Fifteenth century comets in non-astronomical Catalan manuscripts.

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From the fifteenth century onwards, it was common in Western Europe to consider astrology as the best instrument to provide a link between the circumstances of life on the Earth and the disposition of the stars in the universe. The intimate relation between astronomy and astrology is reflected even in non-specialist works where the words *astrònom* and *astròleg* are used indistinctly. To this effect, the intrusion of astrology into medicine is also revealing, mainly in the countries of the Mediterranean and Western Europe, where several university chairs in both astronomy and astrology were established.

The belief, above and beyond the sphere of human health, that the stars bore some influence on terrestrial events such as catastrophes, political or economic changes or wars was, in turn, prevalent. The same phenomenon is additionally evident in the vernacularization of science throughout the fifteenth century, particularly visible in translations or compilations of original works. A general outline of this issue in scientific works in Catalan in general and astronomy in particular is offered by Cifuentes (2001).

The fifteenth century is a period with abundant observation of comets. Astronomy was in a pre-Copernican state and astronomers based their observations on Ptolemy's *Almagest*, adding minor modifications to this general frame. According to Jervis (1985) there were no developments in cometary theory from antiquity to 1400, when quantitative observations began. These comments were recorded in notes, some of them by well-known astronomers such as Toscanelli and Regiomontanus, and astrological judgments were attributed to them. There was a consensus that comets were atmospheric phenomena and yet general disagreement about their localization (upper regions of the air or in the region of fire), effects (war, pestilence, death) and causes (natural phenomena, divine creations). A list with sources and comments for this century may be seen in Kronk (2000).

Until the Sixteenth century, comets were usually considered presages of the deaths of important figures or future disasters; and they were even interpreted as attacks by heavenly beings on terrestrial inhabitants. In antiquity, comets inspired both awe and alarm, "hairy stars" resembling fiery swords that appeared unpredictably in the sky. Often, comets seemed to be omens of doom

and this fear was not just limited to the distant past: in 1910, people in Chicago sealed their windows to protect themselves from what they thought was the poisonous tail of Halley's comet.

Our study is mainly based on several *dietaris* from the fifteenth century.[1] During the modern age we find a significant number of official and personal *dietaris* written in Catalonia and other Catalan-speaking territories. The task of classifying and transcribing them is still in process.[2] We have a good and growing account of them and some tie in neatly with our aims since their authors introduce perceptions that go beyond their professional or family area. It is in this context that we find observations of phenomena or abnormal events that caused commotion during the epoch, including such natural phenomena as earthquakes, exceptionally violent storms, eclipses or comets.

In an earlier essay (Martínez and Marco, 2014) we published previously unnoticed reports of astronomical events included in the first volume of the *Dietaris de la Generalitat de Catalunya* (Sans i Travé, 1996; henceforth *Dietaris*) and the *Llibre de Jornades 1411/1484 de Jaume Safont*[3] (Sans i Travé, 1992; henceforth *Llibre*).[4] Our main focus dealt with astronomical phenomena that had not previously been published in the astronomical literature since relatively few medieval and early modern history astronomical records from Spain are known. For example, in 1456, professional astronomers noticed the presence of a comet (Halley's); but we have no other account that the comet had been witnessed in Medieval Spain. In

[1] The Catalan word "Dietari" is more than a simple diary and represents an historiographical genre that provides news with a higher frequency and volume than annals and chronicles. The *Dietaris* were diaries where social, political, economical or religious events were annotated, but they were also a document where every remarkable phenomenon was reported. In some cases, explanations on the margin of the page or even drawings were included. Our thanks to the Genenalitat de Catalunya for their permission to reproduce relevant parts of these publications

[2] This interest is evident in the recent international meeting "Construcció i projecció de la memòria personal a l'època moderna" held in Barcelona in 2011.

[3] The *Llibre de Jornades 1411/1484 de Jaume Safont*, also published in 1992 by the *Fundació Noguera* under the direction of Josep María Sans i Travé (1992) is a particular document that complements the first tome of the *Dietaris*. They both are mostly written by the same author, who expresses himself with more freedom in the *Llibre* and so provides some clues to understand why he reports some astronomical events and not others.

