical Society* 46/2 (1956), 123-177; David A. King, Julio Samsó, Bernard R. Goldstein, “Astronomical Handbooks and Tables from the Islamic World (750-1900): An Interim Report,” *Suhayl* 2 (2001), 9-105.

³⁸ BML Or. 24, 3b.

by Aḥmed-i Dā'ī.³⁹

For practicing *munajjims*, especially the novice and inept ones, almanacs had a function similar to the *zīj*, providing readily available tables of celestial positions in a given year. However, the prestige of a *munajjim* rested upon the ability to make the necessary astronomical calculations with ease and precision on his/her own. Because making accurate calculations without relying upon a *zīj* was a praiseworthy virtue for a *munajjim*, unskillful practitioners were often mocked for their lack of computational skills. For instance in one of his letters to his father, Jamshīd al-Kāshī (d. 1429) derides a certain Mawlānā 'Imād for his inability to determine the positions of celestial objects without—not even a *zīj* but—an almanac.⁴⁰ It is evident through the remarks of al-Kāshī that an erudite *munajjim* was expected to produce *taqwīms*, not simply consume them.

Jamshīd al-Kāshī is not the only witness to the production and circulation of almanacs in the Timurid era. Although no almanac from the Timurid realm is known to survive, various contemporary scholars refer to the genre in their writings. It would have been surprising indeed not to find such references to the notion of *taqwīm* in the Timurid context, as it was in the courts of Timurid princes, especially the first half of the fifteenth century, that astral pursuits, among other occult curiosities, gained a new momentum. Mīrzā Iskandar ibn 'Umar-Shaykh (r. 1409–14) was evidently the first of these princes who showed a keen interest in the science of the stars

³⁹ For the 15th century Turkish translation see: Aḥmed-i Dā'ī, *Muhtasar fi ilm el-tencim ve marifet el-takvim (risale-i si fasl)*, ed. T. N. Gencan, M. Dizer. Istanbul: Boğaziçi Üniversitesi Kandilli Rasathanesi, 1984.

⁴⁰ Mohammed Bagheri, “A Newly Found Letter of al-Kashi on Scientific Life in Samarqand,” *Historia Mathematica* 24 (1997), 241-256.

as part of his greater theosophical and political aspirations.⁴¹ The real flowering of the science of the stars, however, took place under the reign of Ulugh Beg (d. 1449). The observatory and the adjoining *madrasas* sponsored by Ulugh Beg himself housed over two hundred masters and students interested in the cultivation of mathematical-astral sciences.⁴² The *Zīj-i Jadīd-i Ulugh Beg*, prepared as part of the systematic observation program undertaken at the Samarqand observatory, aspired to definitively revise the inaccurate data of earlier tables, especially the *Zīj-i Īlkhānī*.

Two of the contemporary voices that help us document the use of *taqwīms* in the Timurid world were intimately connected with Ulugh Beg. The first one is Sharaf al-Dīn ‘Alī Yazdī (d. 1454), a dynastic historian to the Timurids and an influential occult philosopher, who was personally invited by Ulugh Beg to join the team of astral experts at the Samarqand observatory.⁴³ In one of his short treatises, Yazdī treats the *taqwīm* texts and attempts to outline their major characteristics. As his wording suggests he associated the *taqwīm* with cognate occult activities that aim to rationalize the divine secrets underlying the interconnectedness of celestial

⁴¹ Jean Aubin, “Le mécénat timouride à Chiraz,” *Studia Islamica* 8 (1957): 71-88; Evrim Binbaş, “Timurid Experimentation with Eschatological Absolutism: Mīrzā Iskandar, Shāh Ni‘matullāh Walī, and Sayyid Sharīf Jurjānī in 815/1412,” in *Unity in Diversity: Mysticism, Messianism and the Construction of Religious Authority in Islam*, ed. Orkhan Mir-Kasimov (Leiden: Brill, 2014), 277-306.

⁴² The literature on the Samarqand observatory is vast, see particularly: İhsan Fazlıoğlu, “The Samarqand Mathematical-Astronomical School,” *Journal for the History of Arabic Science*, 4/1-2 (2008), 3-68; Hamid-Reza Giahī Yazdī and Pouyan Rezvani, “Chronology of the Events of the Samarqand ‘Observatory and School’ based on some Old Persian Texts: a Revision,” *Suhayl* 14 (2015), 145-165.

⁴³ For his life and intellectual stance, see: Evrim Binbaş, “Sharaf al-Dīn ‘Alī Yazdī (ca. 770s-858/ca. 1370s-1454): Prophecy, Politics, and Historiography in Late Medieval Islamic History.” (Ph.D. dissertation, University of Chicago, 2009).

and terrestrial realms.⁴⁴ For Yazdī, annual *taqwīms* systematically determine the daily celestial positions and derive accompanying astrological suggestions therefrom. Although he does not comment upon the origins or historical development of the genre, his remarks on the inclusion of annual astrological predictions relative to the fortunes of seven different social categories and five earthly affairs evince the established practice of the almanac tradition in the central and eastern Islamic lands.⁴⁵

The second scholar from the Timurid realm who testifies to the use of almanacs is Muḥammad al-Ḥusayn (d. later than 1434), better known as Sayyid Munajjim.⁴⁶ As mentioned in the previous chapter, Sayyid Munajjim presented Ulugh Beg with an astronomical treatise that he finished composing on Friday, Ramaḍan 20, 837/April 30, 1434.⁴⁷ He is most famous for his *Laṭā'if al-kalām fī aḥkām al-a'wām*, a manual for teaching the students of the science of the stars' basic astrological principles. Like Ṭūsī's *Ma'rifat-i taqwīm*, Sayyid Munajjim's astrological textbook soon became popular among contemporary students. Besides his autobiographical remarks and astrological interpretations of the comet that became visible in the

⁴⁴ Sharaf al-Dīn 'Alī Yazdī, *Munsha'at*, 80: “***Dībācha-i aḥkām-i taqvīm***: ...[C]hūn ‘ālam bā-sirrhā az rūḥāniyāt va jismāniyāt, ‘ulviyāt va sufliyāt majmū‘ āfarīda khalqī-i vāhīd ast ba-vaḥdat-i ḥaqīqī - jalla wa ‘allā - va ān rā bā-kamāl-i qudrat-i qāhira bar ṭibq-i ḥikmat-i bāhira pardākhta va tadabbur-i daqā‘iq-i ān rā mirqāt-i samavāt-i ma'rifat-i asmā va ṣifāt-i khīsh sākhta, aḥvāl-i ajsām-i suflī rā bā avzā‘-i ajrām-i ‘ulvī nav‘-i irtibāṭī hast.”

⁴⁵ Ibid., 80-81: “Binābarīn vāqifān bar ān asrār az laṭā'if-i afkār vaż‘-i badī‘ iktirā‘ farmūda-and ki dar mukhtaṣar varaqī chand ma‘dūd mu‘azzamāt-i avzā‘-i falakī dar tamām-i yak sāl rūz-ba-rūz ta'yīn-i avqāt-i ān bāz mi tuvān namūd ... Va ‘ādat-i sābiqān dar intihāj-i ān maslak barīn jumla jarayān yāfta ki dar avā‘il-i ān avraq anmūzajī az kulliyāt-i aḥkām-i ān sāl bar sabīl-i ijmāl bāz namāyand mushtamil bar zikr-i aḥvāl-i haft ṣinf az ṭabaqāt-i mardom va chagūnagī-yi vuqū‘-i panch amr az umūr-i kullī-i ‘ālam va ḥāl-i aqālīm, nastaghfirullāh al-‘azīm al-tawwāb al-rahīm.”

⁴⁶ Morteza Somi & Mohammad Bagheri, “Risāla-i tashrīkh al-ālāt fī sha'n al-imtihānāt az Sayyid Munajjim Ḥusaynī Gīlānī,” *Mirath-i Ilmi-i Islam va Iran* 2/1 (1393/2013), 181-205.

⁴⁷ SK Yazma Bağışlar Ms. 1362.

year 803/1400–1 as the portent of Tīmūr’s victory against Bāyezīd I (r. 1389–1402), the most interesting aspect of this text for our purposes here is the quasi-*taqwīm* of the year 824/1421 appended to the end of the treatise.⁴⁸ In fewer than 12 folios, Sayyid Munajjim calculates the horoscope of the year and enumerates the accompanying astrological forecasts (*aḥkām-i kulliya-i tāli ‘-i sāl-i ‘ālam ‘alā tarīq al-ijmāl*).⁴⁹

One last contemporary source on *taqwīms* in the Timurid realm is Rukn b. Sharaf al-Dīn al-Āmulī, another venerable astral expert who wandered around Iran and India during the tumultuous years of the post-Shāhrūkh (d. 1447) period.⁵⁰ As the author of an individual *zīj* and master of several students, some of whom eventually ended up in the Ottoman court and served the Ottoman sultans, Rukn al-Āmulī’s views on the science of the stars reveal the common scholarly approach toward the practice of the science of the stars in the late-medieval Turko-Persian cultural sphere. In the treatise on the astrolabe that he dedicated to Abū’l-Qāsim Bābūr Mīrzā (r. 1449-1457), Rukn al-Āmulī says that he spent most of his career studying philosophy (*‘ulūm-i ḥikmī*), more specifically the mathematical sciences of *‘ilm-i hay’a*, geometry (*handasa*), and arithmetic (*ḥisāb*).⁵¹ There is no doubt for him that the ultimate goal in studying these disciplines is to practice the science of judgments (i.e., astrology) and grasp the methods of time reckoning (*ṣamara-i īn ‘ulūm... ‘ilm-i aḥkām va ma ‘rifat-i avqāt ast*). The proper conduct of these practices, however, is foundational: first observing the stars, and then calculating the true longitudes of stars (*istikhrāj-i taqwīm-i kavākib*) and the horoscope of the hour horoscope

⁴⁸ Kandilli Rasathanesi Kütüphanesi Ms. 310, 30b.

⁴⁹ Ibid., 63b-71b.

⁵⁰ Not much is known about Rukn al-Āmulī. In addition to Sayılı’s *Observatory in Islam* (p. 214-5), see: S. Mohammad Mozaffari and Georg Zotti, “The Observational Instrument at the Maragha Observatory after AD 1300,” *Suhayl* 12 (2013), esp. 146.

⁵¹ Harvard University Library Ms. Persian 33, 2a-3a.

(*tavāli* 'i *sā* 'āt). The astrolabe is, according to Rukn al-Āmulī, the best tool in the eyes of the men of wisdom to compute the horoscope as well as make other necessary time measurements.⁵² Rukn al-Āmulī's text does not specifically discuss the genre of almanac-prognostications; however, given that he mentions the importance of tabulating the celestial positions for a certain time, his elaboration is perfectly applicable to (and may even derive from) the tradition of preparing *taqwīm-i sāl* based upon the celestial configuration at the time of the year-transfer.

As part of our survey of pre-Ottoman *taqwīms*, we may now finally introduce two surviving almanacs from fourteenth-century Rum and Anatolia. One of these texts is a Greek almanac produced in Trebizond by an anonymous author for the course of the year March 12, 1336 to March 12, 1337.⁵³ The basic structure of this text is quite similar to other surviving examples of *taqwīms* from later periods of Islamic history and bears many prototypical characteristics of the genre outlined by earlier authorities such as al-Bīrūnī. As is customary, this Greek text starts with determining the celestial map at the time of the spring equinox. After calculating the ascendant and rendering the horoscope, the author shares his astrological predictions as to the fortunes of, first, Constantine Loukites, the eminent official in Trebizond, and then those of various other social groups. Similar to many later *taqwīms*, these annual predictions are followed by monthly tables of astronomical and calendric information, the margins of which are filled with astrological prescriptions for performing and/or avoiding certain acts. The dates in the tables are given according to the Byzantine and Hijrī calendars. Considering the vibrant intellectual relations between Pontus Trebizond and western Iran in the

⁵² Ibid., 3a.

⁵³ Raymond Mercier, *An Almanac for Trebizond for the Year 1336* (Louvain-la-Neuve: Academia-Erasme, 1994).

fourteenth century, it is not far-fetched to argue that the methods and data used by the anonymous Byzantine almanac-maker were modeled upon the contemporary Persian astral tradition.⁵⁴ Several contemporary scholars in the Trebizond region were instrumental in the transmission of Persian astral materials to the Greek world. For example, Gregory Chioniades (d. 1320), a protégé of Constantine Loukites and a key figure in the introduction of new forms of astral studies into the Byzantine world, conveyed the then-recent astronomical tables of *al-Zīj al-Sanjarī* by al-Khāzinī, *al-Zīj al-Alāʿī* by al-Shirvānī, and the *Zīj-i Īlkhānī* into the Greek world. This argument is borne out in fact in this case, as Raymond Mercier asserts on the basis of his own calculations that this almanac was computed by utilizing either the *Zīj-i Īlkhānī* or *al-Zīj al-Alāʿī*.⁵⁵

The second extant fourteenth-century *taqwīm* from the *Rūm*-Anatolia region is the illuminated and voluminous almanac prepared in the year 773 A.H. (July 15, 1371–July 2, 1372 A.D.) for the Eretna court by a certain Zayn al-Munajjim b. Süleymān al-Konavī.⁵⁶ In fact, it is difficult to define it as a standard *taqwīm*, as the text lacks astronomical contents, detailed annual astrological predictions, or ephemerides and calendar tables. It is, rather, a compendium of useful divinatory knowledge, including tables and charts for different occult practices that range from dream interpretation and palmoscopy to astral divination and *ikhtiyārāt*. A detailed historical chronology, listing major events that have happened from Creation up to the year 769, precedes all of these tables of divination. Apparently, the paratextual notes scattered in the first few folios document that the *taqwīm* was in circulation in the Eretna court for about a decade since its

⁵⁴ See for instance: David Pingree, *The Astronomical Works of Gregory Chioniades* (Amsterdam: J.C. Gieben, 1985).

⁵⁵ Mercier, 17.

⁵⁶ SK Nuruosmaniye Ms. 2782.

composition, for there are records about events that happened in the year 783.⁵⁷ Although the text lacks year-specific astronomical and astrological calculations, the layout of the folios, the detailed charts for divinatory practices, and most importantly, the presentation of reverse historical chronology tables make this compendium a close relative of the fifteenth-century Ottoman *taqwīms*.

IV. 3. *Taqwīm à l'Ottoman*

As the development of the genre described above clearly demonstrates, the Ottoman case is not the first instance in the Islamicate world where *taqwīms* were composed routinely. Ample references to the practice from at least the tenth century onwards and a few surviving manuscripts from outside the Ottoman world make it possible to argue that the *taqwīm* was a ubiquitous literary tradition in Islamicate culture during the Middle Ages. Yet, unlike other periods and cultures of the Islamicate world for which a dearth of evidence prevents definitive interpretation of the significance of this genre, the early-modern Ottoman era provides a substantial amount of *taqwīm* texts that can be carefully followed, almost year-to-year.

The best bibliographical sources for Ottoman *taqwīms*, *Osmanlı Astroloji Literatürü Tarihi*, and the two volumes of *Kandilli Rasathanesi El Yazmaları Kataloğu*, list by my count over 150 known almanac-prognostications composed in the period 1421-1800.⁵⁸ This list is far

⁵⁷ One of these notes is related to the late-fourteenth century Ottoman principality, showing that the Ottoman conquests in western Anatolia were followed in the Eretna court: “*fath kardan-i khudāvandigār ... Sulṭān Bāyezīd b. Murād Beg b. Orḥān dar vilāyat-i Aydın va Şārūḥān sana 771.*”

⁵⁸ Günay Kut, *Kandilli Rasathanesi el yazmaları : Boğaziçi Üniversitesi Kandilli Rasathanesi ve Deprem Araştırma Enstitüsü astronomi, astroloji, matematik yazmaları kataloğu* (İstanbul: Boğaziçi Üniversitesi Yayınevi, 2007); Ibid., *Kandilli Rasathanesi el yazmaları : Boğaziçi*

from complete, as many *taqwīms* have certainly been lost altogether due to their ephemeral nature, and some additional ones doubtless survive undiscovered within miscellanies and obscure collections. I have had access to about 120 such works and have closely studied more than two third of these.

Although earlier scholarship on the Ottoman *taqwīms* has argued that they were produced in multiple copies to be distributed to the wider reading public, there is not much evidence in support of this case in the surviving manuscripts and contemporary historical sources, at least prior to the nineteenth century.⁵⁹ Compared to contemporary Europe where vernacular almanac-prognostications became early-modern best sellers after the introduction of print technology, the consumption and circulation of the fifteenth- and sixteenth-century Ottoman *taqwīms* were mostly restricted to the inner circle of the sultan. The European counterparts of *taqwīm*, that is, the *tacui* in Italy, the *practica* in Germany, and the *almanach* in Britain, France, and the Low Countries had formats, contents, and functions surprisingly similar to those of contemporary Ottoman *taqwīms*.⁶⁰ In fact, as revealed in etymological dictionaries of Latin, the word *tacui* was originally derived from the Arabic *taqwīm*, making these contemporary texts close relatives.⁶¹ Despite from this intriguing etymological connection, there is alas no study shedding

Üniversitesi Kandilli Rasathanesi ve Deprem Araştırma Enstitüsü astronomi, astroloji, matematik yazmaları kataloğu (İstanbul: Boğaziçi Üniversitesi Yayınevi, 2013); *Osmanlı Astroloji Literatürü Tarihi ve Osmanlı Astronomi Literatürü Tarihi Zeyli* (İstanbul: IRCICA, 2011).

⁵⁹ Aydüz, “Osmanlı Devleti’nde Münecimbaşılık.”

⁶⁰ See: B. S. Capp, *English Almanacs, 1500-1800: Astrology and the Popular Press* (Ithaca: Cornell University Press, 1979); Elide Casali, *Le spie del cielo: oroscopi, lunari e almanacchi nell’Italia moderna* (Torino: Einaudi, 2003); Jonathan Green, *Printing and Prophecy: Prognostication and Media Change, 1450-1550* (Ann Arbor: University of Michigan Press, 2012).

⁶¹ Online Etymological Dictionary. Accessible at: <http://www.etymonline.com/>

light upon the shared sources and origins of these different varieties of almanac-prognostications. Yet, the relatively rich European historiography on early modern almanac-prognostications makes it evident that these texts enjoyed wider public and political recognition in Europe from the late fifteenth to the early eighteenth century.

It is outside the purview of this study to compare early-modern Ottoman *taqwīms* to their contemporary European counterparts. What I will try to do here is to go beyond the earlier descriptive treatment of the genre and correlate different aspects of *taqwīm* writing to the (changing) realities of the early-modern Ottoman world. By especially focusing on the production, circulation, and consumption of *taqwīms*, and tracing relevant stories of the agents involved, I will historicize fifteenth- and sixteenth-century Ottoman *taqwīms* within their respective social and political contexts.

Regarding the authorship of *taqwīms*, earlier scholarship has suggested that the task of compiling and presenting the annual *taqwīm* was a monopoly enjoyed by the office of *müneccimbaşı*.⁶² As we have already discussed in the previous two chapters, despite the fact that an office consisting of monthly-salaried court *munajjims* became formalized during the time of Bāyezīd II (r. 1481-1512) and the tasks of the *munajjims* on the palace payroll were more or less defined, *taqwīm* production was still considered a viable option for aspirant outsiders seeking to secure a sultanic benefaction.

It is not easy to reconstruct the personal dynamics underlying the production of *taqwīms*. Most of the surviving fifteenth- and sixteenth-century *taqwīms* do not include the names of their compilers. Those few almanac-prognostications identifying their authors are also not very

⁶² Aydüz, “Osmanlı Devleti’nde Müneccimbaşılık.”

helpful. Almanac-makers revealed little about themselves in their *taqwīms*, and were barely considered worthy of mention in contemporary biographical sources. For example in Ṭaşkoprīzāde's *al-Shaqā'iq al-Nu'māniyya* only one individual, that is Mawlānā Aṭāullah 'Acemī, the master of Mīrim Çelebi, is underlined for his productivity in the making of *taqwīms*.⁶³ Likewise, in contemporary historical narratives and chronicles, there exist no specific mention of a *taqwīm* maker or a *munajjim*, despite loose references to the services of unspecified *munajjims* in designating auspicious times for undertaking imperial enterprises. The archival documents, already introduced in the previous chapters, are also not that helpful for illuminating how the *munajjims* were undertaking the task of producing and presenting annual *taqwīms*.

Therefore we do not have sufficient evidence as to the exact mechanics and procedures underlying the *taqwīm* business. Who were the agents involved in the writing of a *taqwīm* and its presentation to the palace? Were all *taqwīms* welcomed in the palace or was there any initial selection process? Did the sultan really read them (or have them read to him)? Who had permission to read annual *taqwīms*? Were *taqwīms* of each year read once and for all, or did their readers consult them sporadically throughout that specific year? Where were the *taqwīms* kept? Why were they—or at least some of them—kept after they expired?

There is no trace in contemporary narrative and archival sources as to a sort of atelier in the palace in which presentation copies of *taqwīms* were produced.⁶⁴ It was mostly incumbent

⁶³ Ṭaşkoprīzāde, *al-Shaqā'iq al-nu'māniyyah fī 'ulamā' al-dawlat al-'uthmāniyyah*, ed. Ahmed Subhi Furat (İstanbul: Edebiyat Fakültesi Basımevi, 1985), 221-222.

⁶⁴ There is a substantial literature on the preparation of illustrated manuscripts for the Ottoman court, yet in none of these studies is mentioned the production of a *taqwīm*. See for instance: Emine Fetvacı, *Picturing history at the Ottoman Court*. (Indiana: Indiana University Press, 2013); Fatma Sinem Eryılmaz, "The shehnamecis of Sultan Süleyman: Arif and Eflatun and their dynastic Project." (Ph.D. Dissertation, The University of Chicago, 2010). See also: Filiz

upon the individual almanac maker to prepare his *taqwīm* on the basis of established conventions. In fact, in terms of its production and reception by readers, the astrological almanac should be considered slightly different than a regular book. Early modern Ottoman readers of *taqwīms* were aware of the ephemeral nature of these texts. For instance in a relatively popular late-fifteenth century text of folk astronomy and meteorology, the author Ḥāce Ebrī points to the main difference between a *taqwīm* and his *malḥama* text by reminding his readers that *taqwīms* are rendered ineffective every new year whereas *malḥama* texts survive for years to come.⁶⁵ Kātib Çelebi also implies this in his *Taqwīm al-tawārīkh* by saying that *taqwīms* of *munajjims* are by nature ephemeral.⁶⁶ Due mostly to their ephemeral nature, their preservation was not an immediate concern. For example, from the early years of Bāyezīd II’s reign, there are at least three separate *taqwīms* (from the years 894/1489 and 895/1490) that have the seal of the sultan in their flyleaves, showing that these copies were initially incorporated to the imperial library. However, the detailed catalogue of the Ottoman Palace Library prepared in 1502–3 by the chief librarian ‘Āṭūfī, does not cite any of those three sealed *taqwīms* among regular books in the library, hinting that *taqwīms* were considered at the time different than regular books despite the fact that they are all in codex form.⁶⁷

As regards to the time of the production and presentation of these texts, it is not far-fetched to consider *taqwīms* in parallel with New Year’s greetings, for *taqwīms* were prepared and presented on the occasion of *Navrūz*. Given the dearth of substantial studies about the

Çağman, “Saray Nakkaşhanesinin Yeri Üzerine Düşünceler,” in *Sanat Tarihinde Doğudan Batıya: Ünsal Yücel Anısına Sempozyum Bildirileri* (İstanbul: Sandoz Kültür Yayınları, 1989), 35-46.

⁶⁵ SK Hafid Efendi Ms. 205/1, 2b: “*taqvīm gibi yılda bir zāyi ‘olmaz.’*”

⁶⁶ Katib Çelebi, *Takvimü’t-Tevarih*, 4b: “*taqvīm-i aşḥāb-i tencīm gibi mensūḥü’l-‘amel.*”

⁶⁷ Library of the Hungarian Academy of Sciences, Ms. Török F 59.

historical anthropology of *Navrūz* celebrations in different parts of the Islamic past, it is difficult to argue with certainty that the coming of the new solar year was always flamboyantly celebrated in different corners of the Islamic world, but on the basis of several pieces of literary evidence from the Turko-Persian cultural zone, it is still safe to maintain that the coming of the spring (as well as the new solar year) was usually considered an auspicious instance: a proper time for the planning and execution of military campaigns, a propitious moment for poets to present the court with their most recent literary compositions, a welcome opportunity for physicians to offer their novel medical prescriptions, and of course a timely occasion for *munajjims* to deliver their annual *taqwīms*.⁶⁸ In the early-modern Ottoman courtly context, these literary offerings had a certain symbolic and material value within the matrix of complex patrimonial gift culture, and *Navrūz* presented a perfect opportunity for aspiring individuals to establish contacts with imperial elites.⁶⁹

To exemplify the timing of the presentation of *taqwīms* to the palace, the famous register of payments from the last decade of Bāyezīd II's reign documents that the entry on the *taqwīm* submission of Qāḍī-i Baghdād was recorded in early April of 1508.⁷⁰ Six more individuals

⁶⁸ For the importance of *Navrūz* and the celebrations in the Ottoman context, see: Fatih Köse, *Osmanlı Devleti'nde Nevruz* (İstanbul: IQ Kültür Sanat, 2007); Yücel Demirer, "Performative Conceptions of Social Change: The Case of Nevruz Celebrations in Pre-Ottoman and Ottoman Anatolia," in *Medieval and Early Modern Performance in the Eastern Mediterranean*, ed. Arzu Öztürkmen and Evelyn Birge Vitz (Turnhout: Brepols, 2014), 465-480; Filiz Kılıç; "Osmanlı Devleti'nde ve Klasik Edebiyatımızda Nevruz," in *Türk Dünyasında Nevruz Üçüncü Uluslararası Bilgi Şöleni*, 203-214. For the letters sent to several statesmen by a late-eighteenth century court *munajjim* to celebrate the *Navrūz*, see Müjgan Cunbur, "Bir Osmanlı Müneccimbaşısının Nevruz Tebrikleri," in *Türk Dünyasında Nevruz İkinci Uluslararası Bilgi Şöleni, 19-21 Mart 1996* (Ankara: Atatürk Kültür Merkezi, 1996), 121-130.

⁶⁹ Atatürk Kitaplığı Muallim Cevdet O. 71 is replete with entries on individuals who received gifts on occasion of the coming of the spring (=Bahāriye).

⁷⁰ *Ibid.*, 127.

received cash and robes in exchange for *taqwīms* they presented to the court that year. Accordingly, Mawlānā Sayyid Munajjim and his son Sayyid Īsmā‘īl received 1,500 and 1,000 *aḳçes* respectively on March 19, 1508. Two days later, on March 21, 1508, Salmān-i ‘Ajam and Erdeşīr, both among the *müşāhereḥorān* class, received 500 *aḳçes* each for their *taqwīms*. Finally on April 2, Yūsuf b. ‘Ömer el-Sā‘atī, who was recorded as Sinān b. Munajjim, and a certain ‘Alī, who is specifically identified in the relevant entry as the student of Mīrim Çelebi, received 500 *aḳçes*.⁷¹ In view of this list, it is self-evident that Bāyezīd II must have accorded great esteem to Qāḏī-i Baghdād, as the amount of the cash gift the newly arrived scholar received equals the largest bequest to any of the presumably more established astral experts.

One thing that is not clear from the archival records is whether each of these experts mentioned presented an individual *taqwīm* or not. Did Mawlānā Munajjim and his son receive benefits for presenting two individual *taqwīms* or a single one that they produced collectively? Likewise, does the stock phrase in some of the later sixteenth century documents, “the custom of the *munajjims* who presented a *taqwīm*” (*‘ādat-i munajjimīn ki taqwīm avordand*), meaning the routine almanac presentations of the *munajjims*, refer to a single *taqwīm* produced through the collective effort of the court *munajjims* or a number of different *taqwīms* compiled individually by each of them?

Considering the fact that we have copies of *taqwīms* compiled by different individuals for a single year, it is highly likely that, at least for a certain period of time during which courtly interest in astral computations and astrological predictions was on the rise, the court was

⁷¹ Ibid., 126-127.

annually presented with a number of different almanacs.⁷² Not all of these diverse almanacs have reached our time, but for certain years three or more *taqwīms* have survived. For instance for the year 932/1526, we have four different almanacs apparently compiled by different *taqwīm* makers. While two of these *taqwīms* are anonymous, the remaining ones were compiled by Necmeddīn b. Seyyid Muḥammed and Yūsuf b. ‘Ömer el-Sā‘atī respectively.⁷³ Similarly, three distinct almanacs survive from the year 909/1504.⁷⁴ Two of these *taqwīms* are anonymous, whereas the compiler of the third one was Salmān from Iranian lands, whose name is recorded in the massive register at least nine times as one of the monthly-salaried court *munajjims* at the time.

Comparing *taqwīms* compiled by different authors for a single year can provide intriguing insights into the intellectual, cultural, and even political history of the era. Such comparisons also help us identify more accurately the shared conceptions and/or diverging elements among diverse almanac-makers.

The two surviving almanacs from the year 919/1513, for instance, based their computations of celestial positions upon different astronomical tables. In his *taqwīm*, Yūsuf b. ‘Ömer el-Sā‘atī utilizes the *Zīj-i Ulugh Beg*, whereas the anonymous author of the other surviving almanac uses the *Zīj-i Muḥaqqaq* of Shams al-Dīn Muḥammad Wabkanawī, which was completed over an observational program of more than forty years in Maragha and Tabriz

⁷² See Appendix C for the full list of *taqwīms* examined for the chapter. Aydın Sayılı also states on the basis of al-Maqrīzī’s historical account that during the Fatimid times, different *munajjims* were producing and presenting distinct *taqwīms*. See: Sayılı, *The Observatory in Islam*, 151.

⁷³ These are Arkeoloji Müzesi Ms. 1607/1-2, BnF Turc 183, and TSMK Revan 1711/14.

⁷⁴ These are respectively TSMK Bağdat Ms. 321, TSMK Revan Ms. 1711/13, and TSMK Emanet Hazinesi Ms. 1712.

where Ghāzān Khan (r. 1295-1304) founded an observatory.⁷⁵ Apparently, the computations made by the anonymous almanac are slightly different than those of Yūsuf b. ‘Ömer el-Sā‘atī, which might have led to divergent astrological interpretations. For Yūsuf b. ‘Ömer el-Sā‘atī, the revolution of the solar year would take place 10 hours and 15 minutes into Friday night, 3 Muḥarrem 919/11 March 1513; whereas the anonymous author sets the moment as 1 hour, 19 minutes and 14 seconds into the same night.⁷⁶ Consequently the horoscopes they calculated for the year-transfer are different from each other. According to the computations of Yūsuf b. ‘Ömer el-Sā‘atī, the ascendant would be in Pisces, whereas the anonymous compiler finds it in Aquarius.

When astrological interpretations are taken into consideration it is relatively difficult to determine whether or not the variations in the scope of astrological forecasts among different almanacs are really caused by slight variances in computations of astronomical data. Especially from the late fifteenth century onwards, as the impact of the Samarqand mathematical-astronomical school became more influential among Ottoman practitioners of astral knowledge, Ottoman *taqwīm* makers allocated an even larger space to the elaboration of celestial parameters as the necessary “scientific” ground for casting their specific astrological predictions. Nonetheless, as discussed in greater detail in the first chapter, many of these astral experts were also aware of the epistemological limits of the science. For them, the celestial parameters and influences are infinite, yet the human mind and lifespan are inadequate to the task of discerning

⁷⁵ For Wābkanawī see: Mohammad Mozaffari, “Wabkanawī’s prediction and calculations of the annual solar eclipse of 30 January 1283,” *Historia Mathematica* 40 (2013), 235-261; Jamil Ragep, “New Light on Shams: The Islamic Side of Σάμψ Πουχάρης,” in *Politics, Patronage and the Transmission of Knowledge in 13th - 15th Century Tabriz*, ed. Judith Pfeiffer (Leiden: Brill, 2013), 166-180.

⁷⁶ Cf. TSMK Emanet Hazinesi Ms. 1710, 10b and TSMK Revan Ms. 1711/10, 228b.

all of them. Therefore, the best one could do is to adopt a conjectural interpretive approach based upon experience.⁷⁷

Their interpretive freedom, however, was always restricted by the conventions of astrological principles. That is to say, since astrology was a conservative craft and the qualities ascribed to celestial objects, astrological houses, and stellar positions were largely delimited by previous authorities; there was little room for creativity for the practicing *munajjim* in interpreting a particular celestial situation.⁷⁸ For example, the practicing *munajjim* did not have the freedom to arbitrarily interpret a hypothetical celestial configuration ruled by the planet Mars with themes and vocabulary ascribed to another planet. Moreover, almanac-makers almost always followed a boilerplate narrative progression in their astrological predictions. All of these features make it difficult for the modern historian to separate the “historical” wheat from the “astrological” chaff.

Nevertheless, the limited vocabulary and restricted creativity in astrological predictions provide the modern historian with the ability to detect with relative ease anomalous usages and unusual references. The comparative analysis of astrological predictions in the two surviving almanacs of the year 919/1513, for instance, reveals that the anonymous author’s remarks are slightly richer in terms of less-commonly used references. For the ease of discussion, I will focus

⁷⁷ One of the stock phrases cited by many *taqwīm* writers reads as follows: “*har chand idrāk az kulliyāt-i īn fann qāshir va az juz’iyyātash muta’addid ast ammā bar sabīl-i ghalaba-i ḡann va tajārib-i ahl-i fann kalima-i chand navashta mī shavad.*”

⁷⁸ The best example is a draft of a later sixteenth-century *taqwīm* that I was able to locate in the Bibliotheca Medicea-Laurenziana in Florence. In this draft, the anonymous *munajjim* apparently put all the formulaic remarks about the fortunes of different social categories with leaving several blanks that were to be filled later with specific dates and/or names of categories. See: BLM Or.

On the conservative nature of astrological craft, also see: Hilary Carey, *Courting Disaster: Astrology at the English Court and University in later Middle Ages* (London: Macmillan, 1982).

on the respective predictions in these two almanacs regarding the conditions of wars and battles.

Both almanac writers describe, before elaborating their predictions, the detailed combination of astronomical and celestial parameters upon which they built their interpretations. However, the combinations selected by these two compilers are not identical. For instance, the anonymous compiler uses in at least two cases the relative positions of Mercury, whereas in Yūsuf b. ‘Ömer’s presentation of astral parameters Mercury plays no role. Despite divergences in the cited parameters, the corresponding astrological interpretations of each compiler still sound quite similar. For Yūsuf b. ‘Ömer, the parameters he found important portend the emergence of disputes, struggles, battles, and slaughter. Instigators will be busy with causing sedition, and sinful people and roughnecks will triumph over noble individuals. According to Yūsuf b. ‘Ömer, majority of these signs will appear in the eastern lands, in Iraq, Alexandria, Egypt, Hijaz, Damascus, Turkistan (*bilād-i Turk*), Yemen, Nihavand, Tabriz, the environs of Gilan, Fars, Azerbaijan, Tabaristan, some of the cities in *Rūm*, and in the lands of infidels.⁷⁹ Like Yūsuf b. ‘Ömer, the anonymous compiler raises the possibility that many massacres and seditious acts will occur in the upcoming year as the instigators prevail. The locations in which the anonymous compiler expects these omens to emerge are the Mediterranean islands, Istanbul, Alexandria, Ghazni, the environs of Tarsus, Diyarbakir and Kurdistan, Hamadan, Isfahan, Ray,

⁷⁹ TSMK Emanet Hazinesi Ms. 1710, 13a [those locations common with the other *taqwīm* of the same year are highlighted]: “*dar īn sāl nizā’ va mujādala va muḥāraba va muqātala bisyār bovad va mufattinān va ahl-i sharr dar nahj-i fitna va fasād va iḥdās-i sharr gūshash konand va dar aṭrāf va javānib ahl-i sharr va fitna dar taḥrīk-i sharr va fitna majidd va sā’ ī bovand va bi-muḥāraba va muqātala qiyām namāyand va dozdīhā va zadan-i rāyhā va kaṣrat-i luṣūṣ va galaba-i ashār va runūd va avbāsh va rasīdan-i muḥirrat az īshān ba-mardom-i jalīlu’l-qadr. Akṣar dar vilāyat-i mamālik-i Mashriq va ‘Irāq va Iskandariyya va Miṣr va bilād-i Hijāz va Shām va bilād-i Turk va dasht-i Arab va Yaman va Nihāvand va Tabrīz va aṭrāf-i Gīlān va Fārs va Āzarbājān va Ṭabaristān va dar ba ‘z-i vilāyat-i Rūm va bilād-i kafara bisyār bāshad.”*

Herat, Ferghana, Sistan, Damascus, the Persian Iraq, the Hejaz, Yemen, Azerbaijan, and finally *Ardabil*.⁸⁰

At first glance, these geographical references appear to be definitive signifiers, alluding to the political and religious denominations of the region. No matter how tempting it may be to take these references as an objective inventory of the immediate historical and political context, by scrutinizing a considerable corpus of *taqwīms* one realizes that the exact same references are used over and over by different almanac-makers. Such vague and repetitive wording serves well the dual purposes of *munajjims*, who on the one hand carefully refrain, as part of their professional concerns, from referring to exact locations, yet at the same time wittily mobilize readers' opinion, expectations, and anxieties toward certain fixed interpretations.

I will delve more into the problem of dealing with the vague and repetitive language of *taqwīms* later in the chapter, but for the time being I would like to focus upon the *Ardabil* reference of the anonymous compiler, as a rare instance of the category in the entire corpus of Ottoman *taqwīms* from the mid-fifteenth to the mid-sixteenth century, it deserves a special consideration. Unlike Ardabil, the categories of Tabriz and Azerbaijan, which modern scholars might also tend to associate with the Safavids, were already among the common stock of references in earlier *taqwīms*. In the almanac prepared the year 895/1490, for instance, the anonymous compiler discusses in a separate section the fortunes of the inhabitants of Tabriz

⁸⁰ TSMK Revan Ms. 1711/10, 231a [those locations common with the other *taqwīm* of the same year are highlighted]: “*bisyārī khūnrīkhtan va koshtan dar īn sāl va zuhūr-i a‘dā va ḥarakat-i lashkarhā va ghalaba kardan-i dozdān va mufsidān va ahl-i sharr va fasād va būdan-i dozdihā va khiyānathā va qitālhā va nahb va gārat va tākht va sūkht dar ba ‘z-i jāyhā va dar īn sāl akṣar-i īn tā ‘sīrāt dar jazā‘īr-i baḥr-i Rūm va Qusṭanṭīniyya va Iskandariyya va Gazna va navāḥī-i Ṭarsūs va Āmad va ‘Ammān va Akrād va ahl-i jibāl va Hamadān va Isfahān va Ray va Harāt va Ḥalvān va Fargāna va Sijistān va Shām va ‘Irāq-i ‘Ajām va Ḥijāz va Yaman va Āzarbāyjān va Ardabīl ba-zuhūr āyad.*”

without any inflammatory remarks.⁸¹ The other locations to which this anonymous compiler dedicates individual sections as part of his annual predictions are Istanbul, Egypt, Herat, Samarqand, Shiraz, the Indian subcontinent (*Hind*), Mecca, Medina, and so on and so forth.⁸² Thus, what we see in the *taqwīm* of 895/1490 is rather a repetition of canonical geographical categories instead of a deliberate invocation. In the case of Ardabil in the two 1513 *taqwīms*, however, it is hard not to associate it with contemporary Ottoman perceptions of the Safavid problem, as it otherwise occurs so seldom in *munajjims*' compositions. Quite intriguingly, apart from the anonymous compiler of the *taqwīm* 919/1513, Qāḍī-i Baghdād, who fled before Safavid expansion and took refuge in Ottoman lands, extensively used the category in his *taqwīm* of the year 913/1508.⁸³

Tracing the use of aberrant categories throughout the extant *taqwīms* not only divulges the immediate personal and communal concerns and anxieties of their expected audiences but also hints at the currencies of ideological discourses of their times. In one of the three extant *taqwīms* of the year 909/1504, Salmān-i 'Ajam surprisingly goes into specifics by saying that during the current water triplicity a *khārijī* and *mudda ī* would rise and attain the throne as well as the crown (*tāj va tākht*) in Iraq, and would impose new customs and laws (*rusūm va āyīn-i nav*

⁸¹ TSMK Kandilli Ms. 365, 14a-14b: “**Hāl-i** [bold in the original text] *Tabrīz va ṭavābi* 'i ān: *dar nīṣf-i avval-i sāl ahvāl-i ahl-i īn bilād mā'il ba-nīkī bovad va mulūk va salāṭīn-i īn diyār rā naql va ḥarakat va safar dar bīsh āyad va sakht-dil va pur-kīn bovand va ra'āyā va 'avāmu'n-nās va akābir qavī-ḥāl va khūsh-rūzgār bovand va dar muntaṣif-i ākhir-i sāl ahvāl-i īn vilāyat mā'il ba-za'af gozarad mulūk va selāṭīn-i īn buqa' mutaraddidu'l-ḥāl va mutahayyiru'l-afkār bovand va ra'āyā va 'avāmu'n-nās va akābir nuḥūsathā va ta'khīrhā dar umūr-i khīsh mushāhada konand va zulm va sitam mulāḥaza konand.*”

⁸² TSMK Kandilli Ms. 365, 14a-16a.

⁸³ British Library Ms. Or. 6432, 35a, 51b.

nahand).⁸⁴ In a similar vein, the anonymous *taqwīm* of 911/1506, which was apparently presented to prince Selīm, interprets the expected solar eclipse of the year as the misfortune of a ruler from the Fourth Clime, more specifically, of the *Pā(di)shāh-i Tabrīz*.⁸⁵ Unlike earlier references to Tabriz as a general geographic category, this novel “padishah of Tabriz” label continued to be used in subsequent *taqwīms* from the reigns of Selīm I and Süleymān I.⁸⁶ Besides such quasi-specific remarks reflecting Ottoman preoccupations with the Safavid problem, one can also find anomalous items in the category pertaining to the “infidels.” The most obvious example crops up in the *taqwīm* of the year 925/1519 in which a certain Hāce Kemāl makes explicit remarks on the *Rīm-pāp* (the Pope of Rome), invoking the need for a campaign in the west (*batu*) and specifically toward the island of Rhodes, which comes to the fore for the first time in the entire corpus of Ottoman *taqwīms*.⁸⁷

The analysis of anomalies is easily extended to titulature and the vocabulary of sovereignty. As extant Ottoman *taqwīms* were dedicated to the reigning sultans, and in a few cases to princes aspiring to the throne, they are extremely rich in expressing notions of sovereignty ascribed at different times to Ottoman rulers. By examining the terms by which the almanac-makers addressed their patrons, it is possible to get a sense of ideological orientations and experimentations undertaken at the court. It is true that these dedicatory passages stand as

⁸⁴ TSMK Emanet Hazinesi Ms. 1712, 2b: “*khārijī va mudda ‘ī dar īn qirān dar mamlakat-i ‘Irāq ba-tāj va takht rasad va rusūm va āyīn-i nav nahand ve dar īn qirān quvvat-i ṭālī ‘-i kasānī bāshad ki ṭālī ‘-i īshān muvāfiq bāshad bā ṭālī ‘-i sāl-i qirān ya vatadi bāshad az ṭālī ‘-i sāl-i qirān.*”

⁸⁵ TSMK Revan Ms. 1711/5, 111a: “*chūn dar faṣl-i tābistān kusūfi vāqi ‘ mī shavad dar burj-i Asad dalīl ast bar za‘f va nikbat-i mulūk hāṣṣa pādishāhān-i mashriq va iqlīm-i rābi ‘ va āfat-i pāshāh-i Tabrīz vallāhu ā ‘lam.*”

⁸⁶ In much later sixteenth century *taqwīms*, one can even find direct references to, for instance, Shāh Tahmāsb.

