The Appearance of Lighthouses on Portolan Charts: 1300-1600 AD[*]

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Seafaring is the life-blood of the Mediterranean and it has been for several millennia: the Phoenicians built their empire by the sea, as did the Athenians. The Romans understood the importance of the Mediterranean for the shipping of goods between the far corners of their Empire, and later the Byzantines ruled the eastern Mediterranean with their *dromon* and *naves*, while the Arabs secured dominion over the north African coast, conquered Sicily, and pushed deep into Iberia and the Italian peninsula through naval power. By the high Middle Ages, seafaring merchants and naval conquest fuelled the development of western Mediterranean nations. The same is true for the Atlantic European coast. In his seminal 1949 work *La Méditerranée et la Monde Méditerranéen à l'Époque de Philippe II* Fernand Braudel examined the entire economic history of the fifteenth-and sixteenth-century Mediterranean, and the importance of the sea was well documented. In more recent years David Abulafia (1987, 1994, 2008) has written extensively on medieval Mediterranean and eastern Atlantic history and economy with particular reference to seafaring, and Geoffrey Scammell (1981, 1989) concentrated chiefly on how the dominion of the seas led to the first empires.

This concentration on the history of Europe from a maritime perspective has often been dubbed the 'new thalassology.' However, as Sarah Tyache illustrated in the Sandars Lectures, although these historians often use maps contemporary to their periods as illustrations, especially the portolan chart, rarely is there any concentration on the history of cartography as a subject (Tyache 2007:2-3). Even less has been written about the use of lighthouses from the fourteenth through sixteenth centuries, which until the advent of GPS have been vital to mariners navigating treacherous coastlines. This paper will attempt to answer three questions: to what extent lighthouses were present in Europe between AD 1300 and 1600; to what extent these lighthouses were depicted or identified

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on portolan charts; and finally, what can this relationship reveal about seafaring in the Mediterranean and western European coast between the fourteenth and sixteenth centuries?

Portolan Charts

In the first broad survey of portolans published in English since 1897, Tony Campbell (1987) concluded that these charts and atlases, having been drafted by experts in seafaring, were the most geographically realistic among cartographic traditions and designed accurately to aid in navigation. Although their origin is debatable, most surviving portolans are from Italian, Catalan, or Majorcan chartmakers. Some scholars including archaeologist Arlington Mallery (Lear 1958:22) and historian Charles Hapgood (1979) have argued for an ancient origin, but more likely is a medieval one - to accompany *periploi* or *pilot books* (written sailing directions) such as *Lo compasso da navigare* (Freiesleben 1983:125), or drawn from the data contained within these pilot books (Lanman 1987), or as compilations of 'skipper-charts' (Nordenskiöld 1897). Although navigational charts are mentioned in earlier medieval documents, the earliest survivour, the *Carte Pisane*, dates to the end of the thirteenth century.

Portolans are large parchments or bound atlases comprising the coastal outlines of the Mediterranean, Black Sea and the eastern Atlantic coast. Islands, shoals, bays, headlands, and estuaries conformed to certain conventions.[1] More importantly, portolans included sixteen or, from the mid-fourteenth century onwards, usually thirty-two compass points perfectly formed in a large circle with straight lines running between each point and beyond to the edge of the parchment, known as *rhumb* lines or *loxodromes*. In combination with a compass, these lines allowed navigators to follow a particular trajectory by keeping a constant bearing parallel to one of the *rhumbs*. Francesco da Barberino in the early fourteenth century referred to only a chart, lodestone (compass) and sandglass as necessary for navigation in his *Documenti d'amore* (Campbell

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[1] Small islands are generally depicted as blocks of colour to be easily recognised, rocky shoals were drawn as black dots, sandy shoals as red dots, and bays, headlands and estuaries were simplified and enlarged.

1987:441). Of course, according to Campbell, the true 'lifeblood' of the portolans are the hundreds or sometimes thousands of toponyms (place-names), which run perpendicular to the coastline around the entire map (1987:415). These ports were placed with accuracy and forethought, and it is from these that the term 'portolan' is derived.