[4] The year 2008, saw the publication in 10 volumes of the *Dietaris de la Generalitat de Catalunya*. This edition was produced by the *Arxiu Nacional de Catalunya* at the request of the *Generalitat de Catalunya* under the direction of Josep María Sans i Travé. The *Dietaris* consisted originally of 109 manuscript volumes. Regretfully, the last one, corresponding to the year 1714, was destroyed in the Bourbon era. The remaining manuscript volumes are considered one of the primary sources for the study of late medieval and modern Catalonia, as they contain the transcriptions of diaries that include military, political, religious and social events that took place in that country from 1411 to 1714, with a focus on Barcelona. In particular, in the first of the ten volumes we can find several examples of earthquakes, unusual meteorological phenomena and also astronomical references: eclipses of Sun, Moon, comets and others. Such references tend to decrease in successive volumes according, no doubt, to the advances in science that explained these phenomena and consequently their assumption as natural occurences and not signs of misfortune.

particular, no popular record has been published; and the essay in hand attempts to fill this gap to a modest extent.

In this paper, we will refer to different primary sources: the *Dietaris* and the *Llibre*, together with secondary sources: *Rubriques de Bruniquer*[5] (Bruniquer, 1916) and the first volume of the *Llibre de les solemnitats de Barcelona* (Duran and Sanabre, 1930) among others.[6] We focus on the observations of the passage of fifteenth century comets as were reported from several sources in Catalonia. We set our attention not only on the astronomical events, but also on their context and reactions to the phenomena.

Historical context

In general, the documents consulted cover a period of about one hundred years, from the beginning of the fifteenth century. The documents had obviously no astronomical purposes and their aim was not to provide scientific data about the phenomenon observed. Astronomical knowledge of the epoch is not clearly reflected and no scientific comments are made. For example, the most outstanding astronomer of the Fifteenth century, Abraham Zacut (1452-1515) (Chabás, Goldstein 2000) is not mentioned at all, nor are any of his predecessors. It is well known (see, for example, the work of Millas, (1931)) that there was a serious concern about Astronomy in Catalonia in the fourteenth and fifteenth centuries but popular wisdom mixed Astronomy and Astrology and related any unusual fact to the arrival of misfortunes.[7] In fact, the authors of the documents sometimes suggest

[5] The *Rúbriques de Bruniquer* is a huge document of more than 2000 pages in 5 volumes. At the end of the sixteenth century the municipal authorities of Barcelona decided to compile all the Dispositions and Privileges. This work was initiated by the assistant of the *Escrivà Major* Francesc Gamis, but he died soon after, leaving the task unfinished. In the year 1608 the Counsellors decided on the confection of the *Rúbriques* (The word *rubrica*, in plural *rúbriques*, makes reference to non-ecclesiastical ceremonies). This labour was entrusted to Bruniquer, who was syndic of the City, and who put in order the dispositions, laws, privileges and *dietaris* according to subjects. Bruniquer left the work almost finished, but not completely, when he died in 1641. His work was continued by Juan Guiu, who died in 1698. From this date until 1714 Jeroni Pitones finalized this great work. Even when there were three different authors, the document has always taken Bruniquer's name. In particular, we focus on volume V, chapter LXXII, where several astronomical observations are recorded under the title of "Prodigious and peculiar things."

[6] The *Llibre de les Solemnitats de Barcelona* o *Llibre de les Solemnitats Reials* is a document covering the epoch between 1383 and 1719 where the *escrivans* of Barcelona registered the celebrations and important acts in which representatives of the city took part. The annotations had the intention of providing historical evidence, as well as the record of the different details of the ceremonies, in order to establish a source of reference and consultation for future similar events. The *Llibre of Solemnitats* contained originally seven volumes, the two first and the first sheets of paper of the third are lost so that the element preserved begins in the year 1424

[7] Although the Trastamara dynasty did not support Astronomy in the same way as their predecessor, we can find several astronomical works, almanacs and tables translated into Catalan. For further information, see Cifuentes (2005). In addition, there are serious Astronomical works done by native scholars as indicated, for example, Chabàs, Roca (1998).

that a particular astronomical event may be the cause or the prelude of some catastrophe. It is for this reason we occasionally offer a brief description of the historical context of fifteenth-century in Catalonia.

Catalonia formed part of the kingdom of Aragon, although under this confederated monarchy, each realm was to keep its own particular institutions of government. The end of the Middle Age and the beginning of the Modern Age was a very turbulent epoch, characterized by the endless struggle against royal power, including a Civil War (1462-1472), the second rebellion of the *remences* (1485-1486) and the revolt of the *Germaníes* (1519-1523). All these events are reflected in the contemporary documents.

The year 1456, when the first of the comets is reported, is close to the end of the reign of Alfons the Magnanimous (1396-1458) who was not, in fact, in Aragon. From 1443 onwards the king had established his court in Naples, devoting himself completely to Italian affairs. The distance favoured the aspirations of the peasants of the *remença* (1448), whose mobilization was violently put down.