⁸⁷ TSMK Emanet Hazinesi Ms. 1695.

just another example of the politics of patronage in pre-modern court life, where every artist and author was expected to show his/her gratitude to the patron on bombastic terms with the hope of strengthening their relationship. However, as *taqwīms*' sphere of influence was not solely restricted to the sultan, and their (astrological) contents evidently circulated, mostly by word of mouth, among contemporary court elites, the honorifics used therein for the reigning sultan became especially important and endowed *taqwīms* with a certain propaganda value.⁸⁸ Moreover, unlike other textual products that are composed quite sporadically, the annual character of *taqwīms* makes it possible to chart the contents of titulature, and changes therein, on a yearly basis.

The close examination of the titulature sections in different *taqwīms* reveals that mid-fifteenth century almanacs are richer in terms of references to celestial and eschatological themes. Especially in the case of the title *ṣāhib-qirān* ("The Master of Conjunction"), mid-fifteenth century *taqwīms* provide the only elaborate astrological discussions of this status, which became commonly accorded to Ottoman sultans. The title itself is derived from the cosmic significance of the Great Conjunction of Saturn and Jupiter, and was systematically used in the

⁸⁸ In the European context, before the popularization of print technology, the almanac makers used to read annual astrological predictions publicly to the university community before New Year's Day. See: Steven Vanden Broecke, *The Limits of Influence: Pico, Louvain, and the Crisis of Renaissance Astrology* (Leiden: Brill, 2003), 30-1. There is no direct evidence for a similar practice in the contemporary Ottoman world, yet the rise of burlesque almanac genre among the late-fifteenth and early sixteenth century Ottoman literati, who largely imitated the language of *taqwīms* to mock certain group of people in the society, is a significant evidence as to the dissemination and circulation of astrological predictions outside the palace circles. For the examples of contemporary burlesque almanac genre, see Mehmed Çavuşoğlu, "Zatî'nin Letayif'i II," *Türk Dili ve Edebiyatı Dergisi* 22 (1977), 143-161. One of the earliest examples of this genre, which became more popular from the seventeenth century onwards, is a certain Vaḫyî's narrative composed apparently in 1496 for Selīm I. See: British Library Or. 3289. For the seventeenth-century examples, see: Köprülüzade Mehmed Fuad, *Kayıkçı Kul Mustafa ve Genç Osman Hikayesi* (Istanbul: Evkaf Matbaası, 1930).

post-Mongol era to signal a ruler's aspirations and predestination to world conquest, in the mold of Alexander the Great and Chinggis Khan.⁸⁹ Although the term predates Tīmūr and was in frequent use during Seljūq times, it is mostly after Tīmūr's adaptation of the title that the term became a major component of subsequent political discourse in the Turko-Persian world. It is not entirely clear when exactly the Ottoman ruling elites decided to integrate this notion into their ideological baggage, but mid-fifteenth century *taqwīms* clearly show that the term was given ample use within the vocabulary of sovereignty.⁹⁰

The anonymous author of the *taqwīm* of the year 849/1446 extensively uses the title *ṣāhib-qirān* as the defining attribute of Murād II (r. 1421-1444; 1446-1451). In the preceding chronology, the compiler describes the Sultan as, among other things, the *ṣāhib-qirān* of all contemporary *tācdārs* ("crown-bearers") and *begs*.⁹¹ In the section where he starts expressing annual astrological predictions, the anonymous author delves into an even more thorough discussion of Murād's status as *ṣāhib-qirān*. He urges his readers to know that (*şöyle bilesiz ki*) Murād II came to the world as the *ṣāhib-qirān* of the age (*'āleme ṣāhib-kirān dūşmüşdür*) and the sound of his sword would buzz all over the globe. The celestial proof of his status is that,

⁸⁹ For the use of the term, see: Naindeep Singh Chann, "Lord of the Auspicious Conjunction: Origins of the *Ṣāhib-Qirān*," *Iran and the Caucasus* 13 (2009), 93-110.

⁹⁰ In the course of the sixteenth century, the term began to be heavily used in non-courtly, popular historical and literary production as well. For the use of the term in a *masnawī* written for Selīm I, see Derviş Işık Şemsi, *Deh Murg-i Şemsi*, ed. Mahmut Kaplan (Manisa: Celal Bayar Üniversitesi, 2003). For the extensive deployment of the term in a versed chronicle written by Mevlānā 'Īsā for Süleymān, see Barbara Flemming, "Şāhib-Ḳirān und Mahdī: Türkische Endzeiterwartungen im ersten Jahrzehnt der Regierung Süleymān," in *Between the Danube and the Caucasus*, ed. György Kara (Budapest: Akadémiai Kiadó, 1987), 43-62.

⁹¹ Oxford Bodleian Library Hunt. Donation 46, 3a: "*Sultān Murād ḥān bin Muḥammed ḥān pādişāh olalidan berü...ki cemī'-i Osmān oğullarınıñ faḥri ve selçukıdır ve pādişāhlarıñ güzīdesi ve yegānesidir ve 'ālem ḳavminiñ ḥayrlısı ve zamāne begleriniñ ve tācdārlarınıñ ṣāhib-kirānidur.*"

according to the horoscope of his accession to the throne, the ascendant was the 28th degree of the sign Virgo. The ruling planet of this sign is Mercury and, at the time of his (second) accession to the throne, Mercury was extremely auspicious. The anonymous *munajjim* does not explain it here explicitly, but as assigning the malefic planet Mars as the ruling planet of the ascendant of Mehmed II's (first) accession to the throne in the year 1444, he explicitly contrasts the fortunes of Murād's second rule to Mehmed's brief first rule. All in all, the celestial indicators are clear proof for Murād II's being the *şāhib-qirān* of the age.⁹²

The use of *şāhib-qirān* never fully disappeared in the titlature sections of later *taqwīms*, yet it also never enjoyed as much prominence as in the *taqwīm* of the year 849/1446—no matter how contrived the astrological reasoning was. In addition to the term *şāhib-qirān*, new notions

⁹² Ibid., 16b [the parts in bold are written with red ink in the original text. The underlined parts are for emphasis]: “ve **'ale't-tahşış** huşuşiyet birle bizüm padişahumuz **Sultān Murād hān** üzerine olsun ... ki dā'imā ra'yyet(i) hoş dutar ve nevāht ider ve şefkat ve merhamet nazarlarıyla nazar ider ve dād virür ve 'adl gösterür ve cemī' yaradılmış halka hayr şanur ve ihsānlar kıılır ve cümle 'ālem halkı 'adli ve āmānı sāyesinde āsūde ve emīn ve rāhat gezerler gice ve gündüz leyl ve nehār devlet ve 'ömri izdiyādına çok çok du'ālar iderler. Hāk te'ālā müstecāb ide inşā'allāh te'ālā ve hāk te'ālā 'ömrüne çok çok yıllar berekātlar virsün āhir ve 'ākıbet hayr olsun sa'ādetle ve devletle mansūr ve muzaffer mü'eyyed ve mü'ebbed dūnya türdukça türsun ve devletle ezeli ve ebedi ve sermedī çok çok yaşasun zīrā kim cemī' yaradılmış halk hāzret-i 'aliyyelerinden şākir ve zākir ve rāzıdur hāk te'ālā hāzret-i 'aliyyelerinden rāzı olsun āhiri ve 'ākıbeti hayr olsun imān ve islām ve Kurān-ı 'azīm yoldaş olsun ve cemī' yaradılmış halkuñ du'āsı gice ve gündüz leyl ve nehār bunuñ üzerinedür maqbūl ve müstecāb olā...**ve dāhi** şöyle bilesiz kim pādīşāh-ı 'ālem ve hūdāvend-i benī Ādem ve a'del ve müşfik ve ekrem Sultān Murād hān hāzretleri 'āleme şāhib-kirān dūşmüsdür gerekdir kim etrāf ve eknāf-ı 'ālemde şiyt ve āvāzesi ve kılıcı şarken ve garben ve ba'den ve qurben ve tahten ve fevken ve berren ve bahren çinreye ve devlet-gür [devlet-gir]? ola ve himmet(i) 'ālī ve kadri yüce olub pādīşāhumuz Sultān Murād hān pādīşāhādesiyle Sultān Muhammed hān birle çok çok yaşasunlar ... Şöyle bilesiz kim Sultān Muhammed hān tāli'i cülūs idüb tahta oturduğı vakte 'Akreb burcuydi ve yıldızı Merrīhdur ve ama pādīşāhumuz Sultān Murād hānıñ **tāli'i cülūs** ve duhūl bildi kim Brūsā şehrine girüb saltanat tahtına geçüb serir-i memleketde karār itdiği vakte Sünbüle burcunuñ 28 derecesiydi ve 24 dakıkasıyla Sünbüle burcunuñ ve Cevzā ve saltanat burcunuñ ıssı Utāridir ve Utārid ol vaqt be-gāyet kuvvetliydi ve Zühre pādīşāh tāli'idür...ve şöyle bilesiz bu sebebdendir kim pādīşāhumuz hāzretleri 'azzama'llāh iqdārahum wa'a'la'llāh shānahum' 'ālemde şāhib-kirān olduğına wallāhu a'lam.”

were gradually integrated at different times. The *taqwīm* of the year 858/1454, for instance, employs for the first time the term *Mehdīyyü'z-zamān* (the expected Messiah of the age) – among many other titles – for the new conqueror of Constantinople, Meḥmed II.⁹³ In his *taqwīm* for the year 902/1497, ‘Abd al-Karīm b. Mawlānā Sinān unusually adopts the term *sālār-i memālik-i Irān* (the vicegerent of the lands of Iran) for Bāyezīd II.⁹⁴ A few years later, Salmān-i ‘Ajam described Bāyezīd II as the *quṭb-i aflāk-i ḥaqīqat* (the pole of the spheres of truth).⁹⁵ Salmān’s association of *quṭb* status with Bāyezīd II seems to be the earliest expression of this notion, which eventually became one of the defining attributes of the sultan, widely used by contemporary literati.⁹⁶ All of these titles and notions of sovereignty might, of course, be interpreted as stylistic preferences of their authors, unworthy of much attention. However, given contemporary elites’ apparent attention to the contents of *taqwīms*, the underlying propaganda value and ideological currency of sultanic titles passing in these texts should be not disregarded at all. As *munajjims* cultivated their authority as experts in celestial and therefore divine knowledge, the celestial significance they ascribed to the reigning sultans might have carried considerable significance among the targeted audience, the elites atop the Ottoman state and culture.

IV. 4. *Taqwīms* and Ottoman History Writing

As shown, almanacs evince important dissimilarities stemming from the identities of their

⁹³ SK Nuruosmaniye Ms. 3080, 18b: ‘*ale’t-taḥṣīṣ ḥuṣūṣiyet birle bizüm padişahımız üzerine olsun....ki pādişāh-ı ‘ālem ve ḥüdāvend-i benī Ādem malikū’r-rikābi’l-ümem seyyidü selāfīnū’l-‘Arab ve’l-‘Acem İskender-i devrān ve Süleymān-āvān ve şāhib-i ‘ālem Ebū’l-feth bi’l-yümn ve’l-iḳbāl ve mes’ūd-ṭālī’ ve meymūn-ṭal’at ve ḥoceste-baḥt ve hümāyun-devlet maḥmūdu’l-fazl ve şādīku’l-kavl ve Mehdīyyü’z-zamān olmağına cemī’ gāzī pādişāhlariñ mufahḥiridir.*’

⁹⁴ TSMK Bağdat Ms. 314, 2b.

⁹⁵ TSMK Emanet Hazinesi Ms. 1712, 2a.

⁹⁶ See *Kutb-name*, ed. İbrahim Ongun and İsmet Parmaksızoğlu (Ankara: TTK, 1980).

compilers and/or the immediate historical-political contexts in which they were composed. These divergences extend, over time, to general structural changes in the contents of *taqwīms*. In terms of language, for instance, there is a shift from the mid-fifteenth to the late-sixteenth century.⁹⁷ While most extant *taqwīms* from the mid-fifteenth century were written in plain Turkish, almost all surviving almanacs from the reign of Bāyezīd II—which number over 30—are in Persian, likely reflecting a cultural reorientation at the court of the latter. Subsequently, as a result of the wider *Ottomanization* process of the cultural and bureaucratic life in the course of the sixteenth century, the language of *taqwīms* gradually shifts again, from Persian to a refined Ottoman Turkish.⁹⁸

As with language, the contents of *taqwīms* also underwent a serious transformation from the mid-fifteenth century over the course of the sixteenth. The surviving mid-fifteenth-century almanacs, which recall the late-fourteenth-century Eretna *taqwīm*, constitute compendia of useful and entertaining knowledge, combining history, astronomy, astrology, and divination. In addition to the detailed chronology tables summarizing the history of the world, one can find almost side-by-side mathematical explanations of horoscope calculations and vernacular statements of omen divination. By late-fifteenth and early-sixteenth century, however, many of these more demotic

⁹⁷ For the details of this language shift, see Appendix C.

⁹⁸ For the Ottomanization of the cultural and bureaucratic life in the sixteenth century, see Cornell H. Fleischer, *Bureocrat and the intellectual in the Ottoman Empire: the historian Mustafa Ali (1541-1600)*. (Princeton: Princeton University Press, 1986); Gülru Necipoğlu, “A Kanun for the State, A Canon for the Arts: Conceptualizing the Classical Synthesis of Ottoman Art and Architecture,” in *Soliman le Magnifique et son Temps: actes du Colloque de Paris*, ed. Gilles Veinstein (Paris: Documentation française, 1992), 195-215. For the increased use of Turkish in scientific texts from the mid-sixteenth century onwards, see İhsan Fazlıoğlu, “Osmanlı Döneminde ‘Bilim’ Alanındaki Türkçe Telif ve Tercüme Eserlerin Türkçe Oluş Nedenleri ve Bu Eserlerin Dil Bilincinin Oluşmasındaki Yeri ve Önemi,” *Kutadgubilig Felsefe-Bilim Araştırmaları* 3 (2003), 151-184.

components were on the verge of decline, as the contents of annual *taqwīms* became increasingly mathematicalized and technicalized. While almost none of the mid-fifteenth century *taqwīms* have detailed ephemeris tables, the almanacs from the time of Bāyezīd II onwards often include them. The individual charts on different divinatory practices such as dream interpretation, palmoscopy, and Aristotelian discourses on the conducts of wars and/or friendships were also gradually purged from the *taqwīm* texts.

This transformation in the structure of the genre is best traced through examination of the reverse-chronology sections. Before discussing the historical context of this transformation, it remains to lay out first the contents of these chronological lists.

It is not, however, the primary aim of this section to evaluate the authenticity of the historical information therein or its significance for early Ottoman history. In the 1950s and 60s, the fifteenth-century Ottoman *taqwīms* containing reverse-chronology tables attracted the attention of Turkish scholars, and some of these lists were published as separate editions.⁹⁹ In the absence of authentic historical materials and archival documents from the early fifteenth century, Ottoman historiography welcomed these tabulated lists of historical events and used their data to supplement the available knowledge of early Ottoman history. Osman Turan and Nihal Atsız pioneered the use of these sources for historical purposes by publishing the chronology tables of some almanacs from the first half of the fifteenth century. Drawing mostly upon the work of Turan, Halil İnalçık was the first to import this new information into his study of the reigns of

⁹⁹ See: Osman Turan, *İstanbul'un fethinden önce yazılmış tarihî takvimler* (Ankara: TTK Basımevi, 1954); Nihal Atsız, "Fatih Sultan Mehmed'e Sunulmuş Tarihi Bir Takvim," *İstanbul Enstitüsü Dergisi* 3 (1957), 17–23; *idem.*, *Osmanlı tarihine ait takvimler* (İstanbul: Küçükaydın Matbaası, 1961); *idem.*, "Hicri 858 Yılına Ait Takvim," *Selçuklu Araştırmaları Dergisi* 4 (1975), 223–83.

Murād II and Meḥmed II.¹⁰⁰ Besides incorporating into his text the historical details introduced by the almanacs, such as the details about the first enthronement of Meḥmed II or Ottoman-Karamanid relations in the first half of the fifteenth century, İnalçık also strove for an inter-textual analysis of *taqwīms* and contemporary chronicles. In that regard, his most significant contribution was the discovery that some late-fifteenth-century chronicles and historical narratives had used the almanacs as sources. According to İnalçık's study, Uruc Bey's chronicle and at least one of the anonymous histories of the Ottoman dynasty written in the late fifteenth century drew upon the tabulated historical data of the almanacs.¹⁰¹ In a similar vein, Victor Ménage also demonstrated, a few years after İnalçık, that Neşrī (d. <1520), another dynastic historian of the Ottoman house, used the chronology sections of *taqwīms* as a source.¹⁰² Although both İnalçık and Ménage focused only upon the chronology sections of the almanacs for historiographical purposes and ignored the remaining astrological contents, as their predecessors Turan and Atsız had, it was Halil İnalçık who percipiently asserted that “the *munajjims* in the [Ottoman] court can be regarded as the first *vak'anüvīs*.”¹⁰³

İnalçık, of course, does not mean here the office of court historian, which, as is well-established, did not come into being until the late seventeenth century.¹⁰⁴ His association of *munajjims* with recorders of chronology and writers of history is worth pursuing indeed, for the

¹⁰⁰ Halil İnalçık, *Fatih Devri Üzerine Tetkikler ve Vesikalar* (Ankara: TTK, 1954).

¹⁰¹ Halil İnalçık, “The Rise of Ottoman Historiography,” in *Historians of the Middle East*, ed. Bernard Lewis and P.M. Holt (London: Oxford University Press, 1962), 152-167.

¹⁰² V. L. Ménage, “The Beginnings of Ottoman Historiography,” in *Historians of the Middle East*, ed. Bernard Lewis and P.M. Holt (London: Oxford University Press, 1962), 168-179; also see his *Neshri's History of the Ottomans: the Sources and Development of the Text* (London: Oxford University Press, 1964).

¹⁰³ İnalçık, “The Rise of Ottoman Historiography,” 158.

¹⁰⁴ Lewis V. Thomas, *A Study of Naima* (New York: New York University Press, 1972).

authority of *munajims* as experts of the science of the stars, and hence the reckoning of time and chronology, has a long history. Despite the variety of ways of keeping time in past cultures, its passing (in, e.g., years, seasons, months, days, or hours) was in principle measured in reference to the movement of planets, particularly that of the sun and the moon. The history of astronomical observation was always closely linked to the history of reckoning time; and, as discussed in earlier portions of the dissertation, the broader definition of horological reckoning includes all kinds of temporal computations ranging from establishing a year's calendar to determining auspicious moments to embark upon an activity. In addition to the regular and relatively easily observable movements of the luminaries, the configuration of other planets was also considered a key component in computing time for different purposes. The conjunction astrology and the accompanying genre of astrological histories, as mentioned in especially the first chapter, could be regarded as examples of such computations.

As experts in tracking the motions of celestial objects, the *munajjims* in the service of early Ottoman sultans must have been also responsible for computing and recording "time" in the broadest sense of the word. We do not have any surviving text by a *munajjim* from the Ottoman court prior to the fifteenth century. Yet the surviving *taqwīms* from the first decades of the fifteenth century are perfect pieces of evidence of the *munajjims*' wide temporal responsibilities, past, present, and future. In addition to chronologically tabulating major events since the Creation, *munajjims* undertook a variety of tasks such as preparing the calendar of the year, specifying the conversion of dates according to different calendric systems, composing arduous electional tables (*ikhtiyārāt*) for acts to do or avoid on certain days or at certain times, and spelling out forecasts/astrological judgments (*aḥkām*) as to the fortunes of the upcoming

year.

The tabulated lists of historical events found in the first few folios of some of the fifteenth- and early-sixteenth-century almanacs are composed of brief entries, each referring to a major political, religious, or natural incident in history. Events are dated (with a few exceptions) not by the Hijrī year in which they occurred, but as having happened so many years before the almanac was drawn up. Each entry is cast in the form, “[This many] years have elapsed since...” (“...*dan berü X yıldır*”/“*az gāh-ı...X sāl ast*”) The entries are usually grouped under different headings, reflecting the historical understanding of their compilers—which proves quite similar to the contemporary or subsequent Muslim writers of universal history such as Kh^wāndamīr (d. 1535 or 1536) in his *Habīb al-siyar* or Muṣṭafā ‘Ālī (d. 1600) in the *Kūnhü’l-aḥbār*.¹⁰⁵ Accordingly, the first section of the chronologies in the almanacs is devoted to the Creation of the universe and the canonical history of pre-Islamic prophets. In this section, the prophet Idrīs is almost always given a special importance as the originator of the *scientia astrorum*, and the date the science of the stars was “descended” (“*ilm-i nüccüm İdrīs’e ineli*” / “*nuzül-i ‘ilm-i nujüm ba-İdrīs*”) to him is specifically mentioned. The next section covers the life of the Prophet and early Islamic history through the end of the Abbasids. Despite the temporal span of this period, this section in the almanacs is usually the least detailed one and only covers—unless the sub-section on major Sufis and ‘*alims* is incorporated here—the birth and death of the Muḥammad, the four Rightly Guided Caliphs, Ḥasan b. ‘Alī, Ḥusayn b. ‘Alī, and a few Abbasid caliphs from the early

¹⁰⁵ For the universal historical vision and classification of epochs in Kh^wāndamīr’s *Ḥabīb al-siyar*, see Shahzad Bashir, “A Perso-Islamic Universal Chronicle in its Historical Context: Ghiyas al-Din Khwandamir’s *Habib al-siyar*,” in *Historiography and Religion*, ed. Jörg Rüpke et al. (Berlin: Walter de Gruyter, 2015), 207-223. For Mustafa Ali’s vision of history, see: Cornell H. Fleischer, *Bureocrat and the intellectual in the Ottoman Empire*, esp. 235-253.

part of the dynasty. The Umayyads are almost always omitted and the entry on Karbala is followed only by the rise (*khurūj*) of Abū Muslim. Following this section comes the most comprehensive list tabulating the political and natural events in the Islamic East during the Saljuq, Mongol, and post-Mongol eras. The history of the Ottoman dynasty is generally appended to this section, and the entries on Ottoman history begin with the emergence (*khurūj*) of ‘Osmān Ghāzī and end with the most recent major event.

Although this scheme is followed as a general principle in different almanacs and the set of events covered is quite standard, it is worth noting that chronology lists are not entirely identical. Firstly, the discrepancy in the amount of elapsed years is a constant matter of conflict. Especially when events from distant past are in question, such as the Creation or history of pre-Islamic times, the discrepancies grow even larger. Given the difficulty of establishing an accurate chronology for pre-Islamic history, a fact attested by medieval scholars like al-Bīrūnī themselves; it is not at all unexpected to find serious inconsistencies between the chronological lists of different almanacs.¹⁰⁶ Yet sometimes such temporal discrepancies occur even in the records of events from the more recent past. For instance, as to the birth of Meḥmed II, the *taqwīm* of the year 843/1439 says that eight years have passed, thus establishing the birth year of the prince as 835; whereas for the *taqwīm* of the year 856, twenty-three years have passed since the birth of Mehmed II, leading to a two lunar-year discrepancy between the two *taqwīms*.¹⁰⁷

¹⁰⁶ In his encyclopedic work on different chronology systems, al-Bīrūnī often reminds of his readers the difficulty to establish consistency among dating systems. See: Al-Bīrūnī, *Kitāb al-āthār al-bāqiya ‘an al-qurūn al-khāliya*, tr. C. E. Sachau as *The Chronology of Ancient Nations* (London: 1879), in *passim*.

¹⁰⁷ Cf. Atsız, *Osmanlı Tarihine Ait Takvimler*, 105 and TSMK Bağdat Ms. 309, 3a. One can argue here that one of these two *taqwīms* might have used the lunar calendar in calculating the

Apart from these discrepancies in the number of years elapsed, the chronology tables also vary depending with respect to the scope of events covered. Some almanacs are much more comprehensive than others, recounting a greater range of political and natural occurrences. Thus it is not unusual to find a reference to a historical incident unrecorded by other almanacs. For the contents of the section on biblical and prophetic history, the variety is quite limited and almanacs basically repeat the same list, starting with the Creation and/or fall of Adam from the heavens and covering other prophets up to Muḥammad. In the section on early Islamic history, too, the list is more or less standard. With the exception of the *taqwīm* of the year 843/1439, there is not a single entry on the reigns of the Umayyad caliphs. The same *taqwīm* is also evidently the only one that addresses (briefly) the Samanids, Buwayhids, Khwarizm-shahs, and the Atabegs.¹⁰⁸ Almanacs also vary relative to the inclusion of events related to the politico-cultural and environmental history of the Turko-Mongol Islamic East. The accession of Abū Sa‘īd Bahādur Khān (d. 1335), for instance, is recorded only in three *taqwīms*, while all except the two lists the enthronement of Barqūq (d. 1399).¹⁰⁹ In particular, with regard to the recent Anatolian and Ottoman past, variety is almost a norm. The outburst of plague in the Karasi region, which apparently occurred in the year 749/1348-9, is only recorded by the *taqwīm* of 824/1421 and is disregarded by the rest.¹¹⁰ In a similar vein, the full solar eclipse and the appearance of a celestial novelty that allegedly took place in the year 790/1388 are only recorded in the *taqwīm* of

age of the sultan, while the other employed the solar one. But even this could not help to explain the chronological difference.

¹⁰⁸ Atsız, *Osmanlı Tarihine Ait Takvimler*, 92.

¹⁰⁹ The two *taqwīms* that did not record Barqūq are the 894/1489 *taqwīm* at TSMK Bağdat Ms. 310, and the 900/1495 *taqwīm* at TSMK Revan Ms. 1711/11, as the chronology tables in these two *taqwīms* are only related to the history of the Ottoman dynasty.

¹¹⁰ Atsız, *Osmanlı Tarihine Ait Takvimler*, 25.

835/1432.¹¹¹ Likewise, the early Ottoman conquests in Balkans and Anatolia do not enjoy the same degree of attention in each almanac. These examples could be multiplied with further discrepancies, and as such reveal what the individual almanac-maker deemed important and unimportant when compiling his list. The selections of the almanac-makers could be further tied to their geographical affiliations and professional backgrounds, as some of them might have been simultaneously affiliated with different courts in the Rum-Anatolia region in the first half of the fifteenth century that might have equipped them with local information on adjacent regions. The death of İlyās Beg, the son of Menteşe, for instance, is only mentioned in the *taqwīms* of 856/1452 and 858/1454.¹¹² In a similar vein, the fire in Samsun in 824/1421 is only recorded by these two *taqwīms*. The death of Yā‘qub Çelebi b. Germiyan is also deemed important only by the compiler of the *taqwīm* of 835/1432.

Having outlined the main characteristics of the chronology sections integral to certain—not all—fifteenth century Ottoman *taqwīms*, one now raises two important questions earlier scholarship has largely neglected: What might be the reasons for incorporating these chronology sections in the first few folios of some almanacs and why did these tabulated lists of historical events begin to disappear by the early sixteenth century?

As mentioned several times before, scholarship on earlier Ottoman *taqwīms* focused almost exclusively on chronology tables and disregarded the remaining, much larger astronomical and astrological sections, unfortunately reinforcing the assumption that *taqwīms* were only produced for chronological purposes and erroneously implying that all almanacs

¹¹¹ *Ibid.*, 69.

¹¹² Nihal Atsız, “Fatih Sultan Mehmed’e Sunulmuş Tarihi Bir Takvim,” 20; *idem.*, “Hicri 858 Yılına Ait Takvim,” 262.

included tabulations of historical events. Quite contrarily, however, a systematic investigation of the surviving *taqwīms* from the fifteenth through the seventeenth centuries clearly shows that compared to the number of *taqwīms* without chronological tables, the ones with tabulated historical information are indeed quite limited. In around hundred *taqwīms* I have personally examined, there are no more than sixteen with chronology sections. In fact, from the late fifteenth century onwards, the chronology sections became sparse and by the first half of the sixteenth century they almost entirely disappeared. The reasons for this dwindling are hard to reconstruct; it might be a useful starting point to discuss the initial use of historical chronologies in *taqwīms* and their eventual elimination as a contribution to debates in the scholarship about the rise of Ottoman history writing in the late fifteenth century and the changing dynastic claims of the Ottoman establishment.

As we have already seen, the use of chronological tables in annual almanacs is not an Ottoman innovation. In addition to the Eretna *taqwīm* mentioned above, there is a surviving Rasulid *taqwīm*, currently preserved in the Bibliothèque nationale de France, which went unnoticed in Varisco's study on Rasulid almanacs. This *taqwīm* was produced in 841/1437 and in both size and comprehensiveness its chronology section surpasses both the Eretna and Ottoman *taqwīms*.¹¹³ The compiler of this lengthy almanac covers in over seventy folios the detailed history of Yemen from 439/1047-1048 onwards with a special emphasis upon the history of the Rasulid dynasty. In the first eight folios where the anonymous compiler of this *taqwīm* lists the names and reigns of rulers from diverse civilizations and historical traditions, the author perfectly exemplifies the universal historical vision embedded in almanacs. Accordingly,

¹¹³ BnF Arabe Ms. 4609.

he first starts with a biblical history that ends with a short entry on the prophet Moses. After this section comes the list of rulers from the Banu Isra'il. Israelite rulers are followed respectively by Babylonian, Persian, Greek, and Roman kings. Finally he jumps to the history of the Prophet and the caliphs, and situates the history of Yemen and the Rasulid dynasty within this framework. The wording he uses, to wit, "the transfer of rule" (*intiqāl al-mulk*) from one civilization to another, clearly reflecting the almanac-maker's understanding of the unfolding of history, was fairly typical among scholars in his time.¹¹⁴

As the Eretna and Rasulid examples manifest, chronology tables, far from being distinctive to the Ottomans, were among the favorite components of almanac-makers across the Islamicate world in the fourteenth and fifteenth centuries. The almanac-makers often prepared their own tables by simply reproducing the lists at their disposal after making necessary calculations based upon the year they lived in. For instance, the *taqwīm* of the year 842/1439, produced by a certain Ibrāhīm b. shaykh al-munajjim wa'r-rammāl, was likely used by another *munajjim* 44 years after its composition, for on top of each date recorded in the chronology list of this *taqwīm* is there a marginal note, showing the new total number of years (added by 44) that have elapsed.¹¹⁵ It is thus not surprising not to find much creativity among *taqwīms* when the historical chronology sections are in question.

It is still worth asking though whether this period is in fact exceptional in terms of the number and extent of historical chronology sections. The growing importance attached to genealogical debates in the Eastern Islamic world from the thirteenth century onwards would have provided fertile ground for such inquiries. The genealogical debates in the period served the

¹¹⁴ BnF Arabe 4609, 2b-8b.

¹¹⁵ BnF Supp. Pers. 367, 2b-4a.

concerns of ruling dynasties in the post-Mongol Islamic East in need of legitimizing their authority in the absence of universally accepted principles of rule. The caliphal ideal had been demolished by the fall of the Abbasid dynasty at the hands of Hülegü Khan in 656/1258, and the later dissolution of Chinggisid rule made the bloodline of the *Altan Urugh*, the “Golden Family” of Genghis Khan, less directly conclusive. The genealogical and chronological tables of almanacs helped connect the history of a ruling dynasty to a prestigious, universal, and sacred past.¹¹⁶ As we have already seen in the surviving *taqwīms* from the Rasulid, Eretna, and Ottoman contexts, the history of each respective dynasty is always situated within the *taqwīm*’s historical scheme as a culmination of the unfolding of universal history, granting the ruling dynasty a divinely ordained status.

Although the genealogical agendas of the post-Mongol world may have played a role in the growing incorporation of chronological tables into almanacs, it should also be noted that the inclusion of historical information in almanacs was a much older tradition. Unfortunately no *taqwīm* survives from earlier centuries with a historical chronology section to allow us a comparison. Nonetheless, we should recall Bīrūnī’s saying in his *Tafhīm* that almanacs in those times did contain lists of historical information. More important than this little piece of information, Bīrūnī argued that the main motive of almanac-makers in including such chronological sections was “the intellectual pleasure found in such things.”¹¹⁷

¹¹⁶ This paragraph is based on Evrim Binbaş, “Structure and Function of the ‘Genealogical Tree’ in Islamic Historiography,” in *Horizons of the World: Festschrift for İsenbike Togan*, ed. Evrim Binbaş and Nurten Kılıç-Schubel (İstanbul: İthaki, 2011), 465-544; Cornell H. Fleischer, *Bureaucrat and Intellectual in the Ottoman Empire*, 273-293; John E. Woods, *The Aqqyunlu: Clan, Confederation, Empire*. Revised and Expanded Edition (Salt Lake City: The University of Utah Press, 1999), 1-23.

¹¹⁷ Bīrūnī, *The Book of Instruction in the Elements of the Art of Astrology*, 188.

Bīrūnī's words are invaluable as they remind us of the importance in medieval Islamic *belles-lettres* of the pedagogical motives and intellectual pleasures underlying the employment of a certain literary device or composition. As we have already seen, the use of tables and charts was favored in different literary genres mostly for the practical reason of presenting the required information to the reader in a succinct and easily understandable fashion. Here, tabulating important historical points concerning the prophets and distinguished rulers must have served similar concerns of practicality. Yet, as Bīrūnī underlines, the type of the information is as important as its form. Although we lack serious studies in the perception and recognition of history as a literary activity in past cultures, it is self-evident that the knowledge of major past events was considered an integral part of courtly and intellectual life, and the Ottoman *munajjims* maintained this tradition in their *taqwīms* through chronological tables.

We still need to explain, however, why in the early sixteenth century these chronology tables were on the verge of decline. Did they become obsolete in the eyes of their readers, particularly the rulers? Did *munajjims* become uninterested in simply repeating the same information each year, mechanically adding one more year to the sum of years elapsed? Is there perhaps a correlation between the simultaneous rise of dynastic history-writing and decline of annalistic chronology tables?

Given the dearth of contemporary sources illuminating the reception of *taqwīms*, it is quite difficult indeed to provide substantial answers for each and every question. We can nevertheless correlate the changes in the contents of *taqwīms* to the changing dynamics of political and literary culture at the Ottoman court in the late-fifteenth and early-sixteenth centuries.

The general consensus in the relevant historiography about the rise of Ottoman history writing maintains that during the reign of Bāyezīd II, a new historical consciousness arose, ushering in the composition of the first Ottoman dynastic histories.¹¹⁸ Although there were earlier Ottoman histories, written mostly in Persian verse in the mid-fifteenth century, through the sustained attempts of Bāyezīd II gained the history writing a new momentum from the late fifteenth century onwards.¹¹⁹ This process had seemingly two different phases. During the 1480s and early 1490s, the type of dynastic histories that Bāyezīd II supported, such as the works of Neşrī or Rūhī, were interested in the simple recounting of events in plain Turkish with an annalistic format.¹²⁰ These earlier examples of dynastic histories also attempted to portray the Ottomans as heirs to the Seljuq dynasty. Thus, in terms of both style and contents, the historical chronology sections of *taqwīms* were in harmony with contemporary dynastic histories.

By the early sixteenth century, however, due partly to the shifting cultural orientations of the court and partly to the growing desire of Bāyezīd II to represent his rule and dynasty as the most prestigious—both politically and culturally—among contemporary houses, leading literati were commissioned to compose comprehensive histories of the Ottoman dynasty in eloquent and

¹¹⁸ In addition to İnalçık and Ménage cited above, see: Cemal Kafadar, *Between Two Worlds: The Construction of the Ottoman State* (Berkeley: University of California Press, 1995), 97; Mehmet İpşirli, “The Ottoman historiography,” in *The Great Ottoman-Turkish Civilization*, ed. Kemal Çiçek (Ankara: Yeni Türkiye Yayınları, 2000); Murat Cem Mengüç, “Histories of Bayezid I, historians of Bayezid II: Rethinking late fifteenth-century Ottoman historiography,” *Bulletin of the School of Oriental and African Studies* 76/3 (2013), 373-389.

¹¹⁹ For the mid-fifteenth century Ottoman historical texts written in Persian, see Sara Nur Yıldız, “Ottoman Historical Writing in Persian, 1400-1600,” in *Persian Historiography*, ed. Charles Melville (New York: I.B. Tauris, 2012), 436-502.

¹²⁰ Fleischer, 235.

learned style.¹²¹ Bāyezīd’s project bore impressive fruit: İdrīs Bidlīsī (d. 1520) composed the *Hasht Bihisht* in elaborate Persian, and Ibn Kemāl produced an Ottoman history in high Turkish prose. Unlike earlier annalistic dynastic chronicles and the chronology sections of almanacs, these novel works were historically more analytical, as well as linguistically more elegant.¹²² Besides the stylistic and linguistic elements, the new dynastic history writing also gave voice to the emboldened claims of the dynasty that increasingly demarcated itself from the simple Seljuq legacy and emphasized instead the unmatched and inevitable success of the Ottoman house. Literary tastes’ moving away from annalistic presentations and the innovative historiographical attempt to distinguish Ottoman rule by detaching the history of the Ottoman dynasty from the earlier Rum-Anatolian tradition, thus, stands as a working hypothesis to explain the gradual decline of the chronology sections of *taqwīms*.¹²³

IV. 5. *Taqwīms* and Contemporary Recognition

Despite the fact that historical chronology sections and detailed charts for various divinatory practices eventually disappeared from *taqwīms*, astrological predictions remained resilient and came to characterize the genre. As we have already seen, the majority of studies on

¹²¹ Vural Genç, “Acem’den Rum’a: İdris-i Bidlisi’nin Hayatı, Tarihçiliği ve Heşt Behişt’in II. Bayezid Kısmı (1481-1512),” (Ph.D. Dissertation, Istanbul University, 2014); Christopher Markiewicz, “The Crisis of Rule in Late Medieval Islam: A Study of İdris Bidlisi and Governance at the Turn of the Sixteenth Century”, (Ph.D. Dissertation, University of Chicago, 2015).

¹²² Fleischer, 239.

¹²³ There are two surviving *taqwīms* produced in the first decade of the sixteenth century that have chronological sections on the House of Osman, the 913/1508 *taqwīm* of Qāḍī-i Baghdād and the 915/1510 *taqwīm* of ‘Abd al-Raḥmān *munajjim*. But as the first one was composed by a newcomer to the Ottoman court and the second compiled for Bāyezīd’s favorite son Aḥmed in Amasya, they might not have been aware of changing trends at the imperial court.

Ottoman *taqwīms* gives precedence to their non-astrological components, which has inevitably led to the rise of misconceptions about the real function and value of the *taqwīm* genre. The literature on the chronology tables, for instance, deliberately presents these tabulated lists of historical information as the only significant part of *taqwīms* and completely ignores the wealth of astrological materials by saying that such “superstitious” elements—which were among the *taqwīms*’ *raison d’être*—have nothing to offer serious historical inquiry.¹²⁴ As a result, the rich prognosticative contents and their potential use for historians have escaped the eyes of modern scholars.

Aside from the latent desire not to besmirch the Ottoman past with astrological “superstition” and “irrationality,” the established scholarly convictions about the insignificance of these sections are also justified on the ground that astrological contents of *taqwīms* are “near-platitudes, equivocations, and the artful hedging of bets,” making them unreliable, if not worthless, as historical sources.¹²⁵ Considering the often boilerplate progression of astrological predictions in *taqwīms*, this objection is not entirely unfounded. Yet, it would be a huge waste of primary sources to categorically dismiss a written tradition that steadily filled pages and pages over five centuries.

The astrological and prognosticative materials in the surviving *taqwīms* can be classified roughly into two groups. The first group, which we can define as “year-specific” contents, includes the detailed annual astrological predictions (*aḥkām-i sāl*) that *munajjims* prepared on the

¹²⁴ Turan, 8.

¹²⁵ This is also true for early modern European almanac-prognostications. See: Robin Bruce Barnes, “Hope and Despair in Sixteenth Century German Almanacs,” in *The Reformation in Germany and Europe: Interpretations and Issues*, ed. Hans R. Guggisberg and Gottfried G. Krodel (Sonderband Washington: Gütersloh, 1993), 440-461.

basis of the horoscope of the intended year. What I mean here by “specificity” is not that the astrological forecasts are explicit about specific individuals or events, but rather these predictions are theoretically produced by the *munajjim*’s interpreting the horoscope of a particular year after calculating the celestial positions at the exact moment the sun enters Aries (i.e., the year-transfer, *tahvīl-i sāl*). In this first group we include the brief astrological judgments accompanying the monthly calendar tables, as *munajjims* also calculated and tabulated the horoscope of each month (i.e., the Sun’s entrance into a new sign) with a few remarks on the general *aḥkām* of the month. The second group consists of a wide array of prognosticative materials, ranging from long and tedious electional tables listing acts to perform and avoid at certain times, to individual diagrams and brief explanations for different sorts of divinatory techniques including dream interpretation or palmomancy, i.e. prognostication derived from the observation of bodily spasms and jerks. The contents of these prognosticative instructions are not strictly tied to a specific year and are usually incorporated by the fifteenth century almanac-makers to enrich and “anthologize” their occult compendia.¹²⁶ Moreover, the first group of astrological contents is almost always an integral part of annual *taqwīms*, whereas the inclusion of any or all of the components from the second group is at the discretion of the *munajjim*.

As we have already mentioned, astrological predictions about the upcoming year are expressed on vague terms and modern historians must be aware of the risks of treating their contents as transparent. As astrology was (and still is) a highly conservative practice with quite

¹²⁶ I borrowed the term from David Roxburgh, who identified in the late medieval Persian artistic context an “anthologizing mode”, “a practice of making digests and compendia on different topics that peaked under the Timurids and their contemporary dynasts.” See David Roxburgh, *The Persian album, 1400-1600: from dispersal to collection* (New Haven: Yale University Press, 2005).

restricted, rigid interpretive mechanisms, any particular reference in a single *taqwīm* does not always need to be related to a burning issue in the immediate historical context.

One method proposed above to deal with the problem of vagueness and repetitive character of astrological predictions/references is to examine *taqwīms* as a cluster of texts and read them in conjunction with others. Initial comparisons can be made of those *taqwīms* written by a single compiler across time or *taqwīms* written for a single year by different compilers. Juxtaposition makes it possible to track more accurately the repeated patterns and deviating elements.

Another method of comparison that could provide even more precise answers about the real value and contemporary recognition of the astrological predictions in annual *taqwīms* is to read the contents of *taqwīms* and contemporary historical narratives in tandem with one another in order to detect whether the astrological predictions expressed in almanacs influenced contemporary discourse or even manipulated certain political and imperial decisions. This path might also lead us to address the elephant in the room, to wit, whether these predictions and prognostications expressed in quite vague terms did have any concrete influence on their audience and their decision making-processes.

