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Astronomical and Astrological Terms in Ibn Ezra's Biblical Commentaries: A New Approach¹

Josefina Rodríguez-Arribas

Abstract. Abraham ibn Ezra (Tudela, 1089/1092–1164/1167) was the most important writer of scientific treatises in Hebrew in the twelfth century; prior to him and his predecessor, Abraham bar Hiyya (d. after 1136), Arabic was the only language of scientific knowledge among Jews. After Ibn Ezra's work, Hebrew became a language of science, and eventually of research, among the Jews of the Iberia Peninsula and Europe. This fact makes Ibn Ezra's language, his choice of technical terms, and his linguistic *agenda* fascinating subjects that deserve more attention than received so far. My purpose in this article is to distinguish Ibn Ezra's strategies in coining technical terminology in the context of his biblical commentaries. The presence of astronomy and astrology in religious exegetical texts is not a feature exclusive to Ibn Ezra, but he is surely the most inclined (and effective) to find astronomical and astrological meanings in the biblical words.

Introduction

The large number of terms involved in astronomical or astrological explanations in Abraham ibn Ezra's biblical commentaries still demands a more careful and detailed analysis of texts and terms after Shlomo Sela's research, in addition to the presentation of the technical words in the form of an alphabetic glossary, which is comprehensive and easy to use for historians of science, Hebraists, researchers, and readers in general.² This critical glossary is the purpose of my current research. My

¹ I would like to express my appreciation to the Warburg Institute and the Sophia Trust for the Sophia Fellowship that made this article possible. This research has been also supported by a scholarship of the Spanish Ministerio de Asuntos Exteriores y Cooperación intended for the mobility of researchers.

² For an overview of Ibn Ezra's writings and thought, see Shlomo Sela, *Scientific Data in the Exegetical-Theological Work of Abraham Ibn Ezra*:

Josefina Rodríguez-Arribas, 'Astronomical and Astrological Terms in Ibn Ezra's Biblical Commentaries: A New Approach', *Culture and Cosmos*, Vol. 13 no 1, Spring/Summer 2009, pp. 3–23.
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present study partly agrees with and confirms Sela's thesis about the significance of Ibn Ezra's choice of terms.³ Ibn Ezra selected biblical

Historical Time and Geographical Space Conception, PhD. Dissertation (Tel Aviv University, 1997) (in Hebrew); *'Astrologiah u-faršanut hamiqra' behaguto šel Abraham ibn Ezra* (Ramat Gan: Bar Ilan University Press, 1999) [Hereafter Sela, *'Astrologiah'*]; and *Abraham ibn Ezra and the Rise of Medieval Hebrew Science* (Leiden: Brill, 2003) [Hereafter Sela, *Rise*]. Concerning the field of scientific terminology, see Sela's articles: 'El papel de Abraham ibn Ezrá en la divulgación de los juicios de la astrología en las lenguas hebrea y latina', *Sefarad* 59, no.1 (1999), pp. 159–94; 'Abraham ibn Ezra's Special Strategy in the Creation of a Hebrew Scientific Terminology', *Micrologus: natura, scienze e società medievali* 9 (2001), pp. 65–87; 'Queries on Astrology Sent from Southern France to Maimonides: Critical Edition of the Hebrew Text, Translation, and Commentary', *Aleph* 4 (2004), pp. 89–190; and the final glossary and general comments on terminology in his *Abraham ibn Ezra, The Book of Reasons* [Hebrew ed. and English tr. of the two versions] (Leiden: Brill, 2007). Concerning the astrological terminology of Ibn Ezra, see also J. Rodríguez Arribas, 'Les significations de 'et et de zeman dans le commentaire de Qohélet d'Abraham ibn Ezra', *Révue des études juives* 165, nos. 3–4 (2006), pp. 435–44, and 'Finis ab origine pendet: Death according to Medieval Astrological Sources in Hebrew', *Pecia* 17 (2008) (forthcoming).

3 See Sela, *Rise*, pp. 104–6 and 140–43: 'His opening statement [in the introduction of the third version of his *Sefer keli ha-nehošet*] that Hebrew was the first and most comprehensive of all languages hints that it was created on the basis of a divine blueprint as a perfect language, with the broadest possible semantic compass. Hence it could express every nuance of reality and included the terminology needed to deal with science in general...his statement should be construed as a sincere ideological declaration of intentions: Ibn Ezra, an expert biblical commentator as well as a skilled scientist, considered himself to be highly qualified to revive the semi-extinguished holy tongue, to restore an original scientific meaning that had been forgotten, a task which involved mining the biblical text to rediscover a set of original Hebrew scientific terms' (pp. 104–5). Sela considers this task with eight terminological examples from the biblical text: *gevulot* (pp. 107–12), *mušaq* (pp. 113–16), *mišpaṭim* (pp. 116–23), *naḥaš bariaḥ* (pp. 124–26), *šamayim* (pp. 126–29), *mešartim* (pp. 129–30), *toledet* (pp. 130–37), and *hešev ha-'afudah* (pp. 137–39), although he misses that some of these words were already used by previous texts and writers (for example, Ibn Gabirol used *hešev ha-'afudah* in his *Keter malkūt*). Sela concludes (p. 140): '... in all these cases Ibn Ezra was motivated by the same prevailing ideological incentive: he preferred biblical words over other common and more normative expressions, because in his opinion the available biblical vocabulary

vocabulary in order to convey astronomical and astrological knowledge upon the basis that the Torah text contains in its words relics of the knowledge of all sciences that once were patrimony of Israel.⁴ However, it is also true that in resorting to the vocabulary in the biblical text, Ibn Ezra was following a procedure already established by Arabic writers, who sought in the Koran words for translating scientific and philosophical concepts from Greek.⁵ Moreover, resorting to the treasury of words that the previous literature in Hebrew displayed, especially the biblical words (biblical language was the highest expression of Hebrew and the main reference for the medieval grammarians of Hebrew), is the basic and first technique for the creation of neologisms that are not loans from a foreign language, especially if the writer is particularly concerned with the purity of his own language, as was Ibn Ezra's case.

We have found that the biblical context (which is clearly connoted) strongly determines the astrological or astronomical significance of some expressions, which in an exclusively scientific context would be named, in some cases, with different expressions.⁶ The particular way in which

occasionally holds some original and authentic scientific terms that represent some of the most central concepts of nature and reality. Ibn Ezra considered these scientific words to be a relic of the original Hebrew language'. For a comparison with other scientific writers (late contemporaries with Ibn Ezra, like Yehudah ibn Tibbon and Maimonides) also coining terms in a similar historical context, see Sela, *Rise*, pp. 140–42.

4 Sela, *'Astrologiah*, pp. 51–59 and 349–51; and Sela, *Rise*, pp. 296–313. Bar Hiyya also holds this belief in his *'Iggeret*, see A. Schwartz (Hebrew ed.), *'Iggeret R. Abraham bar Hiyya*, *Festschrift Adolf Schwartz zum 70. Geburtstag* (Berlin: R. Löwit, 1917), [Hereafter Schwartz, *'Iggeret R. Abraham bar Hiyya*] pp. 23–36, here p. 30: 'The calculation of the motions of stars is not a [specific] science to Israel with respect to the Gentile nations, but most nations were fostered to this calculation by Israel'.

