Representative Portolan Charts

Two of the major themes throughout the history of humankind are the city and transportation. Those interrelated themes are brought together by maps. Anthropologists tell us that cities were first constituted in about 3500 BC as people gathered together for protection. The social and economic advantages were then discovered. People with similar financial, faith or information needs gravitated toward each other as trade, religion, and education centers evolved. The cities that prospered first were built around intersections or ports where meetings for commerce were most practical. As centers for land or sea transportation, the emerging cities were points to which first paths, then roads or sea routes would lead. Guides to these points were probably first personal lists, then shared lists which evolved into portolani, then more sophisticated maps, atlases, and globes for virtual travel.

Originally the portolano was no more than a list of sailing instructions. It stated simply the directions and distances between ports or prominent landmarks. There were no pretensions to detail or to literary quality. They were highly if not exclusively descriptive. Ancient Greece knew a very similar work. Few examples of the periplus have survived, the oldest being from the fifth century BCE and the latest from the fifth century. The last, by Marcianus Heraclensis, covered Europe to the mouth of the Vistula and was a compilation of earlier works, the typical pattern with all such books. The best known was the fourth century BCE compilation attributed to Scylax of Caryanda that covered the Mediterranean and adjacent seas. Though the material existed in such periplus to make a chart there is no evidence that one was ever made. The oldest surviving version of the book by Scylax is from the 12th century so copies continued to be made. There seems to have been less of a Latin than a Greek tradition of writing such coast pilots. The portolans were charts made by seamen for seamen. They were practical and utilitarian, at first almost entirely the work of Italian and Catalan draughtsmen, later of Portuguese and other nationalities. The typical portolano had no graduation, but instead a network of loxodromes or rhumb lines, that is, straight lines in the direction of different winds, their points of intersection on the later examples being formed into compass roses, many of great beauty. These rhumb lines, however, bore no relation to the actual construction of the map itself, being added after the drawing of the chart and varying from one portolan to another.

Though periplus certainly existed in late medieval Europe and though they and portolani were in essence compilations of memorized sea routes there is no obvious or direct connection between the two. It is conceivable that the medieval books took their data from classical predecessors but the extent and variety of information in the former type suggests development beyond the products of Antiquity. There was a difference in style. The classical periplus had commercial information while the portolan recorded nothing but navigational knowledge. Medieval portolani might possibly be related to the Arab sakifâ which served similar purposes. The surviving portolans are all in Italian. Whatever their roots those portolani were major advances on sea itineraries which were
accounts of voyages offering little more than a general impression of how the traveler got from one place to the other. The Il Comopasso da navigate, for example, which appeared in 1296 and was probably based on a similar book from earlier in the 13th century, had sailing directions for all of the Mediterranean and Black Sea coasts with bearings, distances in Italian miles, guides to entering harbors and the location of dangers such as shoals and reefs along with facts on safe harbors and anchorages and directions for open-sea crossings of up to 1,200 kilometers. Pilots, according to Castilian law of the second half of the 13th century, were to know the winds and the routes, to know the ports and how to get in and out of them. Portolans supplied exactly that information. What took medieval sailing directions well beyond any predecessors was the addition of graphic representation of the data in the books.

Europeans began to use the compass for navigation in the 12th century. The use of the compass had significant implications for shipping and the economy. The bishop of Acre declared in 1218 that the compass was necessary for navigation at sea and by 1269 Petrus Peregrinus de Maricourt in his Epistola da magnete discussed exactly how it could be used to establish the position of any place on land or sea. By the mid 13th century the compass had moved beyond a needle floating in water to a pivoted indicator often set above a card which showed directions. Use spread beyond the Mediterranean and by the 14th century Flanders was a center for the production and sale of compasses. In the 15th century northern Europeans were altering the position of compass cards relative to the needle to compensate for the difference between true and magnetic north. The widespread use of the compass probably promoted the development of the nautical chart. The mass of direction or rhumb lines typical of portolan maps that show compass directions give further support for the charts depending on the introduction of the compass. The lines are so prominent that in English portolan charts are at times called compass charts. The existence of long routes in the 1296 version of Il Compasso da navigate, routes defined more precisely than the coastal ones, suggests that it like the portolan charts was designed to help captains exploit the potential of the increasingly widely used compass.

In other respects the portolan draughtsmen 'were extremely conservative, not only the map itself being copied with minute accuracy, but a systematic rule for coloring being adhered to, black, red, green, blue, yellow, gold and silver having their respective places; and the same on the Catalan as on the Italian examples.

At first, dealing solely with the Mediterranean and Black Sea area, they were concerned only with a delineation of the coast and its salient features, no details being given of the interior. Successive discoveries were added gradually to the main chart, first west and northwest Europe, then Africa, and lastly America, each succeeding type, once firmly established, being copied as faithfully as its predecessors, the central core remaining the same.

These portolans were remarkably accurate from the very beginning for the Mediterranean area, and the outer bounds, though rudimentary at first, were continuously if slowly improved, and far in advance of the map of the geographers who generally ignored their work up to the introduction of the Tabula Moderna in the various editions of Ptolemy. The consistent grid on which the outline of the Mediterranean and Black Seas is projected on portolan charts appears to be similar to that in use in the time of Marinus of Tyre, suggesting some classical roots (see #119). So do the measures of distance used in constructing the charts. What is more periploi were never accompanied by any chart but some students of those ancient works see a strong possibility that the
written directions were intended as companions to now-lost charts. The first medieval charts like the written portolani may have been based on examples from antiquity or intermediary Arab maps. A possible Chinese connection as the root for the 13th century cartographic novelty has been suggested as has the emerging scholastic cosmography of the universities in the 13th century that borrowed heavily from Arabic learning. Ultimately the collection of rhumb lines combined with the absence of any previous map with the same characteristics as the portolan chart makes it most likely that the experience with compass headings of various captains was brought together in graphic form to match the written form in the portolani.

The action of the ordinary compass is not due to any pull or influence of the North Pole, but is simply an indication of the distribution of earth’s magnetism at the place of observation. After its invention in about AD 1000, the compass was soon used in sea navigation. Prior to this date most water travel involved hugging the coastline, always keeping land in sight. Thus, the portolani evolved first as practical guides to those coastlines, then also as artifacts that commemorated successful explorations. Some time around the 13th century Europe witnessed the birth of a new type of secular cartography, the nautical map commonly referred to as the ‘portolan chart’, which embodied the interests of the emerging merchant and scholarly classes. Initial impressions of portolan charts, with their numerous toponyms and apparently accurate coastlines, suggest that they were functional charts used for navigation, and most scholars have interpreted them in that way. In 1904 Charles Raymond Beazley dubbed them ‘the first true maps’ (that is, aids to way finding). In 1987 Tony Campbell maintained that the primary function of the genre was to aid navigation, although some charts were ‘constructed with the pleasure and enlightenment of landsmen in mind’, and that these have survived while utilitarian one have not. Most recently, Ramón Pujades i Bataller concluded that portolan charts were necessary for navigation until well into the 16th century and possibly later.