In the following pages, I will illustrate how the predictions in *taqwīms* were deemed important by the contemporary Ottoman elites—at least in the early sixteenth century—no matter how vaguely they were expressed. For that purpose, I will read sections from select *taqwīms* together with contemporary historical narratives to demonstrate how the *munajjims*' interpretations of the celestial data at a particular moment (i.e., his astrological predictions) were later reinterpreted by a broader interpretive community, primarily composed of individuals

affiliated with the court.

In the *taqwīm* prepared for the year 920/1514 and presented to Sultan Selīm I before *Navrūz* of that year (i.e., Muḥarram 13, 920/March 10, 1514), the anonymous *munajjim* calculates, using the Ulugh Beg tables, a full solar eclipse beginning nine hours and 33 minutes into Sunday night, Jumādā II 28, 920/August 20, 1514.¹²⁷ The eclipse will begin to slow (*makth*), ten hours and 23 minutes into the same night, reaching total eclipse at ten hours and 33 minutes. The sun begins to reappear at ten hours and 43 minutes, fully emerging from eclipse 41 minutes into Monday morning.

As for the astrological interpretation of this astronomical data, the anonymous *munajjim* says the following:

“Because the total eclipse occurs below the horizon in this latitude (*ufq*), its effects in this region [viz. *Rūm*] are relatively minor. [By the same token], because it occurs above the horizon in the Persian lands (*diyār-i ‘Ajam*), its effects are most strongly felt in that region, including the region of the Euphrates, Mosul, Fars, Hamadan, the Sawad of the Arab Iraq, Ferghana, Herat, India, Makran, eastern Khurasan, Ahvaz, Tabriz and Isfahan, and will persist for two years and twelve days, being the strongest at the beginning of this period. It signifies the affliction (*nakbat*) of a person of a great stature (*shakhṣī-i ‘aẓīm al-shān*) in the region of the Euphrates, Mosul or the Persian lands. But God knows best the true nature of things.”¹²⁸

The categories and geographic references employed by the anonymous *munajjim* in his astrological predictions of the expected solar eclipse are not that striking, as he refers to vague

¹²⁷ TSMK Revan Ms. 1711/11, 266b.

¹²⁸ Ibid.: “*chūn vasaṭ-i kusūf dar īn ufq taḥta’l-arz ast, aṣar-i kusūf dar īn diyār kamtar bāshad va chūn vasaṭ-i kusūf dar diyār-i ‘Ajam favqa’l-arz ast ta’šīr-i kusūf dar ān diyār va kanār-i Firāt va Mūṣul va Fārs va Hamadān va savād-i ‘Irāq-i ‘Arab va Farghāna va Harāt va Hind va Makrān va sharqī-yi Khorasān va Ahvāz va Tabrīz va Isfahān ba-vujūd āmad va do sāl va duvāzdah rūz īn ta’šīr bi-mānad va mu’azzam-i ta’šīr dar avā’il ba-zuhūr āyad va dalīl-ast bar nikbat-i shakhṣī-i ‘aẓīm al-shān dar aṭrāf-i Firāt va Mūṣul va diyār-i ‘Ajam wallāhu a’lam bi-ḥaqā’iq al-umūr.*”

geographic categories such as the Euphrates, Mosul, and the lands of the ‘*Ajam*. Yet he skillfully concentrates the attention of the reader on the foretold individual, who is said to be of exalted status. The anonymous *munajjim*’s remarks become all the more meaningful when they are juxtaposed with an intriguing passage of the *Selīmshāhnāme* of Idrīs Bidlīsī, which explains the Ottoman victory in 1514 over the Safavids in the Battle of Chaldiran in astrological terms:

“Among the indicators of the divinely-granted victory that made good the purpose of the lord of all sultans of the age [i.e., Selīm] and the triumph realized by the allies of that holy [sovereign] against foes perverted in religion and government were a number of configurations (*ṣūrat*) apparent to the sight of percipient analyzers of the motions of the heavenly spheres, this in accordance with the principles laid down by sage observers of the fixed stars and planets (*rāṣidān-i marāṣid-i nujūm-i ṣavābit va sayyār*) and the meteorological phenomena that occur under cycling heaven.

The first [of these indicators] was the total solar eclipse that occurred on Sunday night, Sha‘bān 28, 920 (*vuqū-i kusūf tamām būd ki dar Yakshanbih bīst-o-hashtom Sha‘bān*), in the descending lunar node in the sign of Virgo, with Monday’s dawn breaking on the eastern horizon during the height of the eclipse. Drawing on [professional] intuition (*taḥaddus*) and [long] experience (*tajriba*), astrologers (*arbāb-i aḥkām-i nujūm*) universally agree that the fact that the radiant body [of the Sun] remained dark for 41 minutes after its dawning in the east was a clear indicator of the calamitous and total destruction of the power of the king of the east (*tamām-i nakbat-i zavāl-i davlat-i khusrav-i mashriq-zamīn*) and the brilliant dawning of a manifest victory from the west, this to protect religion and serve as a model warning [of the woe that awaits] tyrannical foes on the Day of Judgment, as heralded by “The Hour has drawn nigh: the Moon is split” (Q 54:1). And indeed, as occult synchronicity (*gharāyib-i ittifāqāt*) would have it, at the moment of eclipse the army of the depraved shah, emperor of the east, was arraying itself in opposition to the army of the sultan of the west. That is to say, it was evident to perceptive observers that the body of that Sun, eclipsed by the darkness of blackly oppressive enemy forces, became ever more ascendant precisely with the increase of the thick blackness of that foundation of darkness and the evil fortune of that black-hearted faction, such that the fully-eclipsed Sun broke forth from the east amid the spheriform tents of the Qizilbāsh: thus did the Sun, wreathed in perfect beauty and glorious majesty, rise from the west (such a reversal and opposition being one of the conditions that will herald the Hour of Resurrection).”¹²⁹

¹²⁹ Idrīs Bidlīsī, *Selīmshāhnāme*, ed. Hicabi Kırılancıç (Ph.D. Dissertation, Ankara University, 1995), 136-7.

There are number of striking issues for our purposes here as to the role *taqwīms* might have played in shaping and mobilizing contemporary political debates and decisions. The work, which narrates the incidents immediately before and during the reign of Selīm I and which aims at underlining his deeds and achievements, was in fact never finished by Idrīs Bidlīsī during his lifetime and could only have been compiled by his son in late 1560s from the scattered notes of his father.¹³⁰ Therefore, we are not in a position to clearly identify whether it was really Idrīs who wrote the above-quoted passage, and if so, when exactly he composed it. Yet, the quality of the Persian prose and the accurate historical details about the chronology of the Battle of Chaldiran make it highly likely that Idrīs himself originally composed the passage.

The hard astronomical data given in Idrīs's passage about the date and duration of the expected solar eclipse almost entirely coincides with the calculations of the anonymous *munajjim* in the annual *taqwīm* presented to the Palace before March 1514. The only information that differs is the month in which the eclipse was expected to occur. However, this was likely a slip of his son's pen when copying Idrīs's notes after so many years or by Idrīs himself while writing down the passage, as the date, which is designated as Sunday (*yakshanbih*), could not simply be in the month of Sha'bān, which corresponds to Wednesday, October 28, 1514, almost two months after the Battle of Chaldiran. The twenty-eighth of Jumādā II, however, makes perfect sense at it corresponds to Sunday, August 20, 1514, immediately before the outbreak of the battle. Apart from the exact month of this eclipse, Idrīs' passage regarding the direction (on the eastern horizon) and duration (41 minutes) of the eclipse also accords precisely with the information given in the *taqwīm*.

¹³⁰ *Ibid.*, 12.

The most important aspect of Idrīs's remarks, however, is his dual-layered astrological interpretation of the solar eclipse. By referring to *munajjims*' interpretation of the solar eclipse, Idrīs (re)interprets the celestial phenomenon as a clear sign of the total destruction (*nakbat*) of the power of the Safavid shah and a manifest victory for the Ottoman sultan. Thus the vague interpretation of the anonymous *munajjim* in the annual *taqwīm* finds its eventual fulfillment and explanation. Whether or not Idrīs had the chance to read and review that particular *taqwīm*, the use of raw astronomical data and the wording of astrological interpretations make a strong case about the political and public recognition of the astrological predictions elaborated in *taqwīms*.

Idrīs's remarks are just one example of how astrological predictions might have directly shaped contemporary expectations and debates. Besides stimulating public discussions, the astrological predictions of *taqwīms* also affected imperial decisions. It is indeed not surprising, as many chronicles and historical narratives often mention in passing that a certain military expedition was initiated or a certain imperial building's construction began upon an auspicious hour of the *munajjims*' designation. What the parallel reading of *taqwīms* and chronicles/historical narratives shows unequivocally that such remarks should not be dismissed as simple rhetorical devices, for the instructive words of *munajjims* as to the propitious times to embark upon certain individual and imperial enterprises were definitely taken seriously, as already manifested in the dissertation by archival documents and manuscript sources.

To that end, I will focus here on the *taqwīm* prepared for the year 925/1519 by the Ḥāce Kemāl and contrast it to another contemporary *Selīmnāme*, written by Keşfi Meḥmed Çelebi (d. 1525). As briefly mentioned before, Ḥāce Kemāl's *taqwīm*, especially its astrological predictions are surprisingly explicit in its references and use of categories. He, for instance, talks at length

about the uneasiness in the west (*Batu*), specifically in the land of the Franks (*Frengistān*), and comments upon the probable Ottoman victory against the Pope (*Rīmpāp*) and the conquest of the island of Rhodes. He, however, cautions the Sultan not to embark upon any campaign in the first couple months of the year, because the relevant astrological variables betoken the advisability of delaying the action at least past the first few months of the year. For Hāce Kemāl, the campaign should be undertaken during the fourth or fifth month of the year.¹³¹

Quite intriguingly, at the end of his narrative, Keşfi Meḥmed Çelebi discusses Selīm’s decision to call off his planned campaign against the island of Rhodes. According to Keşfi, Selīm was eager to initiate a campaign against the island but after learning about the words of *munajjims* who reached a consensus in their *taqwīms* saying that the beginning and the middle of the year would be extremely inauspicious, he decided to give up the campaign.¹³²

In just a few years after Selīm’s unfinished attempt, the Ottomans were able to seize the island under the commandment of Selīm’s newly enthroned son Süleymān, but even before Süleymān’s campaign against the island, astrological conspiracies in the contemporary *taqwīms* seem to have distracted the palace. As already mentioned in the previous chapter, according to ‘Āşık Çelebi (d. 1571), a certain ‘Özrī, who was at the time the *qāḍi* of Varna (today in Bulgaria) besides his being a poet, presented to the court a *taqwīm* during the campaign against the island of Rhodes. In his *taqwīm*, ‘Özrī Çelebi allegedly predicted that the island of Rhodes would

¹³¹ TSMK Emanet Hazinesi Ms. 1695, 6b: “*delā’ıl şöyledir ki bu yılıñ ibtidāsında ḥāzret-i pādīşāh-i ‘ālem-penāh kendü neḥsine sefere çıkmayalar... amma sefere çıktıkları vaḳit dördüncü ve beşinci ay ola, vallāhu ‘ālam*”

¹³² SK Esad Efendi Ms. 2147, 133b: “*ve hem ehl-i nücüm müttefīkun ‘aleyh bu yılıñ evā’ili ve evāsıḡı gāyetde şüm ve nihāyetde mezmūmdur diyü taḳvīmlerinde taḥrīr ... kıldılar. Ol sebebden sefer emri te’ḥīr buyuruldu.*”

eventually be conquered but the siege would be prolonged and cost the lives of many soldiers.¹³³ Embittered by these predictions in the *taqwīm*, Süleymān asked his retainers to bring the author of this *taqwīm* to his presence. Upon hearing the sultan's order, 'Özri first visited a close friend of his, Muştafa the geomancer, and they together interpreted his ascendant, reaching the same conclusion that he would die during his visit of the palace. According to Āşık Çelebi's anecdote, 'Özri died exactly as he foretold.¹³⁴

The *taqwīm* of 'Özri is not extant today; therefore, unlike the cases of Idrīs Bidlīsī and Keşfi, we could not read this anecdote in parallel with the actual predictions from the original almanac. In fact, the anecdote recounted by Āşık Çelebi is likely apocryphal, for contemporary archival records about a certain poet named 'Özri clearly document that as late as Muḥarram 19, 940/August 10, 1533, he received gifts and allowances from the court.¹³⁵ No matter what really happened to 'Özri Çelebi, and how and when he lost his life, Āşık Çelebi's anecdote is still valuable as it conveys a contemporary perspective pertaining to the discursive power of the *taqwīms*.

A last piece of evidence for the extent to which contemporary (ruling) elites deemed astrological predictions important is a non-anecdotal, archival one: a petition, written apparently by a dismissed *munajjim* and delivered to Sultan Bāyezīd II, likely through the end of his reign. In this anonymous petition—or in fact a letter of pardon—the dismissed *munajjim* asks the sultan's mercy for his recent failure to present the court with *taqwīms*. He explains it by referring first to his lately shifting scientific interests, as apparently he has become interested in medicine.

¹³³ Aşık Çelebi, *Meşa'irü'ş-Şuara*, ed. Filiz Kılıç, v. 2 (Istanbul: Suna ve İnan Kıraç Vakfı, 2010), 1064.

¹³⁴ Ibid.

¹³⁵ Kamil Kepeci 1764.

He then reveals the real reason of his failure by saying that as he becomes older and death draws near, it excites more grief and uneasiness to deal with the stars, especially with the *judicium*.¹³⁶ In the last part of the petition, the anonymous dismissed *munajjim* desperately pleads with the sultan and concludes the petition by asking the sultan to reemploy him in his service.

Besides revealing an interesting detail about the epistemological suspicions of a practicing *munajjim* as to his own craft, the petition is a clear proof that sultans—at least some of them—inquired after, and waited impatiently for, the annual astrological counsel of the *munajjims*, and failing to produce the annual astrological prognostications in a timely manner potentially entailed a *munajjim*'s loss of position.

All in all, the *taqwīms* that *munajjims* produced and presented the Ottoman court on a yearly basis are invaluable sources modern scholars from various subdisciplines should pay more attention. Not only the *taqwīms* can allow modern historians of science to easily track the scientific models and astronomical methods preferred by different practitioners. They also provide, through especially the detailed astrological predictions on the fortunes of the upcoming year, complementary details and colorful insights about the burning political and ideological matters of the time, which were subject to constant change. Though it is a challenging task to glean the valuable historical information out of the often repetitive and hackneyed prose of prognostications, that the *taqwīms* were composed on a yearly basis helps the modern researcher detect more accurately the diverging elements to further associate them with the problems and

¹³⁶ TSMA E. 10159/145: “*dar īn ayyām muyassar nashod ki bi-istikhrāj-i taqvīm mashgūl shavad...Az chand jihat yaki az ishtighāl bi-muṭāla‘a-i ṭibbiyya ammā māni‘-i kullī ān ast ki īn kamīna rā vaqt-i irtiḥāl nazdīk ast va ishtighāl bi-nujūmiyāt siyammā bi-aḥkāmash mustalzim-i qasāvat-i qalb ast.*”

debates of their times. The testimony of contemporary historical narratives and a few archival documents about the recognition of *munajjims*' astrological predictions in the *taqwīms* also reveals the need to appreciate the value of these texts for historical purposes. It should be also noted that *taqwīms* were not the only surviving textual product of the *munajjims*. The astral experts were also engaged in producing other types of annotated horoscopes that they composed for the occasions of birth, enthronement of the sultan, or the calculation of the auspicious moment for undertaking an imperial enterprise. The next chapter will discuss the significance of this genre on the basis of few surviving examples from the fifteenth and sixteenth century Ottoman world.

Chapter Five—From Bolstering Royal Claims to Expressing Self-Aggrandizement: Political and Personal Dynamics of Casting Horoscopes

V. 1 Introduction

In the previous chapter I delved into one particular, and seemingly the most prevailing, form of horoscope production identified within the astrological practice of (solar year) revolutions (*taḥvīl-i sāl*). In annual *taqwīms*, *munajjims* and other individuals conversant in the astral sciences interpreted the horoscopes they prepared on the basis of the key moment of sun's annual ingress into Aries, i.e. the beginning of the solar year, as well as its monthly entrance into other Zodiacal signs. Contrary to the conventional wisdom that tends to take *taqwīms* simply as calendars, ample amount of relevant texts descending from the fifteenth-and sixteenth-century Ottoman realm has demonstrated that astrology played a central role in the *taqwīm* tradition.

There are other examples of horoscopes produced for different forms of astrological practice such as nativities and elections.¹ As I already outlined in greater detail in the first chapter, the genre of nativities (*mawālīd*) rests upon the fundamental assumption that the celestial configuration at the time of birth has an enduring impact on a person's destiny. Whereas the branch of elections (*ikhtiyārāt*) intends to determine the most propitious moment to start a specific enterprise or perform an activity, such as enthronement of a ruler, embarking upon a military campaign, or laying the cornerstone of an imperial building. Although the amount of such horoscopes descending from the period in question is not as many as the extant *taqwīms*, a

¹ For a more universal discussion of it, see H. Darrel Rutkin, "Various Uses of Horoscopes: Astrological Practices in Early Modern Europe," in *Horoscopes and Public Spheres. Essays on the History of Astrology*, ed. by G. Oestmann, H. D. Rutkin and K. von Stuckrad (Berlin: Walter de Gruyter, 2005), 167-182.

few surviving documents, including the nativity of Meḥmed II and the horoscope produced for the construction of the Süleymaniye mosque complex, will be scrutinized in this chapter with an eye toward examining the intersecting personal and imperial dynamics of the astrological practice.

The reasons are not clear why we have surprisingly so little extant nativity books and occasional horoscopes, although the practice itself was quite widespread given the frequent references in contemporary sources.² In addition to numerous anecdotes about the practice that regularly feature in the chronicles and historical narratives, manuscript sources also contain various personal horoscope charts (*zāyicha*), often in the standard square or rectangular format divided into twelve sections, scattered in the colophon page or the recto of the first folio (*zahr al-*

² Even in the surviving horoscope for the construction of the Süleymaniye complex, which I will discuss in detail below, the author Riyāzī explicitly refers to other horoscopes he prepared for the birth and accession day of Süleymān. Unfortunately none of these horoscopes have survived our day, unless they remain undiscovered in some obscure manuscripts. One should also recall the discussion in the *taqwīm* of the year 849/1446 about the horoscope of Murād II’s second accession to throne or the elaboration of Idris Bīdlīsī on Bāyezīd II’s horoscope, both discussed in more detail above.

Similar references could also easily be found in earlier historical narratives. In his *Gazānāme-i Rūm* (ca. 1456), Kāṣifī recounts that when Meḥmed II was born, Murād II called for the *munajjims* and asked them to interpret the birth horoscope of his son. Apparently, *munajjims* interpreted the celestial configuration as the definitive sign of Meḥmed II’s being a *ṣāhib-qirān*. See: Ebrahim M. Esmail, “Kāṣifī’nin Gazānāme-i Rūm adlı Farsça Eseri ve Türkçe’ye Tercüme ve Tahlili.” (MA Thesis, Mimar Sinan Fine Arts University, 2005), 14.

Kivāmī narrates in his *Fethnāme-i Sultān Meḥmed* that when Meḥmed II ascended the throne for the second time, he had the *munajjims* interpret the horoscope of his ascension. Their interpretation was that Meḥmed II would rule the world like Alexander the Two-horned. See: Ruṣan Türken, “Kivāmī, Fethnāme-i Sultān Mehmed.” (MA Thesis, Fırat University, 2006), 192. Such anecdotes in the earlier Ottoman sources follow the examples richly elaborated in preceding and/or contemporary Persian chronicles and historical writings, such as Kh^wāndamīr’s *Ḥabīb al-siyar* or Sharaf al-Dīn ‘Alī Yazdī’s *Zafarnāma*. For example for the curious story of Mavlānā ‘Abd al-Lisān *munajjim*’s calculation and interpretation of the birth horoscope of Ibrāhīm Sultān b. Shāhrukh (d. 1435) see Yazdī, Sharaf al-Dīn ‘Alī, *Zafarnāma*, ed. by Sayyid Sa‘īd Mīr Muḥammad Ṣādiq and ‘Abd al-Ḥusayn Navā’ī, v. 1 (Tehrān: Kitābkhāna Mūzih va Markaz-i Asnād-i Majlis-i Shūra-yi Islāmī, 1387), 786-788.

kitāb).³ These diagrams are not necessarily accompanied by an astrological commentary of the horoscope, but still hint at the prevalence of the practice.

One important reason of the scarcity of extant textual examples of these occasional horoscopes is the very personal nature of these materials. As Laurence Elwell-Sutton has already pointed out, since most of these horoscopes were of interest only to the individual or the specific occasion to whom/which they applied, their preservation across different generations was not an immediate concern.⁴ We should also take into consideration the oral nature of the astrological counseling, which I have already mentioned, as these natal charts or suggestions for elections might have been interpreted verbally on the spot.

In order to introduce the reader to the distinguishing characteristics of the materials this chapter will evaluate, i.e., the nativities and other horoscopes produced for electional purposes, it would be useful to start with comparing them with the *taqwīms*. First of all, in both *taqwīms* and nativities, the same standard mathematical and astronomical procedures were followed for casting the horoscope at the desired moment. Accordingly, the *munajjim* first determined the degree of the ascendant (*tāli*'), the Zodiacal sign rising above the horizon, by consulting the astronomical tables (*zīj*) or sometimes using an astrolabe, or even both. The next step was to demarcate all the other eleven astrological houses, so as to sketch the position of the Zodiac in relation to them at the designated moment. This operation is called the equalization of houses

³ These charts available in numerous Islamic manuscripts still wait to be thoroughly studied. For a general evaluation of the question in medieval European manuscript culture, see: Sophie Page, *Astrology in Medieval Manuscripts* (British Library/University of Toronto Press, 2002). On *zāyicha* (horoscopic diagram), see: David Pingree, "Horoscope" *Elr*; Enrico Raffaelli, "Zāyča" *Elr*.

⁴ Laurence P. Elwell-Sutton, "A Royal Tīmūrid Nativity Book," in *Logos Islamikos: Studia Islamica in Honorem Georgii Michaelis Wickens*, ed. Roger M. Savory and Dionisius A. Agius (Toronto: Pontifical Institute of Mediaeval Studies, c1984), 119-134.

(*taswiyat al-buyūt*). Once the horoscope chart (*zāyicha*) was drawn, the *munajjim* became ready to start prognosticating it.

Here emerges the fundamental difference between the *taqwīms* and the nativities, because in the former case the calculations and ensuing prognostications are only for the particular year in question, whereas in the nativities *munajjims* needed to project the celestial calculations and astrological interpretations toward the temporal point that the newborn is expected to reach in terms of lifespan. In order to make these projections and establish the life expectancy of the newborn, the *munajjims* had recourse to calculating additional astrological variables such as the *haylāj* (indicator for the body), *kadkhudā* (indicator for the soul), *tasyīrāt* (prorogation or progression), *firdārāt* (planets ruling certain periods), or *intihā'āt* (profections), all of which are discussed in greater detail in the major examples of the *zīj* genre.⁵

Aside from the use of additional astrological indicators, another important difference between the nativities and *taqwīms* is the timing of these calculations. In the *taqwīms*, which were produced and presented before or around the time of *Navrūz* (i.e., the revolution of the solar year), calculations were made prospectively, to wit, the *munajjims* estimated the moment of the solar year transfer in order to make prognostications out of it. Whereas in the nativities, the *munajjim* makes retrospective computations on the basis of the information provided to him about the exact birth date of the individual. Although there is both textual and visual evidence implying that *munajjims* might have been in close proximity to the royal birth chamber, the

⁵ The last major section in both the *Zīj-i Īlkhānī* and *Zīj-i Ulugh Beg* is solely devoted to the elaboration of these procedures. For the technical details of these indicators, see the very useful commentary and annotated glossary of astrological terms prepared by L. P. Elwell-Sutton in his edition of a horoscope descended from the Qajar period: *The Horoscope of Asadullāh Mīrzā: A Specimen of Nineteenth-Century Persian Astrology*, tr. and ed. by L. P. Elwell-Sutton (Leiden: Brill, 1977), 57-98.

detailed birth horoscopes at hand rather reveal that the nativities were produced after the *munajjim* was approached by the client, who was usually enjoying his/her her adult years and curious enough to ask the *munajjim* to prognosticate his/her destiny in the remaining years of his or her life.⁶ As part of this request, the client (or his/her deputy) usually provided the *munajjim* the original date of his/her birth. For example, in the nativity of the Timurid Mirzā Rustam Bahadur, produced in Muharram 822/February 1419 by a certain Yaḥyā b. ‘Imād b. Yaḥyā al-munajjim al-Kāshānī, the *munajjim* refers to the initial calculation of the degree of the ascendant that was apparently recorded by an observer (of the sky) (*rāṣidī*) at the original time of birth.⁷ In a similar manner, as we briefly mentioned about its contents in the second chapter, a petition was delivered to Bāyezīd II by an anonymous *munajjim*, who, apart from asking for permission to have access to certain books and instruments in the treasury, promised the sultan to prepare nativities for the princes Ḳorḳud and Aḥmed if their birth dates are communicated to him.⁸

As it was the case in previous chapters, the present chapter also does not set out to illustrate the complex methods and techniques used by the *munajjims* to cast horoscopes or verify the past calculations on the basis of modern computations. It has rather the sole purpose of

⁶ George Saliba’s study on the status of astrology in medieval Islamic society provides several examples of miniatures depicting *munajjims* as part of the royal birth chamber. See: Saliba, “The Role of the Astrologer in Medieval Islamic Society,” *Bulletin d’études orientales* 44 (1992), 45-67. For other references to visual evidence also see: Eva Orthmann, “Circular Motions, Private Pleasure, and Public Prognostication in the Nativities of the Mughal Emperor Akbar,” in *Horoscopes and Public Spheres. Essays on the History of Astrology*, ed. by G. Oestmann, H. D. Rutkin and K. von Stuckrad (Berlin: Walter de Gruyter, 2005), 101-114.

⁷ Huntington Library Ms. HM 71897, 7b: “*rāṣidī ki bi-ālāt-i raṣad daraja-i ṭāli ‘ ma ‘lūm konad ... az taḥrīr-i musavadda-i ki mavjūd būd. Chunān ma ‘lūm shod ki az shab-i mazkūr dah sā ‘at gozashta būda ta zamān-i vilādet-i mubārak.*”

⁸ TSMA E. 10159/6: “*va agar ṭāli ‘hā ma ‘lūm nabāshad tārikh-i vilādathā taslīm namāyand tā ba ‘d az istikhrāj kayfiyyat-i ṭāli ‘-i har yak rā chunāncha az dalā ‘il-i nujūmī ma ‘lūm shavad ba ‘arḍ rasānīda shavad.*”

understanding what these extant occasional horoscopes could tell the modern historians about the complex political and patronage dynamics underlying their production and circulation. Unlike the *taqwīm* genre, however, the amount of surviving textual materials is significantly limited. Therefore compared to the comparative analytical examination of the numerous *taqwīms* from the fifteenth-and early-sixteenth-century Ottoman milieu, the treatment here will be more descriptive and sporadic. Here I will describe in detail two specific examples. One of them is a nativity produced for the sultan Meḥmed II through the end of his life. Although ‘Āṭūfī’s catalogue of the Palace library that he prepared in 1502-3 also lists the horoscopes of Cem Sultan and Bāyezīd II in the inventory, these texts have not survived our day.⁹ The second textual example that I will discuss even in more detail is Riyāzī’s curious horoscope that he composed around the year 1550 for the occasion of the construction of the Süleymaniye mosque complex.

V. 2. Nativity Books as a Means of Self-Propaganda

Immediately after arriving at the court of Meḥmed II and presenting him in December 1479 with his lengthy commentary on Ṭūsī’s *Si faṣl* (which he entitled *Muwaddih al-rusūm fī*

⁹ Library of the Hungarian Academy of Sciences, Ms. Török F 59, 317: “*Risāla wilādat Cam raḥimahallāh wa huwa Ibn Muḥammad Khān*”; 27: “*Risāla fī al-handasa wa risāla ṭālī ‘sulṭān al-salāṭīn Sulṭān Bāyezīd Khān bin Muḥammad Khān zīda naṣrahu wa risāla fī al-tafsīr fī mujalladīn wāḥidīn.*”

There is an eighteenth century copy of Bāyezīd II’s horoscope, fragmentedly copied by a certain al-Sayyīd ‘Abdu’l-kerīm b. Muṣṭafa in Muharram 1177/July 1763. This copy consists of only five folios and does not contain the part on astrological judgments. In the horoscope, Bāyezīd’s birth date is set as 5 Muharram 851/March 26, 1447 and the birth place as Manisa. While this birth date complies with the overall consensus in the relevant historiography, his birthplace is usually considered to be Dimetoka. See: Kandilli Rasathanesi Kütüphanesi Ms. 396.

ilm al-nujūm), Khiṭābī was requested by the sultan to compose his nativity.¹⁰ The voluminous nativity was originally completed by him in 24 Rabī‘ al-awwal 885/June 3, 1480, and another presentation copy was made ready before the sultan would pass away in May 1481.¹¹ The horoscope begins with a standard invocation of God, to which are added several quotations from the Quran that refer to the heavenly bodies, the world of the unseen (*a‘lam al-ghayb*), or the idea that human body is the microcosm of the universe. This is followed by a brief doxology in praise of the Prophet Muhammad. These rather standard textual components are then followed by a relatively long passage glorifying Meḥmed II and his rule. Among numerous strong appellations with full of celestial imagery, Khiṭābī particularly defines the sultan in this passage as the caliph of the epoch (*khalīfat al-dahr*), the *imām* of the age (*imām al-zamān*), and the *khān* to all the world rulers (*khān-i khavāqīn-i jihān*).¹² He then swiftly records the birth date of the sultan, first according to the lunar Hijri system (26 Rajab 835) and then the Old Iranian/Yazdigerd era. (2

¹⁰ SK Esad Efendi 1997, 2b: “*ammarani an yustakhrāja ṭāli‘ mawlūdihi al-maymūn wa yuḥaṣṣal min wilāyat mā huwa al-aṣl wa-l-qānūn li-yazhara min ithbātihi awḍā‘ al-su‘ūd wa-n-nuḥūs wa yu‘raf mā yuṣtaḥṣala min sayrihā al-sanawī...*”

¹¹ There are at least two copies of this text. The one now located at SK Esad Efendi 1997 and composed of ninety folios seems to be the autograph copy of Khiṭābī. Not only the quality of the script seems very similar to the handwriting of Khiṭābī in his other works cited in the third chapter. In the colophon part of the copy Khiṭābī says that he first finished writing it in Istanbul in 24 RA 885/June 3, 1480. SK Esad Efendi 1997, 90b: “*Tammāt al-kitāb awwal ‘alā yad al-‘abd al-za‘īf Khiṭābī al-munajjim al-Jilānī fī yawm al-arba‘ā ‘ishrīn Rabī‘ al-awwal min shahr [sic] sana khams wa ṣamānīn wa ṣamāna mi‘a hijriyya nabawiyya fī baladiyyat al-Qusṭantīniyya.*” Based likely upon this copy, another and more flamboyant presentation copy (composed of 264 folios) was prepared by the famous calligrapher of the time, Ghiyāth al-dīn Iṣfahānī. TSMK Yeni Yazmalar 830, 264a: “*tammāt al-kitāb al-ṭāli‘ al-mawlūd al-mubārak humāyūn khalladallāh ta‘ālā ‘umrahu wa khilāfatahu ‘alā yad al-majrūh al-ḥaqīr Ghiyāth al-mujallid al-Iṣfahānī bi-dār al-salṭanat Qusṭantīniyya aṣlahallāhu shānahu abadan.*” Unfortunately its copy date is not specified, but Ghiyāth al-dīn’s wording certainly implies that it was produced when Meḥmed II was still alive.

¹² SK Esad Efendi 1997, 2b. As for celestial imagery, Khiṭābī uses the following expressions: “*āfītāb-i jalāl az ufq-i iqbāl ṭulū‘ kard*” (for describing the birth of Meḥmed II), “*khilāfat-i āfītāb-i falak-i mustaqīm, markaz-i dā‘ira-i muqīm-i mihr, burj-i ṭājdārī dar daraj-i shahriyārī*”

Murdād māh-i qadīm 801).

The author then gives a quick table of contents and briefly introduces the main chapters in the horoscope. Although he says that the text is composed of three chapters (*salāsa abvāb*), it would be more accurate indeed to group his overall scheme into two main parts: astronomical/computational (elaborated in between 3a-67a) and astrological/interpretive (67b-90b), because the three chapters Khiṭābī introduces in the beginning are only related to the specific astronomical/computational procedures. These are as follows:

- i) Procedures undertaken to determine the degree of the ascendant (*istikhrāj al-tāli*);
- ii) Procedures undertaken with the use of the indicators to establish the life expectancy of the newborn (*haylāj* and *aṭīyya al-kawākib*);
- iii) Procedures undertaken with the use of the latitude of the incidental horizons (*arūḍ al-āfāq al-ḥāditha*).

Khiṭābī opens his elaboration by fixing the birth date of the sultan in the Old Iranian/Yazdgirdi era as Saturday, 2 Murdād 801. He then starts establishing the equivalent dates according to other temporal systems. As an indication of his intentions to show off his extensive knowledge in computational tasks, Khiṭābī here instructs, in the fashion of the *zīj* literature, how these calendric calculations can be manually made. After making, and showing how to make, painstaking calendric calculations, he establishes that the equivalence of the date in the lunar Hijri calendar (*tārīkh-i Arabī*) is 26 Rajab 835. The corresponding dates in the Rūmī/Iskandarī (*tārīkh-i Rūmī*) and Jalālī/Malikshāhī (*tārīkh-i Malikī*) eras are given respectively as 29 Āzar

māh (April) 1843 and 17 Farvardīnmāh 353.¹³ He later gives the place of the birth as Edirne (*dār al-saltanat*), which he says is located in the sixth clime. He then moves to the next section and fixes the exact hour of the birth as eight hours and four minutes into the Saturday evening, 26 Rajab 835/March 29, 1432. Here, like Yahyā munajjim in the horoscope of Mīrzā Rustam Bahadur, Khiṭābī refers to the notes of an anonymous observer that had recorded the birth date of the sultan.¹⁴ He further implies his surprise to have found this information already recorded, because as he says, in the absence of such recorded dates *munajjims* often have to appeal to instruments like the astrolabe (*uṣṭurlāb*) or hourglass (*shīsha-i sāʿat*) to retrospectively calculate the time of birth. However, in the case of Meḥmed II, there is no such need.

After setting the ground by inserting the date and place of the birth, Khiṭābī starts his lengthy exposition on the complex mathematical and astronomical procedures required for calculating the horoscope. Quite similar to the flow of narrative in other extant horoscopes from the Timurid realm, such as the famous horoscope of Mīrzā Iskandar produced by ʿImād al-munajjim or the horoscope of his half-brother Mīrzā Rustam Bahadur composed by Yahyā b. ʿImād b. Yahyā al-munajjim, Khiṭābī himself explains and exemplifies in a very detailed fashion (in almost two-third of the entire work (3a-67a)) those specific methods an erudite *munajjim* should adopt when preparing someone’s nativity. The methods he specifically mentioned include the *namūdārāt* of Ptolemy, Idris, Abū Maʿshar, or Zarathustra as well as the *haylājāt*, *kadkhudāhs*, and *firdārāt*. He also provides in a simple textbook format the minimum sufficient

¹³ Ibid., 3a-3b.

¹⁴ Ibid., 4a: “*ḥāfīzān-i vaqt-i vilādat-i bā-saʿadat-i humāyūn ba-taqrīb va kitābat chunān rasānīdand chūn ṣāhib-qirān bā-davlat va saʿadat az katm-i ʿadam-i mubārak ba-ṣahrā-yi vujūd nihād gozashta būd az shab-i shanbih hasht sāʿat va chahār daqīqa taqrīban muvāfiq bā-bīst o shash-i māh-i mubārak sana 835.*”

knowledge on the dispositions of the stars and planets (*tabāyi 'i sitāragān*), indications of each astrological house and signs of the planetary aspects (*ittiṣāl-i nazarī*).

It is partially true, in light of the extant annotated horoscopes from the Timurid realm, that such detailed explanations on the astronomical, mathematical, and astrological technicalities of the practice, which probably did not have any bearing on the patron sultans, were in fact dictated by the genre of the nativities. Every new *munajjim* might have felt the pressure to (re)produce these generic features and conventions of their scholastic endeavor in order to prove how well-trained s/he was as a *munajjim*. In fact the exhaustive comments upon these technical matters might have served two important purposes. On the one hand, the *munajjim* could create another opportunity for him/herself to demonstrate, in the presence of both the primary patron and contemporary practitioners, his deep knowledge in the different foundational units of the astral sciences. On the other hand, these explanations with exemplary cases and insertion of tables might have stood as useful training materials for the would-be *munajjims*.

Given the fact that there is almost no surviving manuscript evidence as to the extra copies of such lengthy horoscopes, and that those limited extant copies do not contain any rich marginalia that would have proved otherwise its heavy use by the past readers/students, it is quite difficult to say, at least for the period in question, that these texts produced for the royal consumption were also studied by contemporary *munajjims* for pedagogical purposes. The later centuries witnessed, however, the emergence of *zāyicha* collections, through which certain *munajjims* brought together several horoscope charts drawn for some of the recent political incidents as well as the decisive events in the Ottoman history such as the conquest of

Constantinople, the enthronement of Süleymān, or the battle of Mohaç.¹⁵ Although these copies are also devoid of reader notes, one may still consider, in the light of Monica Azzolini's excellent study about the pedagogical uses of collected horoscope charts, as exercise notebooks of certain practitioners.¹⁶

In Khiṭābī's case, however, he shows his scholarly aspirations and ambitions to display his intellectual assets through painstaking quotations from, and detailed references to, some of the major authorities in the astrological lore including Ptolemy and *Kitāb al-Thamara*, Bīrūnī and his *Tafhīm*, Ghaznawī and his *Kifāya*, 'Alī-Shāh Bukhārī and his *Aṣmār va ashjār*, Hermes and the *Kitāb al-asās*, or Ṭūsī and his *Zīj-i Īlkhāni*. Somewhat similar to his lengthy commentary on Ṭūsī's *Sī faṣl*, by which he also likely aimed at convincing the sultan as regards to his level of expertise, the horoscope best serves for the self-interests of Khiṭābī, who was trying to establish a stable position for himself in the court hierarchy as an erudite *munajjim*.

Following his long discussion on the lots and the fixed stars as well as the concepts of the prorogators, whose specific function is considered influencing the lifespan of the native, Khiṭābī finally turns to what was presumably the main justification for the entire work: the astrological interpretations of the celestial findings.¹⁷ He first starts with the general prognostications based upon the degree of the ascendant of Meḥmed II's birth, which was established, according to his

¹⁵ See for instance Kandilli Rasathanesi Kütüphanesi 444. See also the *Mücerrebāt* of Muṣṭafā Zekī: SK İzmir Ms. 485.

¹⁶ See: Monica Azzolini, "Refining the Astrologer's Art: Astrological Diagrams in Bodleian MS Canon. Misc. 24 and Cardano's *Libelli Quinque* (1547)" *Journal for the History of Astronomy* 42/1 (2011), 1-25.

¹⁷ SK Esad Efendi Ms. 1997, 67b: "Chūn az taṣḥīh-i daraja-i ṭāli' va ta'yīn-i haylāj va kadkhudhāhāt va 'arūḍ-i āfāq-i kavākib va tasyīr-i avtād (...) fāriḡh shodīm khāstīm ki aḡkām-i davāzdah khāna rā mujmalan bayān konīm ba'd az ān aḡkām-i har sāl ra 'alā al-taṣḥīl irād konīm."

own calculations, the 22nd degree of the Aquarius. Similar to the discourse produced in the *taqwīms*, Khiṭābī employs platitudes and vague references to praise the rule of Meḥmed II. For Khiṭābī, as far as the indications of the horoscope are concerned, the owner of this horoscope would be firmly stationed in his throne. All of his measures would well serve to their purposes. Whoever dares to revolt against him or avoids fully obeying him would end up being a miserable and formidable one. He would be victorious over his rivals, and many sultans of the time would envy him due to his successes. Day by day his glory would intensify, and his generosity would keep pleasing the scholars, Sufis, and mystics. When his age would turn to 45 (solar years), there is a possibility that he would undertake a military campaign, at the end of which he would be victorious. His fame would spread over all corners of the world. When he would turn to 47, several mischievous individuals would try to provoke trouble and unrest. During this age, the balance of his blessed temperament would be disturbed, and the enemies and dissidents of his state would be in a stronger position. Nevertheless in the end they would be defeated at the blessed hands of the sultan.¹⁸

As far as Khiṭābī’s projection for the sultan’s life expectancy is concerned, the turning point seems to be the year 60, as Khiṭābī particularly says this is the era when the owner of the horoscope may come close to the end of his “granted/gifted” life. Therefore he should be careful,

¹⁸ Ibid., 68a-70b: “*ṣāḥib-i ṭāli‘-i humāyūn ... bar maqarr-i salṭanat va ‘aḏamat va pasand-i khilāfat va imārat thābit va rāsikh bāshand va nikū-rāyi va khūb-andīsha va tīz-dhihn va rūshan-rāy bovand va ‘āqil va kāmīl va khudāvand-i rāy va tadbīr bovand va dar ‘avāqib-i umūr fikrhā ba-ṣavāb andīshand va ba-har muḥim va kāri ki rūy āvorand akthar ba-ḥuṣūl payvandand va rūzgār bi-‘aḏamat va ḥashmat godharānand va harkas ki bā ān ḥaẓrat sar az mutāba‘ va ‘ubūdiyat munḥarīf kardānad maḥzūr va mankūb kardaaksar avqāt tīr-i tadbīr bar hadaf-i ṣavāb zanand va bar a‘dā muẓaffar va maṣṣūr gardand.....bar chashm-i salāṭīn maḥsūd bovand.*”

at that particular time, especially with the food he would eat and water he would drink.¹⁹ If nothing bad happens during that period, Khiṭābī concludes, the owner of the horoscope would live until he would be 75 years old. Considering the likely timing of the production of this horoscope, which coincided with the last phase of Meḥmed II’s political career when controversies derived from the deterioration of his health condition were in circulation, these vague remarks and cautions as to the dietary measures of Meḥmed II are reflective of the atmosphere at the court of Meḥmed II.²⁰

V. 3. Choosing the Most Auspicious Time for the Sultan and the Self

An important aspect of the *munajjims*’ authority in measuring and interpreting time was to elect astrologically auspicious moments to start a specific activity. As regards to the elections of propitious moments, Ottoman chronicles and historical narratives are replete with references, albeit vaguely expressed, to the *munajjims*’ designation of auspicious hour. The periodic insertion of formulaic remarks (“*bir sāl-i sa’d ve vaḳt-i meymūn*” or “*mübārek sāl-i sa’d ve fīrūz-dem*”) into historical narratives inevitably raises questions whether these fillings on pages point

¹⁹ Ibid., 88b-89a: “*ammā dar sāl-i shastom-i shamsī tasyīr-i daraja-i ṭālī ‘-i maymūn ba-Marrikh aṣl mi godharad, darīn sāl khayf va khaṭr ast az ghidāhā-yi nā-munāsib iḥtirāz bāyad kard ... yumkin ki dar īn sāl mizāj-i mubārak az ḥadd-i i tidāl munḥarif gardad dar īn sāl az ghidā-yi nā-munāsib va havā-yi bad va āb-i bad muḥtariz bāyad būdan va nīz dar bāb-i dovvom dhikr karda shoda ast ki Harmas [Hirmis] ḥakīm dar kitāb-i Asās āvorda ast ki chūn ‘aṭīyya-i mu‘adala-i kadkhudhāh tamām shavad dar ān rūzhā iḥtirāz bāyad kard az ghidā-yi nā-munāsib va havā-yi bad va dar sāl-i 60?? shamsī ‘aṭīyya-i mushtarī ba-ākhir rasīda ast. Pas dar īn sāl khayf va khatrat az bīmārī va ghayruhu chūn az īn sāl hā-yi makhūfa ki ān dar ākhir-i sāl-i 51-i? ‘arabī? ast va dar sāl-i 61. arabī?? bi-ṣiḥḥat va salāmat ba-ghozarad va ‘omr-i mubārak-i humāyūn ... ba-haftād o panc sāl ba-rasad inshāllāh ta ‘ālā.”*

²⁰ For the detailed political history of the final period of Meḥmed II’s life from May 1480 onwards, see Franz Babinger, *Mehmed the Conqueror and his Time* (Princeton, N.J.: Princeton University Press, 1978)

to an actual, historical fact or are used as a mere rhetorical device. Extant archival documents, most of which survived from seventeenth and eighteenth centuries, clearly evince the former, as court *munajjims* were routinely asked to compute astrologically auspicious moments for a wide variety of matters, such as setting out on a military campaign, launching a newly constructed galleon, organizing a banquet, or even manufacturing a talismanic shirt.²¹ Despite the fact that there were certain Ottoman sultans who were uneasy with the idea of heeding astrologers' advice, the ruling authorities often duly noted the temporal instructions of the court *munajjims*.²² In certain cases, when the initial recommendation of *munajjims* could not be implemented due to unavoidable delays, they might have even been asked to calculate an alternative auspicious hour. For example, in a brief memo written in the year 1788, the office of court astrologers was asked to designate an alternative hour to set out on the military campaign towards Bulgaria after the first proposed time was missed. Upon this request the office calculated a second hour and delivered it to the grand vizier.²³

These surviving archival documents, through which the court *munajjims* reported the result of their calculations to the court for the requested imperial matter, were usually written in the form of brief memos.²⁴ Unfortunately, prior to the late seventeenth-century there is no such surviving archival document. There is, however, one extant report in a manuscript form,

²¹ See for instance BOA C. SM 37/1873, BOA AE SMST III 50/3625.

