

Treatises and Technical Texts on Shipbuilding



08.00 Portugal

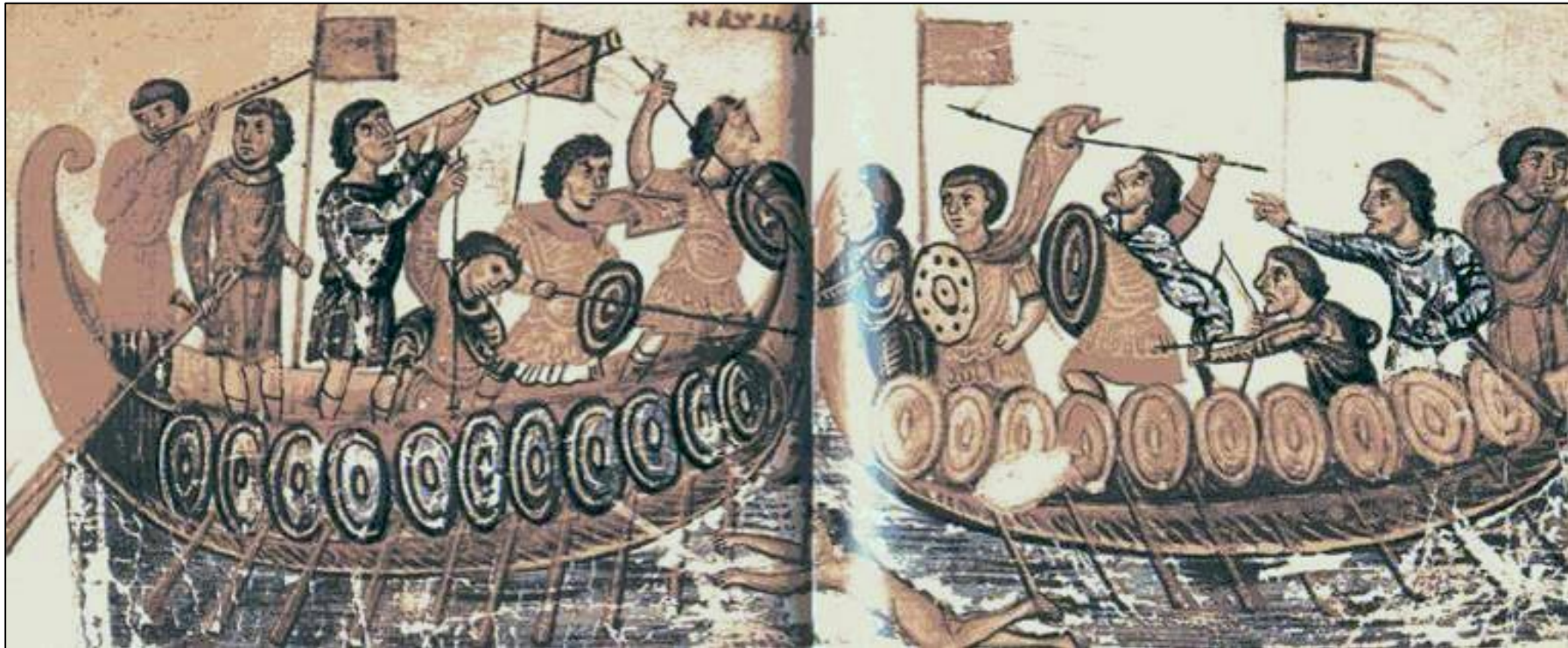
Filipe Castro

Last edited: June 2020

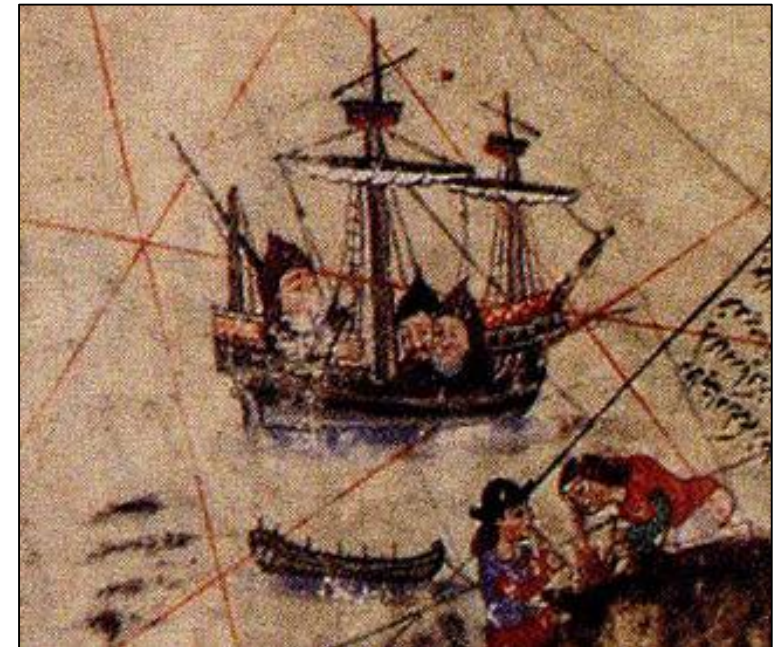
A diversity of Iberian cultures developed under the influence of different visitors and invaders, which have established colonies and factories on this territory: Phoenicians, Greeks, Carthaginians, Romans, Byzantines, Goths and Arabs.



The coasts of Portugal and Spain harbored several crusader fleets, and the so-called *Reconquista* encompassed several naval blockades.



The Arab influence on Portuguese shipbuilding has been overlooked. Arab warships helped the Islamic conquest, fought Viking invaders, and sacked coastal villages with regularity since the Christian warlords started the push against the Muslim rule of the Iberian Peninsula.



Piri Reis, 1513.



