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Some Observations on Mordecai Nathan

Charles H. Manekin | College Park, Maryland

Some Observations on Mordecai Nathan and the Paracontents of Turin, Biblioteca Nazionale Universitaria, Cod. A. I. 14

Charles H. Manekin University of Maryland 

charlesh.manekin@uni.com

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Article

Some Observations on Mordecai Nathan and the Paracontents of Turin, Biblioteca Nazionale Universitaria, Cod. A. I. 14

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Abstract

This paper examines the paracontents of Turin, Biblioteca Nazionale Universitaria di Torino, A. I. 14, an important manuscript for understanding the study of logic and philosophy among Jewish scholars in late medieval Provence. Its marginal notes and diagrams provide insights into the teaching practices and intellectual landscape of Jewish scholars, in particular the logical acumen of the annotator, R. Mordecai Todros Nathan (second half of the fifteenth century, Avignon). Mordecai's horizontal tree diagrams and comments reveal the advanced state of Jewish philosophical study before the expulsion of the Jews from Provence at the end of the century and provide evidence of the degree of familiarity with scholastic logic. The extensive use of horizontal tree diagrams, also found in his rabbinic works, suggests that these tools played a role in his pedagogy. Since our understanding of this scholar remains limited, as most of his writings are found in the margins of the manuscripts he possessed, the notes offer valuable insights into his thinking.

Keywords

Mordecai Nathan, Hebrew philosophy manuscripts, paracontent, Jewish philosophy, Hebrew logic, syllogism, Averroes, Gersonides, Provence

1. Introduction

Attempting a history of how Jews taught logic in the Middle Ages is difficult. Unlike in the Christian and Muslim traditions, Hebrew logic, with a few exceptions, was not taught in educational institutions; so we have no official records of curricula, teachers, or students. To construct a history of Hebrew logic pedagogy, one needs to rely on fragmentary pieces of evidence: the study plan of a particular scholar, the contents of private libraries, comments about logic in personal correspondence, references to logical doctrines in works of philosophy, scriptural exegesis, Talmudic study, etc. Of course, manuscripts containing Hebrew logical writings are not only important for the historian of logic but for the historian of the teaching of logic. Some anonymous Hebrew commentaries of Porphyry's (c.234–c.305 CE) *Isagoge* appear to be based, at least in part, on records of a master's lecture, sometimes with study questions inserted, or in the manner of scholastic *reportatio*.¹ Obvious

¹ See Manekin 2020, 8–12; Manekin 2021, 116–118. See also Rothschild 1993, 696 and Zonta 2006, 118–119. For the *reportatio* in the Latin world see Curut 2025.

sources for the practice of logic are a manuscript's paracontent, for example, marginal notes, diagrams, scribbles, etc.² In this paper I will discuss some instances of paracontent in Turin, Biblioteca Nazionale Universitaria di Torino, A. I. 14, a particularly important manuscript for the study of the history of Hebrew logic and philosophy during the twilight years of Jewish philosophy in Provence. As we shall see, the marginal notes and diagrams shed important light not only on instructional practices of the period, but also on the state of logic among Jewish intellectuals, and especially on the logical acumen of the annotator, R. Mordecai Todros Nathan (flourished second half of the fifteenth century in Avignon and thereabouts).³ Since our understanding of this intellectual remains limited, the notes offer valuable insights into his thinking, as most of his writings are found in the margins of the manuscripts he owned.

In what follows, I consider the logical and pedagogical significance of the marginal notes and diagrams in the Turin manuscript, with particular attention to Mordecai Nathan's method of presenting syllogistic reasoning. The discussion begins with some remarks on the role of diagrams in Hebrew logical manuscripts and the codicological features of Turin A. I. 14, and proceeds to Mordecai's use of horizontal tree diagrams and his treatment of syllogistic form. Special emphasis is given to his defence of the fourth figure of the syllogism, both because that figure long served historians of logic as a measure of an author's logical acumen, and because in Mordecai's hands it becomes a striking instance of the merging of the Arabic and scholastic traditions.

2. Logical diagrams in Hebrew manuscripts

Among the paracontents of Hebrew logical manuscripts that have been, on the whole, ignored by the scholarship, are illustrative diagrams and tables. Often their presence is not noted, much less identified, in catalogues and inventories. Some appear to be produced by the individual scribe or student in possession of the manuscript; others have been copied from notes in other manuscripts; and still others are part of the original work. On the whole, the logical writings of the classical Arabic Peripatetics did not include illustrative logical diagrams such as the Square of Opposition or the Porphyrian Tree, although al-Fārābī (c.870–950) and Averroes (1126–1198), following Aristotle's lead in the *De interpretatione* 10 and 12, arranged sentences and modal qualifiers as diagrams in the text itself.⁴ Both the Square of Opposition and Porphyrian Tree diagrams entered the Latin West via Boethius's (c.480–524) commentaries,⁵ and they are common in manuscripts of scholastic works of logic translated into Hebrew. Hebrew logical texts based on the Arabic tradition do not generally have these diagrams, although there are exceptions, as when a scribe adds a scholastic diagram to the text of a work from the Arabic tradition, sometimes as 'filler' as the end of a work. Thus, in Vatican City, Biblioteca Apostolica Vaticana, Vat. ebr. 283, a late fourteenth-century manuscript copied in

² See Ciotti et al. 2018.

³ See, most recently, Roth 2019, 1–3; cf. Renan and Neubauer 1893, 580–582.

⁴ See Verboon 2014, 96.

⁵ See Verboon 2014, 96. For a discussion of diagrams in the Latin tradition, see Caterina Tarlazzi's contribution in this volume.

Jerusalem, a square of opposition is inserted between two primers of logic based on the writings of Arabic Peripatetics: the *Logical Terms*, attributed to the young Maimonides (1138–1204), and the *Bundle of Silver* of Joseph Ibn Kaspi (c.1280–1345).⁶ Similarly, in Paris, Bibliothèque nationale de France, héb. 673, a fourteenth-century Italian manuscript, a diagram of a Porphyrian Tree is inserted between the same primers.⁷ Where diagrams do and do not appear is an unstudied question, but one might speculate that the presence of diagrams reflects the adoption of Latin practices, and reflects a scholastic environment somewhere along the nodes of a manuscript's stemma.

A particular form of medieval scholastic diagram, to which a monograph by Ayelet Even-Ezra has recently been devoted, is the 'horizontal tree' diagram.⁸ These diagrams portray the teachings of the text in a logical manner, subdividing it into alternatives and recombining so as to display the structure of the argument in a manner easy for the eye to follow. A good example of this is found in a Latin diagram, translated by Even-Ezra, which displays the modes and rules of the first figure of the Aristotelian syllogism (Fig. 1).⁹ The advantage of a diagram like this is that it enables the alternatives to be recombined in different ways, as displayed here by the shifting nodes (Fig. 2).

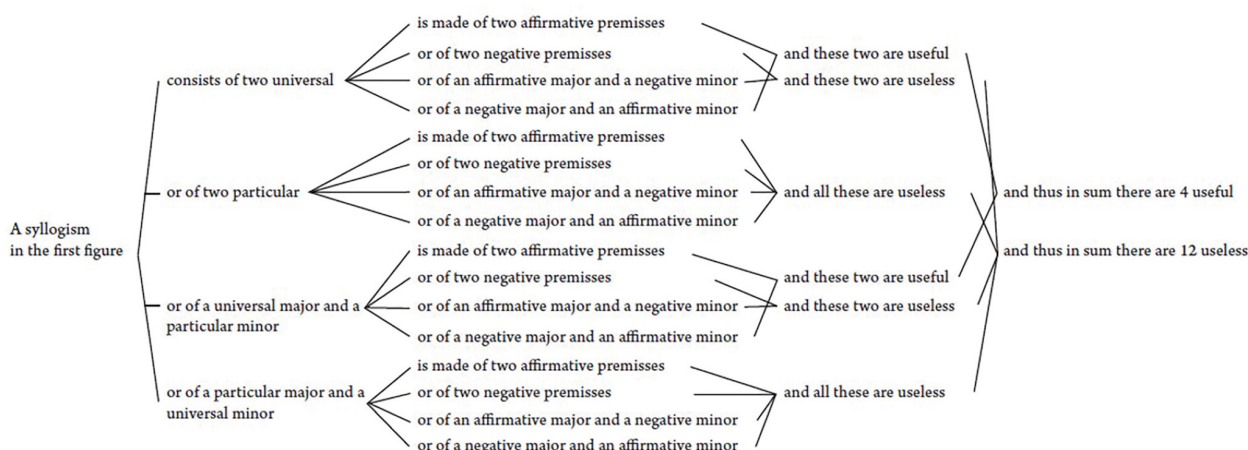


Fig. 1: Reproduction of horizontal tree diagram of first-figure syllogistic conditions, Vatican City, Biblioteca Apostolica Vaticana, Borgh. 133, fol. 17^v, translation of diagram by Even-Ezra 2021, 35.

