

# Great cycles, the Conjunction of 1345, and the Black Death

by Chris Mitchell

Medieval astrology is often portrayed as being very “black and white” and involving making fatalistic predictions. While it is true that many of the texts available to us from the medieval period are essentially textbooks full of hard and fast rules, this doesn’t give us an insight into how astrologers of that period actually worked. However, one remarkable astrologer, mathematician, theologian, philosopher and rabbi - Levi ben Gerson - wrote a report, apparently for the Pope, about a Jupiter/Saturn conjunction of 1345 that grants us a rare insight into the techniques that he used as a working astrologer. This paper analyses those techniques, and shows how a combination of translation errors, theological differences and more recent assumptions by historians can skew the perspective that we have today of medieval astrology.

There is a common perception among contemporary astrologers that modern astrology involves learning about one’s self, and finding a path through life, while traditional astrology was much more black and white, focusing on prediction. Contemporary enthusiasts of traditional astrology refer to its ability to predict, such as the claim from Lee Lehman that the medieval English astrologer John of Eschenden, writing in 1345, successfully “predicted the Black Plague of 1348 from the Eclipse of 1345”<sup>1</sup>.

While it is true that astrologers in the early fourteenth century were aware that 1345 would bring a significant astrological line-up – notably a triple conjunction of Mars, Jupiter and Saturn – and wrote on the subject (the date of 1345 had been noted as significant over two hundred years previously by Abraham bar Hiyya), it is worth considering the claims made on their behalf more critically. This paper focuses on one particular work, written by the Jewish philosopher Levi ben Gerson in 1344, and looks at his predictions for 1345 and analyses the sources from which he derived these predictions. This manuscript has been translated by Bernard Goldstein, and analysed by David Pingree in a 1990 paper entitled “Levi ben Gerson’s Prognostication for the Conjunction of

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<sup>1</sup> Lehman, Lee, *Classical Astrology for Modern Living* (Atglen, PA: Whitford, 1996), p.51

1345", which includes the original Hebrew, the Latin translation (compiled from three surviving Latin manuscripts dating from the fourteenth and fifteenth centuries) and an English translation<sup>2</sup>.

Levi ben Gerson, also known as Leo de Balneolis, Gersonides and "Ralbag" ("RLBG" being an abbreviation of "Rabbi Levi ben Gerson", as written Hebrew doesn't use vowels) was a Jewish philosopher born in 1288 in Provence, France, who wrote in Hebrew on a number of topics, including biblical exegesis, mathematics, astronomy, astrology and theology. His most famous work is usually referred to in English as "The Wars of the Lord"<sup>3</sup> and is a theological work that also outlines his philosophical perspective. In the introduction to *Prognostication for the Conjunction of 1345*, Goldstein and Pingree state that "Levi depended upon his own astronomical theories for the positions of the Sun and the Moon (and probably the planets as well), and upon Abraham ibn Ezra for astrological interpretations (though no astrologer is named in the text)"<sup>4</sup>. This is rather simplistic; while ibn Ezra would certainly have been a major influence, Gersonides' astrological commentary is very detailed and borrows heavily from many authors of whom any Jewish scholar of the time would have been aware, and this paper will look at these ideas in more detail.

Gersonides was not the only medieval astrologer to have written about the year 1345; Abraham bar Hiyya wrote an eschatological treatise usually transliterated "Megillat ha-Megalleh"<sup>5</sup> two centuries earlier in which the conjunction of Saturn and Jupiter in 1345 was said to herald a sequence of events culminating in the coming of the Messiah, and bar Hiyya himself was following many of the traditions of earlier Jewish astrologers, such as Abu Ma'shar and Masha'Allah. Indeed, at the time that Gersonides wrote his prognostication, there was interest in both the Christian and Jewish communities about this particular date and its possible significance. Nachmanides (1194-1270), the Spanish Jewish

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<sup>2</sup> Goldstein, B and Pingree, D, "Levi ben Gerson's Prognostication for the Conjunction of 1345", *Transactions of the American Philosophical Society, New Ser.*, Vol. 80, No. 6. (1990), pp. 1-60 [hereafter: Goldstein & Pingree, *Prognostication for the Conjunction of 1345*].

<sup>3</sup> ספר מלחמות השם lit. "Book of the Wars of ha-Shem", facsimile edition of the 1560 edition, in Hebrew (Jerusalem: Books Export Enterprises, 1977). "Ha-Shem" literally means "The Name", and is one way of referring to God. A 3-volume translation and commentary in English is also available: Gersonides (trans. Feldman, S), *The Wars of the Lord* (Philadelphia: Jewish Publication Society of America, 1984-1999) [hereafter Feldman, *Wars of the Lord*]

<sup>4</sup> Goldstein & Pingree, *Prognostication for the Conjunction of 1345*, p.1