According to Campbell's census (1986), there is one late-thirteenth-century portolan chart (the *Carte Pisane*), thirty-three charts/atlases that can be attributed to the fourteenth century, and a few less than 150 that can be attributed to the fifteenth century. Many portolans are undated and their assumed date is debatable. There are probably 400-600 charts and atlases dating to the sixteenth century, and even more from the seventeenth, though their form changes considerably and it is questionable if the term 'portolan' can continue to be used for these later documents. The most recent census of portolan charts comprises 1842 charts and atlases (Pflederer 2009).

Portolans have been studied since the late nineteenth century: Nordenskiöld's *Periplus* (1897) is the first major study of portolan charts and many of his theories and categorisations still form the groundwork for research. Campbell (1987) noted that Catalan and Portuguese charts were poorly understood until Pastor and Camarrero's *La Cartografia Malorquina* (1960) and *History of Portuguese Cartography* (1969-71) by Armando Cortesão, although there is still very little primary evidence for Portuguese cartographic traditions before the seventeenth century. Unfortunately, although mentioned in medieval documents centuries earlier, no Portuguese portolan survives before the end of the fifteenth century. Campbell (1987) has discussed the origins, the methods of compilation and drafting, stylistic elements, hydrography, the chartmakers and finally the overall function of the charts. He also identified numerous possibilities for future study. More recent research completed by Ramon Pujades i Bataller (2007) discusses the economic and cultural history of the charts in great detail, as well as inquiring further into the production process, the chartmakers and their clients. He also provides an in-depth inquiry into the relationship between the charts and the history of cartography within the different areas of the Mediterranean.

The Medieval Pharos

Lighthouses have been a feature of the Mediterranean coastline for over two millennia and several have been recorded in Classical antiquity. The third-century-BC *Pharos* of Alexandria was the first recorded lighthouse, but as Hague and Christie (1975:3) indicated, lighthouses of some form or another must have existed long before as no prototype could have been so grand. After the fall of the Roman Empire the building of new lighthouses generally ceased and extant ones fell into decline and disuse. New lighthouses begin to appear in the historical and archaeological record from the thirteenth and fourteenth centuries, and doubtless many smaller lighthouses and signal fires were used that are not noted in surviving records.

There has been little academic inquiry into the presence of lighthouses in the medieval period. First, historical records concerning the use and maintenance of lighthouses are scarce until the seventeenth century. Often, where there is a short statement or inference to a lighthouse, the document is concerned with another subject, and the lighthouse is likely to go unheeded by the historian/diplomatist. Second, although today lighthouses are thought of as purpose-built towers, in the medieval period most lighthouses would simply have been a signal fire burning at the top of whatever was available - a castle, a city wall tower, or a church. Thus they would not necessarily be recorded in historical records as a lighthouse, nor would they be noted as a lighthouse in the archaeological record.

This is not to say there is no evidence; Hague and Christie (1975) gave several examples of documented lighthouses and discussed their presence, construction and use from the classical through the modern era. This work is concerned mostly with later lighthouses for which there is more evidence. As a result, their medieval section is sometimes weak, and a number of their claims for the location of a medieval lighthouse are not properly referenced to any particular evidence. In addition, although providing a map of the locations of sixty-six medieval lighthouses in the Mediterranean and European coastline (Hague and Christie 1975:11), more than half are not discussed in the text. Certainly there exists ample room for further historic inquiry.

It is difficult to determine to what extent lighthouses were needed in the medieval period to aid seafaring, but history has provided a few examples. In 1246, King Louis IX of France led a crusade and set sail from Aigues Mortes in southern France, where he built the *Tour de Constance* and placed a light on the tower to protect the fleet (Hague 1975:13 n20). However, this light may have been more of a symbol for his fleet to sail in good wind and triumph in battle than a functional lighthouse to guide ships around a dangerous cape or rocky shoals. By the fourteenth century, Venice had become a bustling commercial port and in 1312 there was call to erect a *phano magnum et pulcherrimum* (a great and illustrious light) at the church of San Niccolo di Lido. The previously mentioned pilot book *Lo compasso da navigare*, written in the middle of the thirteenth century mentions that Genoa 'has a cape to the west called Cape Faro on which is a high white tower on which they put a great light at night' (Taylor 1956:107).