Horizontal tree diagrams appear in a few Hebrew manuscripts,¹⁰ but the manuscript with the most of them, according to what I have seen, is Turin, Biblioteca Nazionale Universitaria, A. I. 14.¹¹

⁶ Vatican City, Biblioteca Apostolica Vaticana, Vat. ebr. 283, fol. 225^r. To the left of the traditional square is another 'square of opposition' diagram based on the distinctions in substance and accident in Aristotle's *Categories*, ch. 2.

⁷ Paris, Bibliothèque nationale de France, héb. 673, fol. 120^r. After the present study was in press, I received from Dr. Sivan Gottlieb a draft of her article, "Tree of Porphyry" Diagrams in Hebrew Manuscripts: Some Textual and Visual Observations," to appear in the *Jewish Quarterly Review*, which sheds considerable light on the phenomenon.

⁸ Even-Ezra 2021.

⁹ Even-Ezra 2021, 35.

¹⁰ Even-Ezra 2021, 80–81. For another example, see Paris, Bibliothèque nationale de France, héb. 926, fol. 68^r, with a horizontal tree diagram of productive syllogisms. The manuscript was written in 1472 in Apice (Italy). This shows that the horizontal tree diagrams are not unique to Mordecai.

¹¹ Pasini 1749, 10–11 (initially catalogued as 'XL, a. v. 10'); Peyron 1880, 10–21; Tamani and Zonta 1997, 157–159.



Fig. 2: Vatican City, Biblioteca Apostolica Vaticana, Borgh. 133, fol. 17r, <https://digi.vatlib.it/view/MSS_Borgh.133>.

This is a mammoth codex composed of 591 double-columned folios, including a complete set of Averroes's middle commentaries on the books of the expanded *Organon* and a complete set of Levi Gersonides's (1288–1344) commentaries on the middle commentaries through the *Sophistics*, since he seems not to have written commentaries on the *Rhetoric* and the *Poetics*. We also find two of Averroes's *Logical Questions*, one, and probably both, translated by Qalonymos ben Qalonymos (1286–after 1328),¹² with Gersonides's commentary, as well as Gersonides's original treatise, the *Book of the Correct Syllogism*. Afterwards there are several of Averroes's other middle commentaries on the physical writings, ethics, and metaphysics, a chapter of Averroes's long commentary on the *Metaphysics*, and Themistius's (317–c.388) paraphrase of Book Lambda of the *Metaphysics*.¹³

The manuscript was completed on 13 Marḥeshvan 5321 (= 17 October 1470), by Crescas Vidal קאייל (*qayil* = from Caylus?), 'for the divine rabbinical sage, Maestre Mordecai Todros Nathan', who is probably identical with the Provençal savant Mordecai Nathan, mentioned elsewhere.¹⁴ Mordecai has been overshadowed by his better known relative, the fifteenth-century philosopher and communal leader, Isaac Nathan.¹⁵ There is a scholarly dispute over whether Isaac or Mordecai should get credit for the first Hebrew concordance of the Bible, *Meir Nativ* ('Illuminative Path'); scholarly consensus goes with Isaac, who wrote the introduction, although Mordecai's name appears as the author in the first printed edition (1523).¹⁶ One reason why Isaac gets the nod, in addition to his writing the introduction, is that he is the author of several philosophical and religious polemical works, whereas Mordecai is virtually unknown. Indeed, Mordecai exists mostly as a 'marginal' figure; many of his known writings consist of marginal notes that he wrote on manuscripts, some of which he himself commissioned. He occasionally adds to these notes the letters א (*alef*), מ (*mem*), נ (*nun*), ה (*heh*), arranged as the acronym אמ"ה, i.e., 'Amanah', which apparently stands for *Amar Mordecai Nathan ha-[?]* / 'Mordecai Nathan the [?] said'. The last term can be anything, but it has recently been suggested that it may refer either to הקטן (*ha-qatan*; 'the small/young'), or האזובי (*ha-ezovi*; 'of the city Orange'), because that is how Mordecai refers to himself in other manuscripts that he possessed.¹⁷

Aside from our manuscript, attributions of notes to 'Amanah' appear in several other manuscripts: in Oxford, Bodleian Library, Marsh 347, which contains a medical prescription and notes;¹⁸ in Parma, Palatine Library, cod. 3551–3554, a multi-volume manuscript of Menaḥem ha-Meiri of Perpignan's (1249–1316) commentary on the Talmud that Mordecai commissioned, and in London,

¹² On this see Manekin 2020, 13–14. I am informed by the coeditor Yoav Meyrav that the texts of both Themistius's paraphrase and Averroes's middle commentary on the *Metaphysics* in this manuscripts exhibit (quite clever) revisions and interpolations that set them apart from all other manuscripts of these works. For discussion of this in Themistius see Themistius 2019, 80–94.

¹³ For a complete listing of the contents and further details see Appendix.

¹⁴ Renan and Neubauer 1893, 235–236; cf. Gross 1897, 10. The name of the scribe appears in Peyron 1880, 21, but after the 1904 fire, only the letters קאייל ש וידאל ([...]s *vidal qayil*) remain in the manuscript.

¹⁵ Ben-Shalom 2017.

¹⁶ Ben-Shalom 1992–1993.

¹⁷ Personal communication from Dr Pinchas Roth. Other suggestions have been either המבאר (*ha-meva'er*; 'the commentator') or בעלים (*ha-be'alim*; 'the owner').

¹⁸ Fols 1^r–6^r. See Neubauer 1886, 731 (no. 2133).

British Library, Add. 22090, a collection of responsa by the prominent rabbinic authority, Solomon b. Adret (1235–1310) and others, at the end of which Mordecai includes his own responsa, with diagrams.¹⁹ The one sustained philosophical work attributed to Amanah is a commentary on Averroes's *Compendium of Logic*, extant in two manuscripts with a similar hand.²⁰ The author writes in the introduction that he decided to write a commentary on the *Compendium* because no commentary of Gersonides on that work had reached him.

Mordecai Nathan is found under his full name as author and owner in various other manuscripts. Turin, Biblioteca Nazionale Universitaria, A. III. 5 (no longer extant) contained a work entitled *Summary Rules of the first Book of Avicenna's Canon, and its Definitions, Objections, and Rules, with the Summary Rules of the Roots of Each Chapter Composed by Rabbi Mordecai Nathan, may God Grant Him Long Life*.²¹ Another manuscript, Moscow, Russian State Library, Guenzberg 364, contains Mordecai's letter to his relative answering a question relating to the solstices; there he refers to notes that he wrote in the margins of a manuscript containing Meir of Trinquetailles's (flourished late twelfth–early thirteenth century) *Sefer ha-'Ezer* ('The Book of Support') that solve a difficulty in the core text. Apparently, the manuscript with those notes is no longer extant. Finally, Hamburg, Staats- und Universitätsbibliothek, hebr. 21, containing Isaac Alfasi's (1013–1103) code of law with numerous commentaries, was written for Mordecai Nathan in 1454 by Nathaniel Kaspi, a scribe and intellectual in his own right. As far as I could tell, there are no notes by 'Amanah'.

3. Some features of Turin, Biblioteca Nazionale Universitaria, A. I. 14

Much of Turin, Biblioteca Nazionale Universitaria, A. I. 14 managed to survive the two-day fire in January 1904 that damaged and destroyed the library's 274 Hebrew manuscripts.²² According to Benjamin Richler, 109 Hebrew manuscripts survived the fire but most were severely damaged; he lists Turin, Biblioteca Nazionale Universitaria, A. I. 14 as one of eleven complete Hebrew manuscripts that were able to be restored,²³ but there are still folios that are missing, and others that are severely charred, and damaged by smoke. The fire shrunk and glued together the pages

¹⁹ See Roth 2019.

