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Preface

It is with great pleasure that we (Fateme Savadi, Sajjad Nikfahm-Khubravan and myself) present this translation of Naṣīr al-Dīn al-Ṭūsī's *al-Risāla al-Muʿīniyya* and its "Supplement" (or "Appendix"), the *Ḥall-i Mushkilāt-i Muʿīniyya*, based on the critical edition prepared by Sajjad Nikfahm-Khubravan and Fateme Savadi.¹ It would be a considerable understatement to say that it has been long in the making.

I began the translation in collaboration with Prof. Wheeler Thackston of Harvard University in the early 1980s. At the time, we worked mainly on the *Ḥall* and produced a first draft; then, much to my pleasant surprise, Thackston sent me a translation in 1992 that included the entire *Muʿīniyya* and a revision of our *Ḥall* translation. Unfortunately,

1. Naṣīr al-Dīn Muḥammad al-Ṭūsī, *al-Risāla al-Muʿīniyya (al-Risāla al-Mughniya) and its Supplement*, Volume I: Critical Edition of the Persian Texts, edited by Sajjad Nikfahm-Khubravan and Fateme Savadi (Tehran: Written Heritage Research Institute [Miras-e Maktoob], 2020). Also available as open access at <https://ismi.mpiwg-berlin.mpg.de/page/muiniyya-edition-2020> and <https://escholarship.mcgill.ca/concern/books/qr46r555w?locale=en>.

other obligations kept intervening, and many years went by without completing the project. But as it turned out, Fateme Savadi and Sajjad Nikfahm-Khubravan, both McGill graduate students at the time, were able to produce their critical edition. Although it became clear that considerable emendations needed to be made to Thackston's translation, nevertheless his draft helped us considerably as we finalized the translation. We wish to sincerely thank him for his generosity in allowing us to benefit from that translation and acknowledge his role in what appears here.

Before discussing the present translation, it is important that we reiterate what is meant by a critical edition of the *Muʿīniyya* and its Supplement. (For a fuller discussion, please see the introduction to the edition.) Ṭūsī completed the first version of the *Muʿīniyya* in 632 H/1235 CE. The *Ḥall* was added as a supplement¹ in 643 H/1245 CE. But this isn't the end of the story. Ṭūsī continued making emendations, the most dramatic being revisions of the introductions to both works in which he removed any mention of his original patrons, the Ismāʿīlī rulers of Kūhistān in eastern Iran. This, of course, came after Iran fell under the rule of the Mongols and Ṭūsī's subsequent employ by them. Through rather impressive codicological analysis, Nikfahm-Khubravan and Savadi were able to determine what we call the oldest Ismāʿīlī version of the text, which is the one presented in their edition. This is as close as we can come at present to Ṭūsī's original version. Their critical apparatus allows the reader to ascertain the later versions of the texts.

1. Some manuscripts refer to it as an appendix (*dhayl*).

The choice of the original version for the edition, rather than, say, the revised version that expunged the Ismāʿīlī references, was made for a number of reasons. First, it allows us to ascertain Ṭūsī's earliest formulations about astronomy and the discoveries of his new models that employ the "Ṭūsī-couple." Second, it provides invaluable information about Ṭūsī's patronage at the Ismāʿīlī court and how that might have influenced how he presented his material. Third, although the revised versions are mostly the same as the originals (with the exception of the introductions), there still are a number of revisions that are part of the textual history, some due to Ṭūsī, some perhaps to others. What we can deduce from some of these revisions is that Ṭūsī made a number of "mistakes" in his original draft; by mistakes, we mean obvious orthographic, numeric, grammatical, and conceptual errors that were changed in later versions, again either by Ṭūsī, students, scribes or someone else. Since our best witness to the Ismāʿīlī version, University of Tehran MS 1346, also contains Ṭūsī's later revisions, we have concluded that Naṣīr al-Dīn, due to haste or otherwise, was not as meticulous as he would later be when he composed the Arabic version of the *Muʿiniyya*, i.e., *al-Tadhkira fī ʿilm al-hayʾa* (*Memoir on Astronomy*).

Now this creates a dilemma for a translator when confronted with obvious mistakes, such as 332,460,952 instead of the correct 33,460,952 (IV,5[7]). The temptation is to assume this to be a copyist error and put the correct number in the translation. But because it is attested in the witnesses from which the Ismāʿīlī version has been determined, it was decided to keep the incorrect number in both the edition and translation, with corrections in the notes; as best as we can now determine, this number (and similar cases) is due to Ṭūsī. Likewise with several numbers in the listings of constellations: our best witnesses attest to the "mistakes," although other witnesses have attempted corrections. To complicate matters further, Ṭūsī himself in his *Taḥrīr al-Majisti* (re-cension of the *Almagest*), completed shortly after the *Ḥall* in 644 H/1247

CE, has the correct numbers for the constellations, i.e., those that correspond to what one finds in the *Almagest*. Again, our decision was to translate what is written in our best witnesses. In that way, the translation follows the critical edition.

A similar problem pertains to the figures. Again, the temptation is to “correct” what is found in the manuscript witnesses, but this potentially leads to considerable distortions and misrepresentations, as has been pointed out with respect to Johan Ludvig Heiberg’s editions of Greek mathematical texts.¹ Generally the figures have been drawn following what is found in University of Tehran MS 1346, but we recognize that they contain errors that may or may not be due to Ṭūsī. (An example is Figure 5 in Section 7 of the *Ḥall*.) In order to assist the reader in comparing our figures with those in manuscript witnesses, we plan to put images of the figures online with the edition and translation, once we have obtained permissions from the various repositories.

The translation follows the standard procedures that we have used for Ṭūsī’s *Tadhkira*,² Quṭb al-Dīn al-Shīrāzī’s *Nihāyat al-idrāk*,³ etc. We have kept notes to a minimum; and a third volume is anticipated that will provide a study and commentary.

Finally, I wish to acknowledge the support of the US National Sci-

1. See Ken Saito and Nathan Sidoli, “Diagrams and Arguments in Ancient Greek Mathematics: Lessons Drawn from Comparisons of the Manuscript Diagrams with Those in Modern Critical Editions,” 135-62, and Reviel Netz, “The Texture of Archimedes’ Writings: Through Heiberg’s Veil,” 163-205, in *The History of Mathematical Proof in Ancient Traditions*, ed. Karine Chemla (Cambridge: Cambridge University Press, 2012).

2. F. J. Ragep, *Naṣīr al-Dīn al-Ṭūsī’s Memoir on Astronomy (al-Tadhkira fī ‘ilm al-hay’a)*, 2 vols. (New York: Springer-Verlag, 1993).

3. Fateme Savadi, “The Historical and Cosmographical Context of *Hay’at al-arḍ* with a focus on Quṭb al-Dīn Shīrāzī’s *Nihāyat al-Idrāk*” (PhD diss., McGill University, 2019).

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