5 See P. Kunitzsch, 'Dies astronomische Terminologie im Almagest', *La formation du vocabulaire scientifique et intellectuel dans le monde arabe*, ed. D. Jacquart, (Turnhout: Brepols, 1994), pp. 55–65.

6 For example, *saddan* versus *qoṭeb*, see the commentary on Amos 5:8, U. Simon [Hebrew ed.], *Abraham ibn Ezra's Commentaries on the Minor Prophets*, vol. I: *Hosea-Joel-Amos* (Ramat Gan: Bar Ilan University Press, 1989), pp. 209–10, and the second version of his *Sefer keli ha-nehošet*, MS BNF 1045 f. 190b, respectively, where the two terms denote the northern/southern poles of heaven;

technical terminology emerges in the biblical excursus (within the biblical quotations or supported by them) is another factor that determines the predominance of biblical sources in Ibn Ezra's astronomical and astrological terminology. Moreover, according to the extant sources, we cannot miss the fact that, except for a majority of his poetry, Ibn Ezra's first writings in Hebrew, begun in the year 1140, were biblical commentaries, and that only later, starting in the year 1146, he began to compose the main group of his astronomical and astrological writings.⁷ Therefore, Ibn Ezra coins technical terminology for the first time in the context of his exegetical writings, not in specific astronomical or astrological monographs. Finally, most of the technical terms created in the context of the biblical excursus also emerge in the scientific writings, which makes very volatile the detection of an intentional distinction by Ibn Ezra between the terminology in the two groups of texts. This fact provides a likely basis for the theory of the predominance of biblical words in Ibn Ezra's technical vocabulary based on the fact that Ibn Ezra wrote the exegetical writings before the scientific writings, and therefore, had already coined some of the technical terms that he would

and for *ḥeṣi* versus *mabbaṭ ebah*, see the commentary on Eccles. 9:11, M. Gómez Aranda [Hebrew ed. and Spanish tr.], *El comentario de Abraham ibn 'Ezra' al Libro del Eclesiastés* (Madrid: CSIC, 1994), [Hereafter Gómez Aranda, *Eclesiastés*] p. 95* and the *Sefer ha-moladot*, MS BNF 1056 f. 50a, respectively, where the two terms denote the astrological aspect of opposition.

⁷ For a chronology of Ibn Ezra's writings, see S. Sela and G. Freudenthal, 'Abraham Ibn Ezra's Scholarly Writings: A Chronological Listing', *Aleph* 6 (2006), pp. 13–55. Ibn Ezra wrote the following biblical commentaries before starting his main astronomical/astrological works: on *Ecclesiastes* (1140), the first version on *Esther* (1140–1142), on *Job* (1140–1142), on *Lamentations* (1142), the first version on *Daniel* (1140–1145), the first version on *Song of Songs* (1140–1145), the first version on *Psalms* (1140–1143), the first version on *Minor Prophets* (1142–1145), the first version on *Pentateuch* [short commentary or *Sefer ha-yašar*] (1142–1145), on *Ruth* (1142–1145), and on *Isaiah* (1145). Some of these commentaries contain relevant astronomical and astrological terms in Hebrew. His early scientific texts before 1146 are not so relevant regarding the technical terminology in these sciences in Hebrew: the first version of the *Luḥot*, a *Sefer ta'amei ha-luḥot* non-extant, and its Latin version (*Liber de rationibus tabularum*), and a group of mathematical treatises (*Sefer ha-middot*, *Sefer ha-mispar*, and *Sefer ha-'eḥad*). Starting in 1146, Ibn Ezra would write more than thirty astronomical and astrological books in comparison with the six that he wrote before 1146.

employ later in his astronomical and astrological treatises. According to this view, technical terms had already emerged as an important part of his terminology in his biblical commentaries, and were confirmed as such in his scientific writings. Clearly, then, the right appraisal of Ibn Ezra's work requires the consideration of both groups of writings, and my current research is devoted to it. However, this paper treats some technical terms in Ibn Ezra's biblical commentaries and very few of the technical terms in his scientific writings (I discuss them only when their mention is helpful for explanation).

When one considers the whole of technical terms related with astronomy and astrology in the biblical commentaries of Ibn Ezra, one of the most striking features is the coexistence, in the same texts, of two groups of words: a highly specialized vocabulary with a clear and unique meaning (e.g., *galgal qaṭan* [epicycle], *galgal ha-mazzalot* [the zodiac], *muṣṣaq* [the center of a sphere/orb], etc.) and a different kind of vocabulary containing words coming from ordinary speech (*pe'ah* [hemisphere], *roḥav* [latitude], *aḥor* [west], etc.), which Ibn Ezra introduces as technical terms with a very specific sense, but at the same time keeps the everyday meanings of the words in other parts of his writings. In other words, the first group denotes only technical meanings, while in the second group the words denote technical meanings without losing the reference to their common meanings. Some of the technical words follow Arabic patterns (for example, the words for zodiac and deferent/eccentric),⁸ whereas the other words seem to be Ibn Ezra's original contribution to technical terminology (*muṣṣaq* for center and *šelišut* for triplicity). Previous Hebrew writers had already put some of the technical words in circulation with the meaning with which Ibn Ezra denotes them. For instance, he employs a distinctive biblical term, *hešev afudah* (solar path or zodiac), which Ibn Gabirol used in his *Keter malḳut* with the same meaning. He also introduces the biblical group *mele'ket ha-šamayim* to denote the influence of stars in his commentary on Ps. 19:1 as Bar Hiyya previously used it in his *Sefer megillat ha-megalleh*, and uses *teḥi* (Baraita di-Šemuel and Donnolo) in different nominal groups to denote the nodes, but also the equinoxes.⁹ *Mešaret* denoting

⁸ Arabic *falak burūj* and *falak ḥārij markaz*, respectively.

⁹ For Ibn Gabirol, see R. Loewe [Hebrew ed. and English tr.], *Ibn Gabirol* (London: Halban, 1989), [Hereafter Loewe, *Ibn Gabirol*] p. 135 [21]; for Bar Hiyya, see *Sefer megillat ha-megalleh*, A. Poznanski and J. Guttmann [Hebrew ed.] (Jerusalem: [s.n.], 1968), [Hereafter Bar Hiyya, *Megillah*] p. 114.

any of the seven planets is also a distinctive word in Ibn Ezra's terminology, but was already referred to the planets (specifically to the angels of the planets) in the *Chapters of Rabbi 'Eli'ezer*.¹⁰ Another group of words emerges for the first time with a technical meaning, i.e., they are neologisms of meaning (for instance, *pe'ah* and *neṭiyyah*). We find also neologisms of form like *keli nehošet* for astrolabe and, in his scientific writings, *al-fardār* (an Arabic loan) for the astrological division of any of the signs of the zodiac called in Latin *firdaria*. Considering all these factors in these texts, it becomes clear that several Hebrew words and expressions in Ibn Ezra's excursuses diverge from their ordinary meanings and contexts and enter a new level of speech, that of scientific language.