²⁰ Oxford, Bodleian Library, Opp. 575 and Oxford, Bodleian Library, Mich. 355.

²¹ According to Peyron 1880, 69, Mordecai presents an overview of the material in tables ('Res exhibentur per synopsis in tabellis'), and it would have been interesting to see whether he employs horizontal tree diagrams.

²² On the Turin library fire and recent restoration efforts, see Pilocane 2004.

²³ Richler 2014. Richler writes in the questionnaire he filled out for the Institute of Microfilmed Hebrew Manuscripts in 1973 that, post-restoration, 469 of the 600 folios survived. For a detailed breakdown see Appendix. Inserted before the first folio of the manuscript, which I inspected in November, 2025, is a sheet of paper that contains the notice: 'Prima del restauro il grandioso volume era ridotto in condizioni disastrose: bruciato in larga parte della marginatura di tutti i fogli. Le carte erano sporche di fanghiglia e residui di carbone, con larghi squarci e tutto in disordine. Le carte sono state pazientemente riordinate dal Prof. Lawrence V. Berman della Stanford University – Religious Studies – Stanford California, 94305, U.S.A., con la collaborazione di P. Stefano Altimari della Badia Greca di Grottaferrata' ('Before the restoration, this huge volume was in disastrous condition: a large part of the margins of every leaf was burnt. The pages were soiled with mud and charcoal residue, featuring wide tears, and everything was in disarray. The pages were patiently reordered by Prof. Lawrence V. Berman of Stanford University – Religious Studies – Stanford California, 94305, U.S.A., with the collaboration of Fr. Stefano Altimari of the Greek Abbey of Grottaferrata').

of the manuscripts, some of which were damaged further after they were thrown into the Via Po and doused with water. This particular codex was restored between 1971 and 1973, and shortly thereafter microfilmed for the Institute for Microfilmed Hebrew Manuscripts in Jerusalem. The digitisation of the manuscript began in 2022 and is now complete;²⁴ the restoration is very good, and the digitisation allows for better decipherment of the marginal notes.

The first of the manuscript's distinctive features is its layout: where the manuscript presents both Averroes's commentary and Gersonides's commentary²⁵ thereupon, each lemma of the former is followed immediately by a lemma of the latter.²⁶ Although there are many manuscripts containing Averroes's commentaries, and quite a few containing Gersonides's commentaries (and some containing both), I can think of only one other manuscript that attempts to place the commentaries on logic on the same page, Mantua, *Comunità ebraica*, Ms. ebr. 68 (fifteenth-sixteenth centuries), where Gersonides's commentary on Averroes's middle commentary of the *Isagoge* is one of three commentaries that surround the text of Averroes.²⁷

The layout of both manuscripts presents a certain challenge to the scribe of how to link the one commentary to the other. Gersonides's commentaries generally contain three elements: (1) a דבור (dibbur *ha-mathil*; 'incipit'), introducing the relevant section of Averroes's commentary; (2) the words of Averroes, interspersed with Gersonides's explanations; and (3) an original comment of Gersonides, occasionally critical, introduced by the words אמר לוי (*amar Levi*; 'Levi says'). In some of Gersonides's later commentaries, where he wishes to expand the explanation, he simply paraphrases the text of Averroes, which makes it difficult to distinguish between the two works.²⁸ In all cases, however, it is clear to what passage in Averroes the commentator refers.

In Turin, *Biblioteca Nazionale Universitaria*, A. I. 14, the scribe adopts two strategies to set off the text of Gersonides from that of Averroes: Gersonides's commentary is written by a thinner quill, and every comment by Gersonides is prefaced with the phrase *amar Levi* – not just the ones in which Gersonides expresses his own views. The scribe often omits the incipit from Averroes, with the result that in this manuscript it is not always clear to what the comment refers.

Enter 'Amanah', i.e., Mordecai Nathan, for whom the manuscript was written, who occasionally restores the incipits from Averroes,²⁹ indicates when a remark of Gersonides is indeed an original thought,³⁰ and aids the reader by providing explanations, charts, and diagrams, especially

²⁴ Personal communication from Fabio Uliana, coordinator of the manuscript, rare book, and special collections, *Biblioteca Nazionale Universitaria di Torino*, 18 July 2024.

²⁵ Gersonides's commentaries on Averroes's expositions are often called 'supercommentaries', but I prefer here 'commentary', since he considered the text that he commented upon to be that of Aristotle as understood by Averroes. He generally was not familiar with the text of Aristotle.

²⁶ This was pointed out by Tamani and Zonta 1997, 157.

²⁷ The others are those of Judah Messer Leon and an unidentified 'Joseph'.

²⁸ Occasionally this leads to Gersonides's commentary being catalogued as that of Averroes, e.g. Munich, *Bayerische Staatsbibliothek*, Cod. hebr. 26 in the National Library of Israel online catalogue, <[https://www.nli.org.il/he/manuscripts/NNL_ALEPH990001002390205171/NLI#\\$FL47944625](https://www.nli.org.il/he/manuscripts/NNL_ALEPH990001002390205171/NLI#$FL47944625)> (accessed on 7 October 2024). For a more complete discussion of Gersonides's method as commentator, see Klein-Braslavy 2011, 180–219

²⁹ E.g. fol. 5^r, 10 lines from the bottom.

³⁰ E.g. fol. 28^r.

horizontal tree diagrams. This type of paracontent occurs primarily in the margins of the middle commentaries on the *Isagoge*, *Categories*, *De interpretatione*, *Prior Analytics* (the latter to a great extent), *Rhetoric*, *Ethics*, *Physics*, and of Averroes's compendium on the *Republic*. Other marginal notes throughout the manuscript are generally corrections, or references to other versions of the texts. We can only speculate why there are so many diagrams and comments on syllogistic inference and almost no comments on topical inference or the theory of demonstration. Perhaps this has to do with the relative importance of the subjects, or at least their relative interest for Mordecai.

The notes and diagrams attributed to 'Amanah' are clearly authored by Mordecai, but what of those, in the same hand, that are without attribution? I submit that these, too, are by Mordecai for two reasons. First, several times the annotator refers to an earlier explanation by mentioning the folio number on which his note is found, and one of these times is in a comment attributed to 'Amanah'.³¹ Second, the extensive tree diagram of the productive and unproductive syllogisms on fol. 97^r is clearly by Mordecai because 'Amanah' explains how he ordered the fourth figure therein, but the acronym comes only a few lines before the bottom of the diagram. If so, why single out some comments with the acronym and others not? It seems that, following Gersonides, Mordecai distinguishes between his explanation of the text and independent observations, observations that (again like Gersonides) can be critical.³²

Mordecai find problems in Gersonides's commentary, and either disagrees, or professes lack of understanding: 'I am astonished that Ralbag did not provide a concrete example as I did',³³ 'Ralbag's question is quite correct, but his answer is insufficient for one who understands.'³⁴ At one point he notes that 'this entire page is Gersonides's addition to his commentary'³⁵ because Gersonides had a version of Averroes's text that read differently from the one familiar to Mordecai.³⁶ Mordecai devotes several tree diagrams to problems of modal syllogistic, such as Aristotle's treatment of the first mood of the first figure with mixed necessary and assertoric premises, the so-called modal *Barbaras*,³⁷ in which he outlines the different interpretations provided by Averroes, and claims that 'the confusion of this passage is also evident'.³⁸ He does not defend Aristotle's modal logic as presented by Averroes against the criticisms of Gersonides, but his infrequent criticisms of Aristotle are milder than the ones expressed by Gersonides.³⁹

³¹ Fol. 48^r, וְכַבֵּר הַעִירוֹתֵי בְכַמוֹ זֶה בְּהַקְדָּמוֹת הַהִכְרָחוֹת בְּגִלְיוֹן עֲלֵה מ"ו, 48^r. The relevant comment on fol. 46^r is preceded by אמנ"ה, Amanah. For the gist of the comment, see below, p. 71.