Hydrographically, it is likely that several documented lighthouses were functional: the usefulness of the twelfth-century lighthouse at Cape Pelorus is mentioned several times in the itinerary of King Richard I for guiding his ships through the Straits of Messina (Hague 1975:13). The shoals of Meloria just south of Porto Pisano were a great hazard, and a lighthouse was erected there in 1157 (though it was destroyed by Charles of Anjou in 1267, rebuilt, and again destroyed by the Genoans and Florentines in 1290) (Hague 1975:12). In 1314, Walter de Godeton was ordered by the courts to build the lighthouse of *St. Catharine's* on the Isle of Wight after he had lost his ship in the treacherous waters. He sold the salvaged cargo to the islanders hoping to convince the owners (the church) it was a complete loss. The lighthouse was maintained for a time, at least until 1328, and housed a priest to attend to the light (Hague 1975:17). Charters of 1277 of the Cinque Ports refer to the collection of 'fire-pence' (tolls) to maintain the lighthouses at the ports of Yarmouth and Rye (Hague 1975:21). A grant of 1261 gave the Barons of the Cinque Ports the right to collect 2d from every laden vessel calling at Winchelsea for the maintenance of the light 'for the safety of sailors putting in there by night' (Hague 1975:24). Around 1360, Edward the Black Prince built a lighthouse on the island of Cordouan in the mouth of the Gironde, and a 1409 document confirmed its

construction was to ensure the safety of Edward's ships during the English occupation (Hague 1975:19-20).

The Lighthouse Depicted on Portolan Charts

Although more study is required to fully understand the medieval lighthouse, it is safe to posit that some lighthouses were constructed to function as navigational beacons in the medieval period. Because portolan charts were used as an aid in navigation it is possible to speculate that they would include lighthouses. There are several possibilities for how this might have been accomplished: first, because rocky and sandy shoals were consistently depicted with red or black dots or crosses, perhaps a tiny pictorial symbol might have been used. Second, as images or vignettes were often placed on the portolans for the grandest ports, these may depict the actual tower from which a light was kept.

   A third possibility is that lighthouses may have been included as toponyms. The potential for their appearance is shown in Table 1 in four languages for three words, though alternate spellings are entirely likely. However, caution must be used in connecting the presence of these words to specifically denoting a lighthouse: *Faro* is a district and city in Southern Portugal, and the name evolved from the Muslim chieftain Al-Harun who founded the city (Blot 2004:198-199), not from the presence of a lighthouse. The same applies to *Ferol*, appearing in a 1593 chart by Voltius, which is the next toponym east of La Coruña in Galicia. On a promontory east of La Coruña there is a grand lighthouse, known as the Tower of Hercules, dating to the second century AD, but the toponym *ferol* is more likely referring to the nearby town, known today as El Ferrol, though possibly thus named after the Tower of Hercules itself.

Language	Lighthouse	Light	Lamp
Latin:	Pharo	Lux/Luxe	Lumen
Italian (Tuscan):	Faro	Luce	Lampada
Catalan:	Far	Llum	Llum
Portugese:	Farol	Luz	Lâmpada

Table 1: Toponymic possibilities for 'lighthouse' that may appear on a portolan.

As a final possibility, many of the ports are marked in red ink instead of the usual black. Nordenskiöld maintained that the red-inked ports are, with few exceptions, the same between all the charts of the same time period, and denote not necessarily the size of the port, but its suitability as a port of call to take on provisions (1897:18). Campbell (1987) was cautious of this hypothesis, and new research on which this paper is based shows that there is considerably more variability in the red-inked toponyms than Nordenskiöld argued. The purpose of the red emphasis is simply not yet understood, and though it plausibly could denote the presence of a lighthouse, it is unlikely to be red for only that reason.

