Ships on Early Maps

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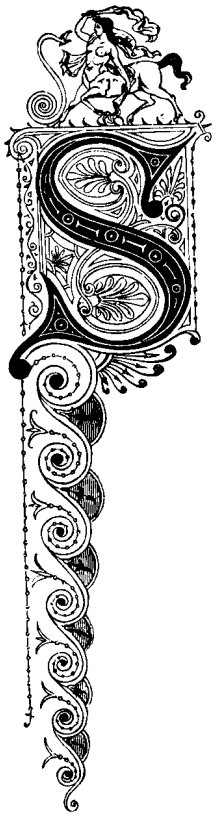


The reason that I love maps and have made a life-long study of them is simply that, aesthetically they continually fascinate me. Each map has a multitude of endless points of fascination – the strange, often imaginary geography, the cultural history displayed, the pure artistry. Maps have been drawn for thousands of years. And during that time, the appearance of each map can very simply be attributed to one thing: the purpose for drawing the map. No, not every map was drawn in order to simply provide directions, or display some selected geographic content. Since they can never show everything (natural or cultural), the map-maker, or cartographer as they came to be called, selected their content based upon the purpose(s) behind the map. Those maps that have survived through the centuries show clearly that the map-maker often had a very different purpose than to simply display selected geographic elements. The type and amount of these non-geographic elements varied widely and while some may be considered purely ornamental decoration, often times they had another more significant reason to be incorporated. Many of these non-geographic elements were placed on maps to satisfy the patron of the map, while others were placed there to provide additional educational value to the potential audience. Some examples include the very decorative "cartouches" that contained the title or textual descriptions; the placement of historical and/or religious events; cities or settlements; or the rendering of ships, exotic animals and indigenous people or even sea monsters. It must be noted that during any period of map making there are those surviving examples that contain no "decorative" or non-geographic elements because, again, it depended on the purpose of the map as determined by its maker.

Of course some will point out that many "decorative elements" such as exotic animals, ships and natives were placed on maps merely to fill-out the empty areas that were relatively unknown to the map-maker. While this may be true, it is more interesting to consider why the cartographer chose to display specific items – Was it to attract his audience with the exotic? Was it to educate his audience? Was he simply passing on information from sailors and travelers?

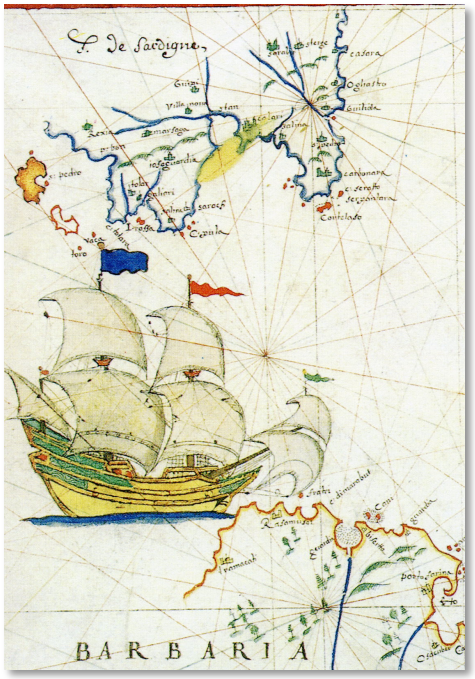
In the book *Art and Cartography* (edited by David Woodward), he discusses all forms of art associated with maps, including coloring, lettering and ornamentation. Woodward states that it has been commonly assumed that the history of cartography can be divided into two distinct phases: a "decorative phase", in which geographical information was usually portrayed inaccurately, and a "scientific phase", in which decoration gave way to scientific accuracy. The famous cartographic historian Leo Bagrow delimited the subject matter of his general work in this way: "This book ends where maps ceased to be works of art, the products of individual minds, and where craftsmanship was finally superseded by science and the machine; this came in the second half of the 18th century." In all but the most narrow definitions of "work of art," it can readily be seen that art and science have coexisted throughout the history of mapmaking, as in the instance of starkly functional *portolan* charts existing contemporaneously with fanciful and moralistic medieval *mappaemundi*.

This definition of the term "work of art" is frequently equated with maps' ornamental elements and nothing more. The term evokes intricate work on the cartouches, robust *putti*, sailing ships, animals, native customs, sea monsters, and other embellishing paraphernalia that account for so much of the decorative appeal of early maps. In my opinion

the attraction of these early, "pre-scientific" maps is their total artistic effort: both geographical and "ornamental".

As new lands were reported and appeared on the maps so new marine vessels were written about and depicted on the maps. Many explorers wrote as much about the ships of a region as they did about the people or the conformation of the coastline. Many of the cartographers used this information fully and their maps showed not only the shape of continents and islands but also many of the ships belonging to particular parts of the world. As new lands became more accurately and more fully delineated European ships were often placed on maps to imply dominance or influence over the area portrayed.

Note that the ***# numbers*** *refer to the complete monographs on each of the referenced maps on this website.*



The *Catalan Atlas* of 1375 ***(#235)*** is an example of a lavishly illustrated world chart, based somewhat upon the *portolan* [navigational chart] tradition. On this chart Chinese *junks*, as well as European ships are displayed. It is because of these wondrous illustrations that I fell in love with old maps, and one of my all time favorites is the *Borgia mappamundi* from ca. 1450 ***(#237)***. This world map, oriented with the South at the top, was engraved on two copper plates riveted together and contains many textual legends, illustrations of 20 maritime vessels. This *mappamundi* is truly a work of art and a true story-telling device.

Another magnificently illustrated map is the *Carta marina et Descriptio septemtrionalium terrarum ac mirabilium rerum in eis contentarum, diligentissime elaborata Annon Domini 1539 Veneciis liberal itate Reverendissimi Domini Ieronimi Quirini* [A Marine map and Description of the Northern Lands and of their Marvels, most carefully drawn up at Venice in the year 1539 through the generous assistance of the Most Honourable Lord and Patriarch Hieronymo Quirino] by Olaus Magnus ***(#366)***. This map takes the viewer on a very detailed journey that is cultural, legendary and naturalist in scope. The purpose of this map? The cartographer Olaus Magnus (1490-1557) did not like the map of Scandinavia in the 1482 edition of Claudius Ptolemy's *Geographia*. The classic Ulm text, a translation of the Greek's principles of geography and cartography formulated in the second century, purported to have the most current and accurate maps available at the time and was a reference work of great scholarly importance. But Olaus knew the map of Scandinavia was hopelessly wrong. To correct the erroneous ideas that most Europeans, especially southern Europeans, had about his native land, he made his own map. Published in 1539, the *Carta Marina*, a wall map in nine sheets, was the first large-scale map of any part of Europe. Also, the title makes clear that Olaus intended his map to be used by navigators, as do the navigational elements depicted on the map: four large compasses, *rhumb* lines indicating directions from them, a pair of dividers, and distance scales.

With respect to the display of ships on maps, an excellent broad discussion on this topic can be found in Richard Unger's book *Ships on Maps* (2010). This book also provides a very good synopsis of the evolution of mapmaking in general. But, like the illustrations in Wilma George's book *Animals and Maps* (1969), the limited illustrations in Unger's book do

not do justice to its well-written and thorough text. Therefore, in this monograph I will provide extensive excerpts from Unger's book alongside more and appropriate illustrations/examples.

Unger states that ships virtually never appeared on maps before 1375. By 1550 they filled oceans, seas, estuaries, rivers, and lakes on all kinds of maps from the most extensive to the most particular. The explanation for the dramatic transformation is to be found in the general changes in map making, in the explosion of geographical knowledge and in the thinking of Europeans about themselves and their place in the world as it evolved during the Renaissance. Trying to make sense of the disappearance of ships from maps in the 18th century leads to similar sources for a turnaround with roots in changes in fashion, in technology, in ideas about Europe and in ideas about the physical world. Unger explains that to identify and appreciate the reasons for the rise and decline of decorative vessels on maps requires an understanding of the prevailing ideas, the problems of representation and the structures of work and rewards that set the parameters for the makers of the maps.

According to Unger, the reasons cartographers chose to add ships to their maps must be indicative of Europeans' understanding of an era when explorers rapidly added a vast range of novel geographic information to what people knew about the world. Those maps must also be indicative of how Europeans understood themselves at the time. Ships appeared on maps because Renaissance Europeans thought ships were important. Examination and analysis of the vessels or the lack of them and their increasing numbers over time do give some sense of what map makers and, equally important their patrons, clients and customers were trying to say and do in the composition of the complex surfaces that were Renaissance maps.

The ships that turn up on maps often represented a major technological breakthrough of the period. Cartographers typically drew the ships accurately, at least as best as it is possible to tell based on comparison with other sources such as the rare shipbuilding treatise and the now expanding range of evidence from underwater archeology. That map makers tried to represent ships consistent with real life suggests something about what they thought they were doing. One result is that images of ships on maps form a valuable source for understanding the development of European ship design in the Renaissance. They are especially crucial for their depictions of rigging, not a topic for contemporary writers on ships, and not something left in the shipwrecks examined by maritime archeologists. The types of ships map makers included on world maps, nautical charts and just about any other kind of map were often of the latest designs, impressive for their size or capabilities as well as for their novelty. The tendency seems to have been to put on maps, where possible, a variety of ships and those with designs which had only relatively recently emerged. That fact makes even more tantalizing the question of why map makers included the ships they did as one part of the varied decoration and why, for centuries up to the Renaissance they chose not to include ships.

Admittedly there was some entertainment value in putting various objects on the seas and the expanses of land. Large animals and plants on land were symbols that were more than just pictorial. The animals also reflected what travelers saw, what impressed them and what they reported back to Europe. Whatever the objects the illustration did offer something to divert the eye, something to impress the viewer. The decoration, following the tradition and practice of book illumination of the late Middle Ages, offered a sense of luxury and made the maps more desirable. There was no pressing need to show ships or animals or plants or people. They were not like coastlines or mountain ranges, but the very incidental nature of the information which such illustration embodied contributed to the value of the map. Cities and

physical features continued to find places, but in the 16th century ships, indigenous people, animals and plants unknown before joined them. Maps in the Renaissance became a place to show things exotic and reflected a rising interest in collecting data about the world and especially the world on the other side of the Atlantic and the Far East that was new to Europeans. Ships as decoration for maps were not quite like other objects. Exotic vessels were rare. Again according to Unger, there were few flirtations with ethnography when it came to ships. The vessels that populated maps were almost invariably European in design, drawn by Europeans and placed not just in home waters but all over the world. The ships were drawn by Europeans for Europeans to transmit information about Europe.

The evidence from before the mid 16th century suggests that map makers were driven by the practical need to fill the great expanses of ocean on large maps. By then smaller maps displayed ships too, so the shift in decoration must be attributed to general changes in the way people created maps in the period. Ultimately there lurked a political message behind the ships. In addition to commercial and technical and artistic reasons artists were also responding to political circumstances when they included ships on maps. In the age of exploration J. B. Harley argued, "In atlases and wall maps decoration serves to symbolize the acquisition of overseas territory."

Medieval *mappaemundi* normally did not have ships as part of their repertoire of illumination. Now and again but by no means universally *Noah's Ark* did turn up, perched often on Mount Ararat where it had come to rest after the Flood. Even the story of Noah, which was well known and a common source of inspiration for illustration in churches in early and high medieval Europe, and which was anchored to a specific geographical site inspired the artists who illuminated the various entries in the visual encyclopedias that were the *mappaemundi.* Ships did not figure in those large maps or for that matter on most maps of medieval Europe (see below for some rare examples).

The first surviving examples of maritime vessels displayed on maps may be those of the Beatus *St Sever mappamundi* from the 11th century *(**#207.13**),* Matthew Paris, 1250 *(**#225**)* and those on the *Borgia mappamundi (**#237**)* of 1450. But, of course, the most elaborate and extensive display of ships is on the *Fra Mauro mappamundi* of 1460 *(**#249**).*

In the 16th century, there already existed a branch of mapping – maritime cartography – which produced piloting guides and nautical maps focusing exclusively on marine spaces, such as ones made by the Dutch cartographer Lucas Waghenaer. However, these charts did not solely represent marine spaces; there were invariably also terrain areas depicted on the borders of these maps. As the geographer Philip E. Steinberg has stated, the shift in Western culture to a perception of the ocean spaces as a negligible place occurred at the turn of the 16th and the 17th centuries. As a consequence characterizations of the sea became more benign, but at the same time it lost much of its former significance. Earlier conventions which saw the ocean space as a terrifying wilderness were replaced little by little with the idea of it as rather being a void between continents.

Of all the representations on the ocean spaces of the atlas's maps, depictions of ships are presented most. As Richard W. Unger has stated, by the end of the 16th century, ships were found everywhere on the seas in Dutch maps, even in cartouches.

The various ships depicted on the maps of were usually decorative, but also based upon real ships of the period. However, they can be also interpreted as symbolizing the ability of humans to brave the dangers of sea travel and encouraging people to make new voyages. One can also interpret ships as symbolizing political control over the seas. For example, many ships are depicted bearing different flags on their masts as indications of the identity of their owners. On the maps made by Hondius some of the illustrations can be seen as

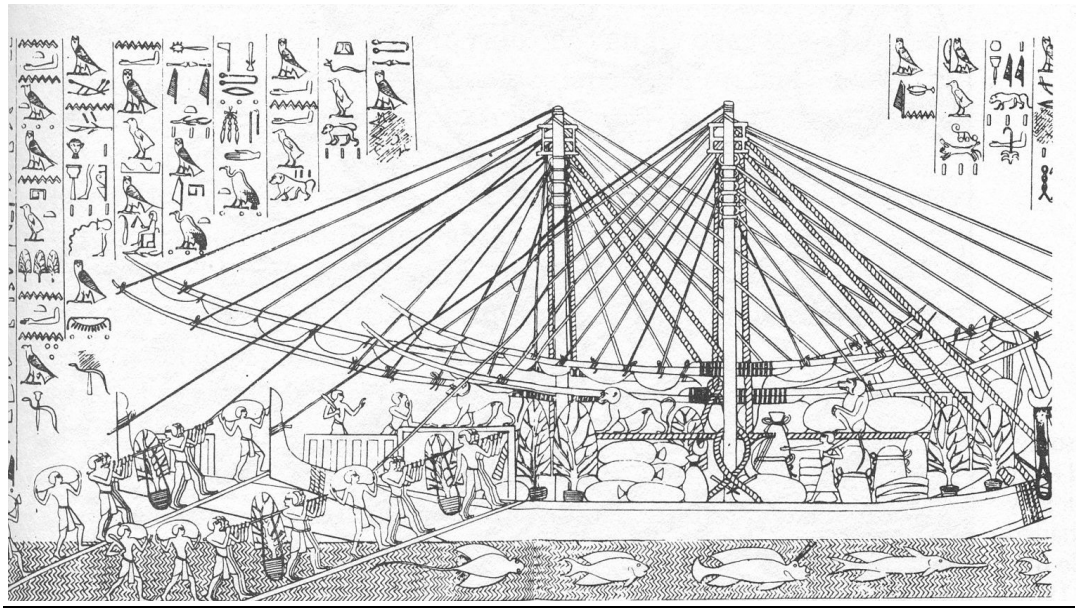
representations of the typical vessels used in particular places. For example, there is "a ship from the Island of Japan" added on to the Sea of China on a map of *Iaponia* [Japan]. In addition, Jodocus Hondius' map of America has two illustrations of small boats and one kayak, all with indigenous people in them.

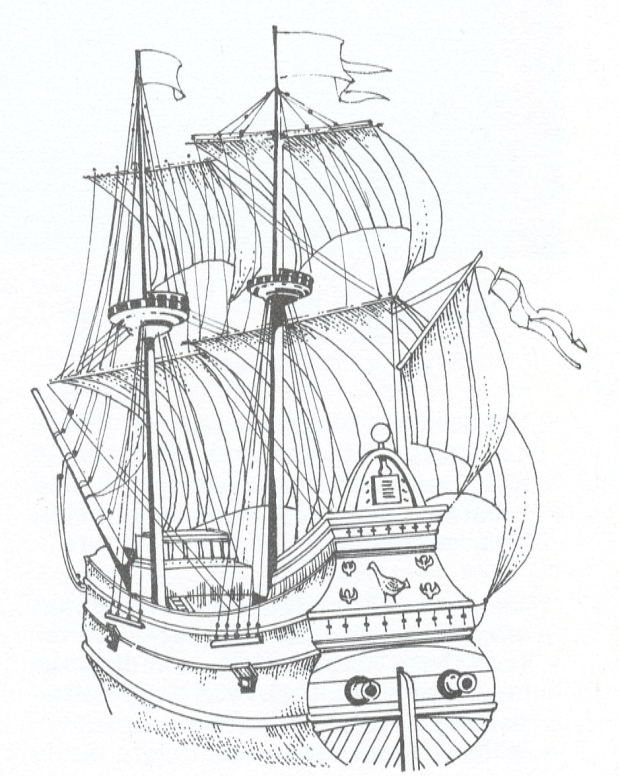


In these pictures from maps produced by Jodocus Hondius there is a 'Japanese ship' and two different boats, with 'natives' said to be living in Greenland and near the Strait of Magellan.

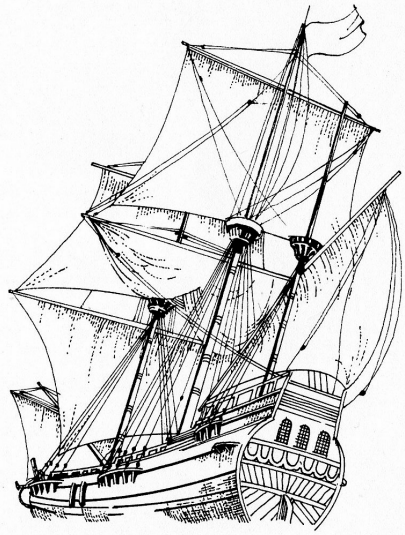
By the mid 16th century, ships were commonly depicted on maps. They were so much a part of the "decorative" element that Abraham Ortelius ***(#397)*** and others often "borrowed" images of ships from earlier engravings. While some map historians believe that these images may be used to identify specific types of ships, most believe that map-makers rarely attempted to portray ships in realistic or even contemporary format. But ships were so ubiquitous on maps of this period that, according to Unger, they have to be considered as another decorative element that symbolized authority, mastery of the ocean and hegemony of maritime European colonial powers. The many ships on Ortelius' maps bear only sketchy resemblance to actual vessels of the time. But they are pictured here actively engaged. Many fully rigged ships in the Atlantic Ocean are sailing to and from the Cape Verde islands and South America and the Caribbean. In the Pacific Ocean ships appear in a course between the Philippines and the Central American isthmus. Whether involved in commerce or in exploring new trans-oceanic transportation routes, these ships are additional examples of the kinds of "power relations" between the colonized and the colonizer that map historian J.B. Harley has said are symbolized by decorative features on maps of this period.

The following images are taken from the monographs on this website (www.myoldmaps.com) and represent some of my favorite examples as to why I love to study maps and ships. Old maps contain a cultural history, a folklore history, insight into the beliefs and outlook of the time period in which they were made, a "snapshot" of the geographic and cosmological knowledge, and, sometimes, the political/religious pressures placed upon the map-makers.

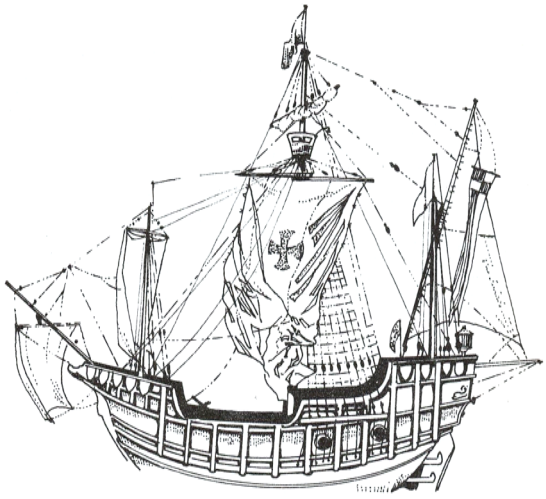




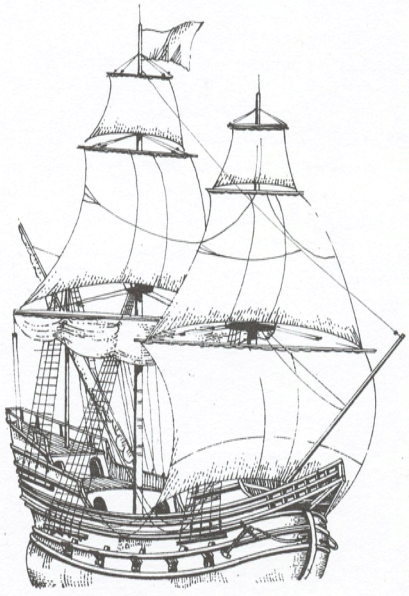
The Victoria—1519.
Magellan's ship which circumnavigated the world.



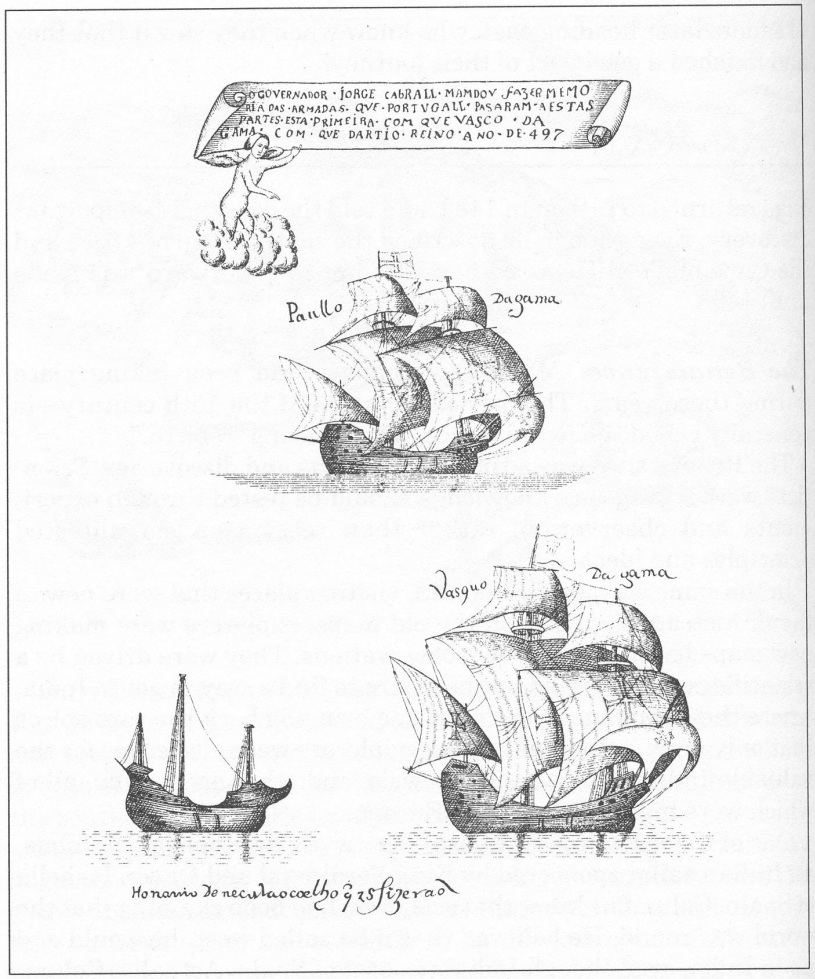
The Mayflower—1620.
The English ship which carried the Pilgrim Fathers to the New World, taking 75 days to make the crossing.



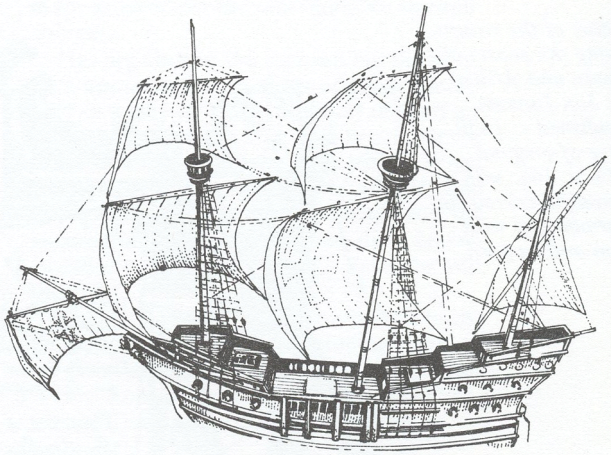
The Santa Maria—1492.
This was the flagship of Christopher Columbus, the ship he used on the voyage that led to the discovery of America.



Barents' ship.
The Dutchman William Barents was the first of the Polar explorers. He sought a route to China across the North Pole and died a chilly death after spending some time among the ice floes.



Vasco da Gama opened up the Cape of Good Hope Route toIndia and the East sailing a square-rigged ship called *não,* shown here. (Science Museum, London)



The San Gabriel—1497.
Vasco da Gama, after sailing around the Cape of Good Hope, reached Calcutta and so opened the new route to the West Indies.



Anonymous, View of Sixteen Ships (1565?).
Courtesy of the Graphische Sammlung Albertina, Vienna.

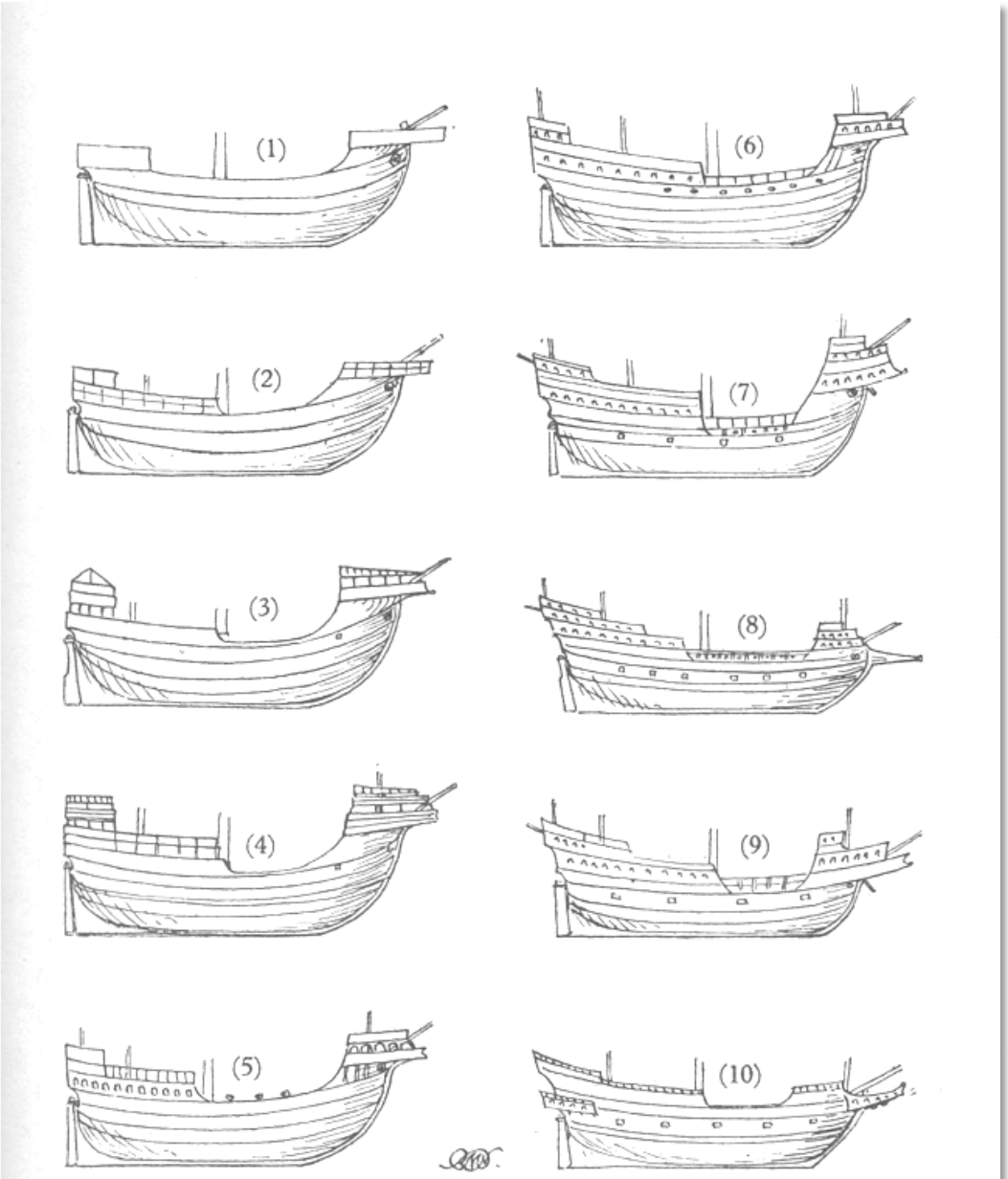




The frontispiece of Simão de Vasconcellos' Chronica da Companhia de Jesu do estado do Brasil, 1663



The following information about shipbuilding is an excerpt from David B. Quinn's book *North America from Earliest Discovery to First Settlements: The Norse Voyages to 1612* (1977).



The Development of European Ships, 1400–1600: Hull Evolution. (1) through (7) are increasingly complex carracks; (8) is the first galleon; (9) is an intermediate form between carrack and galleon and (10) is a later galleon. (From R. Morton Nance, *The Ship of the Renaissance* [1955]).

The broad-beamed, single-masted *cog* or *balinger* used by northern mariners underwent a transformation in the 15th century, when a two-masted and then a three-masted vessel, sometimes of as much as 1,000 tons, appeared. Few details are known about this crucial stage in the evolution of what in course of time became the *nef*, '*great ship*', and later the *galleon*. As

time went on the sail-plan was improved by the addition of a topmast, a foremast, a mizzen mast (rigged with a triangular lateen sail) and a spritsail below the bowsprit. The clumsy medieval round ship was thus slowly transformed into a capacious and manageable vessel that retained the high castles at either end as integral parts of the hull, making her capable of oceanic voyages.

Navigation remained largely a matter of using the sounding-line and lead, until the compass was introduced from the Mediterranean at the close of the 12th century. From the 15th century may be dated charts and sailing instructions, variously called *rutters*, *routiers* or *pilots*. A simplified version of the astrolabe was occasionally used for taking sights.

Oceanic voyages had to be carefully planned and provisioned, and the men taking part in them required above all experience, endurance and courage. If the seaman had all these qualities, but not the patience or skill to use instruments other than his compass, he could still often make his way successfully across the ocean once the initial pioneer courses had been sailed by others. Thousands of masters of fishing vessels were to take their craft successfully to the Newfoundland Banks and island from during the late 15th century while displaying little interest or skill in instrumental navigation. Of course, if he was skilled in using instruments and had a body of practical skills as well, the seaman was better equipped for making the longer and more novel voyages/coastal sailing, once the ocean had been passed and continental land reached, was within the skill of most experienced seamen. Many ships disappeared on ocean voyages, but it must be remembered that they were also frequently lost in routine coastal voyages along well-known European coasts and that this continued to be the case throughout the age of sail.