Ibn Ezra's methodology to coin technical words in the biblical excursuses

First of all, Ibn Ezra's approach to the coinage of terminology is that of a grammarian.¹¹ As Van der Heide stated: 'The study of the language in

Concerning these expressions in Ibn Ezra, see the third version of Ibn Ezra's *Sefer keli ha-nehošet*, MS Moscow, Gunzburg 937 f. 6b (*hešev afudah*), and M. Cohen [Hebrew text], *Miqra'ot gedolot ha-keter* (Ramat Gan: Bar Ilan University Press, 1992–), *Psalms*, Vol. 1, p. 57 (Ps. 19:1, *mele'ket ha-šamayim*) [Hereafter Cohen, *Psalms*]. Regarding the meaning of *roš* and *zenav ha-teli* for denoting, respectively, the spring and autumnal equinoxes, see Ibn Ezra's *Sefer ha-'eḥad*, I. Levin [Hebrew text], *Abraham ibn Ezra's Reader* (Tel Aviv: Israel Matz, 1985), p. 403.

10 *Pirquei rabbi 'Eli'ezer*, MS HUC 75 ff. 4b and 6b, digitized copy of the manuscript of the Hebrew Union College, Klau Library, *Pirque Rabbi Eliezer, Electronic Text Editing Project*, ed. Lewis M. Barth, <<http://www.usc.edu/projects/pre-project/graphics/index-04.html>>. However it is also true that in this text *mešaret* is also applied to the stars and in wider contexts, whereas Ibn Ezra uses it exclusively in relation to the planets.

11 See Mordechai Z. Cohen, *Three Approaches to Biblical Metaphor From Abraham ibn Ezra and Maimonides to David Kimhi* (Leiden: Brill, 2003), pp. 33–97. This writer explains that Hebrew lexicography began 'as a tool for reading and translating the Bible' (p. 94). According to Elaine R. Miller, 'rather than studying Hebrew as a language first, and then reading from the Bible, the student learned to understand Hebrew by reading the Bible and translating it into the vernacular', see *Jewish Multiglossia: Hebrew, Arabic, and Castilian in Medieval Spain* (Newark: Juan de la Cuesta, 2000), p. 47–48.

fact became part and parcel of the study of the Bible'.¹² My focus in this paper will be the technical terminology (in the fields of astronomy and astrology) in the biblical commentaries. There are two main contexts of the emergence of technical terminology in the exegetical texts of Ibn Ezra. First, the biblical text and the words in it. Second, Ibn Ezra's explanation of the biblical text, which is properly the excursus, where he introduces technical terms that are not in the biblical sentences that he is explaining, but are related to them in some way. I will analyze some examples of how Ibn Ezra builds his interpretation of certain biblical passages, those that he considered to be related to scientific contents (astronomical/astrological) or to be appropriated to relate to them. I intend to approach this along three lines. First, how the emergence of technical terms takes place either directly from the wording of the biblical sentences or indirectly from the words in the excursus that explain the biblical meaning. Second, how Ibn Ezra manipulates the biblical text to introduce technical meanings (the word 'manipulates' is not intending anything pejorative here). He usually produces more biblical references to justify and round up the astrological/astronomical meanings that he has found. Third, what kind of technical words Ibn Ezra uses in these excursuses: neologisms of form or of meaning, Arabic transliterations in Hebrew, and technical terms already employed by previous writers. Let us take a look at several of these excursuses.

In the commentaries on Eccles. 3:2, 8:5, 8:6, and 9:11, Ibn Ezra introduces excursuses on the biblical term 'et, which is present in the four

12 Quotation taken from Albert van der Heide, 'Banner, Miracle, Trial? Medieval Hebrew Lexicography Between Facts and Faith', ed. Nicholas de Lange, *Hebrew Scholarship and the Medieval World* (Cambridge: Cambridge University Press, 2001), p. 92. So is described the two-fold method of medieval grammarians upon the model of Arabic linguists, who firstly turned to the study of the Koran: 'The first step was to determine the root of each word in the Bible by means of formal criteria. As soon as the correct morphological identification was established, a lexical explanation followed, preferably with the help of biblical equivalents. In this second phase, the limited size and the uniformly religious subject matter of the biblical corpus hampered the grammarian's task, leaving him a limited choice of etymological equivalents', see Irene E. Zwiép, *Mother of Reason and Revelation, A Short History of Medieval Jewish Linguistic Thought* (Amsterdam: Brill, 1997), [Hereafter Zwiép, *Mother of Reason and Revelation*] p. 6. As Zwiép remarks, this method was in turn influenced by the earliest Jewish exegesis of the Bible.

biblical verses.¹³ The technical meaning of this term in the four excursuses has to do with astrology. It denotes a time selected for carrying out a purpose according to the rules of electional astrology (Eccles. 8:6). It also denotes the moment of death in natal astrology, which is determined by the planet of the horoscope called in his astrological writings ‘prince’ (*sar*), which rules the afetic places (*meqom ḥayyim*) or points in the horoscope related to life and death (Eccles. 3:2).¹⁴ ‘*Et*’ is also part of a nominal group (construct state) that is one of the denominations of astrologers (*yode‘i ha-‘ittim*) in Eccles. 8:5. In this excursus, Ibn Ezra introduces the technical expression (*yode‘i ha-‘ittim*) quoting another biblical verse where the term ‘*et*’ appears (Esther 1:13). The relation between the two verses (Eccles. 8:5 and Esther 1:13) is that the passage of Esther explains the meaning of a sentence in Eccles. 8:5, namely, *the heart of a wise man knows the moment (‘et) and the judgment (mišpaṭ)*. The wise man is an astrologer, defined by his knowledge of the astrological judgment of any moment according to the positions of stars. The excursus on Eccles. 9:11, in addition to ‘*et*’, explains the biblical word *pega‘* (chance, destiny), whose meaning Ibn Ezra interprets as depending on the meaning of ‘*et*’ (occasion), that is, ‘what is in the arrangement (*matkonet*) of the first stellar configuration (*ha-ma‘areket ha-‘elionah ha-rišonah*)’, in other words, the natal horoscope. In this way, *pega‘* denotes ‘the meeting (*pegi‘ah*) of any planet of the natal configuration (*ha-ma‘areket*) with any of the seven planets, which can be in the aspect of opposition (*ḥeši*), square (*ḥeši le-fanav ve-‘aḥarav*), trine (*šelišit*), and sextile (*ḥeši lefanav ve-‘aḥarav*)’. By this brief expression, Ibn Ezra is making reference to the complex and long procedure of directions, an astrological technique that involves a radix horoscope and the different aspects (angles between planets measured in longitude) that the planets in the natal chart make with the planets in the course of time. Only these four excursuses contain a complete typology of new technical

13 See Gómez Aranda, *Eclesiastés*, pp. 28*–29* (Eccles. 3:2), p. 86* (Eccles. 8:5 and Qo 8:6), and p. 95* (Eccles. 9:11), respectively. Concerning the technical meanings of these terms, for ‘*et*’, see Rodríguez Arribas, ‘Les significations de ‘*et*’ et de *zeman*’, and for *sar*, see the second version of Ibn Ezra’s *Sefer ha-še‘elot*, MS BNF 1058 f. 2b.

