

Tracing the Development of Mediterranean Medieval Warships from the 11th to 15th Century*

»In any pre-industrial society, from the Upper Paleolithic to the 19th century, a boat or (later) a ship was the largest and most complex machine produced«¹. Indeed, very few human creations would rival the complexity, sophistication, technology or even mere size of ships. And the more complex type of ship seen throughout the ages was the oared ship, better known as the galley. These long, slim and fast vessels, combining the shipbuilding technology with the mechanics of oar power and the art of sailing, were by far the most advanced technological achievements of antiquity and the Middle Ages and have survived in various forms until today.

Their importance, however, expands in a more complex sphere than contemporary advanced technology: galleys, whose construction, manning and maintenance requires large amounts of manpower and money, were the basic symbols of naval power and national pride. The existence of galley fleets or even single galleys was a basic factor for the practical and theoretical consolidation of state authority and power. Religious and political symbolism was stated through various symbols always present upon these vessels. In short, galleys were a vital element of all sea cultures of the past².

Before we begin our journey into the medieval Mediterranean some basic oar-mechanic considerations about galley construction should be underlined³.

Galleys were above all oared vessels. Their whole structure was organized around their oar system and oar crew, their other attributes (e.g. sails) only marginally influencing their design. The main objective of every galley design was to increase the ship's speed and manoeuvrability either by fitting more oarsmen on a smaller and lighter vessel or by improving their rowing position. The maintenance of a proper gearing of the oars (the ratio between the outboard length of an oar and the inboard length; ideally 1:3) and of the lowest angle with the water were essential features. Both could be achieved by adding an outrigger, a frame that holds the tholes away from the gunwale to optimize leverage. Outriggers, however, were

often a fragile and complicated addition, thus many galleys were often rowed by tholes and oar-ports in the simplest possible way. Another important aspect is the rowing position. Today the sliding seat is the norm, but that appears to have been unknown in the past and the simple seated position was probably preferred. A standing position, still used around the world, was more common in boats and smaller ships, but not in galleys. A combination of the two methods was, as we shall see, the sit-and-stand stroke which came into use during the period which we will discuss.

11th-12th century

We will begin the examination of our sources from the written evidence. Byzantine sources, after the rich information supplied by the 10th century naval warfare manuals like Leo VI's *Naumachica*⁴, become quite tacit after 1000: historical texts occasionally refer to galleys, listing numbers and documenting a variety of names (*diereis*, *triereis*, *dromades nees*, *dromones*, *myopari*)⁵, but offering no actual information on the form of these ships, the authors using whatever name, preferably antique, matched their prose. References to galleys having three wales during the 12th century are not easy to interpret and give little evidence on the galleys themselves⁶. The gradual demise of the term *dromon* is also evident, but it is unknown whether this marks any actual change in ship construction or just the authors' trend to adopt more classicistic terms. The word both in Greek and Latin sources eventually becomes obsolete and by the 13th century denotes even merchant ships⁷.

Latin sources give a similar plurality of names for galleys: the Pisan fleet attacking the Balearics in 1115 comprised »*Gatti*, *drumones*, *garabi* and swift *galee*, *barce*, *currabii*, *lintres* and large *sagene*«⁸. We must note here that the term *galea* is used more and more instead of *dromon* or *chelan-*

* This paper is largely based on the study concerning medieval Mediterranean galleys the author undertook as his M.A. thesis at the University of Southampton (Nakas, Galleys). The author would like to warmly thank the Onassis Public Benefit Foundation, whose generous scholarship allowed him to complete this course successfully, as well as his supervisors and lecturers Mr Jon Adams and Ms Lucy Blue for their support, help and encouragement.

1 Muckelroy, *Archaeology* 3.

2 Morisson, *Introduction* 7.

3 Shaw, *Mechanics*. – Bondioli/Burlet/Zysberg, *Oar* 172 f.

4 Leo VI, *Naumachica*. – Pryor/Jeffreys, *Dromon* 175-188.

5 Pryor, *Galea* 108-110.

6 Anna Comnène, *Alexiade* VI., 7. – Theodore Prodromos, *Rhodanthe* 5, ll. 449-59. – Pryor/Jeffreys, *Dromon* 410.

7 Pryor/Jeffreys, *Dromon* 407-421.

8 *Liber Maiolichinus* 105. – Pryor, *Galea* 109 f.

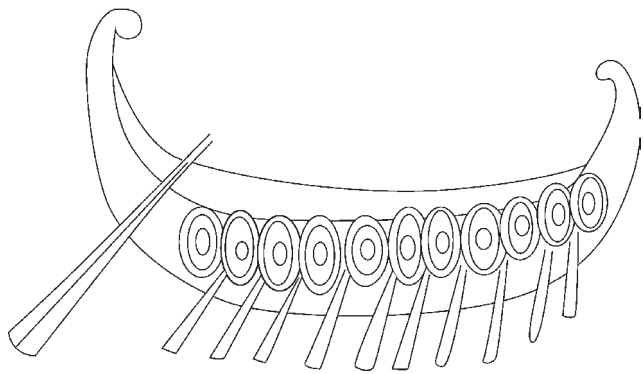


Fig. 1 Pseudo-Oppian, Venice, Biblioteca Nazionale Marciana, Marc. gr. Z. 479, fol. 23r (11th century). – (Illustration Y. D. Nakas).

dium, this probably indicating a prominence of this type of ship. Information concerning the actual form of the galleys is meagre and debatable: the chronicler of the Crusades William of Tyre, a generally reliable source, mentions a trireme with 200 oarsmen operating 100 oars, something which is most probably a mistake⁹, as well as another anonymous passage concerning a galley with two levels of oars, possibly divided by a deck, each level being operated simultaneously in opposite directions¹⁰. William's report of a fleet of 150 long boats, »commonly known as *galee*«, equipped with spurs

9 Pryor, *Galea* 109 note 47. It is interesting that the early-13th century French translator of the original text corrected the mistake by altering William's 100 oars with two oarsmen per oar to 100 oarsmen.
10 *Itinerarium peregrinorum* 324. – Pryor, *Galea* 109 f.
11 William of Tyre, *Chronicon* 20.13.7-17 (vol. 2, 927).

and rowed by two files of oars in 1169 makes much more sense¹¹. Finally an Arab source reports 140 oars on a Muslim *shawani* galley¹².

The iconography of this period, on the other hand, is much richer. For the first time we have a variety of galley images, something unknown for earlier periods. One of the most famous is the sea battle in the 11th century copy of Pseudo-Oppian's *Cynegetica*, showing two simple, crescent-shaped monoreme galleys with a pavesade of round shields (fig. 1)¹³. The antique shape of the hulls with the helix decorations, as well as the warriors' equipment strongly indicate that this is a copy of a much earlier image and does not portray contemporary galleys.

One of the best iconographical sources is the Skylitzes's manuscript, today in Madrid¹⁴. It is a copy of the historical text *Synopsis Historiōn* which was created in the third quarter of the 12th century in Sicily and its thorough study by various scholars revealed that it duplicated a Byzantine prototype, made probably between 1118 and 1150 in Constantinople. This richly illuminated manuscript contains numerous images of galleys, drawn in various styles according to the different artists. Leaving aside some over-simplified and stylized images, we will examine the images which seem to be more accurate and precise, sharing many common attributes (fig. 2). Galleys are low and slender, occasionally painted black (probably an

12 Pryor, *Galea* 109 f.
13 Venice, Biblioteca Nazionale Marciana, Marc. gr. Z. 479, fol. 23r: Pryor/Jeffreys, *Dromon* fig. 26.
14 Madrid, Biblioteca Nacional, Vitr. 26-2: Cirac Estopañan, Skylitzes. – Tsamakda, Skylitzes. – Babuin, *Illuminations*. – Pryor/Jeffreys, *Dromon* 633-644.

