LATE BYZANTINE SHIPS AND SHIPPING
1204-1453

A Master's Thesis

by
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LATE BYZANTINE SHIPS AND SHIPPING
1204-1453

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ABSTRACT

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1204-1453

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This study has aimed to investigate the problem of interpreting the nature and influence of Byzantine ships and shipping in the later Middle ages. Maritime transport activities and ships or shipbuilding of the Byzantines during the later Medieval age, between 1204-1453, have never been adequately revealed. The textual, pictorial, and archaeological evidence of Byzantine maritime activities is collected in this study. This limited evidence is evaluated in order to gain a better understanding of Byzantine maritime activities such as shipbuilding and maritime commerce. The impact of these activities in the Late Medieval age is discussed.

Keywords: Shipbuilding, Byzantine, Maritime trade, Ship representations, Monasteries, Constantinople.

ÖZET

GEÇ BİZANS GEMİLERİ VE DENİZ TİCARETİ

1204-1453

Yüksek Lisans, Arkeoloji ve Sanat Tarihi Bölümü

Tez Yöneticisi: Yrd. Doç. Dr. Charles Gates

Aralık 2006

Bu çalışma Geç Ortaçağ'da, Bizans gemileri ve deniz taşımacılığının durumu ve etkilerinin yorumlanmasını amaçlamaktadır. Bizanslıların 1204-1453 arası deniz taşımacılığı, gemileri yada gemi yapımı hakkında şu ana dek yapılan çalışmalar sınırlıdır. Bizans denizcilik faaliyetleri hakkındaki yazılı belgeler, tasvirli eserler ve arkeolojik kanıtlar bu çalışmada biraraya getirilmiştir. Kısıtlı sayıdaki kanıtlar, Bizans denizcilik faaliyetlerini daha iyi anlayabilmek için değerlendirilmiştir. Bu faaliyetlerin Geç Orta Çağ daki etkileri tartışılmıştır.

Anahtar kelimeler: Gemi yapımı, Bizans, Deniz ticareti, Gemi tasvirleri, Manastırlar, Konstantinople.

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I. CHAPTER I

INTRODUCTION

Maritime transport activities and ships or shipbuilding of the Byzantines during the later Medieval age, between 1204-1453, have never been adequately revealed. During the period, the Byzantine empire weakened, losing its influence in the Mediterranean world and suffering from political instability and continuous warfare against Latins and Turks. This situation surely had a negative impact on the sea trade network and shipbuilding activities of the empire. However, evaluating this impact is difficult, because the evidence for Byzantine ships and shipping is limited, a reflection, it has been thought, of the empire's reduced power during this period. Most of the historical evidence consists of texts written by Westerners such as Italians, whose merchants dominated the Mediterranean world, especially after the 11th century. As a result, the picture may well be distorted. One scholar, at least, has emphasized the need for reconsideration of those sources.

"The European archives certainly reveal a very great increase in voyages made by ships of the Christian West to the Byzantine and Muslim worlds and from place to place within those worlds during the period from the twelfth to the fifteenth centuries. However, they reveal absolutely nothing about any contemporary survival or disappearence of Byzantine and Muslim maritime traffic. Naturally enough, European sources written by Europeans were concerned with European ships, merchants and seamen. This was the case even on those rare occasions where they were written abroad, within the Muslim or Byzantine worlds.

In fact the European archives may be positively misleading, since they may give the impression that the shipping of the Christian West displaced its Muslim and Byzantine competitors when there is no way of really knowing whether that was the case or not. At present no quantitative assessment of a decline or survival of either Muslim or Byzantine maritime traffic can be made. Since that is so, the evidence of the European archives must be treated with great caution.

Although such claims (western displacement of Muslim and Byzantine shipping) certainly embody a great deal of truth, historians ought to be wary of their parameters, their extent, and their implications. They are made primarily on the basis of European evidence and as suggested above, that may be misleading. What is needed is an examination by historians consciously investigating the evidence for survival of shipping and maritime traffic in Egypt, the Byzantine empire, Turkey, and the Maghreb from the twelfth to the sixteenth centuries" (Pryor 1988:140)

This study aims to correct the imbalance by focusing on the evidence, limited though it may be, for Byzantine ships and shipping in the period 1204-1453. Textual, pictorial, and archaeological evidence of Byzantine ships and shipping is analyzed in order to evaluate our knowledge of the design and technology of Byzantine ships and Byzantine involvement in maritime exchange, during the Late Medieval period.

Overall discussion is divided into six chapters. After the introduction, the historical background is presented by focusing on maritime activities of Arabs, Italian city states, and Turks who competed with Byzantines in the Black Sea, Aegean, and Mediterranean during the Middle Ages. These activities include issues such as the operation of the maritime trade on regular routes, naval warfare affecting the balance of power on these routes, the commodities subject to exchange, ship designs, shipbuilding organization, and interactions between Byzantines and its rivals.

Chapter III focuses on the textual records revealing Byzantine seafaring activities during the Late Medieval Age including the names of ship types, organization of shipbuilding, sea routes, and sea journeys. The accounts of Byzantine merchants, both monks and private entrepreneurs, are emphasized as indicators of

Byzantine commercial involvement in maritime exchange on various routes from the Black Sea to the Aegean and the entire Mediterranean, even to western European shores. Documents indicating monastic ownership of merchant vessels, and state efforts in regulating sea trade are analyzed for information concerning institutional participation in Byzantines maritime trade.

In Chapter IV, pictorial representations of ship types of the Late Medieval age are examined in detail. The sources of images are Italian and Arab as well as Byzantine. Evidence gleaned from these representations supplements the information found in textual and archaeological records of ships. Despite the problems of identifying the origins of exact ship types, pictorial depictions give details about their design, particularly their upper structures and rigging, in a more reliable way than in texts or archaeological finds. Thus it is possible to establish comparisons between the designs of different countries and to trace changes in design. The contribution of the designs of these ships to supremacy on the seas is discussed.

Chapter V presents the evidence of shipwrecks dated to the Late Medieval period. Too little is known about the construction details of Late Byzantine ships, in fact for contemporaneous ships throughout the whole Mediterranean. Evidence coming from archaeological excavation and survey is rare. The major exception is the shipwreck of Çamaltı Burnu-I, thoroughly excavated and studied. On the basis of this study, the construction method of a Byzantine ship is analyzed and compared with a contemporary shipwreck from Italy, the Contarina vessel. In addition, its contents are important, indicating Byzantine ownership, perhaps a monastery. The cargo is the key of other shipwrecks. Shipwrecks from Kastellorizo, Tartousa and from surveys are presented here because these ships carried a Byzantine cargo,

information that by itself does not indicate origins. As a result, they must be evaluated rather as indicating a network of distribution of Byzantine commodities.

Chapter VI presents the conclusions drawn from the collected data. Despite the limited evidence and difficulties in distinguishing Byzantine componenets in maritime activities, nonetheless, it seems clear that Byzantines were active in shipbuilding and shipping in the Late Medieval period. The contribution of the new evidence to the evaluation of Late Byzantine maritime activities as called by Pryor (1988) is also discussed in the conclusion chapter.

II. CHAPTER II

COMPETITION FOR MARITIME DOMINANCE IN

BYZANTINE WATERS

During the early Middle ages, the Byzantine Empire was both the greatest political power in the Mediterranean world and the center of Christian civilization, through which it developed new forms of art, thought and literature.[1] The empire held prosperous land covering southern Italy, the Balkans, Greece and Asia Minor. The economy was stable and the Byzantine gold coin was the standard of monetary value in Mediterranean trade. The administrative structure of the empire centrally organized, was controlled by the imperial court in Constantinople.[2] The capital stood at the junction of Europe and Asia and controlled the sea trading routes between the Black Sea and the Mediterranean. Therefore the city, one of the biggest international markets, had always been destined to be the center of commerce during the Middle ages.[3] The Byzantine merchants having their own fleet sailed on regular sea routes that linked Constantinople to the nearby markets on the coasts of the Black Sea, the Marmara, and the Aegean, and that led to the entire Mediterranean.

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[1] Charanis, 1953: 412-414.
[2] Nicol, 1993: 2.
[3] Nicol, 1993: 16.

Undoubtedly, this trade network greatly increased the welfare of the state, but in the meantime, it attracted foreign countries who competed with the empire to dominate the maritime network throughout its existence. Until the 11th century the major rivals of the empire on the sea were the Arabs, while the Italian city states took precedence after the 11th century, with Turks involved in this struggle during the later Middle ages.

Arabs won their first victory over the Byzantine navy in 655, off the Syrian coast, and they even besieged Constantinople in 673, when the city was saved with difficulty.[4] During the early 8th century, the Byzantine naval power was re-established, and the Byzantine navy was successful in defending its maritime trade routes and imperial coasts against the Arab fleet.[5] But Byzantine supremacy on the sea tended to decline during the reigns of the land-oriented Iconoclast emperors. Consequently, Crete was captured by Arab fleets in 826. Thus, the Byzantine empire lost both its connection with the western Mediterranean and influence on the Italian maritime states. By the beginning of the 10th century, the Arabs had taken over large portions of southern Italy and Sicily in addition to their dominions along the shores of the Levant, North Africa, and Spain and their maritime power in Mediterranean reached its peak.[6] There is no doubt that their shipbuilding skills, dockyards installed along the Mediterranean shores, and innovations in navigation techniques contributed to their maritime power.

Arabs designed their own ships for specific purposes. The *Shini* was a big warship rowed by 143 oars. The *Shini* had two bank of oars similar to the Byzantine

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[4] van Doorninck, 1972: 145.
[5] Ahrweiler, 1966: 391.
[6] van Doorninck, 1972: 145.

dromon.[7] The Fatimid caliphate was known to have built 600 *shini* in the dockyard at

Maqs in Egypt in 972. The *Buttasa,* another warship, had the capacity of 1500 crew

and carried 40 sails. The *Ghurab* and the *shallandi* were the large decked merchant

ships, the *qurgura* was a large ship carrying supplies for the Muslim navies and the

shubbak and *sanadil* were used for fishing.[8] It is possible to trace the adoption of

some of the Byzantine names for ship types by Arabs probably as a consequence of

their using some local Greek shipwrights. For instance, *shallandi* is said to be

derived from the Byzantine *kelandion*, as well as *sanadil* from the *sandalia*. Thus,

we can claim that there may be an interrelation between the ship designs of Arabs

and Byzantines.[9] An ordinary Arab merchant ship was a sailing vessel with a wide

beam relative to its length to gain maximum storage capacity; their warships were

narrower and were both oared and equipped with lateen sails as were the Byzantine

vessels. All the ships had carvel built hulls. In the eastern Muslim world, the planks

of the hull were sewn together, but in the western Mediterranean they used iron nails

to faste the timbers. Arabs built their ships in the facilities installed by themselves at

Rawda island near Cairo, Alexandria, Damietta, Fustat, also at Tyre and Acre. They

also possessed naval dockyards at Tripoli and Tunis in North Africa and at Seville,

Almeira, Pechina, and Valencia in Spain. Arabs were also successful in navigation.

For instance, Abbasids had charts of coastlines, maps of seas divided into squares of

longitude and latitude, with notes on prevailing winds. They could also determine the

latitudes with an instrument known as the *kamal.*[10]

During the 10th century, Byzantine reaction to Arab domination in

Mediterranean was very effective. They prepared the largest fleet the empire ever

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[7] Pryor, 1988: 63.
[8] al- Hasan and Hill, 1992: 123-127.
[9] Pryor, 1988: 62.
[10] al- Hasan and Hill, 1992: 123-131.

built, which consisted of 2000 warships and 1360 supply ships. Thanks to their fleet, they regained the island of Crete in 960, Cyprus in 965,[11] and then Sicily in 1038.[12] The empire with its strong fleet aimed to recover all former Roman lands, in part taking advantage of declining Arab naval power as a consequence of political fragmentation of North Africa, Sicily and Spain. However, in the middle of the 11th century, Norman invaders from the west, and the Seljuk conquests in eastern Asia Minor threatened the empire and the long lasting overseas expeditions exhausted the Byzantine fleet and the monetary sources of the empire.[13] Moreover, the internal structure of the empire began to dissolve. The landed military aristocracy increased in its power and privileges in contrast to the decline of the soldiery-peasantry who had served the empire as the backbone of the state economy.[14] The landlords, members of the aristocracy, enlarged their estates through privileges which undermined the economic basis of the empire and resulted in the supremacy of local authority over the central authority in Constantinople.[15]

As a consequence of its declining power, the empire relied on Venice for the naval support against the Norman threat in return for maritime trade privileges in Byzantine waters. In the chrysobull of 1082, the emperor, Alexius Comnenus gave the right to Venetian merchants to trade freely without the payment of any duty within all the cities of the empire including the capital.[16] This can be seen as the turning point in the maritime history of Byzantium. By the end of the 11th century,

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[11] Rose, 1999: 563.
[12] van Doorninck, 1972: 145.
[13] Ahrweiler, 1966: 395-396.
[14] Charanis, 1953: 414-424.
[15] Nicol, 1993: 3-4.
[16] Charanis, 1953: 422.

the growing merchant fleet of Italian maritime states, in particular of Venice, began to control the maritime trade of the entire Mediterranean, Aegean, and Black Sea.[17]

In addition to Venetian hegemony, the Turks, despite their lack of seafaring customs before reaching the Anatolian coast, adapted to maritime affairs in a short time and became a serious threat to the Byzantines in the Aegean. They displayed a conciliatory attitude toward the native Greek population, employing locals who possessed shipbuilding skills or who were sailors or corsairs; these Greeks subsequently played an important role in the development of the Turks' seafaring activities. Their first appearence on the Aegean sea was recorded at the end of the 11th century.[18] Çaka Bey, the Seljuk emir based in Smyrna, commanded a fleet built by local Greek shipbuilders, and won the first naval victory against Byzantium in 1090. His fleet defeated the Byzantine navy off the Koyun islands near Chios in 1090.[19] But the Seljuk emirates soon disappeared from the Aegean coast until the 13th century, as a consequence of the first crusade between 1095-1097.[20]

During the 12th century, the Italian city states, one of the most important commercial rivals of the Byzantine empire, greatly benefited from the eastern Mediterranean trade by renewing the trade privileges and heading the crusader activities in the area. In 1123, Venice led successful naval expeditions against Fatimids in Egypt, then took over Acre, Jaffa, Haifa, and Tyre, consequently gaining control over the eastern Mediterranean. The Byzantine emperor, John Comnenos, who aimed to keep the naval cover provided by Venetians, renewed and extended their trade privileges in the empire. Genoa and Pisa were also granted promises of tax exemption and quarters in the cities of Palestine, but neither in Palestine nor in the

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[17] van Doorninck, 1972: 145.
[18] İnalcık, 1993: 310-324.
[19] Özdemir, 1992: 12.
[20] İnalcık, 1993: 310.

Byzantine empire did they ever obtain the privileges that Venice had in the 12th century.[21]

The prosperity of the Italian city states continued to expand during the later Middle ages. Venice and Genoa were the richest and largest cities. The economy and politics of these states were to a large extent dependent on maritime trade. The key factor which contributed to the growth of the Italian maritime republics was their close commercial connection with the Byzantine empire which held important trading bases in the Mediterranean.[22] They also put their ships at the disposal of Christian princes during the crusade expeditions, thereby advancing their own power and prestige.[23] Their trade organization expanded through their overseas possessions such as harbours, customs agreements, and judicial privileges gained by these expeditions, and their overall naval power led to this expansion.[24]

Venetians prized their ships as the basis of their efficiency in both economical and military operations. Being aware of that, as in the early days of the Byzantine empire[25], the government of Venice prohibited ship owners from selling their ships to foreigners. An ordinary Venetian merchant vessel of the 13th century was a round ship without oars. Its length was about three times its maximum width, usually at the center of the vessel. It had two masts, each carrying triangular lateen sails which allowed the ship to sail closer to the wind than did the square sails commonly used in antiquity. Apart from the merchant ships, Venetian warships were mostly biremes that had two rowers on each bench, each pulling a separate oar. These galleys had long and narrow hulls that provided extra speed and

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[21] Abulafia, 2000: 5-12.
[22] Grief, 1994: 271-272
[23] Scandura, 1972: 206.
[24] Grief, 1994: 271-272.
[25] Makris, 2002: 99.

maneuverability. In the case of a military expedition an ordinary armed galley carried 140-180 oarsmen.[26]

Ship construction was well organized in Venice. The government and more frequently private entrepreneurs were involved in this industry. Most of the shipwrights or caulkers were employed by merchants in small shipyards, and they also served on board during the sailing season. The government had the right to regulate shipbuilding such as stipulating the dimensions of the ships. The government could also order all the ships to join military expeditions and could order ports to be closed during the winter season to minimize shipwrecks.[27]

The organization of maritime trade in Venice could be either regulated by the state or operated privately, although the latter was not totally exempt from state regulation. Private entrepreneurs had to follow basic rules of maritime law such as the number of crew needed in certain sizes of ships; in addition, the state had the right to cancel voyages due to political reasons. The times and route of the voyage, the size of its cargo and the choice of vessel were determined by the entrepreneur himself. However, the state was more involved in voyages to the east, particularly for ships carrying valuable cargo. Their loading periods, called *mudue,* were in spring and fall and the sizes of cargo were determined by law.[28] The sea trade of Venice was not based on transporting goods in demand in Venice itself. By taking advantage of their overseas possessions and privileges, they traded between foreign lands. Their base at Corinth allowed them to export Greek wine, oil, fruits, and nuts from the Greek islands to Egypt, bringing back wheat, beans and sugar in return. They were also the biggest supplier of the chief market of the age, Constantinople, especially in

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[26] Lane, 1973: 48.
[27] Lane, 1973: 48-49.
[28] Lane, 1963: 180-181.

the first half of the 13th century. Venetian possessions in the Black Sea played an important role supplying markets in Constantinople. They used the port of Soldaia as a base on the eastern coast of Crimea and exported grain, salt, fish, furs and slaves to Constantinople.[29]

The Venetians had two main trade routes to the east (Figure 16). The first route comprised the Greek peninsula and Aegean islands, including the neighbouring lands which mostly belonged to the Byzantine empire. The other main route was through the east and southeast coasts of the Aegean and further to Cyprus, Syria, and Palestine. As a measure against piracy and to ensure the safety of their merchant shipping convoys, the Venetians regularly sent a fleet of galleys to the eastern Mediterranean, not only in the case of war.

The city of Genoa was as actively involved in the maritime struggle as Venice. The Genoese established control over Liguria and ruled the coast between the Rhone river and Tuscany. The city was protected from the interior by the mountains which rise sharply above the sea. This natural defense allowed them to grow more rapidly in safe coastal places.[30] In Genoa and the villages of Liguria the sea played a major role in the economy and was the biggest source of employment for local people. Thousands of Genoese were employed by the merchant class as ship crews (oarsmen and mariners), also as master shipwrights, rope and sail makers, provisioners, coopers, and stevedores. Genoese galleys with a crew of 100-125 men were the shallow draft vessels usually carrying one great lateen sail. The *navis,* the big sailing merchant vessel with rounded hulls had a crew from 16 to 32 men. The *navis* and its smaller version, the *bucius*, could carry considerable cargo.[31]

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[29] Lane, 1973: 68-69.
[30] Lane, 1973: 73.
[31] Byrne, 1970: 98-99.

