The Age of the ΔΡΟΜΩΝ

The Byzantine Navy ca 500-1204

John H. Pryor and Elizabeth M. Jeffreys



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THE
MEDIEVAL MEDITERRANEAN

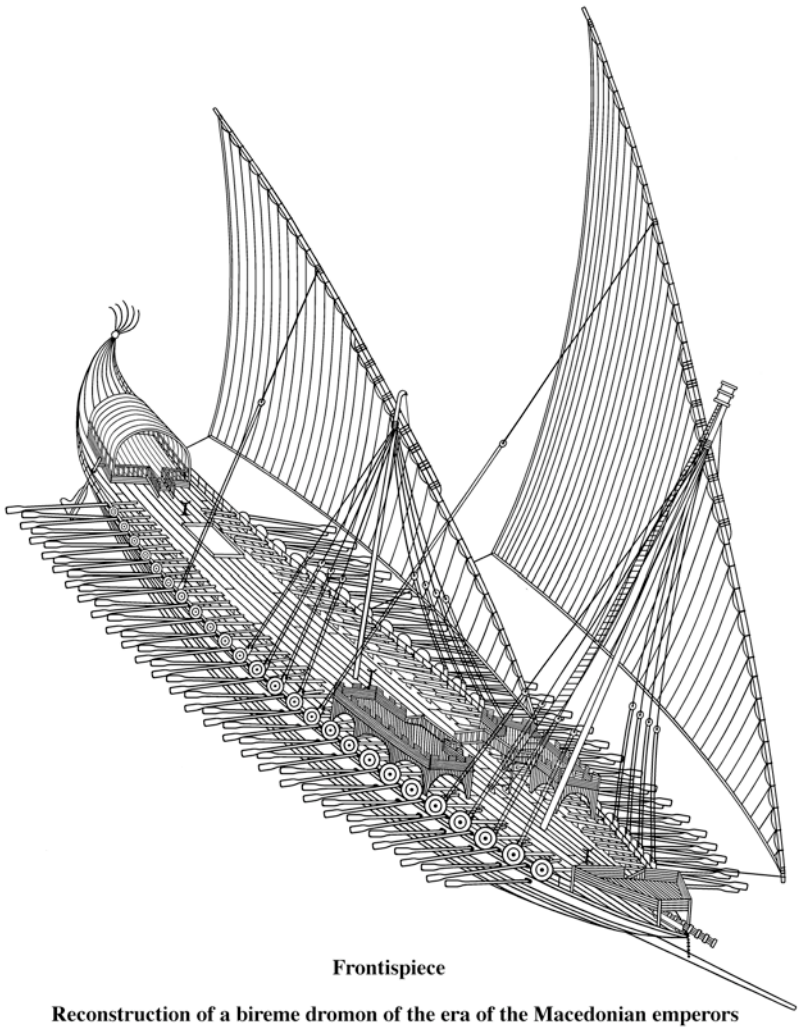
PEOPLES, ECONOMIES AND CULTURES, 400-1500

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VOLUME 62





Frontispiece

Reconstruction of a bireme dromon of the era of the Macedonian emperors

© John H. Pryor

THE AGE OF THE ΔΡΟΜΩΝ

The Byzantine Navy ca 500-1204

BY

JOHN H. PRYOR
AND
ELIZABETH M. JEFFREYS

WITH AN APPENDIX
TRANSLATED FROM THE ARABIC OF
MUḤAMMAD IBN MANKALI

BY

AHMAD SHBOUL



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On the cover: 'Dromon using Greek Fire' from John Skylitzes' *Matritensis Græcus* (formerly *Codex Græcus Matritensis Ioannis Skyllitzes*, 5-3 N-2). © Biblioteca Nacional, Madrid, vitr. 26-2, fol. 34v.

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PRINTED IN THE NETHERLANDS

To my children, Shefali and Sean

John Pryor

To my daughter, Katharine

Elizabeth Jeffreys

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PREFACE AND APPRECIATIONS

We have shared a happy collaboration in this book. Our friendship even survived the translation of the texts for Appendices One to Five, where we were concerned to achieve a delicate balance between producing a readable English translation for Byzantinists and the general public and preserving the literal meaning of technical language as closely as possible for maritime and military historians. John Pryor has been responsible for the historical research and for the writing of the text. Elizabeth Jeffreys has been responsible for the editing of the texts in Appendices One to Five, for the translation of Greek texts, for matters philological, and for the interpretation of the *milieux* of the Byzantine sources. We are indebted to Ahmad Shboul for his collaboration in Appendix Eight.

An earlier version of some parts of the book was published by John Pryor as "From *dromōn* to *galea*: Mediterranean bireme galleys AD 500-1300", in J. Morrison, ed., *The age of the galley: Mediterranean oared vessels since pre-classical times* (London, Conway Maritime Press, 1995), 101-16. A much shorter version of the first four parts of Chapter One was published by John Pryor as "The Mediterranean breaks up: 500-1000", in D. Abulafia, ed., *The Mediterranean in History* (London, Thames & Hudson, 2003), 155-82, and parts of Chapter Four were also used by John Pryor in "Types of ships", "Byzantium and the Sea", and "Σταδιοδρομικόν". We acknowledge the permission of the various publishers to reuse material here.

We are grateful to friends and colleagues who kindly read and commented on preliminary drafts of this study or who made valuable contributions in other ways: Professor Lionel Casson, Professor John Dotson, Professor Michael McCormick, Dr John O. Ward, and Mr Nigel Wilson. Professor Reinhold Mueller traced down at our request the medal forged by Alvise Meneghetti and attributed to a Doge Pietro Candiano. Associate Professor Dexter Hoyos was generous in assistance with some tortuous passages in Latin. Mr Maxwell Walkley was our consultant for Old French and Professors Margaret Clunies Ross and Geraldine Barnes for Old Norse. Mr John Coates displayed endless patience and good will in replies to numerous questions from an academic (even if a nautically knowledgable one) to a practised seaman and naval architect, and Ms Ann Hyland was our consultant on horses. We are particularly indebted to Professor Michael Carter

for his extensive assistance with matters Arabic in the last years of production of the book and to Professor John Haldon for the unfailing generosity of his collaboration over many years. It is not possible to acknowledge individual contributors everywhere, but they will recognize where we are indebted to them.

We are also grateful to David Frendo for allowing us access to a draft of his translation of the *On the capture of Thessalonikē* of John Kaminiatēs and also to Ann Moffat for her translation of chapters II.44, 45 of the *De cerimoniis* of Constantine Porphyrogennētos. We are also indebted to John Haldon for allowing us access to the manuscript of his commentary on chapters II, 44 & 45 of the *De cerimoniis*, before it was published as "Theory and practice", and for a pre-publication copy of his "'Greek Fire' revisited".

John Pryor acknowledges that his interest in the Byzantine treatises on naval warfare and in the δρόμων was originally aroused by a copy of a translation of, and commentary on, the first few paragraphs of the *Ναυμαχικὰ Λέοντος Βασιλέως* of Leo VI by the late R. H. Dolley, which was made available to him by Mr Brian Dolley, his brother's executor. He is grateful to him for his generosity. R. H. Dolley had intended to complete a translation of, and commentary on, the whole of the *Ναυμαχικὰ Λέοντος Βασιλέως*, but never did so. We also acknowledge the unfailingly helpful assistance of the staff of the Bodleian Library, Oxford, in particular of Ms Christine Mason, and of Fisher Library, University of Sydney, in particular of Rod Dyson, Bruce Isaacs, and Megan O'Brien of Inter Library Loans and of Terry O'Brien (no relation), the Library's wizard at finding "lost" books.

Finally we would like to acknowledge the patience, and also the assistance, of Michael Jeffreys, who suffered endless phone calls to his wife from John Pryor, whom he came to know as "dromons personified", and of Gail Pryor, who suffered the absence of her husband "away at sea" for years on end. Research for this book, the original draft of which was a 12,000-word article, began in 1987.

John Pryor
Sydney

Elizabeth Jeffreys
Oxford

January 2006

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NOTE ON ORTHOGRAPHY, TRANSLATION, CITATION, AND DATING

Orthography

This work is intended for the use of not only Byzantinists who can read Greek but also maritime historians and medievalists of all persuasions who can not. Therefore, we have tried to be as accomodating as possible, frequently giving terms not only in Greek, but also in transliteration and in translation where we have judged it useful to readers to do so. We have also created a Glossary of selective Arabic, Greek, and Latin technical terms. Usages have usually been given in the text in Roman transliteration or English translation except where specific reference is made to a particular Greek text. All Arabic citations have been made in transliteration. Terms included in the Glossary have been given in italics in the text.

There is also a separate Glossary of English nautical terminology for the assistance of those unfamiliar with matters maritime.

In transliterating Greek we have distinguished η from ε by adding a makron to "e" for the η, as in "ē". Similarly, we have distinguished the Greek "ω" from "o" by adding a makron to "o" for the ω as in "ō". The only exception we have made to this rule is the word δρόμων itself. It would have been pedantic beyond words to have used "*dromōn*" and "*dromōnes*" on hundreds of occasions. Except where the use of the word itself is at issue, we have simply used "dromon" and "dromons". In transliterating Arabic and Turkish we have followed a modified version of the *Encyclopedia of Islam* system, only replacing "dj" by "j", "ḳ" by "q", and omitting the underlining of digraphs; thus, Aghlabid rather than Aghlabid, Shah rather than Shah, etc.

To assist readers lacking a strong historical background we have created a selective Gazeteer of historical place names which can not be found in commonly available English-language atlases. Place names included in the Gazeteer have been given in italics in the text. In the Gazeteer, and throughout, Greek names of people, places, institutions, etc. have been standardized to the usage of *The Oxford dictionary of Byzantium* or, failing that, Smith's *Dictionary of Greek and Roman geography*, or the British Admiralty *Mediterranean Pilot*. We have preserved the Greek orthography in the transliteration of

proper nouns except where there is a common English equivalent, thus Constantine rather than Kōnstantinos, Constantinople rather than Kōnstantinoupolis, Leo rather than Leōn, etc. However, Nikēphoros, Lekapēnos, etc. On occasions when the extent of a common English equivalent is ambiguous we have had to make a choice, thus Thessalonikē rather than Thesssaloniki or Salonika, etc.

Arabic names and titles have been standardized to the transliterations of the *Encyclopedia of Islam* as modified above.

Translation

In translating Greek, Latin, and Arabic texts we have have kept in mind throughout our intended readership; namely, not only Byzantinists but also maritime historians and others who cannot read these languages but who are concerned with the close technical meaning of the texts. Therefore we have made our translations as literally close to the Greek, Latin, and Arabic texts as it is possible to do without making the English incomprehensible.

Square brackets [ ] in translations indicate our additions to texts where the corresponding words in English do not exist in the texts but need to be added to make the English comprehensible.

Citation of Primary Sources

Because not all readers will have access to the same editions we have used, we have followed the principle that in citation of primary sources we have given any text subdivisions, for example, book, chapter, verse, etc. first. We have then added the page numbers of the editions we have used in parentheses.

On the one hand, Greek and Latin texts have been cited according to the best editions known to us. Where translations known to us into European languages exist, we have cited the most convenient of these in the Bibliography for the information of readers; however, we have not cited them in the notes.

On the other hand, for Arabic texts we have followed the principle that because standard editions in Arabic are in many cases very difficult to obtain, even in major libraries, and because few readers of this book will be able to read Arabic, we have used translations. In many cases this has meant using a variety of translations, frequently

obscure, of selections from, and parts of, texts. The only exceptions to this rule have been where a point has needed to be made in the text from a part of an Arabic text which has no translation known to us or where a word with a technical meaning is at issue.

Dating

All dates refer to the "Christian" (or "Common") Era (C.E.) or "*Anno Domini*" (A.D.) unless otherwise specified. "B.C.E." is used for the pre-Christian era, "A.H." for the years of the *Hijrah*, the Muslim calendar dating from 16 July 622, and "A.M." for *Annus Mundi*, the Byzantine sytem of dating from the Creation, reckoned to B.C.E. 5,508.

When citing the regnal dates of Byzantine emperors, we have used their entire reigns, irrespective of whether or not they were only co-emperors for part of that time.

NOTE ON METROLOGY AND HOURS OF DAYLIGHT

[a] Metrology[1]

In terms of the practical limitations of medieval shipbuilding and also of medieval mensuration, measurements or trigonometrical calculations taken to tenths or even hundredths of a centimetre, or other equivalents, would have been totally impracticable of course. We have used such equivalents as derived from the nineteenth-century metrological manuals compiled by Martini, Doursther, and others after the metrification of Europe only as a base on which to build more realistic medieval measures. Similarly, we have rounded out the results of often complex mathematical applications to sensible figures.

Modern		
British Imperial		Metric
ton		tonne
.984	1	1.016
mile		kilometre
.621	1	1.609

Byzantium		
Length		
πούς (*pous*)	= 16 *daktyloi*	= 31.23 cms
πῆχυς (*pēchys*)	= 24 *daktyloi* [= 1.33 *podes*]	= 46.8 cms
μίλιον (*milion*)	= 4,200 or 4,500 *podes*	= 1.31 or 1.40 kms
Weight		
Λίτρα (litra)		= approx. 0.32 kgs
Liquids		
μέδιμνος/μόδιος (*basilikos modios*)	= 40 *litrai*	= 17.1 litres

[1] Sources: Doursther, *Dictionnaire universel*; Martini, *Metrologia*; *Oxford dictionary of Byzantium*.

Genoa		
Liquids		
quartarolo		= 39.75 litres
barilio	= 2 *quartaroli*	= 79.5 litres
mezzaruola	= 2 *barili*	= 159 litres
Marseilles		
Length		
palmus		= 0.252 metres
Liquids		
millayrola/milhairǫla		= 63.5 litres
Naples		
Liquids		
barile		= 43.625 litres
Paris		
Liquids		
quarta	= 2 pinte	= 1.86 litres

[b] Hours of Daylight

For hours of daylight we have utilized the United States Naval Observatory, *Complete sun and moon data for one* day, @ http:/aa.usno.navy.mil/data/docs/RS_OneDay.html. This enables one to enter any town in the world for any day of any year back to 1800 to obtain hours of daylight and moonlight for that day and place. It gives the hours of the beginning of daylight, sunrise, the midday transit, sunset, and the end of twilight. We have used the year 1800 throughout because it is the earliest for which the Observatory has computed data, because it eliminates the effects of modern climate change, and because the climate at that time is considered by historians of climate to have been similar to that of the Middle Ages. Even if the climate was not quite the same, the differences would have been negligable and would not affect any calculations made here.

SELECTIVE GAZETEER OF HISTORICAL PLACE NAMES[1]

Abbreviations

Ar.	Arabic	lit.	literally
Byz. Gr.	Byzantine Greek	med. Lat.	medieval Latin
cl. Lat.	classical Latin	prov.	province
et var.	*et variae* (and variants)	*q.v.*	*quod vide*, which see
Gr.	Greek	R.	Roman

Abydos Ἄβυδος, *et var.* (cl. & Byz. Gr.), *Abydus*, *et var.* (cl. & med. Lat.): town and port on the Dardanelles, near Çanakkale, Turkey, ruined.

Achelōon Ἀχελῷον (Byz. Gr.): battlefield near a river or fortress of the name, W coast of the Black Sea.

Actium Ἄκτιον (cl. Greek), *Actium* (cl. & med. Lat.): naval battle off the promontory of the name, S entrance to the Gulf of Amvrakia, Greece.

Aegates *Aegates insulae* (cl. Lat.), possibly from Gr. Αἰγάδες: Egadi islands, W Sicily.

Africa *Africa* (cl. Lat.), Ἀφρική (cl. Gr.): prov. of R. North Africa, N Tunisia.

Aigaion Pelagos Αἰγαιῶν Πέλαγος (Byz. Gr.): lit. "Aegean Sea", Byzantine naval *thema*†, headquarters Lesbos.

Aigina Αἴγινα (cl. & Byz. Gr.), *Aegina*, *et var.* (cl. & med. Lat.): island, Aiyina, Greece

Al-Andalus *Al-Andalus* (Ar.), *Andalus/Hispania/Iberia* (med. Lat.): Muslim Spain, connected hypothetically to the Arabic for the Vandals, *al-Andalīsh*.

Alarcos Alarcos (med. Spanish), Al-Arak (Ar.): battlefield near Santa Maria de Alarcos, prov. Calatrava la Vieja, Spain.

Al-Faramā' Πηλούσιον (Gr.), *Pelusium* (cl. Lat.), *Pelusium*, *et*

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[1] The gazeteer is a guide only to those historical place names which may not be known commonly and which cannot be found in the commonly-available English language atlas: J. C. Bartholomew, *The world atlas*, any ed. (Edinburgh). The style of the Wisconsin *History of the Crusades* [Setton, *HC*] has been followed except that for Turkish and Arabic names a modified version of *The Encyclopedia of Islam* [*EI.2*] has been followed and for Byzantine names *The Oxford Dictionary of Byzantium* [ ]. Graesse, *Orbis Latinus*, has also been used. All are acknowledged throughout.

var. (med. Lat.), al-Faramā' (Ar.): town, *al-Faramā'*, Egypt.

Al-Fayyūm (Ar.), *Phiom* (Coptic): fertile agricultural region of Middle Egypt, capital *Arsinoe* (*q.v.*).

Al-Fusṭāṭ Al-Fusṭāṭ (Ar.), *Babylon*/*Babilonia*, *et var*. (med. Lat.): Muslim town north of *Babylon* (*q.v.*), later Qaṣr al-Sham', now Miṣr, Old Cairo, Egypt.

Al-Kūfa *Al-Kūfa* (Ar.), *Cufa*/*Kufa* (med. Lat.): town founded on the middle Euphrates in 638 C.E., near al-Najaf, Iraq, ruined.

Al-Mahdiyya Al-Mahdiyya (Ar.), *Madia* (med. Lat.): town and port founded by 'Ubayd Allāh al-Mahdī in 912-13 C.E., Mahdia, Tunisia.

Al-Qayrawān Al-Qayrawān (Ar.): Aghlabid capital, founded by Mu'āwiya ibn Ḥudayj in 665 C.E., Kairouan, Tunisia.

Al-Rawḍa *Al-Rawḍa* (Ar.): island in the Nile at *al-Fusṭāṭ* (*q.v.*).

Ampurias Ἐμπορίαι/Ἐμπόριον (cl. Gr.), *Emporiae*/*Emporium* (cl. Lat.), *Emporitanus*, *et var*. (med. Lat.): medieval county, from the ancient city of the same name, Gulf of Rosas, Catalonia, Spain.

Anatolikon Ἀνατολικόν: original *thema*† of Asia Minor, central Anatolia south of *Opsikion* (*q.v.*).

Antioch on Cragus Ἀντιόχεια ἐπὶ Κράγῳ (cl. Gr.), *Antiochea super Cragum*, *et var*. (med. Lat.): fortress city on the Gulf of Antalya, Turkey, lost.

Aphroditē Ἀφροδίτης πόλις/Ἀφροδίτω (cl. & Byz. Gr.), *Aphrodito*/*Aphroditopolis*, *et var*. (cl. & med. Lat.): city of *al-Fayyūm* (*q.v.*), Kom Ishgaw, near Atfih, Egypt.

Aquileia *Aquileia* (cl. Lat.), Ἀκυληία (Byz. Gr.), *Aquilegia*, *et var*. (med. Lat.): town, Aquileia, Italy.

Aquitania Secunda *Aquitania Secunda* (cl. Lat.): prov. of R. Gaul on the Bay of Biscay, N of the Garonne, France.

Arados Ἡ Ἄραδος, *et var*. (cl. Gr.), *Aradus* (cl. & med. Lat.), Arwād/Ruwād (Ar.): island off Lebanon near Tortosa/Tartus, Ruad, Syria.

Arginousai Ἀργινοῦσαι (cl. Gr.), *Arginousae* (cl. Lat.): promontory or small islands on the mainland opposite Mitylēnē, Turkey.

Armeniakon Ἀρμενιακόν: original *thema*† of Asia Minor, eastern Anatolia from *Cappadocia* to the Euphrates, reduced in the 9th century to the coast of the Black Sea, bounded by *Paphlagonia* (*q.v.*) to the W, *Kolōneia* to the E, and *Charsianon* to the S, Turkey.

Arsinoe Ἀρσινόη (cl. Gr.), *Crocodilopolis* (cl. Lat.), *Arsinoe/Crocodilopolis* (med. Lat.), Madīnat al-Fayyūm (Ar.): capital of the area of Middle Egypt known as *al-Fayyūm* (*q.v.*), Madīnat al-Fayyūm, Egypt.

Arsuf Ἀπολλωνία (cl. Gr.), *Apollonia* (cl. Lat.), *Apollonia/Arsur/Sozusa*, *et var.* (med. Lat.): Arsuf, Israel.

Aṣīla Ζῆλις, *et var.* (cl. Gr.), *Zilia* (cl. Lat.), *Arzilia*, *et var.* (med. Lat.), Aṣīla (Ar.): town and port on the Atlantic coast, As(z)ilah, Morocco.

Astakos, Gulf of Ἀστακός (cl. & Byz. Gr.), *Astacus* (cl. Lat.), *Astacenus sinus* (med. Lat.): Gulf, Izmit Körfezi, Turkey.

Avlona *Aulon* (cl. Lat.), Αὐλών (Byz. Gr.), *Aulona/Valona*, *et var.* (med. Lat.): town, Vlorë, Albania.

Ayas *Agai* (cl. Lat.), *Ayacium* (med. Lat.), Āyās (Ar.): Ayas, prov. Yumurtalık, Turkey.

Babylon *Babylon* (cl. Lat.), Βαβυλών (cl. Gr.): military camp and fortress, N of *al-Fusṭāṭ* (*q.v.*), Egypt, ruined.

Bādis *Parietina*? (cl. Lat.), Bādis (Ar.), *Bardias*, *et var.*, (med. Lat.): town at the mouth of the Tālembādes river, territory of *Nakūr* (*q.v.*), Morocco (to Spain), ruined.

Barqa Βάρκη (Gr.), *Barce* (cl. Lat.), *Barca*, *et var.* (med. Lat.), Barqa (Ar.): town and prov., al-Marj, Libya.

Bijāya *Saldae* (cl. Lat.), Σάλδαι (cl. Gr.), *Bogia* (med. Lat.), *Bijāya* (Ar.): town and port, Béjaïa, Algeria.

Bilbays Phelbès (Copt.), Bilbays (Ar.), *Belbeis* (med. Lat.): town, Bilbays, Egypt.

Bithynia Βιθυνία (Gr.), *Bithynia* (cl. Lat.): prov. of NW Asia Minor.

Bona *Hippo Regius* (cl. Lat.), Ἱππὼν Βασιλικός (cl. Gr.),

Būna, *et var*. (Ar.), *Bona*, *et var*. (med. Lat.): town and port, al-ʻAnnāba, Algeria.

Boulgarophygon Βουλγαρόφυγον (Byz. Gr.): battlefield, Baba Eski, near Edirne, Turkey.

Bouthrōton Βουθρωτόν (cl. Gr.), *Buthrotum* (cl. & med. Lat.): coastal town, Butrint, Albania.

Busta Gallorum Βουσταγαλλώρων (Byz. Gr.): battlefield near Gualdo, Umbria, Italy.

Byzacena *Valeria Byzacena* (cl. Lat.), Βυσσάτις χώρα (Byz. Gr.): prov. of R. North Africa created by Diocletian, southern Tunisia.

Byzantion Βυζάντιον (cl. Gr.), *Byzantium* (cl. Lat.): Greek city on the site of the later Constantinople.

Caesarea Καισάρεια (cl. & Byz. Gr.), *Caesareia* (cl. Lat.), *Caesarea, et var*. (med. Lat.): town, Kayseri, Turkey.

Calatrava Qalʻat Rabāḥ (Ar.), *Callatriva* (med. Lat.): town and castle, Calatrava la Vieja, prov. Ciudad Real, Spain, ruined.

Camarina Καμάρινα/Καμαρῖνα (cl. Gr.), *Camarina* (cl. Lat.): Greek city on the S coast of Sicily, 30 kilometres E of Gela, ruined.

Cannae Κάνναι (cl. Gr.), *Cannae* (cl. Lat.): town on the S bank of the river Ofanto, Apulia, Italy, 10 kilometres inland.

Capitanata *Capitanata* (med. Lat.): northern Apulia, prov. of Foggia, Italy. From *katepanō*†, because the Byz. *katepanate* repopulated it in the eleventh century.

Cartenna Καρτέννναι (cl. Gr.), *Cartenna* (cl. Lat.), *Cartenna/Teneza*, *et var*. (med. Lat.): city and port, Ténès, Algeria.

Carthage Καρχηδονία (Gr.), *Carthago* (cl. Lat.), *Carthago*, *et var*. (med. Lat.), Qarṭājanna (Ar.): Roman capital of *Africa* (*q.v.*), on the site of the Carthaginian capital, superseded by Muslim Tunis.

Castronuovo *Castellum novum* (med. Lat.): Muslim fortress in central Sicily NE of Prizzi.

Cerami *Ceramum* (med. Lat.): town, Cerami, district of Enna, Sicily.

Cetara *Cetara* (med. Lat.): unknown site, not far from

Salerno.

Chalkēdōn Χαλκηδών (cl. & Byz. Gr.), *Chalcedon* (cl. Lat.), *Calcedonia*, *et var*. (med. Lat): town opposite Constantinople across the Bosporos, Kadıköy, Turkey.

Chandax *Al-Khandaq* (Ar.), Χάνδαξ (Byz. Gr.), *Candia/Chandax*, *et var*. (med. Lat.): port, Iraklion, Crete.

Chelidonia, Cape *Hiera acra* (cl. Lat.): from the Χελιδόνιαι, *Chelidoniae insulae* (cl. Gr. & med. Lat.), two islets off its tip, Cape Gelidonya, Turkey.

Chersōn Χερσών (Byz. Gr.), *Cherso/Chersonium* (med. Lat.): town, Kherson, Crimea, Ukraine.

Christiana Χριστιανὰ, Τὰ, (Byz. Gr.): islet SW of Thēra, Greece.

Chrysopolis Χρυσόπολις (cl. & Byz. Gr.), *Chrysopolis* (cl. Lat.), *Chrysopolis/Scutarium* (med. Lat.): harbour on E shore of Bosporos upstream from Constantinople, Üsküdar, Turkey.

Cilicia Κιλικία (cl. & med. Gr.), *Cilicia* (cl. & med. Lat.): prov. of R. SE Asia Minor between the Gulf of Antalya and the Gulf of Alexandretta, Turkey.

Civitate *Teanum* (cl. Lat.), Τεάνον (cl. Gr.), *Civitas* (med. Lat.): town on Fortore river, *Capitanata* (*q.v.*), Apulia, Italy.

Classe *Classis*, *et var*. (med. Lat.), Κλάσαι (Byz. Gr.): port of Ravenna, Italy.

Covadonga *Cova Sancte Marie/cova-domenica* (med. Lat.): rock or outcrop in the Picos de Europa Peña Vieja, E of Cangas de Onis, prov. Asturias, Spain

Dacia *Dacia* (cl. Lat.), Δακία (cl. & Byz. Gr.), *Dacia*, *et var*. (med. Lat.): R. prov. ca 101-270/75 C.E., N of the Lower Danube, central Romania.

Darna Δάρνις (cl. Gr.), *Darnis et var*. (med. Lat.), Darna (Ar.): town and port, Darna/Derna, Libya.

Dēmētrias Δημητριάς (cl. & Byz. Gr.), *Demetrias* (cl. & med. Lat.): port on the Gulf of Pagasaí, SE of Volos, Greece, ruined.

Develtos Δεβελτός/Δηβελτός (Byz. Gr.), *Deultum/Develtus*, *et var*. (med. Lat.): city and fortress controlling

the road on the W coast of the Black Sea, 20 kilometres S of Burgas, Debelt, Bulgaria.

Dorostolon Δορόστολον (Byz. Gr.), *Durostorum/Silistra/ Distra et var.* (med. Lat.): city and fortress on the Danube, Silistra, Bulgaria.

Drakōn Δράκων (Byz. Gr.): geographical *hapax legomenon* mentioned by Prokopios, a river somewhere near Mt Vesuvius.

Duklja Διόκλεια (Byz. Gr.), *Dioclea/Zenta*, *et var.* (med. Lat.): stronghold at the junction of the Zeta and Morava rivers, name extended to the coastal plain north of the *thema*† of *Dyrrachion* (*q.v.*), Serbian heartland, Serbia.

Dyrrachion *Epidamnus/Dyrrachium* (cl. Lat.), Δυρράχιον (Byz. Gr.), *Dy(i,o,u)rrachium/Epidamnus*, *et var.* (med. Lat.): town and port, Durrës, Albania.

Eknomos Ἔκνομος (cl. Gr.), *Ecnomus* (cl. Lat.): site near the mouth of the river Salso, S coast of Sicily.

Elvira *Ilbīra* (Ar.), *Eleberis/Iliberris*, *et var.* (med. Lat.): town on part of the site of Granada, Spain, ruined.

Epidaurus Ἐπίδαυρος (cl. Gr.), *Epidaurus* (cl. Lat.): town in *Argolis*, E coast of Peloponnēsos, Greece, ruined.

Epidauros Ἐπίδαυρος (cl. Gr.), *Epidaurus* (cl. Lat.): town in *Illyricum*, abandoned for *Ragusa* (*q.v.*), Croatia, ruined.

Epiros Ἤπειρος (cl. & Byz. Gr.), *Epiros/Epirus* (cl. & med. Lat.): prov. of NW Greece bounded to the N by the Gulf of Vlorës and to the S by the Gulf of Amvrakia, Greece & Albania.

Euripos Εὔριπος (cl. Gr.), *Euripus* (cl. & med. Lat.): 9th-century synonym for *Chalkis*, Greco-Byz. town on Evvoia at the straits separating the island from the mainland, Greece.

Fraxinetum *Fraxinetum/Fraxinum* (med. Lat.): Muslim corsair nest, La Garde-Freinet, Dép. Var, France.

Galata Τὰ Γαλάτου/Γαλατᾶς (Byz. Gr.), *Calata/Galatas/ Sycae*, *et var.* (med. Lat.): originally *Sykai*, fortress and suburb opposite Constantinople on the NE of the Golden Horn.

Galatia Γαλατία (cl. & Byz. Gr.), *Galatia* (cl. & med. Lat.): N-central Anatolian plateau E from the river Sakarya to the Kizil Irmak and S from *Paphlagonia* (*q.v.*) to the Salt Lake, Tuz Gölu, Turkey.

Grado Γράδον (Byz. Gr.), *Gradum*/*Nova Aquileia* (cl. & med. Lat.): late R. fortress and city on an island south of *Aquileia* (*q.v.*), Grado, Italy.

Hadrumetum *Hadrumetum et var*. (cl. Lat.), Ἀδράμητος, *et var*. (Byz. Gr.): capital of *Byzacena* (*q.v.*), town and port, Sūsa, Tunisia.

Harmathous Ἁρμαθοῦς (cl. Gr.), *Harmathus* (cl. Lat.): town on the N coast of the Gulf of Edremit E of Cape Baba, Turkey.

Ḥaṭṭīn, Horns of *Ḥaṭṭīn* (Ar.), *Carnehatin* (med. French), *Mares-calcia* (med. Lat.): village and hill around 4 kilometres SW of Tiberias, Israel.

Ḥaydarān *Al-Ḥaydarān* (Ar.): battlefield, probably between 30-60 kilometres S-SW of *al-Qayrawān* (*q.v.*), Tunisia.

Heliopolis of Egypt Ἡλιούπολις, (cl. & Byz. Gr.), *Heliopolis Aegypti* (cl. & med. Lat.): city in Egypt, 12 miles N of *Babylon* (*q.v.*), ruined.

Heliopolis of Syria Ἡλιούπολις, (cl. & Byz. Gr.), *Heliopolis Syriae* (cl. Lat.), *Heliopolis Libanesia*, *et var*. (med. Lat.), Ba‘labakk (Ar.): city, Baalbek, Lebanon.

Hellas Ἑλλάς (Byz. Gr.): *thema*†, E-central Greece, capital *Thebes* (*q.v.*), Greece.

Hērakleia Πέρινθος (cl. Gr.), Ἡράκλεια (Byz. Gr.), *Perinthus* (cl. Lat.), *Heraclea* (med. Lat.): town and port, Marmara Ereğli, Turkey.

Hērakleia Pontikē Ἡράκλεια Πόντικη (cl. & Byz. Gr.) *Heraclea Pontica* (cl. Lat.), *Heraclea*/*Pontaracia*, *et var*. (med. Lat.): town and port, Black Sea, Ereğli, Turkey.

Hierax Ἱέρακος (Byz. Gr.), *Hierax*/*Zarax* (med. Lat.): port N of Monemvasia on the E coast of the Peloponnēsos, Greece.

Hunayn Hunayn (Ar.): port, near Beni Saf, Algeria.

Ibēria Ἰβηρία (Byz. Gr.): NE *thema*† in Asia Minor created from Armenian lands, Turkey.

Ifrīqiya — *Ifrīqiya* (Ar.): Arabic name for the R.-Byz. prov. of *Africa* (*q.v.*).

Ivrea — *Iporegia*, *et var.* (med. Lat.); town and marquisate, prov. Turin, Italy.

Kardia — Καρδία (cl. & med. Gr.), *Cardia* (cl. & med. Lat.); town at the head of the Gulf of Saros, Turkey, lost.

Kasion — Κάσιον/Κάσιος ὄρος (cl. Gr.), *Casius mons* (cl. Lat.): small summit south of *Lacus Sirbonis* (Sabkhat al Bardawil), Egypt.

Katasyrtai — Κατασύρται (Byz. Gr.): battlefield in Thrace not far from Constantinople, unidentified.

Kellia — Κελλία (Byz. Gr.): monastic complex near the W edge of the Nile delta, Egypt.

Kēpoi — Κῆποι (Byz. Gr.): "the Gardens", *aplēkton*† at the mouth of the *Maeander* (*q.v.*) river, Turkey.

Khurāsān — Khurāsān (Ar.), *Corasania*, *et var.* (med. Lat.): prov. of NE Iran, W Afghanistan, and S Turkmenistan.

Kibyrrhaiōtai — Κιβυρραιῶται (Byz. Gr.): ["those of Κιβύρρα", from Κιβύρα the Greater, classical city of the name in *Phrygia*]; originally part of the fleet of the *Karabisianoi* but erected into the first Byz. naval *thema*†, around the Gulf of Antalya, Turkey.

Kleidion — Κλειδίον (Byz. Gr.), *Cimbalongus* (med. Lat.): battlefield in a mountain pass near the Struma valley, Ključ, Bulgaria.

Korkyraioi — Κορκυραῖοι (cl. Gr.) *Corcyraei* (cl. Lat.): inhabitants of Κόρκυρα/*Corcyra*, Corinthian colony, Corfu, Greece.

Kyzikos — Κύζικος (cl. & Byz. Gr.), *Cyzicus* (cl. & med. Lat.): city and port on the S coast of the Sea of Marmara, Balkız, Turkey.

Lamos — Λάμος (cl. & Byz. Gr.), *Lamus* (cl. & med. Lat.): river in *Cilicia* (*q.v.*), boundary between Muslim and Byz. territory in the 9th-10th centuries.

Lampsakos — Λάμψακος (cl. & Byz. Gr.), *Lampsacus* (cl. & med. Lat.): city on the E shore of the Dardanelles opposite Gallipoli, Turkey, lost.

Las Hormigas — *Formigueras* (med. Lat.): group of islets off the

coast of Catalonia, NE of Palamos, Spain.

Las Navas de Tolosa — *Las Navas de Tolosa* (med. Spanish), Al-'Iqāb (Ar.): battlefield 9 kilometres NW of Las Navas de Tolosa, prov. Ciudad Real, Spain.

Laureatē — Λαυρεάτη (Byz Gr.): geographical *hapax legomenon* mentioned by Prokopios, somewhere on the coast of Dalmatia.

Lebounion, Mt — Λεβούνιον (Byz. Gr.): hill or mountain near the mouth of the Maritsa river, Turkey.

Lilybaion — Λιλύβαιον (cl. Gr.), *Lilybaeum* (cl. Lat.), Marsa 'Alī (Ar.), *Marsala* (med. Lat.): Carthaginian settlement, Roman town, on Cape Bœo, Marsala, Sicily.

Longobardia — Λογγιβαρδία/Λαγουβαρδία (Byz. Gr.), *Longobardia thema* (med. Lat.): Byz. *thema*†, Apulia and NE Basilicata, Italy.

Lycia — Λυκια (cl. & Byz. Gr.), *Lycia/Lucia* (cl. & med. Lat.): R. prov. of SW Asia Minor.

Maeander — Μαίανδρος (cl. & Byz. Gr.), *Maeander/ Maeandrus* (cl. & med. Lat.): river *Mendere*, Turkey.

Mamora — *Banasa* (cl. & med. Lat.), Βάνασσα (cl. Gr.), Al-Mamora (Ar.): ancient town on the river *Sebou*, Morocco, lost.

Mams, the — *Al-Mams* (Ar.): watercourse about 50 kilometres W of *al-Qayrawān* (*q.v.*), Hanshīr Dwīmīs, Tunisia.

Mantzikert — Μαντζικιέρτ (Gr.), *Manazkert* (Arm.) Malāzgird (Ar.), Malazgirt (Turkish): fortress city N of Lake Van, Malazgirt, Turkey.

Mauritania Caesariensis — *Mauritania Caesariensis* (cl. Lat.): prov. of R. North Africa, N-W Algeria.

Mauritania Sitifensis — *Mauritania Sitifensis* (cl. Lat.): prov. of R. North Africa, N-central Algeria.

Mesopotamia — Μεσοποταμία (Byz. Gr.): *thema*† of S-E Asia Minor, Turkey/Syria/Iraq.

Morea — Μορέα (Byz. Gr.), *Morea* (med. Lat.): the Peloponnēsos, Greece.

Mouikouron — Μουϊκοῦρον (Byz Gr.): geographical *hapax legomenon* mentioned by Prokopios, near *Salōnes* (*q.v.*), Croatia.

Mylae — Μυλαί (cl. Gr.) *Mylae* (cl. & med. Lat.): town and port, Milazzo, Sicily.

Myra Μύρα (cl. & Byz. Gr.), *Myra* (cl. & med. Lat.): town and port on the river *Andracus*, about 3.5 kilometres inland, Dembre, Turkey.

Myriokephalon Μυριοκέφαλον (Byz. Gr.): battlefield E of Homa in the *Maeander* (*q.v.*) valley, Turkey.

Nahr al-Ibrāhīm Ἄδωνις (cl. Gr.), *Adonis* (cl. & med. Lat.): river, S of Jubail, Lebanon.

Nakūr Nakūr (Ar.), *Nocor/Necur* (med. Lat.): city and state around al-Ḥusayma/Alhucemas Bay, Morocco (to Spain).

Narbonensis Prima *Narbonensis Prima* (cl. Lat.): prov. of R. Gaul, Languedoc.

Nicaea Νίκαια (cl. & Byz. Gr.), *Nicaea/Nicea* (cl. & med. Lat.): city, Iznik, Turkey.

Nikomēdeia Νικομήδεια (cl. & Byz. Gr.), *Nicomedia* (cl. & med. Lat.): city, Izmit, Turkey.

Nikopolis Νικόπολις (cl. Gr.), *Nicopolis* (cl. & med. Lat.): city on the Gulf of Amvrakia, Greece, ruined. *Thema*† of *Nikopolis*, capital Naupaktos.

Nineveh Νίνος/Νινεύη (cl. Gr.), *Ninus* (cl. Lat.), *Ninive*, *et var*. (med. Lat.): capital of ancient Assyria on the Tigris river opposite Mosul, Iraq.

Novem Populi *Novem Populi* (cl. Lat.): prov. of R. Gaul, Gascony.

Numidia *Numidia* (cl. Lat.): prov. of R. North Africa, N-E Algeria.

Ophryneion Ὀφρύνειον (cl. Gr.), *Ophrynium* (cl. Lat.): town near lake *Pteleos* on S coast of the Dardanelles.

Opsikion Ὀψίκιον (Byz. Gr.): original *thema*† of Asia Minor, NW Asia Minor N of *Anatolikon* (*q.v.*), capital Ankara, Turkey.

Ostia *Ostia* (cl. Lat.), *Hostia*, *et var*. (med. Lat.): city and port of Rome at the mouth of the Tiber river, synonym for *Portus*, a new port built by Claudius some 3 kilometres N of *Ostia*.

Outremer *Ultra mare* (med. Lat.), *Outremer* (med. French): the Crusader states in the Levant.

Oxyrhynchus Ὀξύρυγχος (cl. Gr.), Pemje (Coptic), al-Bahnasā (Ar.): town in upper Egypt, Bahnasa, ruined.

Pamphylia Παμφυλία (cl. & Byz. Gr.), *Pamphylia* (cl. & med. Lat.): prov. of S Asia Minor around the Gulf of Antalya, Turkey.

Pannonia Παννονία (cl. & Byz. Gr.), *Pannonia* (cl. Lat.), *Pannonia/Hungaria* (med. Lat.): R. territories S & W of the middle Danube, E Austria and W Hungary.

Paphlagonia Παφλαγονία (cl. & Byz. Gr.), *Paphlagonia* (cl. & med. Lat.): coastal region of N Asia Minor, *thema*†, capital Çankırı, Turkey.

Patara Πάταρα (cl. Gr.), *Patara/Patera* (cl. & med. Lat.): town and port E of river Etshen, Turkey, ruined.

Pechina *Bajjāna* (Ar.): Muslim town in the hills behind Almeria, Spain.

Pēgē Πηγή (Byz. Gr.): church, monastery, and palace outside the walls of Constantinople.

Peukia, Ta Πευκία, Τὰ (Byz. Gr.): "the Pines", perhaps *Pefkhia* near *Ophryneion* (*q.v.*), Turkey.

Phoinikous Φοινικοῦς (cl. & Byz. Gr.), *Phoenicus* (cl. Lat.), *Finica/Phoenix* (med. Lat.): port near Finike, Turkey, ruined.

Phygela Φύγελα (cl. & Byz. Gr.), *Figila*, *et var.* (med. Lat.): town and port, Kuşadasi, Turkey.

Picenum *Picenum* (cl. Lat.), Πικηνοί, *et var.* (cl. Gr.): region around Ancona, NE Italy.

Portus See *Ostia*.

Praeneste Πραίνεστος/Πραίνεστε (cl. Gr.), *Praeneste* (cl. & med. Lat.): town, Palestrina, Italy.

Preslav the Little Πρεσθλαβίτζα (Byz. Gr.): town in the Danube delta, now abandonned, near Tulcea, Bulgaria.

Proikonnēsos Προικόννησος (cl. & med. Gr.), *Proconnesus* (cl. & med. Lat.): Marmara island, Turkey.

Pylai Πύλαι (Byz. Gr.), Yalaqābād (Ar.): town, Yalova, Gulf of Izmit, Turkey.

Pylos Πύλος (cl. Gr.), *Pylus* (cl. Lat.), *Pylus/Ionchium/Navarinum* (med. Lat.): town and gulf (Pilos) on the W coast of the Peloponnēsos, Greece.

Ragusa Ῥαγούσιον (Byz. Gr.), *Ragusium*, *et var.* (med. Lat.): port and city founded from *Epidauros* (*q.v.*), capital of a *thema*†, Dubrovnik, Croatia.

Rhaidestos Βισάνθη (cl. Gr.), Ῥαιδεστός (Byz. Gr.), *Bisanthe* (cl. Lat.), *Rhaedestus/Bisanthe*, *et var.* (med. Lat.): town and port, Tekirdağ, Turkey.

Rhoiteion Τὸ Ῥοίτειον (cl. Gr.), *Rhoeteum* (cl. Lat.); town and

promontory at the entrance to the Dardanelles, near It-ghelmes, Turkey.

Romania — *Romania* (med. Lat.), Ῥωμανία (Byz. Gr.): synonym for the Byzantine Empire, applied in the Latin West to all territories that belonged, or had belonged, to the Empire.

Rūm — *Al-Rūm* (Ar.), from Byz. Gr. Ρωμαῖοι, Romans. Used in Arabic mainly for the lands and the people of the Byzantine Empire but also for those of the Christian West.

Saepinum — *Saepinum* (cl. Lat.), Σαίπινον (cl. Gr.): town on the E slopes of the Monte Matese, abandoned in favour of Sepino, Italy.

Sagrajas — *Sacralias* (med. Lat.), Zallaque (med. Spanish), Al-Zallāqa (Ar.): battlefield on the river Guerrero, 8 kilometres NE of Badajoz, Spain.

Salōnes — Σαλῶνα (cl. Gr.), Σάλωνες (Byz. Gr.), *Salona*/*Salonae* (cl. & med. Lat.): town and port in *Illyricum*, abandoned for Split in the 7th century, revived as Solin, Croatia.

Samosata — Σαμόσατα (cl. & Byz. Gr.), *Samosata* (cl. & med. Lat.), *Sumaysāṭ* (Ar.): town, Samsat, Turkey.

Sēlymbria — Σηλυμβριά, *et var*. (cl. & Byz. Gr.), *Selymbria*, *et var*. (cl. & med. Lat.): port, Silivri, Turkey.

Senogallia — Σεναγάλλικα (cl. Gr.), Σενογάλλια (Byz. Gr.), *Senogallia*, *et var*. (cl. & med. Lat.): town N of Ancona, Senigallia, Italy.

Septimania — *Septimania* (med. Lat.): name of the Mediterranean coastal region held by Visigoths after the battle of Vouillé, from the establishment there of the Roman Seventh Legion by Augustus.

Sigeion — Σίγειον (cl. Gr.), *Sigeum* (cl. Lat.): promontory and town on the S coast of the mouth of the Dardanelles, ruined.

Sophon — Βοάνη λίμνη (cl. Gr.), *Sunonensis lacus* (cl. Lat.), *Sophon lacus* (med. Lat.); lake Sapança, Turkey.

Stenon, the — Τὸ Στενόν (Byz. Gr.); "the Straits", the Bosporos.

Stilo, Punta di — *Cocinthus* (cl. Lat.), *Cocintum promontorium* (med. Lat.), Στῆλαι (Byz. Gr.): cape, Punta di Stilo, Calabria, Italy.

Strobilos — Στρόβιλος (Byz. Gr.) *Strovilus*/*Strobilus et var*.

(med. Lat.): fortress and port on the SW coast of Asia Minor, Aspat or Çifut Kalesi, Turkey.

St Symeon — *Sancti Symeonis Portus*, *et var*. (med. Lat.), al-Suwaydīya (Ar.): town and port, Samandağ, Turkey.

Sybota — Σύβοτα (cl. Gr.), *Sybota* (cl. Lat.): island in the Straits of Corfu, Syvota, Greece.

Ṭabarqa — Θάβρακα (cl. Gr.), *Thabraca* (cl. Lat.), Ṭabarqa (Ar.): town and port, Ṭabarqa, Tunisia.

Tāhart — *Tāhart* (Ar.): town founded by ʿAbd Allāh ibn Rustam about 15 kilometres from ancient *Tingartia*, W. Algeria.

Tahūda — *Thabudeus* (Lat.), Tahūda (Ar.): battlefield S of Biskra, Algeria.

Tenedos — Τένεδος (cl. & Byz. Gr.), *Tenedos*/*Tenedus* (cl. & med. Lat.): island, Aegean Sea, Bozca Ada, Turkey.

Thebes — Θῆβαι (cl. & Byz. Gr.), *Thebae* (cl. & med. Lat.): chief city of *Boeotia*, Thivai, Greece.

Themetra — *Themetra* (cl. Lat.): Chott Maria, Tunisia.

Thermopylae — Θερμοπύλαι (cl. & Byz. Gr.), *Thermopylae* (cl. & med. Lat.): pass leading from Thessaly to Locris, fortifications restored by Justinian I, Greece.

Thrakēsiōn — Θρακησίων (Byz. Gr.): *thema*† in W Asia Minor, W of *Anatolikon*, S of *Opsikion*, and N of *Kibyrrhaiōtai*, capital *Chōnai,* Honaz, Turkey.

Thugga — *Thugga* (cl. Lat.): Douga, Tunisia.

Tingitania — *Tingitania*/*Mauritania Tingitana* (cl. Lat.), *Mauretania Tingitana* (med. Lat.): prov. of R. North Africa, N Morocco.

Tinnis — Θιννησός (cl. Gr.), *Tenessus* (cl. Lat.), *Tanis*, *et var*. (med. Lat.), Tinnīs (Ar.): town on an island in Lake Manzala, Egypt, ruined.

Tmutorakan — Τὰ Μάτραχα (Byz. Gr.), *Matrega*/*Tmutaracha*, *et var*. (med. Lat.): town and region on N coast of the Black Sea E of the Straits of Kerch, region of Krasnodar, Ukraine.

Trajan's Gates — *Succorum angustiae* (late Lat.), Ἁγίου Βασιλείου κλείσουρα/Βασιλική πύλη (Byz. Gr.), *Traiani porta*/*Sancti Basilii porta* (med. Lat.): pass on the *Via militaris* between Ikhtiman and

Pazardčik, Vratnik, Bulgaria.

Tricamaron Τρικαμάρον (Byz Gr.): battlefield, geographical *hapax legomenon* mentioned by Prokopios, in *Africa* (*q.v.*).

Tripolitana Τρίπολις (cl. & Byz. Gr.), *Tripolitana* (cl. & med. Lat.): prov. of R. North Africa, W Libya.

Tziliapert Τζιλιάπερτ (Byz. Gr.): unkown, possibly a corruption of Τὸ Παΐπερτε, perhaps Üçyol (Turkish), Gjuljabert (Georgian), on the Turkish/Georgian border.

Utica Ἡ Ἰτύκη (Gr.), *Utica* (cl. & med. Lat.): Phoenician settlement, later Roman colony, in *Africa* (*q.v.*), near the mouth of the river *Merjeda*, Gulf of Tunis, NW of *Carthage* (*q.v.*), ruined.

Versinikia Βερσινικία (Byz. Gr.): battlefield N of Edirne, near Malamirovo, Bulgaria.

Volubilis Οὐολουβιλίς (cl. Gr.), *Volubilis* (cl. & med. Lat.): Roman colony and town on the river *Sebou* in *Mauritania Tingitana*, Morocco, ruined.

Zenta (Zeta) and *Stamnos* Ζέντα and Στάμνος (Byz. Gr.): region usually identified with *Duklja* (*q.v.*), Serbian *toparchia*†, Serbia.

Zichia Ζιχία/Ζηκχία (Byz. Gr.), *Zechia/Zichia et var.* (med Lat.): N-E Black Sea region, separated from *Tmutorakan* (*q.v.*) by the river Kuban.

SELECTIVE GLOSSARY OF GREEK, LATIN, AND ARABIC TERMINOLOGY

Abbreviations and cross references

Ar.	Arabic	p. cl.	post classical
Byz.	Byzantine	pl.	plural
cl.	classical	*q.v.*	*quod vide*, which see
esp.	especially	R.	Roman
Gr.	Greek	sing.	singular
Lat.	Latin	W.	Western
lit.	literally	*	See Gazeteer

‘abd (Ar.) [pl. *‘abīd*]: lit. “slave”; in *Ifrīqiya** and Egypt, black soldiers, originally bought as slaves.

‘ahd (Ar.): covenant; esp. Muslim covenant of peace with non-Muslim power.

akation/akatenarion ἀκάτιον/ἀκατενάριον [pl. ἀκάτια/ἀκατενάρια]: diminutive derivative synonyms for *akatos* (*q.v.*).

akatos ἄκατος (cl. & Byz. Gr.): light merchant galley.

akritēs ἀκρίτης (Byz. Gr.) [pl. ἀκρίται/*akritai*]: from *akra*, “edges, border regions”; troops stationed in, or inhabitants of, frontier territories.

Al-Ḥajj (Ar.): pilgrimage to Mecca, obligatory at least once in life for Muslims able to accomplish it, one of the five “pillars” of Islam.

amīr (Ar.) [pl. *umarā’*]: lit. “commander”, usually in the Middle Ages, a military commander of various rank, also a title.

amīr al-juyūsh (Ar.): commander of the armies.

Amīr al-Muslimīn (Ar.): “Commander of the Muslims”, title of Almoravid rulers.

aplēkton ἄπληκτον (Byz. Gr.) [pl. ἄπληκτα/*aplēkta*]: lit. “fortified camp”, staging area, rendezvous for forces, magazine where resources were stockpiled.

Arithmos — Ἀριθμός: in Byz. Gr. the regiment of imperial guards also known as the Βίγλα/*Vigla*.

asēkrētis — ἀσηκρῆτις (Byz. Gr.) [sing. & pl.]: upper echelon of imperial secretaries in the 6th-12th centuries.

bourgesioi — βουργέσιοι (Byz. Gr.): legal order or category created by Manuel I Komnēnos for foreigners permanently domiciled in the Empire.

buṭsa — (Ar.) [pl. *buṭsāt*]: used in the 12th-13th centuries for large merchant sailing ships of the type referred to in contemporary W. sources as *naves* (*q.v.*).

Caesar — Καῖσαρ: in Byz. Gr. a dignity applied to junior emperors, often emperors' sons but also others on occasions.

cattus/gatus — (med. Lat.) [pl. *catti/gati*]: type of galley referred to commonly in W. sources of the late 11th and early 12th centuries, from the Ar. *qiṭ'a* (*q.v.*).

chrysobull — χρυσόβουλλον (Byz. Gr.): solemn docucument bearing the imperial gold *bulla*, seal.

comes — see *komēs*.

comes Africae — late imperial provincial administrator of the province of *Africa*.

dā'ī — (Ar.): lit. "caller/summoner", missionary propagandist; esp. spreading Ismā'īlism.

diērēs — διήρης [pl. διήρεις/*diēreis*]: in cl. Gr. a "two" or bireme, rowing two files of oars each side; in Byz. literature a literary affectation for a warship but, occasionally, with apparent reference to an actual number of oar banks.

domestikos tōn scholōn — δομέστικος τῶν σχολῶν (Byz. Gr.): commander of the regiment of the *scholae*, the imperial guard.

doux — δούξ (Byz. Gr.) [pl: δουκάδες/*doukades*]: esp. military commanders and provincial governors from the 11th century.

droungarios — δρουγγάριος (Byz. Gr.) [pl. δρουγγάριοι/*droungarioi*]: high military rank in the 7th-

	8th centuries, esp. naval commands.
droungarios tou ploimou/droungarios tōn ploimōn	δρουγγάριος τοῦ πλοΐμου/δρουγγάριος τῶν πλοΐμῶν (Byz. Gr.): *droungarios* of the ship(s), of the imperial fleet at Constantinople.
Eidikon	Εἰδικόν (Byz. Gr.): etymology disputed, imperial treasury and warehouse.
eparchos of the city	ἔπαρχος τῆς πόλεως (Byz. Gr.): governor of Constantinople, responsible for law and order, justice, and commerce.
exarchos	ἔξαρχος (Byz. Gr.) [pl. ἔξαρχοι/*exarchoi*): lit. "leader", governor of certain provinces in the 6th-8th centuries, holding both civil and military power, esp. of Ravenna and *Carthage**, hence ἐξαρχία/*exarchia*, "exarchate".
geniza	*genīza* (Hebrew): storehouse, depository for documents bearing name of God, in particular that attached to the synagogue in *al-Fusṭāṭ**.
Ghassānī	(Ar.): from the Banū Ghassān, south Arabian tribe which settled around Damascus in the 3rd and 4th centuries C.E.
ghurāb	(Ar.) [pl. *aghriba*]: used for oared galleys of indeterminate types, often interchangeably with *shīnī* (*q.v.*).
golafrus/garabus	(med. Lat.) [pl. *golafri/garabi*]: name for W. galleys of some kind in the late 11th and early 12th centuries, from the Ar. *ghurāb* (*q.v.*)
gumbaria	(med. Lat.) [pl. *gumbariae*]: Latinization of the Byz. Gr. *koumb(p)arion* (*q.v.*) for a war galley.
ḥājib	(Ar.): lit. "chamberlain", superintendant of a place, head of government, chief minister; esp. in *al-Andalus**.
ḥarrāqa	(Ar.) [pl. *ḥarrāqāt*]: used in a variety of contexts for light vessels of various kinds, often river boats and pleasure craft, but also for warships, fire ships in particular.
hippagōgos	ἱππαγωγός (cl. & Byz. Gr.) [pl. ἱππαγωγοὶ/

hippagogoi]: horse transport ship.

imām (Ar.): religious leader, in particular the *imāms* of the *Shī'a* (*q.v.*).

jihād (Ar.): lit. "striving", in particular, here, holy war to extend the boundaries of the *dār al-Islām*, the world ruled by Muslims.

jizya (Ar.): poll tax levied on non-Muslim men under Muslim rule and recognized religiously as *dhimmī*, peoples of the book.

jund (Ar.): esp. in *al-Andalus*, a regiment attached to a *kūra* (*q.v.*).

Karabisianoi Καραβισιάνοι (Byz. Gr.): lit. "those of the κάραβοι" (*q.v.*), first regular fleet of the Byzantine Empire.

karabion/karabos καράβιον/κάραβος (Byz. Gr.) [pl. καράβια(οι)/*karabia(oi)*]: word for a war galley which first appeared in Muslim Egypt but then spread in the Byz. Empire.

katēna κατῆνα (Byz. Gr.) [pl. κατῆναι]: possibly the same as *akation/akatenarion* (*q.v.*), etymology otherwise unknown, possibly Ar. *qiṭ'a*, transport vessel; used by Theophanēs the Confessor for Muslim transport ships.

katepanō κατεπάνω (Byz. Gr.) [sing. & pl.]: lit. "the one above", used in the 11th century, esp., for governors of major provinces, esp. Italy, *Mesopotamia**, and Bulgaria.

Khārijī] (Ar.) [pl. *Khawārij*]: lit. "seceders", hearkened back to a supposed purity of the age of Caliph 'Umar ibn al-Khaṭṭāb, believing that succession to the Caliphate should be decided by God alone.

kleisourarchēs κλεισουράρχης (Byz. Gr.) [pl. κλεισουράρχαι/*kleisourarchai*]: commander of a *kleisoura*, territory smaller than, sometimes part of, a *thema* (*q.v.*).

komēs *comes* (Lat.), κόμης (Byz. Gr.) [pl. κόμητες/*komētes*): late imperial title for officials of various ranks with assignments, sometimes military, often linked to the imperial family; various functionaries in later times, also

commander of a squadron of a fleet.

koubikoularios κουβικουλάριος (Byz. Gr.): general term for a palace eunuch waiting upon the emperor; appointed to many commands, including military ones.

koumb(p)arion κουμβ(π)άριον (Byz. Gr.) [pl. κουμβ(π)άρια/*koumb(p)aria*]: term for a Muslim galley, perhaps from *ghurāb* (*q.v.*).

kūra (Ar.): landed district or dependent province, from Gr. χώρα, place.

logothetēs λογοθέτης: lit. "auditor", in Byz. Gr. a generic term for a high official, head of a department of the imperial administration.

logothetēs tou dromou λογοθέτης τοῦ δρόμου (Byz. Gr.): head of the department of the δρόμος/*dromos*, originally the public post but by the eighth century concerned with foreign affairs.

logothetēs tōn agelōn λογοθέτης τῶν ἀγελῶν (Byz. Gr.): head of the department of the ἀγέλαι, herds, of the imperial horses and mules.

magister militum (p. cl. Lat.): commander in chief of armies in the later R. empire.

Magnaura Μαγναύρα (Byz. Gr.): ceremonial hall on the edge of the imperial palace in Constantinople.

Mahdī *Al-Mahdī* (Ar.): lit. "the guided one". Among the *Shī'a* (*q.v.*), the hidden *imām* (*q.v.*), descendent of 'Alī ibn Abī Ṭālib.

maks (Ar.) [pl. *mukūs*]: non-*Qur'ānic* tax.

malik (Ar.) [pl. *mulūk*]: ruler, loosely, "king".

mamlaka (Ar.) [pl. *mamālik*]: realm, loosely, "kingdom".

mamlūk (Ar.) [pl. *mamālīk*]: "one owned", a slave. Slaves imported from non-Muslim regions and raised to be soldiers loyal to their owner/commander.

Mardaites Μαρδαΐται (Byz. Gr.): a people, originally from the Tauros, who became famous as warriors in Byz. service, esp., here, in various fleets of the naval *themata* (*q.v.*).

markab (Ar.) [pl. *marākib*]: generic term for ships in

general.

mawālī (Ar.): from *mawlā*, "client": non-Arab converts to Islam adopted into Arab tribes as clients.

megas domestikos μέγας δομέστικος (Byz. Gr.): supreme military commander below the emperor, esp. in 11th-12th centuries

megas doux μέγας δούξ (Byz. Gr.): admiral of the imperial fleet from the late 11th century.

monērēs μονήρης [pl. μονήρεις/*monēreis*]: in cl. Gr. a "one" or monoreme, rowing one file of oars each side; in Byz. literature a literary affectation for a small warship, perhaps also actually used in practice.

mujāhidūn (Ar.): those who wage *jihād*, both holy war and also other forms of "striving for God".

mulūk al-ṭawā'if (Ar.): *ṭā'ifa*, "party" "kings"; a generic, the rulers themselves used various titles.

myoparōn μυοπάρων (cl. Gr.) [pl. μυοπάρωνες/*myoparōnes*]: light pirate ship.

navis [pl. *naves*]: in med. Lat. a generic for ships in general but having the specific sense of round-hulled, lateen-rigged, sailing ships in the 12th-14th centuries.

nipsistiarios νιψιστιάριος (Byz. Gr.): originally an official whose function was to hand the emperor a basin in which to wash his hands, became a title.

Oghuz *Ghuzz* (Ar.), Οὖζοι (Byz. Gr.): the *Oghuz* Turks, confederations of Turkish peoples from S of the Aral Sea.

ostiarios ὀστιάριος (Byz. Gr.), *ostiarius* (Lat.): doorkeeper, originally an office whose function was to introduce dignitaries to the emperor, became a title.

parakoimōmenos παρακοιμώμενος (Byz. Gr.): lit. "sleeping at the side [of the emperor]", high chamberlain, guardian of the emperor's bedchamber, head of the civilian government in the tenth century.

paria (med. Spanish), from med. Lat. *pariare*, to pay a fine; tribute paid by one state to another in

return for protection or non-aggression.

patrikios πατρίκιος (Byz. Gr.), *patricius* (Lat.): high ranking dignity, not an office, granted to important generals and governors.

pentēkonteros πεντηκόντερος [pl. πεντηκόντεροι]: in cl. Gr., a fifty-oared galley; in Byz. literature a literary affectation.

phortagōgoi φορταγωγοί (Byz. Gr.): lit. "load carriers", transport ships.

phortēgoi φορτηγοί (Byz. Gr.): lit. "load carriers", transport ships.

ploion πλοῖον (cl. & Byz. Gr.) [pl. πλοῖα/*ploia*]: generic for ships in general.

ploia makra πλοῖα μακρά: literary synonym in Byz. Gr. for "long ships", war galleys.

praefectus πραίφεκτος (Byz. Gr.), *praefectus* (Lat.): title conferred on local rulers.

praefectus Aegypti title of governors of Egypt under the early R. empire.

praetorian prefect *praefectus praetorio* (Lat.), ἔπαρχος τῶν πραιτωρίων/*eparchos tōn praitōriōn* (cl. & Byz. Gr.): originally commander of the imperial bodyguard, but a high-ranking civil functionary from the 4th century, deputy to the emperor.

proedros πρόεδρος: in Byz. Gr. a dignity rather than an office, ranking with the office of *proedros* [president] of the Senate.

prōtasēkrētis πρωτασηκρῆτις (Byz. Gr.): head of the secretaries, ἀσηκρῆτις/*asēkrētis* (*q.v.*) of the imperial chancery.

prōtosebastos πρωτοσέβαστος (Byz. Gr.): lit. "first *sebastos*", high title conferred on close relatives of the emperor, esp. under the Komnēnoi emperors.

prōtospatharios πρωτοσπαθάριος (Byz. Gr.): lit. "first sword-bearer", first of the *spatharioi*, dignity awarded to military commanders, governors of *themata* (*q.v.*), foreign princes, and others. Varied in significance over the centuries.

prōtospatharios tēs phialēs πρωτοσπαθάριος τῆς φιάλης (Byz. Gr.): *prōtospatharios* of the "basin": judge of the oarsmen of the imperial ships, probably from the "basin" of the small harbour at *Boukoleon*, S of the imperial palace and the Hippodrome on the Sea of Marmara.

qā'id (Ar.): military commander of various rank, in *al-Andalus* frequently commander in chief, admiral of a fleet.

qārib (Ar.) [pl. *qawārib*]: sometimes a small boat or ship's boat but also a generic for sailing ships in general.

qiṭ'a (Ar.) [pl. *aqṭā'*]: word used esp. for war galleys but also for transport ships, both galleys and sailing ships.

Rhōs Ῥῶς/Ῥώς (Byz. Gr.): Scandinavians settled in the Ukraine, especially along the Dnepr river and around Kiev.

ribāṭ (Ar.) [pl. *ribāṭāt*]: fortress/"monastery" on the frontiers of the Muslim world where military and religious duties were performed.

safīna (Ar.) [pl. *sufun*]: common word for ships in general, esp. transport ships.

sagēna σαγήνα (Byz. Gr.) [pl. σαγήναι/*sagēnai*]: etymology unknown, possibly from σαγήνη, a fishing net. Used for small ships of Muslim or Dalmatian pirates but by the *Stratēgikon* of Maurice for a Byzantine galley of some kind.

saio *sagio*, *et var.* (p. cl. & med. Lat.): royal retainer in the Ostrogothic kingdom, agent of the king.

sa(k)toura Σα(κ)τούρα (Byz. Gr.) [pl. σα(κ)τούρα/*sa(k)-tourai*]: term for Cretan ships used in the *Vita Basilii* of the *Thephanēs continuatus*, probably from Ar. *shakhtūr*, some kind of small ship.

sandanum (med. Lat.): from Byz. Gr. χελάνδιον/*chelandion*, W. transport galley in the 12th-13th centuries.

sekreton σέκρετον (Byz. Gr.): a department of the imperial administration.

shalandī (Ar.) [pl. *shalandiyyāt*]: term used frequently in Muslim sources for Byz. galleys, then emulated by the Muslims, esp. in Egypt; from Byz. Gr. *chelandion*.

sharī'a (Ar.): from the root *shara'a*, "prescribe", the revealed law of Islam as found in the *Qur'ān*, the *sunna* (*q.v.*), and the schools of law.

Shī'a (Ar.): from "*shī'at 'Alī*", "party of 'Alī", Muslims believing (among other things) that the Caliphate should have descended through the line of Muḥammad's son-in-law, 'Alī ibn Abī Ṭālib.

shīnī (Ar.) [pl. *shawānī*]: common generic term for a war galley.

skevophoron σκευοφόρον (Byz. Gr.) [pl. σκευοφόρα/*skevophora*]: lit. "carrying vessel", supply ship.

skevos, barytera σκεῦος, βαρύτερα (Byz. Gr.) [pl. σκεύη, βαρύτερα/*skevē*, *barytera*: (lit.) "vessel of burden", cargo ship.

spatharios σπαθάριος (Byz. Gr.): lit. "sword-bearer", a dignity and title rather than an office.

stratēgos στρατηγός (Byz. Gr.) [pl. στρατηγοὶ/*stratēgoi*]: cl. Gr. for a military commander, by the 8th century applied to governors of *themata* (*q.v.*), holding both civil and military authority.

sulṭān (Ar.): power or authority, secular title of ruler, alongside Caliph.

Sunnī *Ahl al-sunna wa 'l-ijmā'* (Ar.), "people of the *sunna* and the consensus": Muslims adhering to the *sunna*, the orthodox example of the Prophet Muḥammad, to one of the four schools of law, and not attributing any importance to the descendants of 'Alī ibn Abī Ṭālib.

tarida (med. Lat.) [pl. *taride*]: W. transport galley, especially for horses, of the 12th and 13th centuries, from the Ar. *ṭarīda*.

ṭarīda (Ar.) [pl. *ṭarā'id*]: transport galley, esp. for horses.

tetrērēs τετρήρης: in cl. Gr. a "four" or quadrireme, rowing four files of oars each side.

thema Θέμα (Byz. Gr.) [pl. θέματα/*themata*]: territory and army administered by a *stratēgos* (*q.v.*), also a squadron of a fleet.

toparchēs τοπάρχης: in Byz. Gr. a term for military and civil authorities, by the 10th century used for independent, neighbouring rulers.

topotērētēs τοποτηρητής: in Byz. Gr. deputy governor, lieutenant commander, esp. "port admiral"?

tourmarchai tōn ploimōn τουρμάρχαι τῶν πλοΐμων (Byz. Gr.): lieutenant commanders of the fleet of the *Stenon**, under the *droungarios tōn ploimōn* (*q.v.*).

tourmarchēs τουρμάρχης (Byz. Gr.) [pl. τουρμάρχαι/*tourmarchai*): military commander of a *tourma*, regiment of a *thema* (*q.v.*), also a naval commander.

triachontērēs τριαχοντήρης: in cl. Gr. a thirty-oared galley; in Byz. literature an affectation.

triērēs τριήρης [pl. τριήρεις/*triēreis*]: in cl. Gr. a "three" or trireme, rowing three files of oars each side; in Byz. literature an affectation for a warship.

Vestiarion basilikon Βεστιάριον βασιλικόν (Byz. Gr.): lit. "imperial wardrobe", warehouse, arsenal for military forces.

GLOSSARY OF ENGLISH NAUTICAL TERMINOLOGY[1]

abeam: across a ship, at right angles to the centre line (*q.v.*) from stern (*q.v.*) to bow (*q.v.*).

aft: towards the stern (q.v.), in the after part of a ship.

ahead: of the wind, from ahead, blowing onto the bows (*q.v.*).

amidships: in the middle or "waist" of a ship.

astern: of the wind, from astern, blowing onto the stern (*q.v.*).

back water: to put a galley into reverse by pulling (*q.v.*) the oars in reverse, from stern (*q.v.*) to bow (*q.v.*)

backstay: rope bracing a mast against forces pushing it forward (*q.v.*) and running from the masthead (*q.v.*) to some point aft (*q.v.*).

bank, of oarsmen: used here for any arrangement of oarsmen on the same horizontal level.

beam: (1) a transverse timber serving to brace the hull (*q.v.*) of a ship apart. See also through beams.

beam: (2) transverse width of a ship at the widest part amiships (*q.v.*).

beat to windward: to sail to windward by a series of alternate tacks (*q.v.*).

bench: bench or seat on which an oarsman sat. Cf. thwart.

bench position: used here for the same position abeam (*q.v.*) of any number of benches (*q.v.*) in a galley (*q.v.*), irrespective of vertical arrangement.

bend (to): to attach a rope to something by means of a "bend", a "knot" in general usage. Esp., to bend a sail to a yard.

bilges: where the floor timbers (*q.v.*) turn upwards and the angle of the frames (*q.v.*) moves from more than 45˚ to less than 45˚ to the vertical.

bilge keel: small keel parallel to the central keel (*q.v.*) of a ship at or just below the turn of the bilge (*q.v.*).

bilge water: water collecting in the bilges (*q.v.*) from rain, seas washing over the decks, or seepage through the

[1]In this Glossary we have used extensively, Kemp, *Ships and the sea*.

seams (*q.v.*) between the strakes (*q.v.*).

bilge pump: one of many different varieties of pumps for extracting bilge water (*q.v.*).

bireme: used here for a galley (*q.v.*) rowing two oars from each bench (*q.v.*) position, irrespective of any vertical arrangement of the benches or of the number of oarsmen on the same bench.

block: a shell or casing in which sheaves (*q.v.*) or pulleys (*q.v.*) are fitted, over which ropes run. Blocks consist of a shell, one or more sheaves, the swallow (q.v.) or hole in which the sheaves are set, and pins or spindles on which the sheaves turn.

blockmast: section of a masthead (*q.v.*) containing a block (*q.v.*) for raising and lowering the yard (*q.v.*) by a halyard (*q.v.*).

bow(s): the forward (*q.v.*) end of a ship.

brails: ropes sewn into the foot of a square sail and running through fairleads (*q.v.*) to its head at the yard (*q.v.*) by which the sail can be taken up to reduce its plane area in heavy weather.

brow(s): sloping ramps or gangways leading up or down from one deck to another or from a deck into a hold for the movement of animals from above to below or vice versa.

bulwark: low wall of frames (*q.v.*) and planking (*q.v.*) above the deck to prevent water coming inboard and seamen being washed overboard.

bung (and bung hole): a hole in the floor (*q.v.*) of a ship through which bilge water (*q.v.*) can be drained off when the ship is out of water. When afloat, the bung hole is stopped up with a wooden plug or bung.

buoy: a float used to mark the position of a submarine object.

camber of a deck: curvature of the deck downwards from the centre line (*q.v.*) towards the hull (*q.v.*), both to strengthen the deck and also to promote the draining off of water shipped inboard.

carling: fore-and-aft (*q.v.*) timber inserted between frames (*q.v.*).

cathead: heavy timber fitted with sheaves (*q.v.*), over which the anchor cables (or cat tackles on large ships)

run, projecting out over both bow quarters of ships for raising and letting-go the anchors.

caulking: any material (flax, oakum, tow, pitch, etc.) used to coat the outside hull (*q.v.*) of a ship or to fill the seams (*q.v.*) between strakes (*q.v.*) to seal them against water penetration.

centre line: line of a ship down the centre from the sternpost (*q.v.*) to the stempost (*q.v.*).

cowl: a ventilating shaft with bell-shaped top above deck which can be turned to catch the breeze from any direction. If turned away from the wind, it can be used as an exhaust.

crab (to catch a): when an oarsman loses control of an an oar when lifting the blade from the water at the end of the stroke and it remains caught in the water.

crutches: crescent-shaped holders set on posts on the deck down the centreline (*q.v.*) of a ship to take masts and yards (*q.v.*) when lowered.

cutwater: section of the stempost (*q.v.*) at the waterline (*q.v.*).

deadweight tonnage: the difference between the tonnage displacement of a ship fully fitted out and the maximum tonnage displacement she can carry with an additional full cargo or military equipage.

fairlead: any ring or other device used to lead a rope in a desired direction.

file, of oarsmen: used here for a row of oarsmen from stern (*q.v.*) to bow (*q.v.*).

flared: of a hull (*q.v.*), curved outwards; of a stempost (*q.v.*), raked (*q.v.*) forward (*q.v.*).

floor: the flatest section of the hull (*q.v.*) and frames (*q.v.*) of a ship, running from the keel (*q.v.*) to the curve of the bilges (*q.v.*).

floor timbers: the lowest futtocks (*q.v.*) of the frames (*q.v.*) of a ship, fitted to the keel (*q.v.*).

fluke: of an anchor, triangular spade at the end of each arm, which digs into the sea bed.

fore-and-aft: in a line from stern to bow.

forecastle: used here for any superstructure built over the stempost (*q.v.*) of a ship at the bows (*q.v.*).

foremast: mast at the bows (*q.v.*).

forestay: rope bracing a mast against forces pushing it aft and

running from the masthead (*q.v.*) to some point forward (*q.v.*).

forward: towards the bows (*q.v.*), in the fore part of a ship.

frame: timber or rib (*q.v.*) of a ship running from the keel (*q.v.*) to the gunwale (*q.v.*). On all large wooden ships frames were composed of several timbers known as futtocks (*q.v.*).

freeboard: distance from the waterline (*q.v.*) to the deck.

furled: of a sail, rolled up and secured to the yard (*q.v.*).

futtock: any sectional timber comprising part of a frame (*q.v.*) or rib (*q.v.*).

galley: used here throughout as a generic for oared ships of every kind, except where the specific type of γαλέα/*galea* is discussed.

garboard strakes: first planking (*q.v.*) or strake (*q.v.*) of the hull (*q.v.*) rabbeted (rebated) to the keel (*q.v.*).

gearing ratio of an oar: the ratio of an oar's length from the mid-point of the oarsman's hands on the handle to the thole to that from the thole to the centre of water pressure on the blade.

gripe (to): to come up into the wind when beating to windward.

grommet: of an oar, ring of twisted leather or cordage used to attach an oar to its thole pin (*q.v.*).

gunwale: the term is a modern one associated with the guns of broadside sailing ships. However, it has become generalized in usage for stringers (*q.v.*) which cover the heads of the frames (*q.v.*) of small boats. We have used it in relation to dromons for stringers which covered the heads of the bulwarks (*q.v.*).

half-deck: small deck at the bow (*q.v.*) and/or stern (*q.v.*) of an otherwise open boat.

halyard: generic term for a rope or series of ropes and tackles, such as ties (*q.v.*) and tie tackles (*q.v.*), by which a yard (*q.v.*) is raised and lowered.

hatch: opening in a deck through which access to the hold (*q.v.*) is provided.

heel of a mast: lower end of a mast, usually squared off to fit into the mast step (*q.v.*).

heel (to): (of a ship) to lean over to one side.

hog (to): when the bow and stern of a ship droop when the

midship section is on the crest of a wave and the weight of the bow and stern causes the hull to flex, it is said to hog. Cf. sag.

hold: in general terms, the space inside the hull (*q.v.*) below deck.

hull: the "skin" of a ship, consisting of frames (*q.v.*) and planking (*q.v.*).

keel: the lowest timber (or composite of timbers) of a ship, extending from sternpost (*q.v.*) to stempost (*q.v.*). The whole ship is built upwards from the keel.

keelson: stringer (*q.v.*) laid over the floor timbers (*q.v.*) and keel (*q.v.*) to provide fore-and-aft rigidity and to lock the floor timbers to the keel.

knot: one nautical mile (6,080 feet), or 1.15 English statute miles, per hour.

lee: lee shore: a shore or coast onto which the prevailing winds blow directly, downwind from any ship off it and thus dangerous.

leech: the trailing or after edge of any fore-and-aft sail (*q.v.*). The outer edges of any square sail (*q.v.*).

leeway: the distance a ship slides to leeward from her true course as the wind, or tide or current, forces her to slide sideways through the water.

lifts: ropes running from mastheads (*q.v.*) to the ends of yards (*q.v.*) on ships with square sails (*q.v.*) to control their angle to the horizontal.

limber (holes): holes cut in the underside of floor timbers (*q.v.*) close to the keel (*q.v.*) to allow bilge water (*q.v.*) to flow to a sump (*q.v.*) at the lowest part of the keel.

long boat: a ship's main auxiliary boat, usually towed behind.

luff: the leading or forward edge of any fore-and-aft (*q.v.*) sail.

luff up (to): to turn the bows (*q.v.*) up in to the wind.

marine: general term used here for any soldiers who fought at sea. There is no reference here to the type of specialized soldiers trained for service at sea in the English and other navies from the 17th century. Such specialized marines did not exist in the Middle Ages. Some oarsmen also doubled as marines.

mast step: framework of timber built on the keel (*q.v.*) and

keelson (*q.v.*), forming a receptacle to take the heel (*q.v.*) of a mast.

masthead: uppermost section of a mast, in which one or more blocks (*q.v.*) could be set to raise and lower the yard (*q.v.*).

midships mast: a mast located amidships (*q.v.*) in the waist of a ship.

mizzen mast: a third mast, usually small, right aft at the stern (*q.v.*).

monoreme: a galley (*q.v.*) rowing one oar from each bench (*q.v.*) position.

moor (to): to anchor a ship with two or more anchors to minimize the swing of the ship with wind or tide.

mortise and tenon joints: method of joining planking (*q.v.*) or strakes (*q.v.*) together edge to edge by chiselling rectangular holes (mortises) in both planks and inserting a piece of wood (tenon) into each, hammering the strakes together, and holding the tenon in place with treenails (*q.v.*) inserted into holes bored through the strakes and tenons.

oar ports: holes cut in the planking (*q.v.*) of the hull (*q.v.*) through which oars are rowed.

oar thongs: grommets (*q.v.*), rings of twisted leather or rope used to hold oars to thole pins (*q.v.*).

parrell: a hoop of multiple ropes rove through circular balls (trucks) and flat spreaders (ribs) to hold a yard (*q.v.*) against a mast.

part deck: narrow deck extending only part way from the hull (*q.v.*) towards the centre line (*q.v.*) of a ship.

pitch (to): ships pitch when waves lift their bows and then travel towards the sterns, thus lifting those and causing the bows to pitch down.

planking: planks making up the strakes (*q.v.*) of the hull (*q.v.*) of a ship which form its "skin".

point of sailing: a one-eighth division of a quarter of a circle: 11 degrees, 15 minutes (11.25°).

poop: general term for the stern (*q.v.*) of a ship, including the sterncastle (*q.v.*) and sternpost (*q.v.*).

port: facing from stern (*q.v.*) to bow (*q.v.*), the left-hand side of the ship.

ports: generally speaking, holes cut in the hull of a ship, especially for loading and entry purposes.

prow: general term for the bows of a ship, including the forecastle (*q.v.*) and stempost (*q.v.*).

pull (to): to row an oar, to "pull" it through the stroke. Hence, a "pull" under oars.

pulley: see sheave.

quarters: the two parts of the stern (*q.v.*) either side of the centreline.

raked: angled.

ram, waterline projection at the bow of a ship at the waterline, made of wood sheathed in bronze, used on classical war galleys to fracture the hull (*q.v.*) of enemy vessels.

rib: see frame.

roll (to): a ship rolls from side to side as she passes over waves unless they are dead ahead or astern.

rudders, quarter: sometimes called "steering oars", rudders on long shafts mounted on both of the stern quarters of ancient and medieval Mediterranean ships.

sag (to): when the bow and stern of a ship rise when the midship section is in the trough of two waves and its weight causes the hull to flex, it is said to sag. Cf. hog.

sail, lateen: triangular, fore-and-aft (*q.v.*) sail, whose luff (*q.v.*) is set on a yard (*q.v.*). The forward end of the yard is hauled down so that it is oblique to the mast.

sail, square: rectangular sail suspended from a yard (*q.v.*) set square to the mast, abeam (*q.v.*) the ship.

scuppers: drainage holes in bulwarks (*q.v.*) allowing water on the deck to drain away over the side.

seam: gap between planking (*q.v.*) or strakes (*q.v.*).

shaft of an oar: the cylindrical section of an oar between the blade and the loom (handle).

sheave: circular wheel that revolves in a block (*q.v.*) and which is grooved to take the rope that runs over it.

shell construction: method of construction of the hull (*q.v.*) of a ship in which the planking (*q.v.*) is set up first, before the frames (*q.v.*) are added. Cf. skeleton.

shores: also known as "legs": timbers used to hold a ship upright when aground.

skeleton construction: method of construction of the hull (*q.v.*) of a ship by building a skeleton of keel (*q.v.*), stempost and sternpost (*q.v.*), frames (*q.v.*) and stringers (*q.v.*)

first, and then attaching the planking (*q.v.*) to the frames. Cf. shell.

sleeve of an oar: leather seal attached to the shaft (*q.v.*) of an oar outboard of the hull (*q.v.*), and to the inside of the hull around the oar ports (*q.v.*) to seal the ports against shipping water inboard.

spur: long wooden beam, perhaps sometimes sheathed in iron, attached to the stempost (*q.v.*) and suspended by a chain or coupling from its head.

stand-and-sit stroke: rowing stroke in which oarsmen rise to a semi erect position at the commencement of the stroke and then, bracing one foot against a footrest, pull the oar through the stroke by falling back on to the bench (*q.v.*).

starboard: facing from stern (*q.v.*) to bow (*q.v.*), the right-hand side of a ship.

stempost: the fore-most timber of the frames (*q.v.*) of a hull (*q.v.*) of a ship at the bow (*q.v.*), set on the keel (*q.v.*) at its foot.

stern: the after end of a ship.

sterncastle: used here for any superstructure built over the sternpost (*q.v.*) of a ship at the stern (*q.v.*). Cf. poop.

sternpost: the aftermost timber of the frames (*q.v.*) of a hull (*q.v.*) of a ship at the stern (*q.v.*), set on the keel (*q.v.*) at its foot.

stocks: also known as “keel blocks”, the line of blocks on which a keel (*q.v.*) is laid down when a ship is being built.

strakes: name given to each line of planking (*q.v.*) of a hull (*q.v.*). A strake may be composed of several planks joined together.

stringer: any timber running fore-and-aft (*q.v.*) in the skeleton of a ship; especially those locking frames (*q.v.*) and deck beams (*q.v.*) in place. Wales (*q.v.*) and keelsons (*q.v.*) are stringers.

sump: a box set at the lowest part of the keel (*q.v.*) into which bilge water (*q.v.*) flowed through limber holes (*q.v.*) and from which it was pumped out by a bilge pump (*q.v.*).

swallow: hole in the casing of a block (*q.v.*) in which the

sheave (*q.v.*) is set.

tack (to): to move the bows (*q.v.*) of a ship across the direction of the wind when sailing into it so as to bring the wind onto the opposite side of the ship.

tackle: a combination of two or more blocks (*q.v.*) and ropes used to increase mechanical advantage when hauling any weight.

thole: pin set in a gunwale (*q.v.*) or other timber to which an oar is held by a grommet (*q.v.*).

through beams: beams (*q.v.*) which projected through the hulls of ancient and medieval ships.

thwart: bench (*q.v.*) or seat on which an oarsman sat. Cf. bench.

tie: rope attached to a yard (*q.v.*) and rove (passed) through a block (*q.v.*) in the masthead (*q.v.*) and connected to a tie tackle (*q.v.*), by which the entire complex of the halyard (*q.v.*) is taken in or let out to raise or lower the yard (*q.v.*) respectively.

tie tackles: tackles (*q.v.*) used to haul on the ties (*q.v.*) attached to the yards (*q.v.*), by which the halyards (*q.v.*) are taken in or let out.

tiller: handle by which a rudder (*q.v.*) is manœuvred.

treenails: wooden pins or dowels inserted into bored holes to hold any two timbers together.

trireme: used here for a galley (*q.v.*) rowing three oars from each bench (*q.v.*) position, irrespective of any vertical arrangement of the benches or of the number of oarsmen on the same bench.

wale: a heavy stringer (*q.v.*) fastened to the outside of a hull (*q.v.*), esp. at points where protection from abrasion or collision is required.

waterline: level of flotation of a ship.

weather helm: when the tiller (*q.v.*) of a rudder (*q.v.*) has to be held to windward, to the weather, in order to prevent the ship griping (*q.v.*).

weight in hand of an oar: the downward force on the mid-handle needed to raise the oar from the water and to balance it at the pivot at the thole.

windlass: a horizontal cylinder fitted with bars to turn it, around which an anchor cable can be wound.

windsail: a cloth funnel able to have its mouth rotated into the

wind so that fresh air is deflected below deck by the spout led through a hatch (*q.v.*) or deck opening of some kind.

yard: spar from which a sail is set; i.e., hung.

NOTE ON CITATION OF GREEK AND LATIN GLOSSARIES

At several points in the text, we have cited editions of some of the extant manuscripts of Greek and Latin glossaries, word lists with explanations of the meanings of words, which contain material relevant to our study. Some of these were bilingual, Greek-Latin or Latin-Greek. Some were simply Latin. In all cases, the glossaries had complex transmission and manuscript histories and, in all instances cited, the manuscripts referred to post-date the original compilation of the glossaries, in some cases by many centuries.

In order to avoid tedious repetition in the text, we have given the details of the glossaries and manuscripts here. Cross references to the discussion here have been added to the notes at the appropriate places. The manuscripts are discussed here not in the order in which they appear in the text but rather in an order which best facilitated discussion of transmission processes.

We are perfectly well aware that compilers of glossaries constantly altered, re-arranged, and modified what they had before them. Sometimes they worked *ab initio* from manuscripts or from marginal glosses on manuscripts but more usually they worked from older glossaries, producing "collected glossaries". On the one hand, it is clear that the scribes of the manuscripts of the glossaries as we have them frequently had no idea what the words that they were glossing had originally meant. They sometimes produced weird and wonderful explanations, sometimes based on false etymologies. But they themselves may not have been responsible for the loss of understanding. That could have occurred anywhere in the process of transmission to them. Alternatively, the meanings of words may have changed, as they frequently do. On the other hand, even when they do appear to have understood the antique meanings of words that they glossed, and in those cases we have had to assume for want of argument that they really did understand, even that may not necessarily have been the case. They may have been simply copying something they did not understand themselves, or they may have been just guessing. It is rarely possible to know the date and provenance of a gloss, whether it was that of the manuscript in which it survives, or that of the original compilation of the glossary, or that of some point in the transmission process between. We have used the glossaries with

extreme caution, being fully conscious of their notorious unreliability and the difficulty of interpretation of these sources.[1]

1: Rome, Biblioteca Apostolica Vaticana, MS. Vat. Lat. 3321 (= Lowe, CLA, vol. 1, no. 15).

Written on parchment in Uncial majuscule letters, this manuscript is generally dated to the mid eighth century with a provenance in central Italy. Folios 2r-163r were edited in Goetz, *Glossarii Latini*, vol. 4, 1-198, as *Glossae Codicis Vaticani* 3321.

The glossary was a copy of an earlier one, also probably produced in Italy, which was the common ancestor of both that of this manuscript and also that of the later tenth-century manuscript Monte Cassino, Biblioteca dell' Abbazia, MS. Cass. 439, which Goetz noted in his critical apparatus.

Both glossaries contain compilations of two separate earlier glossaries, that known as the *Abolita* (from its first *lemma*), which was produced in Spain in the late seventh century, and that known as the *Abstrusa* (again from its first *lemma*), which was probably produced in France, perhaps as early as the sixth century. In Goetz's edition, the *Abolita* entries are contained within square brackets.

2: Paris, Bibliothèque Nationale, MS. Lat. 7651.

Produced in the ninth century in France, possibly at Laon, and probably compiled from an earlier Uncial exemplar, this manuscript, whose Latin text is in Caroline minuscule, contains the oldest extant copy of the Latin-Greek glosses attributed to Philoxenos. It was intended for Greeks attempting to read Latin. Folios 1r-218r were edited in Goetz, *Glossarii Latini*, vol. 2, pp. 1-212 as *Glossae Latino-Graece*.

Who the compiler of the Philoxenos was is unkown, but he was not the consul of 525 C.E. He was probably a monk in an Italian, Greek-literate monastery. He had access to a copy of the *Ars grammatica* of Flavius Sosipater Charisius (fl. ca 375), so the earliest possible dating would be to the fifth century. However, a sixth-century dating is widely accepted.

3: St Gall, Stiftsbibliothek, MS. 912 (= Lowe, CLA, vol. 7, no. 967a).

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[1] The sources that we have used for this note on the glossaries include CLA; Dionisotti, "Greek grammars and dictionaries"; Goetz, *Glossarii Latini*; Kaster, *Guardians of language*; Law, *Grammar and grammarians*; Lindsay, *Early mediaeval Latin glossaries*.

Written on parchment as a palimpsest over six other texts dating from the fourth to eighth centuries, in rude Uncial majuscule, this manuscript was once thought to have been produced at St Gall; however, it has been shown to have been written in North Italy in the eighth century, at approximately the same time as Vat. Lat. 3321. The glossary on folios 2v-160v was edited in Goetz, *Glossarii Latini*, vol. 4, pp. 199-298 as *Glossae Codicis Sangallensis* 912.

The sources of the St Gall glossary included a composite *Abstrusa-Abolita* glossary as well as a Philoxenos glossary, St Isidore's *Etymologiae*, and some bilingual glossary probably produced in an Italian monastery where Greek was spoken or studied, such as Vivarium or Bobbio.

4: London, British Library, MS. Harley 5792 (= Lowe, CLA, vol. 2, no. 203).

A parchment Uncial manuscript probably produced in Italy, possibly Byzantine Italy, possibly as early as the seventh century or alternatively as late as ca 800, this soon found its way to Merovingian France, as is shown by some annotations on it in Merovingian minuscule. Folios 1v-240v were edited in Goetz, *Glossarii Latini*, vol. 2, pp. 213-483 as *Glossae Graeco-Latinae*.

The glossary was a copy of the Greek-Latin glosses attributed to a certain Cyrillus and may well have been copied from a papyrus exemplar. The Cyril glosses have been tentatively dated to the sixth century; however, who Cyrillus was is unknown. He was not the fifth-century Patriarch of Alexandria.

The sources of the Cyril glosses included a Latin-Greek glossary similar to the pseudo-Philoxenos and then turned back to front, and a Latin grammar composed for Greeks.

5: Munich, Bayerische Staatsbibliothek, Cod. Monac. Lat. 13002.

In a dated manuscript produced in 1158 at the German monastery of Prüfening in Bavaria, this glossary is known as the *Hermeneumata Monacensia*. Folios 209r-218r were edited in Goetz, *Glossarii Latini*, vol. 3, pp. 117-220.

The glossary was a much-removed copy of glosses from a third-century Greco-Latin schoolbook attributed, falsely, to Dositheus, the author of a Latin grammar for Greeks composed in the early third century which achieved a wide circulation.

6: Metz, Bibliothèque Publique, Cod. Metensis 500.

Folios 9r-24v and 136r-160v of this eleventh-century manuscript contain a late tenth-century copy of a glossary known as the *Glossae Aynardi* from their inscription attributing them to a certain Aynardus

in the year 969. Excerpts from the glosses were edited in Goetz, *Glossarii Latini*, vol. 5, pp. 615-625.

This was a unique glossary, *sui generis*, with no known links to any other glossary. The author was an unknown grammarian associated with Toul, at the tomb of St Evre of which he dedicated the glossary, according to his own preface. He knew Origen and St Ambrose, the *De compendiosa doctrina* of Nonius Marcellus (fl. ca 280) on the literature of Republican Rome, the grammarian Servius (Rome, late fourth to early fifth century), and Horace, Vergil, and Juvenal.

7: Erfurt, Wissenschaftliche Allgemeinbibliothek, Amplon. Fol. 42.

Folios 1-14v contain the so-called *Amplonianum Primum*, the First Amplonian Glossary. The Second Amplonian Glossary follows on folios 14-34 of the manuscript. The First Amplonian Glossary dates from the ninth century and was probably produced in Germany. It was edited in Goetz, *Glossarii Latini*, vol. 5, pp. 337-401. It was akin to the manuscript Épinal MS. 7, also of the ninth century, which Goetz included in his critical apparatus.

The glossary included material from the *Ars de nomine et verbo* of the grammarian Phocas (Rome, fifth century), *Hermeneumata* materials, glosses of the Antiochene grammarian Rufinus (mid fifth - early sixth century) on Eusebius, Orosius, St Jerome, *De viris illustribus*, the Vulgate Bible, and the *Abstrusa* and *Abolita* glossaries.

8: Rome, Biblioteca Apostolica Vaticana, MS. Vat. Lat. 6925.

Folios 67r-78v contain the so-called *Hermeneumata Vaticana*, like the *Hermeneumata Monacensia* a much-removed copy of glosses from the Greco-Latin schoolbook attributed to Dositheus. The manuscript is dated to the tenth century. The glossary was edited in Goetz, *Glossarii Latini*, vol. 3, pp. 421-438.

9: Leiden, Bibliothek der Rijksuniversiteit, MS. BPL 67F (= Lowe, CLA, vol. 10, no. 1575).

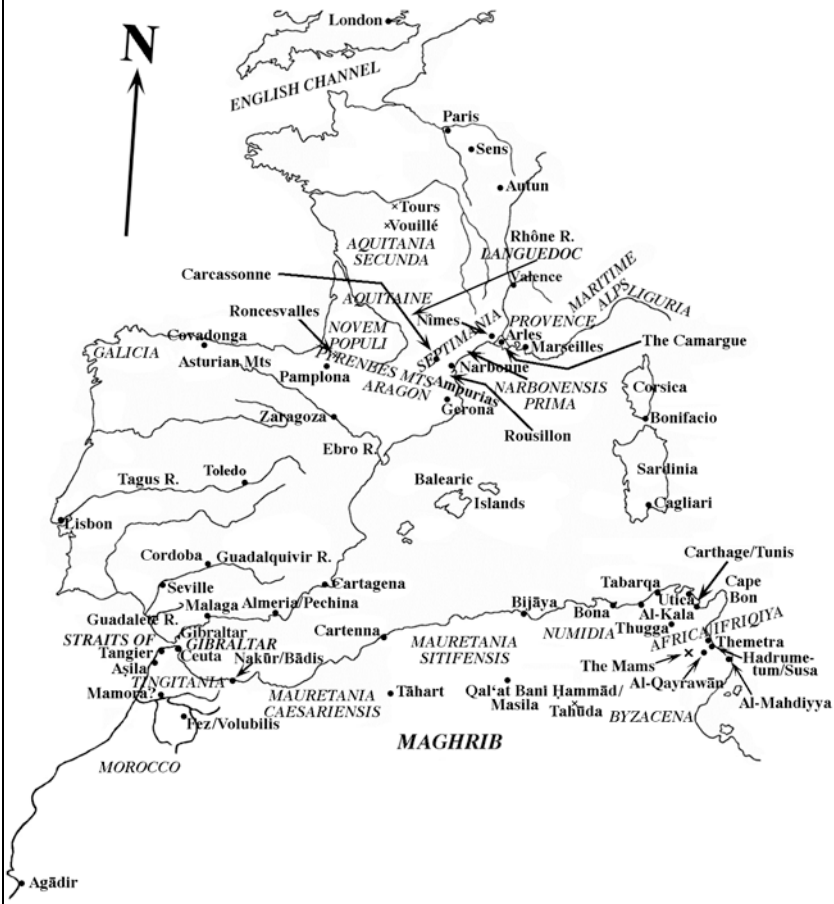
In Caroline minuscule, this manuscript was written somewhere in North-East France in the age of Charlemagne and signed on folio 158v by a certain ΓAωσΘ MA Rωσ (Gaōsthmarōs). Folios 142v-147r were edited in Goetz, *Glossarii Latini*, vol. 5, pp. 637-651 as the *Glossae Nonii*.

Compiled by Agellus and Marcellus, the *Glossae Nonii* contained glosses derived from the *De compendiosa doctrina* of Nonius Marcellus. It was probably compiled from marginal notes in a manuscript of Nonius, one of which may have been taken to Tours by Alcuin.

ABBREVIATIONS

AnalBoll	*Analecta Bollandiana*
BA-S	Amari, M., trans., *Biblioteca Arabo-Sicula. Versione italiana*, 2 vols and Appendice (1880-81, 1889; rpt, Turin and Rome, 1982).
BGA	De Goeje, M. J., ed., *Bibliotheca geographorum Arabicorum*, 3rd ed. (Leiden, 1967).
BMGS	*Byzantine and Modern Greek Studies*
BZ	*Byzantinische Zeitschrift*
CC*ContMed*	Corpus Christianorum, Continuatio medievalis, 173- vols (Turnhout, 1971-2000-).
CC*SL*	Corpus Christianorum, Series Latina, 176 vols (Turnhout, 1954-65).
CFHB	Corpus fontium historiae Byzantinae (Berlin et al., 1967-).
CI	*Corpus iuris civilis. Vol. II: Codex Iustinianus*, ed. P. Krueger (1877; rpt, Berlin, 1970).
CLA	Lowe, E. A., ed., *Codices Latini antiquiores*, 11 vols (Oxford, 1934-71).
CSHB	Corpus Scriptorum Historiae Byzantinae, 34 tomes (Bonn, 1828-53), plus tome 34, vol. 3 (Bonn, 1897).
EHR	*English Historical Review*
FstI	Fonti per la Storia d'Italia
IJNA	*International journal of nautical archaeology and underwater exploration*
JHS	*Journal of Hellenic Studies*
JMH	*Journal of medieval history*
JRS	*Journal of Roman Studies*
MGH*AA*	Monumenta Germaniae historica, *Auctores antiquissimi*, 15 vols (1877-1919; rpt, Berlin, 1961).
MGH*Ep*	Monumenta Germaniae historica, *Epistolae*, 8 vols (1891-1939; rpt, Berlin, 1957-75).
MGH*ScriptRerGerm*	Monumenta Germaniae historica, *Scriptores rerum germanicarum in usum scholarum ex monumentis Germaniae historicis*, nova series, vols 1-7 (1922-30; rpt, Berlin, 1964);

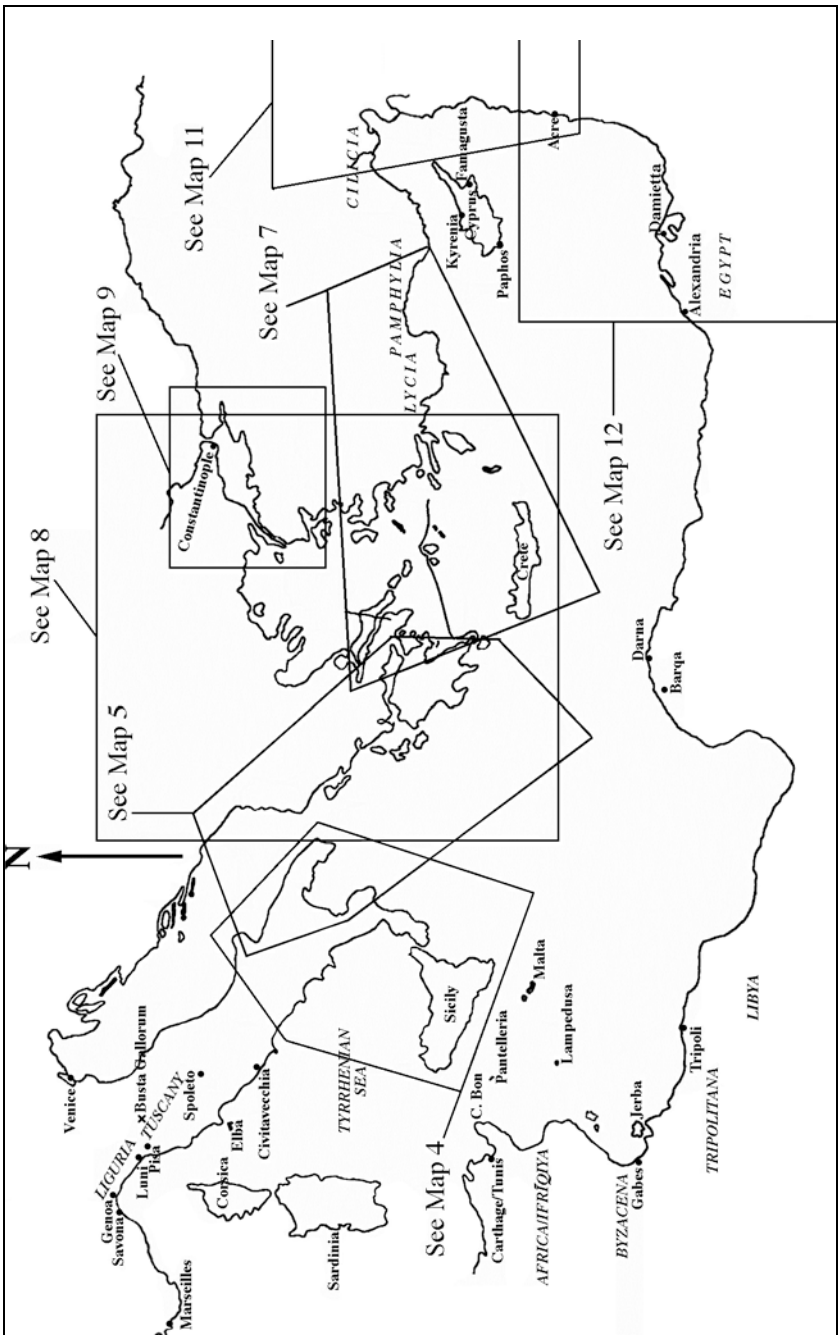
	vols 8-13 (Berlin, 1955-67); vol. 6 *recusi* (1985; rpt, Hanover, 1950); vol. 41 *separatim editi* (Hanover and Leipzig, 1915).
MGH*ScriptRerLang*	Monumenta Germaniae Historica, *Scriptores rerum Langobardicarum et Italicarum saec. VI-IX* (1878; rpt, Hanover, 1964).
MGH*ScriptRerMer*	Monumenta Germaniae historica, *Scriptores rerum Merovingicarum*, 7 vols (Hanover and Leipzig, 1885-1919/20; vols 1-4 rpt, Hanover, 1969-77).
MGH*SS*	Monumenta Germaniae historica, *Scriptores*, 30 vols (1826-1934; rpt, Stuttgart and N.Y., 1963-64).
MM	*Mariner's Mirror*
PG	Patrologiae cursus completus, Series Graeca, ed. J.-P. Migne, 161 vols (Paris, 1857-66).
PL	Patrologiae cursus completus, Series Latina, ed. J.-P. Migne, 217 vols (Paris, 1878-90).
PO	Patrologia Orientalis, 47 vols [212 nos] (Paris and Turnhout, 1903-98).
REB	*Revue des études byzantines*
RHC*HOcc*	Recueil des historiens des Croisades, *Historiens occidentaux*, 5 vols (1844-95; rpt, N.Y., 1967).
RHC*HOr*	Recueil des historiens des Croisades, *Historiens orientaux*, 5 vols (1872-1906; rpt, N.Y., 1967).
RISS	Rerum italicarum scriptores, ed. L. A. Muratori, 25 vols (Milan, 1723-51).
RISS*NS*	Rerum italicarum scriptores, nova series, 34 tomes (Bologna, 1900-35).
ROL	*Revue de l'Orient Latin*
Rolls Series	Great Britain, Public Record Office, *Rerum Britannicarum medii aevi scriptores; or, Chronicles and memorials of Great Britain and Ireland during the Middle Ages*, 99 tomes (London, 1857-96).
RSBN	*Rivista di studi bizantini e neoellenici*
TM	*Travaux et Mémoires*



Map 1: The Atlantic and western Mediterranean: antiquity and the Early Middle Ages



Map 2: The Atlantic and western Mediterranean: the High Middle Ages



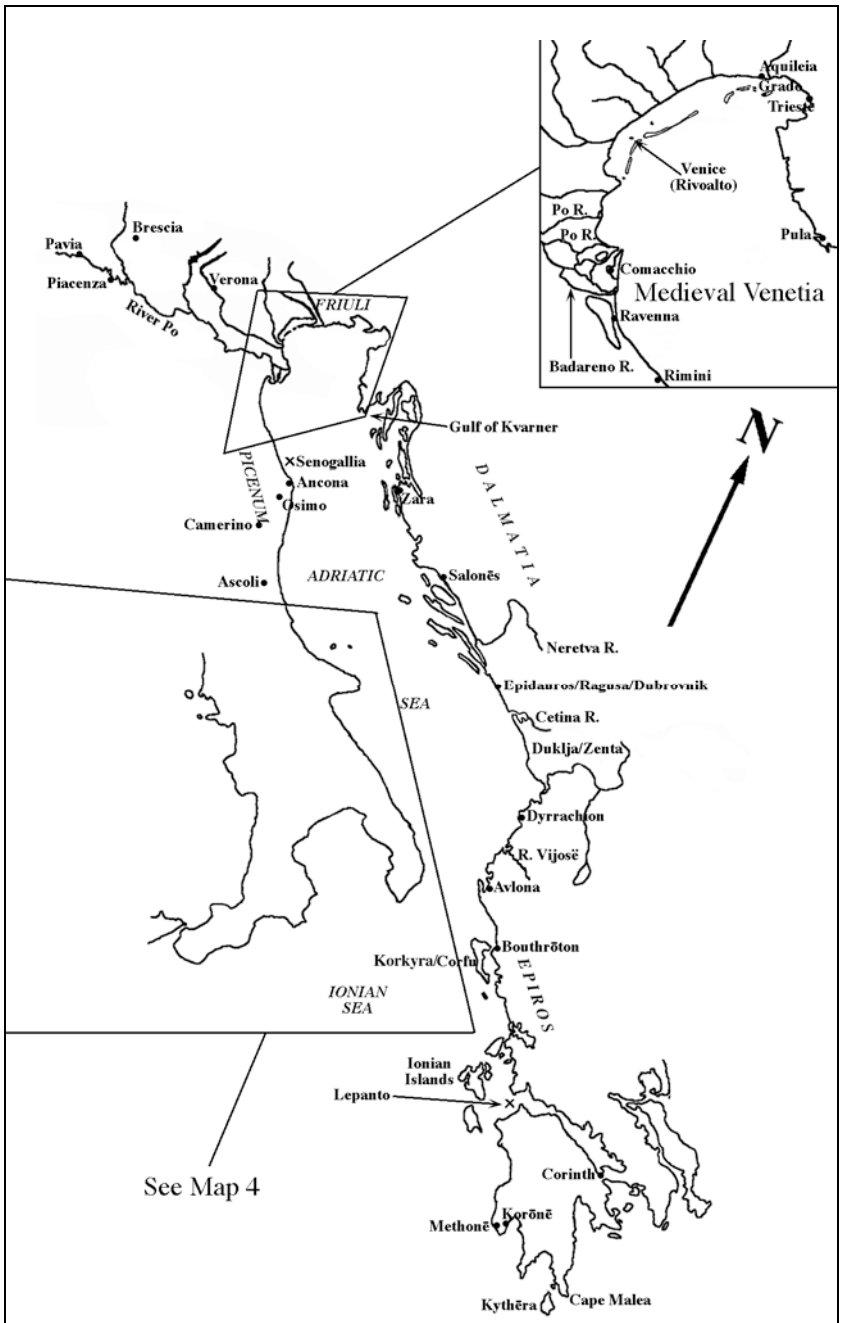
Map 3: The central and eastern Mediterranean



Map 4: Southern Italy and Sicily



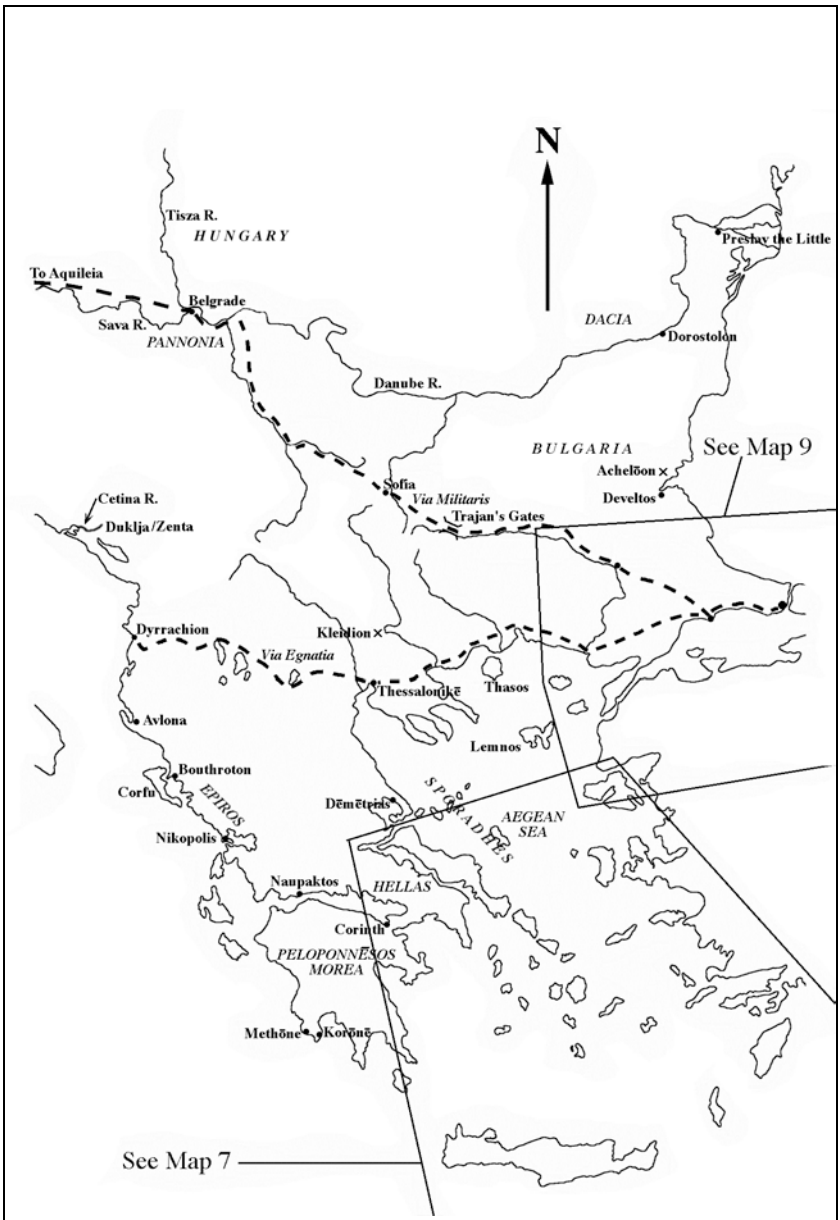
Map 5: The Ionian Sea



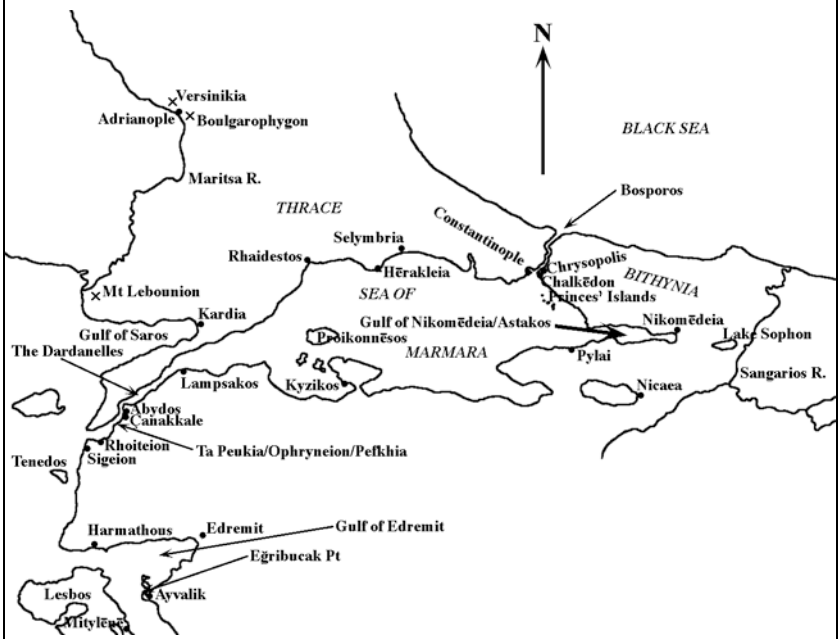
Map 6: The Adriatic Sea



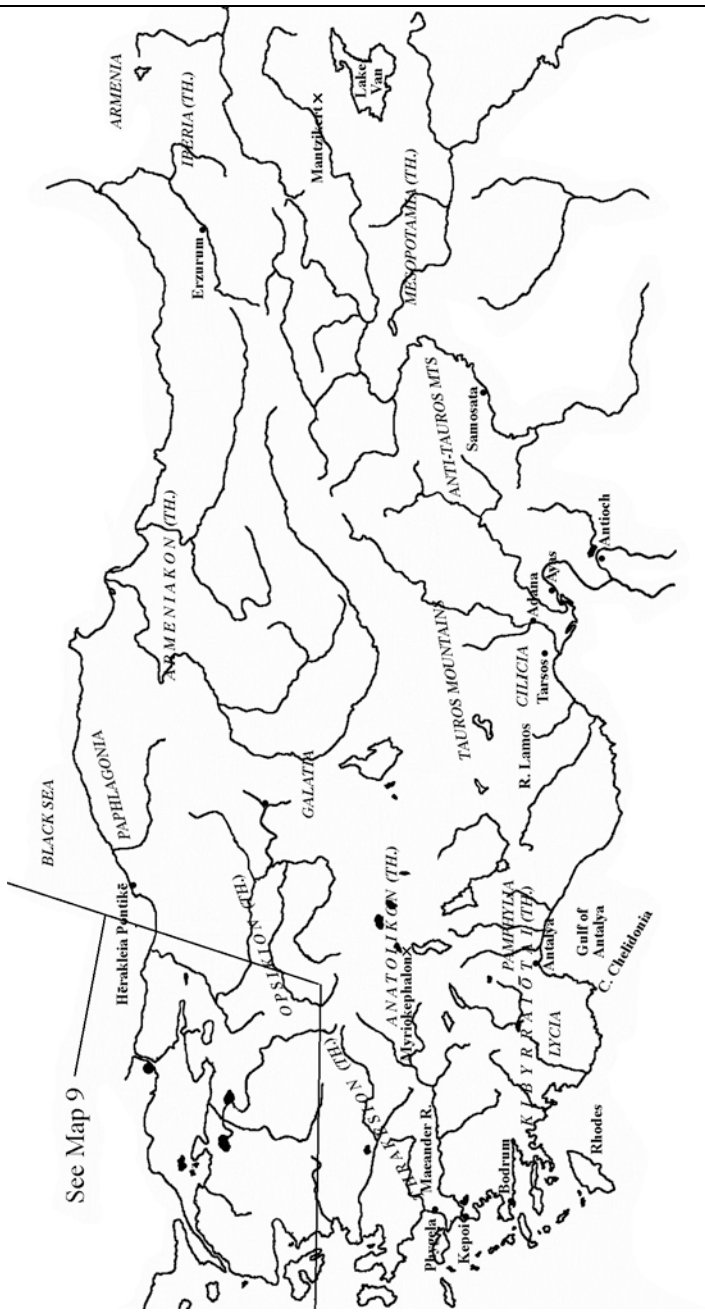
Map 7: The southern Aegean and *Lycia*



Map 8: The northern Aegean and the Balkans



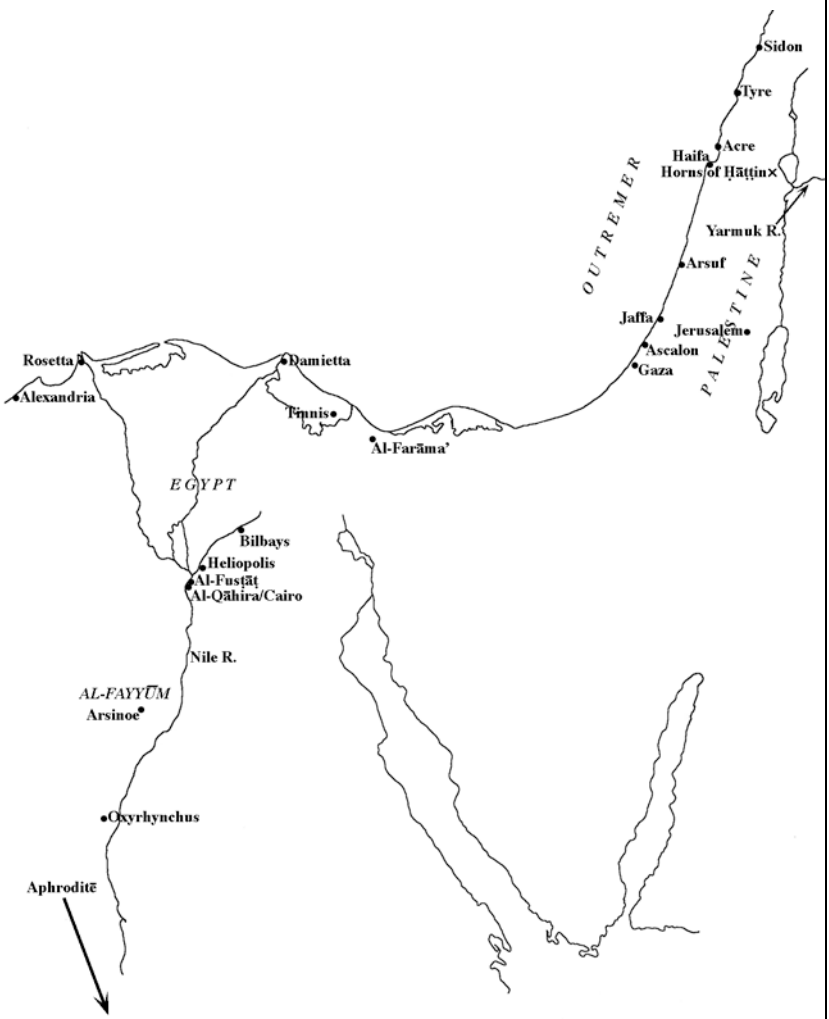
Map 9: The Dardanelles to the Black Sea



Map 10: Byzantine Asia Minor



Map 11: Greater Syria



Map 12: Egypt and Palestine



Map 13: Greater Iraq

INTRODUCTION

There are few images more representative of the Mediterranean Sea in the Early Middle Ages than that of the famous Byzantine war galley known as the *dromōn*. At sea, the succession of the dromon to the Roman bireme *liburna* and its predecessors, especially the Greek *triērēs*, has been presented in the conventional historiography of the maritime history of the Mediterranean as marking a transition from Rome to Byzantium. Similarly, the succession of the Western *galea* to the dromon in the late eleventh and twelfth centuries has been presented as marking a transition from the Early Middle Ages to the High Middle Ages in so far as the maritime history of the Mediterranean is concerned.