At least from the 13th century onwards, Iberian Christian rulers hired Italian shipwrights and sailors to built and man their fleets.

c. 1300 Ambrogio Lorenzetti

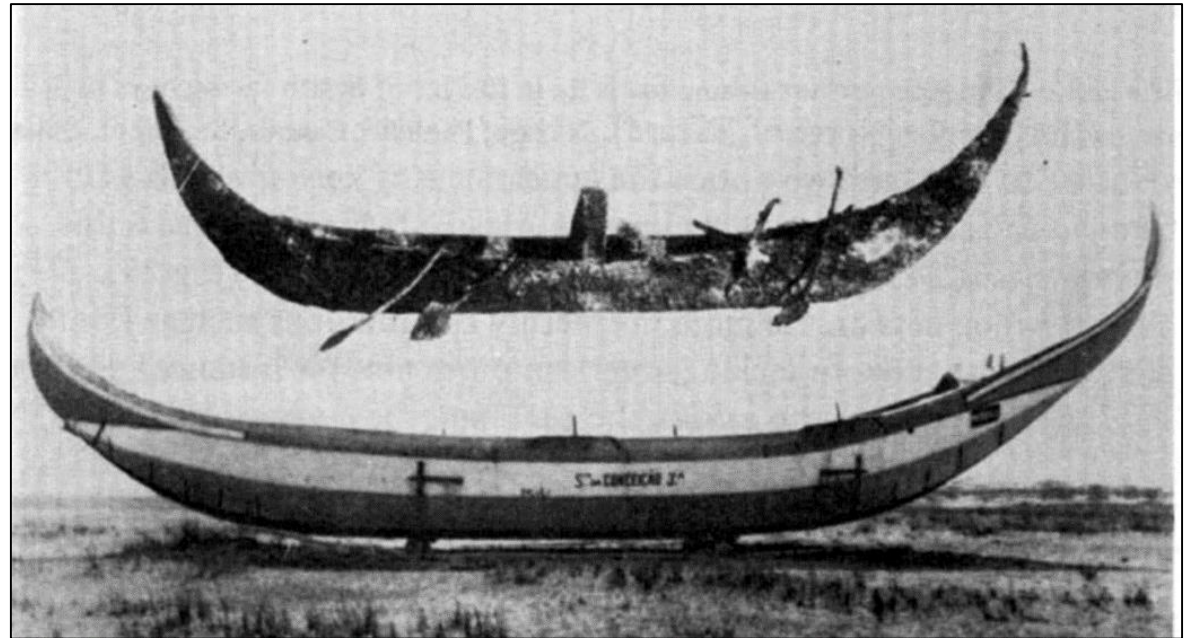


Octavio Lixa Filgueiras suggested that some of the craft that could be found on the Douro River region was built with northern influence, perhaps from the Germanic Suevi people, which invaded the Iberian Peninsula between AD 407 and 409, together with other Germanic tribes, the Vandals and Alans.

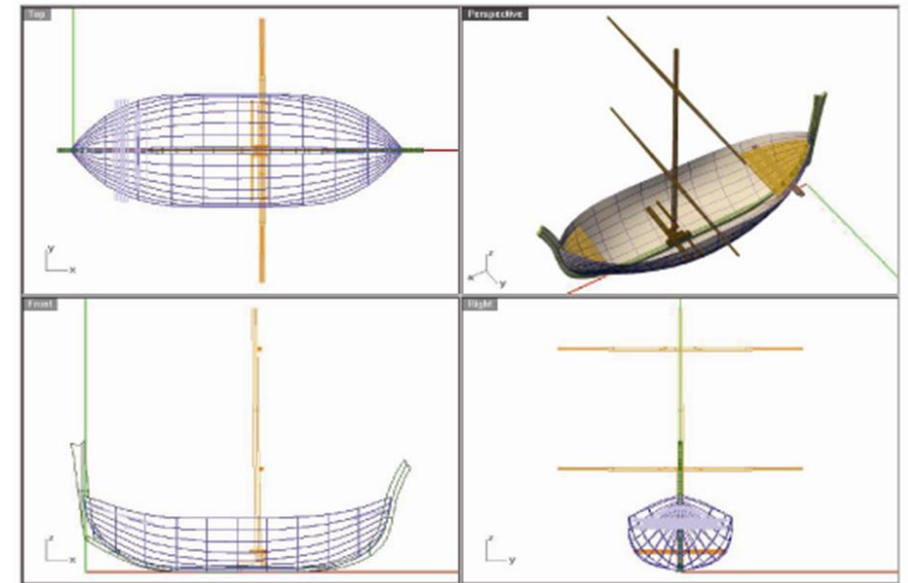
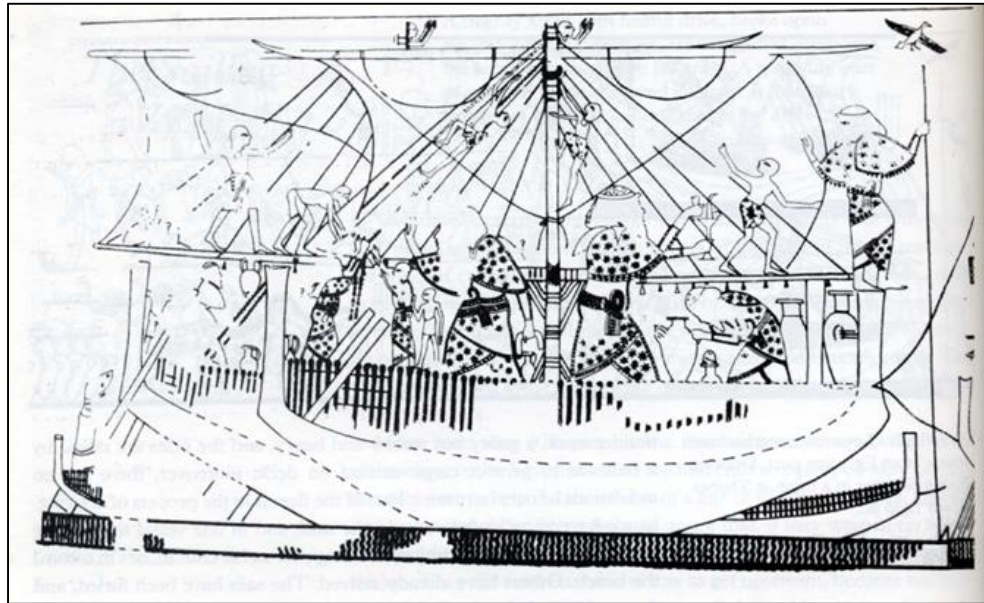
In Galicia, today's *dornas* are lapstrakes, built under a clear northern influence, and so are the bottom based *barcos rabelos* from the Douro River, in the north of Portugal, built with flush laid planks on the bottom and lapstrake sides.