The Catalan bourgeoisie in the fifteeth century was grouped by political affinity into two main blocks: *La Biga* and *La Busca.* Roughly speaking, la *Busca* promoted a democratizing access to public office whereas *La Biga* tried to govern in line with absolutist ideas. The origins of the problem in Barcelona stem from an economic crisis that caused the adoption of protectionist measures from 1425. This was followed by protests and riots. On one side, the mercantile classes and artisans proposed measures including devaluation of the currency, a ban on the import of various products, improvements in textile production and taxes levied on foreigners. On the other hand, the aristocratic *ciutadans honrats* proposed more limited measures to attenuate unemployment.

The intransigence of the latter and their resistance to the reforms caused a political crisis and the division in these two opposing blocks from 1450 onwards. The majority of *ciutatans honrats*, some merchants and importers of luxury fabrics joined the *Biga.* This social group – who considered themselves as nobility and acted as such - enjoyed control of municipal power and were opposed to the sectors linked with the productive economy. The *Busca* was the party of the merchants and artisans who aimed at exercising control over municipal institutions in order to fulfil the privileges, freedoms and customs granted to the people of Barcelona.

Alfonso V supported one group and then the other, depending on the financial needs of the moment. In addition, the king attempted, as other kings of the fifteenth century, to establish his authority over both the Catalan *Corts* and the nobility. The process of selection of municipal positions of responsibility excluded members of the *Busca* from access, without the direct intervention of the monarch. Alfonso, who was in Naples, finally entrusted resolution of the conflict to Galceran de Requesens who suspended the council, naming a new *conselleria* on November 30th, 1453. However, the program of changes promoted by the new authority was not successful due to the fierce opposition of the *Biga* and the preeminence that had been given

to this group in the distribution of municipal responsibilities. In 1462 a Civil War broke out (1462-1472) at the end of which the *Biga* recovered power. Finally, a lasting peace was concluded in the Capitulation of Pedralbes in 1472.

Cometary references

It is now accepted that comets are remnants of the gas, dust, ice and rocks that initially formed the solar system about 4.6 billion years ago. As a comet gets closer to the sun, the ice on the surface of the nucleus begins turning into gas, forming a cloud known as the coma. Solar wind pushes dust particles away from the coma, forming a tail that always point in the opposite direction from the Sun. Few comets can be seen by the naked eye when they pass near to the sun because most of them are too small or too faint to be seen without a telescope. However, sometimes their comas and tails reflect sunlight or even glow and then the comet becomes visible, in some cases even during the day.

Observations of comets are few and far between in Medieval Spain. Contemporary records are scarce: which indicates the importance of reports examined in the rest of this article. All observations relate to the city of Barcelona, which is sometimes named in the text in its visigothic version, Barchinona.[8]

Halley's comet

Halley's comet is one of the most renowned visitors to the inner solar system. In 1705 Edmond Halley predicted the return of a comet seen in 1682. The comet did return in 1758 and subsequently acquired the mathematician's name. Its returns have been eagerly anticipated ever since. The success in predicting returns has also allowed astronomers to project backwards the visits, from the seventeenth century to ancient times. A large number of appearances were recorded in ancient writings, paintings and even tapestries and they were always registered with concern and even fear throughout antiquity and the Middle Ages.

Halley's comet has remarkable characteristics: it is the only periodic comet that becomes visible to the naked eye. Its orbital period typically varies between 75 and 76 years, but it can return in as few as 74 or as many as 79 years. This variation is explained because its orbit sometimes brings it close to planets whose gravity can modify its course. The 1456 appearance of the comet is particularly relevant, with abundant observation around the world. Kronk's *Cometography* (2000) provides a comprehensive list of resources in this area.

[8] Translations of the original Catalan text have been undertaken by the authors who would like also to thank the Servei de Traducció of the Universitat Jaume I for their valued assistance. Astronomical simulations have been carried out using programs suitable for the study of ancient astronomical phenomena (i.e., programs that include the calculation of precession, proper motion and an accurate planetary theory, in our case, VSOP87 (Bretagnon and G. Francou. 1988)), such as Sky Map (Mariott, 2005).

The period of time that the comet remained in view, from May 27th till July 6th, 1456, is recorded in different Chinese sources. In Europe, Toscanelli and Peuerbach made careful observations. According to modern numerical computations, performed by Yeomans and Kiang (1981), after the first report of the comet it remained visible to the naked eye for 44 days. The minimum distance to the Earth was reached on June 19th (0.45 Astronomical Units), and it reached its maximum brightness on the same day with 0 magnitude. [9]

Below we present some records which have previously gone unnoticed by the astronomical community.