Behind this conventional presentation lie two intellectual assumptions which have underpinned the historiography. The first is that specific ship types, known by different names, existed in different chronological periods, or in different civilizations, and that these had distinctive construction features which either can be ascertained or, if they cannot be ascertained, would be able to be ascertained if sufficient evidence were available. The second assumption is that when the writers of ancient and medieval texts used terms such as *triērēs*, *liburna*, *dromōn*, or *galea*, they actually intended to refer to such specific ship types because these names were applied to the ship types by their contemporaries. Therefore, if a new name began to be used in the texts from a certain period, this reflects the fact that a new type of ship appeared in that period. Conversely, if a name faded from use in the texts in a certain period, then this indicates that the type of ship to which it referred had disappeared. It has been assumed that there were definite relationships between the words and the physical objects to which they referred, relationships which were both stable over long periods of time and also consistent in usage from place to place and person to person at any one time.

This study was begun by John Pryor as an attempt to research the construction characteristics of the Byzantine dromon in the age of the Macedonian emperors in this conventional way. When it was commenced, there was an implicit acceptance of the assumptions of the conventional historiography. However, in the course of our research we have been led to question them. As a result, we have also been led to question the very basis of any attempt to know what "the"

Byzantine dromon actually was. In certain periods Byzantines certainly referred to galleys by the term *dromōn*, and also by *chelandion* and other terms, but did they always really intend that their use of these terms should actually designate specific galley types with distinctive design characteristics?

On the one hand, maritime historians know well that throughout history gradual evolution has almost invariably been the norm in so far as ship design is concerned. There has very rarely been any sudden technological innovation which has produced a distinctive new ship type overnight. Even submarines and aircraft carriers were developed gradually as new features were experimented with. Ship types have never remained static and fixed in design over time. They have always evolved slowly as generation after generation has progressively refined them and adapted them to changing circumstances. The evolutionary norm has been that eventually changes have become so marked that the ships have become distinctive new types which can be distinguished from their progenitors. Sometimes a previous name or term for a ship type has been taken into a new technological context; for example, the medieval Italian *galeone* for a small galley eventually became *galleon* for sailing ships of the sixteenth century. Sometimes a term for a ship type has been replaced by another term; for example, the Scandinavian *knörr*, which evolved in England into the Anglo-Norman *buss*. This being the case, we are led to consider whether "a" distinctive Byzantine warship, known as a *dromōn*, ever actually existed at any time or whether, in fact, different forms of galleys over many centuries were referred to by Byzantines and others by the name *dromōn*? There is no reason *per se* why the same term used in, say, the sixth century and the tenth, should not have been used with reference to quite different ship types. There is no reason, *per se*, why the same name should not have continued in use even if the construction features of the ships had changed dramatically.

On the other hand, when we examine texts which use terms such as *dromōn* for ships, the reality for us lies in the texts and terms themselves. In most cases, we cannot see beyond the terms and cannot know whether two authors using the same term, even in the same time period, really had the same type of ship in mind. The same would true of the use of terminology in different geographical regions. Was a ship referred to as a *chelandion* in Byzantine South Italy in the tenth century really the same as that which was referred to by the same name in Constantinople? Futhermore, in most cases we cannot even know whether authors really even intended to refer to any specific

ship type by their use of such terms. Indeed, in many cases, collateral evidence suggests that their use of them was no more specific than is that of "yacht" in our own time: a term which began with a specific reference to a seventeenth-century Dutch ship but which has since been applied to almost any kind of sailing pleasure craft. The popular use of "battleship" is another case in point. The word is correctly used for first-rate capital ships of the modern era of iron ships but is frequently used in popular literature with many other references. Nelson's *Victory*, for example, is often referred to as a "battleship"; whereas, she was properly a "first-rate ship of the line". Only if we had texts which empirically described the construction or operation of galleys referred to as *dromōnes* at any particular time could we be confident that we were being informed about actual ships in contemporary use, but even then only for that time and place and for those texts.

To this general problem of the use of technical and technological terminology in texts, we need to add another consideration especially prominent in Byzantine literary texts. As is well known, in most periods most educated Byzantine authors aped the style and vocabulary of classical Greece. Their models were, for example, Homer, Herodotos, and Thucydides. Moreover, Byzantine literati learned their classical Greek by reading and memorizing these and other authors. As a result, classical vocabulary and expressions continually recurred to them when searching for ways in which to express what they wished to say. When writing, they might, on the one hand, attempt to display their education to their intended readers by deliberately quoting or paraphrasing snippets from classical authors. On the other hand, such snippets might find their way to their pens quite unconsciously simply as a product of their education because a word or phrase or clause remembered from their education sprang to their minds as a way to say something. A similar problem occurs in Western medieval Latin texts when authors used short passages of scripture to express something. Often, one can not know whether the quotation was deliberate or simply a product of their education, during which much of the Bible had been memorized. Consequently, when we find Byzantine authors using technical vocabulary derived from a distant past, such as *triērēs* for a "three" or three-banked galley, or *triakontērēs* for a "thirty" [oared galley], or *pentēkonteros* for a "fifty" [oared galley], we can never be sure that they intended to convey to their readers that fact that the ships in question had the technological characteristics to which the terms had

originally referred. They may simply have been using a word for a ship which was known to be classical, and therefore approved, without any intent at all to link it in their readers' minds with the technological characteristics of the ships of their own day referred to. The latter may or may not have had three banks or thirty or fifty oars, etc. There is simply no way of knowing from the texts *per se*.

Leaving aside the question of subconscious utilization of classical terminology, there is no doubt that educated Byzantines did also deliberately and consciously ransack classical texts for their own purposes. Unfortunately for modern maritime historians, this was the case with the "*Naval warfare, commissioned by Basil, the patrician and parakoimōmenos*", a treatise compiled by an anonymous author for the *parakoimōmenos* Basil Lekapēnos, in 958-59, and which is the only surviving text which purports to describe the contemporary construction of *dromōnes* and *chelandia*.[1] In the past, this treatise has been accepted as a virtual "shipwright's manual" by maritime historians; although, its derivative nature has been recognized by literary historians.[2] It will be shown to have been little more than an exercise in classicizing philology, and therefore to be of only limited use for study of the construction of actual tenth-century dromons.

Since we have been led to question seriously the underlying assumptions for empirical study of the construction of the ships, we have then approached the reality of "the" Byzantine dromon from alternative perspectives. On the one hand, from the sixth to the twelfth centuries, Byzantines and others certainly referred to some kinds of war galleys by the name *dromōn*. On the other hand, real war galleys certainly existed. But, what did contemporaries intend their terminology to signify and what can we know of the physical objects to which they referred? Beyond that, with what degree of confidence can we use their texts to research the construction characteristics of the galleys and the ways in which they may have evolved over time? Our primary objective has become an attempt to elucidate the meanings of terminology as used by contemporaries and how such meanings may have varied from time to time or from author to author.

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[1] *Naumachika syntachthenta para Basileiou patrikiou kai parakoimoumenou*. Hereafter, this text is referred to as the *Anonymous* and its author as "the Anonymous". We have edited the text from a microfilm of the manuscript and translated it here in Appendix Three because the text published as *Ναυμαχικὰ Συνταχθέντα παρὰ Βασιλείου πατρικίου καὶ παρα-κοιμωμένου*, in Dain *Naumachica*, pp. 57-68 has been found to be completely unsatisfactory. On the text and its classicizing terminology, see below pp. 183-6.

[2] Hunger, *Hochsprachliche profane Litteratur*, vol. 2, p. 334.

As a result, large sections of this study have evolved into an etymological and philological hunt for linguistic chimerae. We are well aware, of course, that the hunt was always doomed to only partial success at the best. The passage of the centuries and the disappearance of so many sources has made the recovery of the meaning of terminology in the past possible only in part. Some readers may consider that in some places we have pushed the search for understanding of the meaning of terminology to excessive lengths, or that we have presented the evidence at excessive length. In response, we point out that the search has been successful in some places in elucidating the meaning of some terms whose meaning has been completely forgotten; for example, περόνη (*peronē*) for the "spur" of a galley, καλυ(μ)βομάτος (*kaly(m)bomātos*) for a water tank or possibly something to do with a bilge pump, and τροχαντῆρ (*trochantēr*) for a part of a rudder to which the rudder tackles were attached. These are merely three examples and there are many points at which we consider that the results have justified the hunt. Those who find the presentation of the evidence tedious can simply skip to the conclusions; however, there will be some readers who will want the evidence for the conclusions properly presented.

In retrospect, now that the research has been done and the book has been written, there will no doubt be some who will consider that we have made much ado about nothing. What else would one expect but that words, even technical and technological terms, varied in meaning from time to time, place to place, and author to author? What else would one expect but that Byzantine galleys of the tenth century were not the same as those of the sixth century? What else would one expect but that Byzantine authors wrote classicizing philological treatises rather than shipwrights' manuals? We would respond that these have not been the assumptions of the traditional historiography of maritime history, that there has been an assumption that something called "the dromon" did exist and remained the same for centuries, and that texts referred to actual ships. We came to a full appreciation of the extent of the methodological difficulties and to our questioning of the assumptions of the maritime historiography only slowly.

We have been mindful of all of these considerations throughout and have attempted to avoid referring to dromons as though they were a single reality. Only in Chapter Four, which deals with the construction, equipment, and armaments of tenth-century Byzantine war galleys during the era of the Macedonian emperors, have we used the word dromon as an intellectual shorthand, as though it did

represent a single reality. To have avoided it there would have involved endless and tedious circumlocutions. Moreover, since most of the texts under discussion in Chapter IV emanated from Constantinople over a comparatively short period between ca 900 and 960, there is some justification for considering that fairly well-known and standardized types of galleys may have been referred to as *dromōnes* in those texts.

CHAPTER ONE

THE OPERATIONAL CONTEXT[1]

The first period, ca 400-560: the Germanic assault and imperial recovery

It has been claimed frequently that from *Actium* in 43 B.C.E. to the battle of the Dardanelles between forces of Constantine and Licinius in 324 C.E. the Mediterranean was a Roman lake and that therefore the Roman imperial navy retained throughout only the skeletal forces needed for state communications and occasional suppression of piracy. When the Crimean Goths crossed the Black Sea into the Sea of Marmara in 267, the naval forces sent against them were inadequate.[2]

In reality, however, the Empire had always maintained significant naval forces, both in the Mediterranean and in the North, and by the fourth century authorities had the capability to put considerable naval forces to sea. At the Dardanelles, Constantine's forces supposedly engaged Licinius' 350 *triēreis* with 200 *triacontoroi*.[3] Constantius gathered a large fleet in the East in 352 for his assault on the usurper Magnentius in the West. Theodosius I sent Valentian II to Italy with a squadron in 388 when Maximus seized power there and Maximus himself gathered a fleet in the Adriatic to intercept them. In 398 the *magister militum* of the West, Stilicho, sent Mascezel, brother of the rebel *comes Africae* Gildo, with a fleet against his brother.

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[1] This chapter could obviously have been another book and the sources that could be adduced in documentation of it are so numerous that they would have expanded the bibliography unrealistically. Only the most pertinent have been adduced here. By and large, only earlier, more contemporary sources have been cited and later, more derivative ones have been omitted; even though it is appreciated that contemporaneity is not always the best index of reliability. We have made occasional exceptions to this rule where there are good reasons to do so, particularly in the cases of some information supplied uniquely by the great Muslim historians Ibn al-Athīr and Ibn Khaldūn, that of the indispensable historian of Maghribin and Andalusi affairs Ibn 'Idhārī, and the Egyptian historian Al-Maqrīzī, but generally we have adhered to it. References to modern secondary literature have been kept to an essential minimum.

[2] Zōsimos, *Historia nova*, A.34-5 (pp. 24-5).

[3] Zōsimos, *Historia nova*, B.22 (pp. 78-9). Zōsimos' use of the classical words *triēreis* and *triacontoroi* for three-banked triremes and thirty-oared galleys respectively was not technical. The language really meant no more than that Licinius' galleys, collected from Egypt, Phoenicia, *Africa*, and elsewhere, were larger than those of the fleet Constantine had built at Thessalonikē.

Stilicho also sent naval forces against the Visigoths in the Balkans and when the Gothic *magister militum* Gainas tried to cross the Dardanelles in 399 on hastily assembled ships or rafts, his forces were massacred by Roman *liburnae* under the command of Fravitta. In 410 the Western emperor Honorius I was besieged in Ravenna by Attalus, a usurping emperor created by Alaric the Visigoth, and prepared to flee by sea but was saved by the arrival of six regiments of 4,000 men from the East, suggesting considerable capability to transport troops by sea. When Heraclianus, the *comes Africae*, rebelled against Honorius in 413 and crossed to Italy, Orosius reported that he had 3,700 ships, a gross exaggeration no doubt but nevertheless indicating that considerable naval forces could be gathered in *Africa*. In 417 the *magister militum* Constantius penned the Visigoths in Narbonne, cutting off supplies by sea and forcing them to evacuate and cross the Pyrenees into Spain. He, also, must have had considerable naval forces. And, finally, in 425 Theodosios II sent forces against the rebel John under the *magister militum* Ardabourios and his son Aspar which stormed *Salōnes* and then made a sea-borne expedition to *Aquileia*.[4]

In 429 a confederation of Siling and Asding Vandals and Alans under the Asding king Gaiseric took ship from Cartagena to *Tingitania*, possibly by invitation of Boniface, the *comes Africae*. From *Tingitania* Gaiseric pushed east into the provinces of *Mauritania Caesariensis*, *Mauritania Sitifensis*, and *Numidia*. A combined expedition of Western and Eastern forces under Boniface and Aspar, the *magister militum* in Constantinople, failed to dislodge him in 431 and by 435 the Western emperor Valentinian III was forced to cede possession of the two *Mauretaniae* and *Numidia*, retaining only *Carthage* and the province of *Africa* for the Empire. But in 439 Gaiseric finally took *Carthage*, making it the capital of the Vandal kingdom. An expedition sent against him reached Sicily in 441 but was recalled because of attacks by Attila the Hun in Thrace. A treaty ceded *Africa*, *Byzacena*, *Tripolitana*, and eastern *Numidia* to the Vandals in 442 while returning the *Mauretaniae* and western *Numidia* to the Empire, at least in theory.[5]

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[4] Claudian, *De bello Gildonico*, ll. 417, 489-91, 515-26 (pp. 69, 71-3); *idem, De quarto consulatu Honorii*, ll. 459-65; *idem*, *De consulatu Stilichonis*, I.170-74; Eunapios, *History* (Blockley), Frag. 64.1 (p. 94); Julian [emperor], *Orations*, I.40 (vol. 1, p. 104); Olympiōdoros, *Books of history*, fr. 43.2 (p. 208); Orosius, *Historiae adversum paganos*, VII.42.13 (p. 298), 43.1 (p. 299); Zōsimos, *Historia nova*, Δ.45.3-46.1, E.11.3-4 (pp. 203, 228-9). See also Manfroni, *Marina italiana. I*, pp. 3-4; Reddé, *Mare nostrum*, pp. 605-47.

[5] Gregory of Tours, *Historiae*, II.2 (fasc. 1, pp. 39-40); Hydatius, *Chronicle*,

The Vandals appear not to have established a navy in the sense of a dedicated battle fleet; however, from *Africa* they immediately launched raids on Sicily using ships captured in *Carthage* and others they built. Under Gaiseric a fleet sailed to *Ostia* in 455 and systematically pillaged Rome for fourteen days. A fleet of 60 ships sent to Corsica probably in 456 was defeated by the *magister militum* of the West, Ricimer. The Vandals raided Campania in 458 and 461-3, occupied the Balearics some time after 455, Corsica some time after 456, raided Sardinia and occupied it temporarily some time after 455 and permanently from 482/3, raided Sicily and Italy annually and occupied Sicily some time after 468, and sacked *Nikopolis* in *Epiros* and Zakynthos around 474.[6]

Theodosios II sent 1,100 ships, according to Theophanēs the Confessor, against Gaiseric in 448 but the fleet only reached Sicily. Then, the Western emperor Majorian attempted to gather a fleet in southern Spain around Cartagena in 460 to mount an attack but the Vandals destroyed it. Not until 465-8 did the Eastern Empire attempt an offensive against the Vandals when Leo I mounted a major three-pronged attack. A *comes* Marcellinus expelled the Vandals from Sicily in 465 and from Sardinia probably in 466. At the same time the *magister militum* Hērakleios of Edessa landed at Tripoli and marched on *Carthage* by land. However, the entire operation ended in disaster when the *magister militum*, the emperor's brother-in-law Flavius Basiliskos, anchored his fleet in an exposed position off Cape Bon and it was destroyed by Vandal fire ships. Leo's successor Zeno realized that he had to come to terms and and negotiated peace in 474.[7]

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§§80, 107 (pp. 90, 94); Jordanes, *Getica*, §167 (pp. 101-2); *idem*, *Romana*, §330 (p. 42); Marcellinus Comes, *Chronicon*, *Annus* 439 (p. 17); Priskos, *History*, fr. 9.4 (p. 240); Prokopios, *History of the wars*, III.iii.23 - III.iv.15 (vol. 2, pp. 28-38); Prosper, *Epitoma chronicon*, §§1295, 1321, 1332, 1339, 1347 (pp. 472-7); Theophanēs, *Chronographia*, A.M. 5931, 5943 (pp. 95, 104); Victor Vitensis, *Historia*, I.i.1-2, I.iv.12-13 (pp. 2-4). See also Courtois, *Vandales*.

[6] Hydatius, *Chronicle*, §§160, 169 (pp. 104, 109); John Malalas, *Chronographia*, IΔ΄[14].26 (pp. 287-8); Jordanes, *Getica*, §235 (p. 118); Malchos, *Byzantiaka*, fr. 5 (p. 410); Marcellinus Comes, *Chronicon*, *Annus* 455 (p. 22); Priskos, *History*, frr. 30.1 & 3, 31.1, 38.1-2, 39.1 (pp. 330-4, 340, 342); Prokopios, *History of the wars*, III.v.1-5, III.v.22-25, III.xxii.16-18, IV.xiv.40 (vol. 2, pp. 46-8, 52-54, 188, 338); Prosper, *Epitoma chronicon*, §1375 (p. 484); Sidonius Apollinaris, *Carmina*, V.388-92 (p. 197); Theophanēs, *Chronographia*, A.M. 5947 (pp. 108-9); Victor of Tunnuna, *Chronica*, *Annus* 455 (p. 186); Victor Vitensis, *Historia*, I.iv.13, I.viii.24, III.v.20 (pp. 4, 7, 45). See also Courtois, *Vandales*; Reddé, *Mare nostrum*, pp. 648-50.

[7] Hydatius, *Chronicle*, §§195, 223 (pp. 112, 116); John Malalas, *Chronographia*, IΔ΄[14].44 (p. 296); Malchos, *Byzantiaka*, fr. 17 (pp. 424-6); Marius of Avenches, *Chronica*, *Annus* 460 (p. 232); Priskos, *History*, frr. 36.1-2; 53.1, 3-5 (pp. 338, 360-68); Prokopios, *History of the wars*, III.vi.7-24, III.vii.26-7 (vol. 2, pp. 56-62, 70-72);

Table 1: Rulers of the first period, ca 400-560

Eastern Empire		Western Empire	
Emperors	*magistri militum*	Emperors	*magistri militum*
Arkadios (395-408)	Gainas (399-400) Fravitta (400-401)	Honorius (393-423)	Arbogast (388-94) Stilicho (395-408) Constantius (411-21)
Theodosios II (408-50)	Aspar (431-71) Flavius Basiliskos (468-74)	Constantius III (421) John (423-5) Valentinian III (425-55)	Castinus (423-5) Felix (425-30) Aetius (430-32) Boniface (432) Aetius (433-54)
Marcian (450-57)		PetroniusMaximus (455) Avitus (455-7)	
Leo I (457-74)	Zeno (473-4)	Majorian (457-61) Liberius Severus (461-5) Anthemius (467-72) Anicius Olybrius (472) Glycerius (473) Julius Nepos (473-75)	Ricimer (457-72)
Leo II (474)			
Zeno (474-91)	Theodoric Strabo (474) Theodoric the Amal (476-8)	Romulus Augustulus (475-6) _____	Orestes (475-6) Odovacar (476-)
Anastasios I (491-518)			
Justin I (518-27)	Vitalian (518-20)		
Justinian I (527-65)	Belisarios (529-48)		
Justin II (565-78)			

From the death of Gaiseric, the Vandals ceased to be a threat and were eventually overthrown by Justinian I's general Belisarios in 533-4. Just how massive an undertaking the sea-borne invasion of *Africa* from

Theophanēs, *Chronographia*, A.M. 5941-2, 5961, 5963 (pp. 101-2, 115-17).

(Table 1 continued)

Ostrogoths	Visigoths	Vandals
	Alaric (395-410)	Godegisel († 406)
	Athaulf (410-15) Valia (415-18) Theodoric I (419-51) Thorismund (451-3) Theodoric II (453-66)	Gunderic (406-28) Gaiseric (428-77)
	Euric (466-84)	
Odovacar (476-93)	Alaric II (484-507)	Huneric (477-84) Gunthamund (484-96) Thrasamund (496-523)
Theodoric the Great (493-526)	Theodoric the Great (507-26) Amalaric (507-31)	
Athalaric (526-34)		Hilderic (523-30) Gelimer (530-34)
Theodahad (534-36) Witigis (536-40) Hildibad (540-41) Eraric (541) Totila (541-53) Teia (553)	Theudis (531-48) Theudegesil (548-9) Agila (549-54) Athanagild (554-67)	
	Leovigild (568-86)	

Constantinople was is revealed by Prokopios's report of the advice of the *praetorian prefect*, John of Cappadocia, to Justinian to think twice about the undertaking. After the defeat and capture of the Vandal king Gelimer, Belisarios's lieutenants subsequently recovered Sardinia, Corsica, the *Mauretaniae*, *Tingitania*, the Balearics, and *Lilybaion* in

Sicily. Belisarios himself recovered the whole of Sicily in 535 and, following Berber uprisings and civil wars, by 546 *Africa* had been pacified.[8]

During the reign of Gaiseric from 439 to 474 the Vandals had broken the Romanized homogeneity of the Mediterranean for the first time. Even though they established a polity based on grain production integrated into Mediterranean maritime commercial networks rather than the corsair kingdom which their state used to be characterized as,[9] nevertheless the establishment of their kingdom marked a first stage in the breakup of the Mediterranean.

When the Visigothic king Alaric I moved into Italy he attempted to cross to *Africa* in 409-10. Then after entering Spain, the Visigoths under Valia also tried to cross from Gibraltar in 415 but did not have the necessary ships. Having moved back across the Pyrenees in 418 to settle in the provinces of *Novem Populi* and *Aquitania Secunda*, they did not return to Spain until 468, occupying most of the peninsula by 473 except for Galicia, which remained in the hands of the Suevi. Then, in 507 at Vouillé, near Poitiers, the Frankish army of Clovis annihilated that of Alaric II and the Visigoths were pushed back into Spain; although, they long retained territory along the Mediterranean coast of *Narbonensis Prima*. In 511 the Ostrogoth Theodoric took over the Visigothic kingship and ruled in Spain and Toulouse through a governor, Theudis, on behalf of Alaric II's son Amalaric. On Amalaric's death Theudis seized the crown but from this time on Visigothic emigration into Spain stepped up. In 551 a noble by the name of Athanagild revolted against King Agila and called in support from the Emperor Justinian, whose troops occupied south-east Spain from Cartagena to Malaga and some distance inland by 555. Athanagild became king in Toledo, his successor Leovigild finally eliminating the kingdom of the Suevi in 585, but the Byzantines were not finally expelled from their Spanish province until after 621.[10]

Throughout the history of their kingdom, the Visigoths appear to have had few, if any, naval forces, their only known naval expedition

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[8] Prokopios, *History of the wars*, III.x - IV.iv, III.x.7-17, IV.v, IV.viii.9-25, IV.x.1-xiii.45, IV.xiv.1-2, IV.xiv.7-xxviii.52, (vol. 2, pp. 90-246, 92-6, 246-54, 272-8, 284-326, 326, 328-458); Theophanēs, *Chronographia*, A.M. 6026 (pp. 186-216).

[9] Courtois, *Vandales*, pp. 205-14; Hodges and Whitehouse, *Mohammed*, pp. 26-30.

[10] *Gregory of Tours*, *Historiae*, II.37, IV.8 (fasc. 1, pp. 87-8, 140); Isidore of Sevi*lle, His*toria, Aerae CCCCXLVII, DXCII*, D*CLVIIII (pp. *275, 286, 292*); Jordanes, Getic*a, §173* (p. 103); Orosius, *Historiae adversum paganos*, VII.43.10-12 (p. 300); Zōsimos, *Historia nova*, ς.7 (p. 288). See also Thompson, *Goths in Spain*; García Moreno, "Byzantium's Spanish province".

occurring in 547. At some time before 534 they managed to cross the Straits of Gibraltar and take Ceuta from the Vandals. Belisarios's forces expelled them in 534 but in 547 Theudis again crossed the Straits in an unsuccessful attempt to regain it. No attempt against the Balearics, which were also recovered for the Empire by Belisarios, is known to have been made. Although Isidore of Seville claimed that from the reign of Sisebut the Visigoths acquired eminence at sea, no evidence supports this.[11]

After the overthrow of the Empire in the West by Odovacer, and then under the Ostrogoth Theodoric the Great, some naval forces were maintained in the Adriatic; however, they appear to have been minimal. According to Malchos, when Theodoric captured *Dyrrachion* imperial authorities were so alarmed by the prospect of his acquiring naval forces that he was ordered to advance no further and to seize no ships. According to the *Fasti Vindobonenses priores* and the *Köbenhaven continuations* of Prosper, Theodoric gathered *dromones* at Rimini before besieging Odovacer in Ravenna. Agnellus of Ravenna recorded that Odovacer fled from Ravenna before Theodoric in 491 "*cum dromonibus*".[12]

In 508 Anastasios I sent 100 war galleys of this new kind known as *dromones* to ravage the coasts of Italy. His relations with Theodoric were hostile but the precise purpose of the expedition is obscure; possibly it was to dissuade the Ostrogoth from intervening in the Languedoc after Vouillé. Whatever the case, Theodoric appears to have had no naval forces with which to mount any opposition at sea.[13] Only late in his reign did he begin to consider naval forces. Cassiodorus drafted four letters on his behalf between 523 and 13 June 526 referring to them: the first two addressed to the *praetorian prefect* Abundantius and the others to the Count of the Patrimony

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[11] CI, I.27.2,§2; Isidore of Seville, *Historia*, *Aerae* DLXVIIII, DCLVIIII (*recapitulatio*) (pp. 284, 294-5); Prokopios, *History of the wars*, IV.v.6-9 (vol. 2, p. 248).

[12] Agnellus, *Liber pontificalis*, §39 (p. 303); Malchos, *Byzantiaka*, fr. 20 (p. 442). *Consularia Italica*, pp. 318-19. These last are anonymous manuscripts. The *Fasti Vindobonenses* are in MS. 3416 (antea hist. Lat. 56 sive hist. prof. 452) of the old Imperial Library of Vienna, now the Österreichisches Staatsbibliotek, written in 1480, and in the eleventh-century manuscript, St Gall, MS. 878. The *Köbenhaven continuations* of Prosper are in what is now the Kongelike Bibliotek, Köbenhaven, quondam MS., N° 454, of the Danish Royal Library, probably twelfth century.

[13] Marcellinus Comes, *Chronicon*, *Annus* 508 (pp. 34-5): "Romanus comes domesticorum et Rusticus comes scholariorum cum centum armatis navibus totidemque dromonibus octo milia militum armatorum secum ferentibus ad devastanda Italiae litora processerunt ...". See also Manfroni, *Marina italiana. I*, pp. 5-12.

Vvilia and to the *saio* Aliulfus. In part they do not ring true. Heavy rhetorical flourishes reek of redrafting when Cassiodorus later compiled his *Variae*, the source in which they survive. Moreover, in the first, Theodoric supposedly ordered construction of 1,000 dromons for carriage of public grain supplies as well as defence against hostile ships. On the one hand, it is extremely doubtful that the Ostrogothic kingdom would have been capable of building and maintaining 1,000 dromons in any case. From where could it have obtained the 50,000 oarsmen at least needed, as well as officers and marines? Later in the letter Theodoric discussed recruiting slaves for the purpose! On the other hand, no one would ever have built war galleys such as dromons to transport grain. That would have been the most inefficient means possible of doing so. It is true that in the second letter to Abundantius Theodoric congratulated him on having completed the task in a very short period of time and said that the fleet was to rendezvous at Ravenna on 13 June 526; however, that does not necessarily mean that 1,000 dromons were constructed. The second letter to Abundantius suggests that Theodoric intended to use the fleet against either the Byzantines or the Vandals, or both. Theodoric's break with the Vandals may have gone back to 508 when the Vandal fleet failed to prevent the imperial fleet ravaging Italy, or to 510/11 when the Visigothic claimant Gesalec had found refuge in *Carthage*, or to the imprisonment of Theodoric's sister Amalafrida, the widow of Thrasamund, by his successor Hilderic and her death in 523.[14] Whatever the case, his plans came to nothing because of his death and a decade later the Ostrogoths appear to have had few naval forces with which to oppose the imperial invasion of Italy.

The Gothic War opened in 535 with a two-pronged amphibious assault on the outposts of the Ostrogothic kingdom. Belisarios was sent with a fleet and and army to coccupy Sicily and in the following year crossed to Calabria. Justinian also sent Kōnstantianos, the commander of the imperial grooms, to *Dyrrachion* in the following year to gather forces to expel the Goths from *Salōnes*. He sailed with a fleet to *Epidauros* and then to *Salōnes*. In the first major Gothic deployment of naval forces, Witigis sent an army by sea, supposedly with many *ploia makra*, to recover *Salōnes* but they were scattered by

[14] Cassiodorus, *Variae*, V.16 (p. 195): "..., deo nobis inspirante decreuimus mille interim dromones fabricandos assumere, qui et frumenta publica possint conuehere et aduersis nauibus, si necesse fuerit, obuiare."; V.17 (p. 196 "..., Non habet quod nobis Graecus imputet aut Afer insultet.". Cf. also V.17-20 (pp. 196-9). See also Wolfram, *Goths*.

Kōnstantianos's fleet.[15] The first phase of the war resolved itself into a Gothic defence of the heartlands of their kingdom while every year Justinian sent new forces to Italy by sea. By the winter of 537-8 Belisarios's forces commanded the sea and those of Witigis besieging Rome were starving. In March 538 he was forced to raise the siege and retire to Ravenna.[16]

In spring 539 Belisarios moved towards Osimo, guarding the approaches to Ravenna. Rimini had been occupied by one of Belisarios's lieutenants and was under siege. He left 1,000 men encamped outside Osimo by the shore, sent a fleet with an army to Rimini while another advanced up the coast, and made a sweep to the west himself. The sudden appearance of the fleet over the horizon precipitated a Gothic flight from Rimini back to Ravenna. With command of the Po and the Adriatic, Belisarios besieged Ravenna late in the year and Witigis was starved into submission by forces smaller than his own. Belisarios entered Ravenna unopposed in May 540 and at the same time a grain fleet entered its port, *Classe*, to supply the city.[17]

After becoming king in 541, Totila perceived the need for naval forces to counter those the Byzantines had thrown against Italy since the beginning of the war. In 542, after Totila had defeated Byzantine forces in the North and had broken through to the South to besiege Naples, Justinian sent out a fleet under the *praetorian prefect* Maximinos. A *stratēgos*, Dēmētrios, sent to Sicily with another fleet, but who sailed to Rome instead, was attacked by Totila and destroyed by many dromons when he brought his fleet to Naples, the first clear mention of Gothic use of dromons. Maximinos went to Syracuse, stayed there through the summer, and then in the autumn was persuaded to send his fleet to Naples. Caught by a storm, it was driven ashore near the Gothic camp and mostly destroyed.[18] Totila's

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[15] Anonymous addition to Marcellinus Comes, *Chronicon*, *Annus* 535 (p. 46); Prokopios, *History of the wars*, V.v.1-7, V.v.12-19, V.vii.26-37, V.viii.1-7, V.xvi.5-17 (vol. 3, pp. 42-8, 64-8, 68-70, 158-62). See also Manfroni, *Marina italiana. I*, pp. 12-21.

[16] Anonymous addition to Marcellinus Comes, *Chronicon*, *Anni* 536-8 (pp. 46-8); Prokopios, *History of the wars*, V.xxiv.18-21, VI.v.1, VI.vi.2, VI.vii.1, VI.vii.16-18 (vol. 3, pp. 342, 326-4, 336, 346, 352).

[17] Anonymous addition to Marcellinus Comes, *Chronicon*, *Anni* 538-40 (pp. 47-9); Prokopios, *History of the wars*, VI.xvi.18-24, VI.xvii.21, VI.xxviii.6-7, VI.xxix.31 (vol. 4, pp. 8-10, 16, 114, 132).

[18] Anonymous addition to Marcellinus Comes, *Chronicon*, *Anni* 542-4 (pp. 49-50); Prokopios, *History of the wars*, VII.vi.10-17, VII.vi.24-5 (vol. 4, pp. 200-202, 204): "Τουτίλας δὲ τὸν πάντα λόγον ἀμφὶ τῷ στόλῳ τούτῳ ἀκούσας δρόμωνας μὲν πολλοὺς ἄριστα πλέοντας ἐν παρασκευῇ εἶχεν, ...", VII.vii.1-7 (vol. 4, pp. 204-8).

command of the sea induced Naples to surrender in spring 543.

In 544, with the Byzantine fortress at Otranto under siege, Belisarios was appointed to command in Italy again and sent a relief fleet from *Salōnes* with a year's supplies and a replacement garrison. After the garrison had been replaced and the fleet had returned, he sailed to Pula, and from there to Ravenna.[19] In the following year he sent to Justinian begging for a new army, money, arms, and horses. Totila moved on Rome, which he cut off by sea by a light fleet stationed in the Aeolian and other coastal islands. A fleet sent from Sicily by Pope Vigilius to reprovision Rome was intercepted off *Ostia* and captured but Belisarios at *Dyrrachion* was able to send an army to *Ostia* under the command of Valentinos with instructions to join the garrison in *Portus*. According to Prokopios, Totila attributed the reconquest of Rome and Italy to being able to secure Sicily and supply Rome from there.[20]

In 546, after receiving reinforcements at *Dyrrachion*, Belisarios sailed to Rome while his lieutenant John, nephew of the usurper of 513-15, Vitalian, took the rest of the army to Otranto and then marched on Rome, clearing out Gothic garrisons *en route*. Outside Rome Totila bridged the Tiber to prevent boats reaching the city. At *Ostia* Belisarios fortified 200 dromons with wooden parapets with bow-slits and made other preparations to ascend the Tiber.[21]

The following year Justinian sent reinforcements to Otranto. Near the winter solstice, general Valerian reached the Adriatic but did not cross because he thought that there would not be provisions sufficient for the men and horses because of the season. Belisarios in Rome sailed for Sicily and then Taranto with 700 cavalry and 200 foot but was forced by storm to put in at Crotone. He stayed there with the infantry but sent the cavalry ahead to secure passes and supplies.[22] This was the first occasion during the progress of the war in which Prokopios was clear that the Byzantines were transporting cavalry and horses around the coasts, although they almost certainly had been doing so earlier.

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[19] Prokopios, *History of the wars*, VII.ix.22 - x.9, VII.x.13, VII.xi.1 (vol. 4, pp. 228-32, 232, 236).

[20] Prokopios, *History of the wars*, VII.xii.1-3, VII.xiii.5-7, VII.xv.9-13, VII.xv.1, VII.xvi.16-21 (vol. 4, pp. 248, 256, 278-80, 274-6, 286-8).

[21] Anonymous addition to Marcellinus Comes, *Chronicon*, *Anni* 546-7 (p. 51); Prokopios, *History of the wars*, VII.xviii.1-4, 8-10, VII.xix.5 (vol. 4, pp. 300-302, 304, 312).

[22] Prokopios, *History of the wars*, VII.xxvii.1-4, VII.xxvii.13-17, xxviii.3-7 (vol. 4, pp. 386-8, 390, 394).

In 548 Justianian sent 2,000 infantry by sea to Sicily and Belisarios at Otranto gathered a large fleet and sailed to the relief of Rossano; however, it was scattered by storm and after regrouping was detered from landing by Totila's cavalry lining the beaches. Retiring to Crotone, they decided to land the men and horses and march overland to *Picenum*. Again, they must have been carrying horses.[23] But what is clearly apparent here is that the imperial forces did not have the capability to land cavalry ashore against opposition. This is a theme to which we shall return.

Belisarios was recalled to Constantinople in 548, having spent 5 years in Italy but having been confined to coastal landings, as a result of which Totila still controlled most of the peninsula. In the same year one of Belisarios's guardsmen, named Indoulph, deserted to Totila and went to Dalmatia to a place called *Mouikouron* near *Salōnes* and then to *Laureatē*. The Byzantine commander at *Salōnes*, Klaudianos, attacked him with a fleet of dromons but was defeated, the crews abandoning their ships in the harbour. After this Indoulph returned to Italy, where Totila gave him and other commanders 47 *ploia makra* to besiege Ancona. This led to an attempt to relieve the city in 551 and to the decisive battle at sea off *Senogallia*.[24]

In 549 Totila readied 400 *ploia makra* as well as a fleet of large sailing ships sent from the East which had been captured. In response to a Gothic attack on Reggio, Justinian sent a fleet and army under the *patrikios* Liberios to Sicily, later replacing him by Artabanēs and making Germanos, sent out with another army, commander in chief in Italy. Germanos died in the following year and Justinian appointed Germanos's son-in-law John, son of Vitalian, and his son Justinian to lead to Italy the army which Germanos had gathered at Sofia. They intended to winter at *Salōnes* before going around the north of the Adriatic because they had no ships. Meanwhile Liberios had sailed to Sicily and forced entry to the besieged Syracuse. Artabanēs' fleet following him from Kefallēnia was scattered by storm off Calabria and driven to Malta. Totila and the Goths had meanwhile plundered Sicily for grain and treasure and took it back to Italy on their ships.[25]

While Narsēs was marching to *Salōnes* in 551 to take command of

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[23] Prokopios, *History of the wars*, VII.xxx.1, VII.xxx.9-14, VII.xxx.15 (vol. 4, pp. 406, 408-10, 410).

[24] Prokopios, *History of the wars*, VII.xxxv.1-2, VII.xxxv.23-30, VIII.xxiii.1-3 (vol. 4, pp. 458, 464-6; vol. 5, pp. 286-8).

[25] Prokopios, *History of the wars*, VII.xxxvii.5, VII.xxxix.6-10, VII.xl.10-19 (vol. 5, pp. 12-14, 28-30, 40-44).

the forces under John and Justinian before going on to Italy, Totila manned 300 *ploia makra* and sent them to Corfu. They reached and plundered it and the opposite mainland and then sailed along the coast capturing many Roman ships, including some carrying provisions to Narsēs. The imperial commander at Ravenna sent a message to John at *Salōnes* asking him to relieve Indoulph's siege of Ancona and, contrary to his orders, John manned 38 *ploia makra* and sailed from *Salōnes*. The Goths at Ancona sailed out to give battle and the two fleets met off *Senogallia* in the only naval engagement of the war, the Goths being defeated and only 11 ships under Indoulph escaping. These were burned to prevent their falling into Byzantine hands and this led to the abandonment of the siege of Ancona, the Goths retreating to Osimo. Prokopios wrote that *Senogallia* broke the spirit and weakened the power of Totila and the Goths. By now Artabanēs in Sicily had reduced all of the Gothic fortresses in the island, although Totila could still assemble a fleet to send to Corsica and Sardinia to subjugate both islands. The Byzantine commander in Libya, another John, sent a fleet against them but was defeated outside Cagliari and retired to *Carthage*.[26]

The long war was brought to a conclusion by the victories of Narsēs over Totila at *Busta Gallorum* near Gualdo Tadino in late June or early July 552 and over his successor Teias at the "Milk Mountain" beneath Mt Vesuvius on 30 October or November. In this last phase of the war control of the sea proved critical. In spring 552 the garrison in Crotone was under siege by the Goths and Justinian ordered the garrison of *Thermopylae* in Greece to sail to its relief, which it did successfully. In 552 when Narsēs moved from *Salōnes* against the Goths he marched around the head of the Adriatic, which must have meant that he did not have enough ships to ship all his troops across the Adriatic, although he did have some, as Prokopios suggested. In 552, when Narsēs was facing Teias across the river *Drakōn* near Mt Vesuvius, the Goths at first controlled the sea and were able to bring in provisions by ship. However, Narsēs captured their ships through an act of treason on the part of the Goth in charge of their shipping and this forced Teias into the battle of the "Milk Mountain".[27]

In 561 the last Gothic garrisons in Verona and Brescia capitulated

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[26] Prokopios, *History of the wars*, VIII.xxii.17-32, VIII.xxiii.4-9, VIII.xxiii.10-38, VIII.xxiii.42, VIII.xxiv.3, VIII.xxiv.31-6 (vol. 5, pp. 282-6, 288-90, 290-300, 302, 312-14).

[27] Prokopios, *History of the wars*, VIII.xxv.24 - xxvi.2, VIII.xxvi.1-25, VIII.xxxv. 12-38 (vol. 5, pp. 324-6, 326-36, 410-18).

and the Empire again controlled Italy, all of the islands, and all Mediterranean coasts except for the strip held by the Visigoths in Spain and the Franks in the Languedoc and Provence. But neither of these were bellicose at sea and the unity of the Mediterranean was restored again until the invasion of Italy by the Lombards from 568.

The second period, ca 560-750: the Muslim assault and imperial recovery

The Lombard invasion of Italy under Alboin in 568 was precipitated by pressure on their *Pannonia* homeland from the Avars in the mid sixth century. A nomadic Turkic people, the Avars first made contact with the Empire in 558, conquering and eliminating the Kutrigurs and Antai north of the Black Sea and the Gepids in *Dacia*. Once established in *Pannonia* around the confluences of the Danube, Sava, and Tisza rivers, inevitable frictions with the Empire eventually led to a combined Avar and Persian siege of Constantinople in 626. However, the Avars' dugout canoes were destroyed by imperial squadrons and the siege dissipated, after which they suffered defeats at the hands of the Croats and Bulgars and their threat diminished.[28]

The Lombard invasion precipitated the flight of the Roman populace of *Aquileia* to the islands of the lagoons and led to the foundation of Venice. The northern inland cities quickly fell, leaving in imperial hands only coastal strongholds which could be supplied from the sea. Pavia fell after three years and within seven years most of Italy had been occupied. In 571 they swept into southern Italy, taking Benevento and establishing a southern duchy centred on that city which would become a principality and which, together with its twin at Spoleto, would dominate south Italy for hundreds of years. Between 584 and 588 the Romans in Ravenna built a fleet and, with the help of a disgruntled Lombard duke, drove the Lombards from its port of *Classe*, thus establishing the *exarchate* of Ravenna. Imperial presence in Italy became confined to the *exarchate* and a belt of territory running south-west to Rome, together with most of Apulia and Calabria. Over the next two centuries it waned progressively, Rome being lost to the Papacy during the first half of the eighth century, and by the opening of the ninth century was confined to southern

[28] *Chronicon Paschale*, *Annus* 726 (pp. 715-26); George of Pisidia, *Bellum Avaricum*; Theophanēs, *Chronographia*, A.M. 6117 (p. 316).

Table 2: Rulers of the second period, ca 560-750

Byzantine Empire	The Muslims	
	Muḥammad and the Caliphs	Governors of *al-Andalus*
Justin II (565-78)		
Tiberios II (578-82)		
Maurice (582-602)		
Phōkas (602-10)		
Herakleios I (610-41)	The Prophet Muḥammad (to 632)	
	The Rightly Guided Caliphs	
	Abū Bakr (632-4)	
	‘Umar ibn al-Khaṭṭāb (634-44)	
Constantine III (641)		
Heraklōnas (641)		
Constans II (641-68)	‘Uthmān ibn ‘Affān (644-56)	
	‘Alī ibn Abī Ṭālib (656-61)	
	The Umayyad Caliphs	
	Mu‘āwiya I ibn Abī-Sufyān (661-80)	
Constantine IV (668-85)	Yazīd I (680-83)	
	Mu‘āwiya II (683-4)	
	Marwān I ibn al-Ḥakam (684-5)	
Justinian II (685-95)	‘Abd al-Malik (685-705)	
Leontios (695-8)		
Tiberios III (698-705)		
Justinian II (705-11)	Al-Walīd I (705-15)	
Philippikos (711-13)		‘Abd al-‘Azīz ibn Mūsā (714-16]

(Table 2 continued)

Lombards	Visigoths	Merovingians on the Mediterranean
(K) Kings (B) Dukes of Benevento		(K) Kings (M) Arnulfing Mayors of the Palace
Alboin (K 568-72) Zotto (B 571-91) Cleph (K 572-4)		Guntram (K 561-92)
Authari (K 584-80) *Interregnum* Agilulf (K 590-616) Arichis I (B 591-641)	Recared I (586-601) Leova II (601-3) Witterich (603-10)	Childebert II (K 593-5) Theodoric II (K 595-613)
Adaloald (K 616-26) Ariold (K 626-36) Rothari (K 636-52	Gundemar (610-12) Sisebut (612-21) Recared II (621) Swinthila (621-31) Sisenand (631-6) Chintila (636-40 Tulga (640-42)	Sigibert II (K 613) Clovis II (K 639-56)
Ayo I (B 641-2) Radoald (B 642-6) Grimoald I (B 646-62) Rodoald (K 652) Aribert I (K 652-61) Godepert/ Perctarit (K 661-2) Grimoald (K 662-71)	Chindaswinth (642-52) Receswinth (653-72)	Clothar III (K 656-61)
Perctarit (K 671-88) Romoald I (B 662-87)	Wamba (672-80) Erwig (680-87)	Childeric I (K 673-75) Theodoric III (K 675-90) Pepin II (M 680-714)
Grimoald II (B 687-92) Gisulf I (B 692-706) Cunipert (K 688-700)	Egica (687-701)	Clovis III (K 690-4) Childebert III (K 694-711)
Luitpert (K 700) Aribert II (K 700-12) Romoald II (B 706-30)	Witiza (701-9) Roderick (709-11)	
Ansprand (K 712)	*Muslim conquest*	Dagobert III (K 711-15)

(Table 2 continued)

Byzantine Empire	The Muslims	
	Muḥammad and the Caliphs	Governors of *al-Andalus*
Anastasios II (713-15)		
Theodosios III (715-17)	Sulaymān (715-17)	Ayyūb ibn Ḥabīb al-Lakhmi (716)
		Al-Ḥurr ibn ʻAbd al-Raḥmān al Thaqafī (717-19)
Leo III (717-40)	ʻUmar ibn ʻAbd al-ʻAzīz (717-20)	Al-Samḥ ibn Malik al-Khawlānī (719-21)
	Yazīd II (720-24)	ʻAbd al-Raḥmān al-Ghāfiqī (721)
	Hishām (724-43)	ʻAnbasa ibn Suḥaym al-Kalbī (721-5)
		ʻUdhra ibn ʻAbd Allāh al-Fihrī (725-6)
		Yaḥyā ibn Salāma al-Kalbī (726-8)
		Ḥudhayfa ibn al-Aḥwaṣ al-Qaysī (728-9)
		ʻUthmān ibn Abī Naṣr al-Khathʻamī (729)
		Al-Ḥaytham ibn ʻUbayd al-Kilābī (729-30)
		Muḥammad ibn ʻAbd Allāh al-Ashjaʻī (730)
		ʻAbd al-Raḥmān ibn ʻAbd Allāh al-Ghāfiqī (730-32)
		ʻAbd al-Malik ibn Qaṭan al-Fihrī (732-4, 740-41)
		ʻUqba ibn al-Ḥajjāj al-Salūlī (734-40)
Constantine V (740-75)	Al-Walīd II (743-4)	Thaʻlaba ibn Salāma al-ʻĀmilī (742-3)
	Yazīd III (744)	
	Ibrāhīm (744)	Abū al-Qaṭṭār al-Ḥusām (743-5)
	Marwān II al-Ḥimār (744-50)	Thawāba ibn Yazīd (745-6)
	ʻAbbāsid Caliphs	Yūsuf ibn ʻAbd al-Raḥmān al-Fihrī (746-56)
	Al-Saffāḥ (749-54)	_____
	Al-Manṣūr (754-75)	*Umayyad amīrs*

(Table 2 continued)

Lombards	Visigoths	Merovingians on the Mediterranean
(K) Kings (B) Dukes of Benevento		(K) Kings (M) Arnulfing Mayors of the Palace
Liutprand (K 713-44)		Charles Martel (M 714-41)
Audelaius (B 730-32) Gregory (B 732-9) Godescalc (B 739-42)		Chilperic II (K 719-20) Theodoric IV (K 721-37)
Gisulf II (B 742-51) Hildebrand (K 744) Ratchis (K 744-49) Aistulf (K 749-56) Desiderius (K 756-74) Liutprand (B 751-58) Arichis II (B 758-87)		Carloman (M 741-7) Pepin III (M 741-51) Childeric III (K 743-51) ——— *Carolingian kings*

Apulia and Calabria.[29] At some time prior to 725 the Lombard Duke Farwald II of Spoleto took *Classe* from the Byzantines; however, King Liutprand ordered him to restore it and the Lombards do not appear to have been concerned to gain control of the Italian coasts except when Rothari swept up the Byzantine outposts on the Tyrrhenian from Luni to Provence around 642 and Aistulf finally took Ravenna in 751.[30] Although they certainly disrupted Italy, and possibly had an encounter at sea with Byzantine forces in Sardinia,[31] they never assumed a Mediterranean presence such as that of the Vandals and they had little impact on the Sea as a whole. Its maritime integrity remained in imperial hands.

In 627 Hērakleios brought the long Romano-Persian conflict to a successful conclusion when he led the Byzantine armies into Persia and won a decisive victory over Khusraw II near *Nineveh*, effectively ending the Persian Empire. In Constantinople it would have appeared that the world had been restored to rights.[32] The East was secure, the Empire again controlled the sea, and the Visigoths, Franks, and Lombards were mostly confined to hinterlands and posed no threat. The emperor might look forward to a long and peaceful reign. However, it was not to be so for a bare nine years later the forces of the newly emergent Muslim Caliphate annihilated the imperial armies in Transjordan at the battle of the Yarmūk in August or September of 636. The Muslims occupied Syria and Palestine and in 640-42 Egypt also fell to them. The religious unity of the Mediterranean world was broken. The assault of the Arian Vandals, Visigoths, and Ostrogoths had been as nothing compared to that which the Muslims were about to unleash.

While the Byzantines still had mastery at sea and could attack at will, as in 645-6 when they reoccupied Alexandria and raised a revolt in Egypt, watch towers and a signalling system were established along the coasts. However, the governors of Syria and Egypt, Mu‘āwiya ibn Abī Sufyān and ‘Abd Allāh ibn Sa‘d ibn Abī Sarḥ respectively, began to create naval forces, at first crewed by native Christians.

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[29] Paul the Deacon, *Historia Langobardorum*, II.6-8, II.10, II.14, II.15-17, II.32, III.32-3 (pp. 75-7, 78, 81, 81-2, 90-91, 112). See also Delogu, *Longobardi e Bizantini.*

[30] Fredegar, *Continuations*, §72 (p. 60); Paul the Deacon, *Historia Langobardorum*, III.18-19, IV.45, VI.44 (pp. 101-2, 135, 180).

[31] See Fiori, *Cosentino* hypatos.

[32] The mood of the years is reflected by Theophanēs the Confessor, followed by his despair following the battle of the Yarmūk. See Theophanēs, *Chronographia*, A.M. 6118-21 (pp. 317-32). See also Nikēphoros I, *Historia syntomos*, §§12-17 (pp. 54-65).

Construction began on *al-Rawḍa* island in the Nile opposite *al-Fusṭāṭ* and the fleet first went into action against Cyprus in 649, subjecting the island to a covenantary status of *'ahd*, a covenant of peace which Muslims could make with non-Muslim peoples living outside the Muslim polity, under which the Cypriots were to remain neutral between the Empire and the Caliphate. Crete, Rhodes, and Sicily were raided between 652-4 and the fleet also returned to Cyprus in 653.[33] There is also a possibility, although only a remote one, that Mu'āwiya's forces attacked Constantinople itself in 654.[34]

In 655 the first real hammer blow to the maritime integrity of the Mediterranean fell. A Muslim fleet under 'Abd Allāh ibn Sa'd engaged the main Byzantine fleet commanded by Constans II off *Phoinikous* in *Lycia*. The Byzantines were annihilated and the emperor lucky to escape with his life. This so-called "Battle of the Masts", "Dhāt al-Ṣawārī", opened the central Mediterranean to Muslim attack, even if the Muslims did suffer heavily in it and Cyprus reverted to Byzantine rule under a truce concluded between Constans and Mu'āwiya in 659. The Byzantine fleet of the *Karabisianoi*, based on Samos, was probably created as a front line of defence shortly thereafter.[35]

Sometime after 660 occurred the curious episode of Constans II leaving Constantinople, moving to Italy, where he arrived in 663, campaigning against the Lombards and advancing on Rome, but eventually retiring to Syracuse in Sicily, where he settled, established a *thema*, created an army and fleet, and was eventually murdered in 668. His son, Constantine IV, most probably led a fleet from Constantinople to Sicily in 669 to avenge him.[36] Constans' motives for

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[33] Agapios, *Kitāb al-'Unwān*, tome 8, fasc. 3,pp. 455, 480, 482; Al-Balādhurī, *Kitāb Futūḥ al-Buldān*, part 2, ch. 13, part 5, ch. 2, part 7, ch. 1 (vol. 1, pp. 235-6, 347-8, 375); Al-Nuwayrī, *Nihāyat 'al-Arab* (Amari), p. 112; Al-Ṭabarī, *Ta'rīkh* (Yar-Shater), A.H. 28 (vol. 15, pp. 25-32); Denys of Tell-Maḥré, *Chronique*, p. 7; Paul the Deacon, *Historia Langobardorum*, V.13 (p. 150); Pseudo al-Wāqidī, *Futūḥ al-Šām wa-Miṣr*, pp. 329-38; Theophanēs, *Chronographia*, A.M. 6140, 6145 (pp. 343-4, 345). See also Beihammer, "Zypern"; Bosworth, "Arab attacks on Rhodes"; Cheira, *Lutte*, pp. 88-101; Vasiliev, *Byzance et les Arabes. Tome I*, pp. 61-3.

[34] The argument is based on Sebeos, *Armenian history*, §50 (vol. 1, pp. 143-6) and vol. 2, pp. 274-6. See O'Sullivan, "Arab attack". In our opinion the evidence is not convincing.

[35] Agapios, *Kitāb al-'Unwān*, tome 8, fasc. 3, pp. 483-4; Al-Ṭabarī, *Ta'rīkh* (Yar-Shater), A.H. 31, 34 (vol. 15, pp. 74-7, 131); Sebeos, *Armenian history*, §45 (vol. 1, pp. 111-12) and vol. 2, pp. 259-62; Theophanēs, *Chronographia*, A.M. 6146 (vol. 1, pp. 345-6). Christides, "Dhāt aṣ-Ṣawārī"; Stratos, "Naval engagement at Phoenix".

[36] Agapios, *Kitāb al-'Unwān*, tome 8, fasc. 3, pp. 490-91; *Gesta episcoporum Neapolitanorum*, pp. 417-8; Paul the Deacon, *Historia Langobardorum*, V.6-11 (pp. 146-50); Theophanēs, *Chronographia*, A.M. 6153-60 (pp. 348-52). On the

abandoning Constantinople may have had as much to do with the precariousness of his domestic position there as with any desire to re-establish Rome as the imperial capital or some notion that the Empire could best be defended from the central Mediterranean.

When Mu'āwiya became Caliph in 661 and established the capital of the Caliphate at Damascus, he began to use his naval capabilities to good effect. Rhodes was again assaulted in 667 and was occupied by a garrison and squadron in 673 until abandoned after Mu'āwiya's death in 680. In 669 the Egyptian fleet sailed to attack Byzantine *Africa*, although it returned after wintering over in Sicily. Cyprus was probably reoccupied around 670 in preparation for the forthcoming great assault on Constantinople and Crete was also attacked in 672 as part of the same assault. According to the so-called *Chronicle of Alfonso III*, during the reign of Wamba a Muslim fleet of 270 ships attacked Visigothic Spain but was destroyed and burned. However, it is improbable that this expedition actually occurred because all Umayyad forces were committed at the time to the assault on Constantinople.[37]

The assault began most probably in 671-2 when two fleets entered the Aegean and wintered at Izmir and in *Cilicia* and *Lycia*. It is possible, although unlikely, that during this preliminary phase of the assault a battle occurred off *Lycia* in which the Byzantines used a new incendiary, "Greek Fire", for the first time.[38] In 672 the Muslims moved into the Sea of Marmara and began the siege, which lasted for seven years, although it was not maintained as a close blockade

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Karabisianoi see also Antoniadis-Bibicou, "Stratège des Caravisiens"; *idem*, *"Thème des Caravisiens"*; Cosentino, "Flotte byzantine", pp. 4-7; Whittle, "Carabisiani".

[37] Al-Balādhurī, *Kitāb Futūḥ al-Buldān*, part 7, ch. 1 (vol. 1, pp. 375-6); Al-Nuwayrī, *Nihāyat 'al-Arab* (Caussin), p. 402; Al-Ṭabarī, *Ta'rīkh* (Yar-Shater), A.H. 53 (vol. 18, p. 166); *Chronicle of Alfonso III*, pp. 6-7, 72, 110; *Gesta episcoporum Neapolitanorum*, §31 (p. 419); Ibn 'Idhārī, *Al-bayān al-mughrib*, vol. 1, pp. 10-13; Sāwīris, *History of the Patriarchs* (Evetts), I.15 (vol. V.1, p. 4).

[38] Three Byzantine *patrikioi* were reported by Agapios and by the much later Jacobite Patriarch of Antioch, Michael the Syrian, to have defeated a Muslim fleet, the remnants of which were then destroyed by a new fire weapon developed by a Greek according to Agapios or by a Syrian named Kallinikos according to Michael the Syrian. See Agapios, *Kitāb al-'Unwān*, tome 8, fasc. 3, p. 492; Michael the Syrian, *Chronique*, XI.xiii (vol. 2, p. 455). However, the story is not confirmed by any Greek or Muslim source and neither Agapios nor Michael the Syrian recounted any further naval conflict between the Byzantines and Muslims until after the death of Mu'āwiya, both passing over the subsequent assault on Constantinople in silence. Their chronology is also very confused at this point. It seems most likely that they or their sources confused the development and use of Greek Fire during the subsequent defence of Constantinople with some report of a prelimary success over the approaching Muslim fleets, which may or may not have actually taken place.

throughout. Muslim squadrons variously retired to *Kyzikos*, Crete, and Rhodes to winter over, returning each spring. In the end Greek Fire shot from weapons mounted on the prows of dromons annihilated the Muslim fleets and forced the lifting of the siege. The remnants of the Muslim armada were destroyed by storms during the retreat and Mu'āwiya had to conclude a thirty-year truce and his son Yāzid I had to evacuate Cyprus and Rhodes.[39]

Until the end of the century the focus of conflict moved to *Africa*. As early as 643 the governor of Egypt, 'Amr ibn al-'As, had launched a tentative against Tripoli and then in 665 Mu'āwiya had sent an army under Mu'āwiya ibn Ḥudayj al-Sakūnī to *Ifrīqiya*. Although it accomplished little, during the expedition a force under 'Abd Allāh ibn al-Zubayr encountered and defeated a Byzantine amphibious force commanded by a *patrikios* named *Neqfur*, Nikēphoros, at *Hadrumetum*. Mu'āwiya ibn Ḥudayj also founded what was to become the capital of *Ifrīqiya*, *al-Qayrawān*. In 669 'Uqba ibn Nāfi' al-Fihrī returned, establishing an advance base at *al-Qayrawān*. From there he raided into the interior against the Berber tribes. However, in 681 he overreached himself with a long-range expedition across the entire Maghrib to Tangier and down the Atlantic coast to near Agādīr. Byzantine naval forces cut his lines of communication and during his return he was defeated and killed by a coalition of Berber tribes under the convert Kusayla or Kasīla ibn Lamzan, the chief of the Awraba Berbers, and Byzantine forces at *Tahūda* near an old Roman fortress called *Thabudeus* in Algeria. The Berbers and Byzantines then took *al-Qayrawān* and forced the Muslims to evacuate back to *Barqa* on the Egyptian frontier.[40]

They did not return to the attack until 688 when a new Caliph, 'Abd al-Malik, sent an old lieutenant of 'Uqba ibn Nāfi', Zuhayr ibn Qays al-Balawī, back to *Ifrīqiya*. Zuhayr defeated and killed Kusayla

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[39] Al-Ṭabarī, *Ta'rīkh* (Yar-Shater), A.H. 54-9 (vol. 18, pp. 172-99); Theophanēs, *Chronographia*, A.M. 6164-5 (pp. 353-4), 6169 (pp. 355-6). Sebeos almost certainly confused this expedition with earlier plans for an assault on Constantinople which he dated to 654. Sebeos, *Armenian history*, §50 (vol. 1, pp. 143-6) and vol. 2, pp. 274-6.

[40] Agapios, *Kitāb al-'Unwān*, tome 8, fasc. 3, p. 491; *Akhbār Majmū'a*, p. 17; Al-Bakrī, *Kitāb al-mughrib*, pp. 32-5, 75-6, 150-51, 213-14; Al-Balādhurī, *Kitāb Futūḥ al-Buldān*, part 5, ch. 5 (vol. 1, pp. 356-60, 362); Al-Nuwayrī, *Nihāyat 'al-Arab* (De Slane), vol. 1, pp. 324-36; Al-Tijānī, *Riḥla*, ser. 4, 20, pp. 104-6, ser. 5, 1.1, pp. 138-9; Al-Ya'qūbī, *Al-Buldān*, pp. 208-9; Ibn 'Abd al-Ḥakam, *Afrique*, pp. 56-75; Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 9-25; Ibn 'Idhārī, *Al-bayān al-mughrib*, vol. 1, pp. 10-19; Ibn Khaldūn, *'Ibar* (De Slane), vol. 1, pp. 210-11, 311, 327-30; *idem*, *'Ibar* (Des Vergers), pp. 5-22; Nikēphoros I, *Historia syntomos*, §34 (pp. 84-7); Theophanēs, *Chronographia*, A.M. 6161 (p. 352). See also Ṭāha, *Muslim conquest*.

near the *Mams*, about 50 kilometres west of *al-Qayrawān*, but was forced to retire by Byzantine amphibious forces which had reoccupied *Barqa* in his rear. He was killed in battle near *Darna* in 690.[41] Five years later the conquest of *Ifrīqiya* began in earnest. A huge army under Ḥassān ibn al-Nu'mān al-Ghassānī reduced the Byzantine fortresses one by one and finally captured *Carthage*, the Byzantine garrison evacuating by sea. A Berber uprising led by a mysterious queen or soothsayer known as al-Kahīna was accompanied by a Byzantine amphibious assault on *Carthage* under a *patrikios* named John. However, al-Kahīna was defeated and, not having the forces to resist the Muslims, John was forced to evacuate Carthage and retire to Crete for reinforcements. He had never had the forces necessary to resist the Muslims on his own and the days of Byzantine *Africa* were over. On Crete John was murdered by mutineers who proclaimed Apsimaros, the *droungarios* of the *Kibyrrhaiōtai*, emperor and who then sailed on Constantinople.[42]

Since the harbour of *Carthage* had proved too vulnerable to attack from the sea, Ḥassān commenced building a new Muslim capital and fortress arsenal at Tunis by connecting an inland lake to the sea by a canal through the coastal strip. The governor of Egypt, 'Abd al-'Azīz, sent 1,000 Coptic shipwrights to populate the new city and to construct a fleet of 100 warships which, under a new governor, Mūsā ibn Nuṣayr, from 704 began to open the way to the conquest of the Maghrib by denying the Byzantines access to remaining outposts. The fleet also began to raid across the western Mediterranean to Sicily, Sardinia, and the Balearics.[43]

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[41] Al-Bakrī, *Kitāb al-mughrib*, p. 22; Al-Balādhurī, *Kitāb Futūḥ al-Buldān*, part 5, ch. 5 (vol. 1, p. 360); Al-Nuwayrī, *Nihāyat 'al-Arab* (De Slane), vol. 1, pp. 337-8; Ibn 'Abd al-Ḥakam, *Afrique*, pp. 74-7, 80-85; Ibn 'Idhārī, *Al-bayān al-mughrib*, vol. 1, pp. 19-22; Ibn Khaldūn, *'Ibar* (De Slane), vol. 1, pp. 211-12-; *idem*, *'Ibar* (Des Vergers), p. 23.

[42] Al-Bakrī, *Kitāb al-mughrib*, pp. 81-4; Al-Balādhurī, *Kitāb Futūḥ al-Buldān*, part 5, ch. 5 (vol. 1, pp. 360-1); Al-Māliki, *Muḥtaṣar Kitāb Riyāḍ*, pp. 295-9; Al-Nuwayri, *Nihāyat 'al-Arab* (De Slane), vol. 1, pp. 338-43; Al-Tijānī, *Riḥla*, ser. 4, 20, pp. 67, 119-22, 202-3; Ibn 'Abd al-Ḥakam, *Afrique*, pp. 76-87; Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 25-35; Ibn 'Idhārī, *Al-bayān al-mughrib*, vol. 1, pp. 23-31; Ibn Khaldūn, *'Ibar* (De Slane), vol. 1, pp. 213-15, vol. 3, pp. 192-4; *idem*, *'Ibar* (Des Vergers), pp. 24-8; Nikēphoros I, *Historia syntomos*, §41 (pp. 98-101); Theophanēs, *Chronographia*, A.M. 6190 (pp. 370-1).

[43] Al-Bakrī, *Kitāb al-mughrib*, pp. 83-5; Al-Balādhurī, *Kitāb Futūḥ al-Buldān*, part 5, ch. 6 (vol. 1, p. 362); Al-Nuwayrī, *Nihāyat 'al-Arab* (Caussin), pp. 402-4; *idem*, *Nihāyat 'al-Arab* (De Slane), vol. 1, pp. 343-4, 357-9; Al-Tijānī, *Riḥla*, ser. 4, 20, pp. 69-70; Ibn 'Abd al-Ḥakam, *Afrique*, pp. 86-87; Ibn 'Idhārī, *Al-bayān al-mughrib*, vol. 1, pp. 31-6; Ibn Khaldūn, *'Ibar* (Des Vergers), pp. 28-30; *idem*, *Muqqadimah*, vol. 2, p. 40; Pseudo ibn Qutaybah, *Aḥādīth al-Imāmah*, pp. lxv-lxvii.

The circumstances leading to the Muslim invasion of Spain are obscure. For some reason Ṭāriq ibn Ziyād, the governor of Tangier, sent an exploratory force across the Straits under Abū Zar'a Ṭarīf ibn Malik al-Mu'āfirī in 710 on four ships provided for reasons of his own by the governor of Ceuta, a certain Count Julian. The success of the probe persuaded Ṭāriq to lead a full-scale follow-up himself in the following year, again in ships provided by Julian, landing at the foot of what was to become known as *Jabal Ṭāriq*, Tariq's Mount or Gibraltar, probably in April 711. The Muslim forces were not large but the Visigothic king, Roderick, was away in the north-east occupied in the Basque country. He marched south attempting to rally all available Visigothic forces and the armies met somewhere around the Guadalete river. The king disappeared in the battle and the Visigothic kingdom then disintegrated in a welter of local insurgencies by governors unable to resist Ṭāriq's forces. Ṭāriq's successes prompted a flood of Muslim adventurers from the Maghrib to cross to Spain and in Ramaḍān A.H. 93 (June-July 712 C.E.) Mūsā ibn Nuṣayr himself landed at Algeciras with a new army of 18,000 men. Ṭāriq met his master outside Toledo and, after having resolved initial hostilities, the two proceeded to pacify the peninsula, with the exception of part of the Asturian mountains. Although Muslim rule remained shaky for some time and the Caliph 'Umar ibn 'Abd al-'Azīz reportedly considered abandoning the conquest in 718, the Muslims consolidated their rule and would eventually push north across the Pyrenees. Seville became the naval base of the new province: *al-Andalus*.[44]

A Visigothic noble named Pelagius or Pelayo whose power base lay in the Asturian mountains raised a revolt against Muslim rule and was attacked by forces sent by the governor, 'Anbasa ibn Suḥaym, but won a victory near the rock of *Covadonga*, on which he was later besieged by a punitive expedition under the governor 'Uqba ibn al-Ḥajjāj. He defied the Muslims, reportedly until they abandoned the

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[44] *Akhbār Majmū'a*, pp. 19-31; Al-Bakrī, *Kitāb al-mughrib*, p. 204; Al-Balādhurī, *Kitāb Futūḥ al-Buldān*, part 6, ch. 1 (vol. 1, pp. 365-6); Al-Marrākushī, *Al-Mu'jib*, pp. 7-10; Al-Nuwayrī, *Nihāyat 'al-Arab* (De Slane), vol. 1, pp. 345-53; Al-Qurṭubī, *Kitābu-l-iktifā*, pp. xliii-l; Al-Ṭabarī, *Ta'rīkh* (Yar-Shater), A.H. 92, 93 (vol. 23, pp. 182, 201); *Fatḥ al-Andalus*, pp. 2-15; Ibn 'Abd al-Ḥakam, *Spain*, pp. 18-25; Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 35-50, 53; Ibn 'Idhārī, *Al-bayān al-mughrib*, vol. 1, pp. 36-7 & vol. 2, pp. 5-25, 34-5; Ibn Khaldūn, *'Ibar* (De Slane), vol. 1, p. 215, vol. 2, p. 136; Pseudo ibn Qutayba, *Aḥādīth al-Imāma*, pp. lxx-lxxviii; *Chronicle of Albelda*, §46 (col. 1136); *Chronicle of Alfonso III*, pp. 14-17, 75-6,114-5; *Chronicle of 754*, §§68-73 (pp. 352-4); *Historia pseudoIsidoriana*, pp. 387-8. See also Ṭāha, *Muslim conquest*, pp. 84-109; Collins, *Arab conquest*, esp. pp. 23-51.

siege when only 30 men and 10 women survived of the Christians.[45] Thus was born the Kingdom of the Asturias, from which the Spanish Reconquista would eventually develop.

The Muslim conquest was in some ways relatively peaceful. Being vastly outnumbered, the Muslims simply had to accomodate the Visigothic nobility: the most well-known example being the agreement between ʻAbd al-ʻAzīz ibn Mūsā and duke Theodamīr, dated 5 April 713. In return for submission he, his lords, and the inhabitants of his seven towns were confirmed in their possessions subject to payment of an annual tribute: the *jizya*. However, this was not always the case. At Narbonne the turning of the town into a Muslim military encampment was preceded by wholesale slaughter of the men and enslavement of the women and children.[46]

Successive governors of *al-Andalus* both pressed against Christian resistance in the northern mountains and also crossed the Pyrenees. Al-Ḥurr ibn ʻAbd al-Raḥmān al-Thaqafī, appointed governor in 716, invaded the Languedoc. Al-Samḥ ibn Malik al-Khawlānī marched through Zaragoza to Narbonne but was killed in battle near Toulouse in 721. The next governor but one, ʻAnbasa ibn Suḥaym al-Kalbī, captured Carcassonne and reached as far as Nîmes, Autun, and Sens, 30 kilometres from Paris, dying during the withdrawal in 726. The most famous of all, ʻAbd al-Raḥman al-Ghāfiqī, brought back vast booty; although, his final expedition ended in his defeat and death at the hands of Charles Martel at the battle of Tours in 732. ʻUqba ibn al-Ḥajjāj al-Salūlī resumed the campaigns. In 737 he sent an army by sea to relieve Narbonne but it was defeated after landing by Charles Martel. Gothic *Septimania* across to the Rhône became a Muslim march centred on Narbonne, the Muslim presence being welcomed by some indigenous aristocracy as a counter-balance to the pretension of the Franks under Charles Martel. The Muslim assault on Gaul petered out eventually only because of over-extended resources and of a Berber revolt which broke out in the Maghrib in 739 and spilled over into *al-Andalus*. Charles Martel's victory at Tours was not nearly as decisive as it has been made out to be traditionally.[47]

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[45] *Akhbār Majmūʻa*, pp. 38-9; *Chronicle of Albelda*, §50 (coll. 1136-7); *Chronicle of Alfonso III*, pp. 18-29, 80-83, 115-8. On the Pelayo legend and the contradictory accounts of his revolt see Collins, *Arab conquest*, pp. 141-51.

[46] *Chronicle of Moissac*, *Annus* 715 (p. 290).

[47] *Akhbār Majmūʻa*, pp. 36, 39-54; Al-Marrākushī, *Al-Muʻjib*, pp. 10-13; Chronicle *of Moissac*, *Anni* 715, 725, 732, 734 (pp. 290-92); *Chronicle of 741*, §2 (p. 14); *Chronicle of 754*, §§80, 86, 90, 103-6, 109-10, 112-25 (pp. 356, 358, 359 361-2, 362-3, 363-5); *Fatḥ al-Andalus*, pp. 28-9, 31, 34-47; Fredegar, *Continuations*, §§13,

The second assault on Constantinople by the Muslims caught the Empire at a nadir in its fortunes following two politically tumultuous decades. In 695 Justinian II had been overthrown by the *stratēgos* of *Hellas*, Leontios. He in turn was overthrown by Apsimaros, Tiberios III, in 698. In exile at *Chersōn* Justinian II married the sister of the Khan of the Khazars and in 705, with the help of the Bulgar Khan Tervel, he regained the empire, executing both Leontios and Tiberios. He was overthrown in his turn by a mutiny in the fleet he sent to *Chersōn* in 711 led by its *stratēgos*, Bardanēs, who became emperor Philippikos. Following Tervel's devastation of Thrace in reprisal for the overthrow of Justinian II and Muslim attacks along the Asiatic frontiers, the army of the *thema* of *Opsikion* revolted and raised the *prōtasēkrētis* Artemios to the throne as Anastasios II. An expedition into *Galatia* in 714 led by Maslama ibn 'Abd al-Malik, a brother of the Caliph al-Walīd I, led Anastasios to sue for peace but al-Walīd's preparations for a large-scale assault on Constantinople prompted him to prepare for siege, readying the fleet, repairing the walls and mounting engines on them, collecting provisions, and ordering those who could not lay up sufficient for three years to leave the city. However, a pre-emptive naval expedition sent to destroy the Muslims' fleet and timber supplies in *Lycia* broke up in disarray in Rhodes and the army of *Opsikion* again revolted, this time in favour of a tax collector from Edremit who assumed the throne as Theodosios III.[48] When the Muslim assault on the capital began to gather momentum in 717, he in turn was overthrown by the *stratēgos* of *Anatolikon*, who became emperor as Leo III on 25 March 717.

The assault had begun in 715 with Maslama's army moving into Anatolia and wintering the first year in *Cilicia* and the next at *Nicaea*. It marched on Constantinople in spring 717 but the fleet did not arrive until 1 September. For the first time known in Byzantine history, the entrance to the Golden Horn was closed by a chain, ἅλυσις (*alysis*). With many ships attacked and burned by Greek fire, starving and freezing through a harsh winter, with Christian Egyptian crews of

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20 (pp. 90-91, 93-5); *Gesta abbatum Fontanellensium*, cc. 9-12 (pp. 282-5); *Gesta episcoporum Neapolitanorum*, §38 (p. 422); Ibn 'Abd al-Ḥakam, *Spain*, pp. 33-8; Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 54-74, 84-9; Ibn 'Idhārī, *Al-bayān al-mughrib*, vol. 1, pp. 50-66 & vol. 2, pp. 36-7, 39-57; Paul the Deacon, *Historia Langobar-dorum*, VI.46, 54 (pp. 180-81, 183).

[48] Agapios, *Kitāb al-'Unwān*, tome 8, fasc. 3, pp. 499-501; Al-Ṭabarī, *Ta'rīkh* (Yar-Shater), A.H. 96, 97 (vol. 24, pp. 28, 30); John Zōnaras, *Epitomē historiōn*, XIV.22-8 (vol. 3, pp. 323-33); Paul the Deacon, *Historia Langobardorum*, VI.36 (p. 177); Theophanēs, *Chronographia*, A.M. 6206-7 (pp. 383-5).

reinforcements which arrived the following spring deserting, squadrons again destroyed by Greek Fire, and with forces around the city attacked by Tervel, with whom Leo III made an alliance, Maslama was ordered by the new Caliph, ‘Umar ibn ‘Abd al-‘Azīz, to abandon the siege in August 718. Most of the remaining fleet was destroyed by storms during the retreat.[49]

Shortly thereafter the fleet of the *Karabisianoi* was dissolved and replaced by two new naval commands: an imperial fleet, *basilikon plōimon*, at Constantinople and the fleet of the *Kibyrrhaiōtai*, now become a naval *thema*, based at Antalya. The *Karabisianoi* either had performed poorly during the siege or had supported the deposed Anastasios II in a revolt against Leo in 719.[50]

In 726 Leo ordered the removal of an icon of Christ from the *Chalkē* entrance vestibule of the Great Palace in Constantinople, thus precipitating the iconoclast dispute which would wrack and weaken the Empire. In 727 the fleets of *Hellas* and the Cyclades islands proclaimed a certain Kosmas as emperor and sailed on Constantinople but were scattered by the imperial fleet using Greek Fire. When imperial officials attempted to enforce iconoclasm in Italy revolts flared and the Lombard king Liutprand seized Luni and perhaps Corsica An expedition sent out under Manēs, the *stratēgos* of the *Kibyrrhaiōtai*, was wrecked in the Adriatic, probably in 732. In 735 Pope Gregory III and the Lombards drove the *exarchos* from Ravenna but the Papacy soon fell out with the Lombards and in 742 Pope Zachary and Venice returned it to the Empire. Disorder continued until 787 when iconoclasm was condemned at the Second Council of *Nicaea*. It resurfaced in the ninth century from 813 during the reigns of Leo V, Michael II, and Theophilos until Empress Theodōra restored iconophile orthodoxy in 843, but the second period lacked the intensity of the first and was not nearly as destructive for the Empire.[51]

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[49] Agapios, *Kitāb al-‘Unwān*, tome 8, fasc. 3, pp. 500-502; Al-Ṭabarī, *Ta’rīkh* (Yar-Shater), A.H. 98-9 (vol. 24, pp. 39-42, 74); Denys of Tell-Maḥré, *Chronique*, pp. 12-14; John Zōnaras, *Epitomē historiōn*, XV.1, 2 (vol. 3, pp. 333-6, 337-8); Nikēphoros I, *Historia syntomos*, §§49-57 (pp. 116-27); Theophanēs, *Chronographia*, A.M. 6208-10 (pp. 386-99), esp. p. 396, l. 18.

[50] On the *Kibyrrhaiōtai*, see Ahrweiler, *Byzance et la mer*, pp. 81-5, 131-5; Cosentino, “Flotte byzantine”, 7-8; Savvides, “Secular prosopography”; Yannopoulos, “Cibyrra”.

[51] Genesios, *Basileiai*, Δ.2-3 (pp. 56-8); John Zōnaras, *Epitomē historiōn*, XV.19 (vol. 3, pp. 381-2); Nikēphoros I, *Historia syntomos*, §§60, 72, 80-81 (pp. 128-31, 142-5, 152-5); Theophanēs, *Chronographia*, A.M. 6215-80 (pp. 401-63) *passim*, esp. 6215, 6217, 6218, 6224 (pp. 401-2, 404, 404-5, 410); *Theophanēs continuatus*, I.17; II.8, 28; III.2, 10-14; IV.1-6 (pp. 28, 47, 83-4, 86-7, 99-106, 148-54).

The Umayyad assault petered out in a whimpering coda around 750, marked by the defeat of a large fleet off Cyprus in 747 by that of the *Kibyrrhaiōtai*,[52] by the overthrow of the Umayyads themselves by the ʻAbbāsids in 750, by the last raid on Sicily from *Ifrīqiya* for a half a century in 752, and by the seizure of power in *al-Andalus* by the refugee Umayyad ʻAbd al-Raḥmān in 756. For the next half century the Empire would have virtually the only naval forces in the Mediterranean. However, during the preceding half century the struggle had turned the entire Mediterranean into something of a no-man's land.

Cyprus was recovered and garrisoned by the Muslims in 693 only to be lost to the Byzantines the following year and recovered again in 695. The islanders clearly assisted the Empire continually in violation of their covenant and the Muslims had to enforce their suzereinty again in 713 and 725. In 743 al-Walīd II deported many of them to Syria. However his action was judged too severe by Muslim jurists and Yazīd III eventually allowed them to return. Crete was also raided during the reign of al-Walīd I, probably in 713.[53] In 703 an Egyptian fleet attacked Sicily at the request of the governor of *Ifrīqiya*, Mūsā ibn Nuṣayr. The island was attacked again in 704 by Mūsā's son ʻAbd Allāh and from then on became subject to virtually incessant Muslim raids for the next fifty years. Sardinia was attacked in 708 and 711 and the Balearics were also raided in 708.[54] In reverse, the Byzantines attacked Egypt and captured the fleet commander Khālid ibn Kaysān in 709. They attacked Latakia in 718 and in the following year returned to Egypt, attacking *Tinnis*. There were further raids on Egypt in 720, 725, and 736. Then in 739 a reported 360 Byzantine ships attacked Damietta.[55]

On land, Al-Ṭabarī's accounts of the interminable Umayyad campaigns against Byzantine frontiers and of Byzantine responses, a

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[52] *Historia miscella*, lib. XXII (col. 1095); Nikēphoros I, *Historia syntomos*, §68 (pp. 140-41); Theophanēs, *Chronographia*, A.M. 6238 (p. 424).

[53] Agapios, *Kitāb al-ʻUnwān*, tome 8, fasc. 3, p. 511; Al-Balādhurī, *Kitāb Futūḥ al-Buldān*, part 2, ch. 13 (vol. 1, pp. 235-43); part 7, ch. 1 (vol. 1, p. 376); Al-Ṭabarī, *Ta'rīkh* (Yar-Shater), A.H. 107, 125 (vol. 25, p. 25; vol. 26, pp. 119-20); Theophanēs, *Chronographia*, A.M. 6234 (p. 417). On the status of Cyprus, see Jenkins, "Cyprus"; Kyrris, "Cyprus".

[54] *Gesta episcoporum Neapolitanorum*, §36 (p. 422); Ibn Khaldūn, *ʻIbar* (Des Vergers), pp. 33-4, 44; Ibn Ṣabbāṭ, *Dīwān Ṣilat al-simṭ*, pp. 348-50; Pseudo ibn Qutaybah, *Aḥādīth al-Imāma*, pp. lxvi-lxvii.

[55] Al-Balādhurī, *Kitāb Futūḥ al-Buldān*, part 2, ch. 9 (vol. 1, p. 204); Al-Ṭabarī, *Ta'rīkh* (Yar-Shater), A.H. 90 (vol. 23, pp. 149-50). See also Brooks, "Relations between the empire and Egypt".

tale of raid and counter-raid, devastation and slaughter, capture and enslavement, makes depressing reading.[56]

The third period, ca 750-875: equilibrium of chaos

In 750 the last Umayyad Caliph, Marwān II al-Ḥimār, was defeated at the battle of the river Great Zab and eventually killed by the forces of Abū 'l-'Abbās al-Saffāḥ, who had been proclaimed at *al-Kūfa* in 749. The 'Abbāsids claimed descent from Muḥammad's uncle al-'Abbās ibn 'Abd al-Muṭṭalib and swept to power on a wave of support from the disgruntled within the Muslim community: the Arab tribes of Iraq, the *Shī'a*, and the *mawālī*. The *Shī'a* had been persecuted, their *imāms*, descendents of 'Alī's second son Ḥusayn, forced underground and hunted by Umayyad secret police. The *mawālī* had been treated unequally by Arab Muslims and especially in Iraq and Persia had become a resentful underclass.[57] Following the disaster at the Great Zab many Umayyads were hunted down and killed; however, one, 'Abd al-Raḥmān ibn Mu'āwiya, later called *al-Dākhil*, "*the Incomer*", managed to flee via the Maghrib to *al-Andalus*, where he seized power in 756.[58] The establishment of an Umayyad *amīrate* in *al-Andalus* was the first rupture in the Muslim polity, although it was only the beginning. In some respects it represented an inevitability because the Caliphate was stretched so far geographically that the contemporary technology of travel and communications was simply incapable of holding it together. Even given the best of circumstances, a message could take a year or more to reach Morocco from Baghdad and return. Reflecting a shift in the centre of gravity of the Muslim polity, the second 'Abbāsid Caliph, al-Manṣūr, founded a new capital at Baghdad in 762.[59] Henceforth the Caliphate would focus towards the east and south rather than the Mediterranean. The 'Abbāsids quickly rose to great power, reaching their zenith during the reign of Hārūn al-Rashīd.[60] However, upon his death in 809 civil war broke out. Al-Ma'mūn was victorious but although his reign

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[56] See al-Ṭabarī, *Ta'rīkh* (Yar-Shater), vols 23-5, *passim* under "Byzantines".

[57] Al-Mas'ūdī, *Murūj*, vol. 6, pp. 35-76; Ibn 'Idhārī, *Al bayān al-mughrib*, vol. 1, pp. 67-70; Sāwīrus, *History of the Patriarchs*, I.18 (vol. V.1, pp. 134-88).

[58] *Akhbār Majmū'a*, pp. 55-109; Al-Marrākushī, *Al-Mu'jib*, pp 13-15; *Fatḥ al-Andalus*, pp. 50-63; Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 91-102; Ibn 'Idhārī, *Al-bayān al-mughrib*, vol. 2, pp. 61-73.

[59] Al-Ya'qūbī, *Al-Buldān*, pp. 6-19.

[60] See Kennedy, *Early Abbasid Caliphate*.

was a great one for Muslim cultural development, politically it was one of disintegration, the great Persian province of *Khurāsān* being delegated to the Ṭāhirids from 821. His successor, al-Mu'taṣīm, began to surround himself with a personal corps of Turkish guards, whose disorderly conduct forced him to evacuate Baghdad in 836 and build a new capital at Samarra, which became the capital until 889. There the guards imprisoned the Caliphs within their own city, making and breaking Caliph after Caliph and not being brought under control until the reign of al-Mu'tamid. In the meantime *Khurāsān* remained lost to the Ṭāhirids, then to the Ṣaffārids from 873, and to the Sāmānids from 900. Southern Iraq was thrown into turmoil by a dangerous revolt of Negro slaves, the Zanj, from 869-83.

Disruption and weakness in the heartlands led to disintegration in the West. In the Maghrib the first 'Abbāsid governor sent to *Ifrīqiya* in 761-2, Muḥammad ibn al-Ash'āth ibn al-'Uqba al-Khuzā'ī, fortified *al-Qayrawān* and made the city the new capital of the province. However, the 'Abbāsids proved incapable of exercizing authority west of *Ifrīqiya* and the governors were fully occupied trying to maintain authority over fractious Arab settlers and Berber tribes.[61]

Those Berber tribes who had been converted had been heavily influenced by the *Khawārij*, who had survived in remote provinces as populist groups opposed to central Caliphal authority, in particular in the Maghrib the *Ibāḍīyya*, followers of the seventh-century Arab 'Abd Allāh ibn Ibāḍ. These *Khārijī Ibāḍī* Berber tribes resisted the authority of the Umayyad governors and their 'Abbāsid successors.

From the third quarter of the eighth century the Maghrib fragmented. 'Abd Allāh ibn Rustam, leader of the *Ibāḍī* Zenāta Berbers, occupied *al-Qayrawān* temporarily and then fled to western Algeria, where he founded an *amīrate* centred on *Tāhart*, becoming *imām* of all the *Ibāḍīyya* in 777. Eventually the Rustamids would be confronted by the *Shī'a* Idrīsids to the west and the *Sunnī* Aghlabids to the east and would forge an alliance with the Umayyads of *al-Andalus*. Andalusi seamen from Almeria/*Pechina* established a colony near ancient *Cartenna* on the coast north of *Tāhart* in 875-6, bringing the Rustamid state and Umayyad *al-Andalus* into economic relations. The last Rustamid, Yaqẓān ibn Muḥammad, would be overthrown by the Ketāma Berbers of the Fāṭimid Abū 'Abd Allāh in 909.[62]

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[61] Al-Bakrī, *Kitāb al-mughrib*, p. 57; Al-Nuwayrī, *Nihāyat 'al-Arab* (De Slane), vol. 1, pp. 374-97; Ibn Khaldūn, *'Ibar* (des Vergers), pp. 55-9.

[62] Al-Bakrī, *Kitāb al-mughrib*, pp. 128-9, 139-41; Al-Ya'qūbī, *Al-Buldān*, pp. 216-17, 224; Ibn 'Idhārī, *Al-bayān al-mughrib*, vol. 1, pp. 283-7.

Table 3: Rulers of the third period, ca 750-875

The Byzantine Empire	The Muslims		
	The ‘Abbāsid Caliphs	(U) Umayyads of *al-Andalus* (C) *Amīrs* of Crete (S) *Amīrs* of Sicily	(A) Aghlabids of Tunisia (I) Idrīsids of Morocco (R) Rustamids of Algeria
Constantine V (740-75)	Abū ’l-Abbas al-Saffāḥ (749-54) Al-Manṣūr (754-75)	‘Abd al-Raḥmān I (U 756-88)	
Leo IV (775-80)	Al-Mahdī (775-85)		‘Abd al-Raḥmān ibn Rustam (R 777-84)
Constantine VI (780-97)	Al-Hādī (785-6) Hārūn al-Rashīd (786-809)	Hishām I (U 788-96) Al-Ḥakam I (U 796-822)	‘Abd al-Wahhāb (R 784-823) Idrīs I (I 789-93) Idrīs II (I 793-828)
Staurakios (811) Michael I (811-13)			‘Abd Allāh I (A 812-17)

(Table 3 continued)

(B) Bulgaria (V) Doges of Venice[63]	The Iberian rulers	The Lombards	The Carolingians and their successors
	(A) Asturias (Ar) Aragon (N) Navarre	(K) Kings (B) Benevento (C) Capua (S) Salerno	(K) Kings of the Franks (E) Emperors (I) Italy (P) Provence (B) Burgundy (A) Aquitaine
Kormisoš (B 739-56)	Pelayo (A ca 718/22-37) Favila (A 737-9) Alfonso I (A 739-57)	Liutprand (K 712-44)	
Vinekh (B 756-ca 761) Telec (B ca, 761-4) Sabin (B ca 764-7) Umar (B 767) Toktu (B 767-ca 769) Pagan (B ca 770) Telerig (B ca 770-77)	Fruela (A 757-68) Aurelio (A 768-74) Silo (A 774-83)	Hiltiprand (K 744) Ratchis (K 744-9) Aistulf (K 749-56) Desiderius (K 757-74) Adelchis (K 759-74) Gisulf II (B 742-51) Liutprand (B 751-8) Arichis II (B 758-87)	Pepin I (K 751-68) Charlemagne (K 768-814, E 800-814) Louis I (A 781-838)
Giovanni Galbaio (V 775-804) Kardam (B 777-ca 803)			
	Mauregato (A 783-8) Vermudo I (A 788-91) Alfonso II (A 791-842)	Grimoald III (B 787-806)	Pepin (I 781-810) Bernard (I 812-17)
Krum (B ca 803-14) Obelerio degli Antenori (V 804-11) Agnello Partecipazio (V 811-27)	Aznar I Galíndez (Ar ca 809-39) Iñigo Iñiguez Arista (N ca 810-52)	Grimoald IV (B 806-17)	

[63] From 800.

(Table 3 continued)

The Byzantine Empire	The Muslims		
	The ‘Abbāsid Caliphs	(U) Umayyads of *al-Andalus* (C) *Amīrs* of Crete (S) *Amīrs* of Sicily	(A) Aghlabids of Tunisia (I) Idrīsids of Morocco (R) Rustamids of Algeria
Leo V (813-20)	Al-Ma’mūn (813-33)		Ziyādat Allāh I (A 817-38)
Michael II (820-29)		‘Abd al-Raḥmān II (U 822-52) Abū Ḥafṣ ‘Umar ibn Shu‘ayb (C ca 824-55) Asad ibn al-Furāt (S 827-8) Muḥammad ibn Abī ’l-Jawārī (S 828-9)	Abū Sa‘īd Aflaḥ (R 823-72) Muḥammad al-Muntaṣir (I 828-36)
Theophilos (829-42)	Al-Mu‘taṣim (833-42) Al-Wāthiq (842-7)	Zuhayr ibn al-Ghawth (S 829) Aṣbagh ibn Wakīl (S 829) ‘Uthmān ibn Qurhub (S 829) Muḥammad ibn ‘Abd Allāh ibn al-Aghlab (S 832-5) Ibrāhīm ibn ‘Abd Allāh (S 835-51)	‘Alī I (I 836-49) Abū ‘Iqāl al-Aghlab (A 838-41) Muḥammad I (A 841-56)
Michael III (842-67)	Al-Mutawakkil (847-61) Al-Muntaṣir (861-2) Al-Musta‘īn (862-6) Al-Mu‘tazz (866-9)	Muḥammad I (U 852-86) Al-‘Abbās ibn al-Faḍl (S 851-61) Shu‘ayb I ibn ‘Umar (C ca 855-?) Aḥmad ibn Ya‘qūb (S 861) ‘Abd Allāh ibn al-‘Abbās (S 861) Khafāja ibn Sufyān (S 862-9)	Yaḥyā I (I 849-?) Yaḥyā II (I ?) ‘Alī I (I ?) Yaḥyā III (I ?) Aḥmad (A 856-63) Ziyādat Allāh II (A 863) Abū ’l-Gharānīq Muḥammad II (A 863-75)

(Table 3 continued)

(B) Bulgaria (V) Doges of Venice[64]	The Iberian rulers	The Lombards	The Carolingians and their successors
	(A) Asturias (Ar) Aragon (N) Navarre	(K) Kings (B) Benevento (C) Capua (S) Salerno	(K) Kings of the Franks (E) Emperors (I) Italy (P) Provence (B) Burgundy (A) Aquitaine
Omurtag (B 814-31) Giustiniano Partecipazio (V 827-9)		Sico (B 817-33)	Louis I (E 813-40) Pepin I (A 817-38)
Giovanni Partecipazio (V 829-36) Malamir (B 831-6) Presiam (B 836-52) Pietro Tradonico (V 836-64)		Sicard (B 833-9) Radelchis I (B 839-51) Sikenolf (B 839-49, S 849-51)	Lothar I (I 822-55, E 840-55) Pepin II (A 838-48)
Boris I (B 852-89) Orso Partecipazio I (V 864-81)	Ramiro I (A 842-50) Galindo I Aznár (Ar ca 844-67) Ordoño I (A 850-66) García Iñiguez (N 852-70) Alfonso III (A 866-910)	Radelgar (B 851-3) Adelchis (B 853-78) Peter (S 853-6) Ademar (S 856-61) Guaifer (S 861-80)	Louis II (I 840-75, E 855-75) Charles the Bald (A 848-66) Lewis II (A. 866-79)

[64] From 800.

As opposed to the *Khārijī* Rustamids, the Idrīsids were *Shī'a*, descended from a great grandson of 'Alī ibn Abī Ṭālib's son al-Ḥasan who was involved in an 'Alīd uprising against the 'Abbāsids in the Ḥijāz in 786 and who fled to the Maghrib and was recognized by several chiefs of the Zenāta Berbers, founding a new capital, Fez, near the site of the old Roman town of *Volubilis* in 793. He and his descendants were proclaimed as Caliphs. However, the Idrīsid Caliphate began to fragment during the reign of Muḥammad al-Muntaṣir as the towns were parcelled out among his many brothers. In the tenth century Yaḥyā IV was forced to recognize the suzereinty of the Fāṭimid 'Ubayd Allāh and in 921 Fez was occupied. Idrīsid rule survived in some outlying towns but their history is obscure. In 931 the Umayyads of *al-Andalus* initiated a forward defence policy in the Maghrib against the Fāṭimids by occupying Ceuta and the last Idrīsids were taken off to Cordoba in 974.[65]

From a Christian perspective, the most important Maghribin splinter state was that of the Aghlabids, who were descended from Ibrāhīm ibn al-Aghlab, the son of a *Khurāsānian* Arab officer of the 'Abbāsids who had moved to Egypt. He was appointed governor of *Ifrīqiya* in 800 by Hārūn al-Rashīd but in practice became independent of Baghdad. The Aghlabids took to the sea with ferocity and determination, the third, Ziyādat Allāh I, beginning the definitive conquest of Sicily in 827. Aghlabid fleets harried south Italy, Corsica, Sardinia, and even the Maritime Alps. Malta was occupied in 868 and by 878 the conquest of Sicily was virtually complete. The island was ruled by governors, at first Aghlabid and then later Fāṭimid. The *Shī'a* propaganda of the *dā'ī* Abū 'Abd Allāh, precursor of the Fāṭimid *Mahdī*, Ubayd Allāh, stirred up the Ketāma Berbers and a military uprising drove the last Aghlabid, Ziyādat Allāh III, out into Egypt.[66]

There was also a small independent *Sunnī* dynasty centred on the

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[65] Al-Bakrī, *Kitāb al-mughrib*, pp. 205, 231-59; Al-Ya'qūbī, *Al-Buldān*, pp. 223-4; Ibn abī Zar', *Rawḍ al-Qirṭās*, pp. 15-65, 103-30; Ibn 'Idhārī, *Al-bayān al-mughrib*, vol. 1, pp. 96-9, 289-95, 303-11; Ibn Khaldūn, *Muqaddimah*, Introduction (vol. 1, pp. 47-53); *idem*, *'Ibar* (De Slane), vol. 2, pp. 559-71; idem, *'Ibar* (Des Vergers), p. 89.

[66] Al-Bakrī, *Kitāb al-mughrib*, p. 99; Al-Balādhurī, *Kitāb Futūḥ al-Buldān*, part 4, ch. 1 (vol. 1, pp. 369-70); Al-Māliki, *Muḥtaṣar Kitāb Riyāḍ*, pp. 306-9; Al-Mas'ūdī, *Murūj*, vol. 1, p. 370 & vol. 8, p. 246; Al-Nuwayrī, *Nihāyat 'al-Arab* (Amari), pp. 113-24, 146-7; *idem*, *Nihāyat 'al-Arab* (Caussin), pp. 404-16; *idem*, *Nihāyat 'al-Arab* (De Slane), vol. 1, pp. 397-447; Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 157-60, 167-8, 173-6, 181-94, 207-8, 210-18, 225-30, 235-41, 247-62, 263-71; Ibn 'Idhārī, *Al-bayān al-mughrib*, vol. 1, pp. 111-29 *et passim ad* p. 163; Ibn Khaldūn, *'Ibar* (Des Vergers), pp. 83-9. See also Pertusi, "Ordinamenti militari", pp. 688-95; Talbi, *L'émirat Aghlabide*.

town of *Nakūr* in Alhucemas Bay in Morocco whose foundation by Ṣāliḥ ibn Manṣūr went back as far as 710. This small city state remained independent of the Rustamids and Idrīsids and was friendly with the Umayyads of *al-Andalus*.[67]

Despite the breakup of the Caliphate, the period from the ʻAbbāsid revolution to the accession of the Byzantine emperor Basil I in 867 witnessed the peak of Muslim eminence. Much later, Ibn Khaldūn penned the famous lines that: "... the Muslims gained control over the whole Mediterranean. Their power and domination over it was vast. The Christian nations could do nothing against the Muslim fleets, anywhere in the Mediterranean. All the time the Muslims rode its waves for conquest".[68] Even if this was in fact never more than comparatively true at best, conquest of the islands and the presence of fleets across the sea did neverthless give Muslim powers an ascendancy. However, they did not have it all their own way and the period was characterized more by inchoate thrust and counter-thrust. Moreover, neither the Muslim nor Christian worlds were internally untroubled. The various Muslim splinter states became at odds with each other and with the Caliphate in Bagdhad. The Byzantines had to reckon with the First Bulgarian Empire under its great Khans Krum and Omurtag and the Italian peninsula was wracked by strife between the Lombards and Franks.

By land, the ʻAbbāsids maintained the interminable raids and counter-raids across the Tauros frontiers begun by the Umayyads.[69] The eighth and ninth centuries were the age of the *mujāhidūn* and the *akritai*. Muslims built numerous *ribātāt*, from which *mujāhidūn* waged *jihād*. Their Byzantine counterparts were the border lords, the *akritai*, of whom the most famous was the fictional Digenēs Akritas. Encounters across the borders were reflected in the epic romance of *Dhāt al-Himmah* and in many tales of later versions of the *Thousand and One Nights*.

By sea the first major assault came in 790 when a Muslim fleet sailing against Cyprus encountered that of the *Kibyrrhaiōtai* in the Gulf of Antalya and the Byzantine *stratēgos*, Theophilos, was defeated, captured, and later killed. In 806 Hārūn al-Rashīd

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[67] Al-Bakrī, *Kitāb al-mughrib*, pp. 183-96; Al-Yaʻqūbī, *Al-Buldān*, pp. 222-3; Ibn ʻIdhārī, *Al-bayān al-mughrib*, vol. 1, pp. 249-55; Ibn Khaldūn, *ʻIbar* (De Slane), vol. 2, pp. 137-43.

[68] Ibn Khaldūn, *Muqqadimah*, vol. 2, p. 41.

[69] Al-Ṭabarī, *Ta'rīkh* (Yar-Shater), vols 29-30, *passim* under "Byzantines"; Theophanēs, *Chronographia*, A.M. 6243-6305 (pp. 427-503), *passim*.

despatched a fleet to Cyprus which deported many Cypriots, once again for suspicion of not remaining neutral. In the following year he sent a fleet against Rhodes; however, it could not capture the fortress. Crete was also assaulted some time during his Caliphate.[70]

In *al-Andalus* ‘Abd al-Raḥmān I was fully occupied consolidating his own rule, though he also defended himself successfully against Charlemagne’s expedition to Zaragoza in 778, which ended in the famous disaster for the Franks in the Pyrenees pass of Roncesvalles. His successors carried the attack to their Christian neighbours, not only to the Kingdom of the Asturias, the Basque lands and the incipient Christian states in Aragon and the Frankish March of Barcelona, but also across the Pyrenees. In 793 Hishām I’s *amīr* ‘Abd al-Malik ibn Mughīth destroyed Gerona and pushed on to Narbonne and Frankish territory, defeating a force sent against him and returning with great booty. In a two-year siege in 801-3 Louis of Aquitaine captured Barcelona, thus establishing the Spanish March, but in 808 and 809 Umayyad columns threw back his troops from Tortosa and in 813 or 815 they defeated the Franks outside Barcelona. During the reign of ‘Abd al-Raḥmān II, war broke out in the Spanish March in 827 between a rebel noble called Aizo and Count Bernard of Barcelona. Aizo called in an army sent in 828 by ‘Abd al-Raḥmān under the *amīr* Abū Marwān ‘Ubayd Allāh which engaged the Frankish forces at Barcelona and devastated the lands north to Gerona. Barcelona was retaken from the Franks in 852.[71]

At the turn of the eighth and ninth centuries, Al-Ḥakam I began to turn his attention to the islands of the western Mediterranean, attempting to extend his rule as far as Corsica and possibly Sardinia. An Andalusi fleet raided the Balearics as early as 798 and it may have been this same fleet which was defeated at Naples in the same year. In 806 the King of Italy, Pepin, sent a fleet from Italy to Corsica against Andalusi Moors who had pillaged the island and in the following year, since they had come to frequent the island, Charlemagne sent his Count of the Stable, Burchard, to Corsica with a fleet which gained a

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[70] Al-Balādhurī, *Kitāb Futūḥ al-Buldān*, part VII, ch. 1 (vol. 1, p. 376); Al-Ṭabarī, *Ta’rīkh* (Yar-Shater), A.H. 190 (vol. 30, p. 265); Theophanēs, *Chronographia*, A.M. 6282, 6298, 6300 (pp. 465, 482-3).

[71] *Annales Bertiniani*, *Annus* 852 (p. 447); *Annales regni Francorum*, *Annus* 778, 801, 826-7 (pp. 50-53, 116, 170-73); *Chronicle of Moissac*, *Annus* 793 (p. 300); Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 102-7, 109-12, 118-22, 125-44, 150-55, 160-72, 174-5, 177-80, 194-9, 200-201, 208-9, 211-12, 220-25; Ibn ‘Idhārī, *Al-bayān al-mughrib*, vol. 2, pp. 73-91, 101-2, 117, 119-20; *Vita Hludowici*, §§10, 13-16, 40-41 (pp. 611-15, 629-30). The best account of the Umayyad *amīrate* in *al-Andalus*, from our perspective, is still that of Lévi-Provençal, *L’Espagne musulmane*, vols 1-2.

victory over them in some harbour, probably Bonifacio. In 810 they again sent a fleet to Sardinia and Corsica and conquered the latter almost entirely. However, in 813 Count Irmingar of *Ampurias* intercepted them returning from Corsica off the Balearics and captured 8 ships. In revenge they ravaged Civitavecchia and Nice and attacked Sardinia but were repelled. Andalusi corsairs raided Marseilles in 838, Arles in 842 and 850, and established a base in the Camargue at the mouth of the Rhône some time before 869. In 849 ʻAbd al-Raḥman II sent 300 *marākib* to the Balearics to reduce them to the same covenantary status of *ʻahd* viz-a-viz *al-Andalus* as Cyprus had to the Caliphate, although they were not conquered and made a *kūra*, dependent province, of Cordoba until 903.[72]

Development of major naval forces in *al-Andalus* was also stimulated by Norse attacks. In 844 a Norse fleet of 80 *marākib* and other smaller boats sailed up the estuary of the Tagus river and assaulted Lisbon. Beaten off, they sailed south and sacked Seville. Mauled by Muslim cavalry, they then re-embarked, attacked *Aṣīla* in Morocco, and retired to winter in Aquitaine. They returned again in 859-60, when 62 *marākib* anchored off the mouth of the Guadalquivir river. Deterred by Muslim forces, they went on to sack Algeciras and part of the fleet assaulted *Nakūr*. The remainder ravaged the Balearics, a detachment raided up the valley of the Ebro as far as Pamplona, and they then went on to sack Arles, Nîmes, and Valence in Provence and Luni in Liguria before retiring.[73]

In Italy the old order was changing. The establishment of the Lombard kingdom and confining of imperial influence to the *exarchate* of Ravenna left the Papacy in Rome isolated from Constantinople. The last emperor to visit Rome was Constans II in 663 and the last Pope to visit Constantinople was Constantine in 711. In an imperial vacuum the Papacy turned to the Frankish kingdom under its Mayor of the Palace, Charles Martel, and then his son Pepin III. In 751, in response to a set-up question from Pepin as to who should bear the title of "king", he who held real power or the titular

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[72] *Annales Bertiniani*, *Anni* 838, 842, 849, 850, 869 (pp. 432, 439, 444-5, 485); *Annales regni Francorum*, *Anni* 798, 806, 807, 810, 812, 813 (pp. 104, 122, 124, 130, 137, 139); Ibn ʻIdhārī, *Al-bayān al-mughrib*, vol. 2, p. 145; *Neapolitanorum victoria facta*. The final conquest of Majorca is reported only by Ibn Khaldūn, *ʻIbar* (Būlaq), vol. 4, p. 164. See also Manfroni, *Marina italiana*. *I*, pp. 35-6, 40-41.

