

A fifteenth-century Hebrew witness of the *Theorica planetarum* from the Kingdom of Naples

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Abstract: In this introductory paper, I present a precious witness of the hitherto-unstudied Hebrew transmission of the *Theorica planetarum*. The Hebrew translation of the *Theorica planetarum* was made on the Italian Peninsula in the middle of the fifteenth century by the Jewish physician Judah Astruc ben Samuel Shalom. The copy found within the codex Ms. III F 12 from the National Library Victor Emmanuel III in Naples was produced in the Kingdom of Naples in the Jewish year 5252 (=1491/2 CE), as part of a rich scientific codex, which also includes several poetic elements. Its scribe was Abba Mari Halfon, who had come to Naples to study astronomy. Halfon's copy, in Hebrew Italian script, is characterised by extremely high textual as well as diagrammatical precision and is part of a complex transmission of the seminal astronomical treatise outside the Latin sphere which preserved part of its Latin lexicon, in Hebrew characters.

Keywords: Theorica Planetarum, Hebrew Astronomy, Judah Astruc ben Samuel Shalom, Abba Mari Halfon.

1. The *Theorica planetarum*

In the Latin world, the *Almagest* served as a primary source for theoretical astronomy from the middle of the thirteenth century. However, it was far too advanced for students at an elementary level. Instead, it was the *Theorica planetarum* which gradually became the pillar of the medieval astronomical university curriculum, from the late thirteenth century into the sixteenth century. After Sacrobosco's *Sphaera mundi*, the *Theorica planetarum* was the most popular astronomical manual, often being placed after the *Sphaera mundi*. The *Theorica planetarum* survived in hundreds of manuscripts (as well as early printed books) - in contrast with the paucity of known manuscripts of the Latin translations of the *Almagest*.

The *Theorica planetarum* displayed mathematical models that summarised Ptolemy's theory of planetary motion, starting with the Sun and Moon, and continuing with each of the five planets. There is no reference to the debate of compatibility between the mathematical (Ptolemaic) and physical (Aristotelean) accounts of the universe. The focus is set on solid Ptolemaic doctrines, with only a brief mention of the eighth sphere in the Section on the Moon. Neither the author of the *Theorica planetarum* nor its exact date of composition can be determined with certainty. Most manuscripts are anonymous. A few are ascribed to one of a dozen authors, among whom Gerard of Cremona. In the nineteenth century, Boncompagni tried to establish a case for the astrologer Gerard of Sabbionetta whereas Duhem sought to give it back to Gerard of Cremona.

The most probable hypothesis emerging from the known data seems to be that the *Theorica planetarum* was composed by an unknown teacher of astronomy at the beginning of the thirteenth century as a manual to supplement the meagre treatment of planetary theory in the fourth book of the *Sphaera mundi*. In any case, whoever the author of the *Theorica planetarum* may have been, and despite its various shortcomings, one must praise its consistent and unequivocal terminology, in contrast to some of the vocabulary found in

the *Almagest*. The scientific lexicon of the *Theorica planetarum* became a linguistic vehicle for theoretical astronomy extending beyond the late Middle Ages. Various academic works shed light on the intricate history of the debate surrounding the authorship and dating of the *Theorica planetarum*, as well as an analysis of its contents, language and general assessment (Federici Vescovini, 1996; The Theory..., 1974; Pedersen, 1981, 1992).

2. The Hebrew transmission of the *Theorica planetarum*

Judah Astruc ben Samuel Shalom, the son of a rabbinic scholar, translated the *Theorica planetarum* from Latin into Hebrew in the middle of the fifteenth century. Shalom was a known physician on the Italian Peninsula and similarly to many of his coreligionists, he was permitted to practice medicine thanks to papal protection, resulting in the field of medicine flourishing among Italian Jews. Shalom also translated into Hebrew Hippocrates's *Aphorisms* and the *Tractatus* on logic by Peter of Spain (Carmoly, 1844, pp. 127-8; Landau, 1895, p. 60; Steinschneider, 1893, pp. 472, 632).

In the elaborate preface to his translation of the *Theorica planetarum*, Shalom describes the Latin treatise as “small in size but significant in quality”¹. We also learn that he made the translation at the behest of two scholars: the liturgical poet Raphael ben Isaac from Faenza and the scribe Shabtai ben Mordecai from Sulmona. Numerous textual gems are interwoven into the lengthy introduction, incorporating hermeneutical and philosophical layers and shedding new light on Jewish intellectual circles during the Italian Renaissance. Shalom's introduction corroborates further our knowledge regarding the widespread interest in astronomy within Jewish circles and its actual study by (at least) Jewish men, who were by and large literate, due to their religious obligation to be able to read (and understand) the prayers in Hebrew from a young age. Shalom further emphasises the superior status of astronomy over all the other sciences in medieval Jewish thought - reminding us of the modern perception of mathematics as the Queen of the Sciences - and its central role within the Jewish tradition and religious practice, for example, in the reckoning of the Jewish calendar. The desire to study nature, and particularly the skies, as a means to approach God, was part and parcel of the medieval Jewish philosophical *Weltanschauung*, most famously represented by the polymath Moses Maimonides. Much has been written about Judaism and astronomy (Goldstein, 1965; Kellner, 1991; Langermann, 2000).