The surviving portolan charts are spread around the libraries, archives and private collections in Europe and the United States, and facsimiles are difficult to come by. Those that are available are, with a few exceptions, poor monochromatic, hand-drawn copies or, if digital, of insufficient resolution. Nordenskiöld (1897) provided hand-drawn facsimiles of twenty-four portolan charts from the fourteenth to the sixteenth centuries, but it is only possible to read the toponyms on fifteen of these monochrome facsimiles, and the red-inked toponyms are impossible to identify. He did, however, provide a table of all the toponyms of four of the aforementioned legible fifteen portolans and identified when the port was in red ink; these are the anonymous fourteenth-century Luxoro Atlas, the anonymous 1375 Catalan Atlas, the 1426 chart by Giroldis, and the 1593 chart by Voltius. To these four, doctoral research on which this paper is based, has added toponyms in Italy (from Durrës in Albania westwards along the coastline to Avignon), Sicily, Corsica, Sardinia, Crete and Cyprus of three charts and one atlas: a 1470 chart by Gratiosus Benincasa (London, British Library, Add. MS. 31318A), a 1467 atlas by the

same (London, British Library, Add. MS. 11547), an undated chart attributed to Gratiosus Benincasa[2] (London, British Library Add. MS. 31318B), and an anonymous, undated atlas (London, British Library, Add. MS. 31316).

These toponyms were compared to a list of fifty-six lighthouses that probably existed during the thirteenth to the sixteenth centuries derived from the work of Hague and Christie (1975), and an online database of lighthouses compiled by Dr. Russ Rowlett of the University of North Carolina (2008). These fifty-six appear in unhighlighted rows in the Appendix. From these sources it has been possible to carry out a limited analysis and make observations, however, a more detailed study is needed before any concrete conclusions can be drawn.

Results

Careful examination of portolan charts has revealed that there is no small symbol used to identify a lighthouse. This is perplexing, considering that because special care was taken to identify the hazards near the coast, a symbol for a lighthouse could have easily been added. However, vignettes of the major ports do occasionally show a lighthouse: the 1373 Pizigano Atlas shows a vignette of Venice with its campanile/lighthouse and a vignette of Genoa including a lighthouse, and the 1403 Beccari chart does the same for Genoa (Campbell 1987:397-398, fig. 19.8). A similar vignette for Genoa appears in the aforementioned anonymous chart presumed to be by Benincasa (MS BL Add. MS. 31318A). The 1497 Jehuda Ben Zara chart also shows a vignette for Genoa, clearly depicting the lighthouse (Figure 1). The same is true for the Jacopo Maggiolo Chart dating to the second half of the sixteenth century (Biadene 1990:80) and the Matteo Prunes chart of 1560 (Biadene 1990:88). Mateo Prunes again shows the same vignette in his 1563 chart (Figure 2).

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[2] The British Library incorrectly attributed this chart to Gratiosus Benincasa by cataloguing and storing it with another signed and dated chart, but the style and palaeography indicate different authorship. More work is forthcoming.

Figure 1: Vignette of Genoa from the Jehuda Ben Zara chart of 1497. Note the four-tiered lighthouse on the bottom left of the city on a promontory. Image digitally courtesy of the Lorente Giménez Foundation (http://fglorente.org/mapas.html).
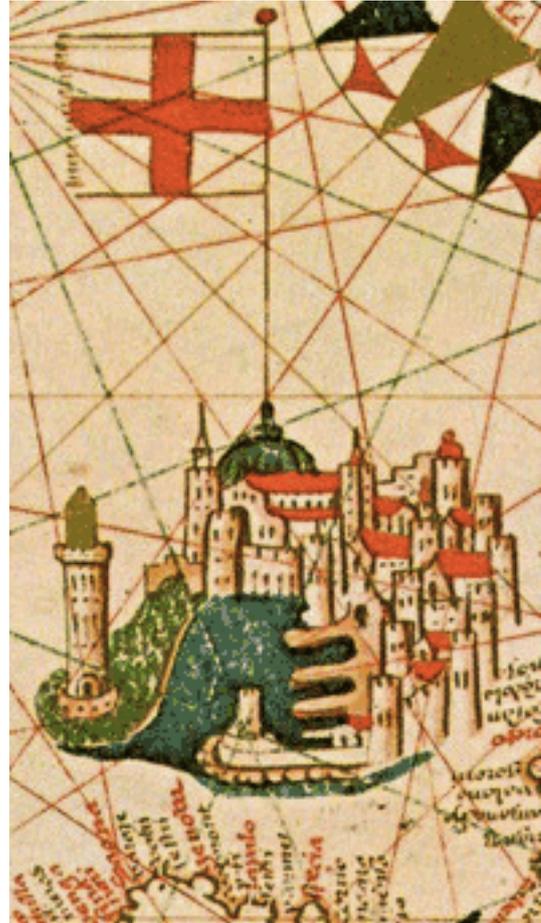
Figure 2: Vignette of Genoa from the Mateo Prunes chart of 1563. Image courtesy of the Lorente Giménez Foundation (http://fglorente.org/mapas.html).

