ΙΔΡΥΜΑ ΜΕΙΖΟΝΟΣ ΕΛΛΗΝΙΣΜΟΥ

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Summary :

The Black Sea served Byzantium as a back yard, by forming a grain storehouse. Byzantine domination over the area was constant from the 4th until the 12th c., basing upon the imperial navy plus the net of the seaport towns accessible via a great number of sea routes. Through Constantinople the empire exercised full control over the commercial traffic. During the 13th c. however merchants from Italy gradually suppressed the Byzantine over lordship in the Black Sea. The aggressive maritime policy plus the nautical superiority ensured the Italians' leading position in the Black Sea navigation and trade.

Date

4th - 12th c.

Geographical Location

Black Sea

1.The Byzantine navigation in the Black Sea

The action of navigation depends on the influence of two substantial factors: climate and technology. Sailing was usually restricted to the good weather, i.e. all months between April and October.[1] Rarely enough the Black Sea could become unnavigable due to some climate anomalies, like the sea's freezing in October 763.[2] The prevailing northerly winds and the currents smoothed sailing north to south to be fairly rapid and easy; however one´s approaching the Bosphorus and entering the Black Sea from the south could often be prooved a difficult task and in some instances even a disastrous attempt. Because of the mighty northerly wind (borreas) two big imperial fleets turned to wreckage near the West Black Sea ports Anchialos (Pomorie) and Mesembria (Nessebar) in 766 and in 775.[3]

At the same time naval technology remained limited. There happened two basic innovations in the Byzantine shipping: the triangular lateen sail,[4] and the change in the ship's hull design through the method of the "frame-first construction".[5]

The sources regarding the Byzantine seafaring in the Black Sea do not attest the use of navigational tools such as the mariner's astrolabe and compass. The main guides to navigation were the ancient periploi[6] and after the 13th C. – the portulans and the nautical charts, brought in use by the Italian navigators.[7] The *periplous* of the Black Sea - *Periplous Efxeinou Pontou* (composed not earlier than the first half of the 6th c.) was one of the most popular ones. It was a compilation of three ancient geographical texts.[8] In fact this is the first and the last known example of a byzantine source pertaining exclusively the navigation in the Black Sea. The limited number of navigational guides could be explained by the naval and military treatises (naumachika and taktika) which reveal that the byzantine maritime philosophy was based primarily upon the experienced pilot, rather than upon any guides or special devices.[9]

2. Historical background

The Black Sea is a typical inland sea. Consequently its seagoing traffic was strongly dependent on the naval power via which the control over the Straits could be exercised.[10] The Black Sea became Byzantine property as a consequense of the foundation of the Eastern Roman Empire in the 4th c., and maintained this status until the conquest of Constantinople by the Latins in 1204.[11] Only the Rus of Kiev attempted to disturb the indisputable Byzantine "thalassokracy" (sealordship) in the Black Sea between the 4th -12th c. Between 860 and 1043 the Rus repeatedly sailed through the Black Sea to attack Constantinople.[12] However, Byzantium remained the real "mistress of the Black Sea"[13] due to its naval organization and technological superiority (particularly with regard to the design of the ships and to the see weapons like the Greek fire).

In Addition, the Byzantines used their maritime hegemony as a geopolitical weapon. This attitude facilitated the maintenance of key positions in the vicinity of the Danubian delta; and Byzantines' pressure exerted (by means of regular naval raids) over the medieval Bulgarian state, of which the eastern frontier was the West Black Sea coast.[14] The most striking example of this policy was the fearsome campaign against the

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Bulgarians launched in 763 by Constantine V via a fleet of 2 600 ships.[15]

In 1204 the situation changed completely. During the 13th c. the Italians (firstly the Venetians, followed by the Genoeses) gradually deprived the Byzantine Empire from its hegemony in the Black Sea.[16] Thereafter despite the restoration of the Byzantine Empire and the unquestionable establishment of byzantine control over Constantinople and the Straits, the Byzantines were no more capable to regain their prior thalassokracy in the Black Sea. The Byzantine naval and technological superiority faded away, a fact that impacted the Empire's interests in the Black Sea area. However, as the Italian notarial sources attest,[17] Byzantium, despite of its naval retreat, preserved certain locations in the Black Sea commercial seafaring. Thus the Byzantine sea traders managed to hold part of the Black Sea victuals' traffic which was significantly important for the food supply of Constantinople.[18]

3. Byzantine ships in the Black Sea

The Byzantine ships could be divided into two major categories according to their function – warships and merchant or transport ships.[19] Each of these categories included different types of ships, with diverse peculiarities.