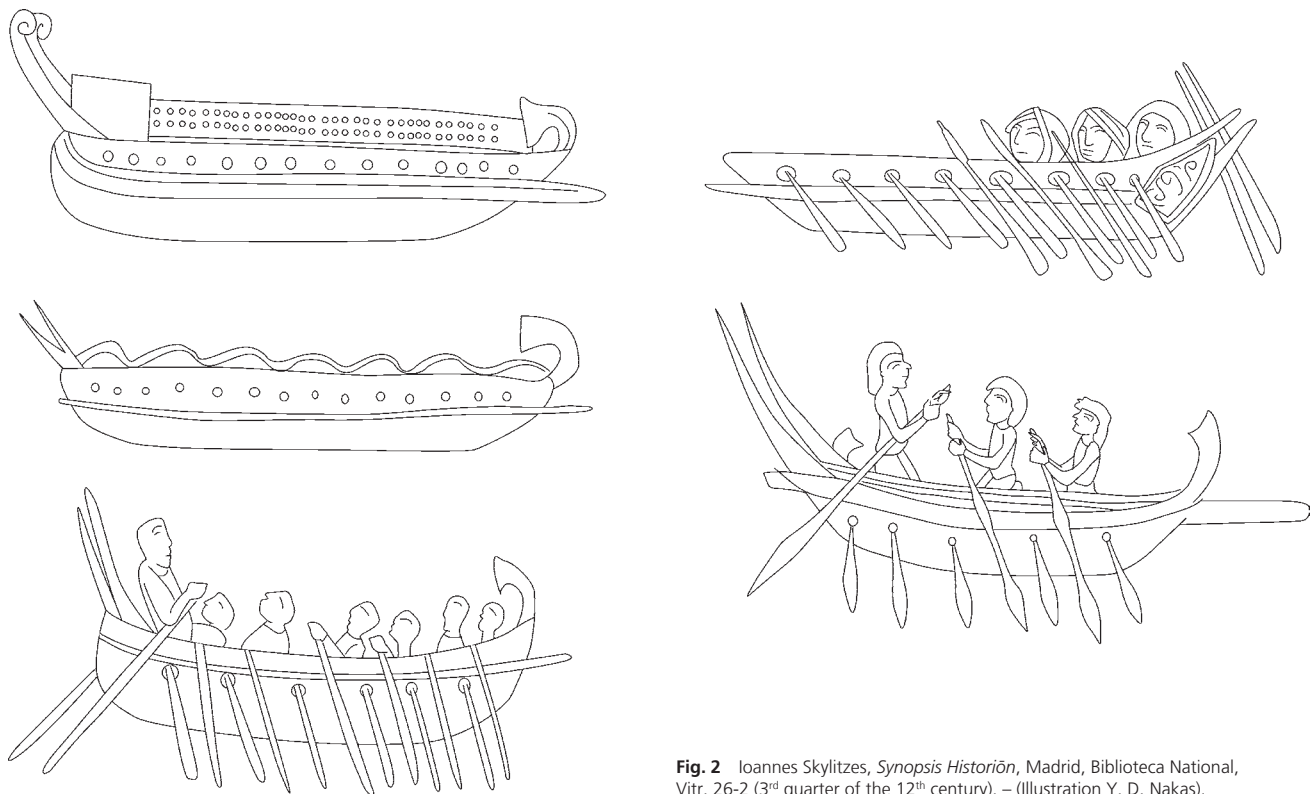


Fig. 2 Ioannes Skylitzes, *Synopsis Historiōn*, Madrid, Biblioteca Nacional, Vitr. 26-2 (3rd quarter of the 12th century). – (Illustration Y. D. Nakas).

indication of pitching), and with up-curving rounded ends. Around the middle of their height a wale is visible, which continues into a long thin spur above the water at the bow. This device (*speron* or *calcar* in later Italian sources) was one of the basic attributes of all medieval Mediterranean galleys and survived until the final disappearance of these vessels¹⁵. At the stern the gunwale and probably the main wale curve upwards, forming the two side »wings«, another common attribute of almost every Mediterranean ship until 1300 (probably the *vardones* of earlier Byzantine sources)¹⁶. The curved ends of the stem-post as well as the »wings« are usually painted in bright red or yellow. Oars are also often painted red (probably some kind of protective primer), something also very common in later galleys.

Most of the galleys are biremes, with two superimposed files of oars, the bottom one operated through oar-ports and the top one from tholes on the gunwale. The oarsmen of the top file are usually visible, rowing in a sitting position sometimes facing the stern and sometimes the stem of the ship. It is unclear whether the bottom file is housed underneath a deck or on benches placed at a lower level and in an open hull. The number of oarsmen is also greatly abbreviated due to the size of the miniatures.

Few superstructures are drawn on the ships. Some ships carry a single mast with a triangular lateen sail and in one case a ship is equipped with what appears to be a wooden fighting platform (*xylokaastro*). This is the only representation of such a construction (often referred in Leo VI's *Naumachica*¹⁷) on a medieval galley. However, the most accurate images have no superstructure at all, apart from one ship, most probably the flag-ship of the fleet, which bears an elaborate red parapet with golden dots (a canopy with gilded nails?) and a similar aftercastle.

The galleys in the Skylitzes's manuscript take part in all kinds of sea ventures: sea battles (including the only known image of the use of Greek fire), raids, travels, transportation of important persons, in brief all the things a galley fleet would normally do.

Other Byzantine manuscripts of the 12th century preserve two more galley representations. They come from the Vatican Library¹⁸ and from the Monastery of St. Panteleimon at Mount Athos¹⁹ and both seem to present small monoreme galleys (*galee*) or rowing boats, but the lack of any comparative material makes it difficult to ascertain that.

The Skylitzes's manuscript offers the first datable representations of a type of breme galley which dominates our sources throughout the 12th to the 13th century. Similar galleys appear again in the Annals of Caffaro, a chronicle manuscript where miniatures of galleys illustrate entries as-

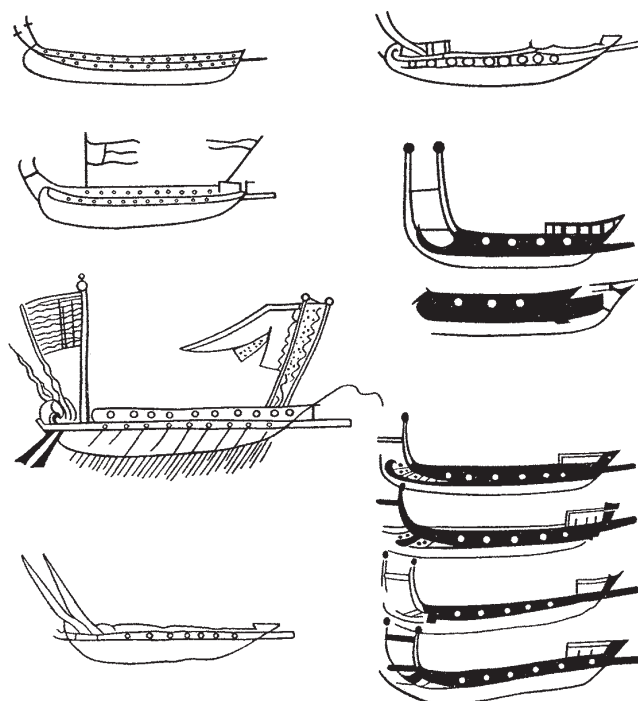


Fig. 3 Annals of Caffaro manuscript, Paris, Bibliothèque nationale de France, Par. suppl. lat. 773 (1125-1191). – (Illustration Y. D. Nakas).

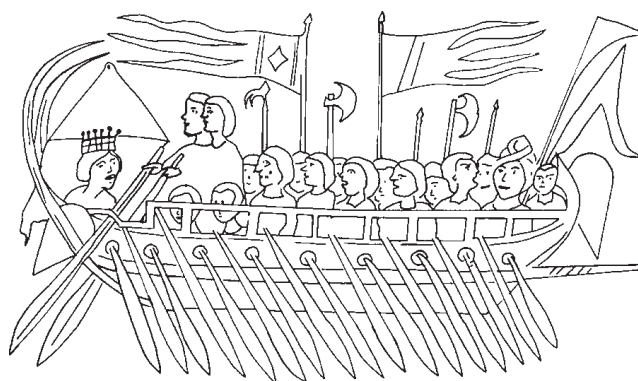


Fig. 4 *De Rebus Siculis Carmen*, Bern, Burgerbibliothek, cod. 120, fol. 119r (early 13th century). – (Illustration Y. D. Nakas).

sociated with such ships²⁰. They are rather simplified images, but clearly depict galleys similar to the Skylitzes's manuscript and date from 1125 to 1191 (fig. 3). The earlier examples, most probably drawn by the same hand, show biremes with two rows of oar-ports, whereas the later ones show one file of oar-ports and a stem-castle. Two galleys also carry large flags at both ends. Stems carry the common spur and sterns the common side-wings.