The six extant copies of the Hebrew *Theorica planetarum* date from the fifteenth and the sixteenth centuries, four manuscripts are in Italian and two in Sephardic Hebrew scripts, but only half of them preserved the beautiful introduction by Shalom². The Hebrew transmission also includes Latin terminology in Hebrew characters, which I will refer to as *Judeo-Latin*, and even one case in which we find the entire Latin text in Hebrew characters juxtaposed with Shalom's Hebrew translation³. Shalom's impeccable translation not only reflects a profound understanding of the astronomical contents but also a mastery of the Latin and Hebrew scientific languages.

The fact that the Hebrew transmission of the *Theorica planetarum* contains variable amounts and forms of *Judeo-Latin* may suggest that it was Shalom himself who originally decided to incorporate Latin terminology in Hebrew characters in the *Urtext* for the benefit of his future readers, for whom the knowledge of the Latin scientific terminology could be of use in their study of astronomy from Latin

¹ שהוא מעט הכמות ורוב האיכות

² Details of the manuscripts can be retrieved through www.nli.org.il (Accessed 1 October 2024)

³ It is important to note that *Judeo-Latin* is not part of the Judeo-languages in the classical sense because unlike Judeo-Italian [with its numerous variants e.g. Judeo-Florentine, Judeo-Roman (still in use), Judeo-Venetian], as well as Judeo-Spanish (Ladino) and other Judeo-Romance languages, Judeo-Arabic, Judeo-Persian etc., which were the native tongues of Jews in the various communities, based on the local dialects with unique Jewish and Hebrew linguistic features within, there is no evidence of Latin being a *lingua franca* of Jews. It is the manifestation of the Latin language in Hebrew script that allows, albeit laxly, to embrace the designation *Judeo-Latin* in our case.

sources, whether at university or with a Christian master. The variegated dissemination of the Hebrew *Urtext* modulo its Judeo-Latin density and forms, as well as many other linguistic and textual features a priori seem to point to a rather complex Hebrew transmission of the *Theorica planetarum*, and possibly, to a significantly larger number of copies extant in the past.

Finally, it is important to know that the Hebrew translation of the *Theorica planetarum* is embedded within the rich history of the naissance of Hebrew as a language of science and philosophy, whose roots are found in the twelfth century. At the same time, one must not forget the high esteem of the Hebrew language in Renaissance Italy, which allowed Hebrew writing to flourish far beyond its traditional Jewish borders and to be learned also by Christian humanists. Nevertheless, it is not a priori clear whether any humanists actually read the *Theorica planetarum* in Hebrew translation, not only because the Latin original would naturally have been much more accessible to Christian scholars interested in astronomy, but because much of the Christian interest in Hebrew, as far as we know, was focused mainly on the Hebrew Bible, Hebrew grammar, and Cabala.

3. Codex III F 12 and its scribe Abba Mari Ḥalfon

The scribe of the codex, who authored some of its contents and also added comments to the Hebrew translation of the *Theorica planetarum*, is Abba Mari Ḥalfon, the father of the famous cabalist Elijah Menaḥem Ḥalfon. In the colophon in fol. 41r, we read: “In the [Jewish] year [5]252,⁴ when the morning stars sang together [Job 38:7], I went to the Kingdom of Naples - I, the student Abba Mari⁵ – in order to study astronomy, may it be a blessing, Amen.” (Fig. 1). In the margins of folio 41r, however, Ḥalfon refers to himself as an astronomer. Perhaps he added this note only after having completed his studies in Naples. According to another colophon found in folio 34v, we also learn that Ḥalfon created the codex, or at least part thereof, in Benevento and that his father’s name was Elijah Šarfatti. One can find further details on Abba Mari Ḥalfon in earlier bibliography (Kohler & Brody, 1901-1906; Steinschneider, 1893, pp. 625-6). The ample codex, embracing more than 240 folios⁶, is for its most part scientific in nature. It includes numerous scientific Hebrew treatises composed by leading Greek, Muslim, Jewish, and Christian authors. They include Hippocrates, Ptolemy, Theodosius, Al-Farghani, Al-Zarqali, Ibn Luqa, Ibn Rushd, Abraham bar Ḥiyya, Jacob ben Machir, Immanuel Bonfils, Abraham Ibn Ezra, Isaac Ibn Al-Aḥdab, and Michael Scot. The majority of works are of astronomical nature, covering planetary theory, models of astronomical instruments (e.g. the astrolabe and the quadrant) and their use, as well as astronomical tables (some incomplete), providing a wide range of material for purely theoretical study as well as astronomical observations. However, Ḥalfon also copied tracts on other related medieval scientific fields, such as mathematics, astrology, physiognomy, and medicine.