14 See the second version of Ibn Ezra’s *Sefer keli ha-neḥošet*, MS BNF heb 1045 ff. 195a–195b, and the second version of his *Sefer ha-te‘amim*, Sela, pp. 236–39 [6.2].

terms: neologisms of form (*ḥeši le-fanav ve-'aḥarav*), neologisms of meaning (*'et, yode'i ha-'ittim, mišpaṭ, pega'/pegi'ah, matkonet, ma'areket*), and Arabic patterns/loans (*šelišit*, which already existed in Bar Hiyya's Hebrew in the form *qešet šelišit*).¹⁵ The appearance of ordinary speech of the expression *ḥeši le-fanav ve-'aḥarav* and the fact that it denotes two different technical meanings (the astrological relations between planets called square and sextile) are also characteristic of the development of early technical terminology in any language.

The biblical names *Kesil* and *Kimah*, which in the Bible refer to names of stars or constellations, are the occasion for Ibn Ezra to expound on the astronomical phenomenon of the precession of the equinoxes, which causes the shift of the vernal point backward throughout the zodiac, and to introduce some astronomical expressions. *Kesil* appears in Job 9:9 (together with *Kimah*), Isa. 13:10 (alone and in the plural), and Amos 5:8 (also together with *Kimah*).¹⁶ In the excursus on Job 9:9, Ibn Ezra explains that *Kesil* and *Kimah* (two stars) are placed in the two opposite parts (*pe'at sem'ol* and *pe'at negev*) of the solar path (*ha-galgal hanoteh*), that is, in the southern (*pe'at negev*) and northern parts (*pe'at sem'ol*) of the zodiac with respect to the equator. *'Ayiš* (the constellation Ursa or the Bear) and *Ḥadrei teman* (a group of stars that remains unidentified in the excursus but is placed close to *Sahil*, which is probably Canopus, one of the most brilliant stars in the southern hemisphere) indicate the other two opposite points (the northern and southern poles of the sphere), explains Ibn Ezra.¹⁷ Implicit in this passage is also the rabbinic understanding of directions in space as referred to man, which Ibn Ezra employs consistently throughout his biblical texts,

15 Arabic *taṭlīl*. Regarding *qešet šelišit*, see Bar Hiyya's *Megillah*, p. 153.

16 M. Gómez Aranda [Hebrew ed. and Spanish tr.], *El comentario de Abraham ibn Ezra al Libro de Job* (Madrid: CSIC, 2004), [Hereafter Gómez Aranda, *Job*] p. 25*–26* (Job 9:9); M. Friedländer [Hebrew ed.], *The Commentary of Ibn Ezra on Isaiah* (London: N. Trübner, 1873), [Hereafter Friedländer, *Isaiah*] p. 26 (Isa. 13:10); and Simon, *Minor Prophets*, pp. 209–15 (Amos 5:8). For an explanation of Ibn Ezra's commentary on Amos 5:8, see Sela, *'Astrologiah*, pp. 312–13, and Sela, *Rise*, pp. 257–73.

17 Ursa is also called *'Agalah* and *Dov* in Ibn Ezra's commentary on Amos 5:8, cf. commentaries on Job 4:19, Gómez Aranda, *Job*, p. 16*, and Joel 4:11, Simon, *Minor Prophets*, pp. 169–70. Regarding *Sahil*, see Ibn Ezra's commentary on Amos 5:8.

and which we will examine more closely later in this paper. These four stars/constellations indicating two pairs of opposite points in the sphere are produced in the biblical text because Job is expressing the power of God, who created and therefore rules the whole universe in all its directions. Ibn Ezra strengthens this idea while at the same time underscoring that these four heavenly bodies are relevant in the sky because they are distinctive of the southern and northern extremes of the solar path or zodiac (the 8th sphere/orb) and of the southern and northern poles of the heavenly equator (the 9th sphere/orb). In his commentary on Isa. 13:10, Ibn Ezra returns to consider the meaning of *Kesil* and determines that it is an only star, the Heart of Scorpio (*Lev 'Agrav*, that is, Antares). In this excursus, as in his scientific writings, Ibn Ezra refers to several interpretations of the biblical term, but guides the reader to the right one by the formula 'according to my opinion' (*lefi da'ti*).

This interpretation also emerges in the long astronomical excursus on Amos 5:8, where the subject of the precession of the fixed stars (one degree and a half every one hundred years) and the change of the constellation pointing the vernal point with respect to biblical times are explicitly introduced. In this case, the Pleiades are a group of stars in Taurus and not an only star (Aldebaran, called the Left Eye of Taurus in his commentaries on Job 9:9 and Job 38:31).¹⁸ Ibn Ezra collects many astronomical terms in this passage to explain the relevance in biblical times of *Kesil* and *Kimah*. Some of the terms are: *yiššuv* (the inhabited part of the Earth), *saddan* (pole), *ha-qav ha-šaveh* (the terrestrial equator), *galgal ha-mazzalot* (the zodiac), *ha-galgal ha-'elion* (the 9th sphere or celestial equator), *naṭah* (the motion of the sun when it inclines northern or southern), *nequdat ha-hištavvut* (any of the two equinoxes), *Lev Aryeh* (the Heart of Leo, namely, the star Regulus), *šurah* (constellation), and *nequdat ha-maḥberet* (an intriguing expression to allude to the fact that there is a shift between the real constellations and the conventional signs of the zodiac named after them due to the motion of precession of the fixed stars). None of these terms appear in the biblical verse that Ibn Ezra is explaining, but all of them are biblical words or compounds of biblical words that Ibn Ezra introduces in his explanation of the biblical words in the passage.

In the use of some of these terms, namely, *ha-galgal ha-'elion*, *nequdat ha-hištavvut*, and *nequdat ha-maḥberet*, Ibn Ezra is already

¹⁸ Gómez Aranda, *Eclesiastés*, pp. 25*–26* and pp. 78*–79*, respectively.

giving proof of one of the most characteristic features of the new technical terminology in the Hebrew of the 12th century: the dependence on the context to understand certain terms. The amphibology of *ha-galgal ha-'elion*, which means either the sphere of the fixed stars or the sphere of the equator (the agent of the diurnal motion every 24 hours), and the indetermination of *nequdat ha-mahberet*, which means literally 'the point of conjunction', are good examples of this dependence on context. Regarding *Kesil* and *Kimah* in Amos 5:8, Ibn Ezra identifies *Kesil* with a group of stars (that is, the constellation of Scorpio), among them, the Heart of Scorpio (Antares) and *Kimah* with the Pleiades.¹⁹ The two are opposite in the sphere and indicate the points of the two equinoxes, despite the fact that neither of them pointed to the equinoxes in Ibn Ezra's time.²⁰ These two words, Ibn Ezra explains, are the vestiges of Amos' time and before, when these stars indicated the equinoxes. Another interesting technical datum in this excursus is Ibn Ezra's distinction between constellation (*surah*) and zodiacal sign (*mazzal*)—a phenomenon related to the precession of the equinoxes, as I have already mentioned. Constellations and signs coincided once and will coincide again after many thousands of years (approximately, every 25,000 years). However, since the beginning, astrology and astronomy work in the fixed frame of the twelve even divisions of the zodiac, consciously ignoring the shift of the real constellations with respect to the conventional signs named after them. For this reason, the entrance of the spring was and is still considered the degree zero of Aries, although this point has shifted from Taurus (namely, the Pleiades or Aldebaran, in biblical times) to Aries and later to Pisces (where it was in Ibn Ezra's times), and is still shifting.