³² See, for example, fol. 67^v, bottom of the first column, where the annotator first presents concrete examples to illustrate the text, and immediately below, has a criticism of Gersonides beginning, 'Amanah'.

³³ Fol. 67^v: אמנ"ה אפלא איך לא המשיל הרלב"ג זה בחמרים כמו שעשיתי אני.

³⁴ Fol. 31^v: אמנ"ה שאלת הרלב"ג נכונה מאד אבל תשובתו בלתי מספקת למבין.

³⁵ Fol. 24^v: אמנ"ה כל זה העמוד תוספת לרלב"ג.

³⁶ Averroes's middle commentary of the *Prior Analytics* is extant in over fifty Hebrew manuscripts and has not been edited. Whether any of these matches the additional material that appears in Gersonides's commentary is a topic for further research.

³⁷ For an explanation and literature see Smith 2022, sec. 5.6.5.

³⁸ Fol. 45^v: וזה המאמר הבלבול בו מבואר גם כן.

³⁹ For Gersonides's criticisms, see Manekin 1993.

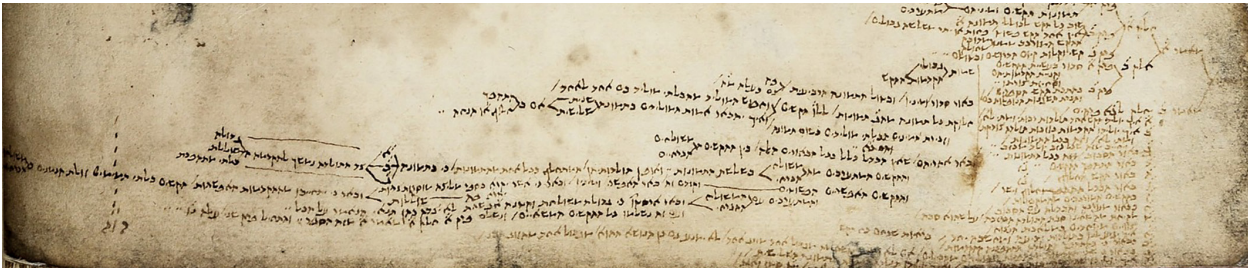


Fig. 3: Mordecai’s analytical contents of Averroes’s middle commentary of the *Prior Analytics*; Turin, Biblioteca Nazionale Universitaria, A. I. 14, fol. 39^v.

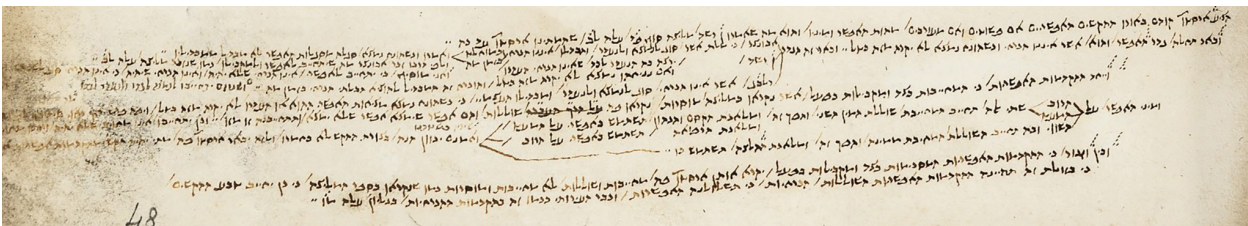


Fig. 4: Mordecai’s tree diagram of the Aristotle’s definition of the possible, according to various interpretations. Turin, Biblioteca Nazionale Universitaria, A. I. 14, fol. 48^r.

Mordecai’s main task appears to be rendering the complicated doctrine of syllogistic as found in Averroes’s middle commentary comprehensible to students. And this is where he employs horizontal tree diagrams to his advantage. At the outset of the section on the syllogism (= *Prior Analytics* I: 4–7) Mordecai provides nothing less than a conspectus of the contents of Averroes’s middle commentary of the *Prior Analytics* according to treatise, part, and chapter, as can be seen in Fig. 3.

The book is divided into Averroes’s Treatise 1 and Treatise 2, and Treatise 1 is divided into Part One and Part Two, Part One is divided into Chapters 1, 2, and 3; Chapter 1 includes Averroes’s *Introduction*, the conversion of premises according to their species, and the reduction of every syllogism, etc. Treatise 2 is divided into 21 chapters. On the left side of the diagram, one appears to have the topics that fill out the treatment of the predicative syllogism, including the modal syllogism. The division of the text does not entirely match up with Averroes’s own, although the order of topics is the same. Was this division original with Mordecai Nathan, or did he find it elsewhere? That needs further investigation.⁴⁰

Over forty horizontal tree diagrams of varying lengths and complexities help the reader understand the difficult material. For example, at the beginning of the section on syllogisms with possible premises (= *Prior Analytics* I: 13), Aristotle characterises the possible as follows: ‘By “being possible” and “the possible” I mean that which, while not being necessary, will not lead to anything impossible when it is assumed to belong’.⁴¹ In Fig. 4, Mordecai presents three interpretations of Aristotle’s characterisation of the possible: al-Fārābī’s (as transmitted by Averroes), Averroes’s

⁴⁰ Yoav Meyrav drew my attention to the varying shades of ink; the darker lines may be later additions by the annotator, but that also needs further investigation.

⁴¹ Aristotle, *Prior Analytics*, I: 13, 32a18–20 (Aristotle 2008, 18).