15 Alertz, *Architecture* 154.

16 Pryor/Jeffreys, *Dromon* 216-218.

17 Pryor/Jeffreys, *Dromon* 229f.

18 Vatican City, Biblioteca Apostolica Vaticana, Vat. gr. 1851, fol. 2v: Piltz, *Costume* 169.

19 Athos, Panteleimon monastery, cod. 6, fol. 138r: Pelekanidis, *Treasures* fig. 307.

20 Paris, Bibliothèque nationale de France, Par. suppl. lat. 773. – *Annali Genovesi* 28, 70, 207, 234 (ed. Belgrano). – Landström, *Ship* 8.

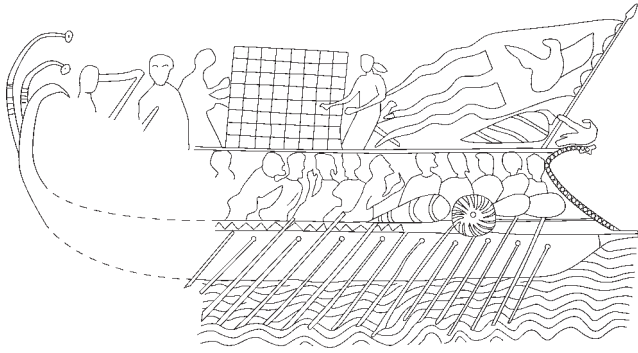


Fig. 5 Cathedral of Pesaro: mosaic (1170-1200). – (Illustration Y. D. Nakas).

Shortly after the Annals of Caffaro, around 1200, another illuminated manuscript sheds light on the construction of Mediterranean galleys. It is the narrative epic *De Rebus Siculis Carmen*, created in Palermo, where a series of excellent galley images appears (fig. 4)²¹. They follow the same configuration as the galleys already presented, but they are much more detailed and better executed. The ships are biremes with the long spur at the bow and the wings at the stern. Some are equipped with an aftercastle or a tent (the *cravatos* of older Byzantine texts²²); they also have a simple rail on the sides, occasionally covered by almond-shaped shields to protect the oarsmen. Similar shields are hung at the bow and stern bearing, like the banners and pennons on the ships, the coat-of-arms of the galley's master. They carry triangular lateen sails (one each). The top file of the rowers is usually visible and in one case the heads of the lower file might be depicted, too.

Three more galley images appear in the monumental art of mosaics in Italy in the second half of the 12th century. The first two appear to be small monoreme galleys (*galee* or *sagitte*, light galleys or vessels of the lagoon) at St. Mark's Basilica in Venice. Oars are operated from tholes on the gunwale and the ships seem to have the side wings on the stern. The second mosaic is a unique (although inconclusively published) representation of a galley from the cathedral of Pesaro, dated around 1170-1200 (fig. 5)²³. This is another bireme galley of the type seen in contemporary sources; it is, however, equipped with an elaborate stem with what seems to be an ancient-style ram and a curved *stolos* decorative feature. The height of this peculiar ram, which is above the lower level of oars, indicates that this too was a spur and not an ancient survival.

Mostly thanks to the iconographical material available, it is feasible to propose a reconstruction of the galleys used around the Mediterranean during the 12th century (fig. 6). Descendants of the Byzantine *dromons*, these were low and slender ships of light construction, most probably not fully decked. They would not exceed a length of 36-40m and

a width of 5 m, according to the number of oarsmen they housed, using an *interscalmium* (the distance between rowing benches) of something less than one meter. A major wale (among other, probably lighter ones) ran along the sides of the ship, extending towards the bow to form a long spur, used as a boarding platform and a decorative element, but also to provide leverage for the long lateen yard and for its standing rigging. Ramming, resulting from the frame-first construction of medieval Mediterranean ships, was out of the question and galleys could only occasionally push and capsize opponents (as theoretically suggested by Leo VI²⁴). The oarage system comprised two super-imposed files of oars, operated by 100-108 rowers on 25-27 benches. No outrigger was apparently used to facilitate rowing. Ships were most probably without decks, apart from a narrow gangway in the middle and small decks at the ends. Oarsmen and crew were protected by a light rail on the sides, where shields or other protective materials like leather was hung during battles. Heavier constructions were not common and were erected at the ends of the ship to protect the steersman and the marines. A basic feature of the ship, as of almost all contemporary round ships, was the double side-wing at the stern. These were the continuation of the wales and gunwales which curved above the stern, much like the decorative *aphlasta* of ancient Graeco-Roman ships. They seem to have been set at a distance from the ship's centre, forming, with the help of a transom beam, a small square deck at the stern where the steersman's tent was erected. Apart from their decorative function the side-wings could also be used as supports for the masts and sails when these were lowered. A single mast carrying one large lateen sail seems to have been the norm, although a second smaller mast is attested in earlier and later sources. Steering equipment comprised the regular double large oars at the stern, probably housed within the side-wings. Flags and pennons, shields and rigging-cutters were part of the ship's basic equipment.

In general, if our approach is correct, the galleys of this period must have been simple, cheap and light ships. The possible lack of a full deck and the placing of oarsmen in the ship's hold prevented them from being used as merchant galleys. No outrigger seems to have been used either, thus preventing the use of longer oars and the addition of extra oarsmen. These disadvantages will lead to technological progress in the following centuries.

13th-15th century

Historical sources of the period continue to offer little information about galley construction. A very interesting source are the Catalan chronicles of the second half of the 13th cen-

21 Bern, Burgerbibliothek, cod. 120, fol. 119r: Pryor, Galea 109.
22 Pryor/Jeffreys, Dromon 216.

23 Ricciardi, Pesaro 85.
24 van Doorninck, Ram. – Pryor/Jeffreys, Dromon 204-206.

GALEA 1200

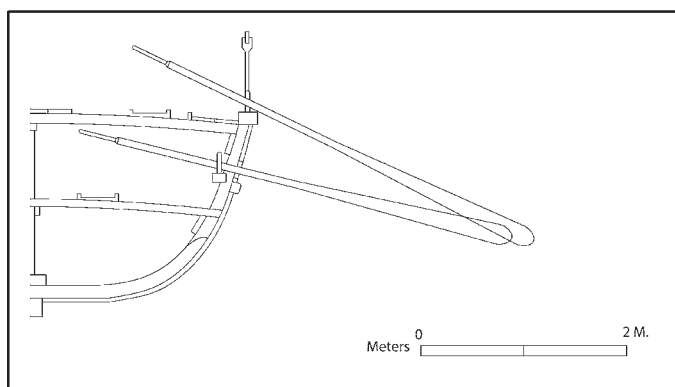
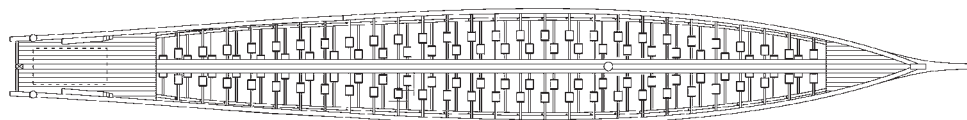
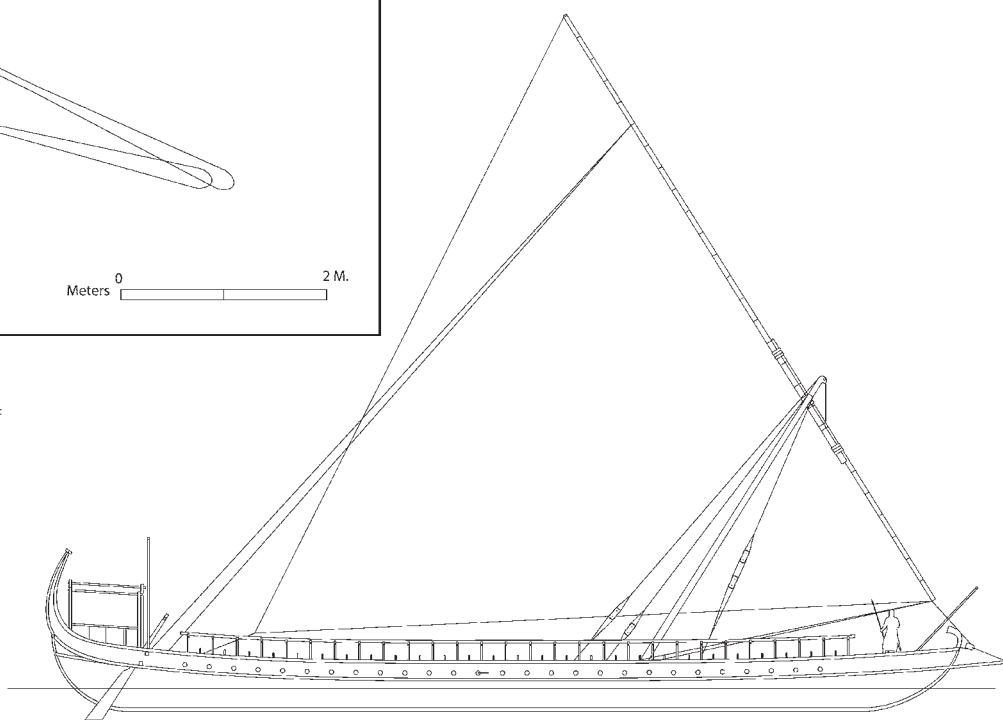