<sup>5</sup> מגלת המגלה lit. "Scroll of the Revealer", no English translation available but a copy (in Hebrew) is available in *Sefer Megillat ha-Megalleh von Abraham bar Chija*, with introduction and notes by J. Guttman (A. Pozanski: Berlin, 1924)

philosopher, calculated the coming of the Messiah in 1358 in his commentary on Genesis 2:3, where Nachmanides relates each day of creation to a millennium on Earth, claiming the “Son of David” will come “118 years after the fifth millennium”<sup>6</sup>. According to Goldstein and Pingree, this agrees with the date that bar Hiyya had derived from his analysis some decades earlier<sup>7</sup>, although a careful reading of bar Hiyya’s work shows that he considered this to be the date that the “appalling abomination” mentioned in Daniel 12:11 was to come to pass; bar Hiyya’s actual date for the arrival of the Son of David was far later, in 1448CE or 1468CE according to an analysis by the author Shlomo Sela<sup>8</sup>. Gersonides’ contemporaries were exercised with the possible implications of the Saturn/Jupiter conjunction of 1345, and Iohannes de Muris (1320-1350) probably knew of Gersonides’ work as he makes reference to the fact that “it appears that the Jews will expect the Messiah before a conjunction of Saturn and Jupiter recurs”<sup>9</sup> and argues against this. The English astrologer John of Eschenden claimed in retrospect to have predicted the Black Death on 20 March 1345 (two years before the Black Death ravaged Europe)<sup>10</sup>. Interest in Gersonides’ prognostication was therefore widespread, and the papal court at Avignon appears to have supported his research, since relations between the Jews of Provence and the Popes in Avignon during the papacy of Benedict XII and Clement VI were good, as this quote from Goldstein shows:

For the cultural history of the Jews as well Provence was of great importance. Under the rule of the counts of Toulouse and the house of Anjou, Provençal Jewry was for the most part protected, even favoured; and the popes in Avignon too had a benign policy toward the Jews.<sup>11</sup>

The idea that the conjunction of 1345 was to be significant was, therefore, in widespread circulation. However, the claims made of a successful prediction of the Black Death bear closer examination. It is certainly true that the conjunction was blamed for the Black Death after the event, as this report from the Paris Medical Faculty of 1348 shows:

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<sup>6</sup> Nachmanides, התורה פירושי (lit. “*Commentary on the Torah*”) (Rome: 1480), digitised version available online from the Jewish National and University Library at <http://jnul.huji.ac.il/dl/books/html/bk1323853.htm>, accessed 19 Dec 2006.

<sup>7</sup> Goldstein and Pingree, *Prognostication for the Conjunction of 1345*, p.3

<sup>8</sup> Sela, Shlomo, “Abraham bar Hiyya’s Astrological Work and Thought”, *Jewish Studies Quarterly*, Volume 13 (June 2006) p. 133

<sup>9</sup> Goldstein and Pingree, *Prognostication for the Conjunction of 1345*, p.37

<sup>10</sup> Goldstein and Pingree, *Prognostication for the Conjunction of 1345*, p.7

<sup>11</sup> Feldman, *Wars of the Lord*, Ch. 2 p.31

We say that the distant and first cause of this pestilence was and is the configuration of the heavens. In 1345, at one hour after noon on 20 March, there was a major conjunction of three planets in Aquarius. This conjunction ... by causing a deadly corruption of the air around us, signifies mortality and famine... Aristotle testifies that this is the case... he says that mortality of races and the depopulation of kingdoms occur at the conjunction of Saturn and Jupiter<sup>12</sup>

However, with the exception of John of Eschenden, who predicted “corruption in the air”,<sup>13</sup> evidence of successful predictions of the plague is scanty. The warnings, though negative, were very general – for example, with Iohannes de Muris predicting “accidents”<sup>14</sup>. Gersonides himself is far more specific, and gives a list of expected events, the list including “diseases and death, and the evil will endure for a long time”<sup>15</sup> but primarily focusing on the “destruction of a nation and kingdom by a nation of a different religion”<sup>16</sup>.

The predictions that Gersonides made are quite detailed, although few of them appear to relate directly to the Black Death, so it is worth looking at these predictions more closely to see how Gersonides derived them. To do this, it is necessary to look at the historic context in which Gersonides was operating. He was Jewish, living in a Catholic country, and influenced by earlier Jewish and Arabic writers living in the Islamic world. By the time of Ptolemy (second century CE), the focus of astrology had shifted to the Hellenised world, although astrology continued to survive in Mesopotamia, with Persian astrology developing separately, while the founders of the third century Sassanian dynasty were patrons of learning, who:

sponsored the collection and translation of texts from the Byzantine empire and India, including astrological manuscripts. According to Nawbakht, who was to be one of the Caliph Harun al-Rashid’s astrologers, Ardashir I commissioned the translation of the works of Hermes the Babylonian, Dorotheus the Syrian, Cedros the Athenian, Ptolemy the Alexandrian and Farmash the Indian.<sup>17</sup>

By 642CE, the Muslim armies had conquered the former Mesopotamia. As a religion, Islam was tolerant, both of astrology and of other religions with a

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<sup>12</sup> Report of the Paris Medical Faculty in 1348, <http://faculty.kirkwood.edu/ryost/hist201/Monarchy/Medieval/blackdeathsources.doc> accessed 19 Dec 2006

<sup>13</sup> John of Eschenden, *Prognosticationes de eclipsi universali Lune et de coniunctione trium planetarum superiorum que apparaverunt anno domini 1345*, quoted in Goldstein and Pingree, *Prognostication for the Conjunction of 1345*, pp.7-8

<sup>14</sup> Goldstein and Pingree, *Prognostication for the Conjunction of 1345*, p.39

<sup>15</sup> Goldstein and Pingree, *Prognostication for the Conjunction of 1345*, p.15