3.1. Warships

The most notable warship of the Byzantine navy was the dromon - an oar-powered vessel, emphasizing speed over weight, with sails for auxiliary use only. By the 9th c. the term dromon had already come to include all the long warships.[20] Modifications of the dromon were the bireme, the trireme, the moneres and the galea. The Byzantine sources reveal that in 680 Constantine IV used dromons in his naval campaign against the Bulgarians[21] while John I Tzimiskes dispatched in 971 a fleet of 300 ships – triremes, supplied with siphons (hurling the Greek fire), moneres and galeas – to the Danube to guard the river estuary.[22] Constantine IX and Alexios I Komnene also used triremes in 1043, and 1048[23] and in 1087[24] respectively in their campaigns against the Rus and the Pechenegs. Another kind of a small warship was the skafos. Skafoi f.ex. were used by Justinian II during his campaign against the Bulgarians in 708.[25] Closely connected to the battleships was the group of the auxiliary vessels such as the chelandion and the heavy pamphylos which transported soldiers, horses and war machines.[26] Between 763 and 775 the emperor Constatine V dispatched a total of 5 500 chelandions ferrying horses and soldiers against the Bulgarians.[27]In the late Byzantine era the dromon was replaced by its improved version - theVenetian light galley (bireme or trireme) called in the Byzantine sources (katerga),[28] whereas the pamphylos was used only for merchant purposes as a cargo ship transporting mainly grain.[29] The sandalion was also used only for non-navy purposes, i.e. as a fishing and cargo ship.[30]

3.2. Merchant ships

The basic information for the Byzantine merchant crafts derives from the underwater archaeology and from a limited number of illustrations.[31] The synthesis of the available data reveals that the merchant ships were comparatively small, round-hulled and had one, two or three masts each with a triangular (lateen) sail. The merchant ships were steered by means of two broad oars fitted to the stern quarters and were primarily sailing ships despite that some types used both sails and oars. However rowing was uneconomical and played only a secondary role.[32] After the 12th c. when the maritime contacts and interactions became more intensive the Byzantine seafarers and merchants brought in use some foreign models of cargo ships such as: the linh, the griparea, the tarida and the ciguta, via which victuals were mainly transported.[33]

In the long run, the Byzantine shipping in 13th – 14th c., following the decline of the empire and the abolition of its navy, was almost totally associated with the sea trade. As a result merchant ships considerably outnumbered warships.

4. Sea routes

The Black Sea was crossroads of middle- and long-distance trade, a zone of intensive contacts and communications linking Europe and Asia. The sailing along the internal Black Sea routes enabled people to be in contact with Western, Central and Northern Europe, Rus, the Caucasus, Central Asia and China.[34] The sea routes of the Black Sea were proved to be safer in compare to the terrestrial ones and the ship transport was rather unexpensive and profitable than the land transport. Ships were the main vehicles of the international trade. Not only merchants used to travel across the sea lanes but also emperors, navies, envoys, messengers, pilgrims, etc.

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The Black Sea routes were both coastal and open sea ones. Since the Byzantine ships were designed essentially for coastal cruising, the Byzantines preferred cabotage to open sea routes. Additionally the developed network of Black Sea ports, harbours and landing places facilitated considerably coastal navigation. The most significant and exploited routes connected the major Black Sea seaport towns with Constantinople. Such a popular coastal sea route linked the Byzantine capital with Heracleia Pontica, as well as Sinope and Amisos (Samsun) and finaly Trebizond on the Southern Black Sea coast. Another coastal sea route hugged the Western Black Sea coast and linked Constantinople with Mesembria, Anchialus (Pomorie) and the harbours in the Danubian Delta. Thence this route followed the northwest coastal line and alongside the estuaries of the rivers Dniester and Dnieper went on to the northern Black Sea coast as far as Cherson from where along the Crimean coast the route set towards Cimmerian Bosporos (Kerch) and the Sea of Azov.[35]