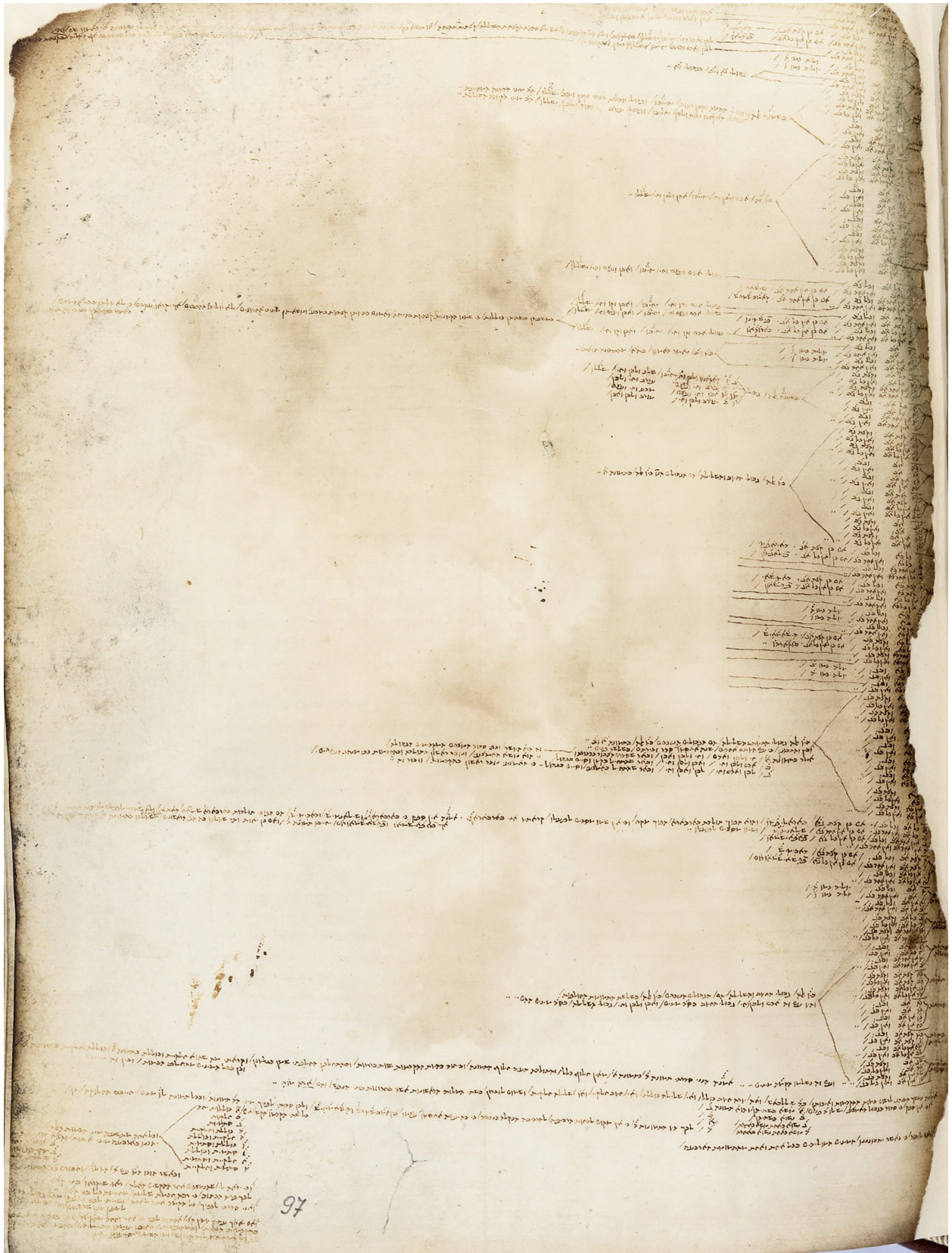


Fig. 5: Mordecai's tree diagram of the productive and unproductive combinations of syllogistic premises. Turin, Biblioteca Nazionale Universitaria, A. I. 14, fol. 97r.

own, and Gersonides's. He then follows Averroes in dividing the possible into the mostly, equally, and rarely possible, and provides examples of each. He ends with instructing the student to 'understand and remember' that Aristotle calls opposing possible statements here 'affirmations and negations, not affirmations and retractions' (מהיבנות ושוללות לא מהיבנות ומוסרות), as he does in the *De interpretatione* because of the requirements of syllogistic, where a negative possible premise is still a statement of possibility, and not a statement of impossibility. This, too, is taken from Averroes's text, but Mordecai refers the reader to 'leaf 46' (עלה מ"ו), where Mordecai had noted a similar case with respect to necessary premises.⁴²

Of particular interest is a horizontal tree diagram (Fig. 5) that takes up an entire page following the Hebrew translation of two of Averroes's *Logical Questions*.

This is Mordecai's list of 145 productive and unproductive combinations of syllogistic premises – universal, particular, and indefinite – with the unproductive premises being demonstrated by Aristotle's rejection proof-procedure, i.e., substituting concrete terms in the premises and getting discrepant conclusions in terms of quantity and quality.⁴³ Accompanying the productive premise pairs are, in Hebrew transliteration, the Latin terms of the *Barbara/Celarent* mnemonic. The vowels in the initial two syllables of each term refers to the quantity and quality of the major premise and minor premise, respectively, which is the order of the premises according to the scholastic tradition. But when Mordecai writes out the premise pairs with term-variables, he writes the minor premise first, as in the Arabic / Hebrew tradition, e.g. 'Some *a* is *b* and every *b* is *c*; if so, some *a* is *c*. *Darii*.'⁴⁴ The Hebrew phrase אם כן (*im ken*; 'if so') may reflect the Latin term *igitur*; it is used rarely by Averroes and Gersonides in their formulation of the syllogistic figures. In short, we have here an example of the merging of scholastic and Arabic traditions of syllogistic. For example, Fig. 6 shows the moods *Cesare* (שישאר) and *Cambestres* (קאמבישטרש). Reading from right to left, you have first the premises, followed by conclusion, and then the Latin terms in Hebrew transliteration.

4. Mordecai on the fourth figure of the syllogism

Mordecai's grappling with the Arabic and Latin traditions of syllogistic comes to the fore in his treatment of the fourth figure of the syllogism, the usefulness and validity of which was debated until the development of modern logic and the waning of syllogistic. Mordecai's treatment appears both in his notes on the middle commentary on the *Prior Analytics* and in his commentary on Averroes's *Compendium of Logic*. Some preliminary remarks: syllogisms are deductions composed of two premises and a conclusion, and the premises contain three term-variables for their subject and predicates, e.g. *a*, *b*, and *c*, with *b* as the middle term. The number of figures depends upon how the placement of the middle term is described; we have three figures if it is described as the

⁴² Fol. 46r.

⁴³ For a succinct explanation of rejection proofs, see Aristotle 1989, xxii–xxiii.

⁴⁴ Fol. 97r, l. 7: / דאריאי / א"ב וכל ב"ג / אם כן קצת א"ג / דאריאי

The /'s appear in the manuscript and simply divide the sentence into units.

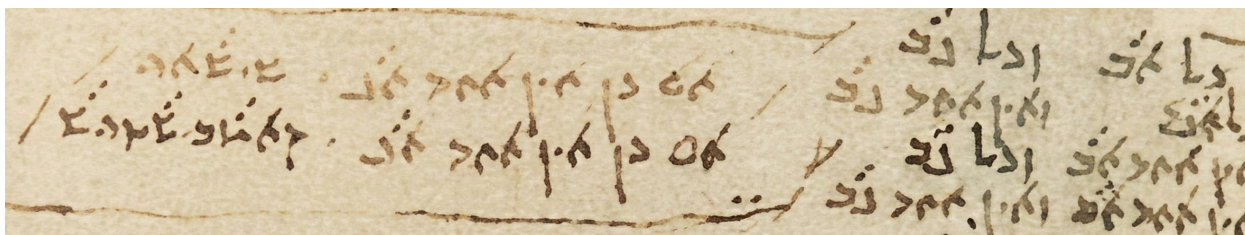


Fig. 6: Mordecai's tree diagram of the productive and unproductive combinations of syllogistic premises. Turin, Biblioteca Nazionale Universitaria, A. I. 14, fol. 97^r (detail).

subject in both premises, predicate in both premises, and subject in one and predicate in another (Aristotle); we have four figures if we further specify that the middle term is the subject in the major premise in one figure and predicate in the minor premise in another figure (Galen; 129–c.216 CE). According to the ordering of premises where minor precedes major:

First Figure	Second Figure	Third Figure	Fourth Figure
<i>Xab</i>	<i>Xab</i>	<i>Xba</i>	<i>Xba</i>
<i>Xbc</i>	<i>Xcb</i>	<i>Xbc</i>	<i>Xcb</i>
<i>Xac</i>	<i>Xac</i>	<i>Xac</i>	<i>Xac</i>

(‘X’ is understood here as a variable to be replaced by one of the four quantifiers of standard predications: *A* [‘Every...is...’], *E* [‘No...is...’], *I* [‘Some...is...’], and *O* [‘Not every...is...’]). Defending Aristotle, Averroes in the middle commentary argues at length against the fourth figure moods, claiming, among other things, that they represent unnatural patterns of reasoning and rely on unnatural predications, where the subject is predicated of predicate and not vice-versa.⁴⁵

Although Aristotle did not recognise a separate fourth figure, he was read as allowing for two additional first figure moods, to which Theophrastus (c.371–287 BCE) added three more, according to Alexander of Aphrodisias (c.200 CE).⁴⁶ These are the five indirect moods of the first figure; their premises are laid out as in the first figure, and they are proved by reduction to the first four direct moods through conversion and transpositions of premises or the conclusion. Petrus Hispanus (thirteenth century), whose teaching on logic were known to Mordecai,⁴⁷ as we shall see below, writes:

The first figure has nine moods, the first four concluding directly and the next five concluding indirectly. To conclude directly is for the major extreme to be predicated of the minor in the conclusion. To conclude indirectly is for the minor extreme to be predicated of the major in the conclusion.⁴⁸

⁴⁵ Arabic: Averroes 1982, 1: 171–174; Latin: Aristotle and Averroes 1562–1574, 1 (pt 1): 23i–24i. For Renaissance Christian reactions to Averroes on the fourth figure, see Ashworth 1970, 20–28; for Jewish reactions, see Manekin 1996, 52–64.

⁴⁶ Alexander also says that Aristotle recognises these three other moods, arrived at by conversions of their conclusions, at the beginning of Book Two. See Alexander of Aphrodisias 1981, 135–137 and n. 157.

⁴⁷ Whether Mordecai had direct knowledge of the text of Petrus, and if he did, whether he knew it in Latin or one of the Hebrew translations, needs further research.

⁴⁸ Petrus Hispanus 2014, 176–177.