Fig. 6 Hypothetical reconstruction of a 12th century Mediterranean galley. – (Drawing Y. D. Nakas).



ture, which document what appears to be first-hand information on contemporary galleys²⁵. The chronicles of Ramon Muntaner and Bernat Desclot (c. 1285) mostly focus on battle tactics, but also mention the occasional addition of a third rower (*terçol*) on a bireme galley, in order to assist the other rowers when needed and also as an aid to fighting, such as for use by a crossbowman in battle. Another source is the *Liber Secretorum Fidelium Crucis super Terræ Sanctæ recuperatione et conservacione*, a Crusader's manual, by the Venetian Marino Sanuto Torsello (1306-1321). Sanuto reports the addition of a third oarsman in bireme galleys some time after 1290, as well as experiments with four and five oarsmen by the Venetians in 1316²⁶.

But it is the archival sources that for the first time offer direct information about galleys. In 1220-1229 Frederick II and in 1246 Louis IX contracted the building of various transport ships in Genoa, amongst which several *taride*, horse-transport galleys, for their forthcoming Crusades²⁷. The contracts for the construction of these ships survive, they are, however, quite brief and document few details. Around 1275 Charles

d'Anjou also commissioned the building of galleys and *taride* in the shipyards of Naples and Bari²⁸. These contracts are extremely detailed and, as we shall see, offer the first actual description of a medieval galley.

The need to standardize and at the same time thoroughly tax the merchant galleys which had appeared as a new type of ship around 1300, led the Venetian and the Genoese authorities to issue the first regulations concerning the size of these ships²⁹. Although not as detailed as the older contracts, they document with precision the basic dimensions of galleys, as these were dictated by the shipbuilders.

In iconography, two frescoes from Catalan churches dated around 1200 depict galleys³⁰. These are monoremes or biremes equipped with spurs and side-wings at the stern, much like the ships which appear in earlier sources. The biggest group of galley images of the century comes also from Spain, in the magnificently illuminated *Cantigas de Santa Maria* (c. 1284) manuscript (**fig. 7**)³¹. Amongst other ships many galleys are pictured. They follow the known configuration of previous galleys, with pointed spurs and much curved sterns,

25 Foerster Laures, Aragon.

26 Sanuto, *Liber secretorum* 57. – Lane, *Trirèmes* 48f.

27 Pryor, *Crusade*. – Pryor, *Galea* 115f. – Fourquin, *Estimate*.

28 Pryor, *Galleys*. – Fourquin, *Estimate*.

29 Jal, *Archéologie Navale* 252-272. – Nakas, *Galleys* tab. 1.

30 Mott, *Catalan Navy* fig. 2. – Casanovas, *Timón* 171 pls 2. 4.

31 Florence, *Biblioteca Nazionale Centrale*, cod. B. R. 20, fol. 105: Guerrero Lovillo, *Cántigas* pls 41. 105 cant. XXXV, XCV.

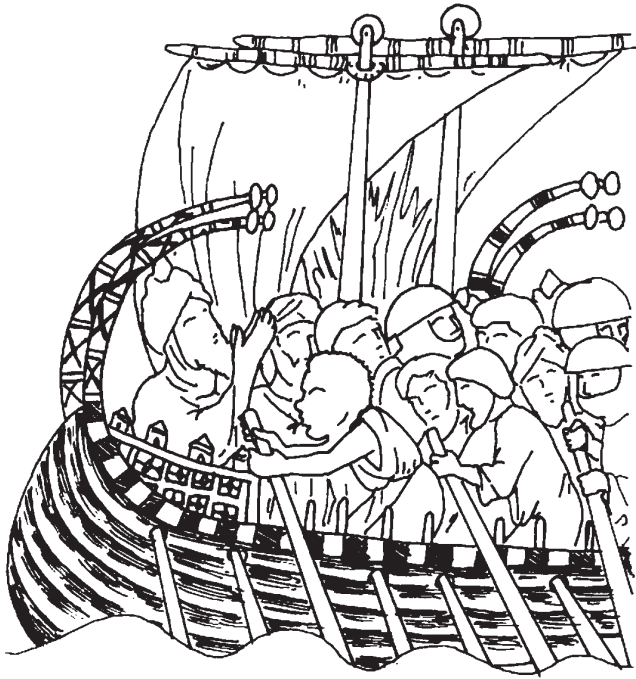


Fig. 7 *Cantigas de Santa Maria*. Florence, Biblioteca Nazionale Centrale, cod. B. R. 20, fol. 105 (c. 1284). – (Illustration Y. D. Nakas).

with decorated »wings« and elaborate parapets. They are biremes, with one file of oars operated through oar-ports and the other through tholes. Sails, most probably lateens, also appear.

The nautical iconography in Spain continues with the group of painted roof beams of the late 13th century preserved today in Barcelona³². Most of them portray small and crudely drawn galleys, but one of them pictures with great detail two bireme galleys attacking a merchantman (fig. 8). The similarities of these galleys with the type already documented in the 12th century are evident. An interesting element is the use of rigging cutters and crossbows against the ship attacked.

In Venice only one depiction of a galley survives in a manuscript of c. 1250 (fig. 9)³³. That too shares the attributes of

the 12th century galleys with the addition of an aftercastle and tent, a stem castle and two long swoops to facilitate steering at the stern in addition to the regular side rudders.

In the Levant, a group of images is found in the illumination of manuscripts from the Crusader kingdoms of Palestine, Syria and Cyprus. Dating to the last decades of the 13th century they show simple monoreme galleys with spurs and side-wings, but without any more details (fig. 10)³⁴.

A noteworthy depiction of a galley survives on the island of Naxos. It is roughly painted below the frescoes of a church of c. 1275 (fig. 11)³⁵. It seems to be a monoreme galley equipped with a covered stern-castle and flags. What is unique is the representation of the raising of the mast by the crew. We know that masts and sails were always lowered and stored during battles, but this is the first surviving representation of this operation.

In order to better understand the development of the Mediterranean galley we will now turn our attention to the first surviving galley construction contracts.

The first galley contracts we have are the ones signed in the later Crusades. In 1220-1229 Frederick II and in 1246 Louis IX agreed the construction of various ships in Genoa for their forthcoming campaigns, from which the contract for *taride* horse-carrying ships survives³⁶. The *taride*, a term derived from Arabic, known as early as the 12th century as *chelanium*, *thelandra* (from the Byzantine *chelandion*) or *uscerius*, were ships mainly used by the Crusaders' expeditionary corps and fell out of use with the end of the Crusades in the 13th century. The short contracts give little information about the form of the ships: they were decked galleys, 36m long, bulkier than other galleys, in order to house a number of horses, as well as soldiers and equipped with a double water-tight door at the stern to facilitate landing on beaches, much like a modern landing vessel (fig. 12).