[73] Al-Bakrī, *Kitāb al-mughrib*, pp. 184-5, 219-20; *Annales Bertiniani*, *Anni* 844, 859-60 (pp. 441, 453-4); *Chronicle of Alfonso III*, pp. 54-5, 64-5, 102, 125; Ibn ʻIdhārī, *Al-bayān al-mughrib*, vol. 2, pp. 141-4, 157-8; Ibn Khaldūn, *ʻIbar* (De Slane), vol. 2, p. 139.

Merovingian incumbent, Pope Zachary gave him the answer he wanted and Pepin was crowned King. A fateful alliance was forged between the Papacy and the Frankish Kingdom which eventually led to the coronation of Pepin's son Charlemagne as Emperor in Rome on Christmas day 800 and to the creation of the medieval Western Roman Empire.[74]

The immediate Papal concern was the Lombards. In 752 Aistulf demanded tribute from Rome and control of the fortresses of Papal territories. Appealed to by Stephen II, Pepin invaded Italy and defeated Aistulf, who had to come to terms. But he broke the peace in 756 and Pepin invaded again. When Desiderius attacked Papal territories in 772-3, Hadrian I appealed to Charlemagne, who invaded, defeated the Lombard army, besieged and took Pavia, and had himself crowned king in 774. The Lombard kingdom was succeeded by a Frankish one which eventually became the Franco-Lombard Kingdom of Italy when the Frankish Empire began to fragment.[75] In response, empress Eirēnē, regent for her son Constantine VI and the power behind the throne in Byzantium, sent an embassy to Charlemagne in 781 with a view to betrothing his daughter Rotrud to Constantine. An agreement was reached; however, in 788 she broke the agreement and despatched the refugee Lombard pretender, Desiderius, together with a *logothetēs* named John, to Italy to counter Charlemagne but the expedition was defeated.[76]

The Carolingian conquest left Italy with a Frankish kingdom in the North and Papal territories in the centre. The South, under the Lombard duke of Benevento, Arichis, became subject to the Carolingians, technically at least. In 787 Arichis died and in return for release of his heir, Grimoald, who was a hostage at Charlemagne's court, his widow Adalperga accepted Carolingian suzereinty. But it remained ephemeral. By the early ninth century the Lombards, now with a second capital established by Arichis at Salerno, were dominant in the South.[77] Their principalities would continue to dominate it until

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[74] *Annales regni Francorum*, *Anni* 749-50, 801 (pp. 8-11, 112-13). On early medieval Italy and the Empire, see Gay, *L'Italie méridionale*.

[75] *Annales regni Francorum*, *Anni* 750-56, 773-4 (pp. 8-15, 34-41); *Chronicon Salernitanum*, §§2-9 (pp. 4-11); Fredegar, *Continuations*, §§36-9 (pp. 104-9); Leo Marsicanus, *Chronica*, I.8, 12 (pp. 585-6, 589).

[76] Theophanēs, *Chronographia*, A.M. 6274, 6281 (pp. 456, 463-4).

[77] *Annales regni Francorum*, *Anni* 787, 812 (pp. 72-5, 137); *Chronicon Salernitanum*, §§9-14 (pp. 11-20); Erchempert, *Historia Langobardorum*, §§2-6 (pp. 235-7); Leo Marsicanus, *Chronica*, I.12 (p. 589). On the Franks, Lombards, Byzantines, and Muslims in Italy in the ninth and tenth centuries, see Kreutz, *Before the Normans*; Loud, *Robert Guiscard*.

their conquest by the Normans in the eleventh century.

In the North, internal strife amongst the communities of the Venetian lagoons eventually led Doge Obelerio degli Antenori to make Venice's submission to Charlemagne in 805. After the defeat of a Byzantine expedition sent to bring Venice back to her allegiance in 809-10, Pepin I, king of Italy, attempted in 810 to incorporate her into his own domains but was forced to withdraw by the Venetian defence of the lagoons, having won only payment of an annual tribute. Venice began the rise to power that would make her master of the Adriatic.[78]

Even after the 'Abbāsid overthrow of the Umayyads, the incumbent governor of *Ifrīqiya*, 'Abd al-Raḥmān ibn Ḥabīb, sent a last raid against Sicily and Sardinia in 752.[79] After that, chaotic politics in the Maghrib and the weakness of the 'Abbāsid governors gave the central Mediterranean islands a respite for half a century. But after Ibrāhīm I ibn al-Aghlab's seizure of power in *Ifrīqiya*, Aghlabid squadrons began to raid across the central Mediterranean. In 805 they raided the Peloponnēsos, and in 812 and 813 Corsica and Sardinia, Lampedusa, Ponza, and Ischia. In 820 corsairs captured eight merchant ships returning to Italy from Sardinia. In the following year squadrons raided Sardinia, but were thrown back. Ziyādat Allāh I began the conquest of Sicily in 827. Carolingian forces attempted to return these compliments in kind and in 828 ships from Pisa and Luni raided *Bona* in Algeria and Count Boniface, governor of Corsica, together with his brother and some Tuscan counts, sailed to *Ifrīqiya* and raided between ancient *Utica* and *Carthage*.[80]

The first half of the ninth century was disastrous for the Byzantine Empire. Byzantine-Bulgarian relations had been reasonably amicable during the reigns of the Khans Telerig and Kardam, apart from occasional skirmishes in which the Empire had mostly prevailed. But in 807 hostilities flared with a new Khan of a very different ilk, Krum. On 26 July 811 he trapped a Byzantine army in a mountain defile, defeated and killed the Emperor Nikēphoros I and reportedly had his skull made into a drinking cup. On 22 June 813 he routed another

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[78] *Annales regni Francorum*, *Anni* 806, 810 (pp. 120-21, 130); Constantine VII, *De administrando imperio*, §28 (pp. 118-120); John the Deacon, *Cronaca Veneziana*, pp. 104-5. See also Manfroni, *Marina italiana. I*, pp. 37-9.

[79] Ibn 'Idhārī, *Al-bayān al-mughrib*, vol. 1, p. 70; Nikēphoros I, *Historia syntomos*, §78 (pp. 150-51).

[80] *Annales regni Francorum*, *Anni* 812, 820, 828 (pp. 137, 153, 176); Constantine VII, *De administrando imperio*, §49 (pp. 228-9); Al-Nuwayrī, *Nihāyat 'al-Arab* (De Slane), vol. 1, p. 412; Ibn 'Idhārī, *Al-bayān al-mughrib*, vol. 1, p. 120; Leo III, *Epistolae*, 6-7 (pp. 96-9); *Vita Hludowici*, §42 (p. 632).

army under Michael I at the battle of *Versinikia* and advanced on Constantinople. The capital was spared only by his premature death and fortunately his son Omurtag concluded a thirty-year peace treaty in 816.[81]

No sooner was this threat neutralized than the Empire was rocked by the revolt in 820 of Thomas the Slav. This revolt, whose origins and purposes are obscure, succeeded in winning over most of the *themata* of Asia Minor, including the front-line maritime *thema* of the *Kibyrrhaiōtai*. Thomas's appeal has been attributed variously to anti-Greek discontent amongst ethnic communities, reaction against iconoclasm, and inchoate social discontent. Thomas was recognized as emperor by the Caliph al-Ma'mūn but, although able to besiege Constantinople from late 821 to spring 823, his fleets were eventually scattered by imperial squadrons using Greek Fire and his armies by the Bulgarian Khan Omurtag, who came to the assistance of Michael II in fulfillment of his treaty.[82]

Weakening of naval defences in the approaches to the Aegean by the *Kibyrrhaiōtai* defection to Thomas may well have been what made it possible for Andalusi corsairs under the leadership of Abū Ḥafṣ 'Umar ibn 'Īsā to land in Crete some time between 824 and 827. Opposition was weak and they succeeded in consolidating their hold.[83] Three expeditions sent out before the death of Michael II on 2 October 829 to retake the island were all unsuccessful: the first under Phōteinos, the *stratēgos* of the *thema* of *Anatolikon*; a second under Krateros, the *stratēgos* of the *Kibyrrhaiōtai*; and a third under Ōoryphas, who was probably the *droungarios tou ploimou*. The last did not even reach Crete. The Byzantines returned again in 843 when the *magistros* and *logothetēs tou dromou*, Theoktistos, achieved brief

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[81] Genesios, *Basileiai*, A.1-2, 10 (pp. 3-4, 9); John Zōnaras, *Epitomē historiōn*, XV.8, 12, 15, 17, 19 (vol. 3, pp. 353-5, 364, 372-4, 376-7, 380-81); Theophanēs, *Chronographia*, A.M. 6265-7, 6283-4, 6288, 6303, 6304-5 (pp. 446-8, 467-8, 470, 489-92, 495-502). See also Runciman, *First Bulgarian Empire*; Fine, *Early medieval Balkans*.

[82] Genesios, *Basileiai*, B.2-8 (pp. 23-31); John Skylitzēs, *Synopsis historiōn*, Μιχαὴλ ὁ Τραυλός.10-12 (pp. 36-9); John Zōnaras, *Epitomē historiōn*, XV.22-3 (vol. 3, pp. 392-7); *Theophanēs continuatus*, II.9-20 (vol. 1, pp. 49-71).

[83] Al-Balādhurī, *Kitāb Futūḥ al-Buldān*, part VII, ch. 1 (p. 376); Al-Ṭabarī, *Ta'rīkh* (Yar-Shater), A.H. 210 (vol. 32, pp. 164-5); Constantine VII, *De administrando imperio*, §22 (pp. 94-6); Genesios, *Basileiai*, B.10 (pp. 32-3); Ibn Khaldūn, *'Ibar* (De Slane), vol. 2, p. 544; John Skylitzēs, *Synopsis historiōn*, Μιχαὴλ ὁ Τραυλός.16 (pp. 42-3); John Zōnaras, *Epitomē historiōn*, XV.24 (vol. 3, pp. 397-8), XVI.7 (vol. 4, pp. 20-21); Sāwīris, *History of the Patriarchs* (Evetts), I.19 (vol. X.5, pp. 429-32); *Theophanēs continuatus*, II.21, 23 (pp. 73-8). See also Christides, *Conquest of Crete*; Tsougarakis, *Byzantine Crete*.

success before returning to Constantinople, leaving his forces behind on Crete to be slaughtered. Another attempt by the *Caesar* Bardas in 866 was prematurely terminated when he was murdered in the presence of Emperor Michael III in camp at *Kēpoi* at the mouth of the *Maeander* river by a rival, Basil the Macedonian, the future emperor Basil I.[84] After that there would be no further Byzantine expeditions against Crete until the reign of Leo VI.

The loss of Crete altered fundamentally the strategic makeup of the eastern Mediterranean. From a new fortress port at *Chandax* on the north coast of the island, the Andalusi raided the Aegean for slaves and booty, exercized some control over the southern Aegean, and occupied some islands periodically: *Aigina*, Kos, Kythēra, and Karpathos, for example. Some others were forced to pay tribute: for example, Naxos. They almost certainly exercized influence over Rhodes and Cyprus also, although they never attempted to occupy them. Around 839 they inflicted a major defeat on a Byzantine fleet off Thasos and around 860 they raided the Cyclades and the mainland, penetrating through the Dardanelles as far as *Proikonnēsos*.[85]

Probably in response to their depredations, in the second half of the century, alongside the *Kibyrrhaiōtai*, the northern Aegean islands were erected into the maritime *thema* of *Aigaion Pelagos* and the southern ones into that of Samos. How effective these measures were is debatable, although the Byzantines did have some success. Around 840-42 Constantine Kontomytēs, the *stratēgos* of *Thrakēsiōn* destroyed a Cretan force ravaging the mainland. A large Muslim fleet sailing on Constantinople in 842 was destroyed by storm off Cape *Chelidonia*. Then in 852-3, having realized that 'Abbāsid Egypt was the power behind Crete, a Byzantine fleet, reportedly 100 *marākib* of the *shalandiyyāt* type strong, attacked Damietta, sacking it, seizing weapons destined for Crete, and destroying naval supplies. They returned six years later to sack *al-Faramā'*; however, the Egyptians replied in kind with raids on Byzantine coasts.[86]

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[84] Genesios, *Basileiai*, B.12-13, Δ.20-23 (pp. 34-5, 73-6); John Skylitzēs, *Synopsis historiōn*, Μιχαὴλ ὁ Τραυλός.16, 18 (pp. 43, 45), Μιχαὴλ ὁ υἱὸς τοῦ Θεόφιλου.22 (pp. 110-12), Βασίλειος ὁ Μακεδὼν.12 (p. 128); *Theophanēs continuatus,* II.22, 25-6, IV.39, 41, V.17 (pp. 76-7, 79-81, 203, 204-6, 235-8). See also Makrypoulias, "Byzantine expeditions"; Pertusi, "Ordinamenti militari", pp. 695-700.

[85] John Skylitzēs, *Synopsis historiōn*, Μιχαὴλ ὁ υἱός τοῦ Θεόφιλου.18 (p. 107); John Zōnaras, *Epitomē historiōn*, XVIII.5 (vol. 4, pp. 15-16); *Theophanēs continuatus*, III.39, IV.34 (pp. 137, 196). See also Christides, "Raids of the Moslems".

[86] Al-Ṭabarī, *Ta'rīkh* (Yar-Shater), A.H. 238 (vol. 34, pp. 124-7); Brooks, "Relations between the empire and Egypt", p. 391 [referring to al-Kindī, *Governors*

As destructive to the Byzantine position in the East as was the loss of Crete, it was less important than that of Sicily. Following their earlier raids from Sardinia to the Peloponnēsos, the Aghlabid conquest of Sicily began in earnest in 827 when a Byzantine naval commander in Sicily, the *tourmarchēs* Euphēmios, revolted and offered Ziyādat Allāh I suzereinty in return for recognition of himself as governor. An expedition under Asad ibn al-Furāt and Euphēmios sailed for Sicily in 827. Landing at Mazara, it encountered stiff resistance and an assault on Syracuse failed. A Veneto-Byzantine relief expedition sent by Michael II may have prevented the fall of the city. However, Palermo fell in 831, by which time the Muslims controlled most of the west of the island. By 843 they had captured Messina and controlled its crucial straits.[87] But from then on their progress was slow. According to Ibn al-Athīr, a Byzantine fleet of 300 *chelandia* sent to relieve the island after the fall of Enna in 858 failed; however, Syracuse would not fall until 878 and the last strongholds not until 907.[88]

From Messina southern Italy lay exposed to Muslim incursions, which had begun even before the fall of Messina. Brindisi and Taranto were seized in 838 and 839 and a Venetian fleet of 60 *bellicosae naves* sent to relieve Taranto at imperial request was defeated in 840. In 841 Bari was captured by Ḥabla, a freedman of Abū ʻIqāl al-Aghlab. From there Muslim forces raided north, sacking Ancona and inflicting a major defeat on the Venetians in the Gulf of Kvarner in 842. Turning their attentions to Calabria and the west coast, they went on to attack Rome itself and to pillage St Peter's in 846. Although

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and judges, p. 203]; George Hamartolos, *Chronikon syntomon*, IV.cclxviii.4 (col. 1033; Sāwīris, *History of the Patriarchs* (Burmester), vol. 2, pt 1, pp. 13-14; *Theophanēs continuatus*, III.39 (p. 137); *Vita Theodorae*, p. 11. See also Kubiak, "Byzantine attack"; Levi della Vida, "Damietta raid".

[87] *Chronicle of Cambridge*, pp. 24-5, 50-53; *Chronicon Salernitanum*, §60 (p. 59-60); Erchempert, *Historia Langobardorum*, §11 (p. 239); Al-Nuwayrī, *Nihāyat ʻal-Arab* (Amari), pp. 113-19; Ibn al-Athīr, *Al-Kāmil* (Amari), p. 367; *idem*, *Al-Kāmil* (Fagnan), pp. 187-94, 216; Ibn ʻIdhārī, *Al-bayān al-mughrib*, vol. 1, pp. 128-9; Ibn Khaldūn, *ʻIbar* (Des Vergers), pp. 103-12; John of Naples, *Gesta*, §54 (pp. 429-30); John Skylitzēs, *Synopsis historiōn*, Μιχαὴλ ὁ Τραυλός.20 (pp. 46-7); John the Deacon, *Cronaca Veneziana*, p. 109; Leo Marsicanus, *Chronica*, I.21 (p. 596); *Theophanēs continuatus,* II.27 (pp. 81-3); *Vita di Sant'Elia*, p. 7. The capture of Messina is reported only by the later historians Ibn al-Athīr and Ibn Khaldūn. See Ibn al-Athīr, *Al-Kāmil* (Fagnan), p. 216; Ibn Khaldūn, *ʻIbar* (Des Vergers), p. 118.

[88] John Zōnaras, *Epitomē historiōn*, XV.24 (vol. 3, pp. 399-400); *Chronicle of Cambridge*, pp. 28-9**;** Al-Nuwayrī, *Nihāyat ʻal-Arab* (Amari), pp. 119-24, 146-52; *idem*, *Nihāyat ʻal-Arab* (Caussin), pp. 404-16; Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 216-18, 225-9, 237-40, 253-4, 263-6; Ibn Khaldūn, *ʻIbar* (Des Vergers), pp. 116-23. There is no corroborating evidence for the despatch of this fleet and from where Ibn al-Athīr derived this information about Sicily in the ninth century is unknown.

driven out by forces of Lothar I and eventually dispersed by the Neapolitan fleet at Gaeta, during these years various Muslim bands established themselves in strongholds all around the coasts. Bari became the capital of an *amīrate* which survived for thirty years.[89]

Southern Italy became polarized between a Muslim-controlled swathe running from Bari to Taranto and the Lombard principalities of Benevento and Salerno to the north and west. In response to Muslim raids Lothar sent his son Louis II against Apulia in 848-9 and he supposedly had some success, although a second expedition and siege of Bari in 852 failed.[90] Subsequent Muslim raids as far as Benevento and into Campania induced Louis to intervene again in 866. In the following year an Aghlabid assault on Dubrovnik induced Basil the Macedonian, become emperor Basil I in 867, to send the *droungarios tou ploimou*, Nikētas Ōoryphas, with a fleet to relieve the city. A new Venetian Doge, Urso Partecipazio I, sent a Venetian fleet which defeated the Muslims off Taranto. An alliance was then concluded between Louis II and the Empire and Nikētas Ōoryphas sailed to Italy again; however, an allied siege of Bari in 869 failed and not until 871 did Louis's forces, now assisted by a Croatian fleet, finally take the city. The third and last *amīr* of Bari was taken off to Benevento. An attempt by the Muslims of Taranto to reverse the setback was driven back. Subsequently Louis's behaviour alienated the Beneventans, who imprisoned him and then sent him back north under promise never to return. When he died in 875, the Byzantines occupied Bari, which then became the capital of Byzantine Italy for the next 200 years.[91]

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[89] Al-Balādhurī, *Kitāb Futūḥ al-Buldān*, part 6, ch. 1 (pp. 371-2); *Annales Bertiniani*, *Annus* 846 (p. 442); *Chronicon Casinense*, §225 (p. 225); *Chronicon Salernitanum*, §§72, 81 (pp. 70-1, 79); Erchempert, *Historia Langobardorum*, §§20, 29 (pp. 242, 245); John of Naples, *Gesta*, §60 (pp. 432-3); John the Deacon, *Cronaca Veneziana*, pp. 113-15; Leo Marsicanus, *Chronica*, I.25, 27 (pp. 598-600); *Liber Pontificalis*, 104 (Sergius II), §44, (vol. 2, p. 99). See also Manfroni, *Marina italiana. I*, pp. 45-7, 49-53; Musca, *Emīrato di Bari*.

[90] *Chronicon Salernitanum*, §93 (pp. 93-4); Erchempert, *Historia Langobardorum*, §§20, 29 (pp. 242, 245); John of Naples, *Gesta*, §61 (p. 433); Leo Marsicanus, *Chronica*, I.29-30, 35 (pp. 601, 604).

[91] *Andrew of Bergamo*, §§14-16 (pp. 227-9); *Annales Bertiniani*, *Anni* 869, 871 (pp. 485, 492); *Chronicon Casinense*, §7 (pp. 224-5); *Chronicon Salernitanum*, §§ 103-9, 120 (pp. 104-22, 134); Constantine VII, De *administrando imperio*, §29 (pp. 126-34); *Cronaca Capuana*, pp. 123-4; Erchempert, *Historia Langobardorum*, §§29, 33-4, 38 (pp. 245, 247, 249); John of Naples, *Gesta*, §§64-5 (pp. 434-5); John Skylitzēs, *Synopsis historiōn*, Βασίλειος ὁ Μακεδὼν.26 (pp. 146-7); John the Deacon, *Cronaca Veneziana*, pp. 119-21; Leo Marsicanus, *Chronica*, I.35, I.36, (pp. 604, 605-6); *Theophanēs continuatus*, V.53, 55-7 (pp. 289-90, 292-6). See also Manfroni, *Marina italiana. I*, pp. 53-6.

The fourth period, ca 875-1025: Byzantine ascendancy

Basil I's seizure of the throne in 867 through his murder of Michael III marked the beginning of a period in which the balance of power in the Mediterranean turned against the Muslims, even if it might not have seemed so at the time. Muslim incursions continued in the east against the Empire, in the central Mediterranean against remaining Byzantine possessions in Sicily and also into the Lombard territories on the west coast of Italy, and in the west into Provence. Nevertheless, in retrospect it is clear that the Muslim offensive was running out of vigour. The following century saw most Muslim expansion negated and the Mediterranean frontiers pushed back to the south everywhere, except in *al-Andalus*.

Political fragmentation of the Muslim polity continued apace. In Egypt a Turkish soldier of fortune, Aḥmad ibn Ṭūlūn, who had been sent to Egypt as deputy to the 'Abbāsid governor, acquired the governorship in 868 and extended his authority into Palestine, Syria, and the Hijāz. Theoretically subordinate to the 'Abbāsids, in practice the Ṭūlūnids were independent. A powerful fleet, the first Muslim fleet about which more than skeletal details are known, projected Ṭūlūnid influence throughout the Levant.[92] Muslim *Cilicia* came under their control from 878 to 882 and again from 892 to 897. Although their inability to keep under control Qarmaṭī *Shī'a* sectarians in Syria provoked the Caliph al-Muktafī to send to Egypt an army which ended Ṭūlūnid rule in 905, re-establishment of direct 'Abbāsid authority was short-lived. Another Turkish soldier of fortune, Muḥammad ibn Ṭughj al-Ikhshīd, sent to Egypt as governor in 935, defended his independence against the 'Abbāsids and the Ḥamdānids in Syria, holding on to Damascus even though acknowledging nominal 'Abbāsid suzereinty. However, his two sons were mere puppets and real power passed to a Nubian slave named Abū 'l-Misk Kāfūr, who he appointed regent before he died and who became the actual ruler on the death of the second son in 966. Only after his own death in 968 was a weak grandson of Muḥammad ibn Ṭughj installed as ruler, only to fall before the Fāṭimids the next year.

The latter were descended from 'Ubayd Allāh *al-Mahdī*, a *Shī'a imām* claiming descent from the seventh *imām*, Ismā'īl, and hence ultimately from 'Alī ibn Abī Ṭālib and his wife: Muḥammad's

[92] Sāwīris, *History of the Patriarchs* (Burmester), vol. 2, pt 2, p. 110. See also Fahmy, *Muslim naval organization*, pp. 42-5, 49-50.

daughter Fāṭima. Groundwork among the Ketāma Berbers by a *dā'ī*, a missionary propagandist, Abū 'Abd Allāh al-Shī'ī, prepared his move to *Ifrīqiya* and he then overthrew the Aghlabids and Rustamids and made the Idrīsids tributary. A new capital and naval base, from which Sicily was conquered from its Aghlabid governors and operations were launched against the Byzantines, was built at *al-Mahdiyya*. Early attempts to conquer Egypt from the 'Abbāsids failed. However the campaign of 919 did see one of the very few naval engagements between two Muslim forces when the Caliph al-Muqtadir sent a fleet from Tarsos to engage the Fāṭimid fleet and won a victory off Rosetta. In 969 the Fāṭimid general Jawhar al-Ṣaqlabī conquered Egypt and paved the way for the fourth Fāṭimid Caliph, al-Mu'izz, to move there in 973. He constructed a new capital al-Qāhira, "the Victorious", Cairo, and from Egypt the Fāṭimids extended their authority over Palestine, Syria, and the Hijāz.[93] As governor in *Ifrīqiya* he left the Ṣanhāja Berber chief Yūsuf Buluggīn ibn Zīrī, who overran the Maghrib as far as Ceuta. However, his possessions proved too unwieldy to hold together and under his grandson, Nāṣir al-Dawla Bādīs, they were divided between the main branch of the family with its capital at *al-Qayrawān* and the Ḥammādid branch which ruled in Algeria with a capital at Qal'at Banī Ḥammād, near Masīla. In theory the Zīrids remained subject to the Fāṭimids in Egypt but in 1041 the fourth Zīrīd, Sharaf al-Dawla al-Mu'izz, rebelled and proclaimed the 'Abbāsid Caliph. In response the Fāṭimid al-Mustanṣir unleashed against the Maghrib the Bedouin tribes of the Banū-Hilāl and Banū-Sulaym, who swept through the interior. The Banū-Hilāl inflicted a crushing defeat on the Zīrīds at *Ḥaydarān* in 1052, forcing them to relocate to the coast at *al-Mahdiyya*. The Ḥammādids founded *Bijāya* on the coast as a refuge in 1067-68 and moved there in 1090-91.[94]

While the Muslim polity continued to fragment, the Byzantines had problems of their own. The threat from Bulgaria had been neutralized temporarily, with the incumbent Khan Boris I, who converted to Christianity in 864, being quite amicable, although the menace would

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[93] Al-Bakrī, *Kitāb al-mughrib*, pp. 65-8; Al-Maqrīzī, *Al-Muqaffā*, pp. 76-8; Al-Nuwayrī, *Nihāyat 'al-Arab* (Caussin), pp. 417-20; Al-Tijānī, *Riḥla*, ser. 5, 1.1, pp.141-2, 357-63; Ibn 'Idhārī, *Al-bayān al-mughrib*, vol. 1, pp. 163-237, 321-2, 332; Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 272-309, 313-20, 366-7, 370-74; Ibn-Khaldūn, *Muqaddimah*, Introduction (vol. 1, pp. 41-4); *idem*, *'Ibar* (De Slane), vol. 2, pp. 506-51; *idem*, *'Ibar* (Des Vergers), pp. 144-56.

[94] Al-Tijānī, *Riḥla*, ser. 4, 20, pp. 85-96, ser. 5, 1.1, pp. 369-73; Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 369-70, 374-9, 391-2, 394-406, 412-20, 448-50, 452-5, 456-60, 468-80; Ibn Khaldūn, *'Ibar* (De Slane), vol. 2, pp. 9-26, 43-59.

Table 4: Rulers of the fourth period, ca 875-1025

Byzantine Empire	The Muslims		
	The ‘Abbāsid Caliphs (B) Būyid *amīrs*	(U) The Spanish Umayyads (C) *Amīrs* of Crete (S) *Amīrs* of Sicily	(A) Aghlabids of Tunisia (F) Fāṭimids (I) Idrīsids of Morocco (Ik) Ikhshīdids of Egypt (R) Rustamids of Algeria (T) Ṭūlūnids of Egypt (Z) Zīrids of Algeria
Basil I (867-86)	Al-Muhtadī (869-70) Al-Mu‘tamid (870-92)	Muḥammad ibn Khafāja (S 869-71) Aḥmad ibn Ya‘qūb (S 871) Al-Ḥusayn (S 871) Abū ’l-‘Abbās (S 871-2) ‘Abd Allāh ibn Muḥammad (S 872-4) Aḥmad ibn Ya‘qūb (S 874-8) Al-Aghlab ibn Muḥammad (S 878) Al-Ḥusayn ibn Rabāḥ (S 878-81) ‘Umar II ibn Shu‘ayb (C ca 880-95) Al-Ḥasan ibn al-‘Abbās (S 881-2) Muḥammad ibn al-Faḍl (S 882-5, 892) Al-Ḥusayn ibn Aḥmad (S 885)	Aḥmad ibn Ṭūlūn (T 868-84) Abū Bakr ibn Aflaḥ (R 872-?) Abū ’l-Yaqẓān Muḥammad (R ?) Ibrāhīm II (A 875-902) Khumārawayh ibn Aḥmad (T 884-96)

(Table 4 continued)

Bulgaria, Croatia, Serbia, Venice, Rhōs of Kiev	The Iberian rulers	The Lombards	The Carolingians and their successors
(B) Bulgaria (C) Croatia (K) Kiev (S) Serbia (V) Venice	(A) Aragon (B) Barcelona (L) Asturias/León-Castile (N) Navarre	(B) Benevento (C) Capua (S) Salerno	(K) Kings of the Franks (E) Emperors (I) Italy (P) Provence (B) Burgundy (A) Aquitaine
	Ordoño I (L 850-66) Alfonso III (L 866-910)		
Branimir (C 879-92)	Fortún Garcés (N 870-905)	Gaideris (B 878-81)	Charles the Bald (E 875-7)
Vlastimir (S mid 9th century)	Aznar II Galindo (A 867-93)	Radelchis II (B 881-4)	Charles the Fat (E 881-7)
Giovanni Partecipazio II (V 881-7)	Wifred I (B 878-98)	Ayo II (B 884-91) Guaimar I (S 880-900)	Boso (B 878-87) Carloman (B & A 879-84)

(Table 4 continued)

Byzantine Empire	The Muslims		
	The ‘Abbāsid Caliphs (B) Būyid *amīrs*	(U) The Spanish Umayyads (C) *Amīrs* of Crete (S) *Amīrs* of Sicily	(A) Aghlabids of Tunisia (F) Fāṭimids (I) Idrīsids of Morocco (Ik) Ikhshīdids of Egypt (R) Rustamids of Algeria (T) Ṭūlūnids of Egypt (Z) Zīrids of Algeria
		Sawāda ibn Muḥammad (S 885-7)	
Leo VI (886-912)	Al-Mu‘taḍid (892-902) Al-Muktafī (902-8) Al-Muqtadir (908-32)	Al-Mundhir (U 886-8) ‘Abd Allāh (U 888-912) Abū ’l ‘Abbās ibn ‘Alī (S 887-90) Sawāda (S 890-92) Aḥmad ibn ‘Umar (S 892-900) Muḥammad ibn Shu‘ayb (C ca 895-910) ‘Abd Allāh ibn Ibrāhīm (S 900-902) Ziyādat Allāh ibn ‘Abd Allāh (S 902-3) Muḥammad ibn al-Sarqūsī (S 903) ‘Alī ibn Muḥammad (S 903, 909) Aḥmad ibn al-Ḥusayn (S 903-9) Al-Ḥasan ibn Aḥmad (S 910-12) Yūsuf ibn ‘Umar II (C ca 910-15)	Abū Ḥātim Yūsuf (R 894-7) Jaysh (T 896) Hārūn (T 896-905) Ya‘qūb ibn Aflaḥ (R 897-901) Abū Ḥātim Yūsuf (R 901-7) ‘Abd Allāh II (A 902-3) Ziyādat Allāh III (A 903-9) Yaḥyā IV (I 905-22) Shaybān (T 905) Yaqẓān ibn Abī ’l-Yaqẓān (R 907-9) ‘Ubayd Allāh al-Mahdī (F 909-34)
Alexander (912-13)		‘Abd al-Raḥmān III (U 912-61)	

(Table 4 continued)

Bulgaria, Croatia, Serbia, Venice, Rhōs of Kiev	The Iberian rulers	The Lombards	The Carolingians and their successors
(B) Bulgaria (C) Croatia (K) Kiev (S) Serbia (V) Venice	(A) Aragon (B) Barcelona (L) Asturias/León-Castile (N) Navarre	(B) Benevento (C) Capua (S) Salerno	(K) Kings of the Franks (E) Emperors (I) Italy (P) Provence (B) Burgundy (A) Aquitaine
Pietro Candiano I (V 887) Pietro Tribuno (V 888-912) Mutimir (S ?-891) Vladimir (B 889-93) Prvoslav (S 891-2) Peter Gojniković (S 892-917) Mutimir (C 892-910) Symeon (B 893-927) Tomislav (C ca 910-28)	Galindo II Azárez (A 893-922) Wifred Borrell I (B 898-912) Sancho I Garcés (N 905-25) García I (L910-14)	Ursus (B 891-2) Guy IV of Spoleto (B 895-7) Radelchis II (B 897-900) Atenolf I (C 887-910, B 900-910) Guaimar II (S 900-46) Atenolf II (CB 910-40) Landolf I (CB 901-43	Berengar I (I 888-924, E 915-24) Louis III (I 900-5) Rudolf I (B 888-912) Guy of Spoleto (I 889-95, E 891-) Louis the Blind (P 890-928, I 900-928) Lambert (I 891-8, E 892-) Arnulf (I. 894-6, E 896) Louis III (I 900-905, E 905)
Orso Partecipazio II (V 912-32)	Suñer (B 912-54)		Rudolf II (B 912-37, I 922-6)

(Table 4 continued)

Byzantine Empire	The Muslims		
	The ʻAbbāsid Caliphs (B) Būyid *amīrs*	(U) The Spanish Umayyads (C) *Amīrs* of Crete (S) *Amīrs* of Sicily	(A) Aghlabids of Tunisia (F) Fāṭimids (I) Idrīsids of Morocco (Ik) Ikhshīdids of Egypt (R) Rustamids of Algeria (T) Ṭūlūnids of Egypt (Z) Zīrids of Algeria
Constantine VII (913-20)		ʻAlī ibn ʻUmar al-Balawī (S 912-13) Aḥmad ibn Ziyādat Allāh (S 913-16) ʻAlī ibn Yūsuf (C ca 915-25) Mūsā ibn Aḥmad (S 916-17) Sālim ibn Rashīd (S 917-37)	
Rōmanos I (920-44)	Al-Qāhir (832-4) Al-Rāḍī (934-40) Al-Muttaqī (940-44)	Aḥmad ibn ʻUmar II (C ca 925-40) Khalīl ibn ʻIsḥāq (S 937-41) Shuʻayb II ibn Aḥmad (C ca 940-43) Ibn al-Kūfī (S 941-48) ʻAlī ibn Aḥmad (C ca 943-9)	Al-Ḥasan al-Ḥajjām (I 922-6) Al-Qā'im (F 934-6) Muḥammad ibn Ṭughj al-Ikhshīd (Ik 935-46)
Constantine VII (944-59)	Al-Mustakfī (944-6) Al-Muṭīʻ (946-74) Muʻizz al-Dawla Aḥmad (B 945-67)	Al-Ḥasan ibn ʻAlī al-Kalbī (S 948-54) Aḥmad ibn al-Ḥasan (S 954-69)	Ūnūjūr (Ik 946-61) Al-Manṣūr (F 946-53) Al-Muʻizz (F 953-75)
Rōmanos II (959-63)		ʻAbd al-Azīz ibn Shuʻayb II (C 960-61)	ʻAlī (Ik 961-6)

(Table 4 continued)

Bulgaria, Croatia, Serbia, Venice, Rhōs of Kiev	The Iberian rulers	The Lombards	The Carolingians and their successors
(B) Bulgaria (C) Croatia (K) Kiev (S) Serbia (V) Venice	(A) Aragon (B) Barcelona (L) Asturias/León-Castile (N) Navarre	(B) Benevento (C) Capua (S) Salerno	(K) Kings of the Franks (E) Emperors (I) Italy (P) Provence (B) Burgundy (A) Aquitaine
Igor (K ?-945)			
Pavel Branović (S 917-21)	Ordoño II (L 914-24) Fruela II (L 924-5)		
Zaharije Prvoslavljević (S 921-4) Časlav Klonimirović (S ca 927/8-60) Peter (B 927-67) Pietro Candiano II (V 932-39) Pietro Partecipazio (V 939-42) Pietro Candiano III (V 942-59)	Alfonso IV (L 925-30) García I Sánchez (N 925-71) Ramiro I (L 930-50) Miro (B 940-66)/ Borrell II (B 940-92)	Atenolf III (CB 933-43) Landolf II (CB 939-61	Hugh (I 926-47) Lothar (I 931-50) Conrad (B 937-93
Svyatoslav (K 945—72) Kresimir II (C 949-69) Pietro Candiano IV (V 959-76)	Ordoño III (L 950-55) Borrell II (B 954-92) Sancho I (L 955-57, 960-67) Ordoño IV (L 957-60)	Gisulf I (S 946-77) Landolf III (CB 959-68/9) Pandolf I (CB 961-81, S 977-81)	Berengar II (I 950-62) Otto I (I, 951-73, E 962-)

(Table 4 continued)

Byzantine Empire	The Muslims		
	The ‘Abbāsid Caliphs (B) Būyid *amīrs*	(U) The Spanish Umayyads (C) *Amīrs* of Crete (S) *Amīrs* of Sicily	(A) Aghlabids of Tunisia (F) Fāṭimids (I) Idrīsids of Morocco (Ik) Ikhshīdids of Egypt (R) Rustamids of Algeria (T) Ṭūlūnids of Egypt (Z) Zīrids of Algeria
		Byzantine conquest of Crete	
		Al-Ḥakam II (U 961-76)	
Basil II (963) Nikēphoros II (963-9)	‘Izz al-Dawla Bakhtiyār (B 967-78)		Kāfūr (Ik 966-9) Aḥmad (Ik 969)
John I (969-76)	Al-Ṭā’i‘ (974-91)	Ya‘īsh (S 969) Abū ’l-Qāsim (S 970-82)	Yūsuf Buluggīn I ibn Zīrī (Z 972-84) Al-‘Azīz (F 975-96)
Basil II (976-1025)	Al-Qādir (991-1031) ‘Aḍud al-Dawla Fannā Khusraw (B 978-83) Ṣamṣām al-Dawla Marzubān (B 983-7) Sharaf al-Dawla Shīrdhīl (B 987-9) Bahā’ al-Dawla Fīrūz (B 989-1012) Sulṭān al-Dawla (B 1012-21) Musharrif al-Dawla Ḥasan (B 1021-4)	Hishām II (U 976-1009) Jābir (S 982-3) Ja‘far ibn Muḥammad (S 983-5) ‘Abd Allāh ibn Muḥammad (S 985-9) Yūsuf (S 989-98) Ja‘far (S 998-1019) Muḥammad II (U 1009) Hishām II (U 1010-13) Sulaymān al-Musta‘īn (U 1013-18) ‘Abd al-Raḥman IV al-Murtaḍā (U 1018-23) Aḥmad al-Akhal (S 1019-36)	Al-Manṣūr ibn Buluggīn (Z 984-96) Nāṣir al-Dawla Bādīs (Z 996-1016) Al-Ḥākim (F 996-1021) Sharaf al-Dawla al-Mu‘izz (Z 1016-62) Al-Ẓāhir (F 1021-36)

(Table 4 continued)

Bulgaria, Croatia, Serbia, Venice, Rhōs of Kiev	The Iberian rulers	The Lombards	The Carolingians and their successors
(B) Bulgaria (C) Croatia (K) Kiev (S) Serbia (V) Venice	(A) Aragon (B) Barcelona (L) Asturias/León-Castile (N) Navarre	(B) Benevento (C) Capua (S) Salerno	(K) Kings of the Franks (E) Emperors (I) Italy (P) Provence (B) Burgundy (A) Aquitaine
		Landolf IV (CB 968/9-82)	
Boris II (B 967-71)	Ramiro III (L 967-84)		
Stjepan Držislav (C 969-97) Yaropolk (K 972-8)	Sancho II Garcés (AN 970-94)		Otto II (E 967-83)
Samuel, Aaron, Moses, David (B 976-86) Pietro Orseolo I (V 976-8) Vitale Candiano (V 978-9) Tribuno Memmo (V 979-91) Samuel (B 986-1014) Pietro Orseolo II (V 991-1008) Vladimir I (K 978-1015) Svetoslav (C 997-1000 Otto Orseolo (V 1008-26) Kresimir III (C 1000-30)	Vermudo II (L 982-99) Ramon Borrell I (B 992-1019) García II Sánchez (AN 994-1000) Alfonso V (L 999-1027) Sancho III Garcés (AN 1000-35) Berenguer Ramon I (B 1019-35)	Pandolf II (B 982-1014) Ladenolf (C 982-93) Laidolf (C 993-9) Landolf V (B 987-1033) Landolf V (C 1000-7) Pandolf II (C 1007-22 Pandolf III (B 1101-60) Manso (S 981-3) John II (S 983-9) Guaimar III (S 989-1027) Pandolf III (C 1014-26) Pandolf IV (C 1016-49)	Rudolf III (B 993-1032) Otto III (E 996-1002) Henry II (I 1004-24, E 1014-) Conrad II (I 1024-39, E 1027-)

(Table 4 continued)

Byzantine Empire	The Muslims		
	The ‘Abbāsid Caliphs (B) Būyid *amīrs*	(U) The Spanish Umayyads (C) *Amīrs* of Crete (S) *Amīrs* of Sicily	(A) Aghlabids of Tunisia (F) Fāṭimids (I) Idrīsids of Morocco (Ik) Ikhshīdids of Egypt (R) Rustamids of Algeria (T) Ṭūlūnids of Egypt (Z) Zīrids of Algeria
		Abd al-Raḥman V al-Mustaẓhir (U 1023-4) Muḥammad III al-Mustakfī (U 1024-7)	

recur in vengeance under Tsar Symeon. But a new threat had emerged in the Ukraine. Scandinavians settled along the Dnepr river around the rapids and especially at Kiev, who became known to the Byzantines as the Ῥῶς, the *Rhōs*, launched the first of several attacks on Constantinople in 860.[95] Although beaten off after ravaging the environs of Constantinople, the attack presaged a new and powerful force which would affect the Empire for centuries, especially up to the conversion of Prince Vladimir I of Kiev in 988 and the defeat of the last *Rhōs* attack on Constantinople in 1043. On the Tauros frontier the virtually independent frontier *amīrs* of the ‘Abbāsids continued the interminable warfare of annual raids. The river *Lamos* in *Cilicia* west

[95] Photios, *Homilies*, III & IV (pp. 82-110); John Zōnaras, *Epitomē historiōn*, XVI.5 (vol. 4, p. 15); *Russian primary chronicle*, p. 60; *Theophanēs continuatus*, IV.33 (p. 196). See also Vasiliev, *Russian attack on Constantinople*.

(Table 4 continued)

Bulgaria, Croatia, Serbia, Venice, Rhōs of Kiev	The Iberian rulers	The Lombards	The Carolingians and their successors
(B) Bulgaria (C) Croatia (K) Kiev (S) Serbia (V) Venice	(A) Aragon (B) Barcelona (L) Asturias/León-Castile (N) Navarre	(B) Benevento (C) Capua (S) Salerno	(K) Kings of the Franks (E) Emperors (I) Italy (P) Provence (B) Burgundy (A) Aquitaine
Gabriel Radomir (B 1014-15) John Vladislav (B 1015-18) Svjatopolk (K 1015-19) Msistlav (K 1019-36) John Vladmir (S late 10th C. - 1016) *Interregnum (S 1016-34*		Pandolf V (C 1020-57) Pandolf VI (C 1022-26)	

of Tarsos marked the border and from 805 to 946 its banks witnessed a depressing series of prisoner exchanges and redemptions.[96] At sea the Cretans continued their corsair war, raiding Dalmatia in 872, although more normally they confined themselves to the Aegean. However, imperial squadrons began to get the better of them from the 870s. Around 873 Nikētas Ōoryphas engaged them off *Kardia* at the head of the Gulf of Saros, destroying 20 *skaphē* with Greek Fire. Then in 879 he inflicted a major defeat on them when he destroyed in the Gulf of Corinth a squadron which had been raiding in the Ionian.[97]

[96] Al-Mas'ūdī, *Murūj*, vol. 8, pp. 224-5; *idem*, *Al-Tanbīh*, pp. 356-61; Al-Ṭabarī, *Ta'rīkh* (Yar-Shater), A.H. 189, 192, 231, 241, 245-6, 283, 292, 295 (vol. 30, pp. 257, 291; vol. 34, pp. 38-43, 137-41, 156, 168-70; vol. 38, pp. 32-3, 153, 185).

[97] John Skylitzēs, *Synopsis historiōn*, Βασίλειος ὁ Μακεδών.30-31 (pp. 152-4); John Zōnaras, *Epitomē historiōn*, XVIII.9 (vol. 4, pp. 27-8, 31-2); John the Deacon, *Cronaca Veneziana*, pp. 119-20; *Theophanēs continuatus*, V.60-61 (pp. 299-301).

The ‘Abbāsids also began to rebuild naval forces in *Cilicia* and by 860 squadrons based at Tarsos were sufficiently powerful to attack Antalya.[98] Perhaps Aḥmad ibn Ṭūlūn had been doing so also, since a century later Constantine VII reported that around 875 he had been preparing a vast fleet in Egypt and Syria to attack the Empire.[99] Possibly in response to this threat or to the build-up of Muslim forces in *Cilicia*, Basil I is said to have sent an expedition to recover Cyprus under a *stratēgos* called Alexios and to have made it into a *thema*. But even if the expedition actually took place, the Byzantines held the island only for a few years.[100]

Tarsos became such a threat to Byzantine territory that in 883 a large army was sent against it under the *domestikos tōn scholōn* Kesta Styppeiōtēs; however, he was attacked at night while unprepared and defeated and killed by Yāzamān al-Khādim. Yāzamān was *amīr* of Tarsos from 882 until his death in 891 and became renowned for the raids of his naval squadrons. Shortly after 883 he led a raid by 30 *koumparia* against *Euripos* but was beaten off by the *stratēgos* of *Hellas*, a certain Oiniatēs, who used Greek Fire against the Muslim ships. He continued hostilities until his death, after which Tarsos was held by governors of the Ṭulūnids of Egypt until 897 and then of the ‘Abbāsids, all of whom continued the annual raids into Byzantine territory.[101] In 898 a Tarsiote squadron under Rāghib, a client of al-Muwaffaq, a brother of the Caliph al-Mu‘tamid, encountered a Byzantine fleet, probably that of the *Kibyrrhaiōtai*, and defeated it, capturing numerous ships and beheading 3,000 seamen. The victory exposed the Aegean to the depredations of Leo of Tripoli, known to the Muslims as Gulām Zurāfa, a former Byzantine seaman from the *Kibyrrhaiōtai* who had been taken prisoner and had then converted to Islam. In 904 he led a devastating raid into the Aegean which penetrated the Dardanelles and sacked *Abydos*, the *droungarios tou ploimou* Eustathios Argyros declining battle. Leo then turned back

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[98] Al-Ṭabarī, *Ta’rīkh* (Yar-Shater), A.H. 246 (vol. 34, p. 167). On the fleets of Tarsos, see Fahmy, *Muslim naval organization*, pp. 56-63.

[99] John Skylitzēs, *Synopsis historiōn*, Βασίλειος ὁ Μακεδών.36 (pp. 157-8); *Theophanēs continuatus*, V.68 (pp. 308-9).

[100] Constantine VII, *De thematibus*, XV.40 (pp. 80-81). This story is corroborated by no other sources, neither Greek nor Arabic, and there is considerable reason to doubt its historicity. See Pertusi’s Introduction to *De thematibus*, pp. 26-7.

[101] Al-Mas‘ūdī, *Murūj*, vol. 8, pp. 71-2; Al-Ṭabarī, *Ta’rīkh* (Yar-Shater), A.H. 269-70, 272, 274-5, 278 (vol. 37, pp. 81-2, 143-4, 152, 155, 157, 175); John Skylitzēs, *Synopsis historiōn*, Βασίλειος ὁ Μακεδών.25, 29 (pp. 144-5, 151); John Zōnaras, *Epitomē historiōn*, XVI.9 (vol. 4, pp. 31-2); *Theophanēs continuatus*, V.50-51, 59 (pp. 286-8, 298-9).

and captured and sacked Thessalonikē before retiring back to Tripoli via Crete with his fleet laden with booty and prisoners. According to al-Ṭabarī, Leo killed 5,000 people in Thessalonikē, delivered to freedom 4,000 Muslim captives, captured 60 ships and took thousands of prisoners. Each man on the expedition received 1,000 gold dinars from the proceeds of the booty.[102] A letter written by Patriarch Nicholas I Mystikos to the *amīr* of Crete may have called for the release of the prisoners taken at Thessalonike.[103]

In response to the depredations of these corsair *amīrs* of *Cilicia*, Leo VI sent a large fleet to the Levant in 910 under the *patrikios* and *logothetēs tou dromou* Himerios, who had already won an important victory over the Muslims on the "Day of the Apostle Thomas", probably in 905 or 906. Although there is great confusion in the sources about Himerios's expedition, complicated by the fact that what purports to be a collection of inventories for an invasion of Crete by it in 911 was inserted into the treatise *De cerimoniis*,[104] the expedition certainly began in 910 as an assault on Muslim naval forces in the Levant. In response, the *amīr* of Tarsos, Damianos, another convert to Islam, ravaged Cyprus for four months and took many prisoners, probably because the inhabitants had broken the terms of their covenant by assisting Himerios.[105] Himerios probably assaulted Crete unsuccessfully the following year and his fleet was annihilated north of Chios in October 912 by Leo of Tripoli and Damianos. The expedition began successfully but ended disastrously as a three-year effort to reduce Muslim capabilities in the Levant and at the entrance to the Aegean. A second letter of Patriarch Nicholas I Mystikos, dated to 913-14, pleaded with the Caliph al-Muqtadir, for

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[102] Al-Ṭabarī, *Ta'rīkh* (Yar-Shater), A.H. 285, 291 (vol. 38, pp. 73, 148); Al-Mas'ūdī, *Murūj*, vol. 2, pp. 318-9; John Kaminiates, *De expugnatione Thessalonicae*; John Skylitzēs, *Synopsis historiōn*, Λέων ὁ φιλόσοφος.23 (pp. 182-3); *Theophanēs continuatus*, VI.Βασιλεία Λέοντος αὐτοκράτορος.20-21 (pp. 366-8); *Vita di Sant'Elia*, pp. 108-9.

[103] Nicholas I, *Letters*, N° 2 (pp. 12-17). There is doubt about the dating of this letter and it is possible that rather than it being dated to 904-5 and calling for the release of the prisoners of Thessalonikē it should be dated to 913-14 and refer to prisoners taken during the defeat of Himerios's expedition of 910-12.

[104] See below pp. 186-7.

[105] Al-Mas'ūdī, *Murūj*, vol. 8, pp. 281-2; John Skylitzēs, *Synopsis historiōn*, Λέων ὁ φιλόσοφος.29, 33 (pp. 186, 191); John Zōnaras, *Epitomē historiōn*, XVI.14 (vol. 4, pp. 44-5); *Theophanēs continuatus*, VI.Βασιλεία Λέοντος αὐτοκράτορος.26, 31 (pp. 371-2, 376-7), VI.Βασιλεία Ἀλεξάνδρου υἱοῦ Βασίλειου.5 (pp. 379-80). See also Vasiliev/Canard, *Byzance et les Arabes. Tome II, part 1*, pp. 196-216. It is even possible that there was no actual Cretan expedition at all in 911. See Haldon, "Theory and practice", pp. 241-2. See also Appendix Four [a].

the release of the Cypriote captives.[106] Between 909 and 916 three inscriptions raised at Antalya, the headquarters of the *thema* of the *Kibyrrhaiōtai*, recorded the strengthening of the walls against Muslim attack by the *droungarios* Stephen. He added a second, inner wall to prevent Muslim ships using flying bridges from their mastheads to overtop the walls.[107] Not until the third decade did the tide really begin to run out. Possibly the accession to the imperial throne in 920 of one of the only two Byzantine admirals ever to do so, the *droungarios tou ploimou* Rōmanos I Lekapēnos, was instrumental. Leo of Tripoli was defeated by the *patrikios* John Rhadēnos off Lemnos in 923 and probably killed. Damianos died besieging the *Kibyrrhaiōtai* fortress at *Strobilos* in the following year, after which the threat to the Empire from Muslim naval forces and corsairs in Syria, *Cilicia*, and Crete began to dissipate.[108]

In Sicily the fall of Enna in 858 confined the Byzantines to the coastal strip from Taormina to Syracuse and Cape Passero. Pressure mounted on Syracuse by a new governor, Khafāja ibn Sufyān, led Basil I to send a new expedition to the island and the fleet, which may well have been that of Nikētas Ōoryphas which had just relieved Dubrovnik, reached Syracuse in 868 and was engaged at sea by Muslim fire ships, *harrāqāt*, under the command of Khafāja's son Muḥammad, while Khafāja himself engaged the Byzantine forces by land. The campaigns were apparently indecisive and the fleet may then have retired back to the Adriatic in time to join Louis II in his assault on Bari in the following year.[109] Under the governorship of Muḥammad ibn Khafāja all of the islands around Sicily fell to the Aghlabids. Malta fell on 29 August 870. From Sicily the *amīrs* and their Aghlabid masters harrassed Italy mercilessly. In 871 they launched a massive attack on Salerno, which was beseiged for over a year but eventually relieved by an army sent by Louis II. In 875 they penetrated the Adriatic as far as the Gulf of Trieste and besieged *Grado* unsuccessfully, razing Comacchio during their retreat. At the same time they were raiding Campania and the west coast of Italy as

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[106] Nicholas I, *Letters*, N° 1 (pp. 2-13). The letter is addressed to the *amīr* of Crete but it has been demonstrated beyond doubt that it was actually addressed to al-Muqtadir.

[107] See Trombley, "War, society and popular religion", pp. 125-7.

[108] John Skylitzēs, *Synopsis historiōn*, Κωνσταντῖνος ὁ υἱὸς Λέοντος.7 (p. 202), Ῥωμανὸς ὁ Λακαπηνός.11 (p. 218); *Theophanēs continuatus*, VI.Βασιλεία Κωνσταντίνου υἱοῦ Λέοντος.9 (p. 388), Βασιλεία Ρωμανοῦ.14 (p. 405).

[109] Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 238-9; Ibn 'Idhārī, *Al-bayān al-mughrib*, vol. 1, pp. 148-9; Ibn Khaldūn, *'Ibar* (Des Vergers), pp. 124-5.

far north as Rome. Pope John VIII tried to organize a coalition against them in 875 and in 877 asked the Byzantine *stratēgos* of *Longobardia* at Bari, Gregory, to send 10 *chelandia* to defend Rome. In 880 he asked Basil I himself to send a fleet.[110]

If the fall of Bari to Louis II and then to the Byzantines had virtually eliminated the Muslim threat in Apulia, the situation was different in Calabria and Campania on the west coast, where the ill-defined political structures of the Lombard principalities and the three quasi independent Byzantine duchies of Gaeta, Naples, and Amalfi provided opportunities. In 880 the bishop-duke of Naples, Athanasius II, allowed a Muslim band to settle at the foot of Mt Vesuvius and others from *Saepinum* raided as far north as Spoleto. Later another band settled at *Cetara* on the Gulf of Salerno. Naples and Salerno combined between 881 and 883 to drive out these various nests but they moved north and joined others on the Garigliano river near Gaeta. In 884 the great abbey of Montecassino was sacked.[111]

The *amīrs* of Sicily attempted to take Syracuse again in 869 and 873 and the city finally fell in 878. A relieving fleet under a *patrikios* named Adrian was supposedly delayed for 50 days by contrary winds at *Hierax* in the Peloponnēsos until too late.[112] The remaining Greeks held out around Taormina until it itself fell to the *amīr* ʻAbd Allāh ibn Ibrāhīm ibn Aḥmad in 902.[113]

In 880 the Aghlabid Ibrāhīm II took his fleet into the Ionian Sea, raiding Kefallēnia and Zakynthos. Basil I responded by sending out a fleet of 45 warships (*triēreis*, *diēreis*, and *nēes tachynautousai*) under

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[110] Andrew of Bergamo, *Historia*, §18 (p. 229); *Chronicle of Cambridge*, pp. 30-33, 60-61; *Chronicon Salernitanum*, §§111-8 (pp. 123-33); Erchempert, *Historia Langobardorum*, §§35, 39 (pp. 247-8, 249); John the Deacon, *Cronaca Veneziana*, p. 121; John VIII, *Registrum*, Ep. 22, 31, 32, 47 (pp. 19-21, 29-30, 31-2, 45-6); Leo Marsicanus, *Chronica*, I.40 (pp. 608-9).

[111] *Chronicon Salernitanum*, §§126, 130, 136 (pp. 139-40, 142-3, 145); Erchempert, *Historia Langobardorum*, §§44, 49, 51, 61 (pp. 251-4, 255-6, 259); Leo Marsicanus, *Chronica*, I.43-4 (pp. 609-10); Liudprand of Cremona, *Antapodosis*, II.44-5 (pp. 57-8).

[112] Hierax was a small port with a sheltered harbour some 15 kilometres north of Monemvasia. See Kalligas, *Monemvasia*, pp. 51-4.

[113] *Chronicle of Cambridge*, pp. 32-3, 38-9, 60-61, 68-9; Genesios, *Basileiai*, Δ.33 (pp. 82-3); Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 239-40, 244, 247-9, 253-4; Ibn ʻIdhārī, *Al-bayān al-mughrib*, vol. 1, p. 152; John Skylitzēs, *Synopsis historiōn*, Βασίλειος ὁ Μακεδὼν.37 (pp. 158-9), Λέων ὁ φιλόσοφος.21 (p. 181); Theodosios the Monk, *Espugnazione di Siracusa*; *Theophanēs continuatus*, V.69-70, VI.Βασιλεία Λέοντος αὐτοκράτορος.18 (pp. 309-12, 365); *Vita di Sant'Elia*, pp. 74-5, 80-83. It would be extremely improbable, meteorologically impossible in fact, for a fleet to be prevented by contrary winds from rounding Cape Malea into the Ionian Sea for 50 continuous days.

the *patrikios* and *droungarios tou ploimou* Nasar. Although some of his crews mutinied at Methōnē, Nasar destroyed the Aghlabid fleet off western Greece by the extremely bold tactic of attacking at night. Night battles at sea were rare because darkness made tactical manœuvring impossible and outcomes unpredictable. Continuing west, Nasar landed near Palermo, ravaged its district, captured many Muslim ships, and won another victory off *Punta di Stilo* while returning. These successes enabled the Byzantines to send a squadron under a *spatharios* Gregory, a *tourmarchēs* Theophylaktos, and a *komēs* Diogenēs to Naples, where they won another important victory. The fleets returned in triumph to Constantinople and after their departure the Byzantine commander in Italy, the *patrikios* Leo Apostypēs, finally succeeded in taking Taranto from the Muslims.[114]

Basil I followed up these successes by sending to Italy an army under the *domestikos tōn scholōn*, Nikēphoros Phōkas, who rapidly reduced many towns and fortresses with conduct so exemplary that when Leo VI produced his famous *Taktika*, his manual of strategy and tactics for war, around 905, he devoted a section to it. Acting upon the success of Nikēphoros Phōkas, Pope Stephen VI asked Basil to send *chelandia* to protect the coasts of Rome and the Byzantines even captured Benevento in 891, although they held it for only four years. But at sea they had a major setback in October 888 while attempting to invade Sicily when the fleet was defeated either in the Straits of Messina or off Milazzo and the Muslims then sacked Reggio.[115]

In following decades the Empire was occupied by new threats from the North. Symeon of Bularia attempted to make Bulgaria the equal of the Empire and even to conquer it. Even though educated in Constantinople, he proved to be an implacable and formidable enemy. Opening hostilities in 893, in 896 he annihilated a Byzantine army at *Boulgarophygon*, after which he agreed to a truce, which held, by and large, for around 16 years. It is probable, even though there is some doubt about it, that in 907 Oleg, the *Rhōs* prince of Novgorod and perhaps of Kiev also, attacked Constantinople and forced Leo VI to

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[114] *Chronicle of Cambridge*, pp. 32-3, 62-3; Genesios, *Basileiai*, Δ.34 (pp. 83-5); Ibn al-Athīr, *Al-Kāmil* (Fagnan), p. 257; John VIII, *Registrum*, Ep. 245, 263 (pp. 214, 233); John Skylitzēs, *Synopsis historiōn*, Βασίλειος ὁ Μακεδὼν.32-4 (pp. 154-7); John Zōnaras, *Epitomē historiōn*, XVI.10 (vol. 4, p. 32); *Theophanēs continuatus*, V.62-6 (pp. 302-6); *Vita di Sant'Elia*, pp. 36-9.

[115] *Chronicle of Cambridge*, pp. 34-5, 64-5; Erchempert, *Historia Langobardorum*, §81 (p. 264); Ibn al-Athīr, *Al-Kāmil* (Fagnan), p. 262; Ibn 'Idhārī, *Al-bayān al-mughrib*, vol. 1, pp. 157-8; Leo Marsicanus, *Chronica*, I.49 (p. 615); Leo VI, *Taktika* (PG), XV.38 (coll. 895-6); *Theophanēs continuatus*, V.71 (pp. 312-13); *Vita di Sant'Elia*, pp. 56-7. On the letter of Stephen VI, see below p. 168 & n. 27.

grant the *Rhōs* rights of access. In 913 Symeon of Bulgaria again marched on Constantinople and the administration of Emperor Alexander, headed by the Patriarch Nicholas I Mystikos, was forced to come to terms and to crown him. Hostilities were nevertheless renewed and Symeon crushed Byzantine armies at *Achelōon* and *Katasyrtai* in 917. Bulgarian columns raided as far south as the Gulf of Corinth, creating the conditions in which the *droungarios tou ploimou*, Rōmanos Lekapēnos, was able to seize the throne. His attempts to neutralize Symeon had only limited success and in 922 Symeon invaded again and won a victory near *Pēgē* outside the walls of Constantinople. Adrianople was temporarily lost. Negotiations for peace failed in 924 and the Bulgarian threat was removed only by their defeat at the hands of Prince Tomislav of Croatia in 826 and by Symeon's death in 927. His son Peter came to terms.[116]

A political entity amongst Croatian Slavs who had entered the Balkans in the seventh century was recognized by the Papacy as early as 879, during the rule of Prince Branimir. However, it matured only during that of Tomislav, who was created King. South of Croatia and along the coast in the province of *Duklja* north of the Byzantine *thema* of *Dyrrachion* lived other groupings of Slavs who became known as *Serboi* and whose first rulers included Vlastimir in the mid ninth century and Časlav Klonimirovič, who was the real founder of an independent Serbian polity. Around the mouth of the Neretva river and north as far as the Cetina river and on islands off the coasts lived the tribes of the Neretljani, known to the Byzantines as the *Arentanoi* and to the Venetians as Narentan "pirates", who seriously menaced their shipping from the ninth century. Doge Pietro Tradonico sailed against them with a fleet as early as 839 and Pietro Candiano I led another expedition in 887 which ended in defeat and his own death in battle. Sixty years later in 948 his grandson Pietro Candiano III returned to the attack with a fleet of 33 *gumbariae* with limited success. But their menace could not be eliminated and Venice continued to pay protection money for safe passage of her ships along

[116] John Skylitzēs, *Synopsis historiōn*, Λέων ὁ φιλόσοφος.12, 14 (pp. 175-8), Κωνσταντῖνος ὁ υἱὸς Λέοντος.3-6, 8-9 (pp. 200-205), Ῥωμανὸς ὁ Λακαπηνός.3, 6, 10, 12, 16 (pp. 213-15, 218-22); John Zōnaras, *Epitomē historiōn*, XVI.12, 16-18 (vol. 4, pp. 40-41, 52-61); *Theophanēs continuatus*, VI.Βασιλεία Λέοντος αὐτοκτράτορος.9-10 (pp. 357-60), VI.Βασιλεία Κωνσταντίνου υἱοῦ Λέοντος.5-8, 10 (pp. 385-8, 389-90), VI.Βασιλεία Ρωμανοῦ.5, 8, 10, 13, 15-16, 20-23 (pp. 400-409, 411-15). See also Runciman, *First Bulgarian Empire*; Fine, *Early medieval Balkans*.

The *Rhōs* attack of 907 is not reported in any Greek sources and its veracity has therefore been questioned. It is reported only in the *Russian primary chronicle*, pp. 64-9.

the Dalmatian coast, which the Venetians had to use because the east coast of Italy was a dangerous lee shore. Not until the year 1000 did Doge Pietro Orseolo II finally subdue them in a victorious campaign and consolidate Venetian hegemony in the Adriatic.[117]

In Italy the Aghlabids made a last major effort in June 901 when Abū 'l-'Abbās, the son of the *amīr* 'Abd Allāh II ibn Ibrāhīm, seized Reggio. If we can believe Ibn al-Athīr, a Byzantine relief fleet under Eustathios, the *stratēgos* of Calabria, was defeated and lost 30 ships off Messina in 902. 'Abd Allāh then crossed into Calabria after taking Taormina but died besieging Cosenza and his army melted away. Nevertheless, the Muslim menace was still sufficient to persuade Constantinople to order Eustathios to conclude a truce with Aḥmad ibn Ziyādat Allāh, the *amīr* of Sicily, sometime around 914, agreeing to a humiliating annual tribute of 22,000 pieces of gold. Then in 915 combined forces of the Papacy, Spoleto, Gaeta, Camerino, Benevento, and Salerno finally eliminated the corsair nest on the Garigliano, a Byzantine fleet closing the mouth of the river. But even if the threat of Muslim conquest had passed, Sicilian corsairs continued to harrass the coasts of Italy for another 50 years and were joined by squadrons of the new Fāṭimid Caliphate operating from *al-Mahdiyya* in *Ifrīqiya*.[118]

In the north-west of the Sea the second half of the ninth century and the tenth was a period of political disintegration. Even when someone continued to hold a title, the kings of Italy, Aquitaine, Burgundy, and Provence became increasingly titular. Real authority drifted to the margarves, counts, and dukes of Tuscany, Provence, Burgundy, Gascony, Toulouse, and Aquitaine. At the same time the Umayyad *amīrate* of *al-Andalus* reached its zenith during the long reign of 'Abd al-Raḥmān III, who assumed the title of Caliph.

As early as 879 Muḥammad I had built a fleet at Cordoba with which to attack Galicia; however, it broke up at sea, the *marākib* no doubt being unsuitable for Atlantic conditions. Early in his reign 'Abd al-Raḥmān III sent light flotillas cruising the Straits of Gibraltar to prevent rebels against his rule receiving reinforcements and provisions

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[117] Constantine VII, *De administrando imperio*, §§29-36 (pp. 122-65); John Skylitzēs, *Synopsis historiōn*, Βασίλειος ὁ Μακεδών.26 (pp. 145-7); *Theophanēs continuatus*, V.52, 54 (pp. 288-9, 291-2); John the Deacon, *Cronaca Veneziana*, pp. 113, 128-9, 136, 155-60. See also Fine, *Early medieval Balkans*.

[118] *Chronicle of Cambridge*, pp. 40-48, 70-82; Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 263-6; Ibn 'Idhārī, *Al-bayān al-mughrib*, vol. 1, p. 175; Ibn Khaldūn, *'Ibar* (Des Vergers), pp. 136-44; John Skylitzēs, *Synopsis historiōn*, Νικηφόρας ὁ Φωκᾶς.4 (p. 263); *Kitāb al-'uyūn*, A.H. 289 (p. 221); Leo Marsicanus, *Chronica*, I.52 (pp. 616-7); Liudprand of Cremona, *Antapodosis*, II.51-4 (pp. 61-2); *Translatio Sancti Severini*, p. 457, n. 1; *Vita di sant'Elia*, pp. 62-3, 82-3.

from the Maghrib. When he perceived the danger posed by the new Fāṭimid fleet, he built up his own and this enabled him to take Melilla in 927 and Ceuta in 931. In 953 an Umayyad *amīr*, Aḥmad ibn Ya'lā, led the fleet on a raid to Galicia, returning in triumph with the bells and crosses of Christian churches. The Fāṭimid fleet sacked Almeria in 955 and in response 'Abd al-Raḥmān III sent the Umayyad fleet to ravage Fāṭimid territory. The fleet was active in the Maghrib again in 958. If we can believe Ibn Khaldūn, during 'Abd al-Raḥmān's reign the fleets of both the Umayyads and Fāṭimids had grown to the formidable numbers of 200 *marākib* each.[119]

In the tenth century, the most important Umayyad naval base was *Pechina* in the hills behind Almeria, which was inhabited by an admixture of *Ghassānī* Arabs originally from Syria and sailors of Andalusi origin, some Muslim and some Christian. Prior to 884 they formed a self-governing community at *Pechina* and succeeded in resisting attempts by the Arab chiefs of *Elvira* to take them over. In the mid tenth century they moved down to the port of Almeria. Under 'Abd al-Raḥmān III the fleet of *Pechina* was the main Umayyad fleet operating against the Fāṭimids in the Maghrib.[120]

Around 890 a group of Andalusi corsairs landed in the bay of St Tropez and fortified themselves on a hilltop at *Fraxinetum*. There they established for almost a century a Muslim enclave from which they raided as far west as Marseilles, as far north as Vienne, as far east as Asti, and as far to the north-east as the abbey of St Gall in Switzerland. Attempts to expel them in 931 and 942 failed and not until 972 did the Counts of Provence and Turin succeed in doing so with the help of a Byzantine fleet. Wrecks of tenth-century Muslim ships found off the coast of Provence suggest that this enclave enjoyed lively maritime communications with the main Muslim world.[121]

By the 920s Italy was divided between a Byzantine *thema* of *Longobardia*, the Lombard principalities of Capua-Benevento and Salerno, Papal territories around Rome to the west of the Apennines, and the Kingdom of Italy in the North. However, although there continued to be kings, real control of much of the North lay with the

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[119] *Akhbār Majmū'a*, pp. 133-42; Al Bakrī, *Kitāb al-mughrib*, pp. 179, 205; Ibn al-Athīr, *Al-Kāmil* (Fagnan), p. 257; Ibn 'Idhārī, *Al-bayān al-mughrib*, vol. 1, pp. 289-95, vol. 2, pp. 170, 339, 363, 366, 369; Ibn Khaldūn, *Muqqadimah*, vol. 2, p. 40. The word translated by Rosenthal as "vessels" is actually *marākib*.

[120] Al-Bakrī, *Kitāb al-mughrib*, pp. 128-9, 158-9, 163.

[121] Liudprand of Cremona, *Antapodosis*, I.2-4, II.43, IV.4, V.16-17 (pp. 5-6, 56-7, 104-5, 139); Ralph Glaber, *Historiae*, I.9 (pp. 20-23). See also Senac, *Musulmans et Sarrasins*.

margraves of Tuscany, *Ivrea*, and Friuli, and the Dukes of Spoleto. The Magyars had already raided into northern Italy in 899-900 and 904-5 but from 922 the whole of the peninsula would be seriously disrupted by their raids, which recurred in 937, 940, and again in either 947 or 949, and which reached as far south as Apulia and Salerno.[122] At the same time they raided into the Balkans, reaching Constantinople in 934. Their assaults were halted only by their defeat by the Western Emperor Otto I at the battle of the Lech in 955.

In Sicily rule by Fāṭimid *amīrs* replaced that of the Aghlabids from al-Ḥasan ibn Aḥmad in 910. Although indigenous revolts flared from time to time, from then until 948 the *amīrs* would mainly be Fāṭimid appointees. Sicilian squadrons raided Calabria and the Basilicata in 925-6 and 929, in spite of the truce bought in 914.[123] However, by this time such Sicilian raids had become mere pin-pricks. More threatening were the exploits of Fāṭimid squadrons. In 925 the *ḥājib* Abū Aḥmad Ja'far took the fleet to Apulia and sacked Bruzzano and Oria, taking many Jewish prisoners back to *Ifrīqiya*.[124] Then, in 927, and possibly again in 928 and 929, the Slavic *amīr* Ṣābir sailed from *al-Mahdiyya* with 44 *marākib*. Taranto was sacked, probably in 928. In 935 they even sacked Genoa.[125]

Resistance to Fāṭimid attempts to impose their hegemony over the powers of the Maghrib led to a struggle for influence between them and 'Abd al-Raḥmān III, the Umayyad seizure of Melilla in 927 and Ceuta in 931 being part of it. When an Umayyad ship attacked and captured a Fāṭimid one off *Ifrīqiya* in 955, it led to war and the *amīr* of Sicily, al-Ḥasan ibn 'Alī al-Kalbī, now back in Fāṭimid service, was ordered to use his fleet against *al-Andalus*. He attacked Almeria and destroyed the Umayyad fleet there. In riposte an Umayyad fleet of 70 ships attacked *Ifrīqiya*, sacking al-Kala, Sūsa, and *Ṭabarqa*. The Fāṭimid Caliph al-Mu'izz then sent his general Jawhar al-Ṣaqlabī to

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[122] *Annales Barenses*, *Annus* 949 (p. 53); *Annales Beneventani*, *Annus* 922 (p. 175); Leo Marsicanus, *Chronica*, I.55 (p. 619); Liudprand of Cremona, *Antapodosis*, II.7-16, 42, 61-2 (pp. 41-5, 56, 64-5); Lupus Protospatharios, *Annales*, *Annus* 947 (p. 54); Romuald of Salerno, *Chronicon*, pp. 165-6.

[123] Ibn al-Athīr, *Al-Kāmil* (Fagnan), p. 320; Ibn 'Idhārī, *Al-bayān al-mughrib*, vol. 1, p. 301.

[124] *Chronicle of Cambridge*, pp. 42-3, 72-3; Ibn 'Idhārī, *Al-bayān al-mughrib*, vol. 1, p. 271; Lupus Protospatharios, *Annales*, *Annus* 924 (p. 53).

[125] *Chronicle of Cambridge*, pp. 42-3, 72-3; Al-Nuwayrī, *Nihāyat 'al-Arab* (Amari), p. 128; *idem*, *Nihāyat 'al-Arab* (Caussin), pp. 420-21; Ibn al-Athīr, *Al-Kāmil* (Fagnan), p. 317; *idem*, *Al-Kāmil* (Amari), pp. 411-12; Ibn 'Idhārī, *Al-bayān al-mughrib*, vol. 1, pp. 274, 277, 279; Ibn Khaldūn, *'Ibar* (De Slane), vol. 2, p. 529; *idem*, *'Ibar* (Des Vergers), pp. 162-3; *idem*, *Muqqadimah*, vol. 2, p. 41; *Kitāb al-'uyūn*, A.H. 315 (p. 223). See also Lev, "Fāṭimid navy".

the Maghrib in 958-9 and in a triumphal campaign he reimposed Fāṭimid rule to the shores of the Atlantic, with the exception of Ceuta and Tangier, which the Umayyads continued to hold.[126]

In this context, when Constantine VII was planning the expedition to recover Crete which would take place in 949, he sent an embassy to Cordoba in 946 which was received with great pomp and ceremony. Another followed in 949. The intent was no doubt to neutralize any Fāṭimid assistance to Crete and perhaps also to open the way to reinforce Byzantine rule in southern Italy.[127] The Cretan expedition was, however, a disastrous fiasco, probably because of the incompetence of the commander, the *hēgētor naumachias* ("commander of the sea battle"), Constantine Gongylēs.[128]

Probably in the following year Constantine VII sent a *patrikios* named Malakēnos to Italy with a fleet under the command of Makroiōannēs. In response the *amīr* of Sicily, 'Alī ibn Abī 'l-Ḥusayn al-Kalbī, sought reinforcements from his Fāṭimid master, al-Manṣūr bi 'llāh, landed in Calabria in 951, and inflicted a series of severe defeats on the Byzantines. Returning in 952 he again defeated Malakēnos near Gerace. Constantine VII appears to have then sent the *asēkrētis* John Pilatos to conclude a truce with al-Kalbī and another embassy to *al-Mahdiyya* to confirm it with his master.[129] Following these reversals, and because Duke John of Naples had been pursuing a policy of accomodation with the Muslims of Sicily and the Lombards of Capua-Benevento, Constantine sent another large expeditionary force to Italy

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[126] *Akhbār Majmū'a*, pp. 133-42; Al-Bakrī, *Kitāb al-mughrib*, pp. 179, 205; Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 358-9; Ibn 'Idhārī, *Al-bayān al-mughrib*, vol. 1, pp. 289-95, vol. 2, pp. 170, 339, 363, 366, 369; Ibn Khaldūn, *'Ibar* (Būlaq), vol. 4, pp. 139-40; *idem*, *'Ibar* (De Slane), vol. 2, pp. 542-4.

[127] Ibn 'Idhārī, *Al-bayān al-mughrib*, vol. 2, pp. 353, 357; Liudprand of Cremona, *Antapodosis*, VI.4 (p. 337).

[128] We say "probably" because the sources are extremely hostile to him. *Theophanēs continuatus* has no details, perhaps because the expedition was such a disaster that Theodore Daphnopatēs, the presumed author of the relevant section, did not wish to include it in his account of the reign of Constantine VII. *Hēgētor naumachias* was an author's description not his dignity or office. He was a palace eunuch, one of the chamberlains, apparently without military experience. "Gongylēs", "Turnip", was a derogatory nickname, not his real name. See John Skylitzēs, *Synopsis historiōn*, Κωνσταντίνος πάλιν αὐτοκράτωρ.15 (pp. 245-6); John Zōnaras, *Epitomē historiōn*, XVI.22 (vol. 4, p. 70); Leo the Deacon, *Historiae*, I.β΄ (pp. 6-7); *Theophanēs continuatus*, VI.Αυτοκρατορία Κωνσταντίνου.1-3 (vol. 1, pp. 436-8); John Zōnaras, *Epitomē historiōn*, XVI.22 (vol. 4, p. 70).

[129] *Chronicle of Cambridge*, pp. 44-7, 74-7; Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 350-54; Ibn Khaldūn, *'Ibar* (De Slane), vol. 2, pp. 540-41; *idem*, *'Ibar* (Des Vergers), pp. 167-9; John Skylitzēs, *Synopsis historiōn*, Νικηφόρας ὁ Φωκᾶς.7, 8 (p. 266); *Kitāb al-'uyūn*, p. 225; Lupus Protospatharios, *Annales*, *Annus* 951 (p. 54).

in 956 under the *patrikios* Marianos Argyros to bring Naples and the Lombards back to their allegiances and to relieve Calabria and Campania from Sicilian attentions. A fleet conveying an army from *Ifrīqiya* to Palermo under the command of al-Ḥasan ibn Alī al-Kalbī and his brother ʻAmmār was wrecked by storm in 958 and following the disaster al-Muʻizz apparently agreed to a new truce with Constantine VII which held until the Byzantine assault on Crete in 960. An *Ifrīqiyan* fleet may have assaulted Naples at that time.[130] The Fāṭimids and their now-independent Sicilian Kalbīte *amīrs* still posed a threat to southern Italy but the worst had passed.

A third *Rhōs* attack on Constantinople in 941 was scattered by the imperial fleet under the *patrikios* Theophanēs. In the following year Emperor Rōmanos I Lekapēnos was able to respond to a request from Hugh of Arles, the King of Italy, for assistance against the Muslims of *Fraxinetum* by sending a squadron of *chelandia* which destroyed the Muslim ships with Greek Fire. The Empire was slowly gathering strength and by 944-5, according to al-Masʻūdī, Rhodes had become a Byzantine arsenal where warships were constructed which attacked Egypt.[131]

In the East relations with the ʻAbbāsids and Ikhshīdids had been relatively calm during the first half of the century. However, Tarsos still remained a threat that was not eliminated until the *stratēgos* of the *Kibyrrhaiōtai*, Basil Hexamilitēs, won a famous victory over its fleet off *Lycia* in 956, freeing the way for a new assault on Crete.[132] Rōmanos II gave command to Nikēphoros Phōkas, who successfully completed the task between July 960 and March 961.[133] Cretan appeals for help to both the Fāṭimid al-Muʻizz and the Ikhshīdid regent Abū ʼl-Misk Kāfūr fell on deaf ears because the Fāṭimid proposals to Kāfūr for a combined operation were ignored since the

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[130] *Chronicon Salernitanum*, §161 (p. 168); *Ex miraculis Sancti Agrippini*; Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 353-6, 359; John Skylitzēs, *Synopsis historiōn*, Νικηφόρας ὁ Φωκᾶς.8 (pp. 266-7); *Kitāb al-ʻuyūn*, A.H. 345 (p. 225); *Theophanēs continuatus*, VI.Αυτοκρατορία Κωνσταντίνου.30-31 (pp. 453-5).

[131] Al-Masʻūdī, *Murūj*, vol. 2, p. 423; Liudprand of Cremona, *Antapodosis*, V.9, 14-16 (pp. 134-9); *Russian primary chronicle*, p. 72; *Theophanēs continuatus*, VI.Βασιλεία Ρωμανοῦ.39 (pp. 423-6); John Zōnaras, *Epitomē historiōn*, XVI.19 (vol. 4, p. 63).

[132] Ibn al-Athīr, *Al-Kāmil* (Vasiliev/Canard), A.H. 345 (p. 162); *Theophanēs continuatus*, VI.Αυτοκρατορία Κωνσταντίνου.29 (pp. 452-3).

[133] Leo the Deacon, *Historiae*, I.γ΄-θ΄, II.ς΄-η΄ (pp. 7-16, 24-29); John Skylitzēs, *Synopsis historiōn*, Ρωμανὸς ὁ Νέος.4 (pp. 249-50); John Zōnaras, *Epitomē historiōn*, XVI.23 (vol. 4, pp. 72-3); Pseudo Symeon magistros, *Chronographia*, pp. 758-60; *Theophanēs continuatus*, VI.Βασιλεία Ρωμανοῦ υἱοῦ Κονσταντίνου τοῦ Πορφυρογενήτου.7-12 (pp. 473-8). See also Farello, "Niceforo Foca".

latter realized quite rightly that to cooperate would be to surrender the political and moral advantage to the Fāṭimids.

Nikēphoros Phōkas pushed into *Cilicia* in 963. An attempt by Kāfūr to reconstitute the Egyptian fleet to relieve Tarsos failed when the squadron of 36 ships was mauled in a storm and the remnants defeated off Cyprus in 965. Both Tarsos and Cyprus were recovered for the Empire. Nikēphoros followed up these successes with a push into Syria in 969 which returned to the Empire Antioch and all of northern Syria west of Aleppo and north of Tripoli.[134] His successor, John I Tzimiskēs, continued the policy, capturing Beirut in 975 and forcing Damascus to pay tribute, although his siege of Tripoli failed.

Under John's successor Basil II the Empire reached its medieval zenith. First, however, he had to face and defeat serious revolts by the provincial aristocracy. In 976 one of John Tzimiskēs' generals, Bardas Sklēros, revolted in *Mesopotamia* and marched on the capital. Initially successful, he was defeated in 979 and took refuge amongst the Muslims. He tried again in 987 but was taken captive by another rebel general, Bardas Phōkas, who was himself killed in battle on 13 April 989. Bardas Sklēros continued the struggle but was eventually reconciled to Basil II in October 989. Provincial fleets joined both of these revolts but were scattered by the imperial fleet using Greek fire.[135]

Basil II eventually became known to history as the *Boulgaroktonos*, the "Bulgar slayer". Svjatoslav of Kiev invaded Bulgaria in 969 and deposed Tsar Boris II, intending to transfer his own capital from Kiev to *Preslav the Little*, south of the Danube. However, John Tzimiskēs' army relieved Preslav and restored Boris, forcing Svjatoslav to retire to *Dorostolon*. Then a Byzantine fleet mounted the Danube and destroyed his ships, forcing him to surrender. He was intercepted and killed by the Pechenegs at the Dnepr rapids during his withdrawal. Bulgaria was annexed to the Empire and Boris was taken to Constantinople.[136] But a rebellion in Bulgaria brought to the throne a new Tsar, Samuel, who trapped a Byzantine army in the pass of *Trajan's Gates* in 986 and inflicted a

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[134] John Skylitzēs, *Synopsis historiōn*, Νικηφόρας ὁ Φωκᾶς.11-13, 17 (pp. 268-70, 271-3).

[135] John Skylitzēs, *Synopsis historiōn*, Βασίλειος καὶ Κονσταντῖνος.1-9, 16-18 (pp. 314-27, 334-8); John Zōnaras, *Epitomē historiōn*, XVII.5-7 (vol. 4, pp. 107-110, 112-17).

[136] John Skylitzēs, *Synopsis historiōn*, Ἰωάννης ὁ Τζιμισκής.5, 9-12, 14-18 (pp. 288, 295-302, 305-10); John Zōnaras, *Epitomē historiōn*, XVII.2-3 (vol. 4, pp. 96-102); *Russian primary chronicle*, pp. 87-90.

devastating defeat on it. Basil returned to the attack from 991 with almost continuous campaigns designed to extinguish the Bulgarian Khanate once and for all and at the battle of *Kleidion* in July 1014 he finally triumphed. The sight of 14,000 Bulgarian captives sent home blinded was said to have led to the Tsar's death within two days. Although some resistance continued, by 1018 Bulgaria had been pacified and incorporated into the Empire.[137]

In the West the Empire was less successful. Following a Greek uprising against the Muslims, Nikēphoros Phōkas sent reinforcements to Sicily and Taormina and Rametta were recovered temporarily in 963-5. However, an army and relief fleet sent out under the command of a *patrikios* named Manuel were both defeated by the Fāṭimids, the fleet in the Straits of Messina, in 965,[138] and soon after that a truce was concluded because both had other concerns: the Fāṭimids with a long planned invasion of Egypt and the Byzantines with the *Rhōs*, the Bulgarians, and the Western Emperor Otto I.

In February 962 Otto I came to Rome to be crowned. An interest in southern Italy was aroused by the question of the Lombard principalities of Capua-Benevento and Salerno, ruled at the time by Pandolf I and Gisolf I respectively, over which both Western and Eastern empires claimed suzereinty. He visited Benevento in 967 and in 968 returned to both Benevento and Capua and then layed siege to Byzantine Bari. Finding it impregnable he sent an embassy to Constantinople headed by Bishop Liudprand of Cremona which Nikēphoras Phōkas dismissed contemptuously, giving rise to the narrative of it by Liudprand, the most famous narrative of an embassy in medieval history. The struggle was resumed in 969 but then terminated by Nikēphoros's assassination by John Tzimiskēs, who proposed a marriage between his niece Theophanō and Otto's son Otto (II). The wedding took place in St Peter's on 14 April 972 and Otto I withdrew from southern Italy.[139]

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[137] John Skylitzēs, *Synopsis historiōn*, Βασίλειος καὶ Κονσταντῖνος.12, 20, 23-7, 30, 35-6, 41, 43 (pp. 331, 339, 341-4, 346, 348-50, 357-9, 363-5); John Zōnaras, *Epitomē historiōn*, XVII.6, 8, 9 (vol. 4, pp. 111-12, 118-19, 121-4). On Basil, see Stephenson, *Basil the Bulgar-slayer*, esp. pp. 1-48.

[138] Al-'Ayni, *'Iqd al-Jumān*; John Zōnaras, *Epitomē historiōn*, XVI.24 (vol. 4, pp. 78-9); *Chronicle of Cambridge*, pp. 46-7, 78; Al-Nuwayrī, *Nihāyat 'al-Arab*, (Amari), pp. 130-34; *idem*, *Nihāyat 'al-Arab* (Caussin), pp. 423-9; Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 362-6; Ibn Khaldūn, *'Ibar* (De Slane), vol. 2, p. 545; *idem*, *'Ibar* (Des Vergers), pp. 169-71; John Skylitzēs, *Synopsis historiōn*, Νικηφόρας ὁ Φωκᾶς.3-4, 9 (pp. 261-2, 267); Leo the Deacon, *Historiae*, IV.ζ΄-η΄ (pp. 64-8).

[139] *Chronicon Salernitanum*, §§166-74 (pp. 170-7); Liudprand of Cremona, *Relatio*; Romuald of Salerno, *Chronicon*, p. 167

From 965 south Italian waters were left to local Byzantine forces, to those of the growing cities of Naples, Gaeta, and Amalfi, and of the princes of Salerno, and above all to those of the Kalbīte *amīrs* of Sicily descended from al-Ḥasan ibn ʻAlī al Kalbī, now become independent from the Fāṭimids in practice although still their clients in theory.

Even though there was no longer any hope of permanent Muslim occupation of areas of southern Italy, Kalbīte raids on the mainland resumed from 975 and continued into the 980s. They contributed to inducing Otto II to intervene. In 981 he marched into Apulia and Calabria, provoking the *amīr*, Abū ʾl-Qāsim, to cross the Straits. At *Punta di Stilo* the armies met in a disastrous defeat for the German, who, in a famous story narrated by Thietmar of Merseburg, escaped only by swimming his horse out through the waves to take refuge on one of two Byzantine *chelandia* which he had previously taken into his service at Taranto as corsairs.[140] Eventually he made his way back north, his policies in ruins, leaving southern Italy to its own devices. His son Otto III would trouble the Lombard principalities of Capua and Benevento, but not the Byzantine and other territories further south.[141]

After al-Muʻizz moved from *Ifrīqiya* to Egypt in 973 the Fāṭimids took no action against the Empire for some time. What naval forces they had were initially occupied countering Syrian squadrons supporting Qarmaṭī and other rebels in Syria and Palestine. Hostilities with the Empire intensified only in the 990s with a series of encounters, including a Byzantine raid on Alexandria in 993. Probably as a response, in 996 the Caliph al-ʻAzīz began to construct a large new fleet at Cairo. A fire which destroyed some of the ships provoked suspicion of Christian merchants from Amalfi and a mob killed 100 of them and looted local Christian churches. The fleet was reconstructed and 24 ships were despatched to Tripoli but it was wrecked on the Syrian coast. However, 20 ships could still be sent in 998 to assist in putting down a rebellion in Tyre and they were capable of defeating a Byzantine squadron assisting the rebels. In the following year a ten-

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[140] *Chronicle of Cambridge*, pp. 46, 48, 80, 82; Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 389-90; Ibn Khaldūn, *ʻIbar* (Des Vergers), pp. 172-5; John the Deacon, *Cronaca Veneziana*, p. 145; Leo Marsicanus, *Chronica*, II.9 (p. 635); Romuald of Salerno, *Chronicon*, pp. 168, 170-71; Thietmar of Merseburg, *Chronicon*, III.20-23 (pp. 122-9).

[141] *Annales Beneventani*, *Anni* 997-1001 (p. 177); *Cronaca Capuana*, pp. 133-4; Leo Marsicanus, *Chronica*, II.10, 15, 24 (pp. 635-6, 638, 642-3); Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 379-80.

year truce was concluded.[142]

The impressive naval forces which ʻAbd al-Raḥmān III had created in *al-Andalus* were maintained by his successors. When the Norse returned to Lisbon with 48 "*marākib*" in 966, they were defeated off Silves by the fleet of Seville. Nevertheless al-Ḥakam II ordered a fleet of Norse style to be built at Cordoba in order to be able to deceive the Vikings and thus to be able to close with them. Another assault in 971 was countered by bringing the Almeria squadrons around to Seville and in the following year the fleet was sent to Ceuta and then to Tangier, which it captured from the last Idrīsids. Al-Ḥakam died in 976, succeeded by his young son Hishām II who was only eleven years old, and power passed to the *ḥājib*, or chief minister, Abū ʻAmīr Muḥammad al-Manṣūr, "the Victorious", known to the Christians as *Almanzor*. He assembled the fleet at Alcacer do Sal for his famous campaign against Santiago de Compostela in 997 which brought the bells of the cathedral to Cordoba. Having made the Caliphate the terror of the Christian states to the north, he died on campaign in 1002. However, ironically, the very policies by which he had done so, reliance on Slavic slave *mamālīk* and Berber and Christian mercenaries, rather than the Muslim *jund* of the Arabic aristocracy of *al-Andalus*, led to disintegration after his death. His son, ʻAbd al-Malik, died in mysterious circumstances in 1008, after which the Caliphate began to collapse.[143]

The fifth period, ca 1025-1204: the triumph of the Latin West

Liudprand of Cremona recorded that when he was in Constantinople in 968 Nikēphoros Phōkas had boasted that he alone had naval power and that he would attack Otto I with his fleets, destroy his maritime cities, and reduce to ashes those along the rivers.[144] There would have been much truth to the claim at the time. However, it appears that from that point on, the very success of the Empire against its enemies in the East, the pacification of Levantine, Aegean, and Black Sea

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[142] Yaḥyā ibn Saʻīd, *Histoire*, XXIII.3, pp. 447-9, 455.

[143] Al-Marrākushī, *Al-Muʻjib*, pp. 22-33; Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 382-5, 392-4, 400-401, 406-7 ; Ibn ʻIdhārī, *Al-bayān al-mughrib*, vol. 2, pp. 394-5, 399, 405, 491-8.

[144] Liudprand of Cremona, *Relatio*, §11 (p. 182): "Nec est in mari domino tuo classium numerus. Navigantium fortitudo mihi soli inest, qui eum classibus aggrediar, bello maritimas eius civitates demoliar et, quae fluminibus sunt vicina, redigam in favillam.".

waters, and the absence of any significant hostile naval forces, led to neglect of its own naval forces. In the Escorial *Taktikon*, a list of titles and offices compiled ca 971-5, the *droungarios tou ploimou* of the imperial fleet in Constantinople appeared in the 133rd place after all of the *stratēgoi* of the *themata* and the *stratēgoi* of the *Kibyrrhaiōtai*, Samos, and *Aigaion Pelagos* appeared in 57th, 69th, and 70th places respectively.[145] This almost certainly reflected a decline in the importance of naval forces by comparison to the preceding period. Reflecting the lack of need for them, the Byzantine sources record no naval expeditions except for the fleet sent by John Tzimiskēs to the Danube against Svjatoslav of Kiev in 971 and that assembled by Basil the *parakoimōmenos* for Basil II against the revolt of Bardas Sklēros in 989. Not until the last years of Basil II was a major new naval expedition considered, this time an attempt to recover Sicily.[146]

This was precipitated by preceding events in south Italy. In 1009 an Apulian noble named Melo had led a revolt against Byzantine rule which lasted until suppressed by Basil Mesardonitēs, a new *katepanō* of *Longobardia* sent from Constantinople in 1010. Melo fled to the Lombards. However, he returned in 1017 accompanied by Norman mercenaries. Basil Mesardonitēs had died early in the same year but a new *katepanō*, Basil Boiōannēs, won a decisive victory near ancient *Cannae* in October 1018, enabling the Byzantines to reconsolidate their rule in northern Apulia and the *Capitanata*, and to exercize overlordship over the Lombard principalities. It also suggested to Basil II a possible reconquest of Sicily and a certain Orestēs was sent out with a fleet. The expedition failed and Orestēs was eventually replaced during the reign of Rōmanos III Argyros. Rōmanos had an adventurous foreign policy and in 1033 sent an expedition to Egypt which was a disastrous failure. However, the Empire's last aggressive foreign policy initiative in the Mediterranean for the century would come in 1038 when the *stratēgos autokratōr* George Maniakēs was sent with a fleet to attempt a reconquest of Sicily. With the assistance of a regiment of Varangians and Norman mercenaries he had initial success and recovered the east of the island. However, accusations were made against him at court and he was recalled in 1040 and the

[145] Oikonomides, *Listes de préséance*, pp. 264-8.

[146] John Skylitzēs, *Synopsis historiōn*, Ἰωάννης ὁ Τζιμισκής.12 (pp. 300-301), Βασίλειος καὶ Κωνσταντῖνος.8 (p. 324), Ῥωμανός ὁ Ἀργυρός.8 (pp. 383-4), 17 (p. 389); John Zōnaras, *Epitomē historiōn*, XVII.9 (vol. 4, p. 124); Leo the Deacon, *Historiae*, VIII.α΄ (p. 129), X.ζ΄ (pp. 169-70).

Table 5: Rulers of the fifth period, ca 1025-1204

Byzantine Empire	The Muslims		
	The ‘Abbāsid Caliphs (B) Būyid *amīrs* (S) Saljūqid *sulṭāns*	(F) Fāṭimids (A) Ayyūbids (Z) Zangids (S) Saljūqids of Rūm	(U) Spanish Umayyads (S) *Amīrs* of Sicily (Z) Zīrids (A) Almoravids (Al) Almohads
Constantine VIII (1025-8)	Jalāl al-Dawla (B 1025-44)		Hishām III al-Mu‘tadd (U 1027-31)
			End of dynasty Ṭawā’if kings
Rōmanos III (1028-34)	Al-Qā’im (1031-75)		
Michael IV (1034-41)		Al-Mustanṣir (F 1036-94)	‘Abd Allāh ibn al-Mu‘izz (S 1038-40) Al-Ḥasan al-Ṣamṣām al-Dawla (S 1040-44)
			Civil war and Norman invasion
Michael V (1041-2) Zōe & Theodōra (1042)			
Constantine IX (1042-55)	‘Imād al-Dīn al-Marzubān (B 1044-8) Al-Malik al-Raḥīm Khusraw Firūz (B 1048-55)		
	Saljūqid conquest		

(Table 5 continued)

The Balkans, the *Rhōs*, Venice	The Iberian rulers	Italy	The Western Empire and France
(B) Bulgaria (C) Croatia (K) Kiev (S) Serbia[147] (V) Venice	(A) Aragon (B/C) Barcelona/ Catalonia (L) Asturias/León (C) Castile) (N) Navarre (P Portugal)	(B) Benevento (C) Capua (S) Salerno (N) Normans	(F) France Western Empire (K) Kings (E) Emperors
			Hugh Capet (F 987-96) Robert II (F 996-1031)
Pietro Centranico (V 1026-32)		Guaimar IV (S 1027-52)	
Stjepan I (C 1030-58) Domenico Flabanico (V 1032-43)	Vermudo III (L 1028-37)	Landolf VI (B 1038-77) Pandolf VI (B 1054-74)	Henry I (F 1031-60)
Yaroslav I (K 1036-54) Stefan Vojislav (S 1040-1043)	Ramon Berenguer I (B 1035-76) Fernando I (L 1035-65) García III Sanchez (N 1035-54) Ramiro I (A 1035-63)		Henry III (K 1039-56, E 1046-)
Joint family rule (S 1043 - ca 1046) Domenico Contarini (V 1043-71) Michael (S 1046-81/2) Vyacheslav (K 1054-7)	Sancho IV Garcés (N 1054-76)	William the Iron Arm (N Ct Apulia 1042-6) Landolf VI (C 1047-58) Gisulf II (S 1052-77) Drogo (N Ct Apulia 1046-51) Humphrey (N Ct Apulia 1051-7)	

[147] Serbian rulers include those of Duklja and Raška, some of whom overlapped.

(Table 5 continued)

Byzantine Empire	The Muslims		
	The ‘Abbāsid Caliphs (B) Būyid *amīrs* (S) Saljūqid *sulṭāns*	(F) Fāṭimids (A) Ayyūbids (Z) Zangids (S) Saljūqids of Rūm	(U) Spanish Umayyads (S) *Amīrs* of Sicily (Z) Zīrids (A) Almoravids (Al) Almohads
Theodōra (1055-6)	Rukn al-Dunyā wa ’l Dīn Ṭoghrïl I (S 1055-63)		
Michael VI (1056-7)			
Isaac I (1057-9)			
Constantine X (1059-67)	‘Aḍud al-Dawla Alp Arslan (S 1063-72)		Yūsuf ibn Tāshufīn (A 1061-1106) Tamīm (Z 1062-1108)
Michael VII (1067-8)			
Rōmanos IV (1068-71)			
Michael VII (1071-8)	Al-Muqtafī (1075-94) Jalāl al-Dawla Malik-Shāh I (S 1072-92)	Sulaymān ibn Qutulmïsh (S 1077-86)	
Nikēphoros III (1078-81)			
Alexios I (1081-1118)	Nāṣir al-Dīn Maḥmūd I (S 1092-4) Al-Mustaẓhir (1094-1118) Rukn al-Dīn Barkyārūq (S 1094-1105) Malik Shāh II ibn Barkyārūq (S 1105)	Al-Musta‘lī bi ‘llāh (F 1094-1101) Qïlïj Arslan I (S 1092-1107) Al-Āmir (F. 1101-1130) Malik-Shāh (S 1107-1116) Rukn al-Dīn Mas‘ūd I (S 1116-56)	‘Alī (A 1106-42) Yaḥyā (Z 1108-1116) ‘Alī (Z 1116-21)

(Table 5 continued)

The Balkans, the *Rhōs*, Venice	The Iberian rulers	Italy	The Western Empire and France
(B) Bulgaria (C) Croatia (K) Kiev (S) Serbia (V) Venice	(A) Aragon (B/C) Barcelona/ Catalonia (L) Asturias/León (C) Castile) (N) Navarre (P Portugal)	(B) Benevento (C) Capua (S) Salerno (N) Normans	(F) France Western Empire (K) Kings (E) Emperors
		Pandolph IV (C 1049-57 *Norman conquest*	
			Henry IV (K 1056-1106, E. 1084-)
Peter Kresimir IV (C 1058-74) Igor (K 1057-60) Svjatoslav II (K 1060-76)	Sancho I Ramírez (A 1063-94) Sancho II (C 1065-72) Alfonso VI (L 1065-1109)	Robert Guiscard (D. Apulia 1057-85)	Philip I (F 1060-1108)
Domenico Selvo (1071-84) Demetrius Zvonimir (C 1075-89/90) Izyaslav (K 1076-8) Vsevolod (K 1078-93)	Ramon Berenguer II (B/C 1076-82) Berenguer Ramon II (1076-97)	Roger I (N Great Count of Sicily 1072-1101)	
Constantine Bodin (S 1081/2-ca 1101) Vukan (S 1083/4-ca 1122) Vitale Falier (V 1084-96) *Interregnum (C 1090-93)* Peter (C 1093-7) Svjatopolk II (K 1093-1113)	Pedro I (AN 1094-1104) Ramon Berenguer III (B/C 1097-1131) Alfonso I (AN 1104-34) Urraca (CL 1109-26)	Roger Borsa (N D. Apulia 1085-1111) William (N D. Apulia 1111-27) Roger II (N Ct Sicily 1105, D. Apulia 1128, K. Sicily 1130-54)	Henry V (K 1106-25, E 1111-) Louis VI (F 1108-37)

(Table 5 continued)

Byzantine Empire	The Muslims		
	The ‘Abbāsid Caliphs (B) Būyid *amīrs* (S) Saljūqid *sulṭāns*	(F) Fāṭimids (A) Ayyūbids (Z) Zangids (S) Saljūqids of Rūm	(U) Spanish Umayyads (S) *Amīrs* of Sicily (Z) Zīrids (A) Almoravids (Al) Almohads
	Ghiyāth al-Dīn Muḥammad I (S 1105-18)		
John II (1118-43)	Al-Mustarshid (1118-35) Mughīth al-Dīn Maḥmūd II (S 1118-31) Ghiyāth al-Dīn Dāwūd (S 1131-2) Rukn al-Dīn Toghril II (S 1132-4) Ghiyāth al-Dīn Mas‘ūd (S 1134-52) Al-Rāshid (1135-6) Al-Muqtafī (1136-60)	Al-Ḥāfiẓ (F 1131-49) ‘Imād al-Dīn Zangī (Z 1127-46)	Al-Ḥasan (Z 1121-48) *Norman, then Almohad conquest* ‘Abd al-Mu’min (Al 1130-63) Tāshufīn (A 1143-5)
Manuel I (1143-80)	Al-Mustanjid (1160-70) Al-Mustaḍī’ (1170-80) Mu‘īn al-Dīn Malik-Shāh III (S 1152-3)	Nūr al-Dīn (Z 1146-74) Al-Ẓāfir (F 1149-54) Al-Fā’iz (F 1154-60)	Ibrāhīm (A 1146) Isḥāq (A 1146-7) *Almohad conquest* Abū Ya‘qūb Yūsuf I (Al 1163-84)

(Table 5 continued)

The Balkans, the *Rhōs*, Venice	The Iberian rulers	Italy	The Western Empire and France
(B) Bulgaria (C) Croatia (K) Kiev (S) Serbia (V) Venice	(A) Aragon (B/C) Barcelona/ Catalonia (L) Asturias/León (C) Castile) (N) Navarre (P Portugal)	(B) Benevento (C) Capua (S) Salerno (N) Normans	(F) France Western Empire (K) Kings (E) Emperors
Vitale Michiel I 1096-1102) Michael & Dobroslav (S ca 1101-2) Ordelafo Falier (V 1102-18) Kočapar (S ca 1102-3) Vladimir (S ca 1103-8) Oleg (K 1113-15) Yaroslav II (K 1115-23)			
Vladimir II (K 1123-25) Juraj (S ca 1118) Grubeša (S ca 1118-25) Domenico Michiel (V 1118-30) Juraj (S ca 1125-7) Mstislav-Harald (K 1125-32) Uroš I (S ca 1125-45) Gradinja (S ca 1127-46) Pietro Polani (V 1130-48) Yaropolk II (K 1132-9) Yuri Dolgoruky (K 1139-57)	Alfonso VII (CL 1126-57) Afonso Henriques (P 1128-85) Ramon Berenguer IV (B/C 1131-62) Ramiro II (A 1134-7) García IV Ramírez (N 1134-50)		Lothar I (K 1125-37, E 1133-) Conrad III (K 1138-52) Louis VII (F 1137-80)
Uroš II (S ca 1145-62) Radoslav (S ca 1146-?) Domenico Morosini (V 1148-56) Vitale Michiel II (1156-72)	Sancho VI (N 1150-94) Sancho III (C 1157-8) Fernando II (L 1157-88) Alfonso VIII (C 1158-1214)	William I (N 1154-66) William II (N 1166-89)	Frederick I (K 1152-90, E 1155-)

(Table 5 continued)

Byzantine Empire	The Muslims		
	The ʻAbbāsid Caliphs (B) Būyid *amīrs* (S) Saljūqid *sulṭāns*	(F) Fāṭimids (A) Ayyūbids (Z) Zangids (S) Saljūqids of Rūm	(U) Spanish Umayyads (S) *Amīrs* of Sicily (Z) Zīrids (A) Almoravids (Al) Almohads
	Rukn al-Dīn Muḥammad II (S 1153-60) Ghiyāth al-Dīn Sulaymān Shāh (S 1160-61) Muʻizz al-Dīn Arslan (S 1161-76) Rukn al-Dīn Ṭoghrïl III (S 1176-94)	ʻIzz al-Dīn Qïlïj Arslan II (S 1156-92) Al-ʻĀḍid (F 1160-71) *Ayyūbid Conquest* Nūr al-Dīn Ismāʻīl (Z 1174-81) Ṣalāḥ al-Dīn (A 1169-93)	
	Extinction of Saljūqid sulṭāns by Khʷārazm-Shāhs		
Alexios II (1180-83)	Al-Nāṣir (1180-1225)		
Andronikos I (1183-5)			Abū-Yūsuf Yaʻqūb al-Manṣūr (Al 1184-99)
Isaac II (1185-95)		Al-Afḍal Nūr al-Dīn ʻAlī (A# 1186-96)[148] Ghiyāth al-Dīn Kay-Khusraw I (S 1192-6) Al-ʻAzīz ʻImād al-Dīn (A* 1193-8)[149]	
Alexios III (1195-1203)		Al-ʻĀdil I Sayf al-Dīn (A# 1196-1218) Rukn al-Dīn Sulaymān II (S 1196-1204) Al-Manṣūr Nāṣir al-Dīn (A* 1198-1200)	Muḥammad al-Nāṣir (Al 1199-1214)

[148] # = Line in Damascus
[149] * = Line in Egypt

(Table 5 continued)

The Balkans, the *Rhōs*, Venice	The Iberian rulers	Italy	The Western Empire and France
(B) Bulgaria (C) Croatia (K) Kiev (S) Serbia (V) Venice	(A) Aragon (B/C) Barcelona/ Catalonia (L) Asturias/León (C) Castile) (N) Navarre (P Portugal)	(B) Benevento (C) Capua (S) Salerno (N) Normans	(F) France Western Empire (K) Kings (E) Emperors
Desa (S ca 1162-6) Tihomir (S ca 1166-7)	Alfonso II (AB/C 1162-96)		
Joint rule (S ca 1168-71)			
Stefan Nemanja (S ca 1171-96) Sebastiano Ziani (V 1172-8) Orio Mastropiero (V 1178-92)			
			Philip II (F 1180-1223)
Peter & John Asēn (B 1186-96) Enrico Dandolo (V 1192-1205)	Alfonso IX (L 1188-1230) Sancho VII (N 1194-1234)	Tancred of Lecce (N 1190-94) William III (N 1194)	Henry VI (K 1190-97, E 1191)
		Hohenstaufen conquest	
Stefan the First-Crowned (S 1196-1217) John & Kalojan Asēn (B 1196-7) Kalojan Asēn (1197-1207)	Pedro II (AB/C 1196-1213)		Philip of Swabia (K 1198-1208) Otto IV (K 1198-1218, E 1209-)

(Table 5 continued)

Byzantine Empire	The Muslims		
	The ʻAbbāsid Caliphs (B) Būyid *amīrs* (S) Saljūqid *sulṭāns*	(F) Fāṭimids (A) Ayyūbids (Z) Zangids (S) Saljūqids of Rūm	(U) Spanish Umayyads (S) *Amīrs* of Sicily (Z) Zīrids (A) Almoravids (Al) Almohads
		Al-ʻĀdil I Sayf al-Dīn (A*1200-18)	
Alexios IV (1203-4) Alexios V (1204) *Latin Empire of Constantinople*			

last Byzantine attempt against Sicily collapsed after his departure. The evidence for the extensive effort made for Maniakēs's expedition to Sicily does not accord with that of Michael Psellos for the degraded state of Byzantine naval forces when the capital was attacked by the *Rhōs* again in 1043. According to Psellos, to face the *Rhōs* attack only a few derelict vessels could be found to be armed with Greek Fire to oppose them. However, the success of the Byzantine fleet suggests that Psellos exaggerated its weakness for literary purposes. According to Kekaumenos, probably writing ca 1075-8, the Byantine fleet was still the "glory of *Romania*" in his own day.[150] And even in the late 1070s there were still some detachments around Thrace and in Asia Minor who assisted in putting down the revolt of Nikēphoros Bryennios and who welcomed Nikēphoros Botaneiatēs.[151] That being

[150] *Chronica monasterii Casinensis*, II.37 (pp. 236-40), II.66 (pp. 298-9); John Skylitzēs, *Synopsis historiōn*, Βασίλειος καὶ Κωνσταντῖνος.34 (p. 348), 47 (p. 368), Ῥωμανός ὁ Ἀργυρός.16-17 (pp. 388-9), Μιχαήλ ὁ Παφλαγών.9-20 (pp. 398-407); John Zōnaras, *Epitomē historiōn*, XVII.15, 22, 24 (vol. 4, pp. 139-42, 160-62, 167-9); Kekaumenos, *Stratēgikon* (Wassiliewsky), Νουθετητικὸς πρὸς Βασιλέα, §22: "Τὸν στόλον ἀγωνίζου πάντοτε ἀκμάζειν καὶ ἔχειν αὐτὸν ἀνελλιπῆ· ὁ γὰρ στόλος ἐστὶν ἡ δόξα τῆς Ῥωμανίας."; Leo Marsicanus, *Chronica*, II.37 (pp. 651-3), II.66 (pp. 675-6); Lupus Protospatharios, *Annales*, *Anni* 1009-1019 (pp. 56-7); Michael Psellos, *Chronographia*, Constantin IX, §76 (vol. 2, p. 1), §§90-95 (vol. 2, pp. 8-12); Romuald of Salerno, *Chronicon*, pp. 174-5.

[151] *John Skylitzēs continuatus*, pp. 175, 178; Michael Attaleiatēs, *Historia*, pp. 254, 268-9, 269-72; Nikēphoros Bryennios, *Hyle historias*, III.22-3 (pp. 249-51).