²² As a counter example, one may consider Sultan Abdulaziz. See: Aydüz,

²³ BOA Hat 14/576: “*ordū-yı hümāyūnuñ...Rusçuk'ta şahrāya hūrūcu zımnında bir vakt-i mübārek ihtiyārını hāvī müneccim-i evvel ve şānī efendiler dā'īleriniñ iki kıt'a ihtiyār pūsūlāları ordū-yı hümāyūna mütekaddimen gönderilmiş idi. Lakin ihtiyār olunan vaktlerden ilerüce bir vakt-i sa'd ihtiyār olunmak huşūsu şadr-ı 'āzam kulları tarafından tahrīr olunduğuna bināen mūmāileyhumā dā'īlerinden tekrār birer ihtiyār pūsūlāsı getürdülüb ma'rūzu 'atebe-yi 'ulyāları kılınmışdı.*”

²⁴ See for instance BOA C. SM 37/1873, BOA AE SMST III 50/3625.

produced in the mid-sixteenth century and now located at the “Yazma Bağışlar” collection of the Süleymaniye manuscript library. Surprisingly, the text is not mentioned in the comprehensive bio-bibliographical catalogue of the Ottoman astral lore published in 2011. Nor is there any reference in modern studies to the text or its author, albeit he was a decent poet in the eyes of his contemporaries.

The report is written on the occasion of the construction of the Süleymaniye mosque complex and its author ‘Alī (d. later than 1550), who uses the epithet Riyāzī, says explicitly in his introductory lines that he composed this treatise upon hearing that Süleymān the Lawgiver requested from the *munajjims* to designate an auspicious moment to lay out the foundation of the mosque he was planning to construct.²⁵ In nine short chapters Riyāzī delivers the auspicious hour that he has calculated, explicates in detail the scientific reasoning behind his temporal election, and communicates his predictions regarding the fortunes of the complex.

As a unique document —unique in the sense of its existence and scope, not in terms of the practice itself— the text neatly illustrates how *munajjims* put astrology in practice for both scientifically ratifying the grand ideological claims of their patron rulers and promoting their own personal professional interests. Given the fact that the date Riyāzī suggests for the commencement of the construction perfectly accords with the date recorded in the surviving inscription of the Süleymaniye mosque as well as in other contemporary historical narratives, the document stands as yet another concrete example of the political and practical recognition

²⁵ SK Yazma Bağışlar Ms. 4034 (from now on Riyāzī), 2a: “*emr-i każā-nişānları cereyān ve hüküm-i vācibü’l-iz‘ānları sereyān itdi ki bir cum‘a-i ‘ālī-nihād ve ‘imāret-i kavī-bünyād mānend-i ‘İrem-zāti’l-‘imād allatī lam yakhlūq mithluhā fī l-bilād’ tedbīrine mübaşeret ve ta‘mīrine mübāderet olunmağa ibtidā-yı esās-ı rüyīn-evtād ve tarḥ-ı bünyād-ı temkīn-nihād için bir ṭālī ‘i meymūn ve sā‘at-i hümāyūn ihtiyār oluna.*”

astrological advice received at the time. There is of course the slight possibility that the treatise was composed when the construction had already started, yet I should also underline the fact that the contents of the text do not contain any anachronistic element. In addition to showing the political recognition of the service of the *munajjims*, the document as a foundation horoscope of a Friday mosque also gives us another opportunity to question some of the established convictions in the modern scholarship that has long assumed a definitive clash between astrological practice and religious orthodoxy. Last but not least, the vocabulary and metaphors used throughout the text present new evidence on the lofty political and cultural meanings ascribed at the time to the Süleymaniye complex by the sultan and contemporary ruling elites.

Unlike the already mentioned archival documents from later centuries preserved in shorter than one-page memos, the report in question is in a standard book format, consisting of thirteen folios written in small clear *naskh* script, with diacritical marks and without a title. The verse markers and section headings are in red ink, and titlature used for Süleymān in gold. The manuscript is bound in brown leather and its center is embossed with a circular medallion (*shamsa*). Both the medallion and decorative lines in the corners are also stamped in gold. Given the physical qualities of its cover, folios, and script, the surviving manuscript seems to be the presentation copy.

According to the colophon of the text, the work is written by a certain ‘Alī, better known with his pseudonym Riyāzī.²⁶ This pseudonym is not an accidental choice for an epithet, as Riyāzī is an appellation literally corresponding to what the term *mathematicus* signifies in the Renaissance context for those who were learned in the mathematical sciences (i.e. *al-‘ulūm al-*

²⁶ SK Yazma Bağışlar Ms. 4034, 13b: “*Qad iṭṭala ‘a kawākib hadihi ’l-aḥkām min falak al-ḍamīr wa ufq al-aqlām, afqar ‘ibādullāh al-rāḍī, ‘Alī al-nisāba al-Riyāzī.*”

riyāḍiyya) of geometry (*handasa*), arithmetic (‘*adad*), astral lore (*hay’a* and *nujūm*), and music (*mūsīqī*).²⁷ As such, the adoption of this epithet certainly displays the self-confidence of our protagonist in his knowledge of the mathematical sciences, which, as we have already examined in the first two chapters, constituted the prerequisite skills and knowledge for the accurate practice of learned astrology.

Riyāzī’s expertise, however, seems much more extensive than a standard coverage of mathematical sciences. As already mentioned in the third chapter, he features in contemporary biographical dictionaries as a polymath, equally adept in casting talismans and magic squares (*tılsım u nırencāt ve vefk*), geomancy (*reml*), celestial magic (*teneccüm ve da’vet*), philosophy (*hikmet*), logic (*mantık*), theology (*kelām*), and chronology (*tevārīh-i eyyām*).²⁸ As a son of a *devşirme*, he completed his standard *madrassa* education likely in the 1520s before he put himself in the early 1530s a master-apprenticeship configuration under the supervision of a certain Lütfullāh, who was one of the court *munajjims* at the time.²⁹ Around this time Riyāzī began to frequent the circles of such powerful bureaucrats as ara Bālızāde (d. 1537-8) and the chief treasurer İskender elebi (d. 1535), but we unfortunately lack any additional detail about his presence in the social environment of these wealthy residents of the blossoming capital.

²⁷ Darrell Rutkin!

²⁸ Aık elebi, *Meairü’s-uara*, v. 3, 1396-8.

²⁹ Very little is known about Lütfullāh, who is usually confounded in the current literature with Mollā Lütfi (d. 1495), an executed Ottoman ‘*ālim* upon allegations of heresy. The confusion results from misinterpreting an imperial order written in 1578 in which the chief judge of Istanbul was asked to procure for the newly constructed Istanbul observatory the relevant astrological-astronomical books of “the late Lütfullāh.” Both Adnan Adıvar and Cevad İzgi, two prominent names in Ottoman history of science, identify “the late Lütfullāh” as Mollā Lütfi without any substantial reason. However “the late Lütfullāh” mentioned in this imperial order was one of the court *munajjims* during the first half of the reign of Süleymān as clearly documented by archival register of payments at the time and his own copy of the horoscope, housed now in Kandilli Rasathanesi Library.

Although it is difficult to fully ascertain the date he started to work as a court *munajjim*, the earliest reference I was able to find about him in the scattered archival documents dates only back to 1548-9, a year before the construction of the Süleymaniye mosque started.

In terms of professional matters, the period preceding immediately the construction of the Süleymaniye mosque must be quite disquieting for Riyāzī. As I already demonstrated in the third chapter, in contrast to the pay levels of any other comparable palace personnel, the salary Riyāzī received at the time was significantly lower. Moreover, he might have been uneasy with his colleague Yūsuf b. ‘Ömer’s enjoying a more prestigious status than that of him, for in one of his verses that ‘Āşık Çelebi quotes, Riyāzī implies in a sarcastic tone the worthlessness of Yūsuf by identifying him as the ass of a body while casting himself as its head.

This possible resentment of him partially explains why Riyāzī decided in the first place to write a relatively long and detailed horoscope with sporadic insertions of personal remarks, instead of merely delivering in a short memo the date he would have advised to start the construction of the mosque. He must have used the sultan’s initial request for the planned construction as an opportunity to impart and persuade the court that by virtue of his unmatched expertise in the required mathematical sciences he was superior to all the other contemporary *munajjims*.

Compared to the brevity of astrological memos later court *munajjims* wrote to designate an auspicious moment for similar occasions, Riyāzī’s text is written in a codex form, containing elaborate explanations for his astrological reasoning and occasional insertions of his original verses, echoing his embittered voice. In the beginning of the text, for instance, he inserts one of his verses that highlight his uneasiness about his adverse fortunes while other inept individuals

receive more favors. In fact the entire horoscope is an explicit call to the sultan to reassess and appreciate his scholarly caliber. In the epilogue section of his treatise, Riyāzī maintains that many calamitous incidents have recently happened in his life, and several unbearable obstacles and adversities have hampered him living a blessed life. In a self-aggrandizing manner, Riyāzī refers here to his own intellectual merits and does not shy away from expressing his discomfort about the lack of meritocracy at his time:

“How strange it is that Riyāzī has no property in this world,
While he is equally well-versed in each of twenty four sciences.”³⁰

Riyāzī opens his treatise with a brief deliberation of the reasons of its composition. Accordingly, Süleymān, whom he glories as “the sultan of the Two Holy cities”, “the caliph of the two mosques”, “the destroyer of the idols and the houses of unbelief”, “the founder of the pavilion of the pure sharia and builder of the private columns of religion” demanded an auspicious hour to lay foundation of a Friday mosque which eventually became the Süleymaniye Mosque that still stands as one of the most significant landmarks of Istanbul.³¹ The mosque, for Riyāzī, will be placed on a high ground, resembling “the Iram of the lofty pillars the likes of which had never been created in the land.” (Q39: 6-7)

Ensuing this royal request, according to the narrative, Riyāzī made necessary calculations to determine the most auspicious hour to start the construction of the mosque. His wording here does not specify the type of instruments he used —whether a *zīj* or an astrolabe— to make these

³⁰ Riyāzī, 13b: “Yigirmi dört fününün her birinde Riyāzī yekfen olmuşken ‘acebdür! Ne malı var ne esbabı cihānda, fazīlet zilleti verse sebebdür”

³¹ Riyāzī, 1b-2a: “Sultānū ’l-ḥaremeyn...ḥalīfetü ’l-mescideyn...hādim-i büyüti ’l-küfr ve ’l-aşnām, bānī-i ḡaşr el-şer’ el-mübīn...mü’essis-i erkān-i maḡşūreti ’d-dīn.”

celestial calculations.³² He simply says that after diligently analyzing the planetary aspects and detecting the relative positions of the celestial objects according to the latitude of Istanbul, he designated a propitious hour, auspiciousness of which was acknowledged by contemporary astrologers and *taqwīm*-makers.³³ Accordingly, the foundation should be laid ground four hours and 12 minutes after sunrise on Thursday, 26 Jumādā I, 957/June 12, 1550 when the ascendant would be in the twentieth degree of the sign Leo.³⁴ Upon designating the exact date and time for his election, Riyāzī then places the chart for the horoscope of the designated moment. Unlike the prose section in which he established the ascendant in the twentieth degree of Leo, in the horoscope chart the ascendant is denoted as the twenty-second degree of Leo, a fact he would later explain in the text. Upon establishing the horoscope chart that denotes the celestial configuration of the astrologically important variables on the day, he starts elaborating the scientific foundations of his election and elucidates in nine short chapters the astronomical and astrological matters relevant to this choice.

In the first chapter Riyāzī explains the reasons for taking the sign Leo as the base for his calculation. He refers heavily to Abū al-Maḥāmid al-Ghaznawī's (d. later than 1154) relatively popular treatise *Kifāyat al-tā'lim fi šinā'at al-tanjīm*, which introduces the students of the science

³² During my research in Süleymaniye manuscript library I found two manuscripts, specifically two astronomical tables, bearing Riyāzī's possession notes. The first one is a commentary of Ilkhanid tables composed by Nizām al-Dīn Nishābūrī (d. 1328/9) and the second one is Mīrim Çelebi's (d. 1525) commentary on the Ulugh Beg tables. It is difficult to gauge which table Riyāzī was consulting for his calculations but as an erudite *munajjim* of his time, he was certainly knowledgeable about both the Maragha and Samarqand tradition.

³³ Riyāzī, 2a: "*Tecessüs-i ittişālât-ı āsumānī ve teferrüs-i enzâr-ı ecrâm-ı nūrānī idüb eṭbâq-ı durüc-ı semevâtı ve evrâq-ı burüc ve derecâtı harfen be-harfen ve mazrûfen ve zarfen tetebbu' olındıqda bîr sâ'at-i mes'ûde ve vaqt-i maḥmûde ihtiyâr olundı ki...*"

³⁴ Ibid.: "*sene seb'a ve ḥamsîn ve tis'a mi'e Cemâze'l-ülâsınıñ yigirmi altıncı gün pençsenbih gününde tülû'-i Şemsden dört sâ'at ve on iki daḳka mürür itdikde ki ufq-ı dârü'l-mülk Koştantiniyye... 'de Esed burcu ufukda vâkı' ve yigirminci derecesi ṭâli' olur.*"

of the stars the movements and characteristics of celestial objects and imparts them the methods for different forms of astrological practice.³⁵ With reference to Ghaznawī, Riyāzī says that when a royal enterprise is in question the astrologer should take into account the royal sign (i.e. Leo) as well as the two luminaries (the Sun and the Moon) and the two remotest planets (the Saturn and Jupiter).³⁶ The signs ruled by Saturn —the Capricorn and Aquarius respectively – are not appropriate to choose for this specific enterprise, because the first one is a tropical sign, not propitious for matters related to construction, and the second one is an inauspicious sign. In a similar vein the signs ruled by Jupiter are also not relevant for construction business. Moreover, as Riyāzī says, during that particular season the ascendants of these two signs would take effect in nighttime, which thus renders them invalid as an option to start the construction. The Cancer, another tropical sign ruled by the Moon, is also not suitable for this kind of election. Therefore, the only available option is Leo, which is a fixed and royal sign appropriate for imperial construction. As Riyāzī maintains, other authorities, including Kūshyār, are also in full agreement about the validity of Leo in designating an auspicious moment for a royal construction activity.³⁷

In yet another reference to Ghaznawī, Riyāzī says in the remaining part of the first chapter that the nativity of the querent (i.e. the Sultan in this instance) is equally important for accurately electing the auspicious moment, for it should be in harmony with the horoscope of the designated

³⁵ Younes Karamati, Farzin Negahban, “Abu al-Mahamid al-Ghaznawi,” *Encyclopedia Islamica*. Online version.

³⁶ Riyāzī, 3a: “*Üstād-ı erbāb-ı tencīm şāhib-i Kifāyat al-ta’līm eydür: a’ māl-i mülükda burūc-ı melikiyyenüñ eli ve kevākib-i ‘ulvyiyye ve neyyireynüñ medhali gerekdür.*”

³⁷ Ibid.: “*Üstād-ı nāmdār Hekīm Kūşyār asbet-i burūc-ı şābitedir diyü i ‘tibār itmişdür ve Hekīm İsmā‘il daḥi burūc-ı şābiteden bināya enseb ve evlā burç Esed’dir diyü da’vā itmişlerdir.*”

hour.³⁸ Like many other practicing *munajjims* of the time would think, says Riyāzī, each person is born under different astrological conditions. Therefore the most auspicious time to hold an event should be different for different individuals. Here he makes a medical analogy by saying that irrespective of its potential benefits; a medicine would inevitably fail if it does not conform to the bodily constitution (*mizāc*) of the particular person. In a similar vein, the selection of an auspicious moment would not turn out good unless it complies with the natal horoscope of the querent.³⁹ Riyāzī does not give in full detail here the nativity of Süleymān, except implying that the fourth, sixth, seventh (the descendant), and the twelfth houses on his nativity were malefic.⁴⁰

In the second chapter Riyāzī explains the reasons why he found it important to rectify the degree of the ascendant and set it as the 22nd degree of Leo as opposed to the consensus of contemporary astrologers on the 20th degree of the same sign.⁴¹ Unlike other astrologers who tend (or whom Riyāzī thinks tending) to believe that each degree of astrological signs produce more or less the same effects, Riyāzī emphasizes the important nuances resulted from the

³⁸ Ibid., 3b: “[Ü]stād-ı kâ'id Ebū Hāmid [Gaznevī] cümle-i ihtiyārâtda şāhib-i ihtiyāruñ t̄ali '-i vilādetini dahı ma'lūm olduḡda ri'āyet ve t̄ali '-i muhtāra münāsebet kaşdın itmek gerekdür dimişlerdür.”

³⁹ Ibid.: “Şerbet fī nefsi 'l-emr her ne deñlü müfīd ve nāfi ' ve emrazı dāfi ' dahı olursa çün mizāc-ı marīze münāsib ve muvāfık olmaya, fāidesi zāhir olmaz. Pes vaḡt-i ihtiyār ve t̄ali '-i muhtār her ne mertede ḡadd-i zatında mes'ūd ve bi-ḡasab-i delāil maḡmūd olursa dahı çün şāhib-i ihtiyāruñ t̄ali '-i vilādetine muvāfakātı ve delāiline münāsebeti olmaya, sa'ādet-i ma'mūle el virmez. Bu cihetden gerekdür ki t̄ali '-i muhtār gerekdür ki şāhib-i ihtiyāruñ t̄ali '-i vilādetinde vāḡi ' olan buyūt-ı nuḡsudan olmaya, sādīs ve rābi ' ve şāni ' aşer ve sābi ' gibi.”

⁴⁰ As Riyāzī's discussion in this text reveals, the birth and accession horoscopes of Süleymān must have been in circulation at the time. However, to date, I have not been able to locate any of them in any of the manuscript libraries I conducted research, not I have come across any such references in a contemporary narrative source.

⁴¹ Riyāzī, 4a: “Cumḡūr-ı aşāb-ı tencīm ve cümle-i erbāb-ı taḡvīm ittifāk ve tedbīr ve ta'yīn itdikleri dereceyi tagyīr ve derece-i uḡraya te'ḡīr itmesinin beyanındadır: Cümle-i müneccimīn ve cumḡūr-ı muḡavvimīn ittifāk itdiler ki t̄ali '-i mübārek Esed burcunuñ yigirminci derecesi ola ammā derece-i mezkūreyi ihtiyār kaşda muḡārenet ve bu ḡuşūşa ziyāde münāsebetle deḡildür. Belki bir ittifāk idi ki ittifāḡı vāḡi ' ve bir tercīh idi ki bilā-müreccaḡ şāyi ' oldı.”

differences in the individual degrees of the sign. As he states, just as the different zodiacal signs have varying terrestrial influences, different degrees of a particular sign also leads to diverging outcomes, and thus should be interpreted accordingly.⁴² This rule is, according to Riyāzī, already established in the treatises transmitting Babylonian secrets and in some of those books written by Muslim philosophers.⁴³ Riyāzī says that after he consulted several books of earlier authorities, particularly the teachings of Teucros, who was known in the Islamic world under the name Tangalūshā, he decided to rectify the ascendant into the 22nd degree of Leo, because this degree signifies piety and sound belief.⁴⁴ By directly quoting a passage in Arabic attributed to Tangalūshā, Riyāzī maintains that if the 20th degree of Leo is to be selected, then the portents would not be promising because not only that the 20th degree is a malefic one, but also the corresponding fixed star is an ominous one, a fact other contemporary *munajjims* simply passed over. If the foundation of the mosque is laid ground when the ascendant is in the 20th degree of

⁴² Riyāzī, 4b: “*Burūcuñ āsārī mütefāvit ve aḥkāmı ‘alā sebīli’t-tagāyūr s̄abit oldığı gibi derecāt daḥı mütefāvitetü’l-āsār ve mütebāyinetetü’l-aḥkāmdır.*”

⁴³ Ibid: “*şuver-i derecāta müştēmil ve rumūz-ı Keldāniyyīne şāmil olan resāilde muḥarrer ve felāsife-i İslāmdan ba’zınuñ daḥı kitāblarında musaṭṭerdür.*”

⁴⁴ Ibid., 4b-5a: “*Pes fakīr bu ḥuşūşda ziyāde dikkat ve kütüb-i mezkūreye mürāca‘at idüb Esedüñ yigirminci derecesin tagyūr ve yigirmi ikinci derecesin taḥrīr...itdirdüm...Ḥekīm-i pīşvā Tengelūşā şuver-i derecātı şerḥ itdigi kitābda bu derece şerḥinde eydür: ‘yatla‘u fihā aḥad al-malāika al-‘uzmā ma‘ahā zammāra yazmīru bihā lā yasma‘ahu aḥad al-aṭrab ṭaraban shadīdan man wulida bihā yakūn ‘ābidan zāhidan bi-takallum al-ḥikma wa yaṭūlu ‘umruhu hadihi daraja mubāraka’*”

The text attributed to Tangalūshā was translated into Persian earlier than twelfth century but apparently Riyāzī had access to an Arabic version of it. Fakhr al-Dīn Rāzī’s book on celestial magic, *al-Sirr al-maktūm*, was also informed by the teachings of Tangalūshā. It is likely that Riyāzī learned the teachings of Tangalūshā through Rāzī’s work.

For the modern Persian edition of the text, see: *Tanklūsha*, az mu’allif-i nāshinākhtah, ed. Raḥīm Rizā Zādah Malik (Tehran: Mīrās-i Maktūb, 1384/2005). For Tangalūshā, see also: Živa Vesel, “Teucros in Nizami’s Haft Paykar,” in *A Key to the Treasure of the Hakim: Artistic and Humanistic Aspects of Nizami Ganjavi’s Khamsa*, ed. by Johann-Christoph Būrgel & Christine van Ruymbeke. Leiden: University Press, 2011, 245-252.

Leo, then majority of people would hesitate to frequent, and even dislike the mosque. Thereby the building would not receive the attention of pious residents.⁴⁵

Riyāzī's elaboration in this second chapter is important for a number of reasons. First of all, his alleged disagreement with contemporary *munajjims* as to the importance of the particular degree of the ascendant hints at the intellectual competition among practicing astrologers, who might have resorted to the teachings of different authorities and reached varying, and at times conflicting, interpretations. Through the end of this chapter, Riyāzī claims in a self-promoting manner that his explanations about the intricacies of the degree of the ascendant convinced his contemporaries to revise their initial position, and they thus came to acknowledge his scientific superiority more than ever.⁴⁶

Besides this scholarly rivalry among practicing *munajjims*, Riyāzī's concerns about the number of individuals that would frequent the mosque perfectly resonate the redefined and sharpened Sunni awareness among contemporary Ottoman political elites at the time. This period overlapping with the second half of Süleymān's reign witnessed a gradual shift from the earlier universalist ambitions on the political and religious spheres to a "more sober and orderly representation" of the empire.⁴⁷ Several methods and measures of social disciplining were

⁴⁵ Riyāzī, 5a: "eğer bu derecede vāki' olaydı nüfūs-ı 'āmmeniñ cāmi'-i mezkûra 'adem-i teveccühleri muḳarrer belki nefretleri muḳadder olub erbāb-ı zühd ve şalāḥ ve aşḫāb-ı 'iffet ve felāḥ çendān müteşevviḳ ve iltifatları müte'alliḳ olmazdı."

⁴⁶ Riyāzī, 5b: "ve bu me'ānī-i bedī' ayı beyān itdiḳde cümlesi bi'l-ittifāḳ semi'nen ve aḫa'nen diyüb teslīm ve münḳād ve müstahriciñ faẓiletine evvelden daḫı ziyāde i'tirāf ve i'tikād itdiler."

⁴⁷ Cornell H. Fleischer, "Shadows of Shadows: Prophecy in Politics in 1530s Istanbul," *International Journal of Turkish Studies*, 13/1-2 (2007), 61. For the importance of contrasting the diverse political and cultural realities of the second half of Süleymān's long reign with those in the first half, see: Fleischer, "The Lawgiver as Messiah: The Making of the Imperial Image in the Reign of Suleyman," in *Soliman le magnifique et son temps*, ed. Gilles Veinstein (Paris: La Documentation Française, 1992), 159-177; Gülru Necipoğlu, "A Kanun for the State, A Canon

introduced to implement state-sponsored confessional policies, promoting the Ottoman House as the ultimate protector of Sunni Islam against the heretical Safavids, European Christians, and recalcitrant Sufis with millenarian ideas. Through heresy trials, unruly dervish leaders were executed and others tamed.⁴⁸ Through the *fatwas* of SheikhuIslam Ebüssu‘ūd Efendi and the other legal writings of leading religious scholars, the irreligious character of the Safavid cause was constantly lamented. New congregational mosques were constructed in almost every neighborhood of the city and mosque worship was particularly promoted through new fines for irregular attendance.⁴⁹ Therefore Riyāzī’s explicit remarks on the importance of the quantitative aspect of mosque worshipping should be evaluated within this particular context of the political enforcement at the time of Sunni orthodoxy. In fact, the whole idea behind the construction of the Süleymaniye mosque was, as Gülru Necipoğlu has aptly remarked, to promote “the policy of religious orthodoxy enforced by a caliph-sultan seeking to legitimate his power as being in the service of the Sharia’s straight path.”⁵⁰

In the third and fourth chapters of this text, Riyāzī treats other celestial conditions and planetary positions that corroborate the auspiciousness of the designated moment, as they sign good fortune for the future course of the mosque. The first condition is related to the position of

for the Arts: Conceptualizing the Classical Synthesis of Ottoman Art and Architecture,” in *Soliman le magnifique et son temps*, 194-216.

⁴⁸ For the standard account of the history of these heresy trials, see: Ahmet Yaşar Ocak, *Osmanlı Toplumunda Zındıklar ve Mülhidler 15.–17. Yüzyıllar* (İstanbul: Tarih Vakfı, 1998), esp. 236-382.

⁴⁹ The discussion here is based on the following works: Tijana Krstic, *Contested Conversions to Islam: Narratives of Religious Change in the Early Modern Ottoman Empire* (Stanford, California: Stanford University Press, 2011), 107; Kaya Şahin, *Empire and Power in the Reign of Süleyman: Narrating the Sixteenth-Century Ottoman World* (New York: Cambridge University Press, 2013), 208-213.

⁵⁰ Gülru Necipoğlu, “The Süleymaniye Complex in Istanbul: An Interpretation,” *Muqarnas* 3 (1985), 92-117.

the Moon and Riyāzī associates its astrological significance with the potential monumentality of the intended mosque complex. For Riyāzī, the elevated ceiling of this noble construction will be like the tenth celestial sphere, and the designed courtyard will look like the ninth degree of paradise.⁵¹ The second astrological condition is linked to the station of Venus vis-à-vis the house upon which Moon exerts the utmost influence. According to Riyāzī this sign is a benefic one, also related, among other things, to the popularity of the mosque worshippers, as it signifies that the mosque would be the favorite of all people from diverse regions.⁵² Third astrological condition mentioned here refers to the firmness of the mosque’s architectural qualities.

When interpreting the fourth astrological condition, Riyāzī contrasts the yet-to-be-built Süleymaniye mosque to the *al-Aqsa* mosque, and more importantly to the *al-Bayt al-ma‘mūr*, ‘the Flourishing House’, which according to most Quran commentators is the heavenly counterpart of the Ka‘ba. For Riyāzī, the portents are obvious that the Süleymaniye mosque will be as refined as these two holy structures. Moreover the same portents also indicate that like Arafat, the Süleymaniye mosque will be brimful with pious and discerning people, and like Ka‘ba, men of the unseen realm (*rijāl al-ghayb*) will be ever-present there.⁵³ As to the interpretation of the fifth astrological condition, Riyāzī says that those who will perform their prayers in the Süleymaniye mosque will be prosperous and thriving. The interpretations of the

⁵¹ Riyāzī, 6a: “*delālet ider ki bu binā-yı şerīfīñ sakf-ı merfū ‘ı sipihr-i ‘āşir ve şahn-ı maşnū ‘ı behişt-i tāsi ‘olub kıbābınıñ ku ‘ūdı ahsen-i vücūh üzere meşdüd ve müşeyyed ve mināreleriniñ kıyāmı elif gibi memdüd ve müşedded ola.*”

⁵² Ibid.: “[D]elālet ider ki evveli mes ‘ūd ve ‘ākıbeti maħmūd ve bünyādı meşdüd ve ‘imādı memdüd olub manzūr-ı kibār olmağda müşārünileyh ve meşhūr-ı diyār olmada müttefikün ‘aleyh ola.

⁵³ Ibid., 6b: “[D]elālet ider ki bu cāmi ‘-i ‘ālī mānend-i Beyt-i Ma ‘mūr-ı Cāvidān ve Mescid-i Aqşā gibi ābādān olub ehl-i zūhd ve ‘irfānla ‘Arafāt gibi mālāmāl ve huzūr-ı ricālū ‘l-gaybla Ka ‘be-i müşerrefe mişāl ola.”

remaining conditions in this chapter and the next one are slanted rather towards expressing the beauty of the façade of the mosque, the exquisiteness of its view, and the divine protection it will enjoy against any sort of misfortune and affliction.

The fifth and sixth chapters of the treatise are devoted to a discussion on the importance of the harmony between four horoscopes: the horoscope of the Süleymaniye complex, the nativity of Süleymān, the horoscope of his accession to the throne, and the horoscope of the year-transfer of the most recent year (i.e. the year 957). For Riyāzī, all of these horoscopes are in compliance with each other, though he does not tabulate and verbally detail the remaining three. As Riyāzī emphasizes, such a harmony is indeed a rare instance, further signifying that the Süleymaniye mosque—he likens it one more time to the legendary Iram of the lofty pillars and Ka‘ba—will be strong, enduring, and immortal.⁵⁴

In the seventh chapter Riyāzī points to some of the inauspicious signs in the designated horoscope that could still be deployed for bringing auspicious consequences. Here he makes another medical analogy and states with an explicit reference to (ps.-) Ptolemy’s *Kitāb al-Thamara* that an erudite *munajjim* has to know how to balance the inauspicious portents just as a learned physician should know how much poisonous substances to put in one’s medication.⁵⁵

The eighth chapter is consecrated to the elaboration of the fortunes of the architect of the complex. Riyāzī says, without mentioning the name of Sinān (d. 1588), that the celestial

⁵⁴ Some of the phrases he uses in these chapters to emphasize the rarity of this situation are: *ittifāk-ı nādirendür; muvāfaqat-i garībedür; böyle düşmek be-gāyet nādirdür; garīb ittifākdur; ‘aceb muvāfaqat-ı fāli’dür.*

⁵⁵ Ibid., 10a: “*hükemā- yı ‘ilm-i nüjüm nuḥūsi dahı maḥallinde istiḥdām ve anları ba ‘zı tarīkiyle dāḥil-i aḥkām iderler ṭabīb-i ḥāzīk ve ḥekīm-i fāik sumūmātdan ba ‘zın miqdār-ı Mu’ayyen birle me ‘acīne maḥlūṭ ve tiryākātına merbūṭ itdiği gibi nitekim üstād-ı şana ‘at ve pişvā-yı ehl-i hey’āt cāsūs-ı felek Baṭlamyūs Semere adlū kitābınıñ kelime-i şānī ‘aşeresinde eydür.*”

configuration of the designated moment is a clear sign of the uniqueness of his acumen and originality of his architectural plan.⁵⁶ In the ninth and the last chapter, he tries to establish —on astrological terms— the possible end date of the construction. Riyāzī reaches two conclusions on the basis of his calculations as to the relative position of the Mars. According to the first conclusion, the construction would last 5 years 3 months and 23 days. According to the second one, it would last 4 years and 9 months. The discrepancy between the two derives, as Riyāzī maintains, from the fact that the first calculation takes as the starting point the moment foundations are to be dug, the second however only takes into account the actual start date of the construction activity. Yet as he explicitly says, all of these (astrological) indications and calculations are mere approximations and it is his hope that the construction of the complex will be finished within five years. Considering the fact that the actual construction process lasted for more than seven lunar years, this last chapter is a clear proof that the treatise was composed long before the completion of the mosque.⁵⁷

In all his remarks throughout the horoscope, Riyāzī mirrors the grand cultural, religious, and architectural meanings ascribed contemporaneously to the construction of the Süleymaniye mosque. The relatively long construction process of the Süleymaniye complex (1550-1557) is well documented thanks to the ample literature on this cultural landscape. For example Ömer Lûtfi Barkan published in two large volumes the detailed registers that list the type and amount

⁵⁶ Riyāzī, 12a: “*delālet ider ki mi ‘mārīñ fikri şāib ve tedbiri şākıb olub tarh-ı aqsāmı ‘adīmü’l-emsāl ve şūret-i kārñamesi bedī’ü’l-timsāl ve firāset-i mu‘ciz-nümāsı ‘acdden ‘ārī ve hazākat u taşarrufātu bi-gayr-ı fütürin cāri ola.*”

⁵⁷ Riyāzī, 12b: “*Pes delīl-i şānī beş yıl üç ay yigirmi üç güne delālet ider ve delīl-i evvel dört yıl ve toküz aya işāret ider. Ammā cāiz ki birisi ibtidā-i esāsdan intihāya şehādet ve birisi evvel-i mübāşeretden intihāya beşāret ide ammā bu delīller takrībīdir ve’l-ḥāşıl beş yıla dek inşā ‘allāh el-melik el-‘allām intihā ve itmām bulur.*”

of materials used, as well as the names, duties, and wages of workers employed in the construction.⁵⁸ The architectonics of the Süleymaniye mosque has also received the attention of scholars, particularly the professional architects, who have focused on the material features of the building.⁵⁹ Beyond these statistical and structural studies, Gülru Necipoğlu has revealed the political and cultural symbolism embedded in every aspect and detail of the construction of the Süleymaniye complex, from chief jurist Ebüssü'üd's (d. 1574) placing the cornerstone of the *mihrab* in the foundation ceremony and the titles used for Süleymān in the inscription to the columns and marbles brought from the ruined Temple of Jupiter in Baalbek to Istanbul.⁶⁰ Necipoğlu particularly emphasizes the cultural myths, cosmological references, and religio-political symbolism underlying the construction of the complex, and further argues that Süleymaniye was Süleymān's ultimate ideological testimony. In that regard, the foundation horoscope of the complex, and constant references of Riyāzī to the paradise or Ka'ba, provide an invaluable contemporary testimony complementing what earlier scholarship has outlined as to the political and cultural significance of the construction of the Süleymaniye Complex.

As to the date for the beginning of the construction, we have available a number of contemporary sources allowing us to make a comparison with the designated hour at the foundation horoscope, which was four hours and 12 minutes after sunrise on Thursday, 26 Jumādā I, 957/June 12, 1550. The most important of all these sources is the inscription that still

⁵⁸ Ömer Lûtfi Barkan, *Süleymaniye Cami ve İmaretini İnşaatı (1550-1557)*, 2 volumes (Ankara: TTK, 1972).

⁵⁹ Tanju Cantay, *XVI.-XVII. Yüzyıllarda Süleymaniye Camii ve bağılı yapıları* (İstanbul: Eren, 1989); Serpil Çelik, *Süleymaniye Külliyesi: Malzeme, Teknik ve Süreç* (Ankara: Atatürk Kültür Merkezi, 2009).

⁶⁰ Gülru Necipoğlu-Kafadar, "The Süleymaniye Complex in Istanbul: An Interpretation," *Muqarnas* 3 (1985), 92-117; *Ibid.*, *The Age of Sinan: Architectural Culture in the Ottoman Empire* (Princeton: Princeton University Press, 2005), esp. 207-222.

stands over the mosque's portal. The inscription, which was composed by the chief jurist Ebüssu'ūd and inscribed by the calligrapher Hasan Çelebi, a student of famous caligrapher Ahmed Karahisari (d. 1555-6), clearly reads that the construction began in the last few days of the Jumādā I 957 (*al-biḍāya fī awākhir Jumādā'l-ülā li-sana sab'a wa kamsīn wa tis'a-mi'a*).⁶¹ In the semi-autobiographical memoirs of the Ottoman chief architect Sinān, the starting date of the construction is also set as Jumādā'l-ülā of the year 957 (*ca.* June 1550), but unfortunately no specific day is mentioned. These information is further corroborated by the remarks of the empire's chief bureaucrat Celālzāde Muṣṭafā (d. 1567), who not only witnessed the construction of the complex but also attached it a great importance in his chronicle by reserving a separate lengthy chapter to introduce it as the “most articulate cultural statement of Ottoman imperial Sunnism.”⁶² According to Celālzāde, after the site for construction was determined and the foundations dug, the astrologers (*mehere-i erbāb-ı takvīm ve nücüm*) designated an auspicious hour and the foundation was laid accordingly on Thursday 27 Jumādā I 957.⁶³

When the information gleaned from these three key contemporary testimonies is juxtaposed side by side with the date suggested in Riyāzī's horoscope and the one presumably advised by

⁶¹ Cevdet Çulpan, “İstanbul Süleymaniye Camii Kitabesi,” in *Kanuni Armağanı* (Ankara: TTK, 1980), 291-299.

⁶² Şahin, 187.

⁶³ Funda Demirtaş, “Celâl-zāde Mustafa Çelebi, Tabakâtü'l-Memâlik ve Derecâtü'l-Mesâlik.” (Ph.D. Dissertation, Erciyes University, 2009), 719: “*Temel emri tamām olub temhīd-i esāsa kābiliyyet ve isti'dād geldikde mehere-i erbāb-ı takvīm ve nücüm bir sâ'at-i sa'd ihtiyār eylemişlerdi. Sene seb'a ve ḥamsīn ve tis'a mi'a cemāziye'l-evvelinüñ yigirmi yedinci ḥamīs-i meymenet-enīs güninde...*”

Modern conversion tables (see: <http://193.255.138.2/takvim.asp>) establish 27 JA 957 not as Thursday, as Celalzāde says, but rather as Friday. When converting dates from Hijri to Gregorian calendar, it is considered much more important to see whether corresponding days of the week fully overlap. Since both calculations give Thursday as the day during which construction started, we can simply disregard this one-day deficit and conclusively establish that the construction started on Thursday of the last week of Jumādā'l-ülā.

other *munajjims*, it becomes crystal clear that the imperial authority duly followed the ruling of astrologers. As regards to the question whether the imperial authority adopted Riyāzī's adjusted recommendation or that of other *munajjims*, who allegedly recommended the time when the Ascendant was in the 20th degree of Leo, it is not possible to give a definitive answer, as these two different computations in fact differ by only eight minutes in terms of their temporal equivalents.⁶⁴ Hence they must have corresponded the exact same day. This, however, makes it impossible for us to ascertain —on the basis of the evidence gleaned from contemporary sources— which recommended hour was taken into consideration. But the only thing that is clear is that despite the declining interest at the time in the cultivation of astrology and patronage of astral experts, the astrological advice of the *munajjims* was still taken into consideration for symbolically important events as the construction of an imperial mosque.

⁶⁴ In the concerning calculations, the astrological rules entail that at the rate of one degree, the ecliptic moves (in relation to the Earth) every four minutes. See: Elwell-Sutton (ed.), *The Horoscope of Asadullāh Mīrzā: A Specimen of Nineteenth-Century Persian Astrology*, 58.

Conclusion

This dissertation was set out to explore the astrological texts produced and circulated in the Ottoman realm, particularly at the Ottoman court, from the mid-fifteenth to the mid-sixteenth century. The initial research question was to examine whether the messianic and millenarian discourse proliferating at the time from “Tagus to the Ganges”, which often had recourse to the occult scientific principles as rhetorical devices, did permeate into the contemporary astrological corpus. The rich body of Ottoman astrological materials surviving from the period seemed as a promising source pool. This corpus consists primarily of almanac-prognostications (*taqwīms*) produced on a yearly basis, annotated horoscopes cast on specific occasions, and all sorts of astrological textbooks and astronomical tables (*zīj*) utilized by *munajjims* when practicing their craft. While these sources have provided surprisingly little evidence as to the advancement of messianic and millenarian claims, their sophisticated scientific underpinnings as well as their ability to resonate the immediate political, cultural, and patronage dynamics of their times make them valuable sources for historical purposes. It is, thus, the primary argument of this dissertation that exploring the hitherto neglected Ottoman astrological materials and visiting the lives of hitherto marginalized Ottoman astral experts (*munajjims*) can provide fresh insights into the intersecting layers of politics, culture, and knowledge production in the early modern Ottoman world.