Dietari General de Catalunya. Tome I. P. 131.
Dietari Number 6: (1455-1458) 20v (June 14th, 1456)

Monday the 14th. For some eight or ten days, a lot of people have been saying they have seen a star in the sky with high brilliance and from it came certain red rays similar to fire and this star may be seen each morning from midnight to the rise of the Sun. That's why I, Jacme Çafont, notary and one of the court clerks of the House of the Diputació General de Catalunya, today Monday 14 June 1456, wanting to check if what people say about this star is true, got up between II and III hours after midnight and have climbed up to the tower of my house. And, as a matter of fact, I have seen a star between Gregal (NE) *and Tramuntana* (N). *From it came long rays that came from the named star and pointed towards between Llebeig* (SW) *and Migjorn* (S) *and they could have a length roughly between XVIII and XX palms[10] and about one palm of width. The star and the rays were as has been reported. Let us hope to God that it is a good sign, because the men of the buscha* (sic. Busca), *who are around these times, have so depressed this city that we have already had bad news.*

In addition to this entry, the writer draws an image of the comet (See figure 1). There is a much shorter version of this record in the *Llibre* corresponding to June 14th that does not add more information. Some days later, we find another reference in the *Dietari*:

Dietari General de Catalunya. Tome I. P. 131. Dietari Number 6: (1455-1458) 21r (21 June 1456) *Monday, the 21st. This day, in the night and some days after, from 9 to 11 hours, before midnight, a star was seen in the sky, which was similar to the one seen the 14th of this same month, and this one rose from the part of Mestral* (NW) *and had the rays behind, that is to the part of Xaloc* (SE).

On November 30th, 1453, Galceran de Requesens suspended the election of *consellers* and designed a new executive including people

[9] 1 Astronomical Unit (AU) is, approximately, 145600000 km.
[10] One palm measures about 14.9 cm. Obviously, the author does not refer to the real measurements of the comet but refers to the fact that the comet was a very imposing vision.

from the *Busca*. As a supporter of the *Biga*, the writer of the *Dietaris* interpreted the 1453 solar eclipse as an early sign of cosmic disapproval (see Martínez & Marco, 2014) of this decision. In the following years, the conflict intensified with the *Busca* urging the implementation of protectionist measures. King Alfons granted a privilege of regulation for the city in 1455: the composition of the organs of municipal government was to be distributed in a fixed way between the diverse estates. The program of changes promoted by the *Busca* was not successful due to the fierce opposition of the *Biga*. As such, the final fragment in the first report should be understood in this political context because, as is implicit in the author's plea for divine benevolence, the comet was taken as a sign of misfortune additional to the putatively ill-starred municipal government.

Moreover, it seems that comets were seen as a bad omen not only in Barcelona, but in Catalonia as a whole, as is reported in *La historia del Ampurdan*:

And it was the case that while the Moon was entering into the eclipse, news came to D. Juan of a victory at the gates of Barcelona. A few days later a very lucid, comet appeared in the sky "similar to the one that in 1456 indicated the death of king Alfons and the ruin of Citerior Spain or Catalonia"; as a sword stretched in the sky, it was pointing to the West and it was preceded by an earthquake in Barcelona. (Pellas y Forgas, 1883: 690)

This fragment refers to the comet of 1472, also recorded in the *Dietaris* that was, indeed, preceded by a Lunar eclipse on November 21st, 1471 and by an earthquake on December 18th of the same year. The extract quoted is a copy of the corresponding paragraph in *Los reys de Aragó y la seu de Girona* (Fita y Colomé, 1873). Halley's comet of 1456 is claimed to have bought death to King Alfons and to have ruined Citerior Spain, making reference without doubt to the impending Civil War. King Alfons, in fact, died on June 27th, 1458. The premonition of his death was not exclusive to Catalonia, as we can read in a later document:

Shortly before his death a comet was seen between Cancer and Leo with the tail that had the length of two signs or of sixty degrees, [it was a] *prodigious thing and, as it is commonly assumed, it was a threat to the heads of great princes.* (Mariana, 1780)

Returning to the *Dietari*, its author, Jaume Safont, does not seem to realize that the comet is the same for both dates, but this possibility is included in the report of the *Croniques de Bruniquer* that, moreover, is less accurate.

Croniques de Bruniquer. Tome V. P. 13.