The Genoese merchants had regular trade destinations both on the east and west routes of the Mediterranean. Especially in the 13th century, their merchant ships carried Levantine spices and silk to Bruges and England and brought back cloth and wool to the east. They had trading bases on the Levantine coast between Antioch and Acre, in Alexandria, in North Africa, in Sicily, and at the Atlantic port of Safi in the west. They held important commercial bases in Byzantine waters. The Genoese colony called Galata was founded across the Golden Horn in Constantinople.[32] Important Genoese bases in the Aegean region were the island of Chios and Focea near Smyrna with its valuable alum mines. In the Black Sea they held Kaffa which has a great harbor protected from the prevailing winds (Figure 17).[33]

In 1204, the Fourth Crusade captured Constantinople and with this defeat, the Byzantine state including its shipping activities underwent dramatic changes. After the Fourth Crusade and the fall of the Byzantine Empire, a new system of administrative and territorial organization was established in Constantinople according to the treaty between the Venetians and the Crusaders in March 1204. This alliance against Byzantium yielded a Latin emperor, Count Baldwin of Flanders, and the first Latin Patriarch of Constantinopole and head of St. Sophia, Thomas Morosini of Venice. Baldwin received one quarter of the imperial land, including strategically important locations on maritime trading routes such as the Bosphorus, Hellespont, and the Aegean islands of Lesbos, Chios and Samos. One half to three quarters of the territory was taken by Venetians, the growing merchant power of the Mediterranean. Their strength at sea increased with the new acquisitions, such as the important ports of Dyrrachium and Ragusa on the Adriatic coast, the Ionian islands, Crete and islands of the Archipelago including Euboea, Andros and Naxos, Coron and Modon

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[32] Lane, 1973: 76.
[33] Lane, 1973:78-79.

in the Peloponnese, Gallipoli, Rhadestus and Heraclea on the Sea of Marmara, and Adrianople in Thrace (Figure 18). Thus the Venetians held the entire sea route from Venice to Constantinople and became the controller of the straits and important harbours on this route.[34]

Ousted by the Venetians from their former trade routes in the eastern Mediterranean and Black Sea, the Genoese became involved in privateering warfare against Venice through attacks on Corfu, raids on Venetian merchant ships and the short-term occupation of Crete. But the Venetian hegemony in Constantinople continued to restrict Genoese commercial activity during the first half of the 13th century.[35]

Taking advantage of the Fourth Crusade against the Byzantine Empire, the Seljuk Turks conquered the territory between Caria and Cilicia, thereby regaining access to the Mediterranean coast during the period between 1207-1226. The important ports in this region were Antalya (Satalia) and Alanya (Alaiye, Greek: Calonoros, Latin: Candelore); the Seljuks established an arsenal at the latter.[36] In 1214, they also took over the Black Sea port of Sinope, which was formerly controlled by the empire of Trebizond.[37] The Turkish fleet, built in the shipyards of Sinope and Alanya by the Anatolian Seljuk Sultan Alaeddin Keykubad, was involved in several campaigns against Byzantium in the Mediterranean and Black Seas and obtained important territories such as Sudak, a vital port in the Crimea (Figure 19).[38]

Despite the rivalry between the maritime powers, there was an effort, headed by Venice, to regulate the maritime trade for better conditions. In 1219, the

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[34] Ostrogorsky, 1968: 423-424.
[35] Balard, 1989: 158-159.
[36] İnalcık, 1993: 310.
[37] Martin, 1980: 328.
[38] Özdemir, 1992: 12.

Venetians signed a treaty with the Nicaean empire, containing reciprocal arrangements for ships and merchants based on the guarantee of properties.[39] After the capture of Antalya by the Seljuks, Venice became the intermediary between Sultan Kaykhusraw I and the Latin emperor. The Venetians adopted this moderate policy in order to obtain access to the port of Antalya, an important gateway to Asia Minor and the eastern Mediterranean coast, particularly Syrian ports, Lajazzo in Cilicia, and significant islands such as Rhodes and Cyprus. This reciprocally beneficial policy yielded a number of treaties renewed periodically between Venice and the Seljuks. One of the most important treaties of 1220 addressed the safety of traded goods and provided guarantees for properties in the event of shipwreck or other unexpected casualty.[40]

After the loss of Constantinople and the collapse of the Byzantine imperial political system, Byzantine nobles as fugitives left the territories in Latin hands and tried to establish new independent territorial states with the support of the local population; these saved Byzantium from absolute destruction and led to the subsequent restoration of the empire. Theodore Lascaris founded the Empire of Nicaea in the north-western Anatolia, Michael Angelus founded the principality of Epirus in Western Greece, and the Empire at Trebizond was established on the northeast shore of Anatolia by Grand Comneni Alexius and David shortly before the capture of Constantinople.[41] Among those successor states, the Nicean Empire was the most successful at rebuilding the Byzantine imperial tradition. The empire organized the native Greek population and blocked the Latin presence and Seljuk invasion of Asia Minor. Then the empire recovered the former Byzantine centers of

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[39] Laiou, 2001:185-186.
[40] Martin, 1980: 327.
[41] Ostrogorsky, 1968: 423-426.

mainland Greece including Thessalonica in 1224 and Adrianopole in 1225.

Meanwhile the Nicaean empire benefited greatly from the agricultural productivity

of the fertile riverine valleys of the north-western Anatolian plateau and traded[42] with

the Venetians and Seljuks.[43] The emperors deliberately supported the local

production. John Vatatzes legislated the protection of the native products against the

importation of foreign goods, especially against Venetians who undermined the

Byzantine economy.

The Nicaean empire was able to defeat the Latins and the principality of

Epirus. In 1261, Michael VIII Paleologus reconquered western Anatolia, Thrace,

Northern Greece, and Constantinople. His organization of military forces was

important, with much attention paid to the navy. He divided the armed forces into

four military units as follows: the Thelematarii, soldiers holding land or pronia

grants; the Gasmuli, sailors receiving salaries; the Proselontes, oarsmen rewarded by

land grants on the coasts and islands; and the Tzacones, sailors who were paid and

held land near Constantinople. This well-organized military arrangement helped to

enhance its power, particularly to strengthen its fleet through the addition of recently

built ships, which led to successful expeditions against the Latins. The Byzantine

fleet defeated the Venetians and took over some Aegean islands such as Paros and

Naxos in 1262 and later reached Crete. Peloponnese and Epirus accepted the

suzerainty of the Byzantines, and the lower Meander valley was captured from the

Seljuks.[44]

After the reconquest of Constantinople, the Venetian influence in

Constantinople became weakened. The emperor sought for naval support against the

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[42] Reinert, 2002: 253-254.
[43] Laiou, 2001: 189.
[44] Treadgold, 1997: 735-740.

Venetians. As a result, Genoa and Byzantium allied against Venice through the treaty

of Nymphaeum in 1261. The Genoese were allowed to establish their own colony,

Galata, across the Golden Horn in Constantinople.[45] They were given the right to

keep the consuls at Anaea, in Chios and Lesbos. While the emperor also promised

free trade in all the ports of Byzantine waters, he prevented Venetian activities in his

dominion.[46] Genoese controlled the access to the Black Sea markets and found the

colony of Kaffa in Crimea and held commercial bases at the mouth of Danube and

Dniester. After Venice hegemony declined in the east, Genoese merchants enjoyed

their wealthiest phase of overseas commerce.[47]

In the meantime, Turkish maritime principalities arose in Western Anatolia.

One of the first was founded by Menteshe who held the official Seljuk title *Sahil*

Begi, or Lord of the Coasts. By 1269, Menteshe succeeded in ruling the entire coastal

region of Caria, which contained the ports of Strobilos, Stingadia, and Trachia.

Towards the north, Anea, located in the bay of Ephesus (Figure 20) and described by

İnalcık (1993: 311) as "a rallying point for Aegean pirates in this period ", was under

Turkish control by 1278.

Michael VIII's successor Andronicus reversed the imperial policy against

Venice. He signed a treaty with Venice in 1285 which allowed Venetian merchants

to resume their commercial activities in Byzantine waters, giving access to the Black

Sea as well. Andronicus's other fatal mistake was the dismantling of his father

Michael's naval organization. He relied on the fleets of Genoese and Venice for his

defence by considering that they were bound to the empire by the treaties. But the

Genoese and Venice contested being supreme in the Black Sea. Because Acre in

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[45] Lane, 1973: 76.
[46] Miller, 1911: 42.
[47] Epstein, 1996: 140-143.

Palestine, the main outlet of Italian states for trade with the east was taken over by Mamluks in 1291, continuity of the trade with Asia was now only possible through the ports of the Black Sea. The Genoese defeated the Venetian fleet in a sea battle at Lajazzo on the Gulf of Alexandretta in Cilicia and attacked Venetian ships at Rhodes and at Modon in the Peloponnese. As a response to the Genoese attacks, Venetians burned down the Genoese colony, Galata, in Constantinople, namely within the imperial borders. Thus, the struggle between Venice and Genoa developed into a war between Venice and Byzantium.[48]

This war led to the recapture of some islands in the Aegean Sea such as Keos, Seriphos, Santorini, and Amorgos by the Venetians. The empire, lacking its own navy, was not able to resist the Venetians at sea. The emperor was desperately renewing the privileges granted to the Genoese in return for their alliance against Venice while they were seizing important Byzantine ports and islands including Chios, Phocea, Adramyttion, Smyrna, and Rhodes. He signed another truce in 1302 with the Venetians on burdensome conditions.[49]

Byzantine influence in the Aegean during the 14th century had almost disappeared. At the beginning of that century, western Asia Minor fell completely into the hands of Turkish maritime principalities such as the Karesioğulları, Saruhanoğulları, Aydınoğulları, and Menteşe. The naval bases of the Turkish maritime principalities were established at the locations of former Byzantine naval bases such as Ania, Ephesus, Smyrna, Adramyttion, Karamides, Pegai, Cyzicus and Chios.[50]

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[48] Nicol, 1992: 215-219.
[49] Treadgold, 1997: 748-754.
[50] İnalcık, 1993: 311-312.

These principalities established large fleets and also held commercial possessions in the Aegean and Black Seas. In particular, the Aydınoğulları, under the command of Umur Bey, became the most effective maritime power of the Turks.[51] Umur had his ships built in the arsenal which he established at Smyrna. The ship types of his fleet were the *kadırga*, *kayık* and *igribar*. As mentioned earlier, as the Turks benefited from the skills of Greek shipwrights as the Arabs did, they adopted some Greek terms for the names of their ship types. The Turkish *kadırga* is said to be derived from the Byzantine *katerga* which corresponds to the term navy, in Greek.[52] The *kadırga*, an oared vessel with a shallow draught, easy maneuverability and relatively high speed, was the basic type of warship in Mediterranean fleets, including the Italian until the 17th century. The *igribar* and *kayık* were also rowed vessels but were smaller than the *kadırga*. These three types of ships were quite suitable for swift Turkish raids against both the islands and coastlands and against Aegean merchant ships.[53]

During the first half of the 14th century, Turkish principalities competed with the Hospitallers and Genoese as well as Venice for establishing control over the Aegean Sea. Rhodes, Chios and Mytilene were attacked by Turkish raids. However, the Genoese- Hospitaller union was successful against the raids; moreover, with the advantage of Byzantine naval weakness, Chios was captured by the Genoese in 1304, Rhodes by the Hospitallers in 1308. This union also defeated the fleet of Aydınoğulları in 1318. Thanks to alliance of Catalans and Turks including Aydınoğulları and Menteşe from 1318 on, Turks were able to extend their raids to Venetian-controlled Euboea and Crete. The Turkish fleet raided the island of Aegina

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[51] Özdemir, 1992: 15.
[52] Pryor, 1988: 68.
[53] İnalcık, 1993: 324.

and pillaged the territories of Latin feudal lords in Morea in 1327. Umur Bey attacked Byzantine lands such as Gallipoli, and the island of Samothrace, and even landed on Thrace in 1332. In the same year, he also raided a Venetian castle in Thessaly.[54]

This situation resulted in the union of Christian nations against the Turkish expansion. In 1334, that union, which included Venice, Rhodes, Cyprus, Byzantium, the kingdom of France, and the support of the pope, defeated the fleet of the Turkish maritime principality of Karasi in the bay of Adramyttion. However, this loosely-formed union dissolved rapidly. After 1334 the Byzantine empire attempted to establish an alliance with Umur Bey, the emir of Aydın-ili, as a protective measure against her former ally, the Genoese. This alliance was the consequence of Byzantium's overdependence on Genoese naval power and the constant Genoese threat against Chios. According to the treaty, Umur Bey guaranteed peace with the emperor and military support against the enemies of the empire, particularly in the Balkans, in return for an annual tribute for Chios and Philadelphia. The treaty allowed the Turks to extend their field of action in the west through military campaigns in the Balkan region. When the Turkish advance became serious, the crusader campaigns changed their focus from the Levant to the Aegean against the Turks. Two crusades, supplied by the Pope, Venice, the king of Cyprus and the Hospitallers, were organized in 1344 and 1345 respectively. The campaigns resulted in the capture of Smyrna, an important naval base for the Turkish fleet, and the loss of Turkish suzerainty over Chios.[55]

In 1348, the Byzantine emperor John VI Kantakouzenos attempted to recreate Byzantine maritime power. By this, the emperor planned to challenge the monopoly

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[54] İnalcık, 2005: 140-146.
[55] İnalcık, 1993: 316-319.

of Venice and Genoa. He ordered the construction of both naval and merchant ships. But the Genoese attacked Byzantine shipyards in Constantinople and burned most of the recently built ships. In 1349 a new fleet consisting of nine galleys and about a hundred smaller vessels were once again constructed. However, the new Byzantine navy failed against the Genoese which led to Byzantium to seek this time an alliance with Venice against the Genoese. This alliance was able to control the Genoese only until 1352 when the Genoese regained their former possesions such as Chios and Phocea.[56]

Apart from the Genoese, the most disturbing rival of Byzantines was another Turkish beylik, the Ottomans. Based in north-west Asia Minor and being insignificant at the beginning of the 14th century, they developed rapidly between 1326-1337 by conquering all the cities of Bithynia. Then they annexed the other maritime principalities and gained a serious naval power.[57] The fleets of the Turkish maritime principalities of Karesi, Aydınoğulları and Menteşe which constituted the core of the Ottoman navy took Gallipoli in 1354. Gallipoli was an important strategic naval base for campaigns into the Balkans and provides the control of the straits. The Ottomans kept controlling the access to Constantinople and Black Sea after 1354. Murad I continued the Ottoman advance into Europe by conquering Thrace, Philippopolis, and Adrianople, the latter of which was made the capital city of the Ottomans in 1365.[58] Sultan Bayezid established a large shipyard in Gallipoli.[59] The Ottoman fleet in Gallipoli in this period consisted of sixty ships. During the reign of

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[56] Nicol, 1992: 267-277.
[57] Fleet, 1999: 5.
[58] Lemerle, 1964: 129-131.
[59] Özdemir, 1992: 15.

Murad II the naval base of Gallipoli was given special importance and strengthened.[60]

Despite the constant naval warfare between Byzantines, Italian city states, and Turks as well, commercial relations continued until the last days of the empire. Their concern in these relations was undoubtedly based on the ensuring of movements of goods. Commercial treaties concerning the free movement of goods and insurance of cargoes were signed between Ottomans and Genoese in 1387, and between Ottomans, Byzantines and the Venetians in 1403. Alum, cloth, grain and slaves were the major commodities of commerce.[61] This exchange mostly consisted of the export of raw materials from Asia Minor such as grain, alum and various metals and the import into the area of luxury items such as soap or mastic. In the meantime, Asia Minor acted as the transit market for eastern luxury items such as silks and spices.[62]

The mutual interests, especially between Genoese and Ottomans, continued even during the siege of Constantinople. While at the same time siding with the Byzantines, Genoese sent ambassadors to the Ottomans to maintain trade relations through new treaties and to express good will.[63]

As seen in this chapter, the great potential of the maritime commerce within the borders of the Byzantine empire has always been attractive to foreign nations. From the 8th century on, rival states took advantage of political instability in the Byzantine empire; Arabs, Italian city states, and finally Turks pursued their own interest in maritime trade by taking over Byzantine possessions, through raids, conquest or trading privileges granted to them.

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[60] Bostan, 2005: 24-25.
[61] Fleet, 1999: 23.
[62] Fleet, 1999: 22-23.
[63] Fleet, 1999: 12.

These rivals also made use of the Byzantine shipbuilding tradition by employing Greek shipwrights. This practice led to similarities in ship design throughout the Mediterranean, instead of distinct differences between the ship types of different nations.

III. CHAPTER III

THE TEXTUAL EVIDENCE FOR BYZANTINE SEAFARING

Historical documents unquestionably provide invaluable information for the study of Late Byzantine ships and shipping. Yet these documents are scarce and rarely studied in detail. Byzantine documents concerning shipbuilding and shipyards mostly consist of the *naupegike techne,* the shipbuilding contracts, and *naumachica*, the documents concerning naval strategies.[64] Evidence of Byzantine maritime trade is revealed through the account books, monastic texts, and commercial treaties of the age.

3.1 SHIPBUILDING

The shipbuilding tradition across the imperial coastland and in Constantinople provided the empire its merchant fleet and navy. Until the 11th century, ships comprising the large Byzantine merchant fleet and its navy were built both in Constantinople as well as in regional shipyards, including Antalya, Rhodes, Lemnos, Samos, Kea, Tenedos, Chios, Gelibolu, (Figure 21) and even non-Byzantine Kiev. As a result of the gradual decentralization of the Byzantine Empire after the

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[64] Ahrweiler, 1966: 419.

11th century and the loss of territorial possessions such as islands or important

harbors, Constantinople became the center of shipbuilding.[65]

Up to the 12th century almost all the terms regarding shipbuilding were

Greek. With the colonial expansion of the Italian maritime states and the Latin

invasion of Constantinople, western terms began to be mentioned in the texts.

However, the essential etymologic origin of the construction terms remained Greek.

Western terms usually referred to navigation, wind directions or ship types rather

than ship building terms.[66]

The terms *neorion* and *exartysis* referred to the shipyards and naval bases of

the empire in all periods, especially in the provinces. Despite the similar use of both

terms, the *neorion* was used in expressing the artificial harbor structures in which

the ships were built, while the *exartysis* was rather a technical term associated with

the shipbuilding activities and referring to the place of those activities. In

Constantinople, *exartysis* was used particularly for the shipyards in which the

imperial navy was built.[67] *Taktika exartistes* were in charge of the administration of

the *exartysis*, and they were represented by *exartistai* in provinces. *Exartistai* were

responsible for the organization of the shipbuilding, in terms of providing

shipwrights and labor from the coastal population. *Neoria* and *exartyseis* were built

in locations described as *aplekton*, a term which was used frequently in *naumachica*

for a place suitable for anchorage; this term also refers to *autophyes hormeterion*, a

natural harbor.[68] These bases could also be built in *limens*, a kind of artificial harbor.

In Constantinople, it is known that many harbor structures were built along the

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[65] Gunsenin, 1994: 101.
[66] Ahrweiler, 1966: 419-420.
[67] For the direct information, see Théophane, 370-386; Malalas, 491, cited by Ahrweiler, 1966: 420-422.
[68] For the direct information, see Malalas, 270, cited by Ahrweiler, 1966: 421-430.

Golden Horn and the Propontis. *Neoria* and *exartyseis* located here served the state

until the first fall of the empire in 1204. With the recapture of Constantinople in

1261, as a measure taken against sudden Latin raids, *exartyseis* and *neoria* were

abandoned and Michael VIII Paleologos founded a new imperial arsenal at

Kontoskalion on the Propontis. During the reign of John VI Kantakouzenos, the last

naval fleet of the empire, later destroyed by the Genoese in 1348[69], was built in the

arsenal at Hepthaskalon located just next to Kontoskalion. The only imperial arsenal

in the Golden Horn during the 14th century was at Kosmidion-Pissa located at the

northern edge of the Golden Horn, almost outside the city. Change in locations of

the imperial shipyards might be an indication of disturbances involving Italian

colonies which had gained permanent possessions around the Golden Horn.[70]

However, Byzantines succeeded in removing their shipyards outside the Golden

Horn, thereby kept continuing their shipbuilding organization in Constantinople

during the Late Medieval age. The continuation of shipbuilding in the regional

shipyards in Smyrna, the coast near Prousa, Gallipoli, Lemnos, Monemvasia,

Rhodes, Ainos at the mouth of the Hebros, and Patmos is also known (Figure 22).[71]

The ships built in those arsenals were mentioned in Byzantine texts with

different specific names according to their type, size and purpose of use. *Naus* was a

general term used for all kinds of ships, while *stolos* referred to the naval ships and

karaboplia-kamatera represents the merchant ships. *Hippagoga* was an horse carrier

transport ship, *sitagoga* and *dorkon* were the grain carriers, and *agrarion*, *sandalia*,

naba, and *gripos* were all used for fishing or small-scale transport purposes. These

ships generally had rounded hulls and were equipped with triangular lateen sails. The

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[69] see Chapter 2.
[70] Ahrweiler, 1966: 433-434.
[71] Makris, 2002: 98.

naval ships such as *dromon* and *kelandion* were propelled by oars and had long, narrow hulls designed for speed and manoeuvrability. Byzantines also used the terms *saktura, katena* and *kumbar* to refer to the ships of foreign countries.[72] Despite the number of terms for ship types in Byzantine documents, the details of the traditional construction methods are only possible to understand with the help of shipwreck studies and ship representations.[73]

The shipwrights of the empire were referred to as *naupegoi* who built various kinds of ships in a traditional manner transmitting their skills from father to son.[74] Being aware of their traditional skill, foreigners such as Venetians and Ottomans made use of Byzantine shipwrights. The Palapanos family, a dynasty of shipbuilders, is known to have built galleys for Venice. It is also interesting to learn that even in 1453, a special policy of protection of Greek shipbuilders was introduced by Mehmed II in order to make use of them.[75]

3. 2 SEA ROUTES

By its geographical situation, the Byzantine empire had a great opportunity to be involved in a maritime exchange network following a sea lane that connects the Black Sea, the Sea of Marmara, and the Aegean and that led to the entire Mediterranean. The capital, Constantinople, was at the heart of this network and had always had great value as one of the most important commercial centres of the world. The harbors around the Propontis linked Constantinople to the nearby provinces. While the harbors of Heraclea, Selymbria and Rhaidestos were located on the

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[72] Günsenin, 1994a: 104-105.