The portolan chart was a pragmatic document, drawn by using compass bearings, but without reference to any larger geographical scheme. No doubt the charts were compilations of observations and with extremely limited theoretical underpinnings. Their creation by and for seafarers made them different and gave them a critical role in the development of cartography. They did have roots in both practical and learned culture, in the exchange of knowledge between very different intellectual and social spheres which also made them exceptional. The book of sailing instructions was a portolan so using the same name for the chart can be a source of confusion. The dual use of the term, which has its origins in the late 19th century work of the Scandinavian explorer and scholar A. E. Nordenskiöld, is now common, however, and alternatives such as compass chart or compass map or the Italian carta nautica are rare. Chart, because it is a Dutch loan word that arrived rather late, indicates a map of the sea in English so the meaning of portolan chart is clear. In the Middle Ages in northern Europe few people if any would have used ‘chart’ to describe the maps with all the rhumb lines, at least not before the 16th century. In German kompasskaart was more common, in Arabic konbas, and in Italy makers would have called the product a comapsso, tabula or charta.

In his thesis Kevin Sheehan argues that portolan charts and atlases were rarely intended for practical navigation. Instead, they were consumer goods designed to show off the owner’s worldliness, used by merchants and notaries to reference trade ventures or to record new discoveries. Pujades i Bataller’s study of 112 chart owners showed that
although 44 were ship’s pilots and skippers, many of them could equally be regarded as
merchants, while 32 were merchants and 24 were not directly involved with seafaring
(for example, notaries, clergy, noblemen and doctors). The remaining twelve were of
various other ownership categories. Campbell noted numerous instances of elite
ownership of portolan charts before 1500, as did Corradino Astengo for the period after
1500.

Extant examples indicate that portolan charts were produced initially in Venice
and Genoa in the 13th century, in Majorca by the early 14th, by the Portuguese in the 15th
century (though possibly much earlier), and later by the French, Dutch, Ottomans, and
the English. Despite the advent and popularity of printed maps in the 16th century, and
the superseded of parchment by paper, portolan charts and atlases were still hand-
drawn on parchment well into the 17th century, and were likely manufactured using the
same techniques as four centuries earlier. Tony Campbell’s census has determined that
approximately 180 portolan charts and atlases dating from the late 13th century to 1500
have survived, though this must be a small percentage of the total actually produced.
Corradino Astengo compiled a list of portolan charts and atlases dating from after 1500,
and calculated that over 650 maps exist in public collections, and many more in private
hands. Richard Pflederer’s 2009 census comprised 1,842 charts and atlases from c. 1290
through to the end of the 17th century.

The finest examples of portolans of the 16th century were brilliant works of art:
gone was the austerity of the early masters, no longer was the portolan purely utilitarian,
a tool for a seaman, but a present fit for a prince, and in many cases composed specially
for them. In form it remained the same, accurate delineation of the coast-line as far as
knowledge allowed being still the primary principle; but the interior and the blank
spaces of the sea blossomed into a pictorial and heraldic geography as gay and vivid,
and almost as full of fantasy and legend, as a medieeval mappamundi.

Focusing on the aesthetic and subjective aspects of portolan charts, Sheehan
explores how the ‘paramap’ and ‘epicartographic’ additions—expository texts, flags, city
vignettes, portraits, animals (real and imaginary), religious symbolism, ships—affected
the meaning and information the charts communicated and whether such additions
would make them unsuitable for way finding. For example, the 1468 Gratiosus
[Grazioso] Benincasa atlas, made for (or purchased by) the papal nuncio and later
bishop Prosper Camulio de Medici of Genoa, includes (for Benincasa) an
uncharacteristically large vignette of Genoa, with five prominent flags. This obscures the
functional littoral and toponyms of the adjacent coast, making the chart difficult to use
to navigate near Genoa. The navigational utility of portolan charts has also been
questioned by cartographic historians like Patrick Gautier Dalché and Piero Falchetta.

Just as mappaemundi reflected the religious desire to explain the universe, portolan
charts revealed the desire of people in the maritime cultures of Genoa, Venice,
Catalonia, Portugal and, later, Languedoc, Castile, the Dutch Republic and England to
understand the world within their frame of reference. Traditional interpretations of
medieval cosmography put forward the idea of conflicting positions between alleged
‘metaphorical’ and ‘theological’ ecclesiastical geography (which supposedly was not
interested in representing the “real” world) and the accurate, practical and experience-
based knowledge of merchants. The latter found its illustrative cultural expressions in
marine charts and in portolans, that is in written texts detailing extended lists of costal
place names with intervening distances and wind directions, bays, headlands, ports and
harbors, river mouths. Following the pioneering work of Gautier Dalché, it is now
generally assumed that the origins of the marine charts and *portolans* can no longer be researched solely through the experiences of navigation and merchants, but more so through the learned and scholarly framing of such practices within the context of urban culture within which practical and erudite items of knowledge flowed together in a symbiotic manner, as eloquently shown by the *Liber de existencia rivierarum et forma maris nostri Meditteranei*. Discovered by Patrick Gautier Dalché in the 1990s, the *Liber* was written in Pisa, most likely by one of the many clergymen who acted as notaries and chaplains on the naval convoys and as urban notaries between the end of the 12th century and the first decades of the 13th century. This work contains about 1,200 toponyms that detail the coastal toponymy of the whole of the Mediterranean Sea basin, providing “a reasonably comprehensive narrative of the sequence (usually with intervening distances) of bays, headlands, ports and harbors, river mouths, and occasional mountains - features which would be directly relevant to a sailor. It also includes a range of open-sea crossings. However Tony Campbell argues that was certainly not the work’s sole purpose: information for a well-educated Christian pilgrim is also plentiful, hence the prominence given to the Holy Land. At the same time, more recent studies underline the complexity of the functions and of the contents of the medieval *mappaemundi*, that encompassed geographical encyclopedia, education, the art of memory, well beyond the universal history of Creation and Salvation.