The general conclusions that I have drawn after examining my research materials are summarized in the Introduction, therefore I would like to use this section as an opportunity to raise several issues that my dissertation has either scarcely covered or entirely left out of immediate discussion. I believe such a discussion will also be fruitful to address a number of

directions for future research.

The focus throughout this study has been upon the production of what the historians of science would call “learned” or “mathematical” astrology in the courtly setting. In this kind of astrological practice, the students and the patrons alike needed to be eager enough to undertake complex mathematical and astronomical computations for accurately determining celestial positions. Although the majority of the historians of scientific production in the Islamicate context still hesitates to acknowledge the inherent astrological concerns in the advancement of observational techniques and mathematical sophistication, the highly technical and “scientific” sources as *zīj*es are rather candid about it. This does not mean, however, that practitioners of this “learned astrology” were blasphemous astral determinists or wonder-workers with occult powers. Quite to the contrary, many of those practitioners in the field of learned astrology were alert about the limits of their craft, either on scientific or religious grounds, or sometimes even both. In that regard, the constant attacks directed against the astrologers and the charges, such as astral determinism, heresy, and disbelief do not necessarily apply for them.

Needless to say, this “learned” and/or “mathematical” astrology was but one form of astrological practice. There were other and mathematically less informed, if not altogether folk, versions of astrological praxis that also counted on the indisputable belief in astral causality with further affinity toward practicing magic. While it would be quite difficult, and historically inaccurate indeed, to strictly separate these two types of mindset from one another, I should say that the materials I have examined for this project fall rather into the first category than the other. There is, thus, a certain need to treat the less-technical production of astrological knowledge and its circulation in the Ottoman world on a wider social, geographical, and temporal scale.

One should, however, take into consideration the availability, quality, and variety of sources before undertaking any historical study. One important reason for focusing rather on the astrological materials produced in the courtly setting was the more systematic nature of these sources. Unlike scattered and fragmented textual artifacts circulated among more popular circles, the technical astrological writings, which were regularly composed for the consumption of the court, substantially alleviated the problem of documentation. It should be noted here that historians working on the practice and politics of astrology are already in a disadvantageous position because in many cases the exact service and presence of astrologers cannot be fully captured and reconstructed due mostly to the oral nature of astrological counseling. The high number of astrological textbooks in circulation, or the frequency of references in contemporary narrative sources to the anonymous astrologers does not always solve this conundrum of “documenting the undocumented.”

In terms of the temporal scope, although 1450s and 1550s have demarcated the chronological boundaries of this dissertation, this does not mean that astrological pursuits played no role afterwards in the Ottoman political, cultural, and intellectual spheres. In fact this scope could and should be extended toward the reign of Murād III (r. 1574-1595), whose turn is crucial for the cultivation of celestial knowledge through the establishment in the capital of the short-lived observatory. The relevant literature on the observatory rather focuses on the infamous episode of its destruction upon the *fatwa* of the shaikhulislam of the time, but the real scope and contents of the astral pursuits undertaken in the short-lived observatory of Taqī al-dīn and his collaborators still deserve a better and fair scholarly treatment.

Another important aspect that my dissertation has not properly addressed is the

penetration of astrological concepts and beliefs into courtly ceremonies and contemporary artistic and visual production. The studies in especially the early modern Mughal historiography have substantially demonstrated the importance accorded to the astrological teachings for the organization of the courtly order. In a similar vein, Mughal paintings have been mined for the powerful astrological symbolism and presence of astral experts therein. One can also add to this list the need for exploring architectural structures for tracking the traces of astrological influences.

As it is clear from this brief discussion and the longer treatment throughout the dissertation, exploring the influences and textual/visual sources of astrological practice/mindset in the late medieval and early modern Ottoman content can provide many fresh insights into the inextricable spheres of intellectual, political, cultural, and personal life in the early modern Ottoman world. The rich manuscript, archival, and visual sources descended from diverse periods and locations could easily be studied across different historiographical and chronological coordinates. Through such a theme-base study, it is even possible to rehabilitate the rigid compartmentalization in the modern Ottoman studies.

Appendix A: The list of astral experts at Bāyezīd II's court, 1503-1512.

Name	Status	Total # Occasions for receiving allowances	# of allowances in return for Presenting <i>Taqwīm</i>	Special Occasions	Active Years
Mevlānā Seyyid Munajjim	monthly salaried palace personnel	≥31	≥8	1 for the loss of his son	1503-1512
Mevlānā Mīrim Çelebi	monthly salaried palace personnel	16	N/A	1 for his wedding expenses, 1 for his wife's consumption	1503-1512
Sinān b. Munajjim ¹	Monthly-salaried palace personnel	≥10	≥5	N/A	1503-1512
Yūsuf b. 'Ömer el-Sā'atī	monthly salaried palace personnel	≥8	≥3	1 for Hajj expenses	1503-1512
Ardashīr b. Malik Ḥasan	monthly salaried palace personnel	≥5	≥5	N/A	1505-1512
Salmān-i 'Ajam	monthly salaried palace personnel	≥9	≥8	N/A	1503-1510
Seyyid İsmā'il	son of Sayyid Munajjim	≥8	≥5	N/A	1503-1512

¹ While it is true that in the Ottoman textual culture the names Sinān and Yūsuf were often used interchangeably for individuals named as Sinānuddīn Yūsuf, it is more likely that these Sinān and Yūsuf b. 'Ömer el-Sā'atī are two different individuals, maybe even brothers as the sons of a certain 'Ömer who is referred to in the register sometimes as *muwaqqit*, sometimes as *mu'adhdhin*, and sometimes as *munajjim*. For example in the relevant entries from the month of Dhū al-Ḥijja in the year 916, Sinān's name is recorded as the one given 500 aspers on the 25th of that month for the *taqwīm* he presented whereas Yūsuf apparently received his customary 500 aspers on the 29th.

İshāk munajjim	unspecified	≥8	≥5	N/A	1505- 1512
‘Alī	student of <i>Mīrim Çelebi</i>	≥3	≥3	N/A	1506- 1510
Murād muwaqqit	time-keeper at Edirne Bāyezīd Mosque Complex	≥2	≥2	N/A	1505- 1506
Muḥammed b. Hızır	sword-bearer	≥2	≥2	N/A	1505- 1506
Mirzā Beg	chief food taster of Shahzāda Aḥmed	≥2	≥2	N/A	1508- 1510
Mevlānā Sinān a.k.a. Qāḏī-i Baghdad	Instructor of religious sciences at the Sultaniya madrasa in Bursa	≥1	≥1	N/A	1507- 1508
‘Abd al- Raḥman munajjim	<i>munajjim</i> of Shahzāda Aḥmed	≥1	≥1	N/A	1509- 1510
Muḥammed b. Qāḏī-i Üsküb	unspecified	≥1	≥1	N/A	1512
Muḥammed b. Qāḏī-i Gelibolu	unspecified	≥1	≥1	N/A	1512
Receb	student of Māwlānā Sayyid Munajjim	≥1	≥1	N/A	1512
Mevlānā Şemseddīn	unspecified	≥1	≥1	N/A	1503- 1504
Muḥammed b. Kūṭbuddīn	unspecified	≥1	≥1	N/A	1505- 1506

Appendix B: The list of books on *'ilm al-nujūm* and *'ilm al-hay'a* at the Palace library (1502-3)

Transcription of the relevant section in 'Āṭūfī's catalogue
(The Library of the Hungarian Academy of Sciences, Török F59, p. 313-333)

Kitāb al-Qānūn al-Mas'ūdī fī 'ilm al-nujūm
Kitāb al-Qānūn al-Mas'ūdī fī 'ilm al-nujūm
Kitāb Madkhal al-Nujūm bi'l-Fārsiyya fī 'ilm al-nujūm
Risāla fī Samt al-Qibla min qibal 'ilm al-nujūm
Kitāb Miiftāh al-Nujūm bi'l-Fārsiyya
Zīj-i Khāqānī fī Takmīl-i Zīj-i Īlkhānī fī'l-nujūm
Zīj-i Ulugh Beg fī'l-nujūm
Kitāb Athmār wa Ashjār fī'l-nujūm fī mujalladin wāḥidin
Kitāb Zīj-i Īlkhānī fī'l-nujūm
Zīj Mawḏū' 'alā mā ṣaḥḥahu al-shaykh Ābū al-Wafā' wa aṣḥābuhu fī'l-nujūm
Zīj-i Ulugh Beg fī'l-nujūm
Zīj-i Īlkhānī fī'l-nujūm
Zīj-i Īlkhānī fī'l-nujūm
Zīj-i Ulugh Beg fī'l-nujūm
Kitāb Zīj-i Īlkhānī fī'l-nujūm al-marqūm bi-annihi bi-khaṭṭ muṣannifihi al-Naṣīr Ṭūsī
Zīj-i mujmal li-Mawlānā Kūchak al-Amāsī fī'l-nujūm
Zīj-i Ulugh Beg fī'l-nujūm
Kitāb Zīj wa Risāla fī'l-Ṭālī' wa Aḥkām al-Nujūm [mujalladin wāḥidin]
Kitāb Rawḍatu'l-Munajjimīn wa Kitāb Zīj-i Īlkhānī fī'l-nujūm wa Fann-i Uqlīdus min Kitāb Durratu'l-Tāj wa Kitāb Aḥkām al-A'wām fī aḥkām al-nujūm wa Burhān al-Kifāya fī'l-nujūm wa Tuḥfat al-Gharā'ib fī mujalladin wāḥidin
Zīj-i Khāqānī fī Takmīl-i Zīj-i Īlkhānī fī'l-nujūm
Zīj-i Ulugh Beg fī'l-nujūm
Kitāb al-Zīj al-Jāmi' li-Kūshyār fī'l-nujūm wa Kitāb mujmal al-uṣūl fī aḥkām al-nujūm li-Kūshyār wa Risāla Abī Ma'shar al-Balkhī fī ihtirāqāt al-kawākib fī mujalladin wāḥidin
Kitāb Kashf-i Ḥaqāyiq-i Zīj-i Īlkhānī fī Sharḥ-i Zīj-i Īlkhānī li-Nizām al-Dīn fī'l-Nujūm
Kitāb Kashf-i Ḥaqāyiq-i Zīj-i Īlkhānī fī Sharḥ-i Zīj-i Īlkhānī fī'l-nujūm
Kashf-i Ḥaqāyiq-i Zīj-i Īlkhānī fī Sharḥ-i Zīj-i Īlkhānī fī'l-nujūm
Sharḥ-i Zīj-i Ulugh Beg li-'Alī al-Qūshjī fī'l-nujūm
Sharḥ-i Zīj-i Ulugh Beg li-Mawlānā Mīrim Chalabī sallamahallāh ta'ālā fī'l-nujūm
Sharḥ-i Zīj-i Īlkhānī fī'l-nujūm
Sharḥ-i Zīj-i Īlkhānī al-musamma bi-Kashf-i Zīj-i Īlkhānī fī'l-nujūm

Kashf-i Ḥaqāyiq-i Zīj-i Īlkhānī fī Sharḥ-i Zīj-i Īlkhānī bi-khatt-i shāriḥihi fī'l-nujūm
Sharḥ-i Zīj-i 'Alī al-Qūshjī raḥimaha Allah ta'ālā bi'l-Fārsiyya fī'l-nujūm
Tarjama-i Risāla al-Jayb bi'l-Turkiyya min qibal al-hay'a wa'l-nujūm
Kashf al-Rayb fī 'amal al-Jayb min qibal al-hay'a wa'l-nujūm
Risāla Kāfiyya fī'l-Ḥisāb wa Risāla Sī Faṣl bi'l-Fārsiyya fī'l-nujūm fī mujalladin wāḥidin
Kitāb al-Ḥidāya fī'l-ḥikmat al-falsafiyya wa Sharḥ-i Kitāb al-Chaghmīnī fī'l-hay'a wa Sī Faṣl li-Khāja Naṣīr fī'l-nujūm fī mujalladin wāḥidin
Kifāya al-Ta'līm fī'l-nujūm
Kitāb al-Mukhtār min kutub al-ikhtiyārāt al-falakiyya fī'l-nujūm
Kifāya al-Ta'līm fī'l-nujūm
Al-Kitāb al-Bādi' fī aḥkām al-nujūm
Kitāb Kūshyār fī aḥkām al-nujūm wa Tarjama Kitāb Thamara-i Baṭlamyūs bi'l-Fārsiyya fī'l-nujūm fī mujalladin wāḥidin
Kitāb Madkhal al-Nujūm wa Kitāb Zubdat al-Raml wa Kitāb Ṭālī' al-Waqt fī'l-nujūm
Kitāb Madkhal al-Nujūm wa Kitāb Uṣūl al-Malāḥim min qibal al-nujūm
Risāla Tashrīḥ al-Ālāt min qibal al-nujūm
Kitāb Tarjama-i Kitāb Ṣuwar al-Kawākib bi'l-Fārsiyya al-marqūm bi-annihi bi-khaṭṭ mutarjimihi alladhī huwa al-Naṣīr Ṭūsī fī'l-nujūm
Risāla Wilādat-i Cem raḥimahallāh wa huwa Ibn Muḥammad Khān ṭāba tharāhumā fī'l-nujūm
Kitāb Madkhal manzūm fī aḥkām al-nujūm wa Risāla Sī Faṣl fī'l-nujūm wa Risāla al-Uṣṭurlāb min qibal al-nujūm fī mujalladin wāḥidin
Kitāb fīhi Arba' Maqālāt fī aḥkām al-nujūm wa Risāla al-Uṣṭurlāb min qibal al-nujūm fī mujalladin wāḥidin
Mukhtaṣar Madḥal ilā 'ilm aḥkām al-nujūm wa Tarjama al-Mukhtaṣar al-Madkhal ilā aḥkām al-nujūm bi'l-Fārsiyya
Kitāb al-'Amal bi'l-Uṣṭurlāb li-'Abd al-Raḥman al-Ṣūfī wa Risāla fī'l-'Amal bi'l-Uṣṭurlāb al-kurrī li-Ḥāmid bin 'Alī min qibal al-nujūm fī mujalladin wāḥidin
Kitāb Manhaj al-Ṭullāb fī 'Amal al-Uṣṭurlāb min qibal al-nujūm
Kitāb al-Aṣl fī 'ilm al-nujūm wa Sarāyir al-Asrār li-Abī Ma'shar al-Balkhī al-Munajjim
Mukhtaṣar fī Ma'rifat al-Uṣṭurlāb al-Naṣīr Ṭūsī min qibal al-nujūm wa Risāla al-Bāb al-Sābi' min Kitāb Qustā fī'l-'amal bi'l-kurra wa Risāla fī'l-Farq bayn al-Ḍād wa'l-Zā min qibal 'ilm al-Qirā'a wa Risāla ukhrā fī mujalladin wāḥidin
Sharḥ-i Bīst Bāb fī Ma'rifat-i Uṣṭurlāb min qibal 'ilm al-nujūm
Ikhtiyārāt al-Aḥkām al-'Alā'iyya fī'l-nujūm
Ikhtiyārāt al-Aḥkām al-'Alā'iyya fī'l-nujūm
Risāla Bīst Bāb fī Mā'rifat al-Uṣṭurlāb wa Risāla Sī Faṣl fī'l-nujūm wa Risāla fī'l-Rub' al-Mujayyab wa Risāla fī'l-Rub' min qibal al-nujūm fī mujalladin wāḥidin
Kitāb Jāmi' al-Mabādī wa'l-Gḥayat ma'a Noqṣān al-Fann al-Rābi' min al-khar fī mujalladayn fī'l-nujūm

Kitāb Jāmi' al-Mabādī wa'l-Ghāyat fī mujalladayn fī'l-nujūm
Risāla Mawḍi' al-Awqāt fī'l-nujūm
Tuḥfat al-Fuqarā' fī Rub' al-Dā'ira min qibal al-nujūm
Sharḥ-i Bīst Bāb fī Ma'rifat al-Uṣṭurlāb fī'l-nujūm wa Risāla fī Kayfiyya al-'Amal bi'l-Uṣṭurlāb al-Kurrī fī mujalladīn wāḥidīn
Mujmal al-Ikhtiyārāt fī'l-nujūm
Zubdat al-Hay'a wa Sī Faṣl bi'l-Farsiyya fī'l-nujūm fī mujalladīn wāḥidīn
Kitāb al-Ikhtiyārāt al-'Alā'iyya fī'l-nujūm wa Kitāb al-Dalā'il fī aḥkām al-nujūm fī mujallidīn wāḥidīn
Risāla Tabyīn al-Awqāt fī Ma'rifat Waḍ' al-Rukhāmāt min qibal al-nujūm
Kitāb Jāmi' Qawānīn 'ilm al-hay'a wa Risāla min qibal al-nujūm wa gayruhu fī mujalladīn wāḥidīn
Kitāb Yawāqīt al-Mawāqīt min qibal al-nujūm
Kitāb al-Mi'a wa'l-'Ishrīn fī Ḥisāb al-Ḍarb min qibal al-nujūm
Risāla bi'l-Fārsiyya fī'l-nujūm wa'l-ṭibb
Sharḥ al-Ṣafāyih al-Āfāqiyya fī'l-nujūm
Tarjama Kitāb Thamara Baṭlamyūs bi'l-Fārsiyya fī aḥkām al-nujūm
Kitāb al-Tafhīm fī'l-nujūm
Kitāb al-Jadwal al-Āfāqī fī'l-nujūm
Tarjama Kitāb al-Jadwal al-Āfāqī bi'l-Turkiyya fī'l-nujūm
Kitāb Jadwal Tashīl al-Qamar wa Jadwal Tashīl 'Uṭārid li-'Imād al-Dīn al-Bukhārī fī'l-nujūm
Kitāb al-Mudhākīrāt 'an Abī Ma'shar al-Balkhī fī aḥkām al-nujūm
Kitāb Wilādat-i Iskandar bin 'Umar Shaykh bin Amīr Taymūr min qibal al-nujūm
Kitāb Mi'yār-i Āfitāb fī Sharḥ-i Bīst Bāb fī Ma'rifat-i Uṣṭurlāb fī'l-nujūm
Kitāb Ṭālī'-i Wilādat-i Sulṭān Maḥammad bin Sulṭān Murād ṭāba tharāhumā wa ja'ala al-janna mithwāhumā min qibal al-nujūm
Kitāb Kūshyār fī aḥkām al-nujūm wa Kitāb Burhān Hay'a Falak wa Risālatān min qibal al-nujūm fī mujalladīn wāḥidīn
Kitāb Ikhwān al-Ṣafā fī funūn al-'ulūm ka-al-riyāḍiyyāt mithl 'ilm al-'adad wa'l-handasa wa'l-nujūm wa gayriha
Kitāb Ikhwān al-Ṣafā fī funūn al-'ulūm ka-al-riyāḍiyyāt mithl 'ilm al-'adad wa'l-handasa wa'l-nujūm wa gayriha
Kitāb Ikhwān al-Ṣafā fī funūn al-'ulūm ka-al-riyāḍiyyāt mithl 'ilm al-'adad wa'l-handasa wa'l-nujūm wa gayriha
Kitāb Ikhwān al-Ṣafā fī thuluth mujalladāt
Risāla fī Kayfiyya al-'Amal bi'l-Uṣṭurlāb al-Kurrī li-kull 'arḍin fī'l-nujūm
Kitāb al-'Amal bi'l-Kurra fī'l-nujūm
Jāmi' al-Qismayn min al-riyāḍī wa'l-ṭabī'i fī'l-nujūm wa'l-ṭibb
Sharḥ Sī Faṣl al-musamma bi-Muwaḍḍih al-Rusūm fī 'ilm al-nujūm

Kitāb al-Şūfī fī'l- 'Amal bi'l-Kurra wa Kitāb fī Ma'rifat al-Uşṭurlāb al-Musatta' wa Kitāb fī'l- 'Amal bi'l-Uşṭurlāb al-Kurrī wa Risāla al-Uşṭurlāb wa Kitāb fī'l- 'Amal bi'l-Kurra wa Kitāb al-Bīrūnī fī İstī'āb al-Wujūh al-Mumkina fī Şan'at al-Uşṭurlāb min qibal al-nujūm fī mujalladin wāḥidin
Risāla al-Uşṭurlāb al-musamma bi'l-Lubāb fī'l-nujūm
Risāla Aḥkām Ṭulū' al-Shu'rā naqlan 'an İdrīs al-Nabī alayhissalām fī 'ilm al-nujūm
Risāla Ma'rifat al-İrtifā' bi-gayr al-uşṭurlāb fī'l-nujūm
Risāla al- 'Amal bi'l-Kurra al-Falakiyya li-Qusṭā fī al-nujūm wa Risāla al-Uşṭurlāb al-Kurrī wa Risāla al-Uşṭurlāb wa Risāla al- 'Amal bi'l-Rub' al-Mawḍū' fīhi al-Muqanṭirāt fī mujalladin wāḥidin
Kitāb Aḥkām al- 'Alā' iyya bi'l-Fārsiyya fī'l-nujūm
Bustān al-Ḥikma fī İkhtiyārāt al-nujūm
Kitāb al-Tafhīm fī'l-nujūm
Kitāb al-Tafhīm fī'l-nujūm
Khams risāla fī'l- 'Amal bi'l-Rub' wa Risāla Qusṭā fī al- 'Amal bi'l-Kurra Dhāt al-Kursī fī'l-nujūm fī mujalladin wāḥidin
Kitāb al- 'Amal bi'l-Uşṭurlāb li'l-Şūfī wa Risāla al- 'Amal bi'l-Kurra li'l-Shaykh al-Mu'ayyad fī'l-nujūm fī mujalladin wāḥidin
Kitāb al-Tafhīm bi'l- 'Arabiyya fī'l-nujūm
Kitāb al-Masā'il li'l-Qaşrānī fī 'ilm aḥkām al-nujūm
Kitāb al-Masā'il li'l-Qaşrānī fī 'ilm aḥkām al-nujūm
Kitāb al-Masā'il li'l-Qaşrānī fī 'ilm aḥkām al-nujūm
Kitāb al-Masā'il li'l-Qaşrānī fī 'ilm aḥkām al-nujūm
Sharḥ-i Thamara-i Baṭlamyūs fī aḥkām al-nujūm
Kitāb al-İhtiyārāt bi'l- 'Arabiyya al-manzūma fī aḥkām al-nujūm
Majmū'a Rasā'il Ibn Al-Haytham ba'ḍiha fī samt al-Qibla wa ba'ḍiha fī khaṭṭ nişf al-nahār wa ba'ḍiha fī irtifā' al-quṭb min qibal al-nujūm
Sī Faşl bi'l-Fārsiyya fī'l-nujūm wa Madkhal-i manzūm fī'l-nujūm wa Rasā'il ukhrā fī mujalladin wāḥidin
Majmū'a min Rasā'il fī 'Amal al-Şafīḥa wa 'Amal al-Uşṭurlāb wa gayruha
Tarjama-i Risāla al-Şafāyih al-Āfaqiyya bi'l-Turkiyya min qibal al-nujūm
Risāla Wilādat-i Shāhzāda-i A'zam Mahammad bin Sultān al-Salāṭīn Sultān Bāyezīd Ḥān zādallāh ta'ala sa'ādatuhuma fī al-dārayn min qibal al-nujūm
Tarjama-i Thamara-i Baṭlamyūs bi'l-Fārsiyya fī aḥkām al-nujūm
Sharḥ-i Sī Faşl fī'l-nujūm
Sī Faşl bi'l- 'Arabiyya fī'l-nujūm
Ṭāli'-i Wilādat-i Muhammad Khān bin Murād Khān ṭāba tharāhumā wa ja'ala al-janna mathwāhumā min qibal al-nujūm
Kitāb İdrīs al-nabī alayhissalām fī aḥkām Shu'rā fī'l-nujūm

Sharḥ-i Bīst Bāb fī'l-Uṣṭurlāb
Risāla Baḥṭh azlāl al-Maqāyīs min qibal al-nujūm
Kitāb al-Azmān wa'l-Shuhūr min qibal al-nujūm
Risāla Fārsiyya fī'l-Uṣṭurlāb mukhtaṣar fī Ma'rifat al-Taqwīm fī'l-nujūm
Kitāb Fārsī ma'a ṣuwar al-burūj wa'l-kawākib fī'l-nujūm
Mukhtaṣar 'Abd al-Raḥman al-Ṣūfī bi'l-Fārsiyya fī Ṣuwar al-Kawākib
Kitāb Bīst Bāb al-muḥashshā fī'l-nujūm
Kitāb al-Anwā' wa'l-Azmina wa Ma'rifat A'yān al-Kawākib fī'l-nujūm
Risāla fī'l-'Amal bi-Ashal Ālat min qibal al-nujūm
Kitāb Jadāwil al-Tawārīkh wa'l-nujūm
Risāla fī 'ilm al-Uṣṭurlāb bi'l-'Arabiyya min qibal al-nujūm
Kitāb al-Īsti'āb fī 'ilm al-Uṣṭurlāb min qibal al-nujūm
Tarjama-i Kitāb-i Thamara-i Baṭlamyūs fī aḥkām al-nujūm wa Kitāb-i Kūshyār fī aḥkām al-nujūm fī mujalladin wāḥidin
Majmū'a min Jadāwil awwaluha Jadwal ṭab'uha burjiha min qibal al-nujūm
Muntakhab Kitāb-i Qirānāt-i Abī al-Ma'shar fī aḥkām al-nujūm
Kitāb Mujmal al-Uṣūl fī aḥkām al-nujūm
Risāla al-Uṣṭurlāb al-Zawraqī min qibal al-nujūm
Kitāb Īdrīs al-nabī alayhissalām fī Aḥkām-i Ṭulū'-i Shu'rā fī aḥkām al-nujūm
Risāla Fārsiyya fī aḥkām al-nujūm
Sharḥ-i Thamara-i Baṭlamyūs fī aḥkām al-nujūm
Risāla fī'l-Ḥisāb wa Kitāb al-Shajara wa'l-Thamara fī aḥkām al-nujūm fī mujalladin wāḥidin
Majmū'a min Rasā'il fihā Risāla Bīst Bāb fī 'Amal al-Uṣṭurlāb fī'l-nujūm wa Risāla fī Naẓm Rashīd al-Dīn al-Waṭwāt fī 'ilm al-'arūḍ
Kitāb al-Alwāḥ al-'Imādiyya fī'l-ḥikma al-falsafiyya wa Sī Faṣl bi'l-'Arabiyya fī'l-nujūm fī mujalladin wāḥidin
Risāla al-Maqāla al-ḥādī 'ashar fī 'amal al-Uṣṭurlāb fī'l-nujūm
Risāla Fattāḥī fī'l-Īnshā' wa Risāla al-'Adad bi-Awḍā' al-Aṣābi' wa Kitāb al-'Amal bi'l-Kurra fī'l-nujūm fī mujalladin wāḥidin
Muntakhab Kitāb Anwār al-Jawāhir fī Manāzil al-Qamar min qibal al-nujūm wa Risāla fī'l-Wafq wa Risāla Makātibāt al-Shaykh Ṣadr al-Dīn al-Qunawī ma'a al-Naṣīr Ṭūsī fī mujalladin wāḥidin
Majmū'a min Rasā'il fī'l-Rub' min qibal al-nujūm
Majmū'a awwaluha Ḥall-i Shukūk fī Kitāb-i Majistī fī'l-hay'a wa āhiruha Sharḥ-i Sī Faṣl fī'l-nujūm
Majmū'a awwaluha Risāla fī Kayfiyya al-Arṣād wa fī Kayfiyyat 'Amal Ālāt al-Raṣad wa Kayfiyya Īsti'māliha min qibal al-nujūm
Majmū'a fī aḥkām al-nujūm awwaluha Kitāb Hurmus wa huwa Īdrīs al-nabī alayhissalam wa dhalik al-kitāb huwa al-ma'rūf bi'l-Tāj
Majmū'a min Rasā'il fī aḥkām al-nujūm wa 'Amal al-Uṣṭurlāb wa gayruhu

Muntakhab Kitāb Abī Ma‘shar fī aḥkām al-nujūm wa gayrihi min Rasā’il al-nujūm
Risāla fī Samt al-Qibla min qibal al-hay’a wa’l-nujūm
Risāla fī’l-Hay’a wa Risāla fī’l-Daraj wa’l-Daqāyīq fī’l-nujūm wa Risāla fī’l-Ḥisāb fī mujalladin wāḥidin
Sharḥ-i maqālāt-i Baṭlamyūs fī’l-Qaḍā’ bi’l-nujūm ‘alā’l-ḥawādith
Risāla fī Wilādat-i Sultān Maḥammad Khān bin Sultān Murād Khān ṭayyaballāh ta‘ālā tharāhumā min qibal al-nujūm
Kitāb al-Mi‘a wa’l-‘Ishrīn fī Ḥisāb al-Ḍarb min qibal al-nujūm wa Risāla ‘alā ṭarīq al-sū‘āl wa’l-jawab fī’l-nujūm wa Rasā’il ukhra fī mujalladin wāḥidin
Sharḥ Sī Faṣl bi’l-‘Arabiyya fī’l-nujūm
Sharḥ Sī Faṣl bi’l-‘Arabiyya fī’l-nujūm
Risāla fī’l-Ālat al-nujūmiyya al-gayr al-mashhūra
Kitāb Abī al-Rayḥān al-Bīrūnī fī’l-Tafḥīm li-Awā’il al-Tanjīm
Risāla Tuḥfat al-Faqīr li-Munajjim Bālī fī Rub‘ al-Dā’ira
Kitāb Jadwal ‘uyyini fīhi Shuhūr al-Kabīsa al-Qamariyya bi-sinniha min qibal al-nujūm
Risāla fī’l-‘Amal bi’l-Basīṭa al-Zilliyya fī’l-nujūm
Mujallad Awwal min Tarjama Kitāb Ikhwān al-Ṣafā’ bi’l-Fārsiyya fī’l-riyādiyyāt wa gayriha
Mujallad min Kitāb Ikhwān al-Ṣafā’ fī’l-riyādiyyāt wa gayriha
Risāla al-‘Amal bi’l-Kurra Dhāt al-Kursī min qibal al-nujūm
Majmū‘a min Kutubin awwaluha Mukhtaṣar Firdaws al-Ḥikma wa fihā Kitāb al-tabṣira fī’l-Hay’a wa fihā Risāla ‘Alī bin ‘Isā fī’l-Uṣṭurlāb
Majmū‘a min Rasā’il awwaluha Risāla ‘Alā’iyya fī’l-Ḥisāb wa thāniyatuhā Risāla al-Muzhirāt fī’l-‘Amal bi’l-Muqanṭirāt wa thālithatuha Risāla Kashf al-Rayb fī’l-‘Amal bi’l-Jayb
Risāla al-‘Amal bi’l-Kurra al-Falakiyya min qibal al-nujūm wa Kitāb Da‘āwā Uqlīdus min qibal al-handasa
Kitāb al-Ḥawāshī fī’l-‘ilm al-riyāḍī
Risāla min qibal al-nujūm wa Risāla fī aḥkām al-nujūm wa Kitāb al-Shajara wa’l-Thamara fī aḥkām al-nujūm wa Risāla al-Wafq wa Kitāb al-Ṣibyān fī’l-Lugha fī mujalladin wāḥidin
Kitāb Ibn Sīnā fī’l-Mantiq wa’l-Ḥikma al-Falsafiyya wa Kitāb Zubdat al-Adrāt? Fī’l-Hay’a wa Risāla fī ‘ilm aḥkām al-nujūm wa Rasā’il ukhrā fī mujalladin wāḥidin
Nihāyat al-‘Idrāk fī ‘ilm al-hay’a
Kitāb fī ‘ilm al-Ḥisāb wa Sharḥ al-Tadhkira fī ‘ilm al-hay’a fī mujalladin wāḥidin
Kitāb Jihān-Dānish bi’l-Fārsiyya Tarjama al-Kifāya fī’l-‘ilm al-Hay’a
Kitāb al-Tuḥfat al-Shāhiyya fī ‘ilm al-hay’a
Ḥashiya Sharḥ al-Chaghmīnī fī ‘ilm al-hay’a
Kitāb Tahrīr al-Majistī fī’l-hay’a
Kitāb Faṣṣ al-Khātīm fī Hay’a al-‘Ālam fī’l-hay’a
Sharḥ al-Chaghmīnī fī ‘ilm al-hay’a
Risāla al-Kurra al-Falakiyya min qibal al-nujūm

Kitāb Uqlīdus fī'l-handasa al-Naṣīr Ṭūsī
Kitāb Uqlīdus fī'l-handasa
Kitāb Abī al-Wafā' fīma yahtāj ilayhi min a' māl al-handasa
Kitāb Ṣuwar al-Kawākib al-Ṣūfī min qibal al-handasa
Sharḥ Taḥrīr al-Majistī fī 'ilm al-hay'a
Kitāb Bayān al-Tadhkira fī Sharḥ al-Tadhkira fī 'ilm al-hay'a
Sharḥ al-Chaghmīnī li'l-Sayyid al-Sharīf fī 'ilm al-hay'a
Kitāb Uqlīdus li'l-Naṣīr Ṭūsī fī'l-handasa
Sharḥ al-Tadhkira fī 'ilm al-hay'a
Kitāb Uqlīdus fī'l-handasa li'l-Naṣīr Ṭūsī
Kitāb Nihāyat al-Īdrāk fī Dirāyat al-Aflāk li'l-Shirāzī fī'l-hay'a wa Sharḥ al-Risāla 'alā'l-Ḥarakat al-Daraja? fī mujalladin wāḥidin
Kitāb al-Tadhkira fī 'ilm al-hay'a
Kitāb al-Tadhkira fī'l-hay'a wa Kitāb Nihāyat al-Īdrāk fī'l-hay'a fī mujalladin wāḥidin
Sharḥ al-Tadhkira fī'l-hay'a
Nihāyat al-Īdrāk fī 'ilm al-hay'a
Ḥaṣhiya Sharḥ al-Chaghmīnī li'l-Niksārī fī 'ilm al-hay'a
Risāla Muḡniya fī 'ilm al-hay'a wa Sharḥ al-Risāla al-Muḡniya wa Zubdat al-Hay'a bi'l-Fārsiyya li'l-Naṣīr Ṭūsī fī mujalladin wāḥidin
Kitāb Uqlīdus li'l-Naṣīr Ṭūsī fī'l-handasa
Kitāb fa'altu fa-lā-talum fī'l-hay'a
Tarjama li'l-Chaghmīnī bi'l-Fārsiyya fī 'ilm al-hay'a
Kitāb Jihān-Dānish bi'l-Fārsiyya fī 'ilm al-hay'a
Kitāb fa'altu fa-lā-talum fī'l-hay'a
Kitāb al-Tadhkira fī'l-hay'a wa Sharḥ al-Tadhkira li-Niẓām al-Dīn fī'l-hay'a fī mujalladin wāḥidin
Sharḥ al-Chaghmīnī fī'l-hay'a wa Sharḥ al-Tadhkira al-musamma bi-Bayān al-Tadhkira fī 'ilm al-hay'a fī mujalladin wāḥidin
Sharḥ al-Tadhkira fī 'ilm al-hay'a
Kitāb Nihāyat al-Īdrāk fī 'ilm al-hay'a
Kitāb al-Uṣūl al-Aṣliyya fī'l-handasa
Talkhīṣ al-Makhrūtāt fī'l-handasa
Sharḥ al-Chaghmīnī li'l-Sayyid al-Sharīf fī'l-hay'a
Tarjama li'l-Chaghmīnī wa sharḥihi bi'l-Fārsiyya fī 'ilm al-hay'ā
Risāla fī 'ilm al-hay'a li-Mawlānā 'Alī Qūshjī
Matn Ādāb al-Baḥṭh fī 'ilm al-Jadal wa Matn al-Chaghmīnī fī 'ilm al-hay'a fī mujalladin wāḥidin
Tawḍīḥ al-Tadhkira fī Sharḥ al-Tadhkira fī 'ilm al-hay'a

Risāla Mawlānā Qūshjī bi'l-Fārsiyya fī'l-hay'a wa Risāla Fārsiyya fī 'ilm al-Ḥisāb wa Sharḥ Ashkāl al-Tā'sīs li-Qāḍizāda al-Rūmī fī'l-handasa fī mujalladin wāḥidin
Kitāb Uqlīdus li'n-Naṣīr Ṭūsī fī'l-handasa wa Sharḥ al-Maqāla al-'Āshira min Kitāb Uqlīdus li'l-Ahwāzī fī'l-handasa wa Risāla fī 'ilm al-Ḥisāb fī mucalladin wāḥidin
Hāshiya Sharḥ Ashkāl al-Tā'sīs li-Mawlānā al-marḥūm Quṭb al-Dīn Chalabī ṭāba tharāhu fī'l-Handasa
Hāshiya Sharḥ li'l-Chaghmīnī fī'l-hay'a
Kitāb al-Tadhkira fī'l-hay'a wa Sharḥ al-Tadhkira li-Nizām al-Dīn fī'l-hay'a fī mujalladin wāḥidin
Kitāb fī'l-hay'a wa Sharḥ al-Chaghmīnī li-Qāḍizāda al-Rūmī fī'l-hay'a fī mujalladin wāḥidin
Sharḥ al-Chaghmīnī li-Qāḍizāda al-Rūmī fī'l-hay'a
Sharḥ al-Chaghmīnī li'l-Sayyid al-Sharīf fī'l-hay'a
Hāshiya Sharḥ al-Tawālī' li'l-Sayyid al-Sharīf fī 'ilm al-Kalām wa Sharḥ al-Chaghmīnī li'l-Sayyid al-Sharīf fī'l-hay'a fī mujalladin wāḥidin
Kitāb al-Dawā'ir fī 'ilm al-hay'a
Sharḥ al-Tadhkira li-Nizām al-Dīn fī'l-hay'a
Kitāb al-Tabṣira fī 'ilm al-hay'a
Risāla Fāl-i Qurān wa Kitāb-i Jihān-Dānish fī'l-hay'a wa Risāla Fārsiyya fī Manāzira Baghdād wa Iṣfahān wa Risāla Munshā'at al-sāhib al-marḥūm fī mujalladin wāḥidin
Īthnān min Sharḥ al-Tabṣira bi-khaṭṭ mu'allifihī Muḥammad bin Mubārak Shāh fī'l-hay'a fī mujalladin wāḥidin
Fatkḥ al-Fatkhiyya fī Sharḥ al-Fatkhiyya fī'l-hay'a
Mulakhkhaṣ li'l-Chaghmīnī fī'l-hay'a
Kitāb al-Mulakhkhaṣ al-Mashhūr bi-matn Chaghmīnī fī'l-hay'a
Risāla al-'Amal bi-Dhāt al-Ḥalaq fī 'ilm al-hay'a
Sharḥ Kitāb al-Chaghmīnī li-Qāḍizāda al-Rūmī fī 'ilm al-hay'a
Sharḥ Kitāb al-Chaghmīnī li-Qāḍizāda al-Rūmī fī'l-hay'a wa Risāla li-'Ishq bi'l-Fārsiyya wa'l-Risāla al-Shamsiyya fī 'ilm al-Ḥisāb fī mujalladin wāḥidin
Sharḥ Kitāb al-Chaghmīnī li'l-Sayyid al-Sharīf fī'l-hay'a wa Sharḥ Kitāb al-Chaghmīnī fī'l-hay'a fī mujalladin wāḥidin
Kitāb 'Umda Khwarazmshāhī fī'l-hay'a
Kitāb Taḥrīr Majistī min qibal al-hay'a
Sharḥ Taḥrīr Majistī fī 'ilm al-hay'a
Kitāb al-Tajrīd fī Uṣūl al-Handasa wa Kitāb Uqlīdus wa Kitāb al-Kifāya fī 'ilm al-Ḥisāb fī mujalladin wāḥidin
Hāshiya Sharḥ Qāḍizāda li'l-Chaghmīnī fī'l-hay'a
Sharḥ Mulakhkhaṣ al-Chaghmīnī li-Qāḍizāda al-Rūmī fī'l-hay'a
Sharḥ Mulakhkhaṣ al-Chaghmīnī li'l-Sayyid al-Sharīf fī'l-hay'a
Thuluth Jumal min Kitāb Durrat al-Tāj fī'l-Mantiq wa'l-Falsafa wa Tarjama Kitāb Uqlīdis min

Kitāb Durrat al-Tāj fī'l-Handasa fī mujalladin wāḥidin
Kitāb al-Tabṣira fī 'ilm al-hay'a
Tarjama Sharḥ al-Sayyīd al-Sharīf li-Kitāb al-Chaghmīnī bi'l-Turkiyya fī'l-hay'a
Kitāb Taḥrīr Majisṭī min qibal al-hay'a
Taḥrīr Majisṭī min qibal al-hay'a
Kitāb Uqlīdus li'l-Naṣīr Ṭūsī fī'l-handasa
Kitāb Uqlīdus li'l-Naṣīr Ṭūsī fī'l-handasa
Tawḍī' al-Tadhkira fī Sharḥ al-Tadhkira bi-khaṭṭ mu'allifihi Nizām al-Dīn fī'l-hay'a
Sharḥ al-Tadhkira fī'l-hay'a
Sharḥ Kitāb Majisṭī-i Baṭlamyūs fī'l-hay'a wa Sharḥ ākhar lahu ayḍan fī'l-hay'a wa Risāla fī Kayfiyya al-Raṣad bi'l-Ālāt fī mujalladin wāḥidin
Kitāb al-Tabṣira fī 'ilm al-hay'a
Ḥashiya Sharḥ Mulakhkhaṣ al-Chaghmīnī fī'l-hay'a
Sharḥ Ashkāl al-Tā'sīs fī'l-handasa
Sharḥ Taḥrīr Majisṭī al-musamma bi-Tafsīr al-Taḥrīr fī'l-hay'a
Zubdat al-Hay'a fī 'ilm al-hay'a
Sharḥ Mulakhkhaṣ al-Chaghmīnī li-Qāḍizāda al-Rūmī fī 'ilm al-hay'a
Kitāb Thābit bin Qurra fī'l-nisba al-mu'allifihi wa Sharḥ al-Shakl al-Mulaqqab bi'l-Qiṭā' min Kitāb Majisṭī fī'l-hay'a wa Risāla Thābit bin Qurra fī'l-Shakl al-Mulaqqab bi'l-Qiṭā' min Kitāb Majisṭī fī'l-hay'a fī mujalladin wāḥidin
Kitāb al-Tuḥfat al-Shāhiyya fī 'ilm al-hay'a
Kitāb al-Tuḥfat al-Shāhiyya fī 'ilm al-hay'a
Kitāb al-Tuḥfat al-Shāhiyya li'l-Quṭb al-Shirāzī fī 'ilm al-hay'a
Sharḥ al-Tadhkira al-musamma bi-tawḍī' al-Tadhkira fī 'ilm al-hay'a
Sharḥ al-Tadhkira al-musamma bi-tawḍī' al-Tadhkira fī 'ilm al-hay'a
Kitāb Uqlīdus li'n-Naṣīr Ṭūsī fī'l-handasa wa Risāla muta'alliqa bi-ba'd mawāḍi' Kitāb Uqlīdus fī'l-handasa fī mujalladin wāḥidin
Sharḥ al-Tadhkira fī 'ilm al-hay'a
Kitāb Ablūniyūs fī'l-Makhrūṭāt fī 'ilm al-handasa
Kitāb Ablūniyūs fī'l-Makhrūṭāt fī 'ilm al-handasa
Kitāb Taḥrīr al-Majisṭī li'l-Naṣīr Ṭūsī fī'l-Hay'a
Sharḥ Mulakhkhaṣ al-Chaghmīnī li-Qāḍizāda al-Rūmī fī'l-Hay'a wa Rasā'il ukhrā fī mujalladin wāḥidin
Kitāb al-Tuḥfat al-Shāhiyya bi'l-Arabiyya fī 'ilm al-hay'a
Majmū'a fihā Kutub al-Handasa wa'l-Hay'a wa gayriha
Kitāb Taḥrīr Majisṭī li'l-Naṣīr Ṭūsī fī'l-hay'a
Sharḥ Mulakhkhaṣ al-Chaghmīnī li-Qāḍizāda al-Rūmī fī'l-hay'a
Ḥashiya Sharḥ Qāḍizāda al-Rūmī li'l-Chaghmīnī fī'l-hay'a