<sup>16</sup> Goldstein and Pingree, *Prognostication for the Conjunction of 1345*, p.13

<sup>17</sup> Campion, Nick, *Cosmos: A Cultural History of Astrology* (London: Hambledon and London, 2006). draft manuscript [hereafter: Campion, *Cosmos*], Ch. 11.

sacred text, which included Christianity and Judaism.<sup>18</sup> This provided an environment in which astrology could thrive, and which incorporated elements from Hellenistic, Persian and Indian astrology. In addition to these astrological elements, the three monotheistic religions – Judaism, Christianity and Islam – had an eschatological component to them. In particular, Judaism and Christianity have a belief that world history is divided into one thousand year phases. Judaism bases this on various biblical references, most notably Psalms 90:4 which says “For a thousand years in your sight are like yesterday when it is past, or like a watch in the night”<sup>19</sup> suggesting that divine timescales run at the rate of one day per thousand years. This is a concept that many Jewish philosophers have used, such as Nachmanides’ linkage of the six days of creation to a six-thousand year period. Whether this was intended by the original texts is dubious – the Hebrew word for one thousand used in the original Hebrew text<sup>20</sup>, אֶלֶף, also means “tribe” or “multitude” and can be used to indicate any large number. Christianity, likewise, has references to a literal millennium in the Book of Revelation – for example, in Revelation 20: “Then I saw an angel coming down from heaven, holding in his hand the key to the bottomless pit and a great chain. He seized the dragon, that ancient serpent, who is the Devil and Satan, and bound him for a thousand years”<sup>21</sup>, a concept which found its way into Christianity from Zoroastrianism<sup>22</sup>.

The idea of epochs was nothing new – in Plato’s *Timaeus* we see the concept of cycles, or the Platonic “Great Year” of vast timescales, where referring to the planets he says: “Only a very few men are aware of the periods of the others... None the less it is perfectly possible to perceive that the perfect temporal number and the perfect year are complete when all eight orbits have reached their total of revolutions relative to each other, measured by the regularly moving orbit of the Same”<sup>23</sup>, taking a cyclic view of history. Campion, writing in his book *The Great Year*, argues that Plato was simply taking a cyclic view of history rather than defining a precise period, but that this misunderstanding “explains why the

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<sup>18</sup> Campion, *Cosmos*, Ch. 11.

<sup>19</sup> Bible (New Revised Standard Version) (London: Harper Collins, 1997), [hereafter NRSV] Psa 90:4

<sup>20</sup> *Biblica Hebraica Stuttgartensia* (Stuttgart: Deutsche Bibelgesellschaft, 1990) Psa 90:4: “כי אלף שנים בעיניך כיום אתמול כי יעבר ואשמורה בלילה”

<sup>21</sup> NRSV Rev 20:1-2

<sup>22</sup> Campion, Nick, *Astrology, History and Apocalypse* (London: CPA, 2000) [hereafter Campion, *Astrology, History and Apocalypse*], p.90

<sup>23</sup> Plato, *Timaeus and Critias*, (London: Penguin, 1977), *Timaeus* Ch. 7 p.54

‘Platonic Year’ of 36,000 years became a permanent feature of Islamic and medieval astrological historiography.”<sup>24</sup>

The idea of cycles certainly became incorporated into medieval astrology, and by the time of the Persian astrologer Abu Ma’shar and the Jewish astrologer Masha’allah in the ninth century, the idea of the rise and fall of civilisations and religions based on planetary relationships had become established. In particular, Abu Ma’shar, using Plato’s idea of cycles, calculated a mythical “Grand Conjunction” of all planets at zero degrees of Aries and made the assumption – based on an Indian source<sup>25</sup> – that they would return to their starting place after a “Great Year” of 360,000 years. A far easier cycle to calculate is that of the Jupiter/Saturn cycle. Jupiter makes a complete apparent orbit in approximately twelve years, while Saturn takes nearly thirty; this means that every twenty years they form a conjunction. Each subsequent conjunction takes place a little over 240° from the previous one, which means that for a long period each subsequent conjunction takes place in the same triplicity as the previous one. After about 240 years, the conjunction moves to a new triplicity, and after about 960 years the conjunction has move through all four triplicities. The closeness of the 960 year value (which is itself approximate) to 1,000 years gives a millennial flavour to this pattern and, indeed, Abu Ma’shar subscribed to the theory that each planet ruled 1,000 years of an historic period<sup>26</sup>. The theory of the astrologers in the Islamic world that this Jupiter/Saturn cycle heralded major world events Campion calls “their most significant contribution” to astrology<sup>27</sup>.