The examination of marine charts preserved in the archives, in libraries, but also in private foundations reveals that they were not destined to be used wholly for navigation; in fact not only do they not bear any trace of having been used at sea, but not even of having been associated with determining the route of the journey or the calculation of distances, on which there do not appear indeed the points of the compass. Despite the testimony of rare archival documents indicating the presence of *mappae mundi* (and so surely of marine charts, in this case) accompanied by a written *portolan* (*compassus* or *compresso*) on board the galley, their presence on board ships appears to have been far from a general custom. The studies on the practice of both medieval and early modern Venetian navigation up to the end of the 16th century through outstanding works such as Michael of Rhodes’ maritime manuscript and Benedetto Cotrugli’s treatise *De navigatione* [On Navigation], both written in the Venetian vernacular in 1430-1460 and 1464-65 respectively, have shown that the use of nautical chart was mostly made recourse to in order to determine distances and calculate the routes. Still, it was empirical knowledge and the ability to ‘read the sea’ of the sea captains guiding navigation, for both military and the commercial kind of galleys plowing the Mediterranean or touching the Atlantic coast.

The function of nautical cartography, from the time of the crusades until the oceanic expeditions (as it were at least to begin from the voyage of the Vivaldi brothers around 1290 and from the conquest of the Canaries around 1341), was also that of an effective holistic intellectual organization of space. Therefore, beside being practical instruments for calculating distances at sea, they were also perceived as complex cultural syntheses for the use of the urban merchant classes, men of letters, and princes. In short, for all those who had a particular interest in geography in the hope of organizing and planning navigation and commercial activity, warfare and conquest, as well as for facilitating pilgrimage to holy sites. In the early 15th century, nautical cartography was not perceived or used in juxtaposition with the cartography of either the so-called T-O maps or the circular *mappaemundi* that, following the rediscovery of Ptolemy’s second-century *Geography*, were based on astronomical calculations. Rather,
nautical cartography was associated with, and considered complementary to other kinds of representational cartography.

As mentioned earlier, the existing *portolan* charts that are available for testing as practical navigation aids are mostly highly decorated “library” charts, which although a visual feast are so complicated in their presentation as to be unsuitable for use in a dark cabin or ships open cockpit. It has been surmised by various authors1 that those used (if they were) on board ship were the same charts but with none of the decoration to obscure the main navigation elements. But are these charts actually an aid in any presentation mode, or are they an encumbrance through the methodology required to use them on board ship? But, were they actually used on board ship? According to research conducted by Michael Ferrar, these very decorative *portolan* charts that exist today in libraries/museums were not used to navigate onboard a ship.

Texts describing sailing routes in the Mediterranean Sea basin, the Red Sea and Indian Ocean have been extant for nearly 3,000 years. Some commenced as classical texts, others as aide memoires for mariners or as instructions for military purposes. But regardless of their origin they included distance and direction components. One center which required the production of such data was Rome. We can readily understand that they were able to collect and use such data from a study of the *Itinerarium Antonini Augusta* and of the *Tabula Peutingeriana* (see #120) both from the fourth century AD. Their content illustrates quite dramatically the extent of surveying distance measures that had been undertaken by the Roman State.

Move forward some 600 years and add to that further directional data gathered as trade increased by sea, some of which may well have been previously available, and the origin of medieval texts such as *Liber De Existencia Riveriarum*, *Lo Compaño De Navegare* and *Grazia Pauli*, dating from 1200 to 1300 AD is apparent.

Originally there would have been a first rate *Lo Compaño De Navegare* text and an excellent map of the Mediterranean Sea basin coastline (i.e., the coastal pilot book of classical times that evolved into the *portolano*, or *portolan* chart, the harbor-finding manual of the Middle Ages - an early portolano for the whole Mediterranean Sea, *Lo compasso da navigare* (1250/1296), gives directions in terms of half points—that is, halves of the angles defined by the 32-point compass). The text and map were undoubtedly paired as the geographical data section required either intimate knowledge of all coastal features or a guide map as an aid. But gradually they were separated and then the copyist scribes employed in many scriptoria who were trained to copy by rote, made a series of uncorrected errors particularly in the zone south of Sardinia and then in the area of the eastern Mediterranean Sea basin. Thus it was a challenge to produce a new map or maps that could be copied and sold as per normal. That new map was drawn from the ‘latest’ manifestation of the *Lo Compaño De Navegare* text containing some errors, but not all that we read today. That is obvious from the contradictory distances and directions on the extant maps/charts. These errors are thus probably of the 11th or 12th centuries after the formation of the Maritime States and the usage of the Italian language. Thus there is no magnetic deviation; the maps are drawn as a single entity and they are generally drawn from west to east.

One of the most remarkable and mysterious technical advances in the history of the world is written on the hide of a 13th century calf. Inked into the vellum is a chart of the Mediterranean so accurate that ships today could navigate with it. Most earlier maps that included the region were not intended for navigation and were so imprecise that they are virtually unrecognizable to the modern eye. With this map, it’s as if some
medieval mapmaker flew to the heavens and sketched what he saw — though in reality, he could never have traveled higher than a church tower. The person who made this document — the first so-called portolan chart, from the Italian word portolano, meaning “a collection of sailing directions” — spawned a new era of mapmaking and oceanic exploration. For the first time, Europeans could accurately visualize their continent in a way that enabled them to improvise new navigational routes instead of simply going from point to point.

‘Portolan chart’, although the most widely used term in English, is problematic since it assumes the maps originated from ‘portolani’ (written sailing directions). Alternative terms are ‘marine charts,’ ‘nautical charts’ and ‘compass charts’.

That first portolan mapmaker also created an enormous puzzle for historians to come, because he left behind few hints of his method: no rough drafts, no sketches, no descriptions of his work.

A typical portolan chart showed coastal contours and the location of harbors and ports, ignoring virtually all inland features. It would be criss-crossed by straight lines, connecting opposite shores by any of the 32 directions of the mariner's compass, thus facilitating navigation. After popping up in Italy, portolans became coveted possessions in the seafaring nations of Spain and Portugal, where they ranked as state secrets. Therefore, the major distinctions between “maps” and “charts” were (1) the land portion of a “map” is normally very detailed with place-names, mountains, rivers, etc. and the seas were relatively blank; (2) on the portolan “chart”, just the opposite – the land areas were relatively blank and the seas were filled with navigational data (rhumb lines, coastal place-names, harbors, bays, etc. The explanation is simple – the “purpose” of the “map” was to display geographical and, in some cases, historical information; whereas the “chart” was used to support navigation; maps are looked upon, while charts are
Portolan Charts

worked on. During the period of the portolan charts, their appearance to the modern eye would give the impression of considerable more accuracy than the contemporary maps. But, again, one must always consider the primary “purpose(s)” of each. As time went on these two graphic representations somewhat merged and we see “composites” of both maps and charts. The charts selected herein are ones that incorporate the addition of beautiful decorative illustrations of animals, kingdoms, rulers, elaborate compass roses, etc.