By far the most detailed contracts are, however, the ones of 1273-1274, which document in pedantic detail the construction of regular galleys for the fleet of Charles d'Anjou in the shipyards of Naples and Bari³⁷. The galleys are supposed to copy a certain *galea rubea* (red galley) from Provence.

32 Mott, Catalan Navy. The painting is unfortunately published in a small image of poor quality. Further details of the galleys will most probably be visible in a better publication.
33 Romanelli, Galea 88.

34 Folda, Illumination figs 11. 139. 152.
35 Papanikolaou-Bakirtzi, Vyzantio 142.
36 Pryor, Crusade. – Pryor, Galea 115f.
37 Pryor, Crusade. – Pryor, Galleys. – Fourquin, Estimate.

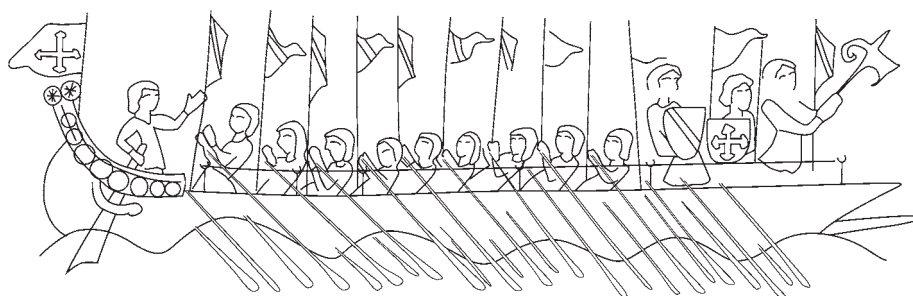


Fig. 8 Barcelona, Museo del Arte de Catalunya: painted roof beam from a church at Teruel (c. 1300). – (Illustration Y. D. Nakas).



Fig. 9 A galley from a Venetian manuscript, Venice, State Archive, Santo Stefano, b. 1 (c. 1250). – (Illustration Y. D. Nakas).

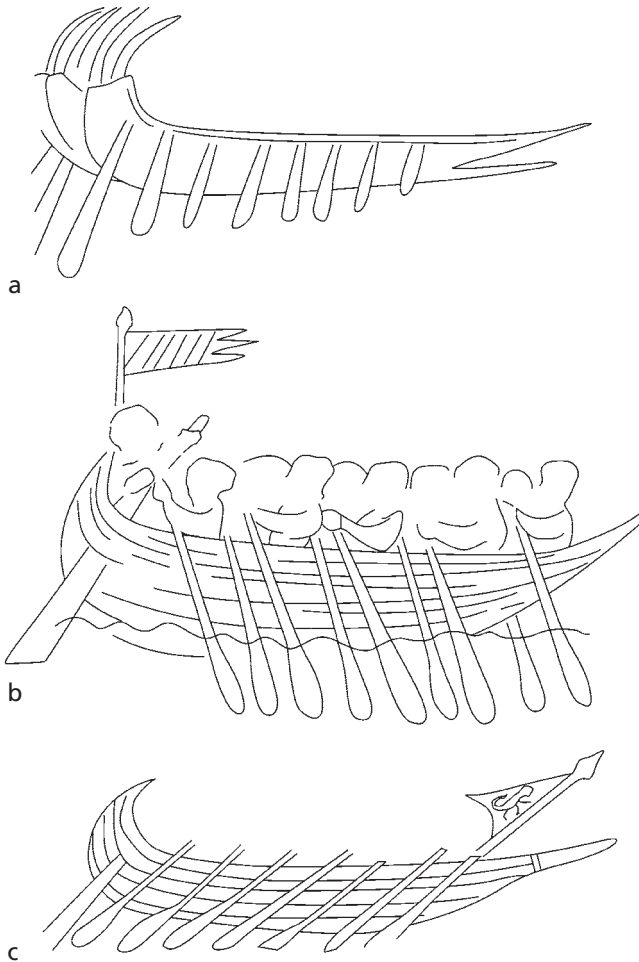


Fig. 10 Gallies from manuscripts of the Crusader kingdoms (c. 1280-1300):
a Saint Petersburg, National Library of Russia, cod. fr. fol. v.IV.5, fol. 103r. –
b Boulogne-sur-Mer, Bibliothèque municipale, cod. 142, fol. 337v. – **c** Florence, Biblioteca Medicea Laurenziana, Laur. Plut. LXI. 10, fol. 138v. – (Illustration Y. D. Nakas).

Thanks to these extremely detailed documents we have a unique insight not only into the actual form and structure of a galley of the time, but also into the contemporary terminology and world of the local shipyards.

In short, the galley was a 40 m long, 3.7 m wide and 2 m high (at midships) decked ship, equipped with a long spur, a stern-castle and two masts carrying large lateen sails (fig. 13). The galley had a crew of 150 men, of which 108 were oarsmen, a number corresponding perfectly with the 108 oarsmen reported for 10th century Byzantine *ousiakoi dromones* (one *ousia* army unit had 108 men). For the first time the construction details and measurements allow us to reconstruct the oarage system of the ship with accuracy. All oarsmen were arranged on the continuous deck into pairs on 27 angled benches. They operated one oar of similar length each, through an outrigger constructed over the deck, which created a square rowing platform, known from later Italian sources as *telaro*. This enabled all oarsmen to use longer oars in a suitable angle with the water and to perform a wider and more efficient sit-and-stand stroke (the *interscaltium* was c. 1.2 m)³⁸. This method, known later as *alla sensile* rowing, required a full deck for the oarsmen to step on and an outrigger, which the galleys of 1275 definitely had. Steering was still achieved with side rudders at the stern and occasionally long scoops. There is no mention of the side-wings, probably because the upper wales, which had previously formed the side-wings, had disappeared to make room for the outrigger.

In general the Angevin galleys of 1274 were slender ships, made for speed and manoeuvrability. Thanks to the outrigger they could house a sufficient oar-crew that rowed with the wider sit-and-stand stroke, which enabled the galleys to reach a great speed in battle. In contrast to earlier galleys, they had a protected hold which could house provisions and equipment, but also some merchandise. This represents a clear technological leap compared to the older, much simpler and cheaper, but slower and less seaworthy galleys.

It is difficult to ascertain when and where the new type of galley was introduced. Written sources mention no change and it seems that the *alla sensile* rowing system first docu-

³⁸ Bondioli/Burlet/Zysberg, Oar 183-186.

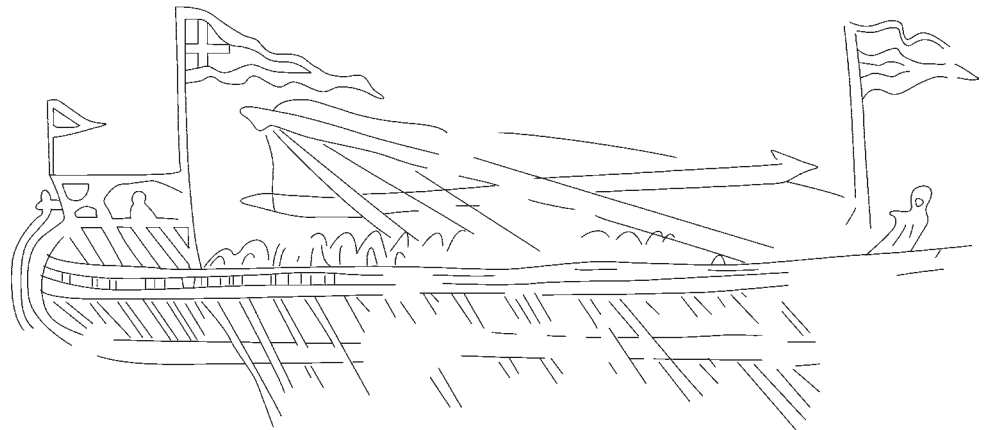


Fig. 11 Naxos, Panagia of Aries church: fresco (c. 1279). – (Illustration Y. D. Nakas).

