How the world lost its centre. The relation of truths and facts in Middle Ages and early modernity

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Abstract: In the Middle Ages, it was commonly accepted that Jerusalem was the centre of the (inhabited) world. This was proven not just from Biblical sentences, but also from an alleged empirical fact: people claimed that in Jerusalem at noon during the summer solstice a vertical pole throws no shadow, the sun being in its zenith. This is not true and even it if were, it would not prove anything. This should have been easy to grasp for an educated medieval person; still, the claim was repeated over and over again. Only at the end of the fifteenth century, it suddenly became subject to investigation and criticism, whereupon it quickly became completely obsolete. The reasons for this shift are not completely clear, but the growing availability of information likely played a role. The episode demonstrates both the importance and the unimportance of empirical facts in the Middle Ages. Jerusalem's central position was not just the symbolic representation of a spiritual truth, it was considered empirically true as well; but this fact was not critically evaluated. The "truth" of Jerusalem's centrality dictated what "facts" were credible. The questioning of these presumed facts at the end of the fifteenth century should therefore be regarded as an important turning point in European intellectual history. After all, the realization that truths must be based on independent facts is a basic precondition of modern science.

Keywords: Jerusalem, centre of the world, facts, truth, symbols.

1. Introduction

In the Middle Ages, it was a common belief that Jerusalem was situated at the centre of the inhabited world. This idea is best known from its graphical representation in the medieval mappaemundi. By the end of the fifteenth century, however, the idea disappeared and hardly a remembrance was left. Historians have paid little attention to this sudden turnaround. Abandoning the idea of Jerusalem's central location might seem unproblematic, for it was flatly contradicted by the facts. The interesting thing however is that those very facts had been known for centuries. The question of why facts that had always been ignored suddenly became decisive *is* problematic.

Studies of medieval world maps have well documented the changing view but give only scant indications about the causes. According to Edson, "In the mid-fifteenth century, the mappaemundi was still holding its own, but in the last twenty years of the century it began to give way."[1] According to her analysis, the mappaemundi were transformed rather than abandoned. Mapmakers increasingly introduced information from non-traditional sources and rethought traditional content. Some of them experimented with new forms for the mappaemundi (most notably the Beham globus). However, most of the newly introduced information had been available for centuries. The TO maps had existed side by side with the portolan maps, with their exact delineation of coastlines.[2] Manuscripts of Ptolemy's Geography proliferated in the west since about 1300.[3]

The tension this created can be seen in a fifteenth-century world map by Fra Mauro. On the one hand, Jerusalem's location on the map is determined by the available geographical information. Its central position is thereby abandoned. On the other hand, Jerusalem's centrality is maintained in a long caption that Fra Mauro adds: "Jerusalem is in the middle of the inhabited world according to the latitude of the inhabited world, although according to the longitude it is too far west. But because the western part, Europe, is more heavily populated, it is still in the middle according to longitude, not considering the physical space of the earth but the number of its inhabitants."[4] The centrality of Jerusalem was defended despite the known facts. Indeed, the transformation of world maps seems the result a new look at old material, rather than the discovery of any new information.

The central position of Jerusalem was not only graphically depicted, it was also stated in texts and defended by both biblical and rational arguments - at least, arguments that claimed to be rational. And here again, as will be explained in some detail, these allegedly rational arguments were directly contradicted by the science and knowledge of their own time. People knew the facts, the problem was to apply them to a given question. Their failure to do so was not due to the intricacies of the specific problem at hand but had a more general background. Jerusalem lost its status as centre of the world, it would seem, not because of any new evidence, but because the existing evidence was assessed by new standards. What is at stake here, I would argue, is the very principle that our knowledge must be based on independent facts.

The question of how facts should be valued has been largely ignored in the history of science. No one doubts that the discovery, recognition, or evaluation of specific facts was often problematic, but the significance of facts as such and their role as evidence has most often been tacitly assumed to be something that must have been obvious throughout history. However, the rise of "alternative

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facts" in our present world has taught us that reliance on independent facts is far from self-evident. In many cases, facts (in practice if not in theory) have only limited relevance for people's understanding of the world. The introduction of explicit standards for assessing facts must be considered a crucial development in the history of knowledge. If we want to write the history of science for a present-day audience, we have to explain not just how specific facts were discovered, but also how scientists came to turn "facts" into important constituents of knowledge in the first place.

The abandonment of the idea of Jerusalem's centrality appears to coincide with, and be part of, this turn in western scholarship towards the recognition of the value of independent facts. The initially trivial question of Jerusalem's exact position thereby becomes part of a much wider story. In this article, I will discuss the episode to throw light on this general shift in the use of factual, empirical evidence. This will include a rather detailed investigation of the arguments by which Jerusalem's central position was defended in the Middle Ages.

2. From truth to fact

One reason that historians of science have paid little attention to the turn towards factual evidence is that it took place largely outside the sciences and well before the so-called scientific revolution of the seventeenth century. The recognition that knowledge needed to be based on empirical, objective facts was a prerequisite of the scientific revolution, not a consequence or even an element. Without it, no investigation of nature would deserve the name "scientific". The old positivist ideal that it was modern science that demolished the medieval attitude and brought about a more modern outlook is clearly untenable.

Other fields have paid more attention to the production of "fake knowledge". Medievalists have long been aware that people in the Middle Ages often created their own "facts", by inventing histories and forging documents.[5] The change of this attitude has since long been attributed to the humanists of the Renaissance, who no longer accepted such inventions and unmasked many ancient and modern documents as forgeries. The debates on the "comma Johanneum", the Gift of Constantine and the forgeries of Annius of Viterbo are probably the best-known episodes.[6] From those debates one might get the impression that the Renaissance was teeming with forgeries. No doubt it was, but it seems unlikely that they were more abundant than in earlier periods. Forgeries became a matter of debate because documents were then assessed by new and rigorous standards, irrespective of whether they agreed with accepted truth.

The rejection of Jerusalem's centrality happened at about the same time as this humanist onslaught on forged documents. This would not seem a mere coincidence, but the exact connection is far from clear. Most studies on medieval or Renaissance forgeries or their rejection have focused on historiography, law, or religion. Forgeries in the investigation of nature have hardly been studied and historians of science who do discuss them typically fail to relate them to the study of Renaissance forgeries in general.[7] As to the emergence of the scientific fact, the topic has been mostly studied in the context of the traditional "scientific revolution".[8] This appears not very helpful for the problem at hand.