The Joan Martines atlas of 1570 shows the lighthouse of Barcelona atop the hill of Montjuïc (Figure 3) and the Jacobus Russus chart of 1563 does the same (Figure 4). Unfortunately on most portolans these vignettes are rare or non-existant, most are generalised, and not accurate depictions of the port itself.
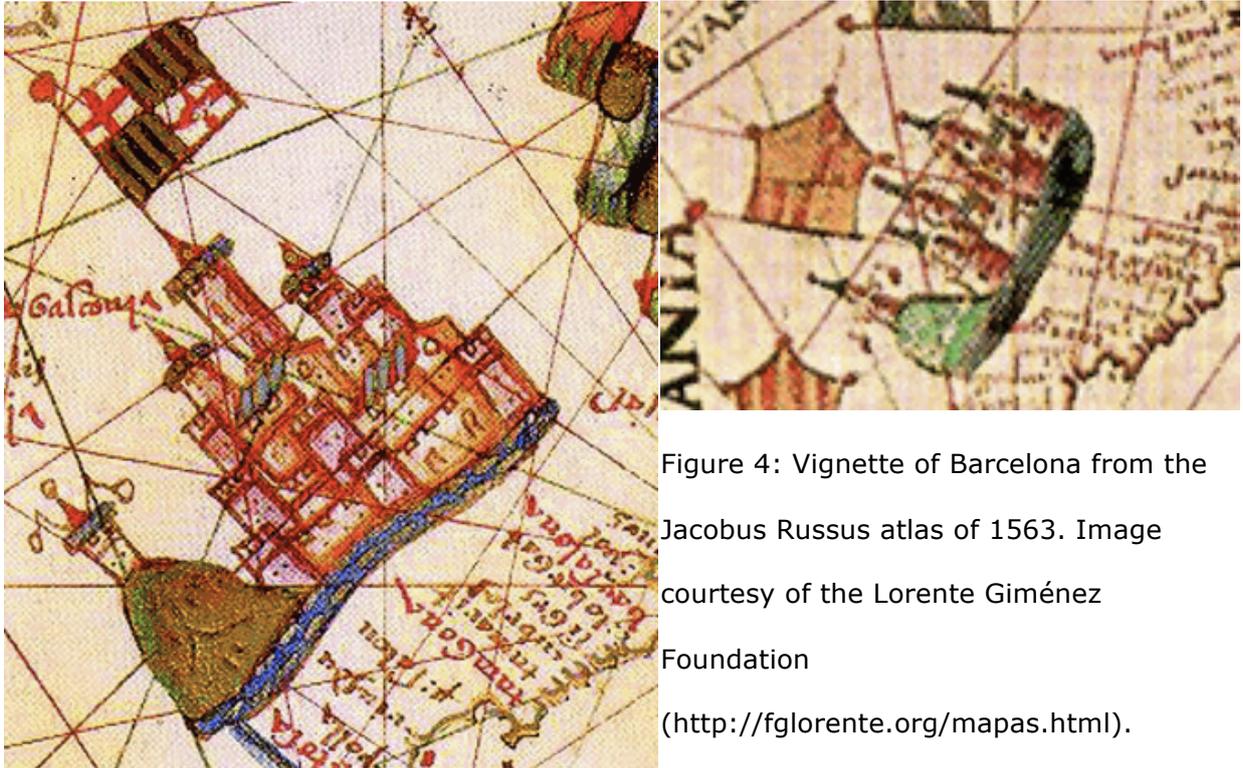
Figure 4: Vignette of Barcelona from the Jacobus Russus atlas of 1563. Image courtesy of the Lorente Giménez Foundation (http://fglorente.org/mapas.html).