(Table 5 continued)

The Balkans, the *Rhōs*, Venice	The Iberian rulers	Italy	The Western Empire and France
(B) Bulgaria (C) Croatia (K) Kiev (S) Serbia (V) Venice	(A) Aragon (B/C) Barcelona/ Catalonia (L) Asturias/León (C) Castile) (N) Navarre (P Portugal)	(B) Benevento (C) Capua (S) Salerno (N) Normans	(F) France Western Empire (K) Kings (E) Emperors
No rulers began their rules in this period			

said, there can be no doubt that by the accession of Alexios I Komnēnos, the Byzantine navy had virtually disappeared and certainly could not project its forces far afield. Faced by the attack on the Balkans in 1081 by the Normans under Robert Guiscard, Alexios had no choice but to offer a new imperial *chrysobull* to Venice, granting extensive economic privileges within the Empire to her merchants in return for the assistance of her fleet against the Normans.[152]

To some degree at least, the decline of Byzantine naval forces over the century can be explained by a lack of enemies to be concerned about. The Bulgarians had been eliminated and the *Rhōs* of Kiev had been largely pacified by an alliance made with Vladimir I in 987 and his marriage to Basil II's sister Anna and conversion to Christianity in the following year. The only outbreak of hostilities with the *Rhōs* was the attack on Constantinople in 1043 by Vladimir's son Jaroslav I, probably as a result of disputes over trading rights. The defeat of his forces led to a peace treaty in 1046 sealed by the marriage of Constantine IX's daughter to Jaroslav's son Vsevolod.

In the South it appears that the Fāṭimid navy went into decline from the end of the tenth century, at least if the complete lack of mention in the sources of any activity by it is a reliable index. During the reigns of al-Ḥākim and al-Ẓāhir, relations with Byzantium were relatively peaceful, except for some clashes by land in Syria, and there were long periods of truce. Then in 1062 civil war broke out between Turkish and black *'abīd* troops in Egypt which was ended only by the appointment in 1073 of Badr al-Jamālī, the governor of Acre, as *amīr al-juyūsh*, commander of the armies. Badr died in 1094 and was

[152] Anna Komnēnē, *Alexiade*, IV.i-iii, VI.v (vol. 1, pp. 145-50; vol. 2, pp. 50-55).

succeeded by his son al-Afḍal. During all this period Muslim sources make no mention of any operations of Fāṭimid fleets. Who the Muslim corsairs who attacked *Myra* and pillaged the Cyclades in 1035, only to be defeated by the fleet of the *Kibyrrhaiōtai* in the Cyclades in the following year, were is unknown.[153] After that Muslim incursions into the Aegean ceased entirely. As a result the three great maritime *themata* of the *Kibyrrhaiōtai*, Samos, and *Aigaion Pelagos* declined. The fleet of the *Kibyrrhaiōtai* and its *stratēgos* are last mentioned during the reign of Constantine IX. During the eleventh century small squadrons based locally at Kefallēnia, *Abydos*, Samos, Chios, Naupaktos, and other places in support of terrestrial forces and against corsairs became more important.

In *al-Andalus* the death of al-Manṣūr's son, 'Abd al-Malik, in 1008 led to a series of short-lived Caliphates interspersed with rules by members of the Ḥammūdid family of Malaga. The Caliphate finally collapsed in 1031 and was succeeded by local dynasties ruling in various regions and cities and known as the *mulūk al-ṭawā'if*, the *taifa* or "Party" kings because the various rulers were descended from either Arabs, or Berbers, or Slavic *mamālīk*. Muslim *al-Andalus* began a slide into military impotence which would lead to domination of it by the Christian rulers of the North and to progressive loss of territory to them. This would culminate in 1085 with the fall of the Dhū 'l-Nūnid *taifa mamlaka* of Toledo to Alfonso VI of León/Castile. Many of the *taifa mulūk* were compelled to pay protection money, *paria***,** to the northern Christian monarchs and to freebooters such as Rodrigo Díaz de Vivar, *el Cid*, to prevent being attacked by them.[154]

There was, however, one exception to the nature of the *taifa mamālik*. This was the *mamlaka* of Denia and the Balearics founded by the renowned Mujāhid al-Muwaffaq, a Slavic *mamlūk* of al-Manṣūr who became governor of Denia and then independent ruler from ca 1009. In 1015-16 he attempted to conquer Sardinia but was ejected by the combined fleets of Pisa and Genoa in 1017.[155] At some time after that he annexed the Balearic islands, which he ruled until

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[153] John Skylitzes, *Synopsis historiōn*, Μιχαήλ ὁ Παφλαγών.6-8 (pp. 396-8); John Zōnaras, *Epitomē historiōn*, XVII.10, 14 (vol. 4, pp. 127, 139); Sāwīris, *History of the Patriarchs* (Khater & Burmester), vol. 2, part 3, pp. 314-16, 388-9.

[154] Al-Marrākushī, *Al-Mu'jib*, pp. 33-111; Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 408-12, 420-46, 480-81;

[155] Bernardo Maragone, *Annales Pisani*, MXVI-MXVII (pp. 4-5); Ibn al-Athīr, *Al-Kāmil* (Amari), *Anno* 406 (vol. 1, pp. 358-9); *idem*, *Al-Kāmil* (Fagnan), p. 444; Ibn Khaldūn, *Muqaddimah*, III.32, VI.10 (vol. 2, pp. 41, 441). See also Codera, "Mochéhid".

his death in 1044/5, to be succeeded there by his son ʻAlī ibn Mujāhid until 1076, when both Denia and the Balearics were occupied by al-Muqtadir ibn Hūd, the *malik* of Zaragoza. They were occupied by the Almoravids in 1115 after the governor called for their help when under attack by an invasion force of Genoa, Pisa and Barcelona. During all this period the Balearics became a hub for Muslim corsairs operating throughout the western Mediterranean.

Around 1050 the Byzantine Empire reached its greatest extent for centuries and at sea faced no enemies. Armenia was finally absorbed completely in 1045 and the Empire then stretched from Lake Urmia to Syria, the Danube, and the Adriatic. Its maritime commerce flourished. But as a consequence the maintenance of military and naval forces was allowed to fall away. Services, both military and those supporting the military, were commuted for cash payments, which might or might not be spent on the military. In his advice to an emperor, Kekaumenos reflected the growing malaise:

> Strive to have commanders of the fleet who are above all giving and receiving, for if the commanders of the fleet are greedy and accept gifts, listen to what they will do. In particular, they allow the forces to be excused, accepting from them money, not the amount they normally give for this service of the fleet but a double amount, and the *chelandion* becomes defective.[156]

This merely reflected corruption at an individual level. Much more serious was the commutation of services for cash on a system-wide basis and the consequent neglect of military forces. The army of *Ibēria/Mesopotamia* was dissolved by Constantine IX around 1050, leaving the eastern frontiers exposed. Constantine also initiated a series of changes to military structures which led to progressive debilitation of the traditional *thema* armies. The Empire became increasingly reliant on foreign mercenaries such as Normans, Turks, and Pechenegs. With the exception of Isaac I Komnēnos and Rōmanos IV Diogenēs, the emperors of the period neglected the armies, preferring to spend their revenues on other things, and the state to which the armies declined is reflected in the descriptions of the rag-

[156] Kekaumenos, *Stratēgikon* (Wassiliewsky), Νουθετητικὸς πρὸς Βασιλέα, §22 (p. 102): "ἀγωνίζου δὲ ἔχειν καὶ τοῦ στόλου ἄρχοντας ἀνωτέρους παντὸς δώρου καὶ λήμματος, εἰ γάρ εἰσιν λείξουροι καὶ δωρολῆπται οἱ τοῦ στόλου ἄρχοντες, ἄκουσον τί ποιοῦσιν. ἐν πρώτοις μὲν στρατείας ἐῶσιν ἐξκουσεύεσθαι λαμβάνοντες ἐξ αὐτῶν νομίσματα οὐχ ὅσα ἤθελον δοῦναι εἰς τὴν ἐπήρειαν τοῦ στόλου, ἀλλ᾽ ἐν διπλῇ ποσότητι, καὶ γίνεται χελάνδιον ἐλλιπές.".

tag battalions which Rōmanos IV assembled to face the Turkish menace in the East in 1068-71.[157]

The nature of Byzantine naval forces changed. The *droungarios tou ploimou* in Constantinople in charge of a *sekreton* became virtually the admiral in chief. The *stratēgoi* of the provincial *themata* in general lost importance and in the case of the naval *themata*, their fleets disappeared. What naval forces remained were either sent out from the centre by the *droungarios tou ploimou* or became dependent upon provincial military commanders such as *doukadēs* and *katepanō*.[158]

In the central Mediterranean the Zīrīds were the successors to the Aghlabids at sea. According to Ibn al-Athīr, who is however unsupported and there must be some doubt about it, in 1025 Sharaf al-Dawla al-Muʿizz sent a huge fleet of 400 ships to sea in response to the Byzantine tentative against Sicily but it was destroyed by storm near Pantelleria. The activities of Zīrīd corsairs provoked the Pisans to attack *Bona* in 1034. Then in 1047 Sharaf al-Dawla sent his fleet raiding into the Ionian.[159]

In Sicily in 1035 a rebel against the rule of the Kalbīte *amīr* Aḥmad al-Akhal by the name of Abū-Ḥafs called in the Zīrīds and Sharaf al-Dawla sent his son ʿAbd Allāh ibn al-Muʿizz with an expeditionary force. Al-Akhal was defeated and killed in 1038 but ʿAbd-Allāh was in turn defeated and expelled by another Kalbīte *amīr*, al-Ḥasan al-Ṣamṣām al-Dawla, in 1040. However, Ḥasan was deposed in 1044 and in any case ruled over part of the island only, which from the 1040s came to be ruled by various *amīrs* in various cities, of whom ʿAlī ibn Niʿma ibn al-Ḥawwās in the region of Enna was the most powerful. Then between 1053 and 1060 another *amīr* by the name of Muḥammad ibn Ibrāhīm ibn al-Thumna rose to power in Syracuse. When Ibn al-Thumna lost support after unsuccessfully besieging Enna and then turned to Roger of Hauteville for aid, the Muslims themselves had sown the seeds of their own destruction.[160]

The advent of the Normans in southern Italy is a confused tale of

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[157] *John Skylitzēs continuatus*, pp. 124-5**;** John Zōnaras, *Epitomē historiōn*, XVIII.10, 11 (vol. 4, pp. 202-3, 207); Michael Attaleiatēs, *Historia*, p. 103.

[158] See Ahrweiler, *Byzance et la mer*, pp. 155-71; Guilland, "Drongaire", pp. 539-42; Malamut, "Les insulaires".

[159] Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 450-51, 455. See also Idris, *Berberie orientale*, pp. 167-71.

[160] Al-Nuwayrī, *Nihāyat ʿal-Arab* (Amari), pp. 141-4; *idem*, *Nihāyat ʿal-Arab* (Caussin), pp. 434-9; Amatus of Monte Cassino, *L'ystoire de li Normant*, V.viii (pp. 147-8); Geoffrey Malaterra, *De rebus gestis*, II.iii (p. 30); Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 498-504; Ibn Khaldūn, *ʿIbar* (Amari), pp. 200-203.

bloodshed and mayhem.[161] Most probably the first of them to attract attention were pilgrims returning from Jerusalem and either they or others became mercenaries in the employ of the prince of Salerno and they, and perhaps yet others, joined the second rebellion of Melo in 1017. After *Cannae* the survivors took service with the Lombards. Byzantine rule in Apulia and the *Capitanata* remained secure until the 1040s but meanwhile Norman mercenaries found employment on all sides in the internecine strife of the period and in 1030 Duke Sergius IV of Naples made one of their leaders, Rainulf, count of Aversa, thus giving them their first landed power base. His countship was confirmed by the Western Emperor Conrad II when he visited the South in 1038, at which time he also deprived Pandolf IV of his principality of Capua and invested Guaimar IV of Salerno with it.

In 1041 a Milanese mercenary by the name of Arduin who had once been in Byzantine service invaded Apulia with the aid of the Normans of Aversa. Arduin soon disappeared, to be replaced by Lombard allies and by Argyrus, the son of Melo, but by 1042 the Normans and their allies controlled all of Apulia apart from Trani, Taranto, and Bari and the peninsula south. In these circumstances, George Maniakēs was restored to favour and sent to Italy. He managed to restore the situation to some extent, in the process inducing Argyrus to abandon his Norman friends, but when his enemy Constantine IX came to the throne he attempted to replace Maniakēs in Italy, inducing him to revolt and march on Constantinople, during the course of which he lost his life. However, Argyrus's defection caused the Normans in Apulia to choose their own leader for the first time. They chose William "the Iron Arm", William of Hauteville, the son of a poor knight of Normandy. In 1042 William and the other Norman leaders carved up the lands they had acquired, William taking Ascoli and his brother Drogo Venosa. The rise to power of the Hautevilles had begun. William received the title of Count from Guaimar IV of Salerno and married one of his nieces. The sucession was disputed but after William's death in 1045, Drogo did eventually succeed him. In the next year or so there arrived from Normandy Drogo's younger half-brother Robert, who Drogo knew well as a potential rival and did not welcome. He shunted him off to Calabria to make a living as a freebooting brigand and it was at this time that he acquired his sobriquet Guiscard, "the wily" because he lived off his wits very successfully.

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[161] See also Kreutz, *Before the Normans*; Loud, *Robert Guiscard*.

In the winter of 1046-7 the Western Emperor Henry III came to Italy, primarily to resolve the problem of three competing claimants to the Papacy. However, he also took the opportunity to visit the South, depriving Guaimar IV of Capua and restoring Pandolf IV, but also confirming Rainulf II as Count of Aversa and Drogo as Count in his own lands. By the early 1050s the Normans were rapidly becoming masters of the South but their depredations had alienated all sections of the native populace and in 1051 Drogo was murdered. Pope Leo IX, by now ruling Benevento on behalf of the Western Empire, and Argyrus, recently sent back to Italy as *katepanō* from Constantinople, began negotiations for an anti-Norman coalition; however, a third Hauteville brother, Humphrey, who had succeeded Drogo as Count, struck against Argyrus and defeated him in 1052. In the following year, when the Pope in person led a substantial force into the South intending to unite forces with Argyrus in Apulia, the Normans intercepted him at *Civitate*, south of the Fortore river in the *Capitanata*, and won an overwhelming victory, the Pope being surrendered to them by the men of *Civitate*. He died in the following year, followed by Constantine IX in 1055 and Henry III in 1056, leaving the Normans free to do as they wished. On Humphrey's death in 1057 Robert Guiscard succeeded him. By 1060 all of Calabria had fallen to the Normans and the last Byzantine garrisons were evacuated. Capua had been taken in 1058, although Salerno would survive until 1076. At Melfi, in August 1059, Robert Guiscard was invested by Pope Nicholas II as Duke of Apulia and Calabria. All that remained was to mop up the last Byzantine possessions in Apulia. However, that would prove to be a very protracted process, exacerbated by the diversion of Norman energies to Sicily from 1061. Not until August 1068 was Robert Guiscard ready to commence the siege of Bari. The city's land walls could not be stormed and the Normans were unable to prevent supplies being brought in by sea, one squadron succeeding in breaking into the city in 1069. But early in 1071 a second was defeated by Robert's younger brother Roger who had brought a squadron around from Sicily. The city was compelled to surrender on 16 April.[162]

The Normans launched a preliminary raid against Sicily in 1061 which succeeded in capturing Messina, delivering mastery of the Straits of Messina to them and allowing their forces to be reinforced

[162] Amatus of Monte Cassino, *L'ystoire de li Normant*, V.xxvii (pp. 159-64); Geoffrey Malaterra, *De rebus gestis*, II.40, 43 (pp. 48-9, 50-51); Romuald of Salerno, *Chronicon*, pp. 187-8; William of Apulia, *Gesta*, III, ll 111-46 (p. 268).

and supplied easily. Muslim naval forces from Palermo were forced to withdraw. The Normans then moved inland against Enna and defeated the army of Ibn al-Ḥawwās. However, the conquest bogged down for many years as a result of a number of factors: inadequate Norman numbers, disputes between Roger and Robert Guiscard and the latter's need to complete the conquest of Apulia, stiffening Muslim resistance and difficulties in taking some heavily fortified positions, worsening relations with the Greek population of the island, and the arrival of Zīrīd reinforcements under the sons of the new *amīr* Tamīm, Ayyūb and 'Alī. Although they were defeated at *Cerami* in 1063 and 'Alī was killed, Ayyūb remained on the island until 1069.[163]

In 1064 Roger, with the assistance of Robert Guiscard, besieged Palermo for four months but the Normans had neither the numbers nor the naval forces necessary for such an assault. However, after the capture of Bari the circumstances became very different. In the summer of 1071 Robert and Roger marshalled their forces and moved against Palermo. For the first time the Normans had significant naval forces and these engaged a Zīrīd relief force, drove them into the harbour, and broke through its chain and set the surviving Muslim ships on fire. The outer walls were penetrated and the city surrendered on 10 January 1072.[164]

Nevertheless, it would be another 20 years before the last Muslim fortress fell. Of immediate concern was Enna, which was too powerfully fortified to be besieged. So an offensive fortress was built on Monte Calascibetta, two kilometres to the north, to contain the Muslims. A Zīrīd assault on Mazara in 1075 was only beaten off with great difficulty, but successful assaults on Trapani in 1077, *Castronuovo* in 1078, and Taormina in 1079, began to turn the tide decisively. In August 1086 Syracuse fell, a Pisan, Genoese, and Amalfitan expedition in 1087 against *al-Mahdiyya* neutralised Tamīm, and in 1087 Enna's *amīr* finally gave up the struggle. The last Muslim fortress, Noto, surrendered in 1091.[165]

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[163] Al-Nuwayrī, *Nihāyat 'al-Arab* (Amari), pp. 144-5; *idem*, *Nihāyat 'al-Arab* (Caussin), pp. 439-40; Amatus of Monte Cassino, *L'ystoire de li Normant*, V.ix-x (pp. 148-50); Geoffrey Malaterra, *De rebus gestis*, II.v-vi, viii-xii, xvii, xxxiii (pp. 31-4, 42-5); Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 502-3. See also Idris, *Berbérie orientale*, pp. 283-9; Loud, *Age of Robert Guiscard*, pp. 146-85; Waley, "Combined operations".

[164] Amatus of Monte Cassino, *L'ystoire de li Normant*, V.xxvi (p. 159), VI.xiv, xvi (pp. 178-80); Geoffrey Malaterra, *De rebus gestis*, II.xxxvi (pp. 46-7), II.xlv (pp. 52-3); Lupus Protospatharios, *Annales*, 1072 (p. 60); William of Apulia, *Gesta*, III, ll. 225-339 (pp. 270-72).

[165] Al-Nuwayrī, *Nihāyat 'al-Arab* (Caussin), p. 440; Geoffrey Malaterra, *De rebus*

Although the Empire had made some efforts to relieve Bari in 1068-71, there can be little doubt that in Constantinople the perils of its last remaining posession in Italy would have appeared insignificant compared to those posed by the irruption of the Turks into its eastern provinces. In 1038 a Saljūqid chieftain of the *Oghuz* Turks, Rukn al-Dunyā wa 'l Dīn Ṭoghrïl I, had proclaimed himself *sulṭān* at Nishapur. In 1055 he entered Baghdad, overthrew the Būyids, and was recognized by the 'Abbāsid Caliph al-Qā'im. In 1063-4 a Saljūqid chieftain by the name of Qutalmïsh rebelled unsuccessfully and was killed; however, his son Sulaymān ibn Qutalmïsh moved north into the mountains south of the Caspian Sea and then into Anatolia and Byzantine territory. The activities of the tribes under Sulaymān led to Rōmanos IV Diogenēs assembling the Byzantine armies and moving against them. This provoked the new *sulṭān* 'Aḍud al-Dawla Alp-Arslan to move north to their defence and the two armies met at *Mantzikert* in August 1071. The ensuing two-day battle was a disastrous defeat for the Empire. Although treated with respect by Alp-Arslan and released, Rōmanos was overthrown in Constantinople by supporters of Michael VII, defeated in the civil war that ensued, and blinded.[166] In the chaos that descended on Anatolia, the Turkish bands under Sulaymān ibn Qutalmïsh moved west and by 1078 he had captured *Nicaea* and made it his capital. Alexios I Komnēnos recognized his boundaries in 1081. The Turks of *Nicaea* would figure prominently in the circumstances leading to the First Crusade.

The rise of the Saljūqids was parallelled in the West by that of the Almoravids. Yaḥyā ibn Ibrāhīm, the leader of a branch of the Ṣanhāja Berbers in the western Sahara, made the *Ḥajj* in the early eleventh century and on his way home engaged in *Ifrīqiya* a famous preacher called 'Abd Allāh ibn Yāsīn. 'Abd Allāh's preaching was so austere that Yaḥyā ibn Ibrāhīm's own tribesmen drove him out but he found refuge in a *ribāṭ* surrounded by water, probably on an island in either the Niger or Senegal rivers, or perhaps on some promontory on the Atlantic coast. His movement became known as the *al-Murābiṭūn*, Hispanicized as Almoravids. After his death, the Almoravid *Amīr al-Muslimīn*, Yūsuf ibn Tashufīn, overran Morocco and founded

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gestis, III.vii-ix, xi-xii, xvii-xviii (pp. 60-61, 62-4, 66-7), IV.i-ii, v-vi, xii-xv (pp. 85-8, 92-3); Ibn al-Athīr, *Al-Kāmil* (Fagnan), p. 503.

[166] Nikēphoros Bryennios, *Hyle historias*, I.13-17 (pp. 104-119); *John Skylitzēs continuatus*, pp. 144-55; John Zōnaras, *Epitomē historiōn*, XVIII.14-15 (vol. 4, pp. 213-19); Michael Attaleiatēs, *Historia*, pp. 142-79; Sāwīris, *History of the Patriarchs* (Khater & Burmester), vol. 2, part 3, pp. 308-11.

Marrakesh as his capital in 1062. In 1086 he was invited by the *taifa mulūk* to come to their assistance and won a great victory over Alfonso VI of León/Castile at *Sagrajas*. He retired back to Morocco but, despairing of the squabbling *taifa mamālik*, returned in 1090 and by 1095 had suppressed all of them, with the exception of Zaragoza.[167]

The Almoravids were fundamentalist Berber warriors who initally had little but contempt for the softness of the civilization of Moorish Spain. They considered payment of *paria* to Christians as a breach of the *sharī'a*, which forbad Muslims from being subject to non-Muslims. They also denounced the imposition of non-*Qur'ānic* taxes, *mukūs*, by the *taifa mulūk*, and the exercise of authority by Jews over Muslims, as had occurred in the *taifa mamlaka* of Granada, as another breach of the *sharī'a*. They were aided by the support of jurists of the Malīkī school and the common populace, who were wearied of the corruption, luxury, and inability to resist the Christians of the *taifa* ruling classes. Increased restrictions were imposed on Christians and Jews and conditions for Christians became so bad that in 1125-6 large numbers returned to the North to settle there with Alfonso I of Aragon when he led a large raid into Muslim territory. Although the Almoravid takeover stabilized the frontiers for some years, they were unable to retake Toledo and Zaragoza was taken by Alfonso I of Aragon in 1118.

According to Ibn Khaldūn, in their heyday the Almoravids had fleets totalling 100 ships and their hereditary admirals were the *banū* Maymūn, a family from Cadiz. Muḥammad II al-Mu'tamid, the last 'Abbādid *malik* of Seville, had handed over his fleet to Yūsuf ibn Tashufīn in 1083 to blockade Ceuta and Yūsuf had built more ships of his own. Although there is little record of the activities of the Almoravid fleets, in 1122 'Ali ibn Yūsuf did send a fleet to Calabria commanded by Abū 'Abd Allāh Muḥammad ibn Maymūn and he captured Nicotera. In 1127 the Almoravid admiral sacked Patti and Syracuse. The strength of the Almoravid fleets may have been underestimated because they appear never to have engaged Christian naval forces in open battle. Traditionally, the twelfth century has been considered to mark the begining of the naval domination of the Mediterranean by the Latin West and it is true that the naval forces of Genoa and Pisa were beginning to flex their muscles in the Almoravid

[167] Al-Bakrī, *Kitāb al-mughrib*, pp. 311-21; Al-Marrākushī, *Al-Mu'jib*, pp. 110-16, 136-8; Ibn abī Zar', *Rawḍ al-Qirṭās*, pp. 162-223; Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 462-8, 482-6, 491-8; Ibn Khaldūn, *'Ibar* (De Slane), vol. 2, pp. 67-80. See also Lagardère, *Almoravides*, pp. 45-141.

period. However, when the two cities allied with Count Ramon Berenguer III of Barcelona to attack the Balearics in 1113-4 in revenge for corsair raids and attacks on Christian coasts, they could not hold onto them against ‘Ali ibn Yūsuf’s counter-attack in 1115. According to a letter of 1116 appointing an unnamed person as governor of the Balearics, the Almoravid invasion fleet had consisted of 300 *shawānī* galleys under the command of a *qā’id* by the name of Ibn Tāfratust. The Almoravid appointed Muḥammad ibn ‘Alī ibn Yūsuf al-Masūfi ibn Ghāniya governor of the Balearics in 1126 and his family would continue to rule them for generations, even after the overthrow of the Almoravids by the Almohads.[168]

In time the Almoravids were captured by the culture and luxury of Moorish Spain and their whole state began to lose cohesion. By the mid twelfth century Portugal had gained Lisbon, Castile had pushed south across the Guadiana river to *Calatrava*, and Aragon had secured the frontier of the Ebro river. Only in this late period of their decline do the Almoravids appear to have begun to cede naval supremacy in the western Mediterranean. In 1136 a Genoese squadron raided the Ḥammādid capital of *Bijāya* and in 1146 the Genoese consul Caffaro assaulted Minorca. In the following year Count Ramon Berenguer IV of Barcelona seized Almeria with Pisan and Genoese assistance, and the following year Tortosa, although the Almohads recovered Almeria in 1157. From the 1130s the Almoravids appear to have sought more peaceful relations with some Christian powers. In 1136 two *galeae* commanded by Abū ‘Abd Allāh Muḥammad ibn Maymūn arrived in Pisa to conclude a ten-year treaty of peace between the city and the Almoravids and the *amīr* of Tlemcen.[169]

The Almohads stemmed from a movement for religious reform known as *al-Muwaḥḥidūn*, “the unitarians”, founded by Muḥammad ibn ‘Abd Allāh ibn Tūmart, a Maṣmūda Berber from the Atlas mountains. They brought fervour, piety, and reform of religious mores to the Muslim world in the West, waging *jihād* against their Almoravid and other opponents. After his death in 1130, his follower,

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[168] Al-Maqqarī, *Nafḥ al-ṭīb*, VII.iv (vol. 2, pp. 257-8); Al-Marrākushī, *Al-Mu‘jib*, pp. 230-33; Bernardo Maragone, *Annales Pisani*, A.D. MCXIIII (p. 8); *Gesta triumphalia per Pisanos facta*, pp. 90-94; Ibn abī Zar‘, *Rawḍ al-Qirṭās*, p. 204; Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 513-15; Ibn Khaldūn, *‘Ibar* (De Slane), vol. 2, pp. 77, 87-9; *idem*, *Muqqadimah*, vol. 2, p. 43. See also Bel, *Benou Ghānya*; Lagardère, *Almoravides*, pp. 205-7; *idem*, *Djihad Andalou*, pp. 39-41, 268-70.

[169] Al-Marrākushī, *Al-Mu‘jib*, pp. 146-54, 179-82; Bernardo Maragone, *Annales Pisani*, A.D. MCXXXIIII (p. 9); Caffaro, *Annales Januenses*, pp. 28, 33-5; Ibn abī Zar‘, *Rawḍ al-Qirṭās*, pp. 224-42; Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 562, 567, 582-4; Ibn Khaldūn, *‘Ibar* (De Slane), vol. 2, pp. 80-86.

the Caliph ‘Abd al-Mu’min, continued his work bringing all of the Maghrib under Almohad control by the time that he annexed the last remaining Norman possessions in *Ifrīqiya* in 1160. Even earlier, in 1146, he had been compelled to intervene in *al-Andalus* when the Almoravid *amīrate* began to break up. By 1148 he controlled the south-west but the south-east remained in the hands of the *malik* of Valencia, Abū ‘Abd Allāh Muḥammad ibn Sa‘d ibn Mardanīsh, known as the “Wolf king” to Christians. The Almohads closed in on him and after he died in 1172 his family submitted to Abū Ya’qūb Yūsuf. In time the Almohads themselves would go into decline but in their heyday, before the distastrous defeat of Muḥammad al-Nāṣir by a Christian coalition at *Las Navas de Tolosa* in 1212, they brought renewed vigour to *al-Andalus*. In particular, their crushing victory over Alfonso VIII of León/Castile at *Alarcos* in 1195 turned back the progress of the Christian *Reconquista* for over a decade.[170]

Even more so than the Almoravids, the Almohads made a determined effort to achieve naval strength in the western Mediterranean and especially to control the 400 kilometre channel through the Straits of Gibraltar from Cadiz to Almeria. They were never able to prevent ingress through the Straits of large Northern Crusader fleets because the contemporary technology of naval warfare and the maritime geography and meteorology of the channel made that impossible; however, Ṣalāḥ al-Dīn considered that they could have attempted to do so at least. In 1189 he sent an envoy to the Almohad Caliph Abū Yūsuf Ya‘qūb al-Manṣūr requesting that he use his fleet to prevent Crusader fleets reaching the East. But other Christian shipping sailed in these waters only with Almohad permission, as the treaties with them concluded by Pisa, Genoa, and Sicily testify. No Christian powers wanted to antagonize the Almohads at sea.[171]

The Almohads acquired the fleet of Seville when its admiral, ‘Alī ibn Īsā ibn Maymūn lent it to them for a siege of Ceuta in 1146. After

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[170] On the Almohads in general in this period see Al-Marrākushī, *Al-Mu‘jib*, pp. 154-281, esp. pp. 245-6 (Alarcos), 279-80 (Las Navas de Tolosa); Ibn abī Zar‘, *Rawḍ al-Qirṭās*, pp. 242-342, esp. pp. 309-22 (Alarcos), 339-42 (Las Navas de Tolosa); Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 526-66, 609-12 (Alarcos); Ibn Khaldūn, *‘Ibar* (De Slane), vol. 2, pp. 161-227, esp. pp. 213-14 (Alarcos), 224-6 (Las Navas de Tolosa). For a detailed account of Almohad history 1160-73, see Ibn Sāḥib, *Al-Mann bi ’l-imāma*, pp. 40-234.

[171] De Mas Latrie, *Traités de paix*, vol. 2, Documents, Pise III-IV (pp. 27-30), Gênes II (p. 108), Deux-Siciles I (p. 152); Ibn Khaldūn, *‘Ibar* (De Slane), vol. 2, p. 215; *idem*, *Muqqadimah*, vol. 2, pp. 43-5. See also Gaudefroy-Demombynes, “Lettre de Saladin”; Rosenberger, “Contrôle du détroit”, pp. 24-5.

the conquest of Ceuta and Tangier, ‘Abd al-Mu‘min named his son Abū Sa‘īd governor of Ceuta and the Almohad fleet began to be built up there and in Tangier. It was the fleet of Ceuta commanded by Abū Sa‘īd which was instrumental in the recovery of Almeria in 1157. He also built a powerful new base on the Atlantic: the *Ribāṭ al-Fath* on the southern bank of Wadī Abū Raḳrāḳ opposite Salé, now Rabat. In November 1158 he sent a circular from there ordering the coastal tribes to construct ships and as early as 1160 the Almohad fleet was able to beat off a Sicilian fleet sent to relieve the siege of *al-Mahdiyya* by ‘Abd al-Mu‘min. According to Ibn al-Athīr, the Almohad fleet included 70 *shawānī*, *tarā’id* and *shalandiyyāt*. According to Ibn abī Zar‘, in 1162 he had 400 ships built: 120 at *Mamora* upstream from Rabat, 100 at Tangier, Ceuta, *Bādis* and other ports of the Rif, 100 in the Maghrib at Oran and *Hunayn*, and 80 in *al-Andalus*. By the 1180s the Almohad fleet was a force to be reckoned with by all. In 1179/80 the Caliph Abū Ya‘qūb Yūsuf I sent the fleet under Ghānim ibn Muḥammad ibn Mardanīsh to blockade Lisbon, which he was trying to recover. According to Ibn Khaldūn, he returned with considerable booty, although Ibn ‘Idhārī recorded that he was defeated and captured. In the following year a Muslim officer of Roger II of Sicily by the name of Aḥmad al-Ṣiqillī, who had fled to *Ifrīqiya* when William I succeeded to the throne and then to the court at Marrakesh where he was made admiral of the fleet, reorganised it and gained a victory over the Portuguese, capturing 40 ships according to Ibn ‘Idhārī; although, according to Ibn Khaldūn the victory was gained by the admiral of Seville, ‘Abd Allāh ibn Isḥāq ibn Jāmī, and only 20 ships were captured. In 1184 Aḥmad al-Ṣiqillī was again sent with the fleet to blockade Lisbon in conjunction with a land assault by Abū Ya‘qūb Yūsuf, who died at Santarem. When Alī ibn Ghāniya of the Balearics seized *Bijāya* in 1185, the Almohad fleet under the command of Ibn Jamī quickly drove him from it. The Balearic fleet of the *banū* Ghāniya was by now no match for that of the Almohads. Ibn Khaldūn wrote that it reached “a size a nd quality never, to our knowledge, attained before or since”. As long as the *banū* Ghāniya in the Balearics continued the corsair war against Christians they were tolerated. But their rebellious activities in the Maghrib provoked punitive expeditions against the islands from Ceuta and Almeria. In 1203 an expedition consisting of 300 ships, of which 70 were *aghriba*, 30 *ṭarā’id*, 50 *marākib*, and the rest *qawārib* and merchant ships, was mobilized in Denia. The Balearics were occupied by the

Almohads.[172]

Having eliminated the menace of the Neretljani in 1000 Venice became if not yet the mistress of the Adriatic at least the dominant power in it. Only two years later the Doge led the Venetian fleet to the relief of Byzantine Bari, besieged by the Muslims, and defeated their naval forces in a three-day battle outside the harbour. For many years thereafter the Adriatic was peaceful; although, Doge Domenico Contarini was led to recapture Zara and reimpose Venetian authority along the Dalmatian coast in 1062 by increasing confusion caused by pressure from Croats, Hungarians, and Byzantines. Thereafter the Venetian fleet remained inactive until Alexios I Komnēnos was compelled to seek Venetian help against Robert Guiscard in 1081.[173]

Guiscard was a man of enormous ambition. In 1074 he accepted a proposal for a engagement between his daughter Olympias and Constantine, the infant son of Michael VII Doukas, in return for imperial titles carrying with them very substantial stipends, money of which Guiscard had sore need. But the overthrow of Michael VII by Nikēphoros III Botaneiatēs changed all of that. The marriage was called off and Olympias, rebaptized Helena, became a virtual prisoner in Constantinople. The stipends no doubt ceased to be paid. An opportunity to invade the Empire beckoned. An imposter claiming to be the deposed Michael VII was used as an excuse and in the spring of 1081 Robert's forces crossed the Adriatic. His son Bohemond first seized Corfu and in June the united forces laid siege to *Dyrrachion*.[174]

In April 1081 Botaneiatēs himself was overthrown by Alexios I Komnēnos, who was married to Eirēnē Doukaina. Constantine and Helena were rehabilitated. But by the time that news of that reached the West the attack had gone in and was not to be called off. The siege of *Dyrrachion* continued despite the best efforts of Alexios. His Venetian allies lost their initial engagement at sea with the Normans,

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[172] Al-Baydhaq, *Histoire des Almohades*, pp. 176-7, 200-201; Al-Marrākushī, *Al-Mu'jib*, pp. 274-5; Al-Nuwayrī, *Nihāyat 'al-Arab* (Caussin), pp. 445-8; Al-Tijānī, *Riḥla*, ser. 5, 1.1, pp. 398-9; Ibn abī Zar', *Rawḍ al-Qirṭās*, pp. 275, 284, 323, 386; Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 584-90, 603-8; Ibn Khaldūn, *'Ibar* (De Slane), vol. 2, pp. 180-81, 183-4, 190, 192, 202, 204, 208-9, 217-19; vol. 4, p. 63; *idem*, *Muqqadimah*, vol. 2, pp. 43-5; Romuald of Salerno, *Chronicon*, pp. 241-2.

[173] John the Deacon, *Cronaca Veneziana*, pp. 165-7;

[174] Amatus of Monte Cassino, *L'ystoire de li Normant*, VII.xxvi (pp. 213-14); Andrea Dandolo, *Chronica*, IX.viii (p. 216); Anna Komnēnē, *Alexiade*, I.x.3, I.xii, I.xiv, I.xvi (vol. 1, pp. 37, 42-7, 51-3, 56-61); Geoffrey Malaterra, *De rebus gestis*, III.13 (p. 65); Lupus Protospatharios, *Annales*, 1076 (p. 60); Romuald of Salerno, *Chronicon*, pp. 189, 191; William of Apulia, *Gesta*, IV, ll. 171-207 (p. 283). On the Norman campaign in the Balkans see also Loud, *Age of Robert Guiscard*, pp. 209-23.

although they regrouped and successfully re-engaged, and Alexios's own relief force by land was overwhelmingly defeated in October. The emperor was lucky to escape with his life and the city was eventually betrayed in February 1082. However, events in Italy compelled Robert to return home leaving Bohemond in command. Although he fought hard for another eighteen months and had several victories, he was eventually outmanœuvred by Alexios's guerrilla tactics, the latter's suborning of some of his forces, inability to take some strategic towns and fortresses, scarcity of supplies, and a Venetian recovery of *Dyrrachion*. He was compelled to evacuate at the end of 1083.[175]

After subduing his enemies in Italy, Robert returned to the Balkans in 1084 to find both Corfu and *Dyrrachion* back in Byzantine hands. He was initially defeated at sea by a combined Venetian and Byzantine fleet although he turned the tables on them in a second engagement. The Byzantine squadron in this allied fleet appears to have been commanded by a Michael Maurēx, who had led squadrons against Guiscard in Apulia in the 1060s, had formed his own private force in *Paphlagonia* in the 1070s, and was reported by Nikēphoros Bryennios to have had great experience of maritime affairs. His squadron was probably his own private force since Alexios does not appear to have attempted to reconstitute any Byzantine imperial squadrons until some time later. Despite this success, however, the Normans suffered cruelly over the winter and when Robert died at the outset of an attack on Kefallēnia in July 1085, the whole campaign disintegrated.[176]

Alexios had survived the first crisis of his reign but the next ten years would not be easy. In addition to a great many domestic problems he had to face the pressure of the Pechenegs, who had moved into the lower Balkans from ca 1078 and who reached the Sea of Marmara by the end of the next decade. Constantinople was besieged by them in the winter of 1090-91. However, Alexios made an alliance with their enemies the Kumans, who were Qipčaq Turks,

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[175] Andrea Dandolo, *Chronica*, IX.viii (p. 216); Anna Komnēnē, *Alexiade*, II.ii.3, IV.i-viii (vol. 1, pp. 68, 144-68), V.iv-vii, VI.i (vol. 2, pp. 17-32, 41-3); Geoffrey Malaterra, *De rebus gestis*, III.26-8 (pp. 72-5); John Zōnaras, *Epitomē historiōn*, XVIII.22 (vol. 4, pp. 237-9); Romuald of Salerno, *Chronicon*, pp. 192-6; William of Apulia, *Gesta*, IV, ll. 272-505 (pp. 284-9), V, ll. 1-105 (pp. 290-92).

[176] Andrea Dandolo, *Chronica*, IX.viii (p. 216); Anna Komnēnē, *Alexiade*, VI.v-vi (vol. 2, pp. 50-57); Romuald of Salerno, *Chronicon*, pp. 196-7; William of Apulia, *Gesta*, V, ll. 143-336 (pp. 293-7). On Maurēx see Anna Komnēnē, *Alexiade*, IV.iii.1 (vol. 1, pp. 148-9); Nikēphoros Bryennios, *Hyle historias*, II.26 (pp. 196-7); William of Apulia, *Gesta*, V, ll. 98-102 (p. 292).

and on 29 April 1091 he and the Kumans annihilated the Pechenegs at the battle of Mt *Lebounion* in Thrace near the mouth of the Maritsa river. Their remnants were absorbed and became part of the mercenary forces in the imperial armies.[177]

Of even more concern were the activities of the Saljūqids of *Rūm* who, under Qïlïj Arslan I, controlled almost all of Asia Minor by the mid 1090s. An independent *amīr* known to the Byzantines as Tzachas, Turkish Çaka, constructed a fleet at Smyrna ca 1088-9 and began to raid across the Aegean and to seize control of its islands. This was in many ways an even more formidable threat than that of the Normans and Pechenegs because it threatened the essential heartland of the Empire: its islands and sea lanes in the Aegean. He entered into negotiations with the Pechenegs but lost his allies after the battle of Mt *Lebounion*. He was then engaged by a new Byzantine fleet under Alexios's brother-in-law John Doukas, for whom, in keeping with the centralizing changes to Byzantine naval forces, a new title of *megas doux*, had been created. Tzachas was forced back to his base at Smyrna. Eventually his fleet was destroyed by Constantine Dalassēnos and he was betrayed to his Turkish rival Qïlïj Arslan I by Alexios and killed.[178]

In the spring of 1096 bands of Western pilgrims began moving from France and Germany towards Constantinople in what was to become known as the First Crusade. According to Ekkehard of Aura, Alexios had been in communication with Pope Urban II, requesting military aid against the Turks. Then, according to two obscure sources, envoys from Alexios had met Urban at the Council of Piacenza in March 1095 and had requested military aid. An even more obscure source, almost incoherent in its Latinity, recorded that Urban had first uttered the call to Crusade at Piacenza, before the momentous call was made after the Council of Clermont, on 27 November 1095.[179] However, it is in fact extremely unlikely that Alexios sent

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[177] Anna Komnēnē, *Alexiade*, VIII.i-vi (vol. 2, pp. 127-46); John Zōnaras, *Epitomē historiōn*, XVIII.23 (vol. 4, pp. 241-2).

[178] Anna Komnēnē, *Alexiade*, VII.viii, VIII.iii.2, IX.i.3-9, IX.iii (vol. 2, pp. 110-16, 134, 158-62, 164-6); John Zōnaras, *Epitomē historiōn*, XVIII.22 (vol. 4, p. 239).

[179] Bernold of St Blasien, *Chronicon*, 1095 (p. 462); Ekkehard of Aura, *Hierosolymita*, c. 5 (pp. 14-15); *Fragmentum historiae monasterii-novi Pictaviensis*, coll. 1219-20; Theodore Skoutariōtēs, *Synopsis Chronikē* (Sathas), pp. 184-5. Bernold of St Blasien was an obscure German monastic chronicler; however, he was present at Piacenza. Theodore Skoutariōtēs was a thirteenth-century bishop of *Kyzikos* and from where he obtained this information, which is reported by no surviving earlier Byzantine historian, is unknown. Ekkehard of Aura was an important historian of the Crusade but his report was not replicated by any other major Latin historian of

envoys to Italy to seek military assistance from the Pope. Envoys arriving in Italy in early spring 1095 would have had to have been sent in autumn 1094 but by then the Norman threat had been eliminated, the remnants of the Pechenegs had been absorbed, Tzachas's fleet had been destroyed and he himself killed, the Kumans had been thrown back by a decisive campaign in the summer of 1094, and Alexios had begun to take the offensive against the Turks by constructing a canal from Lake *Sophon* to the Gulf of *Nikomēdeia*, to isolate much of *Bithynia* from Turkish raids and thus to create a beachhead for an attempt at reconquest of Asia Minor. It is more probable that the confused reports of requests made at Piacenza for assistance reflected earlier overtures to the West such as that addressed to Count Robert I, "the Frisian", of Flanders ca 1091 seeking assistance against the Pechenegs,[180] and it is at least possible that there had been some earlier communication between Alexios and the Pope as Ekkehard reported, even though no hard evidence for it survives.

The Pisan and Genoese expulsion of Mujāhid al-Muwaffaq, from Sardinia was one of the first manifestations of the growing rise to maritime power of these two great trading cities of the Tyrrhenian Sea. Amalfi had preceded them in developing maritime commerce with the Muslim world but they would overtake and eclipse her in the later eleventh century, although there are only fragments of evidence from the eleventh century to indicate the growing reach of their maritime commerce. A letter from the Cairo *geniza*, written in Alexandria and dated to ca 1060, recorded that: "There arrived ships from Genoa and other *Rūm* places, and three other ships are expected from Spain". This is, in fact, the earliest known reference to Genoese voyaging to the Levant. For Pisa there is the intriguing archaeological evidence of the Pisan *bacini*, glazed ceramic shallow basins of Muslim origin inserted into the walls of churches, 628 of which have survived. Two from the church of St Piero a Grado, which dates from the early 11th century, have been identified as coming from the Balearics. Others can be identified as coming from the Maghrib and

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the Crusade. The *Fragmentum historiae monasterii-novi Pictaviensis*, the only text to report that Urban actually preached the Crusade at Piacenza, was written by a certain monk Martin. It ends immediately after its report on Piacenza and Clermont and was presumably very contemporary to the events. However, as it survives the text is extremely corrupt.

[180] Hagenmeyer, *Epistulae*, N° I (pp. 129-36). See also Joranson, "Spurious letter". As we have it, the letter from Alexios to Robert of Flanders is undoubtedly false but, it may well have been based on an authentic original.

al-Andalus.[181]

Of the two Tyrrhenian cities of Pisa and Genoa, it was Pisa which was initially the more aggressive at sea. In 1063 the Pisans proposed a joint attack on Palermo to the Normans but Count Roger considered it premature and did not take part. Nevertheless, the Pisan fleet attacked the port, seizing its chain and six *magne naves*. In 1087 Pisa, Genoa, and Amalfi attacked *al-Mahdiyya* in revenge for the raids of Tamīm's corsairs on Christian shipping and the coasts. There were many Christian prisoners in his prisons and his assistance to the Sicilian *amīrs* against the Normans had also increased Christian hostility to him. This was an important expedition because for the first time it embodied some elements of the ideology of Crusading. The expedition was successful and Tamīm was forced to free his prisoners, pay tribute, grant access to *al-Mahdiyya* to Christian merchants, and promise to restrain his corsairs.[182]

Even though it appears that from early in his reign Tamīm had some form of truce with Sicily, Zīrīd relations with the rest of the western Mediterranean remained fraught. In 1105 a Christian fleet of "*shawānī*" and "*marākib*" attacked *al-Mahdiyya* but was unable to bottle up the Zīrīd fleet and was defeated by it. On the death of Tamīm in 1108 George of Antioch, a young Christian who had come from the East with his father early in Tamīm's reign and had become his financial official but who feared the animosity of his son and successor Yaḥyā, fled to Sicily. He would become a renowned admiral of Roger II. Yaḥyā devoted considerable attention to his fleet, increasing the number of ships, multiplying corsair raids on Christian coasts and, according to Ibn Khaldūn, compelling Genoa, Sardinia, and "the French" to pay tribute. According to Muslim sources, in A.H. 503 (31 July 1109 – 20 July 1110) Yaḥyā sent 15 *shawānī* or *aghriba* to raid *Rūm* but they were defeated by a Christian squadron with the loss of six ships; however, in the autumn of 1113 the fleet of *al-Mahdiyya* returned from the lands of the *Rūm* with many captives.[183]

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[181] Abulafia, "Pisan *Bacini*"; Goitein, *Mediterranean society*, p. 318.

[182] Al-Nuwayrī, *Nihāyat 'al-Arab* (Amari), pp. 153-4; Al-Tijānī, *Riḥla*, ser. 5, 1.1, pp. 374-6; Bernardo Maragone, *Annales Pisani*, MXXXV, MLXIII, MLXXXVIII (pp. 5, 6); Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 487-8; Ibn 'Idhārī, *Al-bayān al-mughrib*, vol. 1, p. 301; Ibn Khaldūn, *'Ibar* (De Slane), vol. 2, p. 24. The major source for the Mahdia campaign is the *Carmen in victoriam Pisanorum*, edited by Cowdrey in his "Mahdia campaign". See also Idris, *Berbérie orientale*, pp. 286-91; Manfroni, *Marina italiana. I*, pp. 84-104.

[183] Al-Tijānī, *Riḥla*, ser. 5, 1.1, pp. 376-8; Ibn al-Athīr, *Al-Kāmil* (Fagnan), p. 519; Ibn 'Idhārī, *Al-bayān al-mughrib*, vol. 1, pp. 452, 455, 456; Ibn al-Khaṭīb, *A'māl al-a'lam*, p. 458; Ibn Khaldūn, *'Ibar* (De Slane), vol. 2, p. 25.

Relations between *Ifrīqiya* and Sicily began to worsen in the reign of Yaḥyā's son 'Alī. The governor of Gabes, an Arab chieftain by the name of Rāfi' ibn Maggan ibn Kāmil, attempted to make himself independent and was besieged by Alī's forces in 1117. He called on Roger II for help and the Sicilian sent a fleet of 24 "*shawānī*", which was, however, defeated or at least forced to withdraw by the Zīrid fleet. Whether there was an actual engagement is unclear. The Almoravid raid on Calabria by Abū 'Abd Allāh Muḥammad ibn Maymūn, which captured Nicotera, had been instigated by the Zīrīds and in reprisal Roger II sent a fleet, supposedly of 300 "*shawānī*", carrying 30,000 men and 1,000 cavalry commanded by George of Antioch and another admiral Christodoulos against *Ifrīqiya* in 1123. Although hit by a storm off Marsala some ships reached Pantelleria and then went on to *al-Mahdiyya*. However, the raid was beaten off, the Normans lost two thirds of their ships, and their last forces left ashore were massacred on the night of 7-8 August.[184]

The storm clouds were gathering for the last Zīrīd, al-Ḥasan. In 1127 Roger II's forces occupied Malta and in 1135 the Ḥammādid *amīr* of *Bijāya*, Yaḥyā ibn al-'Azīz, attacked *al-Mahdiyya* and *in extremis* al-Ḥasan turned to Roger II for assistance. Also in 1135 the Normans occupied Jerba and then in A.H. 536 (6 August 1141 – 27 July 1142) George of Antioch assaulted *al-Mahdiyya* with 25 "*aghriba*", returning to attack Tripoli of Libya the following year. The Zīrids began to slide into dependency on the Kingdom of Sicily, which acquired a kind of protectorate over *al-Mahdiyya*. Tripoli was occupied in 1146 and then in 1148 the Sicilian fleet was launched against *al-Mahdiyya* itself and al-Ḥasan fled without offering any resistance. The Norman occupation of *Ifrīqiya* had begun. Although Norman rule rapidly began to disintegrate, it was not finally ended until the Almohad 'Abd al-Mu'min overran the last possession, *al-Mahdiyya*, in January 1160.[185]

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[184] Al-Nuwayrī, *Nihāyat 'al-Arab* (Amari), pp. 154-5; *idem*, *Nihāyat 'al-Arab* (Caussin), p. 441; Al-Tijānī, *Riḥla*, ser. 4, 20, pp. 148-50, 177, ser. 5, 1.1, pp. 143, 378-82; Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 523-5, 547-9; Ibn 'Idhārī, *Al-bayān al-mughrib*, vol. 1, pp. 461-3; Ibn Khaldūn, *'Ibar* (De Slane), vol. 2, pp. 25-7, 35-6. See also Manfroni, *Marina italiana. I*, pp. 182-93.

[185] Al-Marrākushī, *Al-Mu'jib*, pp. 195-7; Al-Nuwayrī, *Nihāyat 'al-Arab* (Amari), pp. 156-9; *idem*, *Nihāyat 'al-Arab* (Caussin), pp. 441-8; Al-Tijānī, *Riḥla*, ser. 4, 20, pp. 110-11, 133-6, 150-51, ser. 5, 1.1, pp. 384-401; Ibn abī Zar', *Rawḍ al-Qirṭās*, pp. 279-81; Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 550-53, 555-67, 576-80, 584-90; Ibn 'Idhārī, *Al-bayān al-mughrib*, vol. 1, pp. 469-77; Ibn Khaldūn, *'Ibar* (De Slane), vol. 2, pp. 27-9, 193-4; Romuald of Salerno, *Chronicon*, pp. 226-7. On the Norman conquest of Africa, see also Abulafia, "Norman kingdom"; Idris, *Berbérie orientale*,

It is no coincidence that the Genoese annals of Caffaro di Caschifellone began with the account of the small Genoese expedition to the Levant for the First Crusade. Consisting of twelve galleys of a new Western type, *galeae*, and a transport galley, a *sandanum*, a Latinization of the Greek *chelandion*, the fleet left Genoa in July 1197 and reached *St Symeon* in late November, taking around four months for the voyage. The larger Pisan and Venetian fleets did not even attempt to make the voyage in a single passage in one season. They left in the autumns of 1098 and 1 099 respectively, wintering in the Ionian islands and on Rhodes and reaching the Levant in the autumn of 1099 and the spring of 1100 respectively.[186]

Voyages such as these by war fleets, across the length of the Mediterranean far from one's own territory and logistical support, had not been seen before. Not since Belisarios's voyage from Constantinople to Vandal *Africa* had there been anything like them and in his case he had had Byzantine territory all the way to the Ionian islands and then the hospitality of the Ostrogothic regent Amalasuntha in Sicily. In all the age of naval warfare between the Muslim and Christian worlds, fleets had always coasted their own territory before making short passages to targets of attack. The Byzantines had never attempted to reconquer Crete from Constantinople. They always brought their forces overland to one of the *aplēkta* on the south-west coast of Asia Minor before making a short crossing to Crete. In 960 Nikēphoros Phōkas had marshalled his forces at *Phygela* for the final, successful attack.

What was undertaken by the Genoese, Pisans, and Venetians between 1096 and 1098 was unprecedented in the Mediterranean and it is no wonder that they took between one and a half and three years to prepare for their voyages. The fleets of these maritime republics were *ad hoc* assemblies composed of privately-owned ships and it would have taken time to gather them if scattered across the sea. Moreover the logistical problems of provisioning, and especially of watering, large numbers of men on galleys, would have created great problems in an age when developed port facilities were few and far between. Even Western galleys of the new *galea* type, which did not

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pp. 338-93.

[186] Albert of Aachen, *Historia Hierosolymitana*, VII.xviii-xx (pp. 519-20); Andrea Dandolo, *Chronica*, lib. IX, c. X(L) (pp. 221-3); Bernardo Maragone, *Annales Pisani*, A.D. MXCVIIII (p. 7); Caffaro, *De liberatione*, p. 102; Raymond of Aguilers, *Historia Francorum*, c. V (p. 242); *Translatio Sancti Nicolai*, cc. I-V (pp. 254-57); William of Tyre, *Chronicon*, 9.14-15 (vol. 63, pp. 438-41).

have a bank of oarsmen below deck as Byzantine dromons had had, and which therefore could stow many more provisions and much more water in their holds, could still only stay at sea for around five days before they needed to water.[187] Watering large galley fleets from springs and wells must have been extremely time consuming.

In 1122-3 Venice launched a new Crusade but the Venetians still wintered over in Corfu and then took over two months to make *Outremer* from Crete in the spring of 1123. In their case, however, the wintering and the slow rate of voyaging was probably necessitated by the fact that they were the first to attempt to transport horses from the West to *Outremer*. But already by then matters were evolving. As early as 1100 a larger Genoese fleet of 26 *galeae* and either 4 or 6 sailing *naves* reached Latakia from Genoa between 1 August and the onset of winter. A Genoese fleet of 60 *galeae* which participated in the siege of Tripoli in 1109 and another of 22 which joined in that of Beirut in 1110, as well as the Venetian fleet of 1109 which assisted at the siege of Sidon in 1110, all appear to have made the voyage in a single passage in one season. By the time of the Third Crusade and that of Frederick II, voyages to the Levant were being made regularly by large fleets, even carrying horses, in a matter of three to four weeks.[188]

Between the Venetian Crusade of 1122-3 and the Third Crusade, no actual Crusader fleets reached *Outremer* except for the Northern fleet for the Second Crusade. However, according to Odo of Deuil, when he was preparing his own expedition for the Second Crusade, Louis VII of France wrote to Roger II of Sicily suggesting that the French would need the support of his kingdom, to which Roger responded with the offer of a fleet and logistical support. If this was true and what was meant was that Sicily would provide transportation to *Outremer* for the entire French army for the Second Crusade, Roger II's offer would have been a major innovation, well beyond even what the Venetians had provided in 1122-3. It would suggest that Western naval powers had made extraordinary progress in their ability to project naval force far afield. The Sicilian experience in *Ifrīqiya* would no doubt have contributed. That the Sicilians perhaps did already have such capabilities is also suggested by the fact that in 1147 Roger II was able to send his fleet under George of Antioch against Corfu and the Ionian islands and into the Aegean, where

[187] Consult Chapter Six below.

[188] Andrea Dandolo, *Chronica*, lib. IX, cc. X(L)I, X(L)II (pp. 228, 233); Caffaro, *Annales Januenses*, pp. 5, 14-15; Fulcher of Chartres, *Historia Hierosolymitana*, III.xiv-xv (pp. 656-8); William of Tyre, *Chronicon*, 12.22 (vol. 63, p. 573).

Thebes and Corinth were plundered. Sicily certainly did have the ability to send its naval forces far afield by 1154, when what appears to have been a small squadron attacked *Tinnis* in Egypt, and again in 1174 when a fleet which attacked Alexandria was very large, being said to have included 200 "*shawānī*" as well as 36 "*tarā'id*"/*taride*, horse transport galleys, six "*sufun*" transport ships carrying war machines, and 40 "*marākib*" transports with provisions.[189]

Throughout the twelfth century, however, it was sailing *naves* rather than galleys by which Western naval power was projected into the Levant and which sustained the economic and human life-lines which maintained the Crusader states. Fāṭimid, and later Ayyūbid, galley forces operating out of Egypt proved ineffectual against them. For so long as the Fāṭimids of Egypt held some of the coastal towns after the conquest of Jerusalem in 1099, shipping moving along the Syro-Palestinian coast was subject to the attacks of their squadrons. Moreover, Egyptian fleets were able to operate against the fledgling Crusader Kingdom of Jerusalem and also to reinforce coastal towns when under siege. We would argue that the Fāṭimids in fact had little grasp of the strategic situation and failed to really coordinate the movement of their armies and squadrons; nevertheless, they did attempt to make use of their naval forces. A squadron was present off the coast during the battle of Ascalon on 12 August 1099 although it did not become involved. Another participated in an assault on Jaffa in 1102 which was unsuccessful because the army was defeated. In the summer of 1103 a squadron participated in another campaign against Jaffa but then distributed its grain amongst some of the coastal towns when the campaign failed. Baldwin I's siege of Sidon in 1108 failed because of the successful intervention of a Fāṭimid squadron, although another fleet sent to relieve Tripoli in 1109 arrived too late. Nineteen Fāṭimid ships entered Beirut in 1110 when it was under siege but could not prevent its fall and an Egyptian relief fleet which arrived too late to prevent the fall of Sidon in 1110 was intercepted by

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[189] Abū 'l-Fīda, *Mukhtaṣar*, A.H. 548 (p. 30); Abū Shāma, *Kitāb al-rawḍatayn*, A.H. 570 (vol. 4, pp. 164-5); Andrea Dandolo, *Chronica*, lib. IX, c. X(L)III (p. 242); Anonymous, *Kitāb al-ilmām*, pp. 26-38; Bernardo Maragone, *Annales Pisani*, A.D. MCLXXV [sic!] (p. 61); *Continuatio Praemonstratensis*, 1154 (p. 456); Ibn al-Athīr, *Al-Kāmil* (Fagnan), pp. 568-9, 600-601; *idem*, *Al-Kāmil* (RHC*HOr*), A.H. 548, 570 (vol. 1, pp. 491, 611-12); Ibn al-Qalānisī, *Dhayl ta'rīkh Dimashq*, A.H. 549 (pp. 321-2); Ibn Shaddād, *Al-Nawadir al-sulṭāniyya*, p. 50; John Kinnamos, *Historiae*, III.4-5 (pp. 96-101); Al-Maqrīzī, *Sulūk* (Broadhurst), A.H. 569 (pp. 48-50); *idem*, *Sulūk* (Blochet), A.H. 570 (vol. 8, p. 524); Nikētas Chōniatēs, *Historia*, Βασίλεία Μανουὴλ τοῦ Κομνηνοῦ Β΄, (pp. 72-6); Odo of Deuil, *De profectione Ludovici VII*, bk III (pp. 58-9); Romuald of Salerno, *Chronicon*, p. 227; William of Tyre, *Chronicon*, 21.3 (vol. 63A, p. 963) and see also *Eracles*, XXI.3 (p. 1007).

Frankish ships and captured. Ibn al-Qalānisī made the revealing comment that by 28 November 1111 when the Franks lay siege to Tyre, the inhabitants despaired of al-Afḍal being able to relieve them by sea. Nevertheless, they successfully defied the siege, which was lifted on 7 April 1112.[190]

After a decade of unsuccessful attempts to use their squadrons against the coastlines of the incipient Crusader states, Fāṭimid naval resources were becoming stretched thin. The threat from their corsairs against Western shipping arriving off the coasts of *Outremer* appears to have dissipated. Nevertheless, the Egyptians were still able to send a relief fleet into Tyre in 1113 and there also appears to have been an attack on Jaffa in 1115 by the garrison of Ascalon, accompanied by an Egyptian squadron which went on to Tyre. In 1118 another squadron sailed to Ascalon to participate in a campaign but again went on to Tyre. In 1122 a squadron again sailed to Tyre and replaced the governor and in the following year the Fāṭimids sent yet another army and fleet to Palestine. However, on this occasion they were unlucky because their expedition coincided with the arrival of the Venetian Crusade off the coast. Doge Domenico Michiel destroyed the Egyptian fleet off Ascalon and in the following year the siege of Tyre could not be relieved by sea and the city fell on 7 or 8 July 1124.[191]

If we can believe Fulcher of Chartres, and William of Tyre following him, in 1126 the Fāṭimids sent 24 "*galeae*" north to raid the coasts but it ran out of water near Beirut because of the loss of Tyre and was severely mauled when it tried to take on water surreptitiously from streams and springs. After that no more is heard of the Egyptian fleet until 1151. In that year, probably as a response to mounting pressure on Ascalon, a large fleet of 70 warships raided from Jaffa

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[190] Abū 'l-Maḥāsin, *Al-Nujūm*, pp. 488, 490, 492; Fulcher of Chartres, *Historia Hierosolymitana*, II. xxxiii.1-2, xlii.2, xliv.5, (pp. 501-2, 535-6, 547-8); Ibn al-Athīr, *Al-Kāmil* (RHC*HOr*), A.H. 496, 501, 503, 504, 505 (pp. 216, 257, 273-4, 279, 283-6); Ibn Muyassar, *Akhbār Miṣr*, A.H. 496 (p. 465); Ibn al-Qalānisī, *Dhayl ta'rīkh Dimashq*, A.H. 492, 496, 501-3, 505 (pp. 48, 58-9, 86-7, 89, 99-100, 119-25); *Saewulf*, pp. 75-6; Sāwīris, *History of the Patriarchs* (Khater & Burmester), vol. 2, part 3, pp. 398-9; Sibṭ ibn al-Jawzī, *Mir'āt al-zamān*, A.H. 496, 501-3, 505 (pp. 526, 535-7, 539, 543-5); William of Tyre, *Chronicon*, 11.3, 13 (vol. 63, pp. 498-500, 515-16). See also Lev, *State and society*, pp. 107-13.

[191] Abū 'l-Maḥāsin, *Al-Nujūm*, p. 492; Albert of Aachen, *Historia Hierosolymitana*, XII.xvii (pp. 699-700); Fulcher of Chartres, *Historia Hierosolymitana*, II.liii.4-6, III.ii.1, xvi.3, xx, xxvii-xxxiv.3 (pp. 585-6, 617-18, 661, 669-72, 695-735); Ibn al-Athīr, *Al-Kāmil* (RHC*HOr*), A.H. 517-18 (pp. 354, 356-9); Ibn Muyassar, *Akhbār Miṣr*, A.H. 516-17 (pp. 468-9); Ibn al-Qalānisī, *Dhayl ta'rīkh Dimashq*, A.H. 507, 518 (pp. 142-3, 170-72); Sibṭ ibn al-Jawzī, *Mir'āt al-zamān*, A.H. 507, 517-18 (pp. 547, 563-5); William of Tyre, *Chronicon*, 11.24, 12.6, 21-3, 13.5-13 (vol. 63, pp. 531-2, 552-3, 571-5, 591-602).

north to Tripoli. Then, when the Franks lay siege to Ascalon two years later in 1153, the city was again provisioned and reinforced by the men of a Fāṭimid fleet, said by William of Tyre to have numbered 70 *galeae* plus supply *naves*. On this occasion there were a large number of Frankish *galeae* and also *naves* participating in the siege and the Egyptians had to fight their way in. But, since Ascalon had no harbour, merely an open beach, the ships must have been abandoned and then lost when the city surrendered on 22 August.[192]

Even the loss of the squadron at Ascalon did not put an end to the activities of the Fāṭimid navy. In 1155 squadrons raided coastal shipping and temporarily seized the harbour at Tyre. In 1157 a raiding fleet was said to have returned to Egypt with 700 captives. Another small squadron of five galleys from Cairo did the same the next year, 1158, and both the Alexandria and Damietta squadrons were also active in the same year. After that, however, no more is heard of the activities of the Fāṭimid fleet until its destruction by fire in its arsenal at *al-Fusṭāṭ* in 1168 during a campaign against Egypt by Amalric of Jerusalem. In the following year, when the Franks again invaded Egypt in conjunction with a Byzantine fleet, there were apparently no Fāṭimid naval forces to oppose the Byzantines.[193]

In spite of Alexios Komnēnos's efforts to rebuild something of a Byzantine fleet, Byzantine naval forces had remained weak well into the twelfth century. After the death of Tzachas the fleet reconstructed by Alexios had been sent under the command of John Doukas to suppress revolts in Crete and Cyprus. Eumathios Philokalēs was appointed governor of Cyprus. By the time of the First Crusade, squadrons of the fleet had sufficient capability to evacuate the remnants of Peter the Hermit's forces back to Constantinople and Eumathios Philokalēs' squadron on Cyprus played a significant role off the Syrian coast during the First Crusade. His squadron was also capable of transporting Robert of Flanders and Robert of Normandy, presumably with their immediate entourages only, back from Latakia

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[192] Fulcher of Chartres, *Historia Hierosolymitana*, III.lvi (pp. 803-5); Ibn al-Athīr, *Al-Kāmil* (RHC*HOr*), A.H. 548 (pp. 490-91); Ibn al-Qalānisī, *Dhayl ta'rīkh Dimashq*, A.H. 546, 548 (pp. 307-8, 316-17); William of Tyre, *Chronicon*, 13.20, 17.23-5, 27-30 (vol. 63, pp. 611-12; vol. 63A, pp. 792-5, 797-805). Ibn al-Qalānisī wrote that in 1153 some of the Ascalonites departed by sea; however, it is much more likely that the Franks would have seized any ships still surviving and that the Ascalonites would have evacuated to Egypt by land, as William of Tyre recorded.

[193] Ibn al-Athīr, *Al-Kāmil* (RHC*HOr*), A.H. 564, 565 (pp. 555, 568-70); Ibn al-Qalānisī, *Dhayl ta'rīkh Dimashq*, A.H. 550, 553 (pp. 323-4, 346); William of Tyre, *Chronicon*, 20.7, 14-17 (vol. 63A, pp. 919-20, 927-34).

to Constantinople in 1099.[194]

Anna Komnēnē also related the very improbable story of a major encounter between the Byzantine fleet and the Pisans on their way east for the First Crusade. To give credence to the story, when Alexios heard of Pisan pillaging in the Ionian islands during their wintering there in 1098-9, he constructed a new fleet armed with Greek Fire and entrusted it to Tatikios, the general who he had appointed to guide the First Crusade across Asia Minor and who had recently returned from Antioch, and to a Latin mercenary called Landulf. Tatikios and Landulf defeated the Pisan fleet off *Lycia* and its remnants, conceiving the idea of pillaging Cyprus, were beaten off by Eumathios Philokalēs and went on to Latakia. Supposedly the Byzantine fleet was then destroyed by storm on its return.[195] However, there is absolutely no corroborating evidence for this story in any other source and the whole account rings of implausibility. It is followed by an equally improbable account of a similar attack on a Genoese fleet the following year. Supposedly forseeing that this Genoese fleet would cause trouble, Alexios sent his general Kantakouzēnos by land to *Lycia* while Landulf took the fleet around. Landulf supposedly intercepted the Genoese off Cape Malea but judged his forces inadequate to engage them and retired. The Genoese eluded Kantakouzēnos who then assaulted Latakia.[196] Again the entire episode is unsupported by any other evidence and reeks of an attempt to explain Bohemond of Taranto's return to the West and gathering of a new Crusade against the Empire.

Bohemond, the mastermind of the victory of the Frst Crusade, who had become Prince of Antioch and who had been captured and imprisoned in August 1100 but released in May 1103, returned to the West in the autumn of 1104 to raise an army to attack the Byzantines. He succeeded in persuading Pope Paschal II to give to his proposed expedition the standing of a Crusade and in the autumn of 1107 crossed to *Avlona* and besieged *Dyrrachion*. In the meantime Alexios

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[194] Albert of Aachen, *Historia Hierosolymitana*, VI.xlv, lvi-lx (pp. 493-4, 501-4); Anna Komnēnē, *Alexiade*, IX.ii, X.vi.5, XI.vii.4 (vol. 2, pp. 162-4, 212; vol. 3, p. 34); Caffaro, *De liberatione*, p. 114; Ibn al-'Adīm, *Zubdat al-ḥalab*, p. 578**;** Ibn Muyassar, *Akhbār Miṣr*, A.H. 546, 550, 551, 553 (pp. 470-72); Ralph of Caen, *Gesta Tancredi*, c. lviii (p. 649).

[195] Anna Komnēnē, *Alexiade*, XI.x.1-8 (vol. 3, pp. 41-5).

[196] Anna Komnēnē, *Alexiade*, XI.xi (vol. 3, pp. 46-9). Note that these two episodes fall into the later section of Anna's account of the First Crusade identified by Howard-Johnston as not having been completed by her husband Nikēphoros Bryennios but rather compiled by her from poorly understood files. See Howard-Johnston, "Anna Komnene", pp. 291-2.

had made Thessalonikē his base, ordered a fleet to be prepared in the Cyclades and maritime cities in Asia Minor and the Balkans, and sent it to *Dyrrachion* under a new *megas doux*, Isaac Kontostephanos. Kontostephanos made an ill-advised and unsuccessful attempt against Otranto and then was unable to intercept Bohemond's fleet and prevent it crossing to *Avlona*. Bohemond was eventually out-manœuvred and forced to surrender, but not because of anything the Byzantine fleet achieved. During the last decade of Alexios's life squadrons of the fleet were used occasionally; for example, to convey Manuel Boutoumitēs on an embassy to Tripoli and Jerusalem in 1111. Anna Komnēnē also has a garbled account of a combined Pisan, Genoese, and Lombard naval assault which Alexios supposedly warded off but there is no evidence that this event ever took place. There is certainly evidence that Alexios did reconstruct Byzantine naval forces to some degree during his reign, but none to suggest that by his death they were anything like a major force to be reckoned with.[197]

This was demonstrated clearly when in response to John II Komnēnos's refusal to renew the commercial privileges which his father had granted to the Venetians, the Venetian fleet for the Crusade of 1122-3 attacked Corfu with impunity on its way east and then on its return in 1125 sacked Samos, Chios, Lesbos, and Andros. The Byzantine fleet could offer no resistance and John was forced to renew the privileges. In fact, if we can believe Nikētas Chōniatēs, although he was a strong military emperor, John was actually persuaded by his collector of revenues, John of Poutzē, to allow the fleet to decay. John convinced him to divert revenues raised for the fleet into general revenues and then to pay for ships only when they were needed.[198]

Even as late as 1147 Byantine squadrons did not have the

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[197] Anna Komnēnē, *Alexiade*, XII.i.6, iv.1-3, viii.1, viii.3-ix.3, XIV.ii.6-14 (vol. 3, pp. 56, 64-5, 77, 78-83, 148-54). Our assessment is very different to that of Ahrweiler, *Byzance et la mer*, pp. 189-97, which we regard as uncritical and Byzantino-centric. That the Empire exercized a "thalassocratie … au début du XIIe siècle sur la Méditerranée orientale", is simply untrue.

[198] Andrea Dandolo, *Chronica*, lib. IX, c. X(L)II (pp. 232, 233, 235); *Historia ducum Veneticorum*, §2 (pp. 73-4); John Kinnamos, *Historiae*, VI.10 (p. 281); Nikētas Chōniatēs, *Historia*, Βασίλεία Μανουὴλ τοῦ Κομνηνοῦ Α΄ (pp. 54-5). The story of John of Poutzē is used by Nikētas as an explanation for why "Now, [i.e., at the time of Nikētas's writing this early part of his *Historia* in the 1190s] as a result of this ill-advised policy or pennypinching, pirates rule the seas and the Roman maritime provinces are harassed by pirate ships, and the enemy gloats.". It is not necessarily to be believed.

capability to oppose the Norman fleet which raided into the Aegean that year. Not until the 1160s did Byzantine naval forces become really formidable again as a consequence of the ambitious foreign policies of Manuel I Komnēnos, which would see adventurous expeditions sent to Egypt, Italy and into Anatolia. He would be criticized by Nikētas Chōniatēs for the enormous expenditure occasioned, although even Chōniatēs recognized that there was good reason behind his adventurism and his reign did witness the last great flourish of Byzantine naval power.[199]

Almost immediately after his succession, Manuel sent an army against Antioch to drive its prince, Raymond, back out of *Cilicia*. The army was accompanied by a fleet under Dēmētrios Branas which was instrumental in the success of the expedition, which compelled Raymond to go to Constantinople to make his peace.[200] Manuel's second expedition against Antioch in 1158-9, which imposed Byzantine suzereinty over the principality, was apparently unaccompanied by a fleet, at least the sources make no mention of one. Byzantine squadrons continued to operate in Levantine waters out of Antalya and Cyprus, but it would not be until 1169 that another large Byzantine fleet made its appearance off the coasts of *Outremer*.

Exactly how large various Byzantine squadrons were at the time of the Second Crusade is a matter of conjecture. Certainly the Byzantines transported the French and German armies across the Bosporos, but that would not have needed imperial ships. Local craft were hired or impressed, as had no doubt been the case during the First Crusade. The same would have been true of the ships which were used by the imperial government to supply Crusader forces. However, Manuel certainly had sufficient ships to ferry Conrad III and his immediate household from Constantinople to Acre in 1148, even while most of the Byzantine naval forces were engaged at Corfu, and then back from Acre to Thessalonikē in the autumn after the failure of the Second Crusade before Damascus.[201]

The Norman attack on the Ionian and Aegean in 1147 led to the mobilization of extraordinary forces and to yet another request to

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[199] John Kinnamos, *Historiae*, III.2 (p. 92); Nikētas Chōniatēs, *Historia*, Βασίλεία Μανουὴλ τοῦ Κομνηνοῦ Β΄, Ζ΄ (pp. 72-6, 203); Romuald of Salerno, *Chronicon*, p. 227.

[200] John Kinnamos, *Historiae*, II.3 (pp. 33-5); Nikētas Chōniatēs, *Historia*, Βασίλεία Μανουὴλ τοῦ Κομνηνοῦ Α΄ (p. 52); William of Tyre, *Chronicon*, 18.23 (vol. 63A, pp. 844-5).

[201] Eustathios of Thessalonikē, "Oratio ad Manuelem imperatorem [4]", p. 107**;** John Kinnamos, *Historiae*, II.19 (pp. 86-7).

Venice for assistance in return for privileges. Nikētas Chōniatēs's enumeration of the fleet sent to Corfu is redolent of literary affectation. The figure of nearly 1,000 *triēreis*, "fire-bearing" *pyrphoroi*, *pentēkonteroi*, *myoparōnes*, horse transport *hippagōgoi*, transport *phortagōgoi*, and light piratical *epaktrokelētes*, is not to be taken literally. This was just a collection of classical names for ships; however, the fleet was clearly a very large one assembled from all quarters. John Kinnamos numbered it at 500 *triēreis* and 1,000 *hippagōgoi* and supply ships.[202] Under the *megas doux* Stephen Kontostephanos the siege of Corfu town began in the autumn of 1148 and although it did not progress smoothly, the garrison eventually surrendered in the summer of 1149.[203] Sometime during the siege Roger II may have sent a Sicilian squadron under George of Antioch raiding into the Aegean, no doubt as a diversion. The fleet was said to have reached Constantinople and to have demonstrated off the imperial palace but to have been intercepted on its return by a detachment of the imperial fleet from Corfu under a certain Chouroup and heavily defeated somewhere near Cape Malea. Supposedly, Louis VII of France, returning from the Crusade on a Sicilian ship, became caught up in the battle. The story is supported by the *Historia ducum Veneticorum* and Andrea Dandolo, who, however, ascribe the victory to the Venetians.[204]

Even immediately after the ending of the siege of Corfu, Manuel may have planned to cross over into Italy to attack Roger II in his own territory. According to Kinnamos, Manuel crossed to *Avlona* and from there ordered the *megas domestikos*, John Axouch, who had succeeded the dead Stephen Kontostephanos in command of the fleet, to Ancona, from there to harry Italy. Axouch apparently prevaricated and stopped at the river Vijosë and the fleet was severely mauled by a

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[202] Andrea Dandolo, *Chronica*, lib. IX, c. X(L)III (p. 243); *Historia ducum Veneticorum*, §§3-4 (p. 75); John Kinnamos, *Historiae*, III.2, 4 (pp. 92, 96-7); Michael Rhetor, "Oratio ad Manuelem imperatorem", p. 156; Nikētas Chōniatēs, *Historia*, Βασίλεία Μανουὴλ τοῦ Κομνηνοῦ Β΄ (pp. 76-7); Tafel and Thomas, *Urkunden*, vol. 1, no. 51 (pp. 113-24).

[203] Andrea Dandolo, *Chronica*, lib. IX, c. X(L)III (p. 243); *Historia ducum Veneticorum*, §§3-4 (pp. 75-6); John Kinnamos, *Historiae*, III.4-5 (pp. 96-101); Nikētas Chōniatēs, *Historia*, Βασίλεία Μανουὴλ τοῦ Κομνηνοῦ Β΄ (pp. 77-88).

[204] Andrea Dandolo, *Chronica*, lib. IX, c. X(L)III (p. 243); *Continuatio Praemonstratensis*, 1149 (p. 454); *Historia ducum Veneticorum*, §§3-4 (p. 75); Ibn al-Athīr, *Al-Kāmil* (RHC*HOr*), A.H. 544 (p. 477); John Kinnamos, *Historiae*, II.19, III.5 (pp. 87-8, 100-101).

storm before returning to Constantinople.[205]

Not until 1155 was Manuel ready to return to Italy. The imperial fleet was entrusted to his uncle, Constantine Angelos, and ordered to Monemvasia to await reinforcements from provincial squadrons. Angelos, however, grappled with a Sicilian fleet before the provincial reinforcements had arrived and was decisively defeated and taken off to prison in Sicily. It is possible that this Sicilian fleet was one returning from the reported attack on *Tinnis* in Egypt in the summer of 1154. The campaign that eventuated in Italy in 1155-6, which at first was crowned with success with the capture of Bari but which ended in total defeat outside Brindisi on 28 May 1156 was fought largely by Byzantine gold and disaffected Normans and Italians. At the beginning the Byzantine commanders had only ten ships and small numbers of forces, although Manuel later sent reinforcements of Latin and Turkish mercenaries and later still a fleet carrying another army under the command of the *megas doux* Alexios Komnēnos Bryennios, the son of Anna Komnēnē. The naval forces, however, played no part in the outcome. All that remained of the Italian adventure was the city of Ancona, to which Alexios Axouch, son of John Axouch, was sent out in 1158, and which remained in Byzantine hands. John Axouch was instrumental in arranging a truce between the Empire and Sicily in the spring of 1158. The raid on Constantinople by a Sicilian squadron commanded by Stephen, the brother of Maio of Bari, reported by both Nikētas Chōniatēs and Romuald of Salerno probably took place in 1157 and contributed to the climate which induced Manuel to seek peace with Sicily.[206]

Manuel sought to project Byzantine authority not only to the West but also into Levantine waters. He had from the beginnings of his reign established a kind of religious protectorate over the Orthodox churches in the Holy land. Amalric of Jerusalem had invaded Egypt several times and prospects for the conquest of the land of the Nile

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[205] John Kinnamos, *Historiae*, III.6, 9 (pp. 101-2, 113); Nikētas Chōniatēs, *Historia*, Βασίλεία Μανουὴλ τοῦ Κομνηνοῦ Β΄ (p. 89); Theodore Prodromos, *Historical poems*, no. 30 (pp. 349-60), esp. ll. 213-22, 402-11.

[206] Abū 'l-Fīda, *Mukhtaṣar*, A.H. 548 (p. 30); *Continuatio Praemonstratensis*, 1154 (p. 456); Ibn al-Athīr, *Al-Kāmil* (RHC*HOr*), A.H. 548 (p. 491); Ibn al-Qalānisī, *Dhayl ta'rīkh Dimashq*, A.H. 549 (pp. 321-2); John Kinnamos, *Historiae*, III.12, 13, IV.1-13, 14 (pp. 118-21, 134-68, 169-70); Nikētas Chōniatēs, *Historia*, Βασίλεία Μανουὴλ τοῦ Κομνηνοῦ Β΄ (pp. 91, 94-6, 96-8, 99); Romuald of Salerno, *Chronicon*, pp. 227, 239-41. There are so many similarities in the accounts of the Sicilian raids on Constantinople in 1148/9 and 1157 that it is quite possible that the first never in fact took place. The second must have because Maio of Bari did not become *amīr* of *amīrs* in Sicily until 1154 and his brother Stephen was appointed *amīr* shortly thereafter.

were not at all unrealistic. The native populace had been demilitarized for centuries and the key to the country lay in possession of the three key cities: Cairo, Damietta, and Alexandria. In retrospect all of the Byzantine and Crusader attempts to conquer Egypt between 1163 and 1248 appear to have been futile; however, the prospects of success were in fact quite real. In 1168 Manuel sent an embassy to Jerusalem to propose an allied invasion of Egypt and Amalric responded by sending a legation back to him to draw up the plans. A fleet under the command of the *megas doux* Andronikos Kontostephanos, enumerated by William of Tyre at 150 *longe naves rostrate* known as *galee*, 60 *naves maiores* horse transports. and 10-12 *naves maxime* transports known as *dromones*, and by Nikētas Chōniatēs at 200 *ploia makra*, reached Acre in the summer of 1169. The assault on Damietta failed, however, because of poor coordination and because the Byzantines ran out of food. Manuel had provided provisions for three months from August but the siege dragged on into December before being abandoned. Reportedly, much of the fleet was lost in storms on the way home.[207] However, the destruction of fleets in storms on the way home after unsuccesful expeditions was something of a literary topos and subsequent events suggest that much of the fleet must have returned. Accusations by John Kinnamos and Nikētas Chōniatēs that the debacle was all due to the Franks may also be unwarranted because when Amalric visited Constantinople in person in 1171 he was warmly welcomed by the emperor.[208]

In that same year Manuel sent orders to officials throughout the Empire to imprison and confiscate the property of every Venetian in their jurisdictions on 12 March. The action against them was taken in response to their overstepping the bounds of peaceful and law-abiding *bourgesioi* when they sacked a newly established Genoese quarter in Constantinople sometime after August 1170. Amazingly the secret orders remained undiscovered by the Venetians and thousands of them

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[207] Abū 'l-Fīda, *Mukhtaṣar*, A.H. 565 (p. 40); Abū Shāma, *Kitāb al-rawḍatayn*, A.H. 565, 570 (pp. 149-53, 173); Ibn al-Athīr, *Al-Kāmil* (RHC*HOr*), A.H. 565 (pp. 568-70); Ibn Shaddād, *Al-Nawadir al-sulṭāniyya*, pp. 45-6; John Kinnamos, *Historiae*, VI.9 (pp. 278-80); John Tzetzēs, *Epistulae*, Epp. ι΄, ιγ΄ (pp. 19, 21-4); Nikētas Chōniatēs, *Historia*, Βασίλεία Μανουὴλ τοῦ Κομνηνοῦ Ε΄ (pp. 159-68); William of Tyre, *Chronicon*, 20.4, 13-17 (vol. 63A, pp. 915-17, 926-34). See also below pp. 415-17.

[208] Eustathios of Thessalonikē, "Oratio ad Manuelem imperatorem [2]", pp. 39-40; John Kinnamos, *Historiae*, VI.10 (p. 280); Nikētas Chōniatēs, *Historia*, Βασίλεία Μανουὴλ τοῦ Κομνηνοῦ Ε΄ (pp. 171-2); William of Tyre, *Chronicon*, 20.22-4 (vol. 63A, pp. 940-43).

were seized and their ships and property confiscated.[209] In response, at the insistence of the Venetian people, Doge Vitale Michiel II left Venice in September 1171 with a Venetian fleet of 100 *galeae* and 20 transport *naves* in an attempt to induce the emperor to reverse his actions. The fleet lay siege to *Euripos* but the Doge and the governor came to an agreement to send a joint delegation to Constantinople to urge Manuel to release his Venetian prisoners. It then crossed to Chios, where they wintered, waiting for a reply. Manuel, however, refused to see the envoys, although he sent his own to Chios inviting them to send another delegation, which was done. Again Manuel refused to see the envoys but sent his own inviting yet a third delegation. Over the winter disease broke out in the fleet and in the spring it moved to the tiny islet of Panaghia, and then to Lesbos and Skyros in attempts to rid itself of the pestilence, after which it returned to Venice and the Doge was murdered by the mob. Now, it may have been that the Doge was indeed deceived by the emperor's prevarications and failed to take any military action because he sought to achieve his objectives by negotiation. However, it is very curious that whereas the Venetian sources make no mention of naval actvity by the Byzantines against the fleet, John Kinnamos recorded that they were opposed by Byzantine forces on Chios and that an imperial fleet pursued them back across the Aegean to Cape Malea. Nikētas Chōniatēs and Theodore Skoutariotēs following him stated that Manuel sent Andronikos Kontostephanos to Chios with 150 *triēreis* and that he pursued the Venetians to Cape Malea. In fact the Byzantine account makes more sense and also explains Michiel's failure to even attempt to enter the Dardanelles. The Venetians never had the numbers to force the straits against the powerful Byzantine fleet and Manuel knew that he had no need to see Venetian envoys. Michiel may indeed have wished to negotiate, but negotiations always proceed more smoothly when backed by some force. In this case there was none and when disease had done its work the Byzantine fleet simply drove the Venetians out of the Aegean. In 1171-2, it was not as it had been in 1125. In the following year, 1173, Byzantine naval forces were instrumental in enabling Ancona to endure a seven-month siege by the forces of the Western Emperor Frederick I Barbarossa

[209] Andrea Dandolo, *Chronica*, lib. IX, c. X(L)V (p. 250); Genoa, *Codice diplomatico*, vol. 2, no. 53 (pp. 121-3); *Historia ducum Veneticorum*, §6 (p. 78); John Kinnamos, *Historiae*, VI.10 (pp. 281-2); Nikētas Chōniatēs, *Historia*, Βασίλεία Μανουὴλ τοῦ Κομνηνοῦ Ε΄ (pp. 172-3). See also Madden, *Enrico Dandolo*, pp. 52-7.

and his Venetian allies.[210]

That these parameters are correct is suggested by the fact that even after the failed expedition of 1169 to Damietta, the Egyptians had sent envoys to Constantinople to make a treaty of peace in exchange for annual tribute. Whether a peace was actually concluded, as Nikētas Chōniatēs wrote, or rejected, as John Kinnamos wrote, is unknown. But in 1176, at the same time as he was preparing his attack on the Saljūqids of *Rūm* which culminated in his defeat at *Myriokephalon*, Manuel sent the fleet back to *Outremer*. John Kinnamos numbered it at 150 ships. It reached Acre, where William of Tyre numbered it at 70 *galee* plus other *naves*; however, negotiations over a campaign against Egypt stalled and the fleet eventually returned home.[211]

When Ṣalāḥ al-Dīn seized the Egyptian throne in 1171, the country was virtually defenceless at sea. No naval resistance appears to have been mounted against either the allied attack on Damietta in 1169 or the Sicilian attack on Alexandria in 1174. However, probably in response to the threat from the Byzantine fleet in 1176 in 1177 Ṣalāḥ al-Dīn visited Alexandria and ordered the construction of new warships. By 1179 he had 60 *shawānī* and 20 *tarā'id*. The extension of Ayyūbid rule across the Maghrib to *Ifrīqiya*, *al-Qayrawān* being taken from the Almohads in 1187, also opened up access to timber supplies and Maghribin sailors. Maghribin sailors and marines are reported aboard Ṣalāḥ al-Dīn's ships. A squadron raided Acre on 14 October 1179, capturing and sinking several ships. By 1181 there were 50 ships stationed at Damietta to protect the coasts and they beat off a Frankish assault on *Tinnis*. Another squadron captured two large sailing *buṭsāt* on their way in to *Outremer* in the same year, three others were taken in 1182 and another in 1183. However a major land and sea assault on Beirut in 1182 failed because the fleet was defeated and driven back to Egypt by a Frankish squadron raised in Acre and Tyre. Al-Maqrīzī reported that 31 Egyptian *shawānī* and other *ḥarrāqāt* left on a cruise in May 1184 but gave no other details. Despite this activity, however, and William of Tyre's gloomy

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[210] Eustathios of Thessalonikē, "Oratio ad Manuelem imperatorem [2]", pp. 36-9; *idem*, "Oratio ad Manuelem imperatorem [4]", pp. 109-17; *Historia ducum Veneticorum*, §7 (pp. 79-80); Andrea Dandolo, *Chronica*, lib. IX, c. X(L)V (pp. 251-3); John Kinnamos, *Historiae*, VI.10, 12 (pp. 282-6, 288-9); Nikētas Chōniatēs, *Historia*, Βασίλεία Μανουὴλ τοῦ Κομνηνοῦ Ε΄, Ζ΄ (pp. 172-3, 201-2); Theodore Skoutariōtēs, *Synopsis Chronikē* (Sathas), p. 281. See also Abulafia, "Ancona".

[211] John Kinnamos, *Historiae*, VI.9, VII.3 (pp. 280, 300); Montfaucon, *Palaeographia Graeca*, pp. 47-8; Nikētas Chōniatēs, *Historia*, Βασίλεία Μανουὴλ τοῦ Κομνηνοῦ Ε΄ (p. 168); William of Tyre, *Chronicon*, 21.15(16)-17(18) (vol. 63A, pp. 981-6). See also Magdalino, *Manuel I Komnenos*, pp. 95-8.

assessment of the effects of the Ayyūbid conquest of Egypt on access by sea from the West to *Outremer*, it is clear that in fact Ṣalāḥ al-Dīn's uses of Egyptian naval forces against the maritime lifelines of the Crusader states were little more than pin pricks. The real struggle would come during the siege of Acre.[212]

On 4 July 1187 Ṣalāḥ al-Dīn all but destroyed the army of the Kingdom of Jerusalem at the Horns of *Ḥaṭṭīn*. Acre was surrendered shamefully on the 10th of July and Jerusalem on 2 October, by which time all that was left to the Franks was Antioch, Tyre, Tripoli, Tortosa, and a few isolated fortresses. A squadron of the Egyptian fleet under its Armenian admiral, the *ḥājib* Ḥusām al-Dīn Lu'lu al-Mas'ūdī, moved up to Ascalon. However, an assault on Tyre was beaten off when the Egyptian fleet was engaged by *galeae* from Tyre and completely defeated. The king, Guy of Lusignan, was released from captivity in the spring of 1188 and on 27 August 1189 began a siege of Acre with the assistance of a Pisan fleet which had reached Tyre in April. In fact, however, the Pisan fleet had not been the first to reach the East after the disaster at *Ḥaṭṭīn*. That honour had belonged to the Sicilians. In 1185 the Normans had launched a new assault on the Byzantine Empire, advancing overland on Thessalonikē while a fleet came round into the Aegean. After the defeat of the land army, the fleet was attacked by the Byzantines in the Gulf of *Astakos* in November 1185 and forced to withdraw through the Dardanelles to Crete, where it wintered under agreement with Isaac Komnēnos, the self-proclaimed emperor of the island. Some time during the stay in Cyprus command passed from Count Tancred of Lecce to admiral Margaritus of Brindisi, who defeated a Byzantine fleet of 70 *ploia makra* sent against the island in the following spring. In the spring of 1188 William II of Sicily sent Margaritus with a fleet of 50 *galeae* to the Levant and his forces helped to save Tripoli, Tyre, and Antioch, and contributed much to enabling the Franks to survive through 1188 and the winter of 1188-9 before other Crusader forces reached the East.[213]

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[212] Abū Shāma, *Kitāb al-rawḍatayn*, A.H. 575, 578, 583 (pp. 200, 203, 209-11, 223, 230, 235, 239-40, 342); Ibn Khaldūn, *'Ibar* (De Slane), vol. 2, pp. 91-5; Al-Maqrīzī, *Sulūk* (Broadhurst), A.H. 570-72, 574, 577-80, 583 (pp. 52, 53, 56, 59, 64, 70, 71, 77, 87); Al-Tijānī, *Riḥla*, pp. 153-63; Ibn al-Athīr, *Al-Kāmil* (RHC*HOr*), A.H. 578, 579 (pp. 653, 660); William of Tyre, *Chronicon*, 20.10, 22.18(17)-19(18) (vol. 63A, pp. 923-5, 1032-6). See also Ehrenkreutz, "Place of Saladin", pp. 100-110; Lev, *Saladin in Egypt*, pp. 161-84; Odetallah, "Ṣalāh al-Dīn and the sea".

[213] Abū 'l-Fīda, *Mukhtaṣar*, A.H. 583 (p. 58); Abū Shāma, *Kitāb al-rawḍatayn*, A.H. 584 (pp. 362-3); Ambroise, *L'estoire de la guerre sainte*, ll. 2730-86 (coll. 73-5); *Continuation de Guillaume de Tyr*, §§40-81, esp. §§64, 72-3, 75 (pp. 52-89, esp.

The struggle for Acre resolved itself into a complex series of strategic and technological parameters with the garrison in the city besieged by Crusader forces, which were too few to close off ingress into the city at first, while they themselves were confronted by Ṣalāḥ al-Dīn's forces which arrived in September 1189. An initial fleet may have broken into the port on 31 October and Ḥusām al-Dīn Lu'lu definitely broke in with 50 *shawānī* on 25 or 26 December 1189, capturing some Christian ships in the process. Another fleet broke through on 15 June 1190 and a large *buṭsa* from Beirut made it through the cordon of Crusader ships at the end of August. Three more from Egypt entered the harbour on 17 September but of either 7 or 15 more which arrived around 31 December 1190 some, if not all, were dashed on the rocks in heavy weather. Ṣalāḥ al-Dīn established Haifa, which was protected from the Crusaders by his own encampment, as a base where ships entering and leaving Acre were loaded. He did attempt to use the ships in Acre harbour to attack the Crusader ships shortly before Easter 1190 but the Egyptian *shawānī* were defeated. The Crusaders' grip around the city gradually tightened as more and more reinforcements arrived from the West, and when Ṣalāḥ al-Dīn's last throw of the dice to slip another *buṭsa* into the city failed because it was intercepted and sunk by the arriving fleet of Richard Cœur de Lion, the die was cast. The city surrendered on 12 July 1191. In fact Egyptian squadrons appear to have acquitted themselves quite well during the siege, breaking through into the city several times and also defeating a Crusader attempt to take the Tower of the Flies, to which the chain of the harbour was attached and which would have given the Crusaders free access to the inner harbour if taken. However, as well as the Pisans, Venetian and Genoese fleets also sailed to Acre for the Crusade and they were joined by huge numbers of ships from elsewhere in the Mediterranean and from Northern Europe. The Egyptians were simply outnumbered and even

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pp. 82-3, 85-7); *Eracles*, XXIII.xl-XXIV.xiv, esp. XXIV.iii, vi-vii, xi, xiv (vol. 2, pp. 62-125, esp. 107-9, 113-15, 119-21, 124-5); *Ernoul*, cc. XX-XXII (pp. 236-47, 251, 257); Eustathios of Thessalonikē, *Capture of Thessaloniki*, §§54, 59, 138 (pp. 66, 74, 150); Ibn al-'Adīm, *Zubdat al-ḥalab* (Blochet), p. 184; Ibn al-Athīr, *Al-Kāmil* (RHC*HOr*), A.H. 583-5 (pp. 677-744, esp. 697, 708-9, 718, 720-21); Ibn Shaddād, *Al-Nawadir al-sulṭāniyya*, pp. 72-9, 91, 96-8; 'Imād al-Dīn, *Al-fatḥ al-qussī*, A.H. 583-5 (pp. 13-168, esp. pp. 44, 68-72, 125-6); Itinerarium *peregrinorum* (Mayer), pp. 257-75, esp. 267-8, 271-2; *Itinerarium peregrinorum* (Stubbs), I.14, 25-6 (pp. 27-8, 59-62); Al-Maqrīzī, *Sulūk* (Broadhurst), A.H. 583-5 (pp. 81-91); Nikētas Chōniatēs, *Historia*, Βασιλεία Ἀνδρονίκου τοῦ Κομνηνοῦ Α΄, Β΄, Βασίλεία Ἰσαακίου τοῦ Αγγελοῦ Α΄ (pp. 297-308, 317-20, 355-63, 369-70); Sāwīris, *History of the Patriarchs* (Khater & Burmester), vol. 3, part 2, pp. 119-41.

if some of the sailing supply ships may have managed to break out of the port again, the galleys' crews were committed to the defence of the walls and the ships were trapped. When the city surrendered they were taken by the Crusaders. That was one of the terms of surrender.[214]

After the fall of Acre, little more is heard of the activities of the Egyptian fleet, although some units of it certainly continued to exist. The administration and financing of the fleet was reformed in 1191 and Ṣalāḥ al-Dīn gave command to his brother Sayf al-Dīn al-'Adil. The arsenal at Cairo was still functioning in 1194, ships were sent down the rivers to relieve *Bilbays* in 1195, Frankish *buṭsāt* were attacked several times between 1196 and 1198, and an Egyptian *amīr* who had some castles near Sidon armed 20 galleys in 1203 and used them to raid shipping off Cyprus and to re-provision his castles. In 1198 Sayf al-Dīn al-'Adil, by now *sulṭān* in Damascus, made a truce with the Franks for six years by land, but not by sea, suggesting that Egyptian naval forces were still capable of hitting Western shipping. Nevertheless, it is abundantly clear that Egyptian naval forces had been severely mauled at Acre and that they would have been no match for the massive battle and transport fleets gathered by Venice for the projected Fourth Crusade assault on Egypt, which, of course, was diverted by a series of circumstances to Constantinople.[215]

There can be little doubt that at the death of Manuel Komnēnos in 1180 Byzantine naval forces were still a power to be reckoned with in the eastern Mediterranean. There is nothing to suggest that the fleet which sailed to *Outremer* in 1176 did not return safely and an

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[214] Abū 'l-Fīda, *Mukhtaṣar*, A.H. 585 (p. 62); Andrea Dandolo, *Chronica*, X.ii (p. 270); *Continuation de Guillaume de Tyr*, §§82-124, esp. §120 (pp. 89-127, esp. pp. 121-3); Ibn al-'Adīm, *Zubdat al-ḥalab* (Blochet), pp. 197-9; Ibn al-Athīr, *Al-Kāmil* (RHC*HOr*), A.H. 585-7 (pp. 7-48, esp pp. 16, 21-2, 29, 32-3, 43); Ibn Shaddād, *Al-Nawadir al-sulṭāniyya*, pp. 98-161, esp. pp. 112-13, 123-4, 126-7, 141-2, 151; 'Imād al-Dīn, *Al-fatḥ al-qussī*, A.H 585-7 (pp. 168-326, esp. pp. 170-71, 175, 190, 193, 197-201, 210, 224-6, 246-9, 253-5, 273-4, 276, 279, 280-81, 289-92, 297-9, 320-21, 324); *Itinerarium peregrinorum* (Mayer), pp. 304-57, esp. pp. 319-24, 327, 329, 345-6, 348; *Itinerarium peregrinorum* (Stubbs), I.x-III.xviii, esp. I.x, xiv, xxv-vi, xxxiii-iv, xxxvii, xxxix, lx, II.xlii (pp. 23-234, esp. pp. 23-5, 27-8, 59-62, 77-81, 86, 88, 114-15, 204-9); Al-Maqrīzī, *Sulūk* (Broadhurst), A.H. 585, 586-7 (pp. 90, 91-3); Ottobono Scriba, *Annales Ianuenses*, pp. 32-6; Sāwīris, *History of the Patriarchs* (Khater & Burmester), vol. 3, part 2, pp. 144-56; Tafel and Thomas, *Urkunden*, N° 73 (vol. 1, pp. 204-6). See also Lev, *Saladin in Egypt*, pp. 172-5.

[215] Abū Shāma, *Kitāb al-rawḍatayn*, A.H. 590 (vol. 5, pp. 152-3); *Eracles*, XXVIII.vii (vol. 2, p. 258); *Ernoul*, c. XXXII (pp. 354-5); Al-Maqrīzī, *Sulūk* (Broadhurst), A.H. 587, 590, 592, 600 (pp. 95, 107, 111, 123, 146); Sāwīris, *History of the Patriarchs* (Khater & Burmester), vol. 3, part 2, p. 171. See also Pryor, "Venetian fleet".

anonymous rhetor claimed that at Manuel's death piracy had been suppressed and maritime routes opened to commerce and navigation. However, medieval technology for protecting ships from rot and shipworm was not particularly effective and neglect would lead quickly to the material decay of fleets. War fleets also depended on skilled seamen, who could not be produced overnight. What crews hardened by years at the oars could achieve by comparison to raw recruits was immeasurable. A few years of neglect could lead quickly to total collapse. It is no wonder that it took the Komnēnoi emperors almost 80 years to rebuild Byzantine fleets into naval forces capable of taking on the best that the Mediterranean had to offer. However, the results of all their efforts were lost in the next twenty.[216]

As early as 1182 the *prōtosebastos* Alexios Komnēnos had to turn to Latin mercenaries to man some of the *triēreis* despatched to face the revolt of Andronikos Komnēnos, Nikētas Chōniatēs commenting that their quality was superior to that of Byzantine crews. However, in 1185 there were still sufficient Byzantine squadrons for Andronikos to prepare 100 *ploia makra* to aid cities threatened by the Sicilian attack, to block access to the Golden Horn, and for the fleet to later engage the Sicilians in the Gulf of *Astakos* and force them to withdraw out into the Aegean. After the defeat of the Norman expedition, an alliance was reached between the Empire and Sicily under the terms of which Sicily was required to furnish a fleet for the Empire if requested. Together with a similar clause in Isaac II Angelos's later treaty with Venice, it suggests that a decline in Byzantine naval forces was becoming felt keenly, a decline which became reflected in the impunity with which Western fleets and corsairs began to operate in the Aegean and the Sea of Marmara.[217]

According to Nikētas Chōniatēs, one of the main contributors to the decay of Byzantine naval strength was the *megas doux* Michael Stryphnos, who during the 1190s sold off spikes and anchors, ropes and sails, emptying the arsenals of *ploia makra* to line his own pockets. The Byzantines became incapable of controlling even their own waters. In 1196 war broke out between Pisa and Venice in *Romania* and a Venetian fleet penetrated the Dardanelles as far as

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[216] Anonymous Rhetor, *Laudatio funebris Manuelis imperatoris*, p. 195.

[217] *Annales Ceccanenses*, 1185 (p. 287); George Tornikios, "Oratio ad Isaacium Angelum imperatorem", pp. 277-8; Nikētas Chōniatēs, *Historia*, Βασιλεία Ἀλεξίου τοῦ Κομνηνοῦ, Βασιλεία Ἀνδρονίκου τοῦ Κομνηνοῦ Β΄, Βασίλεία Ἰσαάκιου τοῦ Αγγελοῦ Α΄ (pp. 246-50, 320, 362-3); Sergios Kolybas, "Oratio ad Isaacium Angelum imperatorem", pp. 289-90.

Abydos. Although ordered home by Doge Enrico Dandolo, its commanders stayed put and its presence probably persuaded Alexios III Angelos to come to terms with Venice. Then between 1197 and 1199 a Genoese squadron under the command of a corsair named Gafforio attacked the Aegean coasts and islands and was overcome only by another Western corsair in Byzantine service, John Steiriones from Calabria.[218] The operations of these Western corsairs and fleets in the Aegean and Sea of Marmara indicate clearly the degree to which the naval forces of the Empire laboriously built up by the Komnēnoi emperors were allowed to go to wrack and ruin in only a few years. Nikētas Chōniatēs is not to be taken literally because he was searching for an explanation of why civilization as he knew it had been eclipsed, nevertheless he wrote that only 20 decaying, worm-eaten, and unseaworthy little skiffs, he used the diminutive and pejorative term *skaphidia*, could be found in the Golden Horn in 1203 to oppose the Venetian fleet of the Fourth Crusade. That this was perhaps an exaggeration is suggested by the fact that the Venetians did not attempt to attack the Byzantine ships ranged behind the chain drawn across the mouth of the Golden Horn to defend it, but rather the Crusaders chose to attack the Tower of *Galata* on the northern side of the Golden Horn, where the chain came ashore, and thus to break the chain that way. Nevertheless, it is clear from the way that the Venetians quickly overcome all resistance in the Golden Horn once the chain was broken, that what remained of Byzantine naval forces were by 1203 no match for the Venetian battle fleet of 50 *galeae*. The days of glory of the Byzantine navy were over forever, as were those of the dromon.

[218] Genoa, *Codice diplomatico*, vol. 3, N° 40 (pp. 112-15); Michael Chōniatēs, *Ta Sōzomena*, vol. 2, pp 105-7; Miklosich and Müller, *Acta et diplomata*, vol. 3, N° 8 (pp. 46-7); Nikētas Chōniatēs, *Historia*, Βασιλεία Ἀλεξίου τοῦ Αγγελοῦ Α΄, Β΄ (pp. 481-3, 491, 540-44); Tafel and Thomas, *Urkunden*, N° 78 (vol. 1, pp. 216-25).

CHAPTER TWO

THE ORIGINS OF THE DROMON

First mentions

To the best of our knowledge, the earliest reference to a galley by a form of the word *dromōn* occurs in a fragment of a work of an unknown Greco-Roman author, possibly the *History* of Eunapios of Sardis (345/6-post 414 C.E.).[1] This text, once attributed to Eunapios, mentioned either "thirty-oared *dromades* in the form of *liburnae*", or "swift *triakontēreis* in the form of *liburnae*", or "*dromades*, thirty-oared ships, in the form of *liburnae*". We prefer the first reading but all three are possible.[2]

It is possible that the earliest mentions of galleys explicitly called *dromōnes* are in charters from Ravenna dated to the late fifth century,[3]

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[1] Interpretation of the word δρ̣ό̣μωνο[ς] (*dro?m?ōno[s?]*) found totally without context in a papyrus fragment of unknown provenance dated to 126 C.E. as referring to a ship of a type known as *dromōn*, as suggested "probably" in the 1996 revised supplement of Liddell and Scott, *Greek-English lexicon*, is in fact highly improbable. See Kiessling, *Sammelbuch*, §9855 (p. 125). See also below pp. 164-5 & nn. 8, 9.

[2] In the anonymous lexicon compiled in the circle of the tenth-century Byzantine encyclopedic movement and known as *Souda*, the following citation is given at Lambda, §490: "Λίβερνα: εἶδος πλοίου. καράβια. πηξάμενος δρομάδας τριακοντήρεις Λιβερνίδων τύπῳ". See *Souda*, Λ.490 (vol. 3, p. 267).

This text was attributed to Eunapios by Boissonade. See Eunapios, *History* (Boissonade), *Eunapii fragmenta ex Suida*, §44 (vol. 1, p. 525). The attribution was accepted by the nineteenth-century editors of Eunapios such as Niebuhr. See, Eunapios, *History* (Bekker), p. 115. However, it is entirely speculative. The *Souda* did not specify the source of the quotation. The latest editor of Eunapios, Blockley, has apparently rejected the attribution since he does not include the text. See Eunapios, *History* (Blockley). All that may be said is that some late Greco-Roman source used by the *Souda* had employed this clause.

The ambiguity in meaning is created by the fact that δρομάδας and τριακοντήρεις are both accusative plurals and both may be either nouns or adjectives. Since there is no context in which to understand the meaning of the clause, either word may qualify the other or both may have been nouns used in apposition.

The attempt by Clover to attribute the text to Eunapios and a non-surviving source of his is interesting but ultimately unconvincing. See Clover, "Count Gaïnas", pp. 65-8.

[3] See Ahrweiler, *Byzance et la mer*, p. 411 and n. 1. Ahrweiler cites Serre, *Marines de guerre*, vol. 3, p. 24. However, all attempts to trace a third volume of admiral Serre's work in all major libraries around the world have failed. It does not appear to exist and this reference cannot be found in volumes one and two of Serre's work. A search of the Ravenna papyri in Tjäder has not found any charters containing references to dromons as such; however, see n. 8 below. We cannot assert

but it is only from the sixth century that the sources which referred to them by this name really proliferated rapidly; for example, the chronicle of Marcellinus (ca 518),[4] the Emperor Justinian I in a rescript of 534,[5] Cassiodorus in his *Variae* (537-8),[6] and John Lydos in his *On the magistracies* (ca 551-65).[7] *Dromonarii*, crews manning the dromons of the fleet, and a *praepositus* or commander of the *dromunarii*, are attested to in rescripts of the Ostrogothic king Theodoric the Great dated to 507-11 and in a charter from Ravenna dated to 539. It is clear that by this time squadrons of dromons must have been stationed at Ravenna and there may well have been others elsewhere in northern Italy even earlier. A sixth-century epitaph from the church of St Saturninus at Cagliari refers to a certain Gaudiosus who was probably a *dromonarius* and who died aged around the age of 24 on 17 July in a year which was the first *indiction*.[8]

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categorically that this reference to dromons at Ravenna in the fifth century does not exist, but our best efforts to verify it have failed.

[4] Marcellinus Comes, *Chronicon*, *Annus* 508 (pp. 34-5): "Romanus comes domesticorum et Rusticus comes scholariorum cum centum armatis navibus totidemque dromonibus octo milia militum armatorum secum ferentibus ad devastanda Italiae litora processerunt ...". This section of the chronicle was written ca 518, even though Marcellinus continued it later up to 534. See Croke, *Count Marcellinus*, pp. 20-35.

[5] CI, I.27.2.§2: "Iubemus etiam, ut in traiectu, qui est contra Hispaniam, quod Septem dicitur, quantos providerit tua magnitudo, de militibus una cum tribuno suo, ... constituas, ... In quo traiectu etiam dromones, quantos provideris, ordinari facias.".

[6] Cassiodorus, *Variae*, V.16 (p. 195): "..., deo nobis inspirante decreuimus mille interim dromones fabricandos assumere, qui et frumenta publica possint conuehere et adversis nauibus, si necesse fuerit, obuiare.". Cf. also V.17, 18, 20 (pp. 196-7, 197-8, 198-9).

These letters were drafted by Cassiodorus on behalf of Theodoric the Great between 523 and 526. The first two were addressed to the *praetorian prefect* Abundantius and the last two to the Count of the Patrimony Vvilia and to the *saio* Aliulfus. On these letters and their historical context see above, pp. 13-14.

[7] John Lydos, *On powers*, pt. II, §14 (p. 106): "..., ἐκεῖνο προλέγων ὥς εἰσιν ἔτι καὶ νῦν πορθμίδες τρεῖς τῇ ἀρχῇ πρὸς τὰς ἀντιπόρθμους διαπεραιώσεις ἐκ τῆς βασιλίδος ἐπὶ τὰς γείτονας ἠπείρους. βάρκας αὐτάς, ἀντὶ τοῦ δρόμωνας, πατρίως ἐκάλεσαν οἱ παλαιότεροι καὶ κέλωκας, οἷον ταχινάς, ὅτι κέλερ κατ᾽ αὐτοὺς ὁ ταχὺς λέγεται, καὶ σαρκιναρίας, ἀντὶ τοῦ ὁλκάδας, ὅτι σάρκινα κατ᾽ αὐτους τὸ ἄχθος καλεῖται.". Note, however, that in part III, §43 (pp. 200-201), John Lydos described the fleet sent against the Vandal king Gaiseric in Africa by Leo I and Anthemios in 468 C.E. as being composed of 10,000 *liburnae* (λιβύρναι), completely impossible of course.

[8] A rescript of Theodoric reproduced in Cassiodorus's *Variae*, was addressed to the *dromonarii* of the river Po. See Cassiodorus, *Variae*, II.31 (p. 79). A second, also dated to 507-11, mentioned 21 *dromonarii* from some unspecified location. See IV.15 (p. 152): "Illustris et magnifici viri comitis patrimonii suggestione comperimus dromonarios viginti et unum de constituto numero mortis incommodo fuisse subtractos.". Tjäder, *Nichtliterarischen lateinischen papyri*, vol. 2, Pap. 30 (p. 58): "...: Casanovam, iuris quond(am) Secund[i] [drom]onarii, ... [et] fundum Kalegaricus iuris quond(am) Andreatis b(onae) m(emoriae), pra[epo]siti dromunariorum, ...".