An interesting attempt to answer the question how and why facts that had been so malleable in the Middle Ages became hard and solid in the modern period was made some years ago by Peter Harrison. He claimed that it was a new approach to texts that brought a new understanding of the world.[9] According to his view, the protestant Reformation did away with the allegorical reading of biblical texts and emphasized the literal interpretation. This would have led to a more factual, empirical understanding of the real world as well. This suggestion is interesting but has serious problems. Making the Reformation directly responsible for the whole shift seems a bit far far-fetched, if only for chronological reasons - the developments can be traced back to the fifteenth century at least. Moreover, Harrison's claim begs the question. Why would people suddenly accept only a literal interpretation of a text? Still, by seeking the roots of the modern understanding of the natural world in the humanities, including textual hermeneutics, rather than in the sciences, he has made an important inroad.

Rather than to the Church Reformers, it seems we should look at the aforementioned humanist scholars of the Renaissance. In early modern natural history indeed, historians have identified humanist scholarship as a main influence on the turn towards factual descriptions in the sixteenth century.[10] Humanists represented a new ideal of knowledge. They brought many ancient writings back to light that they took completely seriously. By trying to incorporate them in the existing worldview, they deliberately transcended existing boundaries. Fields that in the Middle Ages had been studied separately were now brought together, and discrepancies and contradictions that so far had not bothered anybody came to be recognized as problems that had to be resolved. To what extent this directly affected other fields and problems, such as the location of Jerusalem, needs to be investigated.

3. Medieval travellers visiting the centre of the world

References to the central location of Jerusalem can be found especially in the many travel narratives left by pilgrims to the Holy City. Many of them mention the centre of the world, and some give arguments why this fact should be true - or not. I will start with two examples, from about the same time and place, but quite different in their attitude.

At the end of the fifteenth century, the Flemish nobleman Joos van Ghistele, from a prominent family in the city of Ghent, undertook a pilgrimage to the Holy Land. Devotion to the holy places does not appear to have been his sole motivation, for he continued his voyage to among other places Persia and Tunis. After having been four years away from home, he finally returned to his native city in 1485. Shortly afterwards, a detailed narrative of his travels was compiled by a certain Ambrosius Zeebout, about whom there is no further documentation. Maybe he was a Carmelite. The book became quite popular. Zeebout's work has been preserved in three manuscripts

and a few early printed editions. A modern edition appeared in 1998.[11]

Zeebout was not a mere ghostwriter. As was common at the time, he freely used other sources to fill in gaps in the narrative or to give further explanations. He was by no means a critical historian and the sources he used included legends and stories from classical mythology. Still, in some cases he was rather critical. This is definitely the case when he describes Van Ghistele's visit to the Church of the Holy Sepulchre in Jerusalem. Many pilgrimage accounts relate that in the cleft in the rocks at Golgotha, shown to the visitors of the church, had been found the skull of Adam. Zeebout duly relates the story but gives as a comment: “but in the Historia Scholastica, on the Gospel, one can clearly see that this cannot be true.” (98) In the same church Van Ghistele was shown “a white-grey stone, square, somewhat protruding above the pavement, with a circular hole, which is said to be the midpoint of the earth (“den rechten middewaert vander weerelt”), and that at this place, the sun does not cast any shadow at midsummer at noon, confirming this by the words of David in the 77th [sic] Psalm: Operatus est salutem in medio terre.”[12]

This was indeed a well-known claim at the time. Another Flemish nobleman, Anselmus Adorno, had made a pilgrimage to the Holy Land a few years before Van Ghistele, in 1470-1471. He too, before returning to his hometown Bruges, visited many other places in the Near East besides the usual highlights. His travel narrative was edited by his son Johannes, who had studied at Padua and who had accompanied his father on his pilgrimage. The Latin text is preserved in a single manuscript from the fifteenth century. On Jerusalem it says: “This after all is the city of cities, the holier of the holy places, mistress of all peoples, the place of our salvation in the centre of the world, placed in the middle of the earth, elected and sanctified by God.” In his description of the Church of the Holy Sepulchre he mentions the same stone as Zeebout “which indicates that here is the centre of the world. For this is proven by a natural argument, by the sun that shining in that place casts no shadow.”[13]

However, the two authors react quite differently. Whereas Adorno accepts the claim as a confirmation of the exalted position of Jerusalem, Zeebout engages in a long and devastating critique:

> At a closer look, it is not possible that the city of Jerusalem or any place therein would be the midpoint of the habitable earth. This can be shown in many ways. For the true midpoint of the earth should be equidistant from the east, the west, the south, and the north, to wit, ninety degrees from each. That is not the case, for Jerusalem is much farther north than south and also farther west than east. Also, Jerusalem should be under the celestial equator and night and day should be of equal length in winter and summer, which is also not the case, as one can see by daily experience. So it cannot be the midpoint of the world, unless one takes the midpoint of the world at any place, in the way that could be done with an apple or a ball. For because it is spherical, wherever one takes a point, one may keep that for the centre, and in the same way, one might call any place on earth the centre. As for the claim that the sun at noon does not cast a shadow at Jerusalem, that is not true either, as said before. This can be shown by many arguments too long to write here, as known to those who study astronomy or cosmography. As to the words of David mentioned before, "Deus operatus est salutem in medio terre", that should be understood of the inhabited earth, it being equally close to every human.[14]

Fig. 1. *OT map* (orbis terrarum) *with Jerusalem in the centre.*

4. The mystery of the vanishing shadow

Medieval authors who wanted to demonstrate that Jerusalem was the centre of the world in the first place referred to some biblical verses, foremost Psalm 74:12, but also Ezekiel 5:5. (“Thus saith the Lord God; This is Jerusalem: I have set it in the midst of the nations and countries that are round about her.”) But, as shown in the narratives of Zeebout and Adorno, some authors were not satisfied with that and advanced a more scientific, empirical proof. This was the alleged fact that at noon during summer solstice, the sun at Jerusalem stands exactly in the zenith, so that any vertical pole or stick indeed will cast no shadow. (In the following, I will refer to this alleged phenomenon as “the vanishing shadow”.)

This argument is deeply flawed, not just according to modern geography, but according to the standard knowledge available in the Middle Ages. In the first place, the alleged fact is simply not true. There are many places on earth where the sun stands in the zenith one or two times a year (actually, this is true for any place between the tropics), but Jerusalem is not one of them. Jerusalem is north of the tropic of Cancer and consequently the sun will never reach the zenith. To people in Scotland or to incidental visitors this fact may not have been immediately obvious, but any local must have been aware of the discrepancy.

More damning still, even if the fact were true, it would prove nothing about Jerusalem's central location, as Zeebout perceived quite well. This should not have been hard to understand for any educated medieval person, certainly not for someone like Johannes Adorno with his Paduan background. After all, spherics was one of the elementary parts of the medieval propaedeutic curriculum. Nor was this knowledge only accessible to people with a basic university training. By the end of the fifteenth cen-

tury, many texts had become available for laymen explaining the basics of geography, astronomy, and astrology.