[74] Günsenin, 1994a: 102.
[75] For the direct information, see N. Jorga, " Notes et extraits pour servir à l'histoire des croisades au XVe siècle," *ROL 8* (1900-1901), cited by Makris, 2002: 99.

northern Thracian coast, Kallipolis, further south on the European shore of the
Hellespont, was an outlet to the European hinterland. On the opposite coast of the
Propontis, the Bithynian ports of Pylai, Prainetos, and Eribolos led to Asia Minor
(Figure 23).[76]

The sea lane through the Bosphorus to the Black Sea led to important trading
bases such as Soldaia, Kaffa, and Tana, the latter of which is another natural outlet
into central Asia (Figure 23).[77]

The route on the north- south axis linked Constantinople to the eastern
Mediterranean, and the coasts of North Africa including Egypt. After passing
through the Propontis and the Dardanelles it reached Tenedos, which protects the
entrance to the Propontis with its sea fortress. The route continued around Aegean
islands such as Mytilene, Chios, Samos, and Kos, then led to Rhodes which was a
strategic location where all the east-west and north-south maritime routes of the
Mediterranean provinces intersected. From Rhodes ships could follow the route to
Alexandria via Cyprus or the route to the east along the southern Anatolian coast
passing Attaleia, Pamphylia, Seleukeia in Cilicia, Korykos, Aigiai, Alexandretta, and
St. Symeon leading to the Levantine coast then to the North African coasts. The
merchants passing the Levantine coast could land at the important commercial
harbors of Laodikeia, Tripolis, Berytos, Sidon, Tyre, Akra, Caesarea, Gaza and
Pelousion (Figure 23).[78]

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[76] Avramea, 2002: 83.
[77] Avramea, 2002: 87.
[78] Avramea, 2002: 83-84.

On a western route from, Byzantine merchants followed the coast of Greece. Thessalonica, Corinth, Negropont, Patras, and Nauplia were the necessary ports for trade between Constantinople and the Adriatic (Figure 23).[79]

Through the available texts such as traveler diaries concerning sea journeys, it is possible to know the durations of the voyages on these sea lanes which give information helpful for a better understanding of the conditions affecting the course. It is difficult to speak of a standard length of time that journeys might take, because the durations involved many changing factors such as the weather conditions, wind directions, stops for repairs, purchase of commodities, the course chosen for the voyage (which could be either hugging the coast or sailing on the open sea), the type of the ship, its capacity and the qualification of the crew.[80]

According to one text, Thomas Magistros describes his journey on a Greek sailing ship with the Greek crew shortly after 1300.[81] He departed from Thessalonike on 1 October and reached Constantinople in 20 days, on a route passing by Lemnos, Imbros, Samothrace, Tenedos, the Hellespont, and the Propontis. His return journey in mid-winter took 45 days due to bad weather conditions. He underlines the skill of the crew as they scrambled up to the sails when they were sailing. The ship is said to have carried passengers and commercial cargo. Makris (2002: 97) speculates that such a ship may be two masted large merchant ship. In another text, it is mentioned that St. Sabas and a delegation of Athonite fathers sailed from the harbor of the Great Lavra on Mount Athos to Constantinople on 23 March 1342 via the islands of the

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[79] Diehl, 1967: 81.
[80] Avramea, 2002:77- 79.
[81] For the complete text, see; M.Treu, "Die Gesandtschraftsreise des Rhetors Theodulos Magistros," *Festschrift C.F.V. Müller (Jahrbücher für classische Philologie,* suppl.,27 (Leipzig, 1900), 5-30, cited by Makris, 2002: 97.

Aegean, the Hellespont and the Propontis in 3 days with the advantage of favorable winds.[82]

3.3 BYZANTINE MERCHANTS

As a consequence of the Fourth Crusade the main trade routes of the Byzantine Empire came under the hegemony of the Latins. Reconquest of Constantinople in 1261 partly changed this situation although the economic pressure of the Italian maritime states and the Turkish threat continued until the final collapse of the empire in 1453, limiting the activities of Byzantine merchant activities at sea. The loss of important possessions and naval bases such as Rhodes, and Crete in the southern Aegean and the Genoese interest in gaining trade bases on the Black Sea coast caused negative repercussions. Byzantine commerce with such overseas regions as Cyprus, the Near East, and Egypt weakened during the Late Medieval Age.[83]

However, despite this negative situation, we can trace sea trading activities of Byzantine merchants all around the Mediterranean and the Black Sea through scattered historical evidence. During the reign of the first Palaiologan emperors, trade and warships of Monemvasia owned by Greeks set sail throughout the eastern Mediterranean, stopping at the Crete, Koron, Modon, Nauplion in the Peloponese, Cyclades, Negropont, Anaia, and Acre.[84] Around 1290 they also recorded being around the Black Sea, for instance in the Genoese colony in Crimea, Kaffa and also in Kuban, Batumi, and Trebizond. It is known that the Monemvasian merchants had military and diplomatic contacts with the Venetians, Genoese, and Catalans, and they

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[82] For the direct information, see; Life of St. Sabas the Younger, ed D.Tsamis, in Φιλοθέου Κωνσταντινουπόλεως τού Κοκκίνου Αγιολογικά Έργα, Ά, Θεσσαλονικείς Άγιοι (Thessalonike, 1958), 292, cited by Avramea, 2002: 78-79.
[83] Matschke, 2002: 789.
[84] For the direct information, see; H.A. Kalligas, *Byzantine Monemvasia: The Sources* (Monemvasia, 1990), cited by Matschke, 2002: 790.

also had commercial dealings with the Italian maritime states. Around 1300 Rainerio Boccanegra, a Genoese entrepreneur, transported a number of merchants and their cargo from Alexandria to Constantinople.[85] In 1310 the imperial envoy John Agapetos who used *salvum conductum* was received by the Venetian doge and it is understood that he was also involved in private business activities, not only in official matters. In 1360, a commercial contract by the Genoese notary Antonio di Ponzo in Kilia, a trading base of the Genoese in the Danube delta, contains names of Greek and Armenian merchants.[86] Seventeen of the 57 ships mentioned in Ponzo's registers (1360-1361) belonged either partly or wholly to Greek owners. The owners were mostly merchants of Constantinople and some were monks. One of these monks is Josaphat Tovassilico from the Mount Athos. Another merchant mentioned by Ponzo, Theodore Agalo, transported Greek wine to the Danube delta. The naming of the Byzantine ships is also found for the first time in these registers. While the ship of Konstantinos Mamalis was called *Sanctus Nicolaus*; another ship, belonging to Mount Athos, was the *Sanctus Tanassius*.[87]

In the course of the fourteenth century, Byzantine emperors pursued a policy to revive intense commercial relations with Egypt and Syria. In 1383, an imperial delegation representing John V asked the Mamluk ruler, Sultan Barquq, for trade privileges in Alexandria.[88] Later, John VI Kantakouzenos is known to have

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[85] For the direct information, see; Bertolotto, "Nuova Serie," 521; on Boccanegra, cited by Matschke, 2002: 790.

[86] For the direct information, see M. Balard, *Genes et l'outre-mer,* vol. 2, *Actes de Kilia du notaire Antonio di Ponzo, 1360* (Paris, 1980), cited by Matschke, 2002:790-792.

[87] For the direct information, see; G Pistarino, *Notari genovesi in Oltremare: Atti rogati a Chilia da Antonio di Ponzo, 1360-61* (Genoa, 1971), cited by Makris, 2002: 94.

[88] For the direct information, see; S.Y. Labib, *Handelgeschichte Ägyptens im Spätmittealte, 1171-1517* (Wiesbaden, 1965), cited by Matschke, 2002: 797-798.

negotiated with the Mamluk Sultan, Malik Nasir Han, on the terms of the security of the Byzantine merchants in Egypt around the the middle of the fourteenth century.[89]

Another piece of evidence from the end of the fourteenth century is a commercial trip of the Goudeles family of Constantinople. They sailed to Sinope, Amisos, and Trebizond on the southern Black Sea shore. They had trade contacts with another Greek family in Chios and possessions in Pera, the Genoese colony in Constantinople. Merchants of Thessalonike, the second largest city of the empire, had their own ships to trade with such regions as Chios, Phokaia, Philadelphia, Constantinople, and even Black sea ports during the fourteenth century. They continued their sea trading activities between 1423-1430 in Crete and the Peloponese even during the Venetian rule.[90] Another western source, the account book of the Venetian Giacomo Badoer, mentions his Greek merchant partners in Crete around 1439-1440 and notes that they had trade relationships as far away as Sicily.[91]

Byzantine merchants are also attested in the Western Mediterranean, even as far to the shores of Western Europe. They are recorded as having been in Adriatic ports such as Dubrovnik, Ancona, and Venice. A small colony of Greek merchants was known in Bruges during the early fifteenth century.[92]

The evidence of Byzantine merchants presented above clearly reflects the commercial involvement of Byzantine merchantmen who were either dependent or independent of foreign traders or concluded deals and contracts with them. If we consider the political situation of the Late Medieval age, it may be claimed that in

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[89]For the direct information, see; *Ioannis Cantacuzeni eximperatoris historiarum libri quattuor,* ed.L.Schopen, 3 vols. (Bonn, 1828-29), cited by Laiou, 1997: 191.
[90] For the direct information, see; C.Gasparis, " Ἡ ναυτιλιακή κίνηση ἀπό τήν Κρήτη πρός τήν Πελοπόννησο κατά τόν 14ο αίώα," Τα Ἰστορικά 9 (1988), cited by Matschke 2002: 795.
[91] For the direct information, see, S.Fassoulakis, *The Byzantine Family of Raoul-Ral(l)es* (Athens, 1973), cited by Matschke, 2002:793-794.
[92]For the direct information, see; E. van den Bussche, *Une question d'orient au Moyen-Age: Documents inédits et notes pour servir à l'histoire du commerce de la Flandre particulièrement de la ville de Bruges avec le Levant* (Bruges, 1878), cited by Matschke, 2002: 797-798.

particular Italian city states were the dominant mercantile powers in the Mediterranean at that time. However, Byzantine merchants were active in the Mediterranean, the Black Sea, and as far as the western European shores even during the last days of the empire.

3.4 INSTITUTIONAL PARTICIPATION IN BYZANTINE MARITIME TRADE: MONASTERIES AND THE STATE

Despite the lack of central administration and direct involvement of the Byzantine state in maritime trade, monks of the monasteries and private entrepreneurs, mostly the member of aristocratic families, maintained the Byzantine maritime presence on the seas of the Late Medieval age. In particular, as the monasteries were professionally operated institutions, their role in maritime trade which has never been adequately studied has to be questioned. In addition to that, the extent of the state influence as a regulatory institution of Byzantine maritime trade must be investigated.

Recent studies concerning the translation of the monastic texts, the *typika* written by the monks who controlled the monasteries, reveal the practices used in the organization and management of the monastic estates. According to the *typika*, the management of the monastic estates was divided into general and local administration. The head of the general organization was the *hegoumenos* or *oikonomos* and the managers residing permanently in the estates were called *metochiarioi* or *pronoetai*. In some cases the local management work was entirely done by the monks. *Typika* reveal that the monks supported peasants to expand land under cultivation, providing them with the equipment necessary for cultivation. Their professional organization eventually yielded a considerable amount of surplus per

season. According to the *typika,* after local expenses the surplus of produce was often transported by tax exempt ships owned by the monasteries [93] In these texts, ships are referred to by information about their ownership, type, and capacities. The ships of the Great Lavra, Mount Athos, in 1263 were described by expressions such as "ships, 4, capacity 600" or as "fishing ships, 2".[94] In 1415, the monks of the St. George monastery on Skyros stated that "all of this boat belongs to St. George."[95]

Despite the lack of detailed information about the organization of shipping in the *typika,* we can only speculate that the monasteries were directly involved in maritime transportation as a result of having their own ships. The dimension of their shipped surplus should be a question for further research.

As the Byzantine sea trade and the economy were based on private entrepreneurship, the involvement of the state in the economy has to be investigated in relation to its role in the maritime trade. During the later Medieval period, despite the various kind of taxes that continued to be collected by the state, the number of taxpayers in the empire was constantly shrinking. At the same time the burden on free peasants and farmers increased.[96]

From the Middle Byzantine period up to the fourteenth century, the *kommerkion,* a tax corresponding to 10% of the value of merchandise, was the revenue of the state from the sea trade. Another separate tax was the *dekateia ton oinarion* which was charged on the transportation and sale of wine. There were also a number of smaller revenues of state or local authorities such as the *katartiatikon,* paid in return for the right to moor in a harbor, and the *limeniatikon,* paid in return

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[93] Smyrlis, 2002: 245-255.
[94] For the direct information, see; πλοία άλιευτικά δύο: *Actes de Lavra,* ed.P. Lemerle et al., 4 vols., Archives de l'Athos (Paris, 1970-82), 2:15, cited by Makris, 2002: 94.
[95] For the direct information, see; τό καράβι τούτο είναι τού ̀Αγιου Γεωργίου όλο: *Actes de Lavra,* ed.P. Lemerle et al., 4 vols., *Archives de l'Athos* (Paris, 1970-82), 3:216, cited by Makris, 2002: 94.
[96] Oikonomides, 2002: 1038.

for the right to drop anchor. All of these charges above were paid by Byzantine merchants excluding monastic ships which had right to dock in Constantinople without paying any tax.[97]

The tax system applied to foreign merchants was dependent on political issues and changed from time to time. By taking advantage of being allies of Byzantium through treaties, Italian merchants were able to retain their privileged status and even establish their own separate economic zone and administrative autonomy in Constantinople during the Late Byzantine period.[98] During this period both the Venetians and Genoese paid 1-2 % for duties and use of their facilities. Venetians even gained complete exemption from taxes through a treaty in 1265. Other western merchants from Pisa, Florence, Provence, Catalonia, Sicily and Ancona paid only 2-3% on their imports and exports. However, during the reign of John VI Kantakouzenos, the Byzantine state decided to take measures against the increasing hegemony of foreign mercenaries and the emperor himself introduced a special tax on imported wheat and wine. More importantly in 1349, he also lowered the Byzantine *kommerkion* to 2% in order to support Byzantine merchants.[99] In addition to that, the state was able to introduce some changes on the immunities that monasteries enjoyed. For instance, in 1402 the sales tax on wine was reimposed and new taxes were added.[100]

As seen above, the Byzantine empire during the Late Medieval age continued its tradition of seafaring activities. Its own original shipbuilding tradition continued, with a Greek terminology of ship types and with specific institutions for the

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[97] For the direct information, see Ἔγγραφα Πάτμου, 1: no. 11, line 27, cited by Oikonomides, 2002: 1038.
[98] Oikonomides, 2002: 1050-1052.
[99] Oikonomides, 2002: 1054-1055.
[100] For the direct information, see; V. Mosin, "Δουλικόν Ζευγάινν" *in Annales de l'Institut Kondakou*, 10 (Prague, 1938), cited by Charanis, 1948: 117.

organization of shipbuilding, namely the arsenals. Byzantine merchants, both private entrepreneurs and monks, traded on a network in the Mediterranean, the Aegean, the Black Sea, and even to western Europe. Moreover, the state itself, despite its weak political position, kept its interest in maritime trade through the regulation of taxes.

IV. CHAPTER IV: PICTORIAL EVIDENCE:

SHIP REPRESENTATIONS

Identifying the actual appearance of a Late Byzantine ship through the evidence of pictorial repertoire is more reliable in comparison with the other evidence such as the shipwrecks and historical texts. However, the repertoire of artistic representations of the ships in comparison with the other themes of the Late Medieval Age is limited. Most of the ship representations are provided from the Italian maritime cities, in particular from Venice. Ray (1992) catalogued 49 Italian ship representations dated to the Late Medieval period by surveying the art of the Veneto region in northwest Italy. In contrast to the relatively large number of ship representations from Italian city states, the ships of the Byzantines and Arabs are rarely depicted; moreover, there is no visual evidence of Turkish ships dated to the Late Medieval age.

The media of the ship depictions are mosaics, wall paintings, graffiti, and manuscript illustrations. The dating of the representations can be problematic except for those manuscripts which contain direct historical records. In particular, the dating of representations within architectural structures, such as mosaics, wall paintings, frescoes and graffiti do not usually offer precise dates. Even if the chronology of

associated building phases is known, it is possible that these depictions could have been made at a later time.

The 15 ship depictions chosen for presentation here illustrate the ship types mentioned in the historical texts and found through archaeological excavations of shipwrecks. However, interpreting these pictures presents several problems. Correlating the ships with the exact types mentioned in the historical texts and shipwrecks is not always possible. Another difficulty with the pictorial studies of ships is to know the nationality to which the ships belonged. The ship types and details of rigging may give the idea of a ship's nationality, but such an idea is not always reliable due to parallelism between the ship traditions around the Mediterranean. In addition, inferences on the basis of the regions in which the depictions are found might be misleading. The instability of political structures during the later Middle Ages, especially in the regions of the Byzantine empire, is already known. Namely, cities, islands, and regions frequently changed hands within short periods. As a result, the ship types depicted may reflect any of several powers who dominated these regions even for very short time spans. It is also possible that a local artist may have depicted a foreign ship if the intense international maritime traffic along the coasts is considered.

The ship representations catalogued in this chapter are presented in a chronological sequence in order to give the idea of development of various ship types of the Late Medieval age. Possible representatives of the Byzantine, Italian, and Arab ships are exemplified for revealing characteristics of their technology which may be seen as one of the parameters affecting their role in maritime dominance.

Figure 1
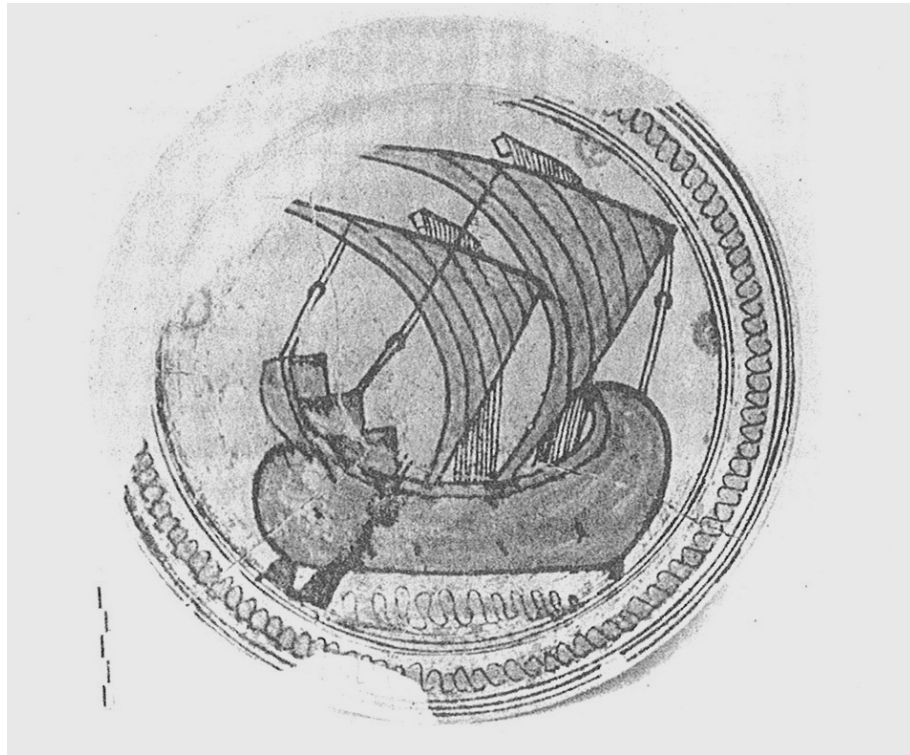
Location: Depiction on a plate found at Corinth.

Date: ca.1200 (Makris 2002: 91)

Ship type: Round merchant ship.

Origin: Byzantine?

Description: The ship is depicted from the starboard side. It has a rounded hull with a pointed bow and stern. It has a lateen rigging consisting of two masts, with one placed at amidships, the other closer to the prow of the ship. Two quarter rudders are also depicted at the stern, one at starboard side and the other at the port side.

According to Makris (2002: 96), the lateen sail, the short length, and the pointed bow and stern reduced the risk of the bottom of the ship thumping down into the troughs between waves, which allowed the ship to sail in strong winds.

It is estimated that this ship may represent a Byzantine vessel. However, it is also known that Corinth where the depiction was found was in Frankish hands in the early 13th century. Therefore, the ship can't be accurately distinguished as Frankish or Byzantine.[101]

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[101] Pryor, 1988: 30.