Gersonides argues against Averroes's rejection of the fourth figure in his *Correct Syllogism* (which appears in Turin A. I. 14, albeit with very few marginal notes), and he appears to be unaware of the scholastic practice of listing five indirect moods of the first figure.⁴⁹

Mordecai offers a spirited defence of the validity of the fourth figure in his commentary on Averroes's *Compendium of Logic*, pointing out that once one understands the fourth figure to contain the same premises as the first figure, with what was once the minor premise now the major, and with what was once the major premise now the minor, then it yields the conclusion directly:

So I do not understand the words of Averroes and his followers, and the followers of the words of Aristotle who leave aside the words of Galen, whose truth is indubitable. Although Aristotle is our friend, the truth is even more our friend! We shall assume the fourth figure as Galen did, as did Hispanus and all the Christian sages that found five moods that yield of necessity.⁵⁰

This is puzzling. Mordecai appears to assert the existence of a fourth figure separate from the first, claiming Peter of Spain and other Christian sages as precedents. But we just saw that Peter treats the five as indirect moods of the first figure, rather than positing a separate fourth figure. Could it be that Mordecai doesn't distinguish between the first figure indirect moods and the fourth figure direct ones, or that he doesn't understand what the fourth figure entails?

Mordecai's position is a bit clearer in his marginal notes on the middle commentary and on the large horizontal tree diagram of the syllogistic moods. Thus, at the end of the discussion of the first figure, when Averroes notes that the early sages thought that three of the first figure's moods yield two conclusions – which Averroes's rejects as שכליות (*sikhlut*; 'ignorance') – Mordecai writes in the margin:

Amanah: [Averroes] alludes here to *Baralippton*, *Celantes*, and *Dabitis*, mentioned by Hispanus, who called them 'indirectly productive'.⁵¹

So he does recognise them as indirect moods of the first figure. Unlike in the commentary to the *Compendium*, Mordecai presents no argument against the fourth figure but offers instead a short tree diagram of Averroes's argument without comment.

Later in the manuscript, in his diagram of the syllogistic moods (Fig. 5), he begins with the four first-figure moods:

⁴⁹ Levi ben Gershom 1992, 142–147, 265–272.

⁵⁰ Oxford, Bodleian Library, Mich. 355, fol. 141v: ולכן, לא אבין דברי ב"ר והנמשכים אחריו הנמשכים לדברי ארסטו ומניחים דברי גלינוס אשר אין ספק באמתתם ואם ארסטו' אהובנו האמת יותר אהובנו. ונניח התמונה הרביעית כמו שהניחה גלינוס וכמו שהניחה אשפאיין וכל חכמי הנצרים אשר מצאו בה חמשה מינים מולידים בהכרח.

⁵¹ Fol. 41r: אמנ"ה רמז הנה לבארליפטו / שילאנט דאביטיש וזכרם אישפאיין / וקראם מולידים בבלתי יושר
One should note in an aside the importance of the Hebrew spelling of the Latin terms for the ascertaining local pronunciation of Latin (Provençal?). An accurate transcription (albeit not a phonetic one) would be *BaRaLYPTV* (*Baralipto*), *SHiLaNT* (*Shilant*).

[Every] man is an animal, and every animal is sentient; if so, every man is sentient. *Barbara*.

Every man is an animal, and no animal is a stone; if so, no man is a stone. *Celarent* [...].

Some *a* is *b* and every *b* is *c*; if so, some *a* is *c*. *Darii*.

Some *a* is *b* and no *b* is *c*; if so, not every *a* is *c*. *Ferio*.⁵²

He then proceeds to list the productive and unproductive premise pairs of the first three figures, after which he lists the moods of the fourth figure.

Every *a* is *b*, and every *b* is *c*; if so, some *c* is *a*. *Baralippton* [...].

Every *a* is *b* and no *b* is *c*; if so, no *c* is *a*. *Celantes* [...].

No *a* is *b*, and every *b* is *c*; if so, not every *c* is *a*. *Fapesmo*.

Some *a* is *b*, and every *b* is *c*; if so, some *c* is *a*. *Dabitis*.

Some *a* is *b*, and no *b* is *c*; if so, not every *c* is *a*. *Fresismorum*.⁵³

The formulations of these five moods are odd for two reasons. First, their premises are indistinguishable from first-figure premises, where one would expect them to be the mirror image.⁵⁴ Second, their conclusion appears to list the major term before the minor term, unlike in any other figure.

But Mordecai explains in a note what he has done:

Amanah: Behold, I arranged [the premises of] the fourth figure according to the first figure without any difference, and [the order of the terms in] the conclusion testifies to the difference of the figure, especially since the premises are identical in quantity. [To emphasise] the differences from each other I changed their names in the margin, and I called what is particular and universal in the first figure, what is universal and particular in the fourth figure, and likewise with all the modes differing in quantity. Understand this.⁵⁵

⁵² Fol. 97r:

[כל] אדם חי וכל חי מרגיש / אם כן כל אדם מרגיש. ברבארא / כל אדם חי ואין אחד חי אבן / אם כן אין אחד אדם אבן. שילארין / [...]

קצת א"ב וכל ב"ג / אם כן קצת א"ג / — דאריאי / קצת א"ב ואין אחד ב"ג / אם כן אין כל א"ג / פיריאר /

⁵³ Fol. 97r:

כל א"ב וכל ב"ג / אם כן קצת ג"א / באראליפטו [...] / כל א"ב ואין אחד ב"ג. / אם כן אין אחד ג"א / שילאנטיש [...] / אין אחד א"ב וכל ב"ג / אם כן אין כל ג"א / פאפאישמאו / קצת א"ב וכל ב"ג / אם כן קצת ג"א / דאביטיש / קצת א"ב ואין אחד ב"ג / אם כן אין כל ג"א / פרישאישמאורום /

⁵⁴ See the diagram above on p. 71.

⁵⁵ Fol. 97r: אמנה הנני סדרתי תמונה ד' / בתמונה א' / מאין חלוף כלל / והתולדה תעיד חלוף התמונה / וביחוד בהיות ההקדמות שוות בכמות / ובהתחלפן החלפתי שמן בגליונן [?] / וקראתי מה שהוא חלקיית וכוללת בתמונה א' / כוללת וחלקית בתמונה ד' / וכן בכל המינים מתחלפי הכמות / ובין זה

While the premises of the fourth figure moods look like those of the first, Mordecai takes several measures to avoid confusion: (a) he lists the conclusion with the *c* as subject and *a* as predicate, unlike the other figures; (b) he provides the Latin names of the moods in the text; (c) he changes the order of particular and universal when referring to the first and fourth figures.

Is this a genuine fourth figure? If Mordecai follows tradition and defines the minor term as the subject of the conclusion and the major as its predicate, then the answer is yes. For in that case *c* becomes the minor term, and *a* the major term, and what he arranged as first figure premises in the Arabic/Hebrew tradition are really fourth figure premises in the Latin tradition. If one transposes the premises, one receives the fourth figure moods according to the Arabic/Hebrew tradition, as represented by Gersonides.

Mordecai's formulation of <i>Baralipton</i> ⁵⁶	After substituting instances of 'c' by 'a' and 'a' by 'c' (<i>Bramantip</i> , <i>Bamalipton</i>)	After transposing premises so that the minor comes first (Gersonides's fourth figure first mood)
Every <i>a</i> is <i>b</i>	Every <i>c</i> is <i>b</i> (major)	Every <i>b</i> is <i>a</i> (minor)
Every <i>b</i> is <i>c</i>	Every <i>b</i> is <i>a</i> (minor)	Every <i>c</i> is <i>b</i> (major)
Some <i>c</i> is <i>a</i>	Some <i>a</i> is <i>c</i>	Some <i>a</i> is <i>c</i>

This interpretation is admittedly forced. One has to read his comment 'I arranged [the premises of] the fourth figure according to the first figure without any difference' as referring to the first figure according to the scholastic convention of major premise before minor premise.