The episode reveals us a good deal about the use of facts and natural arguments in this period. The central location of Jerusalem, and the "natural" argument used to prove it, are clear examples of invented facts, facts that were not established independently but were deemed real because they demonstrated or supported a preconceived truth. It is not that in the Middle Ages people did not refer to empirical facts; of course they did. Truths were defended with an appeal to facts. However, the way such facts were identified, and the role they played in the establishment of truth, deviated from modern standards (though not always from modern practice).

The question that spontaneously arises is of course why an educated person such as Johannes Adorno would believe this apparent nonsense. From his words, it seems evident that the centrality of Jerusalem was an important truth for him. Obviously, he had this "truth" determine his facts, not the other way round, as modern standards of assessing evidence would require. The second, more interesting question is why Zeebout did reject both the centrality of Jerusalem and the fact of the vanishing shadow, a stance which clearly was not self-evident in his time, and which puts him on the threshold of the modern understanding of factual evidence.

5. The position of Jerusalem

As the case of Adorno indicates, if people accepted the evidence that Jerusalem was at the centre of the world, they did so because the position of Jerusalem was important to them. So, before looking at the evidence by which Jerusalem's centrality was upheld, let us have a look at the claim itself.[15] The idea that Jerusalem was the center (or navel, "omphalos") of the world is of respectable antiquity. It can be traced to ancient Jewish traditions. These traditions attribute the central place more in particular to the temple, where the "foundation stone" was believed to mark the midpoint of the earth. Such "omphalos stones" are known from many cultures. It seems likely that the early Christians borrowed the idea from the Jews. The Church father Jerome, who called Jerusalem "umbilicum terrae", is often mentioned as the person who christianized the idea, but the transmission is not fully clear.[16] In any case, rather than in the temple, the Christians put the centre of the world in Mount Golgotha.

Anyway, to the Christians of the first centuries, the idea appears not to have been very important. Historians agree that it is only with the Crusades that Jerusalem came to play an important role in the Christian imagination, initially above all as a powerful image of the heavenly city.[17] But once Jerusalem came to be seen as the world's spiritual centre, this easily led to the idea that it was its physical centre as well. It would be interesting to know whether such a shift is indeed reflected in the biblical commentaries of the period, in their explanations of Psalm 74:12 and Ezekiel 5:5, but this has not been studied. Still, it is hardly a coincidence that the tendency of medieval mappaemundi to depict Jerusalem at the center begins in this very period.[18]

In the wake of the Crusades, the pilgrimages to the Holy Land became a large-scale industry and thereby very much standardized. Local guides showed the pilgrims the various sites in the city, repeating the same stories over and over again. The centre of the earth became firmly fixed in the Church of the Holy Sepulchre, which was consecrated in 1149 and where the centre was marked by the stone described by Zeebout. (The present omphalos stone is a different one.)

It has been shown by Brefeld that most written reports left by pilgrims of their voyage are based on a standard narrative, a kind of travel guide that must have existed in written form but that has been lost. It appears to have been very succinct, an aide-mémoire rather than a real narrative. The "centre of the world" is mentioned in sixteen out of eighteen narratives on which Brefeld's analysis is based. Most texts simply report that "here is the center of the world, as is said by some," without any reference to a biblical or natural argument.[19] (The addition "as is said" merely seems to indicate the lack of an authoritative written source, not any doubt about the claim's truth.)

Even though the position of Jerusalem was important to many people, we should keep in mind that it was not a matter of Church doctrine, nor the subject of devotion. The central location certainly underlined the importance of the biblical places, but in itself probably was not a matter that most pilgrims spent much thought on. They went to the Holy Land to worship at the places where Christ had performed His work of redemption, not to be instructed about geography. Indeed, many travel narratives and descriptions of Jerusalem never mention the centre of the earth, and those that do, do so generally rather as an illustration or a confirmation of the biblical verse, not because it would have any special significance in and of itself. The issue was of interest either to people who wanted to underline the special place of Jerusalem (as seems to be the case for Adorno), or for educated persons who apart from personal devotion also had some interest in the world in general. Belief in the centrality of Jerusalem was not an element of popular or religious culture, but of the worldview of the intellectual elite.

And then, at the end of the Middle Ages, this worldview apparently collapsed. The idea of Jerusalem as the centre of the world disappeared to the point that it was not even worth refuting any more. When by the middle of the sixteenth century astronomers in defense of the motion of the earth started to collect examples of theologians mistakenly deducing cosmographical information from the Bible, they would bring up the flat earth or the antipodes, but none of them would recall the use of Psalm 74:12 or Ezekiel 5:5 to prove the centrality of Jerusalem. Apparently, by that time the argument had long been forgotten.

(Remarkably, however, in the seventeenth century the claim that Jerusalem was the centre of the world would turn up again in the writings of some Franciscan theologians. Vincenzo Berdini in 1642 even attempted to demonstrate this in a rational, scientific way, although without referring to the vanishing shadow.[20] This episode should be studied in the context of the confessionalization of science during the counter-Reformation, which is beyond the scope of the present article.[21])

So, how did that happen? Did people develop a new idea of the world because of new empirical facts, or did the empirical facts gain a new significance because of a changing view of the world?

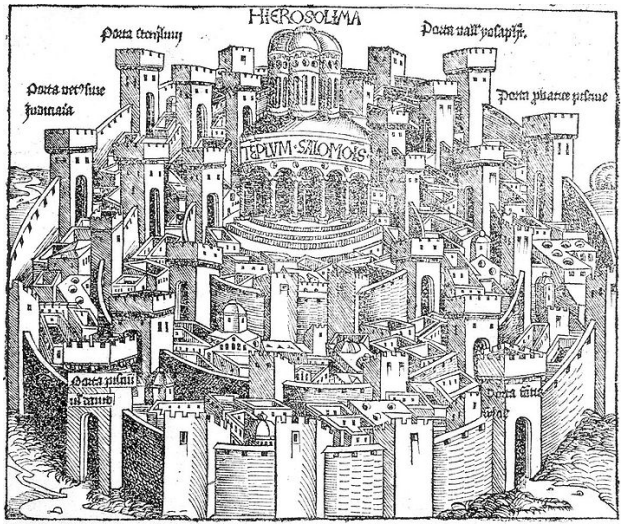

Fig. 2. *A picture of Jerusalem from Hartmann Schedel's* Liber Chronicarum (1493).