Catalan map from ca. 1325, British Library Add. MS 31318B

Little or nothing is known of their origins and production, so the working hypothesis among cartographic historians was that portolans were somehow gathered together from the knowledge of medieval European sailors, possibly enhanced with older knowledge from Byzantine or Arab sources. Treatments of medieval mapmaking still occasionally imply that the portolan charts — remarkably accurate charts of the coasts of the Mediterranean and Black seas with part of the Atlantic coast of Europe—were an aberration on the medieval scene. Scott Westrem comments that the “familiarity” to the modern eye of maps used by navigators . . . may be deceptive, causing us to see them only as ‘precursors’ of the ‘realistic’ cartography of today, thus distracting us from some of their essential medieval qualities”. Even the map historian Tony Campbell refers to portolan charts as “precocious in their precision,” although elsewhere he describes them as “a necessary if specialized element of medieval life”. This view has recently become even less sustainable with the suggestion that the later 13th century date most commonly proposed for their origins be pushed back by a hundred years. Geographically accurate and intended—at least in part—for the purpose of route finding, the portolan charts
Portolan Charts

reflected a different set of assumptions and expectations about the purpose of a map than did contemporary world maps: nevertheless, room must be found in our view of medieval cartography for these fascinating and problematic inventions.

The very earliest evidence that we have of the existence of both portolans and portolan charts stems, not surprisingly, from the intersection between learned culture and the practices of Mediterranean trade and seafaring. In the case of written sailing directions, the first traces appear not in local sources, but in the chronicles of northern European crusaders and pilgrims, for whom Mediterranean navigation was a foreign world and who borrowed from portolans as a helpful framework for writing about unknown coasts and seas. In contrast, the Liber de existencia riveriarum et forma maris nostri Mediterranei, the first known work to be based in part on what may have been a portolan chart, was an entirely Italian undertaking, but, like the works just mentioned, the product of a mixture of information and ideas from both learned and “practical” knowledge spheres. The text we have indicates that the author began by creating a map, which he later supplemented with the text in response to a demand for more historical and learned material by a member of the local clergy.

Both of these examples give early evidence of interdependence of learned and “practical” cultures and of the cross-fertilization of ideas from cultural communities usually taken as distinct in the Middle Ages. This evidence is corroborated by the available information on the early use and ownership of portolan charts. In addition to pilots and merchants, as we might anticipate, notaries were relatively strongly represented among owners of these charts. Patrick Gautier Dalche suggests that they used them to aid in drawing up contracts involving far-flung trading ventures that required a specific and accurate understanding of Mediterranean, Black Sea, and Atlantic coastal geography. He is also concerned to note the mixed evidence for the actual nature of shipboard usage of these charts. Compare Tony Campbell states that “the evidence that portolan charts were used on board ship is overwhelming,” but who is similarly cautious about the role of the charts in navigation. There are also interesting connections between the role of portolan charts as markers of participation in a community of men who gained their livelihood in connection with the sea, an element of display that has something in common with the later importance of maps as prints in the more highly commercialized world of the 16th century. This creative interaction of types of knowledge has been seen as key in Renaissance developments, while, conversely, the separation of medieval knowledge communities has been seen as a limitation on creativity and innovation. Spheres of knowledge did in fact remain quite distinct, but these examples suggest several settings in which contact could occur: the intensely self-conscious world of the nascent Italian communes, heavily influenced by merchant culture and open to any means of expressing civic consciousness; and the Crusades, with their mass movement of northerners out of their habitual intellectual and physical territories into a strange new Mediterranean world. As far as we now know, the interdependence of map, portolan, and learned geographical text that underlies the Liber was not replicated until the late 13th or early 14th century, although new discoveries (like the Liber itself) have been frequent enough in recent years to justify a healthy skepticism about the extent of our knowledge in these areas. Nevertheless, the examples that do exist suggest that in certain circumstances fruitful exchanges could and did occur.

Michael Ferrar provides the following a summary of the development of the portolan charts:
800/900 AD: commencing in the ninth century sea trade began to expand and the Mercantile City developed. To sail the Mediterranean Sea basin maps were required and the then only source would have been those closeted in “Church” libraries and they would have been mostly copies of Roman maps and the itineraries or periplus available. They would in all probability have been localized maps not full “world” maps. At this period the texts would still have been Latin or even Greek and the language problem started to arise with the change from Latin to Tuscan Italian (probably the first) and the problems of determining distance measures at sea. Land surveying was easy but sea travel brought its own particular problems, not only standardization as research of metrology will show, but the physical work. However the extant Roman Itinerary Maritimum would have produced a basic list of distances from which a new list could be compiled. The necessity for good sailing data was the driving force to enable the maritime mercantile cities to expand and develop.

900/950 AD: from the basic itinerary (call it Lo Compresso De Navegare) maps could be constructed but they were nominally the Roman world. Thus they had to be updated along with the Lo Compresso De Navegare. New data flowed into the maritime cities and each updated its data and jealously guarded it. But the Lo Compresso De Navegare text could only be updated by actual sailing data. However as it was copied and copied, basically by scribes who were trained for that purpose, copy by rote, gradually the Lo Compresso De Navegare became corrupted. Not until full maps of the Mediterranean Sea basin were required by the maritime powers would this become a major problem. At first each power drew maps to suit their domains or trade routes, not necessarily the whole Mediterranean Sea basin.

950/1000 AD: the basic data in Lo Compresso De Navegare gradually becomes insufficient for the maritime powers as the ships venture further throughout the Mediterranean Sea basin. Thus the Lo Compresso De Navegare required updating in its Peleio section to inform the mariners of any and every possible alternative. But hardly any Peleio routes would have been accurately measured at sea for distance and direction and thus another method was required to establish the Peleio. But, it had to be found quickly and be simple to carry out. Thus the full map of the Mediterranean Sea basin is drawn from the extant data available; basic Lo Compresso De Navegare data; 73 Peleio, Starea and updated knowledge for the new routes and then used to detail other routes as required.

A full map thus drawn had some accuracy no doubt gained from the Roman itinerary measures and their maps, but of course by now the Lo Compresso De Navegare data was corrupt. Thus this new map was skewed (unknown of course) perhaps from Sardinia but most certainly in the Levant and the simple solution adopted was to measure from the map new Peleio routes for distance and direction. Thus a start on the Peleio data was made such that it could be tabulated in the text from island to island or cape to cape, etc. but it was unfortunately already corrupted.