The best seaman could do little unless he had a sound and efficient ship. The shipbuilder's craft was one where traditional local skills in adapting vessels to the purposes for which they were to be employed were strong, but the craftsmen were also open to novel ideas about construction and utilization if they understood that these had a substantial advantage over older types. Most shipbuilders expected to build vessels which were both durable and maneuverable; but once ships began to sail farther and under unknown/novel conditions, new designs and new scales of construction were forced on shipbuilders in the areas where skills and accessible materials, primarily timber, were readily available. A sufficient degree of innovation over most of Western Europe took place in the 15th century to provide adequate oceangoing ships, and innovation continued into the 16th century so as to make them fully effective for open ocean sailing.

Most of the sailing vessels used along the western European coastlines at the opening of the 15th century were short and broad in the beam. They varied very much in size, though the average was very small by subsequent standards: vessels of 15 to 100 tons comprised most of the merchant fleets of European states. Many of them were little more than capacious, decked, broad-bottomed boats, with scant accommodation for crew or equipment, and space only for a basic cargo to be carried a relatively short distance. These were adequate for coastal sailing but were neither safe nor reliable on the open ocean. They were almost universally powered by a single large mainsail that could be an effective means of propulsion with the wind behind it. When the winds were contrary, a harbor or anchorage had to be found for such a ship; obviously this type of vessel was not suitable in most cases for sailing off the European shores into the open ocean.

From the Mediterranean the use of the triangular *lateen sail* spread early in the century to southern Spain and Portugal, and later to northern Spain and France. This allowed the vessel to sail with winds coming in from either side, though not of course directly into the wind. The vessels to which they were fitted were also made relatively longer and narrower.

These ships were known as "*caravel*s", and took somewhat different forms in Andalusia and in Portugal. They proved excellent for the pioneering voyages that the Portuguese made down the west coast of Africa and some distance out into the western ocean in the first half of the 15th century. The early single-masted, lateen-rigged vessels were small, but they were soon followed by larger and longer ones, with two lateen-rigged masts and even three. These continued to be employed by Portugal down to the end of the century. The main function of the lateen sail was, however, destined to be as an auxiliary. The combination of the standard northern mainmast, with its square sail, and the lateen-rigged mizzenmast was first developed in Andalusia. It was soon taken up by the Portuguese and spread more gradually to northern Spain, France and eventually England. By 1500 two masts, foremast and mainmast, carrying square sails, and a mizzen with a lateen became the pattern for most oceangoing ships of the crucial decades of the discoveries between the 1480s and 1500s. The Portuguese, once they had combined driving power with maneuverability, built larger vessels of this type, the *caravela redonda,* with which they proved able to sail to India and back. By that time the sail pattern on main- and foremast was becoming complex. A second, and soon a third, course was added, and the combination of sails of varying sizes in predominantly square-rigged ships provided much more effective and more maneuverable vessels than any hitherto developed. The lateen was retained on one, and later, two masts (as *mizzen* and *bonaventure mizzen*). Such vessels had a wide range of maneuver in varying winds, and they had the power to make long voyages at relatively high speeds in comparison with the earlier ships.

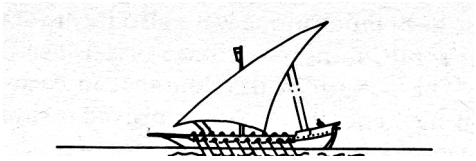
While these vital changes in sail plan were taking place, ships were becoming more complex in their construction and generally larger. As they grew longer and narrower, they were also built higher in the water, with single decks giving way gradually to multiple decks, and stern- and forecastles being incorporated into their design (adapted from the clumsy defensive and offensive platforms of earlier naval war vessels). The ship thus became capable of stowing a larger and more varied cargo, of offering quarters for officers and seamen necessary for their good health on long voyages, of providing additional space for working on charts, keeping logs, etc., and of improving observation facilities for the watch.

The main bulk carriers in northern waters in the late 15th and early 16th centuries were the *carracks*. These had adopted the newer sail plans and some of the more sophisticated decking of the Iberian vessels, but they remained rather broad-beamed and clumsy compared with the *caravela redonda*. The newer, medium-sized vessels of 60 to 100 tons from almost anywhere along the western seaboard were capable of making oceanic voyages by about 1500, though there continued to be many local variations in ship construction and in sailing skills. The smaller vessels in France and England often remained somewhat broad and clumsy, with quite primitive equipment.

The precise nature of the commercial and technical drives that improved the sailing qualities and cargo-carrying capacity of western European vessels are difficult to pin down. Periods of prosperity and depression followed each other several times during the century, but certainly maritime commerce improved rapidly in the last quarter of the 15th century. The decline of the Italian city *galley* fleets, plying from Italy to northern Europe, offered incentives to vessels from the Atlantic littoral to make longer voyages to take their place. The bulk of trade between the Netherlands and England to Spain and Portugal was undoubtedly increasing. Gradually, the improvements made in Iberian shipping were taken up farther north, while northern innovations were also incorporated into vessels built farther south, as more northern vessels used Iberian ports and vice versa. 'The pattern of development in each

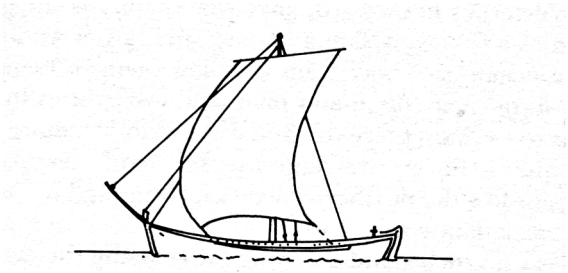
area differed appreciably, but the general effect of improved technical efficiency was almost universal.

Within a single decade from 1492, Columbus, Cabot, the Corte Real brothers, and others had proved capable of taking vessels safely across the Atlantic and home again, even though there were also frequent ship losses on record. Columbus, by exploiting the Canaries current and the northeast trade winds outward and the Gulf Stream and the westerlies homeward, gave the Spaniards the great initial advantage of a relatively safe and easy (though extended) passage across the ocean each way. This enabled them to begin the swift exploitation of their island and mainland discoveries in the Caribbean so as to develop there the first transatlantic empire, 'The route too was suitable for square-rigged vessels, and these, often rather broadly built like the northern *carracks*, continued to dominate the Spanish transatlantic merchant marine.



Fragata

There was, however, no such "standard route" for crossing the ocean in the more northerly latitudes. The Corte Reals had learned how to get from the Azores to America by sailing first north and then west, not northwest. The English and French, if the westerlies were dominant, continued to find it difficult to make effective progress into the Atlantic even with a flexible sail plan. They tended to sail well to the southwest into mid-Atlantic before making their way north again. If they went too far south they were liable to find themselves becalmed in the region of light airs, the doldrums, north of the belt of the Northeast Trade winds. Some preferred to reach southeastern North America until well into the 17th century by making the long haul down to the Canaries and then following the Spanish route first westward and then northward. Mostly, the French and English tended to await a period when winds were in an easterly direction and sail westward in their own latitudes or only a relatively short distance to the south before making their northing. They could not rely on such winds carrying them all the way across. Such passages could be very rapid, taking as little as two or three weeks only; equally, if the ships ran into westerly winds, they might take up to three months. The return voyage from North America could also be rapid - as little as two weeks and, more usually, a month or there abouts, but heavy winds and high seas made the easterly passage often highly dangerous, especially in the fall.

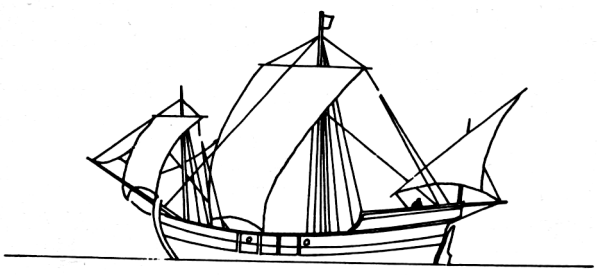


Barcolongo

The Newfoundland fishermen from Spain and Bristol soon managed to make their way, year after year, across the Atlantic in ships as small as 20 tons and rarely, for the first half of

the 16th century, of more than about 80 tons. From Newfoundland access to the Gulf of St. Lawrence by the Strait of Belle Isle was easy enough. Cape Breton became a favorite landfall and they could then progress down the coast of the Maritimes. But for reasons that do not seem to be fully understood, reaching southern New England from Newfoundland did not prove so easy. Access from France or England to latitudes in North America between 26° and 35° N. was seldom achieved by a direct voyage before the early 17th century; it was obtained either by a slow voyage down the coast from Newfoundland, or, more commonly, the long expedition by way of the Canaries and the Caribbean. Thus a curious anomaly developed. The Caribbean and Central America rapidly became accessible to Spain, and Newfoundland to a wide range of European fishermen: the zone in between was harder to reach or to exploit.

The 16th century ship developed on the basis of the improvements of the latter part of the 15th century. The sail plan became steadily more complex, giving at the same time greater driving power and more flexibility in adjusting to various types of weather and wind direction. Four masts became common for the larger vessels, two of them being lateen-rigged; up to four courses were employed on the foremast and mainmast. The hull form also became more sophisticated. Additional decks provided for a new variety of cargo and stores, as well as for cannon, and for more specialized accommodation for both crew and passengers. Most ships engaged in oceanic crossings were armed, as attempted interception by open or covert enemies was frequent. The construction of the stern became more elaborate, gun ports at several levels being allowed for, and the great cabin used by the officers became part of a complex of sleeping and other apartments, rounded off late in the century by a stern gallery which was valuable for observation. There was a tendency to build up both the stern-castle and forecastle too high for real stability in the first half of the century, but this was usually confined to naval vessels. The forecastle provided somewhat more habitable quarters for the crew; gradually it was built less high in the water and the bow extended forward. The galleon, after mid-century, developed a beaklike projection on the bow which could be used as a forward gallery.



Caravela

The increasing care to make hull forms more streamlined for both grace and speed led to the emergence of the *galleon*. Originally a small speedy vessel, she had become mid-century, in the hands of the French, a highly effective ship with excellent sailing qualities. The type was improved by the English later, when they studied the shapes of fishes and attempted to make hull forms conform to their lines. The English *galleon* as a war vessel could be a large ship, up to 1,000 tons, but it was more usually only about 500 tons. Her form influenced the design of the more far-ranging merchant vessels, especially as these had to be increasingly capable of fighting off hostile ships. She was perhaps twice as fast and infinitely more maneuverable than the comparably sized square-rigged Spanish merchant ship; the Spanish *war galleons*

were on the average larger than the English *galleons* and more heavily armed, but they were broad and sluggish in the water and consequently vulnerable when attacked by a number of small English *galleons* at sea. This helped to explain the victory of the English naval craft and armed merchantmen over the Armada in 1588, and their considerable success at sea when attacking or being attacked by Spanish ships, whether on the ocean routes or in the Caribbean.

Spain brought more colonists to North America than the English and French did in the later 16th century, and for the vital decade in Florida history, 1565-74, many of the vessels taking part came direct from Spain. The total amount of French and English shipping involved in trade and colonization of North America in this period (outside the cod fishing and whaling fleets) was small, and almost all the ships took part in fighting at sea or were prepared to do so. Spanish vessels going directly to the Caribbean and returning from there were normally in convoy, and did not need to be so well armed. But as the sea war went on, increasing numbers were equipped with at least some means of defending themselves. Generally the rather slow, heavily laden Spanish vessels were an easy prey for French and English privateers, if they could be separated from their powerful escort *galleons*. At the same time, Spain does not appear to have lost many ships going directly to North America or near its shores. Most interceptions were off the Azores or nearer Spain on the return voyages, and the tradition of arming merchantmen involved in trade with North America survived the conclusion of peace in 1604.

When Vasco da Gama reached Calicut in 1498 he was asked what he wanted, "Christians and spices", he replied. If religion was the pretext of European expansion, gold or spices were the motives, and the ocean-going ship was the means. The technological breakthrough which enabled Europeans to cross oceans to establish trading posts on the shores of distant continents was the development of the sailing ship armed with guns, an invention of almost as much significance in world history as that of the wheel.

The ocean-going ship was the result of a marriage between the sturdy northern ship and the longer Mediterranean trading vessel with finer lines, excluding the *galley*, which was used for war rather than commerce. From about 1400 the square-rigged, clinker-built *cog* with a rudder (a northern invention) became popular in the south because she required a smaller crew. When *carvel*-built (i.e. with flush planking) and lateen-rigged she became the *caravel* or, on a larger scale, the *carrack*, two or three-masted ships usually with a square sail on the fore and mainmasts. In such *caravels* of under 300 tons most of the early explorers carried out their voyages, but in the Portuguese trade with the East, enormous *carracks* were used.

In contrast to such trading vessels, warships retained the high superstructures fore and aft of the medieval '*castles*'. At first they were called '*great ships*' or *nefs*, but later *galleons*. There was, however, no ship of a specifically *galleon type*. The word was derived from the Venetian *galeones* built about 1530, a longer, narrower vessel than the *carrack*, with a low beakhead, something between the ram of a *galley* and the towering forecastle of the high-charged ship. There were great differences between English, Dutch and Spanish *galleons*, though the same word was applied to all, merchant vessels and warships alike, since all were stout, well-armed craft.

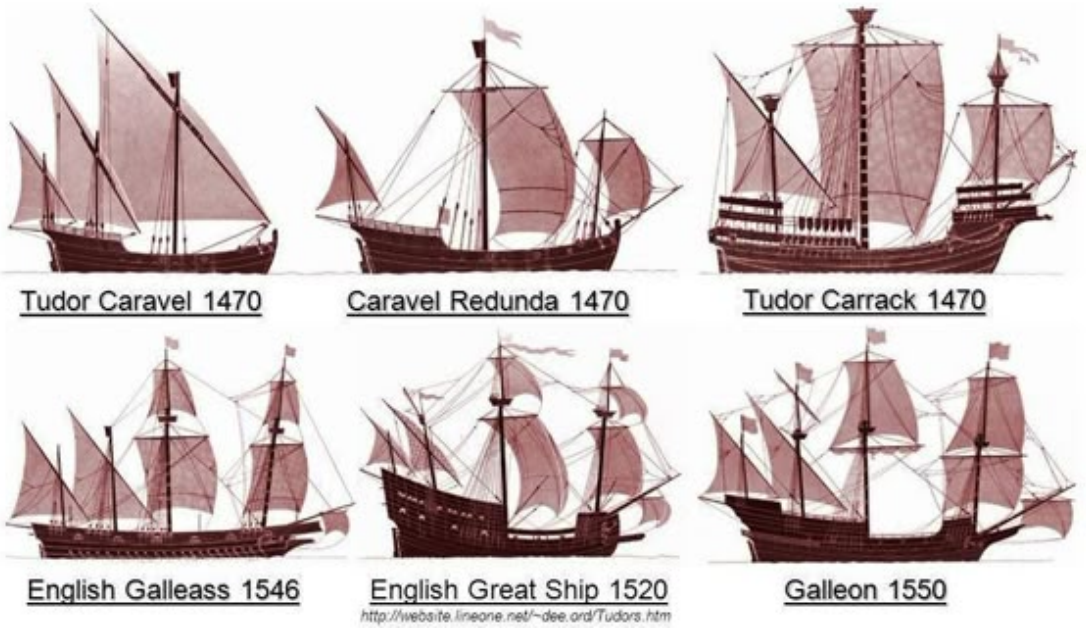
Such ships had to be navigated across distant, unknown seas. It was here that the Portuguese made their distinctive contribution. 'They transformed coastal pilotage into oceanic navigation by learning to observe the heavenly bodies with the mariner's astrolabe, the quadrant, and the cross-staff or backstaff. Celestial navigation might remain unintelligible to most seamen, who continued to sail 'by Guess and by God', but Portuguese

manuals of navigation (the earliest is dated 1509) gradually achieved a wide circulation, the English being so backward in this respect that William Bourne's first manual did not appear until 1574.

Among the instruments used on board, the compass (first noted at Amalfi in 1187) was the most important. It was housed in a binnacle on the poop, using brass gimbals to hold it level against the roll of the ship. Variations of the compass were noted by early navigators, but remained inexplicable. Most mariners relied on the sounding lead and the hour glass to mark the time of their time of their watches: a half-hour sandglass being turned eight times in each watch, the turning being marked by a cry on deck or the sounding of a bell.

A seaman could reckon his position north and south fairly well by taking sights of the sun, so that latitude sailing remained the rule. But the longitude, distance cast or west, remained a mystery, The only means of ascertaining a day's run was the logline, marked with knots and heaved overboard at stated intervals to mark the rate at which the knots passed over the side and hence the speed of the ship. The estimated position was recorded with a peg: stuck into a traverse board and written up as 'the log'. The consequence was enormous errors in the size of continents and the breadth of oceans, Magellan's pilot being credited with underestimating the breadth of the Pacific by 3,000 miles.

The maritime revolution resulting from the new construction of ships, and the way they were navigated, necessitated a new way of looking at the world, which led to a cartographical revolution. Catalan and Italian cartographers of the 15th century produced beautiful and accurate coastal charts called *portolani* drawn on vellum and ornamented with vivid colors (see ***#250***). Their tradition continued even after the appearance of the first printed maritime atlas, the *Mariner's Mirror* by Lucius Wagenhaer in 1584. On the other hand, medieval *mappaemundi* were extremely inaccurate. When it became necessary to record the new worlds revealed by the explorers, the assistance of mathematicians who were academic geographers was required because they were capable of constructing maps of the spherical world on a plane surface with a grid of latitude and longitude.



Ships on Early Maps

5.25

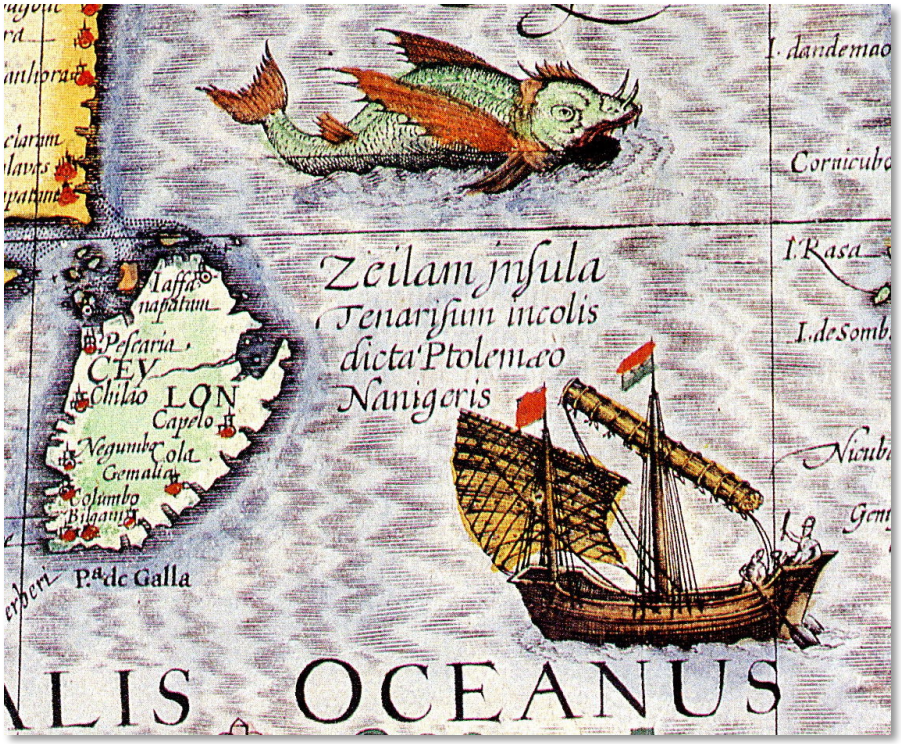
Richard Unger states that until the mid 15th century putting a ship on a map was a radical act. By the mid 16th century it was still a conscious act but no longer unusual. Starting as far back as about 1300 map makers generated an expanding range of pictorial signals which became more stylized, artistically economical and, therefore, more conventional and standard. Over time they developed a complex and ingenious vocabulary of signs and symbols. After 1375 the vocabulary included ships. While ships might share many of the same trends toward standardization of representation of other map features they stand out from all those objects because of their numbers, their variety, their accurate depiction, their ubiquity and their rapid disappearance in the 18th century.

Unger argues that the reasons cartographers chose to add ships to their maps must be indicative of Europeans' understanding of an era when explorers rapidly added a vast range of novel geographic information to what people knew about the world. Those maps must also be indicative of how Europeans understood themselves at the time. Ships appeared on maps because Renaissance Europeans thought ships were important. Examination and analysis of the vessels or the lack of them and their increasing numbers over time do give some sense of what map makers and, equally important their patrons, clients and customers were trying to say and do in the composition of the complex surfaces that were Renaissance maps. Looking at the maps, the ships and the background to Renaissance map making is the basis for teasing out the varying forces which led to all those ships decorating all those different kinds of images.

The changes in maps mirrored the revolution in ship design. The types of ships map makers included on world maps, nautical charts and just about any other kind of map were often of the latest designs, impressive for their size or capabilities as well as for their novelty. The tendency seems to have been to put on maps, where possible, a variety of ships and ships with designs which had only relatively recently emerged. While the artists who decorated maps do appear to have joined in a trend toward showing archetypes, not accidents or particulars of the specific specimen but the type, the ideal, that did not come until after 1550 nor did it stop them through the mid 16th century from presenting ships in a number of variants. That fact makes even more tantalizing the question of why map makers included the ships they did as one part of the varied decoration.

Maps in the Renaissance became a place to show things exotic and reflected a rising interest in collecting data about the world and especially the world on the other side of the Atlantic and Pacific that was new to Europeans. Ships as decoration for maps were not quite like other objects. Exotic vessels were rare. There were few flirtations with ethnography when it came to ships. The vessels that populated maps were almost invariably European in design, drawn by Europeans and placed not just in home waters but all over the world. However, as is shown here ships of the Middle East design (*dhows*) and the Far East (Chinese *junks*) began to be displayed on maps. The ships were drawn by Europeans for Europeans to transmit information about the world.

5.25


Zeilam jnsula
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CEV
Chilao
LON
Capelo
Negumbo
Cola
Gemalia
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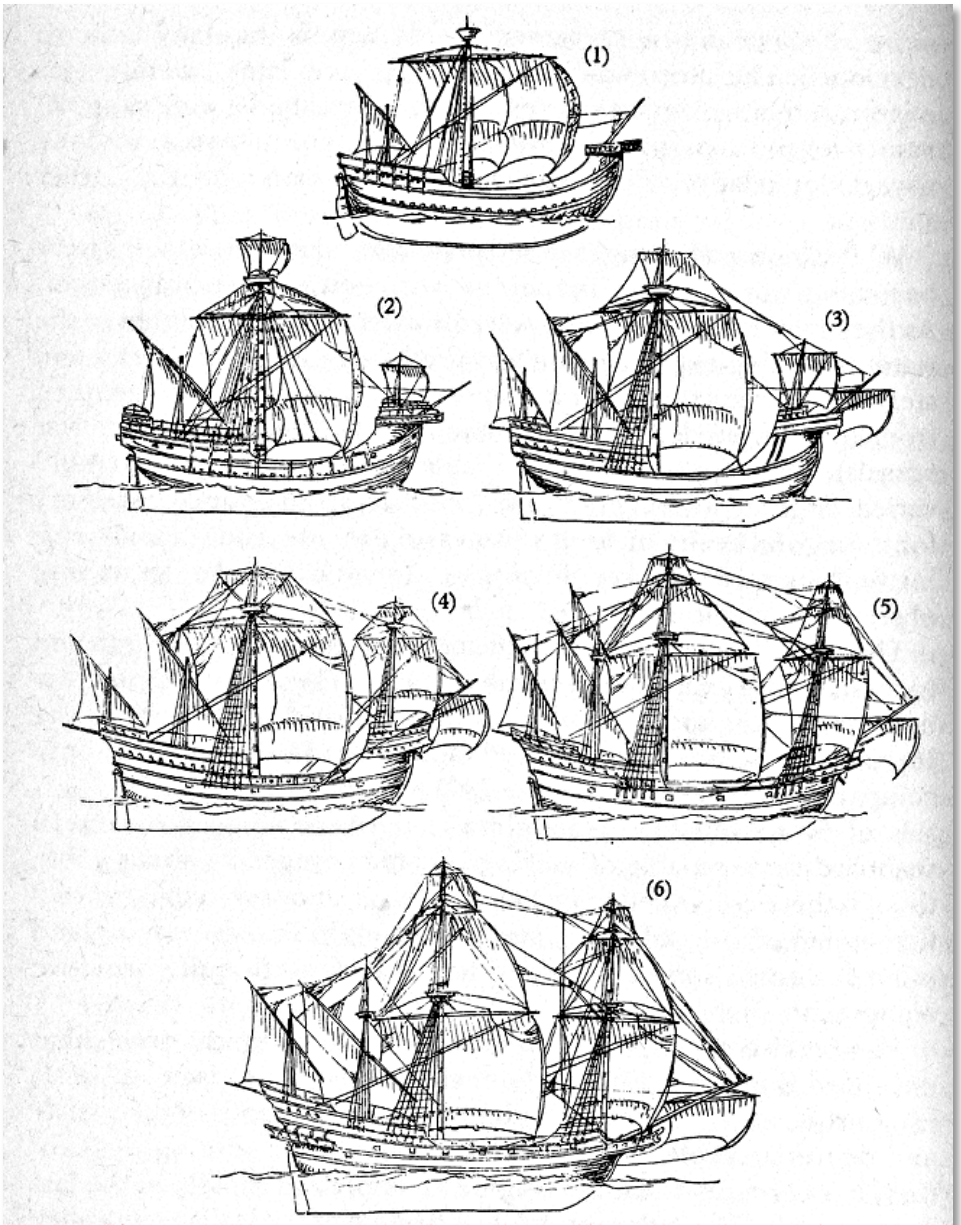
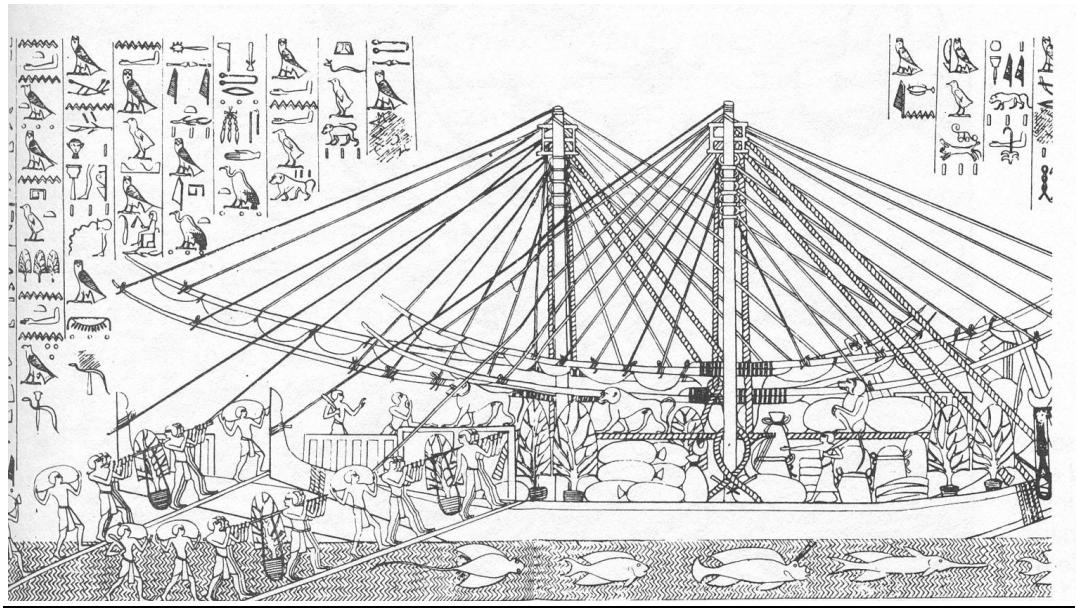
ALIS OCEANUS





The Development of European Ships, 1400–1600: The Evolution of Sail Plan. (1) *c.* 1430; (2) *c.* 1450; (3) *c.* 1500; (4) *c.* 1530; (5) *c.* 1560; (6) *c.* 1600. (From *The Ship of the Renaissance*)



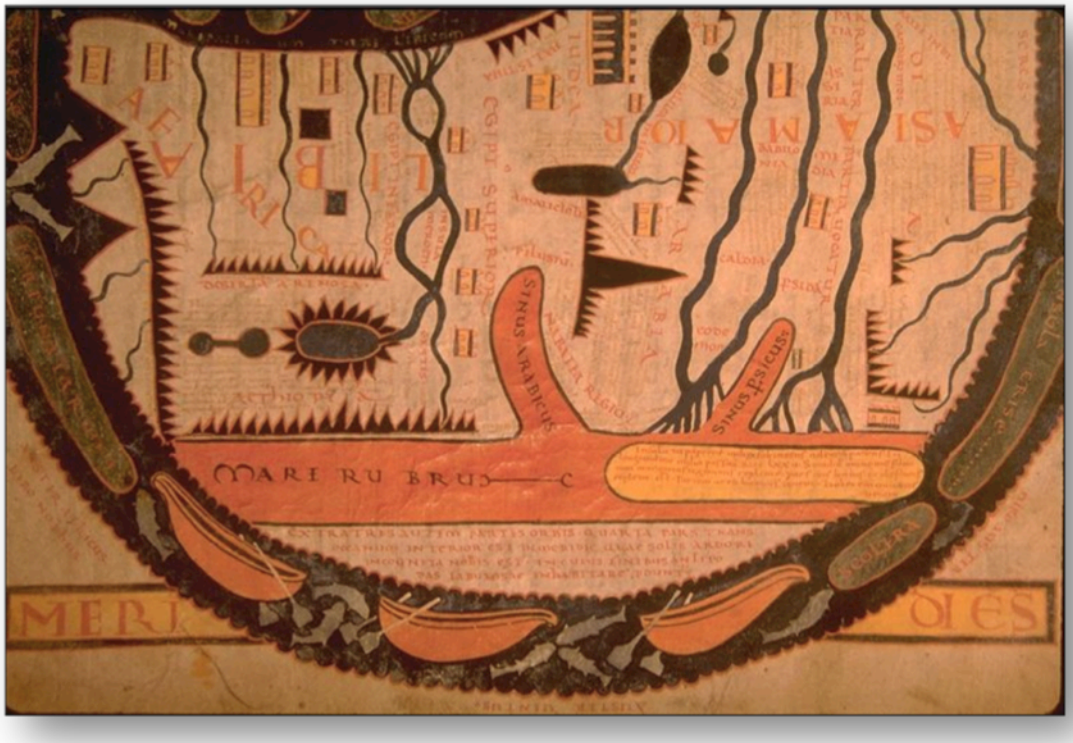
Queen Hatshepsut's expedition to the land of Punt commemorated on a relief near Thebes in the 2nd century BCE



The Medieval Period



*Livre des proprietes des choses, 42 x 32.5 cm, Jean Corbechon, 1479-80 (**#205Z4**)*
BnF, Manuscrits (Fr 9140 fol. 226v). Three single-masted ships (cogs and carrack) and one three-masted ship (caravel)



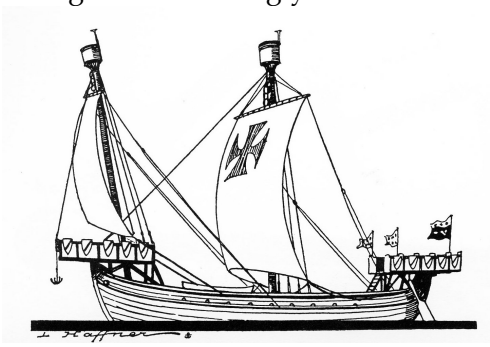
*The Beatus St. Sever mappamundi, 1060, showing open-boats and oars in the circumfluent ocean (**#207.13**)*

Matthew Paris did produce a map with ships. It was one of his maps of the Holy Land, showing the siege of Acre *(**#225**)*. There are different versions of the map but in all of them the place chosen for the map in the text suggests that it was to indicate the end point of a journey, a pilgrimage from England to the Holy Land. The journey may have been only a spiritual, contemplative and pious one but the illustration shows knowledge of the physical destination. Next to Acre is a camel suggesting the town as the terminus of overland trade to Asia. The depiction of the town is reminiscent of the stylized Jerusalem on the *Ebstorf* map *(**#224**)*. There is more detail in some versions, including the fortifications added to the port by Louis IX on his Crusade in the 1250s. Off the coast there are six ships, three of them sailing ships and of unquestionably northern European type. They are similar to contemporary keels, descendants of Viking cargo ships that were common cargo and people carriers as well as warships in the waters around Britain in the 13th century. The dragon heads on the foreposts and the decoration of the sails also indicate their origins. The hulls have overlapping planking and the sails are square, set on single yards, features that were virtually unknown among contemporary Mediterranean vessels. Such types might have made it to the eastern Mediterranean as part of flotillas bringing Crusaders from the North though the numbers of such ships were small and their survival rate in the worm-infested warm waters off the Holy Land was low. Whatever the origins of the ships on the map they are involved in naval activity in support of a Christian cause.