6. The vanishing shadow throughout the Middle Ages

Certainly not everybody referred to a "natural" argument when asserting the central position of Jerusalem.[22] As we will see, the argument of the vanishing shadow becomes prominent especially in the fifteenth century. One might speculate that exactly at a time when the centrality of Jerusalem became harder to maintain, it became important to adduce supporting evidence, whereas earlier, people had simply accepted it without questioning. Still, in western Christianity, the argument of the vanishing shadow can be traced as far back as the seventh century. Adamnon, abbot of the Scottish monastery of Iona, around 685 wrote a narrative of the voyage of a certain Arculf to the Holy Land. He tells about a very high column in the centre of Jerusalem that "fails to cast a shadow at midday during the Summer solstice, when the sun reaches the centre of the heavens. (...) And so this column, which the sunlight surrounds on all sides blazing directly down on it during the midday hours (...) proves Jerusalem to be situated at the centre of the world." This is followed by a reference to Psalm 74. The story of the column may go back to ancient Jewish legends.[23]

For a long time, Adamnon's narrative remains a rather isolated case. Even though by the twelfth century, during the Crusades, Jerusalem's central place becomes more commonly accepted in the West, very few writers initially see the need to defend it by referring to a rational argument. (Numbers say little, however, given the fact that many authors, as explained above, appear to follow a single source.) The exception is the twelfth-century Icelandic cleric Nikulás of Thverá, who mentions it in his pilgrimage account in a very succinct form: "The centre of the earth is there, where the sun shines directly down from the sky on the feast of John."[24] Saint John's Day, 24 June, is traditionally the day that midsummer is celebrated. In Iceland, it is known as Jónsmessa and is an important feastday.

Interestingly, when the vanishing shadow turns up in the twelfth century, it is initially NOT used with respect to Jerusalem, although still with respect to the Holy Land. It would appear that the argument had existed as an independent, not strictly local tradition before the "tour guides" in the city seized upon it and monopolized it for the omphalos in the Church of the Holy Sepulchre. In the well-known *Otia imperialia* of Gervase of Tilbury, there is the following passage on the center of the world: "Some feel that the centre of the circumference is in the place where the Lord spoke with the Samaritan woman at the well [cf. Gospel of John, chapter 4]. For during summer solstice at noon the sun passing overhead shines down on the water in the well without casting any shadow, as the philosophers tell happened [fieri] at Syene..."[25] Given that the *Otia* are a work of compilation, the argument must have existed earlier. Interestingly enough, at another place in the same work Gervase does appear to argue for the central position of Jerusalem, but without reference to the vanishing shadow.[26]

The claim that the centre of the world is at the well where Christ spoke with the Samaritan woman is also made in the widely read *Historia scholastica* of the twelfth-century theologian Petrus Comestor (the same book that Zeebout used to refute the claim concerning Adam's skull): "Some say that that place is the navel of our habitable world, because every year on a certain day in the summer at noon the sun shines down on the water of the well without casting any shadow, as the philosophers say that happens at Syene."[27] The ancient Greek mathematician Eratosthenes had estimated the circumference of the earth by measuring the shadow at Alexandria at noon during the summer solstice, at the moment that at Syene (Assuan) the sun stood in the zenith, as shown by its shining down into a deep well. It is interesting that although Petrus and Gervase are aware that the phenomenon can be observed at other places on earth, this does not appear to raise any doubt with them as to the value of the argument.

Somewhat more dubious is an anonymous twelfth century author who claims that a certain mountain called "*Amor Reorum*" [Love of the guilty] is the centre of the earth. This author states that he has established this by a measurement of which he gives a detailed explanation. He had a circular log, twelve cubits long and one in diameter, suspended vertically in the air by means of a rope, and he had moved this installation around until he had found the place where at noon on the seventh of the Kalender of July the shadow of the log was right beneath and of the same circular shape; "and from this very measurement, I learned that the centre of the earth was at Mount Amor Reorum." For greater veracity, the author adds: "This I measured in the year 39. I had not drunk any wine, my eyes were not satiated with sleep (...)."[28] The whole story is definitely too good to be true. It nearly looks like a romance, but it is found in the context of a collection of scientific and scholarly texts. In any case, it does show the importance that apparently was attributed to the argument.

The vanishing shadow becomes firmly connected to the city of Jerusalem only in the well-known Book of

John Mandeville, which must originate from the second half of the fourteenth century. Higgins has noted that this book lays particular emphasis (at least in its most widely divulged versions) on the central place of Jerusalem. Apparently, the author wanted to prove this point by every possible argument. As the book explains, the centrality of Jerusalem "is shown by a spear fixed in the earth at the hour of noon, which casts no shadow in any direction."[29] Apparently, the author did not deem it worthwhile to mention a specific date. In the medieval Dutch version of the book, this omission is made good in a somewhat unexpected way: a spear put erect is supposed to cast no shadow at noon not during solstice, but during the equinox (which would imply that Jerusalem is on the equator).[30]

The Book of John Mandeville was very popular and no doubt helped to make the argument of the vanishing shadow widely known. Interestingly, another (less popular) version of the book of Mandeville, composed between 1396 and 1415 and dubbed by Higgins the Vulgate Latin, does deny that Jerusalem is the centre of the world. The arguments are basically common sense: Jerusalem would have to be on the equator, there would always be equinox, whereas in reality in Judea the polar star can be seen high above the horizon. Moreover, Judea would have to be at the antipodes of the earthly paradise in the east, whereas to this author it seems more probable that it is actually at the midpoint between paradise and its antipode. However, the author does not refer to the vanishing shadow, neither to refute the argument nor in another way. Most of his arguments were pretty sound and commonsensical, but they do not appear to have had much impact for the time being.

By the fifteenth century, the vanishing shadow is not only described in travel narratives, but also in didactic works. An example is an anonymous Dutch text from (probably) 1464, "A short description of this sphere". It appears to have been written for the instruction of clerics and offers the kind of basic knowledge about the world that an educated person should have. It includes such topics as cosmology, chronology, geography, angels, and the human body. Jerusalem is called the centre of the world, again with reference to Psalm 74, but also with appeal to the natural argument: "One also reads that if one places a lance upright at the place where the cross of Our Lord stood on mount Calvary, exactly at noon on the day of St Vitus martyr [15 June] (...) and on the day of St Lucia [13 December] (...), it will not throw a shadow to any side. For at that moment, the sun is right above the lance, and at those times the days are shortest and longest."[31] It is somewhat remarkable that this version of the argument turns up in a text with scholarly pretentions. The alleged fact, that in Jerusalem the sun is in the zenith at *both* the two solstices is not just untrue, but geometrically impossible, as anyone with even a basic understanding of spherics would have known.