Mordecai defends in his notes not just the validity of these moods but also the appropriateness of arranging them in a separate fourth figure rather as indirect moods of the first figure. It is true, he argues, that three of the five fourth-figure moods are closely related to the first by simple and *per accidens* conversion. In those cases one could say that the first figure premises yield more than one conclusion, as we saw above. But this is not the case with *Fapesmo* and *Fresismorum*, which require not only conversions but transposition of the premises in order to reduce to the first figure. Since these two moods require a separate fourth figure, he argues, it is more fitting that the other three should join them in the fourth figure. Towards the bottom of his syllogistic chart he writes:

⁵⁶ To my knowledge, Mordecai seems to be the only person in the history of logic until recently who is bothered by the name *Baralipton*. Here is the problem: according to the mnemonic, *Baralipton* reduces to the first figure *Barbara* by performing a *per accidens* conversion on the proposition preceding the letter *p*, which is a particular affirmative proposition. But conversion *per accidens* only operates on universal propositions. To remedy this Mordecai proposes *Barbarap*, but that has the drawback of not signifying the fourth figure mood (in which the conclusion is a particular proposition) but only how one arrives at it from the first figure. For a recent analysis of this problem, see Corcoran, Novotný and Tracy 2018; my thanks to Kevin Tracy for pointing out to me the aforementioned drawback.

I have no doubt that the middle term can be arranged in four ways:

- (a) the subject in both [premises], which is the third figure;
- (b) the predicate in both, which is the second figure;
- (c) subject in one, predicate in another, which is the first figure;
- (d) predicate in one, subject in another, which is the fourth figure.

Hence, there are four figures, since there is no room for rejecting the fourth, for ‘having the base lord over the respected’ (*Isa. 3: 5*). For this is what Aristotle himself did with respect to *Cambestres* and *Disamis*.⁵⁷

In the defence of the fourth figure both here and in the *Compendium* one can distinguish, therefore, between two claims. The first is that it is necessary to recognise five valid syllogistic moods in addition to the fourteen valid moods recognised by Aristotle. These additional moods should not be viewed merely as following from the four first-figure moods and hence dispensable, as Aristotle, according to Alexander, did for two of them. On this Mordecai and Petrus Hispanus agree against Averroes. The second claim, however, is that the five additional moods should be arranged in a separate figure, and here Petrus, who considers them merely as indirect first figure moods, parts company with Mordecai. In terms of validity, it makes no difference where the five additional moods are put. Mordecai correctly sees that when the middle term is defined in a certain way, there will be four figures. But he himself is willing to present an equivalent set of syllogisms to that of the fourth figure syllogisms whose premises are arranged as in the first figure but whose conclusions have their subject and predicate terms reversed. Mordecai reminds us that Petrus calls these indirect moods, and he is willing to use the names of the first figure indirect moods from the *Barbara/Celarent* mnemonic.

As for explaining the mnemonic, he writes:

AMANAḤ. The custom has continued to use a vowel (*ot*) to record the quantity and quality of the propositions in four syllables: ‘ah’ signifies a universal affirmation, ‘ei’, a universal negation, ‘ee’, a particular affirmation, and ‘oh’, a particular negation. Now Levi b. Abraham put them in the first two words of his verses, *Brooches* and *Charms*, which are ‘*Areh Mori*’.⁵⁸

⁵⁷

/ ואני אין ספק / כי סדור הגבול האמצעי / יש לו ד פנים / א נשוא בשתייהן / והוא תמונה ג /
 ב נשוא בשתייהן / ב /
 ג נשוא באחת נשוא באחרת / א.
 ד נשוא באחת נשוא באחרת / ד / לכך היו התמונות ד כי אין מקום לדחות הרביעית / להרהיבה הנקלה בנכבד / כי כה יעשה אריסטו עצמו /
 בקאמבישטריש ודישאמאי / ולכן סדרתי לפניך מיני הד תמונות

Cf. Levi ben Gershom 1992, 146 (*Correct Syllogism* 2:6): ‘Averroes, however, rejects this figure because it requires two conversions: the transposition of the premises and the conversion of the conclusion itself [...] So how is this more odd than something that requires three conversion, i.e., the conversion of one sentence, the reduction of the major premise to the minor, and the conversion of the conclusion [i.e., *Cambestres* and *Disamis*]?’ The relationship between the syllogistic theories of Gersonides and Mordecai needs to be examined; clearly the latter’s defense of the fourth figure is influenced by Gersonides. Yet he only has one note on the *Correct Syllogism* in Turin A. I. 14, where Gersonides mentions the fourth figure moods. That note cites the five Latin names of the indirect moods, but when he writes *Baralipton* he prefaces it with the two words, קראו אישפאין, ‘Hispanus called it’. This may reflect his aforementioned unhappiness with the name *Baralipton*, which led him to coin the name, *Barbarap*.

⁵⁸ Turin, Biblioteca Nazionale Universitaria, A. I. 14, fol. 97^v: / אמנה נמשך המנהג לרשום באות ההקדמות ואיכותן / בד שלבאש / ואה יורה חיוב כולל / ואי / שלילה כוללת / וא / חיוב חלקי / ואו שלילה חלקית / ושמום לוברון [=לוי בן אברהם] / בשתי המלות הראשונות אשר

Does Mordecai believe that his well-known predecessor, Levi b. Abraham of Villefranche (c.1240–c.1315), intended to begin his rhymed encyclopedia of science (1276) with a deliberate nod to the scholastic practice of using vowels to signify the standard types of quantified propositions? Or is he providing his own mnemonic by which his students can remember them? There is no evidence from the fourteen verses that Levi devotes to the types of syllogisms and to priority in *Batei ha-nefesh ve-ha-lehashim* ('Brooches and Charms') that he was at all aware of scholastic syllogistic.⁵⁹

I have devoted much space to the question of the fourth figure because Mordecai's notes provide us with additional information about the logical skill and self-confidence of this fifteenth century savant, e.g. his attempt to improve upon Aristotle's proof procedure (fol. 40^v), his explanation of why Aristotle did not investigate whether certain premise-pairs are productive (41^r), the reason why Aristotle bothers to prove the validity of *Darapti* and *Datisi* through *ecthesis* and *reductio ad absurdum* after he has proved their validity through conversion (43^r); his criticisms of Gersonides, etc. All these need to be studied to assess Mordecai's place in the history of Jewish philosophy.

5. Conclusion

Mordecai's notes and diagrams in Turin A. I. 14 provide us with a glimpse of Jewish logical practices in the last years of Jewish life in Provence. We also see the advanced state of philosophical studies before the expulsion. One generally does not think of fifteenth century Talmudists possessing views on the fourth figure of the syllogism, but such was the synthesis among some Jews in the Midi until they were forced to leave. Turin A. I. 14 is also important for the extensive use of horizontal tree diagrams by Mordecai. Pinchas Roth has also discovered such diagrams in Mordecai Nathan's rabbinic works,⁶⁰ and it is not impossible that the two Oxford manuscripts of his commentary of Averroes's *Compendium of Logic* originated as marginal notes that employed horizontal tree diagrams; several paragraphs are broken down into alphabetical subpoints, as one finds in the notes in A. I. 14. How and to what extent these were incorporated in his pedagogy is difficult to say; they were clearly not intended only for the author, as some of them refer to the importance of the 'speculants' (המעיינים; *ha-me'ayyanim*) being aware of a certain point. But this awaits further study.

בהריוות בתי הנפש / והם / ארה מורי

⁵⁹ Paris, Bibliothèque nationale de France, héb. 978, fols 35^v–37^v. On this work see Harvey 2000, 171–173.

⁶⁰ See above, n. 19.

Appendix: A description of the contents of Turin, Biblioteca Nazionale Universitaria, A. I. 14

Turin, Biblioteca Nazionale Universitaria, A. I. 14 has been described several times, but never with complete accuracy.⁶¹ Because it was presumed lost in the Turin fire of 1904, or was not yet restored, the manuscript was not used by scholars preparing editions of the works contained therein, although there are exceptions.⁶² The purpose of this appendix is to provide a description of its contents, according to digital images of the complete manuscript that I received in August 2023. It may be that a physical examination of the manuscript may provide more details about its contents. As mentioned above, the manuscript was damaged by the fire, with folios partially and completely destroyed. Damaged and missing folios will be noted.