TARIDA
1274

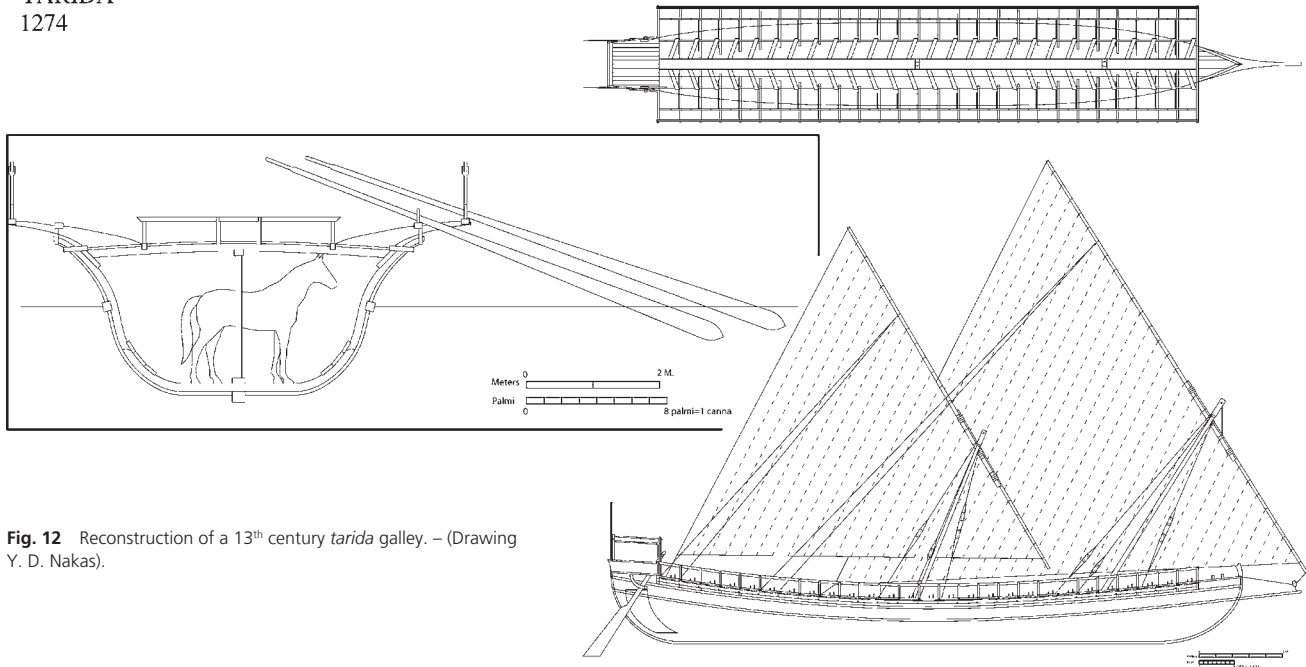


Fig. 12 Reconstruction of a 13th century *tarida* galley. – (Drawing Y. D. Nakas).

GALEA RUBEA
1274

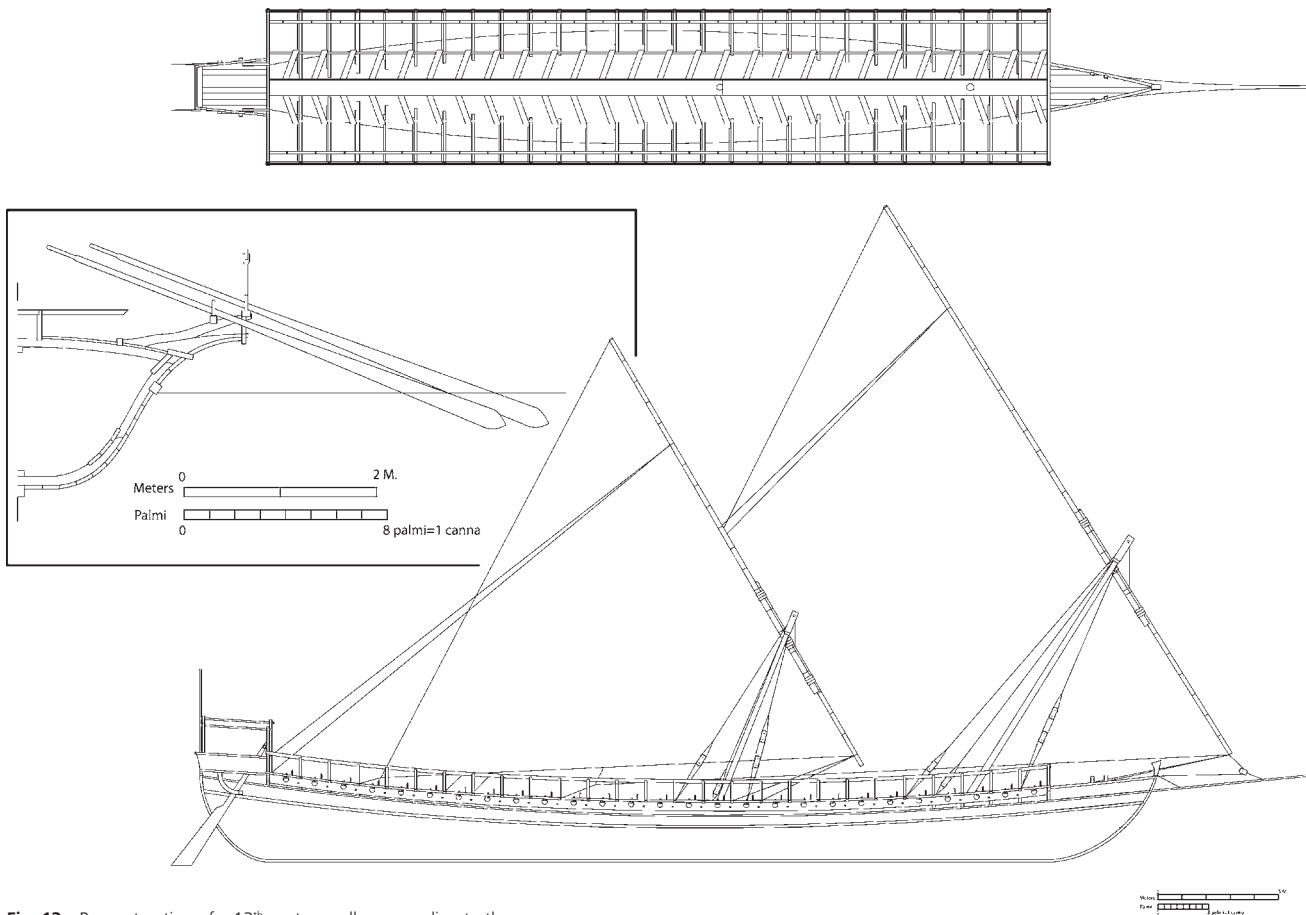


Fig. 13 Reconstruction of a 13th century galley, according to the 1273-1274 Angevin contracts. – (Drawing Y. D. Nakas).

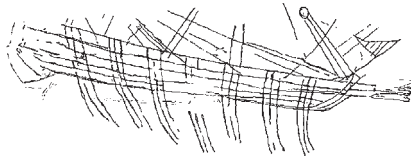


Fig. 14 Graffito of a galley from the hull of the Boccalama galley, Venice (c. 1328). – (Illustration Y. D. Nakas).

mented in the Angevin galleys was introduced gradually. A possible outrigger (*aposticum* in Latin or *postizza* in Venetian) is documented in the archives of Genoa in 1248³⁹, whereas the decked *taride* galleys of the same period were almost certainly rowed this way. However, contemporary and even later iconographical sources give no clue for the existence of any outrigger. Moreover, contemporary Catalan iconographical and written sources indicate that the new type of galley was not adopted in every part of the Mediterranean at the same time. It is interesting that the Catalan chronicles mention the occasional addition of a third oarsman (*terçol*), but only on some of the benches, most probably the central ones⁴⁰. This was probably due to the lack of a square outrigger which allowed the addition of a third oarsman on each bench with minor modifications.