At the same time some sources attest the existence of direct open sea routes which followed the ancient sea lanes.[36] Such One was the open sea route which linkedxx the southern and the northern Black Sea coast through a straight line across the sea. In fact this is the shortest axis of communication connecting directly across the narrowest part of the Black Sea the town of Sinope with the southernmost point of the Crimea (Cape Sarych) and the adjacent harbours. Given to the use of this direct north-south open sea route the sailing from Sinope to the Crimea lasted from two up to ten days depending on the weather conditions but usually it used to take four to five days.[37] In his 14th century "Geography" the Arabian author Aboulfeda (Abufeda) recorded that Cherson laid just opposite to Sinope, Sougdaia (Sudak) – to Simisso and Kaffa (Theodosia) – to Trebizond.[38] This information could be accepted as an indication that three parallel north-south direct routes were in use across the Black Sea.[39] Some other sources reveal the existence of another open sea route which linked the Black Sea northwest with the Black Sea southeast. This route connected Tebizond with the Danubian Delta area and usually nine days of sailing were enough to complete the joureney.[40]

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1. The "mare clausum" (the prohibition on sea travel for a period of four months each year) was not always in effect, especially dyring the late Byzantine period. See Avramea, A., "Land and Sea Communications, Fourth–Fifteenth Centuries", in: Laiou, A. (ed.) *The Economic History of Byzantium,* (Dumbarton Oaks 2002), p. 78. And yet the Byzantines themselves kept respect for the winter even when the navigation moved a step forward in its technological development in 13th – 15th C. Georges Pachymere was truly impressed by the Genoese who dared to sail, on the board of their ships called "taridae", into the Black Sea even in the wintertime. *Γεωργίου Παχυμέρη, Συγγραφικαί ιστορίαι,* Bekker, I. (ed.) *Georgii Pachymeres de Michaele et Andronico Palaeologis libri trecedim, vol. I De Michaele et Andronico Paleologo,* (Corpus Scriptorum Historiae Byzantinae, Bonn 1835), p. 419.

2. *Νικηφόρου πατριάρχου, Ιστορία σύντομος*, de Boor, C. (ed.), *Nicephori archiepiscopi Constantinopolitani, Opuscula historica* (Leipzig 1880), pp. 67-68.

3. *Νικηφόρου πατριάρχου, Ιστορία σύντομος*, de Boor, C. (ed.), *Nicephori archiepiscopi Constantinopolitani, Opuscula historica* (Leipzig 1880), p. 73; *Θεοφάνους Χρονογραφία*, de Boor, C. (ed.), *Theophanes Chronographia*, I (Leipzig 1883), pp. 437, 447 – 448.

4. Makris, G., "Ships", in: Laiou, A. (ed.) *The Economic History of Byzantium,* (Dumbarton Oaks 2002), p. 96. The triangular (lateen) sail was attached to the mast by means of a long inclined crossbar (in larger ships, this consisted of two elongated, thin wooden bars joined together), and it greatly facilitated tacking (even at angles of more than 30 degrees) and maneuvering. Its use had begun to spread through the eastern Mediterranean in Roman times and started predominating after the 6th C.

5. One of the earliest examples of Mediterranean frame-first construction is the hull of the ship sunken at Serçe Limani (on the Asia Minor coast north of Rhodes) in the in the latter 1020s. See Steffy, J.R., *Wooden Ship Building and the Interpretation of Shipwrecks (*College Station, Texas 1994), p. 85 – 91; van Doorninck Jr., Fr. "The Byzantine ship at Serçe Limani", in: Macrides, R., (ed.) *Travel in the Byzantine world, (Papers from the Thirty fourth Spring Symposium of Byzantine Studies, Birmingham, 2000*), (Aldershot Ashgate 2002), p. 137 – 148; F. van Doorninck, Jr., "Byzantine Shipwrecks", in: Laiou, A. (ed.) *The Economic History of Byzantium*, (Dumbarton Oaks 2002), p. 902 – 903.

6. Müller, C. (ed.), *Geographi Graeci minores*, vol.2, (Paris 1855 - 1861).

7. Dalché, P. Gautier, "Portulans and the Byzantine world", in: Macrides, R., (ed.) *Travel in the Byzantine world, (Papers from the Thirty fourth Spring Symposium of Byzantine Studies, Birmingham, 2000*), (Aldershot Ashgate 2002), p. 59 – 71. Greek portulans, similar to Italian porttulans, are known only from the 16th C. See Dellate, A. (επιμ.), *Les Portulans grecs I,* (Bibliothèque de la Faculté de philosophie et lettres université de Liège 107, Liége – Paris 1947); Dellate, A. (επιμ.), *Les Portulans grecs II* (Compléments. Académie Royale de Belgique, Classe des lettres, Mémoire 2éme série 53, Brüssel 1958).