Visually, Ibn Ezra's terminology for the equinoxes makes reference to the fact that there are two spheres (the zodiac and the celestial equator, respectively, that is, the 8th and the 9th spheres in his system, the former inclined and starry with respect to the latter, straight and starless) whose planes coincide twice a year at the moment of the equinoxes, which is visible in the phenomenon of the equality of hours of light and darkness two days a year, and reflected in the terminology (*hištavvut/equality*). The equinoxes of the excursus are related to the biblical verse by the

19 In Ibn Ezra's commentary on Job 9:9 and on Job 38:31, *Kesil* is a big star of Scorpio (called the Heart of Scorpio, i.e., Antares), see Gómez Aranda, *Job*, pp. 25*–26* and pp. 78*–79*, respectively; see also Sela, *Rise*, pp. 257–73.

20 See Simon, *Minor Prophets*, pp. 211–15 (Amos 5:8).

references to day/night and light/darkness in the biblical text. Again, in this small group of technical terms, we have found neologisms of form (*ha-galgal ha-noṭeh*, *nequdat hahištavvut*, *nequdat ha-maḥberet*), of meaning (*pe'at negev*, *pe'at sem'ol*, *Kesil*, *Kimah*, *galgal 'elion*), Arabic loans/patterns (*Sahil*, *Lev 'Agrav*, *Lev 'Aryeh*),²¹ and technical words already existing in Hebrew (*'Ayiš*, *Ḥadrei teman*, *Kesil*, *Kimah*, *saddan*, *galgal ha-mazzalot*, *ṣurah*, *mazzal*, *yiššuv*, *ha-qav ha-šaveh*, and *naṭah*).

The biblical term *Heilel* (Lucifer) in Isa. 14:12 denotes, in Ibn Ezra's view, the planet Venus (*koḳav Nogah*) and its condition of matutinal star, as the biblical expression *Ben Šaḥar* (the son of the twilight) in the same verse indicates.²² He also explains that, when it is visible, it is the most brilliant star in the sky, and relates the etymology of the term *Heilel* to another expression in Isa. 13:10, *lo yahellu oram* ('they will not give their light'), which makes reference to the particular brightness of Venus. This is another case of resorting to a different biblical expression to explain a biblical word. *Heilel*, *Ben Šaḥar*, and *koḳav Nogah* were words already existing in Hebrew when Ibn Ezra used them.

In his commentary on Gen. 33:10 (referring to Gen. 32:32),²³ Ibn Ezra uses the biblical allusion to the rise of the sun and refers to the question of some commentators perplexed by the biblical statement *the sun rises for him* to introduce the basic astronomical knowledge that the sun rises (*zoreḥet*) at different moments depending on the place of the Earth, namely, the local longitude and latitude (*roḥav*). This excursus clearly shows that Ibn Ezra also had in mind readers who were completely ignorant of the basic tenets of astronomy. *Zoreḥet* and *roḥav* were already technical terms in medieval Hebrew.

The term *gevul* is one of the many technical terms displayed in Ibn Ezra's extensive excursus on Exod. 33:21.²⁴ Among several other

21 Arabic *Suhail*, *Qalb al-'Agrab*, and *Qalb al-'Asad*.

22 Friedländer, *Isaiah*, p. 28.

23 A. Weizer [Hebrew ed.], *Pirūšei ha-Torah le-rabbeinu Abraham ibn Ezra, Berešit*, (Jerusalem: Mossad ha-Rav Kook, 1976), [Hereafter Weizer, *Berešit*] p. 100.

24 A. Weizer [Hebrew ed.], *Pirūšei ha-Torah le-rabbeinu Abraham ibn Ezra, Šemot* (Jerusalem: Mossad ha-Rav Kook, 1977), [Hereafter Weizer, *Šemot*] pp. 215–18. Concerning some of the questions of this long excursus, see Sela, *'Astrologiah*, pp. 80–84 (the 120 conjunctions), 100–2, and 211–13 (the term

subjects, he explains the name of God, the numerical values of its letters, and makes reference to the previous verses and their meanings. After disclosing the high spiritual level that Moses reached, Ibn Ezra introduces a long explanation. He begins with the statement that all the sublunary beings are connected to the forty-eight constellations of the heaven. There is a mention of all the possible mathematical combinations of the seven planets (which are 120, to be precise) and, after a brief mention to mundane/historical astrology (making reference to the fact that every clime has a zodiacal sign), he confirms it with the biblical quotation of Ps. 74:17, where the term *gevu* appears: *'attah hišavtta kol gevu*lot areš ('You have established all the limits [climes in Ibn Ezra's understanding] of the Earth'). The technical term is produced within a biblical verse referred to in order to explain another biblical verse. In this case, the two verses have to do with the special status of Moses and Israel (which is the part of God); for this reason this long excursus will finish with the rabbinic topos *'en mazzal le-Israel* ('Israel does not have star').²⁵ With relation to mundane astrology, that is, the stellar decrees about human groups, peoples, religions, and kingdoms (mainly determined by the cyclical conjunctions of Jupiter and Saturn), Israel is above them as far as it keeps the Law of God; otherwise, it is in the same status *vis-à-vis* the stars as the other peoples and religions.²⁶ Regarding *gevu* (clime), Ibn Ezra explains that there are seven in the northern hemisphere (the inhabited part of the Earth) and that they are the result of the inclination of the solar path with respect to the equator. As I have suggested above, *gevu* is a neologism of meaning introduced by Ibn Ezra, as Sela has proved, although it has an intriguing precedent in the *Sefer yeširah* (ch. 5).

In Job 28:3, Ibn Ezra expounds on the biblical expression of Job *even 'ofel* (stone of darkness), which he interprets as meaning the Earth, for it

gevu); and Sela, *Rise*, pp. 288–323 (among other things, the knowledge of astronomy/astrology that Ptolemy took from Jews).

²⁵ Regarding this *topos* and the rabbinic discussion about it, see *Talmud, Šabbat* 156a. Concerning Ibn Ezra's commentary on Ps. 74:17 and the term *gevu*, see Sela, *Rise*, pp. 111–12.