In his *Chronicle* (expl. 563), John Malalas mentioned dromons four times,[9] and at book 9, §10, which was in a part of his chronicle composed at Antioch in the early 530s, in discussing Marcus Antonius's preparation of the fleet to engage Octavian at *Actium*, he wrote that: "..., he also built many *dromōn* ships and war *liburna* ... ". Malalas appears to have identified galleys that he himself knew as *dromōnes* in his own time with those that he knew the Romans had called *liburnae* in the first century B.C.E. and to have equated the two terms for galleys in his own mind.[10]

There can be little doubt that the word *dromōn* became used for some war galleys, or perhaps rather for some specific type of war galley, because these galleys were unusually fast, faster than the standard Roman *liburnae* war galleys of the late Empire, which had been developed by the Romans from the ships of the Illyrian people known as the Liburni during the first century B.C.E.[11] The word *dromōn* was derived from the Greek "δρόμος" (*dromos*), meaning a "race", and the root "δρομ-(άω)" (*drom-aō*), meaning "run".[12] Writing in the 550s, Prokopios of Caesarea, who accompanied Belisarios as his secretary on the Byzantine expedition sent to *Africa* against the Vandal king Gelimer in 533, was clear about this. In his *History of the Wars*, he wrote that the dromons of this expedition were capable of great speed.

> And they also had ships of war [long ships] prepared as for sea-fighting,

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On the *dromonarius* named Gaudiosus, see Cosentino, "Epitafio sardo". *Indictions* were 15-year taxation cycles instituted from 312 C.E. The first *indiction* was the first year of any cycle.

[9] John Malalas, *Chronographia*, Θ΄ [9].10 (p. 166): "... ποιήσας πλοῖα δρομώνων πολλῶν, καὶ λίβυρνα πολεμικά ..."; ΙΑ΄ [11].3 (p. 205): "ὁ δὲ βασιλεὺς Τραϊανὸς ἢ μόνον κατέφθασε τῷ δρόμωνι ..."; Ις΄ [16].16 (p. 331): "..., λαμβάνοντας πλοῖα δρομώνων καὶ στρατιώτας. ... καὶ ἀγανακτήσας κατ᾽ αὐτῶν ὁ βασιλεὺς ἔβαλεν αὐτοὺς ἔξω τοῦ παλατίου, καὶ κελεύσας Μαρίνῳ τῷ Σύρῳ λαβεῖν τοὺς δρόμωνας ..."; ΙΗ΄ [18].90 (p. 407): "ὁ δὲ αὐτὸς βασιλεὺς πέμψας Ναρσῆν τὸν κουβικουλάριον μετὰ δρομώνων ...".

[10] On Malalas, Θ΄ [9].10 (p. 166) see also John Malalas, *Chronographia*, trans. Jeffreys et al., pp. xxiii and 116.

[11] See Vegetius, *Epitoma*, IV.33 (p. 151).

Quite remarkably, in spite of the fact that they were the Empire's major warships for four centuries or more, perhaps even less is known about Roman *liburnae* than about the dromons which succeeded them. The latest study is Höckmann, "Liburnian". See also Morrison, *Greek and Roman oared warships*, pp. 131, 165, 170-5, 253, 264, 316-7; Reddé, *Mare nostrum*, pp. 104-10.

[12] It was once argued that the word was derived from the Gothic word *droma*, meaning to go slowly. However, the etymology is extremely doubtful and it does not accord with what we know of the ships in any case. See Jal, *Archéologie navale*, p. 230.

> to the number of ninety-two, and they were single-banked ships covered by decks [ὀροφὰς, *orophas*], in order that the men rowing them might if possible not be exposed to the bolts of the enemy. Such ships are called *dromōnes* by those of the present time; for they are able to attain a great speed. In these sailed two thousand men of Byzantium, who were all rowers as well as fighting men; for there was not a single superfluous man among them/in them.[13]

In addition to the testimony of Prokopios, there is also that of St Isidore of Seville who wrote in his *Etymologiae* that: "The dromon is so called from 'running down'; for the Greeks call 'running' δρόμον".[14]

This reference to "speed" may have referred to any one or more of a number of quite different things in the context of war galleys. On the one hand, it may have referred to overall or general speed, to an ability to outpace other galleys over long distances. On the other hand, it may have referred rather to short-term sprint speed in battle. Alternatively, it may have referred to manœuvrability, which would also translate in practice into "speed" in battle.[15] Whatever may have been these alternative possibilities for the type of "speed" to which Prokopios and St Isidore referred, and the possible technological

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[13] Prokopios, *History of the wars*, III.xi.15-16 (vol. 2, p. 104): "ἦσαν δὲ αὐτοῖς καὶ πλοῖα μακρά, ὡς ἐς ναυμαχίαν παρασκευασμένα, ἐνενήκοντα δύο, μονήρη μέντοι καὶ ὀροφὰς ὕπερθεν ἔχοντα, ὅπως οἱ ταῦτα ἐρέσσοντες πρὸς τῶν πολεμίων ἥκιστα βάλλοιντο. δρόμωνας καλοῦσι τὰ πλοῖα ταῦτα οἱ νῦν ἄνθρωποι· πλεῖν γὰρ κατὰ τάχος δύνανται μάλιστα. ἐν τούτοις δὴ Βυζάντιοι δισχίλιοι ἔπλεον, αὐτερέται πάντες· περίνεως γὰρ ἦν ἐν τούτοις οὐδείς.". The last τούτοις may refer to either the men or the ships; although, most probably to the men. Thus the final clause probably meaned that there was not a superflous man among the 2,000; although, it is possible that it meaned that there was not a superflous man in the ships, which does not necessarily amount to the same thing.

Cf. Theophanēs, *Chronographia*, A.M. 2026 (vol. 1, p. 189): "... ἀρχηγὸς δὲ εἷς ἐπὶ ταῖς ναυσὶ Καλώνυμος Ἀλεξανδρεύς. ἦσαν δὲ καὶ δρόμωνες διὰ ναυμαχίαν ἐνενήκοντα.".

[14] Isidore of Seville, *Etymologiae*, XIX.i.14: "Longae naves sunt quas dromones vocamus, dictae eo quod longiores sint ceteris: cuius contrarius musculus, curtum navigium. Dromo autem a decurrendo dictus; cursum enim Graeci δρόμον vocant.".

Elsewhere we have pointed out that Isidore apparently knew very little about Roman war galleys. See below pp. 128, 134-5. It is therefore quite possible that he was merely writing philologically, drawing an explanation of the Latin word *dromon* from his knowledge of Greek. Consequently, whether he can really be considered as an independent witness to the meaning of the word, or more importantly to whether or not any real ships of his own age which he knew as dromons were unusually fast, is arguable.

[15] The Latin *mobilitas* could also mean either "speed" or "manœuvrability" in the context of a ship. See Pryor, "Rutilius Namatianus", pp. 272-3.

reasons for them,[16] there can be little doubt that it was because these galleys which were becoming referred to as *dromōnes* had these particular qualities that the term became applied to them. It is perhaps significant that when Prokopios discussed in an earlier part of his *History of the wars* the expedition of Flavius Basiliskos to *Africa* in 468 he did not use the term *dromōnes* for the ships of Flavius's fleet, but rather the conventional terms for ships, ναῦς (*naus*) and πλοῖον (*ploion*).[17]

Meagre though it is, the evidence suggests that the early use of the term *dromōn* was philological rather than technological in its import. As the apparent identification of *liburnae* and dromons by pseudo-Eunapios and John Malalas indicates, these war galleys which were becoming referred to as *dromōnes* by the sixth century were almost certainly the product of a gradual evolution of Roman *liburnae* over a considerable period of time rather than of some dramatic and sudden "invention" of a new design. Some *liburnae* may have become called *dromōnes* at some point in time simply because they were particularly fast rather than because, as yet, they had significantly different design characteristics. If this was the case, however, we are left with the question of what it was that gave such *liburnae* this extra speed? Only when evidence for significant design changes begins to occur can we begin to be confident that technological evolution had finally produced a ship type which was qualitatively different from its predecessors and distinctive.

Evidence for changes in the design characteristics of war galleys during the Late Roman Empire suggests that evolution in three key areas eventually led to these new galley types becoming distinguished from *liburnae*. And, since no other new term for war galleys was coined and became widely used in the period, we may reasonably connect the use of the term *dromōn* to the evidence for these changes in design. This evidence associates the term in the first case with smaller galleys which had only 50 oarsmen but which were fully-decked and were therefore distinguished from half-decked bireme and trireme *liburnae*.[18] Secondly, there is evidence for the replacement of the classical waterline rams by abovewater spurs and for changes in hull design and construction at the bow in particular consequent upon that. Finally, there is evidence for the replacement of the traditional square sails of antiquity by lateen sails. Not all of these changes may

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[16] See also below pp. 139, 143.
[17] Prokopios, *History of the wars*, III.vi.5-27 (vol. 2, pp. 56-63).
[18] See Höckmann, "Liburnian", pp. 196-7.

have been necessary before the term *dromōn* became applied to such galleys. Nor is it necessarily the case that all galleys becoming known as *dromōnes* had the same design characteristics. For example, continued use of square sails may well have co-existed side by side with increased use of lateeen sails. Such changes obviously occurred slowly and progressively over time and it will always be impossible to know to what particular point of technological change the use of the term *dromōn* corresponded, if, indeed, there ever was such a single point of correspondence. More probably there was not and even to put the question in such terms is inappropriate to what were slow and progressive evolutions in both technology and terminology.

Evidence for discontinuation of the use of the word *liburna*, or for misunderstanding of what it had once meant, may also be revealing. Although the late-Roman writer on military tactics Publius Vegetius Renatus wrote that in his own day, which was the second quarter of the fifth century, warships of the Empire were still known as *liburnae*, and although the word λιβέρνος (*libernos*) for a ship is found as late as the fifth and sixth centuries in the *Oxyrhynchus* papyri from Egypt,[19] by the 630s St Isidore of Seville no longer understood either the meaning of the word or its etymology. He thought that it was derived from "Libya" and that *liburnae* were merchant ships.[20] It is significant that use of the word was discontinued and knowledge of its meaning was lost in the same chronological period in which use of the word *dromōn* began.

Deck and oarage system

As Prokopios presented them, early dromons were monoreme galleys with a full deck to protect the oarsmen beneath it. In classical Greek the word *katastrōma* had been used for the lateral part-decks which *triēreis* and other polyremes had had along both sides.[21] It was used in conscious contradistinction to other words for the decks of ships such as ἴκρια (*ikria*), especially a half-deck at the bow or stern of an otherwise open boat, στέγη or στεγός (*stegē* or *stegos*), lit. "roof", and the group of words σανίς (*sanis*), σανίδιον (*sanidion*), and σανίδωμα

[19] See Vegetius, *Epitoma*, IV.33 (p. 151); Grenfell, *Oxyrhynchus papyri*, N°s 2032.52 & 54 (p. 255) (sixth century) and 2042.11 (p. 264) (fifth century).

[20] Isidore of Seville, *Etymologiae*, XIX.i.12: "Liburnae dictae a Libyis; naves enim sunt negotiatorum.".

[21] See Morrison, et al., *Athenian trireme*, esp. pp. 158-61.

(*sanidōma*), literally "planking". Terminological usage was not inflexible but it is clear that *katastrōma* did have this specialized meaning. When the Romans developed *liburnae* as their own pre-eminent galleys in the period from ca 50 B.C.E., they are thought to have modelled them on Hellenistic galleys and to have built them with the same lateral part-decks; although, some Roman triremes had full decks and some *liburnae* may also have been given full decks.[22] But, curiously, the Romans did not take the word *katastrōma* into Latin, and they used a variety of words for the decks of ships, none of which seem to have had a meaning confined to the idea of a *katastrōma* or even to war galleys in particular: *pons*, *forus*, *constratum*, *stega* (from στέγη), *tecta* (past participle, "decked").[23] If Roman *liburnae* really did have lateral part-decks the linguistic evidence for them is unknown. No Latin text known to us associates any particular word with what were clearly lateral part-decks and the pictorial evidence does not help since pictures of ships were invariably drawn from the side rather than from a bird's-eye view. No picture known to us shows part-decks.

Irrespective of what types of decks *liburnae* of the Roman Empire may have had, the salient innovation to which Prokopios appears to have pointed was to give monoremes, many of which were certainly undecked in prior centuries, a full deck. Prokopios was employing literary, rather than technical, language and he used the word *orophē*, literally a "roof" or "ceiling", rather than *katastrōma*. But he probably chose a word for a complete covering because these were full-decks rather than part-decks. He made it clear that the purpose of the deck was to provide greater protection for the oarsmen from incoming missiles than the construction of traditional galleys gave and this implies something different from *katastrōmata*; surely, full decks. By the tenth century dromons were certainly fully decked.

Prokopios's reference to dromons having full decks was probably predated by around thirty years in the second letter of Theodoric the Great to the *praetorian prefect* Abundantius, penned by Cassiodorus

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[22] See Höckmann, "Liburnian", pp. 196-7; Casson, *Ships and seamanship*, pp. 123-4, 141-6, 178-9; Morrison, *Greek and Roman oared warships*, pp. 170, 264. See below pp. 231-2.

[23] See, for example, Tacitus, *Annals*, II.6 (vol. 3, p. 392): "... multae pontibus stratae super quas tormenta veherentur ..."; Lucan, *Civil War*, III.630 (p. 160): "Et, postquam ruptis pelagus conpagibus hausit, / Ad summos repleta foros descendit in undas."; Caesar, *Civil wars*, I.56 (p. 78): "Dum haec Ilerdam geruntur, Massilienses usi L. Domitii consilio naves longas expediunt numero XVII, quarum erant XI tectae.".

between 523 and 526. In this letter the king, or rather Cassiodorus, congratulated Abundantius on having completed his task of constructing a fleet of dromons in quick time, almost as speedily as they were customarily sailed. He described the dromon as: "..., a 'trireme' conveyance carrying a great many oars but carefully concealing the form of the men".[24] Where else could oarsmen have been concealed but below deck?

Being monoremes, Prokopios's dromons must have been smaller than their Greco-Roman bireme and trireme predecessors. If we can believe Zōsimos, monoremes had prevailed over biremes and triremes in the victory of the fleet of Constantine I over that of Licinius at the battle of the Dardanelles in 324. According to him, Constantine's fleet of small monoreme *triakontoroi* defeated that of Licinius which supposedly included 160 *triēreis* from Egypt.[25] However, whether the victory was really due to any superiority of monoremes over biremes and triremes in the context of changing conditions of naval warfare is debatable. Leadership and tactics may also have been important and there is insufficient corroborating evidence from elsewhere to reach any definite conclusion. And, whether the use of the word *dromōn* was confined to monoremes alone in the sixth century is also arguable. By the tenth century there were certainly bireme galleys which were also called *dromōnes* and this may have been the case as early as the late eighth century. It is possible that Prokopios was referring to only one class of dromons and that the term had become applied to galleys distinguished from *liburnae* because of their speed and perhaps other design characteristics in addition to the deck, irrespective of whether they were monoremes or not. The reference to "speed" in the "racer" etymology of *dromōn* suggests that this may

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[24] Cassiodorus, *Variae*, V.17 (p. 196): "Renuntias ilico completum, quod uix credi poterat inchoatum, ut paene quanta uelocitate nauigari solet constructio nauium, tanta sit celeritate completa. ... , trireme uehiculum remorum tantum numerum prodens, sed hominum facies diligenter abscondens.". The adjective *trireme* need not be read literally. The phrase reeks of a rhetorical re-writing by Cassiodorus when later compiling his *Variae*.

[25] Zōsimos, *Historia nova*, 2.22 (pp. 78-9): "καὶ τριακόντοροι μὲν εἰς διακοσίας κατεσκευάσθησαν, ναῦς δὲ φορτίδες συνήχθησαν πλέον ἢ δισχίλιαι, ... Λικίννιος δὲ Κωνσταντῖνον ἀκούσας ἐν παρασκευαῖς εἶναι, διέπεμπεν ἀγγέλους κατὰ τὰ ἔθνη πλοῖα πολεμικὰ καὶ δυνάμεις πεζάς τε καὶ ἱππικὰς εὐτρεπεῖς ποιῆσαι κελεύων. καὶ σὺν παντὶ τάχει τριήρεις ἐξέπεμπόν οἱ Αἰγύπτιοι μὲν ὀγδοήκοντα, Φοίνικες δὲ τὰς ἴσας, ..."; 2.23 (p. 80): "ἀφικομένου δὲ τοῦ στόλου κατὰ τὸ προσταχθέν, οἱ μὲν Κωνσταντίνου στρατηγοὶ μόναις ὀγδοήκοντα τριακοντόροις ταῖς ἄριστα πλεούσαις ἔγνωσαν ναυμαχεῖν οἷα τοῦ τόπου διὰ τὴν στενότητα πλήθει νεῶν οὐκ ὄντος ἐπιτηδείου, ...". A τριακόντορος (*triakontoros*) was a thirty-oared galley, very small, and certainly a monoreme.

have been the case since small ships are never faster than larger ones unless they have different design characteristics which cause this to be so. Large yachts are always faster than smaller ones with the same design because they can carry more sail per unit of wetted hull surface. All other factors being equal, rowing fours will outpace eights over short distances but will fall behind over the long haul.[26] This consideration adds weight to other evidence, especially that which can be extrapolated from the replacement of the ram by the spur, which suggests that dromons may have had new hull design characteristics, and that use of the term may therefore not necessarily have been confined to monoremes. When considered together with the general observation that ship types evolve over time in any case, it would also help to explain how biremes as well as monoremes could have been referred to as *dromōnes* by the tenth century.

How large were Belisarios's dromons? Supposedly, Prokopios wrote that the 92 dromons of the fleet were manned by 2,000 men, although this figure was no doubt an approximation.[27] The word used for the crews, αὐτερέται (*auteretai*), referred to men who were both oarsmen and marines at the same time. Prokopios also used it with the same sense in reference to the ships of the people he referred to as the "Angili" of the island of "Brittia",[28] and it is reasonably well attested with this meaning, particularly by Thucydides but also by Heliodōros of Emesa of the second-fourth centuries, Longus of the late second to early third centuries, and Philostratos the elder in the third century. It was referenced by Hesychios in the fifth-sixth centuries and remained known with this meaning into the Middle Byzantine period in the *Souda* and by Phōtios.[29] There are two possibilities. Either the 2,000

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[26] At the Olympic Games, rowing over courses of 2,000 metres, gold-medal winning eights habitually outperform coxed fours by between around 25 and 40 seconds, or about 7-12%.

[27] We say "supposedly", because the earliest extant manuscripts from which the received edition has been compiled date from the fourteenth century and it is impossible to know what violence may have been done to the figures in the intervening eight centuries. See Prokopios, *Opera omnia*, vol. 1, pp, xxviii-liv. An earlier, thirteenth-century manuscript has been discovered recently but is unpublished. Given the fact that 2,000 oarsmen for 92 dromons appears to be a figure inexplicably low, it is possible that in the manuscript transmission process between the sixth and fourteenth centuries the figure was mistranscribed and corrupted at some point.

[28] Prokopios, *History of the wars*, VIII.20.31 (vol. 5, p. 260): "περίνεως δὲ οὐκ ἦν ἐν τούτῳ τῷ στόλῳ, ἀλλ᾽ αὐτερέται πάντες.".

[29] It does not necessarily imply that Prokopios's evidence on this point is not to be trusted, nor that he was not saying something about the real characteristics of the dromons of Belisarios's fleet; nevertheless, it seems highly probable that his choice of language here was inspired by the passage of Thucydides referring to the composition of the fleet of Philoktētēs for the Trojan War. See Thucydides, *Peloponnesian war*,

auteretai were the oarsmen of the dromons and they fought as well as rowed. Or, alternatively, these men were marines in addition to the normal complements of oarsmen and they doubled as oarsmen when necessary. On the one hand, the figure of approximately 22 oarsmen per dromon which the first possibility gives is not so far removed from the supposed 30 oarsmen of the *triakontoroi* of Constantine's fleet at the battle of the Dardanelles as to rule it out. Moreover, it did become normal in the Middle Ages for galley oarsmen to also fight in battle once the galleys became locked together. They were always armed, at least lightly. On the other hand, it is very difficult to accept that any serious warship could have only eleven or so pairs of oars. Such a ship would have been a mere long boat.[30] What could they have been intended to be used for? Surely not to engage the Vandal fleet. This being said, all 92 dromons need not necessarily have been of the same size and any estimate of the size of the dromons on the basis of the crews is therefore not be possible for that reason alone.

As we have seen, Cassiodorus wrote that dromons had a great many oars. This alone suggests that they must have had more than a mere eleven or so pairs of them. However, in addition to that, one further consideration above all leads us to conclude that these 2,000 men were in reality marines in addition to the normal oarsmen: the fact that the dromons were fully decked with the explicit purpose of protecting the oarsmen from missiles. Obviously, there could be no incoming missiles until after battle had been joined and, since Prokopios wrote that the oarsmen continued rowing after that, they therefore cannot have fought as marines. In any case, how could oarsmen rowing below deck be called upon to then engage in battle as marines? They would have had to scramble up on deck through hatches, leaving the ships powerless in order to do so. Both the leaving of the ships without power and also the time elapsed before they could take up their arms and join battle would be unacceptable from the point of view of both manœuvrability in battle and advantage

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I.x.4 (vol. 1, p. 20): "αὐτερέται δὲ ὅτι ἦσαν καὶ μάχιμοι πάντες, ἐν ταῖς Φιλοκτήτου ναυσὶ δεδήλωκεν· τοξότας γὰρ πάντας πεποίηκε τοὺς προσκώπους. περίνεως δὲ οὐκ εἰκὸς πολλοὺς ξυμπλεῖν ...". See also II.18.4 & VI.91.4, where the word was also used. The word was scholiated in the tenth-century Patmos manuscript at I.x.4 as: "αὐτερέται: οἱ αὐτοὶ ἐρέται καὶ στρατιῶται". See Hude, *Scholia*, p. 14. See also Heliodōros, *Aithiopika*, Β΄.ii.2 (vol. 1, p. 49); Longus, *Daphnis and Chloe*, II.20 (p. 94); Philostratos, *Εἰκόνες Α*, I.12.(1) (p. 50); Hesychios, *Lexicon* (Schmidt), A.8385 (vol. 1, p. 325); *Souda*, A.4468 (vol. 1, p. 418); Phōtios, *Lexicon* (Theodoridis), A.3202 (p. 295).

[30] In the thirteenth century the ships' boats of large sailing ships rowed from 32 to 52 oars. See Pryor, "Naval architecture", pp. 372-3.

in initial engagement. We conclude that the 2,000 *auteretai* were marines supernumerary to the oarsmen and that this figure tells us nothing about the size of the dromons of Belisarios' fleet or of the number of oarsmen aboard them.

What is possibly the earliest evidence for the size of dromons occurs in the *Histories* of Theophylaktos Simokattēs, which were written in the late 620s. Theophylaktos referred twice to *dromōnes*, once to fast-sailing ships, ταχυναυτούσας ὁλκάδας (*tachynautousas olkadas*), commonly known as *dromōnes*, in use by the *stratēgos* Priskos on the Danube against the Avars at Belgrade in 595 and once to the Emperor Maurice fleeing Constantinople on a dromon in 602.[31] However, in another section, he used almost the same term for "fast sailing ships", ταχυναυτοῦσαι νῆες (*tachynautousai nēes*), for those on which Maurice took ship at *Sēlymbria* for *Hērakleia* in 590, and he then said that the one on which he was travelling was a *pentēkonteros*; that is, it supposedly had fifty oars.[32] Assuming that Theophylaktos was not merely aping Herodotos or Thucydides by using the classical *pentēkonteros* simply as an approved word for a war galley, he most probably also meant that these "fast sailing" *pentēkontoroi* were of the type commonly known as *dromōnes*. Since, as we shall see, in the tenth century the *Theophanēs continuatus* said that monoreme dromons had fifty oars and the emperor Leo VI (886-912) that bireme dromons had fifty oars in the lower bank,[33] the evidence suggests that the standard size of galleys to which the word *dromōn* was applied was fifty oars by the early seventh century at least, and most probably in the age of Prokopios as well. In fact, a figure of 50-54 oars for any two files of oarsmen, whether arranged in superimposed banks or in some other way, remained the norm for standard galleys of the line of

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[31] Theophylaktos Simokattēs, *Historiae*, 7.10.3 (p. 262): "ὁ μὲν οὖν Πρίσκος τῇ νήσῳ τὰς δυνάμεις περιβαλών, ταχυναυτούσας ὁλκάδας παραστησάμενος, ἃς δρόμωνας εἴωθεν ὀνομάζειν τὸ πλῆθος, ἐπὶ τὰ Κωνσταντίολα παραγίνεται."; 8.9.7 (p. 300): "... ὁ Μαυρίκιος ... τήν τε ὑπηρέτιν ὁλκάδα παραστησάμενος (δρόμωνα δὲ ταύτην εἰώθασι τὰ πλήθη ἀποκαλεῖν) καὶ χρήματα ἐς αὐτὴν ἐμβαλὼν ἅμα τῷ γυναίῳ καὶ τοῖς παισὶν ἐπ᾽ αὐτῆς ἐπιβαίνει, ...". Cf. Theophanēs, *Chronographia*, A.M. 6090 (vol. 1, p. 276): "τοῦτο μαθὼν Πρίσκος παραγίνεται εἰς τὴν νῆσον τοῦ Ἴστρου, καὶ παραλαβὼν δρόμωνας παραγίνεται πρὸς τὸν Χαγάνον εἰς Κωνσταντίολα, θέλων αὐτῷ ὁμιλῆσαι."; 6094 (vol. 1, p. 288): "ὁ δὲ Μαυρίκιος μεσούσης τῆς νυκτὸς ἀποδυσάμενος τὴν βασίλειον στολὴν καὶ ἰδιωτικὴν περιβαλόμενος εἰς δρόμωνά τε εἰσελθὼν μετὰ τῆς γυναικὸς καὶ τῶν τέκνων αὐτοῦ καὶ Κωνσταντίνου ἀποδιδράσκει.".

[32] Theophylaktos Simokattēs, *Historiae*, 6.1.1-2 (p. 220): "Τοίνυν ταχυναυτοῦσαι νῆες παρῆσαν τῆς περὶ αὐτὰς ἀρτίας κατασκευῆς μηδὲν πρὸς βασίλειον ἐκπομπὴν ἀποδέουσαι. ... τὸν δὲ αὐτοκράτορα ἅμα τῇ περὶ αὐτὸν πεντηκοντόρῳ παραδόξῳ σωτηρίᾳ ἐν τῷ Δανίῳ διασωθῆναι τὴν ναυαγίαν ἐκκλίναντα.".

[33] See also below pp. 190, 283-4.

battle until the end of the thirteenth century. Twenty five to 27 oar benches for any one file of oarsmen became the norm, almost certainly determined by the technological limitations imposed by building ships as long and as narrow as galleys with such a flexible material as wood.

The ram and the spur

Of the two most salient design characteristics which eventually distinguished Byzantine galleys from their Roman predecessors, the first was the replacement of the waterline ram, *embolos*, by an abovewater spur. The last known use of the classical words *embolos*, "a ram", or *emballein*, "to ram", in a context which might possibly indicate that classical waterline rams were still in use occurred in Prokopios's *History of the wars*. In his account of the battle of *Senogallia* in 551, Prokopios referred twice to the Byzantine fleet ramming the Gothic ships.[34] But Prokopios was not present at *Senogallia* and he was writing in a classical tradition, using classical Greek terminology for an imperial and educated audience. His use of *emballein* cannot be taken as proof that Byzantine war galleys of the period, which he referred to at *Senogallia* by the generic terms for ships, πλοῖα (*ploia*) and νῆες (*nēes*), rather than as *dromōnes*, still had waterline rams. Later Byzantine authors continued to use the words *embolos* and *emballein*, for example the Anonymous author of the treatise commissioned by the *patrikios* and *parakoimōmenos* Basil;[35] however, it is clear from other evidence that by his age spurs rather than rams were in use and that "ramming" meant simply engaging, not even necessarily by the bow. At §6.2 of his treatise the Anonymous used the noun *embolas* to express the ideas contained in the participle ἐπερχομένους (*eperchomenous*) used by Leo VI for attacking, but clearly in the sense of engaging side to side, at §28 of his *Naumachika Leontos Basileōs*.[36]

Isidore of Seville suggested that by his age, the late sixth and early seventh centuries, the real function of the ram was no longer understood in the West. He wrote that: "Ships with rams are so called

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[34] Prokopios, *History of the wars*, VIII.xxiii.31 and 34 (vol. 5, pp. 296-8).

[35] Appendix Three, §§2.15, 6.2, 7.3. On the spurs of dromons in the tenth century, see below pp. 203-10. At §2.15 the Anonymous used *emboloi* for cables used to control the tillers, οἴακες (*oiakes*), of the quarter rudders, revealing clearly that he did not understand the meaning of the word.

[36] See Appendix Three, §6.2 and Appendix Two [a], §28.

since they have at the bow copper rams [*rostra*] on account of rocks, so that they [the ships] do not collide [with the rocks] and be destroyed".[37] It is surprising that someone of Isidore's erudition had not learned the real function of the *rostrum* from the classical sources that he was familiar with. Nevertheless, he seems to have merely deduced by the application of logic that the purpose of the Roman *rostrum* had been to act as a sort of fender at the bow against rocks, thus indicating that he had no familiarity with its use as a ram in naval warfare. The equation between the Greek *embolos* and the Latin *rostrum* continued to be understood but there is no evidence that the actual functions of the object to which these terms had referred in the context of a ship remained known.[38]

The literary sources are inconclusive as to whether or not the waterline ram had been replaced by the abovewater spur as early as the sixth century. However, the pictorial evidence suggests that it had been. The earliest surviving depiction of what may have been a dromon is an illustration in the *Roman Vergil* manuscript of the *Aeneid* in the Vatican Library, a late fifth-century manuscript whose provenance was some metropolitan centre in the West.[39] It is followed shortly thereafter by miniatures of what must surely have been many dromon galleys in the illustrations of the manuscript of the *Iliad* of Homer in the Ambrosiana Library (*Ilias Ambrosiana*), which is dated to the early sixth century with a provenance in Constantinople.[40] These manuscripts show galleys with bow characteristics significantly different from those of their Greco-Roman predecessors. They are

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[37] Isidore of Seville, *Etymologiae*, XIX.i.13: "Rostratae naves vocatae ab eo quod in fronte rostra aerea habeant propter scopulos, ne feriantur et conlidantur.".

[38] See "Note on citations of Greek and Latin glossaries", p. lxix above. See the Greek-Latin *Cyril* glosses of London, British Library, MS. Harley 5792; Goetz, *Glossarii Latini*, vol. 2, p. 376, l. 7: "Νεωνραμφη ητοι εμβολοι : rostra singularenonhabet [sic]". The gloss on ἐμβάλλω in the same manuscript shows that the author was unaware of what the verb meant in the context of naval warfare. *Ibid*., vol. 2, p. 295, l. 45: "Εμβᾱλλω inmitto inicioconicio [sic]". The same is true of the *Philoxenos* Latin-Greek glosses of Paris, Bibliothèque Nationale, MS. Lat. 7651; *ibid*., vol. 2, p. 114, l. 30: "Contorquet inmittit etiaculatur εμβᾱλλει [sic]" and p. 175, l. 23: "Rostra εμβολαῑ · ρυγχηξελυνια [sic]". However, the equation of the word *embolos* with *rostrum* remained known in the *hermeneumata* attributed to Dositheus in the *Hermeneumata Monacensia*. See *ibid*., vol. 3, p. 205, l. 29: "embolon rostrum nauis".

[39] Rome, Biblioteca Apostolica Vaticana, MS. Vat. Lat. 3867. See Rosenthal, *Vergilius Romanus*, plate VIII (p. 52).

[40] Milan, Biblioteca Ambrosiana, Cod. Ambros. F. 205 Inf. See Bandinelli, *Hellenistic-Byzantine miniatures*, esp. figs 44 (p. 56) [= fig. 96 (pl. 9)], 63 (p.67) [= fig. 190 (pl. 34)], 74 (p. 73) [= Min. XXXVIII (colour plate III)]. All that survives of this manuscript are the illustrations.

quite different, for example, to the bows of the many galleys shown in the *Vatican Vergil* manuscript of the late fourth c entury.[41]

Classical Greek *triēreis* and other galleys had a straight stempost with a pronounced waterline ram extending from it which had at least

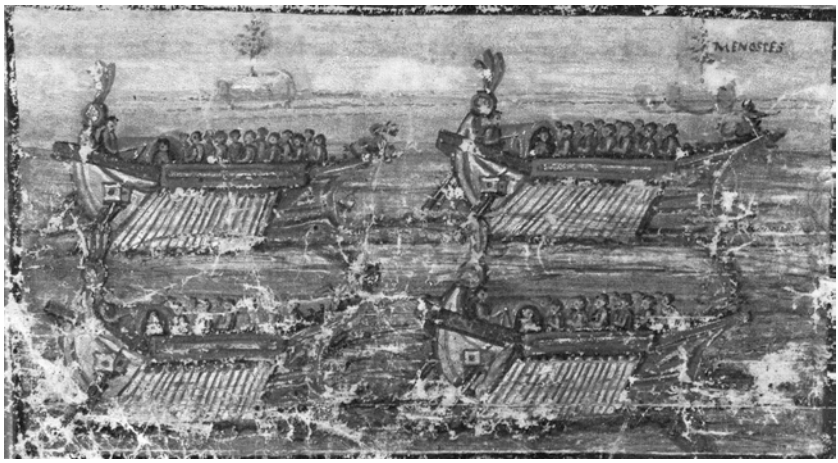


Figure 1
Liburnae in the *Vatican Vergil* (Rome, Biblioteca Apostolica Vaticana, MS. Vat. Lat. 3225, fol. 43v), late fourth century.

two, and perhaps three, horizontal fins and a central vertical post at the impact zone.[42] In the Hellenistic period the head of the stempost became recurved towards the stern and the ram was now invariably three-finned.[43] The bows of galleys of the navy of the Roman Republic had this same recurved stempost and three-finned ram and were no doubt modelled on Hellenistic galleys.[44] However, it appears that during the first century C.E. the Romans abandoned the three-finned ram and replaced it with a single-pointed one. Some of the galleys were also given forecastles.[45] The many galleys depicted on Trajan's column of ca 114 C.E., celebrating the emperor's *Dacian*

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[41] Rome, Biblioteca Apostolica Vaticana, MS. Vat. Lat. 3225. See Stevenson, *Miniature decoration*, pictures 17, 21, 25, 28, 29, 30, 39.

[42] See Casson, *Ships and seamanship*, p. 85 and plates 81-2, 84, 88-90.

[43] See Casson, *Ships and seamanship*, p. 117 and plates 107, 109, 110, 116.

[44] See Casson, *Ships and seamanship*, p. 146 and plates 124, 125, 129, 130-32.

[45] See Casson, *Ships and seamanship*, p. 146 and pll. 122-3, 127, 141; Stevenson, *Miniature decoration* (as per n. 41 above).

victories, appear to show rams that also curve upwards from the keel below water to terminate in a single point above water.[46]

It is possible that this may mean nothing more than that the sculptors attempted to show the ram while at the same time showing the water. However, even if this was the case with Trajan's column, there is too much evidence for similarly curved rams in some of the late Roman mosaics to maintain the argument that all we are looking

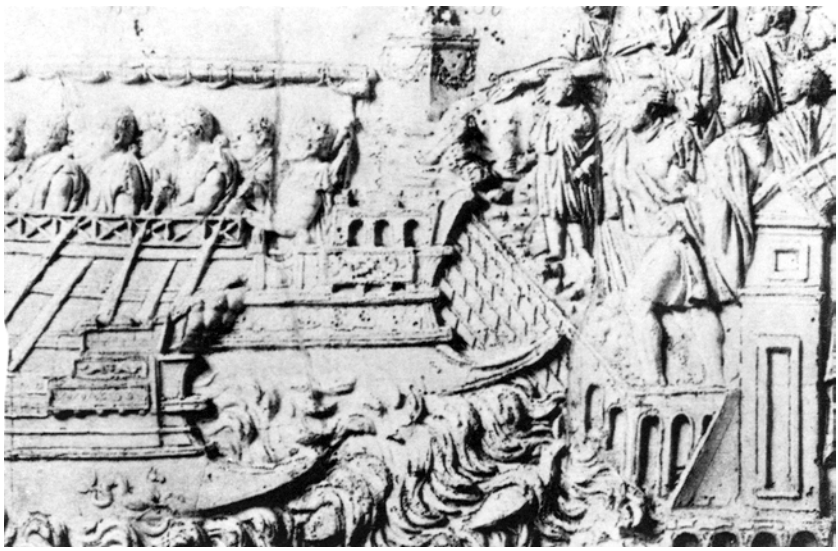


Figure 2
Liburnae on Trajan's column, ca 114 C. E.

at is artistic license.[47] The mosaic of a galley from the baths at *Themetra*, near *Hadrumetum* in Tunisia, dated to ca 200-220 C.E., is a good example.[48] If rams continued to have the same function that they had had for centuries, that is to fracture the hulls of enemy ships at the waterline, why were they apparently begun to be built from this time

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[46] Lepper and Frere, *Trajan's column*, plates 26, 35, 58, 59, 61, 63.

[47] See also Höckmann, "Liburnian", pp. 200-202.

[48] Foucher, *Navires et barques*, fig. 9 (p. 17). See also figs 2 (p. 7) and 12 (p. 21): galleys on mosaics from the house of L'Oued Blibane, *Hadrumetum*, ca 190-210, and the baths at *Themetra*, ca 200-220, respectively. See also the Dionysios mosaic from *Thugga* in Dunbabin, *Mosaics of Roman North Africa*, pl. 16. One of the galleys in the great hunting scene mosaic at Piazza Armerina, Sicily, also has a similarly curved ram. See Figure 36.

commencing at the waterline at the stempost but then curving up to a point well above the waterline?

The *Roman Vergil* illustration appears to show bow configurations very similar to those of Trajan's column and the *Africa* mosaics. However, there is a critical difference. In the *Roman Vergil* what appear to have been the rams are sustained from the stemposts by couplings not seen on earlier depictions of Greco-Roman galleys.[49] This indicates that they were not, in fact, rams. No ram built as an integral part of the keel and stempost structure needed to be sustained

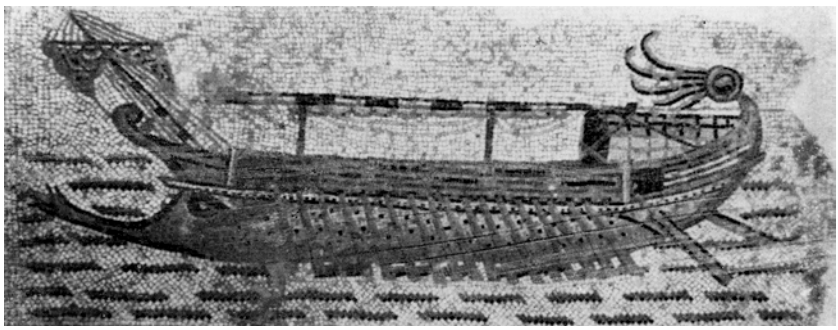


Figure 3
Galley on a mosaic from the baths at *Themetra* near *Hadrumetum*, Tunisia, ca 200-220 C.E.

in this way. The couplings must have indicated something new. They cannot be considered to have been a mere artist's aberration because in the Latin West in the Middle Ages exactly the same type of coupling was used to sustain the spurs of galleys.

They can be seen in a late thirteenth-century painting of a Catalan galley from a church near Teruel in Spain,[50] and are also specified in the earliest surviving contracts for the construction of galleys, from the Angevin court in the reign of Charles I of Anjou, King of Sicily (ca 1269-84).[51] The illustration of the *Roman Vergil* manuscript surely shows the first known depiction of spurs and a new type of war galley. Whether the same can be said of all the depictions of galleys with

[49] Wright, *Codicological notes*, p. 82.
[50] Foerster, "Warships of Aragón", fig. 6 and p. 28.
[51] See Pryor, "Galleys of Charles I of Anjou", p. 40: " Et de iugo prore usque ad palmam habet palmincellum [palmentellum] palmorum XVI et medii usque ad ferrum quod sustinet speronum [speronem].".

similarly curved "rams" from the time of Trajan's column onwards is a moot point.



Figure 4
Dromons in the *Roman Vergil* (Rome, Biblioteca Apostolica Vaticana, MS. Vat. Lat. 3867, fol. 77r), late fifth century.

The illustrations of the *Ilias Ambrosiana* depict for the first time galleys with stemposts raked strongly forward and flared bows of a type which ought to have decreased water resistance and increased speed, but which would have made constructing ships with waterline rams impossible. Significantly, no projection of any kind at or near the waterline which might possibly be a waterline ram is shown in any of these illustrations. Some Roman merchant galleys had also had such

raked and flared bows but they, of course, had no need for rams.[52] In most cases it is not possible to distinguish any more detail of the bows of the *Ilias Ambrosiana* galleys since they are hidden either by other galleys or by promontories of land. In a few cases the stemposts



Figure 5
Catalan galley on a painted beam from a church near Teruel (Barcelona, Museo del Arte de Cataluña, Ref. 15839), late thirteenth century.
© MNAC – Museu Nacional d'Art de Catalunya. Barcelona. 2006
Photographers: Calveras/Mérida/Sagristà

appear to be clean, having no forward projection of any kind.[53] However, there are two illustrations where it is possible to make out a narrow beam projecting forward from the stempost about half way between the water and the gunwale and raked slightly upwards. These also must surely have been spurs. These beams, or "spurs" as we would argue that they were intended to represent, were shown clearly in the first reproduction of the drawings of the manuscript, done in 1819 under the direction of Cardinal Angelo Mai.[54]

Although we would not wish to nail our colours to the mast on the issue, it is certainly arguable that the earliest known "Byzantine" illustrations of dromons occur in the manuscript Paris, Bibliothèque Nationale, MS. Grec 923 of the *Sacra Parallela* attributed to St John of Damascus (ca 675-753/4) at fol. 207r. It is now generally accepted that the manuscript may be dated to the third quarter of the ninth century, with a provenance in Constantinople.[55] Although the artist

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[52] See Casson, *Ships and seamanship*, plates 138, 139.

[53] Bandinelli, *Hellenistic-Byzantine miniatures*, figs 47 (p. 58) [= fig. 116 (pl. 15)], 63 (p. 67) [= fig. 190 (pl. 34)].

[54] See Mai, *Iliad*, pl. VIII (= Figure 6 here), pl. XXXVIII (= Figure 7 here). The 1819 edition has no page numbers.

[55] See Weitzmann, *Sacra Parallela*, fig. 203 (pl. LIII). The illustration is to Psalm 106 (107) verses 23-4: "They that go down to the sea in ships, working [rather than "doing business"] in many waters; these [men] have seen the works of the Lord, and his wonders in the deep." [*The Septuagint version of the Old Testament, with an English translation*, p. 765] quoted in abbreviated form from John Chrysostom, *Homily in Lazarum*. There are other illustrations of ships with some of the same characteristics, but nowhere near as complete, at fols 29v and 206v (fig. 206, pl. LXIV and fig. 316, pl. LXXII). On the dating and provenance of the manuscript see

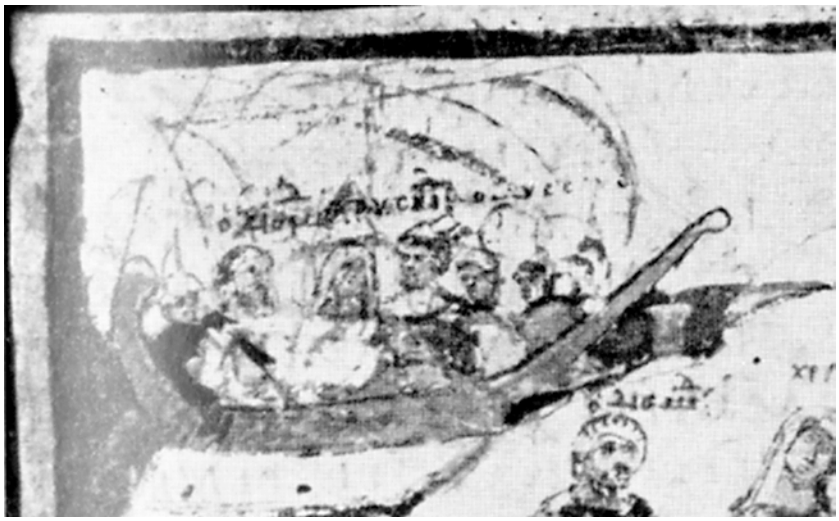


Figure 6
Dromon in the *Ilias Ambrosiana* (Milan, Biblioteca Ambrosiana, Cod. Ambros. F. 205 Inf., min. VIII), early sixth century.

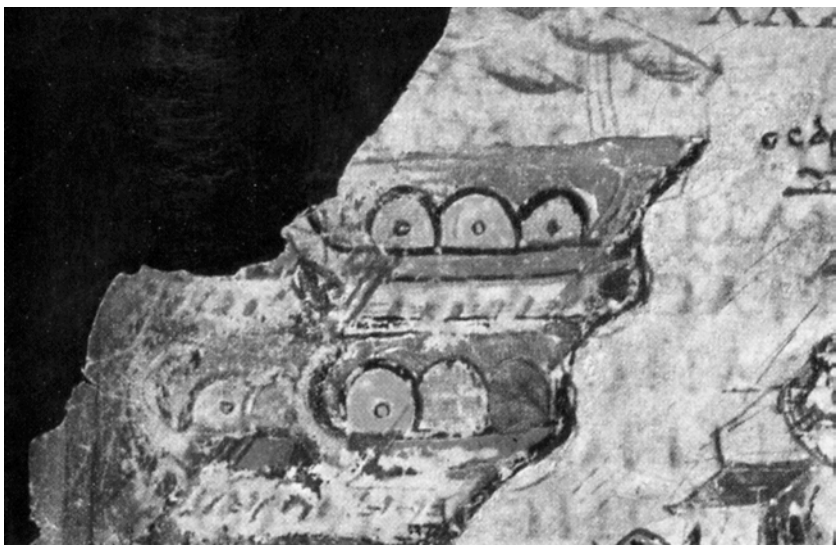


Figure 7
Dromons in the *Ilias Ambrosiana* (Milan, Biblioteca Ambrosiana, Cod. Ambros. F. 205 Inf., min. XXXVIII), early sixth century.

Brubaker, *Vision and meaning*, p. 25.

has distorted the ships to make them fit the margins of the manuscript, he has clearly depicted oars as well as two masts with lateen sails. These are the only depictions of two-masted ships known to us in European art between the second and twelfth centuries. Moreover, on the stemposts, below the line of the oars, there are forward projections of some kind similar to those of the *Ilias Ambrosiana* galleys. It is difficult to imagine what they might have been intended to depict other than spurs of dromons.



Figure 8

Two-masted, lateen-rigged dromons in a manuscript of the *Sacra Parallela* attributed to St John of Damascus (Paris, Bibliothèque Nationale, MS. Gr. 923, fol. 207r), third quarter of the ninth century.
Cliché Bibliothèque nationale de France

The replacement of the waterline ram by the abovewater spur must have been accompanied by changes in hull design. With a waterline ram the ship itself was the weapon rather than the ram, just as, in the High Middle Ages, the weapon was not the knight's lance but rather the entire combination of horse and rider. The lance was merely the delivery system. In the case of the ram, the impetus of the entire galley was funnelled into the impact zone of the ram. Therefore, the keel, stempost, ram, and hull had to be constructed in such a way as to absorb the shock of impact.[56] This precluded raking and flaring of the stempost and hull at the bows. Replacement of the ram by the spur permitted war galleys to have stemposts and bows constructed in the same raked and flared way as some merchant galleys had had. This may have decreased water resistance at the bow somewhat, possibly producing a concomitant increase in speed. However, water resistance is an extremely complex matter,[57] and suffice it to say here that such a change in the structure of the bows ought not in itself to have produced any marked increase in speed *per se*. The speed of *triēreis*, which did have rams of course, was legendary. It may have made the ships somewhat more manœuvrable since they would have had a shorter keel and therefore less length of keel to drag across the water when turning but, against this, the reconstructed Greek *triērēs Olympias* has proved to be highly manœuvrable. Neither of these factors are likely to have been sufficiently significant in their own right to explain the disappearance of the ram or the etymology of the word *dromōn*.

The new spur of Byzantine and medieval galleys was not designed for "ramming", in the traditional classical meaning of that term.[58] It was not meant to fracture the hull of an enemy ship in order to sink it. Rather, it was designed to ride up and over the oars of an enemy ship, smashing them and disabling its power source so that it would be

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[56] See Steffy, "Ram and bow timbers", pp. 37-9.

[57] Water resistance to a ship is largely comprised of, first, frictional resistance due to the ship dragging water along with it and, secondly, the wave-making action of the ship as it moves through the water and creates drag. The first is effectively proportional to the wetted surface of the hull and to the speed of the ship to the power of 1.85. In the case of a hull shaped like that of a galley and of the same length, the second is not very significant below about 6 knots but rises to become about equivalent to the frictional resistance at around 9 knots. Communication from John Coates.

[58] Contrary to the opinion of Dolley in "Warships", p. 48, and also of other scholars.

rendered helpless and vulnerable to attack by marines and archers.[59] This function is revealed by the etymology of "*calcar*" one of the two medieval Latin terms for such spurs, the other being *speronus*. In Latin, "*calcare*" meant "to tread under foot, to ride over, to trample".

In the twelfth-century Sicilian manuscript of John Skylitzēs' *Synopsis historiōn* galleys intended to represent Byzantine war galleys defeating *Rhōs* ships in the Bosporos in 941 are shown rolling the *Rhōs* ships over and smashing their oars with their spurs and bows.



Figure 9
Dromons rolling over *Rhōs* ships with their spurs in the *Synopsis historiōn* of John Skylitzēs (Madrid, Biblioteca Nacional, vitr 26-2, fol. 130r), ca 1160.

There has been much speculation about possible reasons for the replacement of the ram by the spur. Some have thought that it may have had something to do with the invention of "Greek Fire", on which see Appendix Six. However, it is clear that the development of

[59] This is made clear in the chronicle composed by an anonymous chaplain of the Templars in the Holy Land in 1191-2 known as the *Itinerarium peregrinorum*. See *Itinerarium peregrinorum* (Mayer), p. 322: "Quod autem antiqui dixere liburnam, moderni galeam media producta nominant, que longa, gracilis et parum eminens lignum a prora prefixum habet, et vulgo calcar dicitur, quo rates hostium transfiguntur percusse.".

the spur predated the invention of Greek Fire by at least a century and a half. More probably, the change was related to the evolution of hull construction in late antiquity.

Maritime archaeologists have now produced clear evidence that during late antiquity the classical technique of constructing the hulls of ships shell first was changing. In the classical Mediterranean form of shell construction,[60] hulls were constructed from the keel outwards by fitting the planks or strakes edge to edge and holding them together with closely-spaced mortise and tenon joints pegged with treenails. Frames were not inserted until hulls had been built up to a point where they could usefully be placed in position. The finest surviving archaeological example of this form of construction is the wreck of a small sailing ship of the fourth century B.C.E. found off Kyrenia, Cyprus. In this ship, the tenons were fitted tightly in the mortises and were approximately 4.3 centimetres wide with gaps of only around 7.5 centimetres between them, around 11.8 centimetres from centre to centre of adjacent tenons. They were also long; the mortises being cut in to each plank to a depth of around 6.1 centimetres, the tenons being around 12 centimetres long. In addition, the tenons were pegged fast in the mortises by treenails after the planks had been hammered home.[61] Internal frames were added after the hull had already been built up to a certain point. This technique produced light and strong, but very inflexible hulls. Almost certainly the waterline ram had been specifically designed for use against hulls constructed in this way.

The only classical waterline ram, *embolos* or *rostrum*, so far recovered from the Mediterranean seabed is the ram found off Athlit, Israel, which survives from what was in all probability a Hellenistic *tetrērēs* of the third-second centuries B.C.E.[62] In a seminal study of this ram Steffy has related its structural operation to the construction of the hulls against which it was used and has argued persuasively that its peculiar structure of the ram, with three horizontal fins and a central vertical post at the impact zone, was specifically designed to operate against hulls constructed from planks edge-joined by closely-spaced mortise and tenon joints. It was not intended to penetrate the hull. Rather, it was designed to deliver a blow to the moving hull of an

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[60] Shell construction as such was also used elsewhere with various plank-joining techniques. For example, in Scandinavia and Northern Europe until the Late Middle Ages shell construction was also used but with the clinker technique of joining the planks to each other.

[61] See Steffy, "Shell to skeleton", pp. 1-2; Casson, *Ships and seamanship*, p. 214.

[62] Murray, "Athlit ship".

enemy ship which would shatter its waterline wale or at least cause it to flex markedly, dislodging frames and and tearing loose the mortise and tenon joinery of adjacent planks. This would probably cause the planks to split down the middle.[63] They would be sprung irrepairably, resulting in flooding of the hull that could not be stopped by damage control.



Figure 10
The Athlit Ram, third-second centuries B.C.E.

Collateral evidence to support this thesis that the classical ram was specifically designed to operate against a particular type of hull construction may be found in Julius Caesar's comment that the rams of his galleys were useless against the oak hulls of the ships of the Veneti in the English Channel.[64]

The evidence of late antique wrecks shows that by around the fourth century the mortise and tenon joinery was becoming looser and less structurally important while the internal frames in the hull were becoming more important. By the time of the fourth-century wreck found at Yassı Ada islet in the Chuka Channel between Pserimo and Turkey, the tenons had become less tightly fitting, wider (7-9

[63] Steffy, "Ram and bow timbers", pp. 37-8. Cf. Shaw, "Steering to ram", p. 99, the quotation from J. Haywood. See, for example, the split plank from the Grand Congloué wreck in Casson, *Ships and seamanship*, plates 159-60.

[64] Caesar, *Gallic war*, III.13 (p. 156): "Neque enim his [navibus] nostrae rostro nocere poterant (tanta in eis erat firmitudo, ...".

centimetres), but shorter, the mortises ranging between 5.0 and 5.5 centimetres, and were spaced some 24.3 centimetres apart. However, they were still pegged in the mortises by treenails. In the wreck of ca 400 known as Port-Vendres A in Roussillon the mortises and tenons were spaced at intervals of between 6 and 15 centimetres. In the wreck of the fifth century known as Dramont E, found off the Ile d'Or, Provence, the tenons were loose fitting in the mortises, irregularly sized, and spaced between around 10 and 30 centimetres apart, but still pegged in the mortises by treenails. The evolutionary process was even more clearly apparent in the seventh-century Yassı Ada wreck, in which the tenons were only around 3 centimetres wide, very loose fitting, and strongly tapered at the ends in mortises up to 5 centimetres wide but only around 3.5 centimetres deep, and varied in spacing between around 35 and 90 centimetres apart. The wreck excavated near Bozburun, Turkey, whose timbers were felled in 874 according to dendo-chronological analysis, shows no signs of mortise and tenon edge-joining of planks.[65] By the eleventh century, in the Serçe Limani wreck, mortise and tenon joining of planks had definitely disappeared and skeleton construction over a framework of ribs and stringers had replaced the classical shell construction technique. Other wrecks which display little or no evidence of mortise and tenon plank joining, and which were skeleton built, include the seventh-century Saint Gervais B wreck, the tenth-century Agay wreck, the twelfth-century Pelagos wreck, and the tenth-century Muslim ship at Plane in Marseilles Bay.[66] As more wrecks from the centuries spanning the first millennia B.C.E. and C.E. are found and excavated in the future, the precise details of this evolution in hull construction in the Mediterranean will become more completely fleshed out. But, even now, enough has been learned from nautical archaeology to confirm the general parameters of the evolution. Slowly, over the centuries, the entire conception of the building of hulls of ships changed.

It has also been suggested that a change from waterproofing hulls by means of a coating of waterproof material covered with lead sheathing to hold it in place, to doing so by a caulking of tow or oakum driven into the seams between the strakes, may also have

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[65] Personal communication from Frederick M. Hocker to John Pryor. See also Hocker, "1995 field season"; "1997 field season"; "Final campaign".

[66] See Bass, *History of seafaring*, pp. 138, 143; *idem*, *Yassı Ada volume I*, p. 55; Parker, *Ancient shipwecks*, pp. 42, 306, 314, 330, 373, 454-5; Pryor, "Mediterranean round ship", pp. 65-7; Santamaria, "L'épave Dramont", p. 144; Steffy, "Shell to skeleton".

accompanied the progressive evolution away from mortise and tenon plank joining.[67] Obviously, with closely-spaced mortise and tenon edge joining of the planks, it was not possible to force caulking into the seams. The tenons would have prevented much of the caulking being driven in very far in any case and to have even tried to do so would have loosened the tenons in their mortises, weakening the whole structure and negating the entire rationale on which the construction of the hull was based.[68] This only became possible and necessary when the number and structural integrity of the mortises and tenons decreased. Since lead sheathing has not been reported reliably on any wrecks dated to later than the end of the second century C.E., this evolutionary process may have begun much earlier than has hitherto been suspected. That being said, the archaeological evidence is very ambiguous, confused by unprofessional excavations and reports and the problem of knowing whether coatings of waterproofing, or caulking between strakes, were applied at the time of construction of ships or much later in attempts to prolong their life.[69]

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[67] See Hocker, "Lead hull sheathing". See also Casson, *Ships and seamanship*, pp. 214-16.

[68] See Basch, "Note sur le calfatage", p. 188.

[69] The following does not pretend to be a comprehensive discussion of the issues. It merely indicates the ambiguous parameters of the subject given the current state of research. References are omitted because of their multiplicity.

On the one hand, the wrecks of Kyrenia (ca 310-300 B.C.E.), Marsala Punic ship (ca 250-175 B.C.E.), Grand Congloué and Spargi (2nd century B.C.E.), Anticythera A, Mahdia, Albenga, and Le Madrague de Giens, (1st century B.C.E.), Ben-Afelí (near Almazora, Spain), Nemi, and Port-Vendres B (1st century C.E.), Saint Gervais D (ca 50-150 C.E.), Grand Bassin C at Gruissan, Roussillon (ca 120 C.E.), and Procchio, Elba (ca 160-200 C.E.), and possibly a ship dated tentatively to ca 200 C.E. excavated off Grado, all had lead or copper sheathing. However, the sheathing was applied to the Kyrenia ship in her old age in an attempt to prolong her life and, while the Marsala ship was lead-sheathed but was newly-built when she sank, in many of the other cases it is impossible to know when the sheathing was applied and for what purpose. Whether any coating of waterproofing between the hull and the sheathing existed is often not specified.

On the other hand, no lead sheathing is reported for the wrecks of La Chrétienne A and C (2nd century B.C.E.), Dramont A and Le Titan (1st century B.C.E.), Mateille B at Gruissan (1st century C.E.), Torre Sgarrata (ca 180-205 C.E.), Monaco A (ca 200-250 C.E.), La Lique B, Provence (ca 300-325 C.E.), Yassı Ada, Dramont F, and Port-Vendres A (ca 400 C.E.), or for any wrecks later than ca 200 C.E.

Lead plates have been found in some other later wrecks such as those at Ayia Galini, Crete (ca 276-90 C.E.), Femmina Morta, Sicily (early 4th century C.E.), and Isola delle Correnti (3rd-4th centuries C.E.?). However, it is unclear whether these plates were to replace sheathing come loose or for patching. The hull of the Culip D wreck at Cap de Creus, Spain (ca 70-80 C.E.) was patched with lead rather than sheathed.

Under the year 718, Theophanēs the Confessor wrote that the Muslim fleet retiring through the Aegean after the failed siege of Constantinople in 716-18 was struck by a "fiery shower" which made the sea boil up and that the ships were then sunk because their pitch was gone.[70] This is an obviously improbable story, but the point is that such a melting of the pitch would effect only ships which depended on intra-seam caulking. Ships with mortise and tenon joined planks and a coat of pitch over the whole hull would not be sunk by its melting, at least not straight away. He had died when Theophanēs was young but Theophanēs's father had held some kind of command in the islands of the Aegean Sea and Theophanēs may have had some real knowledge

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As for coatings of waterproofing or intra-seam driven caulking, the hull of the Dramont A wreck had been coated on the inside with some protective material and the La Chrétienne C wreck (ca 175-150 B.C.E.) had been coated inside and out with resin. The Mateille B wreck had coats of pitch on the the hull both inside and outside. The Grand Bassin C wreck had a layer of fabric and pitch between the hull and the lead sheathing. The Monaco A wreck had pitch on the outside of the hull but the Pomegues A wreck (3rd century C.E.) had it on the inside. The fourth-century Yassı Ada wreck had pitch applied to the undersides of the frames before they were laid in place but this was probably to stop water being trapped between the frames and planks and thus rotting out both. The Dramont F wreck of ca 400 C.E. also had pitch applied to the hull both inside and out. The seventh-century Yassı Ada wreck had a coat of pitch applied over the whole of the inside hull after the frames had been put in place and to the outside of the hull before the ship was launched. The Port Vendres A wreck had caulking of tow driven between the planks but this may have been a repair job late in the ship's life. The Dramont F wreck (ca 420-25 C.E.) had coats of pitch over both the inside and outside of the hull. The inside coating was done when the ship was built but that on the outside only shortly before the ship sank.

Strangely enough, in the seventh-century Yassı Ada wreck, there is no mention of intra-seam driven caulking; although, what appears to have been a caulking tool was found. There was, however, caulking in the L'Anse Saint-Gervais B wreck (ca 600-625 C.E.) and in the ninth/tenth-century Bozburun wreck a fibrous material, probably grass, was driven between the seams as caulking and the outside of the hull was covered in a layer of pitch or resin. Similarly, in the wreck of the eleventh-century Serçe Liman ship a complete set of caulking tools was found and the coating of grass and pitch applied to the outside of the hull was also driven into the seams.

[70] Theophanēs, *Chronographia*, A.M. 6210 (vol. 1, p. 399): "... οἱ δὲ περιλειφθέντες παρήρχοντο τὸ Αἰγαῖον πέλαγος, καὶ ἄφνω ἐπῆλθεν αὐτοῖς θεομηνία φοβερά· χάλαζα γὰρ πύρινος κατελθοῦσα ἐπ᾽ αὐτοὺς τὸ ὕδωρ τῆς θαλάσσης καχλάσαι πεποίηκεν, καὶ τῆς πίσσης λυθείσης, αὔτανδροι αἱ ναῦς εἰς βυθὸν κατηνέχθησαν·".

In his note on this passage, Mango comments that "though doubtless embellished", the report of boiling waters in the Aegean may well have been connected with unusual volcanic activity which culminated in the eruption of Thēra in 726, also reported by Theophanēs. See, Theophanēs, *Chronographia*, trans. Mango and Scott, A.M. 6210 (pp. 550-551 & n. 9) and cf. A.M. 6218 (p. 559). Note that the translation, "... and as the pitch of their keels dissolved, their ships sank ... " is incorrect. Keels were not mentioned in the text, which simply said that they sank because the pitch was gone. Ships had pitch as caulking in the seams between strakes, not on their keels. Or at least, if they did have pitch on their keels, loss of it would not lead to them sinking, as it would if the pitch was caulking in the seams.

of ships and the sea and an unusual familiarity with Byzantine fleets.[71] His story seems to reflect an age in which ships depended on intra-seam driven caulking for watertightness.

Although the first known use of a particular word for any practice is only circumstantial evidence for the chronology of its emergence, the first known usages of the words which became the medieval Greek for a "caulker", *kalaphatēs*, and "caulking", *kalaphatizein*, occur in Egyptian papyri dated to the 560s. By the eighth century, they were common in the *Aphroditē* papyri.[72] They appear in Byzantium itself in the *De cerimoniis* attributed to Constantine VII. In inventories for expeditions to Crete in 911 and 949, flax for, and the cost of, *kalaphatēseōs*, "caulking", was included.[73] The first known illustration of caulkers at work on the hull of a ship is at folio 240r of the Pierpont Morgan manuscript of the *De materia medica* of Dioskoridēs, which was probably made for Constantine VII. The manuscript was a re-working of the early sixth-century Vienna manuscript, which, however, did not include this illustration, or indeed any human figures. It appears that the process of caulking became known in the Byzantine world between the ages of composition of these two manuscripts.[74] In Latin the word first appeared as *calafata* in the *Antapodosis* of Liudprand of Cremona, written ca 958-62, where it was a transliteration of the Greek term, but misunderstood as meaning shipwrights,[75] as though he encountered the word in Constantinople but its meaning was new to him. These words were not known in classical Greek and Latin and their appearance clearly reflected new practices for waterproofing the hulls of ships, presumably by intra-seam driven caulking, as early as the sixth century in Egypt at least.

Although all of the wrecks upon which research into the evolution

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[71] *Vita Theophanis*, III.5 (p. 4): "... τῷ κατὰ σάρκα πατρὶ ἐν τῇ διεπομένῃ αὐτῷ τῶν Αἰγαιοπελαγιτῶν ἀρχῇ τελευτήσαντι, ...". By comparison to the authors of subsequent Byzantine histories and chronicles such as *Theophanēs continuatus*, Genesios, George Hamartolos, John Skylitzēs, Leo the Deacon, and Symeon Logothetēs, Theophanēs does show a particular interest in, and knowledge of, matters maritime.

[72] Bell, *Greek papyri. IV*, N°s 1391, 1410, 1433-36, 1446, 1514; *idem*, *Greek papyri. V*, N° 1852 (p. 270); Rea, *Oxyrhynchus papyri*, N° 3804.262 (p. 113); Turner, *Oxyrhynchus papyri*, N° 2480.33 (p. 185). See also Kahane and Tietze, *Lingua Franca*, §775 (pp. 513-14).

[73] Appendix Four [a], §15; [b], §VI.14 [= Haldon, "Theory and practice", pp. 211, 231; Constantine VII, *De cerimoniis*, II.44, 45 (vol. 1, pp. 659, 675)].

[74] Dioskoridēs, *De materia medica* (Pierpont Morgan), fol. 240r; *ibid.* (Wellmann), I.72 (vol. 1, p. 72); *ibid.* (Vienna), *passim* for lack of human figures.

[75] See Liudprand of Cremona, *Antapodosis*, V.15 (p. 138): "Quod ut audivit, τοὺς καλαφάτας, tus calafatas, hoc est navium compositores, ad se venire praecepit.".



Figure 11
Caulkers at work extracting old pitch from the hull of a ship in a manuscript of the *De materia medica* of Dioskoridēs (N.Y., Pierpont Morgan Library, Cod. 652, fol. 240r), tenth century.

of hull construction has been based were merchant ships, there is no evidential reason to suppose that warships were not subject to similar processes.[76] Certainly, by the age of Leo VI it is clear that dromons

[76] It is possible that, because of the value of lightness and strength in the hulls of warships, and because governments may have been less susceptible to the socio-economic constraints that contributed to propelling commercial shipping towards skeletal construction, shell construction may have survived in warships longer than in merchantmen. Against this should be balanced the consideration that governments frequently found it necessary to build war fleets in considerable haste and that the skeleton method of construction was much quicker, less labour intensive, less costly, and required fewer carpentry skills than the shell method. These considerations ought to have been extremely attractive in moments of crisis.

Since no underwater archaeological evidence for the hull construction of either classical or early medieval galleys has yet been discovered, it is not possible to affirm positively whether or not shell construction continued to be used in them after the change was under way in merchant ships. The only wreck known to us of what was probably a galley of the early Byzantine period is that investigated by Purpura at Cefalù, Sicily. The evidence of its pottery dates it to the late sixth or early seventh centuries and it appears to have been around 35 metres in length and perhaps up to 6 metres in beam, although that may have been a product of the hull collapsing outwards as it disintegrated. However, so little of the ship has been reported that no hypotheses as to its hull construction can be ventured. That it was of the type of the

were caulked with tow or oakum driven into the seams because the emperor wrote in his *Naumachika Leontos Basileōs* that ships should carry extra floor timbers, planks, tow (στυππία, *styppia*), pitch (πίσσα, *pissa*), and liquid pitch (ὑγρόπισσον, *hygropisson*). Given that the specification for tow and pitch comes after the mention of extra timbers and before a requirement that one oarsman should be a *naupēgos*, a shipwright, with the requisite tools, there can be no doubt that what the emperor was referring to was caulking for the seams.[77]

We suggest that when hull construction changed so that the mortise and tenon joinery of the planks became far less frequent and tight, with the results that the planks were more flexible and not so susceptible to splitting, that the waterproofing of the seams became more dependent upon caulking, and that the frames became heavier and more integral to the construction of the hull, the Greco-Roman ram no longer worked in the way it had done in the past. Heavier and more frequent frames would better sustain the hull against any impact and any breach in it would be more localized and more easily sealed from within by damage control. Without the structural weakening of the planks down their centres caused by the frequent chiselling out of the mortises on both sides, they would be far less susceptible to splitting. Therefore, the ram was replaced by a different offensive weapon, the spur, which was also designed to disable an enemy ship, but in a completely different way.

These developments cannot be dated precisely. All that can be said is that the evidence for disappearance of lead sheathing suggests that some changes in hull construction were under way by the end of the first century C.E., that the evidence of the fourth-century Yassı Ada wreck shows clearly that they were considerably advanced by that time, and that the evidence for spurs on the galleys of the *Roman Vergil* and *Ilias Ambrosiana* manuscripts suggests that the processes of change were so far advanced by the turn of the fifth and sixth centuries that the waterline ram had been abandoned by that time.[78]

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dromon, as suggested by Purpura, is entirely hypothetical. It could have been almost any kind of galley, perhaps a merchant galley, judging from the pottery aboard it. See Purpura, "Relitto bizantino di Cefalu". The wreck has not been excavated and nothing is known about the construction of its hull.

[77] See Appendix Two [a], §5. Basch reached the same conclusion on the basis of this text. See his "Note sur le calfatage", p. 197.

[78] Harris, "Bessarion on shipbuilding", p. 292, has claimed that dromons were built using the new skeletal construction techniques. However, this is sheer speculation and none of the sources he cites, including Pryor, *Geography, technology, and war*, pp. 57-60, actually say this.

Square sails and lateen sails

The square sail of antiquity evolved gradually into the lateen sail of the Middle Ages by an evolutionary process of setting the sails more fore-and-aft than square and then tailoring the luff and leech.[79] Whether the dromons of Belisarios's fleet still had square sails as the the *triēreis* and *liburnae* of antiquity had had, or whether they already had the lateen sails of medieval galleys, Prokopios did not make clear since he referred to Belisarios's command ships by the generic *nēes* rather than as dromons. However, he did write that: "The sails of the three ships in which he [Belisarios] and his following were carried he painted red from the upper corner for about a third of their length".[80]

Because of its reference to an "upper corner", this passage has been widely considered to indicate that the sails of at least part of the Byzantine fleet, perhaps including the dromons, were triangular, presumably lateen. What is possibly the first direct literary reference to ships with lateen sails occurred in the *Life* of St Caesarius of Arles (ca 470-542) in a paragraph apparently written by a deacon named Stephen between the death of the saint and 549. Stephen wrote that sometime between 508 and 516 the Burgundian kings Gundobad (474-516) and Sigismund (516-32) sent relief to famine-stricken Arles in the form of: "..., three large ships, which they call *latenae*, full of wheat ...".[81] It is difficult to imagine what else *latenae* could have meant here other than lateen-rigged ships. That being said, this is in fact the only use of such a word for a sail known to us from medieval Latin and no equivalent is known from medieval Greek. It appears to be a *hapax legomenon*. The word did not find currency for a sail in either Greek or Latin in the Middle Ages and the origin of the modern English word "lateen" is from the French "latine", itself not known before the sixteenth century.[82]

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[79] See Casson, "Origin of the lateen", pp. 49-51; *idem*, *Ships and seamanship*, pp. 243-5, 273-8 and plates 180-182.

[80] Prokopios, *History of the wars*, III.xiii.3 (vol. 2, p. 118): "τριῶν νεῶν, ἐν αἷς αὐτός τε καὶ ἡ θεραπεία ἔπλει, τὰ ἱστία ἐκ γωνίας τῆς ἄνω καὶ ἐς τριτημόριον μάλιστα ἔχρισε μίλτω/, ...".

[81] *Vita Caesarii Arelatensis*, II.9 (p. 487): "..., antequam ipsa lux diei claresceret, tres naves quas latenas vocant maiores plenas cum tritico direxerunt.". On the interpretation of *latenae* here see Jal, *Glossaire nautique*, p. 915.

[82] The first European citation apparently occurs in the account of his travels between 1435 and 1439 by Pero Tafur, probably composed in the 1450s. See Pero Tafur, *Andanças e viajes*, pp. 75-6: "... despues el Adelantado me fizo dar un navío, para yr á Babylonia, que llaman gerba, que son tan luengos como una grant galea é todo fecho á cámaras de un cabo é de otro para aposentamiento, é llanos de carena,

Some pictorial evidence suggests that square sails survived in the Mediterranean into the sixth century, or even beyond. The most well-known example is the apparently square sail on a sailing ship in a mosaic dated to ca 504-26 in the church of St Apollinare Nuovo, Ravenna. However, the sail is depicted in reverse. The ship is sailing backwards, indicating that the mosaicist had little familiarity either with square sails or with ships in general. His testimony to the survival of square sails is questionable.[83] This is certainly true of the artist of the galley with a square sail in the manuscript of the Bible commissioned by abbot Vivian of St Martin of Tours, sometimes known as the First Bible of Charles the Bald because it was presented to him around 850. This manuscript's illustrations were based on an earlier, late antique manuscript, possibly even a Bible commissioned by Pope Leo I (440-61).[84] No really unchallengeable evidence for the survival of the square sail in the Mediterranean is known to us from later than the sixth century.[85] From then on it disappeared until re-introduced from Northern Europe in the fourteenth century.

The earlier *Vatican Vergil* manuscript definitely showed square sails on all the galleys depicted in it under sail.[86] However, the sails of the *Roman Vergil* manuscript are more problematical. The galley in the

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porque naden en poca agua; levan grandes cargos, traen la vela tan alta como una carraca, salvo que es angosta é latina como de galea; ..."

Under "*barca*" in the manuscript, Florence, Biblioteca Riccardiana, Cod. 217, which is an Arabic-Latin and Latin-Arabic dictionary compiled in Eastern Spain in the thirteenth century, the Arabic word *lāṭana*, pl. *lawāṭin*, appears among a list of Arabic words for ships considered equivalent to *barca*. See Schiaparelli, *Vocabulista*, p. 267. However, whether the author of the manuscript really did intend this word to refer to a lateen-rigged ship is highly doubtful. The word became common in European languages only from the sixteenth century. See Kahane and Tietze, *Lingua Franca*, §361 (p. 272).

[83] See Bass, *History of seafaring*, ch. 6, pl. 18 (p. 154). The mosaic is discussed in Martin, *Art and archaeology*, pp. 31-3. It was altered from the original in some ways in 561 and suffered a poor restoration at the hands of Felice Kibel in 1855. See Bovini, "Felice Kibel", pp. 93-6; Bonino, *Archeologia*, p. 48. Martin believes that the sail may in fact have been either lateen or square; however, it is quite clear from Bovini's reproduction in his fig. 7 of a drawing of the mosaic published by Ciampini in 1699, which clearly shows the yard of the sail, that it represented a square sail. Ciampini, *Vetera monimenta*, vol. 2, tav. XXVII (pp. 98-9) [*non vidimus*].

[84] Paris, Bibliothèque Nationale, MS. Lat. 1, fol. 3v. See Dufrenne and Villain-Gandossi, "Bateaux figurés", pl. 14 (p. 254). On the illustrations of the manuscript see Beckwith, *Early medieval art*, pp. 52-6 and n. 53.

[85] The square sail on a ship in the tenth-century manuscript, whose provenance was probably Constantinople, Paris, Bibliothèque Nationale, MS. suppl. Grec 247, of the *Theriaca* and *Alexipharmaca* of the poet Nikander, fol. 12r, is a copy of a picture from a late antique manuscript. See Omont, *Miniatures*, pp. 34-5 and plate LXVI.

[86] See Stevenson, *Miniature decoration*, pictures 17, 21, 25, 30, 39.

background appears to have no mast and to have a square sail but it may be a lateen sail with the slope of the yard towards the bow reversed through artistic ignorance. That in the foreground has a broken mast and the sail is attached directly to it.[87] The artist either did not understand sails or made no attempt to depict them accurately. Both sails could be equally as well lateen or square.

Miniature XXVII of the *Ilias Ambrosiana*, in the print of the 1835 edition by Angelo Mai, shows two lateen-rigged galleys with the direction of the sails reversed. They are sailing backwards.[88] This is the only miniature of the codex showing unfurled lateen sails. In all

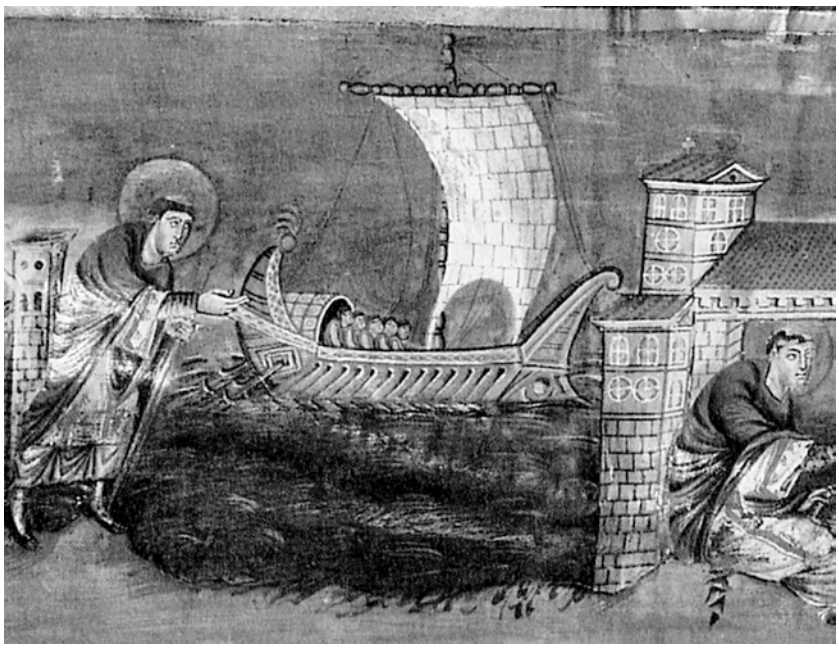


Figure 12
Square sail on a galley in a manuscript of the Bible commissioned by abbot Vivian of St Martin of Tours (Paris, Bibliothèque Nationale, MS. Lat. 1, fol. 3v), ca 850.
Cliché Bibliothèque nationale de France

[87] The illustration is of *Aeneid*, I.84-101: storm at sea. A broken mast fits the context.

[88] Bandinelli, *Hellenistic-Byzantine miniatures*, fig. 63 (p. 67) [= fig. 190 (pl. 34)]. The original edition which contained the copperplate engraving from which fig. 63 is reproduced, is Mai, *Homerus et Virgilius*.



Figure 13
Lateen sails on dromons in the *Ilias Ambrosiana* (Milan, Cod. Ambros. F. 205 Inf., min. XXVII), early sixth century, in the 1835 edition by Angelo Mai.

others bar one the sails are furled and may be either lateen or square. The exception is Miniature VIII, in which the sail is clearly square.[86]

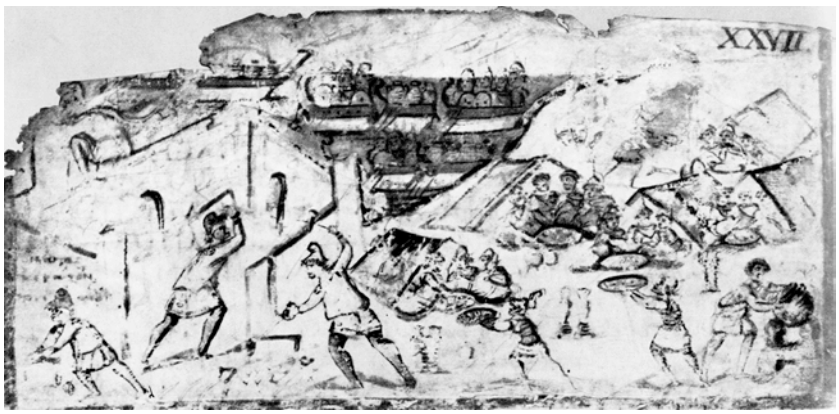


Figure 14
Lateen? sails on dromons in the *Ilias Ambrosiana* (Milan, Cod. Ambros. F. 205 Inf., min. XXVII), early sixth century.

[86] Bandinelli, *Hellenistic-Byzantine miniatures*, fig. 44 (p. 56) and fig. 96 (Plate 9).

There is a problem, however. The original reproduction of Miniature XXVII in the edition of 1819 shows the two galleys just as they are today in the mutilated manuscript and, indeed, the torn corner of the manuscript just as it is today. It is unclear whether the sails are lateen or square. The engraver of 1819 was faithful to the manuscript and drew only the foot of the sail of the right-hand galley. It looks as though he also made it out to be a lateen sail but drew it billowing in the correct way. This illustration of the manuscript has not deteriorated further since 1819 and the completion of the reversed lateen sails was the work of the engraver of the 1835 edition.[87] Nevertheless, there is perhaps just enough of the foot of the sail of the right-hand galley surviving in the manuscript to suggest that these may have been lateen sails reversed as he thought. The sail certainly appears to be cut differently to that of the galley in Miniature VIII. If lateen sails were still somewhat unusual when the manuscript was produced, the artist may have reversed the sails out of ignorance. At the turn of the sixth century both rigs may well have been used in the Mediterranean and galleys referred to as *dromōnes* may equally well have employed either rig at this time.

In conventional historiography, the first definite depictions of lateen sails are usually said to be those of lateen-rigged ships in the Paris, Bibliothèque Nationale, Ms. Grec 510, manuscript of the Sermons of St Gregory of Nazianzos, fols 3r & 367v, which has been dated to ca 879-82 with a provenance in Constantinople.[88] However, the little-known miniature of a sailing ship in the manuscript known as the *Khludov Psalter*, Moscow, Historical Museum, MS. 129 D, fol. 88r, also clearly shows a lateen sail and this manuscript has been arguably dated to 843-7, also with a provenance in Constantinople.[89] If

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[87] The original 1819 reproduction may be found in both Mai, *Iliad*, pl. XXVII, and in idem, *Picturae*, pl. 27 (p. 27).

[88] See Weitzmann, *Byzantine book illumination*, ch. IV, fig. 1. On the dating and provenance of the manuscript see now Brubaker, *Vision and meaning*, pp. 5-7. The illustration on fol. 367v is of Orthodox Christians fleeing Arian persecution, to illustrate Homily XXXIII: Πρὸς Ἀρειανοὺς, καὶ εἰς ἑαυτόν, probably the lines: "Τίνας πρεσβυτέρους ἐναντίαι φύσεις, ὕδωρ καὶ πῦρ, ἐμερίσαντο, πυρσὸν ἄραντας ξένον ἐπὶ θαλάσσης, καὶ τῇ νηὶ συμφλεχθέντας ἐφ᾽ ἧς ἀνήχθησαν; ...". See Gregory of Nazianzos, *Logoi*, col. 220.

[89] See *Khludov Psalter*, Nº 88 (no page numbers). The illustration is to Psalm 88 (89) [Septuagint], verse 9 ("You rule the power of the sea; and you calm the tumult of its waves."). See *The Septuagint version of the Old Testament, with an English translation*, p. 751], prefiguring *Mark*, 4.37-39 ("And there arose a great storm of wind, and the waves beat into the ship, so that it was now filling up. And he was in the stern of the ship, asleep on a pillow: and they awoke him, and said to him, Master,

this is true, then the Khludov Psalter illustration predates those of the Sermons of the Paris Gregory of Nazianzos by some thirty years.



Figure 15
Lateen-rigged ship in a manuscript of the Sermons of St Gregory of Nazianzos (Paris, Bibliothèque Nationale, MS. Gr. 510, fol. 367v), ca 879-82.
Cliché Bibliothèque nationale de France

The illustration of the dromons in the Paris manuscript of the *Sacra Parallela*, which is contemporary with the Paris Gregory of Nazianzus also shows lateen sails. [See Figure 8] There is, however, even earlier evidence than this for lateen-rigged ships from Byzantine, or possibly early-Muslim Egypt. A number of Egyptian graffiti and pictures of the sixth to seventh centuries appear to show lateen-rigged ships, the most definitive of which is a painting from the monastic complex at *Kellia*

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do you not care that we are perishing? And he arose, and rebuked the wind, and said to the sea, be quiet and still. And the wind ceased, and there was a great calm."). See *Greek New Testament*, pp. 153-4.

On the dating and provenance of the manuscript see Brubaker, *Vision and meaning*, p. 25. The manuscript was overwritten for the most part in a dark minuscule script in the twelfth century. Originally the illustrations were merely ink drawings but at a later date they were coloured with thin, light colours. Many, and parts of many others, were later repainted with heavy colours, especially ultramarine, no earlier than the late fourteenth century.

in the Nile delta, about 60 kilometres south-east of Alexandria, which has been dated to ca 600-630.[90] In fact, as Casson has shown, there is ample evidence to prove that the origins of the lateen sail in the Mediterranean reached back to the pre-Christian era.[91] Most probably, all that occurred was that in the late-Roman, early-Byzantine period this sail became adapted from its previous use on small craft and merchant ships for the warships of the Empire.



Figure 16
Lateen-rigged ship in a manuscript of the *Psalms*, the *Khludov Psalter* (Moscow, Historical Museum, MS. 129 D, fol. 88r), ca 843-7.

[90] See Basch, "Navires et bateaux coptes". Probable lateen sails can also be seen in figures 22 (sepulchre at Anfouchy, Alexandria, 1st or 2nd centuries C.E.) and 23 (house at Kôm el-Dikka, Alexandria, probably late 6th century C.E.).

[91] See Casson, "Origins of the lateen", pp. 49-51; *idem*, *Ships and seamanship*, pp. 243-5.

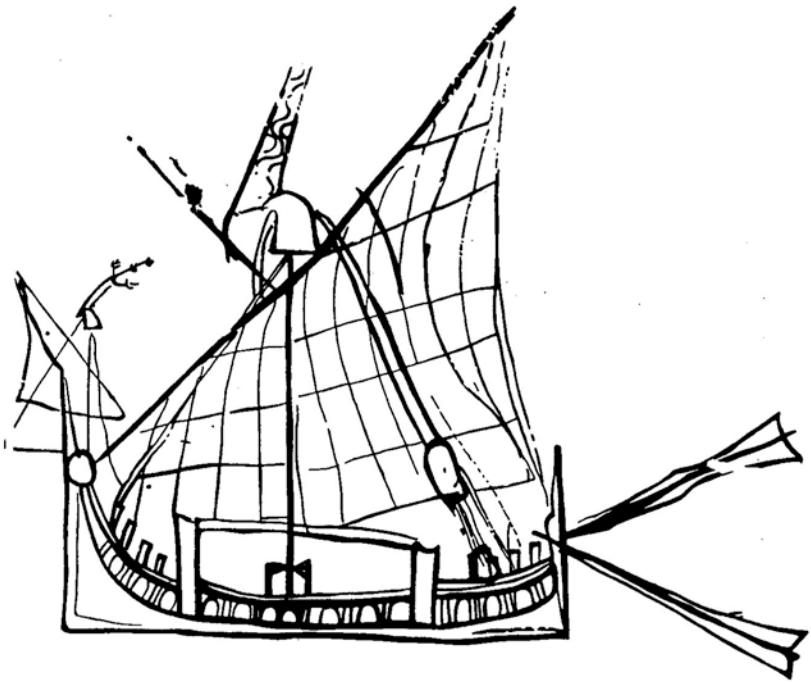


Figure 17
Two-masted, lateen-rigged ship in a painting from *Kellia*, Egypt, ca 600-630.

Even the emperor Leo VI, an "arm-chair sailor" who had never been to sea, appreciated that ship design was always a matter of compromise between various objectives. He understood that it was possible to design a galley which would be light and which would have good speed and other qualities in battle. However, the same ship would probably be swamped and sunk if caught at sea in heavy weather and would be too slight to withstand enemy attack. As he wrote of dromons of his age:

> The construction of the dromons should be neither too heavy, or they will be sluggish when under way, nor built too lightly, or they will be weak and unsound and quickly broken up by the waves and the attacks of the opposition. Let the dromon have suitable workmanship, so that it is not

> too sluggish when under way and remains sturdy and unbroken when in a gale or struck by the enemy.[92]

The theme of the emperor's comments was surely true also of the processes by which Roman *liburnae* evolved over the centuries to become the galleys which he knew as dromons. Generation after generation no doubt applied practical expertise to the design characteristics of battle galleys as they knew them in order to improve them. They made innovations which gave superior performance, they adapted design features to changing conditions of naval warfare and changing technology, and they made whatever compromises between various performance desiderata were necessary to achieve the best possible overall designs. Like all other ship types throughout history, *liburnae* and dromons evolved continuously and the latter would continue to do so from from the sixth century to the tenth century and beyond.[93]

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[92] Appendix Two [a], §4. Cf. Appendix Five, §3. Interestingly, Ibn Mankalī chose to include the quite literal translation of these comments in his *Al-aḥkām al-mulūkiyya*. See Appendix Eight [b], p. 20.

[93] Cf. Alexandres, *Ἡ θαλασσία*, pp. 57-60.

CHAPTER THREE

FROM THE SIXTH TO NINTH CENTURIES

Although dromons are mentioned in Byzantine sources between the age of Prokopios and the late ninth century, no detailed descriptions of them and no pictorial representations survive from this period.[1]

The *Stratēgikon* attributed to Maurice (ante 630) differentiated dromons as warships from *ploia*, ships in general, *sagēnai*, and *barytera skevē*, vessels of burden, used for transportation purposes.[2] The second, anonymous, collection of the miracles of St Dēmētrios of Thessalonikē, composed in the late seventh century, recorded in its fourth miracle that an emperor sent a dromon to warn Thessalonikē of the flight from Constantinople of a certain king Perboundos of a Slavic people referred to as *Rynchinoi*.[3]

In the West, in 590 the *exarchos* of Italy, Rōmanos, wrote to Childebert II of the Franks, announcing the receipt of news that a Frankish army had been sent to Italy against the Lombards, rehearsing details of the ensuing campain in which the Lombard king Authari had shut himself up in Pavia, and announcing plans, which were never put into action, to besiege him there with combined Frankish and Ravennese forces, including dromons, which would have had to sail

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[1] The graffito of a lateen-rigged galley found on a piece of ceramic at Malaga has sometimes been thought to have represented a dromon of the sixth century from the period when Malaga and southern Spain were still under Byzantine control (until 621). See Höckmann, *Antike Seefahrt*, fig. 109 (p. 120); Viereck, *Römische Flotte*, p. 287; Alertz, "Naval architecture", pp. 155-6. The projection at the bow shown on it has been variously interpreted as either a σίφων (*siphōn*) for Greek fire or as a "pole-like ram prow".

This graffito now exists only in a reproduction in the Museo Naval in Madrid because the original was stolen from the Museo Arqueologico in Malaga. However, the original ceramic was excavated at Malaga in a level of the old city dated to the fourteenth century. We owe this information to Larry Mott who spoke to the Director of the Museo Arqueologico about the graffito.

The graffito dated from the High to late Middle Ages and clearly depicted a medieval galley with a spur at the bow. It is interesting in its own right because it appears to show a row of oar ports in the lower hull, but it was definitely not a representation of a Byzantine dromon. It was most probably a representation of a late medieval Muslim galley.

[2] Maurice, *Stratēgikon*, XI.4.88-9 (pp. 376-8): "Τοὺς δὲ δρόμωνας καταστῆσαι ἐν τοῖς τρέκτοις τοῖς ἀναγκαίοις". See also XI.4.138-9 (p. 380), XIIB.21.1-2, 21-2 (p. 468). On *sagēnai* see Woody, "Sagena piscatoris".

[3] *Miracles of Saint Demetrius*, §237 (vol. 1, pp. 199, 210).

up the Po river.[4] Pope Gregory the Great twice referred to dromons in letters to Innocentius the *praetorian prefect* of *Africa* and Smaragdus the *exarchos* of Italy dated to 600 and 603 respectively.[5]

The chronicle known as the *Parastaseis syntomoi chronikai*, dated to the early eighth century, referred for the first time to a *dromōn basilikos*, "imperial dromon", which pursued and overtook certain thieves.[6] By this time it had apparently become customary for one or more dromons of the imperial fleet in Constantinople to be specially designated for the use of the emperor. The practice would continue until dromons disappeared from the sources after the twelfth century.[7]

By the eighth century, Greek scribes in Muslim chanceries in Egypt were using *dromonarion*, together with other terms for warships such as *akation/akatenarion* and *karabōs/karabion*, for war galleys in the Egyptian fleet, although their Muslim rulers referred to the same ships by different Arabic names.[8] *Akation/akatenarion* was derived from the Greek ἄκατος/ἀκάτιον (*akatos/akation*) for a light merchant galley. Presumably dromons were known in Egypt in the Byzantine era before the Muslim conquest of the country in 639-42; however, neither that term nor *akation/akatenarion* appear in the papyri record of the Romano-Byzantine period.[9] *Karabōs/karabion* is even more

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[4] *Epistolae Austrasicae*, N° 40 (p. 146).

[5] Gregory I, *Epistulae*, Bk. X, Ep. 16 (vol. 2, p. 845) and Bk. XIII, Ep. 34 (vol. 2, p. 1037). We are indebted to Michael McCormick for this and many of the following references to Western sources in the remainder of this chapter.

[6] *Parastaseis syntomoi chronikai*, §43 (vol. 1, p. 50).

[7] It must be acknowledged that the untitled treatise attributed to Constantine VII Porphyrogennētos written between 948 and 952 and given the Latin title *De administrando imperio* in the seventeenth century by its first editor, Joannes Meursius the elder, said that there was no designated "imperial *dromōnion*", βασιλικόν δρομώνιον (*basilikon dromōnion*) until the reign of Leo VI. The diminutive *dromōnion* had no particular significance. It was merely used as a derivative synonym for *dromōn*, a common practice in Byzantine Greek. *De administrando imperio* said that until the reign of Basil I, emperors had used a "scarlet barge", ῥούσιον ἀγράριον (*rousion agrarion*), when they wished to make a progress by water and that Basil had been the first to use *dromōnia* for longer journeys. See Constantine VII, *De administrando imperio*, §51 (p. 246). Either the compiler of the *De administrando imperio* was unaware of the designation of a dromon for imperial use before the age of Leo VI or else the author of the *Parastaseis syntomoi chronikai* did not intend anything so specific by his use of the term. He may have meant to refer merely to a dromon of the imperial fleet.

[8] See Bell, *Greek papyri. IV*, Pap. 1337.3 (p. 7), 1348.3 (p. 21), 1369.4 (p. 44), 1376.6 (p. 50), 1387.6 (p. 61), 1390.2 (p. 62), 1391.4 (p. 63), 1408.5 (p. 79), 1410.2 (p. 79), 1435.10 & 95 (pp. 325, 329), 1442.22 & 135 (pp. 309, 315).

For the Arabic equivalents see Becker, "Arabische Papyri", pp. 84, 88; *idem*, "Papyrusstudien", pp. 150-51. The Arabic terms were *qādis*, *mawā(')īn*, and *safīna*. See also Pryor, "From dromōn to galea", p. 107.

[9] Neither *Dromōn/dromonarion* nor *akation/akatenarion* are cited in Johnson and

problematical. The term does not appear to have been Greek at all, first appearing in papyri from *Arsinoe* and *al-Fayyūm* dating from the seventh to eighth centuries,[10] and then in *Aphroditē* papyri of ca 709-715/16, where some *karaboi* were qualified as *diēreis*, "twos", that is biremes, some as being *kastellatoi*, that is castellated in some way, and one as being both a *diērēs* and also castellated.[11] By that time they had clearly evolved into major units of the Egyptian fleet.



Figure 18
Galley on a lustre-ware bowl from *al-Fayyūm*, Egypt (Cairo, Museum of Islamic Art, Inv. No. 7900), tenth century, probably Fāṭimid period.

West, *Byzantine Egypt*, pp. 139-40, nor in Merzagora, "Navigazione in Egitto", both of which are based on the papyri.

[10] See Wessely, *Studien*, N°s 718 and 900.

[11] See Bell, *Greek papyri. IV*, Pap. 1433.64, 129, 179, 227, 319 (pp. 287, 290, 292, 294, 297) for διήρεις κάραβοι; 1434.35, 1435 98 & 103, 1441.102, 1464 (pp. 310, 329, 330, 347, 424) for κάραβοι καστελλᾶτοι; 1449.94 (p. 376) for κάραβοι καστελλᾶτοι διήρεις.

In 758 Pope Paul I wrote to the Frankish king Pepin I requesting assistance to force the Lombard king Desiderius to return to the Papacy some cities he had occupied. In it he referred to previous negotations between Desiderius and George, the legate of Emperor Constantine V in South Italy, for a combined assault on Otranto by land and sea with the participation of a Sicilian Byzantine fleet of dromons.[12] Also in the eighth century, the North-Italian compiler of the Latin glosses in the St Gall, Stiftsbibliothek, MS. 912 knew the word as used by "Greeks" in the form "*dulcones*" and equated it to the classical "*trieres*"; however, he was merely paraphrasing his source: Isidore of Seville.[13]

Letters of the ninth-century Popes Nicholas I and John VIII also referred to dromons, both Byzantine and Western, operating in the Tyrrhenian Sea in the years ca 860-80. In 860 Nicholas I asked the emperor Michael III to send his ambassadors back to Rome on suitable dromons. In 872-3, in two letters to the *praefecti* of Amalfi and the Carolingian empress Engelberga, John VIII referred to "*dromones nostros*" and to his building dromons and other ships to defend Rome. In 877 he asked the bishop of Benevento to request the Byzantine *stratēgos* to arrange for ten dromons to be sent to Rome to help defend it against the Muslims. In 878 he was also said to have taken ship for France from Rome on three dromons which had come from Naples to convey him there.[14] In two letters of 879 he referred to "*dromonibus nostris*" and congratulated the *spatharios* Gregory, the *tourmarchēs* Theophylaktos, and *komēs* Diogenēs on their victory over the Muslims and asked them to come to Rome "*cum aliquantis dromonibus*". In the following year he wrote to the emperor Basil I asking him to send dromons to defend the lands of St Peter.[15]

The word *dromōn* was also used many times by Theophanēs the Confessor;[16] however, a new term for a warship, *chelandion*, also

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[12] *Codex Carolinus*, N° 17 (p. 515): "Nam et hoc cum eodem Georgio imperiali misso constituit, ut dromonorum Siciliae stolum in Otorantina civitate dirigatur, ut tam Graeci quamque Langobardi ipsam opsidentes conprehendere valeant civitatem, ...".

[13] *Glossae codicis Sangallensis 912*, in Goetz, *Glossarii Latini*, vol. 4, p. 292, l. 29: "Trieres nauis magna quas greci dulcones uocant". See "vi.. Note on citations of Greek and Latin glossaries", p. lxix above. Cf. Isidore of Seville, *Etymologiae*, XIX.1.10: "Trieris navis magna, quam Graeci durconem vocant.".

[14] Auxilius, *In defensionem*, p. 63; Nicholas I, *Epistolae*, N° 82 (p. 439); John VIII, *Register*, pp. 258-9.

[15] John VIII, *Fragmenta*, N°s 5 (p. 276), 11 (p. 279) and *Registrum*, N°s 46 (pp. 44-5), 217 (p. 194), 245 (p. 214), 259 (p. 229). Cf. above p. 66.

[16] For example, Theophanēs, *Chronographia*, A.M. 6171 (vol. 1, p. 358).

appeared among surviving sources for the first time in Theophanēs in the context of the imperial expedition sent to *Chersōn* by Justinian II in 711, which consisted of: "... all kinds of ships: *dromōnes*, and *triēreis*, and 10,000 [*modioi*]-carrying vessels, and boats, and *chelandia*". Theophanēs also wrote that when Constantine V led a fleet against the Bulgars in 774, he himself sailed with "the red *chelandia*" (τὰ Ῥούσια χελάνδια).[17] The word was certainly derived from κέλης, *kelēs*, which in classical Greek had the sense of a "courser". It became applied to fast-sailing monoreme galleys as well as to riding-horses. In fact, *chelandion* almost certainly originated as a term for horse transports, although its use did not remain confined to them.[18] Almost contemporaneously, St Theodore of Stoudios mentioned in his letters both a ship known as a *chelandion* and a crew member of such a ship, to whom he referred by the term *chelandarios*.[19] So also Patriarch Nicholas I Mystikos referred to *chelandia* being sent to the relief of *Lampsakos* in a letter addressed to the then *Caesar* Rōmanos Lekapēnos in late 920.[20] The chronicle attributed to Symeon Logothetēs referred to an imperial *chelandion* and an anonymous chronicle of the reign of Leo V also referred to an unarmed *chelandion* sent to negotiate with the Bulgars.[21] *Dromōn* and *chelandion* became sometimes interchangeable terms, although in some sources the latter appears to have had the specific meaning of an oared transport ship, especially for horses.[22] Written around 995, the text known as the *Patria Kōnstantinoupoleōs* referred to an imperial dromon, *dromonion basilikon*, in use in the Golden Horn, supposedly during the reign of Justin I, and then later to a fleet of *chelandia* with which the *droungarios* of the *Kibyrrhaiōtai* Apsimaros seized the

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[17] Theophanēs, *Chronographia*, A.M. 6203 (vol. 1, p. 377): "... πᾶσαν ναῦν δρομώνων τε καὶ τριηρῶν καὶ σκαφῶν μυριαγωγῶν καὶ ἁλιάδων καὶ ἕως χελανδίων, ...". See also A.M. 6265 (vol. 1, p. 446).

[18] The extraordinary attempt by Moutsos, "Greek *ΧΕΛΑΝΔΙΟΝ*", to investigate the etymology of χελανδίω(ο)ν, completely overlooks the obvious. He does not consider the classical Greek κέλης, nor the origin of the ships as horse transports, although he does realize that they were originally transports of some kind.

[19] See Theodore of Stoudios, *Epistulae*, 108, l. 25 and 116, l.1 (vol. 2, pp. 226, 235).

[20] See Nicholas I, *Letters*, 95, ll. 10-14 (p. 362): "Νῦν οὖν γενέσθω ἡ πᾶσα φροντὶς καὶ ἐπιμέλεια, ἵνα θεοῦ συνεργοῦντος μὴ ἀρχὴν λάβῃ τὸ τοιοῦτον κακόν, εἴτε δι᾽ ἐντοπίων χελανδίων, ἐὰν εἰσίν, εἴτε μονερίων ἐντεῦθεν κἂν δύο ἀποστελλομένων εἰς παραφυλακὴν τοῦ τόπου καὶ σωτηρίαν.".

[21] See Symeon Logothetēs, *Chronographia*, Life of Nikēphoros I, p. 202, ll. 22-3; *Syngraphē chronographia*, p. 342, l. 18.

[22] See Appendix Three, §2.16. See also Eickhoff, *Seekrieg und Seepolitik*, p. 136.

throne as Tiberios III in 698.[23] By ca 852, according to the *Cronaca Veneziana* attributed to John the Deacon, Venice had attempted to build *zalandriae*, that is *chelandia*, for her own use.[24] In a letter which was probably written by Anastasius Bibliothecarius in 871, and which purported to be from the Western emperor Louis II to Basil I announcing the capture of Bari, Louis asked Basil to send a fleet to prevent Muslim forces reaching Italy, especially Naples, from Sicily and Africa because the "*stratigus*" Georgius had too few *chelandia* to stop them.[25] On the same day in 877, 17 April, on which John VIII had asked the bishop of Benevento to convey to the Byzantine *stratēgos* his request for 10 dromons to defend the coasts of Rome, he also wrote directly to the *stratēgos* of *Longobardia* at Bari, Gregory, asking him to send 10 *chelandia* to defend Rome. He used the two words, *chelandium* and *dromo*, interchangeably.[26] To a letter to the emperor Basil I in 885-6, Pope Stephen VI appended an appeal asking him to send some *chelandia*, equipped for a year, to defend the coast of Rome against the Muslims from April to September and to place them under the command of a reliable man who would have the task at heart and would not abuse the local population by raiding and pillaging on his own account.[27]

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[23] See *Patria Kōnstantinoupoleōs III*, §65 (p. 187) and §207 (p. 280).

[24] John the Deacon, *Cronaca Veneziana*, p. 115: "Illud etiam non est pretermittendum quod antedicti duces [Doge Pietro Tradonico (836-64) and his son Giovanni († 863)] ad sua tuenda loca eo tempore duas bellicosas naves tales perficere studuerunt, quales numquam apud Veneciam antea fuit, que greca lingua zalandriae dicuntur." [written post 1009]. Cf. p. 145: "Imperator siquidem [Otto II], licet ingenti difficultate. per medias barbarorum acies vix ad litus usque pervenit, ... ubi duae Grecorum naves, quae lingua illorum zalandriae nuncupantur, non procul a terra anchoris herebant; a quibus ipse cum duobus suis vernaculis susceptus, minime agnitus est." [describing Otto's defeat by the Kalbīte *amīr* of Sicily, Abū 'l Qāsim, in 982].

[25] Louis II, *Epistola*, p. 394. This letter survives only as an insert in the anonymous, tenth-century *Chronicon Salernitanum*. See *Chronicon Salernitanum*, §107 (pp. 107-21, esp. p. 120, l. 9). The point is that the word *chelandia* was used, and its meaning was clearly understood, either by Anastasius Bibliothecarius or by the chancery of Louis II. In the chronicle itself the anonymous author used an orthography which was probably closer to the way the word was pronounced in the vernacular in South Italy towards the end of the tenth century: *scelandria*. *Chronicon Salernitanum*, §107 (p. 107, l. 11). On the letter, its authenticity, and its milieu, see Gay, *L'Italie méridionale*, pp. 84-99.

[26] John VIII, *Registrum*, N° 47 (pp. 45-6).

[27] The Greek version of this letter was edited by Grumel from the fourteenth-century manuscript, Mt Sinai, monastery of St Catherine, MS. 482 (1117). The original language of the letter is considered by Grumel to have been Latin; however, no trace of a Latin version survives. If this was the case, then this was another case of a ninth-century use of the word *chelandia* in Latin. See Grumel, "Lettre du Pape Étienne V", §61 (p. 147): "Παρακαλῶ δὲ τὸ ἅγιον ὑμῶν κράτος χελάνδια ἐξωπλισμένα

Al-Ṭabarī recorded that in 852-3 a Byzantine fleet of 100 *marākib* of the *shalandiyyāt* type, ships of the *chelandia* type, each carrying between 50 and 100 men attacked Damietta.[28] In his *Ṣūrat al-Arḍ*, Ibn Ḥawqal used forms of both *dromūn* and *shalandi* as generics, indicating that the words were known commonly, and also the adjectival form *shalandiyyāt* to qualify *marākib* ships.[29]

Theophanēs the Confessor who, as noted, may have had some real familiarity with matters naval, wrote that in 672-3, in response to the Muslim assault on Constantinople, Constantine IV armed huge fire-carrying *diēreis* with cauldrons for Greek Fire and also dromons equipped with *siphōnes* for Greek Fire. When describing the response of Anastasios II in 713 to the projected Muslim assault on Constantinople by Maslama ibn ‘Abd al-Malik, he wrote that the emperor: “... began to build *dromōnes* and fire-carrying *diēreis* and huge *triēreis*”. The Umayyad fleet of caliph Sulaymān was described as being composed of “huge ships, fighting *katēnai*, and *dromōnes*”. Another Muslim fleet which arrived in spring 717 was described as consisting of “four hundred grain-carrying *katēnai* and *dromōnes*”. Finally, the new emperor Leo III prepared “fire-bearing *siphōnes* and put them aboard *dromōnes* and *diēreis*, then dispatched them against the two [Muslim] fleets”.[30] Elsewhere Theophanēs referred to both

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μετὰ τῶν χρειῶν αὐτῶν ἐνιαυσιαίων ἀπὸ μηνὸς Ἀπριλλίου ἕως Σεπτεμβρίου ἀποστεῖλαι, ὅπως φυλάττωσι τὴν παραθάλασσαν ἡμῶν ἀπὸ τῆς τῶν Ἀγαρηνῶν παγάνων ἐκπορθήσεως· ...”.

This Greek version of the letter was later abridged by the compiler of the anti-Phōtian collection, a collection of materials pertaining to the eighth Ecumenical Council held in Constantinople in 869-70, which restored Patriarch Ignatios and exiled Phōtios, and which was compiled by a partisan of Ignatios, probably Nikētas David Paphlagon, the author of the *Life* of Ignatios. In this version, the details of the Pope’s request were altered slightly and the second request about the commander was omitted, but this makes no difference to the point here. The anti-Phōtian version of the letter was edited from five manuscripts in *Epistolae ad res Orientales spectantes*, esp. p. 374: “Παρακαλῶ δὲ τὸ ἅγιον ὑμῶν κράτος χελάνδιον ἐξοπλίσαι μετὰ καὶ τῶν χρειῶν αὐτῶν ἀπὸ μηνὸς Ἀπριλλίου ἕως Σεπτεμβρίου καὶ ἀποστεῖλαι, ὅπως φυλάττωσι τὰ πρὸς θάλασσαν ἡμῶν ἀπὸ τῆς τῶν Ἀγαρηνῶν ἐκπορθήσεως.”. The Latin versions of the letter in Mansi, the *Patrologia Latina*, and elsewhere were Renaissance translations, not the supposed Latin original. See Mansi, *Concilia*, coll. 419-26; Stephen V, *Epistolae*, 1 (col. 789).

[28] Al-Ṭabarī, *Ta’rīkh*, (de Goeje), vol. 3, pp. 1417-18; Al-Ṭabarī, *Ta’rīkh* (Yar-Shater), A.H. 238 (vol. 34, pp. 124-7)

[29] Ibn Ḥawqal, *Kitāb Ṣūrat al-Ard*, pp. 151, 197-198.

[30] Theophanēs, *Chronographia*, A.M. 6164 (vol. 1, p. 353): “... καὶ αὐτὸς διήρεις εὐμεγέθεις κακκαβοπυρφόρους καὶ δρόμωνας σιφωνοφόρους ...”; A.M. 6206 (p. 384): “ἔστησε δὲ ἐπείκτας καὶ ἤρξατο κτίζειν δρόμωνάς τε καὶ διήρεις ‹πυρσοφόρους καὶ μεγίστας τριήρεις› ...”; A.M. 6209 (p. 395): “... ἔχων παμμεγέθεις ναῦς καὶ πολεμικὰς κατήνας καὶ δρόμωνας ...”; A.M. 6209 (p. 396): “..., ἔχων κατήνας σιτοφόρους υ΄ καὶ δρόμωνας.”; A.M. 6209 (p. 397): “... σίφωνας πυρσοφόρους κατασκευάσας εἰς

Byzantine and Muslim warships as either *dromōnes* or *chelandia*, amongst other words.[31]

The "letter" attributed to Pseudo John of Damascus and addressed to the emperor Theophilos, which may be dated to any time between ca 840 and 940, referred to a fleet of 120 *dromōnes* sent by Theodosios III to Italy in 716-17 under the command of Leo the Isaurian, who then seized the throne as Leo III on his return to Constantinople.[32]

Anastasius Bibliothecarius, the ninth-century cardinal priest of St Marcellus, Antipope, and Papal archivist, in his translation of the chapter of Theophanēs' *Chronographia* describing the preparations undertaken by Anastasios II against the projected Muslim attack on Constantinople by Maslama ibn 'Abd al-Malik, translated literally and wrote that the emperor ordered the construction of "*dromōnes*, and fire-carrying *dieres*, and very large *trieres*, ...". But, curiously, when this text was later incorporated into his *Historia miscella* by the otherwise unknown Lombard author Landolfus Sagax, he altered Anastasius' *dieres igniferas* to *trieres igniferas*.[33]

In the ninth century, in his *Liber pontificalis ecclesiae Ravennatis* Agnellus of Ravenna mentioned dromons four times: first, in the context of Odovacer fleeing from Ravenna before Theodoric the Great in 491 "*cum dromonibus*", and secondly, in the context of a certain abbot John of the monastery of St John "*ad Titum*" being unable to find a ship to carry him from Constantinople to Ravenna or Sicily some time between 692 and 708, having searched out "all *carabi* and *celandria* and *dromones*".[34] He certainly knew the word as that for major units of Byzantine fleets. Writing of a supposed battle outside Ravenna between iconodule Ravennese and an expedition sent by the iconclast emperor Leo III sometime after ca 727, Agnellus wrote that

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δρόμωνάς τε καὶ διήρεις τούτους ἐμβαλὼν κατὰ τῶν δύο στόλων ἐξέπεμψεν.".

[31] Theophanēs, *Chronographia*, A.M. 6171 (vol. 1, p. 358), A.M. 6178 (p. 368), A.M. 6210 (p. 398), A.M. 6235 (p. 420), A.M. 6238 (p. 424), A.M. 6254 (pp. 432-3), A.M. 6261 (p. 444), A.M. 6265 (p. 446), A.M. 6266 (pp. 447-8), A.M. 6267 (p. 448), A.M. 6289 (pp. 471-2), A.M. 6295 (p. 479).

[32] See Munitz, *Letter of the three Patriarchs*, §11.b (p. 163): "... καὶ καταλαβὼν τὰ ἐκεῖσε ἐν πλωτηρσίοις δρόμορσι [δρόμωσι] τὸν ἀριθμὸν ρκ΄, ...". "δρόμορσι" as per the MS. is meaningless. "δρόμωσι" is a logical editorial emendation. See also below pp. 420-21.