In the codex, we also find Ḥalfon’s own study of solar and lunar phases, solar eclipses, and paraphrase of Ibn Rijal’s commentary on the Alfonsine Tables, preceded by his own poem. In the codex, there is also an elegy Ḥalfon had written in 1490, in Lucca, over the death of his friend, the well-known Rabbi Jehiel of Pisa, scholar, and philanthropist, whose charity helped alleviate the suffering of Sephardic Jews,

⁴ The thousands are often omitted in the notation of Jewish years for the sake of abbreviation, similarly to omitting thousands and hundreds in the Gregorian calendar e.g. writing the year 24 instead of 2024. 252 is the alphanumerical value of the word בָּרָן (=when X sang), which appears at the beginning of a biblical verse mentioning the stars: “When the morning stars sang together, and all the sons of God shouted for joy” [Job 38:7]

בָּרָן יַחַד כּוֹכְבֵי בּוֹקֵר וַיִּרְעוּ כָּל בְּנֵי אֱלֹהִים

⁵ Ḥalfon creates a pun in his abbreviation *Abba Mari* [the] *Student* אָבָא מַרִּי means ‘truth’.

⁶ An old black and white imperfect scan of the entire codex III F 12 acquired by the National Library of Israel for its digitisation project of all Hebrew manuscripts worldwide is accessible online: www.nli.org.il (Accessed 1 October 2024). Note that several folios within the codex had been originally bound upside down.

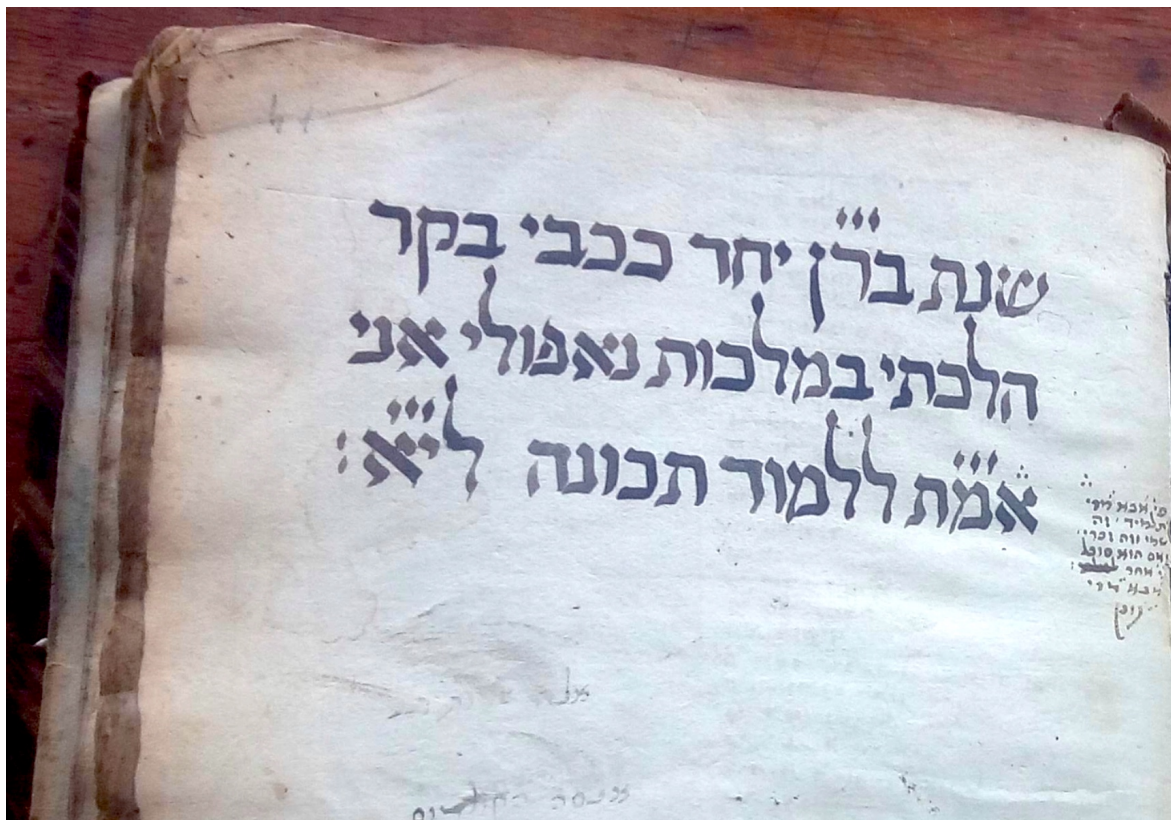


Fig. 1: Ms. III F 12, fol. 41r. By courtesy of the Ministry of Culture, National Library of Naples