Figure 2

Location: Icon in Pinacoteca Provenciale, Bari

Date: 13th century

Ship Type: Merchant roundship and small escort ship (Balaska and

                   Selenti:1997:68)

Origin: Byzantine?

Description: The merchant roundships that sailed in the Mediterranean and

Black Seas were escorted by small boats which Byzantine writers referred to as

sandalia or *agraria*. These ships were used for commerce and fishing. The possible

Byzantine *sandalia* in this scene is shown from the port side; it has a slightly curved

bow, and the gunwale of the ship is also indicated. An oar is seen at amidships, while

any rigging equipment of the ship is not represented. The merchant roundship in the

scene is shown from the starboard side. It has a lateen rig consisting of a mast at amidships and a halyard. The mast is topped by a pulley and the halyard is tied to the port side through a brace. The ship's stern is fairly curved upwards, and two quarter rudders may be seen at either side of the stern. A mounted box-like cabin is placed at the stern.

<u>Figure 3</u>

Location: Manuscript in the Hellenic Institute of Byzantine and Postbyzantine

     Studies, Venice

Date: 13th century

Ship Type: Small round fishing boat

Origin: Byzantine?

Description: The most common Byzantine name used for fishing boats is

gripos.[102] Possible Greek fishermen represented here catch fish with a net. The boat

is shown from the port profile. Rigging or oars are not represented here. The stern

and bow of the boat are curved upwards. The details of the hull are not indicated

except for the gunwale, which projects beyond the bow.

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[102] Aidoni, 1997: 72.

Figure 4
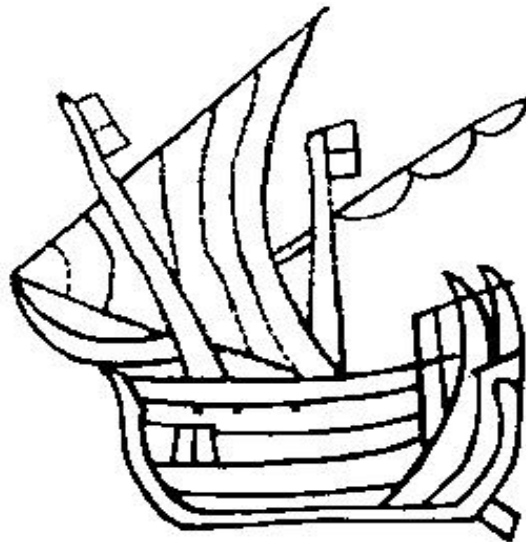
Location: Floor mosaics at St. Giovanni Evangelista, Ravenna

Date   :   1235 (Bonino 1978: 9)

Ship Type: Horse transport ship (Bonino 1978: 9)

Origin: Italian (Venice?)

Description: Because the execution of the ship is considered very realistic, the reconstruction of the ship is available through clues such as the distance between the two decks, the height of the ports, the position of the foremast and protruding cross beams, the shape of the raised quarter deck, and the yards. The lines of the hull, especially the first wale, are strongly emphasized. The ports are believed to be the entry ports for horses and are lower than the distance between the decks to provide an opening that is as small as possible but sufficient to allow a horse to enter. The ports were later closed before sailing with boards which are seen on the depiction

prior sailing. The lateen sails of the ship are also represented, one which is furled and the other of which is not. [103]

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[103] Bonino, 1978: 10-12.

Figure 5

Location: Mosaic in the west vault of the Capella Zen

Date: ca. 1270s (Demus 1988: 182)

Ship Type: Small round ship (Ray 1992: 76)

Origin: Italian

Description: Twelve scenes of the life of St. Mark are arranged in two tiers in

the two halves of the barrel vault. The cycle begins in the upper northeast corner of

the vault and ends in the lower northwest corner. [104] In one of these scenes, "Vita of

St. Mark: The voyage to Alexandria", St. Mark and two companions are depicted in a

small round ship shown from the starboard profile. The boat has a quarter rudder

which is attached to the starboard side by a box mount; it also has a lateen sail set

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[104] Demus, 1988: 179.

through a single mast step and a halyard. At the stern of the ship a small quarter

deck, which must be for the helmsman to steer the vessel, is also seen. The bow and

stern of the boat are curved upwards.[105]

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[105] Ray, 1992: 76.

Figure 6

Location: The Church of San Marco in Venice, relief at the central porch,

                 soffit of third arch

Date: ca. 1250 (Ray 1992: 196)

Ship Type: Small round ship and a fishing boat

Origin: Italian (Venice?)

Description: According to Demus (1960: 161-162), this relief represents what
he calls the "Cycle of Trades", the whole spectrum of the daily life of Venice and the
foundation of the city's sea-power. The cycle, right to left, begins with fishing and
ends with the shipbuilding scene, all typical Venetian traits.

   At the right of the cycle, two fishermen are depicted in a small fishing boat.
While the fisherman at the stern of the boat catches fish with hooks on a line, the

other one at the bow aims a trident. Three horizontal lines indicate the plank strakes of the boat. Nails fastening the planks and the inner frames are seen clearly. The boat has a horizontal sheer strake except from the fair curvature of the stem and sternposts.[106]

At the left of the cycle a shipbuilding scene is represented. While one of the shipwrights at the bow of a small round ship is boring a hole with an auger, another one takes out an adze from a basket. Two men below the ship are probably caulking the ship with a hammer and chisel. The upper wale and a main wale of the ship are seen. Plank strakes at the bow are tied together with a rope, probably for securing the planks temporarily until the construction is completed. [107]

[106] Ray, 1992: 198.
[107] Ray, 1992: 196.

Figure 7
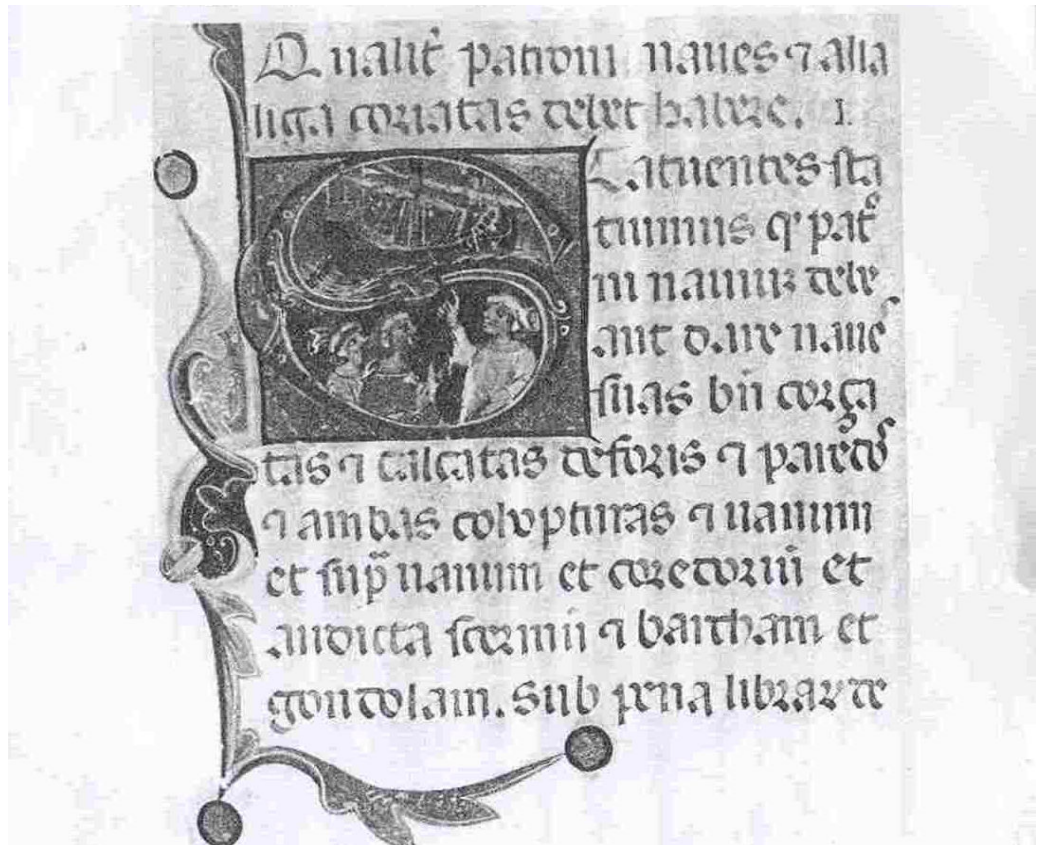
Location: Manuscript in Querini Stampalia, Venice.

Date: 1255 (Lane 1973: 47)

Ship Type: Large round merchant ship (Lane 1973: 46-47)

Origin: Italian (Venice)

Descrption: This manuscript consists of the laws codified by Doge Ranieri

Zeno which specified the equipment of lateen rigged merchantmen like that depicted.

The ship represented here is a two decked, lateen rigged merchantmen which has two

masts: one set at amidships, and another, the foremast, placed at the bow. Both masts

are topped by crow's nests. The sails which hang on yards are furled. The sail called

artimon was used on the forward mast in a light breeze.[108] The bow of the ship is rounded while the stern is higher and flat ended as a transom stern. Below the horizontal beam in the stern area, plank strakes run vertically which are parallel to the two upright beams. The arms of two quarter rudders project through the holes toward the stern of the ship.[109]
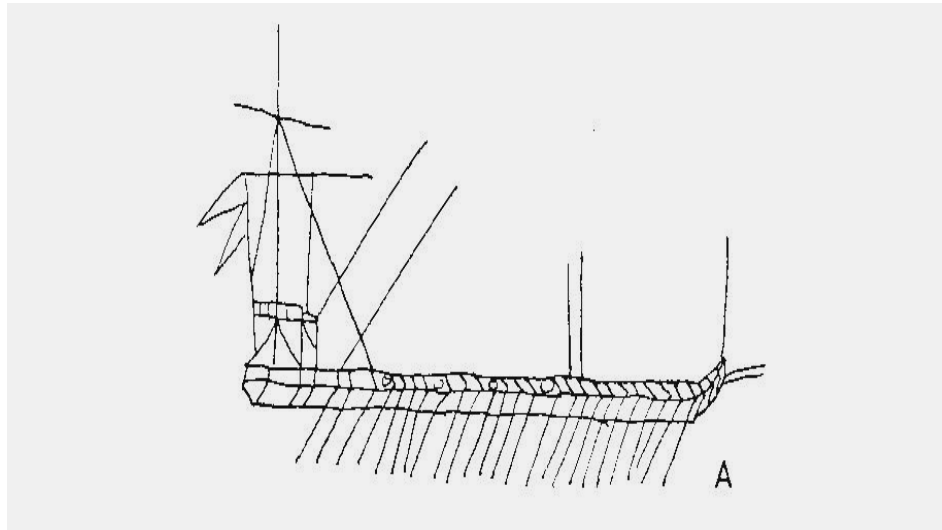
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[108] Lane, 1973:46.
[109] Ray, 1992: 99.

Figure 8

Location: Graffito in the narthex at the Church of Haghia Sophia in Trebizond.

Date: 13-14th centuries? (Accurate date is unknown)

Ship Type: Oared galley-like vessel

Origin: Greek.

Description: This ship is depicted nearby other graffiti of ships at Haghia Sophia. According to Talbot Rice (1968: 248-251), most of the ships depicted on the walls of Haghia Sophia represent type of boats which were in use in the sixteenth century. However he interprets the graffito above as most likely a Byzantine boat rather than one of a later date. The ship, depicted from the starboard side, has a central mast and sail. The rigging of the stern is elaborated. The ship is also propelled by the oars which were shown on the side of the ship.[110] The long, narrow design of the hull and the oars in addition to the rigging indicate that the ship was designed for more speed and manoeuvrability. On the basis of that, this ship can be considered as used for military purposes.

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[110] Talbot Rice, 1968: 251.

Figure 9
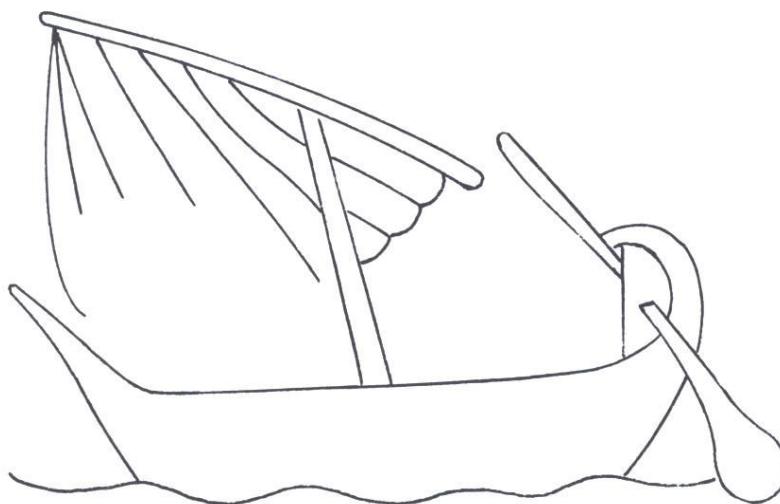
Location: Manuscript of Al-Hariri's *Maqamat* in Egypt

Date: Early 14th century

Ship Type: Round Ship

Origin: Mamluk

Description: A lateen rigged, one masted Muslim sailing ship. The sternpost is curved upwards. A quarter rudder is attached to the stern from the port side.[111]

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[111] Pryor, 1988: 59.

Figure10

Location: Wall painting at St. Nicholas Orphanos, Thessalonike

Date: 14th century

Ship Type: Small round ship

Origin: Byzantine

Description: The wall painting represents the miracle of St. Nicholas, a patron

saint of sailors and a Bishop of the Myra, a coastal city located in southwest

Anatolia.[112]

   The ship, depicted from the starboard side, has a lateen rigging consisting of a

single mast and a halyard placed towards the bow. The halyard is tied to the prow

and the stern through braces. The mainmast is topped by a pulley. The three

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[112] Vitaliotis, 1997: 90.

companions of St. Nicholas row the ship. The oarlocks on the gunwale are visible.
The oarsmen probably sit on thwarts placed inboard.

The oar closest to the stern may be a quarter rudder but, due to damage on the
painting just below the gunwale at the stern side, the blade of the oar cannot seen.
The stern of the ship curves upwards more than the bow. No lines indicating the
plank strakes are visible except the one which possibly marks one of the ship's
wales.

Figure 11
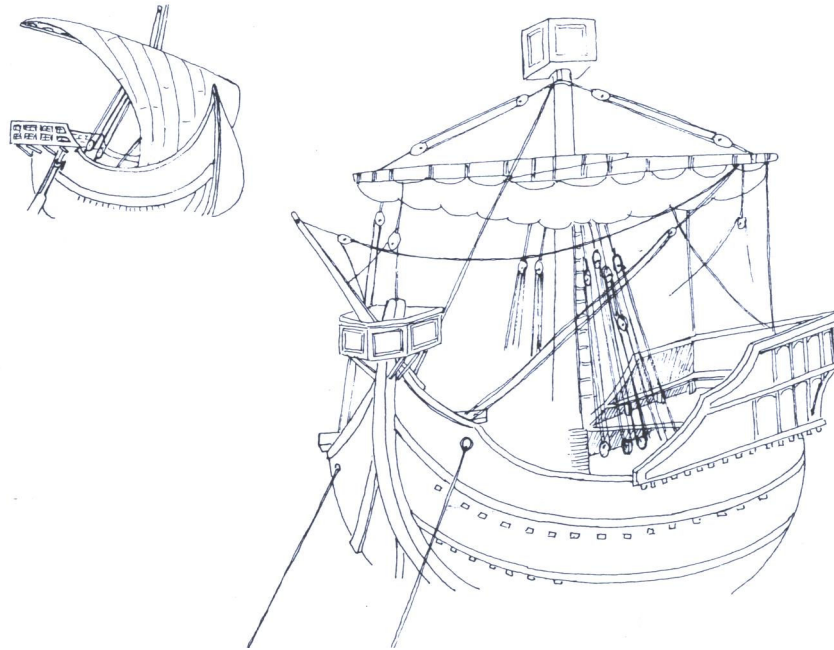
Location: Fresco (by Giovanni da Milano) in the Rinuccini chapel, Florence

Date: 1365-1371 (Bonino 1978: 22)

Ship Type: *Cocca* (cog) and *Nave* (Bonino 1978: 22)

Origin: Italian (Venice).

Description: While the original scene cannot be found, only the detailed drawings of two ships are available. The ship to the right is viewed from the port side; it is a *cocca* (cog) with a mounted stern deck and a prow curved upwards. Its furled sail is set on a single mast at amidships and is topped by a crows nest. A number of hauls tied to the mast and halyard go through pulleys which allows for control of the sails.

The ship to the left is viewed from the starboard profile; this ship is a *nave* with a mounted deck and curved prow, similar to the cog. It is depicted with a

quarter rudder and an unfurled lateen sail set through a single mast and a halyard. Pulleys and hauls of the rigging are also seen.

Bonino (1978: 22) claims that the series of rectangular markings on the plank strakes of *cocca* and the direction of the other strakes of the *nave* can be explained as the stitches of a sewn, shell-built hull. Thus he comes to conclude that the ships were built by a sewn planking technique, which is an ancient method which had faded from use in the early Middle ages but survived as a local technique in some isolated areas.

Figure 12
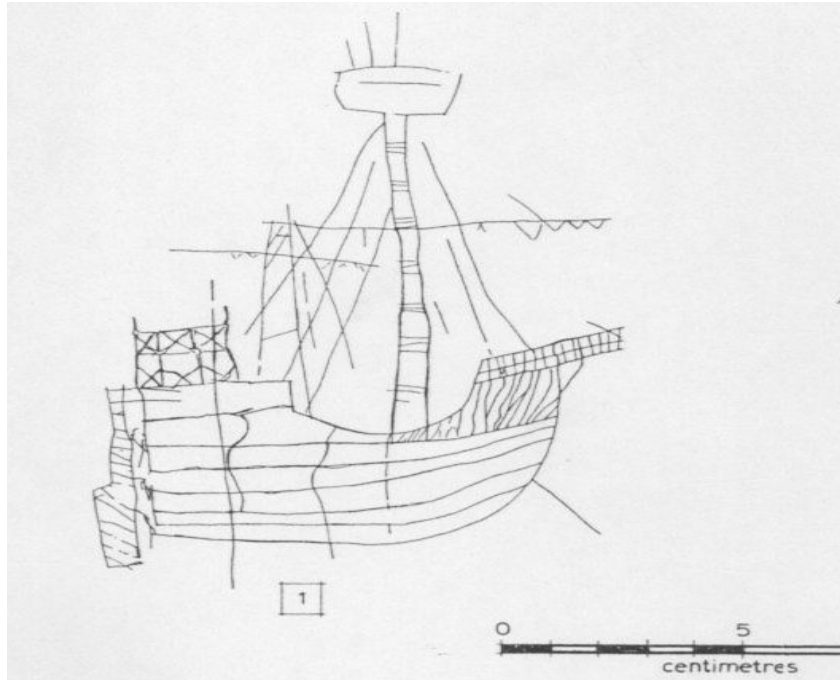
Location: Graffito on Portal II, column R3, Church of San Marco, Venice

Date: ca. Late 14th-early 15th century. (Helms 1975: 230)

Ship Type: Cog or carrack?[113]

Origin: Italian (Venice)

Description: The ship has a square main mast, set slightly forward of amidships and

topped by a heavy crow's nest, and a mizzen mast. The main sail is furled up to the

yard. According to Helms (1975: 229-230), despite the horizontal position of the

yard of the mizzen mast, the general appearance of the ship suggests a lateen rig for

the mizzen mast. A raised afterdeck and an after castle raised on posts which

represents latticed construction of the rails are seen. The forecastle is supported by a

short stem. The vertical and diagonal planking above the sheer strake is

characteristics of such ships. The vertical rudder at the stern is clearly depicted.

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[113] The ship is interpreted as two masted cog by Helms (1975: 229), however Asst.Prof .Dr.Harun Özdaş claims that this ship rather represents a carrack.

Helms (1975: 230) states that the ship was probably carvel planked below the sheer strake.

Figure 13
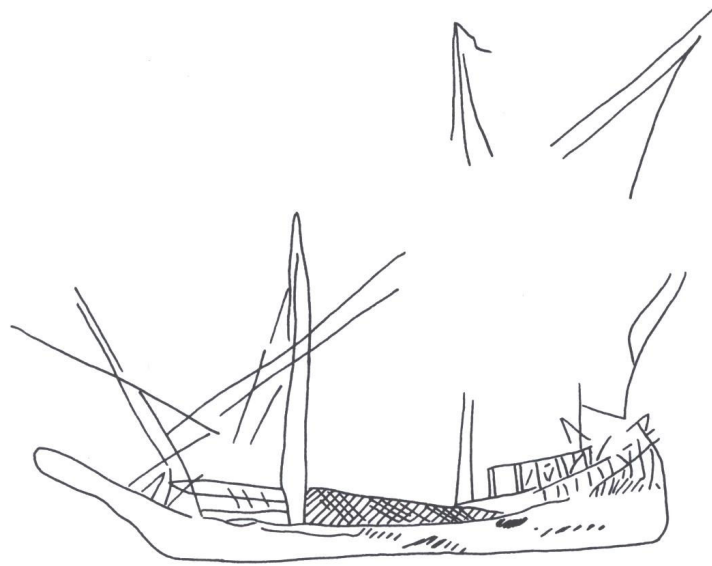
Location: Graffito found at Theseion, Athens.