1000/1100 AD: the rise of the mercantile city, sailing hither and thither and establishing new ports led to the further enlargement of the basic Lo Compresso De Navegare Starea text with its small number of Peleio included to be as full a Peleio section as possible. It would be continually updated rather haphazardly at first as each maritime city would jealously guard its data until City State absorbed City State and it could be coordinated. Then the new Republics although all powerful must have allied themselves in text terms
to permit a full comprehensive *Lo Compasso De Navegare* to be written and no doubt used by all. That is of course ignoring the obtaining of data by subterfuge and then the extant *Lo Compasso De Navegare* not being available to any other City State other than that which produced it at this point in the historical timescale. Each may have had its own errors.

**1100/1200 AD:** the mercantile cities are at their peak, the crusades are in progress and many more maps and texts are required. Thus they are prodigiously copied and with that copying multitudinous errors are introduced yet again. Thus any charts drawn from the new texts are erroneous in many areas and this leads to the erroneous *portolan* charts that are extant today.

**1200/1250 AD:** the *Lo Compasso De Navegare* text approaches its final state having been fully revised with the addition of the latest towns, the Starea section adjusted accordingly and thus the final Peleio routes could be taken from a map and added to the section. But at all times the data is taken from a corrupt map and text.

**1296 AD:** preceding copies of *Lo Compasso De Navegare* are now gathered and rewritten, or should it be mostly just copied out with any final adjustments made to accord to the latest data. But as has been shown it is based upon corrupt data in both the Starea and Peleio sections. It is thus obvious the author, or copyist, had no knowledge of the subject and probably little interest in its accuracy as the errors attest.

**1300+AD:** the latest *portolan* charts are drawn using a thoroughly distance accurate but direction corrupt *Lo Compasso De Navegare* document. It has a good accuracy in the northwest Mediterranean Sea area but as has been shown skews to the northeast the further east the map is drawn.

By the end of the 13th century this type of map had already become so normalized that it was common for cartographers to make presentation copies, versions designed for the libraries and offices of merchants, traders, and even politicians. The some 33 charts that have survived from the 13th century are luxury productions, not only grand but often sumptuous, elaborately decorated and expensive, much more expensive than the charts pilots might have used on board ship. Though the impressive products that have survived most likely never saw the deck of a ship or ever went to sea there is every reason to believe that they reflect the principal and many of the minor features of the charts pilots had with them on board. Presentation copies were not intended as decoration but they were more likely to be decorated. They often contained illustration and ornamentation and so could be vehicles for expressing ideas about geography and the relationship of people to the land and seas.

The network of *rhumb* lines on each *portolan* chart radiated from usually eight centers which were equidistant from two circles of the same radius, one centered in the Aegean and the other in the western Mediterranean off Corsica. Those wind roses where the lines met, though they typically had no decoration on Italian maps, could be embellished and decorated to create compass roses, a practice which began in the second half of the 14th century. They could have heads of the Virgin or landscapes. The winds indicated by the lines had names, handed down from ancient Greece. 12 or 24 winds were possible and common through the early Middle Ages but *portolan* chart makers settled on 32 as the norm.
The names of towns were written at right angles to the coast, taking up space inland, while the names of islands were always more or less parallel to the edges of the chart. About 400% of *portolans* in the 14th and 15th centuries had flags for certain towns though there is no guarantee that the arms shown on the flags were correct or that the indication of the overlord of any town was up to date or that the information was of any value to sailors. When they were colored, which was rare, there were normal colors for the sea and the land, for lettering, for lines, and for dots and crosses. Keys and legends on maps were a product of the 16th century which was all the more reason for map makers before about 1500 to be consistent and so reduce potential confusion. There was a typology of colors inherited from the Hebrew Bible through which early medieval thinkers had a mixed influence on map makers. There was some color coding of different climatic zones and some specific colors attached to specific bodies of water such as the Red Sea, however, the color traditions of individual *portolan* chart makers were distinctive. The *portolans* were spotted with *vigias*, small crosses almost invariably in black to indicate shoals and rocks, shallows and bars among other potential dangers to navigation. Later maps would differentiate rocks with black and shallows with red. The coastlines were in black. Town names were in black, the most important ones getting their names in red. Islands were in red, blue, and gold. Even the lines emanating from the wind roses had specific colors with blue or black reserved for the four cardinal directions, green for the half winds and red for the sixteen quarter winds.

Sonja Brentjes discusses the issue of multi-cultural, multi-linguist exchanges inherent in the *portolan* tradition. “Medieval writers and chart-makers encountered several problems when creating a description of a foreign stretch of land or sea. As a rule, they had no direct access to the foreign places or their names, and knew next to nothing about their physical environment. They had to find sources from their own environment and make foreign sources accessible. To do this, they had to contact and collaborate with a number of people from different social groups and educational levels. Then, they had to choose between differing information found in texts, maps, and images, as well as that received from human informants, and to evaluate its trustworthiness. Last but not least, they had to take into account the capability of the users of their work to understand the data, including its visual and symbolical components. Thus, writers and chart-makers had to navigate between different ways of knowing foreign lands, of reporting about them in writing, speaking, or drawing, and of using the final products of their work.”

“All of these aspects can be detected not only by analyzing which names chart-makers attributed to localities on the North African coast and the region of its hinterland from the Sinai to the Atlantic, but also by paying attention to the position of these names on the respective maps. The names and places show that there was a broad cultural reservoir from which all chart-makers were able to choose. They also indicate that those choices differed more than once.” Polyglossia [the coexistence of two or more languages, or distinct varieties of the same language, within a speech community] was the norm of the day, but every chart-maker or workshop spoke it differently, even if the deviation was some-times only minor.

“The polyglot coastal names of Africa can be roughly divided into three groups: transliterations of local names (i.e. Arabic names or Arabic forms of names used in previous cultures); names given by visitors from the Catholic world or, occasionally, adaptations of local forms into the linguistic spectrum of the chart-makers and their sources; and borrowings from ancient sources, either directly or possibly through an
Arabic intermediary. As my description of the content of each group indicates, the boundaries between them appear to have been fluid, and examples can be found on the boundaries between each pair of groups. Sonja Brentjes states that a systematic linguistic analysis, combined with a register of the variants of such boundary cases in different languages and sources, is a desirable undertaking for future research."