7. The vanishing shadow in the last decades of the fifteenth century

As explained before, the idea of Jerusalem as centre of the world appears to have fallen apart in the last decades of the fifteenth century. Interestingly, it is at this very time that the argument of the vanishing shadow is most debated. In the fifteenth century, people would have more access to books and knowledge about the world increased. Some pilgrims to Jerusalem, like Van Ghistele and Adorno, were not just interested in worshipping at the Holy Places but appear to have been driven by genuine curiosity about the world. Their pilgrimages went far beyond the traditional Holy Places. To such people, the question of whether or not Jerusalem was at the centre of the world was of inherent interest. The argument of the vanishing shadow appears to become more prominent, but at the same time it became a topic of investigation.

At nearly the same time that Van Ghistele travelled in the Near East, there were other visitors who commented on the centre of the world. The Baseler dominican Felix Fabri and the German nobleman Bernard von Breydenbach, a lawyer and canon from Mainz, travelled to the Holy Land in 1483-1484 in the same group of pilgrims.[32] They were joined there by the Franciscan Paul Walther von Guglingen, who had arrived a year earlier. All three of them wrote a travel narrative; Guglingen even combined this with a full treatise on the Holy Land. Breidenbach's narrative was soon thereafter published, whereas Fabri's report appears to have been destined for circulation among his convent brothers only. A shortened German version was printed in 1556, but the main work was not published until the nineteenth century. The same is true for Guglingen's itinerary, whereas the accompanying treatise remains largely unpublished to this day.[33]

Interestingly, their descriptions of the centre of the world are completely different. Breidenbach includes only a short description of the omphalos stone adding: "where it is said that the centre of the habitable earth is."[34] The formulation "where it is said" is rather standard and probably copied from the "travel guide" reconstructed by Brefeld.

Guglingen too makes only the barest mention of "the place of the middle of the world" in his itinerary, in a list of things that can be seen in the Church of the Holy Sepulchre.[35] However, in the treatise on the Holy Land that he wrote at the same time, the centrality of the Holy Land and of Jerusalem are a main point. Most of his ideas are of a theological nature, following the metaphysical and cosmological ideas of Bonaventura, but there is also a reference to the vanishing shadow: "And I have heard from persons worthy of belief, and found in writing, that the midpoint or centre on the earth's surface of the whole world is in the middle of the choir of the Church of the Holy Sepulchre. (...) And this place is nowadays marked in the Church of the Holy Sepulchre. And I have myself often been in that place. That Jerusalem is in the centre of the earth is also proven by sun and moon, for in the month of June the sun stands directly above us in Jerusalem, so that a man casts no shadow. The moon has the same position in December, and this is shown by experience."[36] The point made about the moon seems unique. I do not know it from any other source. Again, the fact is not correct and would not prove anything anyway.

In Fabri's narrative, the natural argument is especially prominent. His narrative makes clear that the story was by now rather standard and elicited serious interest from at least some pilgrims. In describing the omphalos stone in

the Church of the Holy Sepulchre, Fabri explains that according to ancient histories, before the church was built philosophers had erected a large column in that place that did not throw a shadow at noon during the spring equinox [sic], as at that moment the sun was standing right above. Interestingly, some people in Felix' company wanted to see this with their own eyes. One of them, a knight, got permission to climb to the dome of the church. There, a place had been made where someone could stand exactly above the omphalos, for the express purpose, as Fabri explains, that people could have the experience of the vanishing shadow. The fact that such a place had been made is reminiscent of the modern tourism industry, but from an astronomical point of view it makes little sense. Even many miles away, there would be no noticeable difference in one's shadow, so it is hard to see why one should stand so exactly at the place of the omphalos. The exact date was clearly of much less concern, for at the time of Fabri's visit it was already July and more than a month past solstice. This apparently bothered nobody.

As Fabri relates, “The knight climbed there at noon to see whether his body would cast a shadow. And he told us for certain that he had not seen any shadow of his body.” Of course, the sun's distance from the zenith at Jerusalem around solstice is not very large, less than ten degrees, and a human body is not a very accurate measuring device, so for a pious pilgrim it was probably easy to see what he believed he should see.

Fabri did not doubt the observation of his companion, but was skeptical whether this actually proved anything about the central position of Jerusalem: "That it would be a sure and true sign that a place is at the centre of the earth if the sun at noon shines so directly above the head of the bodies that the body does not throw a shadow, I do not see. For I have read in various books about several places where bodies at a given time do not throw a shadow.” He gave examples from the works of Dionysius ab Halicarnassos, Petrus ab Abbano (*Conciliator*) and the maps of Ptolemy. “And it is known that those regions are not in the midst of the earth. Many believe that a certain island is in the centre of the world, where however the sun throws a shadow every noon.” He also noted the argument that since the earth was a sphere, any place could be seen as the centre: among the antipodes too, someone would stand under the highest point of the heaven and on the midpoint of the earth. However, Fabri pointed out that Augustine had refuted the existence of antipodes, and reason also seemed to reject it.

However, unlike Zeebout, Fabri does not call the central position of Jerusalem into doubt. His conviction is exclusively based on his reading of the various biblical verses: “This way or that, Sacred Scripture that states that Jerusalem is in the middle of the earth and that our Redeemer worked salvation in the centre of the earth, must be believed.” Zeebout's solution, that these texts could be interpreted in a different way, did apparently not occur to him.[37]

As stated, after Zeebout and Fabri, both the idea of Jerusalem's centrality and the argument of the vanishing shadow appear to vanish. Their criticism therefore happened at a rare moment in time: the idea of Jerusalem's centrality was already losing credibility but was still prevalent enough to be seriously considered.

8. Conclusion I: Facts in the Middle Ages (with a note on methodology)

The discussion about the location of Jerusalem demonstrates that medieval authors definitely cared about facts. It is sometimes suggested that facts were only of secondary importance to them. So, Pamela Gravestock concludes about the question of whether medieval scholars actually believed in the fabulous creatures they described: “Perhaps the most useful way to approach the problem of imaginary animals is to hypothesize that medievals knew quite well that these animals did not exist and to view the questions as to whether or not they actually existed as irrelevant. That is, what was important was that imaginary creatures served a didactic purpose. (...) Perhaps, then, the imaginary animals in the bestiaries were used to fill certain ‘spiritual gaps’ for which the real animals were not as readily adaptable.”[38] It has also been claimed that medieval persons were not really interested in the question whether the relics of the saints they venerated were genuine or not. “The most effective means available from the ninth through eleventh centuries to determine the authenticity of relics was in reality a very pragmatic one: if the relics performed as relics - that is to say, if they worked miracles, inspired the faithful, and increased the prestige of the community in which they were placed - they had to be genuine.”[39] In a similar vein, Alexander has claimed that the maps which placed Jerusalem in the centre belonged to a tradition “of Christian symbolic and mythical geography for which the real world was of little moment. ...for most Christian writers Jerusalem was a spiritual entity which the Christian could experience anywhere.”[40]

At a certain level, these statements are no doubt true. It can hardly be doubted that many things were considered in a purely allegorical or symbolic sense, without necessarily implying that such descriptions referred to anything in the physical world. But it would be wrong to claim that medieval scholars considered the truth in a purely pragmatic or instrumentalist way. As the case of Jerusalem shows us, they wanted to back up their truth claims with solid and observable evidence. We are not talking of an allegorical understanding of the world that is separate from a more practical and realistic approach to reality. The empirical world was founded on moral and religious principles. Factual truths were important because they had a deeper meaning.