[33] Anastasius Bibliothecarius, *Chronographia*, p. 246: "Constituit autem praepositos construentium naves, et coepit aedificare dromones et dieres igniferas et maximas trieres, ...". Cf. *Historia miscella*, lib. XX (col. 1071): "Constituit autem praepositos construentium naves, et cœpit ædificare dromones, et trieres igniferas, et maximas trieres, et ...".

[34] Agnellus, *Liber pontificalis*, §§39, 131 (pp. 303, 364).

the defeated Byzantines sought refuge on their dromons on the river Badareno but were surrounded and killed by the Ravennese with their light *cymbae* and *carabi*.[35] These passages appear to have been well informed. However, the fourth, referring to one of the annual wheat transportations from Sicily to Ravenna, "..., *exinde honeratis dromonibus quinquaginta milia modiorum tritici*, ...", is obviously problematical and therefore casts doubt upon the others.[36] Noone would ever have transported grain on galleys of any kind, except in dire emergencies, because of their low capacity and high operating costs. Sailing ships were the normal means of transporting grain. Depending upon which *modius* Agnellus was referring to, the 50,000 *modii* of wheat would have ranged in volume from around 550 cubic metres to around 850 cubic metres and in weight between around 440 and 680 tonnes. Given the low deadweight tonnage of medieval galleys of all types, between 17 and 27 dromons would have been needed.[37] Although it is possible that Agnellus may have been familiar with real galleys known as *dromōnes* at Ravenna in his time, even though Ravenna had not been part of the Empire since 751, it is much more probable that he knew the word from literary sources and used it as a generic for any major vessel, whether a warship or a transport.

The anonymous Greek author who wrote, sometime in the ninth or tenth centuries, a treatise on the interpretation of dreams, an *oneirokritikon*, under the Muslim name of Achmet the son of Seirēm, also used the term *dromōn* in a paragraph on the interpretation of

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[35] Agnellus, *Liber pontificalis*, §153 (p. 377): "Videntes vero Pelasgi, cornu suum esse cunfractum, coeperunt fugere infra dromonibis, putantes se liberare. Tunc Melisenses, id est Ravenniani cives, circumdederunt eos cum cymbis et carabis, et irruentes super Bizanteos, omnes interfecerunt et corpora eorum in Eridanum praecipitaverunt.". There is no other evidence to confirm this account of a supposed iconodule uprising in Ravenna against Byzantine authority after the death of the *exarchos* Paulos ca 727, nor for the defeat of a Byzantine expedition sent to return the city to its allegiance.

[36] Agnellus, *Liber pontificalis*, §110 (p. 350).

[37] The various types of *modioi* used by Byzantines ranged in volume from approximately eleven litres to approximately seventeen litres; although it is most probable that Agnellus would have been referring to the "sea" (*thalassios*) or "imperial" (*basilikos*) modios, of around 16-17 litres of wheat. Wheat weighs approximately 80 kilogrammes per hectolitre, 800 kilogrammes per cubic metre. Even in the thirteenth century, the deadweight tonnage of Western light *galeae*, that is the weight of maximum cargo, was only around 40 tonnes at best, and of that some ten tonnes would have to be allowed for the weight of the crews. See Pryor, "From dromōn to galea", p. 114. Dromons were considerably smaller than Western *galeae* and their deadweight tonnage is unlikely to have exceeded around 26 tonnes. Allowing 25 tonnes for cargo would be very generous. See below p. 304. The grain fleet would have had to have comprised a minimum of around 17 dromons up to a maximum of around 27.

dreams concerning imperial ships.[38] The account of the lives of Saints David, Symeon, and George, bishops of Mitylēnē, composed towards the end of the ninth or in the early tenth century, related that Symeon was provided with an imperial dromon by the empress Theodōra when he was sent by her from Constantinople to take up the bishopric.[39] In his life of Patriarch Ignatios, Nikētas David Paphlagon, also writing around the same time, referred to dromons on several occasions.[40] However, none of these sources contained any details about the construction of the ships.

To say that the evidence for the dromon in these centuries is extremely exiguous would be to understate the obvious. Nevertheless, the few texts that do survive from this period illustrate one important methodological issue. Theophanēs the Confessor and Anastasius Bibliothecarius both used the terms *dromōn*, *diērēs*, and *triērēs* in sequences connected by the Greek word καί ("and") and the Latin *et* (also "and"), respectively. Were they, first, using the classical terms to distinguish monoreme galleys known as *dromōnes* from bireme and trireme warships still in use in Byzantine fleets? Or, secondly, were they using them parenthetically as in "*dromōnes*, both fire-carrying *diēreis* and very large *triēreis*, ...", implying that both biremes and triremes were already known as *dromōnes*? Both καί and *et* could be used in this way. Or, thirdly, were they simply using the classical terms parenthetically to *dromōn* as approved classical words for ships in order to display their own classical erudition, but without any intention to specify anything about the number of banks of oars on dromons?

The answers to these questions affect the understanding of the reality of the dromon at the time. When the word *dromōn* was used, did it refer to monoremes only and were polyremes distinguished from dromons still called *diēreis* and *triēreis*? But, did bireme and trireme polyremes even exist at the time? If they did, were they already known as *dromōnes* in the vernacular? Was *dromōn* a generic vernacular term for all Byzantine war galleys by this time? Or, was the use of the classical terminology totally without technical meaning?

We believe that in fact *dromōn* had become the standard Byzantine

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[38] See Achmet, *Oneirocriticon*, § ρπ΄ [180] (p. 141): "... τὸν βασιλικὸν δρόμωνα ... ὁ δρόμων αὐτοῦ ... ὅτι νέον δρόμωνα εἰργάσατο, etc.". The poor translation of Oberhelman does not use the term *dromōn* [§180 (pp. 177-8)].

[39] See De Smedt, "Acta Graeca", p. 253: "... καὶ δρόμωνος ἐπιβάντες βασιλικοῦ ...".

[40] See *Vita S. Ignatii*, cols 540B, 544C.

term for a war galley long before the age of Theophanēs the Confessor and that, given the deep attachment of both Byzantine and Latin authors to displays of classical erudition, the classical terms *diēreis* and *triēreis* were used parenthetically to *dromōnes* by Theophanēs the Confessor and Anastasius Bibliothecarius without any intended technical import, being used in this way simply because they were approved classical words for war galleys. Although it is not possible to actually prove this solely from grammatical analysis of the texts, later evidence suggests that it was so. As we shall see, both monoreme and bireme galleys could be called *dromōnes* by the tenth century, but there is no hard evidence that triremes even existed at that time and there is some to suggest that the Byzantines had only monoremes and biremes.[41] Therefore, the use of the classical term *triēreis* in the sources of the tenth century and later can have been nothing more than a classicizing affectation. Arguably, this was also the case in the sources of the eighth and ninth centuries? It may have been the case that some bireme galleys were also known as *dromōnes* as early as the fifth and sixth centuries if Prokopios and Theophylaktos Simokattēs were merely describing one class of dromon. However, the sources of the eighth and ninth centuries cannot be relied upon for technical details and therefore we cannot know what the evolution of the dromon was until those of the tenth century provide new information.

All that we can be confident of is that the term *dromōn* was originally applied, primarily at least, to monoreme galleys of 50 oars, that its use became more and more widespread not only in the Empire but also in the Muslim world and the Latin West between the seventh and ninth centuries, and that by the tenth century its primary reference in Byzantium had changed to a bireme galley of 100 or more oars.

[41] See below pp. 276-304

CHAPTER FOUR

THE DROMON IN THE AGE OF THE MACEDONIAN EMPERORS

(a) *The sources*

Only from the age of the Macedonian emperors between 886 and 1025 does information about the construction of galleys known by the term *dromōn* and associated names survive in any quantity and detail. Three treatises on naval warfare dating from this period provide the most detailed information about ships and naval warfare to survive from anywhere in the Mediterranean world between antiquity and the thirteenth century.

The first of these is the treatise *Naumachika Leontos Basileōs*, *The naval warfare of the emperor Leo*, which was in fact Constitution XIX of the *Taktika* written by, or compiled under the auspices of, the emperor Leo VI, which is dated to 905-6. Some time later, in the compilation of the manuscript Milan, Biblioteca Ambrosiana, MS. B 119-sup. [Gr. 139] the text of the entire *Taktika* was included in the manuscript at folios 186r-322r, with the exception of Constitution XIX, which was excerpted, included at folios 323r-331v, and followed by other materials on naval warfare. In his edition of the treatise, this manuscript was referred to by Dain as MS. A and for convenience we have retained this reference to it throughout.[1] It was written in an expert mid tenth-century hand and its compilation has been dated to the years around 963 and has been associated strongly with Basil the *parakoimōmenos*.[2] It was produced in Constantinople for a client at the highest levels of court society, most probably for Basil himself.

Leo VI's *Taktika* in general, and the *Naumachika* in particular, have been generally considered to have been practical in nature, even if Leo's use of classical texts on military tactics has been acknowledged. It has even been suggested that the *Taktika* were intended to be quasi-legal fighting instructions which the emperor's

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[1] See Appendix Two [a].

[2] See Dain, *Naumachica*, p. 11; *idem*, "Stratégistes", p. 385. See also Bouras, "Basil Lekapenos"; Cosentino, "Syrianos's «Strategikon»", pp. 245-7; Mazzuchi, "Basilio Parakimomenos", p. 293. Also discussed by Dennis and Gamillscheg in Maurice, *Stratēgikon*.

stratēgoi would ignore at their peril.[3] However, there are several problems associated with Constitution XIX of Leo's *Taktika* and we have severe reservations about the practicality of some parts of it.

Leo VI was one of the few Byzantine emperors to that time who had no practical experience as a *stratēgos*. He never took to the field or to the sea.[4] By his own admission, his knowledge of naval warfare was derived from consultation with his *stratēgoi* and from some "ancient" tactical manuals. Having said at the start that he could find nothing about naval warfare in the old tactical manuals, he later referred his readers to "the book on ancient tactics and strategies" for more information about weaponry used at sea. What this book was is unknown, although it is probable that it was a composite manuscript containing various ancient or early Byzantine treatises on warfare, possibly, although improbably, having some sections on naval warfare.[5]

We say improbably because our research has found only two treatises dealing with naval warfare which survived to the era of Leo VI and which he knew. To deal first with those which either may once have existed but which had been lost by that time, or which appear to have been unknown to Leo VI:

First: the *Poliorkētikon* attributed to Aeneas the Tactician, written around 357-56 B.C.E., had a section on naval warfare appended to it, but all but the first few words of this have been lost from the sole surviving medieval text in the tenth-century manuscript, Florence, Biblioteca Medicea Laurenziana, MS. Laurentianus LV-4, folios 153v-180v.[6] Many other treatises in the same manuscript are also incomplete, indicating that the losses had occurred before the compilation of the manuscript(s) from which Laurentianus LV-4 was itself compiled.

Second: there was a small section on naval warfare and besieging cities from the sea at the end of Book VIII, the *Poliorkētika*, of the *Mechanical construction*, *Mēchanikē syntaxis*, of Philōn of Byzantium, dated to the late third century B.C.E. This book survived in three tenth- and eleventh-century manuscripts: Madrid, Escorial, MS. Scorialensis Gr. Y-III-11 (late tenth century); Rome, Biblioteca

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[3] See Karlin-Hayter, "Military affairs"; Tougher, *Leo VI*, pp. 171 ff.; Magdalino, "Non-juridical legislation".

[4] On this question see Tougher, "Imperial thought-world".

[5] See Appendix Two [a], §§1, 72. It is quite probable that this was in fact the treatise of Syrianos Magistros. See pp. 178-81 below.

[6] See Aeneas the Tactician, *Poliorkētikon*, XL.8 (p. 198).

Apostolica Vaticana, MS. Vat. Gr. 1164 (early eleventh century); and Paris, Bibliothèque Nationale, MS. Gr. 2442 and Barberianus II 97 (276) (early eleventh century).[7] However, there is no suggestion in Leo VI's *Naumachika* that he knew this work.

Third: Asclepiōdotos, early first century B.C.E., briefly mentioned naval forces in his *Art of tactics*, *Technē taktikē*, but there is no discussion of naval warfare or tactics in the surviving text, which in this case appears to be complete, at folios 132r-142v of the Laurentianus LV-4 manuscript.[8]

Fourth: Ailian the Tactician, late first century C.E., the oldest text of whose *Theory of tactics*, *Taktikē theōria*, is also in the same tenth-century manuscript Laurentianus LV-4 at folios 143r-153r, said that he was going to discuss naval warfare in another work.[9] However, if he ever wrote this, it did not survive.[10] Leo VI knew and used Ailian's *Theory of tactics*;[11] however, there is no evidence that another work on naval warfare, or even a now-lost section on naval warfare of the *Theory of tactics*, had survived to the tenth century and was used by the emperor.

Fifth: Athēnaios Mēchanikos, second century C.E., had a section in his *On machines*, *Peri mēchanēmatōn*, now best preserved at folios 18r-24v, 25r, and 32r-v of the tenth-century manuscript Paris, Bibliothèque Nationale, MS. Suppl. Gr. 607, which dealt with the construction of flying bridges from the mastheads of ships to the walls of besieged towns.[12] This was known in the tenth century to the author of the *Parangelmata poliorkētika* attributed to Hērōn of Byzantium.[13] However, it was not known to Leo VI.

Sixth: in the late fourth century, Vegetius did have some paragraphs on naval warfare in Book IV of his *Epitoma rei militaris*.[14] Vegetius's treatise survived in many manuscripts, the earliest of which is dated to the seventh century, but as far as is known it was never translated into Greek and there is no indication in Leo's

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[7] Edited in Garlan, *Poliorcetique grecque*, pp. 291-327, esp. D.101-110 (pp. 326-7).

[8] See Asklepiōdotos, *Technē taktikē*, I.1 (p. 247).

[9] See Ailian the Tactician, *Taktikē theōria*, II.1 (p. 248): "καὶ περὶ μὲν τῶν ἐν ταῖς ναυμαχίαις συντάξεων ὕστερον ἐροῦμεν, ...".

[10] See Dain, *Elien le tacticien*, pp. 135-6.

[11] R. Vari has shown throughout his edition that the sources that Leo did know were the *On the General, Stratēgikos*, of Onasandros, the *Taktikē theōria* of Ailian the Tactician, and the *Stratēgikon* attributed to Maurice.

[12] Published in Wescher, *Poliorcetique*, 3-40, esp. pp. 32-3.

[13] See below p. 242 & n. 257.

[14] See Vegetius, *Epitoma*, IV.31-46 (pp. 150-65).

Naumachika that he was familiar with it.[15]

Seventh: the treatise *On strategy*, *Peri stratēgikēs*, once thought to have been anonymous and composed in the age of Justinian I, now found at folios 104-130v of the Laurentianus LV-4 manuscript and in part at folios 8-21v of the manuscript Milan, Biblioteca Ambrosiana, MS. B 119-sup. [Gr. 139], which is now argued convincingly to have been part of the same treatise composed by Syrianos Magistros in the ninth century which contained the *Naumachiai Syrianou Magistrou*, signalled at §14 an intent to discuss naval warfare after land warfare had been dealt with. This section on naval warfare was almost certainly separated from the rest of the treatise before the tenth century but survives in the *Naumachiai Syrianou Magistrou* of the Ambrosiana manuscript at folios 333r-338v.[16]

Eighth: the anonymous author of the *Precepts from strategical practice*, *Hypotheseis ek tōn stratēgikōn praxeōn*, which consisted of paraphrases of extracts from the *Stratēgēmata* of Polyainos (second century C.E.), in the same tenth-century manuscript Laurentianus LV-4, folios 76v-103v, did have a chapter on naval warfare.[17] However, nothing in this chapter was used by Leo VI. He appears to have been unaware of both it and of Polyainos, even though the treatise on imperial military campaigns which was adapted from an earlier one by the *magistros* Leo Katakylas and produced under the auspices of Constantine VII for his son Rōmanos, the treatise known generally as the *Praecepta imperatori Romano bellum cogitanti ... observanda*, recommended that among the books which an emperor should take with him on campaign were the works of Polyainos and Syrianos.[18]

None of these treatises were used by Leo VI and they are the sum total of those known which contained any material on naval warfare. In fact, the only earlier treatises that contained material on naval warfare and which we have been able to establish that Leo knew and

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[15] No Greek translation is listed in Shrader, "Handlist". According to a colophon added to Book Four of many manuscripts of Class One, the *Epitoma rei militaris* was revised at Constantinople in 450 by a Flavius Eutropius: "Fl[avius] Eutropius emendavi sine exemplario Constantinopolim consulibus Valentiniano Augusto VII. et Avieno.". See Vegetius, *Epitoma*, pp. vi, xvii. However, from then on knowledge of the text appears to have disappeared in Constantinople.

[16] Syrianos Magistros, *Peri stratēgikēs*, §14.10-17 (p. 44). On the dating see also Baldwin, "Peri Stratēgikēs"; Cosentino, "Syrianos's «Strategikon»", pp. 248-50; Zuckerman, "Military compendium".

[17] See Anonymous, *Hypotheseis*, §57 (pp. 498-503).

[18] Constantine VII, *Praecepta*, p. 467. Here and throughout we have used the new edition by John Haldon: Ὅσα δεῖ γίνεσθαι τοῦ μεγάλου καὶ ὑψηλοῦ βασιλέως τῶν Ῥωμαίων μέλλοντος φοσσατεῦσαι. See Constantine VII, *Three treatises*, Text C (p. 106).

used are two fragments of earlier treatises later inserted in the same manuscript, Milan, Biblioteca Abrosiana, MS. B 119-sup. [Gr. 139], or some other version of them: that on crossing rivers, the *Pōs dei diapleein potamous* ..., excerpted from the *Stratēgikon* of Maurice and the *Naumachiai Syrianou Magistrou* of Syrianos Magistros.[19] This can hardly have been a coincidence.

The *Stratēgikon* attributed to Maurice contained a chapter on crossing rivers in the face of the enemy, *Pōs dei diapleein potamous*, which was part of a separate small treatise on infantry added to the text as Book XII later.[20] This treatise was transmitted in three manuscript groups, of which the major surviving one is once again Laurentianus LV-4, folios 3r-67v, where the treatise was attributed to Urbikios. However, another version was incorporated into Milan, Biblioteca Ambrosiana, MS. B 119-sup. [Gr. 139], at folios 6r-88v. Subsequently, the compiler re-worked the chapter on crossing rivers at Book XII.B.21 from the treatise and included this version in the section on naval warfare at folios 331v-332v. The excerpt concludes halfway down folio 332v, indicating that the manuscript still has the whole of the text that interested the compiler. Leo VI knew and used the chapter on crossing rivers but he also knew and used other parts of the *Stratēgikon*.[21] He must have had access to a complete text of it.

The chapters on naval warfare attributed to Syrianos Magistros, the *Naumachiai Syrianou Magistrou*, contained in the Ambrosiana manuscript at folios 333r-338v are unique to that manuscript. No other text of them is known. However, they have now been identified almost certainly as having originally been part of a treatise on strategy composed by a certain Syrianos Magistros. The treatise is incomplete at the beginning because a page has been lost from the manuscript between what is now folio 332v and what is now folio 333r.[22] Over

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[19] Both published by Dain from the manuscript under the rubrics *Ἐκ τοῦ Μαυρικίου πῶς δεῖ διαπλέειν τοὺς ποταμοὺς καὶ τὰς διαβάσεις αὐτῶν ποιεῖσθαι ἐχθρῶν ἀντικαθισταμένων* (*From Maurice, how you should sail across rivers and make crossings when the enemy resist*) and *Ναυμαχίαι Συριανοῦ Μαγίστρου* (*Naval battles of Syrianos Magistros*) in *Naumachica*, pp. 41-2 & 45-55, respectively. See various notes to Appendix Two [a] which indicate sections where the treatise of Leo VI was indebted to these earlier works.

[20] See Maurice, *Stratēgikon*, XII.B.21 (pp. 468-73) and for convenience the comments on the manuscripts in Dennis's translation, pp. xxviii-xx.

[21] See below p. 395 & n. 652.

[22] The treatise now ends at the foot of fol. 338v, at the end of a paragraph but without the normal *explicit* such as is found at the end of the Maurice text. There are also stubs remaining from now missing folios after 338. The Syrianos text was originally written on one quaternion of the manuscript, from which the outer leaves at beginning and end have been lost.

the text of the *Pōs dei diapleein potamous* from the *Stratēgikon* attributed to Maurice, on folio 332v, can be discerned an impression of a rubricated heading which was once on the facing page which is now lost. Dain believed that he could decipher the words "Συριανοῦ Μαγίστρου Ναυμαχίαι".[23] The compiler had the treatise to its beginning and obviously considered it to be important and therefore gave it a major heading. A certain Syrianos appears at the beginning of the *Taktika* of Nikēphoros Ouranos as one of his sources and the same name is cited in the *Praecepta imperatori Romano bellum cogitanti ... observanda*, attributed to Constantine VII.[24] Leo VI knew it but did he have access to the complete text or was what he had already only the now separated section? Most probably he had the whole since he also used the treatise *Rhetorica militaris*, which is also contained in the Ambrosiana and Laurentian manuscripts, in Constitution XVIII of his *Taktika*. In fact, the *Naumachiai Syrianou Magistrou*, the *Peri stratēgikēs*, and the *Rhetorica militaris*, are now all considered to have been part of the same treatise by Syrianos Magistros. Nikephoros Ouranos also used the *Peri stratēgikēs* at §§74-87, and the *Naumachiai Syrianou Magistrou* at §§119-21, of his own *Taktika*, although he may conceivably have received them by an independent tradition. Zuckerman considers that the treatise should be dated to the sixth century; however, Cosentino, and we also, consider that it should be dated to the ninth century. The *Naumachiai Syrianou Magistrou* does not suit the sixth-century context but sits admirably in that of Byzantine-Muslim naval conflict in the ninth century.[25]

When the compiler of the Ambrosiana manuscript came to the task of assembling treatises on naval warfare, the only ones that predated Constitution XIX of Leo VI's *Taktika* and that he knew and included were the *Pōs dei diapleein potamous* ... from Maurice and the sections on naval warfare of Syrianos Magistros, significantly, the only treatises on naval warfare also known to have been known to Leo VI.

The emperor extrapolated from some classical Greek historical texts,[26] and his language was studded throughout with classical allusions and archaic, anachronistic terminology. Some of his advice to his *stratēgoi* also reads like that of an arm-chair sailor dreaming up

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[23] See Dain, *Naumachica*, pp. 43-4; idem, "Stratégistes", p. 342.

[24] Constantine VII, *Praecepta*, p. 467; idem, *Three treatises*, p. 107. See also Dain, "Stratégistes", p. 342.

[25] See Cosentino, "Syrianos's «Strategikon»"; Zuckerman, "Military compendium".

[26] See Appendix Two [a], §45 and n. 32.

stratagems for naval warfare in front of a fire in the imperial palace. For example, at §21, where Leo instructed his *stratēgoi* to be aware of the character and bravery of each soldier under his command. All very well, but how could any commander ever acquire such knowledge about each of thousands of soldiers or sailors? Similarly, at §74 the emperor instructed them to ensure that the crews of the dromons of their fleets should be no smaller than, and preferably larger than, those of the enemy.[27] This was almost certainly based on what he had read in the treatise of Syrianos Magistros, and was all very well but, even given the fact that the Byzantines employed spies and had intelligence systems,[28] as did other medieval military and naval powers, how could any fleet commander preparing for battle know how large the crews of the enemy's ships would be? One might make a reasonable guess on the basis of the known size of the enemy ships and the normal crews of such ships, but no commander could ever know how his enemy counterpart might crew his ships in the approach to battle.[29] The normal number of marines or oarsmen might well augmented by supernumeraries, as the Byzantines themselves apparently did in the case of the Cretan expeditions of 911 and 949.[30] No doubt the emperor's advice was theoretically appealing, but it was very impractical. There were a series of other stratagems suggested in §§69-71 of Constitution XIX which also read very much as though they were conceived by an arm-chair sailor.[31]

In the same Ambrosiana Library MS. B 119-sup. [Gr. 139] a short collection of five paragraphs drawn from Constitution XX, §§196, 201, & 220 of the *Taktika* and from its Epilogue, §§44, 45, & 47 fin. was included at folios 331r-v under the rubric *From the Lord Leo, the Emperor*, *Ek tou kyrou Leontos tou Basileōs*.[32] The compiler of the manuscript went to the trouble of culling the rest of the *Taktika* for material relating to naval warfare not found in Constitution XIX.

Leo VI's Constitution XIX was closely paraphrased by the *magistros* Nikēphoros Ouranos as chapter 54, entitled *Peri*

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[27] See Appendix Two [a], §§21, 74.

[28] See Christides, "Military intelligence"; Koutrakou, "Diplomacy and espionage"; idem, "Spies of towns".

[29] The text of Syrianos Magistros merely amounted to general advice to have good intelligence and this was taken up again later by Nikēphoros Ouranos. See Appendix One, §9.8; Nikēphoros Ouranos, *Ek tōn taktikōn*, §119.4 (8) (p. 94).

[30] See below pp. 262-6, 370-71. However, note our remarks on the disruptive effects this would have on the delicate gearing of oarage systems, pp. 262-3.

[31] See below pp. 204-7, 387-406.

[32] Published by Dain in *Naumachica*, pp. 37-8. See Appendix Two [b].

thalassomachias by Dain, of his own *Taktika*, which was composed around 1000-1011 during his tenure of the governorship of Antioch as ὁ κρατῶν τῆς Ἀνατολῆς (*ho kratōn tēs Anatolēs*), "He who holds the East", the commander of Byzantine forces in the East.[33] Nikēphoros included two short passages found in the *Ek tou kyrou Leontos tou Basileōs* but not in the *Naumachika Leontos Basileōs*,[34] indicating that he probably knew the Ambrosiana Library manuscript or one of its ancestors; although, it is of course possible that he included them from the manuscript of the entire *Taktika* of Leo VI to which he had access. Nikēphoros's text is a very useful check on that of Leo VI because his paraphrase clarified some obscure points in that of his predecessor. His language and syntax were more simple and down to earth and it is clear that, as both an educated man and also a practised general, he was able to interpret the emperor's text for the use of soldiers, even if on occasions he remained faithful to his imperial mentor's impractical advice.[35] He frequently eliminated Leo VI's classical allusions or translated his archaic terminology into contemporary terms.

There are also problems associated with the surviving texts of Nikēphoros's treatise. All of the earliest manuscripts are unpublished and the earliest of them all, Munich, Bayerische Staatsbibliothek, Cod. Monac. Gr. 452, dates only from the fourteenth century. Dain had wished to publish his edition from this manuscript but his

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[33] McGeer, "Tradition and reality". See Appendix Five, esp. n. 1.

[34] See Appendix Five, nn. 42, 44.

[35] On several occasions Nikēphoros Ouranos reiterated the essence of what Leo VI had written when, as an experienced general himself, he ought to have known that the emperor's advice was, as we consider, impractical. On Nikēphoros's career, see Dain, *Nicéphore Ouranos*, pp. 133-6; McGeer, "Tradition and reality", pp. 130-31.

However, as far as is known, Nikēphoros's experience in war was entirely land based. His major achievements were against Tsar Samuel of Bulgaria and against the Muslims on the land frontier in Syria and Armenia. There is no evidence that he had any practical experience in naval warfare and this may help to explain why he reiterated some of Leo VI's impractical suggestions.

Almost the entire text of ch. 54 of Nikēphoros's *Taktika* was a close paraphrase of Leo VI's Constitution XIX of his own *Taktika*. No doubt, considerations of having his own *Taktika* accepted for "publication" in the highest circles of Byzantine court society meant that Nikēphoros could not have cast aspersions on what a revered former emperor was well known to have either written himself or to have been responsible for the writing of. Nikēphoros was, after all, writing during the reign of Basil II, the great grandson of Leo VI. His capacity to emend the text of Leo VI was limited to paraphrase and clarification.

In fact, not only chapter 54 but also all of chapters 1-55 of Nikēphoros's *Taktika* were a paraphrase of Leo VI's *Taktika* and chapters 56-62 were a paraphrase of the *Praecepta militaria* of emperor Nikēphoros Phōkas. Nikēphoros Ouranos did add some original material of his own, but it was very limited. See McGeer, "Tradition and reality", esp. pp. 132-8; idem, *Dragon's teeth*, esp. pp. 79-86.

transcripts were lost in the Second World War and he was compelled to use those he had made from the sixteenth-century manuscript, Florence, Biblioteca Medicea Laurenziana, MS. Laurentianus LVII-31, which had been copied from Cod. Monac. Gr. 452 at Corfu by Antonios Eparchos in 1564. We have edited our text from Cod. Monac. Gr. 452. However, because even this manuscript postdates the original time of composition by Nikēphoros Ouranos by over 300 years, not surprisingly we have have been able to identify several points at which we believe that errors have surely crept in between what should have been Nikēphoros's original text and that of the fourteenth-century manuscript.

In the manuscript Oxford, Bodleian Library, MS. Baroccianus Graecus 131, dated to the first half of the fourteenth century, which contains many other treatises, there was included another excerpt from the *Taktika* of Nikēphoros Ouranos containing chapters 119-123, which were largely concerned with naval warfare.[36] However, chapters 119 and 122 were simple paraphrases of Syrianos Magistros and Maurice respectively and 120, 121, and 123 were a collection of *exempla* from classical history. The excerpt has been of only limited use to us.

At face value, the only treatise which described the actual construction of *dromōnes* and *chelandia* was the anonymous treatise *Naval warfare, commissioned by the patrikios and parakoimōmenos Basil*, executed by an anonymous client, "the Anonymous", for the *patrikios* and *parakoimōmenos* Basil Lekapēnos, an illegitimate son of the emperor Rōmanos I who rose to great power from ca 947 to 959 under Constantine VII, and again under Nikēphoros II Phōkas, John I Tzimiskēs, and Basil II from 963 until his overthrow in 985. This treatise was an unashamed attempt to impress an important patron by parading a knowledge of classical Greek.[37]

The only surviving medieval manuscript of this text is contained at folios 339r-342v of the same Ambrosiana Library, MS. B 119 sup. [Gr. 139] manuscript which contains the *Naumachika Leontos Basileōs* of Leo VI. It is possible that the text of the Anonymous's treatise transcribed in this manuscript was the first part of the original

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[36] Folios 269r-272v. Published by Dain, *Naumachica*, pp. 89-104.

[37] The Anonymous said that the construction of *dromōnes* and *chelandia* used the same types of timbers, even if two different names were used for the ships. See Appendix Three, §2.16: "Αὗται μὲν αἱ ὀνομασίαι οἰκεῖαι χελανδίου καὶ δρόμωνος· ἐκ τῶν ἀυτῶν γὰρ νηΐων ξύλων ἀμφοτέρων αἱ κατασκευαὶ γίνονται, εἰ καὶ περὶ τὴν καθόλου κλῆσιν διενηνόχασι· καὶ τὸ μὲν δρόμων ὠνόμασται, τὸ δὲ χελάνδιον.". On Basil the *parakoimōmenos* see Brokkaar, "Basil Lacapenus".

fair copy of the author's holograph. As it survives the treatise is incomplete because the manuscript ends in mid sentence at the bottom of folio 342v.

In the poem with which the Anonymous opened his treatise, he referred to Basil having defeated "Chambdan", that is Sayf al-Dawla ʿAlī I, the Ḥamdānid *amīr* of Aleppo (945-67), and to Crete being at the time still in Muslim hands.[38] This enables us to date the composition of the treatise very precisely. Under Constantine VII, Basil was *patrikios* and *parakoimōmenos*, and *paradynastevōn tēs synklētou*, "co-president of the Senate". He was the highest ranking eunuch in the government, "Prime Minister" as he has been called.[39] He had participated with John Tzimiskēs, *stratēgos* of *Anatolikon*, in a victorious campaign against *Samosata*, which was subject to Sayf al-Dawla, in October/November 958.[40] In November 959 Constantine VII died and Basil was excluded from power by Constantine's son Rōmanos II. He returned to power only in 963, when he became *proedros* and *parakoimōmenos* under Nikēphoros II Phokas. The final campaign to recover Crete departed in July 960 and was brought to a successful conclusion in March 961. Now, obviously the planning of the expedition of 960-61 had taken some time and we suggest that the Anonymous's treatise was compiled for Basil between his return from the *Samosata* campaign and his fall from grace: between November 958 and November 959. Because the Anonymous writes as though Basil expected to participate in the Cretan campaign, he must have completed his treatise before Basil's fall from power. This is confirmed by his addressing Basil as "the valiant attendant of our valiant emperor".[41] This must have been written before the death of Constantine VII. Moreover, since the treatise was addressed to him as *patrikios* and *parakoimōmenos* rather than *proedros* and *parakoimōmenos*, it cannot have been compiled after his return to power in 963. The redaction of the fine copy of the treatise in the form that we have it may possibly have post-dated 963 but the original composition of it can not have. More probably, the redaction of the entire surviving manuscript was completed between November 958 and November 959.[42]

For several reasons, it is most probable that the Anonymous was a

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[38] See Appendix Three, opening poem.
[39] Brokkaar, "Basil Lecapenus", p. 213.
[40] See Vasiliev/Canard, *Byzance et les Arabes. Tome II, part 1*, pp. 362-4.
[41] See Appendix Three, Preface.4.
[42] Cosentino, "Syrianos's «Strategikon»", pp. 244-5.

young member of Basil's own household. First, he associated himself with those who had taken pleasure in Basil's achievements.[43] Secondly, he referred to his own "youthful exuberance".[44] Thirdly, his whole treatise reads very much as though it was a rather juvenile exercise in book learning composed by someone whose education did not sit lightly on him. For example, on occasions he employed Platonic and Aristotelian terminology which reads awkwardly in such a treatise, as though the author was using it pretentiously and self-consciously.[45] Also, when technical terms are used in the manuscript, sometimes there are spaces left in the lines of writing before the definitions of the terms, as though to emphasize the lexicographical nature of the work. Fourthly, although the Anonymous claimed to be using a variety of historical and strategical texts,[46] we have been able to identify positively only five texts used by him: the *Naumachika Leontos Basileōs* of Leo VI, the *Onomasticon* of Julius Pollux, professor of rhetoric at Athens from ca 178 C.E., the *Lexicon* of Hesychios of Alexandria (fifth-sixth centuries C.E.), a manuscript of Thucydides which had scholia, and a manuscript of Homer's *Odyssey* which also had scholia.[47] We have been able to find no evidence that he had access to a manuscript of the *Iliad*, to any of the ancient treatises on tactics, to the classical commentaries on Homer and Homeric dictionaries by Aristarchos of Samothrace (ca. 217-145 B.C.E.), Apiōn (1st century C.E.), and Apollōnios Sophista (ca 100 C.E.), or to any of the surviving encyclopedic and other treatises compiled under the auspices of Constantine VII. His sources appear to have been those of a rather limited private library.

The Anonymous derived most of his information about ships from a manuscript of the *Onomasticon*, the "word book", of Julius Pollux, one of which had been copied in the ninth century in literary circles in Constantinople and had then been owned and interpolated by bishop Arethas of *Caesarea* (mid 9th century - 932/44).[48] A manuscript of Hesychios may also have been known to Arethas.[49] The fate of

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[43] See Appendix Three, Preface.9.
[44] See Appendix Three, Preface.4.
[45] See Appendix Three, §§1.1, 1.2.
[46] See Appendix Three, Preface.10.
[47] These sources are identified in the notes to Appendix Three.
[48] First noted by Dain. See *Naumachica*, p. 58.
[49] This manuscript of Pollux is now lost and of the surviving manuscripts, all of which are incomplete, interpolated, and abridged, the earliest is dated to the tenth century. See Pollux, *Onomasticon* (Bethe), vol. 1, pp. vi-vii. How much Pollux's original work may have been altered in the ninth century, or in earlier transitional manuscripts, is impossible to say. On Arethas's library, see Wilson, *Scholars*, pp.

Arethas's library after his death is unknown; however, it is arguable that Basil the *parakoimōmenos* himself had acquired these manuscripts from it and that the library that the Anonymous had access to was Basil's own. Pollux himself had used classical Greek sources such as Plato, Thucydides, Herodotos, and Homer and the section of the *Onomasticon* dealing with ships was never intended to be a technical treatise. What Pollux had written about the construction of ships reflected that of a *triērēs* of Themistoclean Athens more than that of a Roman *liburna* of his own time.

Either the redactor of the Pollux manuscript, or even perhaps Pollux himself, had misunderstood some of the classical Greek terminology for ships and the Anonymous then misunderstood parts of the Pollux manuscript. Far from describing the construction of a tenth-century dromon, the text of the *Anonymous* as it survives essentially describes a Greek *triērēs* but with numerous errors. It is not a shipwright's manual but rather an exercise in philology. That being said, on the one hand, some of the characteristics ascribed to tenth-century dromons and *chelandia* by it can be accepted because they are confirmed by other sources and some of the terminology used is so common to ships of all kinds that it can be presumed to be relevant to dromons also. On the other hand, quite a few of the characteristics ascribed to dromons by it can be rejected because they are clearly anachronisms misunderstood. Many others lie in the realms of probability or possibility.

To these sources can be added a series of works compiled either by Constantine VII himself, or under either his auspices or those of Basil the *parakoimōmenos*, including: the *De administrando imperio*;[50] the *Praecepta imperatori Romano bellum cogitanti ... observanda*,[51] the treatises produced as part of the encyclopedic *Excerpta historica*;[52] and the anonymous collection of imperial biographies known as *Theophanes continuatus*.[53]

However, the most important of the Porphyrogennētan treatises for Byzantine naval affairs are some inventories, supposedly for the unsuccessful expeditions to recover Crete in 910-12 led by the *patrikios* and *logothetēs tou dromou* Himerios and in 949 led by Constantine Gongylēs, and for two other expeditions to Italy in 934

120-35.

[50] Constantine VII, *De administrando imperio*.
[51] Constantine VII, *Three treatises*, Text C.
[52] Constantine VII, *Excerpta historica*.
[53] *Theophanēs continuatus*.

and 935. These were inserted in the treatise *De cerimoniis*, *On [court] ceremonies*, which is traditionally ascribed to Constantine VII but which was actually compiled in its final form under the auspices of Basil the *parakoimōmeno*s during the reign of Nikēphoros II Phōkas.[54] Attention has long been drawn to problems inherent in the *De cerimoniis* compilation in general, and in these inventories in particular. Why were the inventories compiled and from what sources? As they survive, the various inventories represented different chronological stages in the organization, and recording of that organization, of these expeditions. Some appear to have anticipated what ought to be done in the future. Others appear to have recorded auditing after the event of what had been done. Still others can be read as though they were standard "check lists" for such expeditions.[55] Why were other bureaucratic sources which may be presumed to have existed not included among the inventories? Why were the inventories that were included inserted in a text to which they clearly did not belong? Why are they ordered in the way that they are in the main surviving manuscript: Leipzig, Univ./Urb., MS. 28 [Rep.i.17]? These and many other questions remain unresolved. We have used the new edition by Haldon, which incorporates some modifications to Reiske's text,[56] but in Appendix Four have made our own translations of those sections of the inventories for the expeditions of 911 and 949 concerned with the ships and their equipment and armaments.

Other treatises, such as the *De expugnatione Thessalonicae* of John Kaminiatēs,[57] also date from the period and add some useful further information. So also do scholia on various classical authors, most of the earliest manuscripts of which are dated to the tenth or early eleventh centuries. Leo the Deacon also referred to fire-bearing

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[54] Constantine VII, *De cerimoniis*, II.44 and 45 (vol. 1, pp. 651-78).

[55] See Haldon, "Theory and practice", pp. 236-9, 255, 267-8.

[56] See Haldon, "Theory and practice", pp. 202-35. See also Bury, "Ceremonial book", p. 221; Ševčenko, "Constantine Porphyrogenitus", p. 185 and n. 47; Treadgold, "Army"; Featherstone, "Preliminary remarks"; *idem*, "Further remarks".

[57] John Kaminiates, *De expugnatione Thessalonicae*.

The authenticity of this text and its dating was questioned by Kazhdan, who wished to redate the surviving text to the fifteenth century. However, its authenticity has been defended by Christides and Khoury Odetallah. See Kazhdan, "Some questions"; Christides, "Caminiates"; Khoury, "Leo Tripolites-Ghulām Zurāfa". See also John Kaminiates, *De expugnatione Thessalonicae*, trans. Frendo, pp. xxxvii-xl; Frendo, "St Demetrius".

We add that the information about ships, shipping, and naval warfare found in the treatise suits the context of the tenth century far better than that of the fifteenth. That does not, of course, preclude the possibility that the surviving text may derive from a later reworking of a tenth-century original.

triēreis which the "Romans" [of his day] called *dromōnes*.[58]

(b) *Terminology and Ship Types*

In the Porphyrogennētan corpus, the terminology used for ship types was very varied. On the one hand, in the *De administrando imperio* the author used *chelandion* throughout as the word for a warship except in §51, where he used δρομώνιον (*dromōnion*) for the imperial galley.[59] *Dromōn* was similarly used in the *De cerimoniis* with reference to the "imperial dromon" whose crew was given a donative during the festival of the *broumalia* before Christmas.[60] On the other hand, in the *Praecepta imperatori Romano bellum cogitanti ... observanda*, *dromōnion* and *dromōn* were used for warships.[61] *Chelandion* was not used at all in this text. In the various parts of the so-called *Theophanēs continuatus* the usage was variable. *Dromōn* is found once in the first part compiled by the continuator of Theophanēs the Confessor and four times in the third part, which is similar to the chronicle of Symeon Logothetēs. It is also found once in the fourth part, probably written by Theodore Daphnopatēs, with reference to the invasion fleet sent to Crete under Nikēphoros Phōkas in 960.[62] However, it is not found at all in the second part, the so-called *Vita Basilii*, "Life of Basil I", compiled under the auspices of Constantine VII. *Chelandion* is found only once in any part of the *Theophanēs continuatus* but in part four *karabia* was used for

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[58] Leo the Deacon, *Historiae*, I.3 (p. 7): "... καὶ ταχυπλοήσας, πυρφόρους τε τριήρεις πλείστας ἐπαγόμενος (δρόμονας ταύτας Ῥωμαῖοι καλοῦσι), ...". See also below pp. 308-9.

[59] Constantine VII, *De administrando imperio*, §8 (p. 54): "Καὶ βασιλικοῦ ἀποστελλομένου ἐντεῦθεν μετὰ χελανδίων, ..."; §42 (p. 182): "... σπαθαροκανδιδάτου Πετρωνᾶ μετὰ χελανδίων βασιλικῶν πλωΐμων ἀπέστειλεν καὶ χελάνδια τοῦ κατεπάνω Παφλαγονίας.". Cf. §29 (pp. 126-7) and §51 (pp. 246-7): "Περὶ τοῦ, τίνι τρόπῳ γέγονεν τὸ βασιλικὸν δρομώνιον, ...".

[60] Constantine VII, *De cerimoniis*, II.18 (vol. 1, p. 601).

[61] Constantine VII. *Three treatises*, Text (C), ll. 321, 686, 827 (pp. 114, 138, 146).

[62] *Theophanēs continuatus*, IV.44 (p. 208); VI.Βασιλεία Λέοντος αὐτοκράτορος.9 (p. 358), VI.Βασιλεία Κωνσταντίνου υἱοῦ Λέοντος.11 (p. 391), VI.Βασιλεία Ρωμανοῦ.23 (p. 414), VI.Βασιλεία Ρωμανοῦ.39 (pp. 423-4), VI.Βασιλεία Ρωμανοῦ υἱοῦ Κωνσταντίνου τοῦ πορφυρογεννήτου.10 (p. 475).

Theodore Daphnopatēs held high positions at court during the reign of Rōmanos I Lekapēnos. He lost influence under Constantine VII but under Rōmanos II was *eparchos*, or urban prefect, of Constantinople. On the question of whether he was the author of the fourth part of the *Theophanēs continuatus*, see Theodore Daphnopatēs, *Correspondance*, pp. 6-10.

warships, both Muslim and Byzantine.[63]

In a letter to Pope John XI (931-35) penned by Theodore Daphnopatēs for Rōmanos I Lekapēnos in February 933, the Pope was invited to send his sister to Constantinople on *chelandia* to be provided by the Empire to marry one of the emperor's sons, probably Constantine, the youngest.[64]

In the inventory for the Cretan expedition of 911-12 *chelandion* was used only for two ships supplied by the *stratēgos* of the *thema* of the *Kibyrrhaiōtai*. The overwhelming majority of this fleet was said to be composed of *dromōnes* and πάμφυλοι (*pamphyloi*).[65] However, in the inventory for the fleets sent to Italy in 934 and 935, the squadrons were described respectively as being composed of 11 *chelandia*, and 11 *chelandia* plus seven *karabia*, which were transporting 415 *Rhōs*. Here the transports appear to have been the *karabia* and the warships to have been the *chelandia*.[66] Finally, in the inventory for the Cretan expedition of 949, the ships were referred to variously as *pamphyloi*, οὐσιακὰ χελάνδια (*ousiaka chelandia*), χελάνδια πάμφυλα (*chelandia pamphyla*), and *dromōnes*.[67]

In Byzantine Italy, the *Life* of St Neilos of Rossano (ca 910-1004) reveals that *chelandia* were constructed by the *doux* Nikēphoros Magistros as part of a naval defence force in the tenth century.[68] Liudprand of Cremona knew Byzantine warships from his first visit to Constantinople in 949 and referred to those that used Greek fire as *chelandia*. According to him, it was fifteen derelict old *chelandia* which had been hastily repaired and equipped with Greek Fire which scattered the *Rhōs* attack on Constantinople in 941.[69] However, it was

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[63] *Theophanēs continuatus*, III.28 (p. 123); VI.Αυτοκρατορία Κωνσταντίνου.29 (p. 453); VI.Βασιλεία Ρωμανοῦ υἱοῦ Κωνσταντίνου τοῦ πορφυρογεννήτου.7, 10 (pp. 473, 475).

[64] Theodore Daphnopatēs, *Correspondance*, letter 1 (pp. 40-41).

The letter was really meant for the Pope's half brother Count Alberic of Tusculum, the current master of Rome, who had imprisoned the Pope's mother, the infamous Senatrix Marozia, and who had himself sought his own marriage to one of Rōmanos's daughters. The letter invited the Pope to have his mother escort and chaperone his sister. The proposal was a diplomatic ruse which both sides knew would not be pursued, as indeed it was not.

[65] Appendix Four [a], §§2-7, 13 [= Haldon, "Theory and practice", pp. 203, 205, 209; Constantine VII, *De cerimoniis*, II.44 (vol. 1, pp. 652-4, 657)].

[66] Haldon, "Theory and practice", p. 213; Constantine VII, *De cerimoniis*, II.44 (vol. 1, p. 660).

[67] Appendix Four [b], §I [= Haldon, "Theory and practice", pp. 219, 221; Constantine VII, *De cerimoniis*, II.45 (vol. 1, pp. 664-5)].

[68] *Vita S. Nili*, coll. 105-8. See also Ahrweiler, *Byzance et la mer*, p. 116.

[69] See Liudprand of Cremona, *Antapodosis*, V.9 (p. 135): "Quam ob rem Hugo rex consilio accepto nuntios Constantinopolim dirigit rogans imperatorem Romanōn, ut

probably in Byzantine Italy that Westerners in general became familiar with the *chelandion* and emulated it as the *chelandia/ scelandrium/salandria*, etc.[70]

Muslim authors of the ninth and tenth centuries, including Ibn Ḥawqal (died post 988 C.E.) and al-Muqaddasī (al-Maqdisī) (died 988 C.E.), also used varieties of the word for Byzantine war galleys.[71]

Smaller light galleys also existed. They were classed generically by Leo VI as *dromōnes* but specifically termed γαλέαι (*galeai*) or μονήρεις (*monēreis*) by him, and were said both by him and by the Anonymous to be used especially for scouting purposes.[72] Nicholas I Mystikos also wrote in his letter of 920 to Rōmanos Lekapēnos that at least one or two *monēreis* should be sent to the relief of *Lampsakos* if *chelandia* were unavailable.[73] The *Vita Basilii* of the *Theophanēs continuatus* referred to ships of the Cretan corsairs as μυοπάρωνες (*myoparōnes*), a classical Greek word for a fast pirate ship, and πεντηκόντοροι (*pentēkontoroi*), i.e. fifty-oared ships, and said that they were commonly known as σα(κ)τούραι (*sa(k)tourai*) and *galeai*. In the first part, the continuator of Theophanēs also referred to ships of the Cretan Muslims as *galeai* and in the fourth part the author referred to the *galeai* of the Byzantine Cretan expedition of 960 as being fast sailing and being used for scouting purposes.[74] In the inventory for the Cretan expedition of 911-12, it was said that the *katepanō* of the *Mardaites* of Antalya undertook to provide *galeai* for

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naves sibi Greco cum igne transmittat, quas chelandia patrio sermone Greci cognominant." [written 958-62]. See also *ibid.*, V.15 (p. 138). Cf. *idem*, *Relatio*, pp. 190, 192, 193.

[70] *Chronicon Salernitanum*, §107 (p. 107): "Basilius imperator Grecorum ut huiusmodi verba captasset, valde gavisus est, atque sine mora non pauca scelandria misit, ..." and cf. §107 (p. 120) [written ca 974]; Thietmar of Merseburg, *Chronicon,* III.23 [13] (pp. 126-127): "Sed ut in omnibus, lector carissime, certus efficiaris, salandria quid sit vel cur ad has pervenerit horas, breviter intimabo. Haec est, ut prefatus sum, navis mirae longitudinis et alacritatis, et utroque latere duos tenens [habet] remorum ordines ac centum quinquaginta nautas" [written ca 1000-1018]; *Anonymous chronicle of Bari*, p. 152 ("Et chelandie incenderunt nave, que veniebat de Calabria.") and cf. p. 153 [written ca 1115 but based on much earlier sources].

[71] Ibn Ḥawqal, *Ṣūrat al-Arḍ*, pp. 197-8; al-Muqaddasī, *Aḥsan*, p. 177.

[72] Appendix Two [a], §10. Cf. §81; Appendix Three, §3.2. Cf. Appendix Five, §§9, 74.

[73] See above p. 167 & n. 20.

[74] *Theophanēs continuatus*, IV.34 (p. 196); V.60 (p. 299): "προσῆν δὲ αὐτοῖς ἀναλόγως καὶ πλῆθος μυοπαρώνων καὶ πεντηκοντόρων, ἃς σακτούρας καὶ γαλέας ὀνομάζειν εἰώθασι πάμπολλοι."; VI.Βασιλεία Ρωμανοῦ υἱοῦ Κωνσταντίνου τοῦ πορφυρογεννήτου.10 (p. 475): "ἔμπροσθεν δὲ ὁ συνετὸς ταχυδρόμους γαλέας ἀποστείλας κατασκοπῆσαι καὶ κρατῆσαι γλῶσσαν προσέταξεν." and 11 (p. 477): "οἱ δὲ ἀποστείλαντες γαλέας εὐθυδρόμους ...".

Syria; however, no details about these were supplied.[75] In that for the Cretan expedition of 949, it was said that of the 15 *galeai* of Antalya, six were left behind to protect the *thema*.[76] Makrypoulias has argued that when the *galea* first appeared in the sources in the tenth century, the ship was especially associated with the *Mardaites* of Antalya, *Antioch on Cragus*, and Karpathos, and that it was developed by them as a corsair and scouting galley.[77] Both *galeai* and also *chelandia* were mentioned as being used by the Mardaites in a short text which may have been a submission from the *stratēgos* of the *Kibyrrhaiōtai* to Constantine VII on weather and seasonal navigation made at the emperor's request, a text now found among the final folios of a manuscript of the late fourteenth or early fifteenth century which once belonged to Cardinal Bessarion: Venice, Biblioteca Marciana, MS. Gr. 335 [coll. 645].[78] According to the tenth-century *Life* of St Theodore of Kythēra, the *tourmarchēs* Melitōn was said to have been sent to Crete around 920-21 by Rōmanos I Lekapēnos with four *chelandia*, then glossed as *diēreis*. Later a *chelandion* put in to Kythēra and found the saint dead.[79]

Pamphyloi were probably dromons or *chelandia* of a type originally associated with the province of *Pamphylia* around the Gulf of Antalya or alternatively with squadrons of the navy having picked crews, since the two elements of the word, πᾶς "all", and φῦλον "tribe or group", might refer to a crew selected from all tribes or localities, or all crews, as Leo VI implied.[80] The province of *Pamphylia* was so-called in ancient Greek because it was reputed to contain tribes or peoples from all areas. In the inventory for the Cretan expedition of

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[75] Appendix Four [a], §13: "... , ὁ δὲ κατεπάνω τῶν Μαρδαϊτῶν εὐτρεπίσῃ γαλέας, ..." [= Haldon, "Theory and practice", p. 209: Cf. Constantine VII, *De cerimoniis*, II.44 (vol. 1, p. 657)].

[76] Appendix Four [b], §I.12: "γαλέαι τῆς Ἀτταλίας ιε΄. ἐξ αὐτῶν κατελείφθη εἰς φύλαξιν τοῦ θέματος γαλέαι ς΄." [= Haldon, "Theory and practice", pp. 219-21; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 665)].

[77] See Makrypoulias, "Navy", pp. 160-61.

[78] The text was published by Lambros in "Τρία κείμενα συμβάλλοντα", pp. 171, 173. On the dating to the age of Constantine VII and the attribution of the text to a work on meteorology possibly compiled for him, see Dolley, "Meteorology".

In the *Praecepta imperatori Romano bellum cogitanti ... observanda*, it was recommended that an emperor take with him on campaign a treatise "which includes information on fair weather and storms and squalls and rain and lightning and thunder and the direction of winds" (our trans.). See Constantine VII, *Three treatises*, Text C (p. 106). It is possible that the Lambros fragments were later incorporated in this treatise, which is now apparently lost if it was ever in fact actually compiled.

[79] See *Vita S. Theodori*, p. 287.

[80] Appendix Two [a], §42. Cf. Ahrweiler, *Byzance et la mer*, pp. 415-17; Alexandres, *Ἡ θαλασσία δύναμις*, p. 74.

911-12 *pamphyloi* were said to have had either 160 or 130 men, it not being specified whether these were oarsmen or marines.[81] The number of men required rules out the possibility that they were sailing ships. Such numbers can have been needed only for oared ships. However, on the one hand, since no specific mention was made of marines for them, in this fleet they were probably used as transports rather than in battle. On the other hand, Leo VI suggested that *pamphylos* became applied to picked crews selected for the personal dromons of *stratēgoi*; that is, if he was not just engaging in a piece of etymological word play. Even if he was, the idea of picked crews for fleet commanders' own galleys was reiterated by Nikēphoros Ouranos and the Arabic translator of Leo VI used by the fourteenth-century Mamlūk Egyptian official Muḥammad ibn Mankalī in his *Al-ahkām al-mulūkyya wa 'l dawābit al-nāmusiyya*.[82] Even if originally transports, *pamphyloi* must soon have assumed more belligerent roles. Their crews, possibly the descendants of the famous *Mardaites* settled in *Pamphylia* by Justinian II, apparently acquired a great reputation.[83]

By the Macedonian age the term *dromōn* had lost its specific reference to a monoreme. It had become a generic for any war galley which could take its place in the line of battle. The tenth-century treatises are very clear that by then the standard Byzantine war galley was a bireme; although, some small monoreme, and just possibly some large trireme galleys, were also used. The term *dromōn* could be applied to all classes of galleys.

(c) *Hull*

According to the Anonymous, dromons had a δρύοχον (dryochon), a keel (τρόπις [*tropis*]), τροπίδια (*tropidia*), σπεῖρα (*speira*), and τροποί (*tropoi*).[84] However, he was merely following Pollux here and that he

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[81] Appendix Four [a], §2: "πάμφυλοι μ΄· ἐξ ὧν οἱ μὲν κ΄ πάμφυλοι ἀνὰ ἀνδρῶν ρξ΄, οἱ δὲ ἕτεροι κ΄ ἀνὰ ἀνδρῶν ρλ΄, ..." [= Haldon, "Theory and practice", p. 203; Constantine VII, *De cerimoniis*, II.44 (vol. 1, p. 652)].

Note that Treadgold assumes that these crews were all oarsmen. However, the men of the *pamphyloi* are referred to simply as ἄνδρες (*andres*), men, as opposed to the ἄνδρες κωπηλάται (*andres kōpēlatai*), oarsmen, and πολεμισταί (*polemistai*), marines or "soldiers", of the dromons. See Treadgold, "Army", p. 110.

[82] See Appendix Two [a], §42: "... καὶ καταστῆσαι τὸν τῆς σῆς ἐνδοξότητος τοιοῦτον δρόμωνα, τὸν δὴ λεγόμενον πάμφυλον.". Cf. Appendix Five, §40; Appendix Eight [b], p. 122.

[83] See also Haldon, "Theory and practice", p. 248, n. 45.

[84] Appendix Three, §2: "Μέρη νεώς. §2.1: Δρύοχον, τρόπις, τροπίδια, σπεῖρα, τροποί· ...". Cf. Pollux, *Onomasticon* (Bethe), I.85 (vol. 1, p. 27): " [μέρη δὲ νεὼς] δρύοχον, τρόπις, [τρόπιδες], τροπίδια, στεῖρα [τροποί].".

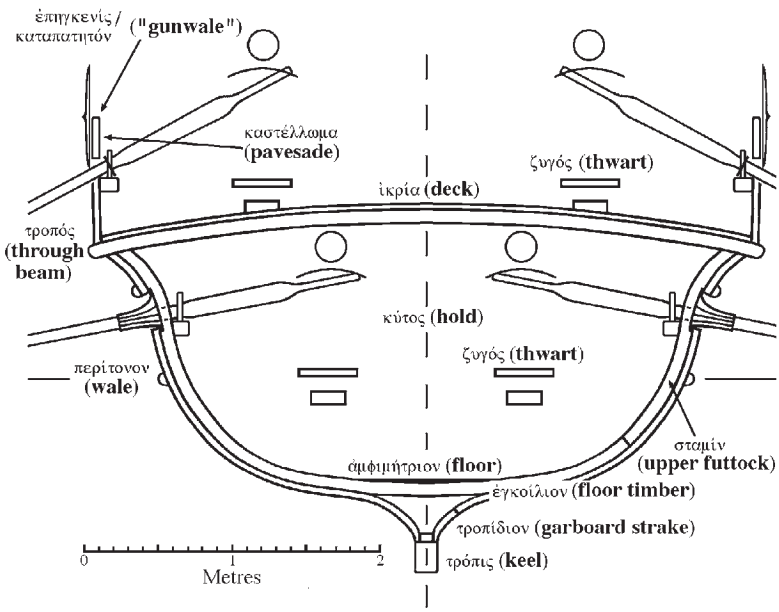


Figure 19
Midships section of a dromon of the era of the Macedonian emperors.[85]
© John H. Pryor

really understood the meaning of all of these terms and that all of them were actually structural elements of dromons of his age is extremely doubtful.

In classical Greek a *dryochon* or *dryochos* was one of the stocks on which a hull was built. But Pollux did not explain the term and the Anonymous defined its meaning in terms which suggested a stringer. He equated it to a κοράκιον (*korakion*), whatever he meant by that, and defined it as: "every long continuous timber which fastens together many other short timbers."[86] Such misunderstanding of

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[85] Dimensions based upon those calculated in Chapter Four (j): Oarage system and dimensions.

[86] Appendix Three, §2.1: "Καὶ δρύοχον μὲν σὺν πολλοῖς ἄλλοις νοείσθω τε καὶ λεγέσθω τὸ καλούμενον παρὰ πᾶσι κοράκιον, ὃ συνέχει πάντα καὶ συγκρατεῖ καὶ ᾧ προσδέδενται καὶ οἱονεὶ ἐπερείδονται τὰ λοιπά. Κοινῶς μὲν γὰρ ὠνόμασται δρύοχον ἅπαν ξύλον ἐπίμηκες συνέχον καὶ οἱονεὶ προσηλοῦν ἕτερα βραχέα τε καὶ πολλά.".

What exactly the Anonymous meant by his equation of *dryochos*/*dryochon* with whatever he meant by *korakion* is unclear. Both sentences here suggest the equation of *dryochos*/*dryochon* with a "stringer".

The Greek κόραξ (*korax*) and its diminutive κοράκιον (*korakion*) were most

dryochoi was common. The famous line of the *Odyssey*, XIX.574 which referred to the setting up of axes in Odysseus' hall in a line like the *dryochoi* of a ship under construction ("... ἵστασχ᾽ ἐξείης, δρυόχους ὥς, δώδεκα πάντας") was frequently misunderstood because the meaning of *dryochoi* had been forgotten.[87] Prokopios, who wrote

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normally used in a maritime context for some sort of grappling iron or hook for seizing on to an enemy ship. The word, in its connotation of "raven", had been used by the Romans in the Latin form *corvus* for the famous boarding bridge devised by them to grapple Carthaginian ships during the First Punic War (264-41 B.C.E.). However, there is no evidence for the use of the *corvus* as such at any time after the Punic wars. Thereafter, the word seems to have been understood as meaning something by which one could grapple on to, or join, any two ships together, presumably a grappling iron for the most part. See Casson, *Ships and seamanship*, pp. 121-2; Morrison, *Greek and Roman oared warships*, p. 45. The Anonymous appears to have understood the word in the sense of something that joined other things together, with no more specificity than that.

Boarding bridges continued to be used in naval warfare and were known in Greek as ἐπιβάθραι, but these were not the same thing as the *corvus* or *korax*. See Arrian, *Anabasis*, IV.27.1 (vol. 1, p. 430); Diodōrus Siculus, *Bibliothēkē historikē*, XII.61.3 (vol. 5, p. 56).

[87] See the scholia on the *Odyssey*. Dindorf, *Scholia Graeca*, T.574 (vol. 2, p. 686): "...] αὕτως ἵστησι τοὺς πελέκεις ὡς δρυόχους. δρύοχοι δὲ ξύλα εἰσὶν ὀρθὰ ὑποκάτω τῆς τρόπιδος, ἐφ᾽ ὧν ἐπερείδεται, ἵνα μὴ αὐτὴν ἡ ψάμμος ἐσθίῃ. [correct] τινὲς δὲ δρυόχους φασὶ τὰ πρῶτα πηγνύμενα ξύλα εἰς ναυπηγίαν. [incorrect] τινὲς δὲ τοὺς πελέκεις τοὺς δρυΐνους στελεοὺς ἔχειν εἰωθότας. [incorrect] ... δρυόχους] κυρίως μὲν τοὺς πασσάλους, ἐφ᾽ ὧν τὴν τρόπιν ἱστᾶσι τῶν καινουργουμένων πλοίων. ἐξῆς δὲ μάλιστα οὗτοι τίθενται ἕνεκα τοῦ ἴσην γενέσθαι τὴν ναῦν· νῦν δὲ, ἐφ᾽ ὧν ἐτίθει τοὺς πελέκεας. [correct]".

See also the scholia on the *Argonautika* of Apollōnios of Rhodes, I.723-4 ("..., ὅτε πρῶτον δρυόχους ἐπεβάλλετο νηός Ἀργοῦς, ..."), which glossed δρυόχους as: "ἐν οἷς καταπήσσεται ἡ τρόπις ξύλοις, ταῦτα οὕτω καλοῦσιν. ... δρύοχοι οὖν τὰ ἐγκοίλια τῆς νεώς. [incorrect]". Wendel, *Scholia*, p. 60. The oldest surviving manuscript of Apollōnios of Rhodes with scholia dates to the early eleventh century.

However, the scholia on Aristophanes' *Thesmophoriazusae*, l. 52 in the tenth-century Ravenna manuscript did understand the word: "δρυόχους· κυρίως δρύοχοί εἰσιν οἱ ἐντιθέμενοι πάτταλοι ναυπηγουμένης νεώς.". See Rutherford, *Scholia Aristophanica*, vol. 2, p. 446.

Both Phōtios and the author of the *Souda* understood the correct meaning of the word in the way that the scholia on Aristophanes understood it because they had access to a similarly correct understanding as given by a scholion on Plato's *Timaeus*. See Phōtios, *Lexicon* (Theodoridis), Δ.767 (p. 432): "δρύοχοι· δρυόχους ἐν Τιμαίῳ (81b) καλεῖ τὰ στηρίγματα τῆς πηγνυμένης νεῶς."; *Souda*, Δ.1547 (vol. 2, p. 143): "Δρύοχοι: πάτταλοι, οἱ ἐντιθέμενοι ναυπηγουμένης νεώς. ... Δρυόχους Πλάτων ἐν Τιμαίῳ καλεῖ τὰ στηρίγματα τῆς πηγνυμένης νεώς.". Cf. Greene, *Scholia Platonica*, *Timaeus*, 81b (p. 289): "δρυόχων: τὰ στηρίγματα τῆς πηγνυμένης νεὸς δρυόχους φασίν.". Plato himself had used the word analogically and the scholion had explained its meaning for ship construction. See Plato, *Timaeus*, 81b (p. 216): "νέα μὲν οὖν ξύστασις τοῦ παντὸς ζώου, καινὰ τὰ τρίγωνα οἷον ἐκ δρυόχων ἔτι ἔχουσα τῶν γενῶν, ...".

By the sixth (or ninth) century, in the *Philoxenos* Latin-Greek glosses of Paris, Bibliothèque Nationale, MS. Lat. 7651, *dryochos* was understood only as something wooden standing up, probably as a tree trunk. See Goetz, *Glossarii Latini*, vol. 2, p. 188, l. 42: "Stipites στελεχηδρυοχοι κορμοι [sic]". See Note on citations of Greek and

that he had seen a ship which was claimed to have been Aeneas's ship in a ship shed or arsenal, νεώσοικος (*neōsoikos*), which had been built to house it on the bank of the Tiber, said that poets used the word *dryochoi* for what were clearly the ship's frames or ribs fitted to the keel.[88] He was probably referring to Homer whose usage of the word he did not understand. The Anonymous also classed the wales, περίτονα (*peritona*), in the same category as *dryochoi*.[89]

Why the nautical meaning of *dryochon*/*dryochos* had become forgotten is unknown. In our opinion it may have had something to do with the change from shell to skeletal construction. No matter how one goes about building a wooden ship, the keel always has to be the first timber laid down and it obviously has to be propped up off the ground in some way. But perhaps skeletal construction required methods of propping up the keel different to those required for shell construction? However, no evidence concerning this question is known to us, neither textual, nor pictorial, nor archaeological. We have consulted maritime archaeologists on this question but they have not been able to assist. The pitch applied to the outer surface of hulls hides any evidence for how the keels may have been braced when propped up and also the keels of wrecked ships are usually so worn from use that there is little chance of finding stock impressions.[90]

The keel (*tropis*) was straight forward; however, because *tropidia* were unexplained by Pollux, the Anonymous may have either guessed at his explanation of them as "what are attached to the keel", or

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Latin glossaries, p. lxix above.

[88] Prokopios, *History of the Wars*, VIII.xxii.12 (vol. 5, p. 280): "τά τε παχέα ξύμπαντα ξύλα ἐς τὴν τρόπιν ἐναρμοσθέντα (ἅπερ οἱ μὲν ποιηταὶ δρυόχους καλοῦσιν, ...".

This is the only known reference to Aeneas' ship. It is not mentioned in any other source. See Richardson, *New topographical dictionary*, p. 266. Prokopios may have been fed a line by his tour guide in Rome. Nevertheless, it is clear that he saw some sort of ship of a type with which he was not familiar. He said that it was 120 *podes*, 37.48 metres, long and that its strakes were single lengths of planking. He was clearly amazed by the combination of its length and also strakes of single planks. His description suggests an old ship of a type with which he was unfamiliar and which had been built somewhere, or at some time, where or when long straight lengths of timber had still been available, as they no longer were in his own time.

[89] See below p. 200.

[90] But note that large numbers of partly unexplained wooden pegs and treenails were found driven into the sides and bottom of the keel of the Kyrenia wreck of the fourth century B.C.E. The pegs on the bottom served to attach the false keel to the keel. However the purpose of the pegs on the sides, which were driven downwards obliquely and trimmed even with the sides, and the three treenails in the bottom, which were also cut off flush with the bottom surface of the keel, is unexplained. Possibly they had something to do with how the keel was set up on its stocks. See Steffy, "Kyrenia ship", p. 72.

possibly he was following the *Lexicon* of Phōtios.[91] Phōtios himself was referring to the version of the word τροπιδεῖον (*tropideion*) as found in Plato's *Laws*, where it was simply a diminutive of *tropis*.[92] However, Phōtios had extended the definition and had written that *tropidia* were timbers εὐθετοῦντα (*euthetounta*), "arranged", on the keel. From where he derived this is unknown. It was neither in Pollux nor in Hesychios nor in the scholia on Plato. The Anonymous said that they were προσηρμοσμένα (*prosērmosmena*), "fitted to", the keel. The replacement of *euthetounta* by *prosērmosmena* would not be remarkable in an author paraphrasing a previous work; however, since this is the only point at which we have been able to establish a possible indebtedness of the Anonymous to the *Lexicon* of Phōtios, his use of it can be regarded as no more than a possibilty.

If the Anonymous really did mean that *tropidia* was a technical term for some kind of timbers attached to the keel, that is to assume that he actually understood hull construction, the only parts of a hull that they conceivably could have been were either the keelson, the floor timbers, or the garboard strakes. These were the only components of wooden hulls actually joined to the keel and, of them, the most likely probability is the garboard strakes. No classical Greek word to which the meaning of "keelson" can be definitively assigned is known to us;[93] moreover, since *tropidia* is a plural noun, it is difficult to comprehend why it would have been used for the singular keelson. Floor timbers were definitely known in Greek antiquity as ἐγκοίλια (*enkoilia*) and the Anonymous knew that word; although, by following a scholion on the *Odyssey* and equating the word to that for a deck, ἰκρία (*ikria*), he showed that he did not understand its

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[91] Appendix Three, §2.2: "Τροπίδια δὲ τὰ προσηρμοσμένα τῇ τρόπει, ...". Cf. Phōtios, *Lexicon* (Naber), vol. 2, p. 229: "τροπίδια· τὰ εἰς τρόπιν νεὼς εὐθετοῦντα ξύλα· ... καὶ ὁ τόπος ἐφ᾽ οὗ τίθεται ἡ τρόπις· οὕτως Πλάτων.".

[92] See Plato, *Laws*, VII.803a (vol. 2, p. 52): "οἷον δή τις ναυπηγὸς τὴν τῆς ναυπηγίας ἀρχὴν καταβαλλόμενος τὰ τροπιδεῖα ὑπογράφεται ‹τὰ› τῶν πλοίων σχήματα, ...".

[93] Jal thought that Pollux had defined the keelson as a δευτέρα τρόπις (*deutera tropis*), a "second keel", also known as a φάλκης (*phalkēs*) which was fastened to the στεῖρα (*steira*). See Pollux, *Onomasticon* (Bethe), I.85 (vol. 1, p. 27): "τὸ δὲ τῇ στείρᾳ προσηλούμενον φάλκης, [ἐφ᾽ οὗ] ἡ δευτέρα τρόπις." and cf. I.86 (vol. 1, p. 28). However, Jal misunderstood Pollux's text because he thought that στεῖρα meant a keel. See Jal, *Glossaire nautique*, pp. 426, 1387, 1569.

Since *steira* actually meant the part of the stempost known as the cutwater, no matter what Pollux thought that he understood by *phalkēs*, it obviously had nothing to do in reality with any "second keel" in the sense of keelson. The word is a *hapax legomenon* and its real meaning cannot be deduced.

classical meaning.[94] Therefore, the garboard strakes are the most likely possibility. That being said, it is much more probable that the Anonymous either had no idea whatsoever what Pollux had meant by *tropidia* and simply guessed that they must have been some things somehow attached to the keel because of the form of the word as a diminutive of *tropis*, or else he was following Phōtios.

The Anonymous altered Pollux's στεῖρα (*steira*) to *speira*. *Steira* meaning "cutwater" was Homeric,[95] and its classical meaning was clearly explained by Pollux: "Between the προεμβολίς (*proembolis*) and the ἔμβολον (*embolon*) is called the *steira*".[96] The *embolon* had been, of course, the waterline ram. The *proembolis* was the secondary "ram" formed above on the stempost where the upper wales had come together and been capped.[97] Since the ram was at the water line, the *steira* above it had been the lower part of the stempost. Above the *proembolis* was the upper part of the stempost, known as the στόλος (*stolos*) or περικεφαλαία (*perikephalaia*), the head of the prow.[98] However, as a result of the disappearance of the ram in the intervening centuries, the Anonymous had no idea what Pollux had meant by all of this.[99] As a result he altered *steira* to *speira* and

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[94] See pp. 200-203 below.

[95] Homer, *Odyssey*, II.427-8 (vol. 1, p. 66): "..., ἀμφὶ δὲ κῦμα στείρῃ πορφύρεον μεγάλ᾽ ἴαχε νηὸς ἰούσης· ...". Cf. Homer, *Iliad*, I.481-2 (vol. 1, p. 38) (exactly the same clause).

[96] Pollux, *Onomasticon* (Bethe), I.85 (vol. 1, p. 27): "μέσον δὲ τῆς προεμβολίδος καὶ τοῦ ἐμβόλου ἡ στεῖρα καλουμένη.". Cf. Hesychios, *Lexicon* (Schmidt), Σ.1713 (vol. 4, p. 74): "στεῖρα· ... καὶ τὸ ἐξέχον τῆς πρώρας ξύλον κατὰ τὴν τρόπιν".

Hesychios appears to have acquired his information from the Homeric lexicon of Apollōnios Sophista (ca 100 C.E.). However, the Anonymous appears not to have known this work because he did not make use of it at times when he might well have done so. See Apollōnios Sophista, *Lexicon*, p. 144, l. 20: "στεῖρα τὸ ἐξέχον τῆς πρώρας ξύλον, διὰ τὸ στερεὸν εἶναι καὶ ἄρρηκτον.".

[97] Casson, *Ships and seamanship*, p. 85. Cf. Figures 1 and 2.

[98] Pollux, *Onomasticon* (Bethe), I.86 (vol. 1, pp. 27-8): "τὸ δὲ μεταξὺ τοῦ στόλου καὶ τῆς προεμβολίδος ... · [ὁ] στόλος δ᾽ ἐστὶν ὑπὲρ τὴν στεῖραν, ὃς καὶ περικεφαλαία καλεῖται.". There is a lacuna in the manuscripts after προεμβολίδος.

The head of the prow was also known as the ἀκροστόλιον (*akrostolion*). See Athēnaios of Naukratis (fl. ca 200 C.E.), quoting Kallixeinos of Rhodes [fl. ca 155 B.C.E.], *Deipnosophistae* (Gulick), 5.203.f (vol. 2, p. 420) [ἀκροστόλιον is incorrectly translated by Gulick as "gunwale"] and the *Scholia* on the *Argonautika* of Apollōnios of Rhodes, I.1089 (pp. 96-7). It is significant that the major manuscript of Athēnaios' *Deipnosophistēs* in the Marciana Library is again a tenth-century manuscript. See Athēnaios, *Deipnosophistae* (Kaibel), vol. 1, p. viii.

[99] The well-read poet, historian, and lawyer Agathias (ca. 532-80), who was also writing well after the replacement of the Roman *liburna* by the Byzantine dromon, apparently did still understand how the prow of a *liburna* had been made up. Writing of the construction of reed boats by the Huns at the siege of *Chersōn*, he said that in order to make them more seaworthy they curved the prows upwards in the likeness of *akrostolia* and *proembola*. See Agathias, *Historiae*, V.21 (p. 192): "ὡς ἂν δὲ αὐτοῖς

explained the word in terms of stones at the foot of pillars, of sails, and of clothing and shrouds, explanations which he almost certainly derived from the *Lexicon* of Hesychios.[100] All that he understood of *proembolis* was that it had had something to do with the bow. However, he made it an extension of the keel rather than of the upper wales, contrasting it to something at the stern called the ποδόστημα (*podostēma*), by which he almost certainly meant the sternpost.[101]

The *tropoi* were explained by the Anonymous as oar-grommets, τροπωτῆρες (*tropōtēres*); that is the rings or loops of twisted leather or cordage that held oars to their tholes.[102] In one way, he was quite correct in this because *tropoi* and *tropōtēres* were in fact synonyms in classical Greek. He probably derived his knowledge of this synonymity from a scholion on a line of Homer in the manuscript of the *Odyssey* that he had,[103] but it led him into yet another instance of misunderstanding Pollux because *tropos* had a second, alternative meaning in classical Greek: a cross beam or through beam. Athēnaios of Naukratis, quoting an earlier account by a certain Moschiōn, perhaps a contemporary of Hierō II of Syracuse, referred to the cross beams needed to brace the hull of any ship, which projected through the hull of Hierō's great ship, as *tropoi*.[104] Pollux cited *tropoi* in the

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πλοϊμώτεραι εἶεν, οἱ δὲ τὰ ἐμπρόσθια τούτων ἠρέμα πρὸς τὸ μετέωρον ἐς πρώρας τύπον περιαγαγόντες καὶ ὑποκάμψαντες καὶ ὥσπερ ἀκροστόλια καὶ προέμβολα ἐκμιμησάμενοι, ...".

However it is clear that knowledge of this kind eventually faded from memory. *Steira* became a term with which philologists had difficulty. For example, the scholia on the *Odyssey* were clearly struggling to make some sense of the term and apparently knew no more than that it had something to do with the keel. See Dindorf, *Scholia Graeca*, B.428 (vol. 1, p. 117): "στείρῃ] τῇ τρόπιδι, διὰ τὸ στερεὰν εἶναι, καὶ διὰ τὸ στερεοῦσθαι ἐν αὐτῇ τὴν ναῦν.".

[100] Appendix Three, §2.3. Cf. Hesychios, *Lexicon* (Schmidt) Σ.1445 (vol. 4, p. 64): "Σπεῖρα· οἱ πρὸς τῇ βάσει λίθοι. καὶ τῆς νεὼς σκεῦός τι. καὶ σύστρεμμα ἐκ σχοινίου, ἢ ῥάκη. καὶ ἱμάτια. καὶ ἱστία. ἄλλοι εἶδος ἱματίου εὐμέγεθες γυναικείου.".

[101] Appendix Three, §2.5: "Ταύτης δὲ τὸ μὲν ἓν μέρος ἐξ οὗ ἡ πρῴρα διανίσταται προεμβολὶς καλεῖται, τὸ δὲ πρὸς τὴν πρύμναν ποδόστημα, ...".

Podostēma is an otherwise unknown word. However, it almost certainly meant the same as ποδοστάμα (*podostama*) used from the twelfth century for a sternpost. See Jal, *Glossaire nautique*, p. 1190; Koukoulès, "Ναυτικὸς βίος", p. 346; Kahane and Tietze, *Lingua Franca*, §834 (p. 560).

[102] Appendix Three, §2.4: "Τροποὶ δὲ οἱ τροπωτῆρες· καὶ Ὅμηρος· Ἠρτύναντο δὲ κώπας τροποῖς ἐν δερματίνοισιν.". Note that this quotation of Homer, *Odyssey*, IV.782 does not correspond to the modern received editions. The Homeric "ἐρετμά" for the oars has been replaced by "κώπας".

[103] See Dindorf, *Scholia Graeca*, Δ.782 (vol. 1, p. 234): "τροποῖς] τοῖς λεγομένοις τροπωτῆρσι.".

[104] Athēnaios of Naukratis, *Deipnosophistae* (Gulick), 5.208 (vol. 2, p. 440): "ὑπῆρχον δὲ καὶ τῶν τοίχων ἑκατέρωθεν τροποὶ προεωσμένοι, διάστημα σύμμετρον ἔχοντες· ...". On the interpretation of Athēnaios/Moschiōn's description of Hierō's

context of a series of structural members of the ship and explained them as: "The *tropoi* lying alongside on each side around the *steira* [are] the first and the second, also the *thalamios*".[105] What exactly he meant by this is unclear, but it certainly had nothing to do with oar-grommets. He was probably groping towards an explanation of through beams.

The hull was constructed, according to the Anonymous, of σταμίδες (*stamides*), a mistake for σταμῖνες (*stamines*), or στημονάρια (*stēmonaria*), ξύλα διάτονα (*xyla diatona*), and *peritona*. However, once again, he derived these terms from lexicographical sources and assembled them in a way which suggests that he had no real idea at all about how the hull of a dromon was actually constructed.

The upper futtocks of frames were called *stamines*. This was a common word in classical Greek and it passed into medieval Latin in the West as *stamenaria*.[106] However, the Anonymous had no idea what *stamines* were, said that there were only three of them, made the word into *stamides*, and seems to have understood them as deck pillars supporting the deck.[107] Again, this was probably a misunderstanding of Pollux, who had written that the timbers on which the σανίδες (*sanides*), the planks of the deck, were laid were the κανόνια (*kanonia*), the deck beams, and *stamines*, off which the *kanonia* ran.[108]

Xyla diatona were said by the Anonymous to have been cross beams.[109] This term was not a technical one and was not derived from

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great ship see Casson, *Ships and seamanship*, pp. 191-9.

[105] Pollux, *Onomasticon* (Bethe), I.88 (vol. 1, p. 28): "οἱ δὲ περὶ τὴν στεῖραν ἑκατέρωθεν παρατεινόμενοι τροποὶ πρῶτος καὶ δεύτερος, ὁ καὶ θαλάμιος.".

[106] See Pryor, "Galleys of Charles I of Anjou", p. 71; Jal, *Glossaire nautique*, p. 1383.

[107] Appendix Three, §2.10: "Καὶ τρεῖς δὲ σταμῖνες [σταμίδες: MS. A] ἤγουν στημονάρια ἵστανται καὶ αὐτὰ κατὰ στοῖχον οἷς ἐπερείδεται τὸ κατάστρωμα.".

Both the scholia on the *Odyssey* and also Hesychios had explanations of *stamines*. See Dindorf, *Scholia Graeca*, E.252 (vol. 1, p. 267): "σταμίνεσσι δὲ τοῖς ἐπιμήκεσι ξύλοις καὶ στήμονος τάξιν ἐπέχουσιν, ἃ παρατίθεται τοῖς ἰκρίοις ἐξ ἑκατέρων τῶν μερῶν πρὸς τὸ ἑστάναι· ..."; Hesychios, *Lexicon*, (Schmidt), Σ.1633 (vol. 4, p. 71): "σταμίνες· παραστάται, καὶ τὰ ἐπὶ τῆς σχεδίας ὀρθὰ ξύλα, πρὸς ἃ αἱ σανίδες προσηλοῦνται, ἢ πάσσαλοι. παρὰ τὸ ἑστάναι.". It seems as though the author of the scholion, followed by Hesychios and later the Anonymous, were drawing on a common pool of knowledge but neither the Anonymous nor Hesychios appear to have used the scholion directly here, nor the Anonymous, Hesychios.

[108] Pollux, *Onomasticon* (Bethe), I.92 (vol. 1, p. 30): "τὰ δὲ ξύλα ἐφ' ὧν αἱ σανίδες ἐπίκεινται, κανόνια καὶ σταμίνες.". Cf. the *scholia* on the *Argonautika* of Apollōnios of Rhodes, I.723-4: "κανόνας δὲ τὰς στάθμας, οἷς τὰ ξύλα καὶ τοὺς τοίχους οἱ τέκτονες ἐξισάζουσι". Wendel, *Scholia*, p. 60.

[109] Appendix Three, §2.11: "Εἰσὶ δὲ καί τινα ξύλα διάτονα διήκοντα ἀπὸ τοῦ ἑνὸς τοίχου τῆς νηὸς ἕως τοῦ ἑτέρου, ἐφ' ὧν ἐπίκειται· ...".

Pollux, Hesychios, or Phōtios. It appears to have been a generalized explanation, derived from classical Greek διάτονος (*diatonos*), referring to any bracing from side to side or front to back. In classical Greek the technical term for a cross beam of a ship was either *tropos* or ζυγόν (*zygon*).[110]

According to the Anonymous, *peritona* were "[timbers] which enclose the sides on the outside". But, again, this seems to have been a misreading of Pollux, who said that a περιτόναιον (*peritonaion*) could be something enclosing the upper part of the hull on either side.[111] As seen above, the Anonymous also said that a *peritonon* could be classified, together with a *dryochon*, as any "long continuous timber which fastens together many other short timbers". Elsewhere, he also said that *peritona* were some things on the hull between the lower and upper bank of oars.[112] This all seems to read as though both Pollux and the Anonymous used *peritonaion* and *peritonon* for a wale on the outside of the hull, the classical Greek word for which was ζωστήρ (*zōstēr*). Neither Pollux, Hesychios, nor Phōtios cited *zōstēr* in the context of a ship. Nor was the word used in any of the *Naumachika*. It appears that *peritonaion*/*peritonon* replaced *zōstēr* as the technical term in the vernacular for a wale some time between middle antiquity and the tenth century, although *zōstēr* survived in literary language.[113]

In one of the most inexplicable passages of his treatise, the Anonymous wrote that: "And somewhere there, when sailing ἰδιωτικῶς (*idiōtikōs*), there is an opening, which is called a *eudias* (bung hole), for the removal of water. Indeed as [the ship] sails, the shores (*hermata*), that is, what are known as seats (*hedrai*), close this; and [there is] the deck (*ikria*), which is called the floor timbers (*enkoilia*)".[114]

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[110] See Casson, *Ships and seamanship*, pp. 14, 193.

[111] Appendix Three, §2.11: "...· τὰ δὲ τοὺς τοίχους ἔξωθεν συνέχοντα περίτονα καλοῦνται.". Cf. Pollux, *Onomasticon* (Bethe), I.92 (vol. 1, p. 30): "τὸ δὲ συνέχον ἄνωθεν ἑκατέρους τοὺς τοίχους περιτόναιον καλεῖται.".

Note, however, that Pollux said that *peritonaia* could also be timbers projecting out around the poop. Pollux, *Onomasticon* (Bethe), I.89 (vol. 1, p. 29): "τὰ δὲ περὶ τὴν πρύμναν προύχοντα ξύλα περιτόναια καλεῖται.".

[112] Appendix Three, §2.1: "Κοινῶς μὲν γὰρ ὠνόμασται δρύοχον ἅπαν ξύλον ἐπίμηκες συνέχον καὶ οἱονεὶ προσηλοῦν ἕτερα βραχέα τε καὶ πολλά. Νοείτω δ᾽ ἂν οὕτω καὶ τὸ περίτονον."; §2.13: "Ταύτης δὲ ἄνωθεν τῆς εἰρεσίας περίτονον, εἶτα σανὶς ἑτέρα, ἡ λεγομένη πέλα, εἶτα περίτονον, ...".

[113] On *zōstēr* as the classical word for a wale, see Casson, *Ships and seamanship*, p. 86, n. 46 and p. 223. On its survival in literary language, see below pp. 410-11. On *peritona* as wales see also Koukoules, "Ναυτικὸς βίος", p. 347; Hocker, "Galleys and fleets", p. 96.

[114] Appendix Three, §2.8: "Πλέουσα δὲ ἰδιωτικῶς ἐκεῖ δήπου καὶ θυρίς ἐστιν εἰς

Reading the various terms of this passage with what should have been their meaning according to classical Greek, it makes only minimal sense. It appears to have referred either to scuppers, through which water shipped inboard on deck would drain off, or to bung holes, which ships which could be beached would normally have in their hulls in order to drain bilge water easily and to facilitate cleaning of the insides of the hulls.[115] In the form εὐδίαιος (*eudiaios*), *eudias* was an obscure word whose first known use was by Plutarch in an analogy to the urethra and bowel, thus almost certainly referring to a bung hole rather than a scupper.[116] Pollux referred to it as: "the hole (*thyris*) which can be opened to let out water" and Hesychios virtually repeated him: "... from the holes (*trēmata*) made in ships for rain.".[117] In both these cases, it could refer to either a scupper or a bung hole. Since the word χείμαρος (*cheimaros*) was used by Hesiod for a bung,[118] one might have suspected that *eudiaios* referred to a scupper rather than a bung hole. However, both Hesychios and also the author of the *Souda* confined the meaning to a bung hole by equating the word to *cheimarrous* and referring to emptying the bilges, ἀντλία (*antlia*): "*Eudiaios*: the *cheimarrous*, the hole of the ship, through which the bilges empty".[119] It appears most likely that by the tenth century *cheimar(r)o(u)s* and *eudia(io)s* were synonyms for a bunghole and bung.

The wording of the Anonymous was so close to that of Pollux, that

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ἐκροὴν τοῦ ὕδατος, ἥτις εὐδίας [εὐδιὰς: MS. A] καλεῖται. Ταύτην δὲ δηλονότι τὴν πλέουσαν συνέχουσι τὰ ἔρματα, ἤτοι αἱ λεγόμεναι ἔδραι· καὶ τὰ ἰκρία, ἃ ἐγκοίλια καλοῦνται.".

[115] See Jal, *Glossaire nautique*, pp. 671, 1024, 1028. Jal gave the meaning of bung and bung hole to *eudiaios* without providing any references. According to him, the Greek term in his own day was μποῦκα (*mpouka*).

The reconstructed Athenian *triērēs Olympias* was provided with a bung hole so that the bilges could be drained and washed out when she was hauled ashore, just as Mediterranean fishing boats still are today. Communication from John Coates. All boats which are built to be able to be beached have bung holes.

[116] Plutarch, *Table-Talk*, VII.1 (699.F), in Plutarch, *Moralia*, vol. 9, p. 18: "..., οὐθὲν ἰδίου πόρου δεῖται τὸ περίττωμα τῆς ὑγρᾶς τροφῆς, ἀλλ᾽ εἷς ἀρκεῖ καὶ κοινὸς ὥσπερ εὐδιαῖος ἀμφοτέροις εἰς ταὐτὸ διὰ ταὐτοῦ συνεισκομιζομένοις· ...".

[117] See Pollux, *Onomasticon* (Bethe), I.92 (vol. 1, p. 31): "ἡ δ᾽ ἀνοιγομένη θυρὶς εἰς ἐκροὴν τοῦ ὕδατος εὐδίαιος καλεῖται."; Hesychios, *Lexicon*, ed. Schmidt, E.72 (vol. 2, p. 219): "εὐδίαιον· ... ἀπὸ τῶν ἐν τοῖς πλοίοις γίνομένων τρημάτων διὰ τοὺς ὄμβρους. οἱ δὲ τὸν πρωκτόν, ἢ τὸν χείμαρ[ρ]ον, ευφημιζόμενοι". Note that the Anonymous distorted Pollux's *eudiaios* to *eudias*, which literally meant "fair weather".

[118] Hesiod, *Works and Days*, 626 in *Hesiod*, p. 48: "..., χείμαρον ἐξερύσας, ἵνα μὴ πύθῃ Διὸς ὄμβρος.".

[119] *Souda*, E.3415 (vol. 2, p. 444): "Εὐδίαιος: χειμάρρους, καὶ τρῆμα τῆς νεώς, δι᾽ οὗ ἡ ἀντλία ἐκρεῖ.".

it appears certain that he emulated the passage from him, rather than from Hesychios or the *Souda*. But, his point about sailing *idiōtikōs*, which should mean sailing either "on private business" or "without due care", is entirely obscure. It is possible that he intended some contrast between either public and private use of ships or professional and unprofessional use of them. However, why either of such uses should have anything to do with bung holes and bungs, or scuppers also for that matter, escapes us. Alternatively, was he making a feeble joke and referring to some "idiot" forgetting to put the bung in? Anyone who has sailed small boats will know that it would not have been the first time. It is curious that he added this to a text taken entirely from Pollux and then added without any authority from Pollux, or any other text known to us, that the *eudias* was closed when sailing. This eliminates any possible meaning of the word as used by the Anonymous being "scupper", because they, of course, had to be left open when at sea in order to fulfil their function. A bung hole on the other hand obviously had to be closed when at sea.

The Anonymous said that the things that closed the bung hole were the *hermata*. He then gave a parenthetical explanation of *hermata* as *hedrai*. Not surprisingly, these terms are not found with this sense in Pollux, Hesychios, Phōtios, or the *Souda*. In classical Greek, *hermata* could mean either the shores or legs used to keep a ship upright when beached or the ballast which kept it upright when afloat. *Hedrai* were seats of any kind. What the Anonymous meant by his use of these terms is totally obscure; however, he seems to have been referring to the bungs which were used to plug the bung holes when at sea.

Then the Anonymous equated *ikria* and *enkoilia*. In classical Greek *ikria* meant a deck and *enkoilia* were the floor timbers of the frames of a ship, the lowest sections of the frames which joined the keel.[120] Leo VI recommended that dromons should include timbers, ξύλα (*xyla*), or *enkoilia*, amongst the spare parts and equipment that they carried.[121] However, *enkoilia* was not a common term in classical Greek and its meaning may have been poorly understood in general.

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[120] Casson, *Ships and seamanship*, 221. Cf. *Souda*, E.1462 (vol. 2, p. 294): "Ἐντερόνεια· τὰ ἐκοίλια, τὰ ἀπὸ τῆς τρόπιδος ἀνερχόμενα ξύλα, ἐντερόνεια καλεῖται· ..."; Athēnaios of Naukratis (quoting Moschiōn), *Deipnosophistae* (Gulick), 5.206.f (vol. 2, p. 435) [the translation of ἐγκοίλια and σταμῖνες is incorrect].

[121] Appendix Two [a], §5: "Ἐχέτω δὲ καὶ ἐκ περισσοῦ ξύλα τινὰ ἐγκοίλια καὶ σανίδας καὶ ...". Significantly, Nikēphoros Ouranos deleted Leo VI's parenthesis of *xyla* with *enkoilia* and simply recommended taking spare *xyla*. Assuming that he knew what *enkoilia* meant, he would have known that if the floor timbers of a dromon needed to be replaced, it was unlikely to be still afloat. Cf. Appendix Five, §4.

The Anonymous's erroneous identification of them with *ikria* was almost certainly derived from a scholion in the manuscript of the *Odyssey* to which he had access.[122]

(d) *Prow*

The prow, πρῴρα (*prōra*) housed a dromon's main offensive weapons, a flame thrower, σίφων (*siphōn*), for Greek Fire, above which, according to Leo VI, was a fortified forecastle, ψευδοπάτιον (*pseudopation*), from which marines could fight,[123] and a spur, which, as has been seen, was suspended by a chain or coupling from the stempost. In late antiquity and the Middle Ages spurs were not built as integral parts of the hull, as they were in the Renaissance. Contracts for the construction of galleys for Charles I of Anjou, King of Sicily, specified neither the provision of spurs nor their dimensions, indicating that the contractors did not have to build them into the galleys. Western evidence from the twelfth and thirteenth centuries suggests that they were long wooden spars, perhaps usually of oak, and perhaps iron-clad in some cases, which were attached to the stempost after construction of the hull, and that they could be bought and sold separately.[124]

Although there is no Byzantine evidence for it known to us, if the spurs of dromons were also iron-clad, it would be clear evidence that they had a totally different construction to Greco-Roman rams, which had been sheathed in bronze.[125] In antiquity, and until the very late

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[122] Dindorf, *Scholia Graeca*, E.163 (vol. 1, p. 259): "ἴκρια] τὰ ὀρθὰ ξύλα, ἐφ᾽ ὧν τὰ τῆς νεὼς καταστρώματα προσπήγνυται, τὰ ἐγκοίλια λεγόμενα." ("*ikria*: the straight timbers, to which the half decks of the ship are fixed, the so-called *enkoilia*.").

[123] See Appendix Two [a], §6; Appendix Five, §5; Appendix Eight [a], p. 241, [b], p. 21.

[124] A contract for the sale of two spurs made of oak (*robor*), each 10.42 metres long and 0.25 metres wide survives from Genoa in 1267. See Ferretto, *Codice diplomatico*, p. 87. Laura Balletto kindly checked this reference for us in the Archivio di Stato di Genova, Cart. 82, fol. 75r. The text reads: "... sperones duos galee de robore bonos pulcros et sannos, longos god. [*gode*] XIIII pro quolibet et largos parmum [*palmum*] unum ...".

The continuation of the *Itinerarium peregrinorum*, the *Itinerarium peregrinorum et gesta Ricardi Regis* compiled by Richard de Templo, prior of the Augustinian priory of The Holy Trinity in London, from various sources, including Ambroise, between 1216 and 1222, suggested that the spurs (*rostra*, a classicizing affectation) were "ironed", *ferrata*. See *Itinerarium peregrinorum* (Stubbs), *Itinerarium regis Ricardi*, II.42 (p. 208): "Rex vero ... jussit ut unaquaeque galea navem suis perpungeret calcaribus, id est, rostris ferratis". See also p. 144 and n. 59 above.

[125] See Eisenberg, "Metallurgical analysis"; Morrison, et al., *Athenian trireme*, pp.

Middle Ages, the metallurgical technology to cast from iron such large and complex items as the rams of ancient galleys did not exist.[126] Spurs must have been more simple constructions which medieval metallurgical expertise was capable of creating in wrought iron.

Neither Leo VI nor Nikēphoros Ouranos mentioned the spur. However, the analysis by Van Doorninck of the manœuvres described in Leo's *Naumachika Leontos Basileōs*, §68 and paraphrased by Nikēphoros Ouranos in his *Peri thalassomachias*, §62, proves unequivocally that tenth-century dromons no longer had waterline rams. Van Doorninck has demonstrated beyond question that the interpretation of this paragraph by R. H. Dolley, who claimed that it pointed to the continuing existence of waterline rams into the tenth century was incorrect.[127] The two paragraphs read as follows:

> Leo VI, *Naumachika Leontos Basileōs*, §68: "It is also possible to capsize an entire enemy ship if — having coupled it side by side to the dromon, and the enemy rush to one side, as is their habit, to engage in hand-to-hand-fighting and expect their own ship to lay against the dromon — another dromon were then to run at the side of the enemy vessel towards the stern and strike it hard as they collide, and if the one [first] dromon should be able to free itself from the coupling and back off a little so that it is not laying against the enemy, and if the other [second] dromon were to weigh down with all vigour, it will capsize the enemy ship and her crew completely. You should organize the coupling so that it does not hold the [enemy] ship evenly but leaves at the enemy ship's stern some of the sides a little exposed, where the dromon will be able to attack and exert pressure to capsize the enemy ship".[128]

167, 221-3.

The *Souda* said that *emboloi* were made of copper, but its author was merely quoting Herodotos. See *Souda*, E.952 (vol. 2, p. 254): "Ἔμβολος· χάλκωμα πεπυρωμένον, περιτιθέμενον κατὰ πρώραν ταῖς ναυσίν.".

[126] In order to cast objects, for example the Athlit ram, from a metal, it is necessary to be able to heat the ore containing it beyond the melting point of the metal so that it can run as a liquid. The melting point of bronze is only around 1100° Celsius, whereas that of iron is 1537° Celsius. It was not until the late Middle Ages that furnaces employing strong blasts of air which could raise the temperature of the charge of ore and charcoal to make the iron "run" were invented. Until then, all iron was wrought iron. The charge was heated until a spongy, soft mass of iron and slag (metallic impurities and charcoal ash) was produced. This was then beaten with hammers to drive out the slag. But such iron was still too viscous to be cast.

[127] See Dolley, "Warships", p. 49; idem, "Naval tactics", p. 331; Van Doorninck, "Waterline ram". Van Doorninck himself modestly claims merely to have cast doubt on underwater rams being involved, rather than to have proved that they were not. See also Bonino, "Rams".

[128] Appendix Two [a], §68.

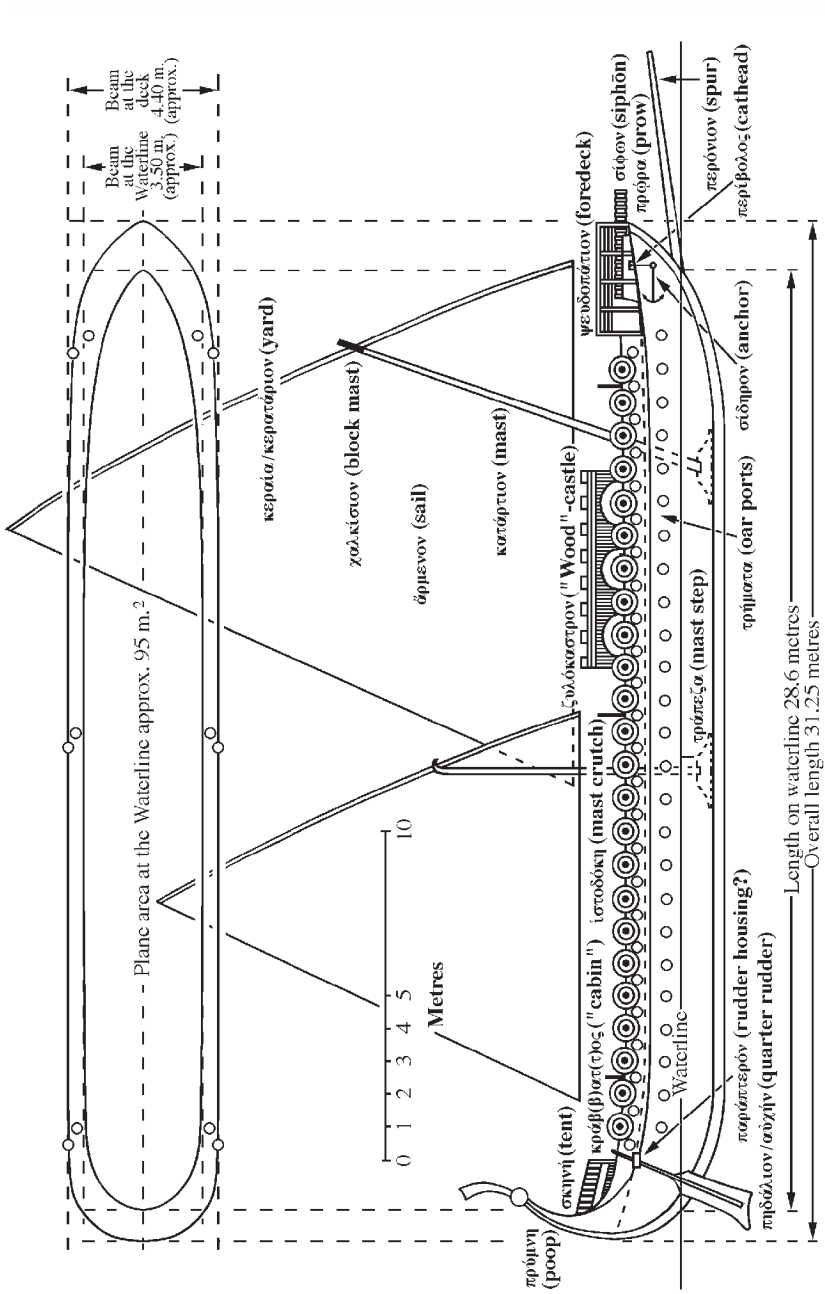


Figure 20
Longitudinal section of a dromon of the era of the Macedonian emperors.
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> Nikēphoros Ouranos, *Peri thalassomachias*, §62: "It is possible to overturn an entire enemy [ship] if you couple it to the dromon side by side, and the enemy rush to that part which is against the dromon, as is their custom, to engage in hand-to-hand fighting, hoping that their ship will lay against the dromon. Then another dromon should run at the enemy [ship]'s side at the stern and should strike and push the enemy [ship] severely. And the first dromon, the one coupled to the enemy [ship], should be able to free itself from the coupling and back off a little so that the enemy [ship] does not lay against it. The other dromon should weigh down as much as it can and if it does this, it should up end the enemy [ship] with the men in it. You should not couple the whole enemy [ship] but only a little, so that at the enemy's stern you leave the sides bare, where the dromon can strike in order to overturn the enemy [ship] with the enemy [crew]".[129]

Leo VI's text was syntactically very obtuse, although its intent was clear enough. Nikēphoros Ouranos paraphrased it in order to make the meaning clearer. Van Doorninck points out that the verb ἀνατρέπειν (*anatrepein*) used by Leo VI meant "to capsize" in the context of a ship. So also the noun σύγκρουσις (*synkrousis*) and the verb συγκρούειν (*synkrouein*) which meant "collision" and "to collide", were used in both texts instead of ἐμβολή (*embolē*) and ἐμβάλλειν (*emballein*) respectively. Finally, the crucial action was for the second dromon to "weigh down", βαρήσῃ (*barēsē*), the enemy ship by attacking at its stern. When the first dromon engaged the enemy ship side by side, the enemy crew would pack the side to fight. The enemy ship was only saved from listing because its hull was hard up against the first dromon. The second dromon could then run up and over it towards its stern with its spur and prow and, when the first dromon disengaged, the weight of the enemy crew and of the second dromon's prow would roll it over completely.

In fact, this stratagem reads very much like the fire-side musings of the emperor himself, and one may legitimately have reservations about its practicability in battle for various reasons. First, it is very probable that if the crew of any ship like a dromon or its Muslim counterpart, a ship as shallow in draft and narrow in beam as they were, unballasted and carrying as little as they did, all rushed to one side, they would probably capsize the ship without any help from the enemy, even if it was resting against the hull of the enemy ship.[130]

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[129] Appendix Five, §62.

[130] On *Olympias*, the movement of even a single man weighing around 80 kilogrammes to the side above deck was enough to cause the ship to list by around

Secondly, given the fine coordination and timing required of the two dromons, it is difficult to imagine how such a manœuvre could possibly have been carried out successfully in the heat of battle with galleys on all sides pitching and rolling with the seas. The text appears to us to have been written by someone imagining three galleys floating on a mill pond alone. Moreover, why could the crew of the enemy galley not prevent the crucial unlinking at the last moment by maintaining its own links? In any case, when the enemy crew saw the second dromon bearing down, why could they not restore the balance of their own ship by moving the crew to the other side? As we shall see, dromons had a beam amidships of only around 4.5 metres and it would have taken only a second or two for men to move from one side to the other.

The difficulty that anyone unfamiliar with the precise import of this paragraph might have with it is clearly illustrated by the garbled way in which it was interpreted in the Arabic paraphrase of the paragraph which was inserted by Muḥammad ibn Mankalī into his *Al-ahkām al-mulūkyya wa 'l dawābit al-Nāmusiyya*: "When a ship rams another ship, let it [the "ramming"] be at the side close to the stern, in order to cut loose the chains and hooks from the enemy's ships and thus disentangle your ships from those of the enemy, and they would perish".[131] It is possible to recognize here a pale reflection of Leo VI's stratagem which was incomprehensible to Ibn Mankalī or his source. Perhaps it always had been incomprehensible if Leo's stratagem was merely the product of arm-chair musings.

Although excessive importance should not be attached to it, it is interesting that the illustration of Byzantine dromons rolling over *Rhōs* ships in the Bosporos in 941 in the Madrid manuscript of the *Synopsis historiōn* of John Skylitzēs shows the Byzantines attacking at the stern quarters of the *Rhōs* ships. [See Figure 9] If there is any import to this beyond merely the way that the artist had to compose his picture, it would be that the stern quarters would be the first point of attack in any case, if the enemy allowed it, because that was where the quarter rudders were and the stern quarters were the least defensible parts of any galley. The entire objective of manœuvring, of

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0.3°. Thirty soldiers moving on the deck a mere 0.7 metres towards the sides would cause the ship to list by about 4°. See Morrison and Coates, *Trireme reconstructed*, p. 60; Morrison et al., *Athenian trireme*, pp. 160-1, 227.

[131] See Appendix Eight, Part B, pp. 124-5. Christides, "Ibn al-Manqalī", p. 95, says that this passage has no corresponding one in the *Naumachika*; however, we consider that it is a clear reflection of *Naumachika Leontos Basileōs*, §68.

the formation of battle lines, and of battle tactics in general was to keep enemy ships at the bow and to prevent them being able to attack at the stern.[132]

Whatever the case, it is clear that the emperor did not envisage attack with a waterline ram and other considerations also suggest that tenth-century dromons no longer had waterline rams. First, as Alexandres has also concluded on the basis of his reflections on the battle tactics found in the *Naumachika*, particularly the extensive use of missiles before engaging, exchanges with missiles would have been unnecessary if the primary objective had been to sink by ramming.[133] The same comment can be made about the use of Greek Fire. Secondly, the *Naumachika* also show clearly that the fundamental battle technique of Byzantine fleets was to grapple with enemy ships side to side and to link them together with iron rods so that the enemy could not escape and marines could then engage the enemy crews.[134] Again this would have been not only unnecessary but also actually dangerous if rams had been used to flood the hulls of the enemy ships.

If dromons did not have waterline rams, then they must have had spurs. But what were these called? None of the *Naumachika* contain a clue. However, in the inventory for the Cretan expedition of 949, amongst the equipment to be supplied by the Department of the *Vestiarion basilikon* for 20 dromons, was specified: "20 περόνια (*peronia*) for the καταπρόσωπα (*kataprosōpa*) together with their κατακόρακες (*katakorakes*)",[135] a phrase which has defied all efforts to comprehend it. *Peronion* (pl. *peronia*) was a diminutive of, or a derivative synonym for, περόνη (*peronē*), which could mean a pin, or brooch, or buckle. It had many other senses in mechanical engineering, and was derived from περονάω (*peronaō*), "pierce" or "transfix". Since only one of these *peronia* was to be supplied for each dromon, they must therefore have been major pieces of equipment and not pins, or bolts, or buckles. However, *peronion* in the sense of something that pierces has the right sense for a spur and

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[132] Note, however, that this illustration to the manuscript was drawn by one of the artists, Ce, who was drawing in a Western style not based upon the Byzantine originals. See Appendix Seven. That being said, the tactical requirement would have been equally as true of tenth-century Byzantine fleets as of twelfth-century Sicilian ones.

[133] See Alexandres, *Ἡ θαλασσία*, pp. 62-4.

[134] See below pp. 403-4.

[135] Appendix Four [b], §IV.12: "περόνια κ΄, καταπρόσωπα σὺν τῶν κατακοράκων αὐτῶν," [= Haldon, "Theory and practice", p. 227; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 672)]. See Appendix Four, n. 27 on the punctuation here and cf. Haldon, "Theory and practice", pp. 227 n. 83, 281-3.

speronus, one of the two medieval Latin words for the spur, was almost certainly derived from it.[136] Surely *peronia* were the dromons' spurs. The specification was that there should be 20 *peronia*, "for the *kataprosōpa*, together with their *katakorakes*". *Prosōpon* had the sense of the front, facade, or face of anything, in particular of a ship,[137] and one of the senses of *korax* was anything hooked for grappling or holding something. Reading the "κατά" prefixes simply in their strengthening sense, we suggest that the real meaning of this specification was: "Twenty spurs for the faces [of the bows], together with their couplings". *Peronion* was probably the Byzantine word for the spur and *katakorax* that for the coupling to the head of the stempost.[138]

Elsewhere in the inventories, amongst a list of additional equipment to be provided by the *Vestiarion basilikon*, it was said that 130 περόναι (*peronai*) (sing. *peronē*) were to be provided for the *chelandia* for the expedition.[139] The composition of the actual fleet was not detailed precisely, beyond the fact that there were 20 dromons. However, there were 150 *ousiai*, standard complements of dromons or *chelandia*, specified for the total navy and it appears that the specification of 130 *peronai* for the *chelandia* was merely an ambit figure for the ships of the remaining 130 *ousiai*, collectively called *chelandia*.[140] It appears that both *peronē* and its diminutive or derivative synonym *peronion* were used for spurs.

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[136] See Jal, *Glossaire nautique*, under "*Sperone*" (p. 1378). Jal provided no justification for this derivation. However, the identification of περόνη as a pin or buckle with various medieval Latin forms such as "*sporo*, *spero*, *speronus*" for pins, buckles, and the spurs of galleys is well established. See Niermeyer, *Lexicon*, p. 985 and the sources cited therein. In the transition to medieval Latin the Greek word took on an initial "s". Jal's derivation thus appears to have been well justified and in the Latin West the word became applied to the spur of a galley, just as we suggest it had been in Byzantium.

[137] This is made quite clear in manuscripts of Thucydides with scholia dated to the tenth or early eleventh centuries. See Hude, *Scholia*, II.90.4 (p. 156): "τὸ δὲ σημείου ἀντὶ τοῦ μιλίου. ἐπιστρέψαντες ... : τὸ μὲν ἐπιστρέψαντες εἶπεν, ὅτι ἦν ἄνω εἰπών, ἐπειδὴ κατ᾽ εὐθεῖαν ἔπλεον· νῦν δὲ οὐκέτι· τὸ δὲ μετωπηδὸν πάλιν τὸ κατ᾽ εὐθεῖαν πλέειν ἐστί· τὸ γὰρ μέτωπον τῆς νεὼς ἡ πρῴρα ἐστί. λέγει οὖν ὅτι τὰ μέτωπα, ἅ ἐστί τὰ πρόσωπα τῶν νεῶν, παρεῖχον τοῖς ἐναντίοις.".

[138] The Anonymous identified the *katakorax*, or *katakoraka* as he actually had it, with the *siphōn*; however, in our opinion, all that he knew was that a *katakorax* was something at the prow and he therefore identified it with the *siphōn*, which was the only salient feature of the prow that he knew about. See Appendix Three, §2.14: "Επὶ δὲ τῆς πρῴρας ὁ σίφων ὃς κατακόραξ [κατακόρακα: MS. A.] λέγεται ἐνεργῶν ὅταν ὦσιν αἱ νῆες ἀντίπρῳροι· ...".