Chronica Maiora S. Albani of Matthew Paris Cambridge, Corpus Christi College, MSS 26
Itinerary from London to Jerusalem with a description in French, similar to one in the Royal MS. 14, C. vii but containing some interesting variations. It occupies seven pages.
*Center, bottom is the city of Acre, 1250 (**#225**)*

Off the coast there are six ships, three of them sailing ships and of unquestionably northern European type. They are similar to contemporary *keels*, descendants of Viking cargo ships (i.e., *Knorrs* or *Moras*) that were common cargo and people carriers as well as warships in the waters around Britain in the thirteenth century. Matthew Paris was an unknowing precursor of a new kind of mapping or at the least he anticipated a number of trends that would take cartography away from long-standing and increasingly standardized practice.



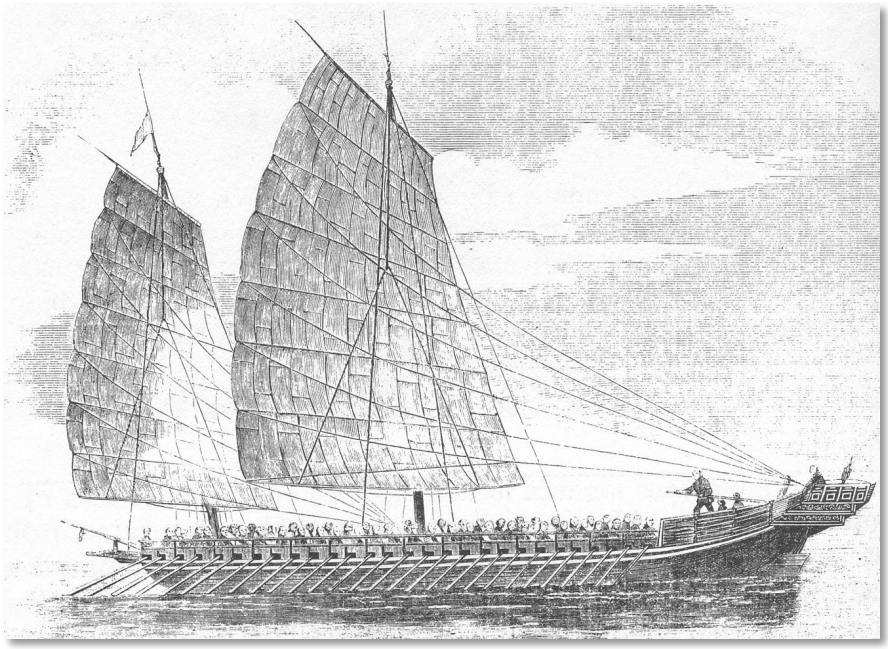


Detail from above (Matthew Paris' Itineraries, **#225***)*



The "Mora" is the name given to the name and place of the place of conversion and acceptance of the sovereignty of the King of France by Rollon, Viking. With him, and his successors, Scandinavian shipbuilding was married with Franques techniques. Thus, the Norman boats were characterized by certain similarities to the Scandinavian Langskips, including the Lion or Dragon head, the folding central mast, the fixed steering rudders, but also a construction specific to these ships, with a top, a slightly higher width. They were judged to be more stable but less rapid. They were also perfect for

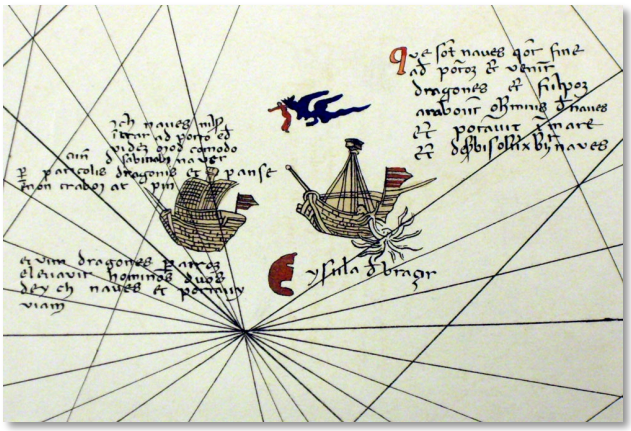
embarking a cavalry, a strong point of the Norman army. Their average size ranged between 12 and 24 meters and they could carry 20 to 30 rowers, who were also fighters. In 1066, William the Conqueror built several hundred of these ships (nearly 900) to disembark his 15,000 warriors on the coasts of Great Britain. through the very long tapestry of bayeux, which shows of the very colorful Langskips. **#225**







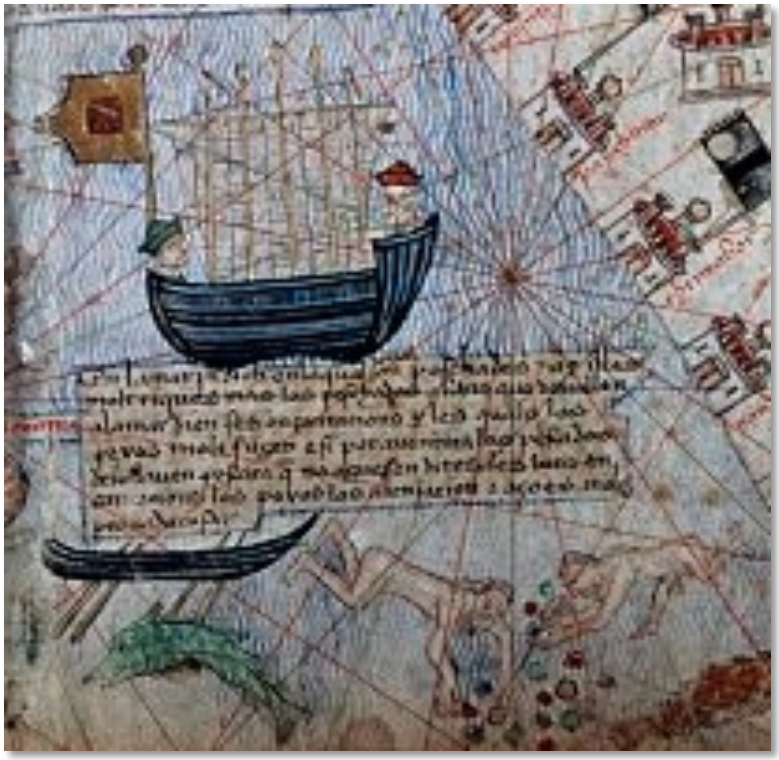
*The Pizigano chart of 1367, one of the earliest and largest surviving portolan charts. (**#250.1**)*
While difficult to see due to its condition, this chart is one of the earliest to display various ships on the ocean as seen in these drawing below showing the ships distributed on this chart.



Depiction of cochas, *or* carracks. *(**#250.1**)*

Those novel vessels of the second half of the 14th century combined the hull shape of the northern cog *with the hull construction techniques of the Mediterranean where instead of overlapping planks ships had planks abutting. Long the pattern for deep sea sailing craft in the Mediterranean that building style gradually became standard for sea going ships throughout Europe from the 15th century on. Also the square sail of the North is joined on the mainmast by a triangular lateen sail of the South on a second or*

mizzenmast. The combination of sails was the remarkable innovation that created the carrack. *The new type was a technological breakthrough.*



*A Chinese junk-like vessel and pearl divers in the Persian Gulf on the 1375 Catalan Atlas (**#235**)*

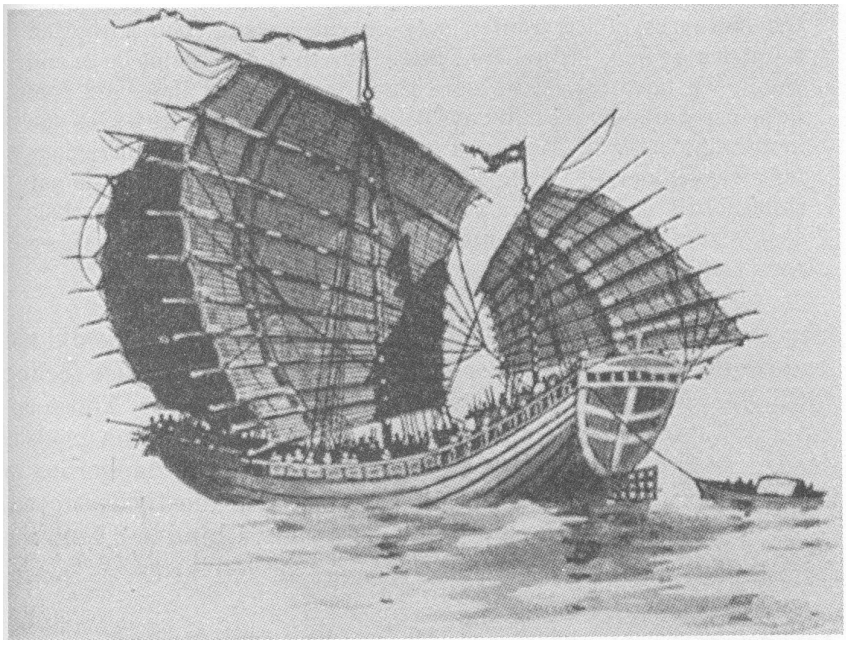


Jacme Ferrer's vessel in search of "Riu del Or" (the River of Gold)
*detail of the map of Western Europe and North Africa on the Catalan Atlas (**#235**)*

The Vivaldi brothers sailed from Genoa in 1291 on board two galleys, taking Franciscan friars along with them to convert people they met along the way. They sailed through the Strait of Gibraltar and were never heard from again, though through the 15th century travelers along the coast searched for signs of survivors from that ill-fated effort to circumnavigate Africa. It is possible that the Ferrer expedition was intended to follow their path, at least in part. The galley on the Catalan Atlas has four men with hats and there is an Aragonese flag flying prominently from the stern. The long low vessel shows no signs of oars but the hull shape and the single triangular or lateen sail suggest a galley or at least a relative of the galley. Some sources called the ship an uxer *but a galley is also suggested and the map certainly indicates a galley.*



*Another attempt at illustrating a Chinese junk located in the Indian Ocean on the 1375 Catalan Atlas (***#235***)*



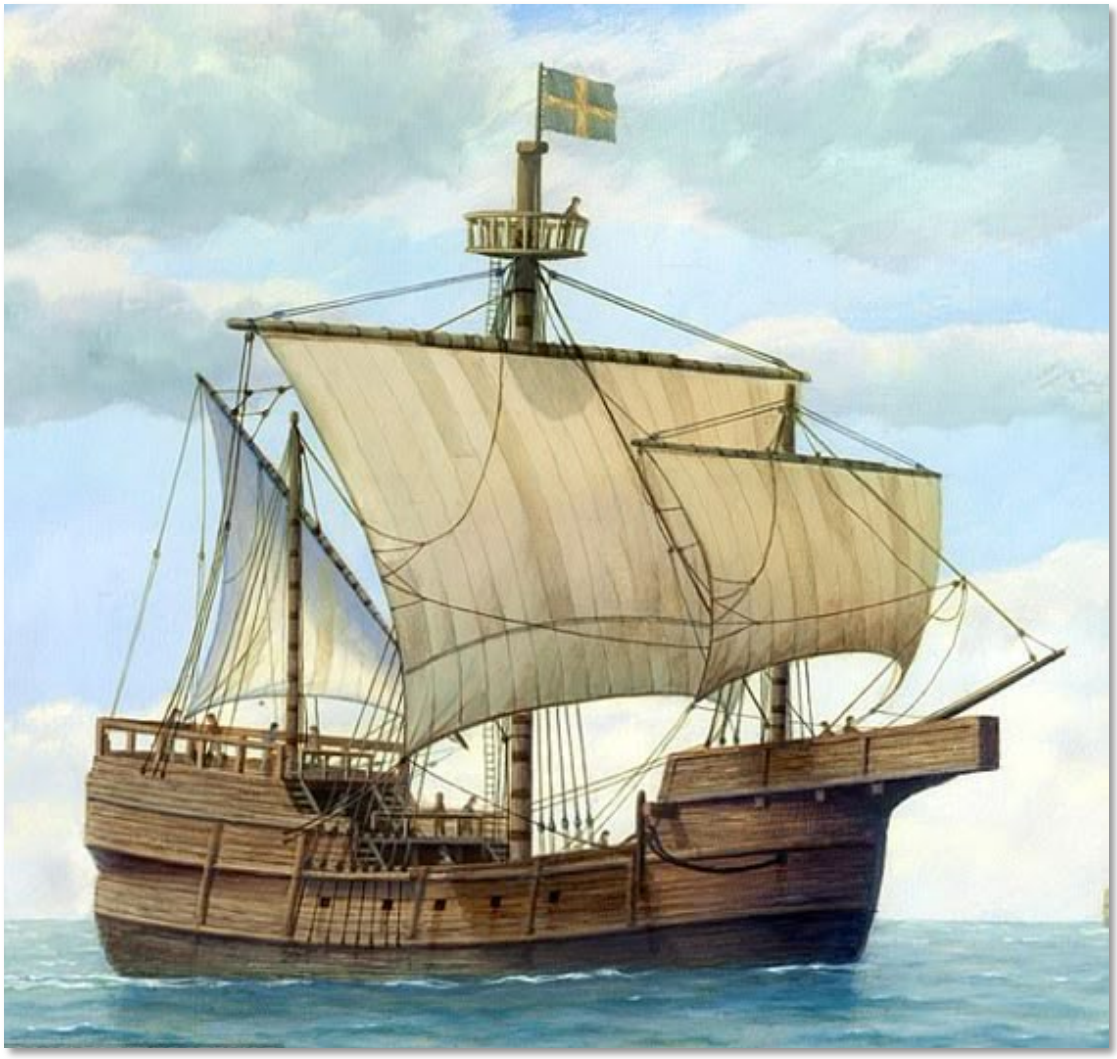
With junks like this one, the Chinese would win the Spice Route—and then let it go. (By Manning de V. Lee, in Rupert Sargent Holland, *Historic Ships*, 1926)



*Ship off the coast of West Africa on the Catalan Estense mappamundi, 1450 (**#246**)*
The Catalan world map of about 1450 now in the Biblioteca Estense in Modena, Italy, has a ship off the West African coast but somewhat south of the location of the Ferrer ship that appears on the 1375 Catalan Atlas. What is more the ship is different. It is still low slung but carries a single square sail and has a stern post rudder, more reminiscent of the types of vessels common to northwest Europe than to the Mediterranean. The second ship on the map, in the Arabian Sea, is similar but seen from the stern. The goal may have been to show a barcha*, the ship used by Portuguese sailors in early voyages of exploration along the African coast.*

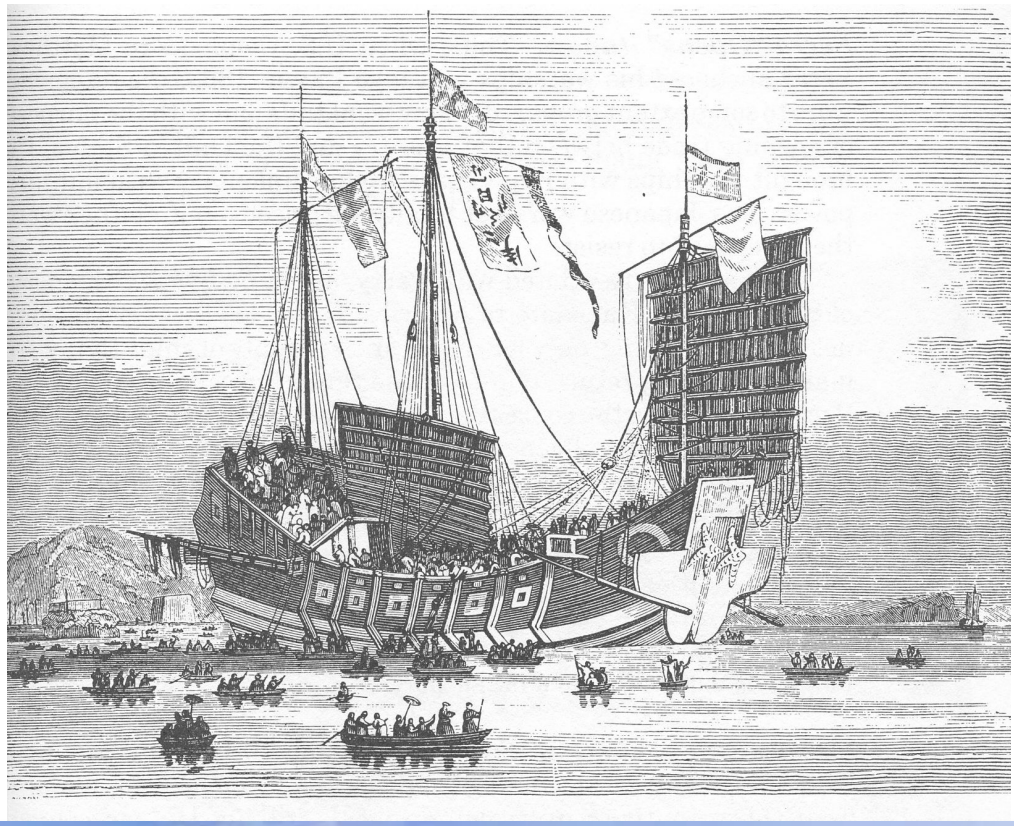
5.25





Ships on Early Maps

5.25







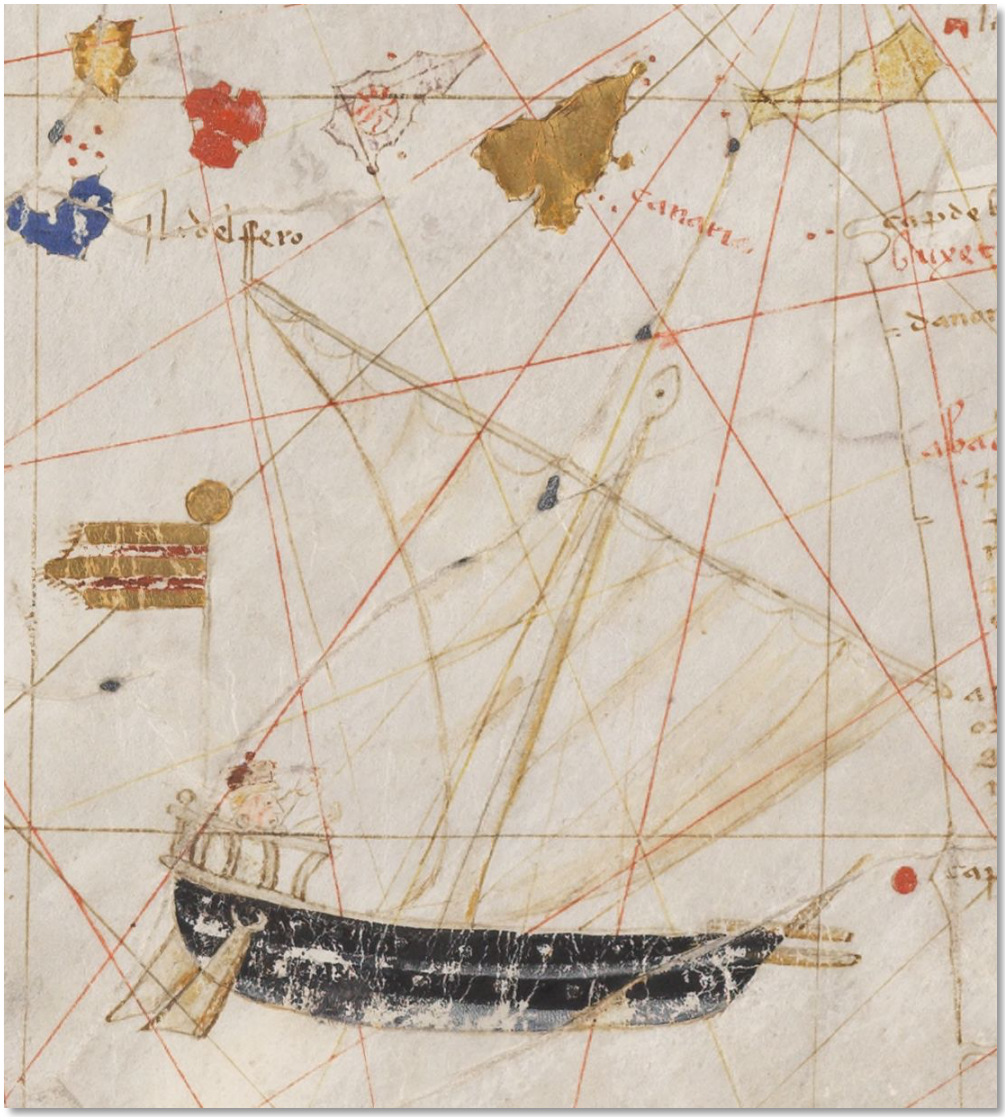
*The Borgia mappamundi, 1410-58 (**#237**) with over 20 vessels around the periphery*
Details below





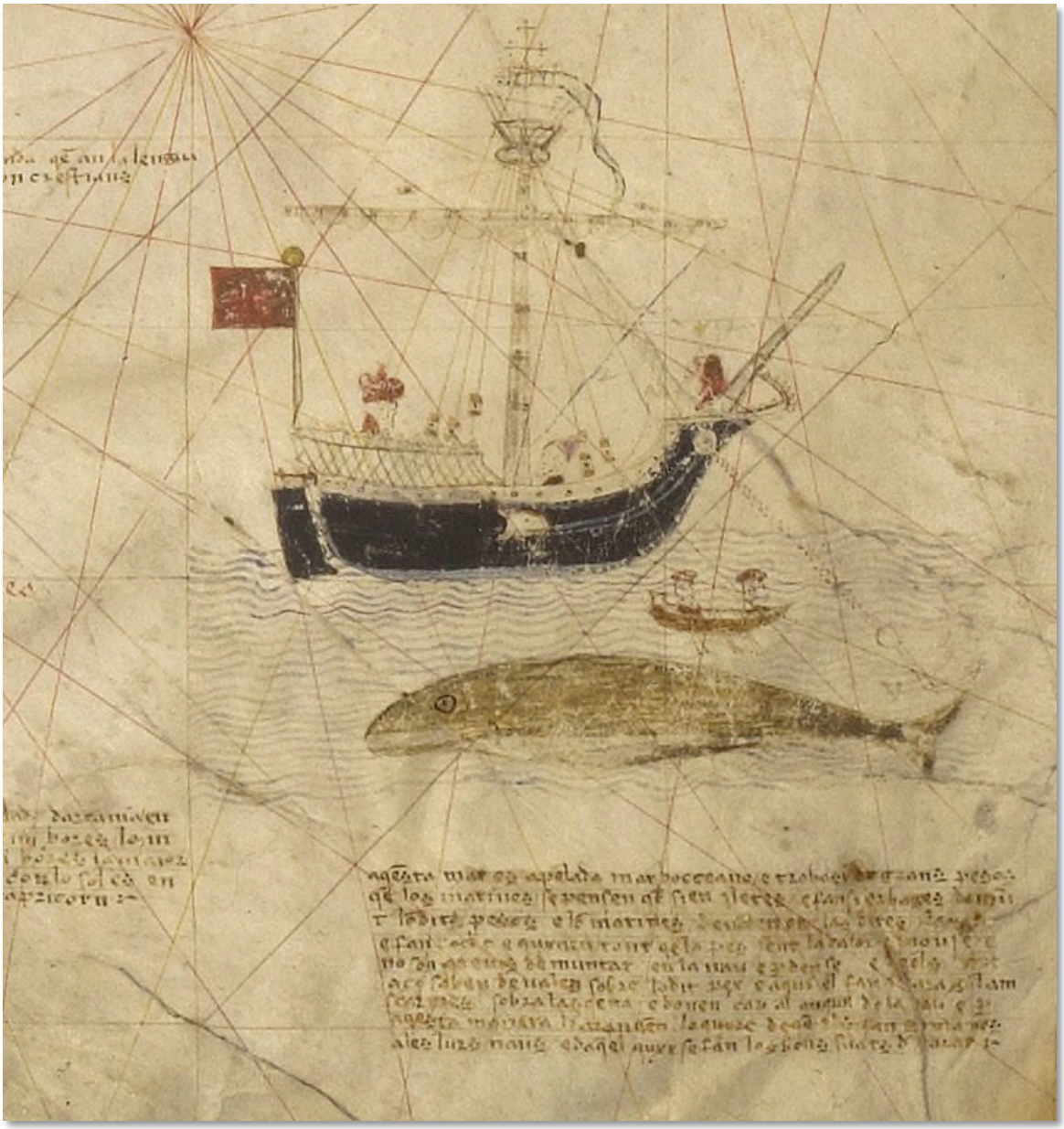
*Ships and galleys on the Borgia mappamundi, 1410 (***#237***) There are some 20 vessels in the sea all around the periphery of the landmass that fills the center of the map. The most prominent vessels are at the bottom. The various craft are almost all but not exclusively single masted and come in different types. According to Unger there are generally two variants of the single-masted sailing ship, one being long with a high built-up platform, or aftercastle, at the stern and a lower built-up platform at the bow, or forecastle, a top or platform high up on the main mast, and a prominent and obvious sternpost rudder. It is probably a hulk and so closely related to the northern European* cog. *Another variant is drawn up at bow and stern with a much more curved profile and almost double ended. There is also an open vessel with five rowers and a captain placed in an enclosed area at the stern and that might have been intended to be a* galley. *There is one single-masted sailing ship which is low and open with no castles and a rudder with a tiller that passes over the stern post so it is more like a river boat than a deep sea sailing ship. One of the ships possibly has overlapping planking. The presence of such ships and in such variety as those on the* Borgia *map combined with the fact that variants of the* cog *design found their way onto other southern European maps in the 15th century strongly suggests that vessels from the North were well known in the Mediterranean and respected there for their sailing qualities and capacity. It also suggests once again that map makers wanted to include signs of novelty at sea.*





The typical Portuguese falua *is beautifully illustrated on the 1413 Viladestes chart (**#240.2**).*

The Portuguese like the other European nations began with a fishing fleet, whose simple vessels were progressively adapted to the new demands placed on them. Technically they were neither better nor worse equipped at the outset than the English, the French or the Dutch. The typical Portuguese *falua* is beautifully illustrated in the *Viladestes* chart of 1413 *(**#240.2**)*. It was deckless, had one or two masts, was lateen-rigged, carried steering boards on the bows, and it was small enough to be rowed. A process of gradual modification saw this design evolve into the larger *caravel*, which was at least partly decked, and partly square rigged, and with small stern-castles. This in turn was succeeded by the *carrack*, which was larger still with castles fore and aft. It is difficult to be precise about when these changes occurred; for example it is usually stated that da Gama's vessels were *carracks*, yet the Cosa chart of 1500 *(**#305**)* shows Portuguese ships approaching India that are rather small, lateen-rigged *caravel*s. This evolution in ship design was dictated by the unique experience gained on voyages longer than those made by any other nation at this time.