Date.   Late Medieval Period?

Ship Type: Great Galley

Origin: Byzantine?

Description: A lateen rigged hybrid ship carrying a small square topsail on the main

mast. Since the Greek inscriptions accompany the graffiti of ships at Theseion, this

representation is associated with the Byzantines. However, whether was it built by

Byzantines or bought from Italians who had similar ship types is not possible to

know with certainty.[114]

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[114] Pryor, 1988: 48-50.

Figure 14
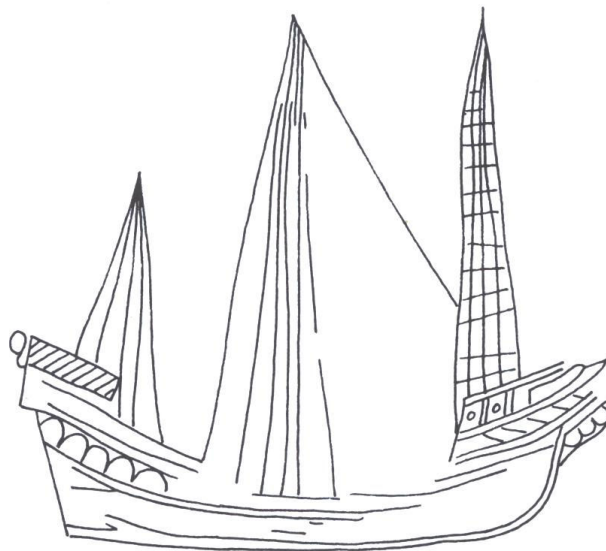
Location: Graffito found at the Theseion, Athens

Date: Late Medieval Period

Ship Type: Carrack?

Origin: Byzantine?

Description: Because of the Greek inscriptions carved near the graffito, the ship is

claimed to be a full rigged three masted Byzantine carrack. The sternpost was formed

straight to mount the rudder. The stempost is curved. The origin of the ship is

controversial due to parallelism with Italian ships.[115]

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[115] Pryor, 1988: 48-50.

Figure 15
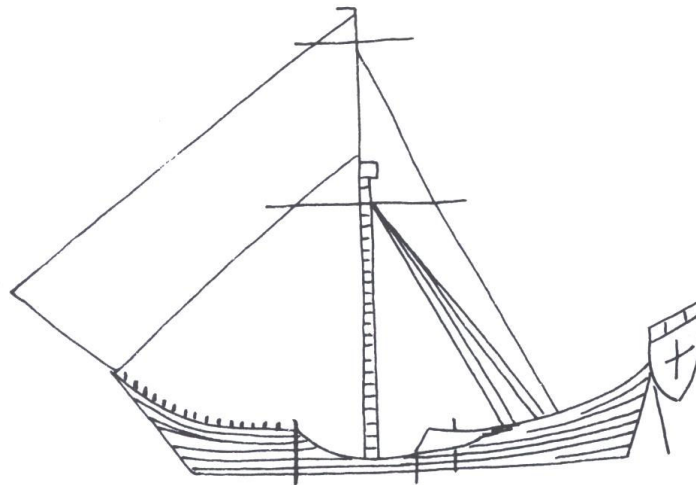
Location: Graffito on the outside the apse of the Church of Haghia Sophia,

          Trebizond.

Date: Late Medieval Age

Ship type: Cog?

Origin: Italian (Genoese)

Description: Single masted ship with a curved gunwale and a square stern.[116] The

depiction is considered to be a Genoese ship because it bears the cross of St. George

of Genoa at the stern.[117]

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[116] Talbot Rice, 1968: 250.
[117] Pryor, 1988: 50.

It is seen that the representations presented above provide a better understanding of ship technology such as the details of the rigging, the decks and the upper structures which we can't usually gain through the historical and archaeological sources. If we compare the depictions, the lateen rigging, rounded hulls with a pointed bow and stern of merchant ships including quarter rudders can be evaluated as common characteristics of Italian, Byzantine, and Arab ships, which indicates a parallel tradition of Mediterranean shipbuilding up to the 14th century (see Figures 1-10).

But from the mid 14th century onwards, the great galleys, carracks, and the cogs of the Christian west, in particular of the Italian maritime states, began to appear.[118] The great galleys were designed for the purpose of trade and carried little armament, useful against pirate attacks only. These are larger and broader vessels than their predecessors and could make better headway under sail rather than if propelled by oars. This feature offers an advantage of reducing the number of the crew and giving a greater storage capacity. The cogs and the carracks entered the Mediterranean probably as an influence of the Northern European tradition. The cog with its single square sail was easier to control than was a lateen rigged vessel of the same size and required a smaller number of crew. In the case of another ship type of the age, the carrack, the square sail and the lateen rigging were combined to utilize the specific advantages of these sails. While the lateen sail was more suitable for coastal sailing, the square sail allowed heading across the sea with a following wind.[119] The development of the design of great galleys, cogs and carracks may be seen as an indication of superiority in terms of ship building technology because it is

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[118] Pryor, 1988: 44-45.
[119] Scandura, 1972: 211-214.

safer to set sail in the winter, and more suitable for open sea crossing by these stronger ships. It is known that the Great Council of Venice of 1292 decided that the ships could make two round trips in a year instead of one, as a result of these new technical advantages of ship design. We do not have the visual evidence of the adoption of great galleys, cogs or carracks by Muslims including Turks, however the ship representation presented in this chapter offers a few possible Byzantine or Greek examples of these type of vessels (see Figure 13, 14). This situation suggests that at least the Byzantines succeeded in executing the latest developments in ship design and therefore were able to compete with their Italian rivals in terms of shipbuilding technology.[120] On the other hand, we can consider that the supremacy in maritime trade may have depended on the number of these developed large vessels that each nation possessed in their merchant fleets rather than merits of their designs only. But on the basis of the ships depicted through artistic media, it is not possible to know the number of ships possessed by different nations. Because the frequency of the ship depictions in art may differ as specific to a nation, one may expect a larger number of representations in the art of Italian states for whom the ships were undoubtedly vital, but in the case of the Byzantines, art can be seen as consisting more of ecclesiastical than maritime themes.

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[120] Pryor, 1988: 61-68.

V. CHAPTER V

THE ARCHAEOLOGICAL EVIDENCE
FOR LATE BYZANTINE SHIPWRECKS

The remains of sunken ships and the cargoes they carried comprise the primary archaeological evidence for the evolution of ship construction, maritime technologies, and the origins of the vessels. McGrail (1997:68) emphasizes that the study of shipwrecks is sterile unless associated with the study of their economic and historical contexts. Shipwrecks with the Byzantine cargo, the primary focus of this chapter, contribute a great deal of information toward the understanding of exchange networks of Late Medieval world. The number and distribution of shipwrecks can indicate possible trade patterns and trunk routes, especially when combined with parallel findings at neighboring land sites.[121] Through botanical analyses of the contents of cargo amphoras -the shipping containers of the ancient world- traded goods can be identified. The styles and sizes (capacities) of the amphoras carried onboard provide clues to the ships' routes and ports of call, as well as to commercial practices and economic factors of the times.

Shipwreck studies also contribute important evidence to the identification of Byzantine ships in the Late Medieval period. The nationality of a particular

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[121] Adams, 1999: 299.

shipwreck may be estimated on the basis of a combination of diverse data such as the type and origin of personal items (crew possessions) and other shipboard finds, the design characteristics and construction methods used in the ship's hull, the botanical identification of materials used in its construction and a knowledge of their native growth habitats, and finally, but to a lesser degree, the location of the wreck and origins of its cargo amphoras and goods.

Research of shipwrecks from the Late Medieval period is relatively rare. The only presumably Byzantine wreck to be completely excavated and demonstrated to be from this period is the Çamaltı Burnu-I shipwreck. Other examples include the partly excavated Tartousa wreck, ladened with a possible Byzantine cargo, and the Kastellorizo shipwreck, which yielded a limited number of Byzantine wares only. Additional Late Byzantine shipwrecks are catalogued by Parker (1992) on the basis of surveys conducted throughout the Mediterranean.

5.1 ÇAMALTI BURNU I SHIPWRECK

The Çamaltı Burnu-I shipwreck was found near Cape Çamaltı, off the northwest coast of Marmara Island, during a survey headed by Prof. Dr. Nergis Günsenin in 1993.[122]

Marmara Island, known as *Proconnesus* in antiquity, is the largest of the islands of the Marmara group.[123] Proconnesus itself was the seat of a Byzantine bishop and eventually became an independent archbishopric during the 9th century. During the Latin rule the island became a Latin bishopric. The island was famous for its marble quarries, which had been in use since classical times; these quarries lay in

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[122] Günsenin, 1994a: 201-220.
[123] Hasluck, 1909: 6-7.

the northeast of the island. Proconnesian marble was transported to large cities of the age such as Constantinople and used in monumental buildings, including the churches of St. Sophia and the Holy Apostles. Vineyards and wine trade also attracted merchants to the island until the eighteenth century.[124] The discovery around the island of 13 shipwrecks, dating between the 6th and 13th centuries,[125] proved that the island, with its advantageous geographical location and abundant natural resources, was actively involved in sea-transport during the Byzantine period. Included in these shipwrecks is the Tekmezar Burnu-I wreck loaded with approximately 20,000 Ganos amphoras (Günsenin Type I) dated to the eleventh century.[126] The giant size of this wreck gives an indication of the large scale of shipping with which the island was involved. No amphora carrier of this size has been recorded elsewhere.[127]

The Çamaltı Burnu-I shipwreck was excavated between 1998 and 2005. Based on the types of amphoras it was carrying, the ship is dated to the 13th century. The ship's cargo was carried in 800 amphoras, the majority of which are classified as Type IV amphoras, but also include a small number of Type III amphoras,[128] and the ship sank with at least 35 iron anchors still on board (Figure 24).

5.2 AMPHORAS

The cargo amphoras were scattered over an area about 600 m^2 on the sloping, sandy bottom, grouped into three main pockets (Figure 25). Analysis of organic

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[124] Hasluck, 1909: 7-18.
[125] Günsenin, 2001a: 117.
[126] Günsenin, 1995:358.
[127] Günsenin, 1996: 98.
[128] For a thorough discussion of the amphora classifications, see Günsenin's 1990 Ph.D thesis, " Les amphores Byzantines (Xe-XIIIe siécles): typologie, production, circulation d'apres les collections torques, Université de Paris I. (Panthéon-Sorbonne).

remains from inside the amphoras indicate that they originally carried wine. The amphoras exhibit a range of dimensions from 41-80 cm in length and capacities between 15.5 and 98.5 liters. Four standard sizes of Type IV amphoras were identified. It is believed that these different sizes of amphoras correlate to multiples of a standardized unit capacity, as was the case in an earlier possible Byzantine wreck, the Serçe Limanı vessel.[129] Despite the thin wall thickness of Type IV amphoras when compared to their relatively large dimensions mentioned above, it may be thought that this indicates a need for greater capacity. Günsenin suggests instead that this situation represents the transition period from amphoras to wooden barrel containers.[130]

The presence and number of notches found inside the mouths of some Type IV amphoras, where the stopper was inserted, were recorded during the study of the amphoras and suggest that the amphoras were re-used. Detailed examination of the amphoras also yielded ten different monogram types located just below the handles of the jars. These stamps were interpreted as abbreviations of the names of the owner of the workshops where the jars were produced, or perhaps symbolic of the workshops themselves, or of rulers of the age or their families. A similar system of monogram stamps was found on the amphoras of earlier possible Byzantine wrecks excavated off the Turkish coast, including the 7th-century Yassıada, 9th-century Bozburun, and 11th-century Serçe Limanı shipwrecks.[131] Despite the wide distribution of Type IV amphoras (Figure 26), both on archaeological sites or from shipwreck contexts along the Black Sea, Marmara, Aegean, and Levantine coasts and even in the Adriatic, the workshops and their owners that produced these amphoras

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[129] Günsenin, 2001a: 118.
For the direct information for Serçe Limanı vessel: Bass et al., 2004: 73.
[130] Günsenin, 2001b: 382.
[131] Günsenin, 2001b: 382.

will remain uncertain unless the monogram stamps are deciphered through epigraphic studies.[132] However, correlations between the earlier Type I amphora and Type IV might be useful in identifying the production center of the latter, the main cargo container onboard the Çamaltı Burnu-I ship. Based on the binocular analysis by Maurice Picon from the CNRS laboratories in Lyon, the clay fabrics of the Günsenin Type I and Type IV amphoras present identical characteristics. If we consider the kilns of Type I amphoras found by Günsenin at Gaziköy (known as Ganos in medieval times) on the northwest shore of the Marmara Sea, the production of Type IV amphoras may be associated with the Ganos region as well.

5.3 ANCHORS

Excavations at the Çamaltı Burnu-I site yielded 35 iron anchors, 31 of which lay parallel to the shore in a 112-meter long line some 17 meters away from the wreck; only 4 anchors were found on the wreck site.[133] The anchors have been studied by Dr. Ufuk Kocabaş of İstanbul University as the subject of his Ph.D. dissertation. Due to heavy distortion and the oxidation of iron underwater, the anchors were analyzed radiographically at the Nuclear Research Center at Küçükçekmece, Istanbul, in order to determine the exact dimensions and structural features of the anchors. The results revealed 13 T-shaped anchors, 18 Y-shaped anchors, and 4 anchor shanks. Most of the anchors were made from at least ten separate iron pieces which were forged together. The arms were usually made from four pieces, while the shank was made from 6 pieces. Aside from the holes for removable stocks, there was no evidence of a stock recorded on any anchor. This may suggest the use of wooden stocks, or iron stocks which were heavily distorted,

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[132] Günsenin, 2005: 123.
[133] Günsenin and Özaydın, 2002: 382.

or perhaps stocks were not used at all. The material origins for these iron anchors and their workshops are difficult to determine due to the lack of analyses of iron ores from Byzantine quarries.[134]

One of the most intriguing questions concerning the anchors is whether or not those which were found apart from the wreck site are related to the shipwreck. Since 35 iron anchors would be considered a large number for a ship of that size, it is possible that these anchors were transported as scrap iron for the purpose of recycling or repair. Another suggestion might be that the presence of so many anchors indicates that the area served as an anchorage for ships during different periods. However, Cape Çamaltı is open to prevailing west and southwesterly winds and is therefore an inconvenient location for an anchorage and would have been avoided. The homogenous characteristics of this group of anchors and the emphasis on the value of iron anchors in Late Medieval documents support the first suggestion presented above. It is likely, therefore, that the anchors were part of the ship's cargo and were jettisoned by the crew during a severe storm in a futile attempt to reduce the weight of the ship before it sank. [135]

Another significant revelation concerns the T-shaped anchors. According to Kapitän's typology[136], T-shaped (Type D) anchors were in use until the 10th century and became Y-shaped as a result of an evolutionary process.[137] New evidence provided by the Çamaltı Burnu-I shipwreck, however, demonstrates that T- and Y-shaped anchors were in simultaneous use until the 13th century, a new *terminus ante quem* for T-shaped anchors.[138]

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[134] Kocabaş, 2005: 127.
[135] Kocabaş, 2005: 125-137.
[136] Kapitän, 1984: 33-44.
[137] van Doorninck, 2003.
[138] Günsenin, 2001: 120; Kocabaş, 2003: 95.

5.4 HULL REMAINS

The wrecked hull remains of the ship were not well preserved. Approximately 3% of the hull is preserved in the form of scattered wood, apart from six fragmentary planks located under the upslope portion of the largest amphora pile. However, even here the planks are eroded and the few frame segments found on planks are dislocated. Only a few pieces of the planks still preserve some original edges. The maximum preserved width of the hull planking is around 18 cm and its thickness is about 2.7 cm. The planks were fastened to each frame with two or three square shaped iron nails spaced about 7 to 12 cm apart. The nail shafts were typically 0.5 cm^2 square in section with 2.5-cm diameter heads. There was no indication of any edge fasteners recorded during the study of the hull remains. Planks were scarf joined to each other as recorded on plank J9007. Nail holes at frame locations on the strakes reveal that the frames were set at regular intervals of about 33-35 cm. Frames were molded about 20 cm and sided about 10 cm. No treenails were found on frame segments. A fragment of the ship's keel with a preserved length of 1.20 m was found at grid H-7, towards the stern of the ship, but no original extremities of the keel survived. Holes measuring 2cm in diameter were recorded on the keel. They may have belonged to forelock bolts, which would imply the presence of a keelson running over the keel.[139]

The forelock bolts were made of iron, with a head on one end and a narrow slot at the other, and were secured by placing a washer over the protruding end and driving a flat wedge through the slot. Such bolts were commonly in use from the

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[139] Günsenin, 2005.

Roman period until the 19th century. They are used typically for fastening together major timbers: the keel, keelson, and frames, for instance.

It is possible to estimate the dimension of the ship from the in situ positions of the surviving hull elements and the distribution of amphoras on the wreck site. A badly preserved wale segment at grid J6 was considered by Jay Rosloff to be nailed at the turn of the bilge.[140] Its location in relation to the position of the keel fragment suggests that the ship's beam was probably 5-6 m somewhere towards the aft of the vessel. Thus it is possible to estimate that the Çamaltı Burnu-I vessel was approximately 25 m long and 8 m in beam at amidships. If the overall cargo found at the site is taken into account, the estimated capacity of the ship must be approximately 100 tons.

The lack of edge fasteners such as coaks or tenons along the seams of the strakes implies that the Çamaltı Burnu-I ship was constructed in a frame-first manner. According to this procedure, once the keel of the ship was laid, the hull was given its shape by erecting the frames before any of the outer planking was installed. The outer skin of planking was then bent around the frames and attached to them.[141] The earliest evidence of this method of construction was recorded on the Serçe Limanı ship, excavated by the Institute of Nautical Archaeology (INA) and dated to the 11th century.[142] As Steffy suggests, erecting the frames before the planks provides greater design flexibility than earlier shell-first construction techniques, such as those recorded on the shipwrecks of Uluburun, Kyrenia and Yassıada.[143] By using a frame-first method, it is easier to produce a boxlike hold which can accommodate a greater amount of cargo. Using shell-first techniques, it is more

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[140] Personal communication with Jay Rossloff, principal investigator of the hull remains.
[141] Steffy, 1994: 280.
[142] Bass et al., 2004: 73.
[143] Steffy, 1994: 91.

difficult to shape the hull into such a design if the thicker strakes and edge fastenings of the planking are considered. In addition to these advantages, a ship built in a frame-first manner probably required less money, manpower, and time to construct.[144]

The transition from shell-first construction to frame-first construction in the evolution of shipbuilding has been the controversial subject of many theoretical discussions. Basch explains the transition as a consequence of building large fleets in a limited time period, and he traces the concept of frame-first design back into antiquity through quotations from ancient writers such as Polybius and Pliny.[145] For example, in 254 B.C., the Romans built 220 ships in three months. Basch (1972: 43-45) claims that some frames must have been used as moulds to determine the shape of the hulls, to provide standardization, and to save time. On the other hand, Steffy believes that the transition must be associated with the lack of slave labor at the end of the Imperial Roman period.[146] However, Beltrame opposes Steffy's idea, citing the presence of *humiliores* in late antiquity who were ready to work for minimal wages, being little more than slaves.[147]

In order to determine the origin of at least some of the timbers used in building the Çamaltı Burnu ship, a number of wood samples were subjected to botanical analysis by Nili Lipschitz at the botanical laboratories of Tel Aviv University. According to her results, 12 wood samples were from *Quercus cerris*. Seven of these samples were taken from the keel (H7002), two planks (H9019, H8008), three possible wales (K7008, J7005, K7011), and a frame (H8042). The

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[144] Steffy, 1994: 91.
[145] Basch, 1972: 43-45.
[146] Steffy, 2000: 265.
[147] Beltrame, 2003: 11.

five remaining samples came from undefined fragments of the hull (J11001, H8043, G11-R, J11-R, and H7003).