8. Müller, C., *Geographi Graeci minores, vol. I* (Paris 1855), p. 424 – 426; Diller, A., *The Tradition of the Minor Greek Geographers* (Oxford 1952), p. 113.

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9. In the Taktika of Nikephoros Ouranos it is recommended that each strategos, and each ship, ought to have the services of experienced pilots who were familiar with the winds, the reefs and shallows, the land around which the ship was sailing, the islands, and the harbors. See Dain, A., *Naumachica partim adhuc inedita* (Paris, 1943), p. 93. In other sources (The Taktika of Leo VI, De Ceremoniis of Constantine VII) it also becomes clear that the seagoing experience was of primary importance in the Byzantine navigation. See Avramea, A., "Land and Sea Communications, Fourth–Fifteenth Centuries", in: Laiou, A. (ed.) *The Economic History of Byzantium*, (Dumbarton Oaks 2002), p. 81.

10. Thiriet, Fr., *La Romanie vénitienne* (Paris 1959), p.341, 353 – 439; Brătianu, G., *La Mer Noire des origines à la conquête ottomane* (Munich 1969), p. 253 – 328 ; Inalcik, H., "The question of the closing of the Black Sea under the Ottomans", Αρχείον Πόντου, 35 (1979), p. 74 – 109.

11. Brătianu, G., La Mer Noire des origines à la conquête ottomane, (München 1969) p. 171 – 184 ; Nystazopoulou-Pélékidis, M., "Venise et la Mer Noire du XIe au XVe siècle", *Thesaurismata*, 7 (1970), p. 17 – 21.

12. Vernadsky, G., "The Problem of the Early Russian Campaigns in the Black Sea Area", *The American Slavic and East European Review*, 8.1 (1949), p. 1-9; Vernadsky, G., "The Byzantine-Russian war of 1043", *Südostforschungen*, Bd. XII (1953), p. 47-67; Литаврин, Г., "Война Руси против Византии в 1043", in: *Исследования по истории славянских и балканских народов* (Москва 1973), p. 195 ff.; Shepard, J., "Why did the Russians attack Byzantium in 1043?", *Byzantinisch-neugriechische Jahrbücher*, 22 (1979), p. 156 – 167; Kostova, R., "Bypassing Anchialos: The West Black Sea coast in naval companies 11th to 12th c.", in: *Сборник в чест на 70-годишнината на акад. Васил Гюзелев* (София 2006), p. 579 – 585. According to some Arabian sources in the 10th c. the Black Sea had already turned into "Rus' Sea". See Симеонова, Л., *Пътуване към Константинопол: търговия и комуникации в Средиземноморския свят* (края на IX – 70-те годинина XI в., (София 2006), p. 153, n. 550.

13. See van Doorninck Jr., Fr. "Byzantium, mistress of the sea 330 – 641", in: Bass, G. (ed.) *A history of seafaring*, (London 1972), p. 134 – 146.

14. Tăpkova-Zaimova, V., "Quelques observations sur la domination byzantine aux bouches du danube – le sort de Lykostomion et de quelques autres villes côtières" , *Studia Balcanica* I (1970), p. 79 – 86; Тъпкова-Заимова, В., *Долни Дунав – гранична зона на византийския Запад* (София 1976), passim; Gjuzelev,V., "Il Mar Nero ed il suo litorale nella storia del Medioevo Bulgaro", *ByzantinoBulgarica*, VII (1981), p. 11 – 24. The lack of relevant maritime rivals which might have contested the Byzantine Black Sea domination, determined (with a single exceptions against the Rus' fleet in 1043) the employment of the fleet along the West Black Sea coast mostly in logistic rather than in actual naval operations. The fleet was predominantly used to inspire respect in the enemies, to ferry troops and supplies, to ensure better communication and coordination in the campaigns and to provide more flexibility and possibilities for quicker retreat in cases of defeat of the land forces /see for example the campaigns of Constantine IV and Justinian II, *Θεοφάνους Χρονογραφία*, de Boor, C. (ed.), *Theophanes Chronographia*, I (Leipzig 1883), pp. 358, 376.

15. *Θεοφάνους Χρονογραφία*, de Boor, C. (ed.), *Theophanes Chronographia*, I (Leipzig 1883), pp. 437; *Νικηφόρου πατριάρχου, Ιστορία σύντομος*, de Boor, C. (ed.), *Nicephori archiepiscopi Constantinopolitani, Opuscula historica* (Leipzig 1880), p. 43.