²⁶ See Ibn Ezra's commentary on Exod. 23:25 (Weizer, *Šemot*, pp. 164–65). Concerning this position, see also the fifth chapter of Bar Hiyya's *'Iggeret* (Schwartz, 'Iggeret R. Abraham bar Hiyya', pp. 27–28).

is *the root of any darkness*.²⁷ This image remains without explanation; maybe we could read in it an allusion to the Gnostic and Neoplatonic theories about the sublunary realm as the source of evil. In any case, Ibn Ezra explains that the Earth is also *even 'ofel* because it is the cause of the lunar eclipses (*qadrut ha-levanah*), when the moon is on the northern or the southern node (*ro's ha-teli* or *zenav ha-teli*, respectively) and grows dark in the middle of the month by the shadow projected upon it by the Earth. Ibn Ezra produces three technical terms in this brief excursus: *qadrut* (eclipse), *qaddar* (to grow dark), and *ro's/zanav* (northern or southern node). These terms are biblical although they are not taken from the biblical verse or from the biblical book that he is explaining. Among these terms, only one of them, *teli*, is non-biblical. This is in fact a very intriguing word that already emerged in Bar Hiyya's writings, where it denoted the lunar and the planetary nodes, that is, the points where the orbits of the planets intersect the solar path. Ibn Ezra keeps this meaning and enlarges its employ with a new nominal group (*galgal ha-teli*, that is, the cycle of the nodes) in his introduction to the commentary on the Torah.²⁸ As far as I know, the first appearance of *teli* is in the *Baraita di-Šemuel ha-qaṭan*, where this term denotes the constellation of the northern hemisphere called Draco.²⁹ However, the first time that the term *teli* denotes the lunar nodes occurs in Donnolo's *Sefer Haḳmoni* (946).³⁰

27 Gómez Aranda, *Job*, p. 51*.

28 For example in his *Megillah*, p. 11, and in his *Sefer hešbon mahalekot ha-koḳavim*, see J.M. Millás Vallicrosa, [Hebrew ed. and Spanish tr.], *La obra Séfer hesbón mahleket ha-koḳabim (Libro del cálculo de los movimientos de los astros) de R. Abraham bar Hiyya ha-Bargeloni* (Madrid: CSIC, 1959), p. 5 (lines 16–17). Bar Hiyya also employs the expression *ro's/zenav ha-tannin*, see *Megillah*, p. 127. In Bar Hiyya's texts *tannin* refers only to the lunar nodes, whereas *teli* refers to the nodes of the moon and any of the five planets, as in Ibn Ezra's texts. Ibn Ezra also employs *tannin* for both the lunar and the planetary nodes, but only in his scientific and astrological writings, never in the biblical commentaries, despite that *tannin* is a biblical word.

29 See Abraham ibn Shoshan, *Ha-milon ha-ḥadaš*, 8 vols., (Jerusalem: Kiryat Sefér, 1974), v. 7, p. 2861 (*teli*).

30 See S. Stern and P. Mancuso, 'An Astronomical Table by Shabbetai Donnolo and the Jewish Calendar in Tenth-Century Italy', *Aleph* 7 (2007), pp. 34–35: 'Donnolo defines it [*teli*] elsewhere as "like a king over the two luminaries, the five planets, and everything that takes place in the world, whether good or bad,"

Ibn Gabirol in his *Keter malkut* employs *teli* in the expression *qav ha-teli*, i.e., the axis of the nodes.³¹ Ibn Gabirol also coined astronomical/astrological terminology in Hebrew before Bar Hiyya and Ibn Ezra, but in a very particular context, poetry. We see that in this excursus Ibn Ezra combined already coined terms (*teli*, *qaddar*, *ro'š ha-teli*, and *zenav ha-teli*) with his neologism *qadrut* (instead of *laqut*, the word characteristic of Bar Hiyya for denoting lunar or solar eclipses).³²

Now, I will consider how Ibn Ezra integrated an anthropomorphic image already present in rabbinic literature into a scientific frame.³³ In this view, the face, back, left, and right are the directions in space according to human perspective. These coordinates are enlarged to enclose the space beyond human reach, that is, the universe, where they are equivalent to east, west, north, and south, respectively. Ibn Ezra's commentary on Exod. 10:13 explains the biblical word *qadim* in this way, and explains that it means eastern, which is the first among the directions of the world (*pe'ot*), for the sun rises in the east, and the west is called *aḥor*, that is, back in Job 23:8.³⁴ In the commentary on Exod. 38:8, Ibn Ezra considers that the expression 'shoulder' (*katef*), in Exod. 38:14 and 38:15, requires an explanation, which is that the parts of the Tent

to which are attached "all the planets in the seven firmaments, both above and below, as well as the two luminaries and the twelve constellations". Donnolo merged in *teli* the mythical meaning of the celestial Dragon with the technical and more restricted meaning of *teli* as the ascending or northern lunar node, which is the specific meaning denoted by *teli* in the astronomical table edited, translated and commented in Stern's and Mancuso's article. The Dragon of the cosmological myth would have his head and tail on the two points where the lunar path intersects the solar path, i.e., the nodes. For some corrections regarding this article, see also S. Stern and P. Mancuso, 'Shabbetai Donnolo and the Jewish Calendar: Corrigenda', *Aleph* 8 (2008), pp. 343–44.

31 See Loewe, *Ibn Gabirol*, p. 127 [12]; cf. Ibn Shoshan, *Ha-milon ha-ḥadaš*, V. 7, p. 2861 (*teli*).

32 See, for instance, Bar Hiyya, *Megillah*, p. 118.

33 For the rabbinic precedent (although not identical with Ibn Ezra's employment of this analogy), see *Talmud, Zevaḥim* 62.2.

34 Cf. Ibn Ezra's commentary on Exod. 27:9 (*qedmah*/the east), Weizer, *Šemot*, pp. 182–83; and on Job 23:8 (*aḥor*/the west), Gómez Aranda, *Job*, p. 46*.

close to the east (the face) are called, as in man, shoulders. Upon the same basis, the part opposite the door, which is the west, is called *yereḳayim* (feet/legs) in Exod. 26:22 and 36:27.³⁵ These excursuses are a clear example of how common words become technical terms by the procedure of inserting common terms in technical contexts and denoting with them a technical meaning that frequently is by some means related to the ordinary meaning (which the word usually does not lose, like in *aḥor* and *pe'ot*. *Katef* and *yereḳayim* are most likely metaphors than technical terms, and they work as if they were technical terms in this excursus, but nowhere else in Ibn Ezra's writings as far as I know.