Medieval *portolan* chart-makers did not take a rigid stance towards empirical versus literary or professional as opposed to elite knowledge. Since, to the best of my knowledge, there is no document known in which a *portolan* chart-maker reflects on his working practice and his criteria for choosing between alternative forms of information, such a judgment is wholly based on the character of their products. These products speak in several languages, linguistically and pictorially. They keep most of the words from different languages unaltered once they were transcribed in Latin letters, except for scribal errors. They reflect the capability of their makers and readers to use a kind of pidgin representing Mediterranean physical as well as intellectual travel along and across several cultural boundaries. The atlases where folios can be turned over can afford to show different traditions sequentially, while those charts that were meant to be seen by themselves offer a single visual whole, hiding the different origins of their individual components.

"The pictorial and verbal messages of adorned charts are often contradictory. They repeat beliefs about neighbors found in elite and popular literature, introduce both correct and fanciful information about faraway lands and peoples, and reassemble foreign visual codes to express their makers’ or users’ world views. Charts of the 14th and 15th centuries describe peaceful, bountiful lands throughout the Old World, generally using arms only as emblems (16th century charts, in contrast, depict the deadly quality of weapons and the enmity between different rulers, if they are filled with human figures). Most of the stories that medieval *portolan* charts tell take place outside the Mediterranean Catholic world, suggesting that the main attraction of ornamented charts lay in the North, South, and East. To sum up, medieval adorned *portolan* charts are highly complex, polyglot cultural products that bespeak the creativity of their makers and the curiosity of their users, as well as the complexities of cultural interaction in the Mediterranean."

*Portolan* charts have been studied for more than a century and a half, and intensively so in recent years. Yet several basic questions remain unanswered; indeed, some have never been asked. Tony Campbell conducted a detailed investigation, focusing in particular on the place-names, and the shapes of the medium and small islands, over the past few years. This has made possible a new understanding of the charts’ development and a fresh explanation of both their purpose and longevity. *Portolan* charts contain an unexpected mixture of surprising geometric accuracy and apparently frivolous invention. Their toponymy was static enough to include in 1600 three-quarters of the names that can be seen 300 years earlier. Yet at the same time they were dynamic enough to introduce many hundreds of new, and subsequently repeated, names over that period, and to discard hundreds of others. Campbell has demonstrated that the *portolan* charts - leaving aside their land-based roles as decorative mercantile or prestige objects - were an essential tool for sailors. According to Campbell their uneven ‘accuracy’ can be explained in terms of three distinct shipboard uses: first, when out of sight of land, second, when sailing along a coastline, and lastly, when finding a way through a complicated archipelago. Before embarking on a long voyage, sailors would work out the direction to their destination (using the appropriately colored compass
direction) as well as the measured distance. Then, once they were underway, they could use the chart to calculate how far they had actually travelled in the correct direction.

The strange, clearly unnatural shapes given to many of the small and medium-sized islands on portolan charts, especially in the Aegean, have been barely noticed by previous cartographic commentators. Campbell suggests that these should be seen as ‘mnemonic substitutions’, simplifying work for the chart copyist and providing the medieval helmsman with an easy way to memorize the position of scores of islands. That these shapes were neither random nor restricted to a single chart-making family or production center, but were instead standardized and widely repeated, sometimes for centuries, provides evidence, in the author’s view, that the 14th century chart-makers had the imagination to create a convention-defying cartographic device. This was apparently without precedent, and not imitated elsewhere. It is ironic that the charts’ continued relevance for merchant shipping can be attributed to the reverence with which every small hydrographical detail of the original workshop model was faithfully copied through perhaps ten generations, rather than to any adaptability in response to what we might have supposed were evolutionary pressures. Only the vital, and ever-changing toponymy contradicts that statement.

While consensus holds that portolan charts are original European medieval creations, a number of questions relevant to the history of science have not yet received a satisfactory answer. On what geometric measurement data are these charts based, how was this data collected, and how did it attain the necessary accuracy? How did medieval cartographers construct portolan charts from the underlying measurement data? What knowledge and technology are required to make such accurate charts, including and in particular their apparent map projection? Any answers to those questions will have to be reconciled with the state of science and technology in the medieval period.

Both Michael Ferrar and Roel Nicolai discuss the pre-medieval origins of the portolan charts. The medieval origin of the surviving portolan charts is not disputed. It is the origin of the geometric information on those charts—that is, the shape of the coastlines—that is the subject of controversy. The accuracy of these charts leaves no doubt that they are based on geometric measurements rather than on a mental image of the Mediterranean world, as is the case with mappaemundi and contemporary Arabic-Islamic maps.

Portolan maps have intrigued historians of cartography since the 19th century. Most scholars have acknowledged portolan maps to have been the first functional map genre to have been invented in Western Europe, and to be of paramount historical importance. In 1904, Charles Raymond Beazley deemed them ‘The First True Maps’. Armando Cortesão wrote that “[the] advent of the portolan chart was [...] one of the most important turning points in the whole history of cartography’, and Alberto Magnaghi described them as a ‘unique achievement [...] in the history of civilization’, as noted by Tony Campbell. Although studied by numerous scholars from the 19th century to the present, portolan maps remain largely enigmatic.
From the famous cartographic historian, R.V Tooley, a list of better-known portolan makers.

14th century:
Carte Pisane
(Tammar Luxoro)
Marino Sanudo the Elder
1306 Giovanni da Carignano
1311-27 Petrus Vesconte
1321 Perrinus Vesconte
1330 Angellino Dulcert
1351 Anon. (Laurentian)
1367-73 Francesco Pizigano
1375 Anon. (Catalan Atlas)
1385 Guillelmus Soleri

15th century:
1408 G. Pasqualini
1413 Meca de Villadestes
1421 Franciscus de Cesanes
1422-43 Jachobus de Giroldis
1426-35 Batista Becharius
1427 Claudius Clavus
1430 Chola de Briaticho
1436-48 Andrea Bianco
1439-77 Gabriel de Vallsecha
1415 Bartolomeus de Paretto
1448-52 Giovanni Leardo
1456-89 Petrus Roselli
1461-82 Grazioso Benincasa
1470 Nicolaus de Nicolo
1476-90 Andreas Benincasa
1480 jlino de Canepa
1480 (Nicolo Fiorin)
1482 Jacme Bertran
1487 Nicholas Mare
1489 Zuan de Napoli
1492 Henricus Martellus
1494 Giovanni Georjio
1497 Conte Hectomanni Frederucci
15th century Francesco Cexano
15th century Aluixe Cexano
15th century Nicolo de Pasqualin