16. Thiriet, Fr., *La Romanie vénitienne* (Paris 1959), p. 63 – 104; Brătianu, G., La Mer Noire, p. 225 – 249 ; Nystazopoulou-Pélékidis, M., "Venise et la Mer Noire du XIe au XVe siècle", *Thesaurismata*, 7 (1970), p. 22 ff.; Balard, M., "Gênes et la Mer Noire (XIIIe – XVe siècles)", *Revue historique* CCLXX. 1 (1983), p. 31 – 54; Todorova, El., "The Thirteenth century shift of the Black Sea economy", *Etudes balkaniques* 4 (1987), p. 112 – 116; Papacostea, Ş., "La Mer Noire: du monopole byzantin à la domination des latins aux Détroits", *Revue roumaine d'histoire* XXVII. 1 – 2 (1988), p. 49 – 71.

17. In this respect very indicative are Antonio di Ponzo's notarial registers. He was a Genoese notary in the Genoese trading base of Kilia in the Danube delta in 1360/61. See Pistarino, G. (ed.), *Notai genovesi in Oltremare. Atti rogati a Chilia da Antonio di Ponzò (1360 – 1361)*, (Bordighera 1971); Balard, M.(ed.), *Génes et L'Outre – Mer, tome II. Actes de Kilia du notaire Antonio di Ponzò 1360* (Paris, 1980). Of the fifty-seven ships listed in the Ponzo registers, seventeen (i.e., almost a third) belonged wholly or at least in part to Greek shipowners and patrons. See Balard, M., "L'activité économique des ports du Bas-Danube au XIVe siècle", *Traveuax et Mémoires*, 8 (1981), p. 40; Laiou, A., "Byzantium and the Black Sea, 13th – 15th centuries: Trade and the native populations of the Black Sea area", *Bulgaria Pontica Medii Aevi 2* (1988), p. 164 – 201; Matschke, K., "Commerce, trade, markets, and money, XIII – XV c.", in: Laiou, A. (ed.) *The Economic History of Byzantium*, (Dumbarton Oaks 2002), p. 789 – 793.

18. On the key economic role of the Black Sea for the importation and delivery of victuals into Constantinople see Brătianu, G., "La question de l'approvisionnement de Constantinople à l'époque byzantine et ottomane", *Byzantion* 5 (1929/ 1930), p. 83 – 107; Brătianu, G., "Nouvelles contributions à l'étude de l'approvisionnement de Constantinople sous les Paléologues et les empereurs Ottomans", *Byzantion*, 6 (1931), p. 641 – 656 ; Nystazopoulou-Pélékidis, M., "Venise et la Mer Noire du XIe au XVe siècle", *Thesaurismata*, 7 (1970), p. 18 – 19; Laiou, A., "Byzantium and the Black Sea, 13th – 15th centuries: Trade and the native populations of the Black Sea area", *Bulgaria Pontica Medii Aevi 2* (1988), p. 165; Koder, J., "Maritime trade and the food supply for Constantinople in the middle ages", in: Macrides, R., (ed.) *Travel in the Byzantine world, (Papers from the Thirty fourth Spring Symposium of Byzantine Studies, Birmingham, 2000*), (Aldershot Ashgate 2002), p. 109 – 124.

19. In fact these two ship categories were representative of the whole ancient and medieval shipping in the Mediterranean world. See Ahrweiler, H., *Byzance et la Mer* (Paris 1966), p. 408 – 418; Kemp, P. *The history of ships* (London 1978), passim; Pryor, J., *Geography, technology, and war. Studies in the maritime history of the Mediterranean 649 – 1571* (Cambridge 1988), p. 25 – 86; Pryor, J., "Types of ships and their performance capabilities", in: Macrides, R.,

(ed.) *Travel in the Byzantine world, (Papers from the Thirty fourth Spring Symposium of Byzantine Studies, Birmingham, 2000*), (Aldershot Ashgate 2002), p. 33 – 58; Makris, G., "Ships", in: Laiou, A. (ed.) *The Economic History of Byzantium*, (Dumbarton Oaks 2002), p. 91 – 100.