It is important to realise that Abu Ma’shar and Masha’Allah, when writing about Jupiter/Saturn conjunctions, were referring to a “mean conjunction” – the 240 year cycle is an average, whereas the actual period can vary from 238 years to 258 years<sup>28</sup>. Masha’Allah wrote a book called *On Conjunctions, Religions and Peoples*, which has not survived intact; Pingree’s *The Astrological History of Masha’Allah*<sup>29</sup> contains copies of the Arabic texts based on this, and Abu Ma’shar’s *On Historical Astrology: The Book of Religions and Dynasties on the Great Conjunction*<sup>30</sup>

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<sup>24</sup> Campion, Nick, *The Great Year* (London: Arkana, 1994) [hereafter: Campion, *The Great Year*] p.245

<sup>25</sup> Campion, *The Great Year* p.354

<sup>26</sup> Pingree, D, *The Thousands of Abu Ma’shar* (London: Warburg Institute, 1968)

<sup>27</sup> Campion, *Astrology, History and Apocalypse*, p.46

<sup>28</sup> Zoller, Robert, *Jewish Astrology* (London: New Library, 1994) p.16

<sup>29</sup> Pingree, D, *The Astrological History of Masha’Allah* (Cambridge, MA: Harvard University Press, 1971) [hereafter Pingree, *Masha’Allah*]

<sup>30</sup> Abu Ma’shar, *On Historical Astrology: The Book of Religions and Dynasties on the Great Conjunction* trans. Yamamoto and Burnett (Leiden: Brill, 2000) [hereafter Abu Ma’shar, *Historical Astrology*]

develops the ideas of Masha'Allah further. Masha'Allah takes as a fairly arbitrary starting point a conjunction that occurred "Five hundred and nine years, two months, and twenty-four days having passed of the thousand of Mars. It took place at seven degrees and forty-two minutes of Taurus."<sup>31</sup> This translates to a date of 3 November 5783BCE<sup>32</sup>, give or take a day. The date is technically meaningless – modern computer programs don't calculate planetary positions that far back; NASA doesn't consider dates prior to 3000BCE to be meaningful when calculating planetary positions<sup>33</sup> and even the Swiss Ephemeris, designed for astrologers, only interpolates as far back as 5400BCE<sup>34</sup>. This is a minor detail, however – even the positions of the "mean conjunction" two thousand years ago bear little resemblance to the actual planetary positions of the time; it's only as we approach the time that Abu Ma'shar and Masha'Allah were writing that we start to get approximate agreement between the mean positions and actual positions of the conjunctions. This lack of actual accuracy didn't prevent Masha'Allah from drawing up a horoscope for "The Shift Indicating the Deluge"<sup>35</sup>, a chart supposedly drawn up for the Vernal Equinox following the biblical Flood, with planetary positions given to the nearest minute in the text, although the actual positions are in many cases not only many degrees out, but even several signs out. "Masha'Allah is simply too sloppy a computer to be trusted at any point", says Pingree<sup>36</sup>.

Abu Ma'shar goes even further in using ridiculous levels of supposed accuracy:

If Saturn and Jupiter conjoin by mean motion at the beginning of a certain sign of the triplicity and their next conjunction occurs at the end of an arc which amounts to 242 degrees 25 minutes 17 seconds 10 thirds and 6 fourths and in each sign in which they conjoin<sup>37</sup>.

In this statement, a third means one sixtieth of a second of arc, and a fourth one sixtieth of a third – roughly one ten-millionth of a degree! This level of accuracy is not only misleading, but is dubious anyway. Later, Abu Ma'shar goes on to say:

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<sup>31</sup> Pingree, *Masha'Allah* p.40

<sup>32</sup> I calculated the dates of all mean conjunctions on a spreadsheet using Pingree's average values

<sup>33</sup> <http://ssd.jpl.nasa.gov/horizons.cgi> is the definitive NASA ephemeris, accessed 19 Dec 2006

<sup>34</sup> <http://www.astro.com/swisseph/> accessed 19 Dec 2006

<sup>35</sup> Pingree, *Masha'Allah* p.41

<sup>36</sup> Pingree, *Masha'Allah* p.70

<sup>37</sup> Abu Ma'shar, *Historical Astrology* Ch.1 sect.16 p.13

Between one conjunction and another there are 19 years 314 days 14 hours 23 minutes 37 seconds 18 thirds 6 fourths and 48 fifths by the mean solar year, which is 365 days without the addition of a quarter. If you multiply these 50 conjunctions by the time between one conjunction and another and its fractions, that amounts to 996 years<sup>38</sup>

As the footnote in the translation of his book points out, his arithmetic is wrong. The correct calculation yields 993 years, 34 days, 23 hours, 41 minutes 5 seconds 5 thirds and 40 fourths<sup>39</sup>. When a result is in error by almost three years, a figure quoted to the nearest microsecond is rather pointless.

However, despite the meaninglessness of some of these calculations, the works of Masha'Allah and Abu Ma'shar highlight one vitally important technique used in medieval mundane astrology: the use of the chart of the Vernal Equinox. The conjunction of Saturn and Jupiter itself isn't the significant moment, but the ingress of the Sun into Aries immediately following the conjunction is.

Looking at Gersonides' prognostication, he starts with a comment that his investigation "will direct men to take counsel concerning evil so that it will not occur", saying "This is the entire fruit of the science of judgements, and in this way it is possible for a man to change what is implied by the decree of the stars, namely things related to free will and secondly, things dependent on divine providence"<sup>40</sup>, echoing a theme in his *Wars of the Lord*<sup>41</sup>. He then calculates the date of the conjunction as 28 March 1345 at 1.18pm, though the Latin text gives 1.17pm<sup>42</sup>. In fact, the original Hebrew seems quite clear, and doesn't even involve any calendrical conversion – he's using the European calendar and not the Jewish one. The original Hebrew uses the word מרס, which is pronounced "Mars" and is the French for March, as opposed to stating the date using the equivalent Jewish month and day. Numbers are represented as letters in Hebrew, and the Hebrew has as the time "one and [yod] [cheth] after the middle of the day" where [yod] is the letter י representing ten, and [cheth] is the letter ח representing eight – so meaning "one and eighteen", or 1.18 in the afternoon. The mistranslation in the Latin is puzzling.