Quercus cerris grow native in the southwest, west, and northwest areas of Turkey. This identification may suggest, then, that the ship was possibly built somewhere along the Aegean or Marmara coasts of Anatolia, perhaps not far from where it ultimately sank. Thus, through the study of the hull remains of the Çamaltı Burnu-I wreck, we can trace the concept of frame-first design as applied to a possible Byzantine ship during the 13th century and provide an example for understanding the evolution of shipbuilding technology in the Mediterranean during that age. The analysis of contemporary hulls of shipwrecks from the Mediterranean region based on comparisons with the Çamaltı Burnu ship would be most useful. Such a shipwreck, dated to end of 13th century, is available thanks to an earlier research in Italy.

5.5 CONTARINA SHIPWRECK

During the construction of a canal in 1898, two well-preserved ships were discovered in the Po River delta at Contarina, Rovigo, in Italy. The first vessel was dated to about A.D. 1300. The bottom of the ship was entirely preserved, the starboard side survived to near the turn of the bilge, and the port side was preserved up to the gunwale (Figure 27). Other surviving hull remains include portions of the stem and sternpost, the keelson, two mast steps and the bottom stringers. The ship is said to be a two-masted, lateen rigged *nave* which originally was about 21 m in length with a maximum breadth of 5.2 m. The so-called Contarina ship was built according to the following manner: after the ship's spine (keel and end posts) was laid, three frames were erected and fixed to the keel, one at amidships, and one at

each end of the keel. These frames functioned as control frames and determined the shape of the hull. Frames consisted of five pieces: a floor timber, two futtocks, and two top timbers which overlapped each other. The frames were fastened to the keel with iron bolts driven from the top of the keelson through the keel and clenched over the bottom face of the keel. The inner structure of the ship was also strengthened by wales and bilge keels externally. The bottom of the ship was about 2.1 m wide at amidships and the bilge was gently rounded.[148] The ship was built entirely of oak except for the stringers, which were of larch, a common tradition in the Adriatic. Oak was favored by ancient shipwrights because it is more sturdy, does not warp from moisture, and is less vulnerable. It is known that the shipwrights of the Adriatic were proud of their entirely oak built ships. On the basis of the use of oak, the ship may be considered to be Italian in origin.[149]

5. 6 ÇAMALTI BURNU-I AND CONTARINA SHIPS COMPARED

The information gained by the study of the hull remains of both the Çamaltı and Contarina vessels suggests that, from a conceptual point of view, the two ships present the same method, frame first, of hull construction and design. In terms of construction details, forelock bolts are used in a similar fashion to fasten together the keel, keelson and frames. But the comparisons of the dimension of these ships can be problematic due to uncertainties of the exact dimensions of both ships, due to the different levels of preservation. In addition, the different functions and sailing environments of the ships and the corresponding impact on their hull designs may cause a false interpretation. The lack of any associated cargo finds within the

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[148] Steffy, 1994: 91-93.
[149] Bonino, 1978: 15

Contarina ship may imply that it was used for a different purpose other than transporting trade goods, as in the case of the Çamaltı Burnu-I vessel. Therefore it is only possible to assume that Çamaltı Burnu-I, with its wider flat bottom, was a relatively larger vessel with greater storage capacity than the more round-bottomed hull of the Contarina ship, irrespective of its purpose of design.

Despite the problems of identifying the exact origins of these ships, if we assume that the Contarina vessel represents an Italian ship, while the Çamaltı Burnu vessel is a Byzantine ship, it would be seen that the two reveal similar constructional features at least in terms of their frame-first design concepts. Therefore on this basis alone, it is not possible to classify these ships as belonging to two different cultural traditions. Shipbuilding as well as other cultural traditions of these regions are interconnected and involve cross-cultural exchanges of ideas; they may also have developed as a result of similar geographical or physical constraints independent of native oriented ideologies. Furthermore, and perhaps most significantly, it is virtually impossible to draw such broad conclusions on the basis of the scanty evidence available.[150]

5. 7 ÇAMALTI BURNU-I: A MONASTIC SHIP ?

As a consequence of the difficulties in determining the origin of the ship on the basis of any single group of artifacts, such as the cargo amphoras or the hull remains, the entirety of the evidence collected from the excavations at Çamaltı Burnu must be examined together with its surrounding context. According to Günsenin, the ship may have been owned by the Byzantine monastery located nearby Marmara Island at Ganos (Figure 28), which was known to have had a monopoly over the

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[150]Adams, 2001: 301.

production and sale of wine in the region.[151] The association of the Ganos monastery

and the Çamaltı Burnu-I ship may be established on the basis of the wreck's location.

The fact that Marmara Island and Ganos are relatively close to each other in

geographical terms may explain the lack of defensive weapons and carpentry tools

typically carried onboard ships during long distance sea voyages; the implication

being that the ship was a local merchantman sailing only short distances, perhaps

even dedicated to the Ganos-Marmara run.[152] The presence of eight more wrecks in

the area loaded with Ganos amphoras (Type I) further strengthens the correlation

between Ganos and the Marmara islands. Besides, the similar clay characteristics of

the Ganos (Type I) and Çamaltı Burnu (Type IV) amphoras already linked the ship to

the Ganos region, perhaps as its home port or at least as the source of its cargo.[153]

But this evidence alone is insufficient to substantiate that the ship is Byzantine

and monastery owned. Such inference on the basis of where the ship sank without

any direct evidence relating the cargo or ship to the Ganos monastery may be

problematic. Ownership of the ship could change through sale or gift or by force.

This exchange might occur between different ethnic groups or nationalities. A ship

may be employed by other societies independent of the local people around where it

sank or where it was built.[154] In the case of Çamaltı Burnu-I, the sum of the evidence

points to a Greek ship with a Greek crew: the ship's galley wares (Figure 29) have

typical Byzantine forms and designs and are inscribed with Greek names, probably

belonging to the ship's crew; the wood used to construct the ship's hull was likely

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[151] For direct information about the Ganos monastery, see *Dictionnaire d'Histoire et de Géographie Ecclésiastiques,* R. Aubert, Fasccicules 108B-109, Paris, *Notitiae Episcopatuum Ecclesiae Constantinopolitanae,* J. Darrouzes, A. A., Paris (1981); Le Patriarcat Byzantin, *Les registres des actes du Patriarcat de Constantinople, Vol.1 Les Actes des Patriarches no. 839-893-2110-2119-2290-2434-2529-2530;* A. Germidis, Τά Γανόχορα τής Ανατολικτής Θραης, Θρακικά, 46 (1972), cited by Günsenin, 1993: 195-196.
[152] Günsenin, 2005: 118-123.
[153] See page 67.
[154] Adams, 2001: 197.

harvested from local forests; and the ship's cargo was carried in Byzantine amphoras made from local clays and carrying wine probably sourced from the nearby monastery. But to prove that this ship was the property of or in the employ of the Ganos monastery, further study is required. A detailed epigraphical study of the monogram stamps on the amphoras would be particularly central to such work and might reveal the producers of the amphoras or of the wine they once held. If it can be shown with certainty that Çamaltı Burnu-I was a monastic ship, further lines of research supported by relevant historical records could estimate the magnitude of this trade and comparisons with its rivals, as well as its role in the medieval economy. Since rough estimations of the import and export volumes handled by Italian merchants are available[155], it would be interesting to establish comparisons between the wealth of monasteries and Italian merchants and to interpret the influence of this situation on the balance of power in Byzantine waters.

There are studies of two other Late Byzantine shipwreck, and also several shipwrecks surveyed but not excavated in the Mediterranean that might provide useful data to augment the study of the Çamaltı Burnu-I wreck.

5.8 TARTOUSA SHIPWRECK

A 13th century possible Byzantine shipwreck was found 20 km due north of the coastal city of Tartous, Syria (Figure 30). The excavation of the shipwreck was conducted by Japanese archaeologists and government agencies of the Syrian Ministry of Culture and Directorate of Antiquities and Museums for three seasons between 1985-1987. The results of excavations have been published only in an interim report of the project compiled during the fieldwork. The ship was dated to the

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[155] See Epstein, 1992.

first half of the 13th century based on the types of amphoras recovered from the wreck. During the 13th century, important centers with active harbors on the Syrian coast included Arwad island, Tartous, Markiyeh, Marqab Castle, Baniyas, and Latakia. The excavation site of the Tartousa shipwreck consists of more than 5,000 amphoras, most of which were still in their original position as loaded on the ship, four anchors, and the well-preserved bottom of the ship's hull. Most of the amphoras of the wreck are described as Type A or Tartousian amphoras, which have large handles that rise 6-7 cm above the top of the mouth, a conical, narrow neck, a long pear-shaped body and rounded base. The height of Type A amphoras ranges from 58 cm to 72 cm, with a wall thickness of 1 cm.[156] Type A amphoras have a wide distribution throughout the Levant, Cyprus, the Aegean coasts, the Bosphorus, coastal areas of Bulgaria, Romania, and southern Russia, and even in major river routes from the Black Sea, along the Danube and Dnieper, as far north as Kiev (Figure 31). Type A amphoras were used for the dating of the ship; according to thermoluminescence analysis of an amphora shipwreck dated to the first half of the 13th century. The amphora cargo of the ship was partly removed. 1,242 of approximately 5,000 amphoras were surveyed and photographed, and 850 of them were removed from the site. Of the four anchors discovered at the site, only one retains its original T shape. The anchors were not removed from the seabed and were not studied in detail.[157]

The well preserved bottom of the ship's hull was also kept on the seabed. The Japanese team estimates that the ship was more than 25 meters long with a maximum beam of 7-8 meters according to the distribution of amphoras and measurements taken in a cross-sectional trench. The ribs (probably floor timbers) have a rectangular

[156] Tanabe, Yoshizaki, Sakata, 1991: 34-38.
[157] Tanabe, Yoshizaki, Sakata, 1991: 37-39.

form with a maximum sided dimension of 18 cm and molded dimension of 20 cm.

Bottom planks of the ship were 20 cm wide with a thickness of 3 cm.[158]

Unfortunately, three years of excavation of the Tartousa shipwreck have not been able to satisfactorily clarify either the structure of the ship or the detailed study of cargo amphoras including their contents, impressions on their bodies. Analysis of the ship's hull either technically or botanical is not given in the report of excavations, as well as any combination of data which may be used to discuss the origin of the ship. As a result of this, the ship may only be evaluated as the evidence of Byzantine amphora types along the Syrian coast, identical with the Çamaltı Burnu-I Byzantine shipwreck, an indication of the maritime trade exchange of Byzantine goods.

5.9 KASTELLORIZO SHIPWRECK

Another possible Byzantine shipwreck loaded with a cargo of Byzantine pottery was found in 1970 off Cape Zapheirion on the southwest coast of Kastellorizo, the ancient name of which is Megisti. Megisti island is located 75 nautical miles east of Rhodes, very close to the coast of Lycia. The island lies on the frequently used maritime route from the Levant to the Aegean, via Cyprus and Rhodes; it has a natural safe harbor. Thus the waterline between the island and the Anatolian mainland formed one of the most important shipping channels in the Eastern Mediterranean. Despite the lack of systematic underwater excavation, 68 glazed plates were found in the possession of a French antiquities dealer who conducted underwater excavation off the island. These plates were considered part of the cargo of the same ship because of its homogenous characteristics. These table wares include large, deep bowls with a ring foot and hemispherical body, and high

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[158] Tanabe, Yoshizaki, Sakata, 1991: 37-39.

footed bowls with splayed seating surface. The majority of the plates have incised-sgraffito decoration with a stylised bird, fish or shellfish motif (Figure 32). These artifacts were dated from the late 12th century to the early 13th century, according to parallels in Rhodes and Corinth. Other groups of plates, including slip painted plates and plates with champlevé decoration with groups of animals, were also dated to the same period. [159]

As was the case with the Tartousian shipwreck research, Castellorizo shipwreck do not yield any satisfactory reference to identify the origin of the ship or to determine construction details. With its Byzantine glazed ware, this shipwreck only indicates the circulation of Byzantine products by maritime trade.

In addition to the three excavated shipwrecks presenting incomplete research above, survey research has also revealed Late Medieval ships. As seen in Parker's (1992) catalogue of the shipwrecks of the Mediterranean. According to his study, seven of the 39 shipwrecks dated between 1200-1450 throughout Mediterranean are said to carry Byzantine cargo. The origins of the cargo of the remaining 26 wrecks could not be identified. For six additional wrecks, two were associated with Mamluks, three were carrying Italian cargo, and one has been identified as carrying Turkish material. One has to evaluate these wrecks with great caution since they are not based on systematic research, but on the observations during survey research only. Despite this fact, it is interesting to know that three of the seven Byzantine wrecks listed in the catalogue were loaded with Gunsenin Type III and IV amphoras (13th century) which are also recorded as the main cargo of Çamaltı Burnu I in Turkey and the Tartousa shipwreck in Syria (Figure 33). One of these three wrecks was located on Cape Matapan on the Peloponese, one on the north coast of Rhodes,

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[159] Dellaporte, 1999: 143-144.

and another located in Brindisi harbour on the east coast of Italy. Together with the distribution of these amphoras at archaeological sites on land, these shipwrecks loaded with the same type of containers suggest an exchange trend on a certain route following the northern Black Sea, Marmara, Aegean, and Levantine coasts in the eastern Mediterranean and as far west as Italy.

On the basis of available evidence of a possible Byzantine vessel, the Çamaltı Burnu-I shipwreck, we can estimate the dimensions of a Byzantine merchant ship which is about 25 m in length, 8 m in beam at amidships, and with the capacity of approximately 100 tons. We can also determine the details of the ship's hull design as the frame first method. However, while the exact dimensions of Byzantine ships and details of their hull structure of are difficult to understand with the help of scanty textual and pictorial evidence, the pictorial evidence of ships reveal the design of the upper structure of the ships. It is also seen that the shipwreck data itself drawn from the Late Byzantine vessels has its limits to establish inferences on a wider historical events without the aid of complementary historical data. The uncertainty of determination of the origin of the ships or the exploiters, the problems in distinguishing native specific shipbuilding traditions, and the rarity of systematic research on Late Byzantine ships limit the conclusions that can be made based on the evidence of shipwrecks.

VI. CHAPTER VI

CONCLUSIONS

This study has aimed to investigate the problem of evaluating the nature and influence of Byzantine ships and shipping in the later Middle ages. In the period 1204-1453, the Byzantine empire was not able to continue its formerly strong influence along the Black Sea, Aegean, and Mediterranean shores. As a result of conflict with its rivals, Latins and Turks, the state lost its important maritime possesions such as the harbours and islands on the main routes of the maritime trade and its naval fleet was dismantled. The leading Italian city states, Venice and Genoa, greatly benefited from these possessions. They dominated the maritime trade routes by taking advantage of trading freely within the imperial borders and by establishing their own trading bases in return for their naval support for the Byzantines. Moreover, the Turks conquered most of Asia Minor including its western shores and rapidly adapted to maritime activities by employing local Greek shipbuilders and sailors and by raiding important maritime centers in the Aegean and Marmara Seas.

Despite the impression that Byzantine maritime activities, such as shipping and shipbuilding, must have been restricted as a result of the reasons cited above, nevertheless the textual, pictorial, and archaeological evidence presented in this study indicates at the very least the continuity of Byzantine shipbuilding and

shipping activities during the Late Medieval Age. However, such evidence is limited. As a result, to know to what extent these activities were limited, and to identify the certain Byzantine components, such as the Late Byzantine ship, its types, construction features, and owners among those activities are difficult. Nonetheless, although the evidence is scanty, if the shipwreck studies, artistic depictions of ships, and textual evidence are combined, the resulting information does help us to see these Byzantine components in shipbuilding, and to gain a better understanding of Byzantine involvement in maritime exchange in the later Middle ages.

As discussed in Chapter V, the only likley Late Byzantine ship excavated completely so far is the Çamaltı Burnu-I wreck. As a result of connections between its cargo of amphoras and ceramic finds at nearby Ganos, a Byzantine monastic center known to have been involved in maritime trade, Çamaltı Burnu-I is claimed to be a ship owned by this monastery. Despite the evidence of monastery owned ships revealed in textual records (see Chapter III), the ownership of a ship must be evaluated as a fact independent of the ethnicity of the people living where it sank or where it was built. Moreover, ownership may change through gift or sale, or even by force. Thus, Günsenin's hypothesis concerning the ownership of the Çamaltı Burnu-I ship is difficult to prove at this stage of the research. The support of relevant historical records and further analysis of artifacts would be needed to support this hypothesis.

Despite the uncertainties about the ownership of Çamaltı Burnu-I, the cargo on board and the analysis of the hull remains indicate a likely Byzantine origin for the ship. Çamaltı Burnu-I may not be necessarily a representative of an ordinary Byzantine ship of the age, but can be considered as being one of them in use. Thus it is possible to list the features of a Byzantine ship of the 13th century. According to

this evidence, we can identify a Byzantine ship of the 13th century as ship with a carvel built rounded hull, built in the frame first manner, at least 25m in length and 8m in beam at amidships, and with a capacity of approximately 100 tons. Moreover, we can supplement these features with the 13th century ship depictions possibly representing Byzantine ships which give information about the upper structures and rigging of ships that we cannot usually gain from shipwreck studies. If we include such information, it may assumed that this Byzantine ship (Çamaltı Burnu-I) was probably a lateen rigged, two masted ship with quarter rudders like the Italian and Arab ships of the 13th century.

Since we know that Çamaltı Burnu-I was a merchant vessel, the specific type of this ship might be identified among the Greek names of ship types found in Byzantine texts. However, it is quite difficult to determine its type with certainty, because the texts never describe the types in sufficient detail.

The similarities between the cargoes of Late Medieval ships, in particular the presence of Günsenin Type III and Type IV Byzantine amphoras in shipwrecks of Çamaltı Burnu-I and Tartousa, and found in surveys indicate a regular maritime exchange pattern on a route following the Black Sea, Marmara, Aegean, and Levantine, and even in the western Mediterranean coasts.

The role of Byzantine merchants in Late Medieval maritime commerce has also been investigated here. In Chapter III we have traced with the help of textual evidence the presence of Byzantine merchants who were monks or private entrepreneurs, dependent or independent of foreign merchants, on important maritime trade routes across Black Sea, Aegean, eastern Mediterranean, Adriatic ports, and even in western European coasts until the final collapse of the empire. The locations of possible Byzantine shipwrecks found in excavation and survey (see

Chapter V) are consistent with the trade routes of Byzantine merchants recorded in these texts.

The changing design and number of ships in the Late Medieval period must have affected the influence of Byzantine merchants. After the mid 14th century, the use of stronger ships perhaps developed earlier in northern Euorope, such as the great galleys, cogs, and carracks with greater capacities by Italian merchants, undoubtedly contributed to Italian dominance in the Mediterranean. The pictorial evidence which reveals the design of possible Byzantine ships at this time suggests that they used similar designs to those of their rivals. Thus, it is possible to assume that they were able to compete with their rivals, at least in terms of ship design. The number of the ships that the Byzantine merchants had is also mentioned in the texts. Pryor (1988:140) emphasized that in 1360-1, Byzantines owned 30% of the ships engaged in the grain trade from the Genoese colony of Chilia to Pera/Constantinople and this according to Genoese records from a Genoese port. The Ponzo registers mentioned in Chapter V indicate that 17 of the 50 ships were Greek owned. Since these may not represent the total of the ships, at least we can conclude that Byzantine merchants continued to be active in maritime exchange with their ships designed in similar fashion to those of their rivals and possessed their own ships during the Late Medieval period.

The larger institutions that affected activities of Byzantine merchants are also evidenced, in particular in the monastic texts. According to these documents, monasteries were well structured to manage their estates in a well organized manner and to transport their own production with their own ships. The Byzantine state also attempted to regulate the maritime trade. Maritime trade was subjected to various taxes. Despite its weak political position it is seen that the state was able to impose

tax policy. It is known from the historical sources that John VI Kantakouzenos lowered the *kommerkion* to 2% in order to support Byzantine merchants against foreign merchants.

Although the continuity of Byzantine shipbuilding and shipping can be traced through the evidence compiled in this study, it is difficult to interpret their impact in a wider historical context. The magnitude of the maritime trade of Byzantine merchants, either monks or private entrepreneurs, in comparison with its rivals, as well as its role in the Medieval economy is not possible to estimate on the basis of evidence presented here. Thus, the analysis and synthesis of existing information including the latest, the Çamaltı Burnu-I shipwreck, concerning the survival of shipping within the Byzantine empire, as Pryor (1988) called for, is not generating new sets of data which can change the parameters of the Late Medieval age in a wider historical context. But further studies, focusing on the evidence indicating the extent of maritime trade and identifying the Byzantine components in a more reliable way, may well reveal more clearly the influence of Byzantine maritime activities in the Late Medieval age.

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GLOSSARY OF SHIP TERMS[160]

Amidships: The middle of a vessel, either longitudinally or transversely.

Bilge: The area of the hull's bottom on which it would rest if grounded. generally, the outer end of the floor. When used in the plural, especially in contemporary documents, **bilges** refers to the various cavities between the frames in the floor of the hold where bilge water tends to collect.