20. Ahrweiler, H., *Byzance et la mer. La marine de guerre, la politique et les institutions maritimes de Byzance au VIIe-XVe siècles* (Paris 1966) p. 410 – 412; Pryor, J., *Geography, technology, and war. Studies in the maritime history of the Mediterranean 649 – 1571* (Cambridge 1988), p. 58 – 59; Makris, G., "Ships", in: Laiou, A. (ed.) *The Economic History of Byzantium*, (Dumbarton Oaks 2002), p. 92; Pryor, J., - El. Jeffreys, *The Age of the DROMON: The Byzantine Navy ca. 500-1204* (Leiden 2006).

21. *Θεοφάνους Χρονογραφία*, de Boor, C. (ed.), *Theophanes Chronographia*, I (Leipzig 1883), p. 358; *Νικηφόρου πατριάρχου, Ιστορία σύντομος*, de Boor, C. (ed.), *Nicephori archiepiscopi Constantinopolitani, Opuscula historica* (Leipzig 1880), p. 34.

22. *Λέων Διάκονος*, Hastii, C. B. (ed.) *Leonis Diaconi Caloensis Historiae libri decem et liber De Velitatione bellica Nicephori augusti, (Leonis Diaconi)*, (Corpus Scriptorum Historiae Byzantinae, Bonnae 1828) p. 129.

23. *Ιωάννου Σκυλίτζη, Σύνοψις ιστοριών*, Thurn, J. (ed.) *Ioannis Scylitzae Synopsis historiarum*, (Corpus Fontium Historiae Byzantinae, 5, Berlin – New York 1973) p. 430 – 433; *Μιχαήλ Ψελλού Χρονογραφία*, Renauld, E. (ed.) *Michel Psellos, Chronographie, II*, (Paris 1928). II, (Paris 1928), p. 8 – 10, p. 8 – 10; *Ιωάννης Ζωναράς, Επιτομή Ιστοριών*, Pinder, M., - Butter-Wobst, Th. (eds), *Ioannis Zonarae, Epitomae Historiarum I, II, III* (CSHB, Bonnae 1841-1897), libri XIII – XVIII p. 630 – 633.

24. *Άννα Κομνηνή, Αλεξιάς*, Reinsch, D.R., Kambylis, Ath. (eds) *Annae Comnenae Alexias. Pars altera indices*, (Corpus Fontium Historiae Byzantinae 40/2, Berlin – New York 2001) p. 204 – 208.

25. *Θεοφάνους Χρονογραφία*, de Boor, C. (ed.), *Theophanes Chronographia*, I (Leipzig 1883), p. 378; *Νικηφόρου πατριάρχου, Ιστορία σύντομος*, de Boor, C. (ed.), *Nicephori archiepiscopi Constantinopolitani, Opuscula historica* (Leipzig 1880), p. 43.

26. Ahrweiler, H., *Byzance et la mer. La marine de guerre, la politique et les institutions maritimes de Byzance au VIIe-XVe siècles* (Paris 1966) p. 410 – 413; Makris, G., "Ships", in: Laiou, A. (ed.) *The Economic History of Byzantium*, (Dumbarton Oaks 2002), p. 93.

27. *Θεοφάνους Χρονογραφία*, de Boor, C. (ed.), *Theophanes Chronographia*, I (Leipzig 1883), p. 433, 437, 446 - 448; *Νικηφόρου πατριάρχου, Ιστορία σύντομος*, de Boor, C. (ed.), *Nicephori archiepiscopi Constantinopolitani, Opuscula historica* (Leipzig 1880), p. 69, 73.

28. Bryer, A., "Shipping in the Empire of Trebizond", *The Mariner' Mirror* 52 (1966), 1, p. 5 – 7, 11; Pryor, J., *Geography, technology, and war. Studies in the maritime history of the Mediterranean 649 – 1571* (Cambridge 1988), p. 57 – 67.

29. Balard, M. (ed.), *Génes et L'Outre – Mer, tome II. Actes de Kilia du notaire Antonio di Ponzò 1360* (Paris, 1980). № 93 – 94; Pistarino, G. (ed.), *Notai genovesi in Oltremare. Atti rogati a Chilia da Antonio di Ponzò (1360 – 1361)*, (Bordighera 1971), № 64.