Moving south, the *saveiros* from Aveiro seem to be evolved plank canoes and look like a Middle Eastern model from Ur (although it probably represents a reed and pitch boat).

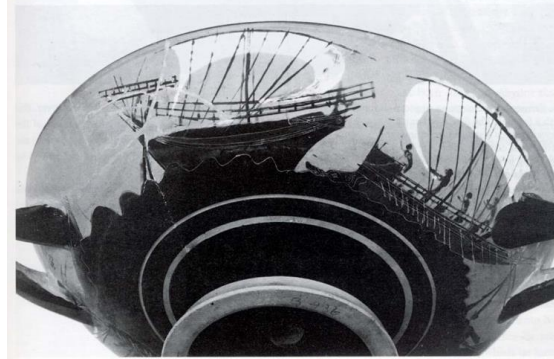
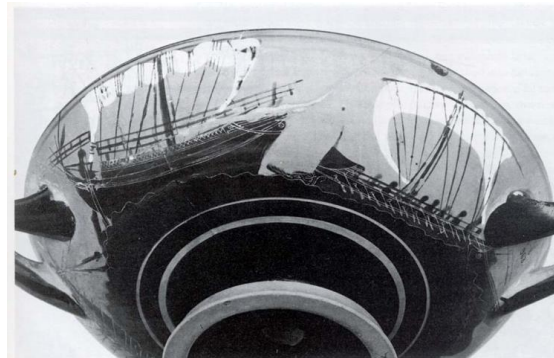


We know that the shores of Portugal were visited by Phoenician merchants during the first millennium BCE, perhaps sailing on shell-first built vessels, with large mortise and tenon joints, similar to the ones found on the 1300 BC Uluburun ship.





They were followed by Greek sailors, possibly traveling on sewn boats.



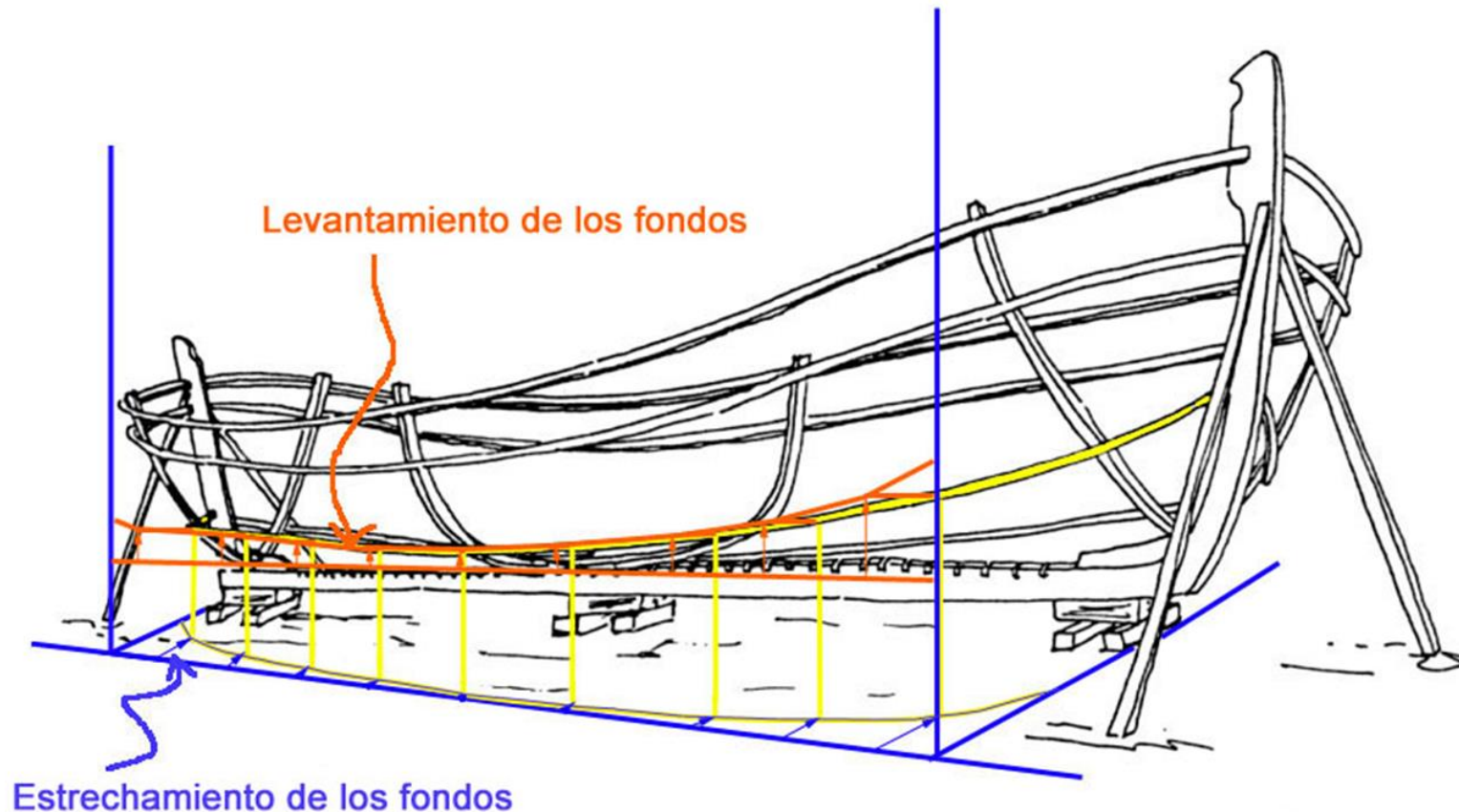
And by Carthaginian and Roman ships, with shell based hulls built with mortise and tenon joints.



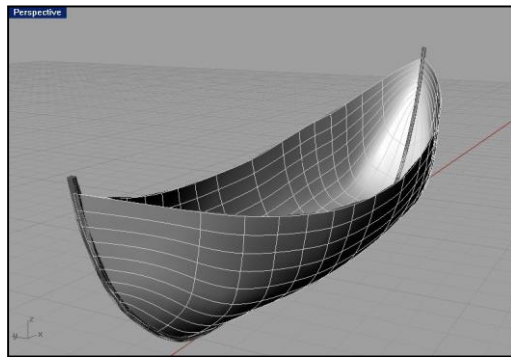
During the Middle Ages the Portuguese shores were visited by northern craft.