*The second ship on the 1413 Viladestes chart (**#240.2**), placed off the west African coast, is very possibly a* falua, *a Single-masted lateen rigged ship with a low profile, straight gunwale, a raised platform at the stern, and a steering oar on each side. It could be that the cartographer was trying to show the* uxer *of Iacme Ferrer but simply did not know much about the technical details of its construction and instead drew a contemporary type. An Aragonese flag is prominently displayed. The ships are distinguished by the quality of the drawing that makes it possible to make out some details, for example, of the rigging. The ships are also technically unique and located well out to sea, involved in novel activities for European sailors. They seem to have a purpose beyond simply filling the ocean off the west coast of Europe and Africa, a portion of portolans that, with the inclusion of new information, was becoming increasingly long and more detailed by the early 15th century.*

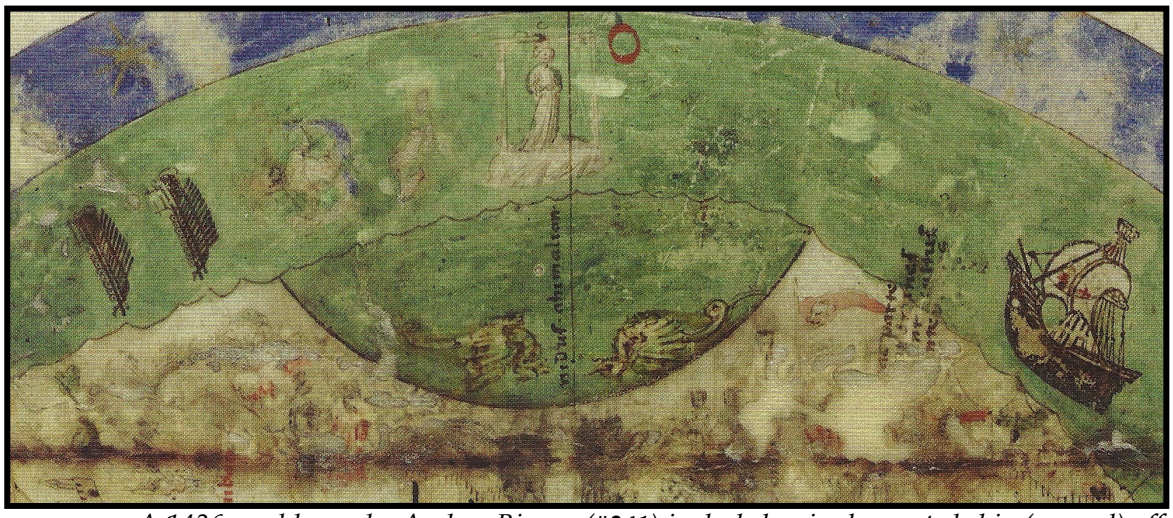


1493 representation of a ship used in the late 15th century

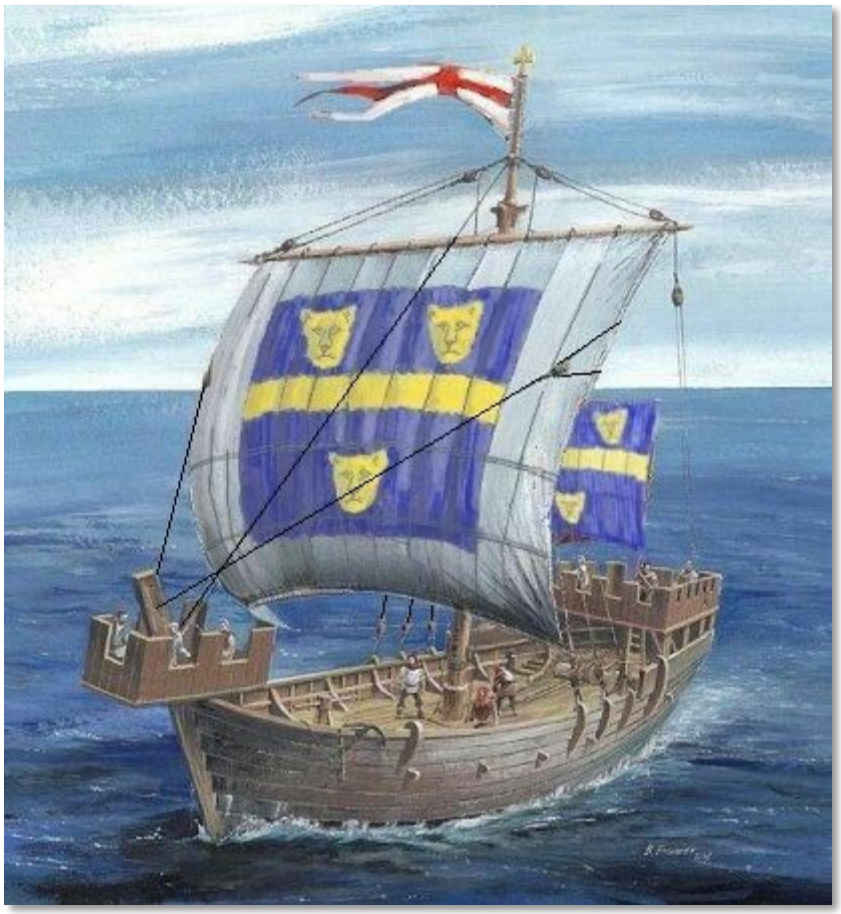


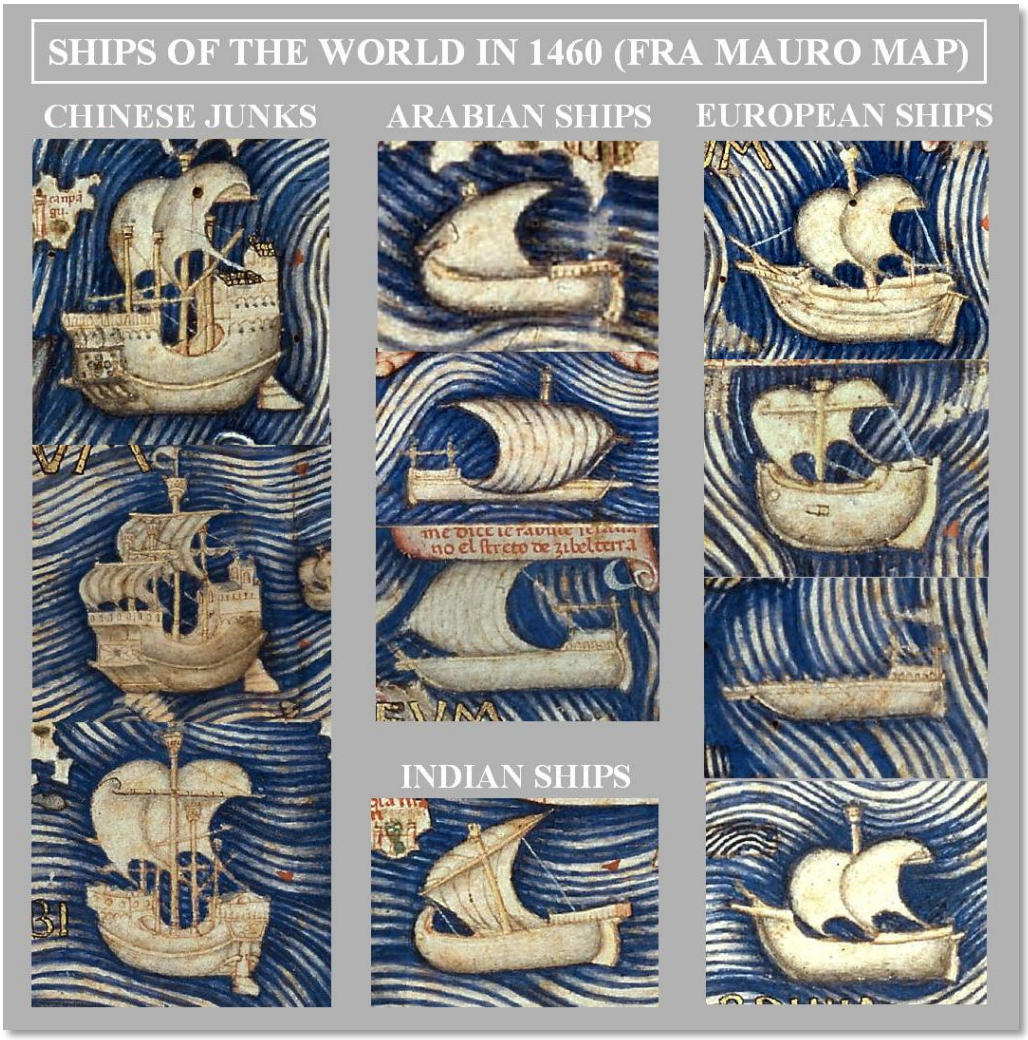
*European off the coast of South America on Juan de la Cosa's 1500 world map (**#305**)*

There are a total of 12 ships on this world map. Two of them are single-masted single sail high-charged ships which would have been more or less at home in northern Europe or along the Basque coast where the type appeared on town seals in the Middle Ages. There is one full rigged ship complete with a high aftercastle. The rest of the ships have the telltale low profile of caravels, often with a sharply curved stem post. There is a mixture of two- and three-masted versions and among the three-masters one suggests a square sail on the foremast and lateens on the other two masts. Some of the three-masted caravels carry only lateen sails. One of those is off West Africa and the other two are off the north coast of Brazil. The general shapes of the hulls on those ships are similar to the ones of the full-rigged ships that turn up crossing the Atlantic on slightly later Portuguese maps. De la Cosa was an experienced sailor so would not have made a mistake in depicting the rig. It is possible that, just as Columbus changed the rig on a caravel to make the Atlantic crossing, captains changed the rig, dropping the square sails on full-rigged ships once they got into the Caribbean. That would have made the ships more maneuverable. There is no mention of such action though other Spanish maps show the same type of three-masted lateen-rigged ships.



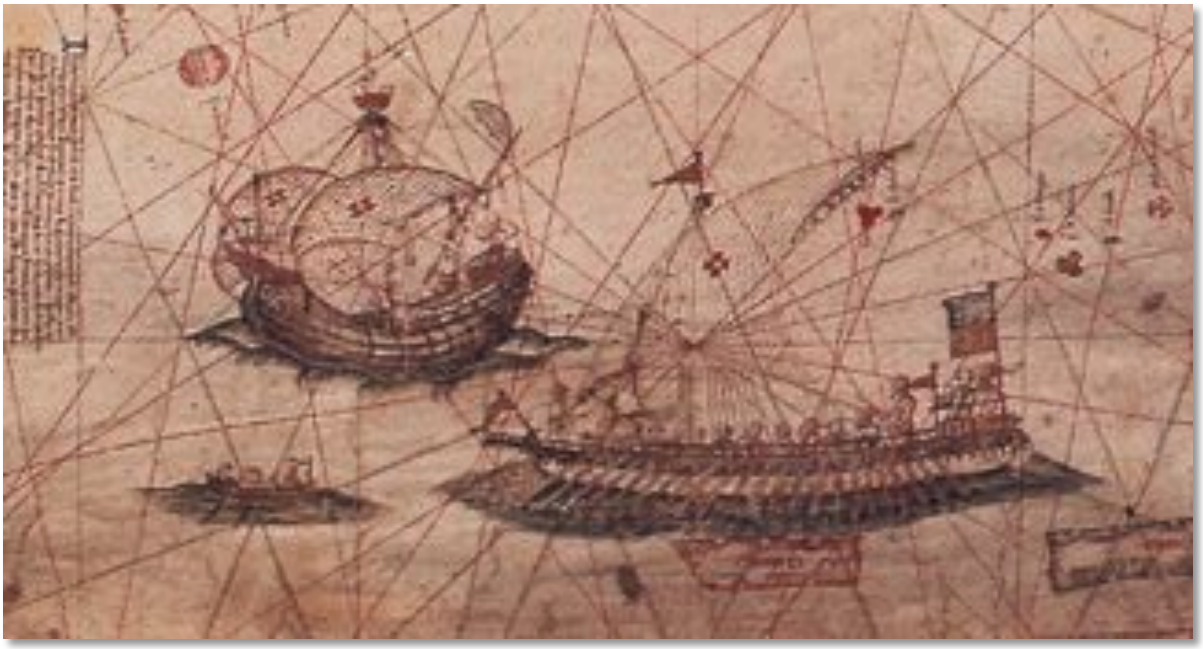
*A 1436 world map by Andrea Bianco (**#241**) included a single-masted ship (caravel) off the southeast coast of Africa and two galleys not far away*





*The variety of ship types displayed on the 1460 elaborately illustrated mappamundi by Fra Mauro (**#249**). There are ships off the coasts of Asia and of Africa but they are small and difficult to distinguish. The ones off southern Africa are single-masted and are probably intended to be* hulks *with sharply curved bows but also curved sterns. That feature made it hard to fit a sternpost rudder, a problem solved by Mediterranean ship carpenters by fitting some deadwood between the curve of the stern and the straight rudder. The artist who drew the ships did not include that small but essential addition suggesting lack of knowledge of how ships functioned. The Fra Mauro map described the presence of* junks *in the Indian Ocean as well as their construction: "The ships called* junks *(lit. "Zonchi") that navigate these seas carry four masts or more, some of which can be raised or lowered, and have 40 to 60 cabins for the merchants and only one tiller. They can navigate without a compass, because they have an astrologer, who stands on the side and, with an astrolabe in hand, gives orders to the navigator." Fra Mauro further explains that one of these junks rounded the Cape of Good Hope and travelled far into the Atlantic Ocean, in 1420: "About the year of Our Lord 1420 a ship, what is called an Indian Zoncho, on a crossing of the Sea of India towards the "Isle of Men and Women", was diverted beyond the "Cape of Diab" (Shown as the Cape of Good Hope on the map), through the "Green Isles" [lit. "isole uerde", Cabo Verde Islands], out into the "Sea of Darkness" [Atlantic Ocean] on a way west and southwest. Nothing but air and water was seen for 40 days and by their reckoning they ran 2,000 miles*

and fortune deserted them. When the stress of the weather had subsided they made the return to the said "Cape of Diab" in 70 days and drawing near to the shore to supply their wants the sailors saw the egg of a bird called roc, *which egg is as big as an amphora."*



Two ships (a galley *and a Portuguese* caravel*) in the Atlantic from a portolan chart by Grazioso Benincasa, 1482 (***#250.3***). Delicately and finely drawn in color, two ships, a three-masted sailing ship with a very small foresail and only the mainsail set, and a galley with a large lateen sail and not one but multiple oars to a bench. Benincasa depicted a design common for more than two centuries but one which was soon to disappear as the multiple rowers on each bench dropped their individual oars and took on pulling together on the same single large oar. Benincasa's vessels are off in the Atlantic among what could be intended as the Cape Verde Islands. The sailing ship he drew is remarkable for its detail but also for its design. The 1482 Benincasa map was detailed with clear indications of abutting planking rather than overlapping, reinforcements of the hull, a sharply angled bowsprit, and a large composite mainmast put together from multiple pieces of wood. By the time Benincasa made the map the ship type must have been widely known and the implications of its greater effectiveness as a cargo carrier making an impression on people throughout the ports of Europe.*



*Ships (Cogs) and a Galley off the coast of Palestine in the 1475 Rudimentum Novitiorum (***#253***)*
A Franciscan handbook, the Rudimentum Novitiorum *printed at Lubeck in 1475, had a number of bird's-eye views and the one of the Holy Land has ships, one a galley off the coast, and another five ships which are single-masted sailing vessels all more or less the same and with heavy reinforcement for the sides of the hulls typical of northern European and not Mediterranean ships.*



*A Galley on the world map by Hanns Rüst, 1480 (***#253.2***)*

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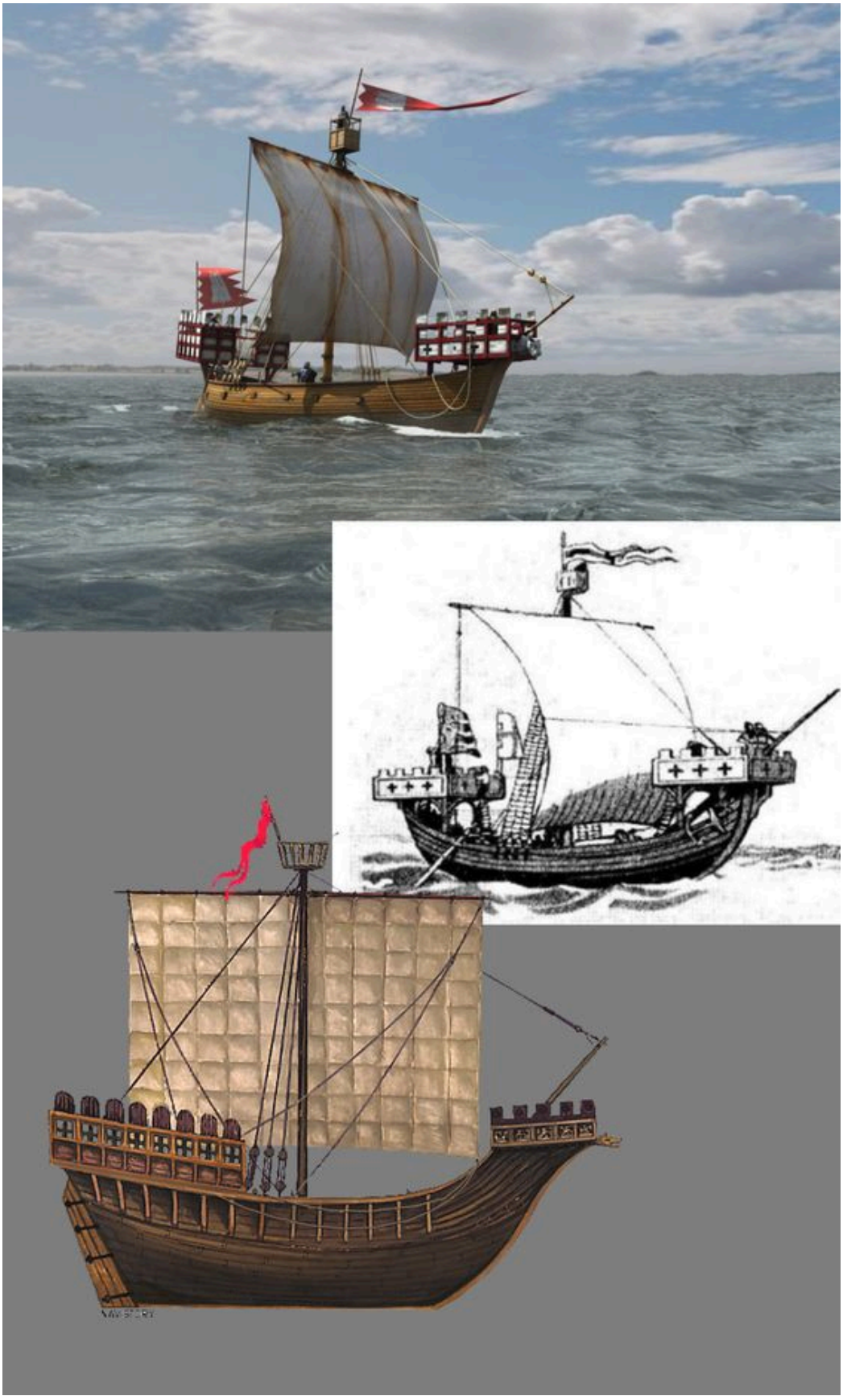

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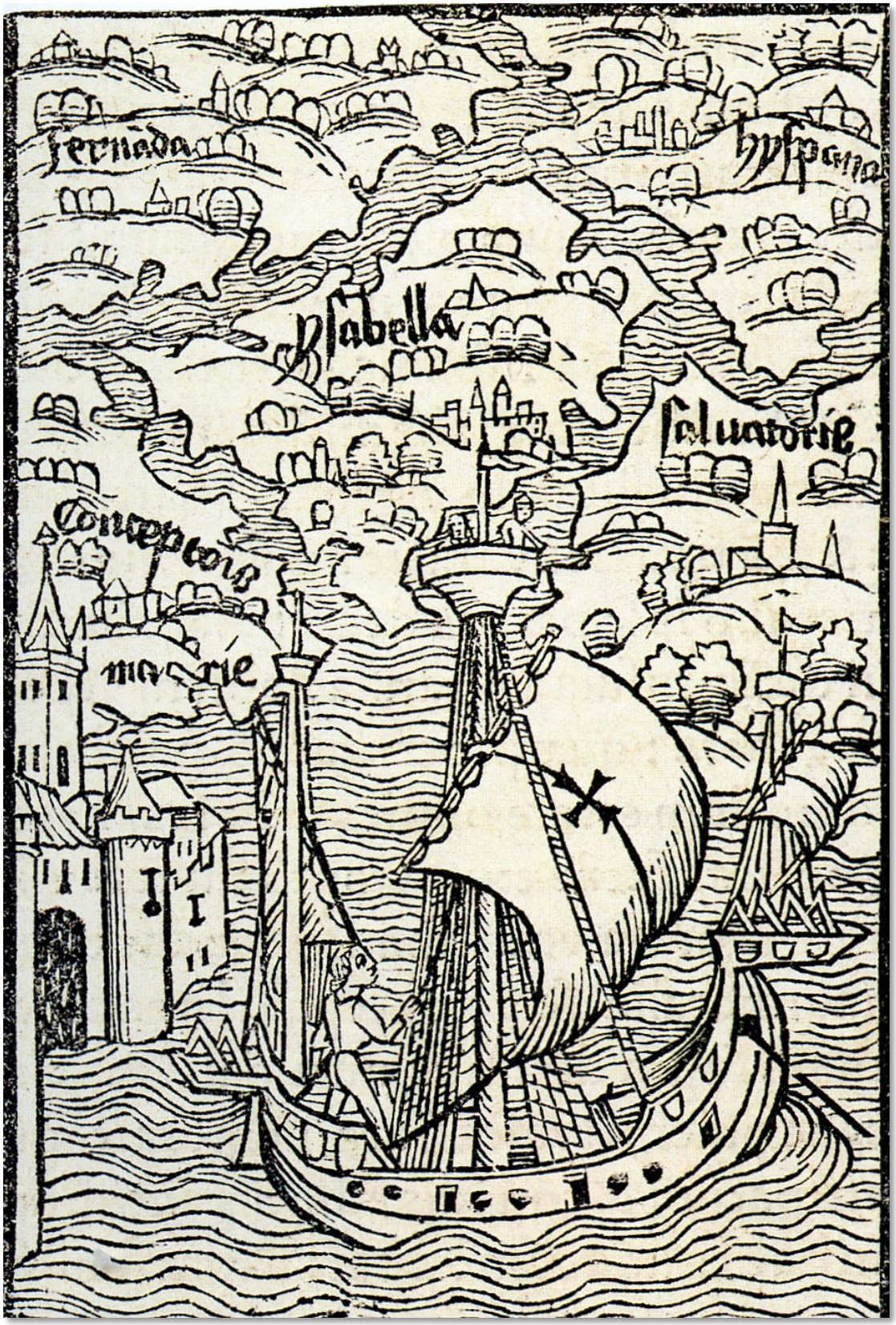
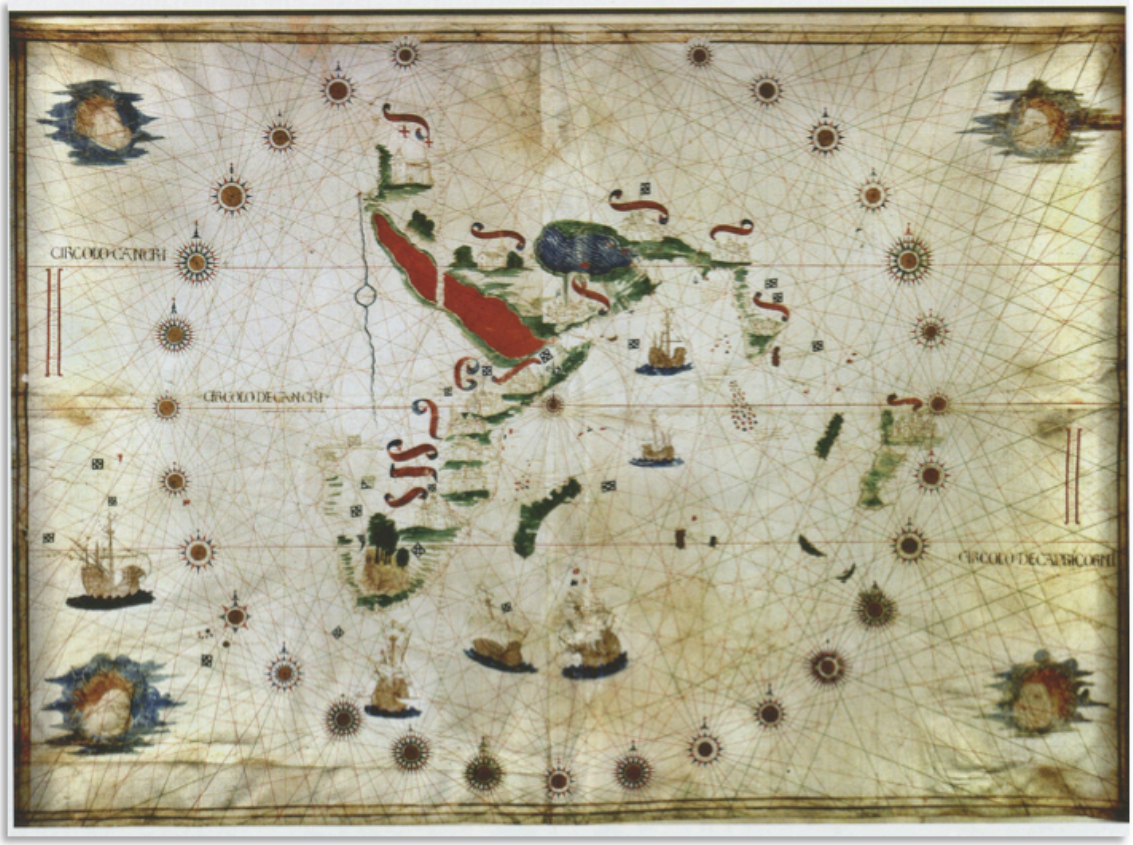


Renaissance



Large galley *from the 1538 map Descriptio Palestinae Nova by Wolfgang Wiussenburg*



South Indian Ocean, 1510, Jorge Reinel with six ships (carracks) *off the coast of Africa, details below*

Ships on Early Maps

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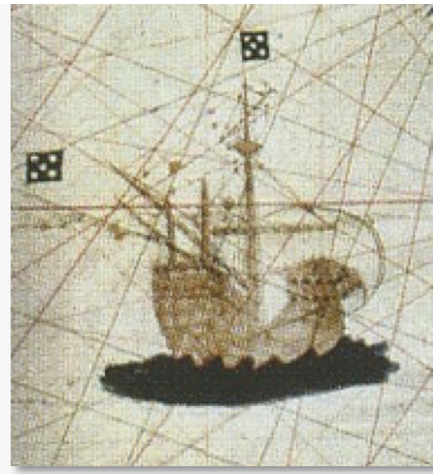
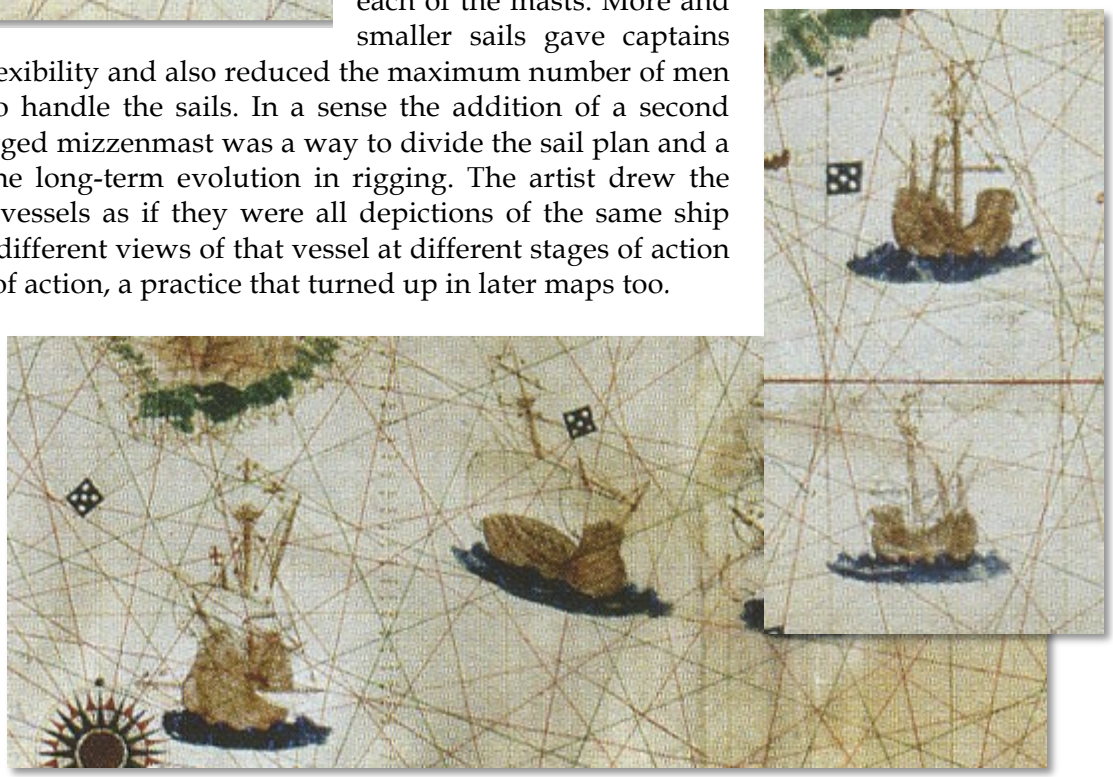
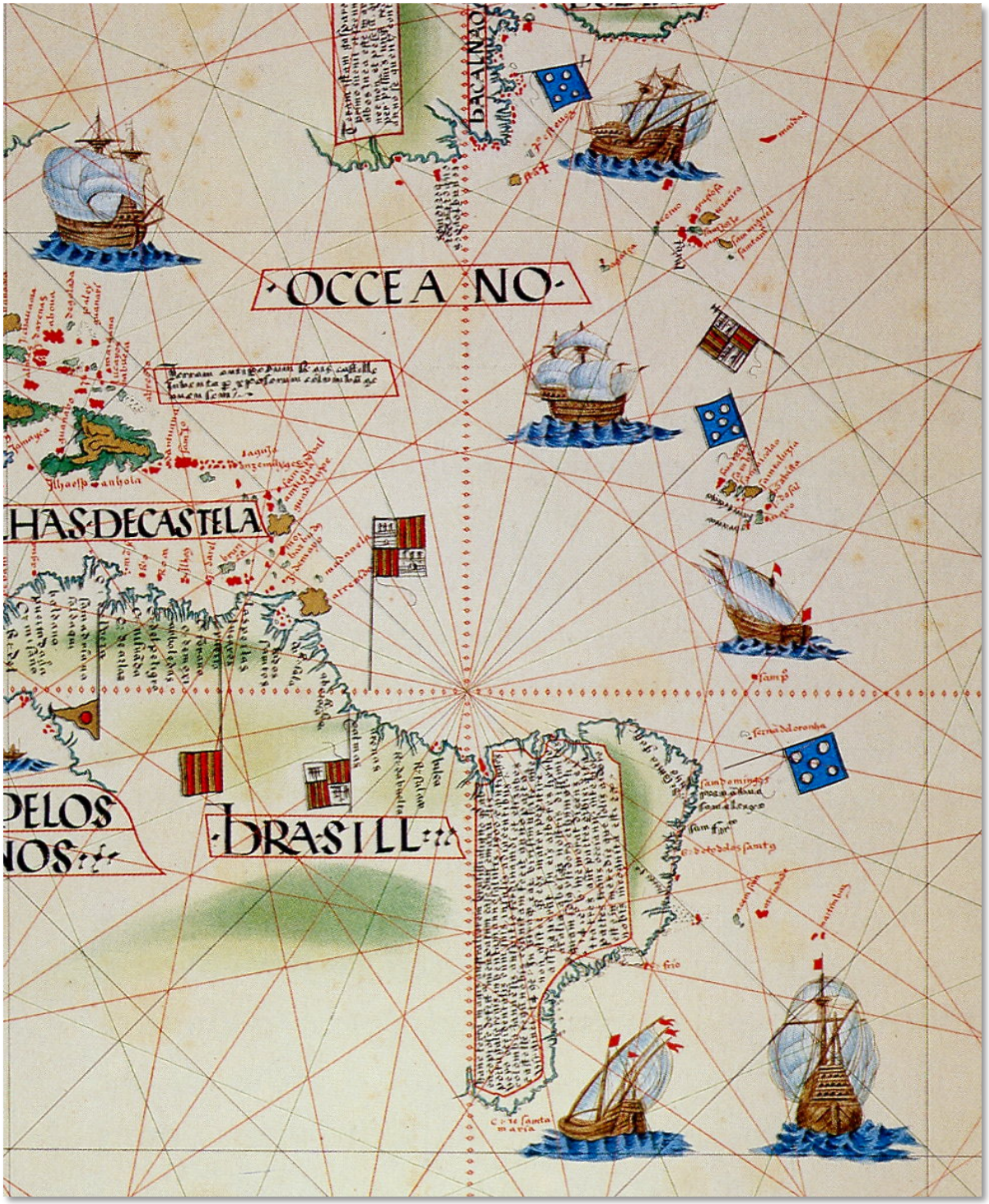
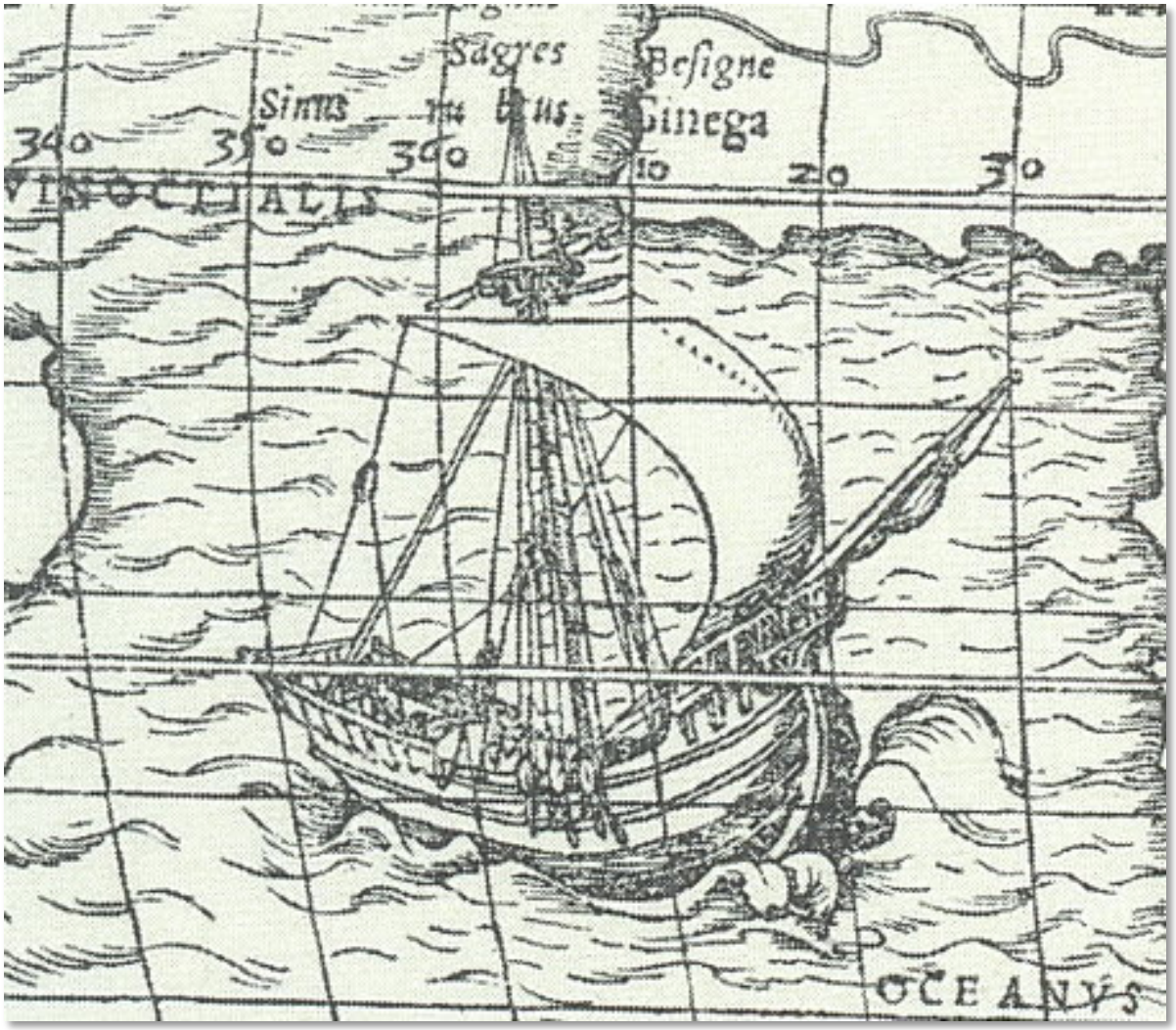


These six ships are spread out from the South Atlantic to the Indian Ocean and Arabian Sea. All of the vessels are variants on a *carrack*. Some have three masts but the largest have four, the second or bonaventure mizzen carrying a second lateen sail. The ships were dramatically sketched giving a sense of action and movement. They had low waists created by sharply turned up bows and sterns. There was a big mainsail and small topsail on the mainmast. The dominance of one sail indicates ship designers had yet to appreciate the advantages of a divided sail plan - that is where the captain had a number of easily deployed smaller sails on each of the masts. More and smaller sails gave captains greater flexibility and also reduced the maximum number of men needed to handle the sails. In a sense the addition of a second lateen-rigged mizzenmast was a way to divide the sail plan and a sign of the long-term evolution in rigging. The artist drew the different vessels as if they were all depictions of the same ship but with different views of that vessel at different stages of action or states of action, a practice that turned up in later maps too.