In Exod. 6:7, Ibn Ezra mentions the great conjunction (*ha-maḥberet ha-gedolah*) of Jupiter and Saturn (*ha-mešartim ha-'elionim*), which was the basis of the astrological judgments concerning peoples, religions, and kingdoms.³⁶ He states that, according to the influence of this conjunction and the sign in which the conjunction took place (Aquarius), Israel should have remained in the exile for more time, but God put an end to this exile. Commenting on Ps. 29:1, Ibn Ezra introduces the technical term in an excursus that is within another excursus.³⁷ The first excursus explains that the biblical expression *benei elim* means the stars. The sub-excursus is introduced by the expression *ha-ta'am* followed by two explanations. The first explanation relates rains to *ma'areket ha-koḳavim*, literally, 'the arrangement of stars' (an allusion to the branch of astrology called astrometeorology). The second explanation states that the stars cannot change their motions (*tenu'ah*) or arrangement (*dereḳ ma'areket*), for they act according to the rule that God established for them at the beginning. The same formula (*ha-ta'am*) is found in a similar pattern in his commentary on Ps. 94:15.³⁸ Here Ibn Ezra introduces an explanation of deep impact on theological and philosophical thought: God only knows individuals (*praṭim/halaqim*) as far as they are part of universals (*klalim*), but does not know their particularities. Upon this basis, he says

35 Weizer, *Šemot*, p. 65 (Exod. 10:13) and p. 230 (Exod. 38:8); Gómez Aranda, *Job*, p. 46* (Job 23:8).

36 Weizer, *Šemot*, p. 48. For a systematic use and interpretation of these conjunctions in historical astrology, see the fifth chapter of Bar Hiyya, *Megillah*.

37 Cohen, *Psalms*, v. I, p. 86.

38 *Ibid.*, v. II, p. 83.

that the divine judgments concerning universals are always fair, but can be harmful for some of the individuals. He gives the example of rain, which is good in general, for everybody needs water, but it can be harmful for some. In Ibn Ezra's view, this rule is also applicable to astrological judgments: what stars indicate can be beneficial to large groups, but harmful to specific individuals. The main contribution of Ibn Ezra to technical terms in Hebrew in the excursus on Exod. 6:7 are the neologisms of form *ma'areket ha-koḳavim*, *ha-maḥberet ha-gedolah*, and *ha-mešartim ha-'elionim*.

In his commentary on Ps. 104:19, the biblical mention of the sun going down is the occasion for Ibn Ezra to comment, among several other things, on the declination of the solar path northern and southern with respect to the equator (*neṭot ha-šemeš*) as the cause of the change of the seasons.³⁹ In contrast to other examples seen in this paper (e.g., his commentary on Amos 5:8), the astronomical information conveyed in this excursus—as in others already seen—is very basic.⁴⁰ In Dan. 11:4, regarding the division of the powerful kingdom and the southern and northern kingdoms referred to in the book, Ibn Ezra explains that the latitude (*roḥav*) of Jerusalem is 33 degrees; this is the distance of this city from the equator (*qav ha-hašvayah*, that is, the line of equality).⁴¹ One of the technical terms involved in this brief explanation is a biblical word (*roḥav*) and the other (*qav ha-hašvayah*) partly, for *qav* is biblical and *hašvayah* is medieval; in any case, neither of the two biblical words are to be found in the biblical passage or in the biblical book explained. *Neṭot ha-šemeš* and *qav ha-hašvayah* are neologisms of form that follow Arabic patterns (*maṭl* [aš-šams] and *ḥaṭṭ al-ištiwā'*), whereas *roḥav* is a technical

39 Ibid., p. 108.

40 For example, his extensive excursus on Exod. 3:15, where he expounds on the three worlds (upper, middle, and lower) and, more precisely, the part of this excursus related to the middle world, where he introduces an amazing number of astronomical terms (*galgal qaṭan*, *galgal gadol*, *mušaq*, *aḥoranit*, *galgal ha-mazzalot*, *qav ha-mazzalot*, etc.) and many astronomical descriptions concerning the motions of the planets. The terminology (unexplained) and the astronomical references are clearly addressed to a reader already familiar with them, but not necessarily an expert, see Weizer, *Šemot*, pp. 26–27 and 32–35.

41 A. Mondschein, [Hebrew ed.], *Ibn Ezra's Short Commentary on Daniel*, MA dissertation, (Bar Ilan University, 1977), p. 65.

term existing in Hebrew and already employed by Bar Hiyya.⁴²

General remarks

These excursuses have in general the effect of producing different readings of the biblical text with respect to the traditional ones. In this way, after the excursus, one has to come back to the biblical words and re-read the verse or paragraph in the light of Ibn Ezra's explanations. The biblical origin of the terms that Ibn Ezra chose to denote the concepts of two sciences (astronomy and astrology) indicates a double purpose in Ibn Ezra. First, as Sela has already pointed out, if Ibn Ezra finds in the Torah terms for these sciences, it is because he believes that the patriarchs and prophets knew them, and they were part of the civilization of Israel from its origin, as others before him also believed (such as Yehudah ha-Levi or Bar Hiyya). If Ibn Ezra has to restore to these words the original scientific meanings that they once denoted, it is because Ibn Ezra's contemporaries, and before them their ancestors, have forgotten them.⁴³ Consequently, this labor of re-allotting meaning and scientific contents to some words of the Torah does not seem to be considered by Ibn Ezra an arbitrary task. Ibn Ezra does not seem to believe that he is creating new vocabulary from ancient biblical words, rather he seems conscious that his task is precisely to recover and restore their original meanings and contents to the biblical words. This is something implied in his understanding of the words in the Torah, for that reason, the scientific excursus (astronomical/astrological, mathematical, and so on) emerges naturally in the exegesis of the text, it is not forced into it. In this way, Ibn Ezra is implicitly alluding to the fact that the holy language has lost something through time; the biblical words have lost meaning, which he recovers by means of the right exegesis. The exegesis of the biblical text is not only a restoration of meanings to the Torah but, precisely, a restoration of the Hebrew language (syntax, grammar, and vocabulary). How and why this process of decay has taken place is not clearly explained in Ibn Ezra's texts, but we have to conclude that Israel possessed, in biblical times, a knowledge of sciences that faded away in the course of time and, later on, it would recover through its contact with Arabic culture.⁴⁴ This recovery of meanings of the Hebrew language is an

42 See, for instance, Bar Hiyya's *Megillah*, pp. 112 and 148.

43 Sela, *Rise*, pp. 104–6 and 140–43.

44 Indeed, Ibn Ezra states in his long commentary on Genesis that the

authentic process of vivification if we consider that Ibn Ezra compares word with body and meaning with soul (Exod. 20: 1 and Deut. 5:5), and that this comparison is not just a simile.⁴⁵ Moreover, Ibn Ezra, in his vindication of Hebrew as a language of science, is keeping a trait of his time, a period of renaissance for the Hebrew language, when Jews ‘made Biblical Hebrew the Jewish equivalent of classical Arabic and accorded their language a new status as a cultural monument above and beyond its traditional status as *the holy tongue*’.⁴⁶ Bar Hiyya and Ibn Ezra are the first Jewish writers making this renaissance of Hebrew possible in the field of science.