No.	Folios	Work
1.	1 ^{ra} –8 ^{va}	Averroes, middle commentary on the <i>Isagoge</i> (c.1170), tr. Jacob Anatoli (c.1194–1256) in 1232, with Gersonides's commentary (early 1320s). The manuscript is missing the first two folios, and Averroes's commentary begins on fol. 3 ^{ra} with שם המדבר סוג לאדם. ⁶³ Gersonides's commentary begins with אמר לוי (הרצון בזה). ⁶⁴ Notes of Mordecai.
2.	9 ^{ra} –21 ^{vb}	Averroes, middle commentary on the <i>Categories</i> (1164?), tr. Jacob Anatoli (1232), with Gersonides's commentary (early 1320s). Notes of Mordecai.
3.	22 ^{ra} –34 ^{rb}	Averroes, middle commentary on the <i>De interpretatione</i> (1165?), tr. Jacob Anatoli (1232), with Gersonides's commentary (early 1320s). Notes of Mordecai.
4.	35 ^{ra} –93 ^{ra}	Averroes, middle commentary on the <i>Prior Analytics</i> (1166?), tr. Jacob Anatoli (1232), with Gersonides's commentary (early 1320s). Notes of Mordecai.
5.	93 ^{ra} –95 ^{rb}	Averroes, <i>Logical Question</i> (date of composition unknown; V in the Juntine edition), tr. Qalonymos ben Qalonymos (?), on <i>dictum de omni</i> , the assertoric premise, and syllogisms with mixed modal premises, with Gersonides's commentary (early 1320s).

⁶¹ See references in n. 11 above; the current record in the online catalogue of the National Library of Israel is not entirely accurate.

⁶² As far as I can tell, only Yoav Meyrav's edition of Themistius's paraphrase of *Metaphysics* 12 (no. 25 below) makes use of the manuscript, to which will be added Charles Manekin's edition of the *Book of the Correct Syllogism* (no. 8) under preparation. See Themistius 2019.

⁶³ Averroes 1969, 9, l. 1.

⁶⁴ Rosenberg 1989, 95, l. 23.

6.	95 ^{rb} –96 ^{rb}	Averroes, <i>Logical Question</i> (IX; date of composition unknown), tr. Qalonymos ben Qalonymos (c.1320), on syllogisms with major negative assertoric premises and minor possible affirmative premises, with Gersonides's commentary (early 1320s).
7.	97 ^{rab}	Mordecai's diagram of the productive and unproductive combinations of premises.
8.	98 ^{ra} –119 ^{ra}	Gersonides, <i>Book of the Correct Syllogism</i> (1319). Mordecai adds in the margin the Latin names of the syllogistic moods.
9.	119 ^{va} –157 ^{rb}	Averroes, middle commentary on the <i>Posterior Analytics</i> (1170), tr. Jacob Anatoli (1232), with Gersonides's commentary (early 1320s).
10.	157 ^{rb} –157 ^{vb}	Jacob Anatoli's conclusion to his translation of the first 5 books of the <i>Organon</i> according to Averroes's paraphrase, his précis of the syllogism (1232).
11.	158 ^{ra} –212 ^{va}	Averroes, middle commentary on the <i>Topics</i> (1168), tr. Qalonymos ben Qalonymos (1313), with Gersonides's commentary (early 1320s).
12.	213 ^{ra} –236 ^{rb}	Averroes, middle commentary on <i>Sophistical Refutations</i> (1174?), tr. Qalonymos ben Qalonymos (1313 or 1323), with Gersonides's commentary (early 1320s).
13.	237 ^{ra} –274 ^{rb}	Averroes, middle commentary on the <i>Rhetoric</i> (1175), tr. Todros Todrosi (1337). Holes and rips in text on fols 237 ^{rb} –238 ^{vb} , 240 ^{ra} – ^{vb} , 242 ^{ra} – ^{vb} , 248 ^{rb} – ^{va} , 261 ^{ra} – ^{vb} , 262 ^{ra} – ^{vb} , 263 ^{ra} – ^{va} , 307 ^{rb} – ^{va} . Notes of Mordecai.
14.	274 ^{rb} –279 ^{vb}	Averroes, middle commentary on the <i>Poetics</i> (1176?), tr. Todros Todrosi (1337).
15.	280 ^{va} –280 ^{vb}	Anonymous table of contents of the ten treatises of Aristotle's <i>Ethics</i> .
16.	280 ^{va} –323 ^{rb}	Averroes, middle commentary on the <i>Ethics</i> (1177), tr. Samuel b. Judah (1321). Holes on fols 284 ^{rb} – ^{va} , 285 ^{ra} – ^{vb} , 286 ^{ra} , 293 ^{ra} – ^{vb} , 294 ^{ra} – ^{vb} , 295 ^{rb} – ^{va} ; 308 is charred at the top and margin. Omits last statement of Samuel. ⁶⁵ Notes of Mordecai, mostly on treatise 1.
17.	324 ^{ra} –339 ^{va}	Averroes, Compendium of Plato's <i>Republic</i> (date of composition unknown), tr. Samuel b. Judah (1321), big hole in 328 ^{rab} , hole in 329 ^{ra} – ^{vb} ; from inner margins and some of text is burnt in 331 ^f –332 ^v . Text ends before Samuel b. Judah's translator's epilogue.

⁶⁵ See Averroes 1999, 356–357.

18.	340 ^{ra} –405 ^{vb}	Averroes, middle commentary on the <i>Physics</i> (1169), tr. Qalonymos b. Qalonymos (1316), with Gersonides's commentary (1321). Inner margins and some of the text increasingly burnt from here until the end of the manuscript. Breaks off at <i>kelal</i> 6, ch. 4. Folios missing from 404 ^r –418 ^v . According to the Peryon Turin catalogue, the work ended at 405 ^{vb} . Notes of Mordecai including many horizontal tree diagrams.
19.	406 ^{ra} –436 ^{rb}	Averroes, middle commentary on <i>De coelo et mundo</i> (1171), tr. Solomon ibn Ayyub (1259). Fols 406 ^r –418 ^v are missing. Begins treatise II, <i>kelal</i> 3, a few lines before the fifth thesis. Fols 419 ^r –423 ^v are charred in various degrees. Fols 424–440 are missing. According to the Peyron catalogue, the work ends on fol. 436 ^{rb} .
20.	436 ^{rb} –449 ^{vb}	Averroes's middle commentary on <i>De generatione et corruptione</i> (1172), tr. Qalonymos b. Qalonymos (1316), begins on fol. 441 ^{ra} towards the end of treatise I, <i>kelal</i> 5, ch. 3. Fols 441 ^{ra} –449 ^{vb} are burnt in various degrees.
21.	450 ^{ra} –466 ^{rb}	Averroes, middle commentary on <i>De anima</i> (1172/1181), tr. Moses ibn Tibbon (1261). The incipits of Aristotle (אמר; <i>amar</i>) are numbered in Hebrew in the margins. The folios are considerably burnt, with only fragments remaining, through fol. 463v. Fols 464 ^r –470 ^v are missing.
22.	467 ^{ra} –470 ^{rb}	Pseudo-Aristotle, <i>De plantiis</i> , tr. Qalonymos b. Qalonymos (1314). Completely missing.
23.	471 ^{ra} –506 ^{ra}	Averroes, middle commentary on <i>De animalibus</i> (1170), tr. Jacob b. Makhir (1302). The inner margins are charred, but in better shape than no. 20. From here to fol. 524 ^v , the margins are charred, with the inner ones more than the outer ones.
24.	506 ^{va} –559 ^{vb}	Averroes, middle commentary on the <i>Metaphysics</i> (1174), tr. Qalonymos ben Qalonymos (1317). Fols 525 ^r –528 ^v are fragments. Thereafter, add 1 to the pencilled folio numbers through 533. Fols 534 ^r –548 ^v are missing. Begins again with Book XI on fol. 549 ^r , with inner margins of the text significantly charred.
25.	560 ^{ra} –567 ^{va}	Themistius' paraphrase of <i>Metaphysics</i> , Book XII (fourth century CE), tr. Moses ibn Tibbon (1255). Significant charring of inner margins.
26.	567 ^{vb} –591 ^{ra}	Averroes, long commentary on the <i>Metaphysics</i> , Book XII (after 1190), tr. Moses ben Solomon of Salon (1320s?). Significant charring of inner margins, including the colophon of the scribe.

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