16th and 17th century:
1497-1556 Frederucci Family of Ancona: Conte Frederucci, Angelus Eufredatus
1504-86 Maiolo or Maggiolo Family: Vesconte, Jacobus, Baldassore, Giovanni
1511 Salvat de Pilestrina  
1514 Battista Genovese  
1520 Johannes Xenodochos of Corfu  
1520-88 Jacobus Russus  
1524-30 Francisco Rodrigues  
1527-64 Battista Agnese  
1530-80 Dominicus Vigliarolus  
1532-88 Bartolomeo Olives  
1537-65 Georgio Calapoda  
1542 Rocco dall Olmo  
1544 Francesco Lodesano  
1550 Jaume Olives  
1553-90 Matheus Prunes  
1557-75 Diego Homem  
1557-90 Antonio Millo  
1558 Bastian Lopez  
1562-69 Paulo Forlani  
1564-86 Johannes Martines  
1568 Domingo Olives  
1570 Bartolomeo Bonomini  
1571 Giulio Cesaro Petrucci  
1578-92 Jacobus Scottus  
1581 Mateus Gruisco  
1589 Domingo de Villaroel  
1590 Muhammed Raus  
1590 Jaimes Dossaiga  
1590 Augustinus Russinus  
1592 Carlo da Corte  
1593-1607 Vincentius Demetrius Voltius  
1596 Bartolomeo Crescentio  
1600 Thomas Lupo  
1607 Andrea Rios  
1612 Nicolas Reynolds of England  
1612-30 Alvise Gramolin 1  
1613 Mario Cartaro  
1613-33 Gio. Francesco Menno  
1615 Sebastian Condina  
1618 Petrus Cornetus  
1629 J. F. Mon  
1645-50 Alberto di Stefano  
1646 Nicolo Guidalotto  
1650 Gio. Battista Cavallini  
1651 Pietro Giovanni Prunes  
1663-69 J. F. Roussin
Portolan Charts

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Portolan Charts

accompanying DVD contains zoomable, rotatable images of over 120 charts and atlases pre-1470.


Angelino Dulcert, possibly an immigrant from Italy to the Balearics, was the author of a 1325 chart done at Genoa. Dulcert’s latter chart of 1339, while the source of some misunderstandings about northern European geography, was impressive for the inclusion of information about exploration in the Atlantic islands and for a complete outline, even if skewed, of the coast of Britain. It was also impressive for its decoration and in various forms. It is the first map to show Mansa Musa, the king of ‘Melli’, in western Africa, known for a fabled early 14th century *hajd* with a large entourage and masses of gold. The interior of Africa also got an ostrich. North Africa got a massive river, presumably the long sought river of gold. The Red Sea is colored red. Dulcert’s maps, while having varied objects and people inland, were sparse in the decoration of
the seas. This portolan chart dated 1339 is held by the Bibliothèque Nationale de France in Paris, France (B.696). Its signature reads: "anno MCCXXXVIII mense Augusto Angelino Dulcert in civitate Maioricarum compositus". It is composed on two parchment pages, joined together as a single map, measuring 75 × 102 cm. Made in Palma, the Dulcert 1339 map is considered the founding piece of the Majorcan cartographic school. Although some of its features were already presaged in the Dalorto map, it goes further in the inland illustrations, in particular including miniature illustrations of people. In many ways, the Dulcert 1339 map is very similar to the 1325 Dalorto chart. On the other hand, the portolan's keys and legends are written in Latin, and it contains features not usually found on Genoese or Venetian portolans.

The 1339 Dulcert chart is notable for giving the first modern depiction of the island of Lanzarote, one of the Canary Islands, as Insula de Lanzarotus Marocelus, a reference to the Genoese navigator Lancelotto Malocello, and affixes a Genoese shield to mark the island (a custom which will be retained by future mapmakers). Dulcert also introduces what seems like the Madeira islands, named here as Capraria and Canaria (legendary names for two of the Fortunate Islands of classical antiquity, as found in, e.g. Ptolemy). The mythical Hy-Brasil is shown off the west coast of Ireland.

The oldest heraldic representation connected with Macedonia surviving to the present time, or discovered so far, is the banner of Skopje, on the Dulcert 1339 chart, with blazon: Or, double-headed eagle Gules. Above the name of the city of "Scopi" is written "Serbia" (Serbia).
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coastlines indicate the area outside the accurate core area of the chart. The two wind roses are shown in grey so as not to obscure the coastline details.

*From the Baltic Sea to the Niger, 1413, by Mecia de Viladestes, parchment, 85 x 115 cm, Bibliotheque Nationale, Paris.*
The Petrus Roselli portolan chart is drawn on one skin; the 1466 portolan chart covers the south shore of the Baltic in the north to most of the Red Sea in the south, the Black Sea on the east to the Antilia group of islands on the west. James Ford Bell Library, University of Minnesota.
Portolan of the Atlantic Ocean by Pietro Vesconte, 1325, British Library
Important for Genoa and for map making was the contemporary work of Pietro Vesconte, called by one scholar the Giotto of cartography and the first named maker of *portolan* charts. He may also have been the first professional chart maker but he apparently had another occupation as a surgeon. Vesconte’s *portolan* of 1311 was the start of an impressive body of work ranging from *portolans* to atlases to world maps, all of which he usually signed and dated. Though Genoese he did work in Venice as well and his maps show many features of the Venetian school. The 1318 collection of maps suggests propagandistic goals rather than helping navigation. That was even clearer with his world map of about 1320 done for the *Liber secretorum fidelium Crucis* of the Venetian politician Marino Sanudo (d. 1338), a book that was part of an effort to promote a new crusade. That world map showed the influence sea charts had on Vesconte’s work. His may be the first attempt to integrate the two traditions of sea charts and *mappaemundi*. There are also indications of the influence of Arabic practice in some of the names he used on the map and in the inclusion of Mecca. Vesconte incorporated new information, most obviously in the depiction of the British Isles in his charts of 1321 and 1327. The latter shows the south coast of England more precisely than previous maps. The way he drew coastlines, as with the case of Ireland, proved to be the model for *portolan* makers for decades and even centuries. (see also #228)

*Iacobo de Maiolo. Portolan Chart of the Mediterranean Sea and Europe (Genoa, 1553). Below, detail scanned from the original in the Yale University Map Collection*
Portolan Charts
Portolan Charts