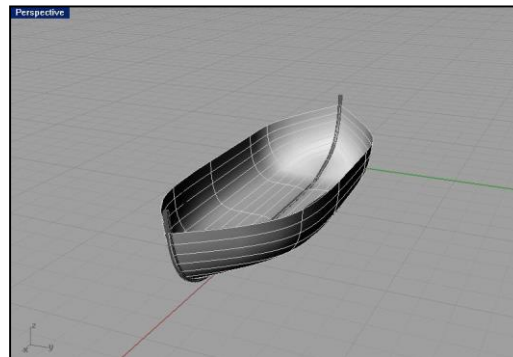
But the ships of the *Discoveries* are completely different from all these types.



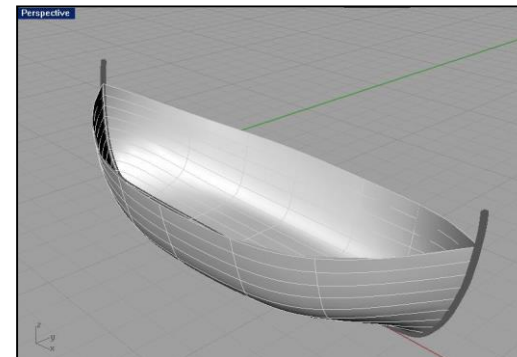
Pre-designed, frame-based ship design: rising and narrowing of the bottom.



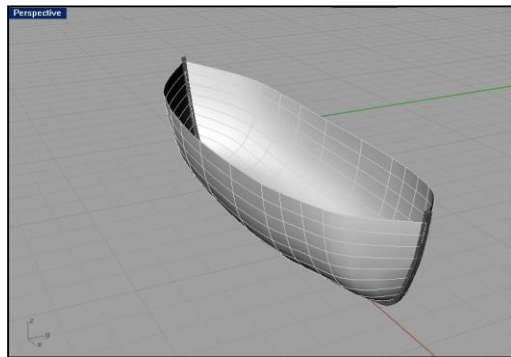
Yassiada c. AD 625



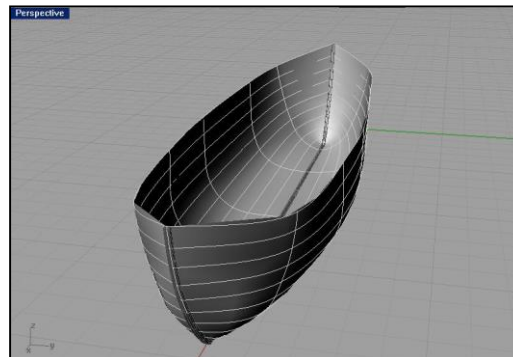
Bozburun c. AD 874



Serçe Limanı c. AD 1025



Culip 6 c. AD 1300



Contarina 1 c. AD 1300



Logonovo c. AD 1400

And do we know about the Portuguese ships of the 1300s, 1400s, 1500s, and 1600s?



Mid-15th century graffiti from Mosteiro da Batalha, Portugal.

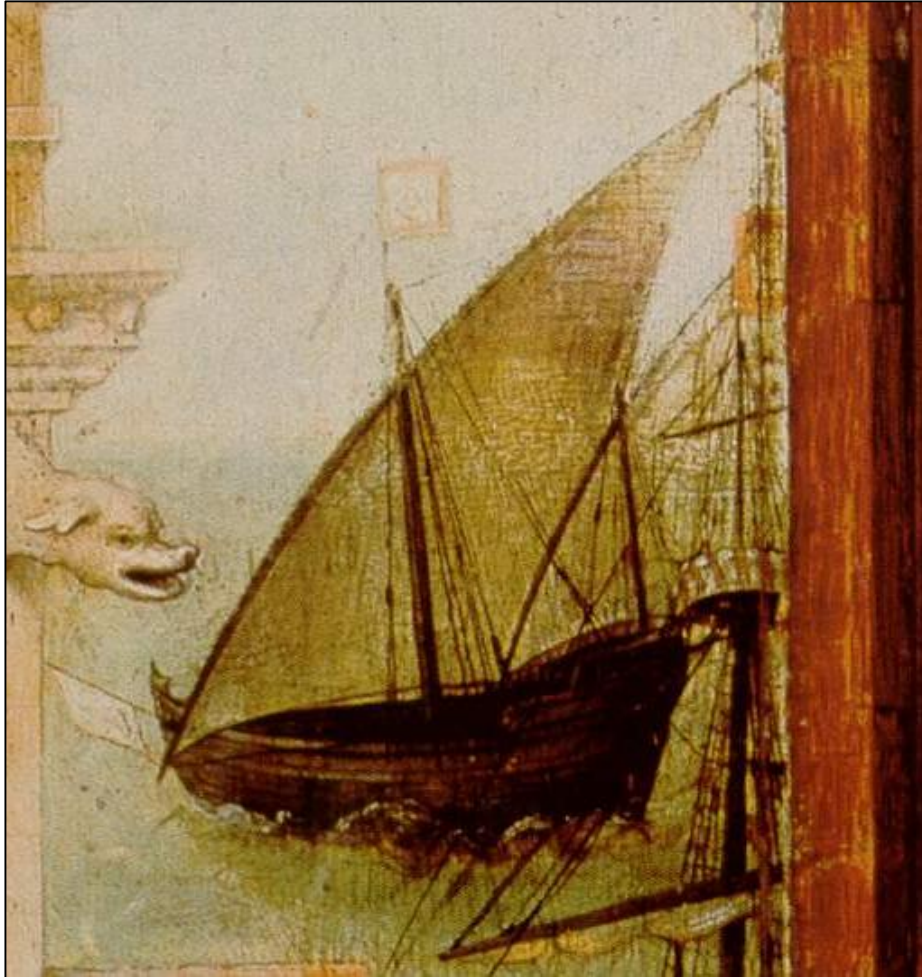
The 3-masted ships that allowed the European expansion overseas evolved in an environment with a diversity of solutions that is not well-known to us, but it was certainly based on the two types of merchantmen that met in the Mediterranean in the 13th and 14th century.