However, that certainly did not mean that scholars were interested in a critical evaluation of the alleged facts, detached from their meaning. As is clear from the above examples, the carelessness and inaccuracy of their descriptions is often quite shocking. Equinox and solstice, or summer- and winter solstice, are occasionally confused or put on equal footings. Before the end of the fifteenth century nobody seems to have taken issue with that.

How important these facts were to them is often hard to tell. Ordinary pilgrims in the Middle Ages no doubt had little interest in geographical problems. As stated, the people who were interested in these aspects were those who had some education and were curious about the world and its overall structure. This did not necessarily mean that they were much interested in the way this knowledge was achieved or could be demonstrated, or whether it agreed with other information.

If this case offers any guidance, it seems safe to say that medieval authors were ready to accept as "fact" anything that supported their preconceived worldview. Their use of facts is thereby highly ambiguous. On the one hand, they recognize that facts offer solid and empirical evidence for the claims they make, and that is exactly the reason why they refer to these facts. On the other hand, the things that the facts have to prove are a priori given. Whereas a critical scientific approach would require that the truth was dependent upon the facts, medieval authors, even learned and curious ones, had their facts determined by what they considered the truth.

Methodologically, the above should encourage us to take past authors at their word and not reject or reinterpret their statements simply because they seem absurd or contradictory. Developments in the modern world after all have reminded us that humans have an amazing capability to believe even the most bizarre and outlandish claims. It takes many years of special training to master the art of constructive criticism.

9. Conclusion II: The vanishing centre

It seems safe to say that Jerusalem did not lose its central position because of any new information or insights. The counterarguments had been known for centuries, only, people did not necessarily put any weight to them. Gervase of Tilbury and Petrus Comestor knew that there are other places on earth where the sun at a certain moment is standing at its zenith, but they do not appear to draw any conclusion from that. The argument of the vanishing shadow was as untenable in the seventh or eleventh century as it would be in the sixteenth. Its refutation was largely a matter of common sense. Fabri clearly realised the untenability, even though he still held firmly to the idea of Jerusalem's centrality.

The motives that caused people to assess the arguments for and against Jerusalem's centrality in this way or that have left hardly any trace in the sources. The location of Jerusalem is not the subject of learned debate. Its centrality is questioned by a few authors, but in most cases, the issue is simply dropped, not refuted or answered. Still, if we follow the argument over the years, it appears that there is a significant shift by the end of the fifteenth century. At this time, there was clearly an urge to reconsider the various arguments, even if that not always resulted in a rejection of the traditional view. The natural arguments get more emphasis vis-à-vis the biblical ones. In summarizing the traditional view, Zeebout mentions first the natural argument and then says that the fact is "approved" by the text from Psalms. Johannes Adorno writes that the centrality of Jerusalem is "proven by a natural argument", without mentioning any biblical sentences. And Fabri puts forward the objections against the centrality of Jerusalem at great length before deciding that they are outweighed by the testimony of the Bible. It would seem that to these people the central location of Jerusalem was no longer simply a matter of pious acceptance, but something that demanded proof. Apparently, the importance of independent evidence was recognized even before it overturned the traditional ideas.

Change in religious outlook did not seem to play a role. Jerusalem remained of central importance to the authors we discussed, even to those who no longer saw it as geographically central. Of course, since most of our testimony comes from pilgrims, one could hardly expect otherwise. To what extent the views on Jerusalem coincided with a specific interpretation of the respective biblical sentences should be the subject of a separate investigation. It is worth noting however that in the whole debate, the centrality of Jerusalem is supported by a literal interpretation of the respective biblical texts. Harrison's thesis of a transition from an allegorical to a literal understanding does not appear very helpful to explain the rejection of such a notion.

The suggestion that the change in outlook was mostly due to humanist scholarship does not find much support in our results either. Zeebout was certainly not a critical historian. The recognition that Jerusalem cannot be the centre appears very well to maintain along with ideas on the earthly paradise or other legendary stuff. The rejection of the vanishing shadow was not the result of philological acumen.

The information people had access to was not new, but the available facts were combined in new ways. There appears to have been an active desire to incorporate all knowledge, either old or new, into one's picture of the world. Instead of remaining satisfied with the familiar lore, some people became curious about what was beyond their horizon. In the study of particular questions, they included knowledge that had traditionally not been referred to in this context. The availability of information thereby certainly played a role. In criticizing the centrality of Jerusalem, Fabri referred to his readings, among them the Ptolemaic maps, which before the age of printing would be out of most educated people's reach.[41] Still, it is worth noting that this information did not change his basic view that Jerusalem was the centre of the earth, nor did he doubt the fact of the vanishing shadow (although he did refute its significance). The problem is in how people used the available knowledge, not the availability itself.

The safest conclusion is probably to recognize that even though most of the information itself was not new, its accumulation was. For the learned elite at least, the invention of printing made maps and alternative views of the world more easily accessible. Information now could more easily be retrieved and compared. Moreover, the introduction of printing was only one aspect of a much wider "communications revolution", including postal services and better means of transport.[42] The voyages of discovery too widened people's horizons. Such developments did not automatically change people's minds on important questions, but they did introduce the need to come to terms with a variety of viewpoints.

People can reach agreement on "facts" only if they share a common truth. If documents, or any form of evidence, only need to confirm what everybody already knows, there is no need critically to analyze them. In the Middle Ages, relics, charters, and chronicles typically existed in a small, well-delineated world where there was consensus upon the basic truths. By the end of the fifteenth century, people became aware of a wider world and were much more likely to encounter unfamiliar ideas.

In some cases, this elicited curiosity and the desire to know more about the world. Soon, the falling apart of Christendom into warring factions, each with its own truth, would put many established certainties into dispute. Though this development may not have originated the new outlook, it seems plausible that it reinforced it and helped it survive. Only when truth is called into doubt and needs to be defended in front of a panel of independent, external judges, that is, without a priori certainties, does it become worthwhile to critically assess the relevant facts and make the truth dependent upon them.

Notes

[1] Evelyn Edson, *The world map, 1300-1492. The persistence of tradition and transformation* (Baltimore 2007) 204.