who fled to Northern Italy after the 1492 Expulsion from the Iberian Peninsula⁷. Furthermore, Ḥalfon copied an elegy written by Moses da Rieti, known as the Hebrew Dante, over the death of his wife. In the catalogue of the National Library Victor Emmanuel III in Naples, there is a detailed description of the codex, albeit not devoid of inaccuracies (Moscatti Steindler, 1971, pp. 315, 317, 327-335).

Shalom's Hebrew translation of the *Theorica planetarum* is found in folios 55v-61v in Ms. III F 12. The given title is *A Study of the Seven Planets* [folio 54v, Fig. 2]. Neither the name of the author nor that of the translator are mentioned. Ḥalfon probably had in front of him an exemplar of the branch of the Hebrew translation that did not include the introduction, in which the translator's name is mentioned. Throughout the codex one notes the numerous names of authors, commentators, and translators explicitly mentioned by Ḥalfon, so one may assume that he did not know the source of the Hebrew translation of the *Theorica*. Ḥalfon copied the *Theorica* meticulously. In the first section, on the Sun, at the bottom of folio 55v (Fig. 2), he adduces information from Ibn Rushd's *Compendium of the Almagest*⁸. His diagrams are precise and made with great care. In folio 56r (Fig. 2) one can see the solar model, and in folio 59r (Fig. 3), the model for Venus and Mercury is drawn. Throughout the copy, we find abundant scientific terminology in the margins in Hebrew characters with vocalisation, which allows the reader to know its precise pronunciation. Ḥalfon's decision to include the *Theorica planetarum* in the codex shows that he considered it important for the study of astronomy and a pathway to Latin astronomy and its lexicon. It may have, together with the other treatises, served him in the preparation for the study at university or within a Jewish or Christian academic circle. Who was the intended readership of Ḥalfon's impressive

⁷ Jehiel of Pisa also hosted in his home for many years Rabbi Johanan Alemanno, the humanist philosopher and cabalist, who was Pico della Mirandola's Hebrew teacher.

⁸ مختصر المجسطي



Fig. 2: Ms. III F 12, fols. 55v-56r. By courtesy of the Ministry of Culture, National Library of Naples

codex, and in particular his copy of the *Theorica*? Did he invest so much effort to create the codex for self-reference only or perhaps for a circle of students, thinking also about future readers, too? How did Ḥalfon obtain copies of the treatises he copied? Was it a collection of Hebrew manuscripts he had brought along, or did he have access to a Jewish scientific library in the Kingdom of Naples itself? Did he make his own scientific contributions during or after his study of astronomy? At the moment, there are more questions than answers, but at least we can say with certainty that Ms. III F 12 is a palpable witness of Jewish intellectual history in the Kingdom of Naples at the end of the fifteenth century, during an enlightened phase of the Aragonite rule by Ferdinand I in the south of the Italian Peninsula. At the same time, the codex serves as a mirror to the relatively little-known figure of Abba Mari Ḥalfon, a representative of a late medieval Jewish *homme de science*, carrying a rich intellectual baggage of Greek, Arabic, Hebrew and Latin science.

4. Pursuing the *Theorica planetarum*

In this brief contribution, I have offered a glimpse into the Hebrew transmission of the *Theorica planetarum* through the lens of one representative from the end of the fifteenth century, created in the Kingdom of Naples. Future interdisciplinary research of the Hebrew *Theorica planetarum* encapsulates a multitude of fascinating facets. First and foremost, the textual and diagrammatical study, accompanied by a palaeographical and codicological analysis of the surviving manuscripts in the endeavour to establish the *stemma codicum* and approach the *Urtext* in as much as possible will make an important contribution to the ongoing study of medieval and early modern Hebrew manuscripts. Secondly, the linguistic analysis of both the Hebrew and Judeo-Latin scientific languages within the transmission will enhance our understanding of the evolution of Hebrew as a language of science on the one hand, and its encounter with Latin in Hebrew dressing, on the other. Thirdly, the study will shed further light on Jewish intellectual history between scholasticism and humanism in the fifteenth and sixteenth centuries. Last but not least, the exploration of the transmission of the *Theorica planetarum* into the Hebrew sphere will contribute to a chapter in the history of science yet to be discovered.



Fig. 3: Ms. III F 12, fol. 59r. By courtesy of the Ministry of Culture, National Library of Naples

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