Sharḥ Qāḍizāda al-Rūmī li'l-Chaghmīnī fī'l-hay'a
Sharḥ al-Tuḥfat al-Shāhiyya fī 'ilm al-hay'a
Kitāb al-Tuḥfat al-Shāhiyya fī 'ilm al-hay'a
Sharḥ Ashkāl al-Tā'sīs fī'l-handasa
Sharḥ Mulakhkhaṣ al-Chaghmīnī al-musamma bi-Ṭurur al-Mulakhkhaṣ fī'l-hay'a bi-khaṭṭ mu'allifihī
Sharḥ Mulakhkhaṣ al-Chaghmīnī li'l-Sayyīd Sharīf fī 'ilm al-hay'a
Taḥrīr Majistī fī 'ilm al-hay'a
Kitāb al-Tuḥfat al-Shāhiyya fī 'ilm al-hay'a
Majmū'a min al-mutawassiṭāt wa gayruha min qibal al-handasa wa'l-hay'a
Ḥawāshī al-Tuḥfat al-Shāhiyya fī'l-hay'a
Mulakhkhaṣ al-Chaghmīnī fī'l-hay'a wa sharḥuhu li'l-Sayyīd al-Sharīf fī mujalladin wāḥidin
Risāla Mawlānā 'Alī al-Qūshjī bi'l-Fārsiyya fī'l-hay'a
Sharḥ Qaṣīda al-Garā' fī Ḥarakāt al-Aflāk min qibal al-hay'a
Al-Qaṣīda al-Garā' fī Ḥarakāt al-Aflāk min qibal al-hay'a
Kitāb Ablūniyūs fī'l-Makhrūṭāt taṣanna'u Abī al-Ḥusayn fī'l-handasa
Majmū'a fihā Kitāb Uqlīdis li'n-Naṣīr Ṭūsī fī'l-Handasa wa Rasā'il ukhrā fī'l-handasa wa gayruha fī mujalladin wāḥidin
Majmū'a min Kutub al-Hay'a wa'l-Handasa awwaluha Kitāb Ablūniyūs
Kitāb Talkhīṣ al-Makhrūṭāt fī'l-handasa
Kitāb Jihān-Dānish fī'l-hay'a
Sharḥ al-Tadhkira bi-khaṭṭ al-Shāriḥ fī'l-hay'a
Risāla fī'l-Tashwīq ilā'l-Ḥaywa al-Dā'ima wa Risāla al-Barkār al-Shām min qibal al-handasa fī mujalladin wāḥidin
Majmū'a min Rasā'il Abī al-Futūḥ awwaluha fī'l-Shakl al-Rābi' fī'l-Mantiq wa'l-Bāqiyya fī'l-Handasiyyāt
Majmū'a min al-mutawassiṭāt wa gayruha fī'l-handasiyyāt
Majmū'a fihā Kitāb Uqlīdis wa'l-mutawassiṭāt fī'l-handasiyyāt wa Kitāb Taḥrīr al-Chaghmīnī fī'l-Hay'a wa'l-Tadhkira fī'l-Hay'a fī mujalladin wāḥidin
İkhhiyārāt Muzaḥfariyya fī'l-Hay'a wa Mukhtaṣar fī'l-Hay'a wa Risāla Muḡniyya fī'l-Hay'a fī mujalladin wāḥidin
Mutun Ashkāl al-Tā'sīs fī'l-Handasa wa Sharḥ Ashkāl al-Tā'sīs li-Qāḍizāda al-Rūmī fī'l-Handasa wa Mutun Ḥikma al-Hidāya fī mujalladin wāḥidin
Al-Risāla al-Mu'ayyaniyya bi'l-Fārsiyya fī'l-Hay'a
Sharḥ al-Tuḥfat al-Shāhiyya fī 'ilm al-Hay'a
Sharḥ al-Tuḥfat al-Shāhiyya li-Mawlānā 'Alī al-Qūshjī bi-khaṭṭihī fī'l-Hay'a
Sharḥ Ashkāl al-Tā'sīs fī'l-Handasa wa Sharḥ al-Chaghmīnī li-Qāḍizāda al-Rūmī fī'l-Hay'a fī mujalladin wāḥidin
Ḥāshiya Sharḥ al-Chaghmīnī fī'l-hay'a

Majmū‘a min Rasā’il fīl-handasa wa gayriha
Risāla ‘Arabiyya fīl-hay’a
Majmū‘a min Rasā’il Ibn al-Haytham wa fihā Kitāb Ablūniyūs fīl-Makhrūṭāt fīl-Handasa
Risāla Fathīyya fī ‘ilm al-hay’a wa Risāla Muḥammadiyya fī ‘ilm al-Ḥisāb fī mujalladin wāḥidin
Talkhīṣ al-Makhrūṭāt fīl-Handasa wa Rasā’il ukhrā fī mujalladin wāḥidin
Kitāb ‘Ajīb fīl-Hay’a wa Risāla ukhrā fī mujalladin wāḥidin
Kitāb ‘Ajīb fīl-Hay’a wa Risāla ukhrā fī mujalladin wāḥidin

Appendix C: The list of examined extant *taqwīms* from the mid-fifteenth to the early-seventeenth century

Dedicatee	Divinatory Tables	Chronology	Zīj	Language	Collection - Condition	Author	Year
Murād II	Yes	Universal History	Zīj-i Shāmil	Persian	BnF Supp. Pers. Ms. 367 (Individual Manuscript)	Ībrahīm b. Shaykh al-Munajjim wa' r-rammāl ibn al-Jamāl	15 N 842 [1438]
Murād II	Yes	Universal History	Unspecified	Turkish	BnF Turc Ms. 180 (Individual Manuscript)	Unspecified	2 Z 848 [1445]
N/A	Yes	Universal History	Unspecified	Turkish	Bodleian Hunt. Donat. Ms. 16 (Individual Manuscript)	Unspecified	13 ZA 849 [1446]
N/A	N/A	N/A	Unspecified	Turkish	BLM Or. 27 (Partial)	Unspecified	26 M 854 [1450]
Mehmed II	Yes	Universal History	Unspecified	Turkish	TSMK Bağdat 309 (Individual Manuscript)	Unspecified	18 S 856 [1452]
N/A	N/A	N/A	Unspecified	Turkish	BLM Or. 27 (Partial)	Unspecified	29 S 857 [1453]
Mehmed II	Yes	Universal History	Unspecified	Turkish	SK Nuruosmaniye 3080 (Individual Manuscript)	Unspecified	11 RA 858 [1454]

Dedicatee	Divinatory Tables	Chronology	Zij	Language	Collection - Condition	Author	Year
Mehmed II	N/A	N/A	Zij-i Shāmīl	Turkish-Persian	Bodleian Ms. Arch. Sel. 31 (Individual Manuscript)	Unspecified	15 SH 872 [1468]
Bāyezīd II	N/A	Universal History	Zij-i Jāmi' (li-Rukn Āmulī)	Persian	TSMK Bağdat 310 (Individual Manuscript)	Khiṭābī al-Ḥusaynī	9 R 894 [1489]
Bāyezīd II	Partial	N/A	Zij-i Muḥaqqaq-i Ilkhānī	Persian	Kandilli 365/1 (Bound together with <i>taqwīm</i> from 897)	Unspecified	20 R 895 [1490]
Bāyezīd II	N/A	N/A	Zij-i Jadīd-i Gurgānī	Persian	TSMK Bağdat 311 (Individual Manuscript)	Unspecified	20 R 895 [1490]
Bāyezīd II	Partial	N/A	Zij-i Jadīd-i Gurgānī	Persian	Kandilli 365/2 (Bound together with <i>taqwīm</i> from 895)	Unspecified	12 CA 897 [1492]
Bāyezīd II	N/A	Universal History	Zij-i Ilkhānī	Persian	TSMK Bağdat 312 (Individual Manuscript)	'Abd al-karīm b. Mawlānā Sinān a.k.a al-Ḥayātī	14 C 900 [1495]
Bāyezīd II	N/A	Ottoman History	Unspecified	Persian-Turkish	TSMK Revan 1711/1 (together with other <i>taqwīms</i>)	Unspecified	14 C 900 [1495]

Dedicatee	Divinatory Tables	Chronology	Zīj	Language	Collection - Condition	Author	Year
Bāyezīd II	N/A	N/A	Zīj-i Muḥaqqaq-i Īlkhānī	Persian	TSMK Bağdat 313 (Individual Manuscript)	Ḥamza b. ‘Abd al-kaṛīm	25 C 901 [1496]
Bāyezīd II	N/A	Universal History	Zīj-i Īlkhānī	Persian	TSMK Bağdat 314 (Individual Manuscript)	‘Abd al-kaṛīm b. Mawlānā Sinān a.k.a. al-Ḥayātī	6 B 902 [1497]
Bāyezīd II	Partial	N/A	Zīj-i Muḥaqqaq-i Īlkhānī	Persian	TSMK Bağdat 315 (Individual Manuscript)	Ḥamza b. ‘Abd al-kaṛīm	6 B 902 [1497]
Bāyezīd II	N/A	N/A	Zīj-i Muḥaqqaq-i Īlkhānī	Persian	TSMK Bağdat 316 (Individual Manuscript)	Nūr al-dīn b. Ḥamza	6 B 902 [1497]
Bāyezīd II	Yes	N/A	Zīj-i Muḥaqqaq-i Īlkhānī	Persian	TSMK Hazine 505 (Individual Manuscript)	Unspecified	17 B 903 [1498]
Bāyezīd II	N/A	N/A	Unspecified	Turkish	TSMK Revan 1711/2 (together with other <i>taqwīms</i>)	Unspecified	17 B 903 [1498]
Bāyezīd II	Yes	N/A	Zīj-i Jadīd-i Gurgānī	Persian	TSMK Hazine 513 (Individual Manuscript)	Unspecified	29 B 904 [1499]

Dedicattee	Divinatory Tables	Chronology	Zīj	Language	Collection - Condition	Author	Year
Bāyezīd II	Yes	N/A	Zīj-i Muḥaqqaq-i Īlkhānī	Persian	TSMK Bağdat 317 (Individual Manuscript)	Unspecified	29 B 904 [1499]
Bāyezīd II	N/A	N/A	Zīj-i Jadīd-i Gurgānī	Persian	TSMK Bağdat 318 (Individual Manuscript)	Unspecified	29 B 904 [1499]
Bāyezīd II	N/A	N/A	Zīj-i Muḥaqqaq-i Īlkhānī	Persian	TSMK Revan 1709 (Individual Manuscript)	Unspecified	10 SH 905 [1500]
Bāyezīd II	N/A	Universal History	Zīj-i Muḥaqqaq-i Īlkhānī	Persian	TSMK Bağdat 319 (Individual Manuscript)	Unspecified	21 SH 906 [1501]
Bāyezīd II	N/A	N/A	Zīj-i Muḥaqqaq-i Īlkhānī	Persian	Kandili 544 (Individual Manuscript)	Unspecified	21 SH 906 [1501]
Bāyezīd II	N/A	N/A	Zīj-i Muḥaqqaq-i Īlkhānī	Turkish	TSMK Bağdat 320 (Individual Manuscript)	Unspecified	2 N 907 [1502]
Bāyezīd II	Yes	N/A	Zīj-i Muḥaqqaq-i Īlkhānī	Persian	TSMK Bağdat 321 (Individual Manuscript)	Unspecified	24 N 909 [1504]

Dedicatee	Divinatory Tables	Chronology	Zīj	Language	Collection - Condition	Author	Year
Bāyezīd II	Yes	N/A	Zīj-i Muḥaqqaq-i Īlkhānī	Persian	TSMK Revan 1711/3 (together with other <i>taqwīms</i>)	Unspecified	24 N 909 [1504]
Bāyezīd II	N/A	N/A	Zīj-i Jadīd-i Gurgānī	Persian	TSMK Emanet Hazinesi 1712 (Individual Manuscript)	Salmān	23 N 909 [1504]
Bāyezīd II	Yes	N/A	Zīj-i Muḥaqqaq-i Īlkhānī	Persian	TSMK Revan 1711/4 (together with other <i>taqwīms</i>)	Unspecified	15 L 910 [1505]
Selīm b. Bāyezīd II	N/A	N/A	Zīj-i Jadīd-i Gurgānī	Persian	TSMK Revan 1711/5 (together with other <i>taqwīms</i>)	Unspecified	15 L 911 [1506]
Bāyezīd II	N/A	N/A	Zīj-i Jadīd-i Gurgānī	Persian	TSMK Revan 1711/6 (together with other <i>taqwīms</i>)	Unspecified	27 L 912 [1507]
Bāyezīd II	Yes	Universal History	Zīj-i Jadīd-i Gurgānī	Persian	British Library Ms. Or. 6432 (together with <i>taqwīm</i> from 960)	Yūsuf b. Ḥasan al-Ḥusaynī a.k.a. Qādī-i Baghdad	9 ZA 913 [1508]

Dedicattee	Divinatory Tables	Chronology	Zīj	Language	Collection - Condition	Author	Year
Bāyezīd II	N/A	N/A	Zīj-i Muḥaqqaq-i Ilkhānī	Persian	IU FY 32 (Individual Manuscript)	Unspecified	29 ZA 913 [1508]
Bāyezīd II	Yes	N/A	Zīj-i Muḥaqqaq-i Ilkhānī	Persian	TSMK Revan 1711/7 (together with other <i>taqwīms</i>)	Unspecified	19 ZA 914 [1509]
Ahmed b. Bāyezīd II	Yes	Universal History	Zīj-i Muḥaqqaq-i Ilkhānī	Persian	SK Esad Efendi 1978 (Individual Manuscript)	‘Abd al-Raḥman	30 ZA 915 [1510]
Bāyezīd II	N/A	N/A	Zīj-i Jadīd-i Gurgānī	Persian	TSMK Revan 1711/8 (together with other <i>taqwīms</i>)	Unspecified	30 ZA 915 [1510]
Bāyezīd II	Yes	N/A	Zīj-i Muḥaqqaq-i Ilkhānī	Persian	TSMK III. Ahmed 1960 (Individual Manuscript)	Yūsuf b. ‘Ömer el-Sā‘atī	12 Z 916 [1511]
Bāyezīd II	Yes	N/A	Zīj-i Muḥaqqaq-i Ilkhānī	Persian	TSMK Revan 1711/9 (together with other <i>taqwīms</i>)	Unspecified	22 Z 917 [1512]
Selīm I	Yes	N/A	Zīj-i Jadīd-i Gurgānī	Persian	TSMK Emanet Hazinesi 1710 (Individual Manuscript)	Yūsuf b. ‘Ömer el-Sā‘atī	3 M 919 [1513]

Dedicatee	Divinatory Tables	Chronology	Zīj	Language	Collection - Condition	Author	Year
Selīm I	N/A	N/A	Zīj-i Muhaqqaq-i Ilkhānī	Persian	TSMK Revan 1711/10 (together with other <i>taqwīms</i>)	Unspecified	23 M 919 [1513]
Selīm I	N/A	N/A	Zīj-i Jadīd-i Gurgānī	Persian	TSMK Revan 1711/11 (together with other <i>taqwīms</i>)	Unspecified	113 M 920 [1514]
Selīm I	N/A	N/A	Zīj-i Jadīd-i Gurgānī	Persian	SK Esad Efendi 1978 (Individual Manuscript)	Yūsuf b. ‘Ömer el-Sā‘atī	17 S 923 [1517]
Selīm I	N/A	N/A	Unspecified	Turkish	TSMK Emanet Hazinesi 1695 (Individual Manuscript)	Kh ^w āce Kemāl	9 RA 925 [1519]
Süleymān	N/A	N/A	Zīj-i Jadīd-i Gurgānī	Persian - Turkish	TSMK Revan 1711/13 (together with other <i>taqwīms</i>)	Yūsuf b. ‘Ömer el-Sā‘atī	16 CA 931 [1525]
Süleymān	N/A	N/A	Zīj-i Jadīd-i Gurgānī	Turkish-Persian	Arkeoloji Müzesi 1607/1 (together with <i>taqwīm</i> 932)	Necmeddīn b. Seyyīd Muḥammed	27 CA 932 [1526]
Süleymān	N/A	N/A	Zīj-i Jadīd-i Gurgānī	Persian	Arkeoloji Müzesi 1607/2 (together with <i>taqwīm</i> 932)	Unspecified	27 CA 932 [1526]

Dedicatee	Divinatory Tables	Chronology	Zij	Language	Collection - Condition	Author	Year
N/A	N/A	N/A	Zīj-i Jadīd-i Gurgānī	Turkish	BnF Turc Ms. 183 (partial)	Unspecified	27 CA 932 [1526]
Süleymān	N/A	N/A	Zīj-i Jadīd-i Gurgānī	Turkish	TSMK Revan 1711/14 (together with other <i>taqwīms</i>)	Yūsuf b. 'Ömer el-Sā'atī	27 CA 932 [1526]
Süleymān	N/A	N/A	Zīj-i Jadīd-i Gurgānī	Turkish-Persian	Kandilli 333 (Individual Manuscript)	Unspecified	9 C 933 [1527]
Süleymān	N/A	N/A	Zīj-i Jadīd-i Gurgānī	Persian	TSMK Revan 1711/15 (together with other <i>taqwīms</i>)	Yūsuf b. 'Ömer el-Sā'atī	9 C 933 [1527]
Süleymān	N/A	N/A	Zīj-i Jadīd-i Gurgānī	Persian - Turkish	TSMK Revan 1711/16 (together with other <i>taqwīms</i>)	Necmeddīn b. Seyyīd Muhammed	29 C 935 [1529]
Süleymān	N/A	N/A	Zīj-i Jadīd-i Gurgānī	Persian	TSMK Revan 1711/17 (together with other <i>taqwīms</i>)	Yūsuf b. 'Ömer el-Sā'atī	21 B 937 [1531]
Süleymān	N/A	N/A	Zīj-i Jadīd-i Gurgānī	Turkish	TSMK III. Ahmed 3497 (Individual Manuscript)	Al-Sayyīd al-Munajjim al-Tokafī a.k.a. Ibn Sayyīd Tāj	21 B 937 [1531]

Dedicatee	Divinatory Tables	Chronology	Zij	Language	Collection - Condition	Author	Year
N/A	N/A	N/A	Zij-i Jadīd-i Gurgānī	Turkish	BLM Or. 156 (Partial)	Unspecified	3 SH 938 [1532]
Süleymān	N/A	N/A	Zij-i Jadīd-i Gurgānī	Turkish	BnF Turc Ms. 183 (Partial)	Necmeddīn b. Seyyīd Muḥammed	7 N 941 [1535]
N/A	N/A	N/A	N/A	Turkish	BLM Or. 156 (Partial)	Unspecified	18 M 954 [1547]
Süleymān	N/A	N/A	Zij-i Jadīd-i Gurgānī	Persian	TSMK Revan 1711/18 (together with other <i>taqwīms</i>)	Necmeddīn b. Seyyīd Muḥammed	11 S 956 [1549]
Süleymān	N/A	N/A	Zij-i Jadīd-i Gurgānī	Turkish	British Library Ms. Or. 6432 (together with <i>taqwīm</i> from 913)	Necmeddīn b. Seyyīd Muḥammed	26 RA 960 [1553]
Süleymān	N/A	N/A	Zij-i Jadīd-i Gurgānī	Turkish	TSMK Revan 1711/19 (together with other <i>taqwīms</i>)	Yūsuf b. ‘Ömer el-Sā’atī	7 R 961 [1554]
N/A	N/A	N/A	Zij-i Jadīd-i Gurgānī	Turkish	BnF Turc Ms. 183 (Partial)	Unspecified	9 CA 964 [1557]
Süleymān	N/A	N/A	Zij-i Jadīd-i Gurgānī	Turkish	Kandilli 546 (Individual Manuscript)	Yūsuf b. ‘Ömer el-Sā’atī	13 C 967 [1560]

Dedicatee	Divinatory Tables	Chronology	Zij	Language	Collection - Condition	Author	Year
N/A	N/A	N/A	N/A	Turkish	BLM Or. 156 (Partial)	Unspecified	19 SH 973 [1566]
N/A	N/A	N/A	N/A	Turkish	BLM Or. 242 (Partial)	Unspecified	? 974 [1567]
N/A	N/A	N/A	Zīj-i Jadīd-i Gurgānī	Turkish	BLM Or. 156 (Partial)	Unspecified	11 N 975 [1568]
N/A	N/A	N/A	N/A	Persian	TSMK Revan 1711/18 (together with other <i>taqwīms</i>)	Unspecified	4 L 977 [1570]
N/A	N/A	N/A	N/A	Turkish	BLM Or. 156 (Partial)	Unspecified	14 L 978 [1571]
N/A	N/A	N/A	Zīj-i Jadīd-i Gurgānī	Turkish	Kandilli 383 (Individual Manuscript)	Unspecified	25 L 979 [1572]
N/A	N/A	N/A	Zīj-i Jadīd-i Muḥaqqaq-i Mudaqqaq-i Şa'd al-dīnī [Taḳī al-Dīn's computations?]	Turkish	BLM Or. 27 (Partial)	Unspecified	6 ZA 980 [1573]
N/A	N/A	N/A	N/A	Turkish	BLM Or. 242 (Partial)	Unspecified	? 982 [1575]

Dedicatee	Divinatory Tables	Chronology	Zij	Language	Collection - Condition	Author	Year
N/A	Yes	Universal History	N/A	Turkish	BnF Turc Ms. 182 (Individual Manuscript)	Unspecified	27 ZA 982 [1575]
N/A	N/A	N/A	Zij-i Jadīd-i Muḥaqqaq-i Madaqqaq-i Shams al-Dīnī [Taqī al-Dīn's computations]	Turkish	BnF Arabe 2570 (Partial)	Unspecified	9 Z 983 [1576]
N/A	N/A	N/A	N/A	Turkish	BnF Supp. Turc Ms. 236 (Individual manuscript)	Unspecified	27 S 991 [1583]
N/A	N/A	N/A	Zij-i Jadīd-i Gurgānī	Turkish	Bodleian Hyde Ms. 40 (Individual manuscript)	Unspecified	22 RA 996 [1588]
N/A	N/A	N/A	Ḥisāb-i Raṣad-i 'Oṣmānī [Taqī al-Dīn's tables]	Turkish	Kandilli 340 (Individual Manuscript)	Yūsuf al-Ṭabīb a.k.a. Ibn al-Bakkāl	115 N 1009 [1601]
N/A	N/A	N/A	Zij-i Jadīd-i Gurgānī	Turkish	BnF Supp. Turc Ms. 235 (Individual manuscript)	Yūsuf al-Ṭabīb a.k.a. Ibn al-Bakkāl	22 ZA 1015 [1607]
N/A	N/A	N/A	N/A	Arabic	Michigan Library Ms. 794	Unspecified	14 B 1037 [1628]

Bibliography

SOURCES

Archival:

Topkapı Sarayı Müzesi Arşivi (TSMA)

Defter (D.): 5375, 5605, 9291/1-2, 9555, 9559, 9600, 9706, 9802, 10026, 10053, 10141, 10184.

Evrak (E.): 1698, 5375, 5605, 6172, 9555, 9802, 10053, 10159/6, 10159/145, 10818.

Başbakanlık Osmanlı Arşivi (BOA)

Kamil Kepeci (KK) 1764

Kamil Kepeci (KK) 1864

Maliyeden Müdevver (MAD) 559

Maliyeden Müdevver (MAD) 7118

BOA AE SMST III 50/3625.

BOA C. SM 37/1873.

BOA D. BŞM. MHF. 55:34.

BOA D. HMH. SFTH. 21941-B.

BOA Hat 14/576.

İstanbul Atatürk Kitaplığı

Muallim Cevdet O. 71.

İstanbul Müftülüğü Şeriye Sicilleri

Kısmet-i Askeriye (KA) 502

Kısmet-i Askeriye (KA) 1650

Unpublished manuscripts:

Arkeoloji Müzesi

Ms. 1607/1 [Anonymous *taqwīm* of the year 932/1526]

Ms. 1607/2 [Necmeddīn b. Seyyid Muḥammed, *Taqwīm* of the year 932/1526]

Bibliotheca Medicea-Laurenziana (BML)

BML Or. 24 [Naşīr al-Dīn Ṭūsī, *Zij-i İlkhānī*]

BML Or. 27 [Anonymous collection of *taqwīms* compiled by the late-16th century]

BML Or. 156 [Anonymous collection of *taqwīms* compiled by the late-16th century]

BML Or. 242 [Anonymous collection of *taqwīms* compiled by the late-16th century]

Bibliothèque Nationale de France (BnF)

BnF Arabe Ms. 2570 [Anonymous *taqwīm* of the year 983/1576]

BnF Arabe Ms. 4609 [Anonymous *Rasulid taqwīm ca.* 841/1438]

BnF Turc Ms. 180	[Anonymous <i>taqwīm</i> of the year 848/1445]
BnF Turc Ms. 182	[Anonymus <i>taqwīm</i> of the year 983/1576]
BnF Turc Ms. 183	[Anonymous collection of <i>taqwīms</i> from the mid-16 th century]
BnF Turc Ms. 186	[Anonymous collection of texts on <i>rūznāme</i> and <i>taqwīm</i>]
BnF Supp. Turc Ms. 235	[Yūsuf al-Ṭabīb a.k.a. Ibn al-Bakkāl, <i>taqwīm</i> of the year 1015/1607]
BnF Supp. Turc Ms. 236	[Anonymous <i>taqwīm</i> of the year 991/1583]
BnF Supp. Pers. Ms. 367	[İbrahīm b. Şeyḫ al-munajjimīn wa-r-rammāl, <i>taqwīm</i> of the year 842/1439]

British Library

Add. 5983	[Ḥayreddīn Konevī, <i>Kitāb-i ṭāli`-i mevlūd</i>]
Or. 3289	[Yaḥyā`'s burlesque <i>taqwīm</i>]
Or. 6432/1	[Necmeddīn b. Seyyid Muḥammed, <i>Taqwīm</i> of the year 960/1553]
Or. 6432/2	[Qādī-yi Baghdād, <i>taqwīm</i> of the year 913/1508]
Or. 11630	[Abū`l-Maḥāmīd b. Mas`ūd al-Ghaznawī, <i>Kifāyat al-ta`līm ft šinā`at al-tanjīm</i>]

Harvard University Library

Ms. Persian 33	[Rukn al-Dīn Āmūli, <i>Risāla Panjāh Bāb</i>]
----------------	------------------------------------------------

Huntington Library

Ms. HM71897	[Yaḥyā b. `Imād al-Yaḥyā, <i>Ṭāli`-i mavlūd-i Sulṭān Amīrzāda Rustam Bahadur</i>]
-------------	------------------------------------------------------------------------------------

İsmail Hakkı Konyalı Kütüphanesi

Ms. 153	[İbn İsā Saruhānī, <i>Rumūz al-kunūz</i>]
---------	--------------------------------------------

İstanbul Üniversitesi

FY 32	[Anonymous <i>taqwīm</i> of the year 913/1508]
-------	------------------------------------------------

Kandilli Rasathanesi Kütüphanesi

Kandilli 123	[Za`ıfı`'s collection of astronomical and astrological treatises]
Kandilli 310	[Sayyid Munajjim, <i>Laṭā`if al-kalām ft aḥkām al-a`vām</i>]
Kandilli 325	[Lüṭfullāh munajjim, <i>Risāla-i nujūm</i>]
Kandilli 333	[Anonymous <i>taqwīm</i> of the year 933/1527]
Kandilli 340	[Yūsuf al-Ṭabīb a.k.a. Ibn al-Bakkāl, <i>taqwīm</i> of the year 1009/1601]
Kandilli 365/1	[Anonymous <i>taqwīm</i> of the year 895/1490]
Kandilli 365/2	[Anonymous <i>taqwīm</i> of the year 897/1492]
Kandilli 371	[Müneccimbaşı Mehmed Çelebi, <i>Risāle-i Aḥkām-ı Nücüm</i>]
Kandilli 372	[Nücümī, <i>Mezāku`l-uşşāk ft `ilmi`l-āfāk</i>]
Kandilli 383	[Anonymous <i>taqwīm</i> of the year 979/1572]
Kandilli 396	[Anonymous, <i>Vilādet-i Sulṭān Bāyezīd</i>]

Kandilli 546

[Yūsuf b. ‘Ömer el-Sā‘atī, *taqwīm* of the year 967/1560]

Library of the Hungarian Academy of Sciences

Ms. Török 59

Oxford Bodleian

Arch. Sel. 31

[Anonymous *taqwīm* of the year 872/1468]

Hunt. Donat. 16

[Anonymous *taqwīm* of the year 849/1446]

Hyde 40

[Anonymous *taqwīm* of the year 996/1588]

Marsh 396

[*Zij-i Ulugh Beg va Sharḥ-i Zij-i Ulugh Beg li-‘Alī Qūshjī*]

Süleymaniye Kütüphanesi (SK)

Ayasofya Ms. 2414M

[Khiṭābi al-munajjim, *Jāmi‘ al-qismayn*]

Ayasofya Ms. 2432

[Anonymous collection of astronomical-astrological treatises]

Ayasofya Ms. 2474

[Naṣīr al-Dīn Ṭūsī, *Sī faṣl*]

Ayasofya Ms. 2618

[Anonymous, *Risāla al-ustūrlāb al-musammā bi‘l-lubāb fī‘n-nujūm*]

Ayasofya Ms. 2641

[Efezāde, *Sharḥ-i bīst bāb fī risāla-i ustūrlāb*]

Ayasofya Ms. 2667

[Anonymous, *Mi‘yār-i Āfiṭāb fī sharḥ-i bīst bāb-i ma‘rifat-i ustūrlāb*]

Ayasofya Ms. 2688

[‘Alī-Shāh Bukhārī, *Aṣmār va ashjār dar aḥkām-i nujūm*]

Ayasofya Ms. 2694

[Wābkanawī, *Zij-i Muḥaqqaq-i İlkhānī*]

Ayasofya Ms. 2697

[Mīrim Çelebi, *Sharḥ-i Zij-i Ulugh Beg*]

Ayasofya Ms. 2702

[Anonymous, *Mukhtaṣar madkhal ilā ‘ilm aḥkām al-nujūm*]

Ayasofya Ms. 2711

[Anonymous, *Kitāb yawāqit al-mawāqit min qibal al-nujūm*]

Ayasofya Ms. 2709

[Khiṭābi al-munajjim, *Muwaḍḍiḥ al-rusūm fī ‘ilm al-nujūm*]

Ayasofya Ms. 3635

[‘Abdurrahmān munajjim, *Jawhar ḥifẓ al-ṣiḥḥat fī al-ṭibb*]

Ayasofya Ms. 4024

[Shukrullāh Shirvānī, *Riyād al-qulūb*]

Bağdatlı Vehbi Ms. 2005

[Mīrim Çelebi, *Masā‘il dar Ta‘ṣīrāt-i Nujūm*]

Darülmesnevi Ms. 345

[Ḥāce Aṭā‘ullāh, *Risāla-i Rub*]

Esad Efendi Ms. 1997

[Khiṭābī, *Ṭāli‘-i Mavlūd-i Sulṭān Muḥammed*]

Esad Efendi Ms. 2147

[Kashfī, *Selīmnāme*]

Esad Efendi Ms. 2198

[Idris Bidlīsī, *Hasht Bihisht*]

Esad Efendi Ms. 3782

[Ibn Kemāl?, *Risāla-i Ṭılsımāt*]

Fatih Ms. 3421

[Nizām al-Dīn Nīsābūrī, *Kashf al-ḥaqā‘iq fī sharḥ Zij-i İlkhānī*]

Fatih Ms. 4357

[Ibn al-‘Ulayf, *al-Durr al-manzūm fī manākib Bāyezīd malik al-Rūm*]

Hacı Mahmud Ms. 6344

[Seyfullāh Çelebi, *Risāla fī‘t-takāvīm*]

Hafid Efendi Ms. 205/1

[Ḥāce Ebrī, *Melḥame-i Ibn ‘Ādil*]

Hamidiye Ms. 848

[Mīrim Çelebi, *Sharḥ-i Zij-i Ulugh Beg*]

Hüsrev Paşa Ms. 482

[Muḥammed Ṣāh Fenārī, *Anmūzaj al-‘ulūm*]

İzmir Ms. 479

[Mīrim Çelebi, *Kitāb fī aḥkām al-nujūm*]

İzmir Ms. 485

[Muṣṭafā Zekī, *Mücerrebāt*]

M. Nuri Efendi Ms. 151

[Mīrim Çelebi, *Sharḥ-i Zij-i Ulugh Beg*]

Nuruosmaniye Ms. 2782	[Anonymous Eretna <i>taqwīm</i> ca. 773/1371]
Nuruosmaniye Ms. 3080	[Anonymous <i>taqwīm</i> of the year 858/1454]
Reisülküttab Ms. 572	[Ps.-Ptolemy, <i>Kitāb al-Thamara</i>]
Yazma Bağışlar Ms. 1362	[Sayyid Munajjim, <i>Risāla al-shakl al-mughnī wa zillī</i>]
Yazma Bağışlar Ms. 4034	[Riyāzī, <i>Zāyiçe</i>]

Topkapı Sarayı Müzesi Kütüphanesi (TMSK)

III. Ahmed (A.) 1960	[Yūsuf b. ‘Ömer el-Sā’atī, <i>taqwīm</i> of the year 916/1511]
III. Ahmed (A.) 2010	[Abdurrahmān munajjim, <i>Jawhar ḥifz al-ṣiḥhat fī al-ṭibb</i>]
III. Ahmed (A.) 2128	[Epistle of <i>Ikhwān al-Ṣafā’</i> on <i>Astrunūmiyya</i>]
III. Ahmed (A.) 3317	[Naṣīr al-Dīn Ṭūsī, <i>Tadhkira fī ‘ilm al-hay’a</i>]
III. Ahmed (A.) 3328	[Naṣīr al-Dīn Ṭūsī, <i>Tahrīr al-Majistī</i>]
III. Ahmed (A.) 3343	[Marrākushi’s <i>Jāmi’ al-mabādī’ wa’l-ghayāt fī ‘ilm al-mīqāt</i>]
III. Ahmed (A.) 3495	[‘Abd al-salām al-muhtadī, <i>Ma’rifat ḥaqqīqat al-kawākib</i>]
III. Ahmed (A.) 3497	[Seyyid Mūneccim el-Tokatī, <i>taqwīm</i> of the year 937/1531]
Bağdat (B.) 309	[Anonymous <i>taqwīm</i> of the year 856/1452]
Bağdat (B.) 310	[Khitābī al-munajjim, <i>taqwīm</i> of the year 894/1489]
Bağdat (B.) 311	[Anonymous <i>taqwīm</i> of the year 895/1490]
Bağdat (B.) 312	[‘Abdulkerīm b. Mevlānā Sinān, <i>taqwīm</i> of the year 900/1495]
Bağdat (B.) 313	[Ḥamza b. Abdulkerīm, <i>taqwīm</i> of the year 901/1496]
Bağdat (B.) 314	[Abdulkerīm b. Mevlānā Sinān, <i>taqwīm</i> of the year 902/1497]
Bağdat (B.) 315	[Ḥamza b. Abdulkerīm, <i>taqwīm</i> of the year 902/1497]
Bağdat (B.) 316	[Nūreddīn b. Ḥamza, <i>taqwīm</i> of the year 902/1497]
Bağdat (B.) 317	[Anonymous <i>taqwīm</i> of the year 904/1499]
Bağdat (B.) 318	[Anonymous <i>taqwīm</i> of the year 904/1499]
Bağdat (B.) 319	[Anonymous <i>taqwīm</i> of the year 906/1501]
Bağdat (B.) 320	[Anonymous <i>taqwīm</i> of the year 907/1502]
Bağdat (B.) 321	[Anonymous <i>taqwīm</i> of the year 909/1504]
Emanet Hazinesi (EH.) 1695	[Ḥāce Kemal, <i>taqwīm</i> of the year 925/1519]
Emanet Hazinesi (EH.) 1710	[Yūsuf b. ‘Ömer el-Sā’atī, <i>taqwīm</i> of the year 919/1514]
Emanet Hazinesi (EH.) 1712	[Salmān, <i>taqwīm</i> of the year 909/1504]
Hazine (H.) 1760	[Partial <i>Külliyāt-i Mīrim Çelebi</i>]
Revan (R.) 822	[<i>Külliyāt-i Za’ifī</i>]
Revan (R.) 1704	[Anonymous, <i>Miftāḥ al-nujūm</i>]
Revan (R.) 1705	[Fakhr al-Dīn Rāzī, <i>Ikhtiyārāt al-aḥkām al-‘alā’iyya min al-‘ālam al-samāwiyya</i>]
Revan (R.) 1711/1	[Anonymous <i>taqwīm</i> of the year 900/1495]
Revan (R.) 1711/2	[Anonymous <i>taqwīm</i> of the year 903/1498]
Revan (R.) 1711/3	[Anonymous <i>taqwīm</i> of the year 909/1504]
Revan (R.) 1711/4	[Anonymous <i>taqwīm</i> of the year 910/1505]
Revan (R.) 1711/5	[Anonymous <i>taqwīm</i> of the year 911/1506]
Revan (R.) 1711/6	[Anonymous <i>taqwīm</i> of the year 912/1507]
Revan (R.) 1711/7	[Anonymous <i>taqwīm</i> of the year 914/1509]
Revan (R.) 1711/8	[Anonymous <i>taqwīm</i> of the year 915/1510]

Revan (R.) 1711/9	[Anonymous <i>taqwīm</i> of the year 917/1512]
Revan (R.) 1711/10	[Anonymous <i>taqwīm</i> of the year 919/1514]
Revan (R.) 1711/11	[Anonymous <i>taqwīm</i> of the year 920/1515]
Revan (R.) 1711/12	[Yūsuf b. ‘Ömer el-Sā‘atī, <i>taqwīm</i> of the year 923/1517]
Revan (R.) 1711/13	[Yūsuf b. ‘Ömer el-Sā‘atī, <i>taqwīm</i> of the year 931/1525]
Revan (R.) 1711/14	[Yūsuf b. ‘Ömer el-Sā‘atī, <i>taqwīm</i> of the year 932/1526]
Revan (R.) 1711/15	[Yūsuf b. ‘Ömer el-Sā‘atī, <i>taqwīm</i> of the year 933/1527]
Revan (R.) 1711/16	[Necmeddīn b. Seyyid Muḥammed, <i>taqwīm</i> of the year 935/1529]
Revan (R.) 1711/17	[Yūsuf b. ‘Ömer el-Sā‘atī, <i>taqwīm</i> of the year 937/1531]
Revan (R.) 1711/18	[Necmeddīn b. Seyyid Muḥammed, <i>taqwīm</i> of the year 956/1549]
Revan (R.) 1711/19	[Necmeddīn b. Seyyid Muḥammed, <i>taqwīm</i> of the year 961/1554]
Revan (R.) 1713	[Mevlānā Kūçek Yezdānbaḥş, <i>Zij-i Mujmal</i>]
Yeni Yazmalar (YY.) 830	[Khiṭābī, <i>Ṭāli ‘-i Mavlūd-i Sulṭān Muḥammed</i>]

The University of Michigan Library

Islamic Manuscripts 794 [Anonymous *taqwīm* of the year 1037/1628]

Published Sources

Abū al-Fidā’ Ismā‘īl ibn ‘Alī. *Géographie d’Aboulféda; texte arabe publié d’après les manuscrits de Paris et de Leyde par M. Reinaud et M. le baron Mac Guckin de Slane* (Paris: Impr. Royale, 1840).

Abū Ma’shar on Historical Astrology: The Book of Religions and Dynasties (On the Great Conjunctions), ed. Keiji Yamamoto and Charles Burnett, 2 Vols (Leiden: Brill, 2000).

Abū Ma’shar. *The abbreviation of the Introduction to Astrology together with the medieval Latin translation of Adelard of Bath*, ed. and tr. by Charles Burnett, Keiji Yamamoto, and Michio Yano (Leiden: Brill, 1994).

Açıkgöz, Mustafa. “II. Bāyezīd Devri İnamat Defteri (Muharrem-Zilhicce 910/Haziran-Mayıs 1504-1505)” (MA Thesis, Marmara University, 1996).

Aḥmed-i Dā‘ī, *Muhtasar fi ilm el-tencim ve marifet el-takvim (risale-i si fasl)*, ed. T. N. Gencan and M. Dizer (Istanbul: Boğaziçi Üniversitesi Kandilli Rasathanesi, 1984).

Al-Akfānī. *Irshād al-qāşid ilā asnā al-maqāşid*, ed. ‘Abd al-Laṭīf Muḥammad al-‘Abd (Cairo: Maktabat al-Anjulū al-Mişrīyah, 1978).

Altınay, Ahmed Refik, “Fatih Devrine ait Vesikalar,” *Tarih-i Osmani Encümeni Mecmuası* vol. 8-11 no. 49-62 (1335/1919), 1-58.