Friday, on 18 June in the Dietari there appears that it was well-known at present in the City that at the beginning of this month, towards

Levant, a star or comet was seen in the early morning by many [persons], between one and two hours after midnight, [the star] casting some lightness as lightness near the end of dark, that extended in front of it, as it seems, 3 or 4 Canas after 15 and 16 of the same month it was seen the same of other similar star or comet between 8 and 9 hours in the beginning of the night between Ponent and Tramuntana.[11]

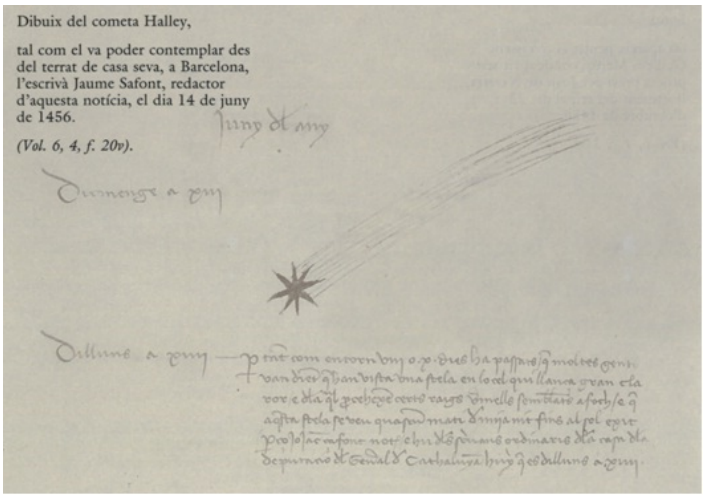

Figure 1: Drawing representing Halley's comet as seen from Barcelona on 14 June 1456. The upper annotation in printing text is a modern comentary of the figure. (Reproduced with the permission of the Generalitat de Catalunya, from the *Dietaris de la Generalitat de Catalunya*. Vol. 1)

Another important issue that we can glean from the first report of the *Dietari*, is the statement that the comet had been previously witnessed by people 8 or 10 days before the entry, which brings us to around the third of June. The weather was bad in Barcelona until the beginning of June, as it is written in the entry of June 1st, which might explain why the comet was not detected before:

Tuesday, 1st June. On this day was celebrated the feast of Corpus Christi, because of the rain it was not possible to celebrate it according to the calendar, on the 27th of the previous month of May.

Whatever the case, if the comet was really detected on or around the third of June, that would still constitute the first contemporary European report. According to Seargent (2009) Chinese astronomers were the first to sight the comet, locating it on the morning of May 27th as a broom star with a tail 3 degrees long. The comet was not recorded again in China until June 22nd. The phenomenon was well observed in Europe, by Paolo Toscanelli (Celoria, 1921), but he first

[11] The Cana (canya in Catalan) was an ancient Catalan length unit, no longer used, corresponding to 1,555 meters and 8 palms. Once again, we must understand this comment in the sense that it was a large object.

saw the comet on June 8th and followed it practically every night until July 8. He said that its head was *as large as the eye of an ox*, with a tail, *fan-shaped like that of a peacock*.

An additional European observer of the return of the celestial visitor was Georg Peurbach of Austria, who first observed it on June 10th (although he apparently knew of its existence as early as June 3rd) and measured the tail as around 10 degrees. An anonymous treatise, *De cometa*, written in 1468, recalled a comet appearing on June 6th, 1456, as "very clear and brilliant" and with a tail 22 degrees long. Returning to the *Dietaris* again, however, it is here where we find the most complete monitoring of the comet.

Jaume Safont climbed to the roof of his house to observe personally the heavenly body and provides a surprisingly accurate record for a non-professional astronomer. He claims to have seen it between II and III hours after midnight, which is about the time of the rise of the comet (about 2h 30m), and he records carefully that the comet was located between Gregal (NE) and Tramuntana (N). The use of wind names to refer to the geographical direction of the beams of the comet would not be untypical in Catalonia (see fig. 2). In addition, it is stated that the beams of the comet were remarkably long, as is attested by other well-known contemporary registers.

The Hour Angle of its rise was around 14h 30min, all of which coincides with Safont's observations. There is also the remark that the beams of the comet pointed to the S-SW; although the conclusion is missed that that this is the direction opposite to the Sun. On that particular night, June 14th, 1456, the comet had almost reached its minimum distance to the Earth and its maximum brightness. It was visible in the constellation of Auriga and in Leo the night of June 21st (See figure 3).

The time of its rising of the comet was approaching sunrise so it should have seemed to disappear. Moreover, in the next few days the comet continued its journey towards the sun and became more difficult to observe. It is surely this coincidence which explains why there are two independent observations of this same comet, one on June 14th and other on 21st. After the later date, the comet was visible once again but now after sunset instead of before dawn.

On June 21st, the writer remarks that the comet was visible from 9 to 11 and before midnight. The sun set at 20h 23m and the comet was heading towards it but still visible until about 23h 20m, when it also set. The author seems to state that it rose from the NW, but what he really means is the zone in the sky where the comet became visible. Once again, he remarks that the beams pointed to the SE.