The general flavour from the position of the conjunction is that "the conjunction of Saturn with Jupiter signifies great and general events", which he is getting directly from the works of Masha'Allah and Abu Ma'sar as mentioned above. "When it takes place in one of the airy signs, its impact is of great strength.

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<sup>38</sup> Abu Ma'shar, *Historical Astrology* p.13

<sup>39</sup> Abu Ma'shar, *Historical Astrology* p.13

<sup>40</sup> Goldstein and Pingree, *Prognostication for the Conjunction of 1345*, p.11

<sup>41</sup> Feldman, *Wars of the Lord*, Ch. 2

<sup>42</sup> Goldstein and Pingree, *Prognostication for the Conjunction of 1345*, p.10

When it takes place in a fixed sign, its impact will last for many days.”<sup>43</sup>. Pingree gives ibn Ezra as the reference for the longevity, and indeed ibn Ezra says “when a planet is in a fixed sign it indicates anything that is constant and lasting”<sup>44</sup>. Pingree doesn’t give any reference for the “great strength” of air signs, and neither does ibn Ezra, who goes into detail for each sign but not for the triplicities; Al-Biruni, Ptolemy and Bonatti also have nothing to say on the subject of air signs implying great strength.

This generalisation out of the way, Gersonides then goes on to describe the “conjunction of the Moon and the Sun preceding the epoch of the year”<sup>45</sup>. The technique of using the “epoch of the year” – the Sun’s ingress into Aries – is taken from the techniques of Masha’Allah, who refers to “...the form of the heavens at the entry of the sun into Aries for the year in which this conjunction [takes place]”<sup>46</sup> when analysing a chart. Gersonides calculates the precise moment of the New Moon prior to the Aries ingress, which also happens to be an eclipse, making it of particular relevance in medieval astrology, following the rules of Ptolemy, who in the *Tetrabiblos* says “The first and most potent cause of such events [general conditions of countries] lies in the conjunctions of the sun and moon at eclipse”<sup>47</sup>, and Masha’allah’s *Book on Eclipses*<sup>48</sup>.

Drawing up the positions of houses in an astrological chart, essential for predictive techniques, was not entirely trivial. Most astrologers of the age used various available pre-calculated tables; Ptolemy’s *Handy Tables* were derived from his calculations in the *Almagest*<sup>49</sup>, and by the fourteenth century astrologers in Europe were either using the *Alfonsine Tables* named after Alfonso X of Leon and Castile who sponsored the translation of many Arabic works, or in the Muslim world the *Toledan Tables* were used. Since tables are specific to a latitude, they do not travel well, and North describes the dangers of using the wrong tables<sup>50</sup>. However, Gersonides had no such problem; an excellent mathematician and astronomer, he was recognised as a leading authority in the field. His treatise on trigonometry in *Wars of the Lord* was translated into Latin in 1342, and was known

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<sup>43</sup> Goldstein and Pingree, *Prognostication for the Conjunction of 1345*, p.11

<sup>44</sup> ibn Ezra, Avraham, רֵאשִׁית חִכְמָה (lit. “The Beginning of Wisdom”, trans. Epstein, M) (Reston, VA: ARHAT publications, 1998) [hereafter ibn Ezra, *Wisdom*]

<sup>45</sup> Goldstein and Pingree, *Prognostication for the Conjunction of 1345*, p.13

<sup>46</sup> Pingree, *Masha’Allah* p.40

<sup>47</sup> Ptolemy, Claudius (Trans. Robbins, F. E., Loeb Classical Library), *Tetrabiblos* (Cambridge, Mass.: Harvard University Press, 2001) [hereafter Ptolemy, *Tetrabiblos*] II-4, p.161

<sup>48</sup> Masha’allah, trans. Goldstein, B, *The Book on Eclipses of Masha’allah*, offprint from: *Physis*. 6. 1964 [hereafter: Masha’allah, *Eclipses*]

<sup>49</sup> Ptolemy Claudius, *Ptolemy’s Almagest* (trans. Toomer, G. J., London: Duckworth, 1984)

<sup>50</sup> North, J.D. *Horoscopes and History* (London: Warburg Institute, 1986) p.97

by Regiomontanus<sup>51</sup>. His astronomical tables were commissioned by several Christian clerics, and his accuracy for computing the mean conjunction and opposition of the Moon and Sun were renowned<sup>52</sup>. For this reason, we can be confident about the house cusps that he calculated for the eclipse chart; unlike the computation of planetary positions, for which the mathematics is notoriously complicated, calculating the house cusps for any preferred house system is fairly trivial<sup>53</sup>.

Gersonides lists the house positions – again, transcription and translation errors seem to have crept in as there are discrepancies between the Hebrew original and the Latin text. A glaring example is the positions he quotes for the fifth and eleventh houses. The Hebrew says “the fifth Ram [yod] [degrees] [mem] [cheth] [minutes]... the eleventh Scales [yod] [degrees] [mem][cheth] [minutes]”<sup>54</sup>; the yod represents the number ten, mem is forty, and cheth is eight. Thus this means “5<sup>th</sup> house: 10°48’ Aries, 11<sup>th</sup> house: 10°48’ Libra”. The Latin, however, says “5e Arietis 6 gradus 48... 11e Libre 8 gradus 48”, which means “5<sup>th</sup>: 6°48’ Aries, 11<sup>th</sup> 8°48’ Libra”<sup>55</sup>. Clearly, at least one of the cusps in this Latin translation is wrong since these two house cusps must be opposite each other. The Hebrew text may also be ambiguous since the symbol for ten (the Hebrew letter yod) is similar in appearance to the symbol for six (the Hebrew letter vav), so the Hebrew text could conceivably say 6°48’.