In addition to the previous remarks and focusing on the terminology, I should address several questions. First of all, the ambiguous polysemy of many of the terms (those related with astronomy and astrology, the sciences considered in this paper) could be due to two reasons. First, an objective reason: the novelty of the domain (scientific astronomy and

multiplicity of languages appeared as a consequence of the people scattering from the place and forgetting their first language, Hebrew, see A. Sáenz-Badillos, ‘The Origin of the Language and Linguistic Pluralism according to Medieval Jewish Exegetes’, *Verbum et Calamus Semitic and Related Studies in Honour of Professor Tapani Harviainen* (Helsinki: Finnish Oriental Society, 2004, [Hereafter Sáenz-Badillos, ‘The Origin of the Language’], p. 301. Concerning the exile as the main reason for the decay of Hebrew language, see Zwiep, *Mother of Reason and Revelation*, pp. 229–40.

45 Weizer, *Šemot*, p. 127 (Exod. 20:1), and A. Weizer [Hebrew ed.], *Pirusei ha-Torah le-rabbeinu Abraham ibn Ezra, Vayyiqra’, Be-midbar, Devarim* (Jerusalem: Mossad ha-Rav Kook, 1976), p. 230 (Deut. 5:5). In relation to the concept of language in Ibn Ezra’s thought and in other Hebrew writers of the period, see A. Sáenz-Badillos, ‘Philologists and Poets in Search of the Hebrew Language’, ed. Ross Brann, *Languages of Power in Islamic Spain* (Ithaca: Cornell University Press, 1997), pp. 49–75; and ‘The Origin of the Language’, pp. 293–303. In the latter, Sáenz-Badillos states that, according to Ibn Ezra’s view in his defense of Saadya, ‘God did not give a complete language to men, even not the language of the Torah or the Prophecy: what He gave to the chosen ones was the faculty of expressing the divine message in their own words’ (pp. 296–97). Ibn Ezra also holds that Hebrew, the holy tongue, was the primeval common language and Adam established its rules (pp. 298–99).

46 Raymond P. Scheindlin, ‘Hebrew Poetry in Medieval Iberia’, ed. V. B. Mann, Th. F. Glick, and J. D. Dodds, *Convivencia: Jews, Muslims, and Christians in Medieval Spain* (New York: George Braziller, 1992), p. 44.

astrology) in the Hebrew language, which lacks some of the words that these sciences require. Second, a subjective reason: Ibn Ezra's perception of this process. Ibn Ezra does not seem to consider this linguistic feature a diminution of the power of the Hebrew language to communicate. In any case, he does not see any reason to justify, to explain, or to avoid the ambiguity, which in his terminology is to some extent lesser than in Bar Hiyya's, yet still present. The different meanings of words are linked to and dependent on their contexts, which is a position very consistent with the approach of a trained textual interpreter, a task that Ibn Ezra carried out throughout his life. The degree of rightness in the identification of meanings also relies on the knowledge of the reader/interpreter, which is also a position in agreement with Ibn Ezra's love for concealment and esotericism.⁴⁷ In other words, this ambiguity could have been something that Ibn Ezra sought and considered convenient, especially in exegetical contexts, although we cannot forget that this is also a distinctive trait of early technical terminology in any language.

There are three features that overlap in Ibn Ezra's position with respect to Hebrew language and make difficult to ascertain his real strategy in the coinage of neologisms without the consideration of the terminology in his scientific writings: first, the high esteem of the Hebrew language, especially biblical Hebrew; second, the certitude of a Jewish science in the past; and, third, the biblical background of the terms that he is explaining. I would tip the balance for the view that Ibn Ezra's prevalent preference of biblical terms in his biblical excursuses is due more to the religious context in which he is introducing technical terminology, which takes into consideration not only the biblical words but also their readers, than to Sela's thesis about the Greek thief of Jewish science. Ibn Ezra took over a double legacy: Arabic and Hebrew, and upon this he created both new meanings for old words, as well as new words for meanings already existing in his favorite domains of knowledge, astronomy and astrology. In this paper I have considered technical terms that are biblical words or emerge in biblical contexts. This presence was not an obstacle to coin new terminology in his scientific texts, which were written later, terminology that in these purely scientific contexts does not always give prevalence to biblical roots and takes into consideration the Arabic models that he is translating: *beit ha-*

47 Concerning, Ibn Ezra's esotericism, see Moshe Halbertal, *Concealment and Revelation, Esotericism in Jewish Thought and its Philosophical Implications* (Princeton: Princeton University Press, 2007), pp. 34–48.

sof (Arabic *burj al-muntaḥā* or *burj al-intiḥā*) for terminal house; *'alfarada'r* (Persian loan in Arabic *al-fardār*) for firdaria; *yated* (Arabic *watad*) for the cardinal houses in a horoscope; [*ha-yom*] *gevuḥ* [*ha-taḥalu'im*] (Arabic *buḥrān* or crisis) for any critical day in illnesses according to astrological rules; *'edl 'edut* (Arabic *ṣahādat*) for testimony; *ha-taqqif* (Arabic *ṣāhib*) for the planet ruling a horoscope, etc.⁴⁸

Considering these words, one last but decisive question emerges: to what extent could Ibn Ezra ellude Arabic patterns in the coinage of technical terminology in Hebrew when most of these terms in Hebrew (biblical words excluded because of the particular way they were coined) are descriptive terms and expressions as their equivalents in Arabic? E.g., *galgal ha-mazzalot* for the zodiac (Arabic *falak alburūj*), *galgal qaṭan* in contrast to *galgal gadol* (deferent) for epicycle (Arabic *falak tadwīr*), *maḥberet/dibbuq* for conjunction (Arabic *ijtimā'/muqārana*), *mišpaṭ* for astrological judgement (Arabic *aḥkām*), *gešer* for almincantarat (Arabic *muqaṭṭara*), *ha-galgal ha-yoše'* [*ha-muṣaqaq*] for eccentric (Arabic *al-falak al-ḥārij al-markaz*), etc.⁴⁹ In addition, a consistent analysis of how many technical words Ibn Ezra truly coined is still required, for we have seen that an important part of his most characteristic terms were introduced and used by previous writers or texts. These questions affect mainly the coinage of terms in scientific contexts and will be answered in the monograph that I am preparing on the subject.

48 See *Sefer ha-moladot*, MS BNF 1056 f. 61a and f. 52a; the second version of the *Sefer keli ha-neḥošet*, MS BNF 1045 f. 194b; the *Sefer ha-me'orot*, Y.L. Fleischer [Hebrew text], *Sinai* 5 (1933), p. 43; the second version of the *Sefer ha-še'elot*, MS BNF 1058 f. 2a; and the first version of the *Sefer haše'elot*, MS BNF 1056 f. 66b, respectively.

49 See the second version of the *Sefer keli ha-neḥošet*, MS BNF 1045 f. 189a; the second version of the *Sefer ha-mivḥarim*, MS BNF 1058 f. 11a; the second version of the *Sefer ha-'olam*, MS Vatican 477 f. 86b; the second version of the *Sefer keli ha-neḥošet*, MS BNF 1045 f. 195a; the third version of the *Sefer keli ha-neḥošet*, MS Moscow, Gunzburg 937 f. 4b; and the introduction to the commentary on the Torah, Weizer, *Berešit*, pp. 3–4, respectively.