Selo do Concelho de Lisboa, 1253.
Lisboa, Torre do Tombo, C.R.,
Santos-o-Novo, maço V, doc. 815.

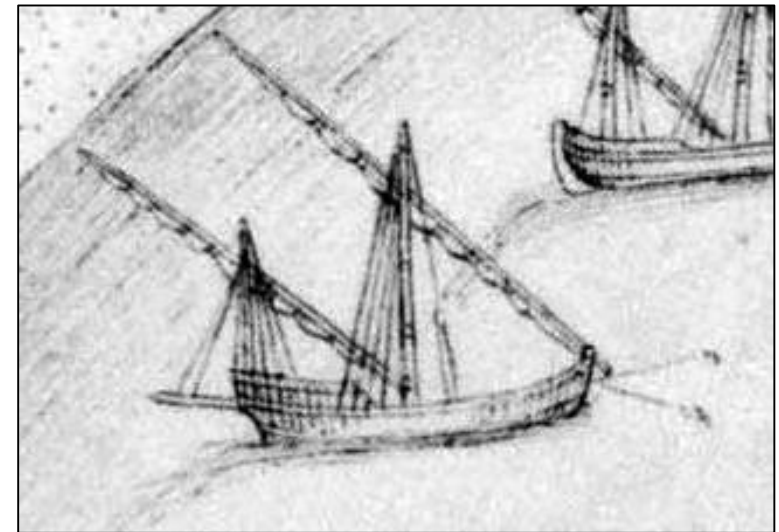
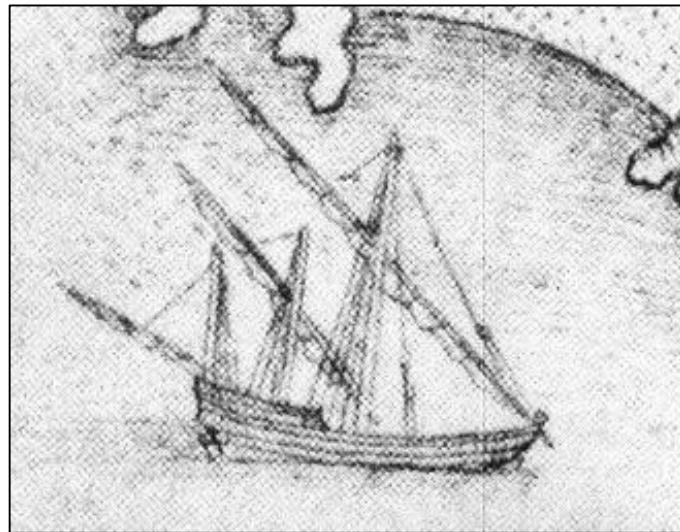
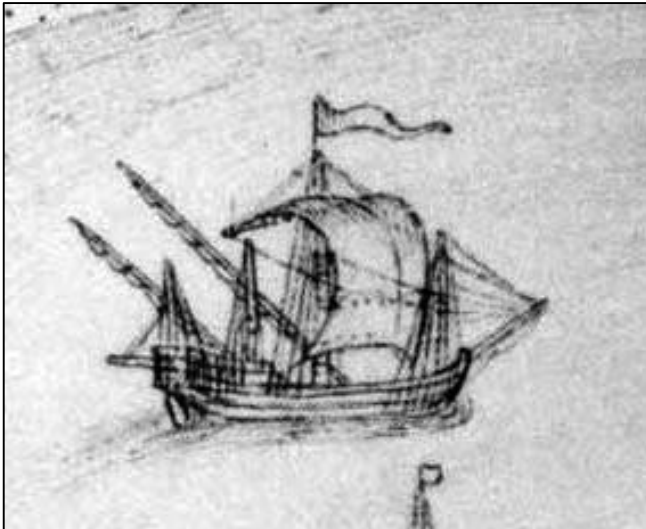


Chafariz do Andaluz, 1336

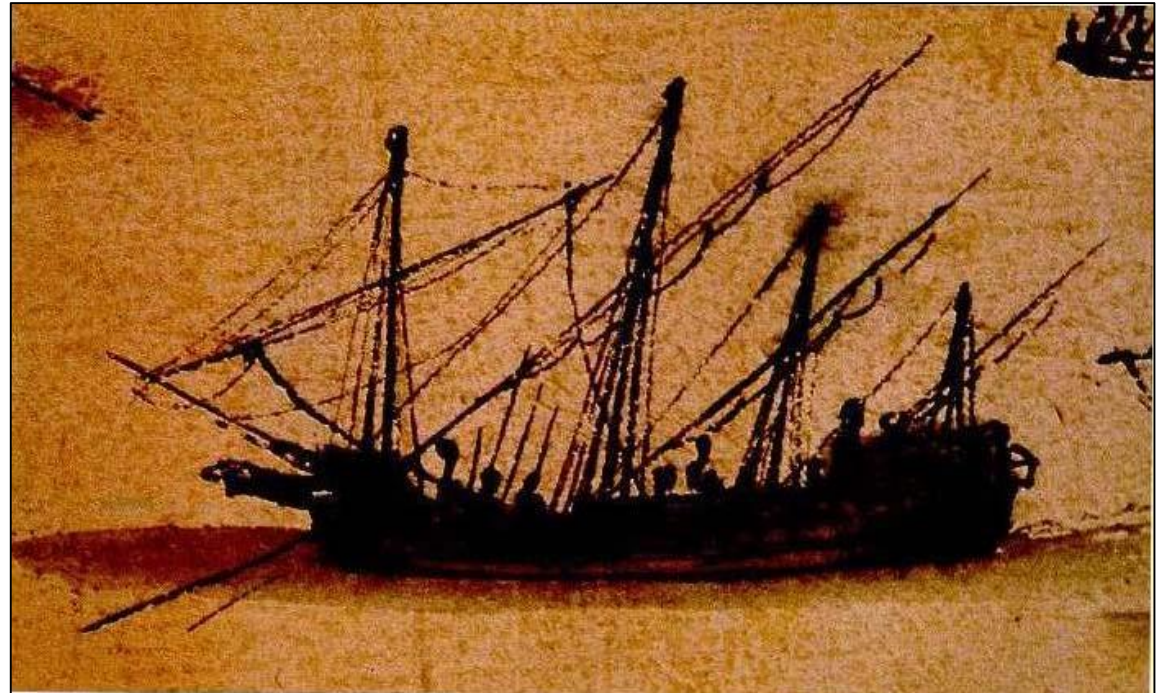


Caravels were originally lateen rigged ships with one or two masts that seem to have been developed in the Mediterranean during the 12th century and were mainly employed in fishing activities in Portugal, in the thirteenth century.