[2] Edson, *World map*, 205-235.

[3] J. Lennart Berggren and Alexander Jones, *Ptolemy's Geography. An annotated translation of the theoretical chapters* (Princeton and Oxford 2000) 43. Józef Babicz, 'De heropstanding van Ptolemaeus,' in: Marcel Watelet ed., *Gerardus Mercator Rupelmundanus* (Mercatorfonds Paribas 1994) 51-69, esp. 56-60. (This book also exists in a French version.)

[4] Edson, W*orld map,* 145; see also 231.

[5] The literature on medieval forgeries is vast and expanding. I will just refer to Detlev Jasper ed., *Fälschungen im Mittelalter* (5 vol, Hannover 1988-1990) (Schriften der Monumenta Germaniae Historica, 33), the result of an international conference at Munich in 1986; Alfred Hiatt, *The making of medieval forgeries. Fake documents in fifteenth-century England* (Toronto 2004).

[6] Here too, the literature is vast. See a.o. Walter Stevens, 'Discovering the past: the Renaissance arch-forger and his legacy', in: Earle Havens ed., *Fakes, lies, and forgeries* (Sheridan Libraries, John Hopkins University 2016) 67-84 (on Annius of Viterbo). Martin Rothstein, 'The reception of Annius of Viterbo's forgeries. The Antiquities in Renaissance France', in: *Renaissance Quarterly* 71 (2018) 580-609. Wolfram Setz, *Lorenzo Valla's Schrift gegen die konstantinische Schenkung: De falso credita et ementita Constantini donatione. Zur interpretation und Wirkungsgeschichte* (Tübingen 1975). Grantley McDonald, 'The Johannine comma from Erasmus to Westminster', in: Dirk van Miert, Henk Nellen, Piet Steenbakkers, and Jetze Touber ed., *Scriptural authority and biblical criticism in the Dutch Golden Age. God's word questioned* (Oxford 2017) 61-72.

[7] Fake natural knowledge has mostly been studied in the case of imaginary animals. See for instance Willem Gerritsen, *Het spoor van de eenhoorn. De geschiedenis van een dier dat niet bestaat* (Leiden 2011). On fake actual specimens see Myriam Marrache-Gourand, 'Merveilles de nature et contrefaçons dans les cabinets de curiosités', in: Pascale Mounier and Colette Nativel ed., *Copier et contrefaire à la Renaissance. Faux et usage de faux* (Paris 2014). The study of alchemy offers another venue; see Tara Nummedal, 'The problem of fraud in early modern alchemy', in: Marc Crane, Richard Raiswell and Margaret Reeves ed., *Shell games. Studies in scams, frauds, and deceits (1300-1650)* 37-58.

[8] Barbara J. Shapiro, *A culture of fact. England 1550-1720* (Ithaca (NY) 2000). David Wootton, *The invention of science. A new history of the scientific revolution* (London 2015) 251-309.

[9] Peter Harrison, *The Bible, protestantism, and the rise of natural science* (Cambridge 1998).

[10] Wolfgang Harms, 'Bedeutung als Teil der Sache in zoologischen Standardwerken der frühen Neuzeit (Konrad Gessner, Ulisse Aldrovandi)', in: Hartmut Boockman, Bernd Moeller, Karl Stackmann ed., *Lebenslehren und Weltentwurfen im Übergang vom Mittelalter zur Neuzeit. Politik-Bildung-Naturkunde-Theologie* (Göttingen 1989) 352-369; Brian Ogilvie, *The science of describing. Natural history in Renaissance Europe* (Chicago 2006) esp. 87-138. Incidentally, the influence of humanist scholarship on some proponents of seventeenth-century science has been discussed, e.g. Paul R. Muller, 'Textual criticism in early modern natural philosophy: the case of Marin Mersenne', in: Kevin Killean and Peter J. Forshaw ed., *The Word and the world. Biblical exegesis and early modern science* (New York 2007) 78-90.

[11] Ambrosius Zeebout, *Tvoyage van Mher Joos van Ghistele* (R.J.G.A.A. Gaspar ed.) (Hilversum: Verloren 1998).

[12] Zeebout, *Tvoyage*, 98. My translation. The reference is to Psalm 74: 12, in the King James version: [God] "working salvation in the midst of the earth." In the vulgate version, this is Psalm 73. (All three manuscripts give the Psalm as 77.)

[13] Jacques Heers & Georgette de Groër ed., *Itinéraire d'Anselme Adorno en Terre Sainte (1470-1471)*. Paris (éditions CNRS) 1978. (Sources d'histoire médiévale publiées par l'Institut de Recherche et d'Histoire des Textes) 254, 268. My translation.

[14] Zeebout, *Tvoyage*, 98-99. My translation. The passage has earlier been discussed by Hans van Dijk, 'Reizigers naar het Heilige Land en het middelpunt van de wereld', in: W.P. Gerritsen, Annelies van Gijsen en Orlanda S.H. Lie ed., *Een school spierinkjes. Kleine opstellen over Middelnederlandse artes-literatuur* (Hilversum: Verloren 1991) 49-52.

[15] For earlier discussions on the idea of Jerusalem as centre of the earth, see Dorothea R. French, 'Journeys to the center of the earth: medieval and Renaissance pilgrimages to Mount Calvary', in: Barbara N. Sargent-Baur ed., *Journeys toward God. Pilgrimage and Crusade* (Kalamazoo, MI 1992) 45-81; Iain Macleod Higgins, 'Defining the earth's center in a medieval "multi-text". Jerusalem in the Book of John Mandeville', in: Sylvia Tomasch and Sealy Gilles ed., *Text and territory. Geographical imagination in the European Middle Ages* (Philadelphia1998) 29-53. John Kirtland Wright, *The geographical lore of the time of the Crusades. A study in the history of medieval science and tradition in Western Europe* (New York: American Geographical Society 1925) 259-261. More generally on the perception of Jerusalem: Folker Reichert, 'Nabel der Welt, Zentrum Europas und doch nur Peripherie? Jerusalem in Weltbild und Wahrnehmung des späten Mittelalters', in: *Zeitschrift für Historische Forschung* 38 (2011) 559-584.

[16] Jewish beliefs that Jerusalem is the centre of the earth are discussed by Michael Tilly, *Jerusalem - Nabel der Welt. Überlieferung und Funktionen von Heiligtumstraditionen im antiken Judentum* (Stuttgart 2002). See also Philip S. Alexander, 'Jerusalem as the omphalos of the world: on the history of a geographical concept', in: *Judaism* 46 (1997) 147-158. For Jerome, see Susan Weingarten, *The saint's saints. Hagiography and geography in Jerome* (Leiden and Boston: Brill 2005), 198; Mette B. Bruun, *Parables. Bernard of Clairvaux 's mapping of spiritual topography* (Leiden and Boston 2007) 27.