A variety of ships in the Western Atlantic on the Jorge Reinel world map of 1519



Ship off the coast of West Africa on Sebastian Münster's 1532 world map (**#353**)



*The Carta Marina, 1539, by Olaus Magnus (**#366**)*

The cartographer wanted to show the maritime culture of the North and that included many ships of different sizes and design, some sailing along, some involved in fishing or whaling, and some under threat from the various sea creatures that populate the map. The range in vessels is everything from heavily built large three-masted sailing ships with high castles to small rowing craft. The ships often have their port of origin written underneath them and he even commented on the profitability of trade from certain Hanse ports to Iceland. He also showed a Hamburg ship sinking a Scots one with gunfire. The ships themselves are not depicted carefully but the principal design features are easily recognized and in the case of the Swedish ship and the one from Gdansk he, or rather the Italian artists who probably worked from his sketches, made a special effort to depict the vessel accurately. The Swedish ship is a three-masted carrack *with overlapping hull planking, a form of construction disappearing in the North in Olaus' day. Lefreeri in the later edition changed the planking so that it abutted rather than overlapped giving the hull the by-then-common form. Olaus' ships in some cases had topmasts and topsails so he was aware of the expansion of canvas on ships as he was aware of the use of guns, though he did place the guns rather high in the vessels which sailors at the time already knew was dangerous.*





Several carrack *ships and whales south of Iceland* (**#366**)



Notice the carrack *and* curragh*-like boat and the ship wreck* (**#366**)





Three-masted carrack. ***(#366)***

According to Unger variety as well as chronicling the Portuguese use of ships in Asia was the hallmark of the sketches made by Joao da Castro (1500-48) who went out to India in 1538 and was viceroy there for three years. A disciple of Pedro Nunes, he was concerned with a range of navigational questions including how to measure longitude. He wrote three *rutters* or books of sailing instructions as a result of his voyage out to Asia and the journeys he made there. Presumably he based the books heavily on information gleaned from local pilots. Da Castro made corrections in existing charts. In the *rutters* he included small sketch maps that in a number of cases included depictions of ships of various sorts. The drawings like the *rutters* concentrate on approaches to safe anchorages. The sketches may not have been made by da Castro himself but rather by an artist brought along for the purpose. For the Lisbon to Goa *rutter* all the ships depicted are virtually the same with high castles, straight gunwales, three masts with topsails on the fore and mainmasts and a lateen sail on the mizzen with a straight outlicker. There is also a sail slung under the bowsprit. It was a standard ship of illustration and presumably the increasingly standard ship of high seas navigation. The second *rutter* covering the coast from Goa to Diu has sketches which are harder to interpret but the standard ship appears again as do *galleys* but not the ordinary ones of the Mediterranean. Da Castro's *galleys* have three masts with the usual lateen sails on the main and mizzenmasts but a small square sail on a foremast suggesting the *galleys* were large, as does the very large lateen sail on the mainmast. The *galleys* have oars and an unexpected scrolled stern with a pavilion aft as well. The third *rutter* dealt with the Red Sea and it too had galleys but they are more recognizable with two masts, both lateen-rigged. There are also cases of highly mixed

fleets with various vessel types ranging from single-masted to two-masted *galleys* to ships without oars carrying the standard complement of two square sails on each of the fore and mainmasts and a lateen-sail on the mizzen to a big sailing ship with four masts, the fourth carrying a lateen-sail on the sternmost mizzen to a four-masted large *caravel* with three lateen-rigged masts and a square mainsail and even a topsail on the foremast. The greatest variety of ships comes in a sketch of a naval battle with on one side what is presumably a Portuguese fleet made up of both sailing ships and galleys and on the other a Muslim fleet made up of a collection of rather uniform, low, light galleys each with a single mast.

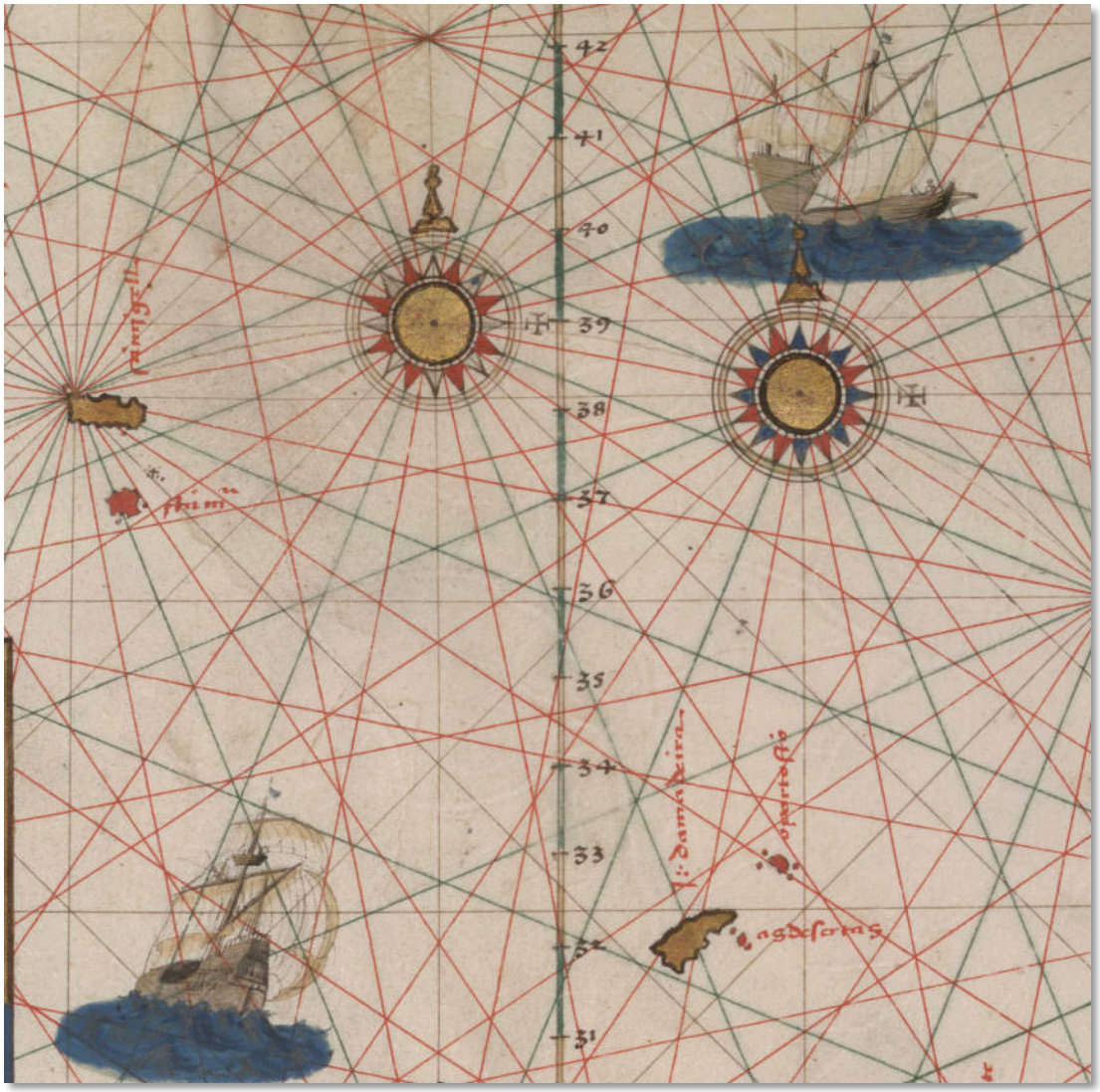
Da Castro had a lasting influence in part because Goa became a center of map making, a process already under way when he went to Asia and one that he promoted. Though he did not produce grand presentation charts as did the Reinels and Homems he did include in his sketches, just as they did in their collections and world maps, a variety of ships and did so with a drive toward accuracy.



Example of ships illustrated by Joao da Castro on sketch maps

More in the style and tradition of the *Miller Atlas (#329.1)* was the 1546 atlas by Joao Freire, a cartographer known only from the single work. The collection is made up of seven beautifully illuminated charts complete with extensive decoration including ships at sea. Off

West Africa there is a three-master seen from the stern, what could be a two-master, and a large *caravel*. Off Newfoundland there is a *caravel* and a standard three-master with a markedly deep waist. Off the Low Countries a small open vessel uniquely has a big yard or sprit forward of the single mast and fixed at the base of the mast. Spread around the Atlantic Ocean, the Mediterranean and Black Seas there are a number of standard three-masters and a couple of undistinguished *galleys* and a few *caravels* but with three masts, each carrying a single lateen-sail.



Caravel ships off the coast of Portugal and Africa on Freire's portolan

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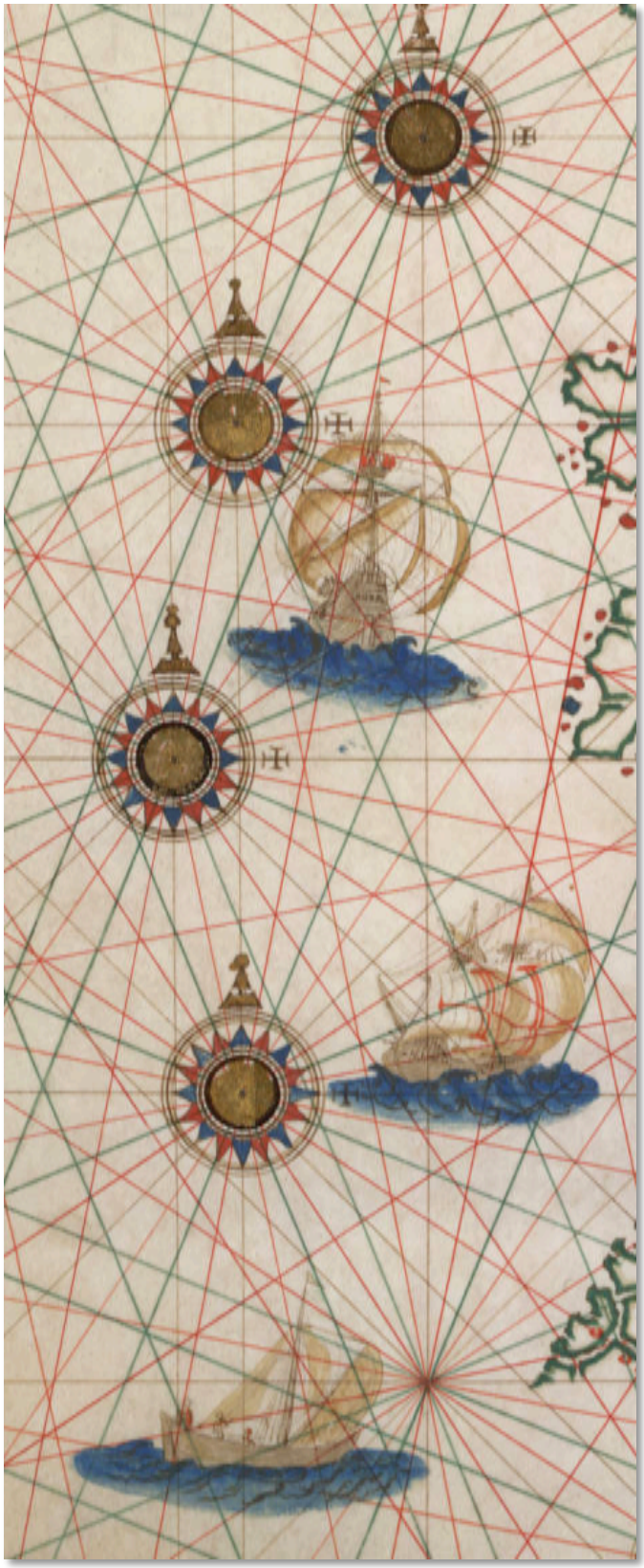


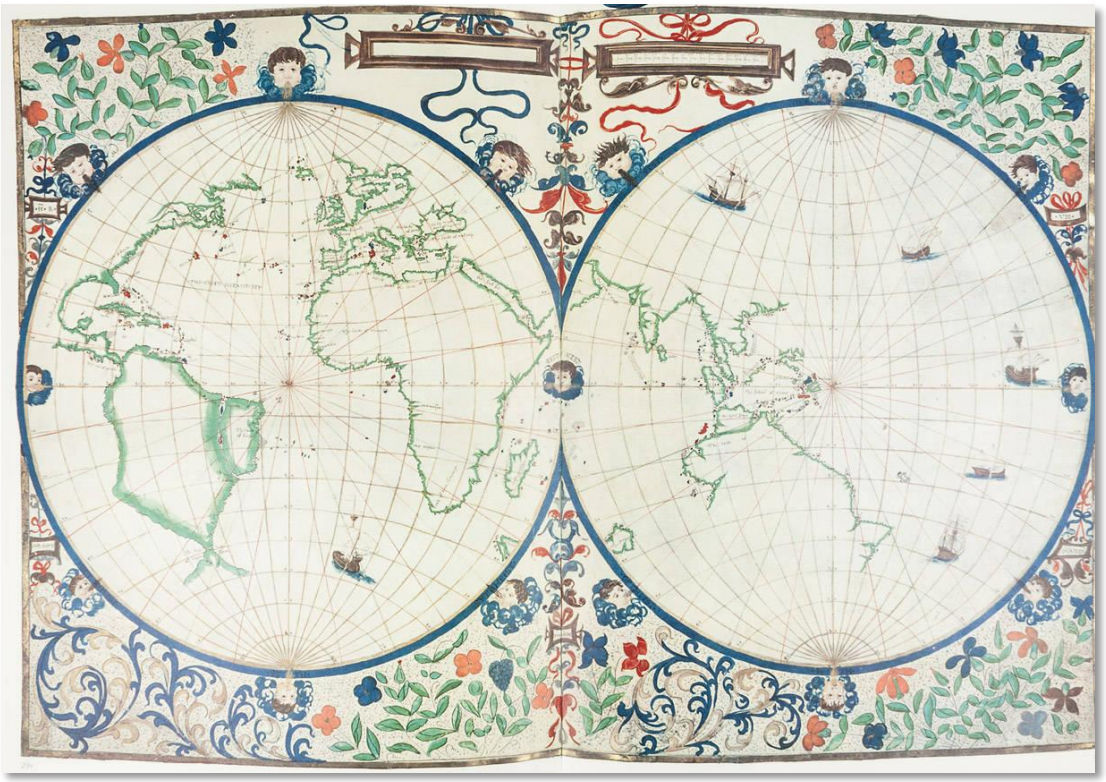
Ships off the coast of Scandinavia, Baltic Sea in the Portolan Atlas of Joao Freire



A caravel and a standard three-master with a markedly deep waist off Newfoundland in the Joao Freire Portolan Atlas

According to Unger, a number of 16th century atlases produced in Portugal or in Goa that covered all or part of the world did not have ships as decoration for the oceans. Still the tendency was to include ships and even in terrestrial maps by the second half of the 16th century where ships show up off shore. The *Miller Atlas (**#329.1**)* had the seas filled with ships. It included a great range of vessels and of many different types. There were some efforts to depict, even if in a clumsy and uninformed fashion, the ships of non-European design traditions. In virtually every case ships are shown in the places where they would have been used by Europeans and non-Europeans. Thanks to the interest in ships and in showing how and where they were used the cartographers created an excellent source of

information about ships Portuguese sailors relied on for their voyages of exploration. Often the artists indicated how sailors managed the ships and used the various sails. Seafaring must have fascinated mapmakers, their audiences and their patrons, at least enough for the cartographers to include as many ships as often as they did. Seafaring must also to a significant degree have infiltrated thinking at least in some circles in Europe, raising questions about the nature of the sea and the political relationship between it and the Portuguese.



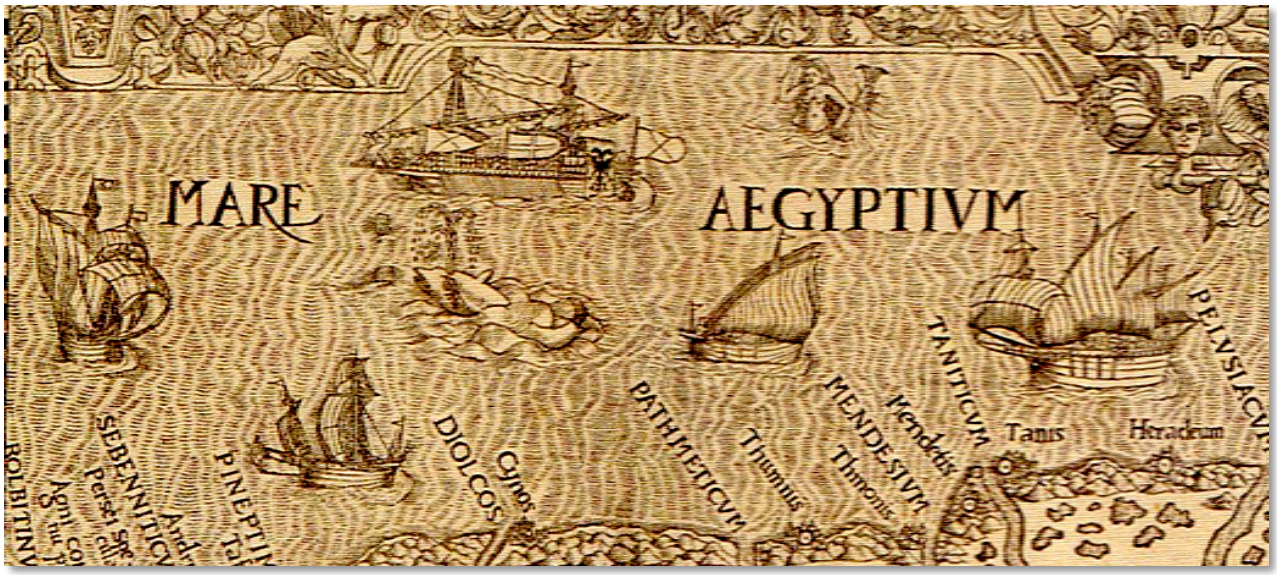
World map, 1542, by Jean Rotz from his Boke of Idrography

This world map is in two hemispheres with one ship in the South Atlantic and five in the Pacific. The first is hard to make out since the sails billow out and cover much of the vessel. Of the ships in the Pacific one is a three-master with all lateen sails and a second is a two-master also lateen-rigged. In both cases all sails are set. The profile of the vessels is like that of caravels on Portuguese maps. The remaining three ships are three-masted and seen from different angles. One has virtually no forecastle so it may be a galleon, a new type only very recently developed. One of the other two is more heavily built with a deeper waist and so reminiscent of a carrack.









Ships in the "Egyptian Ocean" on the 1559 map Itinera Isrealitarum et Aegypto…
by Tilleman Stella – a galley, *two* carracks, *a* caravel *and a* dhow



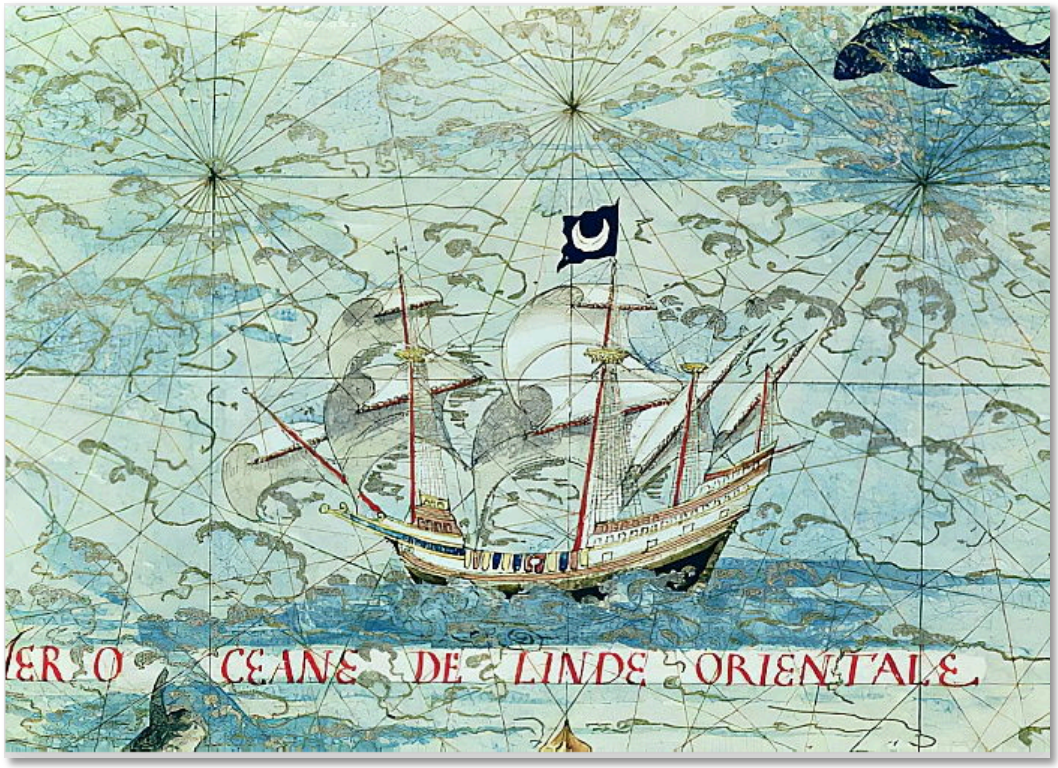
Portuguese ocean-going ships of the 16th century from the Livro das Armadas, a list of drawings of Portuguese fleets in India made after 1566

5.25


S. cruz
belchior de sousa
felipe digno. s. boa
Dom pedro mas carenhas
conceyção
Miguel de castanhoso
espa darte.
Fernão gomez de sousa
fra memga
Dom manoel tello
não passou, e foy ter a são thomé desbaratada
gale ginha
Fr.co de gouuea
Jn V. nou emocambique



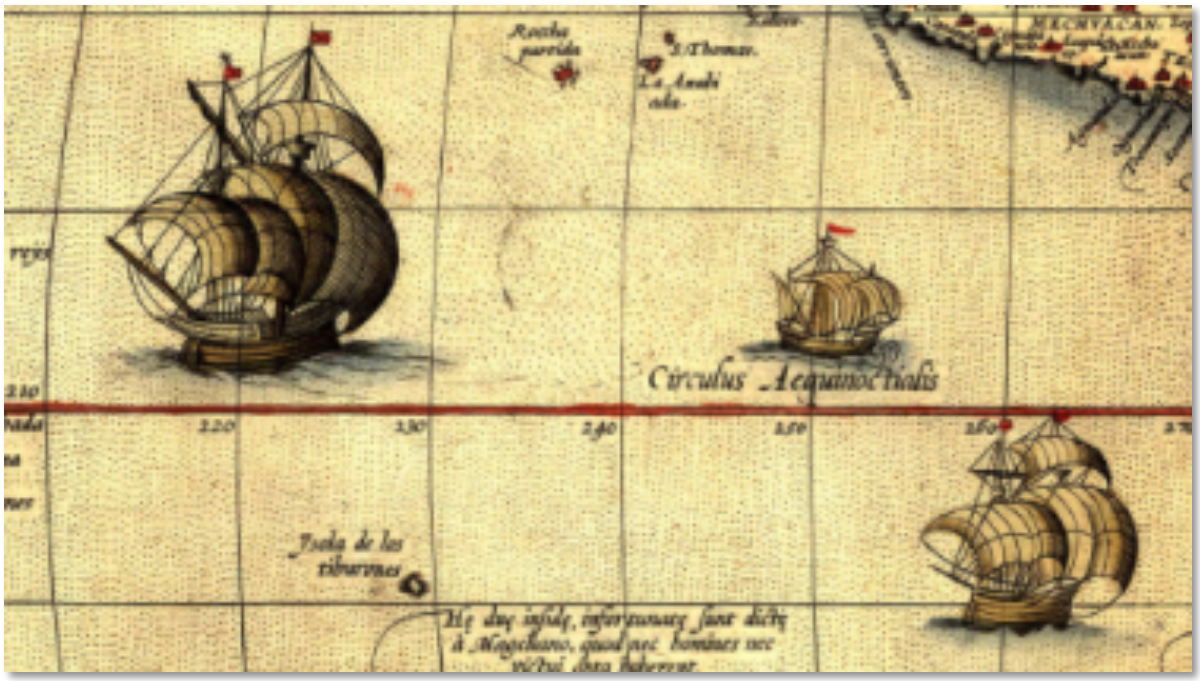
A caravel, *detail from Cosmographie Universe lie, 1555*
Guillaume Le Testu



A caravel, *from Cosmographie Universelle, 1555*
Guillaume Le Testu



*A large number of ships (*caravels*) displayed on Abraham Ortelius' map of America, 1570*



*Three ships (*carracks*) off the western coast of South America on Ortelius 1570 map America*



Ships (caravels *and Mediterranean* cogs) *off the coast of Palestine, 1570 by Ortelius*



A caravel *ship off the coast of Zeeland, by Ortelius*



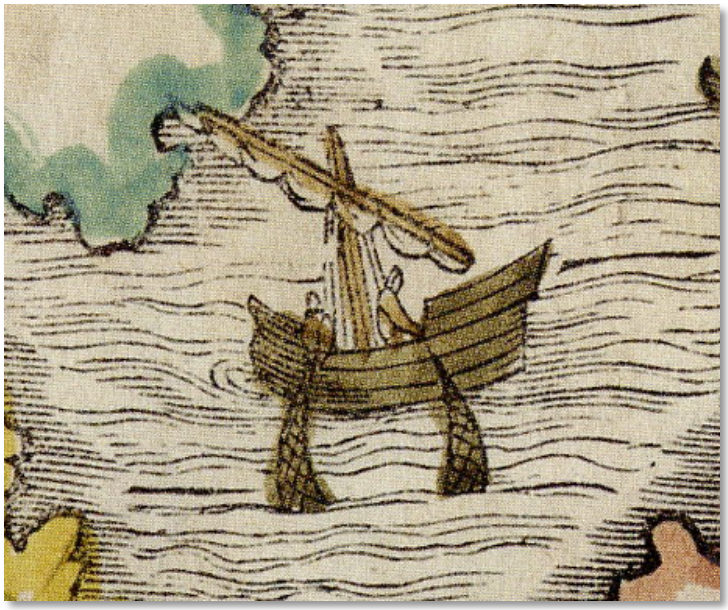
A caravel *ship of the coast of Spain, by Ortelius*