[139] See Appendix Four [b], §VII.2: "περόνας τῶν χελανδίων ρλ΄, [= Haldon, "Theory and practice", p. 233; Constantine VII *De cerimoniis*, II.45 (vol. 1, p. 676)].

[140] On the fleet's composition see pp. 259-60, 372-3 and Appendix Four [b], §I.

We do not, however, deny that elsewhere in the inventories for the Cretan expeditions the terms *peronion* and *peronē* apparently had other meanings. The Department of the *Vestiarion basilikon* was also to provide 120 *peronai* among a list of tools and spikes and to attribute the sense of "belaying pins" to the word seems reasonable in this context. In addition, twelve large iron *peronia* for a "wooden castle", *xylokastron*, were also to be supplied to the *droungarios tōn ploimōn* for the expedition.[141] This specification was related to a single *xylokastron* and seems to have been unconnected to the ships. Perhaps it was a portable fortress for consolidating a beach-head. *Peronion* and *peronē* were terms which could be used in a variety of contexts.

According to the Anonymous, there were also περίβολοι (*periboloi*) on either side at the prow, from which the anchors were lowered.[142] *Periboloi* were also listed in the inventories for the Cretan expedition of 949 amongst equipment paid for by the Department of the *Eidikon* for the *karabia* of the *Rhōs*.[143] Our best suggestion for the meaning of *peribolos* is "cathead". On Greek *triēreis* the ἐπωτίδες (*epōtides*), the transverse "cheek timbers" of the outriggers at the bows, had apparently served for this purpose;[144] however, with their passing something like catheads must have become necessary on galleys. Other ships of any size must always have had something like catheads. Leo VI equated the classical ἄγκυρα (*ankyra*) for an anchor to what appears to have been the vernacular tenth-century term for it, an "iron", σίδηρον (*sidēron*), and said that it was the duty of one of the two oarsmen at the bow to cast, βάλλειν (*ballein*), the anchors into the sea. Nikēphoros Ouranos simply used the tenth-century term,

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[141] See Appendix Four [b], §§IV.21, VII.6: "περόνας κατὰ περίσσειαν σ΄."; "περόνια σιδηρᾶ μεγάλα τοῦ ξυλοκάστρου ιβ΄" [= Haldon, "Theory and practice", pp. 227, 233; Constantine VII, *De cerimoniis*, II.45 (vol. 1, pp. 672, 677)].

[142] Appendix Three, §2.14: "Τῆς δὲ πρῴρας πλησίον ἑκατέροις τοῖς μέρεσι περίβολοι ἐμπεπηγμένοι ἵστανται δι᾽ ὧν αἱ ἄγκυραι κρέμανται, αἱ τὴν ναῦν ἱστῶσι χαλώμεναι.". This may have been derived from Pollux, *Onomasticon* (Bethe), I.93 (vol. 1, p. 31): "ἄγκυραι, ἀμφίβολοι, ἀμφίστομοι, ἑτερόστομοι· ...".

[143] See Appendix Four [b], §VI.13 [= Haldon, "Theory and practice", p. 231; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 675)].

[144] See Euripides, *Ἰφιγένεια ἡ ἐν Ταύροις*, ll. 1350-1, in Euripides, *Fabulae*, vol. 2, p. 297: "..., οἱ δ᾽ ἐπωτίδων ἄγκυραν ἐξανῆπτον, ... ". See also Casson, *Ships and seamanship*, p. 86, n. 45. On *epōtides* see below pp. 218-24.

Jal believed that in classical Greek παρειά (*pareia*) meant a cathead but there seems to be no evidence for this. He also said that in his own day the vernacular Greek for a cathead was καπόνι and this does indeed appear to have been derived from the Italian *capone* (and variants) for a cat tackle. See Jal, *Glossaire nautique*, p. 318; Kahane and Tietze, *Lingua Franca*, §155 (p.146).

sidēron,[145] which had in fact been used for an anchor as early as the sixth/seventh centuries in the anonymous *Life* of St Nicholas of Sion.[146] The emperor and the *magistros* both referred to anchors in the plural, a clear reflection of the inefficient design and light weight of ancient and medieval anchors, whose flukes were small and did not grab well. Ancient and medieval ships needed many anchors. The small seventh-century Byzantine coastal trader excavated at Yassı Ada islet carried no less than eleven anchors and the eleventh-century ship excavated in Serçe Limani, opposite Rhodes, nine. The anchors of the Yassı Ada ship weighed between approximately 80 and 140 kilogrammes and those of the Serçe Limani ship between approximately 50 and 65 kilogrammes.[147] Byzantine dromons would certainly have needed multiple anchors and this is confirmed by the inventories for the 949 Cretan expedition.

These contain information about what appear to have been anchoring systems. In three lists, they give a number of items in sequence which correspond significantly to each other. These are all given in Appendix Four; however, it is convenient to cite the Greek in parallel here.

Table 6: Specifications for conjectured anchoring systems in the *De cerimoniis*

Appendix Four [b], IV	Appendix Four [b], V	Appendix Four [b], VII
13 σίδηρα βολιστικὰ ρκ΄,	17 σιδηροβολιστικὰ κατὰ περίσσειαν ν΄,	
14 σιδηροβόλια ρκ΄,	18 σιδηρόβολα ν΄,	23 σχοινία σιδηρόβολα ξ΄,
15 ἀναγοκατάγοντα σὺν τῶν ἱμανταρίων αὐτῶν κ΄,		22 ἀναγοντιτέα χαλκᾶ ιε΄,
16 περιπετόμενα ἀνὰ κδ΄, ὁμοῦ υπ΄,	20 περιπετόμενα ρ΄,	24 περιπετόμενα ρμ΄,
17 φιλουρέαι ἀνὰ ιβ΄, ὁμοῦ σμ΄,	19 φιλουρέαι ρ΄,	
	21 σπαρτίνας ρ΄,	25 σπαρτίνας ρμ΄,
	22 λεπτάρια σ΄,	26 λεπτάρια σκ΄,
	25 σκαλοδέματα υ΄.	27 σκαλοδέματα τ΄,
		28 κουβάρια ρ΄,

[145] See Appendix Two [a], §8: "Τῶν δὲ πρῳραίων ἐλατῶν οἱ τελευταῖοι δύο, ὁ μὲν ἕστω σιφωνάτωρ, ὁ δὲ ἕτερος ὁ τὰς ἀγκύρας βάλλων κατὰ θάλασσαν, ἤγουν τὰ σίδηρα· ...". Cf. Appendix Five, §7. See also Appendix Two [b], §1.

[146] *Vita S. Nikolai*, §38 (p. 66): "Βάλετε τὰ σίδηρα τοῦ πλοίου εἰς τὴν γῆν, καὶ δήσατε τὸ πλοῖον ἡμῶν, καὶ φέρετε τὸν κάραβον· ...".

[147] See Pryor, "Naval architecture", pp. 369-72; Bass, et al., *Yassi Ada. Volume I*, pp. 121-43; Steffy, "Medieval cargo ship", p. 17; Bass et al., *Serçe Limani*, pp. 189-238.

The inventories (Appendix Four [b], §§IV.13-14 and §§V.17-18) specified that for the 20 dromons there should be 120 σίδηρα βολιστικά (*sidēra bolistika*) with 120 σιδηροβόλια (*sidērobolia*), that is, six of each per dromon, as well as another 50 σιδηροβολιστικὰ (*sidērobolistika*) with 50 σιδηρόβολα (*sidērobola*). This has to be the starting point. At [b], §VII.23 they also said that the Department of the *Vestiarion* supplied another 60 "iron-throwing ropes", σχοινία σιδηρόβολα (*schoinia sidērobola*), for the expedition. Since *schoinia sidērobola* clearly implied something made of iron and equivalent to a rope, we conclude that the 120 and the 50 *sidērobolia*/*sidērobola* were the same thing and that the 120 and 50 *sidēra bolistika*/*sidērobolistika* were something different. *Sidēra bolistika* literally meant "casting irons" and these latter must therefore have been the anchors, which were "cast" into the sea, as the Leo VI and Nikēphoros Ouranos both said.

What then were the *sidērobolia*/*sidērobola* or *schoinia sidērobola* in this context? There is no doubt that one of the scholia on Lucian's *Lexiphanēs* used the word σιδηροβόλιον (*sidērobolion*) for an anchor;[148] however, here we suggest that they were iron anchor chains attached to the anchors. The rope anchor cables would have been attached to them. When anchor cables are made of rope, as was the case in the Middle Ages, it is necessary to have the last few metres connected to the anchors made of a heavy chain because an anchor works best when the drag of the ship on it is as close as possible to parallel to the sea bottom. This causes the flukes to dig into the sea bed. But, because rope is light and floats, it tends to pull anchors upright and dislodge the flukes if attached directly to the anchors. Iron chain, on the other hand, will sink, thus causing the entire anchor system to form an arc with the anchor end as close to parallel to the bottom as possible. All modern small craft using rope anchor cables have a length of heavy chain connecting them to the anchors.

At both Appendix Four [b], §IV.17 and §V.19, the inventories specified some things called φιλουρέαι (*philoureai*), of which there should be twice as many as the number of anchors and anchor chains.

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[148] The scholion is on *Lexiphanēs*, §15: "... ἕκτοράς τινας ἀμφιστόμους καὶ ἰσχάδας σιδηρᾶς ἀφεὶς καὶ ναυσιπέδας ...". See *Lucian*, vol. 5, p. 312. Lucian appears to have used parenthetically three obscure metaphors for an anchor: ἕκτοράς τινας ἀμφιστόμους (*hektoras tinas amphistomous*), "double-fluked hold-fasts", ἰσχάδας σιδηρᾶς (*ischadas sidēras*), "iron holders", and ναυσιπέδας (*nausipedas*), "ship-fetters". The scholion defined all three as σιδηροβόλιά. See Rabe, *Scholia in Lucianum*, 46.15 (p. 200): "ἕκτορας καὶ ἰσχάδας καὶ ναυσιπέδας τὰ σιδηροβόλιά φησι".

These were probably cables made from the inner bark of the Linden tree, φιλύρα (*philyra*).[149] Such cables were specified nowhere else in the inventories and we suggest that this material had some properties which made them especially suitable for use under water. They may have been attached to the anchor chains. The other cables specified at [b], §V.21 and §VII.25, σπαρτίναι (*spartinai*), which were made from the much more common *spartum* or esparto grass, may have been the upper parts of the cables running from the *philoureai* to the catheads and windlasses, by which the anchors were cast or weighed.

At Appendix Four [b], §IV.15, the inventories also specified immediately after the entries for the anchor chains, that the 20 dromons should have "20 ἀναγοκατάγοντα (*anagokatagonta*) with their ἱμανταρία (*himantaria*)", one per dromon. The word *himantaria* appears to have been used as a generic for the entire anchor cable systems. Casson has established that ἱμάντες (*himantes*) were the "lifts" used on the yards of classical square-rigged ships.[150] *Himantaria* in the same sense of a cable for lifting something fits the anchor cables. At [b], §VII.22, the specification was "15 bronze ἀναγοντιτέα (*anagontitea*)". The verbs ἀνάγειν (*anagein*) and κατάγειν (*katagein*) could have the meanings of "to raise" and "to lower" respectively, suggesting that *anagokatagonta* were devices for raising and lowering some things. Because of their position in the list, we suggest that they were windlasses or capstans by which the anchors were cast and hoisted, terms for which in classical Greek were περιαγωγεύς (*periagōgeus*), στροφεῖον (*stropheion*) and possibly ἐργάτης (*ergatēs*).[151] Whether the *anagontitea* of [b], §G.22 were the same things as *anagokatagonta* is arguable because of the specification that they were made of bronze. Why would anyone make windlasses of bronze? To do so would have been extraordinarily extravagant, even given that bronze is a non corrodable metal.

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[149] The Greek *philyra* was the same as the Latin *tilia* from which the modern name of the genus, *tiliaceae*, is derived. *Tilia Europea* (syn. *tilia vulgaris*, *tilia cordata*) is the common, small-leaved European linden tree from whose fibrous inner bark ropes, nets, and matting were made for centuries. See Polunin, *Trees and bushes*, pp. 141 & 198; Edlin, *What wood is that*, pp. 126-8; Rackham, *Ancient woodland*, pp. 237-9.

See also the sixth- (or ninth-) century *Philoxenos* Latin-Greek glosses of Paris, Bibliothèque Nationale, MS. Lat. 7651, in Goetz, *Glossarii Latini*, vol. 2, p. 472, l. 5 ("Φιλυρα tilia" [sic]). See "Note on citations of Greek and Latin glossaries", p. lxix above.

[150] See *Ships and seamanship*, pp. 260-63.

[151] See Lucian, "The ship or the wishes", §5, in *Lucian*, vol. 6, p. 436: "... καὶ πρὸ τούτων αἱ ἄγκυραι καὶ στροφεῖα καὶ περιαγωγεῖς καὶ ...". On *ergatēs* and derivatives for a capstan in Turkish, Arabic, and Modern Greek see Kahane and Tietze, *Lingua Franca*, §769 (pp. 507-8).

Normally windlasses were made of wood. Besides, the number of them specified, fifteen, does not correspond to the number of dromons and the specification referred to "extra" equipment supplied by the Department of the *Vestiarion basilikon*.

At Appendix Four [b], §IV.16, the inventories specified 24 περιπετόμενα (*peripetomena*) per dromon. At [b], §V.20 and §VII.24, it was specified, respectively, that 100 *peripetomena* should be supplied for what may have been siege engines and another 140 *peripetomena* should be supplied for the fleet. The word appears to have had the sense of something flying around. They may possibly have been windlass bars by which the *anagokatagonta* were turned. Against this, it is difficult to see why 24 of them would needed for each windlass, especially given the light weight of Byzantine anchors.

At two places immediately after the mention of the *spartum* cables, the inventories listed both 200 and 220 λεπτάρια (*leptaria*). *Leptaria* were also listed between *schoinia* (cordage) and some things called *chartaria* amongst equipment purchased for the *karabia* of the *Rhōs*.[152] The meaning of *leptaria* is unknown but the specification appears to have had some connection to the anchoring system. If the word was derived from λεπτός (*leptos*), which had the meaning "light" amongst other things, the term might possibly have referred to something light and hence to something which floated. We suggest anchor buoys and their ropes: small floats attached by thin lines to the anchors and used to mark their position on the sea bed so that that could be easily ascertained when trying to raise them.[153]

Finally, as regards the anchoring systems, the inventories listed among additional items provided from the Department of the *Vestiarion basilikon* to the *droungarios tōn ploimōn* (Appendix Four [b], §VII.27, 28), immediately after the *leptaria* and before a list of materials, 300 σκαλοδέματα (*skalodemata*) and 100 κουβάρια (*koubaria*). These items were probably mooring cables and perhaps reels of some sort associated with their use.[154]

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[152] See Appendix Four [b], §§V.22, VI.19, VII.26 [= Haldon, "Theory and practice", pp. 229, 231, 233; Constantine VII, *De cerimoniis*, II.45 (vol. 1, pp. 673, 675, 677)].

[153] In classical Greek a λεπτάριον was some sort of surgical instrument. The reference appears to be to something thin, or light, or slight. Reiske suggested that they were light cords or twine. See Constantine VII, *De cerimoniis*, vol. 2, p. 795. However, there would be no need for such minor items to be mentioned in an inventory such as this. We prefer to think that they were items of major importance of some kind. A thin line for an anchor buoy would also accord with Reiske's etymology.

[154] Our initial inclination was to follow Reiske on these terms: rope ladders for

(e) *Poop*

The poop, πρύμνη (*prymnē*), had a berth, κράβ(β)ατ(τ)ος (*krab(b)at(t)os*), for the κένταρχος (*kentarchos*) or "captain" of the dromon, a fleet commander, or for dignitaries such as the emperor.[155] This would have been protected by a round tent or awning on a wooden framework, σκηνή (*skēnē*), such as those depicted on Roman galleys.[156] The word *krab(b)at(t)os* was used in both Greek as κρεβάτη

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skalodemata and barrels for *koubaria*. However, we have been persuaded otherwise by both Haldon and by the identification of κάδοι (*kadoi*) in the inventories (Appendix Four [b], §III.20) as amphorae for water. See below pp. 361-3. It is extremely unlikely that the fleet would have been using both amphorae and barrels as water containers.

Haldon suggests that *skalodemata* for mooring ropes was derived from σκάλα (*skala*), a ladder, thence a gangplank, thence a landing stage or quay (cf. below pp. 306-7) and δέμα (*dema*), a bond, rope, even a tow-rope. Hence a *skalodema* was a rope bonding a ship to a landing; i.e., a mooring rope. In Modern Greek κουβάρι (*koubari*) can mean a spool or reel. The Byzantine word may thus have meant something like spools around which ropes, perhaps the *skalodemata*, were wound. See "Theory and practice", pp. 283-4.

[155] Leo VI and Nikēphoros Ouranos both used the term "couch" (*krabatos*), which meant a "berth", or "cabin", much as we would say "bed and breakfast" for "room and breakfast". It cannot have been a simple "couch" since Leo and Nikēphoros both said that it provided protection for the commander from enemy missiles in battle. See Appendix Two [a], §8: "Καὶ ὁ τοῦ ναυάρχου δέ, ἤτοι τοῦ κεντάρχου, κράβατος ἐπὶ τῆς πρύμνης γινέσθω, ... ὁμοῦ δὲ καὶ φυλάττων ἐν καιρῷ συμβολῆς ἀπὸ τῶν ῥιπτομένων βελῶν παρὰ τῶν ἐναντίων, ...". Cf. Appendix Five, §7.

On the interpretation of *krab(b)at(t)os* as "berth" or "cabin" see also Alexandres, *Ἡ θαλασσία*, pp. 60-61 and Koukoulès, "Ναυτικὸς βίος", pp. 352 and 384.

In the *Praecepta imperatori Romano bellum cogitanti ... observanda*, the author said that when an emperor crossed from Constantinople to *Pylai* on the other side of the Sea of Marmara for an Anatolian campaign he rose from his *krabbatos* when at a sufficient distance from the capital and prayed that God would protect it while he was absent. See Constantine VII, *Three treatises*, Text C, ll. 321-4 (p. 114): "... καὶ ἀπὸ ἱκανοῦ διαστήματος τοῦ βασιλείου ὅρμου γενόμενος, ὥστε αὐτὸν ἐπισκοπεῖν τὴν πόλιν, ἐγείρεται ἀπὸ τοῦ κραββάτου καὶ ἵσταται κατ᾽ ἀνατολὰς τὰς χεῖρας πρὸς τὸν οὐρανὸν αἴρων, καὶ τρίτον τῇ χειρὶ τὴν πόλιν κατασφραγίσας εὔχεται τῷ Θεῷ λέγων οὕτως.".

Thietmar of Merseburg used the Latin *lectus* for the commander's berth on the poop of *salandriae* in close parallel to the Byzantine use of *krab(b)atos*. See Thietmar of Merseburg, *Chronicon*, III.21 [12] (pp. 14-5): "... iterum equo comite in mare prosiliens ad alteram salandriam, que sequebatur, tendit et, ab Henrico solum milite eius, qui Sclavonice Zolunta vocatur, agnitus, intromittitur et, in lecto senioris eiusdem navis positus, tandem ab ipso eciam cognitus, si imperator esset, interrogatur.".

[156] Cf. Figures 1, 3, 12.

Only the Anonymous referred to the commander's "tent" or "berth". Appendix Three, §2.5: "..., ἔνθα δὴ καὶ σκηνὴ πήγνυται τῷ στρατηγῷ ἢ τριηράρχῳ ἤγουν κράβατος. Ἐν οἷς δὲ ὁ κράβαττος ἐπερείδεται, ...". This reference to a *skēnē* was almost certainly taken from Pollux, *Onomasticon* (Bethe), I.89 (vol. 1, p. 29): "The timbers projecting arund the poop are called the *peritonaia*. The part which is called

(*krebatē*) and in Latin as *grabatus* in sources for the arrest of Pope Martin I and his transportation to Constantinople for trial on a charge of treason in 653. After his arrival in Constantinople, the Pope was left on the *grabatus* of his ship, exposed to the jeers of the mob.[157]

Right aft was a recurved stern ornament of some kind. In varying forms, this ornament can be seen in the pictorial evidence from antiquity, through the Byzantine period, to the High Middle Ages in the West. In classical Greek and Latin it had been been known as the ἄφλαστον (*aphlaston*) and *aplustre* respectively but, what it was actually known as in Byzantium in the tenth century is unclear. According to the Anonymous, the *krab(b)at(t)os* was erected on *aphlasta* and on τροχαντῆρες (*trochantēres*), together known as βόρδωνες (*bordōnes*), a word which is otherwise unknown in the context of ships.[158] Since it would obviously have been impossible to erect the *krab(b)atos* on stern ornaments, it is clear that the Anonymous did not understand the classical meaning of *aphlasta*, probably because his sources did not explain it. Pollux and Hesychios both merely described it as the "peak" or "extremity" of the poop, as also did the *Souda*, and this was insufficiently precise for the Anonymous.[159] Phōtios had explanations derived from Apollodōros of Athens and Didymos of Alexandria but the Anonymous appears to have known neither of these nor, perhaps, the *Lexicon* of Phōtios itself.[160] The word was not used in the *Odyssey* or by Thucydides and

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the "*skēnē*" is constructed thereabouts for the *stratēgos* or *triērarchos*." ("τὰ δὲ περὶ τὴν πρύμναν προύχοντα ξύλα περιτόναια καλεῖται. ἐκεῖ που καὶ σκηνὴ ὀνομάζεται τὸ πηγνύμενον στρατηγῷ ἢ τριηράρχῳ.").

It was also common practice to cover the poops of medieval Western galleys with awnings. The ceremonial *kadirga* of the Turkish sulṭāns in the Turkish Naval Museum in Istanbul has an elaborately carved wooden *skēnē* covering the poop. See Basch, "Galley in Istanbul". No doubt the wooden frame of the *skēnē* of a Byzantine war dromon would have been less elaborate but much more protective.

[157] Anastasius Bibliothecarius, *Collectanea*, col. 592: "... reliquerunt eum a mane ministri usque in horam decimam recubantem in grabato navis, eratque, sicut scriptum est, spectaculum omnibus angelis et hominibus."; Peeters, "Vie grecque", §6 (p. 258): "Καὶ προσώρμισαν αὐτὸν πλησίον Ἀρκαδιανιῶν, ἐάσαντες αὐτὸν ἀπὸ ἕωθεν ἕως ὥρας δωδεκάτης κείμενον ἐν τῇ κρεβάτῃ τοῦ πλοίου.".

[158] Appendix Three, §2.5: "Ἐν οἷς δὲ ὁ κράβαττος ἐπερείδεται, τροχαντῆρες καὶ ἄφλαστα, οἱ λεγόμενοι βόρδωνες.".

[159] Pollux, *Onomasticon* (Bethe), I.90 (vol. 1, p. 29): "τὰ δὲ ἄκρα τῆς πρύμνης ἄφλαστα καλεῖται, ὧν ἐντὸς ξύλον ὀρθὸν πέπηγεν, ὃ καλοῦσι στυλίδα· ..."; Hesychios, *Lexicon* (Schmidt), A.8702 (vol. 1, p. 337): "ἄφλαστον· τὸ ἀκροστόλιον, τὸ ἄκρον τῆς πρύμνης, ἀποτεταμένον εἰς ὕψος."; *Souda*, A.4631 (vol. 1, p. 432): " Ἄφλαστον· τὸ ἄκρον τῆς πρύμνης.".

[160] Phōtios, *Lexicon* (Theodoridis), A.3369 (p. 308): "ἄφλαστα· τὰ ἀκροστόλια Ἀπολλόδωρος. ὁ δὲ Δίδυμος τὸ ἐπὶ τῆς πρύμνης ἀνατεταμένον εἰς ὕψος ἐκ κανονίων πλατέων ἐπικεκαμμένων.".

therefore the Anonymous had no scholia on it. The *Iliad* did have scholia on the word but he had no manuscript of that. In fact, there was confusion in post-classical times about the meaning of *aphlaston*. One scholion on the *Iliad*, followed by one on Apollōnios of Rhodes' *Argonautika* went to some lengths to reject identification of it with the *akrostolion* of the prow and to insist that it was at the poop.[161]

What the Anonymous meant by *bordōnes* is unknown and there are a number of possibilities. The Greek βόρδωνες may have been a contraction from βούρδωνες (*bourdōnes*), a word associated with "mules". However, as used here the word appears to be a *hapax legomenon* and no word with any similar form and meaning is known to have passed into medieval Latin or the vernacular languages with any nautical connotation and therefore its meaning cannot be elucidated from later evidence. Perhaps the word was used in the Anonymous's own age for the stern ornaments but, against this, he seems to have understood the word as applied to the substructure of the *krab(b)at(t)os*, which would rule out the ornaments. Another possibility is that there may have been a scribal error in the Ambrosiana manuscript and that the word may have been βάνδωνες (*bandōnes*). In later medieval Latin and Italian, *banda* could mean a parapet around the poop. Jal derived its etymology from Anglo-Saxon *bendan*, to bend; however, surely a more likely derivation is from Byzantine Greek.[162] A more attractive alternative is to associate the

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The ultimate source of all of this was probably Apollodōros, but Apollōnios Sophista also added to the debate. See Apōllonios Sophista, *Lexicon*, p. 49, l. 6: "ἄφλαστον τὸ ἀκροστόλιον. κέκληται δὲ κατ᾽ ἀντίφρασιν οὕτως τὸ ἀσθενέστατον, οἷον εὔθλαστον.".

[161] Erbse, *Scholia graeca*, O.717 (vol. 4, pp. 149-50): "ἄφλαστον: οὐ τὸ ἀκροστόλιον, ἀλλὰ τὸ ἐπὶ τῆς πρύμνης εἰς ὕψος τεταμένον ἐκ κανονίων πλατέων, διήκοντος δι᾽ αὐτοῦ πλατέος κανονίου, ὀνομαζομένου μὲν θρανίτου, ὑπηρεισμένου δὲ τῷ στυλίσκῳ τῷ ὄπισθεν τοῦ κυβερνήτου.". Scholia on the *Argonautika* of Apollōnios of Rhodes, I.1089a, ed. Wendel, *Scholia*, p. 97: "..., ἔστιν οὖν ἄφλαστον ‹οὐ› τὸ ἀκροστόλιον ‹τὸ› κατὰ τὴν πρώραν, ἀλλ᾽ ὁ ποιητὴς αὐτὸ παραδίδωσιν ἐπὶ τῆς πρύμνης λέγων ... ἔστιν οὖν ἄφλαστον σανίδιον κατὰ τὴν πρύμναν.".

The sixth- (or ninth-) century *Philoxenos* Latin-Greek glosses of Paris, Bibliothèque Nationale, MS. Lat. 7651 also associated it with the prow. See Goetz, *Glossarii Latini*, vol. 2, p. 19, l. 43: "Aplustra ασφαλτος καιτō ακρον της πρωας" [sic]. See "Note on citations of Greek and Latin glossaries", p. lxix above.

[162] See Jal, *Glossaire nautique*, p. 234. In addition to the sources cited by Jal, the word was also used in the registers of the chancery of the Angevin Kingdom of Sicily during the reign of Charles I. See Pryor, "Galleys of Charles I of Anjou", pp. 62-3. There was a significant linguistic influence from Greek on the Latin used in the Angevin chancery as far as maritime terminology was concerned; however, in the context in which the word was used in the Angevin documents, *banda* appears unlikely to have had anything to do with the poop. It was associated with the sides of Western galleys, specifically with the outriggers for the oars. See also Kahane and

word with whatever gave rise to the later Italian "*bardone*" and Turkish "*bardone/bradone*" for a backstay. In classical Greek a backstay had been an ἐπίτονος (*epitonos*), as opposed to πρότονος (*protonos*), a forestay. It has been suggested that *bardone/bradone* was derived from παράτονος [ἱμάς] (*paratonos [imas]*), very tentatively a rope stretched to the side, giving rise to medieval Latin *partanus*, found in one entry in the Angevin chancery registers. However, the latter was merely a manuscript error for *peronus,* itself an alternative for *prodanus* (Lat.), *prodano* (It.), for a cable used to lower a mast, all of which were derived from *protonos* because when masts were lowered they were lowered towards the stern and the cable used to control them during the process thus had to run forward.[163] In fact, neither forestays nor backstays could be used with lateen sails because they would get in the way of manœuvring the yards.[164] By the age of the Anonymous both *epitonos* and *protonos* must have been complete anachronisms. In any case, it is clear that the Anonymous did not mean backstays by his use of *bordōnes* because he used the word in the context of the structure of the poop. Nevertheless, it is certainly possible that because of its association with the stern, whatever its actual meaning in Byzantine Greek, *bordōnes* later gave rise to the word for a backstay in Italian and Turkish once square sails returned to the Mediterranean. Whatever the case, once again the Anonymous appears to have been very confused by all of these terms.

According to the Anonymous, the aftermost part of the stern was the παρεξειρεσία (*parexeiresia*) and there were παράπτερα (*paraptera*), "side wings", there, which were known as ἐπωτίδες (*epōtides*). In a piece of wordplay derived either from a scholion on Thucydides or from Hesychios, he explained the meaning of *parexeiresia* as being derived from "outside the *eiresia*", the oar-bank.[165] On classical Greek *triēreis* this was in fact true because a

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Tietze, *Lingua Franca*, §§15-16 (pp. 56-9) on the Italian "*alla banda*", Turkish "*alavand/alabánda*" and the Greek "βάντα/πάντα".

[163] Kahane and Tietze, *Lingua Franca*, §78 (pp. 95-6). Because they were unfamiliar with the Angevin registers, the authors misunderstood the passage in question. See Pryor, "Galleys of Charles I of Anjou", p. 43.

Note that although the authors were familiar with the *Anonymous* in Dain's edition, they did not make a connection between *bordōnes* in the *Anonymous* and the Italian/Turkish *bradone/bardone*, even though Dain had mistranscribed *bordōnes* as *bardōnes*. See Appendix Three, n. 38.

[164] They are rarely shown in illustrations of lateen-rigged galleys and when they appear to be it is always a question either of some other cable, such as a top-tackle, or of artistic ignorance. See the numerous illustrations in Morrison, *Age of the galley* and *Quand voguaient les galères*.

[165] Appendix Three, §7.5: "Παρεξειρεσία δέ ἐστι τὸ ὄπισθεν μέρος τῆς πρύμνης,

parexeiresia was an outrigger for the upper bank of oars. The *epōtides* were the lateral timbers at the bow of such outriggers which took the shock of any head-on collision. According to Thucydides, Corinthian ships at the second battle of Naupaktos in 413 B.C.E. rammed the Athenian ships prow to prow and were able to smash their *parexeiresiai* because they themselves had "reinforced outrigger cheeks (*epōtides*) for this very purpose".[166] However, many later writers had no idea what either *parexeiresiai* or *epōtides* were because these terms had fallen out of use together with outriggers for oars, which had been discontinued since the days of Roman *liburnae*.[167] The scholion on Thucydides, and Hesychios also, had both located the *parexeiresia* at the prow, *prōra*, in front of the oars, which was incorrect. Assuming that the scholion in fact predated Hesychios, and that the latter copied it rather than vice versa, this suggests that the scholion was written after war galleys had ceased to have *parexeiresiai*. The author of the *Souda* also repeated the location of the *parexeiresia* at the prow derived from the scholion on Thucydides,[168] suggesting that he also did not understand *parexeiresiai*. His, and the Anonymous's, misunderstanding is clear evidence that tenth-century galleys did not have outriggers either.

The Anonymous, however, located the *parexeiresia* at the poop, *prymnē*, which was also incorrect. He appears to have done so on the authority of another scholion on Thucydides. In reading Thucydides on the battle of *Pylos* in 425 B.C.E., where the historian wrote that the Spartan admiral Brasidas fell unconscious into the *parexeiresia* of his ship,[169] the Anonymous seems to have had before him a *scholion* which located *parexeiresiai* at the poop as well as at the prow.[170]

ἔνθα τὰ παράπτερα τῶν νεῶν εἰσιν, ἃ ἐπωτίδες κέκληνται· λέγεται δὲ οὕτως διὰ τὸ παρεκτὸς τῆς εἰρεσίας εἶναι τὸ πηδάλιον οἱονεὶ ἐρέττον καὶ ἰθύνον τὴν ναῦν.". Cf. Hude, *Scholia*, VII.34.5 (p. 385): "τὰς παρεξειρεσίας· παρεξειρεσία ἐστὶ τὸ κατὰ τὴν πρῴραν πρὸ τῶν κωπῶν, ὡς ἂν εἴποι τις τὸ πάρεξ τῆς εἰρεσίας."; Hesychios, *Lexicon* (Schmidt), Π.834 (vol. 3, p. 282): "παρεξειρεσίαν· τὸ κατὰ τὴν πρῷραν πρὸ τῶν κωπῶν· ὡσει λέγοι τις, πάρεξ τῆς εἰρεσίας".

[166] Thucydides, *Peloponnesian war*, VII.34.5 (vol. 4, pp. 64-5): "... ἐπ᾽ αὐτὸ τοῦτο παχυτέρας τὰς ἐπωτίδας ἐχουσῶν.". See further Casson, *Ships and seamanship*, pp. 84-6.

[167] See Casson, *Ships and seamanship*, pp. 143-6. Once again, in the sixth century the well-versed Agathias had still understood the meaning of *parexeiresia*. See Agathias, *Historiae*, V.21 (p. 192): "..., κωπωτῆρας ἐφ᾽ ἑκατέρᾳ πλευρᾷ καὶ οἷον παρεξειρεσίας αὐτομάτους ἐμηχανήσαντο.".

[168] *Souda*, Π.559 (vol. 4, p. 51): "Παρεξειρεσίας: παρὰ Θουκυδίδῃ τὸ κατὰ τὴν πρῴραν πρὸ τῶν κωπῶν· ὡς ἂν εἴποι τις τὸ παρὲξ τῆς εἰρεσίας".

[169] Thucydides, *Peloponnesian war*, IV.12.1 (vol. 2, p. 230): "..., καὶ τραυματισθεὶς πολλὰ ἐλιποψύχησε τε καὶ πεσόντος αὐτοῦ ἐς τὴν παρεξειρεσίαν ...".

[170] Cf. Hude, *Scholia*, IV.12.1 (pp. 234-5): "παρεξειρεσία ἐστὶν ὁ ἔξω τῆς εἰρεσίας

Elsewhere, the Anonymous said that on either side of the poop, the quarter rudders rested on "spreaders", πέτασοι (*petasoi*), "dividers", σχιστά (*schista*), and the *epōtides*. Then he said that the quarter rudders, πηδάλια (*pēdalia*), were composed of tiller, οἴαξ (*oiax*), shaft, αὐχήν (*auchēn*), and blade, ὑπερύπτιον (*hyperyption*). Where a helmsman, κυβερνήτης (*kybertnētēs*), "leaned", ἐπικλίνεται (*epiklinetai*), was an ἄγκλιμα (*anklima*). Once again, this was all derived from Pollux.[171] The *anklima* may have referred either to the helmsmen "leaning" on their tillers or else to their being positioned at the sides of the poop where the camber of the deck sloped off towards the hull.

Because Pollux had done so also, the Anonymous understood correctly the terminology for the construction of rudders, which were composed of blade, shaft, and tiller. His equations of the word *pēdalion* for the rudder as a whole with those for two of its composite parts, *auchēn* for the shaft and *oiax* for the tiller, can also be accepted as what was probably vernacular usage in the tenth century.[172] But yet again he probably derived the synonymity from Pollux or Hesychios.[173]

τῆς νεὼς τόπος, καθ' ὃ μέρος οὐκέτι κώπαις κέχρηνται. ἔστι δὲ τοῦτο τὸ ἀκρότατον τῆς πρύμνης καὶ τῆς πρώρας.".

[171] Appendix Three, §2.6: "Τῆς δὲ πρύμνης τὰ μέρη πάλιν ἑκάτερα πέτασοι καὶ σχιστὰ καὶ ἐπωτίδες λέγονται, ἐν οἷς ἐπίκεινται τὰ πηδάλια. Καὶ τὸ μὲν ἄκρον τοῦ πηδαλίου ἤτοι τοῦ αὐχένος λέγεται οἴαξ· ὅπου δὲ ὁ κυβερνήτης ἐπικλίνεται ἄγκλιμα καλεῖται. Τὸ δὲ πᾶν οἴαξ τε καὶ πηδάλιον, τὸ δὲ τελευταῖον ὑπερύπτιον, τὸ δὲ λοιπὸν αὐχήν.". Cf. Pollux, *Onomasticon* (Bethe), I.89-90 (vol. 1, p. 29): "τὸ δὲ ἄκρον τοῦ πηδαλίου [οἴαξ· τὸ δὲ πᾶν] οἴαξ τε καὶ πηδάλιον [καλεῖται]. τὸ δὲ μέσον αὐτοῦ φθεὶρ ἢ ῥίζα ἢ ὑπόζωμα, τὸ δὲ τελευταῖον πτερύγιον, τὸ δὲ λοιπὸν αὐχήν. ἵνα δὲ κατακλίνεται ὁ κυβερνήτης, ἄγκλιμα καλεῖται.".

Ὑπερύπτιον is an otherwise unknown word, probably a misreading of Pollux's πτερύγιον for the classical πτέρυξ for the blade of an oar.

On the development of rudders, see Mott, *Development of the rudder*.

[172] Both Leo VI and Nikēphoros Ouranos recommended that dromons should carry shafts, *auchēnes*, amongst their spares; however, they were probably using the word for the entire quarter rudders. See Appendix Two [a], §5 and Appendix Five, §4. The *scholia* on Aristophanes' *Peace*, l. 142 in the tenth-century Ravenna manuscript also said that the *pēdalion* was: "... what we now call the *auchenion*.". See Rutherford, *Scholia Aristophanica*, *Pax*.142 (vol. 2, p. 47): "... πηδάλιόν ἐστι τὸ νῦν καλούμενον αὐχένιον.". John Kaminiatēs also used the word αὐχήν for the entire quarter rudder. See p. 241, n. 252 below.

The Greek-Latin *Cyril* glosses of London, British Library, MS. Harley 5792; used *auchēn*, *oiax*, and *pēdalion* interchangeably. See Goetz, *Glossarii Latini*, vol. 2, p. 252, l. 11: "Αυχηνπλοιου gubernaculum [sic]"; p. 379, l. 55: "Οιαξ clauus : gubernaculum clauus singularitertan tum declinabitur [sic]"; p. 407, l. 17: "Πηδαλιον gubenaculum clauum serraculum [sic]. See "Note on citations of Greek and Latin glossaries", p. lxix above.

[173] See Pollux, *Onomasticon* (Bethe), I.89 (vol. 1, p. 29) in n. 171 above. Cf. Hesychios, *Lexicon* (Schmidt), O.175 (vol. 3, p. 181): "οἴακες· πηδάλια ἤτοι αὐχένια.".

Petasoi and *schista* were terms mentioned by neither Leo VI nor Nikēphoros Ouranos and they are not found in this sense either in classical sources or in Pollux, Hesychios, Phōtios or the *Souda*. The word *petasos* was derived from πετάννυμι (*petannymi*), having the sense of opening or spreading out. In classical Greek a *petasos* could be a distinctive kind of hat, a broad leaf, or an awning or canopy. In the Harley manuscript copy of the *Cyril* glosses, a *petasos* was understood to be a *fatigium*, for which is understood *fastigium*; probably meaning a roof.[174] *Schista* was derived from σχίζω (*schizō*), having the sense of splitting, and *schista* were listed together with the *periboloi* in the inventory for the Cretan expedition of 949 as items on which 11 nomismata were spent in constructing, or reconstructing, the 11 *karabia* for the *Rhōs*.[175] If our understanding of *peribolos* as cathead is correct, and if the Anonymous actually knew the word to have the same meaning, then it is possible that by analogy he used *schista* for some things projecting from the hull at the stern and associated with the rudders. That would almost certainly mean that they were the through-beams to which the rudders were attached, beams which had to "split" through the hull. *Petasoi* may then have been coverings of the housings for the rudders, "spreading" the hull. If we understand the housings for the quarter rudders as being composed of "boxes" of some sort on the outside of the hull,[176] then *petasoi* and *schista* in the senses deduced above does seem to make some sense. Box mountings for rudders can be seen in many illustrations of ships from antiquity through to the High Middle Ages. However, whether dromons of the tenth century actually had their rudders mounted in boxes like this is impossible to know since the pictorial evidence from late antiquity to the High Middle Ages shows a variety of mounting systems for the rudders, including, "wings", and "rings" on the outside of the hull, as well as boxes.[177] Exactly how the quarter

[174] See Goetz, *Glossarii Latini*, vol. 2, p. 406, l. 29: "Πετασος fatigium [fastigium]". See "Note on citations of Greek and Latin glossaries", p. lxix above.

[175] See Appendix Four [b], §VI.13: "ἐδόθη ὑπὲρ ναυπηγήσεως τῶν αὐτῶν ια΄ καραβίων τῶν τε σχιστῶν καὶ τῶν περιβόλων αὐτῶν καὶ λοιπῶν ,, ια΄." [= Haldon, "Theory and practice", p. 231; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 675)].

[176] See, for example, the mounts for quarter rudders of Rhodian and Roman galleys in Casson, *Ships and seamanship*, plates 108, 114, 128, 129, 131, 170.

[177] By way of example, amongst the figures here, Figures 1 and 12, and possibly 4, 6, 7, and 11 show "box" mounts. Figures 3, 5, 24, and 35 show "wing" mounts. Figures 34, and 47 show "ring" mounts. Figures 8-19, 13-17, 22-3, 26, 36 48-54, and 57 either do not depict the rudders at all or else show no mounting system.

Figure 21 shows a through-hull mount on a galley representing the constellation Argo in a manuscript of the *Aratea* attributed to Germanicus Caesar. The manuscript has been dated to the eleventh century with a somewhat doubtful provenance of the

rudders of dromons were mounted and what the terminology was for the various elements of the mounts and housings is impossibly indeterminate. Mott has argued that there were several different systems for mounting rudders and it is indeed probable that different terminology was used at different times and for different systems.[178]

The word *paraptera* used by the Anonymous is a *hapax legomenon* otherwise unknown but its literal sense of "side wings" seems to be quite appropriate for the whole complex of the housings for the quarter rudders. What these were known as in classical Greek is unknown. However, when the Anonymous used *epōtides* for part of the housing for the rudders, and equated *epōtides* with *paraptera*, he went horribly wrong because he was again relying on scholia on Thucydides. Just as the meaning of *parexeiresia* became forgotten, so also did that of *epōtides*. The scholia on Lucian's *Zeus tragōdos*, *Zeus rants*, said that in one of the understandings of the χηνίσκος (*chēniskos*), the goose-head stern ornament on Greco-Roman sailing ships, the *epōtides* were joined to it.[179] One of the scholia on the same passage of Thucydides referring to the second battle of Naupaktos said that the *epōtides* were timbers on either side at the prow and the author of the *Souda* repeated this.[180] Only because his scholion had understood *epōtides* was the author of the *Souda* also able to understand the term. However, when the Anonymous came to Thucydides and the scholia that his manuscript had, he relied on other scholia which located both the *epōtides* and the *parexeiresia* at the stern. In reading Thucydides on the continuation of the Peloponnēsian war after the battle of Naupaktos, when the Syracusans emulated the

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monastery of St Bertin. It is said to have been copied from an earlier manuscript from Rheims. However, the pictures, including this one, are quite correctly said to have been modelled, probably at more than one remove, on others from late antiquity, probably the fourth century. The galley here is clearly drawn in a style similar to others of late antiquity; for example the Dermech mosaic from Carthage (see Figure 35) and one of the Piazza Armerina mosaics (see Casson, *Ships and seamanship*, fig. 141), both of which are dated to the early fourth century. The backstays for the mast give away a presumption of a square sail such as those carried by *liburnae* in the age prior to the dromon. See Héliot, *Manuscrits illustrés*, pp. 687-8; *Catalogue général*, pp. 7-8.

Other examples of "through-hull" mounts can be found in Mott, *Development of the rudder*, figs 4.3 and 5.20-22.

[178] Mott, *Development of the rudder*, pp. 9-69.

[179] See Lucian, *Zeus rants*, §47, in *Lucian*, vol. 2, p. 162; Rabe, *Scholia in Lucianum*, Ζεὺς τραγῳδός.47 (p. 82).

[180] *Souda*, E.2848 (vol. 2, p. 400): "Ἐπωτίδες· Θουκυδίδης· ... Ἐπωτίδες εἰσι τὰ ἑκατέρωθεν πρώρας ἐξέχοντα ξύλα". Cf. Hude, *Scholia*, VII.34.5 (p. 385): "τὰς ἐπωτίδας: ἐπωτίδες εἰσὶ τὰ ἑκατέρωθεν τῆς [τῆς omitted in five MSS] πρῷρας ἐξέχοντα ξύλα.".

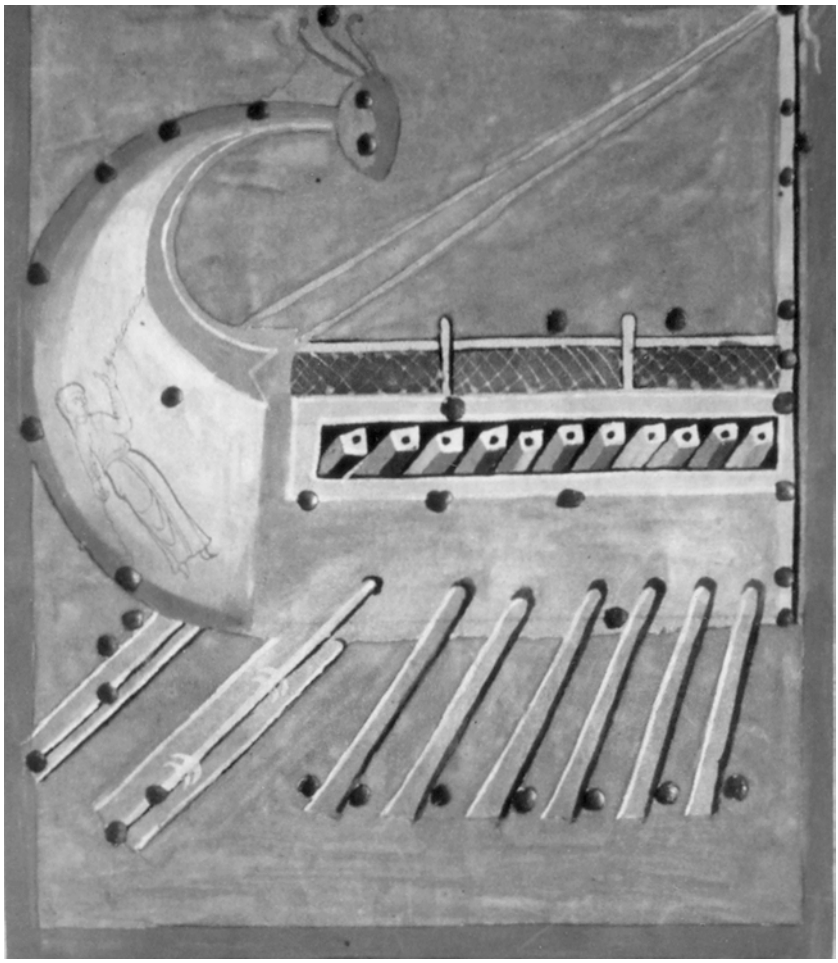


Figure 21
Through-hull rudder mounts on a galley representing the constellation Argo in a manuscript of the *Aratea* attributed to Germanicus Caesar (Boulogne-sur-Mer, Bibliothèque Municipale, MS. 188, fol. 78), eleventh century.

Corinthians by reinforcing the *epōtides* of their ships,[181] it appears that he had before him another scholion which glossed *epōtides* as: "The [things] projecting on each side of the ship at the poop".[182] It must

[181] Thucydides, *Peloponnesian war*, VII.36.2 (vol. 4, p. 68): "... καὶ τὰς ἐπωτίδας ἐπέθεσαν ταῖς πρῴραις παχείας, ...".

[182] Hude, *Scholia*, VII.34.5 (p. 385): "τὰς ἐπωτίδας: τὰ [ἐφ᾽] ἑκατέρωθεν τῆς νηὸς πρὸς τῇ πρύμνῃ ἐξέχοντα.".

have been this scholion or one similar to it which suggested to the Anonymous that *epōtides* meant the housings for the quarter rudders.

The Anonymous said that the tillers, οἴακες (*oiakes*), were bound to something called a *trochantēr*.[183] In the context of a ship, the word *trochantēr* is known to have been used only rarely. Its sense was given only by Hesychios, who said that *trochantēres* were a part of the poop around the quarter rudders,[184] and it seems certain that this was the Anonymous's source. However, in anatomy the word was much better known. Galēn referred to the processes or eminences on either side of the neck of the femur which serve as points of attachment for the muscles which control movements of the femur as the great and the small *trochantēr*. They are still known in modern anatomy as the greater and lesser trochanters and in insect entymology the trochanter is that segment of the leg between the coxa attached to the body and the femur. Again, muscles controlling the femur are attached to it.[185] In the second century C.E., Sextus Empiricus quoted an epigram in which the word may have been used more loosely for the hip joints, the sockets of the hip bones in which the heads of the femurs sit, although his words will also stand a more technical interpretation in accordance with Galēn's description.[186]

By analogy *trochantēres* may have been some sort of ball and socket

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[183] Appendix Three, §2.15: "Τὰ δὲ τῆς νεὼς σχοινία· κάλοι, πρότονοι, πείσματα, ἀπόγαια, πρυμνήσια, καὶ ἔμβολοι, οἳ τοὺς οἴακας συνέχουσι καὶ δι᾽ ὧν εἰς τὸν τροχαντῆρα ἀποδεσμῶνται.".

[184] Hesychios, *Lexicon* (Schmidt), T.1523 (vol. 4, p. 181): "τροχαντῆρες· πρὸς τὰ πηδάλια. καλεῖται τῆς πρύμνης μέρος". The word was also used by Nikētas David Paphlagon. See Nikētas David Paphlagon, *Vita S. Ignatii*, coll. 516-7: "πρὸς οἷς καὶ τῶν τοῦ πατριάρχου μοναστηρίων βαρβαρικῷ καταδραμόντες ὁρμήματι καὶ θυμῷ, πᾶσαν μὲν τὴν εὑρεθεῖσαν κτήσιν ἀφείλοντο, εἴκοσι δὲ καὶ δύο τῶν γνησιωτέρων αὐτοῦ κεκρατηκότες οἰκετῶν, ἐφ᾽ ἑνὶ τροχαντῆρι πλοίου τοὺς πάντας ἀξίναις κατεμέλισαν.".

Later the word appears to have changed its form and to have become τρεχαντήρι (*trechantēri*), which gave rise to Turkish *tirhandil* for a stern frame or transom. See Kahane and Tietze, *Lingua Franca*, §863 (pp. 585-6). Note that the authors' understanding of this passage of the *Anonymous* is completely wrong. They have made *emboloi* into "pins" and *trochantēr* into a "sternpost"; which cannot be justified since quarter rudders of the tenth century were located nowhere near the sternpost and were not attached to anything by pins. The authors were thinking of post-medieval sternpost rudders.

[185] See Galen, *De usu partium*, 15.8 (vol. 2, pp. 370-74), trans. May, 15.8 (vol. 2, pp. 676-79). See also Rosse, *Hollinshead's textbook of anatomy*, pp. 314-5; Chapman, *Insects*, pp. 134-6.

[186] Sextus Empiricus, *Against the professors*, I.316-7, in *Sextus Empiricus*, vol. 4, p. 184: " ἄρθρῳ ἐν ἀσπιδόεντι βεβηκότα γυῖα καθ᾽ ὅλμου // βλαισὰ τροχαντήρων ἄχρι περιστρέφεται, ...". Bury translated *trochantēres* here as "hip joints"; however, there is no reason why in this text the word should not refer to the *trochantēres* as described by Galen.

mountings for the rudders of ships. However, there is no pictorial evidence for any such ball and socket mountings for the rudders of classical galleys.[187] More probably, they were projections on the rudder shafts to which tackles were attached in order to control the rudders. Tackles attached to projections on the shafts of the rudders would parallel very closely the idea of muscles attached to the *trochantēres* of the femur. Such tackles and their fastenings to the rudders are shown in the Torlonia relief of ca 200 and in a third-century mosaic from a house in Rome.[188] This interpretation does not fit either Hesychios's description of the *trochantēres* as being part of the poop or the Anonymous's description of them as being some things bound to the tillers by *emboloi*; although, in the latter case only a small leap of imagination would be necessary. However, both Hesychios and the Anonymous very probably knew only that they were some things associated with the rudders at the poop.

Quarter rudders were huge blades with extremely long shafts, so long that if hoisted to the mastheads, they could be used as bearers on which to construct flying bridges from ships' masts to surmount the sea walls of besieged towns. Theophanēs the Confessor said that the Muslims had intended to hoist them up and rest them against the ramparts of Constantinople during the siege of 717 and John Kaminiatēs also described them as being used for this purpose by the Muslims at the siege of Thessalonikē in 904.[189] On galleys of the Kingdom of Sicily in the later thirteenth-century, the earliest for which accurate dimensions survive, the quarter rudders (*temones*) of galleys were 6.06 metres long.[190] It is not surprising that elsewhere the Anonymous also listed amongst the ship's cables ἔμβολοι (*emboloi*), which he said restrained the tillers, *oiakes*, and by which these were bound to the *trochantēr*.[191] Whatever he may have understood by the vocabulary he used, he was almost certainly referring to the blocks and tackles which were needed to control the quarter rudders of ancient and medieval ships.[192] A variety of terms were used at various times and in various places for these tackles.

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[187] See Mott, *Development of the rudder*, pp. 9-40, esp. pp. 35-9.

[188] See Casson, *Ships and seamanship*, Ill. 144, 154 and, for discussion, Mott, *Development of the rudder*, pp. 22, 39-40.

[189] See Theophanēs, *Chronographia*, A.M. 6209 (vol. 1, p. 396). For John Kaminiatēs see below pp. 240-42.

[190] See Pryor, "Galleys of Charles I of Anjou", p. 56.

[191] See p. 224 & n. 183 above.

[192] See Casson, *Ships and seamanship*, pp. 228-9; Mott, *Development of the rudder*, pp. 29-30, 75-8.

As early as the fifth century B.C.E., Euripides had written in *Helen* that, in the preparation of a *pentēkonteros* for sea, the rudders were let down by ζεύγλαι (*zeuglai*), lit. "yokes".[193] This word appeared again in a cognate form in the *Acts of the Apostles* when the crew of the ship on which St Paul was travelling let go the ζευκτηρίαι (*zeuktēriai*) of the rudders before driving the ship ashore on Malta. Casson is surely correct when he equates *zeuglai* and *zeuktēriai* to "pennants", that is tackles, of the rudders.[194] In fact, Hesychios defined *zeuglai* as: "*zygoi*, or parts of the *zygos*. And *zeuktēres* [are] binding straps. And metaphorically *tropōtēres*".[195] His meaning was clear. Just as *tropōtēres* were grommets for binding oars to tholes, *zeuktēres* and *zeuglai* were "straps" for some other purpose; arguably for controlling the rudders. The *Argonautika* attributed to the Orphic corpus, which was derived from Apollōnios of Rhodes, also said that the rudders, οἴηκες (*oiēkes*), were fixed at the poop and tied off with straps.[196]

Vitruvius, following the pseudo-Aristotelian *Mēchanika*, referred to a helmsman holding the tiller, *ansa gubernaculi*, which he said the Greeks called *oiax*, and moving it with one hand carefully around the centre [of the rudder shaft]. The *Mēchanika* said that the point at which the rudder was attached to the ship was the ὑπομόχλιον, *hypomochlion*, the "fulcrum".[197] However, neither Vitruvius nor the

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[193] Euripides, Ἑλένη, l. 1536, in Euripides, *Fabulae*, vol. 3, p. 64: "πηδάλια τε ζεύγλαισι παρακαθίετο.".

[194] Souter, *Novum Testamentum*, Πράξεις τῶν Ἁγίων Ἀποστόλων, 27.40: "καὶ τὰς ἀγκύρας περιελόντες εἴων εἰς τὴν θάλασσαν, ἅμα ἀνέντες τὰς ζευκτηρίας τῶν πηδαλίων· ...". See Casson, *Ships and seamanship*, p. 228, n. 17.

[195] Hesychios, *Lexicon* (Schmidt), Z.120 (vol. 2, p. 256): "ζεύγλας· ζυγοί, ἢ μέρη τοῦ ζυγοῦ. καὶ ζευκτῆρες ἱμαντόδεσμοι. καὶ τροπωτῆρες μεταφορικῶς.".

[196] *Ὀρφεὼς Ἀργοναυτικὰ*, ll. 276-7 in Abel, *Orphica*, p. 13: "ἐπὶ δ' αὖτ' οἴηκας ἔδησαν πρυμνόθεν ἀρτήσαντες, ἐπεσφίγξαντο δ' ἱμᾶσιν." ("on these they bound the rudders from the poop and tied [them] off with straps.").

[197] Vitruvius, *De architectura*, X.iii.5, trans. Granger, vol. 2, p. 298: "Quemadmodum etiam navis onerariae maximae gubernator ansam gubernaculi tenens, qui *oiax* [οιαξ] a Graecis appellatur, una manu momento per centrum ratione pressionibus artis [aptis] agitans, versat eam amplissimis et inmanibus mercis et pinus [penus] ponderibus oneratam.". "Aptis" and "penus' were editorial emendations by Krohn in his edition of 1912.

The middle clause of this passage almost defies understanding. Both Morgan and Granger had to guess at a translation. We believe that its meaning was as follows: "So also the helmsman of a very large cargo ship holding the tiller of the rudder, which is called an *oiax* by the Greeks, moving [it] with one hand around the centre [of the rudder shaft] in a trice with care [and] with small (skilful?) amounts of force, turns it [the ship] loaded with very great and even enormous weights of merchandise and pine [wood] (provisions?)."

Aristotle, *Mēchanika*, §5, pp. 354-6: "Διὰ τί τὸ πηδάλιον μικρὸν ὄν, καὶ ἐπ' ἐσχάτῳ τῷ πλοίῳ, τοσαύτην δύναμιν ἔχει ὥστε ὑπὸ μικροῦ οἴακος καὶ ἑνὸς ἀνθρώπου δυνάμεως, καὶ ταύτης ἠρεμαίας, μεγάλα κινεῖσθαι μεγέθη πλοίων; ἢ διότι καὶ τὸ

author of the *Mēchanika* appear to have been using technical language here.

In a letter which was a translation of a now lost Paschal letter of bishop Theophilos of Alexandria, St Jerome made an analogy to the helmsmen of great ships who met the rush of oncoming seas by turning the bows in alternate directions by tightening or slackening the "lines" (*funiculi*) of the rudders (*gubernacula*). Once the seas had passed, they let off the "straining bonds" (*laborantia vincla*) of the rudders (*clavi*).[198]

(f) *Deck and Castles*

According to the Anonymous, from poop to prow at the centre line, above the floor, ἀμφιμήτριον (*amphimētrion*), and hold, κύτος (*kytos*), dromons were undecked, ἀσάνιδον (*asanidon*): "The middle of the stern and the ship as far as the prow is undecked. ... And the bottom [of the ship] is named the hold (*kytos*) and the floor (*amphimētrion*)".[199] Yet again, this was based on Pollux; however, the Anonymous misunderstood Pollux because he had at hand a manuscript of the *Onomasticon* with a significant variant. In fact Pollux wrote that: "The middle of the stern [is] a σανίδιον (*sanidion*), where that inside [is] the ἐνθέμιον (*enthemion*), [and] that attached

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πηδάλιόν ἐστι μοχλός, καὶ μοχλεύει ὁ κυβερνήτης. ᾗ μὲν οὖν προσήρμοσται τῷ πλοίῳ, γίνεται ὑπομόχλιον, τὸ δὲ ὅλον πηδάλιον ὁ μοχλός, ..." ("Why does the rudder, which is small and at the end of the vessel, have so great power that it is able to move the huge mass of the ship, though it is moved by a small tiller and by the strength of but one man, and then without violent exertion? Is it because the rudder is a bar (*mochlos*), and the helmsman works a lever? The point at which it is attached to the ship is the fulcrum (*hypomochlion*), the whole rudder is the bar (*mochlos*), ...").

[198] Jerome, St, *Epistolae*, 100.14, col. 825: "Sicut enim gubernatores magnarum navium, cum viderint immensum ex alto venire gurgitem, quasi venatores ferocissimam bestiam, spumantes fluctus suscipiunt, eosque prorae objectione sustentant, flectentes in diversum gubernacula, et prout ventorum flatus et necessitas imperarit, stringentes funiculos, vel laxantes, cumque unda subsederit, ex utroque navis latere laborantia clavorum vincula dimittunt, ...". On this passage see Casson, *Ships and seamanship*, pp. 228-9.

[199] Appendix Three, §2.6: "Τὸ δὲ μέσον τῆς πρύμνης καὶ νεὼς μέχρι τῆς πρῴρας ἀσάνιδον."; §2.8: "Καὶ τὸ μὲν ἔδαφος αὐτῆς κύτος καὶ ἀμφιμήτριον ὀνομάζεται.". Cf. Pollux, *Onomasticon* (Bethe), I.87 (vol. 1, p. 28): "καὶ τὸ μὲν ἔδαφος τῆς νεὼς κύτος καὶ γάστρα καὶ ἀμφιμήτριον ὀνομάζεται.".

On the *amphimētrion*, see Hesychios, *Lexicon* (Schmidt), A.4065 (vol. 1, p. 163): "ἀμφιμήτρια· τὰ μετὰ τὴν τρόπιν τῆς νεὼς ἐξ ἑκατέρου μέρους ἐπιτιθέμενα."; repeated exactly by Phōtios, *Lexicon* (Theodoridis), A.1354 (p. 141): "ἀμφιμήτρια· τὰ μετὰ τὴν τρόπιν τῆς νεὼς ἐξ ἑκατέρου μέρους ἐπιτιθέμενα.".

[is] the ἐπισείων (*episeiōn*)".[200] Although some manuscript variants have either ἀσάνδιον or ἄσανδρον for σανίδιον, Pollux's latest editor, Bethe, was surely correct to choose σανίδιον, as attested to by the best manuscripts.[201] However, the Anonymous must have been using a manuscript with a variant such as those rejected by Bethe since he used ἀσάνιδον. Even if it is unclear what exactly Pollux meant by the *sanidion* with its *enthemion* and *episeiōn*, it is neverthless certain that he did not mean that the stern, or any part of a ship, was "undecked". *Sanidion* was, of course, a diminutive of, or derivative synonym for, σανίς (*sanis*), meaning a board, or plank, or timber, or just about anything made from wood; in particular, a platform, scaffold, or stage. By *sanidion*, Pollux probably meant the platform of the poop, stepped up from the level of the main deck. What he meant by *enthemion* and *episeiōn* is arguable.

Jal thought that the *enthemion* was the internal part of the *asandion*, but he was following Scheffer, who was merely repeating Pollux. However, Jal then said that in literary Greek of the 1840s the word was used for a *dunette*, a "poop", known also as a κάσσαρον (*kassaron*): the highest part of a quarter deck, where there was a cabin for the officers.[202] Hesseling claimed that *enthemion* was the same as modern Greek δεσπέντσα (*despentsa*) or κουμπάνια (*koumpania*) and meant a storeroom for provisions in the hold;[203] however, he provided no evidence for this and this was clearly not the meaning of the word as used by Pollux. Since the word is unknown in nautical terminology except in Pollux, the only other known use of the word being in the *Septuagint* translation of the *Old Testament* in *Exodus*, where the word meant a socket of a candelabrum,[204] there is simply no way of

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[200] Pollux, *Onomasticon* (Bethe), I.90 (p. 29): "[τὸ] μέσον δὲ τῆς πρύμνης σανίδιον, οὗ τὸ ἐντὸς ἐνθέμιον, τὸ δ' ἀπηρτημένον αὐτῷ ἐπισείων.".

[201] Ἀσάνδιον is derived from a now-lost manuscript, at least one copy removed from the manuscript of Arethas of Caesarea, from which the two extant fifteenth-century manuscripts of Paris, Bibliothèque Nationale, MS. Gr. 2646 and Salamanca, University Library, MS. I 2.3 stemmed. It is also found in the thirteenth-century manuscript Paris, Bibliothèque Nationale, MS. Gr. 2647. ῎Ασανδρον and ἀσάνδιον are found in the twelfth-century manuscript Heidelberg, Universitäts Bibliothek, MS. Pal. 375.

Dindorf relied on the Paris manuscripts for his edition of 1824 and consequently has ἀσάνδιον rather than σανίδιον. See Pollux, *Onomasticon* (Dindorf), I.90 (vol. 1, p. 88).

[202] See Jal, *Glossaire nautique*, pp. 607, 633, 877.

[203] Hesseling, *Mots maritimes* , pp. 17, 21.

[204] See *Septuagint*, *Exodus*, 38.16: "... καὶ τὰ λαμπάδια αὐτῶν, ἃ ἐστιν ἐπὶ τῶν ἄκρων, καρυωτὰ ἐξ αὐτῶν· καὶ τὰ ἐνθέμια ἐξ αὐτῶν, ἵνα ὦσιν ἐπ' αὐτῶν οἱ λύχνοι, καὶ τὸ ἐνθέμιον τὸ ἕβδομον ἀπ' ἄκρου τοῦ λαμπαδίου ἐπι τῆς κορυφῆς ἄνωθεν, ...".

knowing what he may have meant by it. As for *episeiōn*, Casson has argued that it was a pennant or flag of some kind on the basis of Pollux, *Onomasticon*, I.91, where the parts of a mast were enumerated from the keel to the masthead.[205] A pennant or flag also fits the sense of *episeiōn* here, where it was similarly attached, ἀπηρτημένον (*apērtēmenon*) to the *enthemion*. However, all that Pollux actually said was that something called an *episeiōn* was at the top of the mast above everything else. Rather than a flag, it may have been a flag pole. Then, in relation to the poop, Pollux may have meant that the *episeiōn* was a flagpole which was set in an *enthemion*, which by analogy to the *Septuagint* text could have been a socket for the pole.

The Anonymous interpreted Pollux's wording in the way he did because of the manuscript available to him and therefore his testimony that tenth-century dromons were undecked at the centre line should be questioned on textual grounds alone. Moreover, corroborating evidence from other sources leads inescapably to the conclusion that they were in fact fully-decked, just as they had been in the days of Prokopios.[206]

First, the implications of an otherwise incomprehensible passage in the *Naumachika Leontos Basileōs* of Leo VI, which was reiterated with minor changes by Nikēphoros Ouranos, suggest unequivocally that this was the case. The passage says that: "Moreover, they will set up the so-called wooden castles, ξυλόκαστρα (*xylokastra*), fortified with planks, around the middle of the mast on the largest dromons, from which men will throw into the middle of the enemy ship mill stones or heavy iron [weights], like sword-shaped blooms, ...".[207] As it

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[205] Pollux, *Onomasticon* (Bethe), I.91 (vol. 1, pp. 29-30): "καὶ τὸ μὲν ὑποδεχόμενον τὸν ἰστὸν ληνός [καλεῖται], τὸ δὲ ἐναρμοζόμενον αὐτῷ πτέρνα, τὸ δὲ τελευταῖον τὸ πρὸς τῇ κεραίᾳ ἠλακάτη καὶ θωράκιον καὶ καρχήσιον, τὸ δὲ ὑπὲρ τὴν κεραίαν ἄτρακτος, οὗ καὶ αὐτὸν τὸν ἐπισείοντα ἀπαρτῶσι.". See Casson, *Ships and seamanship*, p. 246, n. 86.

[206] Alexandres, Dolley, and Eickhoff all accepted uncritically the evidence of the Anonymous that dromons were only half-decked amidships and had full decks only at the bow and the stern. See Alexandres, *Ἡ θαλασσία*, pp. 65-66; Dolley, "Warships", p. 50; Eickhoff, *Seekrieg und Seepolitik*, p. 138.

[207] Appendix Two [a], §7: "Ἀλλὰ καὶ τὰ λεγόμενα ξυλόκαστρα περὶ τὸ μέσον τοῦ καταρτίου ἐν τοῖς μεγίστοις δρόμωσιν ἐπιστήσουσι περιτετειχισμένα σανίσιν, ἐξ ὧν ἄνδρες τινὲς εἰς τὸ μέσον τῆς πολεμίας νηὸς ἀκοντίσουσιν ἢ λίθους μυλικοὺς ἢ σίδηρα βαρέα, ...".

Note that Nikēphoros Ouranos altered "περὶ ..." to "πρὸς τὸ μέσον τοῦ καταρτίου". Appendix Five, §6: "Ἀλλὰ καὶ τὰ ξυλόκαστρα περιτετειχισμένα ὑπὸ σανίδων ἵνα στήκωσιν εἰς τοὺς μεγάλους δρόμωνας πρὸς τὸ μέσον τοῦ καταρτίου πρὸς τὸ στήκειν ἄνδρας ‹εἰς› αὐτὰ καὶ ῥίπτειν μέσον εἰς τὸ πολεμικὸν ἢ λίθους μεγάλους μυλικοὺς ἢ σίδηρα βαρέα, ...".

Cf. also Appendix Three, §3.2. The Anonymous also referred to *xylokastra* but

stands this passage is meaningless. No commander worth his salt would ever have gone into battle with wooden "castles" slung halfway up the the masts of his galleys. Any shock of impact would bring them crashing down and those in them would have been easy prey for an enemy severing the shrouds of the masts with rigging cutters, which were a normal part of the equipment of warships.

Vegetius wrote that: "The very sharp curved iron [blade] in the likeness of a *falx* (sickle) is called a sickle, because, set in long pikes, it quickly cuts the *chalatorii* by which the yard is suspended and, the sails having collapsed, makes the *liburna* slow and useless".[208] In Greek a sickle was a δρεπάνη (*drepanē*), or δρέπανον (*drepanon*), and λογχοδρέπανα, *longchodrepana*, "lance-sickles', are found among the armaments of dromons in an inventory for the Cretan expedition of 949 in the *De cerimoniis*.[209] They were no doubt similar to the *squarciavele*, "sail cutters", used on Angevin galleys in the thirteenth century,[210] which can be seen in the illustration of a galley in the

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did not locate their position on the dromons.

[208] Vegetius, *Epitoma*, IV.46 (pp. 164-5): "Falx autem dicitur acutissimum ferrum curvatum ad similitudinem falcis, quod contis longioribus inditum chalatorios, quibus antemna suspenditur, repente praecidit conlapsisque velis liburnam pigriorem et inutilem reddit.".

Casson believes that the *chalatorii* were "lifts", that is slings, from the mastheads to the ends of the yards of the square sails of *liburnae*. See *Ships and seamanship*, p. 262, n. 11. If so, the "sickles" could have been used only by men on the yards of an attacking ship and the operation must have been very hazardous. However, the passage is a re-working of a passage in Caesar's *Gallic War* describing his fleet's encounter with the ships of the Veneti and it is doubtful whether it has any independent value. See Caesar, *Gallic War*, III.14 (pp. 156-8): "Una erat magno usui res praeparata a nostris, falces praeacutae insertae adfixaeque longuriis, non absimili forma muralium falcium. His cum funes, qui antemnas ad malos destinabant, comprehensi adductique erant, navigio remis incitato praerumpebantur. Quibus abscisis antemnae necessario concidebant, ...". We owe this reference to Casson.

Caesar left little doubt that *funes* were halyards because when they were cut, the yards collapsed. Vegetius appears merely to have substituted *chalatorii* for *funes* and therefore the word must have meant halyards or tie tackles, in which case, the sickles could have been used from the deck.

On thirteenth-century, lateen-rigged Western galleys "*callati*/*collativi*/*collaturi*" were definitely tie tackles. See Pryor, "Galleys of Charles I of Anjou", p. 58. In fact no lateen-rigged ships could have "lifts" because the upper yard was much higher than the masthead. But if the *chalatorii* were tie tackles or halyards and the sickles were used from the deck, it then becomes difficult to understand why the defending crew could not simply break them or push them away from the halyards or ties.

In any case, the passage of Vegetius suggests that *liburnae* went into battle with masts and yards still raised. Although this was apparently the practice of the Veneti, it was contrary to normal practice in the Mediterranean in antiquity and the Middle Ages. The veracity of Vegetius' entire passage must be questioned.

[209] See Appendix Four [b], §II.11 [= Haldon, "Theory and practice", p. 225; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 669)].

[210] See Pryor, "Galleys of Charles I of Anjou", p. 78.

manuscript of the *De rebus Siculis carmen* of Peter of Eboli. [See Figure 54]

Masts were normally lowered before going into battle if at all possible in order to prevent their smashing the hulls and causing loss of life if they came crashing down.[211] For example, in his description of the battle of the *Aegates* islands in 241 B.C.E., Polybios wrote that when the Carthaginians descried the Roman fleet they "lowered their masts and cheering each other on in each ship closed with the enemy".[212] A well-known example of what could happen if masts were not lowered before battle occurred at the battle of *Ayas* in 1294. There a much superior Venetian fleet of 68 galleys made the cardinal mistake of going into battle against a smaller Genoese fleet with masts still raised and sails unfurled. The result was a catastrophe. The Venetian admiral Marco Basegio was killed and 25 of his galleys were lost.

"Castles" halfway up a mast could have had no conceivable purpose; however, the critical phrase in the texts, "around" (Leo VI), or "towards" (Nikēphoros Ouranos) "the middle of the mast" ("περὶ"or "πρὸς" "τὸ μέσον τοῦ καταρτίου"), stands easy emendment to either "around the middle mast" ("περὶ τὸ μέσον κατάρτιον") or "around the middle [i.e., half way between] of the masts" ("περὶ τὸ μέσον τῶν καταρτίων").[213] There is also another possibility. The term for the midships mast of Western sailing ships and galleys in the High Middle Ages was "*arbor de medio*", "the mast of the middle".[214] This was not a "middle" mast between two others, but rather any mast stepped amidships, irrespective of any other masts. The second mast of these Western ships was the "*arbor de prora*". If the Greek were to be emended to mean "around the mast of the middle" in parallel to later Western Latin usage, it would read: "περὶ τὸ κατάρτιον τοῦ μέσου".

Whatever the case, Vegetius had said that such castles had also existed on larger Roman *liburnae* and Appian described them being erected at the bows and sterns of Marcus Agrippa's ships at the Battle of *Mylai* in 36 B.C.E. and Dio Cassius by Marcus Antonius on his

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[211] Cf. Morrison, et al., *Athenian trireme*, p. 43.

[212] Polybios, *Histories*, I.61 (vol. 1, p. 166): "οἱ δὲ Καρχηδόνιοι κατιδόντες τὸν διάπλουν αὐτῶν προκατέχοντας τοὺς Ῥωμαίους, καθελόμενοι τοὺς ἱστοὺς καὶ παρακαλέσαντες κατὰ ναῦν σφᾶς αὐτούς, συνέβαλλον τοῖς ὑπεναντίοις.".

[213] These emendations were suggested in Dolley, "Warships", p. 51.

[214] See Pryor, "Naval architecture", p. 284; idem, "Galleys of Charles I of Anjou", pp. 40, 55.

ships before *Actium* in 31 B.C.E.[215] They are also seen on bas-reliefs and other pictorial depictions of Roman galleys.[216] The *Pōs dei diapleein potamous* attributed to Maurice also recommended that "castles" should be constructed on dromons for archers to fire from.[217] From a structural point of view, it is very difficult to imagine how such castles could have been raised on anything but full decks and the testimony of Pollux was very clear on this point. He wrote that: "... if the ship is fully decked, platforms for towers are built, and on these are two towers, left and right, between which (is) the deck".[218] This makes sense. Castles were built on both sides with a gangway on the deck between them. It accords with the construction of decked Roman *liburnae* to the age of Vegetius and, if the text of Pollux as we have it reflects dromons of the ninth century, it indicates that they were fully decked at that time and surely in the tenth century also.

Secondly, when Leo VI, and Nikēphoros Ouranos following him, wrote that: "If you realize that any of the soldiers are cowardly, send them to the lower oar-bank, and if any of the soldiers should be wounded or fall you should fill his place from those below out of necessity",[219] it again suggests that they were fully decked. Cowardly marines were dismissed to the oar-bank "below" [the deck], where they would be safe. The calibre of men there was such that they were brought into combat above the deck only when the need was dire.

Thirdly, John Kaminiatēs wrote in his *De expugnatione Thessalonicae* that when Leo of Tripoli's fleet carrying him and his fellow captives left Crete for Tarsos, he was on a "Roman warship", a *diērēs*, which the Muslims had raised from the sea at Thessalonikē after it had been sunk, and that: " ... the barbarians with us put themselves on the upper benches and left the lower [benches] to us, which were full of deep gloom and evil smells, and could only be

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[215] Vegetius, *Epitoma*, IV.44 (p. 162). Cf. Appian, *Civil wars*, 5.106 (vol. 4, p. 554); Dio Cassius, *Roman history*, 50.23.3-3 (vol. 5, p. 484).

[216] See, for example, Casson, *Ships and seamanship*, plate 130; Höckmann, "Liburnian", pp. 202-4; Morrison, *Greek and Roman oared warships*, pp. 356-8.

[217] Maurice, *Ek tou Maurikiou*, §3: "ἐμβάλλειν δὲ εἰς τοὺς τοιούτους δρόμωνας χρησίμους καὶ γενναίους τοξότας καὶ καστελλῶσαι αὐτούς.". Cf. Maurice, *Stratēgikon*, XIIB.21.15-16 (p. 468): "Χρησίμους δὲ τοξότας ἐν αὐτοῖς βάλλειν καὶ γενναίους, καὶ καστελλῶσαι αὐτούς.".

[218] Pollux, *Onomasticon* (Bethe), I.92 (vol. 1, p. 30): "ἐὰν δ᾽ ᾖ κατάφρακτον τὸ πλοῖον, ἐπιναυπηγοῦνται πυργοῦχοι, καὶ ἐπ᾽ αὐτῶν πυργία δύο, δεξιὸν καὶ εὐώνυμον, ὧν μέσον τὸ κατάστρωμα.".

[219] Appendix Two [a], §20: "Εἰ δέ τινας τῶν στρατιωτῶν ἀνάνδρους ἐπιγνῷς τούτους εἰς τὴν κάτω ἐλασίαν παράπεμπε, καὶ εἴ ποτέ τις πληγῇ ἢ πέσῃ τῶν στρατιωτῶν, τὸν ἐκείνου τόπον ἐκ τῶν κάτω ἐξ ἀνάγκης ἀναπληρώσεις.". Cf. Appendix Five, §18; Appendix Eight [a], p. 244.

described as a floating grave".[220] Again this suggests that the deck was a full deck and that conditions below it were dark and fetid as a result.

An argument *ex silentio* for dromons and *chelandia* having full decks may also be drawn from the history of the word ὑπόζωμα, *hypozōma*, "undergirdle". Any ships as long and shallow as dromons or *chelandia* were particularly prone to hogging and sagging as they moved across waves. In classical *triēreis* like *Olympias* the problem of hogging was overcome as far as was possible by the use of *hypozōmata*, heavy ropes running from stempost to sternpost and back again which were tensioned, most probably with deadeye tackles,[221] so that they acted in some respects as hogging trusses. *Triēreis* had to have *hypozōmata* because they had only part decks, not full decks. However, full decks removed the need for *hypozōmata* because the deck itself acted as a truss against both hogging and sagging. Consequently it was important that it be as rigid longitudinally as possible. By the thirteenth century, on galleys of the Kingdom of Sicily, the deck was laid on deck beams which ran from the heads of the frames at the hull and which were locked together longitudinally by stringers run from bow to stern under the beams and which were mortised onto them. Internal longitudinal stringers mortised onto the frames also performed the same function.[222] There can be little doubt that the decks of Byzantine dromons and *chelandia* were constructed similarly and the fact that the word *hypozōma* disappeared from the language and became misunderstood suggests that part-decked war galleys no longer existed. In fact they may have disappeared very early. The word *hypozōma* did not pass into Latin. In classical Greek literature it had been used by Plato in his *Republic* and *Laws* but it was not scholiated in the medieval manuscripts of these works. At the end of the second century Pollux misunderstood the word to mean a

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[220] John Kaminiates, *De expugnatione Thessalonicae*, §74.7-8 (p. 64): "ἦμεν δὲ πάντες, ὡς εἴρηται, ἐν μιᾷ νηὶ Ῥωμαίᾳ πολεμικῇ ἥτις ἦν διήρης, ὧν τὴν μὲν ἄνω καθέδραν οἱ λαχόντες εἶναι μεθ᾽ ἡμῶν βάρβαροι ἑαυτοῖς ἐκληρώσαντο, τὴν κάτω δὲ ἡμῖν ἐπαφῆκαν, σκότους πολλοῦ καὶ δυσωδίας πλήρη. καὶ τί ἄλλο γε χρὴ λέγειν ἢ τάφον ἐν ὕδασι πορευόμενον; ...". Cf. §§61.3, 73.12.

On the interpretation of this passage see also Livadas, "Medieval nautical technology". Livadas misunderstands καθέδρα as a deck rather than a rowing bench.

[221] See Coates, "Spanish windlasses"; Coates and Shaw, "Speculations".

Note that the rope *hypozōmata* of *Olympias* could never be made to work and that a wire hawser tensioned to 12 tonnes was used instead. See Coates, "Reconstruction", p. 22; Coates, et al., *Trireme trials*, pp. 6-8; Morrison et al., *Athenian trireme*, pp. 169-71, 220-2; Coates, "Development", p. 74; Coates and Shaw, "Speculations".

[222] See Pryor, "Galleys of Charles I of Anjou", pp. 39, 48-9.

part of a quarter rudder,[223] and in the fifth century Hesychios did not include it in his *Lexicon* at all. Nor did Phōtios include it in his *Lexicon* in the ninth century and towards the end of the tenth century the author of the *Souda* misunderstood it to mean a timber of a ship.[224]

Finally, the evidence that at least some Muslim and Western galleys of the tenth to twelfth centuries, all of which were ultimately descended from Byzantine galleys, were fully decked,[225] again leads to the conclusion that the model on which they were based was also fully decked.

The castles must have been built along either beam, with a clearway between them, for two reasons. First, it should be noted that in the texts of both Leo VI's *Naumachika Leontos Basileōs*, §7 and Nikēphoros Ouranos's, *Peri thalassomachias*, §6, "the largest dromons" is plural, as is "castles".[226] Both texts can stand either of two interpretations. Either there was only one castle and the whole sentence refers to multiple dromons, or else there was more than one castle on each dromon and the sentence refers to individual ships. Dolley, Eickhoff, and others have thought either that there was only one such castle and that it straddled a dromon from bulwark to bulwark somewhere amidships or else that there were two castles, one at the bow and one amidships, but again both straddling the ship from bulwark to bulwark.[227] However, in addition to the testimony of Pollux, the Anonymous's description of the mast and yard crutches makes it certain that neither of these interpretations was the case. All classical and medieval war galleys had a series of crutches, known in Greek as ἱστοδόκαι (*histodokai*), set up down the centre line, on which masts rested when lowered before going into battle or for other reasons.[228] The only conceivable construction which could make it

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[223] Pollux, *Onomasticon* (Bethe), I.89: "τὸ δὲ ἄκρον τοῦ πηδαλίου [οἴαξ· τὸ δὲ πᾶν] οἴαξ τε καὶ πηδάλιον [[καλεῖται]]. τὸ δὲ μέσον αὐτοῦ φθεὶρ ἢ ῥίζα ἢ ὑπόζωμα, ...".

[224] *Souda*, Υ.493 (vol. 4, p. 669): "Ὑποζώματα: ξύλα τῆς νεώς. ἀντι τοῦ εἰπεῖν ὑποζώματα ὁ σκυτεὺς πρὸς μάγειρον παίζων εἶπε ζωμεύματα, ὡς ἀρτύσεων ἔμπειρον καὶ ζωμευμάτων. ἀπείρητο δὲ ἀπὸ Ἀθηνῶν ἐξάγειν ξύλα καὶ πίσσαν. εἶχον δὲ καὶ Λακεδαιμόνιοι τριήρεις, ἐπειδὴ ἦρχον καὶ νήσων τινῶν. Ἀριστοφάνης· τοῦτον τὸν ἄνδρ᾽ ἐγὼ δείκνυμι καὶ φήμ᾽ ἐξάγειν τῆσι Πελοποννησίων τριήρεσι ζωμεύματα.".

[225] See Pryor, "From dromōn to galea", pp. 107-12.

[226] See above pp. 229 & n. 207; Appendix Two [a], §7; Appendix Five, §6.

[227] See Dolley, "Warships", p. 51; Eickhoff, *Seekrieg und Seepolitik*, pp. 138-9 and plan p. 8.

[228] See below pp. 248-52.

Eickhoff assumed that the crutches were to take the masts and yards when in harbour or during extended periods of rowing against the wind. He failed to appreciate that on war galleys their main purpose was to permit their lowering before going into battle. See Eickhoff, *Seekrieg und Seepolitik*, p. 138.

possible for a dromon both to have castles somewhere around a mast and also for the masts and yards to be lowered onto the crutches when necessary was for there to be two castles built to either side of the centre line, just as Pollux said, allowing for a clear gangway down the middle and for the crutches to be set up on the deck down the centre line.

Secondly, in order for lateen-rigged ships to tack, the yards have to be raised to the vertical and then swung across forward of the masts to the other side.[229] The foot of the yard has to be hauled in flush to the mast so that the yard is suspended vertically by its halyard rove through the block at the masthead. If a castle were built across the whole beam of the ship anywhere forward of a mast, the foot of the yard could not possibly be hauled in to the mast. If it was built behind the mast, then they would get in the way of the sail. The only way in which a ship with castles like this could tack would be if its yard was shortened by at least twice the height of the castle, its upper yard being shortened in order to balance the yard by at least the equivalent of the shortening of the lower yard made necessary to clear the castle. This would hardly be desirable from the point of view of the performance of the ship under sail. Eickhoff realized that his construction of the castles posed severe difficulties for the handling of the yards and sails.[230] In fact, it is impossible to imagine how galleys could possibly have managed their lateen sails effectively if constructed with superstructures of the type that Eickhoff and Dolley thought dromons had. One glance at Dolley's model shows immediately that its midships sail could not possibly have been tacked,[231] and it is probable that Eickhoff's could not have been either. The problem is removed if the castles were not built across the beam of the ships but rather to either side so that the yard could be brought to the vertical.

The Arabic version of this paragraph of the *Naumachika Leontos Basileōs* included by Muḥammad ibn Mankalī in his *Al-adilla al-rasmiyya fi 'l-ta'ābī al-ḥarbiyya* translated Leo VI's clauses as: "In each ship there should be a tower beside the mast (*al-ṣārī*), ...". The corresponding clause was identical in his *Al-aḥkām al mulūkiyya wa 'l-ḍawābit al-namūsiyya*.[232] Christides understood the Arabic term "*al-ṣārī*", for the mast, as "*al-ṣārī al-kabīr*", the large mast located in the

[229] See Pryor, "Mediterranean Round Ship", pp. 67-9.
[230] See Eickhoff, *Seekrieg und Seepolitik*, p. 141.
[231] Dolley, "Warships", plate V.
[232] Appendix Two [a], §7. Cf. Appendix Eight [a], p. 242; [b], p. 21.

middle of the ship,[233] and therefore located the castle amidships. The model of a dromon recently constructed under his direction for an exhibition on Oinoussai of models of medieval Byzantine and Arab ships perpetuates this.[234] However, in fact, the largest of the masts on all lateen-rigged medieval ships, whether sailing ships or galleys, was always the foremast.[235] The Arabic versions of Leo VI almost certainly had it correct. Castles were on the deck adjacent to a mast, but the mast to which *al-ṣārī* referred was surely a foremast rather than a midships mast. The castles would have been placed towards the bow around the foremast where they would be most effective in combat. The only illustration known to us of a Byzantine galley with such a castle is in the Madrid manuscript of the *Synopsis historiōn* of John Skylitzēs, fol. 31v. The illustration is of the arrival of the fleet of the rebel Thomas the Slav at *Abydos* and the castle is depicted exactly where it should be, towards the bow of Thomas's flagship. [See Figure 33]

In initial phases of combat, galleys almost always engaged by the bow and castles amidships would have been of little use. The closer castles were to the bow, the better the angles of fire would have been for archers stationed in them and the easier it would have been to hurl rocks or iron weights onto enemy ships. Broadside engagement such as would have made castles amidships effective was avoided whenever possible and would normally have occurred only when formations had been broken up and battles had degenerated into mêlées.[236] In fact, since galleys in combat would normally approach each other from opposite directions, even if they did end up engaged side to side they would most probably do so engaged stern by bow and vice versa.[237] Castles would have been most useful at the bow, from where the vulnerable poops of enemy galleys could be attacked.

One final issue concerning the castles must be addressed. In 1840

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[233] See Christides, "Ibn al-Manqalī", p. 86; idem, *Conquest of Crete*, p. 44, n. 53.

[234] Andriotes, *Βυζαντινά και Αραβικά ιστιοφόρα πλοία*, fig. 1: Δρόμων-Dromon. See also Christides, "Introduction", pp. 29-30. The exhibition was organized in conjunction with the Eighth International Congress on Graeco-Oriental and African Studies: «Navigation and trade in the Mediterranean from the 7th c. – 19th c. A.D.», Oinoussai, 5-9 July 2000.

[235] See below p. 243 & n. 259.

[236] See below pp. 399-404.

[237] Consider the battle of Ponza of 14 June 1300 between the Angevin fleet under Roger of Lauria and the Sicilian fleet under the Genoese admiral Conrad d'Oria. The admirals' galleys of Lauria and d'Oria slid along each other's sides until engaged stern to bow. See Pryor, "Naval battles of Roger of Lauria", p. 210.

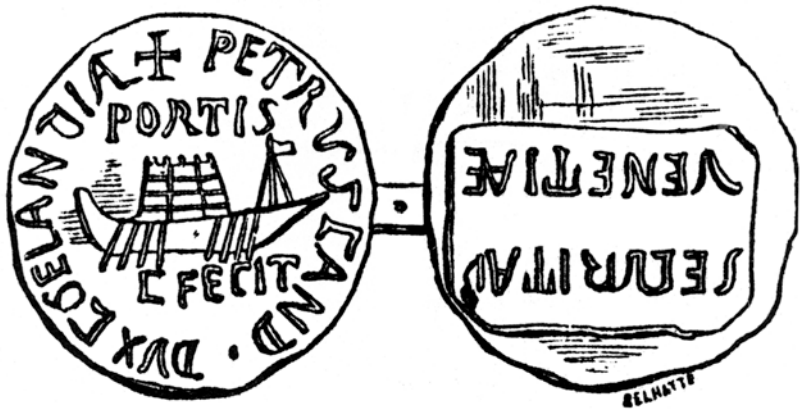


Figure 22
Chelandium on a medal forged by Alvise Meneghetti (1691-1768) attributed to a Venetian Doge Pietro Candiano, as published by Augustin Jal.

Augustin Jal reproduced a sketch of a medal with an engraving of a *chelandia* on it with some sort of tower amidships and inscriptions reading PETRUS CAND. DUX CϬELANDIÆ PORTIS C. FECIT on the obverse and SECURITAS VENETIÆ on the reverse, which he said had been shown to him in Venice in 1834 by Giovanni Casoni, a historian of the Venetian arsenal. The Doge referred to has been variously identified since there were four Doges of Venice of the Candiano family called Pietro in the ninth and tenth centuries.[238] Jal's sketch gave rise to over a century of scholarly discussion of Byzantine and Venetian *chelandia* in the ninth and tenth centuries. However, the medal itself disappeared from view and no scholar actually saw it until it was identified in the Archaeological Museum of Zagreb as one of numerous medals and coins from the collection of Dr Giorgio Catti of Fiume which was acquired by the Department of Archaeology of the National Croatian Museum of Zagreb in 1894. In 1991 it was published as one of many forgeries made by the Venetian jeweller and antique dealer Alvise Meneghetti (1691-1768).[239] The medal is a weld

[238] Jal, *Archéologie navale*, pp. 246-8. Cf. *Glossaire nautique*, pp. 465 and 751.
Doges of the Candiano family by the name of Petrus/Pietro were: Pietro Candiano I (887), Pietro Candiano II (932-9), Pietro Candiano III (942-59), and Pietro Candiano IV (959-76).

[239] See Gorini, Mirnik, and Chino, "Falsi di Meneghetti", pp. 324-7 & no. 8 (p.

of two laminae of copper alloy and the inscriptions should read "PETRUS CAND. DUX CHELANDIÆ PORTIS C. FECIT", and "SECURITAS VENETIÆ". The history of the medal and the scholarship on it has now been traced by Reinhold Mueller,[240] but it is valueless for study of the construction of dromons or *chelandia*.

(g) *Masts, yards, and sails*

Although the texts of Leo VI and Nikēphoros Ouranos referred to plural dromons and castles, they referred to a singular mast.[241] However, all possible emendations of the texts made necessary by the need to explain the castles imply that dromons must have had more than one mast. "Around the middle mast" (περὶ τὸ μέσον κατάρτιον) implied a mast between two others. "Around the middle of the masts" (περὶ τὸ μέσον τῶν καταρτίων) implied between two masts. "Around the mast of the middle" (περὶ τὸ κατάρτιον τοῦ μέσου) implied that there was another mast distinguished from the midships mast.

All that can really be said about the masts is that dromons almost certainly had at least two: a midships mast and a foremast. Dolley was surely correct to point out that a foremast and foresail would have been necessary in order to enable ships as large as these to be manageable with lateen sails.[242] Eickhoff drew his standard dromon with two masts but he made the second one a small mizzen mast at the stern, which is impossible. He also hypothesized, without any evidence, that the largest dromons may have had a third mast, which would have had to have been placed at the bow.[243] However, his reconstruction is historically inappropriate and the same is true of Dolley's replica, which also has the largest mast and sail amidships. It is also true of the Oinoussai exhibition model of a dromon. Both Eickhoff and Dolley were apparently influenced by the norm for post-medieval square-rigged ships, which had the largest mast amidships between a mizzen mast and a foremast. Their entire reconstructions of the sailplans can be dismissed because they did not appreciate that

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[240] Mueller, "Venetian ships". We are indebted to Reinhold Mueller, who traced the medal and its history at our request.

[241] See Appendix Two [a], §7 and Appendix Five, §6.

[242] Dolley, "Warships", p. 52. Dolley claimed that with only one mast their bows would have fallen off the wind. In fact they would have luffed up into the wind out of control.

[243] See *Seekrieg und Seepolitik*, p. 140.

from antiquity to the end of the Middle Ages all lateen-rigged ships of all kinds, including war galleys, always had their largest mast and sail towards the bow and a smaller one towards the stern. The documentary evidence for this for Western galleys of the High Middle Ages is very clear and there is no reason to suspect that it was not the case also for similarly lateen-rigged Byzantine dromons.[244] Although he constructed his dromon replica with three masts, Dolley was quite circumspect on this issue and did not actually claim that they had three masts;[245] however, following Dolley's lead, and relying on a graffito from a later period, Christides has claimed that they did have three.[246] It is indeed true that several graffiti from Byzantine churches and monasteries show two- and three-masted galleys, frequently with what appears to be a forked tongue, presumably Greek Fire, projecting from the bow. However, none of these can be firmly dated to the era of the Macedonian emperors. The dating of all of the graffiti is so impossibly indeterminate as to make them virtually useless for the study of the dromon in any period.[247]

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[244] See Pryor, "Galleys of Charles I of Anjou", p. 55. It is true that the only depiction of a two-masted galley known to us from the Middle Byzantine period, the miniature of the manuscript of the *Sacra Parallela*, our own Figure 8, does show the midships mast longer than the foremast. We attribute this, however, to the artist's need to cram the drawing into a very elongated space.

[245] Dolley, "Warships", p. 51. Alexandres also claims three masts. See *Ἡ θαλασσία*, p. 72.

[246] Christides, "Byzantine dromon and Arab ṣḥīnī", p. 115; idem, "New light", fig. 5 (p. 9); Andriotes, *Βυζαντινά και Αραβικά ιστιοφόρα πλοία*, fig. 1: Δρόμων – Dromon.

Christides says that the graffito in question is from the "temple of Christ the Saviour in Megara" and dates from the twelfth century. However, he attributes his source to Alexandres, *Ἡ θαλασσία*, fig. 2.10 (p. 58), where it is ascribed to the monastery of the Blatadōn at Thessalonikē, which was not established until ca 1355.

[247] See Alexandres, *Ἡ θαλασσία*, fig. 2.1 (p. 58) [a two-masted galley from the church of Galatision at Athens, which is dated to the late thirteenth century] and fig. 2.8 (p. 58) [a three-masted galley? (no oars are shown but the hull configuration is that of a galley) from the church of the Holy Apostles at Thessalonikē, which is dated to 1310-14].

See also Meinardus, "Medieval navigation", fig. V.4 (p. 42) [a two-masted galley from the church of St Luke of Stiris in the subterranean church of St Barbara, which may date to the tenth century] and fig. IX.2 (p. 48) [a three masted galley? (no oars are shown), from the Hephaisteion (church of St George), Athens, date unknown].

See also Goudas, "Μεσαιωνικὰ καράγματα", fig. 19 (p. 336) [a two masted galley? (no oars are shown) - from the Hephaisteion (Church of St George), Athens. date unknown]

As Meinardus himself wrote: "..., there is no reason to assume that all of these akidographemata were the pious expressions of Greek sailors. For that matter, it is quite likely and even probable that some of these scratchings represent the ships of Venetian and Genoese sailors." (p. 32).

One other argument *ex silentio* may be adduced against the proposition that dromons had three masts. The Anonymous's major lexicographical source, Pollux, had discussed in clear terms the three masts that some ancient ships had had, naming them as foremast, ἀκάτειος (*akateios*), midships mast, ἐπίδρομος (*epidromos*), and a smaller mast, presumably at the stern, δόλων (*dolōn*). Hesychios described them similarly, except that he made an ἐπίδρομον (*epidromon*) the mast at the stern.[248] The *Lexicon* of Phōtios did not include any of these terms;[249] however, significantly, the author of the *Souda* did, but had no idea what they meant.[250] Since the author of the *Souda* did not understand Pollux's terminology, perhaps neither did the Anonymous, simply because by their age these terms for masts had been forgotten. The Anonymous chose not to repeat Pollux and made no mention of the number of masts that dromons had. Perhaps, from the window of the library in Basil's palace, he could see that dromons sailing the Golden Horn or the Bosporos did not have three masts and for once allowed reality to take precedence over philology.

Dolley claimed that the flying bridges used by Leo of Tripoli at the siege of Thessalonikē in 904 A.D., as described by John Kaminiatēs, proved that the Muslim ships employed in the attack had two masts, a foremast as well as a main mast.[251] The passage of Kaminiatēs in question reads:

> ..., coupling all the ships together in pairs, the one against the other, and tightly holding the sides of each one to the other with strong cables and iron chains so that they would not easily drift apart, they hauled by means of the rigging hanging at the bow the timbers standing in the middle which sailors are accustomed to call masts, then raising by means of the ropes twisted around the mastheads the quarter rudders of each ship into the air, pushing the blades out from the prow beyond the extent of the ship. ... when the quarter rudders had been suspended aloft in the manner described, they placed long strips of wood over them in rows, one next to

[248] Pollux, *Onomasticon* (Bethe), I.91 (vol. 1, p. 30): "καὶ ὁ μὲν μέγας καὶ γνήσιος ἱστὸς ἀκάτειος, ὁ δὲ κατόπιν ἐπίδρομος, ὁ δὲ ἐλάττων δόλων. καλεῖται δέ τι καὶ λόγγασος.". Cf. Hesychios, *Lexicon* (Schmidt), A.2302 (vol. 1, p. 94), Δ.2185 (vol. 1, p. 528), E.4760 (vol. 2, p. 152). These ships were not, however, specifically galleys of any type. Some ancient and medieval sailing ships certainly had three masts.

[249] The entries from ἀδιάκριτος to ἐπώνυμοι were missing from the manuscripts from which Naber's edition was compiled but were included in the thirteenth-century manuscript Zavorda, monastery of St Nikanor (near Gravina in Northern Greece), MS. 95 on which the new edition by Theodoridis has been based. These words, however, do not appear in it either.

[250] See *Souda*, A.819 (vol. 1, p. 77), Δ.1346 (vol. 2, p. 125), E.2310 (vol. 2, p. 355).

[251] Dolley, "Warships", p. 52.

> the other, flooring in the intervening space by this ingenious method. They then fenced in the edges on all sides with planks and secured the ends of the shafts with very strong cables at the stern.[252]

This is in fact a very curious passage because there is actually no mention of foremasts. On the one hand, the "rigging hanging at the bow" might be considered to pre-suppose them but, if so, why was it necessary to move the midships masts in order to raise the steering oars aloft to construct the assault bridges to the walls? Why could they not have been slung from the foremasts? On the other hand, if these were single-masted ships, what was the "rigging hanging at the bow"? And if they were single-masted ships, the masts could not have been moved in any case because there would have been no second mast-step for them and the decks would have been pierced in only the one place.[253] However, it appears to have escaped attention that this passage was very similar to another in the tenth-century treatise *De obsidione toleranda* which was based on Polybios's account of the Roman siege of Syracuse in 214 B.C.E. as preserved in the encyclopedic *Ἐκλογαί* (*Excerpta*) produced for Constantine VII. Polybios was known in literary circles in Constantinople in the tenth

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[252] John Kaminiates, *De expugnatione Thessalonicae*, §32.5-7 (p. 30): "..., καὶ πάσας αὐτῶν τὰς νῆας κατὰ δύο συζεύξαντες ἑτέραν τῆς ἑτέρας ἐχομένην, καὶ τίσι κάλοις στιβαροῖς καὶ σιδηραῖς ἀλύσεσι τὰς ἑκατέρων πλευρὰς ἐν ἀλλήλαις συσφίγξαντες πρὸς τὸ μὴ ῥᾳδίως ἀφίστασθαι, ἀνείλκυσαν διὰ τῶν κατὰ πρῴραν ἀπῃωρημένων ἐξαρτίων τὰ διὰ μέσου προβεβλημένα ξύλα, ἃ τοῖς ναυτιλλομένοις κατάρτια καλεῖν ἔθος. εἶτα τοὺς τῶν ἑκατέρων νηῶν αὐχένας ἐν τούτοις διὰ τῶν εἰς τὴν κεφαλίδα στρεφομένων σχοινίων μέσον που τοῦ ἀέρος μετεωρήσαντες, τάς τε σπάθας αὐτῶν ἐκ τοῦ κατὰ πρῴραν μέρους καὶ πέρα τῆς τῶν νηῶν διαμέτρου προβεβληκότες, ... ὑψοῦ γάρ, ὡς ἔφην, τῶν αὐχένων μετεωρηθέντων, ἔβαλλον ἐν αὐτοῖς ἐπιθέντες μακρά τινα ξύλα στιχηδὸν ἄλλο κατ᾽ ἄλλο, καὶ τὸν διὰ μέσου τόπον γεώσαντες τῇ σεσοφισμένῃ ταύτῃ μηχανῇ, τὰ πέρατά τε πάντοθεν σανίσι καταφραξάμενοι, καὶ τὰ ἄκρα τῶν αὐχένων ἐν τοῖς κατὰ πρύμναν μέρεσιν ἄλλοις στιβαρωτάτοις δεσμοῖς ἐνασφαλισάμενοι, ...". The translation is ours.

In his translation of this passage, Dolley translated *katartia* as "yards" rather than as "masts". See Dolley, "Rig", p. 52. Consequently, his understanding of the construction of the flying bridges is inaccurate and his conclusion that these ships necessarily had lateen yards cannot be sustained. They surely did have lateen yards, but that is beside the point.

[253] Livadas also interprets this passage to mean that the the Arab ships had two masts because they had "foremast slings", a term which he appears to have derived from Dolley, "Rig", p. 52, where it is unclear what Dolley actually meant by the term. See Livadas, "Medieval nautical terminology", p. 285. To interpret "κατὰ πρῴραν ἀπῃωρημένων ἐξαρτίων" as "foremast slings" is surely to stretch the meaning of the Greek, whatever was meant by the English expression. In the context of a mast, "slings" normally referred to ropes or chains which supported yards on the masts of square-rigged ships; however, lateen-rigged ships do not have "slings". They can not have because the upper end of the yard is much higher than any "sling point" on the mast could be.

century. In neither the *De obsidione toleranda* nor Polybios were the ships explicitly said to have had two masts and it is at least possible that Kaminiates, who was probably influenced by Polybios, derived his confused form of the account from him.[254]

Such flying bridges had certainly been used for a very long time. Appian described their use by Mithridatēs VI Eupator at a siege of *Kyzikos* in 74 B.C.,[255] and Theophanēs the Confessor wrote that the Muslim fleet under Maslama ibn ‘Abd al-Malik which besieged Constantinople in 717 initially expected to attack the walls at the shore and to raise the quarter rudders onto the ramparts.[256] What seems to have been a depiction of something very similar to the ship-borne siege engines described by Kaminiatēs and the *De obsidione toleranda* can be seen in an illustration at folio 40r, in a section dealing with flying bridges, ἐπιβατήρια (*epibatēria*), run from the mastheads of ships to the walls of a town, in the eleventh-century manuscript Rome, Biblioteca Vaticana, MS. Gr. 1605 of the *Parangelmata poliorkētika* attributed to Hēroñ of Byzantium.[257] Here the bridges to the walls can clearly be seen constructed from long spars decked in with planks and fenced along the sides, almost exactly as Kaminiatēs described. They are raised by blocks from beams crossing the mastheads of each pair of ships. However, there is a critical difference. There are two masts here. Both the foremasts and midships masts of each pair of galleys are in place and the bridges are hoisted between all four masts. Such flying bridges continued to be

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[254] *De obsidione toleranda*, §§208-11 (pp. 220-21); Polybios, *Histories*, VIII.4.2-11 (vol. 3, pp. 452-5).

[255] Appian, *Mithridatic wars*, §73 (vol. 2, p. 376): “... κατὰ δὲ τοὺς λιμένας δύο πεντήρεις ἐζευγμέναι πύργον ἕτερον ἔφερον, ἐξ οὗ γέφυρα, ὁπότε προσπελάσειαν ἐς τὸ τεῖχος, ὑπὸ μηχανῆς ἐξήλλετο.”.

[256] Theophanēs, *Chronographia*, A.M. 6209 (vol. 1, p. 396): “ἐβούλοντο γὰρ τῇ αὐτῇ ἑσπέρᾳ εἰς τὰ παράλια προσορμίσαι τείχη καὶ τοὺς αὐχένας εἰς τὰς ἐπάλξεις ἐπιθεῖναι.”.

[257] Hēroñ, *Parangelmata poliorkētika*, in Sullivan, *Siegecraft*, fig. 26.

Epibatēria was a later form of ἐπιβάθρα, *epibathra*, for gangways or boarding bridges. See above pp. 193-4 & n. 86 and also Marsden, *Technical treatises*, pp. 85, 92, 97.

The treatise attributed to Hēroñ of Byzantium was in fact an anonymous treatise compiled in the second quarter of the tenth century during the reign of Constantine VII Porphyrogennētos from various earlier treatises on siege warfare. It was probably another product of the encyclopedic movement associated with Constantine VII; however, the author added comments of his own to his paraphrases of his sources and on occasions these appear to have been based on some practical experience. The attribution to a certain “Hēroñ” was added to the manuscript in the fourteenth or fifteenth century. The section on assault bridges was paraphrased from a section of the *Peri mēchanēmatōn* of Athēnaios Mēchanikos.

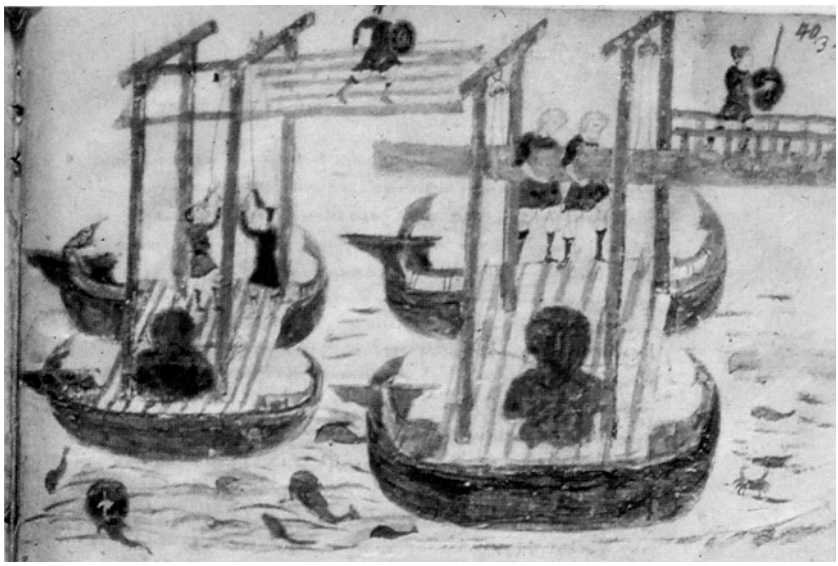


Figure 23
Ship borne siege engines in a treatise on poliorcetics attributed to Hērōn of Byzantium (Rome, Biblioteca Apostolica Vaticana, MS. Vat. Gr. 1605, fol. 40r), eleventh century.

used throughout the Middle Ages. Robert of Clari and Count Hugh of St Pol described their construction by the Venetians for the assault on Constantinople by the Fourth Crusade in 1203.[258]

In the absence of any Byzantine data the best estimate of the length of the masts of dromons that can be made is by comparison to that of the masts of thirteenth-century Sicilian galleys, whose middle masts were 11.075 metres long and whose foremasts were 15.82 metres long, being raked forward at approximately thirteen degrees to the vertical, bringing their mastheads to approximately 14.20 metres

[258] Robert of Clari, *Conquête de Constantinople*, §44 (p. 44): "Adont fist li dux de Venice molt merveillex engiens faire et molt biaus, car il fist prendre les antaines qui portent les voiles des nes, qui bien avoient trente toises de lonc ou plus; si les fist tres bien loier et atakier a boines cordes as mas, et fist faire bons pons par deseure et bons puis encoste de cordes; si estoit li pons si les que trois chevalier armé i pooient aler de front. Et fist li dux les pons si bien warnir et couvrir as costés d'esclavinnes et de toile que cil qui i montassent pour assalir n'eussent warde ne de quarriaus d'arbalestes ne de saietes; et lanchoit li pons tant avant outre le nef qu'il avoit bien de hauteur du pont dusques a tere pres de quarante toises ou plus; ...". Hugh of St Pol, *Epistola* to Henry of Louvain, in Tafel and Thomas, *Urkunden*, vol. 1, p. 308: "Dux Venetie vero super quamlibet navim construxit de antennis pontem altissimum, in altitudine 100 pedes habentem; et super quemlibet pontem poterant ire quatuor milites de fronte.".

above the water line. However, these galleys had an overall length from stempost to sternpost of 39.55 metres and a beam amidships of 4.61 metres, whereas the estimates here for the corresponding dimensions of dromons are 31.25 metres and 4.46 metres.[259] In other words, dromons of the tenth century were probably only around 75% of the size of Angevin galleys. If the masts were scaled down proportionately, the middle masts of dromons may have measured around 8.3 metres long and the foremasts around 11.85 metres long with a masthead height above the water line of around 10.65 metres.

The inventories for the Cretan expedition of 949 specified that the Department of the *Vestiarion basilikon* was to supply for 20 dromons: "20 χαλκίσια (*chalkisia*), together with the rest of the μάγγανα (*mangana*)".[260] *Chalkisia* was surely derived from the classical Greek καρχήσιον (*karchēsion*), which was well known to refer to a masthead amongst other things.[261] The word ought to have been known to the Anonymous from Pollux and Hesychios and it is therefore curious that he did not include it when enumerating the parts of masts and rigging.[262] In Latin the word became *carchesium* and was well known to refer to the head of a mast.[263] Jal identified καρχήσιον and *carchesium* as the origin of the various medieval vernacular words *calces*, *calcez*, *calcese*, *calcet*, *cholzexe*, for a "block mast"; that is, a masthead with blocks inserted in it for the halyards to be rove through.[264] Since only 20 *chalkisia* were specified for the 20 dromons,

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[259] See Pryor, "Galleys of Charles I of Anjou", pp. 55, 70, 74; idem, "From dromōn to galea", p. 113; idem, "Naval architecture", pp. 284-5.

[260] See Appendix Four [b], §IV.9: "χαλκίσια κ΄ μετὰ καὶ τὰ λοιπὰ μάγγανα," [= Haldon, "Theory and practice", p. 227; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 672)].

[261] See Lendle, "Das Karchesion", esp. pp. 85-101.

[262] See Pollux, *Onomasticon* (Bethe), I.91 (vol. 1, pp. 29-30): "τὸ δὲ τελευταῖον τὸ πρὸς τῇ κεραίᾳ ἠλακάτη καὶ θωράκιον καὶ καρχήσιον, ...". Cf. Hesychios, *Lexicon* (Schmidt), K.952 (vol. 2, p. 418): "κάρχησι. [καρχήσια, ed. Latte, vol. 2, p. 419] · τὰ κέρατα τὰ ἐπάνω τῶν καταρτίων τῶν πλοίων. καὶ τὰ ἄκρα τῶν ἱστῶν".

[263] See Isidore of Seville, *Etymologiae*, XIX.ii.9: "Carchesia sunt in cacumine arboris trochleae, quasi F littera, per qua funes trahuntur.".