The house positions also pose another puzzle. Pingree goes into detail about a rather complex house system devised by North<sup>56</sup> to make the published values of Gersonides’ house cusps match the calculated values based on his location in Provence. However, I was able to get a precise match to Gersonides’ house cusps – within a minute – with the exception of the 5<sup>th</sup> and 11<sup>th</sup> houses (which were an exact match to the 6°48’ figure given in the Latin version for the 5<sup>th</sup> house), using the well-known Placidus house system. However, to do this I had to ignore the assumption made by Pingree that Gersonides must have drawn his tables up for the location of Avignon, which he did since it is widely assumed that Gersonides spent his entire life in the small town of Orange near Avignon. The only location where Gersonides’ house cusps work using Placidus (and the match is so precise that it would difficult to conclude that this was coincidence) is

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<sup>51</sup> Feldman, *Wars of the Lord*, Book 5 Part 1

<sup>52</sup> Feldman, *Wars of the Lord*, Ch. 99 Book 5 Part 1

<sup>53</sup> See for example, Meeus, Jean, *Astronomical Algorithms* (Richmond, VA: Willmann-Bell, 1998).

<sup>54</sup> Goldstein and Pingree, *Prognostication for the Conjunction of 1345*, p.12

<sup>55</sup> Goldstein and Pingree, *Prognostication for the Conjunction of 1345*, p.25

<sup>56</sup> Goldstein and Pingree, *Prognostication for the Conjunction of 1345*, p.41

44°02'N, 7°38'E. This is on the modern French/Italian border, in the region of Piedmont. The Jewish Encyclopedia says of Gersonides' location:

Very little is known of Levi's life beyond the fact that he lived now in Orange, now in Avignon, now in a town called in Hebrew עיר האזוב "the city of hyssop" (comp. Isidore Loeb in "R. E. J." i. 72 et seq., who identifies the last-named town with Orange)<sup>57</sup>.

The word אזוב in Hebrew means not only "hyssop", but "marjoram"<sup>58</sup>. There was an active Jewish community in Piedmont which "spanned the Alps"<sup>59</sup>. A modern day website specialising in the cuisine of Piedmont and Liguria describes the dishes of the region as follows:

Zucchini, onions, eggplants, and green peppers are generally baked in the oven, enriched with bread crumbs, cheese, and flavours of garlic and herbs, especially marjoram.<sup>60</sup>

I have no hard proof that Gersonides lived in Piedmont at any time, but it would fit the bill for the "City of Marjoram", and the house cusps certainly appear to be calculated for that location.

Gersonides goes on to give further predictions based on the chart of the eclipse of 1345 (See Appendix One for the chart):

The three superior planets will be in one term and they will be very nearly in conjunction, and Venus is in aspect with them from the house of its enmity. According to [the planetary] configuration, it indicates the destruction of a nation and a kingdom by a nation of a different religion. This will begin to happen in the tenth year [after] the aforementioned conjunction according to this configuration because this conjunction will take place in the third house that signifies religions.<sup>61</sup>

This is a fairly major prediction, but has very little to do with the Black Death. Venus is in Aries, so is considered weak by ibn Ezra as this is the sign of her detriment. In the eclipse chart, Mars, Saturn and Jupiter are conjunct, and Venus makes a 60° "sextile" aspect to them, which satisfies the conditions for ibn Ezra's "harm of a planet when it is in a conjunction with malefic planets, or opposite them, or in a quartile, trine or sextile aspect... It is worse when one of

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<sup>57</sup> <http://www.jewishencyclopedia.com/view.jsp?artid=247&letter=L> accessed 19 Dec 2006

<sup>58</sup> Oxford English-Hebrew Dictionary (Oxford: Oxford University Press, 1998) p.554 entry for "Marjoram"

<sup>59</sup> Cohen, Thomas, reviewing *The Jews in Piedmont Vol 1: 1297-1582* in *The Journal of Modern History*, Vol 63 No 3 (Sep 1991) pp582-584.

<sup>60</sup> <http://www.travelsignposts.com/Italy/food-in-northwest-italy.php> accessed 19 Dec 2006

<sup>61</sup> Goldstein and Pingree, *Prognostication for the Conjunction of 1345*, p.13

the malefics is... in the 10<sup>th</sup> or 11<sup>th</sup> house relative to the place of the planet”<sup>62</sup>. Mars is the chart ruler, and Pingree claims that ibn Ezra says that the third house signifies religion<sup>63</sup>, but in fact ibn Ezra claims that the third house represents “knowledge of the Torah and the laws”<sup>64</sup> while religion in general is given to the ninth house just as it is in modern astrology. The translation above says ‘knowledge’ of the Torah, but the word used in the Hebrew is נִמְנוּנָה meaning “fidelity”<sup>65</sup> and usually associated with the idea of salvation. However, appealing to ibn Ezra as Pingree does isn’t sufficient to explain the “destruction of a nation”; we have a clue to the true nature of this eclipse in Masha’allah’s *Book on Eclipses*, where he says:

Masha’allah said that great events Occur on account of the conjunction of the outer planets because they are slow-moving. When the three outer planets are in one term or one decan and the sun is in aspect to them, it is an indication of the destruction of the nation, and the downfall of the kingdom, their motion from place to place, and ancient things according to the mixture of their strength, and the nature of the zodiacal signs. A great conjunction is an indication for the rising of prophets and seers, and the destruction of the climates, and more if one of the inner planets is in aspect to them. Know that the strongest among them is the significator. If it is one of the benevolent planets, it is an indication of good, but if it is malevolent, it indicates evil and confusion.<sup>66</sup>

The three outer planets are Mars, Jupiter and Saturn – and these three are all conjunct in the eclipse chart, and are all in the same “term” and “decan” (a term is an unequal division of a zodiac sign ruled by one of the five planets, and a decan is a ten degree segment of a zodiac sign). All three planets are in the terms of Jupiter, and in the second decan of Aquarius<sup>67</sup>. The conjunction is not a “great conjunction” (this is where the conjunction of Saturn and Jupiter change triplicity), but an inner planet – Venus – is in aspect to them; although Venus is a benevolent planet, she is in poor condition, in the sign of her enmity, Aries.

The reason for the ten year time span of which Gersonides writes is not clear – the usual method of prediction was based on “profections” and the concept of one sign per year, based on the complex rules outline by Abu Ma’shar<sup>68</sup>

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<sup>62</sup> ibn Ezra, *Wisdom*, p.108

<sup>63</sup> Goldstein and Pingree, *Prognostication for the Conjunction of 1345*, p.46

<sup>64</sup> ibn Ezra, *Wisdom*, p87

<sup>65</sup> Brown, Driver, Briggs, *Hebrew and English Lexicon* (Peabody, MA: Hendrickson, 1996) p.53 (Strong’s concordance number 530)

<sup>66</sup> Masha’allah, *Eclipses*, Ch IX

<sup>67</sup> As calculated by the astrology computer program *Solar Fire*, and confirmed by reference to tables I used provided on Bernadette Brady’s *Medieval Diploma Course* by Astrologos.

<sup>68</sup> Abu Ma’shar, *Historical Astrology* p.83

or the simpler “division” of one sign per year of Al-Biruni<sup>69</sup>. The eclipse takes place in the fourth house and will take ten years by profection to reach the Ascendant.

Gersonides also gives details of countries and directions (for example, that the north will beat the south) based on attributions of signs. “Since Aquarius has significance for the Land of Israel, Egypt, and the Land of Greece, most of these upheavals will take place there”<sup>70</sup>. Ptolemy introduces this concept in the *Tetrabiblos*<sup>71</sup>. Abu Ma’shar has a rather confused list of places, partially based on Ptolemy but some added from other sources. For Aquarius, he gives various places, including “Sawad, Kufa, the land of the Copts in Egypt”<sup>72</sup>. The idea of attacks coming from the North is from ibn Ezra, who associates Pisces (where the Sun/Moon conjunction takes place) with the North<sup>73</sup>, while the idea of wars are from the chart ruler, Mars, a malefic, being conjunct another malefic (Saturn) in “a sign of a strong human form”<sup>74</sup>, suggesting that the events will effect the human race (this is from Ptolemy<sup>75</sup>).

Gersonides also looked at the conjunction of 9 March 1226, since this was the previous “Grand Conjunction” where the conjunction changed triplicity, as well as the lunar eclipse of 1345, and it’s clear to see that he made his predictions clearly and methodically using the rules of astrologers such as ibn Ezra, Ptolemy, Abu Ma’shar and Masha’Allah. The predictions made from the lunar eclipse certainly focused on violence, war and religion, rather than the possibility of plague<sup>76</sup>.

Iohannes de Muris, who arrived in Avignon shortly after Gersonides’ death in 1344 and may have helped translate Gersonides’ prognostication, wrote his own manuscript on the events. He seems to imply that Gersonides believed there would be the coming of the Messiah in 1355, and seems dubious because the conjunction is not “one of the greater ones” (in other words, it is not a Saturn/Jupiter conjunction that takes place in a new triplicity):

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<sup>69</sup> Al-Biruni, *The Book of Instruction in the Elements of the Art of Astrology* (London: Ascella, 2003) p.149

<sup>70</sup> Goldstein and Pingree, *Prognostication for the Conjunction of 1345*, p.15

<sup>71</sup> Ptolemy, *Tetrabiblos* II-5 p.163

<sup>72</sup> Abu Ma’shar, *Historical Astrology* p.513

<sup>73</sup> ibn Ezra, *Wisdom* p.73

<sup>74</sup> Goldstein and Pingree, *Prognostication for the Conjunction of 1345*, p.15

<sup>75</sup> Ptolemy, *Tetrabiblos* II-7, p.173

<sup>76</sup> Goldstein and Pingree, *Prognostication for the Conjunction of 1345*, p.19