A carrack *ship of the coast of Scotland*

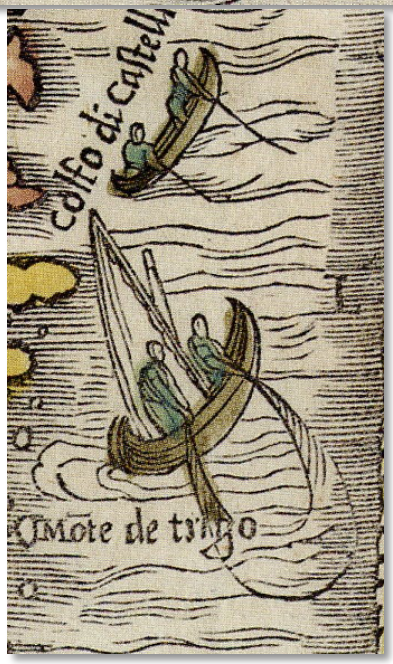


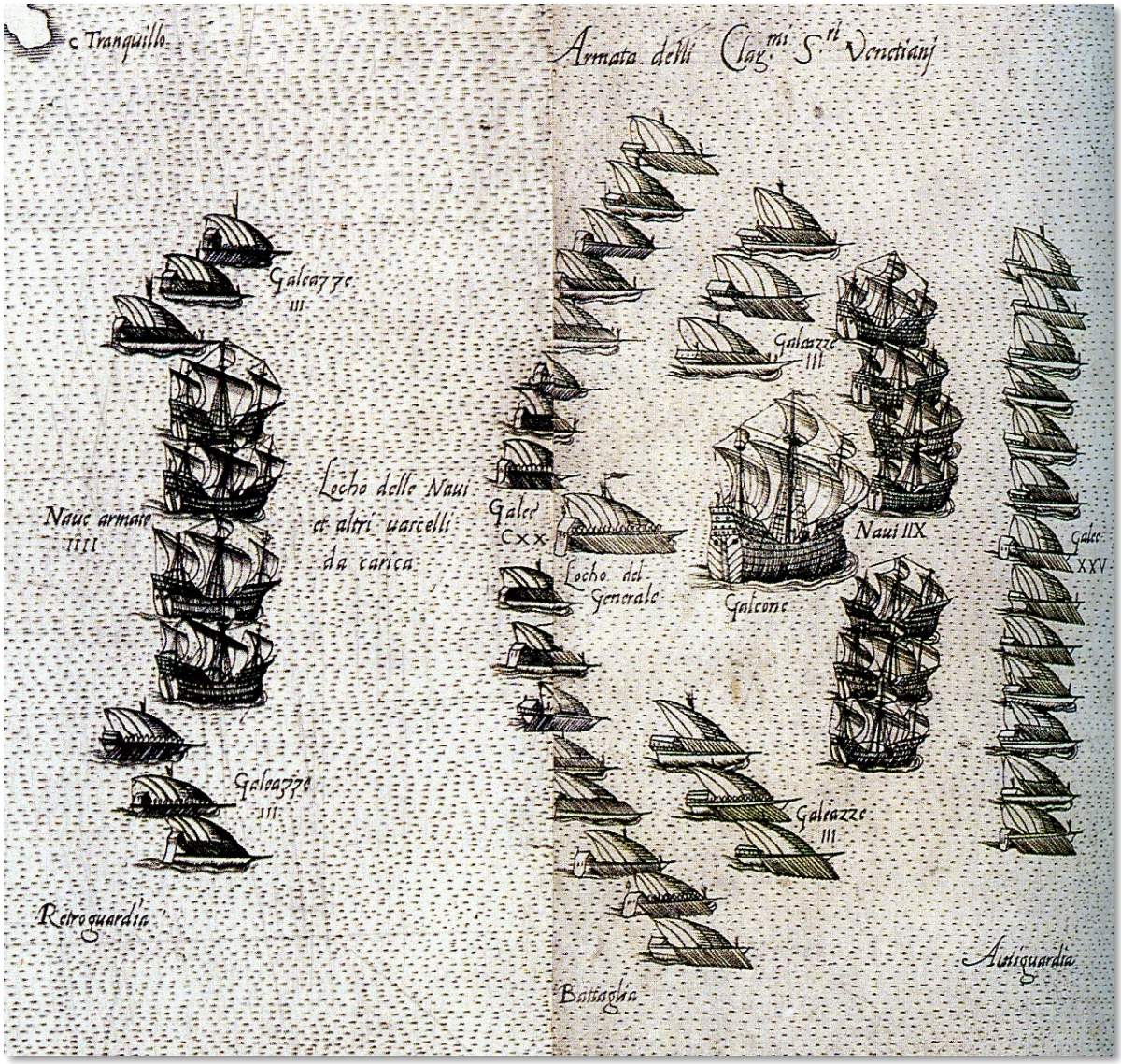
A galley *off the coast of Sicily by Ortelius*



*Fisherman off the coast of Newfoundland on the 1556 map of New France by Giacomo Gastaldi (**#393**)*







An array of ships, carracks, caravels *and* galleys, *in the Eastern Mediterranean Sea near Cyprus on the 1570 map Disegno de I'Isola di Cypro con li confini della by Antonio Lafreri*

This map brings news of what was, in effect, the last Crusade. Lafreri, mapmaker, publisher, and print seller, depicts the Venetian fleet drawn up for battle against the Turks near Cyprus. Palestine forms the background for the last major 16th century East-West conflict. The eastern Mediterranean is shown from Crete to the Levantine coast, and from the south coast of Asia Minor to the Nile Delta. As in a *portolan* chart, considerable attention is focused on the coastlines and little on the interiors. There is a magnificent but imaginary harbor at Jaffa, flanked by the Crusader castles of Peregrino and Beroard. Haifa Bay is also much exaggerated. In the interior, starting in the northeast, five vignettes represent the major cities: Aleppo, Antioch, Damascus, Jerusalem, and Cairo. The Venetian fleet is shown deployed for battle, and Lafreri somewhat hopefully implies Venetian dominance of the eastern Mediterranean. It was not until May 1571 that Pope Pius V financed a Holy League, a last Crusade, to attempt to stop the Turks. Philip II contributed over eight

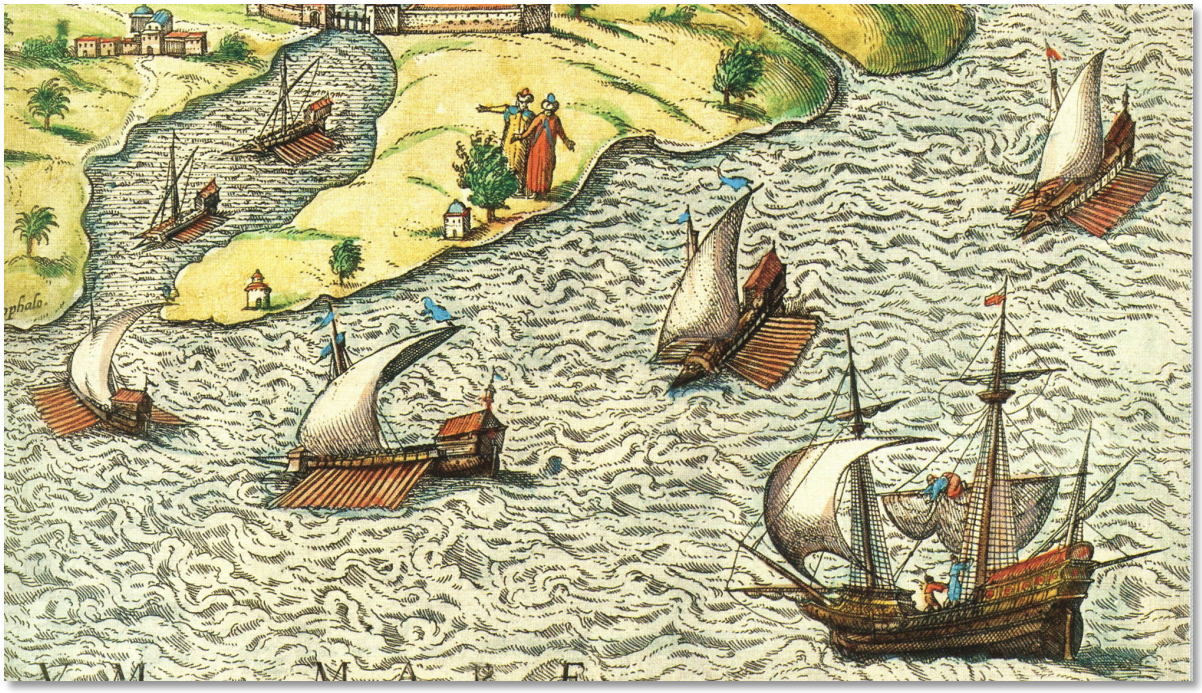
thousand Spanish soldiers, and Venice contributed most of the two hundred galleys and eight large warships, or galleasses. Don Juan of Austria, the natural brother of Philip II, was the commander of the allied fleet, which also contained ships and men from Genoa under Gianandrea Doria, and from Sicily and Naples under the Marques of Santa Cruz.

Selim II assembled 273 vessels under Captain Ali Pasha to meet the Europeans. The Turkish ships were lighter than those of the Christians and carried fewer cannon. The two fleets met on October 7,1571, at Lepanto, off the coast of Greece in the Gulf of Corinth. It was the last large-scale naval battle between fleets of galleys, and the loss of life was enormous. Nearly twenty thousand Turks and eight thousand Christians died.

Christians celebrated the Battle of Lepanto as an end to the Turkish menace. The Catholic states had finally joined and defeated a much larger and overly confident Turkish force. The exploits of Don Juan, the misjudgments of Gianandrea Doria, and the timely rescue by the reserves under the Marques of San Cruz were the talk of every noble house in Spain and Italy. It seemed as though God had intervened to vindicate Christendom.

The European powers were too divided to capitalize on this victory. The Turks rebuilt their fleet by 1572, and Don Juan refused to challenge it in the Adriatic. Venice finally surrendered its claim to Cyprus in 1573, deserting Spain. In effect, the Holy League disintegrated after its dramatic first victory. Turkish ships continued to raid the Mediterranean until the end of the century.

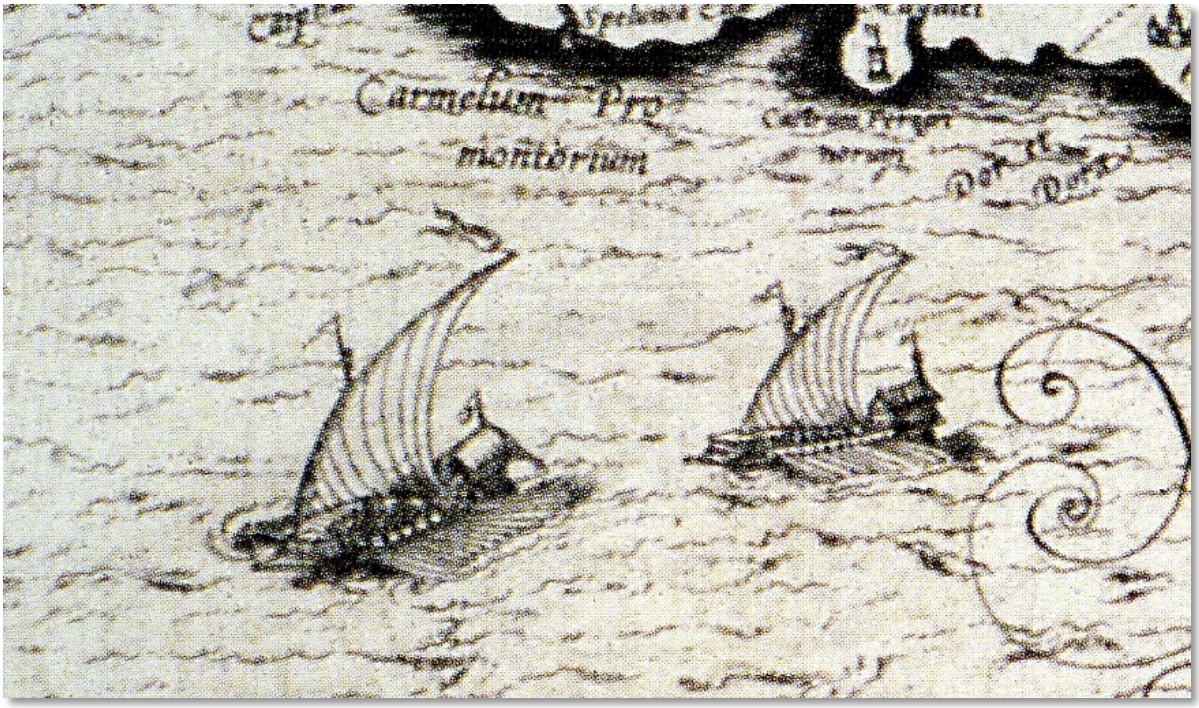
Published on the eve of the last Crusade, Lafreri's map is a cartographical illustration of the situation, much as the *Situs Hierusalem* map (*see* #*205*) is an illustration of the first Crusade of 1099. Lafreri shows the Venetian fleet mastering the seas. In the background stands Jerusalem and the cities of the East, situated though the Holy League were sailing to invade the Turkish Emppire and not merely to save an outpost they would later surrender. Cartography served to popularize the war against the Turks, as it had served to popularize the recapture of Jerusalem five hundred years earlier.



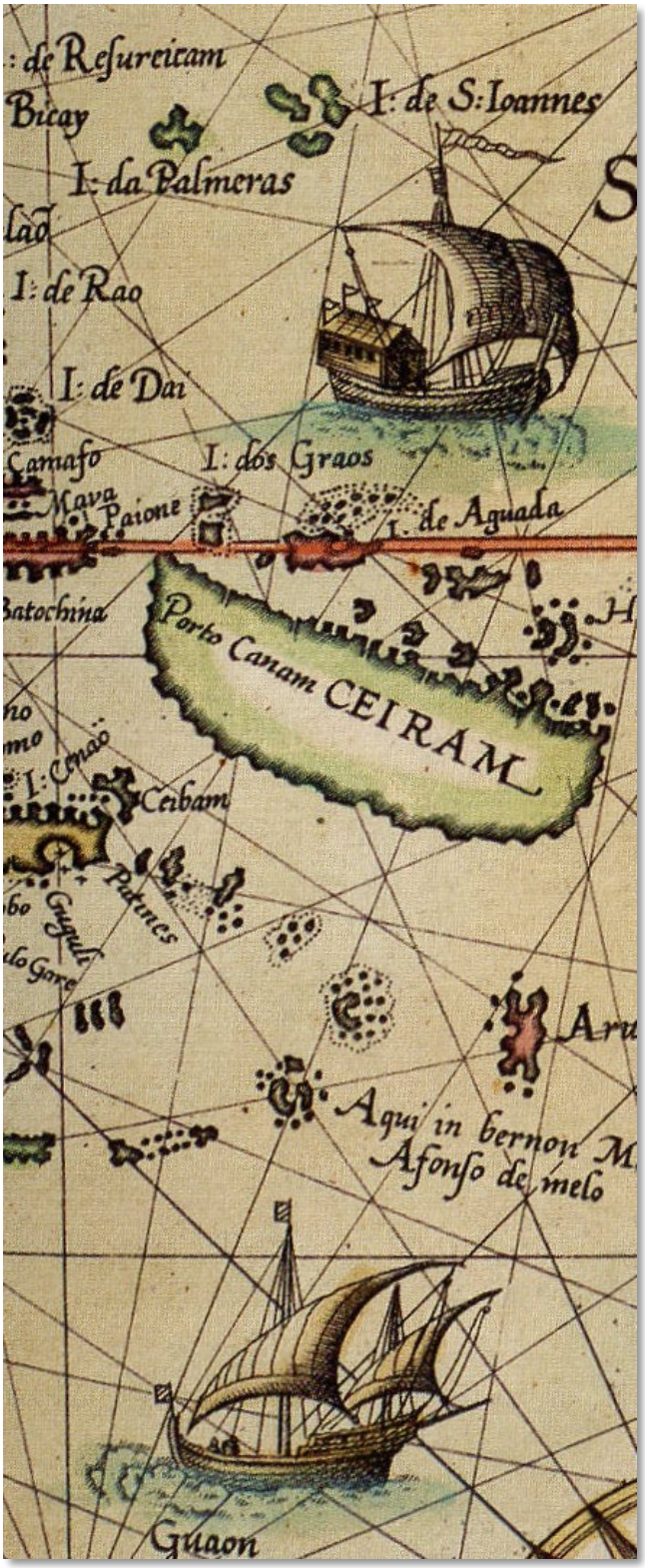
Galleys and caravels off the coast of Alexandria, 1575, by Georg Braun and Franz Hogenberg







Galleys *on the 1590 map Situs Terrae Promissionis… by Christian von Adrichom*



Ships off the Moluccas on Petrus Plancius 1594 map (see also below)

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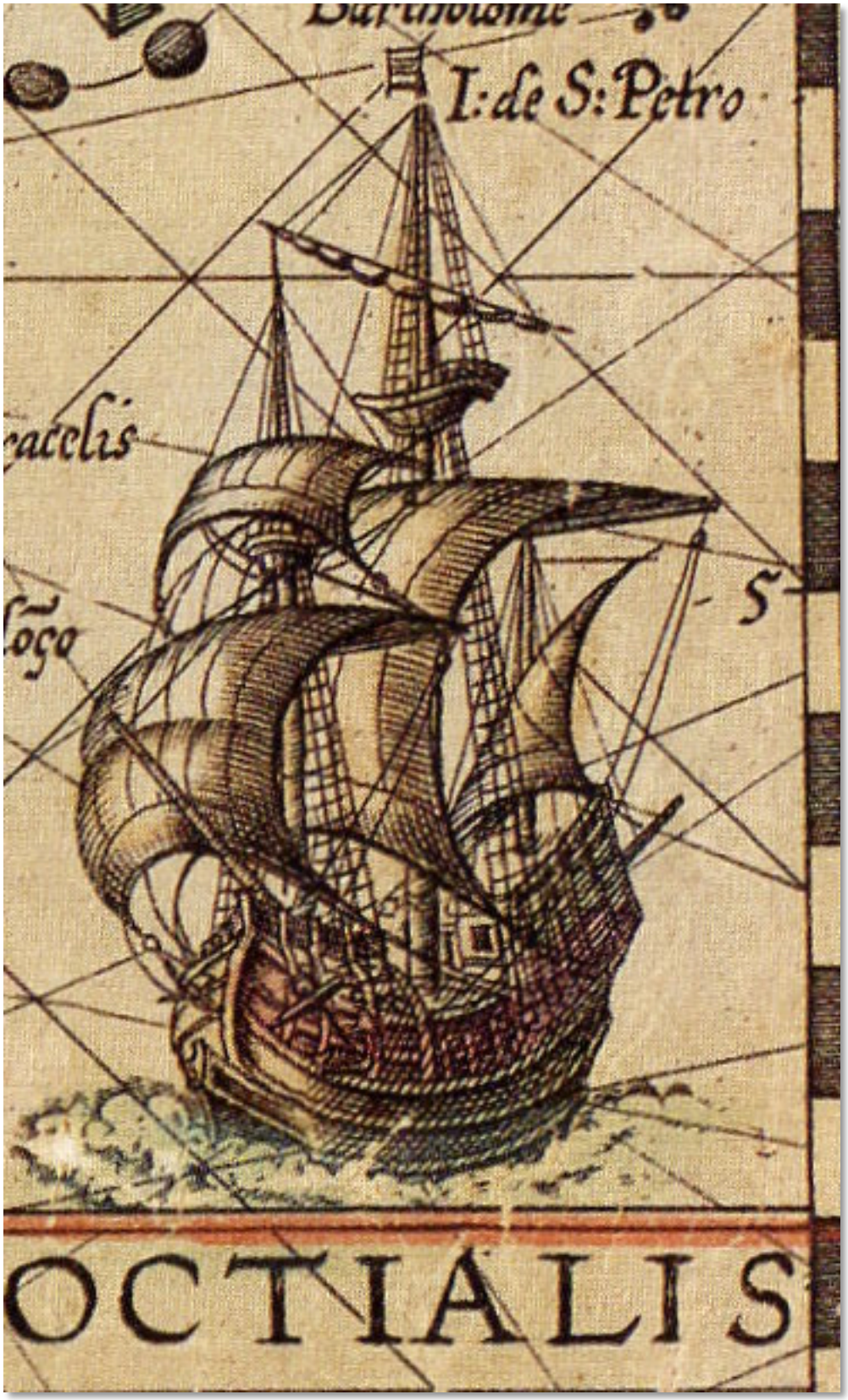




Many ship types surround Utopia by Abraham Ortelius, 1595



Carrack *ships around the island of Cyprus, 1573, by Ortelius*



A dhow *off the coast of Thusciae by Ortelius*



A carrack *ship off the coast of Denmark by Ortelius*

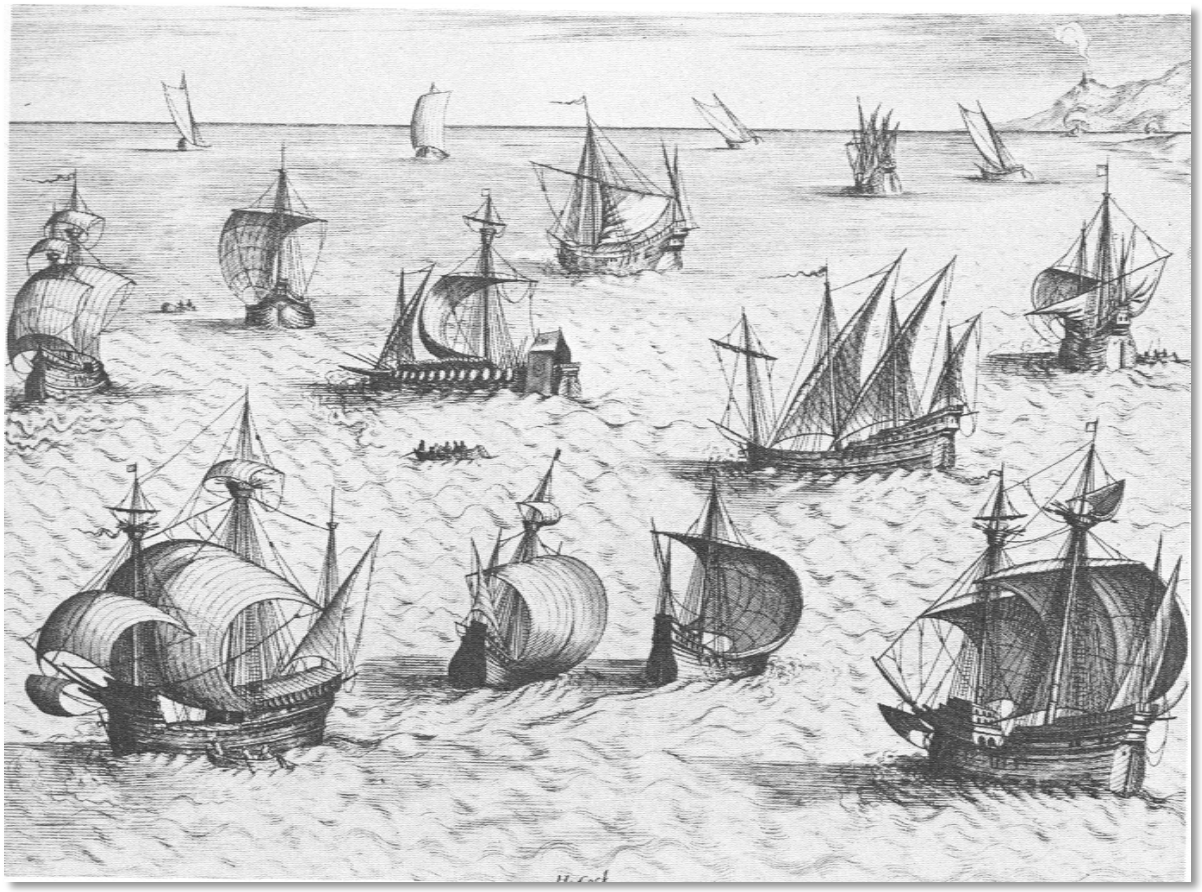


A galley *from Valentiae Regni by Ortelius, 1608*



A carrack *ship from Valentiae Regni by Ortelius, 1608*

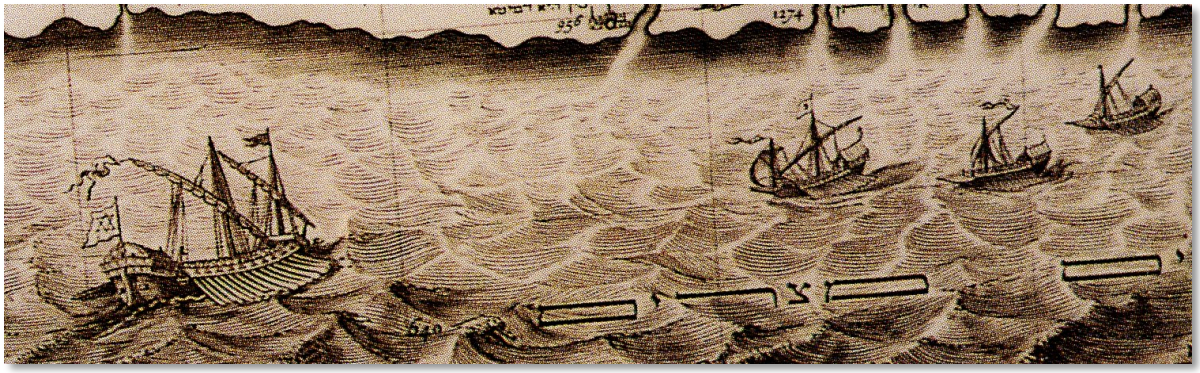
A series of seventeen ornament prints by Jacob Floris, published in Antwerp in 1566, inspired the ornamentation on maps in the Ortelius' *Theatrum*. The ships on the maps were often taken from earlier engravings, such as a view of sixteen ships shown below which traditionally has been associated with Pieter Bruegel the Elder. Although this print is now rejected from Bruegel's *oeuvre*, it appeared with a set of naval prints designed by him and issued in 1565. As van Beylen has already noted, many of the ships on Ortelius' atlas maps were taken from the prints in this series. The same prints were used by other mapmakers such as Gerard de Jade, who also drew from the view of sixteen ships for the large vessel on his maps. However, van Beylen notes that because of their mixed accuracy the ships on these maps are of little value for the study of naval vessels.



Ship "models" used by various cartographers/engravers



Sir Francis Drake's ships in the harbor at Santo Domingo on a map by Baptista Boazio , 1588



A galley *and smaller sailing ships on the 1621 Map of Canaan (in Hebrew) by Yaaqov ben Abraham Zaddiq*



A three-masted vessel, one of the smaller ships used by the Chinese Zheng He's expedition, 1405





A single galley *firing near Cyprus on the 1624 map Lumen Historiarum per Orientum by Franciscus Haraeus*



A dhow *south of Cyprus on Jodocus Hondius' map of 1623*



An example of all types of ships/boasts on this 1606 map of America by Jodocus Hondius



Two ships (a caravel *and a humber keel) south of West Africa Guinea on a 1619 map by Jodocus Hondius*



A galera *in the Indian Ocean on Jodocus Hondius' 1619 map India Orientalis*



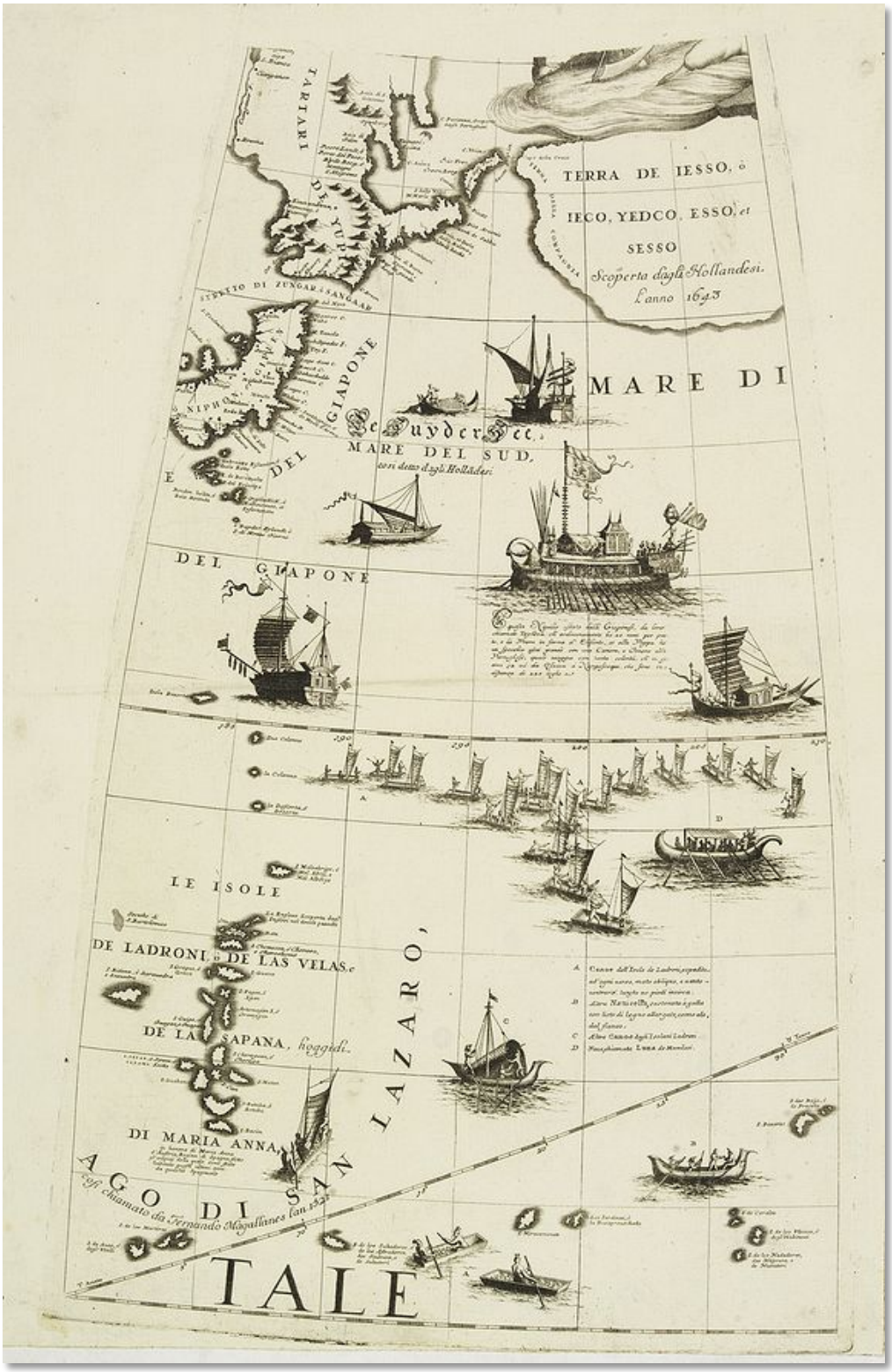
Indian boats, seals and fishermen off the coast of Canada from Vincenzo Coronelli's 1688 globe (**#488**)



Indians in canoes from Vincenzo Coronelli's 1690 map America Settentrionale . . . (**#488**)