Whatever the case was the new type of galley soon prevailed, at least in the Venetian and Genoese fleets. In 1292, the Genoese Benedetto Zaccaria is reported to have added a third oarsman on a bireme⁴¹ and soon all regular galleys were to become actual triremes, as mentioned by Marino Sanuto Torcello a little later⁴². The first image of such a galley is the graffito carved on the hull of the galley which was discovered at the submerged islet of Boccalama in Venice (first quarter of the 14th century; **fig. 14**)⁴³. The Boccalama galley was used as a means to reclaim land at the islet, which housed a monastery (today all lost), and, unfortunately, only its bottom part survives. In 1308, *Santa Kathalina*, the first definite trireme galley with 150 oars, left Genoa on a voyage to Aigues Mortes⁴⁴.

Meanwhile, the Venetians and Genoese started exploiting their galleys as merchant ships. It seems that in the 13th century oared ships were for the first time equipped with a protected hold able to carry small quantities of trade goods. The first trade missions with galleys were organized in Flanders as early as 1270⁴⁵, but the need for a larger, sturdier vessel was evident. Thus, in 1294 the Venetian Demetrio Nadal appears to have invented the great galley (*galea grossa*) which, larger than the regular »thin« galleys (*galee sottili*), offered better

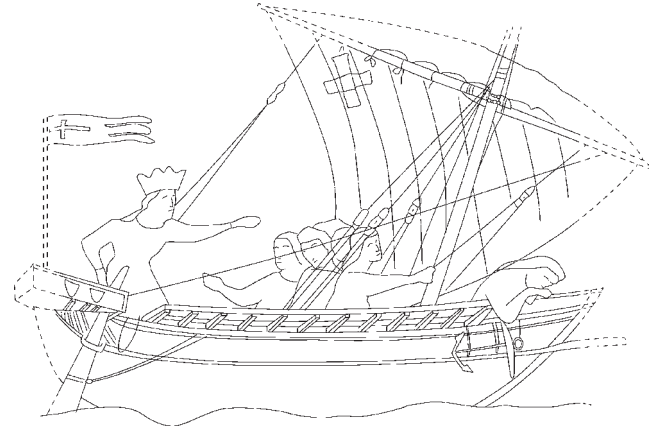


Fig. 15 Private collection, Italy: altar piece (paglioto) with the life of St. Ursula by Paolo Veneziano (c. 1335). – (Illustration Y. D. Nakas).

possibilities for trade throughout the Mediterranean and was to become extremely important⁴⁶. Being able to safely transport a small, albeit precious amount of cargo (spices, silk, gold etc.)⁴⁷, thanks to their large rowing and fighting crews and exploiting both wind and oar power, they would contribute immensely to the economic growth of the maritime republics.

Certain technological improvements also helped the emergence of the merchant galleys around 1300. These were the magnetic compass, the portolans and the hour-glass, all introduced in the 13th century. Another important improvement was the introduction of the stern pintle-and-gudgeon rudder, which gradually replaced the side rudders (first in round ships and later in galleys) by 1400⁴⁸.

The standardization of types and sizes of ships became a norm soon after 1300: all galleys (light and great ones) were built and owned by the state, at least in Venice; they were then leased to various entrepreneurs who organized the dangerous, but extremely profitable trips inside and outside the Mediterranean⁴⁹. The need for seaworthy, but also cheap and easy to construct galleys was becoming essential for the maritime powers of the time and an »industrial« production of galleys was established⁵⁰. Galleys were practically copied from successful originals and there was little space for changes and improvements⁵¹. Galley commanders soon could not tell the difference between their ship and the rest⁵².

Iconographical sources of the 14th century clearly indicate a change in the appearance of galleys: a series of manuscript illuminations of the early 14th century portrays galleys with the common spurs and stern-castles, but carrying a single file of oars and without the side-wings at the stern (**fig. 15**)⁵³.

39 Byrne, Shipping 78.

40 Foerster Laures, Aragon 23f.

41 Bondioli, Arsenal 11.

42 Sanudo, Liber secretorum II.iv.5.

43 D'Agostino/Medas, Boccalama 32.

44 Unger, Ship 176.

45 Epstein, Genoa 144.

46 Bondioli, Arsenal.

47 Unger, Ship 176.

48 Mott, Rudder 109-111.

49 Lane, Venice 126f.

50 Lane, Venice 144f.

51 Chiggiato, Contenuti 143.

52 Alertz, Architecture 148.

53 Zorzi, Biblioteca pl. LXIV. – Martin, Ships fig. 47. – Pächt/Alexander, Manuscripts fig. 120b.

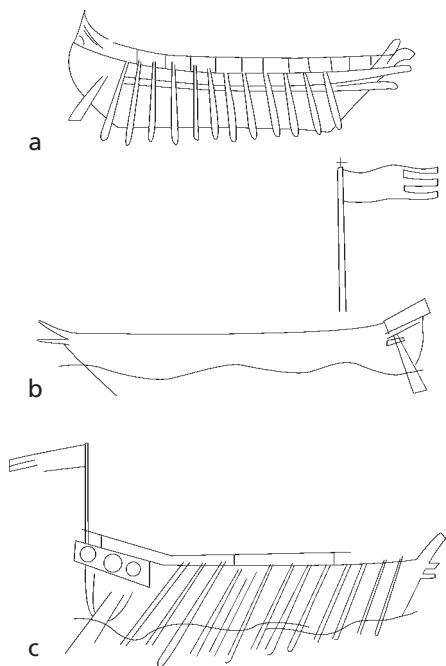


Fig. 16 Galleys from early 14th century manuscripts: **a** Marito Sanuto, *Liber Secretorum fidelium Crucis*, Oxford, Bodleian Library, cod. Tanner 190, fol. 20v, 22r. – **b** Paulinus Venetus, *Chronologia Magna*, Venice, Biblioteca Nazionale Marciana, Marc. lat. Z. 2399, fol. 76v. – **c** Geoffroi de Villehardouin, *La Conquête de Constantinople*, Oxford, Bodleian Library, cod. Laud. Misc. 587, fol. 1. – (Illustration Y. D. Nakas).



Fig. 17 San Marco, Venice: mosaic panel by Paolo Veneziano (1348-1355). – (Illustration Y. D. Nakas).

No outrigger is visible, probably owing to the small size and simplicity of the miniatures. A rather precise representation of what is believed to be a Venetian galley was drawn by Paolo Veneziano on an altar panel around 1335 (fig. 16)⁵⁴. Although no oars are visible and the ship is sailing with a single lateen, the protruding outrigger, the spur and the stern-castle indicate that this is definitely a galley. A mosaic panel in St. Mark's Basilica in Venice is also attributed to the same artist (1348-1355)⁵⁵. The sterns of two galleys are portrayed, most probably triremes rowed *alla sensile* with their tents and flags (fig. 17).

In the Levant our iconographical information comes from manuscripts. The Bulgarian manuscript containing the *Manasses Chronicle* (1345) includes some unfortunately badly preserved images of galleys⁵⁶. Another important source is the manuscript of the *Romance of Alexander the Great*, now in Venice (fig. 18)⁵⁷. This lavishly illuminated book, donated to the young Emperor of Trebizond Alexios III around 1350 preserves many images of galleys. These are typical galleys of

the period, bearing double spurs, stern-castles and an outrigger supported by curved stanchions. Oarsmen are pictured rowing the ships for the first time in a sit-and-stand type of stroke. They seem to be rowing, however, in pairs, something which could be another indication that the trireme galleys were not adopted by everyone in the Mediterranean before 1400. Another interesting element is the fact that galley crews are deliberately distinguished as Westerners by their appearance. This is most probably a visual documentation of the common habit of leasing galleys and their crews from Venice and Genoa or of the practice of preferring the *gasmouloi*, the children of mixed marriages between Orthodox and Catholics, as the best galley crews.

54 Pallucchini, *Pittura* fig. 45.
 55 Concina, *Arsenale* 25.
 56 Dujčev, *Manasses* 24.
 57 Trahoulia, *Alexander* 31-38. – Nakas, *Galley*.