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32. The length of the merchant ships varied between 6 and 35 m, and the beam between 3 and 12 m. For example the seventh-century Yassi Ada ship had an overall length of 20.5 m and a beam of around 5 m, while the Serçe Limani ship was of around 15 m overall length and 5 m beam. The length to beam ratios of the merchant ships were usually 3:1 or 4:1. Their cargo capacity varied between 10 and 250 tons. See van Doorninck Jr., Fr. "Byzantium, mistress of the sea 330 – 641", in: Bass, G. (ed.) A history of seafaring, (London 1972), p. 133 – 158; van Doorninck Jr., Fr. "The Byzantine ship at Serçe Limani", in: Macrides, R., (ed.) *Travel in the Byzantine world, (Papers from the Thirty fourth Spring Symposium of Byzantine Studies, Birmingham, 2000*), (Aldershot Ashgate 2002), p. 137 – 148; Bass, G., - F. H. Doorninck, Jr., (eds.), *Yassi Ada. Volume I: a seventh-century Byzantine shipwreck* (College Station, 1982); Pryor, J., "Types of ships and their performance capabilities", in: Macrides, R., (ed.) *Travel in the Byzantine world, (Papers from the Thirty fourth Spring Symposium of Byzantine Studies, Birmingham, 2000*), (Aldershot Ashgate 2002), p. 34 – 35; Parker, A. J., *Ancient Shipwrecks of the Mediterranean and the Roman Provinces* (Oxford 1992), passim; Koder, J., "Maritime trade and the food supply for Constantinople in the middle ages", in: Macrides, R., (ed.) *Travel in the Byzantine world, (Papers from the Thirty fourth Spring Symposium of Byzantine Studies, Birmingham, 2000*), (Aldershot Ashgate 2002), p. 123, appendix I; Makris, G., "Ships", in: Laiou, A. (ed.) *The Economic History of Byzantium*, (Dumbarton Oaks 2002), p. 94 – 97.

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Glossary :

bireme
The bireme, i.e. a type of dromon, powered by two banks of rowers, one above the other (Taktika of Leo VI).The standard bireme dromon had two banks of 25 oarsmen per side, one below deck and one above it, for a total of 100 oarsmen . The overall length of the bireme was at least between 31 and 32 meters. The bireme had two masts.

chelandion
The terminological use in the sources is ambivalent. Sometimes the term chelandion was used synonymously with domon to refer to oar- and sail-powered warships of varying sizes and speeds.

ciguta
A cargo ship whose characteristics were similar to those of the small linhs so probably it was also a hybrid type of ship just like the linh. The ciguta was typical for the West Black Sea and especially for the Danubian Delta area where a shipyard for chigutoi and pamfyloi existed.

dromon
dromon (“runner”) - first attested in the 5th – 6th C. as an oar-powered vessel with sails for auxiliary use. Although the dromon was a continuation of the Roman shipbuilding tradition, it reached such an advanced stage of development as to constitute a purely Byzantine type. In the sixth century according to Procopius, the term dromon referred to a single specific type of decked warship powered by one bank of rowers, but later sources from 9th and 10th C. indicate for dromons which had two or even three banks of rowers (these were the so called “bireme” and “trireme”). The offensive weapons of each dromon included a ram fixed to the prow and a siphon from which Greek fire was sprayed

frame-first construction
A shipbuilding method in which overall hull shape was determined primarily by frames (ribs) erected before planking, rather than by tenoned-together planking erected before frames (the method followed in the ancient Mediterranean world).

galea
galea (from γαλαίος, “swordfish”,) – a term introduced first by Leo VI to denote light, rapid dromones powered probably by one bank of oars. They were commonly used as messenger ships or for reconnaissance in enemy waters.

Greek fire
Incendiary mixture based on crude oil (‘naphtha’), which was launched with the help of a pressure pump. Its used was spread in Byzantium towards the late 7th century and became one of the most powerful weapons of the Byzantine navy until the invention of canons.

griparea – (grippo, gripar, igribār)
A small lateen-rigged ship which probably have been developed from the Venetian “grippo”. The griparea usually had one mast and was used particularly for trade and fishing. However some Trapezuntine sources refer to griparea as a warship in the fleets of Trebizond.

linh – (lignum)
A hybrid type of ship combining features of both oared and sailing, long and round-hulled ships. The use of oars was very helpful in cases of emergencies and for maneuvering in confined waters. The linhs were of small and medium size and were exploited primarily as merchant ships. However some sources attest them as warships as well as pirate ships.

mariner’s astrolabe
An astronomical computer with use in navigation. It consisted of a graduated circle with an alidade used to measure vertical angles. Early instruments were only graduated for 90°; later instruments were graduated for the full 360° circle around the limb.

moneres
moneres (monšria) – small extrarapid dromons, with only one bank of oars.

pamphylos (pamphylion)
A round-hulled vessel that served to ferry war machines and horses. It was both oar- and sail-powered. The number of its oarsmen varied between 130 and 160 men.