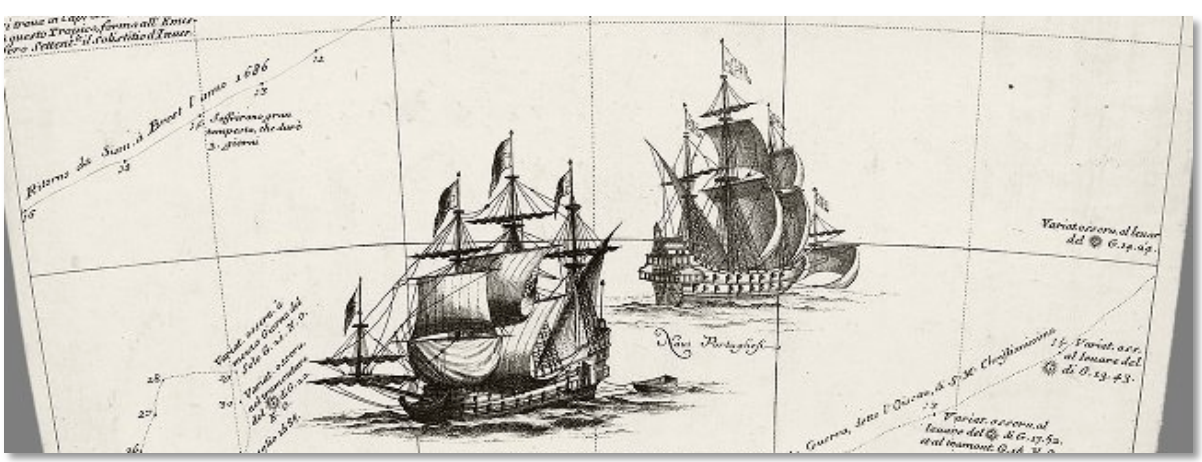
A variety of Asian ships off the coast of Japan, including a galley, *and* junks
*from Vincenzo Coronelli's 1688 globe (***#488***)*

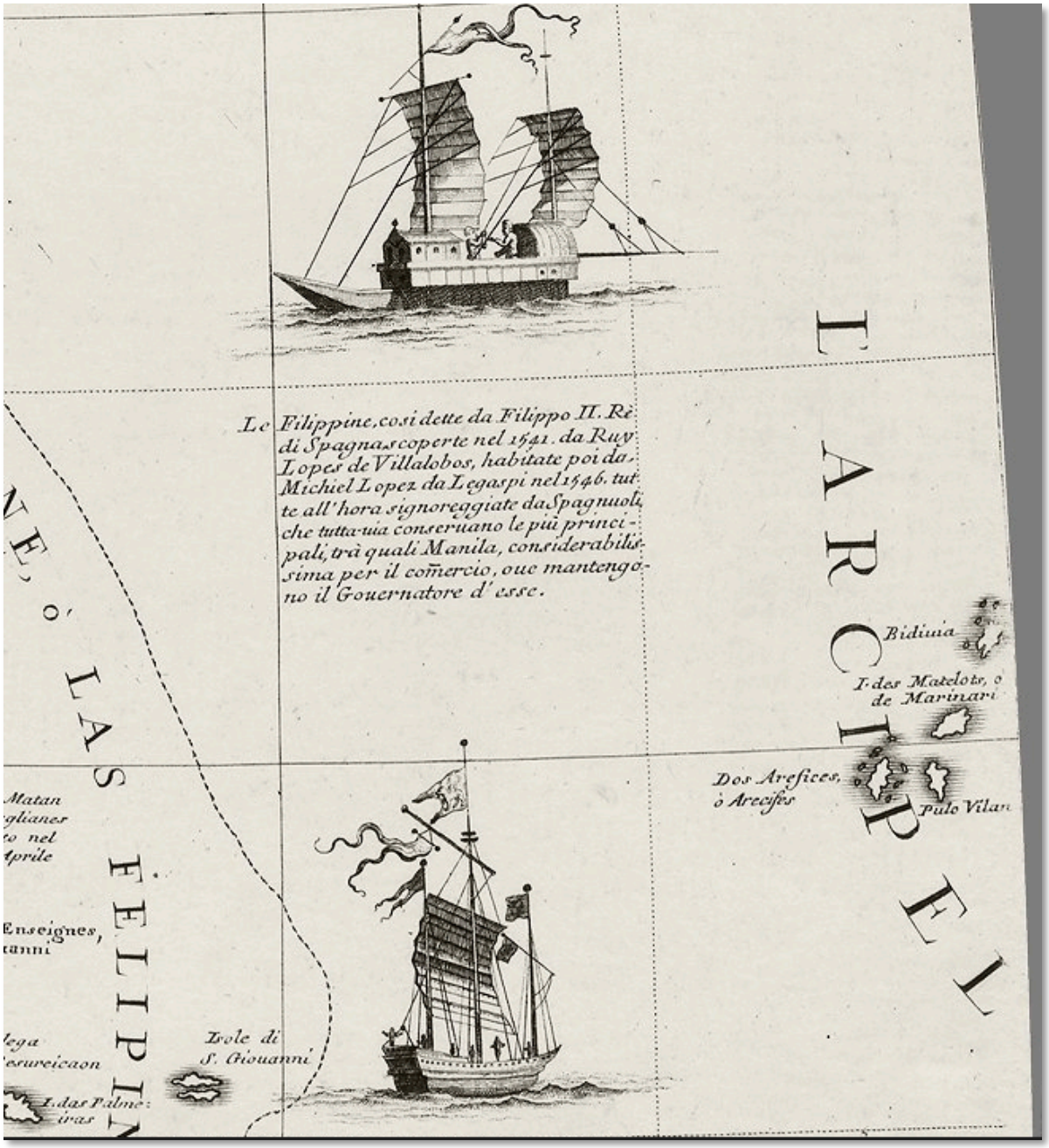


*A great variety of Asian ship types and canoes in the Pacific Ocean from Coronelli's globe gore, 1688 (**#488**)*

5.25

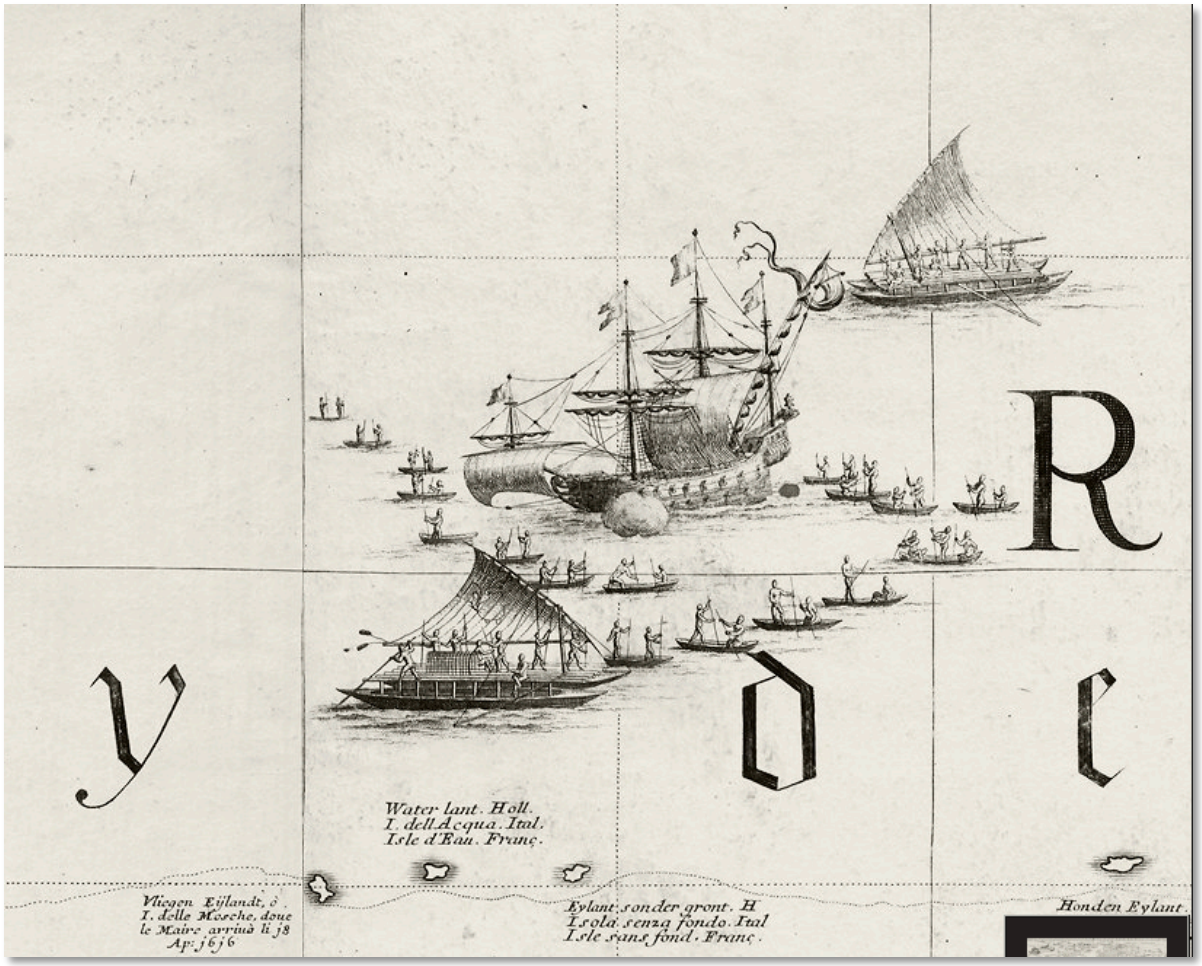

ELLE MALDIVE
N
Palegua
Almadia
Almadia di Cangada
Capricorno
Ritorno da Siam à Brest l'anno 1686


Ritorno da Siam à Brest l'anno 1686
Nave Portoghese

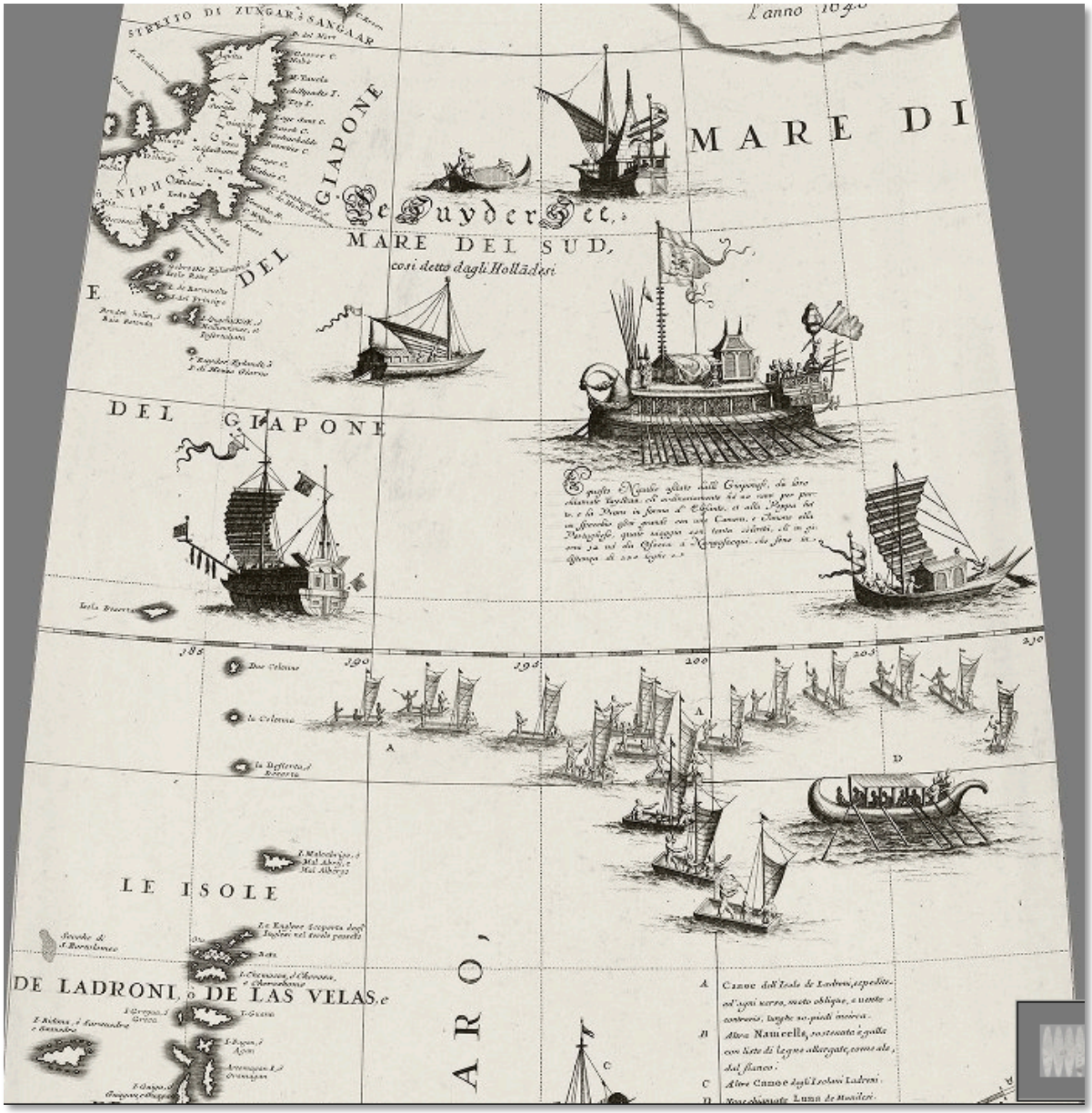


Note the type of sails on these ships (**#488**)

5.25


Water lant. Holl.
I. dell Acqua. Ital.
Isle d'Eau. Franç.
Vliegen Eijlandt, ô
I. delle Mosche, doue
le Maire arriuò li 18
Apr. 1616
Eylant sonder gront. H
Isola senza fondo. Ital
Isle sans fond. Franç.
Honden Eylant.

5.25


STRETTO DI ZUNGAR, ò SANGAAR
MARE DI
DEL GIAPONE
MARE DEL SUD,
cosi detto dagli Hollādesi
DEL GIAPONE
LE ISOLE
DE LADRONI, ò DE LAS VELAS, e
ARO,



Carracks *and flying fish off the western coast of Africa, from Hondius' 1631 map Africae nova tabula*





Chinese junks*, all seeming based on a single model, from G. Mercator/J. Hondius' maps Iaponia (1620) and America (1606)* ***#444.1***

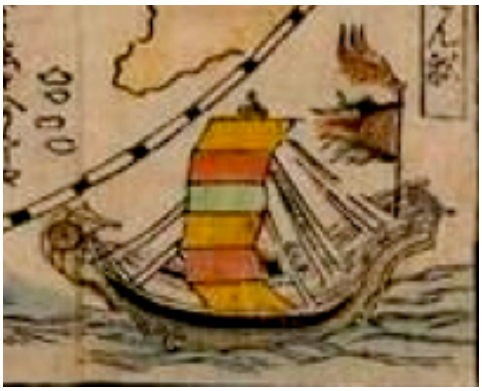




A Chinese land-based sailing vessel (prairie schooner) from J. Hondius' 1606 map of China
(#444.1)

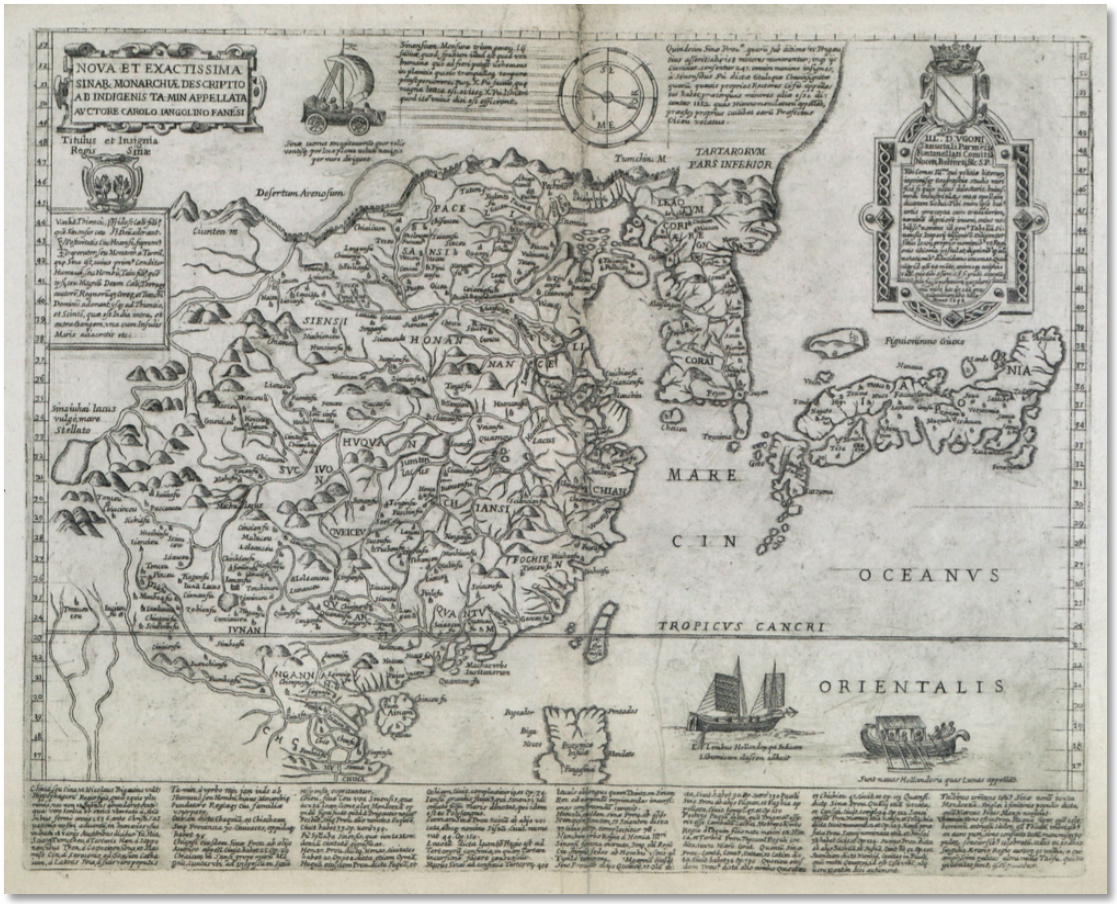


A prairie schooner on the 1642 map by Rosaccio, **#475**



Chinese junks *from a 1645 Bankoku Sōzu map*

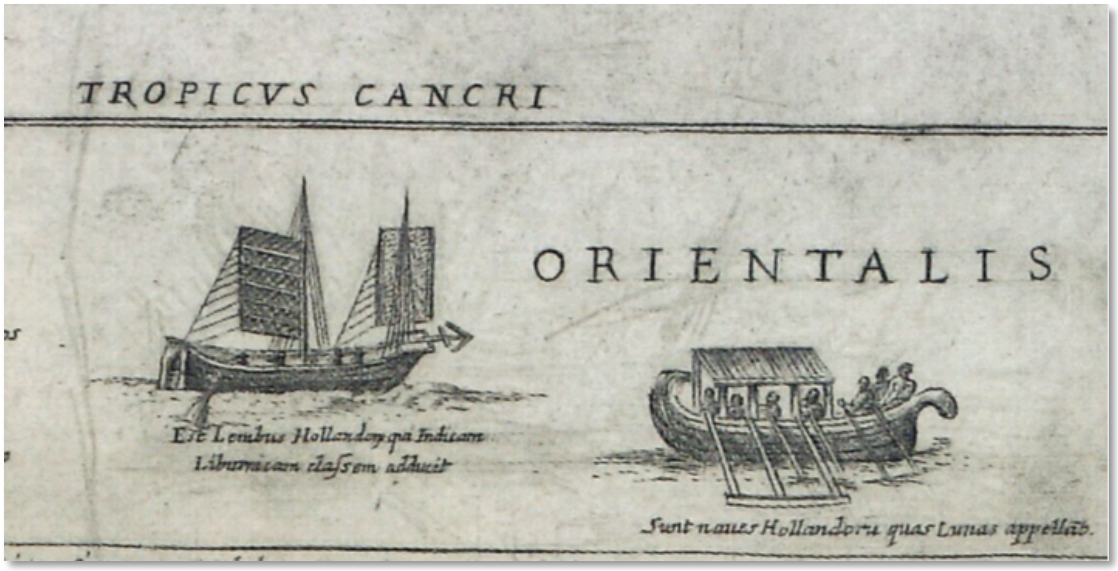




Novo et Exactissima Sinar Monarchiae Descriptio: ab Indigents Ta-min Appellate, Rome 1642, ca. 31 x 42 vm. Göttingen, Niedersächsische Staats und Universitätsbibiouthek



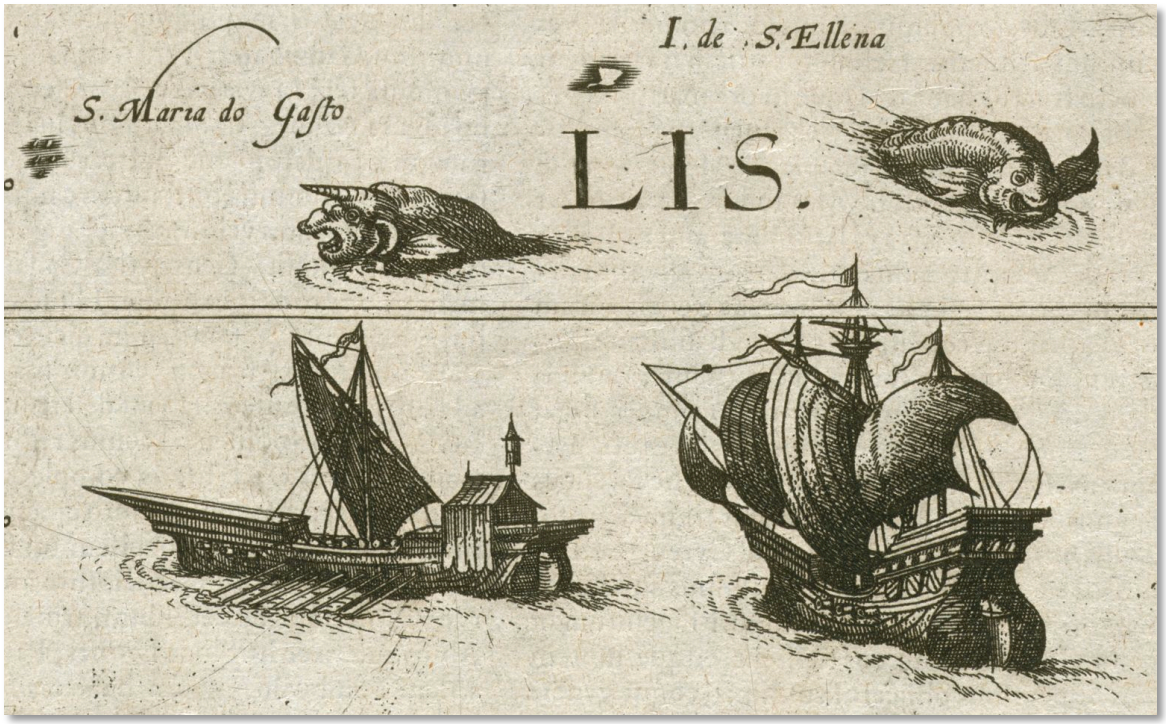
Detail: the Great Wall and a "prairie schooner"





Eskimo (above) and Indian canoe (below) from Jodicus Hondius' 1606 map America





Ships (a galley *and* caravel*) in the Atlantic Ocean near southwestern Africa, from the map Africae vera forma, et situs by Gerard de Jode, 1593*





*Ships, sea creatures and settlements in the far reaches of North America on the map Quiuirae Regnu cum alijis verus Borea [Alaska] by Cornelius de Jode, 1593 (**#432**)*



*Indian canoes in the Atlantic Ocean off the coast of South America from the map Brasilia et Peruvia by Gerard de Jode, 1593 (**#432**)*



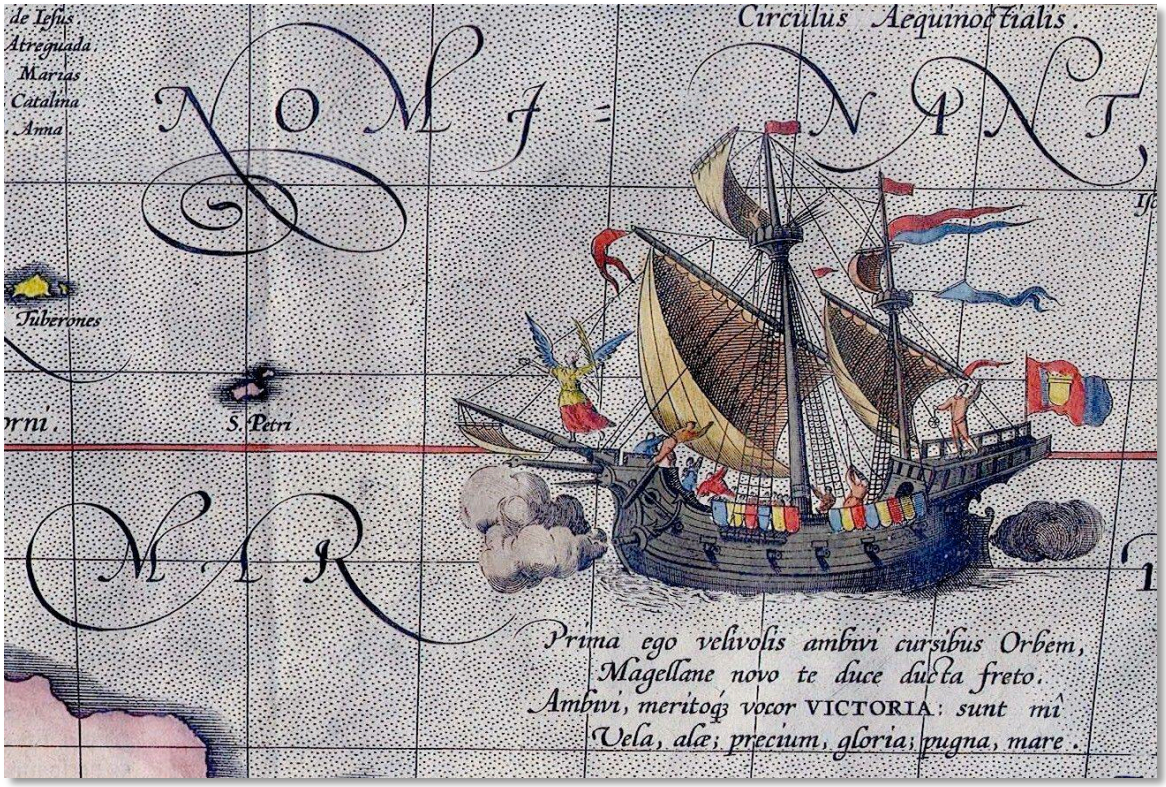
The Famouse West Indian voyadge made by the Englishe fleete of 23 shippes and Barkes wherin weare gotten the Townes of St. Iago: Sto. Domingo, Cartagena and St. Augustines … Newlie come forth by Baptista B., 1589



Two fighting ships on the map *The Famouse West Indian voyadge made by the Englishe fleete of 23 shippes and Barkes wherin weare gotten the Townes of St. Iago: Sto. Domingo, Cartagena and St. Augustines … Newlie come forth by Baptista B., 1589*



*Elephants and "*prairie schooners*" on the map Chinae olim Sinarum regionis, nova descriptio by Abraham Ortelius/Ludovico Georgio, 1598 (**#410**)*



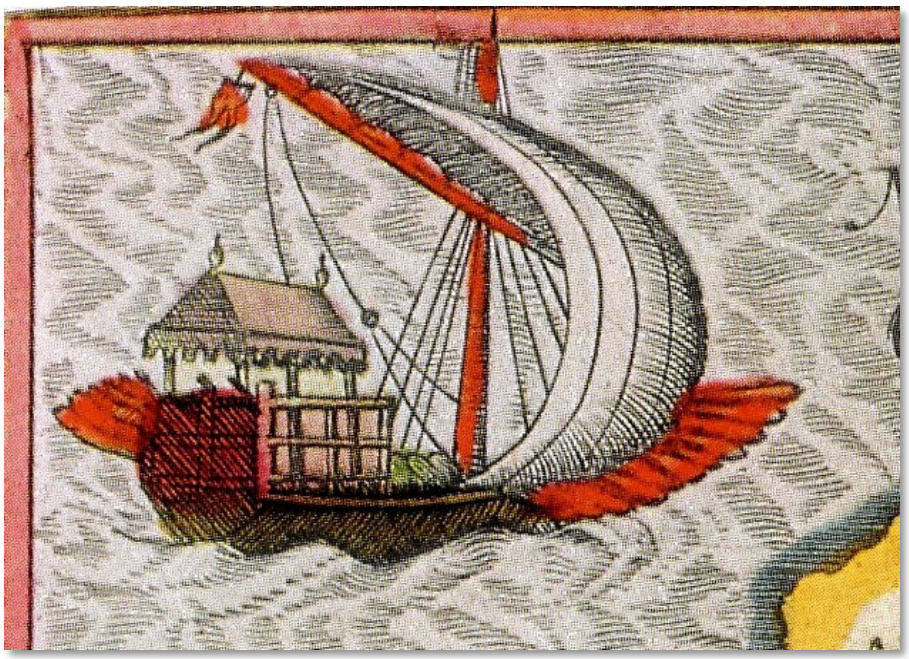
Magellan's ship, the Victoria, from Abraham Ortelius' map MARIS PACIFICI, 1589, the first printed map of the Pacific Ocean



Dhows *in the Mediterranean Sea from Ortelius' 1564 map Serentissimae Reipublicae Genuensis Ducatus et Domini nova descriptio*



A "monoculi", exotic bids, an elephant and cog *ship displayed on Sebastian Munster's map Totius Africae tabula, & descriptio universalis, etiam ultra Ptolemaei limites extensa, 1546* ***(#381)***

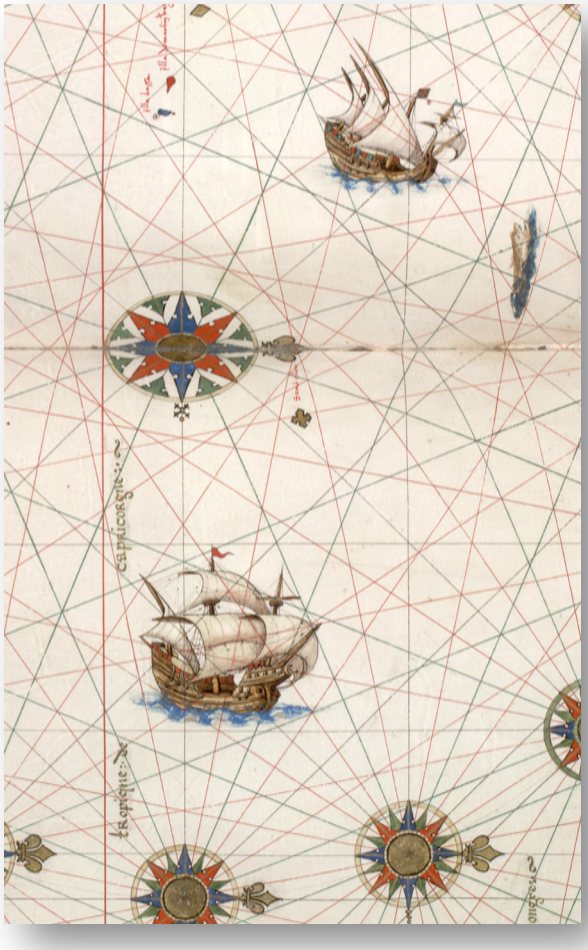


A galley *on the map of Tunis by Mercator, 1633*



*In the Vallard Atlas of 1547 (**#381.2**), on a portion of the map of the Adriatic Sea, displaying a variety of Mediterranean* galleys, *camels, and a bear.*