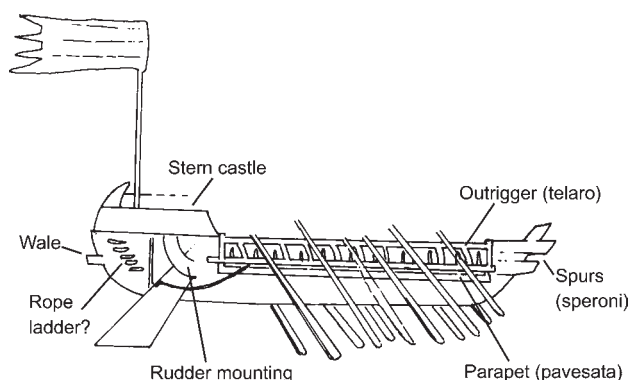


Fig. 18 *The Romance of Alexander the Great*, Venice, Hellenic Institute for Byzantine and Post-Byzantine Studies, cod. gr. 5, fol. 113v (c. 1350). – (Illustration Y. D. Nakas).

The second half of the 14th century is a rather dark period concerning galleys. Sources are scarce and this could be a reflection of the mid-century crisis. Heavily afflicted by the Black Death plague of 1348 and exhausted by the Chioggia War (1376-1381) Venice and Genoa came to a standstill towards the end of the century. The quality of their fleets and crews became remarkably low, owing to the lack of manpower and serious financial and political problems⁵⁸. Fleets, however, were still raised and apparently improvement continued. The adoption of the stern rudder in galleys occurred during this period, as well as the use of cannons, whose presence on Venetian galleys is documented as early as 1395⁵⁹.

By 1400 Venice was to emerge from the crisis and to start re-consolidating her maritime power. This is reflected in a new interest in galley construction. Iconography becomes richer and more coherent. A fresco of a sea battle by Spinello Aretino in the Palazzo Publico of Siena (c. 1400; **fig. 19**) portrays the new steering method of the pintle-and-gudgeon rudder (strangely enough on bireme galleys)⁶⁰. Another interesting iconographical source is the bronze doors of Vatican by Filarete (c. 1440) portraying the Venetian galley which transported the Byzantine emperor John Palaiologos to the Council of Ferrara-Florence in 1438 (**fig. 20**)⁶¹.

But the most important fact in the study of medieval galleys for this period is the appearance of the first shipbuilding treatises. Influenced by the upcoming Renaissance certain authors (basically Venetians) produced the first manuals concerning shipbuilding, starting with the book of Michael of

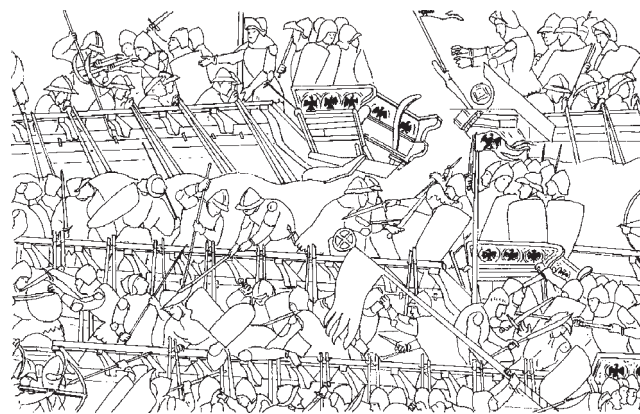


Fig. 19 Palazzo Publico, Siena: fresco by Spinello Aretino (c. 1400). – (Illustration Y. D. Nakas).

Rhodes in 1434, the book of Zorzi Trombetta da Modone in 1445 and the *Ragioni antique spettanti all'arte del mare et fabriche de vasselli* in 1480⁶². For the first time the methods of building and fitting galleys are properly (although not always comprehensively for us) documented. All manuscripts describe similar types of galleys, where the standardisation of construction is evident, as well as the similarities with previous sources such as the Angevin archives galleys. From now on the form of galleys is thoroughly documented and, although certain secrets of the art of galley construction remain somewhat obscure to us, we have enough evidence to reconstruct with accuracy the form of Renaissance and later galleys.

58 Lane, Venice 189-196. – Long, Michael of Rhodes 9.

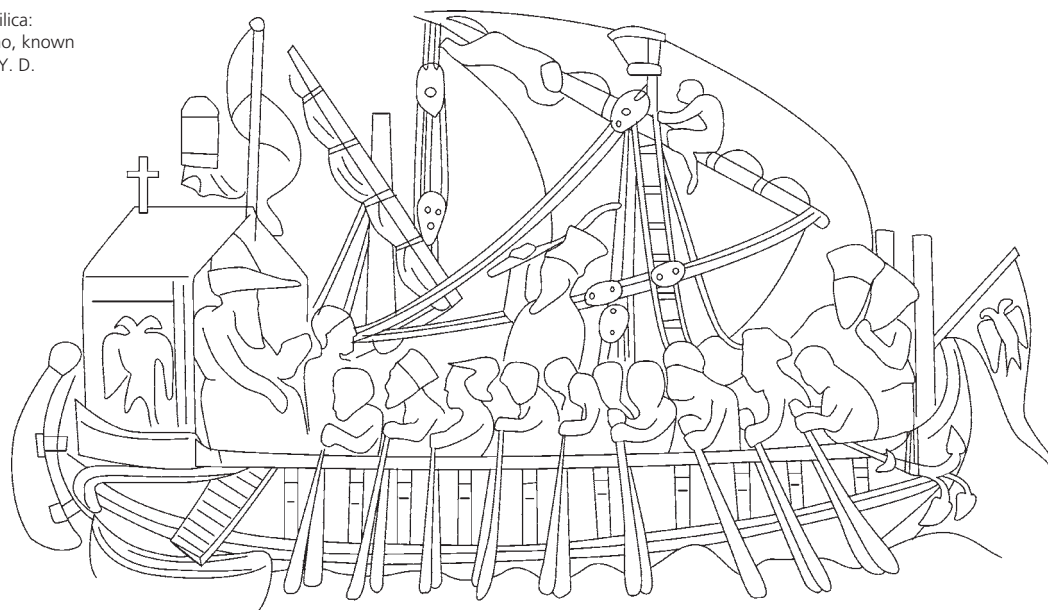
59 Bonnardot/Longnon, Voyage 98. One of the earliest representations of cannons on galleys can be found in an Italian manuscript of 1462, see Martin, Ships fig. 58.

60 Scandurra, Republics fig. 4.

61 Long, Michael figs 1. 4-5.

62 Bondioli/Penzo, Influsso 69-73. – Bondioli, Records 261-266.

Fig. 20 Vatican, St. Peter's basilica: bronze doors by Antonio Averlino, known as Filarete (1438). – (Illustration Y. D. Nakas).



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Zusammenfassung / Summary

Ein Abriss der Entwicklung mediterraner mittelalterlicher Kriegsschiffe vom 11. bis zum 15. Jahrhundert

Geruderte Kriegsschiffe stellen in der Geschichte der Seefahrt einen besonderen und sehr wichtigen Aspekt in der Schiffbau-tradition der mediterranen Welt dar. Als äußerst komplexe technologische Errungenschaften jeder vergangenen Kultur spielten sie eine signifikante Rolle bei der Entwicklung des Schiffbaus sowie der jeweiligen Geschichte. Auch das Mittelalter stellt in dieser Hinsicht keine Ausnahme dar.

In konstruktiver und technologischer Hinsicht erlebte der Bau von Kriegsschiffen im Mittelmeerraum signifikante Veränderungen vom 11. bis zum 15. Jahrhundert. Das in diversen Ausführungen seit der römischen Zeit dominierende Kriegsschiff (*dromon*) wurde schrittweise durch einen anderen, in mancherlei Hinsicht fortschrittlichen Schiffstyp (*galea*) ersetzt. Der Beitrag möchte die Entwicklung der mediterranen Kriegsschiffe im Spiegel der ikonographischen und schriftlichen Quellen sowie deren historische Bezüge darstellen.

Übersetzung: Th. Schmidt

Sketching the Development of Mediterranean Medieval Warships from the 11th to 15th Century

Throughout maritime history galleys formed a special and very important part in the shipbuilding tradition of the Mediterranean world. Being considerably complicated technological achievements of every past culture they played a significant role in the development of shipbuilding, as well as the respective history, whereby the Middle Ages was no exception to that.

In terms of construction and technology, the building of warships in the Mediterranean experienced some significant changes from the 11th to 15th century. The warship that in various forms had dominated the seas since Roman times (*dromon*) was gradually replaced by another, in certain ways more advanced type (*galea*). This paper would like to show the development of the Mediterranean warships as seen through iconographical and textual sources, as well as their historical bearings.