Therefore, although this conjunction of Saturn and Jupiter is not one of the greater ones and is not found in the third house of the revolution, yet because of the joining with Mars in a humid sign and in the third house both in the conjunction of the revolution and in the eclipse-causing opposition immediately following, as will be seen below, because also Saturn, being predominant there, has a great signification over the Jews and Aquarius over the Israelites and Egyptians, it appears that the Jews will expect the Messiah before a conjunction of Saturn and Jupiter recurs, which will be within 10 years, rather than at another time.<sup>77</sup>

Gersonides, however, was well aware that the 1345 conjunction was not a great one (indeed, he delineated the previous great conjunction of 1226 as part of the prognostication) and said nothing about the coming of the Messiah. He was certainly influenced by Nachmanides (in fact, he was a direct descendant of Nachmanides<sup>78</sup>), and he wrote a treatise on the Book of Daniel in 1338<sup>79</sup>, noteworthy for its eschatological concerns and with Messianic speculations about the year 1358, thirteen years after the eclipse. The treatise based this date on a reading of Daniel 12:5 which says:

How long shall it be until the end of these wonders? ...From the time that the regular burnt offering is taken away and the abomination that desolates is set up, there shall be one thousand two hundred ninety days. Happy are those who persevere and attain the thousand three hundred thirty-five days. But you, go your way and rest; you shall rise for your reward at the end of the days.<sup>80</sup>

This figure of 1,290 days is taken to mean 1,290 years and has nothing to do with the Saturn/Jupiter conjunction of 1345; this figure relates to 1,290 years after the destruction of the temple in Jerusalem, which was commonly believed to have taken place in 68CE (the currently accepted date nowadays is 70CE). Indeed, Gersonides was at pains to point out in the treatise that the coming of the Messiah had nothing to do with the stars, but with divine providence<sup>81</sup>.

Despite the fact that these two works were very separate, Feldman, in his introduction to *Wars of the Lord*, notes that at the arrival of the Messiah would be a time of conflict between Christianity (King of the North) and Islam (King of the South), with the former invading the Holy Land. "This apocalyptic war will end, Gersonides continues, in 1403 at which time resurrection of the dead will take place at the hands of the Messiah. All nations will recognise the dominion of the Lord and will abandon their false faiths and accept the Torah. The Kingdom of

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<sup>77</sup> Goldstein and Pingree, *Prognostication for the Conjunction of 1345*, p.37

<sup>78</sup> S. Schechter, "Nachmanides", *The Jewish Quarterly Review*, Vol. 5, No. 1. (Oct., 1892), pp. 78-121.

<sup>79</sup> Gersonides, ניאלפרוש הספר ד (lit. "Commentary on the Book of Daniel") (1338)

<sup>80</sup> NRSV, Daniel 12:5

<sup>81</sup> Goldstein and Pingree, *Prognostication for the Conjunction of 1345*, p.4

God will then become a universal reality.”<sup>82</sup> The Book of Daniel tells the story of a noble Israelite who is forced to work for a foreign king, and has the gift of prognostication, and is able to tell the king of his downfall. The parallel between Daniel and Gersonides, a Jew who wrote prognostications and worked for the Pope, is fairly clear.

Thus there has been confusion on a number of fronts. Firstly, the dire predictions for the conjunction of 1345 made not only by Gersonides but by various astrologers of the time were only related to the Black Death in hindsight. Secondly, when looking at techniques from a contemporary perspective, errors in transcription and translation can creep in, although these wouldn't affect the ability of the astrologers of the time to make a prediction. Thirdly, the calculations of the astrologers themselves weren't always accurate; Gersonides was a particularly skilled mathematician and didn't make the arithmetic mistakes that Masha'Allah and Abu Ma'shar made, but even his planetary calculations weren't precise by today's standards. Fourthly, astrologers of the time had a religious agenda to follow as well as purely following the method laid down, leading to confusion; there has been some mixing up of predictions in the case of Gersonides – his eschatological predictions derived from Daniel are separate to his astrological prognostications, but were lumped together by commentators at the time and subsequently, leading to assumptions that he predicted the arrival of the Messiah astrologically, a confusion that is further exacerbated when we try to analyse these works in a contemporary setting. Finally, other astrologers came up with different interpretations for the same events. Gersonides himself made no claims of precise prediction; indeed in *Wars of the Lord* he says:

It is impossible for man to apprehend the Agent Intellect... Moreover, the Agent Intellect possesses complete knowledge of the necessary influences of the heavenly bodies upon the sublunar world, as shall be proven later in this book; but this knowledge is unattainable by man because of the small number of principles he has abstracted from sense perception. In general, it is impossible for man to know the [complete] truth of the sublunar world. This is nicely illustrated in astrology, where frequently false predictions are made. All the more so is it impossible for man to know the general order of the sublunar world by means of its causes so that his knowledge would be perfect.<sup>83</sup>

So, far from medieval astrology being the purely black and white accurate predictive method that some contemporary astrologers paint it as, it was as rich, varied, open to interpretation and subject to failure as is modern astrology.

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<sup>82</sup> Feldman, *Wars of the Lord*, Vol 1 p15-16.

<sup>83</sup> Feldman, *Wars of the Lord*, Vol 1 Ch 12, p.219

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# Appendix 1: Chart of eclipse of 1345

## Solar Partial Eclipse

### Natal Chart (2)

4 Mar 1345

22:55 LMT -0:19:12

Piedmont, France/Italy

44°N02°007'E38'

*Geocentric*

*Tropical*

*Placidus*

*Mean Node*