As such, the observer only noticed the nocturnal appearance of the comet, paying no attention to the hours from its rise to the dawn, when the comet was also visible. In fact, when the observer says that '(this star) rose from the part of Mestral (NW)…' he does not refer to the actual astronomical rise of the comet, but to the area in the sky where the comet was visible after sunset.

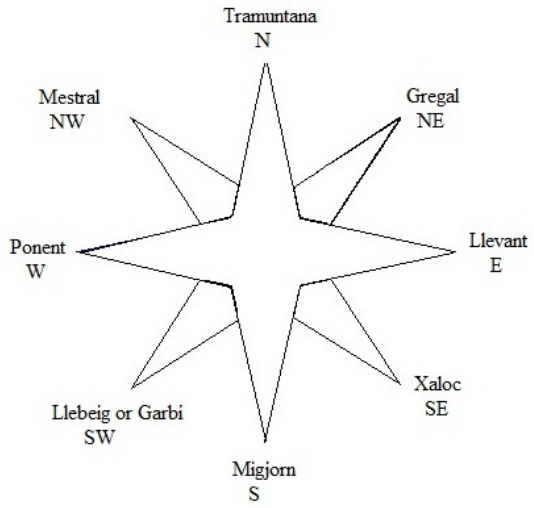

Figure 2: Rose of the winds used in Catalonia.

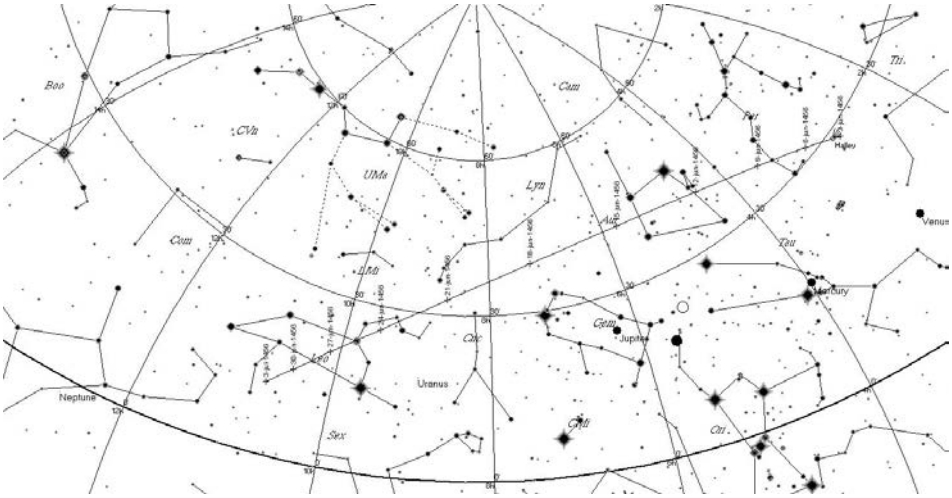

Figure 3: Trajectory of Halley's comet from June 3rd to July 3rd, 1456 using Yeomans and Kiang's (1981) orbital elements. The map represents the night sky and the constellations have been delineated to ease their identification. The comet moved slowly from the right hand side of the picture to the left hand side. This movement would have become evident over days. On 3rd June the comet was in Perseus and then crossed Auriga in middle of June and finally to Leo at the end on June-beginning of July, when it had already become difficult to observe with the naked eye.

As previously stated, Halley's appearance in 1456 was remarkable in many ways and was considered as a bad omen around the known world. For a complete description about theories and observations of comets in the fifteenth century see Jervis, (1985). It is not our aim to make an exhaustive list of all the reports of the comet around the world. We limit ourselves to pointing out that, in this year, the Ottoman Empire invaded the Balkans, culminating in the Siege of

Belgrade in July. In a well known Papal Bull, Pope Calixtus III ordered special prayers be said for the city's protection. In 1470 the humanist scholar Bartolomeo Platina wrote in his *Lives of the Popes* (1479) that

A hairy and fiery star having then made its appearance for several days, the mathematicians declared that there would follow grievous pestilence, death and some great calamity. Calixtus, to avert the wrath of God, ordered supplications that if evils were impending for the human race He would turn all upon the Turks, the enemies of the Christian name. He likewise ordered, to move God by continual entreaty, that notice should be given by the bells to call the faithful at midday to aid by their prayers those engaged in battle with the Turk. [12]

Other fifteenth-century comets

Two other remarkable comets were recorded in Catalan sources. The first of them was C/1468 S1 that was also reported in several Chinese and European texts. It was discovered on September 17th in the East but soon became a nocturnal object, last seen on November 18th. According to (Yeomans 1981), this comet remained visible for 56 days, with the date of the minimum distance to the Earth on October 2nd 1468 when it also reached the maximum brightness of 1-2 magnitude.[13] (See figure 4 for the estimated trajectory of this comet.)