Bilge Strake: [Bilge Plank] A thick strake of planking placed at or below the turn of the bilge; its purpose was to reinforce the area of the bilge or floor heads. Infrequently its called a bilge wale.

Coak: A rectangular or cylindrical pin let into the ends or seams of timbers about to be joined in order to align or strengthen the union.

Frame: A transverse timber, or line or assembly of timbers, that described the body shape of a vessel and to which the planking and ceiling were fastened. Frames were sometimes called **timbers** or, erroneously, ribs. Ancient ships often had frames composed of lines of unconnected timbers; later ships usually had compound frames composed of **floor timbers**, **futtocks,** and **top timbers. Square frames** were those set perpendicular to the keel; in the bow and stern there were **cant frames,** running obliquely to the keel. Forward of the cant frames, in large round-bowed vessels, were the frames running parallel to the keel and stem, sometimes called **knuckle timbers;** more accurately, these were the **hawse pieces** and **knight heads**, the latter being the frames edjacent to the apron or stemson that extended above the

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[160] This section is cited from Steffy, J. R. 1994. *Wooden Shipbuilding and the Interpretation of Shipwrecks*. College Station, Texas A&M University Press.

deck to form bitts and support the bowsprit. The aftermost frames were the **fashion pieces,** which shaped the stern.

Futtock: A frame timber other than a floor timber, half-frame, or top timber; one of the middle pieces of a frame.

Keel: The main longitudinal timber of most hull, upon which the frames, deadwoods, and ends of the hull were mounted; the backbone of the hull.

Keelson: [Kelson]. An internal longitudinal timber or line of timbers, mounted atop the frames along the centerline of the keel, that provided additional longitudinal strength to the bottom of the hull; an internal keel.

Molded: [Molded Dimension]. The various dimensions of timbers as seen from the sheer and body views of construction plans; the dimensions determined by the molds. Thus, the vertical surfaces (the sides) of keels, the fore-and-aft sides of the posts, the vertical or athwartships surfaces of frames, etc. Normally, timbers are expressed in sided and molded dimensions, while planks and wales are listed in thicknesses and widths. Molded and sided dimensions are used because of the changing orientation of timbers, such as frames, where "thick" and "wide" or "height" and "depth" become confusing.

Motrise-and-Tenon Joint: A union of planks or timbers by which a projecting piece (tenon) was fitted into one or more cavities (mortises) of corresponding size.

Port: [Port Side, Larboard]. The left side of a vessel when facing forward.

Rabbet: A groove or cut made in a piece of timber in such a way that the edges of another piece could be fit into it to make a tight joint. Generally, the term refers to the grooves cut into the sides of the keel, stem and sternpost, into which the garboards and hooding ends of the outer planking were seated.

Rudder: A timber, or assembly of timbers, that could be rotated about an axis to control the direction of a vessel underway. Until the middle of the medieval period, the practice was to mount rudders on one or both stern quarters; these were known as *quarter rudders*. By the late Medieval period, however, it appears that most vessels of appreciable size were steered by a single rudder hung at the sternpost; these were known as *stern-hung rudders*. For a brief period, the two types were sometimes used in combination. Rudders were designed for the vessel and type of duty they served. In protected waters they could be made quite broad, while seagoing ships utilized longer more narrow rudders. For the largest seagoing ships, rudder construction was complex and required huge timbers, the assembly sometimes weighing several tons.

Scarf: [Scarph]. An overlapping joint used to connect two timbers or planks without increasing their dimensions.

Shell-First Construction: [Shell-built]. A modern (sometimes misleading) term used to describe the process by which all or part of the outer hull planking was erected before frames were attached to it. In pure shell-built hulls, outer planking was self-supporting and formed the primary structure; the framework fastened to it formed the secondary, or stiffening, structure.

Sided: [Sided dimension]. The dimension of an unmolded surface; the distance across an outer frame surface, the forward or after surface of a stem or sternpost, or the upper surface of a keel or keelson.

Skeletal Construction: [Frame-First construction]. A modern (sometimes misleading) term used to describe the procedure in which hulls were constructed by first erecting frames and then attaching the outer skin of planking to them.

Starboard: The right side of a vessel when facing forward.

Stem: [Stempost]. A vertical or upward curving timber or assembly of timbers, scarfed to the keel or central plank at its lower end, into which the two sides of the bow were joined.

Sternpost: A vertical or upcurving timber or assembly of timbers stepped into, or scarfed to, the after end of the keel or heel.

Strake: [Streake]. A continuous line of planks, running from bow to stern.

Treenail: [Trunnel, Trennal]. A round or multi-sided piece of hardwood, driven through planks and timbers to connect them. Treenails were employed most frequently in attaching planking to frames, attaching knees to ceilings or beams, and in the scarfing of timbers. They were used in a variety of forms; with expanding wedges or nails in their ends, with tapered or square heads on their exterior ends, or completely unwedged and unheaded. When immersed, treenails swelled to make a tight fit.

Wale: A thick strake of planking, or a belt of thick planking strakes, located along the side of a vessel for the purpose of girding and stiffening the outer hull.

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FIGURES
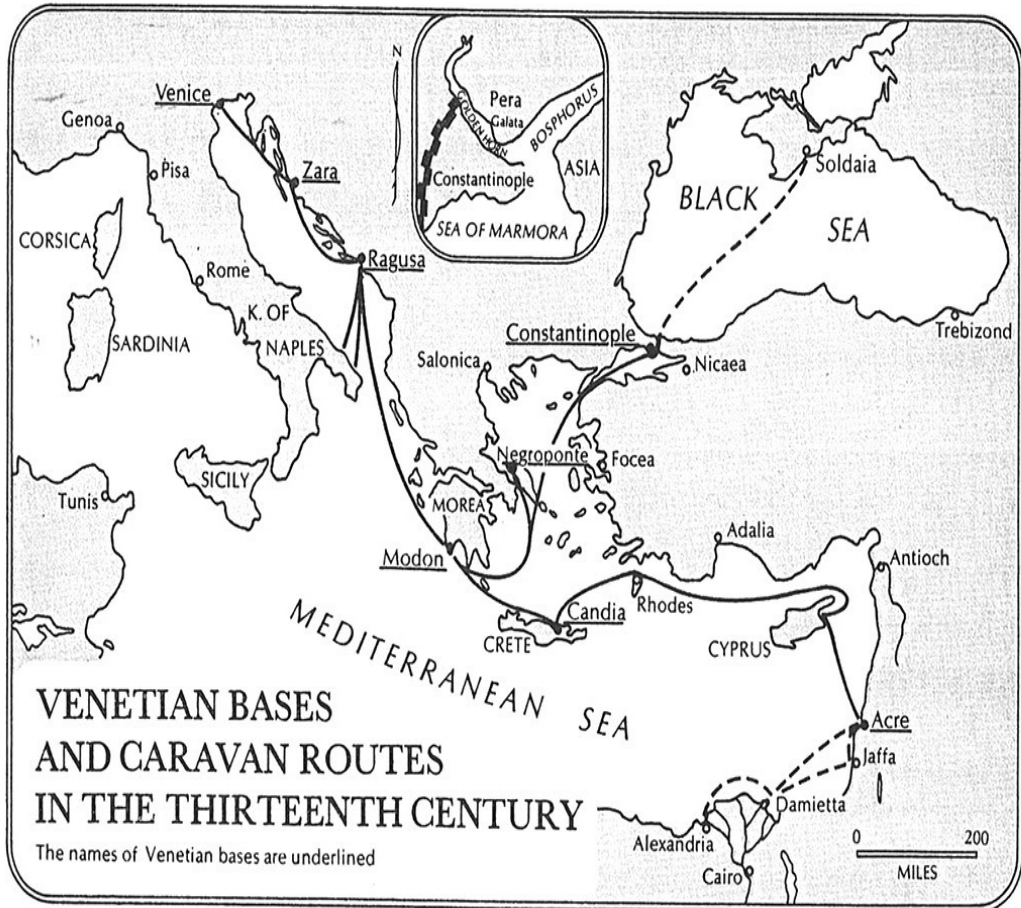
Figure 16: Venetian maritime trade routes to east.
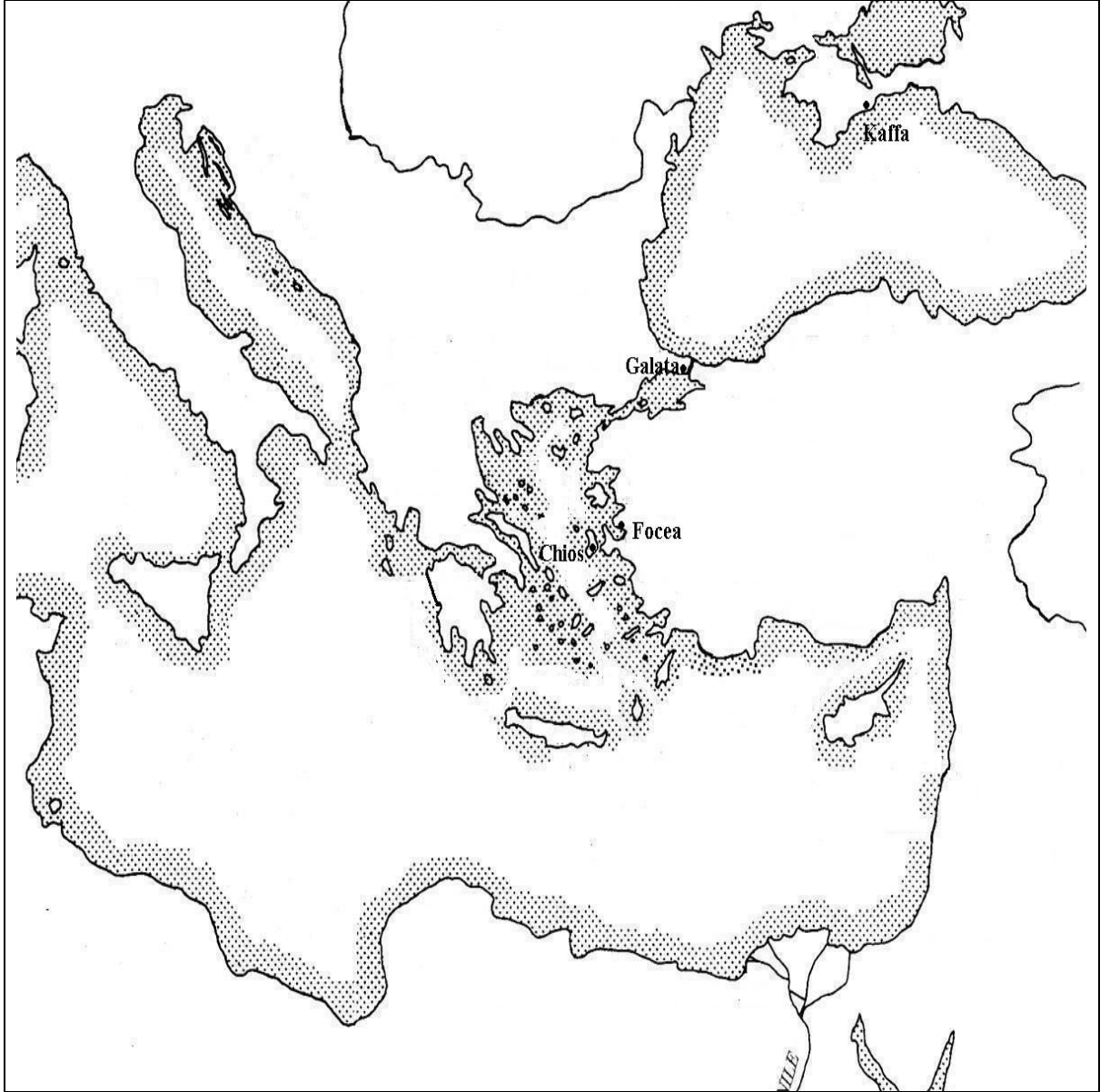
Figure 17: Genoese maritime bases.
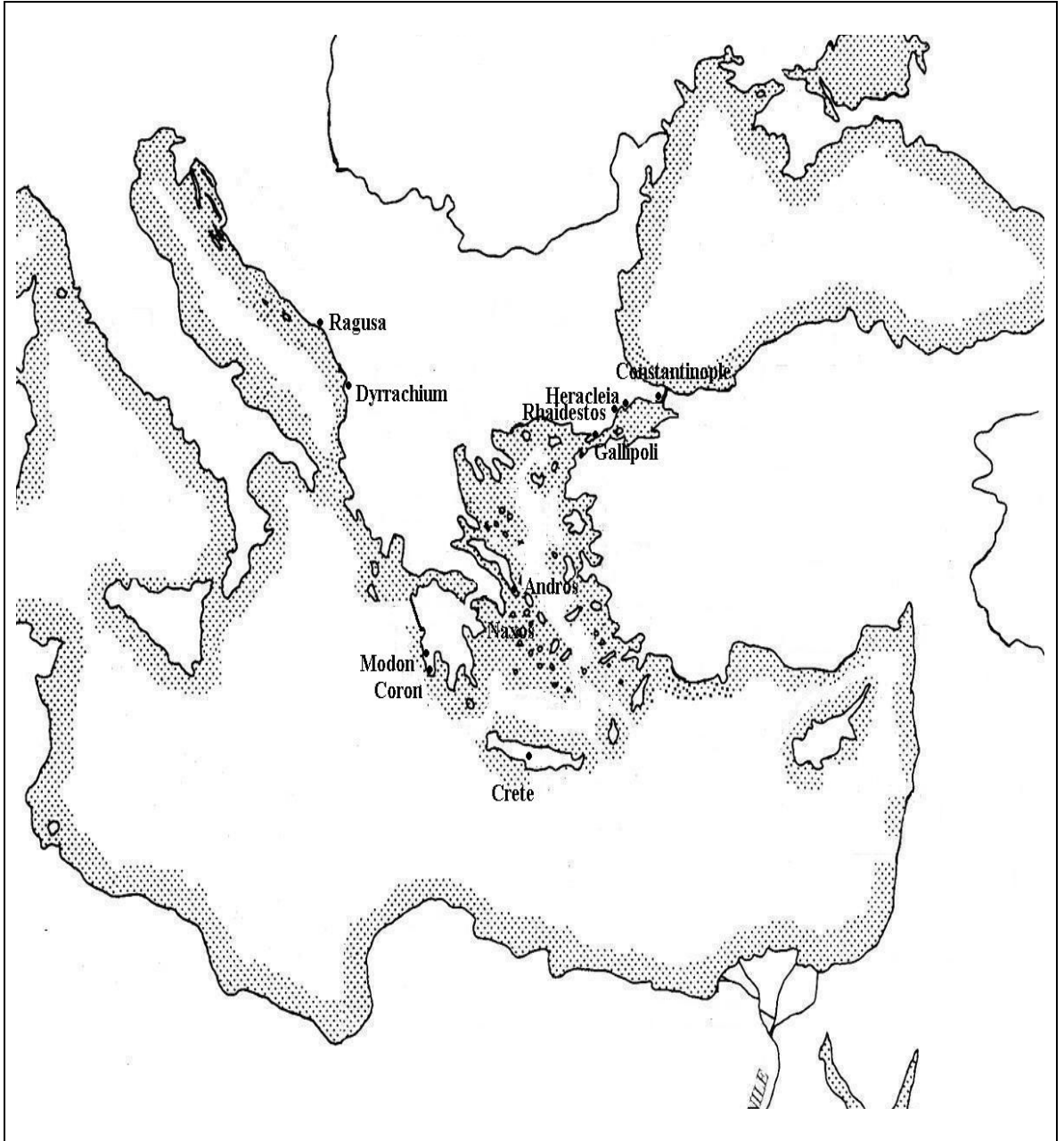
Figure 18: Venetian maritime possessions after Fourth Crusade

Figure 19: Seljuk maritime bases in the early 13th century.

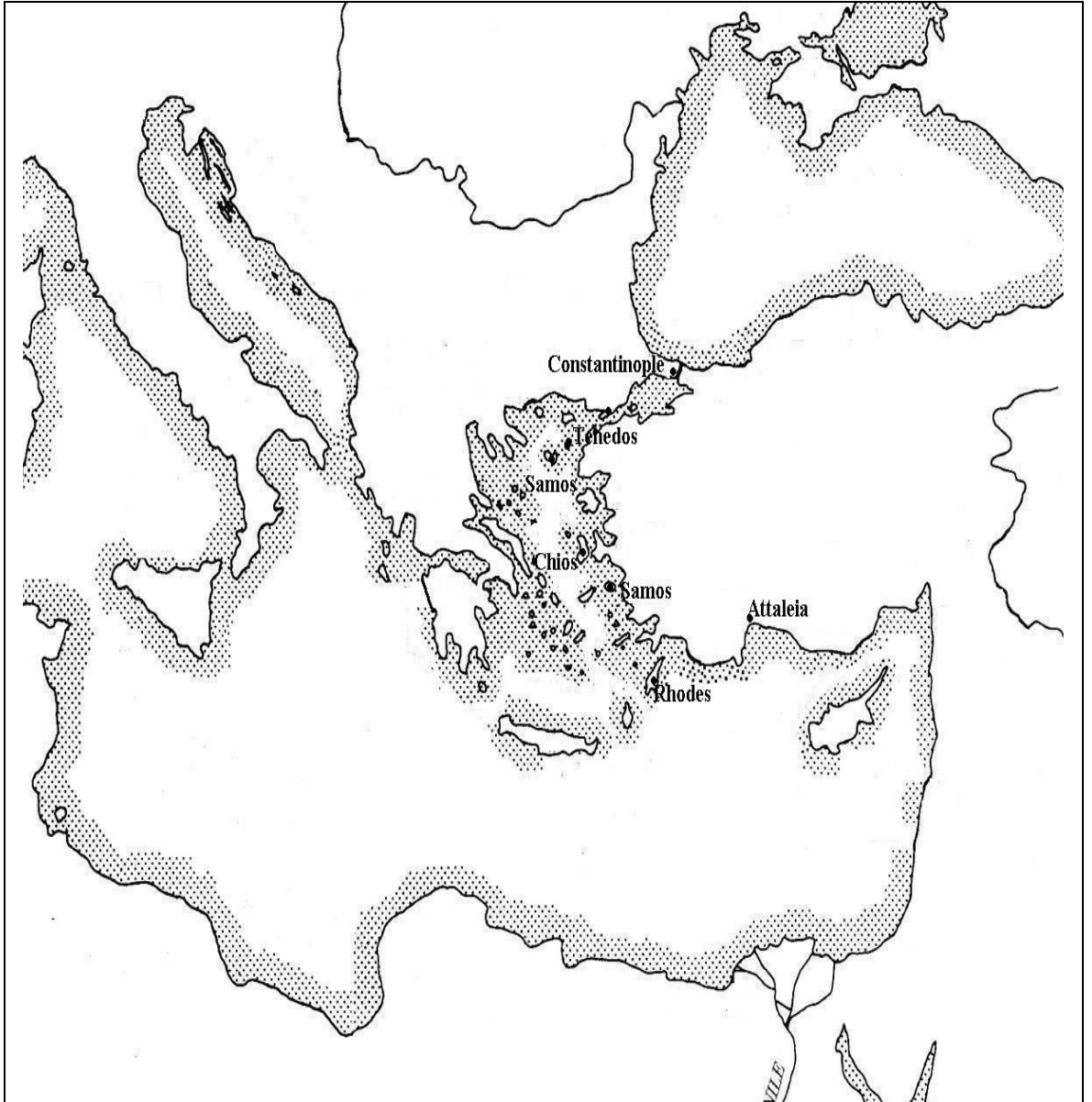Figure 20: Seljuk maritime possessions in the mid 13th century.

Figure 21: Early Byzantine shipyards.

Figure 22: Byzantine shipyards in the Late Medieval Age.