Figure 3: Vignette of Barcelona from the Joan Martines atlas of 1570. Note the tower atop the hill of Montjuïc in the bottom left, the red triangle and yellow dot may be indicative of fire, and the cranes to either side would have been for hoisting fuel. Image courtesy of the Lorente Giménez Foundation (http://fglorente.org/mapas.html).

Toponymic examination for lighthouses reveals that of the fifty-six discussed above, only two (*co de far* for Genoa and *faro* for Kassandra on the western-most Chalkidiki peninsula) are recorded toponymically, yet a further five are found that are not in the list, making a total of sixty-one, which are listed in the Appendix. The five new locations are noted in bold capitals and shaded. Concerning the two lighthouses identified both historically and toponymically on the charts to the west of Genoa is a promontory, and on

many portolans a place-name appears there as some derivation of *co de far* (cape of the lighthouse). The lighthouse built there in 1130 was of great importance for navigation into the harbour (Hague 1975:12), and when it was rebuilt in 1543, *La Lanterna* as it was known, became the tallest lighthouse in the world, taller even than the Pharos of Alexandria, and still today the tallest masonry-built lighthouse (Hague 1975:21). Unfortunately no medieval documents have been found referring to the lighthouse at Kassandra, on the westernmost of the Chalkidiki peninsulas, but it did appear on Hague and Christie's map of medieval lighthouses. Only in one examined chart did the toponym *faro* appear on the Kassandra peninsula: the c.1350 Luxoro Atlas.

Of the other five 'lighthouse' toponyms, it is difficult to be certain whether these actually corresponded to a then extant lighthouse. The island named *La fara*, near Dalmatia, has been known as 'Pharos' since Roman times, but there is no evidence of a medieval lighthouse. *Faro* (in southern Crete near Ierapetra) appears in two of the examined charts but again, there is no evidence for a lighthouse. In fact just one, the toponym *Luxe*, appearing on several charts just north of Ravenna, has historical evidence supporting it; potentially referring to a campanile built by Guido of Ravenna in the eleventh century of the Benedictine abbey there (Kleinhenz 2004:924). According to Hague, it was also the location of Roman lighthouse (1975:5).

Clearly, there seems to be no correlation between a historically documented lighthouse and its appearance on a portolan toponymically, symbolically or pictorially. As previously mentioned, the nature of the red-inked toponyms is far from clear; Genoa is always depicted in red ink, but it was an important port, one of the centres of chart drafting and the toponym *co de far* does not appear in red. In fact none of the five 'lighthouse' toponyms are in red ink, and in places where there was a historically certain lighthouse, e.g. Cordouan, there is no notation of a lighthouse in any form.

Conclusion

It is unfortunate that on the examined portolans, there seems to be no intentional or consistent mention of lighthouses, yet great care was taken to chart the hazardous

shoals, rocks and promontories. There are a few possible reasons for this: first, perhaps lighthouses were not as necessary as they are today. According to Campbell, with a lodestone, sandglass and accurate chart, long voyages could be completed with accuracy, especially in the Mediterranean, and contrary to popular belief, ships did not hug the shore because they were safer travelling in the open sea on direct courses (1987:387).

Second, as the grant to the Barons of the Cinque Ports to collect light-tolls for Winchelsea, Yarmouth and Rye shows, the upkeep of lighthouses was expensive. As a result lighthouses such as the Tower of Hercules at La Coruña could fall into disuse. Highly important in Roman times, there is no evidence it was used as a lighthouse in the medieval period. It was not until 1682 that a refurbishment began at the request of the English, Dutch and Flemmish (Hague 1975:14). If navigators could not rely upon lighthouses, it would not be prudent to include them on a chart. This is especially true for the surviving portolans because all are archival exemplar; unfortunately none survive that were actually used at sea (Campbell 1987:440).