The maps of the Vallard Atlas included illustration of a number of ships at sea like a four-masted vessel in mid Atlantic with a small square sail on the foremast and three lateen-rigged masts aft. The waist is truncated because the raised works at the stern run so far forward in the ship. While the curve of the hull may be a bit exaggerated the protective protrusions along the side suggest attention to detail and an interest in accuracy. The standard three-master puts in an appearance, for example in the Arabian Sea, but other types show up as well such as the five two-masted galleys that join the full-rigged ship in the Adriatic Sea. The foremasts on the galleys may carry square sails but the mainsails are unquestionably lateen. The decoration at sea came dose to matching the quality of illustration on land not so much for the variety but in the effort to offer accurate representations of a range of vessels. The Indian Ocean got a full-rigged ship with the typical very deep waist and a four-masted caravel *and in addition off the Cape of Good Hope a monarch riding a sea creature but instead of the king of Portugal the Dieppe cartographer has inserted the king of France.*



*Two ships on Map #6, the Atlantic Ocean, from the Vallard Atlas (**#381.2**)*



European ships in the Atlantic on a 15th century portolan chart



A portion of the 1519 planisphere (the Kuntsmann IV) by Jorge Reinel displaying many ships at sea

The 1519 planisphere made by Jorge Reinel has a total of 14 ships spread out across the world but there are clear differences among them. The vessels in the Atlantic include a galley, two ships with lateen sails on each of two masts that might be *caravels*, and three that recall the four-masted carracks of his 1510 chart. In the Indian Ocean the design of some of the ships is a bit different. Each has a single square or almost square sail, the yards tilted showing

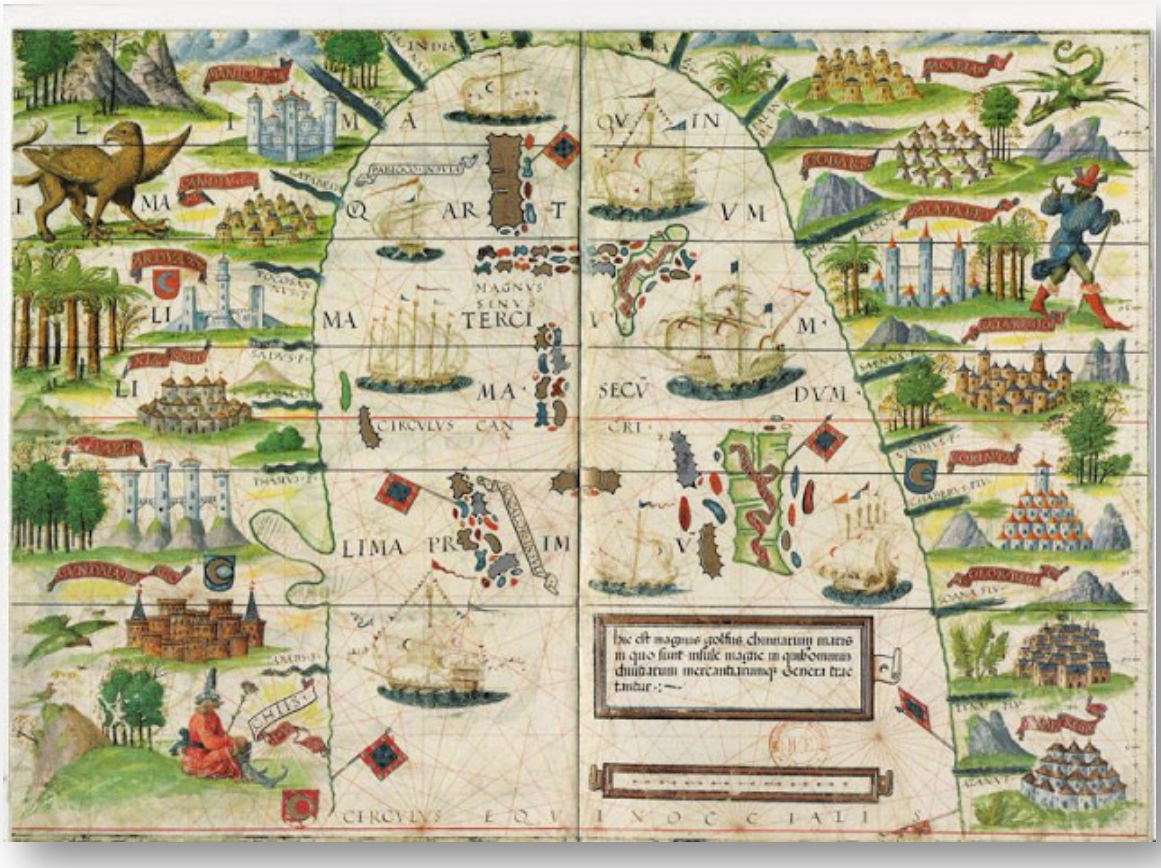
another way to set the sails, a shallower waist because of straight rather than the usual curved gunwales, and a large aftercastle. Perhaps recalling the effort in the *Catalan Atlas (#235)*, there is a ship in the South China Sea with five masts possibly intended as a depiction of a Chinese junk. While the dominant vessels were European at least in this case the mapmaker tried to show something of another, competing, and perhaps superior and so respected shipbuilding tradition.



Detail: South Atlantic



Detail: Indian Ocean



*Eight European ships in the China Sea on Miller Atlas, 1519 (**#329.1**)*

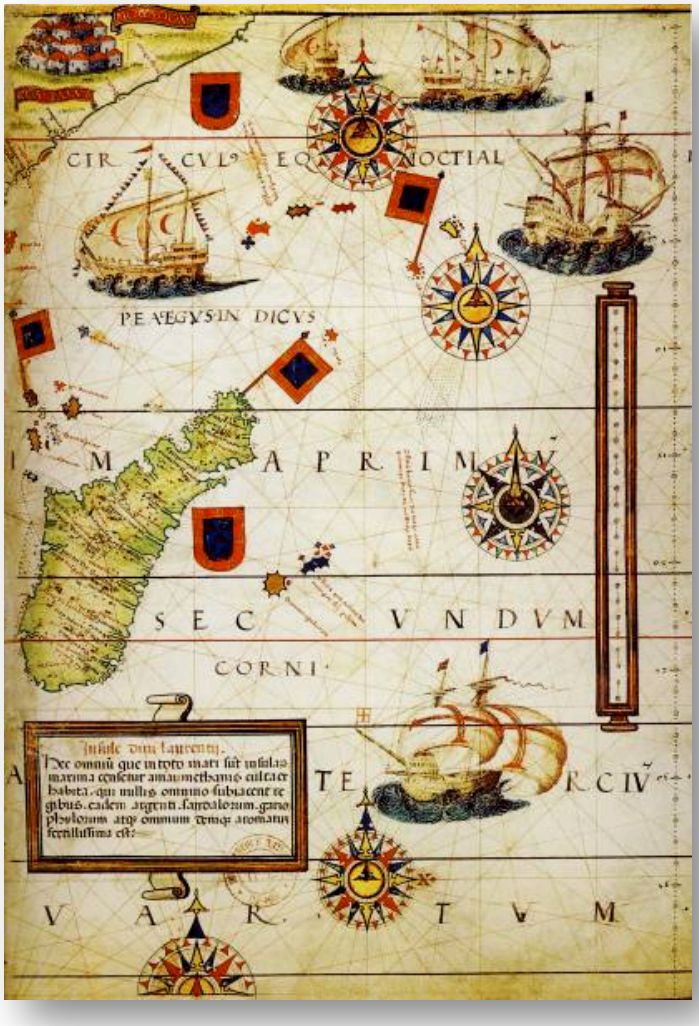
Lopo Homem made the *Miller Atlas* along with the Reinels, father and son. The variety of the total of 47 ocean going ships on maps in the Atlas is if anything greater than the variety of objects on land. There are flags flying on virtually all the ships, mirroring flags on land that indicate, among other things, possessions of Spain and Portugal. Sails are often decorated with crosses, to indicate Christian vessels, or crescents to indicate Muslim ones. Ships appear on all sheets so they turn up all over the world but the Indian Ocean is especially full of vessels. The ships fall into six broad categories: the three-masted *carrack*, the two-masted early *carrack*, the small *caravel*, the large *caravel*, the *galley*, and exotic or non-European types. The *carracks* are often shown from different angles as off the coast of Ireland. They have three masts including one lateen-rigged mizzen. Waists are deep and in some cases very deep, as with the carracks in the Indian Ocean, suggesting large cargo capacity. Some even have four masts with a lateen on the additional mast at the stern. There is usually an outlicker or yard projecting from the high raised stern to which the after lateen could be sheeted. There is usually a bowsprit angled sharply upward. The sails are typically set and billowing out. Both the main and foremasts have topsails, suggesting the move toward a more divided sail plan that was underway and slowly gaining some momentum. The type was apparently by 1519 becoming the standard vessel to illustrate maps. There were variants on the standard like the three-masted ships in the Atlantic with low aftercastles, rather low forecastles and straight gunwales. The shallow

waist and sleek profile suggests a vessel of relatively less cargo capacity but greater speed so the artist indicated a distinction between vessels in trades to the New World compared to those going to India, a difference which would become pronounced through the 16th century.



*Detail showing Arab (crescent moon on the sail) and Portuguese ships (red cross on the sail) in the Indian Ocean on the Miller Atlas, 1519 (**#329.1**)*

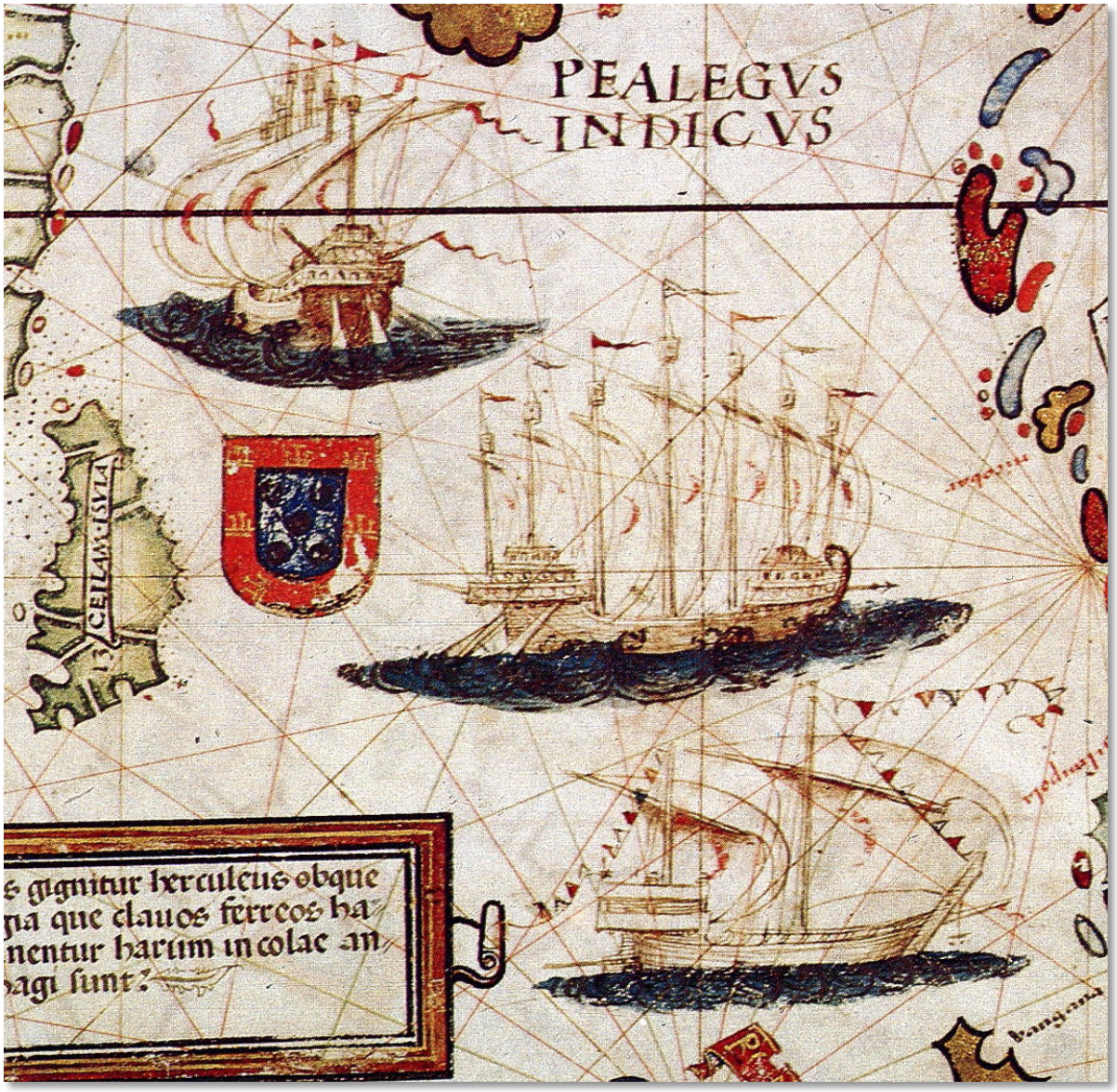
Four large *caravels* appear in the *Miller Atlas* and the same can be said of *galleys*. The one in the Indian Ocean has a single mast and sail and is in no way remarkable. The opposite is true of the exotic ships. Vessels with two masts, each with a lateen sail, are probably Muslim since the sails are decorated with crescents. Multi-masted ships with something like side rudders instead of the stern post rudder common on all the other vessels appear in the Bay of Bengal and the China Sea. One even has seven masts and two versions have what could be battened lug sails. Those may be attempts to depict forms of Chinese *junks*. The images show once again that Europeans were interested in *junks* but also that they did not understand the design. Other exotic vessels have what could be three rudders and three sails, all lateen. There are two single-masted ships with what could be a square sail on each and scroll like stem posts and one even with a scrolled stern post. The artists of the *Miller Atlas* offered a wide variety of information about vessels packed into a range of different illustrations that populate the waters of the entire world they depict. The body of illustrations is remarkable because it shows the different types of ships in use, the different uses of the different types and the breakthroughs and improvements in ship design of the previous century and more.



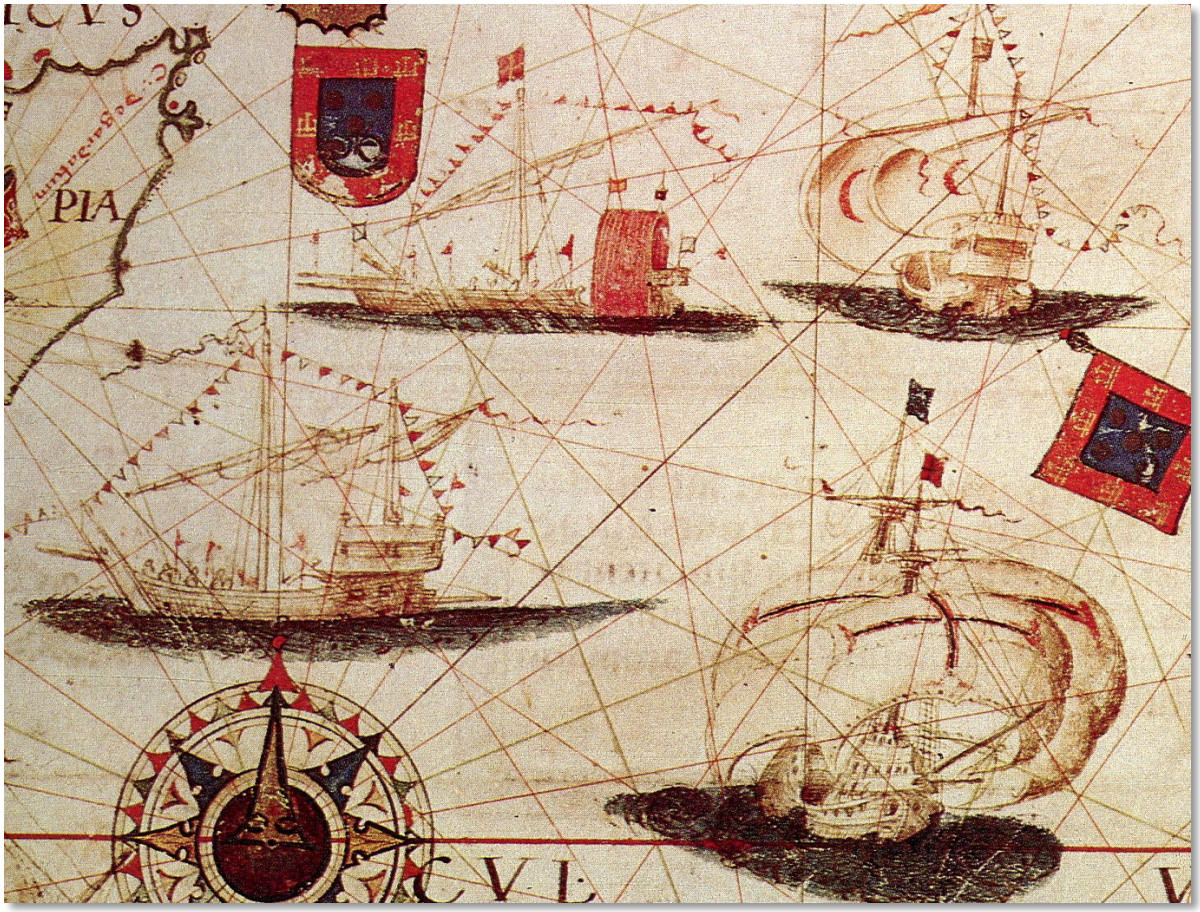
*Madacascar in the Miller Atlas, 1519 (**#329.1**)*



*Ships off the coast of Brazil in the Miller Atlas (**#329.1**) below, detail examples*

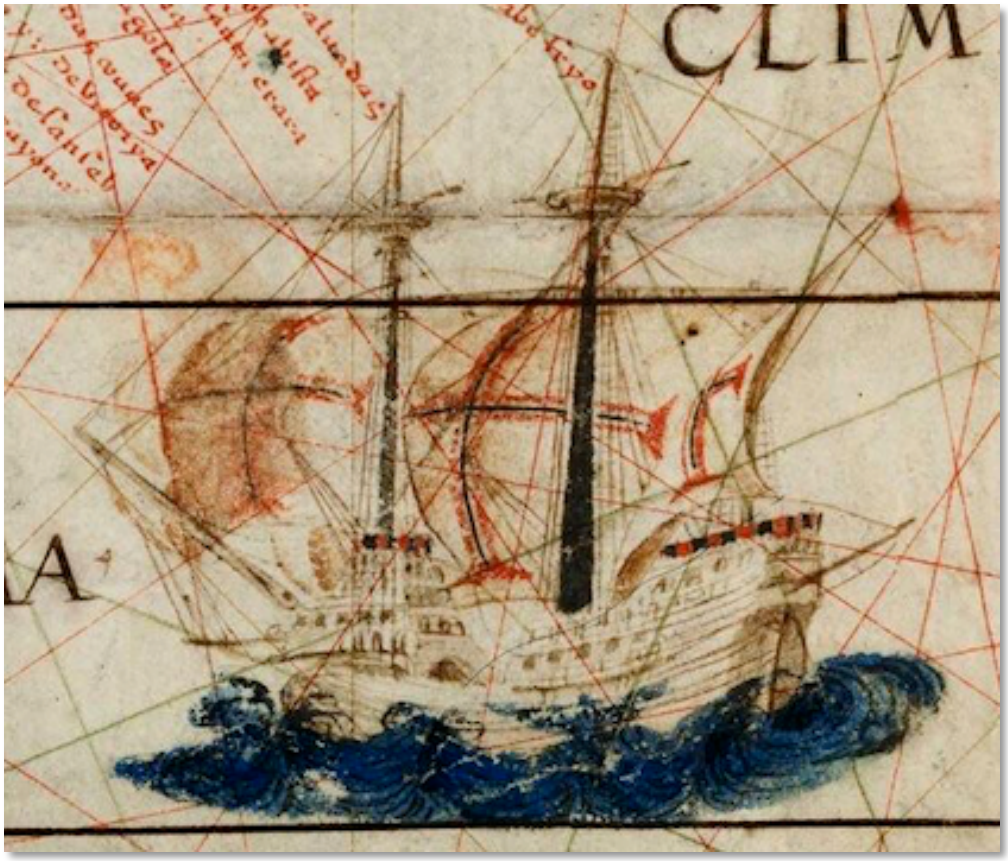

PEALEGVS
INDICVS
CEILAM·ISVLA
s gignitur herculeus obque
ga que clauos ferreos ha
nentur harum incolae am
bagi sunt?

(#329.1)

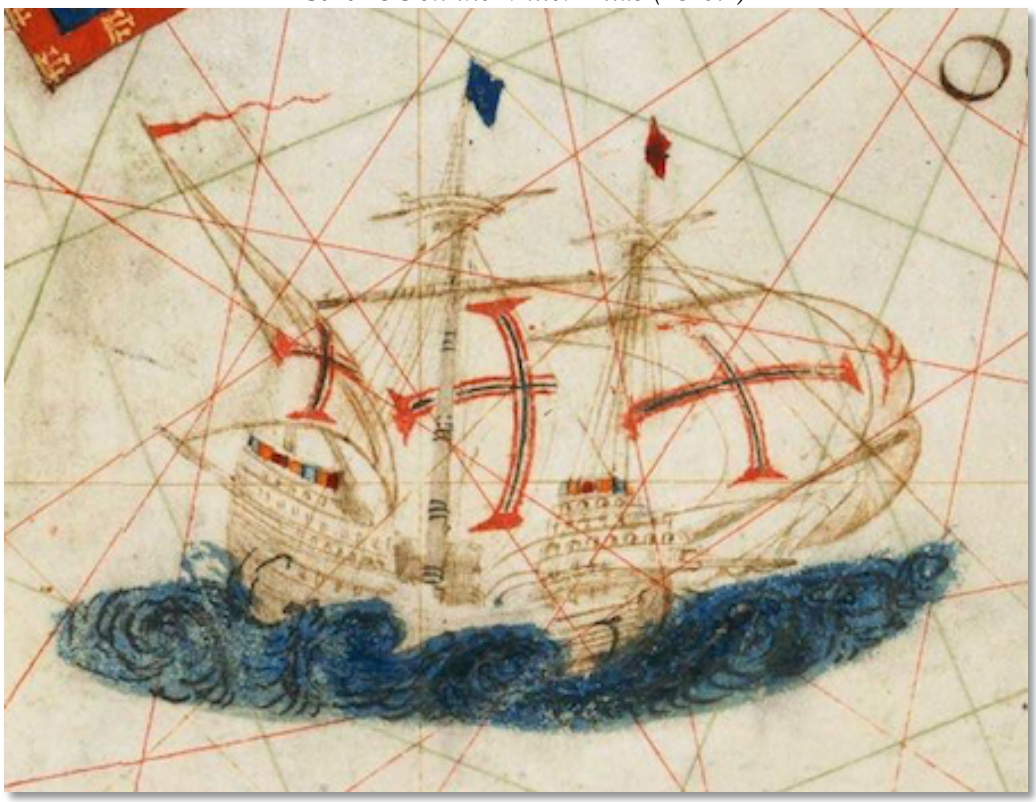


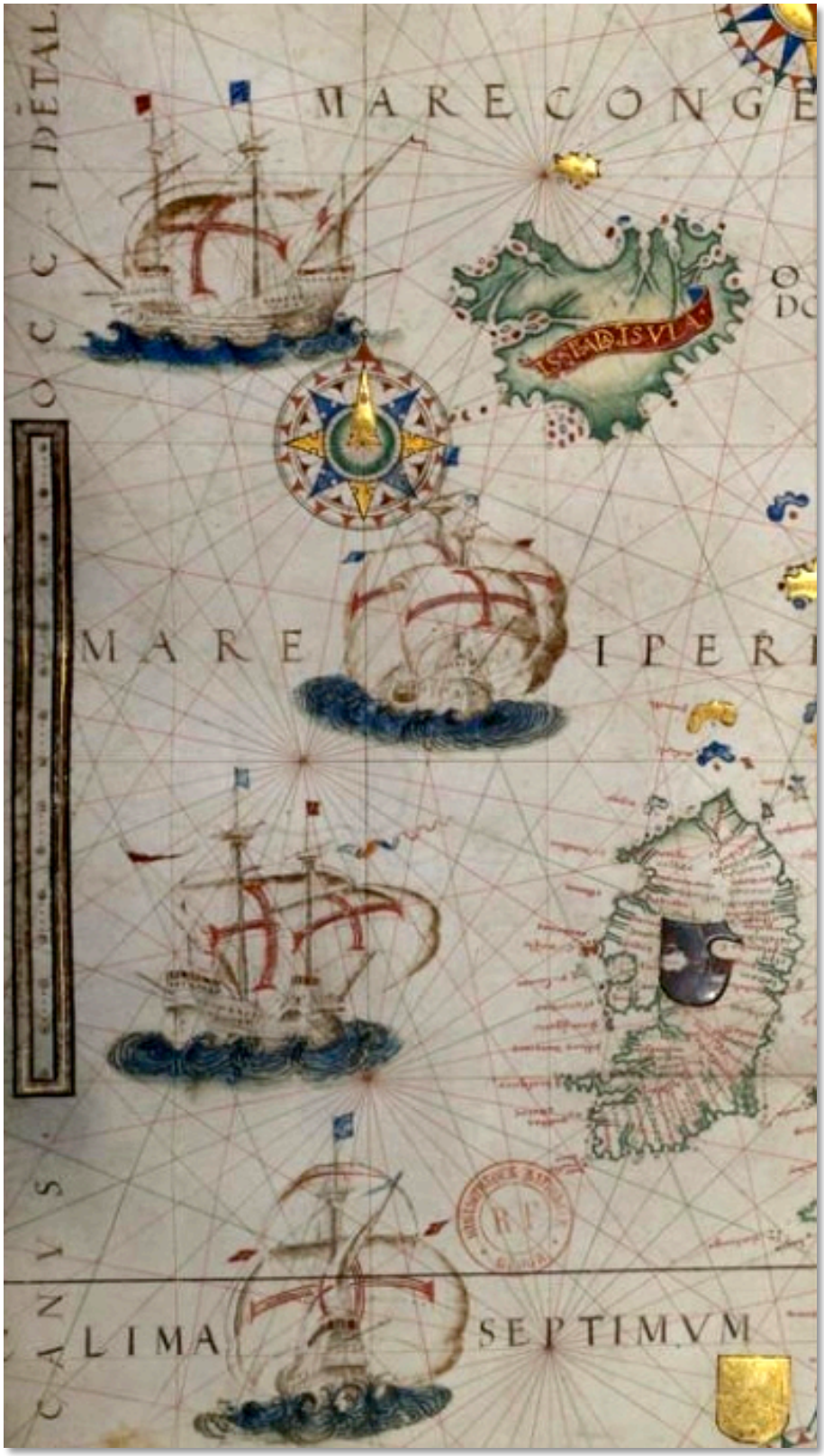
(#329.1)



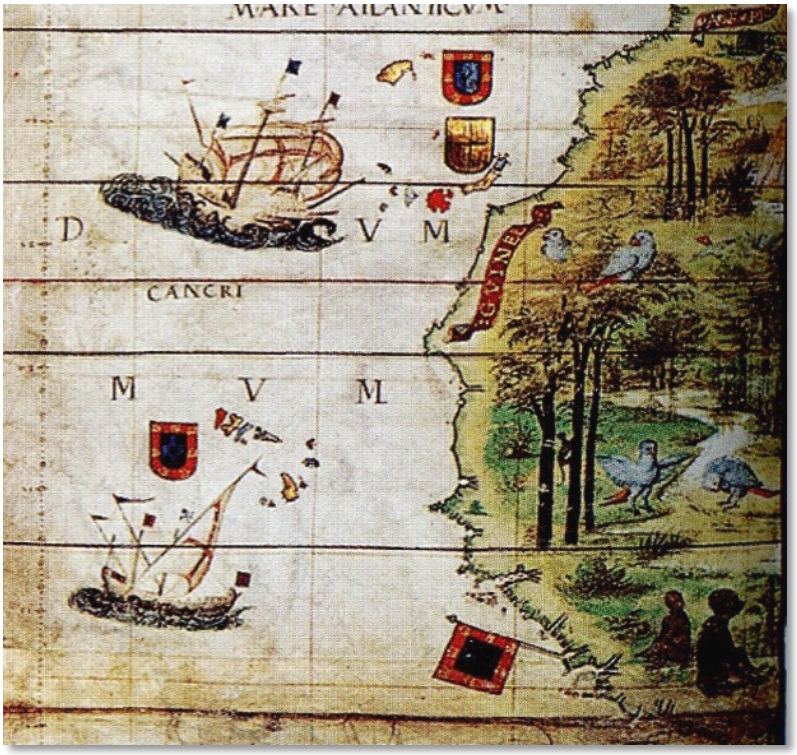


Caravels *on the Miller Atlas* (**#329.1**)





*Ships off the west coast of the British Isles in the Miller Atlas (**#329.1**)*



The first illustration anywhere of a *caravel* shows up off the coast of Africa, the vessel furthest south in the Atlantic. The two-masted *carrack* with a single square sail on one mast and a lateen sail on the mizzen mast turns up in the South Atlantic. Though the aftercastle is high the gunwale is straight and the forecastle low suggesting it was an advance on the two-masted *carrack* design of the 14th and 15th century. The bow is rather pointed so the artist may have been thinking of a vessel more suited to inshore work and making landfalls where cargoes were not abundant and port facilities poor.

The type had no upperworks, relatively high length-to-breadth ratios, and one to two lateen sails. It was highly effective in Portuguese exploration along the coast of Africa in the 15th century and *caravels* did make some voyages to and in the Indian Ocean. The *caravel* in the *Miller Atlas* has, atypically, three masts, each with a lateen sail only one of which is set. It seems more than a coincidence that the vessel should appear in the Atlantic off the African coast, that is in the region where it had proven most successful. The type may well have developed from earlier fishing vessels with Moorish roots and was possibly designed specifically for use in exploration, that in the first half of the 15th century. It is impossible to say with certainty since there is no depiction of the type before 1500 and certainly nothing as comprehensive as the illustration in the *Miller Atlas (**#329.1**)*. That vessel has the typical low profile but with small enclosures at bow and stern. The third mast near the stern is considerably smaller, indicating that this was a ship in need of extra power to navigate.

The large *caravel* had four masts with lateen sails on three of the masts and one or two square sails on the foremast. Thought to be a later development and especially suited to the sugar trade between Portugal and the Atlantic islands, the appearance of the type on maps suggests it was also popular for long distance voyages elsewhere and that it proved valuable in less well known waters. Having three lateen sails would have kept crew size large, lateen sails being harder to handle than square ones and not divisible. The voyages Portuguese

explorers and traders undertook often over some considerable distance and across the open ocean presumably could sustain the extra labor costs, as the appearance of the vessels on the maps indicates.





*Ships in the Indian Ocean on the King Hamy map, 1502 (**#307.1**)*

5.25





5.25


Mc Con.
Rosse haven
Rosse.
Molinge bay
The olde head
Kinsale haven
Corke haven
SEA.
SOVTH
Sylley

5.25



5.25



Ships on Early Maps

5.25