Carta nautica del Mediterraneo di by Grazioso Benincasa, 1482
Grazioso Benincasa in a lengthy career spanning the years 1461 to 1482 produced more
than 20 charts including three sea atlases in 1467 which incorporated new information
about the coasts of northern Europe and especially about Portuguese exploration along
the African coast. While over time there were few changes in the coastlines in the
Mediterranean and Black Seas on so-called normal portolans cartographers like
Benincasa did add new information about the coasts of the Black Sea, west Africa,
Atlantic islands, and northern Europe, even if at a slow pace. Though he was born in
Ancona and spent time in both Genoa and Rome and even returned to Ancona for the
last years of his life most of his work was consistent with Venetian practices, at least
through the 1470s. Venice and Genoa were typically given a prominent place on his
maps with big buildings and flags flying. There is one compass rose, Ireland is colored
green and there are two large illustrations of ships, African rulers and major urban areas
presented as decoration.
A world map by Giacomo Maggiolo, 1561.
A unusual feature is the inset of the New World in North Africa (see below)
Portolan Chart, ca. 1490, 67.5 x 81 cm
Huntington Library, California
1489 Portolan Chart by Albino de Canepa. The Mediterranean in the center of the chart - France, Spain and Portugal on the west to modern day Israel and the Black Sea on the east.
Detail: the Middle East (James Ford Bell UM) showing Damascus, Jerusalem and Mt Sinai
Portolan Charts

Detail: the Iberian peninsula
Portolan chart of the central and western Mediterranean Sea and part of the Atlantic in a codex of five manuscript charts in the Catalan style, MS on vellum, 1559, by Bartolome Olives, 55.5 x 42.5 cm, Oxford University, MS. Canon. Ital. 143, map folio 3, oriented with South at the top.
Detail of Venice and Genoa in the portolan chart by Bartolome Olives
Arabic portolan, Western part, 1600 or 1601 (from Jomard)

Arabic portolan, 1600 or 1601, Eastern part (from Jomard)
Portolan Charts

Portolan by Vesconte Maggiolo (1541)
Portolan by Jacobus Russus of Messina, 1533
Very little is known about this chart. It is believed that it was made in Mallorca in the mid-15th century, but the lack of information about its authorship, date, and provenance does not impede us to consider it a very interesting example of late medieval portolan [nautical] charts. This chart is made on parchment, and measures 59 x 76 cm. It depicts the Mediterranean basin, as well as part of Europe and the eastern Atlantic. The southernmost point represented in the chart is Cape Bojador on the coast of western Africa, which was not rounded until the voyage of the Portuguese mariner Gil Eanes in 1434. In fact, the lack of information about those southern limits of the world is indicated by the blank spaces on the west African coastline.

In Africa, a large green band represents the Atlas Mountains, following the formal tradition of late medieval nautical charts, and a series of cities and rivers are also portrayed. We can also see various rulers and kings in Africa, one of them representing the mythical Prester John, who was believed to rule over a utopic Christian land in eastern Africa.

In the eastern limit of the continent, we can see the Red Sea colored with an intense red, and an inscription indicates the passing of the Hebrews through that sea during the Exodus. Thus, the chart combines geographical and religious references.

As is customary in medieval and early modern maps, an interesting coexistence of real and imaginary places is visible in this chart. Thus imaginary references like Prester John, the Atlantic island of Brazil, and the Lacus fortunatus [Fortunate Lake] in western Ireland are portrayed with the same level of reality as other places like European cities. This is a graphical reflection of the malleability of the line between real and imaginary geographies in late medieval mindset.
In Europe, the major cities, such as Granada, Santiago de Compostela, Genoa, and Venice are portrayed, and mountain ranges like the Sierra Nevada in southern Spain and the Alps in Central Europe are also depicted in green.

This anonymous and undated manuscript chart is an interesting reflection of late medieval cartography in southern Europe. It is believed that it was made in Mallorca in the mid-15th century, and it shows the Mediterranean coast, as well as northern Africa, part of northern Europe, and the British Isles. With abundant place names over the coastlines of the continents, the chart includes also rich artistic decoration, with depictions of important European and African cities, mountains and rivers, as well as various flags and coats of arms.

The abundance of rhumb lines, the accuracy in the depiction of the continents and the different figures represented in the chart make it a remarkable example of 15th century portolan charts, one of the most important cartographic traditions of late medieval southern Europe, which helps us to understand the transition between the Middle Ages and the Modern period.

Several flags and coats of arms indicate the sovereignty of different kingdoms, and a series of heads representing the winds are symmetrically located near the northern and southern edges of the chart.

This chart is held in the Biblioteca Estense e Universitaria in Modena, under the shelfmark C.G.A.5.d. Portolan Charts.
The *portolan* charts (*portolani* in Italian) are nautical representations centered on the Mediterranean basin, produced in the late medieval and modern period. The oldest surviving *portolan* chart is the so-called *Carte Pisane*. Though found in Pisa it was probably made in Genoa. It is not dated but was made in the closing years of the 13th century and most likely before 1291 when Acre fell to Muslim forces. The chart shows a
Portolan Charts

banner decorated with a cross of Malta above the town indicating it was still in Christian hands. Measuring an impressive 50 x 100 cm, the map shows many of the features that would prevail for portolan charts even down to the 17th century so conventions for portolans were already in place by 1300.

Portolan charts usually fell in the range of 45 x 95 to 75 x 140 cm, the limitation being the size of the animal which supplied the parchment. The goal appears to have been to make them as large as possible. There was variation in the places named in the maps and in the names used for the places but there was almost no variation in the shape of the coastlines of the Mediterranean and Black Seas. Inconsistencies in the names may have simply been a result of copyist error with the work of writing being delegated to people in the workshops who were less experienced. The names usually took not learned Latin forms but rather vernacular Italian or Catalan ones, presumably reflecting the culture of the users. The names gave a sequence that seamen could follow as they moved along the coast. The goal for the chart maker was to get the headlands and estuaries right since those were the most important features for sailors. The spaces between got filled in. With the Carte Pisane in one case the line connecting two points depicts a deep sea sailing direction just like that described in Il Compresso da navigare suggesting a strong connection between those written sailing directions and the chart. No matter how cartographers made portolan charts the results were surprisingly accurate. As Tony Campbell has argued, these works are the clearest statement of the geographic and cartographic knowledge available in the Mediterranean at the time.

The less elaborately decorated examples were intended for practical use in navigation, whereas the more lavishly decorated charts, like this one, were produced for collection and displayed by nobles for their enjoyment as pieces of art. They are usually oriented to the north, and the outlines of the Mediterranean and Atlantic coasts are remarkably accurate. As the knowledge of the world increased, portolan charts came to represent broader spaces, and, given their accuracy and utility, they were fundamental artifacts for the expansion of the known world in the 15th and 16th centuries.