[17] Cf. the spiritual topography of Bernard of Clairvaux. Bruun, *Parables*, 28-30, 66-70, 103-105.

[18] David Woodward, 'Medieval mappaemundi', in: J.B. Harley and David Woodward ed., *The history of cartography*, I *Cartography in prehistoric, ancient, and medieval Europe and the Mediterranean* (Chicago and London 1987) 286-371; see p. 340-342. Ingrid Baumgärtner, 'Mapping narratives: Jerusalem in medieval mapped spaces', in: eadem, *Mapping narrations - narrating maps. Concepts of the world in the Middle Ages and the early modern period* (Berlin and Boston 2022) 189-219, see p. 195. French, 'Journeys', 60-65, argues that the rise of sacred cartography directly influenced the idea of Jerusalem as a physical, not just symbolic centre.

[19] Josephien Brefeld, *A guidebook for the Jerusalem pilgrimage in the late Middle Ages. A case for computer-aided textual criticism* (Hilversum 1994) 52, 53, 140, 194-195.

[20] Marianne P. Ritsema van Eck, *The Holy Land in observant Franciscan texts (c. 1480-1650). Theology, travel, and territoriality* (Leiden and Boston 2019) 66-71.

[21] On confessionalization, see among others Andreas Blank, 'Confessionalization and natural philosophy', in: David M. Miller and Dana Jalobeanu ed., *Cambridge History of Philosophy of the Scientific Revolution* (Cambridge 2022) 111-27.

[22] Several of the following references were suggested by Reichert, 'Nabel der Welt', 560. See also French, 'Journeys', 55.

[23] Denis Meehan ed., *Adamnan's De locis sanctis* (Dublin: Dublin Institute for Advanced Studies 1958) 56 (Latin), 57 (translation). For the possible Jewish origin cf. French, 'Journeys', 52, referring to Eliade.

[24] Quoted in John Wilkinson a.o. ed., *Jerusalem pilgrimage 1099-1185* (London: The Hakluyt Society 1988) 217. For the original text, see Rudolf Simek, *Altnordische Kosmographie, Studien und Quellen zu Weltbild and Weltbeschreibung in Norwegen und Island vom 12. bis zum 14. Jahrhundert* (Berlin and New York 1990) 483; on Nikulás, see 265. A number of other sources translated by Wilkinson also refer to Jerusalem as centre of the earth, (87, 90, 92, 103, 128, 198, 212, 233, 260), but without mentioning the vanishing shadow.

[25] Wright, *Geographical lore,* 260, with the Latin text quoted in note 24 on page 461.

[26] Wright, *Geographical lore*, 259-260, and note 19 on p. 461.

[27] Petrus Comestor, Historia scholastica, in: J.P. Migne ed., *Patrologia cursus completus, series Latina*, CXCVIII, *Adami Scoti opera omnia* [etc.] (Paris 1855) column 1567. My translation.

[28] Wright, *Geographical lore*, 260, with the Latin text quoted in note 23 on p. 461. A few sentences are hard to understand, but the overall message is clear. Solstice of course falls nearly two weeks before 7 Kal. Julii (June 27) in the Julian calendar. The manuscript is described in G.F. Warner and J.P. Gilson, *Catalogue of Western manuscripts in the old*

Royal and King's collections, I (London: British Museum 1921) 192-193, MS 7 D xxv. The story of the experiment appears to be part of a collection of notes and tracts on chronology, meteorology, etc.

[29] Iain Macleod Higgins, 'Defining the earth's center in a medieval 'multi-text". Jerusalem in the Book of John Mandeville', in: Sylvia Tomasch and Sealy Gilles, *Text and territory. Geographical imagination in the European Middle Ages* (Philadelphia1998) 29-53. See esp. 44-45; quote on p. 44.

[30] N.A. Cramer ed., *De reis van Jan van Mandeville, naar de middelnederlandsche handschriften en incunabelen* (Leiden: Brill 1908) 157. See also Van Dijk, 'Reizigers'.

[31] *Eyn corte decleringhe deser spere, uitgegeven door een werkgroep van Utrechtse neerlandici* (Utrecht: Instituut de Vooys 1983) I, 68. (My translation.) The date (in the Julian calendar) given for the winter solstice is more or less correct for the fifteenth century, but the date for the summer solstice is several days off. Quite likely, the author simply took the nearest major feastday.

[32] On the relation between Fabri and Breydenbach, see Elizabeth Ross, *Picturing experience in the early printed book. Breydenbach's Peregrinatio from Venice to Jerusalem* (University Park (Pen) 2014) 10-11.

[33] On Guglingen, see Ritsema van Eck, *Holy Land*, 19-22, and 36-51 for a summary of his treatise.

[34] Bernhard von Breydenbach, *Sanctarum peregrinationum in montem Syon ad venerandum Christi sepulcrum in Jerusalem* (Mainz 1486). No page numbers. The passage on the centre of the world is the third paragraph of the chapter "De egressu ex templo dominici..." My translation.

[35] Paulus Walther von Guglingen, *Itinerarium in Terram Sanctam et ad Sanctam Catharinam*, M. Sollweck ed. (Tübingen 1892) 291: "Item locus medii mundi".

[36] The Latin text is given by Ritsema van Eck, *Holy Land*, 50 note 45. My translation.

[37] Felix Fabri, *Evagatorium in Terrae Sanctae, Arabiae et Egypti peregrinationem*, C.D. Hassler ed., I (Stuttgart 1843) 306-308: De loco, ubi dicitur esse centrale medium totius mundi. The passage is discussed by Higgins, 'Defining the earth's center', 38-39, and French, 'Journeys', 72-75.

[38] Pamela Gravestock, 'Did imaginary animals exist?', in: Debra Hassig ed., *The mark of the best. The medieval bestiary in art, life, and literature* (New York and London 1999) 119-139, on p. 130.

[39] P. Geary, *Furta sacra. Thefts of relics in the central Middle Ages* (Princeton 1978) 66.

[40] Alexander, 'Jerusalem', 154.

[41] For a discussion on the impact of Ptolemy's Geography, see Jean-Marc Besse, *Les grandeurs de la terre. Aspects du savoir géographique à la Renaissance* (Paris 2003), 112-132. For Ptolemy's introduction in the west, cf. Berggren and Jones, and Babicz, as in note 3. Besse does not discuss ideas on the inhabited world's centre.

[42] For the term "communications revolution", see Wolfgang Behringer, 'Communications revolutions: a historiographical concept', in: *German history* 24 (2006) 333-374.