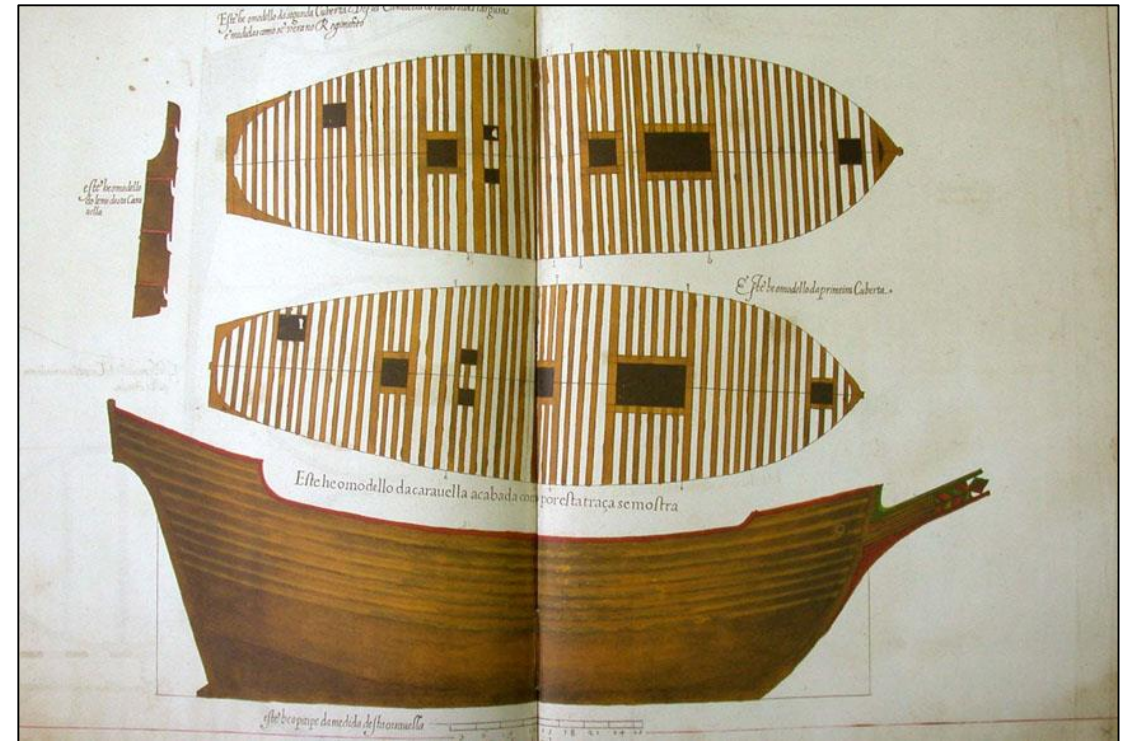
Absent from original documents throughout the fourteenth century, they appear in the beginning of the fifteenth century as the preferred ships of discovery, for their swiftness and maneuverability.



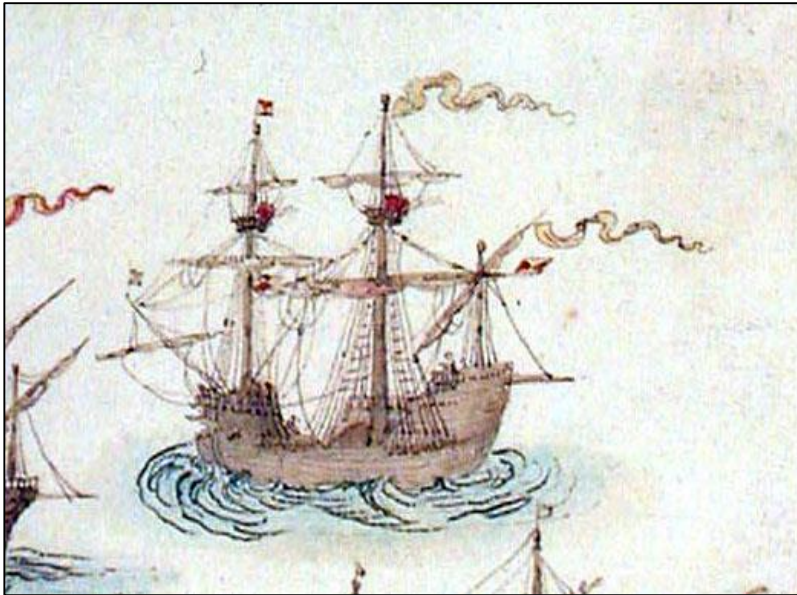
Towards the end of this century there are references of three-masted, ship rigged caravels, and in the 16th century we witness the development of the *caravela de armada*, with four masts: all masts with lateen sails except the foremast, which bore square sails.



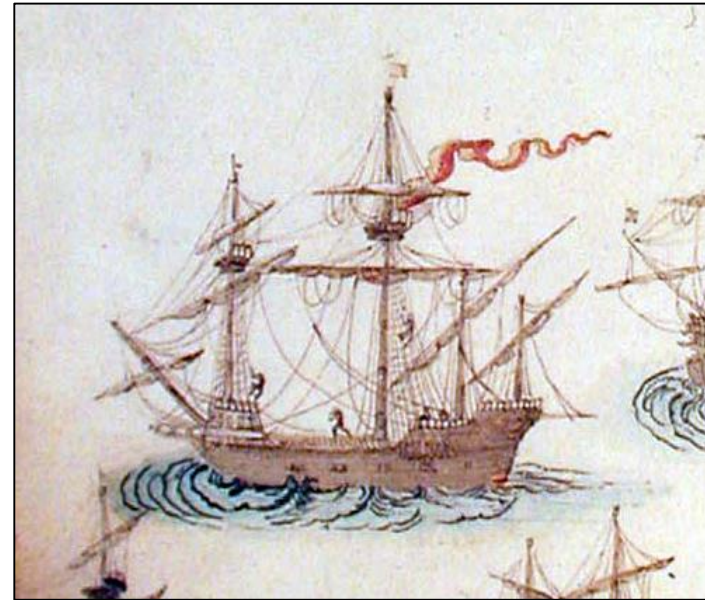
In the 17th century caravels were still in use, either represented in 1616 Manoel Fernandez treatise or sailing around Cape Horn.