Finally and most certainly, there is simply a lack of understanding about portolan charts and medieval lighthouses. Happily, the study of portolan charts is progressing, and more will no doubt be published in the years to come. However, as this paper has demonstrated, serious academic inquiry into lighthouses, both historical and archaeological, is long overdue. A catalogue of all documented medieval lighthouses might number anywhere from just a few more than Hague and Christie found, to the hundreds or even thousands (which could have existed). Ironically these beacons of light seem to be quite elusive.
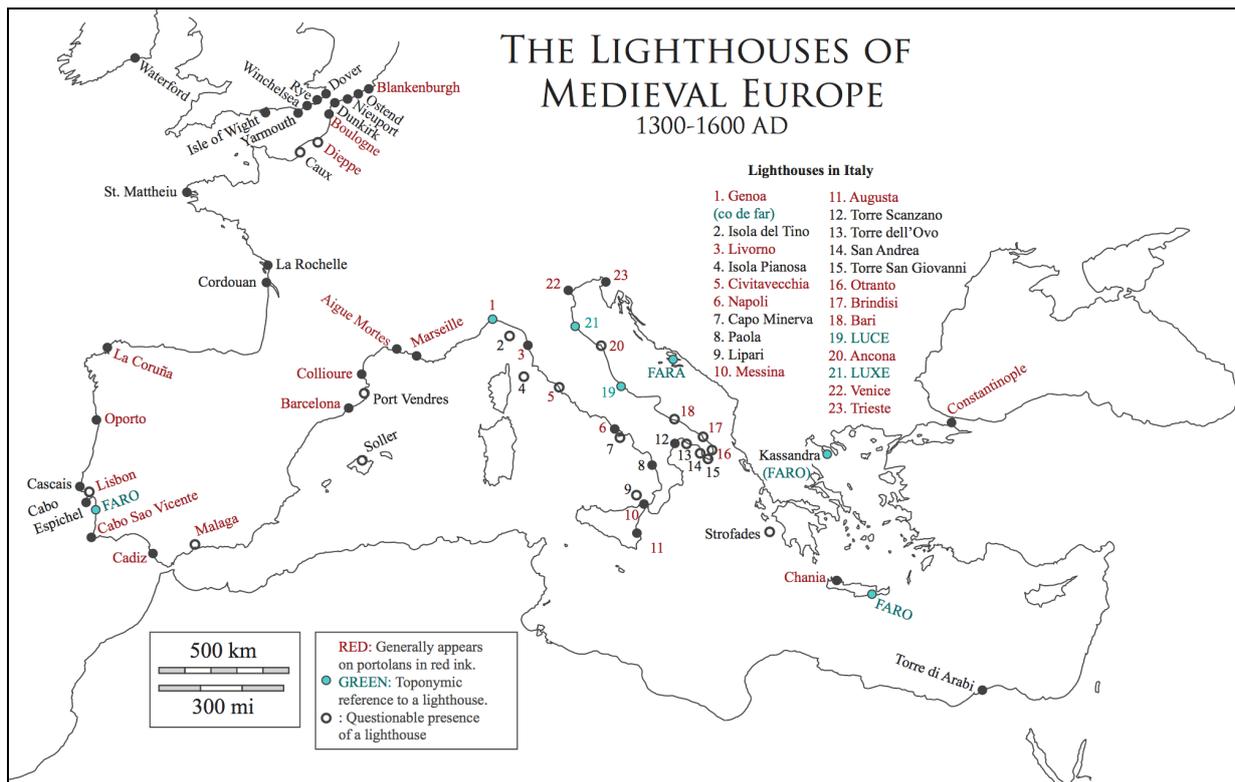
Figure 5: The Lighthouses of Medieval Europe. The outline of the Mediterranean with scale courtesy of Daniel Dalet and the Marseille historical geography unit (http://histgeo.ac-aix-marselle.fr).

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