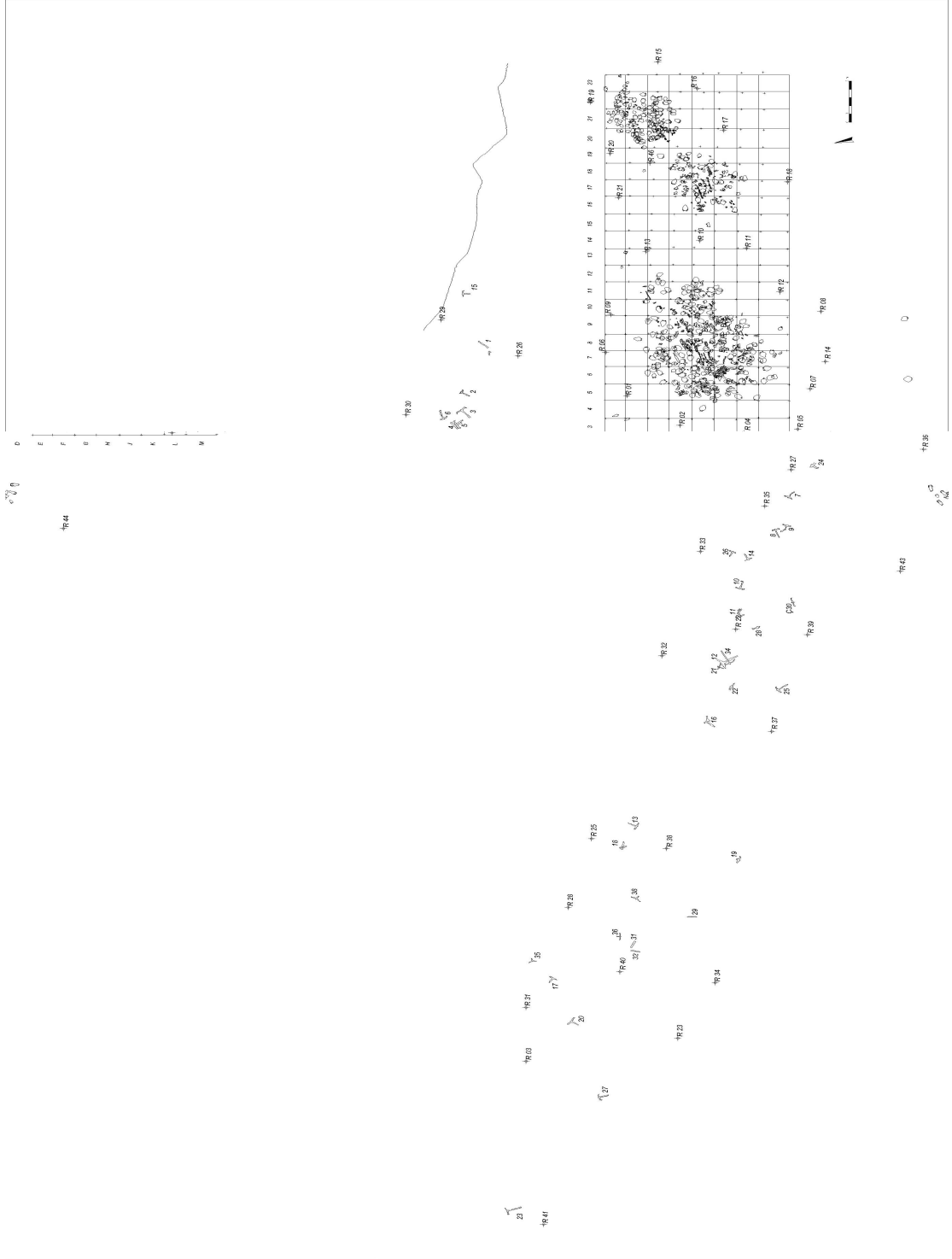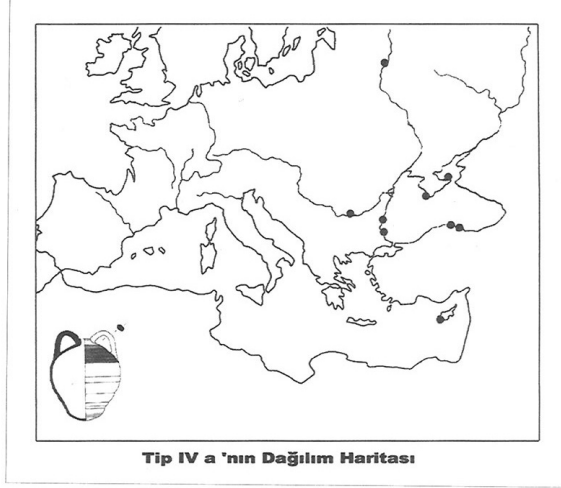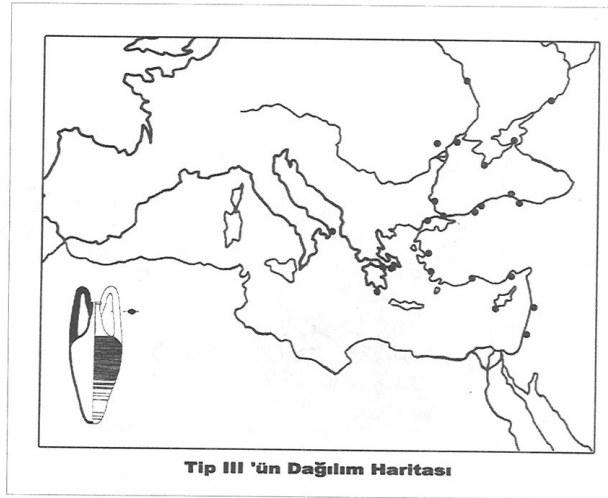Figure 23: Late Medieval ports on maritime trade routes.

Figure 24: Günsenin's amphora classification.

Figure 25: The site plan of Çamaltı Burnu-I Shipwreck.

Harita: 2

Harita: 3

Figure 26: The distribution of Type III and Type IV amphoras
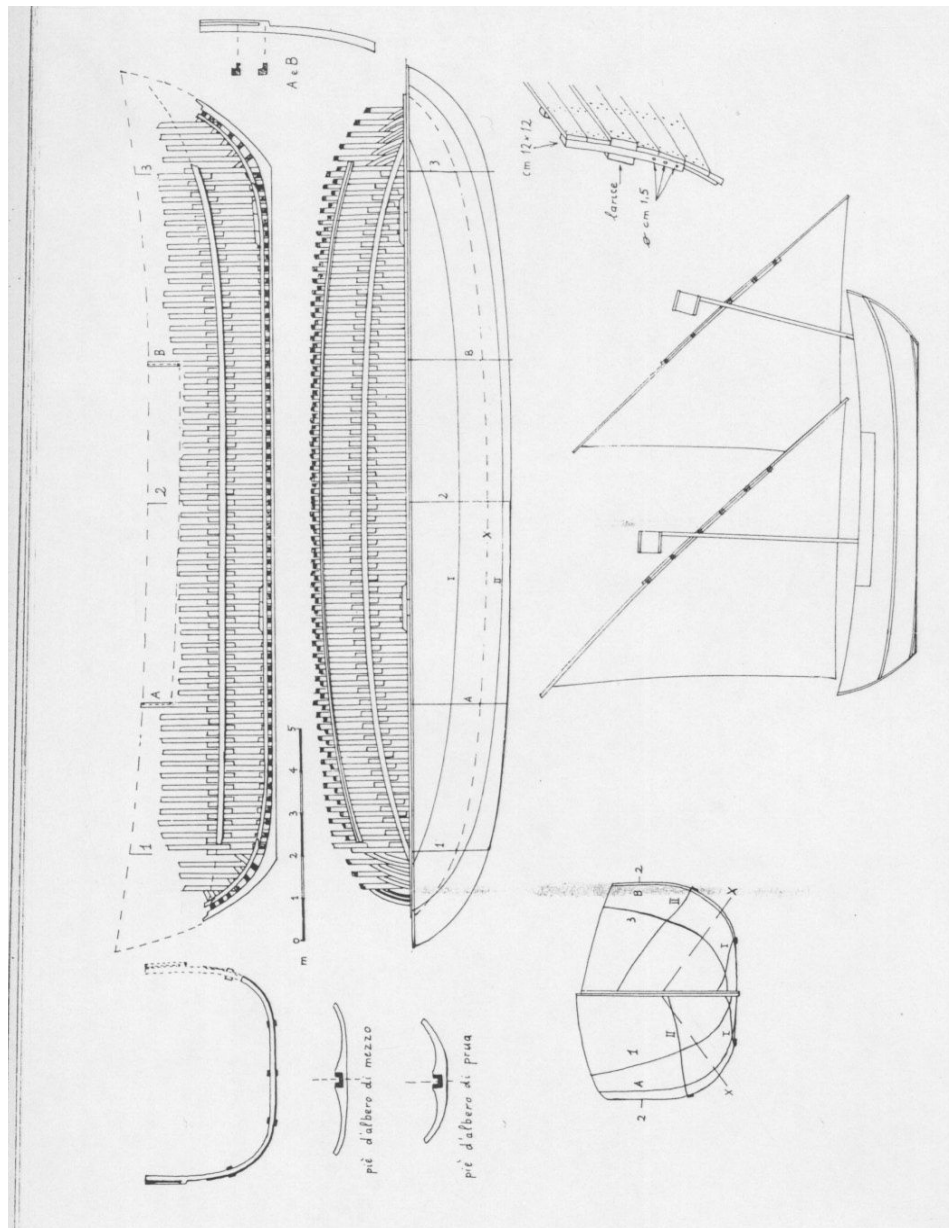
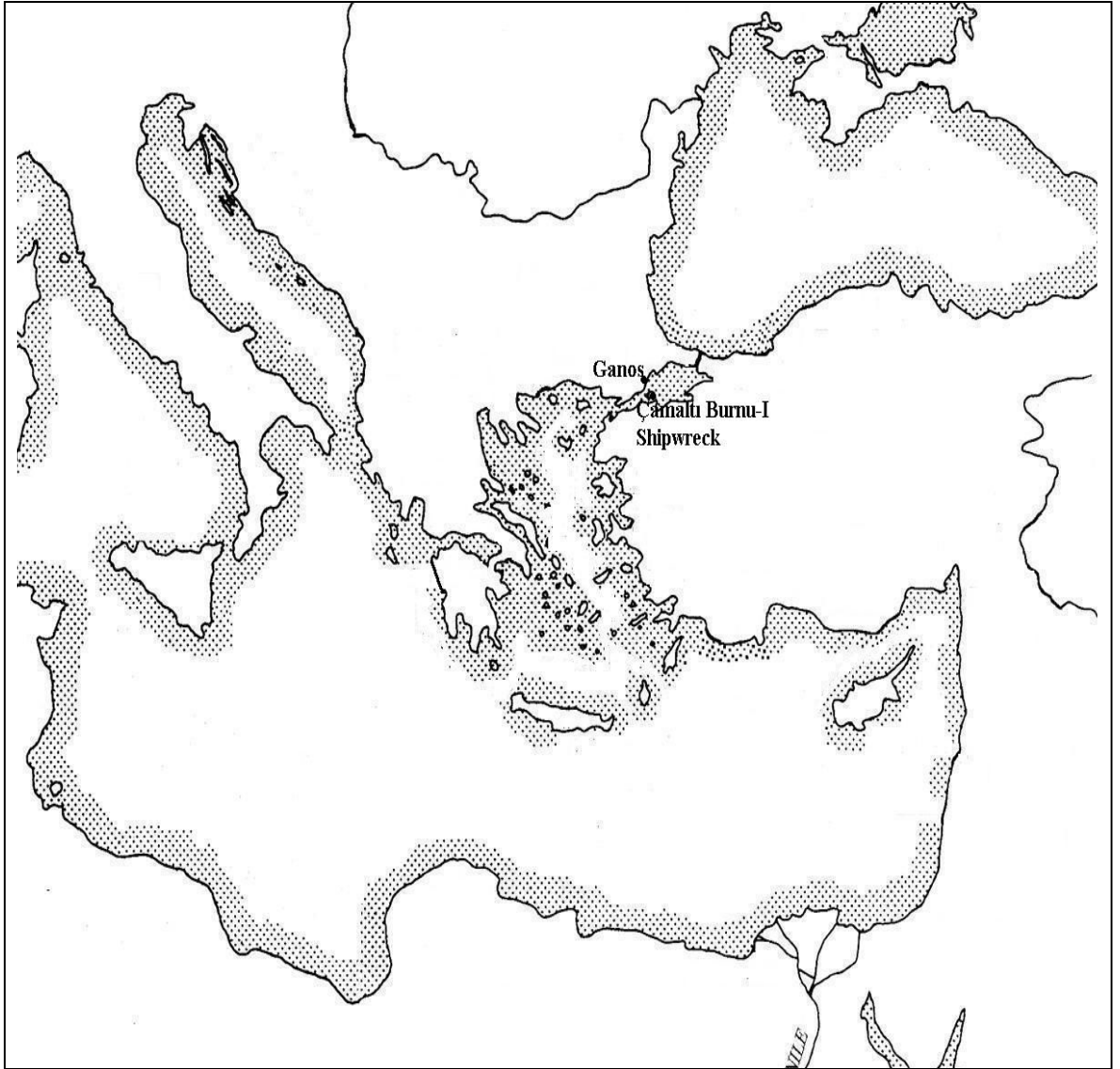Figure 27: Reconstruction of Contarina shipwreck.

Figure 28: Ganos and the Çamaltı Burnu I shipwreck

Figure 29: Byzantine tableware found in Çamaltı Burnu-I shipwreck.

Suface Diagram of the Syrian Sunken Ship
by Underwater Photogrammetry

※ The diagram of the vertical section and the F-section are done by hand.
Photography: Tetsu Tsukamoto   Drawing: Shunji Murai and others
Survey: Shin Yoshizaki, Yuji Sakata   Mapping: Shin Yoshizaki

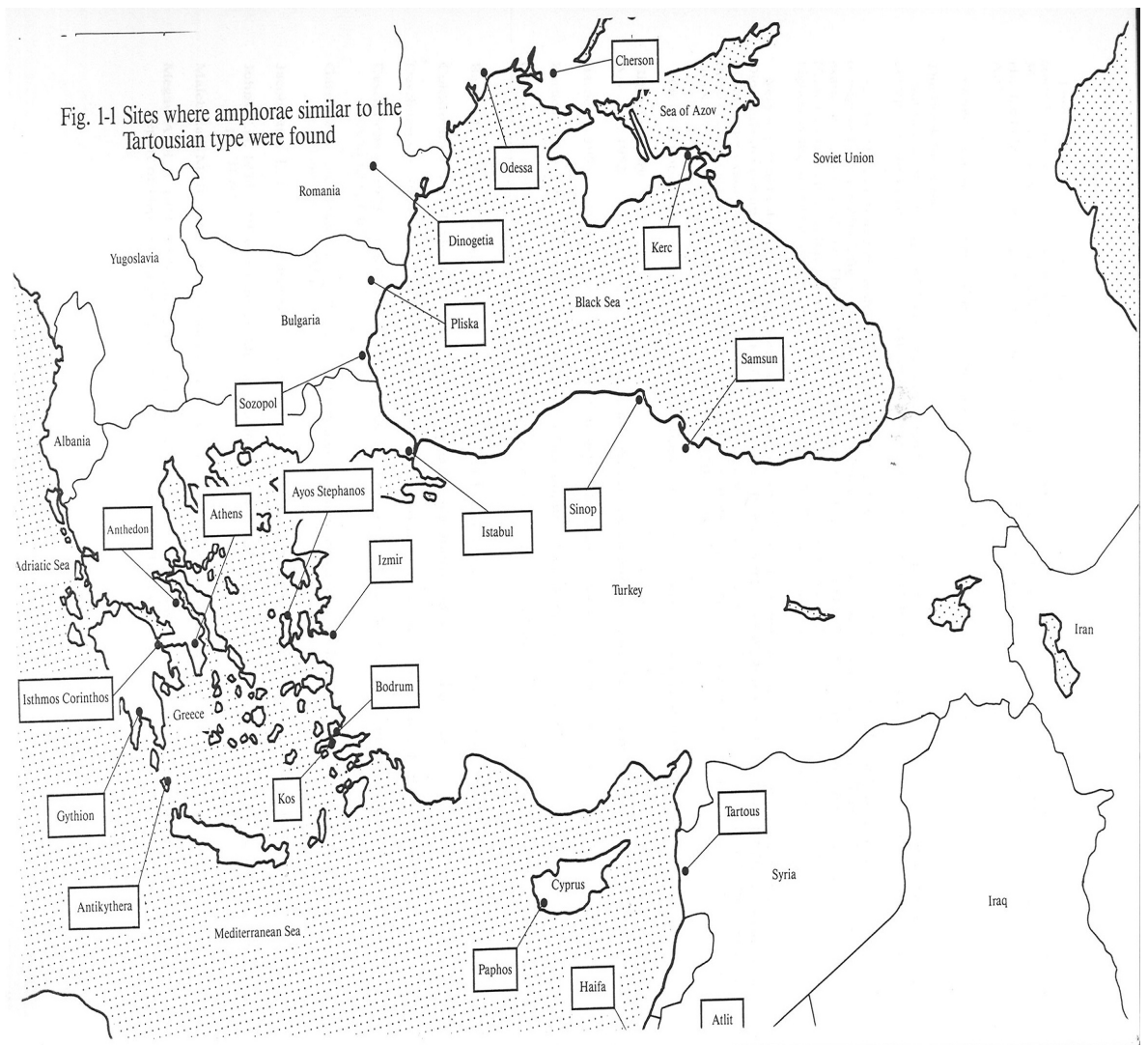Figure 30: Site plan of Tartousa shipwreck.

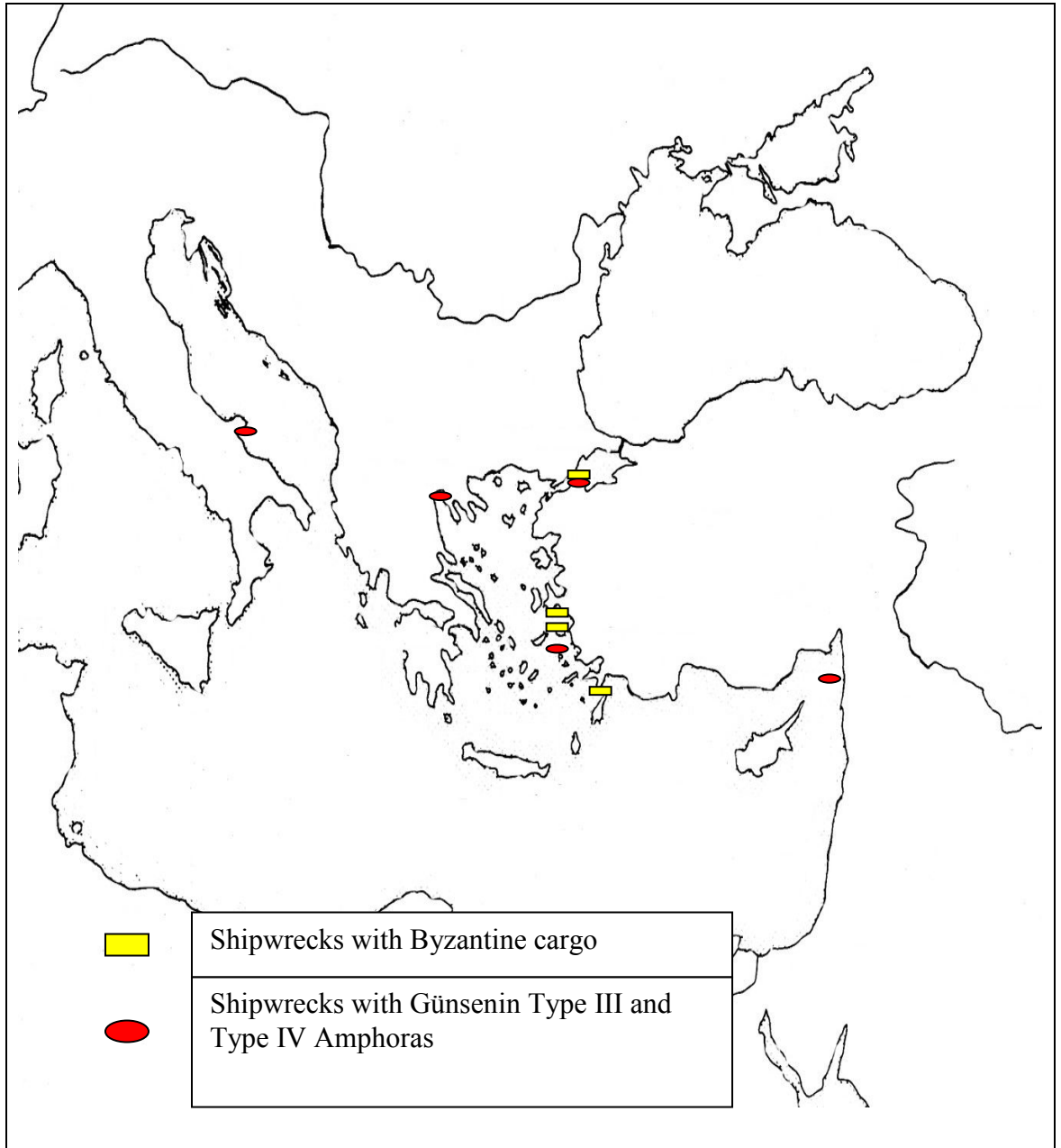Figure 31: Distribution of Tartousian (Günsenin type III) amphoras.

Figure 32: Byzantine ware found in Castellorizo shipwreck.

Figure 33: Late Byzantine Shipwrecks.

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