- Āmulī, Shams al-Dīn Muḥammad b. Maḥmūd, *Nafāyis al-funūn fī 'Arāyis al-'uyūn*, 3 volumes, ed. Abū'l-Ḥasan Sha'rānī (Tehrān: Kitābforūshī-ye Islāmīya, 1377-79/1957-59).
- 'Āşık Çelebi, *Meşā'irü'ş-Şuara: İnceleme, Metin*. ed. Filiz Kılıç, 3 vols. (İstanbul: İstanbul Araştırmaları Vakfı, 2010).
- Atasoy, Faysal Okan. "Melhame-yi Şeyh Vefa: Giriş-Metin-Sözlük." (M.A. Thesis, Marmara University, 2001).
- Atsız, Nihal. "Fatih Sultan Mehmed'e Sunulmuş Tarihi Bir Takvim," *İstanbul Enstitüsü Dergisi* 3 (1957), 17–23.
- . *Osmanlı tarihine ait takvimler* (İstanbul: Küçükaydın Matbaası, 1961).
- . "Hicri 858 Yılına Ait Takvim," *Selçuklu Araştırmaları Dergisi* 4 (1975), 223–83.
- Avicenne. *Réfutation de l'astrologie*. Édition et traduction du texte arabe, introduction, notes et lexique par Yahya Michot (Beirut-Paris: Albouraq, 2006).
- Aydın, Ayşe. "Ebri Hâce İbn-i Adil (Giriş-İnceleme-Metin-Dizinler)." (Ph.D. Dissertation, Sakarya Üniversitesi, 2011).
- Barāt Zanjānī (ed.), *Divān-i ash'ār va rasā'il-i Shams al-Dīn Muḥammad Asīrī Lāhījī, shāriḥ-i Gulshan-i Rāz* (Tehran: Mu'assasah-i Mutala'at-i Islāmī-i Dānishgāh-i McGill, 1357/1978).
- Barkan, Ömer Lütfi. "Ayasofya Camii ve Eyüp Türbesinin 1489-1491 yıllarına ait Muhasebe Bilançoları," *İstanbul Üniversitesi İktisat Fakültesi Mecmuası* 23/1-2 (1962-3).
- . "H. 933-934 Tarihli Bütçe Cedveli ve Ekleri," *İktisat Fakültesi Mecmuası* 15 no. 1-4 (1953-1954).
- . "İstanbul Saraylarına ait Muhasebe Defterleri," *Belgeler*, 9/13 (1979), 1-380.
- Beyatlı, Ahmet (ed.). *Fatih Sultan Mehmed'in 877/1472 tarihli vakfiyesi* (Ankara: TTK, 2013).
- Bidlīsī, İdrīs. *Selīmshāhnāme*, ed. Hicabi Kırlangıç (Ph.D. Dissertation, Ankara University, 1995).
- Al-Bīrūnī. *The Book of Instruction in the Elements of the Art of Astrology*, ed. and tr. Robert Ramsay Wright (London: Luzac & co., 1934).
- . *Kitāb al-āthār al-bāqīya 'an al-qurūn al-khāliya*, tr. C. E. Sachau as *The Chronology of Ancient Nations* (London: 1879).

Browne, Edward G. *Revised Translation of the Chahār Maqāla (“Four Discourses”) of Niẓāmī-i ‘Arūḏī of Samarqand, followed by an abridged translation of Mīrzā Muḥammad’s notes to the Persian Text* (London: Cambridge University Press, 1921).

Celālzāde, Mustafa. *Tabakātü’l-Memâlik ve Derecâtü’l-Mesâlik*, ed. by Funda Demirtaş (Ph.D. Dissertation, Erciyes University, 2009).

Derviş Işık Şemsi. *Deh Murg-i Şemsi*, ed. Mahmut Kaplan (Manisa: Celal Bayar Üniversitesi, 2003).

Dieterici, Friedrich. *Al-Fārābī’s Philosophische Abhandlungen* (Leiden: Brill, 1892).

Elwell-Sutton, Laurence P. (ed.), *The Horoscope of Asadullāh Mīrzā: A Specimen of Nineteenth-Century Persian Astrology* (Leiden: Brill, 1977).

Emecen, Feridun and İlhan Şahin, *II. Bāyezīd dönemine ait 906/1501 tarihli ahkam defteri* (İstanbul: Türk Dünyası Araştırmaları Vakfı, 1994).

Ergin, Osman Nuri. *Fatih İmareti Vakfiyesi* (İstanbul, 1945).

Erzi, Adnan Sadık. *Selçukîler Devrine Aid İnşa Eserleri. Gunyetü’l-kâtib ve munyetü’l-ṭalib. Rusūmu’r-resā’il ve nucūmu’l-fazā’il* (Ankara: Türk Tarih Kurumu, 1963).

Evliya Çelebi, *Seyahatname*, vol. 1, ed. Robert Dankoff, Seyit Ali Kahraman, Yücel Dağlı (İstanbul: Yapı Kredi Yayınları).

Fakrh al-Dīn Rāzī. *Jāmi‘ al-‘ulūm ya Hadāyiq al-anwār fī haqāyiq al-asrār ma’rūf bih Kitāb-i Sittīnī*, ed. Muḥammad Ḥusayn Tasbīḥī (Tehran: Kitābkhānah-i Asadī, 1346/1967-8).

Al-Fārābī. *Iḥsā al-‘ulūm* (Beirut: Dār wa Maktabat al-Hilāl, 1996).

Fatih Mehmed II Vakfiyeleri (Ankara: Vakıflar Genel Müdürlüğü, 1938).

Firdevsi-i Taviil ve Da’vetname’si: İnceleme, Transkripsiyon, İndeks, Faksimile ve Mikrofiş, ed. Fatma Büyükkarcı (Cambridge, MA: Harvard University Near Eastern Languages and Civilizations, 1995).

Ḥakīm Shāh Muḥammad Qazvīnī, *Tazkīrah-i majālis al-naḫā’is*, ed. ‘Alī Aşghar Ḥikmat (Tehran: Kitābfurūshī-i Manūchihri, 1363).

Ḥüseyin Kefeli. *Rāznāme*, transcription and facsimile prepared by İ. Hakkı Aksoyak (Cambridge: Harvard University the Department of Near Eastern Languages and Civilizations, 2004), 147.

Ibn Kemal. *Tevarih-i Al-i Osman 8. Defter*, ed. Ahmet Uğur (Ankara: TTK, 1997)

Ibn Khaldūn. *The Muqaddimah: An Introduction to History*, 3 volumes, tr. Franz Rosenthal (Princeton; New Jersey: Princeton University Press, 1958).

Ibn Sīnā. *Tis 'rasā'il fī l-ḥikma wa-l-ṭabī'īyyāt* (Cairo: Maṭba'at Hindīyah, 1908).

Ibn Ṭāwūs. *Faraj al-mahmūm fī tāriḫ 'ulamā' al-nujūm* (al-Najaf: al-Maṭba'ah al-Ḥaydarīyah, 1948-9).

Ikhwān al-Ṣafā'. *On Astronomia: An Arabic Critical Edition and English Translation of Epistle 3*, ed. Jamil Ragep and Taro Mimura (Oxford: Oxford University Press, 2015).

Karaarslan, Nasuhi Ünal (ed). *18. Asrın Ortalarına Kadar Türkiye'de İlim ve İlimiyeye Dair bir Eser: Kevâkib-i Seb'a Risâlesi* (Ankara: TTK, 2015).

Kâşifî. *Gazânâme-i Rûm*, ed. Ebrahim M. Esmail (MA Thesis, Mimar Sinan Fine Arts University, 2005).

Katib Çelebi. *Takvimü't-Tevarih İndeksli Tıpkı Basım* (Ankara: TTK, 2009).

Al-Khwārizmî. *Mafātih al-'ulūm* (Beirut: Dār al-kutub al-'ilmiyya, n. d.)

Kınalızade Hasan, *Tezkiretü'ş-Şuara*, ed. Aysun Sungurhan-Eyduran (Ankara: 2009).

Kitab-ı Bahriye = Book of Navigation, ed. Arı, Bülent. (Ankara: Republic of Turkey, Prime Ministry, Undersecretary of Navigation, 2002).

Kūshyār ibn Labbān's Introduction to Astrology, ed. Michio Yano (Tokyo: Tokyo University of Foreign Studies, 1997).

Kutb-nâme, ed. İbrahim Olgun and İsmet Parmaksızoğlu (Ankara: TTK, 1980).

Latifî. *Tezkiretü'ş-Şu'arâ ve Tabsiratü'n-Nuzamâ: İnceleme, Metin*, ed. Rıdvan Canım (Ankara: Atatürk Kültür Merkezi Başkanlığı, 2000).

Marino Sanuto. *I diarii*, vol. 5, ed. Federico Stefani (Venezia: F. Visentini, 1881).

Muhyî-i Gülşenî. *Menâkıb-ı İbrâhim-i Gülşenî*, ed. Mustafa Koç and Eyyüp Tanrıverdi (İstanbul: Türkiye Yazma Eserler Kurumu Başkanlığı, 2014).

Mustafa Ali, *Kūnhü'l-Aḥbār*, v. 2 Fatih Sultan Mehmed Devri (1451-1481), ed. by M. Hüdayi Şentürk (Ankara: TTK, 2003).

Nev'î Efendi, *Netā'icü'l-fünūn ve meḥasinü'l-mütūn*, ed. Gisela Procházka-Eisl and Hülya Çelik

(in collaboration with Adnan Kadrić) (Harvard University, The Sources of Oriental Languages and Literatures Series, 2015)

Nizāmī ‘Arūzī, *Chahār maqāla*, ed. Muḥammad Qazvīnī (Tihārān: Kitābfurūshī-i Zavvār, 1954).

Öz, Tahsin. “Zwei Stiftungsurkunden des Sultans Mehmed II. Fatih,” *Istanbul Mitteilungen* 4 (1935).

Özgül, Ayhan. “İlyas b. İsâ-yı Saruhânî’nin ‘Rumûzü’l-Künûz’ adlı eserinin transkripsiyonu ve değerlendirilmesi.” (MA Thesis, Kırıkkale University, 2004).

Pingree, David. *The Thousands of Abu Mashar* (London: Warburg Institute, 1968).

Ptolemy, *Tetrabiblos*, ed. and tr. by F. E. Robbins (Cambridge: Harvard University Press, 1940).

Al-Qabīṣī (Alcabitius). *The Introduction to Astrology: Editions of the Arabic and Latin Texts and an English Translation*, ed. Charles Burnett, Keiji Yamamoto, Michip Yano (London: Warburg Institute, 2004).

Quṭb al-Dīn Shīrāzī. *Durrat al-tāj*, ed. Muḥammad Mushkāt (Tehran: Intishārāt-i Ḥikmat, 1369/1990).

Salih Zeki. *Asar-ı Bakiye* vol. 2 (İstanbul: Matbaa-ı Amire, 1329).

Sayılı, Aydın. *Uluğ Bey ve Semerkanddeki İlim Faaliyeti Hakkında Gıyasüddin-i Kaşî’nin Mektubu: Ghiyāth al-Dīn al-Kāshī’s Letter on Ulugh Beg and the Scientific Activity in Samarqand* (Ankara: TTK, 1960).

Seydi Ali Reis. *Mir‘âtü’l-memâlik: inceleme, metin, indeks*, ed. Mehmet Kiremitçi. (Ankara: Atatürk Kültür, Dil ve Tarih Yüksek Kurumu, 1999).

Sinan Paşa. *Maârif-nâme: Özlü Sözler ve Öğütler Kitabı*, ed. Mertol Tulum (Ankara: TTK, 2013).

Somi, Mortaza and Mohammad Bagheri. “Risāla-i tashrīḥ al-ālāt fī sha’n al-imtiḥānāt az Sayyid Munajjim Ḥusaynī,” *Mirāth-i ‘Ilmī-yi Islām va Īrān*, 2/1 (1392/2013), 181-205.

Süleymān Sûdî Efendi. *Tabakāt-ı Müneccimîn*, ed. Salim Aydüz (İstanbul: Fatih Üniversitesi Yayınları, 2007).

Süleymaniye Vakfiyesi, ed. Kemal Edib Kürkçüoğlu (Ankara: Vakıflar Genel Müdürlüğü, 1962), 32.

Tacizade Cafer Çelebi. *Mahruse-i Istanbul Fethnamesi* (İstanbul: Ahmed İhsan ve Şurekası

- Matbaacılık Osmanlı Şirketi, 1331/1915-6).
- Tağman, S. Ertan. “Mustafa İbn Ali el-Muvakkıt’in Usturlab Risalesi,” (MA Thesis, Ankara University, 2007).
- Tanklūsha*, az mu’allif-i nāshinākhtah, ed. Raḥīm Rizā Zādah Malik (Tehran: Mīrās-i Maktūb, 1384/2005).
- Tashkopriẓāde. *al-Shaqā’iq al-nu’mānīyah fī ‘ulamā’ al-dawlat al-‘uthmānīyah*, ed. Ahmed Subhi Furat (İstanbul: Edebiyat Fakültesi Basımevi, 1985).
- . *Kitāb Miftāḥ as-sa’āda wa mişbāḥ as-siyāda*, v. 1 (Hyderabad: Osmania Oriental Publications Bureau, 1977).
- Torun, Arzu. “Muvakkıt Mustafa b. Ali Rûmî’nin Hall-i Daire-i Muaddil’i,” (MA Thesis, Celal Bayar University, 2011).
- Traité des instruments astronomiques des Arabes composé au treizième siècle par Abū’l-Ḥasan ‘Alī al-Marrākūshī (VII-XIII s.) intitulé Jāmi‘ al-mabādi’ wa-l-ghāyāt*, 2 vol., Frankfurt am Main : Institut für Geschichte der Arabisch-Islamischen Wissenschaften, 1998).
- Turan, Osman. *İstanbul’un fethinden önce yazılmış tarihî takvimler* (Ankara: Türk Tarih Kurumu Basımevi, 1954).
- Tursun Bey. *Tarih-i Ebū’l-Feth*, ed. Mertol Tulum (İstanbul: İstanbul Fetih Cemiyeti, 1977).
- al-Ṭūsī, Naşīr al-Dīn. *Memoir on Astronomy = al-Tadhkira fī ‘ilm al-hay’a*, ed. Jamil Ragep, 2 volumes (New York: Springer-Verlag, 1993).
- . *Sharḥ-i Samarah-i Baṭlamyūs dar aḥkām-i nujūm*, ed. Khalīl Akhavān Zanjānī (Tehran: Āyīnah-i Mīrās, 1999).
- Uluğ Beğ’in Astronomi Cetvelleri = Zic-i Uluğ Bey*, 2 volumes, ed. and tr. Mustafa Kaçar and Atilla Bir (Ankara: Kültür ve Turizm Bakanlığı, 2012).
- Vakıflar Umum Müdürlüğü, *Fatih Mehmed II Vakfiyeleri* (Ankara: Vakıflar Genel Müdürlüğü, 1938).
- Yazdī, Sharaf al-Dīn. *Munsha’āt-i nivishta-yi Sharaf al-Dīn Yazdī*. ed. İraj Afshār (Tehran: Şureyyā, 1388/2009).
- . *Zafarnāma*, ed. by Sayyid Sa‘īd Mīr Muḥammad Şādiq and ‘Abd al-Ḥusayn Navā‘ī, 3 volumes (Tehrān: Kitābkhāna Mūzih va Markaz-i Asnād-i Majlis-i Shūra-yi Islāmī, 1387).

Studies

Ackerman Smoller, Laura. *History, Prophecy, and the Stars: the Christian Astrology of Pierre D'Ailly, 1350-1420* (Princeton, N.J.: Princeton University Press, 1994).

Adamson, Peter. "Abū Ma'şar, al-Kindī and the Philosophical Defense of Astrology," *Recherches de théologie et philosophie médiévales* 69/2 (2002), 245-270.

Adivar, Adnan. *La Science chez les Turcs Ottomans* (Paris: Maisonneuve, 1939).

———. *Osmanlı Türklerinde İlim* (İstanbul: Maarif Matbaası, 1943).

Afyoncu, Erhan. "Müteferrika," *TDVİA*.

Ahmad, Shahab and Nenad Filipovic, "The Sultan's Syllabus: A Curriculum for the Ottoman Imperial Medreses," *Studia Islamica* 98-99 (2004), 183-218.

Aigle, Denise. "L'histoire sous forme graphique, en arabe, persan, et turc ottoman: origins et fonctions," *Bulletin d'études orientales* 58 (2009), 11-49.

———. "The Historical taqwīm in Muslim East," in *The Mongol Empire between Myth and Reality: Studies in Anthropological History* (Leiden: Brill, 2015), 89-104.

Akalay, Zeren. "An Illustrated Astrological Work of the Period of Iskandar Sultān," in *Akten des VII. Internationalen Kongresses iranische Kunst und Archäologie, 7-10 September 1976* (Berlin: Dietrich Verlag, 1976), 418-425.

Akgündüz, Ahmet. *Osmanlı Devleti'nde Belediye Teşkilatı ve Belediye Kanunları* (İstanbul: Osmanlı Araştırmaları Vakfı, 2005).

Akgür, Necati. "Müneccimbaşı Takvimlerinde Tarihleme Yöntemleri," *Türk Dünyası Araştırmaları* 80 (1992), 99-120.

Allsen, Thomas T. *Culture and Conquest in Mongol Eurasia* (New York: Cambridge University Press, 2011).

Almeida, Onesimo T. "Science during the Portuguese Maritime Discoveries: A Telling Case of Interaction between Experimenters and Theoreticians", in *Science in the Spanish and Portuguese Empires, 1500-1800*, ed. Daniela Bleichmar *et al.* (Stanford, Stanford University Press, 2008), 78-92.

Anay, Harun. "Celâleddin Devvânî. Hayatı, Eserleri, Ahlâk ve Siyaset Düşüncesi." (Ph.D. Dissertation, Istanbul University, 1994).

Anooshahr, Ali. "Review of *The Millennial Sovereign: Sacred Kingship and Sainthood in Islam*," *The Medieval History Journal* 18/1 (2015), 183-191.

Arribas, Josefina Rodrigues. "Medieval Jews and Medieval Astrolabes: Where, Why, How, and What for?" in *Time, Astronomy, and Calendars in the Jewish Tradition*, ed. Sacha Stern and Charles Burnett (Leiden: Brill, 2013), 221-272.

Asch, Ronald G. and Adolf Birke (ed.), *Princes, Patronage, and the Nobility: The Court at the Beginning of the Modern Age, c. 1450-1650* (Oxford: Oxford University Press, 1991).

Atsız, Nihal. "Kemalpaşaoğlu'nun Eserleri I," *Şarkiyat Mecmuası* 6 (1966), 71-112.

———. "Kemalpaşaoğlu'nun Eserleri II," *Şarkiyat Mecmuası* 7 (1972), 83-135

Aubin, Jean. "Le mécénat timouride à Chiraz," *Studia Islamica* 8 (1957), 71-88.

Aydüz, Salim. "İsmet Mehmed Efendi (ö. 1747) ve Tedahül-i Seneye Dair Risalesi," *Kutadgubilig* 15-16 (2009), 223-264.

———. "Müneccimbaşı Takvimleri ve Tarihi Kaynak Olarak Değerleri," *Cogito* 22 (2000), 132-44.

———. "Osmanlı Astronomi Müesseseleri," *TALİD* 2/4 (2004), 411-453.

———. "Osmanlı Devleti'nde Münecimbaşılık Müessesesi," *Belleten* 70 no. 257 (2006), 167-264 [based upon his MA Thesis, "Osmanlı Devleti'nde Münecimbaşılık ve Münecimbaşılar," (Istanbul University, 1993)].

———. "Osmanlı Devleti'nde Münecimbaşılık," *Osmanlı Bilimi Araştırmaları* 1 (1996), 159-207.

———. *İstanbul Muvakkithaneleri ve Muvakkitleri* (İstanbul Büyükşehir Belediyesi Strateji Geliştirme Daire Başkanlığı Stratejik Planlama Müdürlüğü Projesi İstanbul, 2009).

Azzolini, Monica. *The Duke and the Stars: Astrology and Politics in Renaissance Milan* (Cambridge, Mass.: Harvard University Press, 2013).

———. "Refining the Astrologer's Art: Astrological Diagrams in Bodleian MS Canon. Misc. 24 and Cardano's *Libelli Quinque* (1547)" *Journal for the History of Astronomy* 42/1 (2011), 1-25.

Bagheri, Mohammad. "A Newly Found Letter of al-Kāshī on Scientific Life in Samarqand,"

- Historia Mathematica* 24 (1997), 241-256.
- . “Kūshyār ibn Labbān’s Glossary of Astronomy,” *SCIAMVS* 7 (2006).
- Barkan, Ömer Lütfi and Ekrem Hakkı Ayverdi, *İstanbul Vakıfları Tahrir Defteri: 953 (1546) tarihli* (Istanbul: Baha matbaası, 1970).
- . *Süleymaniye Cami ve İmareti İnşaatı (1550-1557)*, 2 volumes (Ankara: TTK, 1972).
- Barnes, Robin Bruce. “Hope and Despair in Sixteenth Century German Almanacs,” in *The Reformation in Germany and Europe: Interpretations and Issues*, ed. Hans R. Guggisberg and Gottfried G. Krodel (Sonderband Washington: Gütersloh, 1993), 440-461.
- . *Prophecy and Gnosis: Apocalypticism in the Wake of the Lutheran Reformation* (Stanford: Stanford University Press, 1988).
- Bashir, Shahzad. “A Perso-Islamic Universal Chronicle in its Historical Context: Ghiyas al-Din Khwandamir’s *Habib al-siyar*,” in *Historiography and Religion*, ed. Jörg Rüpke *et al.* (Berlin: Walter de Gruyter, 2015), 207-223.
- . “The Risālat al-Hudā of Muḥammad Nūrbakhsh (d. 869/1464). Critical Edition with Introduction,” *Rivista degli Studi Orientali* 75/1-4 (2001), 87-137.
- . *Fazlallah Astarabadi and the Hurufis* (Oxford: Oneworld, 2005).
- . *Messianic Hopes and Mystical Visions: the Nūrbakhshīya Between Medieval and Modern Islam* (Columbia: University of South Carolina Press, 2003).
- Behrens, Gerhard. “An Ottoman Calendar (takvim) for 1740/41 AD,” *Middle East Studies Online Journal* 4/2 (2011), 1-90.
- Beinorius, Audrius. “On the social and religious status of an Indian astrologer at the royal court,” *Acta Orientalia Vilnensia* 9/2 (2008), 39-55.
- Beldiceanu-Steinherr, Nicoara et Irène Beldiceanu. “Considérations sur la chronologie des sources ottomanes et ses pièges,” in *Studies in Ottoman History in Honour of V. L. Ménage*, ed. Colin Heywood and Colin Imber (Istanbul: Isis, 1994), 15-29.
- Ben-Zaken, Avner. *Cross-Cultural Scientific Exchanges in the Eastern Mediterranean, 1560-1660* (Baltimore: Johns Hopkins University Press, 2010).
- . “The Heavens of the Sky and the Heavens of the Heart: The Ottoman Cultural Context for the Introduction of Post-Copernican Astronomy,” *British Society for the History of Science* 37/1 (2004), 1-28.

- Berkey, Jonathan. *The transmission of knowledge in Medieval Cairo: a social history of Islamic education* (Princeton: Princeton University Press, 1992).
- Bernardini, Michele. "Ottoman 'Timuridism': Lāmi'ī Çelebi and his *Şehrengiz* of Bursa," in *Irano-Turkic Cultural Contacts in the 11th-17th Centuries*, ed. Éva M. Jeremiás (Piliscsaba: The Avicenna Institute of Middle Eastern Studies, 2003), 1-16.
- Biagioli, Mario. *Galileo, Courtier: The Practice of Science in the Culture of Absolutism* (Chicago: The University of Chicago Press, 1993).
- Bilici, Faruk. "Les bibliothèques vakıf-s à Istanbul au XVI^e siècle, prémices de grandes bibliothèques publiques," *Revue des mondes musulmans et de la Méditerranée* 87-88 (1999), 39-59.
- Binbaş, Evrim. "Sharaf al-Dīn 'Alī Yazdī (ca. 770s-858/ca. 1370s-1454): Prophecy, Politics, and Historiography in Late Medieval Islamic History." (Ph.D. dissertation, University of Chicago, 2009).
- . "Structure and Function of the 'Genealogical Tree' in Islamic Historiography," in *Horizons of the World: Festschrift for İsenbike Togan*, ed. Evrim Binbaş and Nurten Kılıç-Schubel (İstanbul: İthaki, 2011), 465-544.
- . "Timurid Experimentation with Eschatological Absolutism: Mīrzā Iskandar, Shāh Ni'matullāh Walī, and Sayyid Sharīf Jurjānī in 815/1412," in *Unity in Diversity: Mysticism, Messianism and the Construction of Religious Authority in Islam*, ed. Orkhan Mir-Kasimov (Leiden: Brill, 2014), 277-306.
- Birnbaum, Eleazar. "The Ottomans and Chagatay Literature," *Central Asiatic Journal* 20 (1976), 157-190.
- Blake, Stephen. *Time in early modern Islam: Calendar, Ceremony, and Chronology in the Safavid, Mughal, and Ottoman Empires* (New York: Cambridge University Press, 2013).
- Boner, Patrick. *Kepler's Cosmological Synthesis: Astrology, Mechanism, and the Soul* (Leiden: Brill, 2013).
- Borrut, Antoine. "Court Astrologers and Historical Writing in Early Abbasid Baghdad: An Appraisal," in *Contexts of Learning in Baghdad from the 8th-10th Centuries*, ed. J. Scheiner and Damien Janos (Princeton: The Darwin Press, 2014), 455-501.
- Boudet, Jean-Patrice and Darin Hayton. "Mathias Corvin, János Vitéz et l'Horoscope de Fondation de l'Université de Pozsony en 1467," in *De Bibliotheca Corviniana. Mathias Corvin, les bibliothèques princières et l'origine de l'État moderne*, Actes du colloque

- international de Paris, 15-17 novembre 2007 (Budapest, 2009), 205-213.
- Boyle, J. A. "The Longer Introduction to the 'Zij-i-İlkhani' of Nasir-ad-Din Tusi," *Journal of Semitic Studies* 8/2 (1963), 244-254.
- Boyras, Şeref. *Fal Kitabı: Melhemeler (sic) ve Türk Halk Kültürü* (İstanbul: Kitabevi, 2006).
- Brentjes, Sonja. "Reflections on the Role of the Exact Sciences in Islamic Culture and Education between the Twelfth and the Fifteenth Centuries," *Études des sciences arabes*, ed. by Mohammad Abattouy (Casablanca: Foundation du Roi Abdul-Aziz al Saoud, 2007), 15-33.
- . "Ayyubid Princes and their Scholarly Clients from the Ancient Sciences," in *Court Cultures in the Muslim World: Seventh to Nineteenth Centuries*, ed. Albrecht Fuess and Jan-Peter Hartung (London: Routledge, 2010), 326-56.
- . "Courtly Patronage of the Ancient Sciences in Post-Classical Islamic Societies," *al-Qantara* 29 (2008), 410.
- . "On the Location of the Ancient or 'Rational' Sciences in Muslim Education Landscapes (AH 500-1000)," *Bulletin of the Royal Institute for Inter-Faith Studies*, 4/1 (2002), 47-71.
- . "Patronage of the mathematical sciences in Islamic societies: structure and rhetoric, identities, and outcomes," in *The Oxford Handbook of the History of Mathematics*, ed. Eleanor Robson and Jackie Stedall (Oxford: Oxford University Press, 2008), 301-28.
- . "Shams al-Dīn al-Sakhāwī on *Muwaqqits*, *Mu'adhdhins*, and the Teachers of Various Astronomical Disciplines in Mamluk Cities in the Fifteenth Century," in *A Shared Legacy, Islamic Science East and West*, Homage to professor J. M. Millás Vallicrosa, ed. Emilia Calvo et al. (Barcelona: Universitat de Barcelona, 2008), 129-50.
- . "The Prison of Categories—'Decline' and its Company," in *Islamic Philosophy, Science, Culture, and Religion: Studies in Honor of Dimitri Gutas*, ed. Felicitas Opwis and David Reisman (Leiden: Brill, 2012), 131-56.
- Brummett, Palmira. *Ottoman Seapower and Levantine Diplomacy in the Age of Discovery* (Albany, State University of New York, 1994).
- Burckhardt, Titus. *Mystical Astrology according to Ibn 'Arabi*, translated from French by Bulent Rauf (Louisville, KY: Fonsvitae, 2001).
- Burnett, Charles. "Abū Ma'shar," *EF³*. Online version
- . "Al-Qabisi's Introduction to Astrology: From Courtly Entertainment to University

- Textbook,” in *Studies in the History of Culture and Science: a Tribute to Gad Freudenthal*, ed. R. Fontaine et al. (Leiden: Brill, 2011), 43-69.
- . “Astrology,” *EF³*, Online version.
- . “The Certitude of Astrology: The Scientific Methodologies of al-Qabīṣī and Abū Ma‘shar,” *Early Science and Medicine* 7/3 (2002), 198-213.
- Buzov, Snjezana. “The Lawgiver and His Lawmakers: The Role of Legal Discourse in the Change of the Ottoman Imperial Culture.” (Ph.D. Dissertation, University of Chicago, 2005).
- Caiozzo, Anna. “The Horoscope of Iskandar Sultān as a Cosmological Vision in the Islamic World,” in *Horoscopes and Public Spheres: Essays on the History of Astrology*, 115-144.
- Cantay, Tanju. *XVI.-XVII. Yüzyillarda Süleymaniye Camii ve bağlı yapıları* (İstanbul: Eren, 1989).
- Capp, B. S. *English Almanacs, 1500-1800: Astrology and the Popular Press* (Ithaca: Cornell University Press, 1979).
- Carey, Hilary. *Courting Disaster: Astrology at the English Court and University in later Middle Ages* (London: Macmillan, 1982).
- . “Astrology at the English Court in the Later Middle Ages,” in *Astrology, Science, and Society: Historical Essays*, ed. Patrick Curry (Woolbridge: Boydell Press, 1987), 41-56.
- Carra de Vaux, Bernard. “Notice sur un calendrier turc,” *Ajab-nāme. A Volume of Oriental Studies presented to Edward G. Browne* (1922), 106–116.
- Casali, Elide. *Le spie del cielo: oroscopi, lunari e almanacchi nell’Italia moderna* (Torino: Einaudi, 2003).
- Casulleras, Josep. “The Instruments and the Exercise of Astrology in the Medieval Arabic Tradition,” *Archives Internationales d’Histoire des Sciences* 63, n. 170-171 (2013), 517-540.
- Catani, Remo. “The Polemics on Astrology 1489-1524,” *Culture and Cosmos* 3/2 (1999), 16-30.
- Chabás, José and Bernard R. Goldstein. *Astronomy in the Iberian Peninsula: Abraham Zacut and the Transition from Manuscript to Print* (Philadelphia: American Philosophical Society, 2000).
- Chamberlain, Michael. *Knowledge and social practice in medieval Damascus, 1190-1350* (Cambridge: Cambridge University Press, 1994).
- Chann, Naindeep Singh. “Lord of the Auspicious Conjunction: Origins of the *Şāhib-Qirān*,” *Iran*

and the Caucasus 13 (2009), 93-110.

Cook, David. "Messianism and Astronomical Events during the First Four Centuries of Islam," in *Mahdisme et Millenarisme en Islam*, ed. by Mercedes Garcia-Arenal (Aix-en-Provence: E'disud, 2001), 29-51.

———. *Studies in Muslim Apocalyptic* (Princeton, N.J.: Darwin Press, 2002).

Cunbur, Müjgan. "Bir Osmanlı Müneccimbaşısının Nevruz Tebrikleri," in *Türk Dünyasında Nevruz İkinci Uluslararası Bilgi Şöleni, 19-21 Mart 1996* (Ankara: Atatürk Kültür Merkezi, 1996), 121-130.

Çağman, Filiz. "Saray Nakkaşhanesinin Yeri Üzerine Düşünceler," in *Sanat Tarihinde Doğudan Batıya: Ünsal Yücel Anısına Sempozyum Bildirileri* (İstanbul: Sandoz Kültür Yayınları, 1989).

Çavuşoğlu, Mehmed. "Zati'nin Letayif'i II," *İÜ Edebiyat Fakültesi Türk Dili ve Edebiyatı Dergisi* 22 (1977), 143-161.

———. "Zati'nin Letayifi I," *İÜ Edebiyat Fakültesi Türk Dili ve Edebiyatı Dergisi* 18 (1970), 1-51.

Çelik, Serpil. *Süleymaniye Külliyesi: Malzeme, Teknik ve Süreç* (Ankara: Atatürk Kültür Merkezi, 2009).

Çulpan, Cevdet. "İstanbul Süleymaniye Camii Kitabesi," in *Kanuni Armağanı* (Ankara: TTK, 1980), 291-299.

Dalen, Benno Van. "An Introduction to the Mathematics of Islamic Astronomy and Astrology" (Unpublished paper).

———. *Islamic Astronomical Tables: Mathematical analysis and historical investigation* (Farnham, Surrey: Ashgate, 2013).

Darling, Linda. "Ottoman Salary Registers as a Source for Economic and Social History," *Turkish Studies Association Bulletin*, 14/1 (1990), 13-33.

Demir, Remzi. *Taḳiyüddîn'de matematik ve astronomi: Cerîdedü'd-dürer ve ḥarîdetü'l-fiker üzerine bir inceleme* (Ankara: Atatürk Kültür Merkezi Başkanlığı, 2000).

Demirer, Yücel. "Performative Conceptions of Social Change: The Case of Nevruz Celebrations in Pre-Ottoman and Ottoman Anatolia," in *Medieval and Early Modern Performance in the Eastern Mediterranean*, ed. Arzu Öztürkmen and Evelyn Birge Vitz (Turnhout: Brepols, 2014), 465-480.

- Druart, Therese-Anne. "Al-Farabi's Causation of the Heavenly Bodies," in *Islamic philosophy and mysticism*, ed. Morewedge, Delmar: 1981, 35-45.
- Elwell-Sutton, Laurence P. "A Royal Tīmūrid Nativity Book," in *Logos Islamikos: Studia Islamica in Honorem Georgii Michaelis Wickens*, ed. Roger M. Savory and Dionisius A. Agius (Toronto: Pontifical Institute of Mediaeval Studies, c1984), 119-134.
- Emecen, Feridun. *İmparatorluk Çağının Osmanlı Sultanları* (Istanbul, İSAM Yayınları, 2011).
- Emirlioğlu, Pınar. *Geographical Knowledge and Imperial Culture in the Early Modern Ottoman Empire* (Farnham: Ashgate, 2014).
- Endress, Gerhard (ed.). *Organizing Knowledge: Encyclopaedic Activities in the Pre-Eighteenth Century Islamic World* (Leiden: Brill, 2006).
- Ephrat, Daphna. *A learned society in a period of transition: the Sunni 'ulama' of eleventh-century Baghdad* (Albany: State University of New York Press, 2000).
- Erünsal, İsmail E. "Fatih Camii Kütüphanesine Ait En Eski Müstakil Katalog," *Erdem* v. 9, n. 26 (1996), 659-665.
- . "Türk Edebiyatının Arşiv Kaynakları I: II. Bayezid Devrine Ait bir İnamat Defteri," *İÜ Edebiyat Fakültesi Tarih Enstitüsü Dergisi* 10-11 (1981), 303-347.
- Eryılmaz, Fatma Sinem. "The shehnamecis of Sultan Süleyman: Arif and Eflatun and their dynastic Project." (Ph.D. Dissertation, The University of Chicago, 2010).
- Eyice, Semavi. "II. Bāyezīd Devrinde Davet Edilen Batılılar," *Belgelerle Türk Tarihi Dergisi* 19 (1969), 23-30.
- Fahd, Toufic. *La divination arabe, études religieuses, sociologiques et folkloriques sur le milieu natif de l'Islam* (Leiden: Brill, 1966).
- Fazlıoğlu, İhsan. "Forcing the Boundaries in Religion, Politics and Philosophy-Science in the Fifteenth Century" (Paper presented at the Conference Before the Revolutions: Religions, Sciences and Politics in the Fifteenth Century, Berlin, January 13-15, 2005).
- . "İthaf'tan Enmûzec'e Fetih'ten önce Osmanlı Ülkesi'nde Matematik Bilimler," in *Uluslararası Molla Fenârî Sempozyumu (4-6 Aralık 2009 Bursa): bildiriler = International Symposium on Molla Fanârî (4-6 December 2009 Bursa): proceedings*, ed. Tevfik Yücedoğru et al. (Bursa: Bursa Büyükşehir Belediyesi, 2010), 131-163.
- . "Kadıze-i Rumi," *TDVİA*.

- . “Mirim Çelebi,” *TDVİA*.
- . “Osmanlı Döneminde ‘Bilim’ Alanındaki Türkçe Telif ve Tercüme Eserlerin Türkçe Oluş Nedenleri ve Bu Eserlerin Dil Bilincinin Oluşmasındaki Yeri ve Önemi,” *Kutadgubilig Felsefe-Bilim Araştırmaları* 3 (2003), 151-184.
- . “Osmanlı Felsefe-Biliminin Arka Planı: Semerkand Matematik-Astronomi Okulu,” *Divan İlmi Araştırmaları Dergisi* 14 (2003), 1-66.
- . “Osmanlılar (İlim ve Kültür. 1. Düşünce Hayatı ve Bilim. Kaynaklar),” *TDVİA*.
- . “Qūshjī: Abū al-Qāsim ‘Alā’ al-Dīn ‘Alī ibn Muḥammad Qushċi-zāde,” in *BEA*, ed. Thomas Hockey *et al.* (New York: Springer, 2007).
- . “The Samarqand Mathematical-Astronomical School,” *Journal for the History of Arabic Science*, 4/1-2 (2008): 3-68.
- . “Mustafa b. Ali el-Muvakkit,” *TDVİA*.
- Fetvacı, Emine. *Picturing history at the Ottoman Court*. (Indiana: Indiana University Press, 2013).
- Finkel, Caroline. *Osman’s Dream: The History of the Ottoman Empire* (New York: Basic Books, 2005).
- Fisher, Sidney Nettleton. *The Foreign Relations of Turkey, 1481-1512* (Urbana, IL: University of Illinois Press, 1948).
- Fleischer, Cornell H. “Ancient Wisdom and New Sciences: Prophecies at the Ottoman Court in the Fifteenth and Early Sixteenth Centuries,” in *Falnama: The Book of Omens*, ed. by Massumeh Farhad and Serpil Bağcı (Washington: Smithsonian Institution, 2009), 231-245.
- . “Mahdi and Millenium: Messianic Dimensions in the Development of Ottoman Imperial Ideology,” in *The Great Ottoman-Turkish Civilization. Vol. 3, Philosophy, Science and Institutions*, ed. by Kemal Çiçek (Ankara: Yeni Türkiye, 2000), 42-54.
- . “Seer to the Sultan: Haydar-i Remmal and Sultan Süleyman,” in *Cultural Horizons. A Festschrift in Honor of Talat S. Halman* vol. 1 (New York: Syracuse University Press, 2001), 290–300.
- . “Shadow of Shadows: Prophecy and Poltics in 1530s Istanbul,” *International Journal of Turkish Studies* 13/1-2 (2007), 51-62.
- . “The Lawgiver as Messiah: The Making of the Imperial Image in the Reign of

- Süleyman,” in *Soliman Le Magnifique et son temps, actes du colloque de Paris. 7-10 Mars 1990*, ed. Gilles Veinstein (Paris: La Documentation Française, 1992), 159-77.
- . *Bureaucrat and Intellectual in the Ottoman Empire: The Historian Mustafa Ali (1541-1600)* (Princeton, N.J.: Princeton University Press, 1986).
- Flemming, Barbara. “Sāhib-ķırān und Mahdī: Türkische Endzeiterwartungen im ersten Jahrzehnt der Regierung Süleymāns,” in *Between the Danube and the Caucasus*, ed. by György Kara (Budapest: Akadémiai Kiadó, 1987), 43-62.
- Forcada, Miquel. “Investigating the sources of prosopography: the case of the astrologers of ‘Abd al-Raḥman II,” *Journal of Medieval Prosopography* 23 (2002), 73-100.
- Garin, Eugenio. *Astrology in the Renaissance: the Zodiac of Life*, tr. by Carolyn Jackson and June Allen (London; Boston: Routledge & Kegan Paul, 1983).
- Genç, Vural. “Acem’den Rum’a: İdris-i Bidlisi’nin Hayatı, Tariḥçiliği ve Heşt Behişt’in II. Bāyezīd Kısmı (1481-1512).” (Ph.D. Dissertation, Istanbul University, 2014).
- Geneva, Ann. *Astrology and the Seventeenth Century Mind: William Lilly and the Language of the Stars* (Manchester: Manchester University Press, 1995).
- Gökbilgin, Tayyib. “Korvin Mathias (Mátyás)ın Bayezid II’ye mektupları ve 1503 (909) Osmanlı-Macar muahedesinin Türkçe Metni/La traduction des lettres de Korvin Mathias á Bayezid II et le texte turc du traité Hungaro-Ottomans de 1503 (909),” *Belleten* 87 (1958), 369-390.
- . “Müteferrika,” *İA*.
- Goldstein, Bernard and David Pingree. “Additional Astrological Almanacs from the Cairo Geniza,” *Journal of the American Oriental Society*, 103/4 (1983), 673-690.
- . “Astrological Almanacs from the Cairo Geniza, Part 1,” *Journal of Near Eastern Studies*, 38/3 (1979), 153-175.
- . “Astrological Almanacs from the Cairo Geniza, Part 2,” *Journal of Near Eastern Studies*, 38/4 (1979), 231-256.
- Goldziher, Ignaz. “Stellung der alten islamischen Orthodoxie zu den antiken Wissenschaften,” in *Abhandlungen der Königlich Preussischen Akademie der Wissenschaften* VIII (1916), 3-46.
- Gökmen, “Eski Türklerde Heyet ve Takvim,” in *İkinci Türk Tarih Kongresi Tutanakları* (İstanbul: Devlet Kitapları, 1937), 833-841.

- Göyünç, Nejat. "XVI. Yüzyılda Ruus ve Önemi," *İÜ Edebiyat Fakültesi Tarih Dergisi* XVII/22 (1967).
- Grafton, Anthony. *Cardano's Cosmos: The Worlds and Works of a Renaissance Astrologer* (Cambridge, Mass.: Harvard University Press, 1999).
- Green, Jonathan. *Printing and Prophecy: Prognostication and Media Change, 1450-1550* (Ann Arbor: University of Michigan Press, 2012).
- Grenier, Carlos. "The *Takvim-i Humayun*: An Exploration of the Heritage and Uses of an Ottoman Calendar-Horoscope of 1452" (1st Year Paper, University of Chicago, 2010).
- Griffel, Frank. *Al-Ghazālī's Philosophical Theology* (New York: Oxford University Press, 2009).
- Gunzburg, Darrelyn. "How do Astrologers Read Charts?" in *Astrologies: Plurality and Diversity*, ed. by Nicholas Campion and Liz Greene (Ceredigion: Sophia Centre Press, University of Wales, 2011), 181-200.
- Gutas, Dimitri. *Greek Thought, Arabic Culture. The Graeco-Arabic Translation Movement in Baghdad and Early 'Abbasid Society (2nd-4th/8th-10th centuries)* (London: Routledge, 1998).
- Hamdani, Abbas. "Columbus and the Recovery of Jerusalem," *Journal of the American Oriental Society* 99/1 (1979), 39-48.
- Hayashi, Kayoko. "Fatih Vakfiyeleri'nin Tanzim Süreci Üzerine," *Bellekten* v. 72 n. 263 (2008), 73-94.
- Hayton, Darin. "Martin Bylica at the Court of Matthias Corvinus: Astrology and Politics in Renaissance Hungary," *Centaurus* 49 (2007), 185-198.
- . *The Crown and the Cosmos: Astrology and the Politics of Maximilian I* (Pittsburgh, Pa.: University of Pittsburgh Press, 2015).
- Heiderzadeh, Tofigh. "Patronage, Networks and Migration: Turco-Persian Scholarly Exchanges in the 15th, 16th and 17th Centuries," *Archives internationales d'histoire des sciences* v. 55 n. 155 (2005), 419-434.
- . "Ali Kuşçu'nun Astronomi Eserleri" (Master's thesis, Istanbul University, 1997).
- Heywood, Colin. "The Shifting chronology of the Chyhyryn campaign (1089/1678) according to the Ottoman literary sources, and the problem of the Ottoman calendar," in *The Ottoman Empire. Myths, Realities and "Black Holes."* *Contributions in honour of Colin Imber*, ed. E. Kermeli and Oktay Özel (Istanbul: Isis, 2006), 283-295.