Galleons appeared in the beginning of the 16th century and were warships with two or three decks, fore and stern castles fully integrated, bearing three or four masts and a bowsprit, the fore and main masts rigged with square sails, and the mizzen and bonaventure masts rigged with lateen sails.



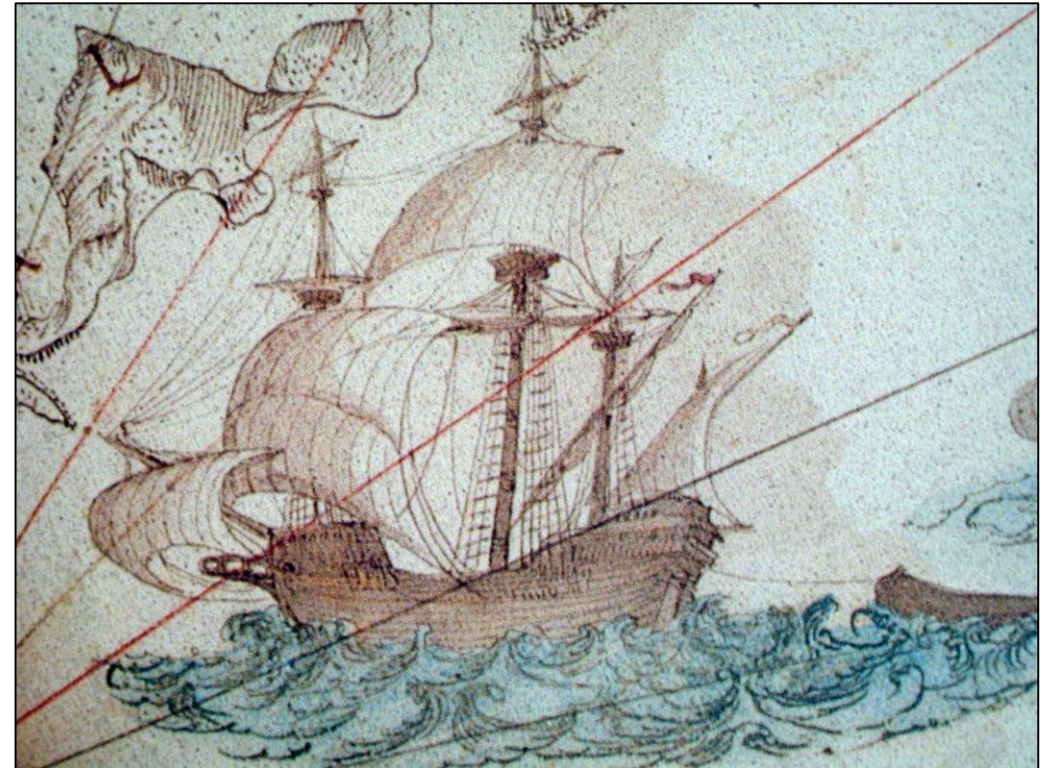
Nau



Galleon

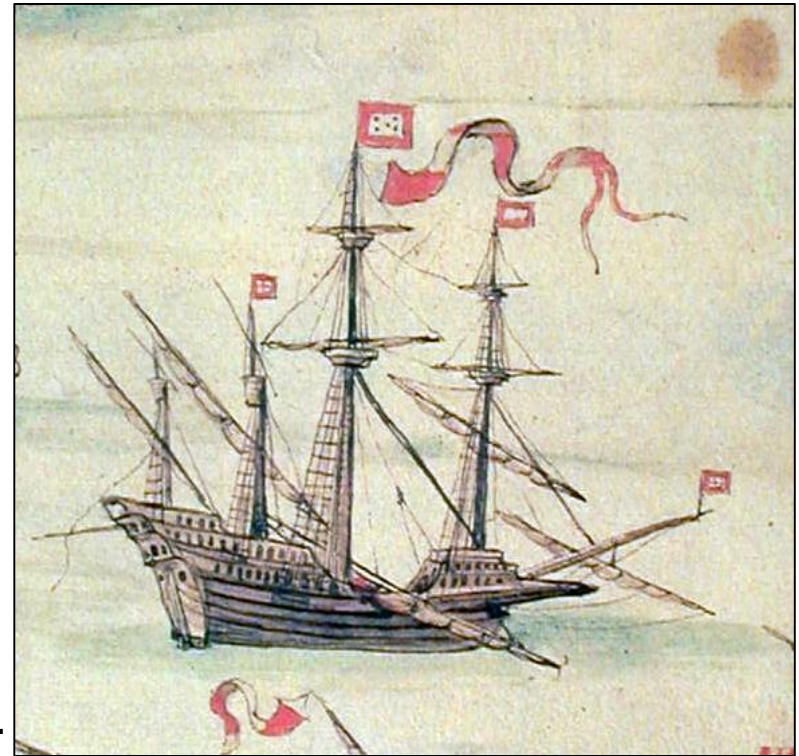
Roteiro do Mar Roxo, 1538.

The length to beam ratios may have been slightly higher than the *naus*' ones, perhaps around 3.5. Contemporary scantling lists show a much sturdier vessel with thicker masts and spars.