Dietari General de Catalunya. Volume I. Pag. 192. Dietari Number 8: 35v (October 8th 1468)

Saturday the 8th. This day, by night and some days before and after, there was seen in the sky a star or a comet […], with a long tail, and it came out from the part of Ponent (W) and had the rays towards Llevant (E); May God give us good signs.

The historical context in which to appreciate the last sentence is the Catalonian Civil war (1462-1472). The two factions, the royalists who supported Juan II of Aragon and the Catalan constitutionalists, with France supporting either one or the other faction, disputed the extent of royal rights in Catalonia. The Catalans set up several pretenders in opposition to Juan during the course of the conflict. The sensation of bad omens is not so strong in this entry because this is a period of the war when Juan II of Lorena, who had been proclaimed king instead of Juan II of Aragon, achieved some military successes. In particular, in 1467 he had initiated a military

[12] The quotation may be viewed online in the archive of *The Tablet*, http://archive.thetablet.co.uk/article/22nd-august-1908/22/et-cetera

[13] http://ssd.jpl.nasa.gov/?great_comets

campaign in l'Empordà and laid siege to Girona which was finally conquered in 1469.

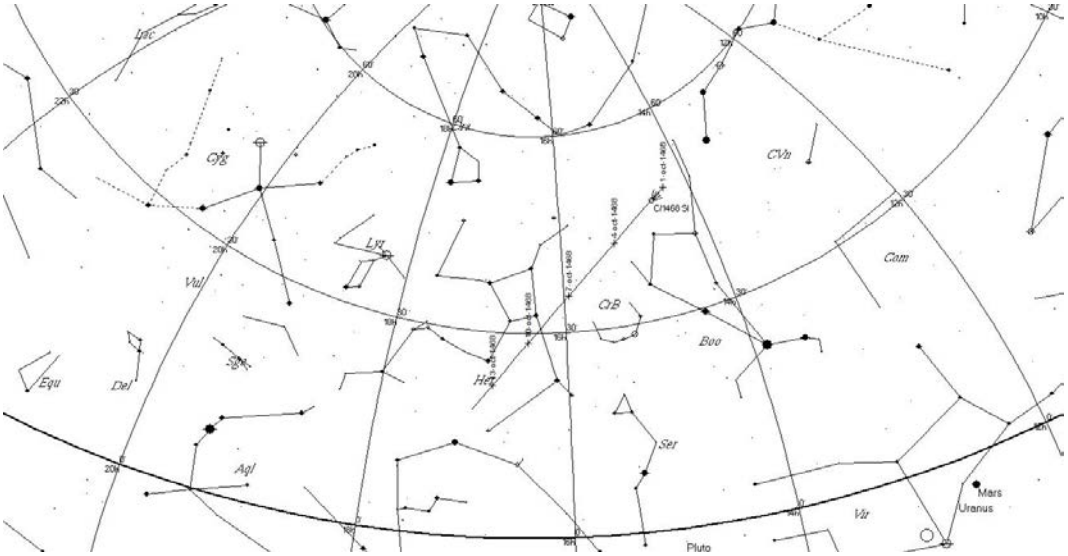

Figure 4: Trajectory of the comet of 1468 form the 1st of October to the 15th October. The comet was detected when it was in the Bootes constellation, on 8th October and it was followed some days after crossing Hercules.

The second comet was C/1471 Y1. It is one of the most documented comets up to the fifteenth century, with Asian, European and Muslim reports. It was discovered on December 21st, 1471 and it was last seen on February 21st, 1472. The report included in the dietary is one of the oldest, together with the ones from Cato of Supino and Regiomontano's *De cometis* (summarized in Jervis, 1985). According to Yeomans, the comet was first detected on December 25th 1471 and then it was visible for 59 days. Its perigee was on January 23rd 1472 with the minimum distance to the Earth being 0.07 AU and reaching a maximum magnitude of -3.[14]

Dietari General de Catalunya. Tome I. Pag. 206.
Dietari Number 7: 44v (16 January 1472)

Thursday the 16th. This night and a lot of other past nights there was seen a star in the sky which rose at 10 hours of the night and lasted until dawn, casting great rays over the city of Barcelona, and went out from Llevant (E) to Ponent (W), having all the rays in one part, neither behind nor rays on its side, because it had all its rays in front of it […]. And on these days the city of Barcelona was under siege by the forces of King Johan. And afterwards, successively, it (the star) was seen inverted, that is, it went out from Ponent (W) and casting its rays to Llevant (E).