Hofelich, M. "The Making of Taqvims in Iran," In *La science dans le monde Iranien à l'époque islamique*, ed. Živa Vesel et al. (Tehran: Institut Français de Recherche en Iran, 1998), 49-51.

Hofelich, M. and D. M. Varisco. "Taḳwīm," *EF*. Online version.

Işıksel, Güneş. "Friendship and the Principle of Good Neighborhood between Bayezid II and Matthias Corvinus," in *Matthias Corvinus und seine Zeit: Europa am Übergang vom Mittelalter zur Neuzeit zwischen Wien und Konstantinopel*, ed. Christian Gastgeber et al. (Vienna, Verlag der Österreichischen Akademie der Wissenschaften, 2011), 33-36.

Ihsanoğlu, Ekmeleddin. *Science, Technology, and Learning in the Ottoman Empire* (Aldershot, UK: Ashgate Variorum, 2004).

İnalçık, Halil. *Fatih Devri Üzerine Tetkikler ve Vesikalar* (Ankara: TTK, 1954).

———. "The Rise of Ottoman Historiography," in *Historians of the Middle East*, ed. Bernard Lewis and P. M. Holt (London: Oxford University Press, 1962), 152-167.

———. "A Case Study in Renaissance Diplomacy: The Agreement between Innocent VIII and Bāyezīd II on Djem Sultan," *Journal of Turkish Studies* 3 (1979), 209-223.

İpşirli, Mehmet. "The Ottoman historiography," in *The Great Ottoman-Turkish Civilization*, ed. Kemal Çiçek (Ankara: Yeni Türkiye Yayınları, 2000).

İzgi, Cevat. *Osmanlı Medreselerinde İlim* vol. 1-2 (İstanbul, İz Yayıncılık, 1997).

Jones, Damien. *Method, Structure, and Development in al-Fārābī's Cosmology* (Leiden: Brill, 2012).

Kaçar, Mustafa; M. Şinasi Acar ve Atilla Bir (ed.). *XVI. Yüzyıl Astronomu Takiyüddin'in Gözlem Araçları* (İstanbul: İş Bankası Kültür Yayınları, 2011).

Kafadar, Cemal. *Between Two Worlds: The Construction of the Ottoman State* (Berkeley: University of California Press, 1995).

Karamati, Younes and Farzin Negahban, "Abu al-Mahamid al-Ghaznawi," *Encyclopedia Islamica*. Online version.

Kazan, Hilal. *XVI. Asırda Sarayın Sanatı Himayesi* (İstanbul: İrcica, 2010).

Kennedy, Edward S. (and Colleagues and Former Students). "Al-Battānī's Astrological History of the Prophet and the Early Caliphate," *Suhayl* 9 (2009-2010), 13-148.

- . “A Letter of Jamshīd al-Kāshī to His Father: Scientific Research and Personalities at a Fifteenth Century Court,” *Orientalia* 29 (1960), 191-213.
- . “A Survey of Islamic Astronomical Tables,” *Transactions of the American Philosophical Society* 46/2 (1956), 123-177.
- . “On the Contents and Significance of the Khāqānī Zīj by Jamshīd Ghiyāth al-Dīn al-Kāshī,” in *Islamic Mathematics and Astronomy* v. 84, ed. Fuat Sezgin (Frankfurt am Main: Institute for the History of Arabic-Islamic Science at the Johann Wolfgang Goethe University, 1998).
- Keshaverz, Fateme. “The Horoscope of Iskandar Sultan,” *Journal of Royal Asiatic Society* 2 (1984), 197-208.
- Kılıç, Filiz. “Osmanlı Devleti’nde ve Klasik Edebiyatımızda Nevruz,” in *Türk Dünyasında Nevruz Üçüncü Uluslararası Bilgi Şöleni*, 203-214.
- Kılıç, Mustafa. “İbn Kemal’in Mısır fethine dair bir risale-i acibesı,” *Diyanet* 26/1 (1990), 111-120.
- King, David and Toufic Fahd. “al-Ṭālī’,” *EF²*, Online version.
- King, David. “Lunar Crescent Visibility Predictions in Medieval Islamic Ephemerides,” in *Quest for Understanding: Arabic and Islamic Studies in Memory of Malcolm H. Kerr*, ed. S.M. Seikaly, R. Baalbaki, and P. Dodd (Beirut: American University of Beirut, 1991), 233-251.
- . “Mamluk astronomy and the institution of the muwaqqit,” in *The Mamluks in Egyptian politics and society*, ed. by Thomas Philipp and Ulrich Haarmann (Cambridge University Press, 1998), 153-162.
- . “On the role of the muezzin and the *muwaqqit* in Medieval Islamic Society,” in *Tradition, Transmission, Transformation: Proceedings of two conferences on Pre-modern Science held at the University of Oklahoma*, ed. by F. Jamil Ragep and Sally Ragep (Leiden: Brill, 1996), 285-346.
- . “Two Astrolabes for the Ottoman Sultan Bayezit II,” in *Essays in honour of Ekmeleddin İhsanoğlu*, v. 1, ed. Mustafa Kaçar and Zeynep Durukal (Istanbul: İrcica, 2006), 439-459.
- Kissling, Hans Joachim. “Betrachtungen über die Flottenpolitik Sultan Bâjezîds II. (1481-1512),” *Saeculum* 20 (1969), 35-43.
- Koç, Aylin. “Sinan Paşa” *TDVİA*.

Köksal, Fatih. “Sinan Paşa’nın Nesri ve Nesir Üslubu,” *Doğu Akdeniz Üniversitesi Türk Dili ve Edebiyatı Bölümü Dergisi* 1 (1998), 83-97.

Köse, Fatih. *Osmanlı Devleti’nde Nevruz* (İstanbul: IQ Kültür Sanat, 2007).

Kraemer, Joel. “Al-Nawbakthī, al-Ḥasan b. Mūsā, Abū Muḥammad,” *EF*. Online version.

———. *Humanism in the Renaissance of Islam: The Cultural Revival during the Buyid Age*, Second Revised Edition (Leiden: Brill, 1992).

Krstic, Tijana. *Contested Conversions to Islam: Narratives of Religious Change in the Early Modern Ottoman Empire* (Stanford, California: Stanford University Press, 2011).

Kuehn, Sara. *The Dragon in Medieval East Christian and Islamic Art* (Leiden: Brill, 2011).

Kurnaz, Cemal and Mustafa Tatçı, “İbn İsa,” *TDVİA*.

Kurşun, Fatih Mehmet. “Sultans and Prophets: The Politics of Calendar Writing in the Ottoman Palace from the mid-15th to the mid-16th Century” (2nd Year Paper, University of Chicago, 2011).

Kurz, Marlene. *Ein osmanischer Almanach für das Jahr 1239/1240 (1824/25)* (Berlin: Klaus Schwarz, 2007).

Kut, Günay. *Kandilli Rasathanesi el yazmaları : Boğaziçi Üniversitesi Kandilli Rasathanesi ve Deprem Araştırma Enstitüsü astronomi, astroloji, matematik yazmaları kataloğu 1 – Türkçe Yazmalar* (İstanbul: Boğaziçi Üniversitesi Yayınevi, 2007).

———. *Kandilli Rasathanesi el yazmaları : Boğaziçi Üniversitesi Kandilli Rasathanesi ve Deprem Araştırma Enstitüsü astronomi, astroloji, matematik yazmaları kataloğu 2 – Arapça ve Farsça Yazmalar* (İstanbul: Boğaziçi Üniversitesi Yayınevi, 2013).

Küçük, Bekir Harun. “Early Enlightenment in Istanbul.” (Ph.D. Dissertation, University of California, San Diego, 2012).

Langermann, Tzvi. “From My Notebooks: A Compendium of Renaissance Science: *Ta’alumat Ḥokmah* by Moses Galeano,” *Aleph* 7 (2007), 285-318.

———. “From My Notebooks: Medicine, Mechanics and Magic from Moses ben Judah Galeano’s *Ta’alumat Ḥokmah*,” *Aleph* 9/1 (2009), 353-377.

———. “From My Notebooks. On *Tajriba/Nissayon* (“Experience”): Texts in Hebrew, Judeo-Arabic, and Arabic,” *Aleph* 14/2 (2014), 147-176.

- Lemay, Richard. "Origin and Success of the Kitāb Thamara of Abū Ja‘far Aḥmad ibn Yūsuf ibn Ibrāhīm," in *Proceedings of the First International Symposium for the History of Arabic Science*: April 5-12, 1976, ed. Ahmad Y. al-Hassan et al. (Aleppo: University of Aleppo, 1978), 91-107.
- . "Religion vs. Science in Islam. The Medieval Debate Around Astrology," *Oriente Moderno* 19/3 (2000), 557-575.
- Lev, Efraim. "An Early Fragment of Ibn Jazlah’s Tabulated Manual ‘ Taqwīm Al-Abdān ’ from the Cairo Genizah (T-S Ar.41.137)," *Journal of the Royal Asiatic Society* 24/2 (2014), 189–223
- Livingston, John. "Science and the Occult in the Thinking of Ibn Qayyim al-Jawziyya," *Journal of the American Oriental Society*, 112/4 (1992), 598-610.
- Long, A. A. "Astrology: Arguments pro and contra," in *Science and Speculation: Studies in Hellenistic Theory and Practice*, ed. Jonathan Barnes et al. (Cambridge; New York: Cambridge University Press, 1982), 165-193.
- Makdisi, G. *The rise of colleges: institutions of learning in Islam and the West* (Edinburgh: Edinburgh University Press, 1981).
- Markiewicz, Christopher. "The Crisis of Rule in Late Medieval Islam: A Study of Idrīs Bidlīsī and Governance at the Turn of the Sixteenth Century." (Ph.D. Dissertation, University of Chicago, 2015).
- Masad, Muhammad Ahmad. "The Medieval Islamic Apocalyptic Tradition: Divination, Prophecy and the End of Time in the Thirteenth Century." (Ph.D. Dissertation, Washington University in St. Louis, 2008).
- Matar, Zeina. "The Faraj al-Mahmūm of Ibn Ṭāwūs: A Thirteenth Century Work on Astrology and Astrologers." (Ph.D. Dissertation, New York University, 1987).
- Mavroudi, Maria. "Translations from Greek into Arabic at the Court of Mehmed the Conqueror," in *The Byzantine Court: Source of Power and Culture*, ed. Ayla Ödekan et al. (Istanbul: Koç University Press, 2013), 195-207.
- McCluskey, Stephen C. *Astronomies and Cultures in Early Medieval Europe* (Cambridge: Cambridge University Press, 1998).
- Melvin-Koushki, Matthew. "Powers of One: The Mathematicalization of the Occult Sciences in the High Persianate Tradition." (Forthcoming in *Intellectual History of the Islamicate World*).

- . “The Quest for a Universal Science: The Occult Philosophy of Sain al-Din Turka Isfahani (1369-1432) and Intellectual Millenarianism in Early Timurid Iran. (Ph.D. Dissertation, Yale University, 2012).
- Ménage, V.L. “The Beginnings of Ottoman Historiography,” in *Historians of the Middle East*, ed. Bernard Lewis and P. M. Holt (London: Oxford University Press, 1962), 168-179.
- . *Neshri's History of the Ottomans: the Sources and Development of the Text* (London: Oxford University Press, 1964).
- Mengüç, Murat Cem. “Histories of Bayezid I, historians of Bayezid II: Rethinking late fifteenth-century Ottoman historiography,” *Bulletin of the School of Oriental and African Studies* 76/3 (2013), 373-389.
- Mercier, Raymond. *An Almanac for Trebizond for the Year 1336* (Louvain-la-Neuve: Academia-Erasme, 1994).
- Meriç, Rıfki Melül. “Bāyezīd Camii Mimarı, II. Bāyezīd Devri Mimarları ile Bazı Binalar, Bāyezīd Camii ile ilgili hususlar, san'atkarlar ve eserleri,” *Ankara Üniversitesi İlahiyat Fakültesi Türk ve İslam Sanatları Tarihi Enstitüsü Yıllık Araştırmalar Dergisi* II (1958), 4-76.
- . *Türk Nakış Tarihi Araştırmaları* (Ankara: Ankata Üniversitesi İlahiyat Fakültesi, 1953).
- Metin, Tülay. “Selçuklular Zamanında Münecimliğe Dair Bazı Tespitler,” *International Journal of History Studies* 6/3 (2014), 239-252.
- Michot, Yahya J. “Ibn Taymiyya on Astrology: Annotated Translation of Three Fatwas,” *Journal of Islamic Studies* 11/2 (2000), 147-208.
- Miquel, André. “İklīm,” *EF²*. Online version.
- Mīr Taqī al-Dīn Kāshānī, *Khulāṣat al-Ash‘ār va Zubdat al-Afkār: bakhsh-i Shīrāz va navāhī-i ān* (Tīhrān: Markaz-i Pizhūhishī-i Mīrās-i Maktūb, 2013).
- Miroğlu, İsmet. “İstanbul rasathanesine ait belgeler,” *Tarih Enstitüsü Dergisi* 3 (1973), 75-82.
- Moin, Azfar. *The Millennial Sovereign: Sacred Kingship and Sainthood in Islam* (New York: Columbia University Press, 2012).
- Molla, Kemal Faruk. “Mehmed Şah Fenâri'nin Enmûzecu'l-Ulûm Adlı Eserine Göre Fetih Öncesi Dönemde Osmanlılar'da İlim Anlayışı ve İlim Tasnifi,” *Divan: İlmi Araştırmalar* v. 10, no. 18 (2005), 245-273.

- Moran, Bruce T. "Courts and Academics," in *The Cambridge History of Science*, vol. 3 *Early Modern Science*, ed. Katharine Park and Lorraine Daston (New York: Cambridge University Press, 2008), 251-271.
- Morgan, Daniel. "Knowing Heaven: Astronomy, the Calendar, and the Sagecraft of Science in Early Imperial China." (Ph.D. Dissertation, The University of Chicago, 2014), 23-25.
- Morrison, Robert G. *Islam and Science: the Intellectual Career of Nīzām al-Dīn al-Nīsābūrī* (London: Routledge, 2007).
- . "A Scholarly Intermediary between the Ottoman Empire and Renaissance Europe," *Isis* 105 (2014), 32-57.
- . "An Astronomical Treatise by Mūsā Jālīnūs alias Moses Galeano," *Aleph* 11/2 (2011), 385-413.
- Moyer, Ann. "The Astronomers' Game: Astrology and University Culture in the Fifteenth and Sixteenth Centuries," *Early Science and Medicine* 4/3 (1999), 228-250.
- Mozaffari, Mohammad. "Wābkanawī's Prediction and Calculations of the Annual Solar Eclipse of 30 January 1283," *Historia Mathematica* 40 (2013), 235-261.
- Mozaffari, S. Mohammad and Georg Zotti. "The Observational Instrument at the Maragha Observatory after AD 1300," *Suhayl* 12 (2013).
- Muslu, Cihan Yüksel. "Ottoman-Mamluk Relations and the Complex Image of Bāyezīd II," in *Conquête ottoman de l'Égypte (1517): Arrière-plan, impact, échos*, ed. Benjamin Lellouch and Nicholar Michel (Leiden: Brill, 2013), 51-76.
- . *The Ottomans and the Mamluks: the Imperial Diplomacy and Warfare in the Islamic World* (New York: IB Tauris, 2014).
- Nallino, Carlo Alfonso. "Sun, Moon, and Stars (Mohammedan)," in *Encyclopedia of Religion and Ethics*, ed. James Hastings (New York: C. Scribner, 1970), 88-101.
- . "Astrologia e astronomia presso i Musulmani," in *Raccolta di scritti editi e inediti*, v. 5, *Astrologia, astronomia, geografia*, ed. Maria Nallino (Rome: Istituto per l'Oriente, 1944).
- Nassiri, Giv. "Turco-Persian Civilization and the Role of Scholars' Travel and Migration in its Elaboration and Continuity." (Ph.D. Dissertation, University of California, Berkeley, 2002).
- Necipoglu, Gülru. "A Kanun for the State, A Canon for the Arts: Conceptualizing the Classical Synthesis of Ottoman Art and Architecture," in *Soliman le Magnifique et son Temps: actes du Colloque de Paris*, ed. Gilles Veinstein (Paris: Documentation française, 1992).

- . “From International Timurid to Ottoman: A Change of Taste in Sixteenth-Century Ceramic Tiles,” *Muqarnas* VII (1990), 136-170.
- . “The Süleymaniye Complex in Istanbul: An Interpretation,” *Muqarnas* 3 (1985), 92-117.
- . *The Age of Sinan: Architectural Culture in the Ottoman Empire* (Princeton: Princeton University Press, 2005).
- Neugebauer, Otto. “The Study of Wretched Subjects,” *Isis* 42/2 (1951), 111.
- Niccoli, Ottavia. *Prophecy and People in Renaissance Italy*. (Princeton, N.J: Princeton University Press, 1990).
- Ocak, Ahmet Yaşar. *Osmanlı Toplumunda Zındıklar ve Mülhidler 15.–17. Yüzyıllar* (İstanbul: Tarih Vakfı, 1998).
- Orthmann, Eva. “Circular Motions, Private Pleasure, and Public Prognostication in the Nativities of the Mughal Emperor Akbar,” in *Horoscopes and Public Spheres. Essays on the History of Astrology*, ed. by G. Oestmann, H. D. Rutkin and K. von Stuckrad (Berlin: Walter de Gruyter, 2005), 101-114.
- . “Court Culture and Cosmology in the Mughal Empire: Humayun and the Foundations of the Din-i İlahi,” in *Court Cultures in the Muslim World: Seventh to Nineteenth Centuries*, ed. by Albrecht Fuess and Jan-Peter Hartung (London: Routledge, 2011), 202-220.
- . “Sonne, Mond und Sterne: Kosmologie und Astrologie in der Inszenierung von Herrschaft unter Humayun,” in *Die Grenzen der Welt: Arabica et Iranica ad honorem Heinz Gaube*, ed. L. Lorn et al. (Wiesbaden, Reichert, 2008), 297-306.
- . “The Charm of Suspicious Calculations: Islamic Astrology in the Debates of Controversial Literature,” *Beiruter Blätter* 10-11 (2002-3), 110-118.
- Osmanlı Astroloji Literatürü Tarihi ve Osmanlı Astronomi Literatürü Tarihi Zeyli/History of Ottoman Astrology Literature*, ed. Ekmeleddin İhsanoğlu (İstanbul: IRCICA, 2011).
- Osmanlı Astronomi Literatürü Tarihi = History of Astronomy Literature during the Ottoman Period*, ed. Ekmeleddin İhsanoğlu (Istanbul : IRCICA, 1997).
- Öçal, Şamil. *Kışladan Medreseye: Osmanlı Bilgini Kemalpaşazade'nin Düşünce Dünyası* (İstanbul: İz, 2013).
- Özdemir, Rıfat. “Çeşitli Kültürlerde Zamanı Ölçme Faaliyetleri ve Bu Konuda Osmanlı

- Mahkemelerinin Uygulamaları II,” *Türk Dünyası Araştırmaları* 144 (2003), 559-590.
- Özel, Oktay and Gökhan Çetinsaya, “Türkiye’de Osmanlı Tarihçiliğinin Son Çeyrek Yüzyılı: Bir Bilanço Denemesi,” *Toplum ve Bilim* 91 (2001-2), 8-38.
- Özervarlı, M. Sait. “Osmanlı Kelam Geleneğinden Nasıl Yararlanırsınız?” in *Dünden Bugüne Osmanlı Araştırmaları: Tespitler – Problemler – Teklifler, Sempozyum*, ed. Ali Akyıldız et al. (İstanbul: İSAM, 2007), 197-213.
- Page, Sophie. *Astrology in Medieval Manuscripts* (British Library/University of Toronto Press, 2002).
- Parry, V. J. “The Reigns of Bāyezīd II and Selim I, 1481-1520,” in *A History of the Ottoman Empire to 1730*, ed. M. A. Cook (Cambridge: Cambridge University Press, 1976), 54-78.
- Paydaş, Kazım. “Ak-koyunlu Devlet Teşkilatı” (Ph.D. Dissertation, Ankara University, 2003).
- Pérez, María José Parra. “Estudio y edición de las traducciones el árabe del Almanach perpetuum de Abraham Zacuto” (Ph.D. Dissertation, Universitat de Barcelona, 2013).
- Pertusi, Agostino. *La caduta di Costantinopoli*, vol. 1 (Rome, Fondazione Lorenzo Valla, 1976).
- Pfeiffer, Judith. “Teaching the Learned: Jalāl al-Dīn al-Dawānī’s Ijāza to Mu’ayyadzāda ‘Abd al-Rahmān Efendi and the Circulation of Knowledge between Fārs and the Ottoman Empire at the Turn of the Sixteenth Century,” in *The Heritage of Arabo-Islamic Learning. Studies Presented to Wadad Kadi*, ed. Maurice A. Pomerantz and Aram A. Shahin (Leiden: Brill, 2016), 284-332.
- Pines, S. “The Semantic Distinction between the terms Astronomy and Astrology according to al-Biruni,” *Isis* 55/3 (1964), 343-9.
- Pingree, David. “Kīrān,” *El²*. Online version.
- . “Abū Ma‘shar al-Balkhī, Ja‘far ibn Muḥammad,” in *Dictionary of Scientific Biography*, vol. I, 32-39.
- . “Abū Sahl b. Nawbakht,” *Elr*.
- . “Astrology,” in *Dictionary of the History of Ideas* v. 1, ed. Philip P. Wiener (New York, 1973-4), 118-26.
- . “Astronomy and Astrology in India and Iran,” *Isis* 54/2 (1963), 229-246.
- . “Ektīārāt,” in *Elr*.

- . “From Alexandria to Baghdād to Byzantium. The Transmission of Astrology,” in *International Journal of the Classical Tradition* 8 (2001), 3-37.
- . “Horoscope” *EIr*.
- . “Indian Influence on Sassanian and Early Islamic Astronomy and Astrology,” *Journal of Oriental Research* [Madras] 34-35 (1964-1965), 118-126.
- . “Māshā’allāh: Some Sasanian and Syriac Sources,” in *Essays on Islamic Philosophy and Science*, ed. G.F. Hourani (Albany, NY: State University of New York Press, 1975), 5-14.
- . “Māshā’ Allāh’s Zoroastrian Historical Astrology,” in *Horoscopes and Public Spheres: Essays on the History of Astrology*, ed. Günther Oestmann, Darrel H. Rutkin, Kocku von Stuckrad (Berlin: Walter de Gruyter, 2005), 95-100.
- . “Māshā’allāh,” in *Dictionary of Scientific Biography*, vol. IX, 159-162.
- . “Nowbaktī, Ḥasan,” *EIr*. Online version.
- . “The Šābians of Ḥarrān and the Classical Tradition,” *International Journal of the Classical Tradition* 9/1 (2002), 8-35.
- . “Umar ibn al-Farrukhān,” in *Dictionary of Scientific Biography*, vol. XIII, 538-539.
- . *From Astral Omens to Astrology: from Babylon to Bīkāner* (Rome: Istituto Italiano per l’Africa e l’Oriente, 1997).
- Pohl, Stephan. “Theosophie und Theologie im nachmongolischen Iran: Leben und Werk des Ġalāladdīn al-Dawwānī (gest. 902/1502).” Unpublished work, Bochum, 1997.
- Pourjavady, Reza. *Philosophy in Early Safavid Iran. Najm al-Dīn Maḥmūd al-Nayrīzī and His Writings* (Leiden: Brill, 2011).
- Quinlan-McGrath, Mary. *Influences: Art, Optics, and Astrology in the Italian Renaissance* (Chicago: The University of Chicago Press, 2013).
- Raby, Julian. “A Sultan of Paradox: Mehmed the Conqueror as a Patron of the Arts,” *Oxford Art Journal*, 5 (1982), 3-8.
- Raby, Julian and Zeren Tanındı, *Turkish Bookbinding in the 15th Century: The Foundation of an Ottoman Court Style* (London: Azimuth editions on behalf of l’Association Internationale de Bibliophile, 1993).

Raffaelli, Enrico. “Zāyča” *EIr*.

Ragep, F. Jamil. “Astronomy,” *EF³*, Online version.

———. “Qādīzāda al-Rūmī: Ṣalāḥ al-Dīn Mūsā ibn Muḥammad ibn Maḥmūd al-Rūmī,” in *BEA* ed. Thomas Hockey *et al.* (New York: Springer, 2007).

———. “Astronomy in the Fenārī-Circle: The Critical Background for Qādīzāde al-Rūmī and the Samarqand School,” in Yücedoğru *et al.*, *Uluslararası Molla Fenârî Sempozyumu*, 165-176.

———. “Freeing Astronomy from Philosophy: An Aspect of Islamic Influence on Science,” *Osiris* 16 (2001), 49-71.

———. “New Light on Shams: The Islamic Side of Σάμψ Πουχάρης,” in *Politics, Patronage and the Transmission of Knowledge in 13th - 15th Century Tabriz*, ed. Judith Pfeiffer (Leiden: Brill, 2013), 166-180.

Ragep, Sally P. “Maḥmūd ibn Muḥammad ibn ‘Umar al-Jaghmīnī’s *al-Mulakhkhaṣ fī al-hay’a al-basīṭa*: An Edition, Translation, and Study.” (Ph.D. Dissertation, McGill University, 2014).

Regourd, Anne. “L’Épître ayant pour objet la mise à l’épreuve de ceux qui n’ont d’astrologue que le nom d’al-Qabīṣī (IVE/Xe s.),” *Politica Hermetica* 17 (2003), 24-53.

Rogers, J. Michael. “Centralisation and Timurid Creativity,” *Oriente Moderno* 15/2 (1996), 533-555.

Roxburgh, David. *The Persian album, 1400-1600: from dispersal to collection* (New Haven: Yale University Press, 2005).

Rutkin, H. Darrel. “Various Uses of Horoscopes: Astrological Practices in Early Modern Europe,” in *Horoscopes and Public Spheres. Essays on the History of Astrology*, ed. by G. Oestmann, H. D. Rutkin and K. von Stuckrad (Berlin: Walter de Gruyter, 2005), 167-182.

Sabra, A. I. “Situating Arabic Science: Locality *Versus* Essence,” *Isis* 87/4 (1996), 654-70.

———. “The Appropriation and Subsequent Naturalization of Greek Science in Medieval Islam: A Preliminary Statement,” *History of Science* 25 (1987), 223-243.

Sahillioğlu, Halil. “Années siviş et crises monétaires dans l’Empire ottoman,” *Annales. Économies, Sociétés, Civilisations* 24/5 (1969), 1071-1091, also published in English as “Siviş year crises in the Ottoman Empire,” in *Studies in the Economic History of the Middle East*, ed. A. Cook (London: Oxford University Press, 1970), 230-252.

- Saliba, George. "Astronomy and Astrology in Medieval Arabic Thought," *Les Doctrines de la Science de l'Antiquité à l'Âge Classique*, ed. Roshdi Rashed et Joël Biard (Leuven: Éditions Peeters, 1999), 131-164.
- . "An Observational Notebook of a Thirteenth-Century Astronomer," *Isis* 74/3 (1983), 388-401.
- . "Horoscopes and Planetary Theory: Ilkhanid Patronage of Astronomers," in *Beyond the Legacy of Genghis Khan*, ed. by Linda Komaroff (Leiden: Brill, 2006), 357-368.
- . "Islamic Astronomy in Context: Attacks on Astrology and the Rise of the *Hay'a* Tradition," *Bulletin of the Royal Institute of Inter-Faith Studies*, 4/1 (2002), 25-46.
- . "The Role of the Astrologer in Medieval Islamic Society," *Bulletin d'études orientales* 44 (1992), 45-67.
- Samsó, Julio. "Māshā' Allāh b. Atharī or b. Sāriya," *EF*². Online version.
- . "The Early Development of Astrology in al-Andalus," *Journal for the History of Arabic Science* 3 (1979), 228-43.
- . "Astrology in Morocco towards the end of the Fourteenth Century and the Beginning of the Fifteenth Century," in *From Māshā'allāh to Kepler: Theory and Practice in Medieval and Renaissance Astrology*, ed. Charles Burnett and Dorian Gieseler Greenbaum (Ceredigion, Wales: Sophia Centre Press, 2015), 407-424.
- Saraç, Yekta. *Şeyhülislam Kemal Paşazade. Hayatı, Şahsiyeti, Eserleri ve Bazı Şiirleri* (İstanbul: Risale, 1995).
- Sarma, S. R. "Jyotiśarāja at the Mughal Court," in *Studies on Indian Culture, Science, and Literature: Being Prof. K. V. Sarma felicitation volume presented to him on his 81th birthday*, ed. by N. Gangadharan, S.A.S. Sarma and S.S.R Sarma (Chennai: Sree Sarada Education Society Research Centre, 2000), 363-371.
- Sarton, George and Frances Siegel. "Seventy-Sixth Critical Bibliography of the History and Philosophy of Science and of the History of Civilization," *Isis* 41/3-4 (1950), 328-424.
- Sarton, George. *Introduction to the History of Science*, v. 1 From Homer to Omar Khayyam (Baltimore: The Williams and Wilkins Company, 1927).
- Savadi, Fateme and Sajjad Nikfahm Khubravan, "Ḥarakat-i vasaṭ-i kavākib dar Zīj-i Īlkhānī va naqdhā-yi vārid bar ān," [The Mean Motion of the Planets in the Zīj-i Īlkhānī and its criticisms] in *Ustād-i bashar: Pajūhashhāyi dar zandagī, rūzgār, falsafa va 'ilm-i Khwāja*

Naşîr al-Dîn Tûsî [The Teacher of the Humankind: Essays on Life, Times, Philosophy and Scientific Achievements of Khwâjah Naşîr al-Dîn Tûsî], ed. Hosein Masoumi Hamedani and Mohammad Javad Anwari (Tehran: Miras-e Maktoob, 1391/2012).

Sayılı, Aydın. “Alaaddin Mansur’un İstanbul Rasathanesi Hakkındaki Şiirleri,” *Belleten* 20 (1956), 411-84.

———. “The Institutions of Science and Learning in the Moslem World.” (Ph.D. Dissertation, Harvard University, 1941).

———. *The Observatory in Islam and its Place in the General History of the Observatory* (Ankara: Türk Tarih Kurumu, 1960).

Schmidl, Petra. “Magic and Medicine in a 13th-century Treatise on the Science of the Stars. The Kitâb al-Tabşira fî ‘ilm al-nujûm of the Rasulid Sultan al-Ashraf ‘Umar,” in *Herbal Medicine in Yemen. Traditional Knowledge and Practice and Their Value for Today’s World*, ed. Ingrid Hehmeyer and Hanne Schonig (Leiden: Brill, 2012), 43-68.

Sezgin, Fuat (ed.). *Geschichte des arabischen Schrifttums*, Band 7: Astrologie-Meteorologie und Verwandtes bis ca. 430 H. (Brill: Leiden, 1979).

Shank, Michael. “Academic Consulting in 15th-Century Vienna: The Case of Astrology,” in *Texts and Contexts in Ancient and Medieval Science. Studies on the Occasion of John E. Murdoch’s Seventieth Birthday*, ed. Edith Sylla and Michael Mcvaugh (Leiden: Brill, 1997), 245-270.

Shefer-Mossensohn, Miri. *Science among the Ottomans. The Cultural Creation and Exchange of Knowledge* (Austin, TX: University of Texas Press, 2015).

Shihadeh, Ayman. *The Teleological Ethics of Fakhr al-Dîn Râzî* (Leiden: Brill, 2006).

Sohrewide, Hanna. “Dichter und Gelehrten aus dem Ostem im osmanischen Reich,” *Der Islam* 46 (1970), 263-302.

Steele, John. “A Late Babylonian Compendium of Calendrical and Stellar Astrology,” *Journal of Cuneiform Studies* 67 (2015), 187–215.

Storey, Charles Ambrose. *Persian Literature: A Bio-Bibliographical Survey* (London: Luzac, 1927).

Şahin, Kaya. *Empire and Power in the Reign of Süleyman: Narrating the Sixteenth-Century Ottoman World* (New York: Cambridge University Press, 2013).

Tamdoğan-Abel, Işık. “Le future dans le *Rumuz-ı Kunuz* de Mejdeddin Ibn Isa: Une utopie, une

- prophétie, un livre à mystères,” in *Melâmis-Bayrâmis: études sur trois mouvements mystiques musulmans*, ed. Nathalie Clayer, Alexandre Popovic, Thierry Zarcone (Istanbul: Isis, 1998), 145-152.
- Tanırdı, Zeren. “II. Bâyezîd’in Sanatlı Kitapları,” in *Kasayid-i Efsahi der medh-i Sultan Bâyezîd* (İstanbul: Sakıp Sabancı Müzesi, 2012), 7-33.
- Tansel, Selahattin. “Yeni Vesikalar Karşısında Sultan İkinci Bayezid Hakkında Bazı Mütalaalar”, *Bellekten* 27/106 (1963).
- . *Sultan II. Bâyezîd’in Siyâsî Hayatı* (İstanbul: MEB Devlet Kitapları Müdürlüğü, 1966).
- Taqizadeh, Sayyed H. “Various Eras and Calendars used in the Countries of Islam,” *BSOAS* 9/4 (1938), 903-922; 10/1 (1939), 107-132; 14/3 (1952), 603-611.
- Tekeli, Sevim. “Meçhul bir Yazarın İstanbul Rasathanesinin Âletlerinin Tasvirini Veren Âlât-ı Rasadiye li Zîc-i Şehinşahiye adlı makalesi,” *Araştırma* 1 (1963), 71-122.
- Terzi, Mehmet. “Yazıcı Salih (Selahaddin) Kitabı’ş-şemsiyye (Melhame-i Şemsiye) Dil Özellikleri, Metin, Söz, Dizin.” (Ph.D. Dissertation, Malatya İnönü University, 1994).
- The Hans Wehr Dictionary of Modern Written Arabic*, ed. J.M. Cowan Third Edition (Ithaca: Spoken Language Services, 1976).
- Thesaurus linguarum orientalium Turcicae-Arabicae-Persicae = Lexicon Turcico-Arabico-Persico* (İstanbul: Simurg, 2000).
- Thomas, Lewis V. *A Study of Naima* (New York: New York University Press, 1972).
- Thorndike, Lynn. “The True Place of Astrology in the History of Science,” *Isis* 46/3 (1955), 273-278.
- Tibawi, A. L. “Origin and Character of al-Madrasah,” *Bulletin of the School of Oriental and African Studies*, 25 (1962), 225-238.
- Toorawa, Shawkat M. *Ibn Abî Tâhir Tayfûr and Arabic writerly culture: a ninth-century Bookman in Baghdad* (New York: Routledge, 2005).
- Tourkin, Sergei and Živa Vesel. “The Contribution of Husayn Va‘iz-i Kashifi to the Transmission of Astrological Texts,” *Iranian Studies* 36/4 (2003), 589-599.
- Tourkin, Sergei. “Iskandar-sultan und sein Geburtsbuch,” in *Orakel. Der Blick in die Zukunft. Ausstellungskatalog Museum Rietberg Zürich*, ed. A. Langer and A. Lutz (Zürich, 1999), 180-189.

- . “Medical Astrology in the Horoscope of Iskandar Sultan,” in *Sciences, Techniques et Instruments dans le Monde Iranien*, ed. N. POUJARVADY and Z. VESEL, (Teheran: IFRI, 2004), 105-109.
- Tunalı, Gülçin. “An Ottoman Astrologer at Work: Sadullah el-Ankaravi and the Everyday Practice of İlm-i Nücum,” in *Les Ottomans et le temps*, ed. François GEORGEON and Frédéric HITZEL (Leiden: Brill, 2012), 39-60.
- . “Osmanlı Siyaset Kültürünü Anlamada Kaynak Olarak İlm-i Nücûm: Sadullah el-Ankaravî,” *TALİD* 2/1 (2004), 183-195.
- . “Sadullah Efendi’nin İlm-i Nücum Kaynaklarından Tanzimat Ankarası’na Bir Katkı,” *Türkiyat Araştırmaları Dergisi*, n.d., 370–92.
- Turan, Osman. *On iki hayvanlı Türk takvimi* (İstanbul: Cumhuriyet Matbaası, 1941).
- . *Türkiye Selçukluları Hakkında Resmi Vesikalar: Metin, Tercüme ve Araştırmalar* (Ankara: Türk Tarih Kurumu, 1958).
- Turan, Şerafettin. “Bāyezīd II,” *İA*.
- Türesay, Özgür. “Le temps des almanachs ottomans: usage des calendriers et temps de l’histoire (1873-1914),” in *Les Ottomans et le temps*, 129-157.
- Türker, Ömer and Osman Demir, *İslam Düşüncesinin Dönüşüm Çağında Fahreddin er-Râzî* (İstanbul: Klasik, 2011).
- Ullmann, Manfredd. *Die Natur- und Geheimwissenschaften im Islam* (Brill; Leiden, 1972).
- Uluç, Lale. “The Common Timurid Heritage of the Three Capitals of Islamic Arts,” in *Istanbul, İsfahan, Delhi. 3 Capitals of Islamic Art: Masterpieces from the Louvre Collection*, exhibition catalogue (İstanbul: Sabancı University Sakıp Sabancı Museum, 2008), 39-53.
- Uluçay, Çağatay. “Yavuz Sultan Selim Nasıl Padişah Oldu II,” *İÜ Edebiyat Fakültesi Tarih Dergisi* 7/10 (1954), 117-142.
- Unat, Yavuz. “Mustafa İbn Ali el-Muvakkît ve İ’lâm el-‘İbâd fî A’lâm el-Bilâd (Şehirler Aleminde Mesafelerin Bildirimi) Adlı Risalesi,” *Electronic Journal of Oriental Studies* VII/10 (2004), 1-48.
- Uyar, Mustafa. “İlhanlı (İran Moğolları) Ordularının Savaş Öncesinde Yaptığı Stratejik Hazırlıklar ve Savaş Sırasında Yaptıkları Hileler,” *Gazi Eğitim Fakültesi Dergisi* 29/4 (2009).
- Uzunçarşılı, İsmail H. *Osmanlı Devletinin Saray Teşkilatı* (Ankara: Atatürk Kültür, Dil ve Tarih

- Yüksek Kurumu, 1984).
- Ünver, Süheyl. “Osmanlı Türkleri İlim Tarihinde Muvakkithaneler,” *Atatürk Konferansları V* (1971-1972), 217-257.
- . *Ali Kuşçi hayatı ve eserleri* (İstanbul: Kenan Matbaası, 1948).
- . *İstanbul Rasathanesi* (Ankara: TTK, 1969).
- Van Bladel, Kevin. “The Arabic History of Science of Abū Sahl ibn Nawbaht (fl. ca. 770-809) and its Middle Persian Sources,” in *Islamic Philosophy, Science, Culture, and Religion. Studies in Honor of Dimitri Gutas*, ed. Felicitas Opwis and David Reisman (Leiden: Brill, 2012), 41-62.
- Van Ess, Josef. “Jorjāni, Zayn al-Dn Abu’l-Ḥasan ‘Alī b. Moḥammad b. ‘Alī al-Ḥosaynī,” *Elr*, Online edition.
- Vanden Broecke, Steven. *The Limits of Influence: Pico, Louvain, and the Crisis of Renaissance Astrology* (Leiden: Brill, 2003).
- Varisco, Daniel Martin. *Medieval Agriculture and Islamic Science: the Almanac of a Yemeni Sultan* (Seattle: University of Washington Press, 1994).
- Vatin, Nicolas. “L’Homme d’État Ottoman, Maître du Temps: La Crise de 1566,” in *Les Ottomans et le temps*, ed. by François Georgeon and Frédéric Hitzel (Leiden: Brill, 2012), 77-98.
- Vesel, Živa. “Le Sırr al-Maktūm de Fakhr al-Dīn Rāzī (m. 606H/1210) face à la Ghāyat al-Ḥakīm,” in *Images et Magie: Picatrix entre Orient et Occident*, ed. Jean-Patrice Boudet, Anna Caiozzo, and Nicolas Weill-Parot (Paris: Honoré Champion Éditeur, 2011), 77-93.
- . “Teucros in Nizami’s Haft Paykar,” in *A Key to the Treasure of the Hakim: Artistic and Humanistic Aspects of Nizami Ganjavi’s Khamsa*, ed. by Johann-Christoph Bürgel & Christine van Ruymbeke (Leiden: University Press, 2011), 245-252.
- . “The Persian Translation of Fakhr al-Dīn Rāzī’s *al-Sırr al-Maktūm* (‘The Occult Secret’) for İltutmish,” in *Confluence of Cultures: French Contributions to Indo-Persian Studies*, ed. Françoise ‘Nalini’ Delvoye (New Delhi and Tehran: Manohar, Centre for Human Sciences, and Institut Français de Recherche en Iran, 1995), 14-22.
- . *Les encyclopédies persanes: essai de typologie et de classification des sciences* (Paris: Editions Recherche sur les civilisations, 1986).
- Warburg, Aby. *Italienische Kunst und internationale Astrologie im Palazzo Schifanoja zu*

Ferrara; Piero Della Francesca's *Constantinsschlacht in der Aquarellcopie von Johann Anton Rambouse* (Roma: Maglione & Strini, 1922).

Watts, Pauline Mofitt. "Prophecy and Discovery: On the Spiritual Origins of Christopher Columbus's "Enterprise of the Indies"," *The American Historical Review* 90/1 (1985), 73-102.

Westman, Robert S. *The Copernican Question: Prognostication, Skepticism, and Celestial Order* (Berkeley: University of California Press, 2011).

———. "The Astronomer's Role in the Sixteenth Century: A Preliminary Study," *History of Science* 8 (1980), 105-147.

Woods, John E. *The Aqqyunlu: Clan, Confederation, Empire*. Revised and Expanded Edition (Salt Lake City: The University of Utah Press, 1999).

Yazdi, Hamid-Reza Giahi and Pouyan Rezvani, "Chronology of the Events of the Samarqand 'Observatory and School' based on some Old Persian Texts: a Revision," *Suhayl* 14 (2015), 145-165.

Yıldız, Sara Nur. "Ottoman Historical Writing in Persian, 1400-1600," in *Persian Historiography*, ed. Charles Melville (New York: I.B. Tauris, 2012), 436-502.

Zambelli, Paola (ed.). "*Astrologi hallucinati*": *Stars and the End of the World in Luther's Time* (Berlin; New York: W. de Gruyter, 1986).

———. "Fine del mondo o inizio della propaganda?" in *Scienze, credenze, occulte, livelli di cultura*. Convegno Internazionale di Studi (Firenze: Olschki, 1982), 291-368.