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periplus, the

From the greek word "περίπλους" (sailing-around), roughly corresponding to the Latin cercum-navigatio. For Phoenicians, Greeks, Romans nd Byzantines it was a manuscript document belonging to ancient documentary genre that survived in late antiquity.used as a guide for sea travelers. Thw periploi listed in order the ports and coastal lines, with approximate distances between, even shelters, that the captain of a vessel could expect to find along a shore, market towns, neighboring tribes and their wares. They also contain historical and mythological information and for the most part they are works of erudition.

portolan, portulan

(from latin word “portus”, port) a book with nautical instructions (today called “a pilot book”) which gives a description of the coastline and indicates the sailing directions which were to be followed in order to reach a given point of orientation (a port, promontory, island, estuary etc.). It also depicts the ports and anchorages with their navigational peculiarities and the possible approaches to them. The portulan is an achievement of the medieval navigation and could be considered as a result from the application of the compass in seafaring during the 12th C.

sandalion

A small sailing fishing and cargo ship which sometimes was also used as an auxiliary craft in the byzantine navy.

skafos

A small oar-powered ship which had up to 50 oarsmen (like the emperor Maurice’s skafos, see Theophylacti Simocattae Historiae, ed. de Boor, Lipsiae 1887, p. 290). Some sources refer to skafoi the ships used by the Rus in their Black sea campaigns.

tarida (tarīda)

A hybrid cargo ship (for horses) combining features of both oared and sailing, long and round-hulled ships, of arabic origin. The Genoese sources reveal thatthe design and form of the tarida were similar to those of the galley. The tarida had usually two lateen-rigged masts but just like the galley it also used the power of the oars.

trireme

Anc. oblong war ship (37 m. length and 5.5 m. width) which used 170 oarsmen who sat in three levels. It could quickly cover long distances and ram the ships of the enemy.
Byz. the largest type of dromon, powered by three banks of rowers. In “De ceremoniis” of Constantine VII, there are references to this large type of dromon which had banks of oars for 230 rowers. The length of these large tenth-century dromons has been estimated at 60 m, their breadth at 10 m, and their height from the keel to the top of the bow and stern towers as 5–6 m. Their draft was 1.5 m. With a displacement of more than 100 tons, these vessels could cruise at 5 knots and developed a battle speed of 7 knots.

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Quotations

Each Byzantine ship should have aboard an experienced man (pilot)

Ἁρμόζει τὸν στρατηγὸν ἔχειν μὲθ ἑαυτοῦ τοὺς γιγνώσκοντας ἀκριβῶς τὴν πείραν τῆς θαλάσσης εἰς ἣν πλέει, τὸ ποιοὶ ἄνεμοι κυμαίνουσιν αὐτὴν καὶ τὸ ποιοὶ φυσῶσιν ἀπὸ τῆς γῆς. Ἵνα δὲ γινώσκωσι καὶ τᾶς κρυπτομένας πέτρας εἰς τὴν θάλασσαν καὶ τοὺς τόπους τοὺς μὴ ἔχοντας βάθος καὶ τὴν παραπλεομένην γῆν καὶ τᾶς παρακειμένας αὐτὴ νήσους, τοὺς λιμένας καὶ τὸ πόσον ἀπέχουσι οἱ τοιοῦτοι λιμένες εἰς ἀπὸ τοῦ ἄλλου. Ἵνα δὲ γινώσκωσι καὶ τὰ χωρία καὶ τὰ ὕδατα. Πολλοὶ γὰρ ἐκ τοῦ ἔχειν ἀπειρίαν τῆς θαλάσσης καὶ τῶν τόπων ἀπώλυντο, ἐπειδὴ φυσῶσι πολλάκις ἄνεμοι καὶ σκορπίζουσι τὰ ἄπλοια εἰς ἄλλον καὶ ἄλλον τόπον. Καὶ ἁρμόζει ἵνα μὴ μόνον ὁ στρατηγὸς ἔχη τοὺς γινώσκοντας ἅπερ εἴπαμεν, ἀλλὰ καὶ ἐν ἕκαστον πλοῖον ἵνα ἔχη τὸν ταῦτα γινώσκοντα, πρὸς τὸ βουλεύεσθαι καλῶς τὸ συμφέρον.

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