[14] http://ssd.jpl.nasa.gov/?great_comets

On the particular date consigned in the *Dietari* the comet was in Bootes (See figure 5). Once again, the time of the rising is accurately reported (on 16th January the comet rose at about 23:00h and later in the preceding days) as was the position of the comet, which remained visible all night. The last sentence must be a subsequent addition since, after 25th January, it became visible again in the west after the sunset.

As previously stated, the eclipse of the Moon mentioned in *La historia del Ampurdan* took place on November 27th, 1471 (Martínez & Marco, 2014) and, with the the Earthquake of December 18th, was included in the *Dietari*. Curiously, in relation to the earthquake, we find what might well be the first reference to the comet:

(42r) *Wednesday 18, Saint Maria de Sperança. Today, in the early morning, almost at the beginning of the day, there was a big earthquake and, the night after, a star was seen in the sky; a star with large beams, casting great light in an unaccustomed way. May God give us good signals and good fortune, by His Mercy.*

If this was really a sighting of the comet, then it would constitute the first ever report of its appearance; and data relating to the discovery should have to be advanced by a few days. The report of Halley's comet in 1456 clearly states that this new comet was a sign of misfortune, the same as may be applied to this case relating to the end of Catalan Civil War. Despite the devastation, Barcelona remained a stronghold to the end; but with its surrender the war came to a close. A naval and land siege lasted from November 1471 to 16 October 1472 before the city surrendered to Juan II of Aragon on October 24th, with the Capitulation of Pedralbes.

There are abundant references to this comet in Russian chronicles (Vyssotsky, 1949): Novgorodsky IV (6979) and (6980), Sophiisky II (6980), Pskovsky I (6980) and II (6980) and Gustinsky (6980). We will only reproduce reference to Sophiisky, because of the similarity to what is recorded in the *Dietaris*:

During the same winter a spread-shaped star which was called a tailed star appeared in the sky. It was visible in the east and the rays from it spread towards the west. It was there for many days and vanished. And another one appeared in the west spreading its rays towards the east.

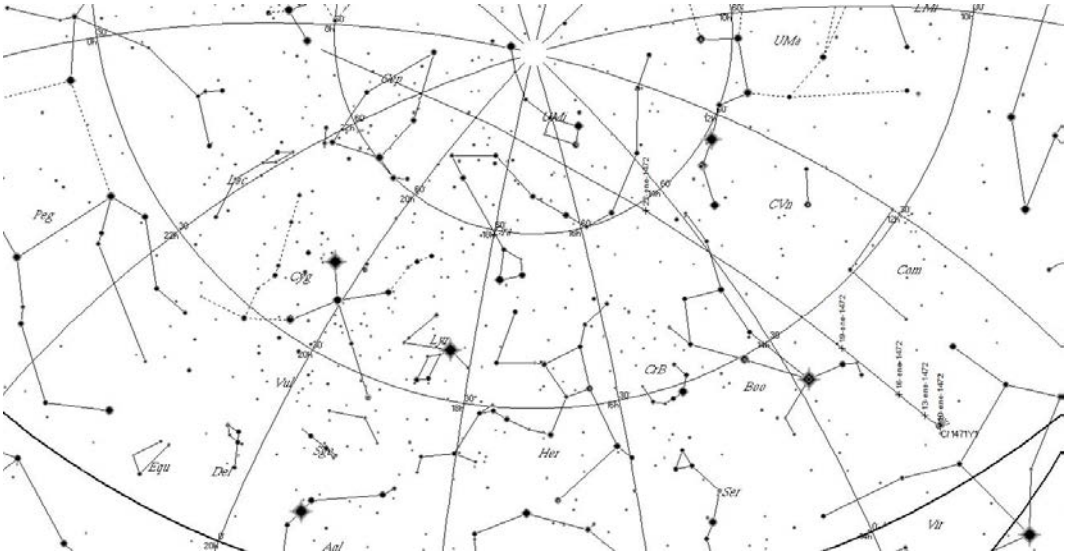

Figure 5: Trajectory of the comet of 1471, from 10th January to the 25th January. This comet seemed to move quickly on the celestial sphere, from Virgo to Bootes (when it was detected by the author of the *Dietari*) and then followed its trajectory, crossing Draco and Cepheus.

Conclusion

In this essay our aims have been modest but informative. We have set out to reference previously unreported sources of cometary sightings included in vernacular written works such as the *Dietaris de la Generalitat de Catalunya* and the *Llibre de Jornades*. We have avoided repetition of well-known accounts of the most famous events, limiting our efforts to privilege lesser known reports. In addition, we have tried to link the observation and subsequent register of the astronomical event to contemporary life and events in the city of Barcelona in order to evaluate the astrological impact of the data.

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