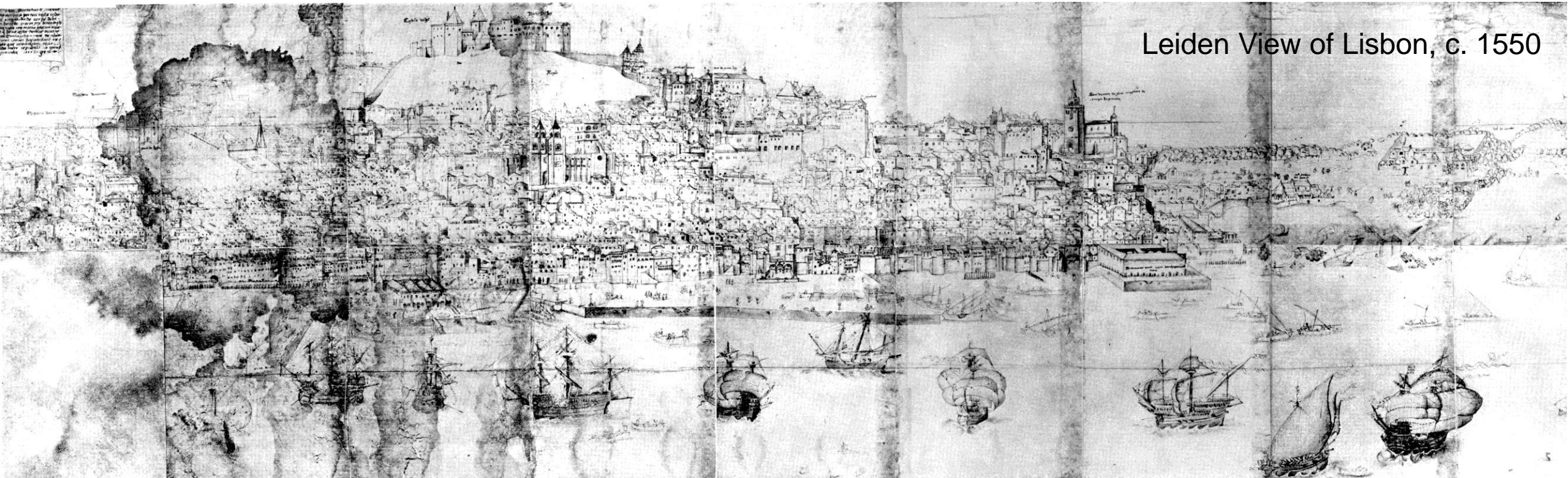
Roteiro do Mar Roxo, 1538.

Flat stern panels seem to be a characteristic of these ships, understandably since they confer more deck space for the operation of artillery.



Roteiro de D. João de Castro, 1538.

A number of smaller vessels, such as *patachos*, *zabras*, *galizabras* and other craft sailed regularly with the fleets, as supporting craft, and may have been conceived and built in the same way as the larger ships.



There are no known technical texts on shipbuilding from Portugal until the 1570s.



Portuguese three-masted ship in a ceramic basin, probably of Arab origin. Circa 1425.

Fernando Oliveira (c. 1507 – c. 1581)

A priest, born in the early 16th century, Fernando Oliveira wrote the first Portuguese grammar and three important texts on seafaring, among other works:

A Arte da Guerra no Mar, c. 1555;

Ars nautica, c. 1570; and

Livro da fábrica das naus, c. 1580.

Anonymous, *Livro náutico*, c. 1575-1625

The *Livro náutico* is a collection of manuscripts bound in two volumes, with 86 and 144 folios respectively, and dating between 1575 and 1625. It is presently located in the Biblioteca Nacional in Lisbon.

It contains much important data pertaining to the organization of the part of the Spanish Armada of 1588 that was fitted in Lisbon, and several lists containing armament and victuals for India naus. It is unpublished.

João Baptista Lavanha (c. 1550-1624)

Livro primeiro de arquitectura naval, c. 1600

The *Livro primeiro de arquitectura naval* is an unfinished manuscript on shipbuilding, dated to c. 1600 and authored by João Baptista Lavanha, chief engineer and chief cosmographer of the kingdom of Portugal at that time. Lavanha was born in Lisbon around 1550, son of a court officer, and he enjoyed a successful career in spite of his Jewish origins. Around 1610 he moved to Spain where he died, rich and accomplished, in 1624.

Naus of Gonçalo Roiz and Sebastião Themudo, c. 1600

The naus of Gonçalo Roiz (c. 1600) and Sebastião Themudo (1598) are two manuscripts copied by Lavanha and transcribed and published by João da Gama Pimentel Barata in his comments to Lavanha's *Livro Primeiro*.

These two short descriptions of India *naus* contain the measures and features considered by their authors fundamental in the definition of these ships and present precious information on the length of keel and posts, number of pre-designed frames, and other basic characteristics, such as the shape of the transom.

Figueiredo Falcão, *Livro de toda a fazenda*, 1607

The *Livro de toda a fazenda* is a large book written by king's officer Luiz de Figueiredo Falcão containing all the rents and profits of the Portuguese crown in 1607. It contains an interesting schematic with the division of space within an India nau.

Manoel Fernandez, *Livro de Traças de Carpintaria*, 1616

The *Livro de Traças de Carpintaria* is a large codex that describes a variety of vessels, from caravels to India *naus*, and is divided into two main sections.

The first has lists of dimensions of the primary structural components of a ship such as stem, stern post, midship and tail frames.

The second contains an impressive collection of drawings, mainly intended as descriptions of the structural components of the ships, and less concerned with the conceptual aspect of the shipbuilding process.

Naval Papers of Dom António de Ataíde, c. 1620

These three codices are a compilation of notes and texts that belonged to D. António de Ataíde (1567-1647), fourth count of Castanheira, first count of Castro Daire, Captain of the India Armada in 1611, and governor of Portugal in 1632 and 1633, during the Habsburg rule.

Arqueação de la Nao nossa Senhora de Oliveira, 1634

Text describing the *naus Nossa Senhora de Oliveira* and *Santa Catarina*, signed by Manoel Fernandez and Bartolome Alvez.

Marcos Cerveira de Aguilar, *Advertências de Navegantes*, 1640

Advertências de Navegantes, authored by Marcos Cerveira de Aguilar, is a codex dated to 1640 and presently located in the Biblioteca Nacional in Lisbon. On folio two its author mentions "the 1st of December of this year of 1640," which is the date of the rebellion that made Portugal independent from the Spanish crown.

It is a rather complete overview of the Portuguese navy, from the construction of ships, rigging and fitting, launching, and manning to a collection of chapters with general rules and knowledge useful to every navy officer.