See also the gloss on *carcessium* in an *Abolita* gloss in the eighth-century manuscript Rome, Biblioteca Apostolica Vaticana, MS. Vat. Lat. 3321 in Goetz, *Glossarii Latini*, vol. 4, p. 29, l. 35: "Carcessium est in summo malona‹uis› [sic]". See "Note on citations of Greek and Latin glossaries", p. lxix above. Cf. the gloss on *carcena* in the tenth-century *Glossae Aynardi*, Metz, Bibliothèque Publique, Cod. Metensis 500 in ibid., vol. 5, p. 617, l. 19: "Carcena sunt loca in cacumine arboris nauis ubi funus stant ad trahendum"; and that on *carcessia* in the ninth-century *Amplonianum primum* glossary, Erfurt, Wissenschaftliche Allgemeinbibliothek, Amplon. Fol. 42, in ibid., vol. 5, p. 353, l. 2: "Carcessia summitas mali".

[264] See Jal, *Glossaire nautique*, p. 385. The metathesis of "κ" and "χ" and the liquids "λ" and "ρ" are both well known linguistic phenomena. See also Hesseling,

they were apparently used on only one of the masts, presumably the largest of them: the foremast. They must therefore have been special blocks of some sort. Much more probably, the word had already become applied to the blockmast, as it was later in the medieval West. Χαλκίσια was apparently the transmission word between καρχήσιον and *calces*.

On other masts ordinary blocks (*mangana*) were apparently used to raise the yards. We draw attention to the fact that some Byzantine and Western illustrations of early medieval sailing ships show peculiar mastheads "hooked" or "beaked" forward. There are too many of these for it to be accidental. They can be seen in the ninth-century illustrations of the ship in the *Khludov Psalter* and in the Paris, Bibliothèque Nationale, manuscripts of the Sermons of St Gregory of Nazianzos and the *Sacra Parallela* attributed to St John of Damascus, [See Figures 8, 15, and 16] as well as at fol. 147r of the London, British Library, MS. 40731 *"Bristol" Psalter* of the late tenth or early eleventh centuries and at fols 117v and 201r of the London, British Library, MS. Add. 19.352 *Theodore Psalter* of 1066.[265] They can also be seen in an eleventh-century manuscript of a *Mēnologion* in the monastery of the Esphigmenou of Mt Athos, in a twelfth-century manuscript of the sermons of St Gregory of Nazianzos in the monastery of the Panteleēmon of Mt Athos, and in an enamel from the Pala d'Oro of San Marco, Venice.[266] In fact they were much more ancient than this. Similar mastheads can be seen in a fourth-century mosaic of a fishing boat from Roman *Carthage*, in a graffito of a sailing ship from Corinth of the fifth or sixth centuries, and in the painting from *Kellia* of ca 600-630.[267] [See Figure 17] However, they are never seen in any illustration of a ship which clearly has a square sail. The conclusion to be drawn is that they were associated with lateen sails. Pryor has suggested that masts with heads such as these did not need blocks inserted in the mastheads and that lateen yards could simply be raised with normal blocks slung from the hooks or

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Mots maritimes, p. 19; Makris, "Griechischer lingua franca", p. 221; Kahane, "Byzantinoromanica", pp. 316-17.

[265] See Dufrenne, *L'illustration*, pl. 56; Der Nersessian, *L'illustration*, pl. 70, fig. 194 and pl. 112, fig. 317.

[266] Paris, Bibliothèque Nationale, MS. Gr. 510, fol. 3r and MS. Gr. 923, fol. 207r; Mount Athos, Esphigmenou, Cod. 14, fols 52a and 387a; Mount Athos, Panteleēmon, Cod. 6, fol. 37a. See Bass, *History of seafaring*, p. 149, pl. 3; Pelekanides, *Οἱ Θησαυροί*, pll. 299 (p. 175), 329 (p. 208), and 348 (p. 266); Weitzmann, *Sacra Parallela*, fig. 203 (pl. LIII).

[267] Fantar, *Mosaïque en Tunisie*, p. 122; Basch, "Navires et bateaux coptes", figs 4 and 25.

beaks. The hooked mastheads presumably served to suspend the yards forward of the masts so that they could be swung across the front of the masts more easily when tacking. Apparently, it was only when ships and their yards and sails grew large enough that blockmasts became needed.[268] Perhaps dromons of the tenth century needed *chalkisia* only for their largest yards and sails and used ordinary blocks slung from beaked mastheads for their other sails.

There is some support for this in the fact that the inventories for the Cretan expedition of 949 specified that the Department of the *Vestiarion basilikon* should have provided 20 "sails", ἄρμενα (*armena*), for the 20 dromons.[269] But ships as large as Byzantine dromons would have been unmanageable with only one sail. Besides which, sails blew out constantly and no ship would ever have put to sea without at least one spare set of sails. Leo VI himself said that dromons should carry a duplicate set of sails.[270] We should probably understand the reference in the inventories as a generic reference to "the" sail, that is the "mainsail", the one used in fair weather on the main mast towards the bow.[271] It would be for this mast that the blockmast was used.

Against this it should be pointed out that another section of the inventories said that the Department of the *Eidikon* outlayed 1154 *nomismata* for cloth for eleven sails for nine *karabia* and two *monēria* transporting *Rhōs* and prisoners.[272] It appears that these ships really were single-masted and that only one sail was provided for each of them. However, these ships were smaller than dromons or *chelandia*.

The inventories for the Cretan expedition of 949 also specified in the item immediately following this one referring to the blockmasts that 20 "hoops", ψελλία (*psellia*), should be provided for the 20 dromons.[273] Ψέλ(λ)ιον was a common word for a ring or hoop of any

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[268] See Pryor, "Mediterranean round ship", p. 71.

[269] See Appendix Four [b], §IV.3: "ἄρμενα κ΄," [= Haldon, "Theory and practice", p. 227; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 672)].

[270] See Appendix Two [a], §5 and Appendix Five, §4.

[271] That is to assume that it was not a much more simple case of some clerk in an office thinking to himself: "One dromon, one sail". This is a peculiar section of the inventories where it was a case of what "should have been provided" by the Department of the *Vestiarion basilikon*, whatever that means. The case of the verb φροντισθῆναι, "provide", is aorist passive infinitive.

[272] See Appendix Four [b], §VI.2-4 [= Haldon, "Theory and practice", p. 229; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 674)]. The major point here is that eleven sails were specified for the eleven ships; that is, one each. However, it must be appreciated that 1154 *nomismata* was a huge amount of money. There simply has to be something wrong, either in the number of sails or in the number of *nomismata*.

[273] See Appendix Four [b], §IV.10: "ψελλία κ΄," [= Haldon, "Theory and practice",

kind: an armband, anklet, etc. Elsewhere in the inventories, the word was associated with siege engines of various kinds, including large bow-*ballistae*.[274] What exactly it was here can only be conjectured. However, since only one of these per dromon was specified, it was presumably a special piece of equipment and since this specification follows immediately after that for the blockmasts, it is very tempting to read the word as meaning a "parrel", the classical Greek word for which had probably been χαλινός (*chalinos*).[275] Yards had to be held close to the masts by rings or hoops, which in later centuries were made up of rope rove through wooden balls and spreaders, in order to prevent the wind in the sails causing them to flail around and slam back and forth against the masts.[276] In medieval Italian and Latin these were known as *trozze*, *troçe*, *trosse*, *troce*, or *trocte*.[277] In English they became known as "trusses" or "parrels" and parrell appears to fit the meaning of *psellion* in this context. If this is correct, then *psellion* was later replaced in Greek by τρότσα (*trotsa*), derived from the Italian *trozza*.[278] Either that or the inventorist was using a non-technical term.

Beyond this, the inventory for the Cretan expedition of 949 specified that the Department of the *Eidikon* should have provided 100 extra small sails, ἀρμενόπουλα (*armenopoula*), for the 20 dromons.[279] One might well ask extra to what? Since these were specifically said to be small, they were no doubt storm sails. Lateen sails could not be shortened in heavy weather and it was necessary to lower the yards, unbend the fair weather sails and bend on smaller ones. In the West in the thirteenth century storm sails were normally known as *tertiarola* because they were one third smaller than the normal sails.[280] An explanation of *armenopoula* as storm sails would explain why each dromon was allocated five of them. Because they were used in heavy weather, they would be much more prone to being blown out than the fair weather sails.

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p. 227; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 672)].

[274] See Haldon, "Theory and practice", pp. 225: "..., καὶ ἡ τούτων ἐξόπλισις. ... ψελλία καὶ δάκτυλοι, ..."; 229: "ψελλία λ΄, καὶ λόγῳ τῶν μεγάλων τοξοβολίστρων.". Cf. Constantine VII, *De cerimoniis*, II.45 (vol. 1, pp. 670, 672-3).

[275] See Casson, *Ships and seamanship*, pp. 230, 260-3.

[276] See Jal, *Glossaire nautique*, under "*racage*" (pp. 1250-51).

[277] See Pryor, "Naval architecture", p. 368; idem "Galleys of Charles I of Anjou", pp. 61-2.

[278] See Hesseling, *Mots maritimes*, p. 32; Kahane, *Lingua Franca*, §679 (p. 450).

[279] See Appendix Four [b], §III.8: "ἀρμενόπουλα κατὰ περίσσειαν ρ΄," [= Haldon, "Theory and practice", p. 227; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 671)].

[280] See Pryor, "Naval architecture", pp. 363-4 and Tables 3 & 4; idem, "Naval architecture revisited", pp. 261-66; idem, "Galleys of Charles I of Anjou", pp. 57-8.

As for the size of the sails, there is only one piece of evidence known to us. The same section of the inventories for the Cretan expedition referred to above, concerning the outlay by the Department of the *Eidikon* of 1154 *nomismata* for eleven sails for the nine *karabia* and two *monēria* transporting the *Rhōs* and prisoners, said that the sails of the *karabia* were 30 *pēcheis* and those of the *monēria* 28 *pēcheis*. Assuming that these dimensions were of the same category as those used for sails in the Latin West in the thirteenth century, where the primary dimension specified was always the length on the yard, it would mean that the lengths on the yard were respectively 14.04 metres and 13.10 metres. This can be compared to the 26.89 metres for the foresail and 20.57 metres for the midships sail of Angevin galleys of the 1270s.[281] The latter had an overall length from stempost to sternpost of 39.55 metres and a beam amidships of 4.61 metres, whereas the estimates here for the corresponding dimensions of dromons are 31.25 metres and 4.46 metres.[282] Since dromons of the tenth century were probably only around 75% of the size of Angevin galleys, if we scale down the sails proportionately, the foresail of a dromon may have measured around 20.17 metres on the yard and the midships sail around 15.43 metres, somewhat larger than those of the *karabia* and *monēria*, as one would expect. The peak of the foremast sail may have been around 21 metres above the water line.

One of the passages penned by the Anonymous which has been amongst the most difficult to make any sense of concerns the masts, yards, and the so-called "stiffener keel". He wrote that: "When [the ship] is sailing, the mast step, τράπεζα (*trapeza*), in which the mast, ἱστός (*histos*), that is, the κατάρτιον (*katartion*), is set up, is fixed in the middle on to the keel. The lower part of the *katartion* which is fixed in the mast step is called the heel, πτέρνα (*pterna*); hence [the expression] 'is unheeled' when it comes out of the mast step under pressure from the wind".[283] He continued: "[There is] the 'mast receiver', ἱστοδόκη (*histodokē*), and the yard, κεραία (*keraia*), the κερατάριον (*keratarion*). The sail, ἱστίον (*histion*), [is] the ἄρμενον (*armenon*). And what are known as the καθορμεῖς (*kathormeis*) are fixed (προσήλωνται) firmly (στερεῶς) in a row on the keel, τρόπις

[281] See Pryor, "Galleys of Charles I of Anjou", pp. 41, 55, 57.

[282] See Pryor, "Galleys of Charles I of Anjou", pp. 70, 74.

[283] Appendix Three, §2.9: " Τῆς δὲ πλεούσης μέσον ἐπὶ τῆς τρόπιος προσαρμόζεται ἡ τράπεζα, ἧς ἐντὸς ὁ ἱστὸς ἵσταται, ἤτοι τὸ κατάρτιον. Τοῦ δὲ καταρτίου τὸ μὲν προσηλούμενον τῇ τραπέζῃ κατώτερον μέρος πτέρνα καλεῖται, ἐξ οὗ καὶ τὸ ἐξεπτέρνισεν, ὅταν ὑπὸ ἀνέμου βιαζομένη ἔξω τῆς τραπέζης ἐκβῇ.". On the interpretation of this passage see also Koukoules, "Ναυτικὸς βίος", p. 353.

(*tropis*), there being three of them, on which the *keraia* rests [when] lowered".[284]

In his edition of this passage Dain made a fateful misreading. For "στερεῶς", an adverb meaning "firmly" and qualifying προσήλωνται meaning "fixed", he read "στερεᾶς", an adjective meaning "firm" and qualifying τρόπιος, the keel. In the scholarship, the words "τρόπιος στερεᾶς" have been understood ever since as referring to a τρόπις στερεά (*tropis sterea*), a "stiffener keel" on which the *kathormeis* were fixed or mounted.[285] But in fact the Anonymous said simply that the *kathormeis* were fixed firmly on the keel and that the yards could rest on them when lowered. The infamous *tropis sterea* never existed, not even in terminology, let alone in reality.



Figure 24
Mosaic of a galley with a lowered mast from a sepulchre at *Hadrumetum*, Tunisia, third century.

Katartion was a post-classical word for a mast, perhaps first recorded in scholia on the *Odyssey*, and the Anonymous probably got the synonymity from there, as also that for *histion* and *armenon*: "The *histion* [is] the *armenon*, and the *histos* [is the] *katartion*, that is the

[284] Appendix Three, §2.10: "Ἱστοδόκη δὲ καὶ κεραία τὸ κερατάριον. Ἱστίον δὲ τὸ ἄρμενον. Καὶ οἱ λεγόμενοι καθορμεῖς ἐπὶ τῆς τρόπιος στερεῶς [στερεᾶς: Dain] προσήλωνται κατὰ στοῖχον τρεῖς ὄντες, ἐφ᾽ ὧν ἡ κεραία καταγομένη ἐπίκειται.".

[285] See, for example, Casson, *Ships and seamanship*, p. 151, n. 45; Dolley, "Warships", p. 50; Pryor, "From dromōn to galea", p. 104.

timber standing in the middle."[286]

The word *histodokē* was well known from Homer's *Iliad* as a mast receiver or crutch into which a mast was lowered.[287] One can be seen clearly at the stern of a ship in a mosaic of the third century from Roman *Hadrumetum*.[288] [See Figure 24] We understand the Anonymous to have meant that on dromons the heel (*pterna*) of each mast (*histos* or *katartion*) was set in a mast step (*trapeza*) on the keel and that the mast could be lowered onto the *histodokē*. Used in this sense, *trapeza*, a "table" in classical Greek, appears to have been a post-classical word for a mast step, first recorded in a scholion on the *Iliad* in a manuscript which probably dates from the last quarter of the tenth century.[289] The classical words for a mast step were μεσόδμη (*mesodmē*) or ληνός (*lēnos*).[290] *Trapeza* is not found in this sense in Pollux, Hesychios, or the *Souda* and from where the Anonymous derived it is unknown. *Pterna*, on the other hand, appears to have been derived by him from Pollux, or perhaps from Athēnaios of Naukratis.[291] This passage is another give away that the Anonymous

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[286] See Dindorf, *Scholia Graeca*, B.427 (vol. 1, p. 117): "ἱστίον τὸ ἄρμενον, ἱστὸς δὲ τὸ κατάρτιον, ὡς τὸ μέσον ἱστάμενον ξύλον.".

[287] Homer, *Iliad*, I.434 (vol. 1, p. 34): "ἱστὸν δ' ἱστοδόκῃ πέλασαν προτόνοισιν ὑφέντες ...". Erbse, *Scholia Graeca*, A.434 (vol. 1, p. 122): "ἱστοδόκῃ τὸ κατὰ τὴν πρύμναν ἐξέχον ξύλον, καθ' οὗ κλίνεται ὁ ἱστός. τὰ δὲ παρὰ τὸ δέχω πάντα διὰ τοῦ κ̄, ξεινοδόκος, ἱστοδόκη.". See also Casson, *Ships and seamanship*, pp. 47 n. 30, 329, and plate 191. Cf. also Hesychios, *Lexicon* (Schmidt), I.1029 (vol. 2, p. 374): "ἱστοδόκη· ἱστοθήκη. τὸ διὰ μέσου ... νεὼς φράγμα, εἰς ὃ κατακλειόμενος ὁ ἱστὸς ἐντίθεται." .Cf. Latte, ed., vol. 2, p. 378: " ἱστοδόκη· ἱστοθήκη. τὸ διὰ μέσου ‹τῆς› νεὼς φράγμα, εἰς ὃ κατακλινόμενος ‹ὁ› ἱστὸς ἐντίθεται.". Hesychios' source was probably Apollōnios Sophista. See Apollōnios Sophista, *Lexicon*, p. 93, ll. 4-5: " ἱστοδόκη τὸ διὰ μέσης τῆς νεὼς φράγμα, εἰς ὃ κατακλινόμενος τίθεται ὁ ἱστός.".

[288] Another mosaic of a galley with a similarly lowered mast from the baths at *Themetra*, dated to ca 200-220 C.E., is reproduced in Foucher, *Navires et barques*, fig. 12 (p. 21).

[289] Commenting on *Iliad*, XV.729 ("θρῆνυν ἐφ' ἑπταπόδην, λίπε δ' ἴκρια νηὸς ἐΐσης"), the scholia in the Venetus A manuscript (Venice, Biblioteca Marciana, MS. Gr. 452 [col. 822]) has: "θρῆνυν· ὑποπόδιον. θρῆνυν δὲ βέλτιον καλεῖσθαι ὑπὸ Ὁμήρου τὰς καθέδρας τῶν ἐρετῶν· ἀναχωρῶν γὰρ ἀπὸ τῆς νεὼς τῶν καταστρωμάτων ἐπὶ ταύτας ἀφικνεῖται. τινὲς δὲ τόπον τῆς νεὼς βάσιν ἔχοντα, ἐφ' οὗ τὸν κυβερνήτην τοὺς πόδας τιθέναι, ὃ καὶ ἐδώλιόν φασιν. ἄλλοι δὲ τὴν ὑποδεχομένην τὸν ἱστὸν τράπεζαν εἶπον.". See Bekker, *Scholia*, O.729 (vol. 1, p. 436). This passage is not reproduced in full in Erbse, *Scholia graeca*, O.729 (vol. 4, p. 152). The phrase referring to the *trapeza* was most probably a post-classical addition to the scholion.

[290] In later times these terms were often misunderstood. See the scholion on the *Argonautika* of Apollōnios of Rhodes, commenting on *Argonautika*, I.563 ("δή ῥα τότε μέγαν ἱστὸν ἐνεστήσαντο μεσόδμῃ, ..."), which glossed μεσόδμῃ as: "ἡ ἱστοθήκη, ὅπου τίθεται ὁ ἱστὸς καὶ κλίνεται.", in Wendel, *Scholia*, p. 48.

[291] See Athēnaios of Naukratis, *Deipnosophistae* (Gulick), XI.474.f (vol. 5, p. 96): "τοῦ γὰρ ἱστοῦ τὸ μὲν κατωτάτω πτέρνα καλεῖται, ἢ ἐμπίπτει εἰς τὴν ληνόν, ...". Athēnaios was quoting Asklēpiadēs of Myrlea (lst century B.C.E.). Pollux seems to

had little familiarity with real ships. A mast step was fixed on the keel permanently, not only when under sail. The mast might be unstepped from it, but mast steps were large and complex pieces of carpentry.[292] They could not be dismantled and were always left in place.

Keraia and *keratarion*, a diminutive of κέρας (*keras*), were also familiar classical terms for the yard of a sail.[293] The two terms for a sail used by the Anonymous in apposition, *histion* and *armenon*, were classical and post-classical terms respectively and were used similarly in the scholia on the *Odyssey* and in the glosses.[294]

The Anonymous said quite clearly that the three *kathormeis* were fixed firmly in a row on the keel and that the yard rested in these when it was lowered. Obviously, something like crutches must have been necessary to take lowered yards, just as *histodokai* were for the masts. One of the bas reliefs on Trajan's column clearly shows a galley with its sail furled and yard lowered onto crescent-shaped crutches at the bow and stern. [See Figure 3] The mosaic of the galley from the baths at *Themetra* also shows the yard, with its furled sail, lowered onto similar crutches. [See Figure 4] What these crutches for the yards were called in classical Greek, whether they were different to the *histodokai* and from where the Anonymous derived the term *kathormeis* for them is unknown. The most likely probability is that the word was derived from classical Greek καθορμίζω (*kathormizō*),

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have derived his text from either Athēnaios or Asklēpiadēs. Cf. Pollux, *Onomasticon* (Bethe), I.91 (vol. 1, p. 29): "καὶ τὸ μὲν ὑποδεχόμενον τὸν ἱστὸν ληνός [καλεῖται], τὸ δὲ ἐναρμοζόμενον αὐτῷ πτέρνα, ...". The Anonymous appears to have taken over the sense of this passage, merely changing *lēnos* to *trapeza*.

Describing the parts of the mast and yard, beginning at the bottom, the scholia on the *Argonautika* of Apollōnios of Rhodes, I.564-7c also referred first to the *pterna*. See Wendel, *Scholia*, p. 49: "ἱστός· πτέρνη, καρχήσιον, θωράκιον, ...".

[292] See, for example, Steffy, *Wooden ship building*, esp. pp. 41, 64, 73, 74, 225, 231; Santamaria, "L'épave Dramont", pp. 161-70.

[293] Casson, *Ships and seamanship*, pp. 47, 232. See also Appendix Two [a], §5 and Appendix Five, §4. Cf. Dindorf, *Scholia graeca*, E.254 (vol. 1, p. 268): "τὴν κεραίαν, τὸ πλάγιον ξύλον τοῦ ἱστοῦ, ᾧ προσδέδεται τὸ ἄρμενον.". See also the *hermeneumata* attributed to Dositheus in the *Hermeneumata Monacensia* in Goetz, *Glossarii Latini*, vol. 3, p. 205, l. 16: "ceras antemna". See "Note on citations of Greek and Latin glossaries", p. lxix. above.

[294] Casson, *Ships and seamanship*, p. 233. Cf. Dindorf, *Scholia graeca*, B.427 (vol. 1, p. 117): "ἱστίον τὸ ἄρμενον, ...". See the Greek-Latin *Cyril* glosses of London, British Library, MS. Harley 5792 in Goetz, *Glossarii Latini*, vol. 2, p. 333, l. 30: "Ιστιον uelum"; the *Philoxenos* Latin-Greek glosses of Paris, Bibliothèque Nationale, MS. Lat. 7651, ibid., vol. 2, p. 205, l. 3: "Vela ārmena · aītou · ïtou · oθōnai [*recte*, "Vela ἄρμενα αἰ τοῦ ἱστοῦ ὀθόναι"]"; and the glosses attributed to Dositheus in the tenth-century manuscript of the *Hermeneumata Vaticana*, Rome, Biblioteca Apostolica Vaticana, MS. Vat. Lat. 6925, ibid., vol. 3, p. 434, l. 17: "αρμεναιστια uela [sic]". See "Note on citations of Greek and Latin glossaries", p. lxix. above.

"to bring a ship into harbour", as a consequence of the practice of lowering the yards when entering harbour.

Elucidating from the manuscript that the Anonymous never wrote that the *kathormeis* were fixed on a "stiffener keel" but rather on the keel itself has simply made whatever he intended to say even more incomprehensible. Even if sheer logic did not demand it, the pictorial evidence suggests that both *histodokai* and yard crutches were set up on the deck, not the keel. It is true that the pictorial evidence does not preclude the possibility that the ships in question had no decks and that the crutches may therefore have been mounted on the keel. But if that were so, the crutches would have been set as low in the hull as possible for reasons of stability and therefore would not have been depicted well above the level of the gunwales as they are. The pictures surely show deck-mounted crutches. The Anonymous clearly differentiated the crutches for yards from the *histodokai* but whether there was in fact any difference between them is unknown. Why could not one set of crutches have been used for both purposes? Whatever the case, neither *histodokai* nor *kathormeis* could have been fixed on the keel unless their posts were made to pass up through the decks as the masts were. That might possibly have been done for reasons of structural integrity since the weight of the masts and yards which they had to carry was very considerable. However, it is far more likely that all that the Anonymous actually knew was that yards were lowered when dromons were entering harbour under oars. Since the crutches onto which they were lowered were obviously aligned down the centre-line of the ships to maintain stability, to him they were surely mounted on the keel?

(h) *Rigging*

Dromons had running rigging and various cables for specific purposes, some of which were catalogued by Leo VI and the Anonymous. Amongst the spare equipment that Leo VI recommended that dromons should carry, κάρυα (*karya*) were listed between oar-grommets, σχοινία (*schoinia*), and sails, ἄρμενα (*armena*).[295] The meaning of *karya* is unclear since *karyon* and its variants had no nautical association in classical Greek. But it is possible that scholia

[295] Appendix Two [a], §5: " Ἐχέτωσαν δὲ καὶ πάντα πρὸς ἐξαρτισμὸν δρόμωνος ἀπαραλειπτὰ καὶ διπλᾶ, ... κάρυα, ...". Note that Nikēphoros Ouranos deleted *karya* from his version of the same list. Cf. Appendix Five, §4.

on Lucian's *Zeus tragōdos* contain the explanation of it. In glossing ἀκάτια (*akatia*), which in classical Greek as ἀκάτειος (*akateios*) meant the foremast of a ship,[296] one scholion said that some people called *karya*, "by which the yard is hauled up", *akatia*.[297] *Karya* and *akatia* would thus appear to have become alternative names for some things by which the yard was hauled up. These may possibly have been halyards. However, there is no corroborating evidence that either *akation* or *karyon* meant a halyard and Casson has established that the classical Greek word for a halyard was ἄγκοινα (*ankoina*). More probably the scholion was referring to the sheaves of the blocks at the mastheads.[298]

The Anonymous listed amongst the running rigging and ship's cordage several items known from classical Greek: brails of sails, κάλοι (*kaloi*), forestays, πρότονοι (*protonoi*), mooring lines, πείσματα (*peismata*), offshore or bow mooring lines, ἀπόγαια (*apogaia*), stern mooring lines, πρυμνήσια (*prymnēsia*), and, as seen above,[299] ἔμβολοι (*emboloi*) which he thought restrained the tillers, οἴακες (*oiakes*), and by which these were bound to τροχαντῆρες (*trochantēres*). However, once again, he took most of these terms from a list that he found in Pollux,[300] and it is clear that either he did not understand them or some of the words had changed meaning. Brails were ropes which in antiquity had been sewn into the feet of square sails, run through fairleads on the front of the sail and then up and over the yards down to the deck aft of the mast. By hauling them in, the sails could be quickly shortened in heavy weather. But, it is impossible to brail

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[296] See Pollux, *Onomasticon* (Bethe), I.91 (vol. 1, p. 30): "καὶ ὁ μὲν μέγας καὶ γνήσιος ἱστὸς ἀκάτειος, ὁ δὲ κατόπιν ἐπίδρομος, ὁ δὲ ἐλάττων δόλων.".

[297] See Rabe, *Scholia in Lucianum*, Ζεὺς τραγῳδός.46 (p. 78): "εἰσὶ δ' οἳ καὶ τὰ παρ' ἡμῖν λεγόμενα κάρυα ἀκάτιά φασιν, οἷς ἡ κεραία ἀνέλκεται.".

[298] H. and R. Kahane suggested that *karyon*, meaning a "nut" in classical Greek, acquired the meaning of a pulley by analogy during the Byzantine period and from there gave rise to the medieval Latin and Italian *car* for the lower of the two spars of which the yards of lateen-rigged ships were composed. The second part of this hypothesis is to draw a very long etymological bow indeed, but the first part is certainly possible. See Kahane, "Massaliotica", p. 321 and n. 7; idem, "Eléments byzantins", p. 468; idem, *Lingua Franca*, §176 (p. 157).

Alexandres also suggests that *karya* were the sheaves of the blocks at the masthead through which the halyards or ties were rove. See Alexandres, *Ἡ θαλασσία*, p. 72. See also Casson, *Ships and seamanship*, pp. 230, 260-3.

[299] See above pp. 134 n. 35, 224 & n. 183.

[300] Appendix Three, §2.15: "Τὰ δὲ τῆς νεὼς σκοινία· κάλοι, πρότονοι, πείσματα, ἀπόγαια, πρυμνήσια, καὶ ἔμβολοι, οἳ τοὺς οἴακας συνέχουσι καὶ δι' ὧν εἰς τὸν τροχαντῆρα ἀποδεσμῶνται.". Pollux, *Onomasticon* (Bethe), I.93 (vol. 1, p. 31): "... ἱστός, ἱστοδόκη, κεραία, σχοινία, κάλοι, πρότονοι, καλῴδια, πείσματα, ἀπόγυα, [ἐπίγυα], πρυμνήσια· ...".

lateen sails in this way. Similarly, it is not possible to use forestays with a lateen rig since they would prevent the yard from being hauled across the front of the mast when tacking. How anyone familiar with dromons sailing the Bosporos could have included brails and forestays amongst their rigging defies the imagination. Against this it should be acknowledged that words mutated in meaning. *Kalos* seems to have become just another word for a rope. In his novel *Leukippē and Kleitophōn*, Achilles Tatios (fl. late second century C.E.), used *kalos* for a cable used to tow a ship's boat.[301] Similarly, in one of the glosses *kalos* seems to have become understood as just another word for a rope of any kind and *protonos* as another word for bow mooring lines: *apogaia*. With the passing of brails and forestays the words may well have acquired new meanings by association to their old ones.[302]

(i) *Crews*

In the tenth century, the term used for both the crews of single ships and also those of fleets was στρατός (*stratos*), lit. "people", host, band.[303] In modern English, it may have all of the senses of "crew", "crews", or "[men of the] fleet".

For the standard bireme dromon, the starting point is the two treatises of Leo VI and Nikēphoros Ouranos, which fundamentally agree with each other.[304] There were two oar-banks, ἐλασίαι (*elasiai*), one below and one above deck. Used in this sense, *elasia* was not a classical Greek term and appears to have been the tenth-century equivalent of εἰρεσία (*eiresia*), which could have many meanings in

[301] Achilles Tatios, *Leukippē and Kleitophōn*, III.3.2 (p. 140) and cf. III.4.1-2 (p. 142).

[302] See the Greek-Latin *Cyril* glosses of London, British Library, MS. Harley 5792, in Goetz, *Glossarii Latini*, vol. 2, p. 337, l. 47: "Καλοσησχοινος funis rudes [*recte*, "κάλος ἡ σχοῖνος funis rude[n]s"]; p. 235, l. 60: "Απογιονσχινιον retinaculum [sic]"; and p. 424, l. 14: "Προτονοιτα απογιασχοινια rudentes" [*recte*, "πρότονοι τὰ ἀπόγεια σχοινία rudentes"]. All this is to assume, of course, that the compiler of the glosses actually knew what he was talking about. See "Note on citations of Greek and Latin glossaries", p. lxix above.

[303] Appendix Two [a], §§24, 42, 75, 76; Appendix Five, §§16, 22, 40, 67, 68. See also Ahrweiler, *Byzance et la mer*, under στρατός.

[304] Appendix Two [a], §§7-8: "῞Εκαστος δὲ τῶν δρομώνων εὐμήκης ἔστω καὶ σύμμετρος ἔχων τὰς λεγομένας ἐλασίας δύο, τήν τε κάτω καὶ τὴν ἄνω. Ἑκάστη δὲ ἐχέτω ζυγοὺς τὸ ἐλάχιστον κε΄ ἐν οἷς οἱ κωπηλάται καθεσθήσονται, ὡς εἶναι ζυγοὺς τοὺς ἅπαντας κάτω μὲν κε΄, ἄνω δὲ ὁμοίως κε΄, ὁμοῦ ν΄. Καθ᾽ ἕνα δὲ αὐτῶν δύο καθεζέσθωσαν οἱ κωπηλατοῦντες, εἷς μὲν δεξιά, εἷς δὲ ἀριστερά, ὡς εἶναι τοὺς ἅπαντας κωπηλάτας ὁμοῦ τοὺς αὐτοὺς καὶ στρατιώτας τούς τε ἄνω καὶ τοὺς κάτω ἄνδρας ρ΄.". Cf. Appendix Five, §§6-7.

classical Greek, ranging from an oar, to oarsmen, to rowing benches, to rowing, and to a bank of oars. The Anonymous used *eiresia* for an oarage [system], a bank of oars, and an oar.[305] Each *elasia* was composed of 25 oarsmen per side, for a total of 100 oarsmen. Between them both, Leo VI and Nikēphoros Ouranos made it clear that the total number of oarsmen was 100 and that they also doubled as soldiers, στρατιῶται (*stratiōtai*), or marines. Nikēphoros's syntax was somewhat clearer about this than that of Leo VI; although he certainly understood his imperial predecessor correctly.[306] In four cases in the illustrations of the Madrid manuscript of the *Synopsis historiōn* of John Skylitzēs some or all of the oarsmen are shown wearing armour; however, there does not appear to be any particular reason why they are in these cases but not in all the others.[307]

Beyond that, Leo VI and Nikēphoros following him, both said that on larger dromons there could be 200 men, of which 50 would serve the lower oar-bank and the other 150 should be stationed above deck and should be able to fight.[308] Exactly how such a distribution of oarsmen and marines was arranged they did not specify.

The testimonies of Leo VI and Nikēphoros Ouranos have to be the starting point; however, their specificity of the number of oarsmen at 25 per oar-bank per side, for a total for the two banks of 100 in all for a standard dromon, need not be taken as more than an approximation. The inventories for the Cretan campaign of 949 provide more precise evidence and raise the vexed issue of what was meant by the arguable term οὐσία (*ousia*) and its adjectival derivative *ousiakos*, literally meaning substance, essence, or property, an issue which has bedevilled scholarship on the Byzantine navy of the Macedonian era. It used to be thought that an *ousia* or an *ousiakos* was an actual ship type. But in fact, an *ousia* was not a type of ship but rather a standard complement of 108 (or 110) oarsmen for a *chelandion* or dromon.

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[305] See Appendix Three, §§1.2, 2.7 & 13, 7.5.

[306] Cf. also Appendix Two [a], §§14, 73; Appendix Five, §§12, 66. Leo VI's syntax was so unclear that Ibn Mankalī's translator did not understand him. See Appendix Eight [a], pp. 242-3

[307] See John Skylitzēs, *Σύνοψις ἱστοριῶν*, folios 31v, 38r, 38v, 39v [= Appendix Seven, Table Two, nos 7, 12, 13, 15; Estopañan, *Skyllitzes Matritensis*, figs 68, 86, 88, 90]. It is noticeable, although what significance may drawn from it is debatable, that armoured oarsmen do not appear on any galley in those illustrations drawn in any of the Western or Muslim styles.

[308] Appendix Two [a], §9: "Καὶ ἕτεροι δὲ δρόμωνες κατασκευαζέσθωσάν σοι τούτων μείζονες, ἀπὸ διακοσίων χωροῦντες ἀνδρῶν ἢ πλέον τούτων ἢ ἔλαττον κατὰ τὴν χρείαν τὴν δέουσαν ἐπὶ καιροῦ κατὰ τῶν ἐναντίων· ὧν οἱ μὲν ν΄ εἰς τὴν κάτω ἐλασίαν ὑπουργήσουσιν, οἱ δὲ ρ΄ καὶ ν΄ ἄνω ἑστῶτες ἅπαντες ἔνοπλοι μαχέσονται τοῖς πολεμίοις.". Cf. Appendix Five, §8.

This understanding of *ousia* as a ship's complement rather than a ship type was a view first advanced by Jenkins in his translation of, and commentary on, the *De administrando imperio*.[309] Although his view found acceptance for some time, Ahrweiler came to the conclusion that the word *ousia* did eventually become applied to actual ships and Alexandres, Treadgold, Eickhoff, and Hocker have also concluded that *ousiai* or *ousiakoi* were actual ships. Haldon, notably, has not.[310]

Most recently, Makrypoulias has attempted to return to the pre-Jenkins view that *ousiai* and *ousiakoi* were actual ships.[311] However, his view is based on certain passages in the inventories for the Cretan expedition of 949 which he misconstrues. First, he says that: the term *ousia* must mean a ship "Otherwise, we would be unable to explain how a *pamphylos* (with a crew of 120 or 150 men) could be fitted with twenty-four 108-men complements (2,592 men)". But this conclusion is based on a misinterpretation of some passages: "As defence for the God-guarded city, one *pamphylos* and 24 *ousiai*" (Appendix Four [b], §I.1); "For the defence of the City, the *stratēgoi* of *Aigaion Pelagos* were left with six *chelandia pamphyla*, each of 120 men ..." (Appendix Four [b], §I.5); "The *stratēgos* of Samos with six *chelandia pamphyla*, each of 150 men ..." (Appendix Four [b], §I.7); and "The *stratēgos* of the *Kibyrrhaiōtai* with six *chelandia pamphyla*, each of 150 men ..." (Appendix Four [b], §I.9). Obviously, *chelandia pamphyla* could be crewed by either 120 or 150 (or 130 or 160) men. But there are no grounds on which to extrapolate that the single *pamphylos* mentioned in the first passage had 24 *ousiai*. Ships' companies have always been used for many purposes. In this case, the 24 *ousiai* were obviously left behind as a marine guard for Constantinople.

Secondly Makrypoulias refers cryptically to: "... why crews should have travelled from Constantinople to Calabria or Spain without their ships!!! (sic)". This reference is to the following passages: "The imperial fleet, 150 *ousiai*, of which 6 [were] hand-picked and 2 recently mobilized. 100 *ousiaka chelandia*, of which 100 *ousiai*, 7 *ousiai* in *Dyrrachion* and Dalmatia. 3 *ousiai* in Calabria, 3 *ousiai* with the *ostiarios* and *nipsistiarios* Stephen for service in Spain".

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[309] See Constantine VII, *De administrando imperio*, §51, ll. 41, 91 (pp. 248, 250) and Jenkins's commentary in *Volume II: commentary*, pp. 195, 198.

[310] See Ahrweiler, *Byzance et la mer*, pp. 416-17; Alexandres, *Ἡ θαλασσία*, pp. 73-4; Treadgold, "Army", p. 134; Eickhoff, *Seekrieg und Seepolitik*, p. 137; Hocker, "Galleys and fleets", p. 94. See Haldon, "Theory and practice".

[311] See Makrypoulias, "Navy", pp. 154-5.

(Appendix Four [b], §I.1). But in fact, all that this text meaned was that the entire imperial navy was composed of 150 *ousiai*, of which three were in Calabria and three were delegated to Stephen for the embassy to the Umayyad court in *al-Andalus*.[312] It says nothing about the actual ships and there is no reason to ask the rhetorical question of why crews should have travelled without their ships to Calabria and *al-Andalus* (or *Dyrrachion* or Dalmatia). It is true that there are references to actual ships (*pamphyloi* and *ousiaka chelandia*); however, the entire text is problematical. The figures do not add up, no matter how one interprets the technical terminology. The passages following on from "The imperial fleet, 150 *ousiai*, ..." were not meant to be inclusive. They were merely parenthetical references to some important deployments.

Finally, Makrypoulias raises the question of why it is that there should be a reference to "20 dromons, each with two *ousiai*" in the actual fleet sent to Crete, whereas later "these 40 *ousiai* are termed *ousiaka chelandia*". He concludes that: "Whatever the meaning of the term, it is certainly not 'complement'". But in fact the two texts he refers to are firstly "20 dromons, each of two *ousiai*. 40 *ousiai*." (Appendix Four [b], §I.2) and secondly "80 *siphōnia* for 40 *ousiaka* [ships]" (Appendix Four [b], §V.13), not for 40 *ousiaka chelandia*.[313] It is quite possible that *chelandia* were intended by the understood [ships] after *ousiaka* as he assumes, but, in any case, this text merely referred to the provision of 80 *siphōnia* for 40 *ousiaka* [ships]. Whatever may have been intended by the 40 *ousiaka* [ships], it had no reference to the 40 *ousiai* of the 20 dromons of the fleet. Elsewhere, the inventory said clearly that the 20 dromons should have three *siphōnia* each.[314]

There are four particular reasons why the words *ousia* and *ousiakos* cannot have referred to real ships. First, the *De administrando imperio* said that from the time of Leo VI, an *ousia* was assigned to the hippodrome to guard the palace when the regiment of the *Arithmos*, the imperial guards, accompanied the emperor on expeditions.[315] The

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[312] See above p. 71.

[313] Appendix Four [b], §§I.2, V.27: "τὰ μέλλοντα ταξειδεῦσαι ἐν Κρήτῃ πάμφυλοι ζ΄, οὐσιακὰ χελάνδια λγ΄, ὁμοῦ χελάνδια μ΄. δρόμονες κ΄ ἀνὰ οὐσιῶν β΄."; "τὰ μ΄ οὐσιακὰ σιφώνια π΄," [= Haldon, "Theory and practice", pp. 219, 229; Constantine VII, *De cerimoniis*, II.45 (vol. 1, pp. 664, 673)].

[314] See Appendix Four [b], §IV.1 [= Haldon, "Theory and practice", p. 227; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 672)].

[315] See Constantine VII, *De administrando imperio*, §51, ll. 40-41 (p. 248): "Πολλάκις γὰρ ἐξερχομένου αὐτοῦ εἰς τὰ πλησίον πρόκενσα, τὴν μίαν οὐσίαν

concept of an *ousia* galley floating around the hippodrome is curious, to say the least! The *De cerimoniis* also recorded that the oarsmen, ἐλάται (*elatai*) of the imperial dromon, who received a donative at the festival of the *broumalia* before Christmas, were its *periousia*.[316] The identification of oarsmen with *ousia* was quite clear. "*Peri*" was simply a strengthening prefix here, without any other meaning. Secondly, no one appears to have noticed the use of the verbal form of *ousia*, οὐσιώσεις (*ousiōseis*) and οὐσίωσον (*ousiōson*), as used by Leo VI and Nikēphoros Ouranos. Both the emperor and the *magistros*, who followed him said that a *stratēgos* should "*ousia*" dromons to match the crews (*stratoi*) of the enemy.[317] They used the verb οὐσιόω (*ousioō*) in the sense of crewing dromons with men. No other meaning can possibly be ascribed to their use of the word. Thirdly, in a paragraph referring to a reception in the *Magnaura* hall in the imperial palace, the *De cerimoniis* reported that the *ousia* of the *droungarios tou ploimou* and the *pamphylon* should be in attendance with their weapons, and the commanders of the ships should also be there with their *ousiai*. *Ousiai* can have had no other meaning here but crews.[318] Finally, perhaps the most conclusive argument of all against the interpretation of *ousia* as having ever referred to an actual ship type is the fact that all known medieval Byzantine terms for ship types, including *dromōn*, *chelandion*, *karabos*, *akatos*, *pamphylos*, and *sagēna* eventually found their way into either Latin or Arabic or both as terms for ship types in those languages. *Ousia* did not, because it referred not to a ship but rather to a ship's complement.[319]

κατελίμπανεν εἰς τὸν ἱππόδρομον πρὸς φύλαξιν τοῦ παλατίου ...".

[316] See Constantine VII, *De cerimoniis*, II.18 (p. 601).

[317] See Appendix Two [a], §75: "Ἐὰν γὰρ συνορᾷς ἔχειν τοὺς πολεμίους πλοῖα πλείονα στρατὸν ὑποδεχόμενα, οὐσιώσεις καὶ αὐτὸς τοὺς ἴσους δρόμωνας ἐν πλήθει.". Cf. Appendix Five, §68.

[318] Constantine VII, *De cerimoniis*, II.15 (pp. 578-9): "... οἱ δὲ τοῦ τραπεζίου τὰ ψευδοξέα κοντομάνικα. ἔξωθεν δὲ τῆς χαλκῆς πύλης τοῦ τρικλίνου τῶν κανδιδάτων ἔστη ἔνθεν κἀκεῖθεν ἡ τοῦ δρουγγαρίου τῶν πλοΐμων οὐσία καὶ ὁ μέγας πάμφυλος, βαστάζοντες δόρκας καὶ τὰ ἑαυτῶν φοροῦντες σπαθία. ἐν δὲ τῇ πρώτη σχολῇ καὶ τῷ τρικλίνῳ τῶν ἐξκουβίτων ἕως τοῦ αὐτοῦ τριβουναλίου ἔστησαν ἔνθεν κἀκεῖθεν αἱ οὐσίαι τῶν παμφύλων, βαστάζοντες δόρκας καὶ τὰ ἑαυτῶν φοροῦντες σπαθία. οἱ δὲ ἄρχοντες τῶν πλοΐμων ἔστησαν καὶ αὐτοὶ ἔνθεν κἀκεῖθεν, ἕκαστος εἰς τὴν ἰδίαν οὐσίαν. ...".

[319] It is significant that although οὐσία appeared frequently in the Greek-Latin glosses, it was always glossed in its meaning of essence, substance, etc. and never with reference to ships. See Goetz, *Glossarii Latini*, vol. 7, p. 600 and the cross references cited therein.

Alexandres has claimed that *ousia* was derived from the Venetian "*huissier*", a term which became widely used in many vernacular and medieval Latin forms in the West in the late twelfth and thirteenth century, in particular for horse transport

The inventories for the 949 expedition recorded that the imperial fleet was composed of 150 *ousiai*. Of these 6 were *pamphyloi*, hand picked, and two had been recently mobilised. Then there were 100 *ousiaka chelandia*, that is *chelandia* of one *ousia*. Seven *ousiai* were on duty in *Dyrrachion* and Dalmatia, three in Calabria, and three had been sent to *al-Andalus* under the *ostiarios* and *nipsistiarios* Stephen. One *pamphylos* and 24 *ousiai* were left to guard Constantinople.[320] Those actually sent on the campaign to Crete amounted to 7 *pamphyloi* and 33 *ousiaka chelandia*, totalling 40 *chelandia*, and 20 dromons with two *ousiai* each, for a total of another 40 *ousiai*.[321]

Other ships and *ousiai* were either deputed to other tasks or left in place as home guards. Of these the most important were the following. The *stratēgoi* of the *thema* of *Aigaion Pelagos* were left with 6 *chelandia pamphyla* of 120 men each and 4 *chelandia ousiaka* with 108 men each. The *stratēgos* of Samos was apparently left with 6 *chelandia pamphyla* of 150 men each and 6 *chelandia ousiaka* of 108 men. The *prōtospatharios* John was sent to *Africa* with 3 *chelandia* and with 4 dromons of 220 men each. The *stratēgos* of the *Kibyrrhaiōtai* was also apparently left behind with 6 *chelandia pamphyla* of 150 men and 6 *chelandia ousiaka* of 110 men. Two *pamphyloi* and 4 *[chelandia] ousiaka* were left to guard the *thema*. One *ousia* and also 4 dromons of 220 men each were left in Rhodes to guard the imprisoned brother-in-law of the emperor, Stephen Lekapēnos.[322] Other *ousiai* were deputed to cut wood and there were

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galleys. See Alexandres, *Ἡ θαλασσία*, p. 73. There are no sources, however, for the use of any form of the term "*huissier*" or the medieval Latin "*uscerius*" in the West earlier than the twelfth century and it is not possible that *ousia* was derived from it. One might suggest the reverse of what Alexandres claimed, namely that "*huissier*" and "*uscerius*" were derived from *ousia*. However, in fact the various forms of "*huissier*" and "*uscerius*" were almost certainly derived from the Arabic *'ushārī* for a transport galley and had nothing to do with *ousia*. *'Ushārī*, which was an Arabic term not derived from Greek, appeared in Egyptian sources as early as the ninth century. See Fahmy, *Muslim naval organisation*, pp. 150-51.

[320] Appendix Four [b], §I.1: "Τὸ βασιλικὸν πλόϊμον οὐσίαι ρν΄, ἐξ ὧν πάμφυλοι ς΄ καὶ οἱ ἀρτίως κατασκευασθέντες β΄. οὐσιακὰ χελάνδια ρ΄. ἐξ αὐτῶν ρ΄ οὐσίων [τῶν ῾ρουσίων, Reiske] ἔν τε Δυρραχίῳ καὶ ἐν Δαλματίᾳ οὐσίαι ζ΄, ἐν Καλαβρίᾳ οὐσίαι γ΄, μετὰ τοῦ ὀστιαρίου Στεφάνου καὶ νιψιστιαρίου εἰς τὴν᾽ Ισπανίαν δουλία οὐσίαι γ΄. εἰς φύλαξιν τῆς θεοφυλάκτου πόλεως πάμφυλος α΄ καὶ οὐσίαι κδ΄.". [= Haldon, "Theory and practice", p. 219; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 664)].

[321] Appendix Four [b], §I.2: "τὰ μέλλοντα ταξειδεῦσαι ἐν Κρήτῃ πάμφυλοι ζ΄, οὐσιακὰ χελάνδια λγ΄, ὁμοῦ χελάνδια μ΄. δρόμονες κ΄ ἀνὰ οὐσιῶν β΄. οὐσίαι μ΄.". [= Haldon, "Theory and practice", p. 219; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 664)].

[322] Appendix Four [b], §§I.5-11: "ἐάθησαν εἰς φύλαξιν τῆς πόλεως οἱ στρατηγοὶ ‹τῶν πλοϊμοθεμάτων· ὁ στρατηγὸς› τοῦ Αἰγαίου πελάγους μετὰ χελανδίων παμφύλων ς΄ ἀνὰ ἀνδρῶν ρκ΄ καὶ χελανδίων οὐσιακῶν δ΄ ἀνὰ ἀνδρῶν ρη΄. ... ὁ στρατηγὸς τῆς Σάμου

also *galeai* involved, some of which were again left behind as home guards.[323]

The two figures for crews of dromons, for those sent to *Africa* and for those left in Rhodes to guard Stephen Lekapēnos, were the same. Their complements were two *ousiai* or 220 men. One *ousia* therefore equalled 110 men. This is as consistent as could reasonably be expected with the figure of 108 men for the *chelandia ousiaka* or *chelandia* of one *ousia* specified on all but one occasion and 110 men on the other.[324] *Chelandia pamphyla* could apparently have crews of between 120 and 150 men. According to the inventory for the Cretan expedition of 911 *pamphyloi* could have crews of either 130 or 160 men.[325] Crews were surely tailored to meet specific needs from time to time and may well have varied from *thema* to *thema* according to local custom. Nor is there any reason to assume that all dromons, or *chelandia*, or *pamphyloi*, were necessarily exactly the same size. As Leo VI said, some dromons were larger and could carry larger crews. Some variation in the crew figures perhaps reflected the size of the actual ships of various classes available in various places at the time or perhaps reflected the particular needs of individual expeditions.

Figures of between 100 and 108 or 110 for the oarsmen and 120-160 for the total crews are consistent with Western evidence for those of standard light galleys. In the early eleventh century, Thietmar of Merseburg wrote that *salandrie* had two banks of oars per side and total crews of 150 *nautae* (sailors).[326] In the 1260s-1280s bireme galleys of the Kingdom of Sicily still had 100-108 oarsmen but they

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μετὰ χελανδίων παμφύλων ς΄ ἀνὰ ἀνδρῶν ρν΄ καὶ χελανδίων οὐσιακῶν ς΄ ἀνὰ ἀνδρῶν ρή. ἀπεστάλησαν δὲ μετὰ τοῦ πρωτοσπαθαρίου Ἰωάννου καὶ ἀσηκρήτης ἐν Ἀφρικῇ χελάνδια γ΄ καὶ δρόμονες δ΄ ἀνὰ ἀνδρῶν σκ΄. ὁ στρατηγὸς τῶν Κιβυρραιωτῶν μετὰ χελανδίων παμφύλων ς΄ ἀνὰ ἀνδρῶν ρν΄ καὶ χελανδίων οὐσιακῶν ς΄ ἀνὰ ἀνδρῶν ρι΄· κατελείφθη δὲ καὶ εἰς φύλαξιν τοῦ θέματος πάμφυλοι β΄, οὐσιακὰ δ΄. ... κατελείφθη δὲ καὶ εἰς φύλαξιν τοῦ κυροῦ Στεφάνου τοῦ γυναικαδελφοῦ τοῦ βασιλέως ἐν Ῥόδῳ οὐσία α΄ καὶ δρομόνων δ΄ ἀνὰ ἀνδρῶν σκ΄.". [= Haldon, "Theory and practice", p. 219; Constantine VII, *De cerimoniis*, II.45 (vol. 1, pp. 664-5)].

[323] Appendix Four [b], §§I.6, 10, 12-14: "[from the *thema* of *Aigaion Pelagos*] κατελείφθη δὲ καὶ μία οὐσία εἰς τὸ κόψαι τὴν τῆς ὀγδόης ἰνδικτίονος ξυλήν. ... [from the *Kibyrrhaiōtai*] κατελείφθη δὲ καὶ εἰς τὸ κόψαι τὴν τῆς ὀγδόης ἰνδικτίονος ξυλὴν οὐσίαι β΄. ... γαλέαι τῆς Ἀτταλίας ιε΄. ἐξ αὐτῶν κατελείφθη εἰς φύλαξιν τοῦ θέματος γαλέαι ς΄. γαλέαι τῆς Ἀντιοχείας β΄. κατελείφθησαν καὶ αὗται εἰς φύλαξιν τοῦ αὐτοῦ θέματος. γαλέαι τῆς καρπάθου. κατελείφθησαν εἰς φύλαξιν τῆς νήσου Καρπάθου γαλέα α΄.". [= Haldon, "Theory and practice", pp. 219, 221; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 665)].

[324] See Appendix Four, n. 11.

[325] Appendix Four [a], §§2-5 [= Haldon, "Theory and practice", pp. 203, 205; Constantine VII, *De cerimoniis*, II.44 (vol. 1, pp. 652-3)].

[326] See p. 190, n. 70 above.

also carried officers, helmsmen, soldiers, and others, to a total figure of around 150 men.[327] The normal number of oarsmen for complements of standard light galleys seems to have remained at 50-54 per side in two banks or files of 25-27 benches from the tenth to the thirteenth centuries, irrespective of how the benches were arranged. Total complements obviously varied according to size and mission, but an average of around 140-150 was the norm.

This being the case, how are the very large figures for some crews to be explained? Both Leo VI and Nikēphoros Ouranos directed that some larger dromons should be constructed on which 50 men should serve the oars below deck and 150, all of whom were armed, should be stationed above deck to fight. But the 150 above deck were not said to have served two or three files of oars, merely to have been armed to fight.[328] In the inventory for the 911 expedition to Crete, the crews specified for the dromons of the imperial fleet and also for those of some provincial *themata* had 230 oarsmen, ἄνδρες κωπηλάται (*andres kōpēlatai*) and 70 marines, πολεμισταί (*polemistai*),[329] and this specification was repeated in a slightly altered form in the paragraph concerning the arming of a dromon in the inventory for the 949 expedition,[330] qualifying the specifications earlier in the inventory that each dromon should have two *ousiai* or 220 men.[331] It is important to appreciate here that 230 men of the ships for the expedition of 949 were described as "oarsmen, that is soldiers" (*ploimoi kōpēlatai ētoi kai polemistai*).[332] They could double in both roles.

On the one hand, the figures ranging between 108 and 160 men or oarsmen, the usage is variable, are not a problem. Dromons with an *ousia* of 108 men, of whom 100 pulled at the oars at any one time in

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[327] See Pryor, "Galleys of Charles I of Anjou", pp. 81-4 and Table Three. Eickhoff also realized that 25 or so oar benches per side remained the norm for all Mediterranean light galleys through to the eighteenth century. See his *Seekrieg und Seepolitik*, p. 137, n. 8.

[328] Appendix Two, §9; Appendix Five, §8.

[329] Appendix Four [a], §2: "Δρόμωνες ξ΄ ἔχοντες ἀνὰ ἀνδρῶν κωπηλατῶν σλ΄ καὶ ἀνὰ πολεμιστῶν ο΄... " and cf. §§3-6 [= Haldon, "Theory and practice", pp. 203-5: Constantine VII, *De cerimoniis*, II.44 (vol. 1, pp. 652-3)].

[330] Appendix Four [b], §II.22: "ὁ δρόμων ὀφείλει ἔχειν ἄνδρας τ΄, οἱ μὲν σλ΄ πλόϊμοι κωπηλάται ἤτοι καὶ πολεμισταί, καὶ οἱ ἕτεροι ο΄ ἄνδρες πολεμισταὶ ἀπὸ τῶν καβαλλαρικῶν θεμάτων καὶ ἀπὸ τῶν ἐθνικῶν." [= Haldon, "Theory and practice", p. 225; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 670)].

[331] Appendix Four [b], §§I.2, 11 [= Haldon, "Theory and practice", p. 219; Constantine VII, *De cerimoniis*, II.45 (vol. 1, pp. 664-5)].

[332] ἤτοι, which may have a range of meanings in the sense of "either ... or ...", or "both ... and ...", etc., in this context is used to introduce an explanation, having the sense of "that is".

two files per side on two banks, could never have been more than a norm and variations in crews of up to around 40-50 more could obviously have been accomodated within the tolerances of oarage systems or by ships of somewhat larger dimensions.

On the other hand, there are only two explanations for the very large figures of 220 or 230 oarsmen for some dromons. If they could all row together, these must have been quadriremes larger than the norm. But if quadrireme dromons did exist, it is inconceivable that the many contemporary sources, which were normally addicted to the spectacular, would not have mentioned them. Moreover, although oarsmen could double as marines, only those serving the oars above deck were armed and there is no evidence that any Byzantine dromons had four files of oars. In fact, that all 230 oarsmen could row on oars at the same time is impossible and the evidence of the inventories for the Cretan expedition of 949 that the same 20 dromons which carried two *ousiai* had only 120 oars is conclusive evidence that they could not all row at the one time.[333] Many crew must have been taken aboard at various times as supernumeraries who could be used either as oarsmen in watches, so that fleets could continue under way under oars around the clock if necessary, or as marines and landing forces. It should be borne in mind that the Cretan expeditions were assaults against an island held by a formidable enemy with a long history of naval prowess. It would not be surprising if the dromons were packed to their gunwales with supernumeraries who could both participate in the assault on the island and also fight if the enemy engaged at sea.

Doubling crews by taking aboard supernumerary oarsmen or marines would have created significant problems. Galleys such as dromons were finely tuned pieces of machinery with oarage systems which had evolved to deliver maximum performance. Upsetting the oarage balances beyond allowable tolerances would have affected their performance capabilities badly and, in extreme cases made them unworkable. We demonstrate below that a dromon with a standard complement of one *ousia* of 108-110 men plus a normal complement of officers, soldiers, sailors, etc., would have been designed to have a freeboard at the lower oarport above the plane water line of around 0.36 metres amidships. To double the *ousia* with another 110 lean but muscly men weighing around 85 kilogrammes each would add another 9.35 tonnes in weight. The plane area at the waterline was only

[333] See Appendix Four [b], §IV.8 [= Haldon, "Theory and practice", p. 227; Constantine VII, *De cerimoniis*, II.45 (vol. 1, pp. 672)] and cf. below pp. 300-304.

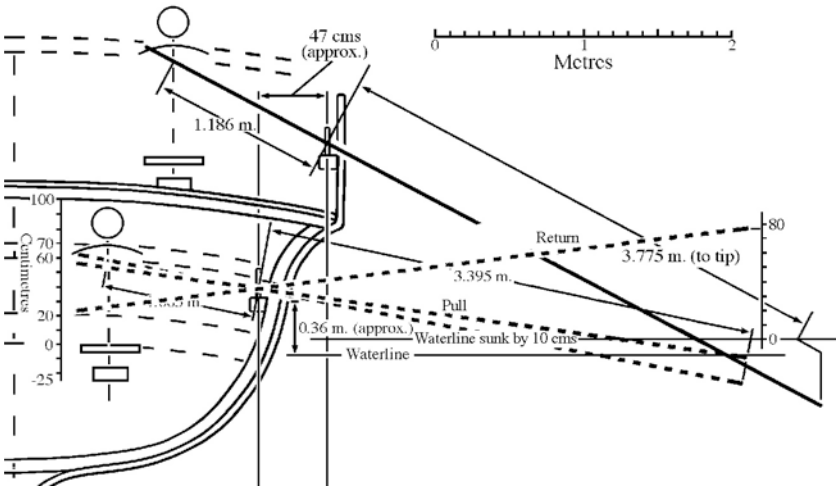


Figure 25
Section of Figure 32 to demonstrate the effect of overloading by ca 9.35 tonnes.
© John H. Pryor

approximately 95 square metres and another 9.35 tonnes would sink the ship by almost 10 centimetres and impede the working of the oarage system badly. Ships such as these had evolved ergonomically to work in the most efficient way. The angle to the horizontal of the oars could not be changed significantly without making the entire stroke inefficient and the recovery in particular extremely difficult. Of course there would have been some tolerances, but how great would they have been? After all the considerations worked through below, the oarage system which we have come to consider most probable is as shown in Figure 32. If the waterline in this figure is sunk by 10 centimetres, the lower oarsmen would have to lower their arms by five centimetres during the pull and would be unable to raise the bottoms of their blades more than around 70 centimetres out of the water during the return, making them unworkable in more than the light breezes of *Beaufort Scale* Three, 7-10 knots, which raise wavelets up to 60 centimetres, which do not even break.[334] The conclusion is that

[334] Haldon, "Theory and practice", p. 254, has also addressed the sinking effect caused by taking on extra crews and/or supernumeraries, although not from the point of view of the funcionality of the oarage systems. John Coates, the designer of *Olympias*, informed John Pryor that sinking the ship in the water by an additional ten centimetres more than the level at which it was designed to float would have thrown

if dromons took aboard a second *ousia*, let alone the 230 oarsmen and 70 soldiers of the Cretan expeditions, they would have had to have been stripped of provisions, water, spare gear, or armaments in order to compensate for the extra weight. Alternatively, the lower oar-bank would have had to have been shut down and the oar ports sealed. But if that was done the ships would have been dangerously low in the water and vulnerable to any sort of a sea at all.

The inventory for the expedition of 949 included a "portulan", a *stadiodromikon*, which, if we can believe it, gave the distances from Constantinople to Crete, specifying fourteen traverses en route.[335] Purposely excluding here discussion of the vexed issue of how the *stadiodromikon* was compiled and how tenth-century Byzantines could have measured spatially across open water when they had no technology capable of dead-reckoning distances at sea, no traverse was given at more than 100 Byzantine *milia*, about 85 English miles, and such short traverses may well have reflected stripping the ships bare in order to accommodate supernumerary crews. These were all traverses which the fleet would make before the prevailing north to north-easterly winds of summer and at the average speed of around two knots maintained around the clock which medieval galley fleets were capable of in all conditions,[336] none should have taken more than two days. As long as the increased weight of the crews was compensated for somehow, the ships could have carried far larger crews than they normally would have on extended cruises.

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its oarage system into chaos.

[335] Haldon, "Theory and practice", p. 235; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 678). On the *stadiodromikon* see Pryor, "Σταδιοδρομικόν"; Huxley, "Porphyrogenitan Portulan". Huxley reached the same conclusions as those here, namely that the distances estimated in the *Stadiodromikon* are consistently too high, and also that the compiler of it was a "bureaucratic landlubber" rather than a "practical mariner", which was no doubt true. See also Christides, *Conquest of Crete*, Appendix D: "Nicephoros Phocas' sailing venture to Crete (960). The stadiodromikon" (pp. 221-4); Haldon, "Theory and practice", pp. 301-2.

In order the places mentioned were: *Hērakleia*, *Proikonnēsos*, *Abydos*, *Ta Peukia*, *Tenedos*, Mitylēnē, Chios, Samos, Phournoi, Naxos, Ios, Thēra-Thērasia, *Ta Christiana*, Dia, Crete. As stop-overs, some of these would have been unnecessary, for example *Ta Peukia* and the Phournoi islets, and others completely useless. If *Ta Peukia* can identified with *Pefkhia* near *Ophryneion*, then it was only around 19 kilometres from *Abydos* and *Tenedos* a further 29 kilometres on. *Tenedos* itself is only around 48 kilometres from *Abydos*.

The longest traverses were from *Proikonnēsos* to *Abydos*, *Tenedos* to Mytilēnē, Mytilēnē to Chios, and Chios to Samos, all of which were reckonned at 100 *milia*, which should be around 85 English miles. The distances are in fact approximately 70 English miles in each case.

[336] See below pp. 338-53 and Table 7; Pryor, *Geography, technology, and war*, pp. 71-5.

This is to assume that the traverses were from mooring to mooring not merely from landmark to landmark. In support of the first interpretation is the fact that *Hērakleia*, *Proikonnēsos*, *Abydos*, *Tenedos*, Mitylēnē, Chios, and Naxos were indeed moorings for Byzantine squadrons and would have been logical stop-overs. However, *Ta Peukia*/*Pefkhia*, the Phournoi islets, Thēra-Thērasia, *Ta Christiana*, Dia, and even Samos had no anchorages for large fleets. Moreover, one major purpose for making stopovers would have been to take on water but the Phournoi islets, Thēra, *Ta Christiana*, and Dia had little or no water. *Ta Christiana* is an isolated, waterless, uninhabited islet. The Phournoi islets were uninhabited.[337]

In fact Byzantine fleets operating against Crete did not traditionally sail direct from Constantinople with all forces aboard but rather made a rendezvous with cavalry and other forces on the south-west coast of Asia Minor, leaving only a short passage to Crete. Almost a century earlier the *Caesar* Bardas had brought the Byzantine forces for his own assault on Crete overland to *Kēpoi* at the mouth of the *Maeander* river, some 40 miles south of *Phygela*, to rendezvous there with the fleet.[338] Then, one of the inventories for the expedition of 911 mentioned that nails for gangways and mangers should be sent to *Phygela*, obviously for fitting out the cavalry transports. The final assault on Crete by Nikēphoros Phōkas in 960 was also launched from *Phygela*.[339] It is not known from where the 949 expedition was launched but all the evidence suggests that it was from *Phygela* or somewhere in its proximity. The *Stadiodromikon*, therefore, was nothing but some landmarks for the fleet, if anything at all. But the point is that *Phygela* or other *aplēkta* in its vicinity were the normal staging posts for assaults on Crete and from there to Crete was a mere 350 or so kilometres via Samos, Naxos, Ios, and Thēra. The longest passages without being able to take on water would be Samos to

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[337] Haldon, "Theory and practice", p. 301; Denham, *Aegean*, p. 255; Malamut, *Iles de l'Empire byzantin*, vol. 1, p. 42, vol. 2, p. 544.

[338] Genesios, *Basileiai*, Δ.20-23 (pp. 73-6); John Skylitzēs, *Synopsis historiōn*, Βασίλειος ὁ Μακεδών.12 (p. 128); *Theophanēs continuatus*, V.17 (pp. 235-8).

[339] Appendix Four [a], §16: "περὶ τοῦ ἑτοιμασθῆναι καρφίον πενταδακτυλαῖον λόγῳ τῆς στρώσεως τῶν δρομονίων, εἰς τὰς σκάλας καὶ εἰς τὰς πάθνας χιλιάδας λ΄, καὶ κατέλθωσιν εἰς τὰ Φύγελα.". [= Haldon, "Theory and practice", p. 211; Constantine VII, *De cerimoniis*, II.44 (vol. 1, p. 658)]. See also below p. 306. See also Leo the Deacon, *Historiae*, I.γ΄-θ΄, II.ς΄-η΄ (pp. 7-16, 24-29); John Skylitzēs, *Synopsis historiōn*, Ρωμανὸς ὁ Νέος.4 (pp. 249-50); John Zōnaras, *Epitomē historiōn*, XVI.23 (vol. 4, pp. 72-3); Pseudo Symeon magistros, *Chronographia*, pp. 758-60; *Theophanēs continuatus*, VI.Βασιλεία Ρωμανοῦ υἱοῦ Κονσταντίνου τοῦ Πορφυρογενήτου.7-12 (pp. 473-8).

Naxos and Ios to *Chandax*, both of around 125 kilometres. For such short distances water supplies could be cut to a minimum to compensate for the weight of supernumerary crews.

The command structure of Byzantine fleets and of dromons in the tenth century is as problematical as the question of their crews. In what follows, we emphasize that we are concerned only with the operation of fleets at sea. Many of the command structures of the Empire amalgamated both administrative institutions on the one hand, and military and naval functions on the other. While we are perfectly conscious of the overlap between all of these, we have confined our analysis to what can be discerned of the operational command of the various fleets.

About the only thing upon which Leo VI, Nikēphoros Ouranos, and the Anonymous were agreed in this respect, was that the general term for "admirals" of fleets was *stratēgos*, the same term as was used for "generals" of armies and for governors of *themata*.[340] This term, however, could have both a general meaning as well as one specific to a rank or title. On the one hand, in the time of Leo VI, the "admiral" of the imperial fleet, βασιλικὸν πλώϊμον (*basilikon plōimon*), based at Constantinople bore the title of *droungarios* of the ship(s), *droungarios tou ploimou* or *tōn ploimōn*.[341] The title still existed at the time of the Cretan expedition of 949 and was even used under Alexios I Komnēnos for the commander of the emperor's personal squadron at Constantinople; however, the position declined in importance from the late tenth century.[342] On the other hand, the title of the "admirals" of the fleets of the three great naval *themata* of the tenth century, *Aigaion Pelagos*, Samos, and the *Kibyrrhaiōtai*, seems to have remained *stratēgos* throughout the century.[343] Their "admirals" were no doubt the same men who held the governorships of the *themata* as their *stratēgoi*.

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[340] Appendix Two [a], §2 ff.; Appendix Three, Pref.4 and §2.5; Appendix Five, §1 ff. See also Oikonomides, *Listes de préséance*, pp. 341-6.

[341] Appendix Two [a], §27; Constantine VII, *De administrando imperio*, §51 (pp. 246-57). See also Oikonomides, *Listes de préséance*, p. 340; Guilland, "Drongaire", pp. 535-42.

[342] See Haldon, "Theory and practice", p. 231: "ἐδόθη ὑπὲρ ἀγορᾶς χαλκώματος διαφόρου τῷ δοθέντι λόγῳ τῆς ὑπουργίας τοῦ δρουγγαρίου τοῦ πλοΐμου ...". Cf. Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 676) and cf. Appendix Four [b], §VII.rubric. See also Ahrweiler, *Byzance et la mer*, esp. pp. 118 ff., 209-10.

[343] Appendix Two [a], §27; Appendix Three, §4.2; Appendix Five, §25. See Appendix Four [a], §1: "ἐδέξατο ὁ στρατηγὸς τῶν Κιβυρραιωτῶν ἔχειν στρατὸν ,εχ΄, ..."; [b] §I.9: "ὁ στρατηγὸς τῶν Κιβυρραιωτῶν μετὰ χελανδίων παμφύλων ς΄ …". [= Haldon, "Theory and practice", pp. 203, 219; Constantine VII, *De cerimoniis*, II.44 (vol. 1, p. 651), II.45 (vol. 1, p. 665)].

Under the *stratēgoi* of the naval *themata* served other *droungarioi* and also τουρμάρχαι (*tourmarchai*). In the tenth century, a *tourmarchēs* was a governor of a *tourma*, one of the two or three principal subdivisions of a *thema*, and the *droungarioi* seem to have become governors of regional subdivisions of *tourmai*.[344] In a much discussed passage whose syntax is very obscure but whose meaning was elucidated by Nikēphoros Ouranos, Leo VI wrote that in the past the governors of the maritime *themata* and thus the "admirals" of their fleets had borne the title of *droungarios* but that in his own day the title of *droungarios* had been elevated to that of *stratēgos* and that *tourmarchai* and *droungarioi* now served under the *stratēgoi*.[345] To what the emperor appears to have been referring is that originally, when the navy was organized as the fleet of the *Karabisianoi*, the *droungarioi* were subject to *stratēgoi*.[346] However, the term *Karabisianoi* is last recorded in 711 and the organization of the navy was changed by the erection of the *Kibyrrhaiōtai* into a naval *thema*, to which were also added later the *themata* of Samos and *Aigaion Pelagos*, under *droungarioi*. But from the middle of the ninth century, these were also elevated to the rank of *stratēgoi*. A *stratēgos* of the *Kibyrrhaiōtai* is first mentioned in 730; although Samos and *Aigaion Pelagos* did not have *stratēgoi* until much later. The Anonymous also said that in the dromons of the *themata*, *tourmarchai* and *droungarioi* served under the *stratēgoi*, almost certainly having taken this from Leo VI.[347] These positions of "vice-admiral" and "rear-admiral" certainly still existed in the mid century since after the arrival of the fleet of 949 in Crete the *tourmarchai* and *droungarioi* were paid 30 *nomismata* and 20 *nomismata* respectively.[348] This fleet was divided into four *themata* or squadrons, most probably for logistical reasons, and *tourmarchai* or *droungarioi* may have been in command of the

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[344] See Oikonomides, *Listes de préséance*, p. 341.

[345] Appendix Two [a], §§26-7: "[ἐπὶ δὲ τῶν θεματικῶν δρομώνων] καὶ δρουγγάριοι ἐπιστήσονται καὶ τουρμάρχαι, καὶ αὐτοὶ τῷ στρατηγῷ ὑποταγήσονται καὶ τοῖς ἐκείνου παραγγέλμασιν ὑπακούσουσιν. Οὐκ ἀγνοῶ δὲ ὅτι κατὰ τὴν ὁμοίωσιν τοῦ βασιλικοῦ πλωΐμου καὶ οἱ τῶν ἄλλων θεμάτων πλώϊμοι στρατηγοὶ δρουγγάριοι ἐκαλοῦντό ποτε τοῖς πρώην χρόνοις καὶ οἱ ὑπ᾽ αὐτοὺς κόμητες μόνον καὶ κένταρχοι· ἀλλὰ νῦν εἰς στρατηγίδα ἡ ἑκάστου τῶν δρουγγαρίων ἀρχὴ ἀναβέβηκεν καὶ οὕτω καλουμένη ταῖς στρατηγικαῖς καταμερίζεται τάξεσιν.". Cf. Appendix Five, §§24-5.

[346] See also Antoniadis-Bibicou, "Thème des Caravisiens", esp. pp. 80-86.

[347] Appendix Three, §4.2: "Ἐπὶ δὲ τῶν θεματικῶν δρομώνων δρουγγάριοι καὶ τουρμάρχαι ὑπὸ τὴν τοῦ στρατηγοῦ χεῖρα καὶ αὐτοὶ τελοῦντες.".

[348] See Haldon, "Theory and practice", p. 215: "ἰστέον, ὅτι τὰ θεματικὰ πλόϊμα ἐν τῇ κατὰ Κρήτης ἀφίξει ἐρογεύθησαν οὕτως· οἱ τουρμάρχαι ἀνὰ: λ΄, ... οἱ δρουγγάριοι ἀνα: κ΄, ..." [expedition of 949, the text is misplaced in the manuscript]; Constantine VII, *De cerimoniis*, II.44 (vol. 1, p. 662).

squadrons.[349]

The commanders of individual ships were known as κένταρχοι (*kentarchoi*). That much at least is clear from Leo VI and Nikēphoros Ouranos.[350] In another piece of his familiar classicizing affectation derived from Pollux, in which he also attempted to show off some knowledge of Latin, the Anonymous provided a false etymology for *kentarchos* from the Latin *centum*, for 100, and then concluded that he commanded a hundred men, while at the same time using the classical terms τριήραρχος (*triērarchos*) and ἑκατόνταρχης (*hekatontarchēs*) for the commander of a *triērēs* and a ship of 100 oarsmen respectively.[351]

In the command chains of fleets, there were squadron commanders between the "admirals" or fleet commanders and individual ship commanders. Leo VI, and Nikēphoros Ouranos and the Anonymous both following him, all wrote that they should be in command of either three or five dromons, employing the ubiquitous word κόμης (*komēs*) for the rank.[352] Leo VI explained what he meant by the term in this context by reference to the classical term for an admiral or fleet commander, ναύαρχος (*navarchos*), a term which was no longer used as a rank or title by the tenth century,[353] and to the non-technical term for a leader or "officer", ἡγεμών (*hēgemōn*). Elsewhere, the emperor used *navarchos* in the sense of a commander subordinate to a *stratēgos*.[354] Significantly, Nikēphoros Ouranos deleted the reference to *navarchos* and changed *hēgemōn* to an even less specific term for a "leader", ἀρχηγός (*archēgos*). *Komētes* were enumerated among the

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[349] See Haldon, "Theory and practice", p. 223: "Διὰ τῶν τεσσάρων θεμάτων τοῦ βασιλικοῦ πλοΐμου, ..."; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 667).

[350] Appendix Two [a], §8: "Ἔξω δὲ τούτων τὸν κένταρχον τοῦ δρόμωνος καὶ ...". Cf. §14 and Appendix Five, §§7, 12. See also Oikonomides, *Listes de préséance*, pp. 340-41.

[351] Appendix Three, §§4.2-3: "Ἑκατοντάρχης ὁ ἐπὶ μιᾶς νηὸς ἑκατὸν ἀνδρῶν ἡγούμενος ὅστις καὶ τριήραρχος κέκληται. Ἔστι δὲ ὁ λεγόμενος κένταρχος· κέντουμ γὰρ παρὰ Ῥωμαίοις ὁ ἑκατὸν ἀριθμὸς προσηγόρευται καὶ κένταρχος ὁ ἑκατὸν ἀνδρῶν ἡγούμενος. ... Ἐφ' ἑκάστης δὲ τῶν νεῶν ἄρχοντές εἰσὶν οἵδε· τριήραρχος καὶ ...".

Such classicizing terms were, of course, commonly used elsewhere for officers of armies. Nikēphoros Phōkas used δεκάρχης (*dekarchēs*), πεντηκοντάρχος (*pentēkontarchos*), and ἑκατοντάρχος (*hekakontarchos*). See Nikēphoros Phōkas, *Praecepta militaria*, I.1, in McGeer, *Dragon's teeth*, p. 12 *et passim*.

[352] Appendix Two [a], §25: "Οὐχ ὡς ἔτυχεν ἁπάντων τῶν δρομώνων πορευομένων, ἀλλ' ἐπιστήσεις αὐτοῖς ἄρχοντας ἢ κατὰ πέντε ἢ κατὰ τρεῖς δρόμωνας, ἕνα τὸν λεγόμενον κόμητα, ὅστις ναύαρχός τε καὶ ἡγεμὼν τῶν ὑπ' αὐτῶν δρομώνων ὑπάρχων φροντίσει προσεχέστερον περὶ πάντων εὐκόλως καὶ διατάξει πρὸς ἕκαστα.". Cf. Appendix Three, §4.1; Appendix Five, §23.

[353] It is not mentioned in Oikonomides, *Listes de préséance*.

[354] Appendix Two [b], §§3, 4.

officers of the fleet paid after the landing in Crete in 949. They were paid only 6 *nomismata* each, as compared to the 20 *nomismata* for the *droungarioi* and the 30 for the *tourmarchai*;[355] however, since the *kentarchoi* were not mentioned in this list of payments, it is not possible to deduce from it the position of the *komētes* in the chain of command.

Elsewhere Leo VI wrote that the berth or *krabatos* of the *navarchos*, that is the *kentarchos*, should be at the poop. Nikēphoros Ouranos deleted the parenthetical reference to a *navarchos* but the Anonymous said that the berth might be for either the *triērarchos* or a *stratēgos*.[356] Did this reflect the operational command structure of Byzantine fleets? When a fleet or squadron commander sailed on a particular dromon, did he take over the operational command of that dromon from its *kentarchos*? Or was it the case that, as was the practice in navies of later centuries, when a fleet or squadron commander "hoisted his flag" in a particular ship, he had the overall command of the fleet but the operation of the ship from which he commanded was left to its own commander. Surely Byzantine fleet and squadron commanders would have had so many other problems to consider, and tasks to fulfill, that the operational command of the ships on which they sailed would best be left to their *kenatarchoi*. The text of the *Anonymous* does not allow resolution of whether the *krabatos* was for the *kentarchos*, who might be a *stratēgos* if he held that rank, or whether it was for both the *kentarchos* and also a *stratēgos* if one was aboard ship. However, the fact that Nikēphoros Ouranos deleted Leo VI's parenthetical reference to the *krabatos* being for a *navarchos*, that is a *komēs* or squadron commander, and did not replace it with *komēs*, a word which he did take over elsewhere, suggests that *kentarchoi* did remain in operational command of their own ships even when superior officers were aboard.

The command structure of individual ships was headed by their *kentarchoi* or "captains". We can dismiss most of the evidence of the Anonymous for this structure because he simply lifted it from what he could understand of Pollux.[357] In all probability, the most senior "officers", or perhaps rather "petty officers", of Byzantine warships

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[355] See Haldon, "Theory and practice", pp. 215, 217: "ἰστέον, ὅτι τὰ θεματικὰ πλόϊμα ἐν τῇ κατὰ Κρήτης ἀφίξει ἐρογεύθησαν οὕτως· ... οἱ κόμητες ἀνὰ: ς´ ..." [expedition of 949, the text is misplaced]; Constantine VII, *De cerimoniis*, II.44 (vol. 1, p. 662).

[356] Appendix Two [a], §8; Appendix Three, §2.5; Appendix Five, §7. See also above pp. 215-17.

[357] See Appendix Three, §4.3 and n. 70.

below the *kentarchos* were those officers called in the tenth century πρωτοκάραβοι (*prōtokaraboi*), a word which we should understand as something like "first ship [man]", or "first mate", since it appears to have been used for men who had risen from the ranks. *Karabōs* and its diminutive *karabion* were post-classical words usually used with the sense of a ship's boat; although, in Greek papyri from Muslim Egypt and in some Byzantine texts they appeared as a term for a warship.[358] Leo VI equated *prōtokaraboi* to the classical word for helmsmen, κυβερνῆται (*kybernētai*). Nikēphoros Ouranos followed him but deleted the equation with *kybernētai*. The Anonymous preserved the meaning of *kybernētai*; however, he simply got it from Pollux. Elsewhere he equated a *navarchos* with a *prōtokarabos*, but his equation can be dismissed since it is quite clear that a *prōtokarabos* was subordinate to a *kentarchos* whereas a *navarchos*, whatever may have been intended by the term, was clearly superior to one.[359] By the tenth century the classical term for a helmsman, *kybernētēs*, was no longer in vernacular usage and *prōtokarabos* was used instead.

In a very curious chapter of the *De administrando imperio* which gave an account of the development of the personal flotillas of the emperor and empress, it was recorded that two men named Podarōn and Leo the Armenian, who had been the "first oarsmen", πρωτελάται (*prōtelatai*), of Nasar, the *patrikios* and *droungarios tou ploimou*, were promoted to become the first oarsmen of the imperial crimson barge during the reign of Basil I.[360] *Prōtelatai* were almost certainly the stroke oarsmen.[361] Then, when Leo VI constructed two imperial *dromōnia* to use in imperial progresses, he promoted these men to become the *prōtokaraboi* of the *dromōnia*.[362] That *prōtokarabos* meant "helmsman" here was confirmed later on in the chapter where it was said that when the *prōtokaraboi* of the first imperial *dromōnion*

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[358] See above pp. 164-5, 188-9. See also Appendix Four [b], §§VI.1-2, 7, 11, 13-14 [= Haldon, "Theory and practice", pp. 229, 231; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 674)].

[359] See Appendix Two [a], §8; Appendix Three, §§2.6, 4.3; Appendix Five, §7. See Ahrweiler, *Byzance et la mer*, under πρωτοκάραβος.

[360] Constantine VII, *De administrando imperio*, §51, ll. 73-7 (pp. 248-50).

Nasar was *droungarios tou ploimou* towards the end of the reign of Basil I. Placed in command of the entire navy of the Empire, he won a notable victory over the Muslims off *Punta di Stilo* on the south coast of Italy in 880 and from the imperial fleet Podarōn and Leo the Armenian were promoted to be chief oarsmen of the crimson imperial barge, the *rousion agrarion*. Cf. above pp. 65-6.

[361] The word survived in medieval Latin with this meaning as *protelati* and *portoladi*. See Pryor, "Galleys of Charles I of Anjou", p. 81.

[362] Constantine VII, *De administrando imperio*, §51, ll. 77-80 (p. 250). On the construction of the two imperial *dromōnia*, see above p. 164, n. 7.

were seconded to the fleet for a naval expedition under the *patrikios* Eustathios, a man named "old Michael", who had previously been a *prōtelatēs*, "steered", ἐκυβέρνα (*ekyberna*), the *dromōnion*.[363] "Old Michael" was later made one of the *prōtokaraboi* of the emperor's *dromōnion* when Podarōn and Leo the Armenian were promoted to be τοποτηρηταί (*topotērētai*), of the imperial ships.[364] Later he was promoted to *prōtospatharios tēs phialēs* but still used to sail on the emperor's *dromōnion* and would instruct his successor *prōtokaraboi* on how to "manage the quarter rudders and steer".[365] That the functions of *prōtokaraboi* were those of helmsmen was clear. According to Liudprand of Cremona, the future emperor Rōmanos Lekapēnos's first major promotion to prominence in the fleet was to *prōtokarabos*, even though Liudprand misunderstood the position to be that of a commander of ship.[366]

There was at least one armed bow-hand in command of the foredeck and still known in the tenth century as πρῳρεύς (*prōreus*) as

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[363] Constantine VII, *De administrando imperio*, §51, ll. 80-90 (p. 250). Most probably the expedition referred to was the one led by the *stratēgos* of Calabria Eustathios to Sicily in 902. See above p. 68.

[364] What *topotērētēs* meant in this context is unclear. The word literally meant "warden of a place". It became used quite widely for a range of subordinate officers and mutated in meaning. The only text known to us which dates from the Porphyrogennētan period which reports a *topotērētēs* with an active role as a field commander is found in the continuation of the chronicle of George Hamartolos sometimes attributed to Symeon Logothetēs, where a certain *topotērētēs*, Michael, was reported on active service against the Bulgars during the reign of Rōmanos I Lekapēnos. See George Hamartolos, *Chronikon syntomon*, col. 1152.

Nikēphoros Phōkas wrote that the commander of the cavalry scouts known as the προκουρσάτορες (*prokoursatores*) should be either a *topotērētēs* or a *stratēgos*. See Nikēphoros Phōkas, *Praecepta militaria* [McGeer], IV.2 (p. 38). However, note that in the corresponding passage of his *Taktika*, which was paraphrased from Nikēphoros Phōkas, Nikēphoros Ouranos deleted the mention of a *topotērētēs*. See Nikēphoros Ouranos, *Taktika* [McGeer], ch. 61.2 (p. 118).

In this maritime context the word is normally translated as "vice admiral", the position being understood as one of the deputies of the *droungarios tōn ploimōn*. In the treatise on precedence or *Klētorologion* of Philotheos of 899, however, *tourmachai tōn ploimōn* appeared between the *droungarios tōn ploimōn* and the *topotērētēs*. See Oikonomides, *Listes de préséance*, pp. 144 & 150. If the *droungarios tōn ploimōn* and *topotērētēs* of the ships were associated with the fleet of the *Stenon*, as the *De administrando imperio* makes quite clear, it is difficult to believe that the *tourmachai tōn ploimōn* were not, and they clearly ranked ahead of the *topotērētēs*. It is rather tempting to consider the office of *topotērētēs* in this context as being similar to that of a "port admiral", a post entrusted to experienced sailors whose days at sea were behind them.

[365] Constantine VII, *De administrando imperio*, §51, ll. 103-112 (p. 250), 137-148 (p. 252); esp. ll. 146-8: "..., ἅμα δὲ καὶ τοῖς τότε πρωτοκαράβοις ὑποτιθέμενος κατὰ τὴν δυσκρασίαν καὶ πνεῦσιν τῶν ἀνέμων τὴν βασίλειον ναῦν πηδαλιουχεῖν τε καὶ κυβερνᾶν.".

[366] Liudprand of Cremona, *Antapodosis*, III.25 (p. 83).

in antiquity. Of the two oarsmen at the bow on the upper oar-bank, one was the σιφωνάτωρ (*siphōnatōr*) and operated the *siphōn* at the bow. The other was in charge of the anchors. Why it was necessary to have a crewman deputed to look after the ship's standard, φλάμουλον (*phlamoulon*), appears inexplicable, unless perhaps he was also the signaller.[367] The Anonymous identified the standard keeper as κελευστής (*keleustēs*); however, this he derived from Pollux, who did not explain the word. In fact its classical meaning was the master of oars, in charge of rowing training, giving the beat to the oarsmen, and transmitting orders from the officers of the poop. This appears to have been a word and a rank which fell out of use during the post-Hellenistic period. The Romans took it over as *celeusma* for the command used to set the stroke but used *hortator* or *pausarius* for the master of oars and *portisculus* for his hammer.[368] Scholia on Thucydides misunderstood the word to mean either *stratēgos* or *kybernētēs*.[369] It does appear to have been properly understood in glosses of the seventh to ninth centuries, however.[370] Obviously, Byzantine galleys must have had some such master of oars, probably two in fact, one for the upper and one for the lower bank of oars, but what they were called is unknown. Perhaps they were still known as *keleustai*, or some variant of that, and the Anonymous merely got their functions wrong. There is support for this in the hypothesis that the medieval Latin and vernacular terms for a galley's crew or oarsmen, the Western equivalent of *ousia*, were supposedly derived

[367] See Appendix Two [a], §8; Appendix Three, §4.3; Appendix Five, §7. See Casson, *Ships and seamanship*, pp. 303, 318-19. Interestingly, Ibn Mankalī's translator added that the *siphōnator* should have an "elite squad" with him. See Appendix Eight [a], p. 243.

[368] See Morrison, *Greek and Roman oared warships*, p. 350.

[369] See Appendix Three, §4.3; Hude, *Scholia*, II.84.3 (p. 153): "τῶν κελευστῶν: τῶν στρατηγῶν καὶ τῶν κυβερνητῶν.". See also Casson, *Ships and seamanship*, pp. 300-310.

[370] See Isidore of Seville, *Etymologiae*, XIX.ii.13: "Porticulus malleus in manu portatus, quo modo signum datur remigantibus.". See also the Greek-Latin *Cyril* glosses of London, British Library, MS. Harley 5792 in Goetz, *Glossarii Latini*, vol. 2, p. 347, l. 28: "Κελευστης iussor [sic]"; the *Philoxenos* Latin-Greek glosses of Paris, Bibliothèque Nationale, MS. Lat. 7651, ibid., p. 154, l. 7: "Porticulus [*recte*, portisculus] κελευστῆς [sic]"; and the *Glossae Nonii* of the eighth-ninth-century manuscript Leiden, Bibliothek der Rijksuniversiteit, MS. BPL 67F, ibid., vol. 5, p. 645, l. 34: "Portisculus hortator remigum". See "Note on citations of Greek and Latin glossaries", p. lxix above. The gloss of Leiden 67F was based on the actual text of Nonius Marcellus, probably from the early fourth century. See Nonius Marcellus, *De compendiosa doctrina*, II.151 (vol. 1, p. 221): "portisculus proprie est hortator remigum, id est, qui eam perticam tenet, quae portisculus dicitur, qua et cursum et exhortamenta moderatur.".

from *celeusma*, thence *clusma*, thence *ciurma* and many other forms in various dialects and languages, such as *çurma*, *çörme*, and then eventually back into Greek as τσούρμα (*tsourma*) or τζούρμα (*tzourma*) and variants. The earliest known medieval use of the word is the Venetian *zurma* in 1278, but it had obviously remained alive over the centuries before that. The Venetian term may well have been derived from a Byzantine one.[371] Whatever the case, the development of the meaning of the word explains why the Byzantine *ousia* never passed into the other languages as a term for a galley's crew.

The flautist of a classical *triērēs*, τριηραύλης (*triēraulēs*), said by the Anonymous to be the ship's trumpeter, ἰβυκινάτωρ (*ibykinatōr*), correctly βουκινάτωρ (*boukinatōr*), was also no doubt a real officer of some sort. The *Stratēgikon* attributed to Maurice mentioned *boukinatōres*, and Leo VI and Nikēphoros Ouranos both implied that



Figure 26
Dromons in the *Kynēgetika* of Pseudo-Oppian (Venice, Biblioteca Marciana, MS. Gr. 479 [coll. 881], fol. 23r), eleventh century.

a trumpet, βούκινον (*boukinon*), was used for giving orders; although not in battle.[372] The figures at the sterns of the two ships in an illustration of naval warfare in the eleventh-century manuscript of the *Kynēgetika* of pseudo-Oppian in the Marciana library appear to be

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[371] Tafel and Thomas, *Urkunden*, vol. 3, p. 257: " ... cum uno ligno, quod armaverat in Ania, et zurinam[4] suam, Latinos et Grecos, ...".

[4] leg. zurmam s. ziurmam

Cf. Kahane, *Lingua Franca*, §723 (p. 475); Jal, *Glossaire nautique*, p. 477.

[372] See Appendix Two [a], §45; Appendix Three, §4.3; Appendix Five, §43 and cf. Nikēphoros Ouranos, *Ek tōn taktikōn*, 119.26 (p. 98); Maurice, *Ek tou Maurikiou*, §3 (p. 41). Cf. Maurice, *Strategikon*, XIIB.21.12 (p. 468).

playing such flutes or trumpets.

Whether there was any real difference between the instrument that on Greek *triēreis* had been called a "flute", αὐλός (*aulos*), and that which was called a *bucina* on Roman *liburnae*, and a *boukinon* on Byzantine dromons is debatable.

Whatever the case, there can be little doubt that dromons must have had some such officers as *keleustai* and *triēraules*. The sea trials of *Olympias* revealed that there were significant problems in setting the stroke and communicating commands throughout the ship. High-pitched sound, such as that from a pipe, carried best within the ship.[373] On dromons, how were commands communicated simultaneously to crews rowing both below and above deck? Obviously, there must have been some way of doing so, perhaps by having a hatch in the deck immediately forward of the poop with two *keleustai* or *boukinatōres* stationed there within hearing of the *kentarchos*, one above and the other below deck.

The other officers referred to by the Anonymous, the πεντηκόνταρχος (*pentēkontarchos*), ἑκατόνταρχος (*hekatontarchos*), *nauarchos* and ἐπιστολεύς (*epistoleus*), can all be dismissed as derivatives from Pollux with no relevance to the tenth century. In antiquity a *pentēkontarchos* had been a sort of commander's secretary or "purser" of a *triērēs*.[374] *Hekatontarchos* was merely a generic for a commander of 100 men. *Navarchos*, as we have seen, meant an admiral and *epistoleus* was a vice admiral. However, there is no evidence that any of these terms were used for ranks in the Byzantine navy.

Finally the crews. The oarsmen were known as κωπηλάται (*kōpēlatai*) or ἐλάται (*elatai*) and the marines as either "soldiers", στρατιῶται (*stratiōtai*), or "warriors", πολεμισταί (*polemistai*).[375] These were soldiers from various army corps, not special sea-soldiers or "marines" in the modern sense. The word for "sailors", ναῦται (*nautai*), seems to have been reserved for the crews of the baggage or supply ships, σκευοφόρα (*skevophora*) or φορτικά (*phortika*), and horse transports, ἱππαγωγά (*hippagōga*), of the "baggage train",

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[373] See Morrison and Coates, *Trireme reconstructed*, pp. 30-32, 63, 101-2; Rankov, "Rowing Olympias", pp. 53-5; Morrison, et al., *Athenian trireme*, pp. 250-2.

[374] See Morrison, et al., *Athenian trireme*, pp. 112, 124.

[375] See Appendix Two [a], §§5, 6, 8, 13, etc.; Appendix Three, §3.1, 5.rub.; Appendix Five, §§4, 5, 7, 11; Haldon, "Theory and practice", pp. 202-35 *passim* and Constantine VII, *De cerimoniis*, II.44 & II.45 *passim* (ἄνδρες κωπηλάται, πολεμισταί, στρατιῶται, etc.).

suggesting that these ships were sailing ships rather than galleys.[376]

To this point we have considered command structures almost entirely by internal examination. However, it is necessary to modify some of the arguments above in the light of external evidence.

First, the helmsmen. Leo VI and Nikēphoros Ouranos both referred to only two helmsmen per dromon. However, all medieval Mediterranean ships, whether sailing ships or galleys, always had two quarter rudders, one on each side. If there were only two helmsmen, they would have had to have manned them without relief. In the earliest evidence known from the West for the crews of war galleys, that of the chancery registers of the Kingdom of Sicily in the reign of Charles I of Anjou, there were always four helmsmen, *nauclerii*, per galley.[377] No doubt, they stood alternate watches on the rudders and this must surely have been the case on Byzantine dromons also. There is supporting evidence for this in the inventory for the Cretan expedition of 949. Although Leo VI mentioned only two helmsmen, one *siphōn* operator, and one bowman, the inventory said that twelve light corselets should be provided for these men.[378] So, obviously there were more of them than the four men in all mentioned by the emperor; most probably four of each kind, to make a total of twelve.

We should understand Leo VI and Nikēphoros Ouranos to have been referring to the command structure as it would have been found in place at any point in time rather than to the total number of crew. There would always have been one bowman on watch at the prow; however, in battle there would have been many more than one stationed there and at other times watches were no doubt alternated as they were for the helmsmen. Similarly for the *siphōn* operators. Leo VI said explicitly that a particular oarsman, one of the two on the last benches at the bow, should operate the *siphōn*. However, he also said that he had invented hand-*siphōnes*, the Anonymous said that two more *siphōnes* were used at the sides, and the inventory for the Cretan expedition of 949 said that each dromon had three *siphōnes*.

It is also possible that the same considerations applied to the *kentarchoi*. None of the Byzantine texts suggest that there was more than one *kentarchos* per dromon; however, the Angevin chancery documents are quite clear that the galleys of the Kingdom of Sicily had two commanders, *comiti*, each. Again, they no doubt stood

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[376] See Appendix Two [a], §13; Appendix Five, §11.

[377] See Pryor, "Galleys of Charles I of Anjou", Table Three (p. 82).

[378] See Appendix Four [b], §II.2 [= Haldon, "Theory and practice", p. 225; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 669)].

watches in command of the ships when at sea. How general questions of command were resolved between them is not known because they both had the same rank and were paid the same.[379] Assuming that such questions could be resolved somehow, it would certainly make sense to be able to share the operational command of dromons in watches between two *kentarchoi* and, given the interpretation of the texts as referring to the command structure as it would have been found in place at any particular time, there is no reason per se to discount the possibility. No text known to us has a correlation between a number of dromons and a number of *kentarchoi*.

(j) *Oarage system and dimensions*

On either side of a bireme dromon there were the rowing benches, the "thwarts", ζυγόι (*zygoi*), arranged in two banks, one "above" (ἄνω) and the other "below" (κάτω).[380] Above and below what is not indicated in any of the sources; although, the deck must surely have been meant. The syntax of the Anonymous at §1.7 where he discussed the oar-banks was very obscure; however, he appears to have said that the thwarts below deck were called ζυγά (*zyga*) and the lower oarsmen ζύγιοι (*zygioi*). He added that the benches above deck were known as "benches", θρᾶνοι (*thranoi*), and their oarsmen as θρανῖται (*thranitai*). Then he added that if there was a third oar-bank, those on it were known as θαλάμιοι (*thalamioi*).[381] In all this, however, he was once again merely following his sources, probably Pollux,[382] who was

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[379] See Pryor, "Galleys of Charles I of Anjou", Table Three (p. 82) and Table Six (p. 90).

[380] See Appendix Two [a], §§7-8: "Ἕκαστος δὲ τῶν δρομώνων εὐμήκης ἔστω καὶ σύμμετρος ἔχων τὰς λεγομένας ἐλασίας δύο, τήν τε κάτω καὶ τὴν ἄνω. Ἑκάστη δὲ ἐχέτω ζυγοὺς τὸ ἐλάχιστον κε΄ ἐν οἷς οἱ κωπηλάται καθασθήσονται, ὡς εἶναι ζυγοὺς τοὺς ἅπαντας κάτω μὲν κε΄, ἄνω δὲ ὁμοίως κε΄, ὁμοῦ ν΄.". Cf. Appendix Five, §§6-7.

[381] Appendix Three, §1.7: "Τὰ δὲ ἑκατέρωθεν τῶν τοίχων κατάστεγα κατάστρωμα λέγεται καὶ θρᾶνος καὶ σανιδώματα, ὧν ἄνωθεν ἡ πρώτη εἰρεσία καὶ οἱ ὁπλῖται καὶ τοξόται καὶ πελτασταί, κάτωθεν δὲ τοῦ σανιδώματος ἡ δευτέρα ἥτις δι᾽ ὅλου ἐρέττει, τυχόντων ἐπὶ τοῦ καταστρώματος ἄνωθεν πολεμούντων. Καὶ οἱ μὲν ἐπὶ τοῦ θράνους καθήμενοι θρανῖται λέγονται, οἱ δὲ εἰς τὰ ζυγὰ ζύγιοι· καὶ θαλάμιοι δὲ ἔστιν ὅτε εἰ ἔχει τρεῖς εἰρεσίας ἡ ναῦς.".

[382] Pollux, *Onomasticon* (Bethe), I.87 (vol. 1, p. 28): "καὶ τὸ μὲν ἔδαφος τῆς νεὼς ... καλοῖτο δ᾽ ἂν καὶ θάλαμος, οὗ οἱ θαλάμιοι ἐρέττουσι· τὰ δὲ μέσα τῇ νεὼς ζυγά, οὗ οἱ ζύγιοι κάθηνται, τὸ δὲ περὶ τὸ κατάστρωμα θρᾶνος, οὗ οἱ θρανῖται.".

All this was widely known and the Anonymous may have got it from anywhere. See, for example, the scholion on Aristophanes' *Acharnenses*, l. 162 in the tenth-century Ravenna manuscript in Rutherford, *Scholia Aristophanica*, *Acharnenses*.162 (vol. 2, p. 282): "τῶν γὰρ ἐρεττόντων οἱ μὲν ἄνω ἐρέττοντες θρανῖται λέγονται, οἱ δὲ

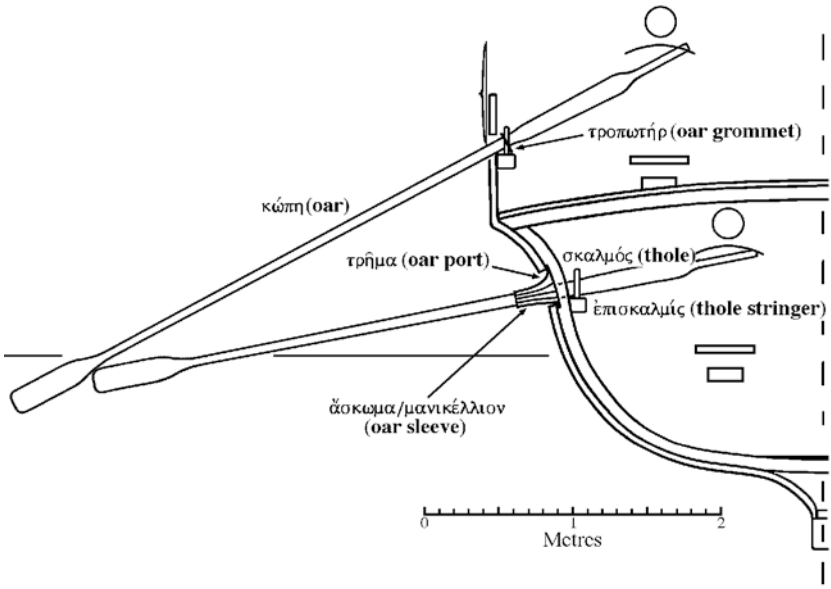


Figure 27
Midships oars of a dromon of the era of the Macedonian emperors, drawn at a right angle to the centre-line of the ship.[383]
© John H. Pryor

himself only rehearsing the standard arrangement and nomenclature for the oar-banks of classical Greek *triēreis*. In early Greek, before the development of *triēreis*, *zygon* or *zygos* meant simply a bench or thwart from which an oarsman rowed. When *triēreis* were developed, the term ζύγιος (*zygios*) or ζυγίτης (*zygitēs*) became used for an oarsman in the middle oar-bank. Θαλάμιος (*thalamios*) or θαλαμίτης (*thalamitēs*) became used for an oarsman in the oar-bank below the *zygioi* because their oars were worked through oar ports known as θαλαμιάι (*thalamiai*). Θρανίτης (*thranitēs*) became used for an oarsman in the oar-bank above the *zygioi*, apparently because they were seated on small benches known as θρᾶνοι (*thranoi*). However, once again in the grip of a piece of classicizing lexicography, these terms were only vaguely understood by the Anonymous from Pollux

μέσοι ζευγῖται, οἱ δὲ κάτω θαλάμιοι.". See also the scholion on Thucydides, VI.31.3 in Hude, *Scholia*, (p. 343): "θρανῖται: οἱ τὴν ἀνωτέραν τάξιν ἐν τῇ τριήρει τῶν ναυτῶν ἔχοντες· οἱ γὰρ μέσοι ζευγῖται· οἱ δὲ κατώτεροι θαλάμιοι.".

[383] Dimensions based on those calculated in this section, especially Figure 32.

or elsewhere. Leo VI and Nikēphoros Ouranos made it clear that in the tenth century *zygos* was used for all the thwarts or benches on which oarsmen sat, irrespective of any vertical arrangement of the oar-banks.

The emperor, and Nikēphoros Ouranos following him, said that there should be 25 thwarts in each oar-bank, for a total of fifty, each with two oarsmen, one on the right and the other on the left.[384] However, we must understand them to have meant 25 thwarts per side. No one would ever have constructed a war galley with thwarts stretching from one beam to the other because they would have impeded the free access from stern to bow down the centre line which was essential in battle. Moreover, it would have been impossible to do so in any case because the oarsmen's thwarts were almost certainly angled forward at around 18.4˚ from the right-angle to the centreline.[385]

Following Pollux again,[386] the Anonymous said that the oars of the lower oar-bank were rowed from tholes, σκαλμοί (*skalmoi*), through oar-ports, τρίματα (*trimata*), corrrectly τρήματα (*trēmata*),[387] in one of the hull strakes which was known as the θυρεόν (*thyreon*). They were hung from the *skalmoi* by oar-grommets, τροπωτῆρες (*tropōtēres*).[388]

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[384] See Appendix Two [a], §8: "Ἑκάστη δὲ ἐχέτω ζυγοὺς τὸ ἐλάχιστον κε΄ ἐν οἷς οἱ κωπηλάται καθασθήσονται, ὡς εἶναι ζυγοὺς τοὺς ἅπαντας κάτω μὲν κε΄, ἄνω δὲ ὁμοίως κε΄, ὁμοῦ ν΄. Καθ᾽ ἕνα δὲ αὐτῶν δύο καθεζέσθωσαν οἱ κωπηλατοῦντες, εἷς μὲν δεξιά, εἷς δὲ ἀριστερά, ὡς εἶναι τοὺς ἅπαντας κωπηλάτας ὁμοῦ τοὺς αὐτοὺς καὶ στρατιώτας τούς τε ἄνω καὶ τοὺς κάτω ἄνδρας ρ΄.". Cf. Appendix Five, §7.

[385] Cf. below pp. 284-91.

[386] Appendix Three, §2.12: "Ἡ δὲ σανὶς δι᾽ ἧς αἱ κῶπαι ἐξέρχονται θυρεόν, καὶ ὅθεν μὲν ἐκδέδενται σκαλμός, ᾧ δὲ ἐνδέδενται τροπωτήρ. Τὸ δὲ ἐπὶ τῶν σκαλμῶν ἐπισκαλμίς. Δι᾽ ὧν δὲ εἴρεται ἡ κώπη τρήματα [τρίματα: MS. A]. Τὸ δὲ πρὸς αὐτῷ τῷ σκαλμῷ δέρμα ἄσκωμα, τὸ παρ᾽ ἡμῖν μανικέλλιον.". Cf. Pollux, *Onomasticon* (Bethe), I.87-88 (vol. 1, p. 28): "καὶ ὅθεν μὲν αἱ κῶπαι ἐκδέδενται, [σκαλμός, ᾧ δὲ ἐκδέδενται], τροπωτήρ, ... τὸ δ᾽ ὑπὸ τὸν σκαλμὸν [ἐπισκαλμίς]. ... δι᾽ ὧν δὲ διείρεται ἡ κώπη, τρήματα. τὸ δὲ πρὸς αὐτῷ τῷ σκαλμῷ δέρμα ἄσκωμα.".

[387] *Trēma* was a post-classical word derived from the classical τρύπημα (*trypēma*) for an oarport. See Hesychios, *Lexicon* (Schmidt), T.1315 (vol. 4, p. 171): "τρήματα· τρυπήματα".

Almost all ancient and medieval pictorial representations depicted the oar ports as as being round; however, in fact they must have been elongated as shown on the Victory of Samothrace monument in order for the oars to work through them on a lateral plane around the *skalmoi* inside the hull. See Casson, *Ships and seamanship*, fig. 118.

[388] Leo VI and Nikēphoros Ouranos both recommended that dromons should carry spare *skalmoi* and oar-grommets. Leo used the classical σχοινία (*schoinia*) for ropes or cords for the oar-grommets but Nikēphoros corrected it to the technical *tropōtēres*. See Appendix Two [a], §5; Appendix Five, §4.

It has been almost universally assumed, on the basis of classical evidence, that oar-grommets were made of leather. See p. 198 and n. 102 above. However, on

The ports were sealed against water by leather sleeves around the oars, ἄσκωματα (*askōmata*) in classical Greek but μανικέλλια (*manikellia*) in the tenth-century.[389]

Thus far he got it right, but then the Anonymous made a "howler" because he did not understand Pollux. Pollux wrote that *skalmoi* were set in and on something, presumably a timber of some kind, called an ἐπισκαλμίς (*episkalmis*): "τὸ δ᾽ ὑπὸ τὸν σκαλμὸν [ἐπισκαλμίς]" ("what is under the thole [is] the *episkalmis*"). The sense of the word was confirmed by Hesychios,[390] and it was also used in the plural ἐπισκαλμίδες (*episkalmides*) by Agathias with the sense of some things to which makeshift oars were attached by the Huns at the siege of *Chersōn*, surely as a synonym for *skalmoi* in his case.[391] But, deceived by the "above" or "upon" sense of the prefix "ἐπί", the Anonymous altered Pollux's text to read: "Τὸ δὲ ἐπὶ τῶν σκαλμῶν ἐπισκαλμίς" ("What is on the tholes is the *episkalmis*"), making nonsense of it. That tholes were set in something called an *episkalmis* must have been correct.[392] They had to be set in something. But that

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Olympias it was found that leather stretched too much and it had to be replaced by rope tied in such a way as to enable the grommets to be tightened when necessary. See Morrison and Coates, *Trireme reconstructed*, pp. 74, 100; Coates, et al., *Trireme trials*, p. 56; Coates, "Oar", p. 49; Morrison, et al., *Athenian trireme*, pp. 241-2.

Note also that, contrary to what one might expect, the oars of *Olympias* were actually rowed against the oar-grommets rather than against the tholes themselves. The oars passed forward of the tholes, rather than aft of them. See Morrison and Coates, *Trireme reconstructed*, p. 100; Coates, "Oar"; Morrison, et al., *Athenian trireme*, pp. 215, 242.

Given our oft-stated doubt about the Anonymous and his treatise, we would not wish to make too much of either his technical expertise or the precise import of his language. However, that being said, it should be noted that when he referred to the oars, he said that they were "hung from" the tholes by the oar grommets, rather than that they were "attached to" them. See Appendix Three, §2.12: "Ἡ δὲ σανὶς δι᾽ ἧς αἱ κῶπαι ἐξέρχονται θυρεόν, καὶ ὅθεν μὲν ἐκδέδενται σκαλμός, ᾧ δὲ ἐνδέδενται τροπωτήρ.". The use of the word ἐκδέω, from which the verb ἐκδέδενται meaning "hung from", is curious. One might have expected some word relating to "attaching to". It does suggest that the oars were secured to the tholes by an oar grommet but that they were rowed against the grommet rather than the thole.

[389] The meaning of *askōmata* may have been forgotten in practice by the tenth century. The *scholia* on Aristophanes' *Acharnenses*, l. 97 in the tenth-century Ravenna manuscript confused the *askōmata* with *tropōtēres*. See Rutherford, *Scholia Aristophanica*, *Acharnenses*.97 (vol. 2, p. 274): "ἄσκωμα ὁ ἱμὰς ὁ συνέχων τὴν κώπην πρὸς τῷ σκαλμῷ· ...".

[390] Hesychios, *Lexicon* (Schmidt), E.5188 (vol. 2, p. 167): "ἐπισκαλμίς· τὸ ὑπὸ τῷ σκαλμῷ σανίδιον".

[391] Agathias, *Historiae*, V.22.2 (p. 192): "ἐμβάντες δὴ οὖν ἐν αὐταῖς ἄνδρες ἐς ἑξακοσίους καὶ πτύα ὡς πλεῖστα ταῖς ἐπισκαλμίσιν ἐντροπωσάμενοι ... ".

[392] On *Olympias*, the tholes were set on carlings between the frames. Personal communication from John Coates to John Pryor. However, there is no reason why a single continuous stringer run along the inside of the frames could not have served the

anything, whether an *episkalmis* or anything else, could be set "on the tholes" would obviously have been impossible since if it were, the oars could not then be hung from the tholes by attaching the oar-grommets to them and then slipping the grommets over the tholes.

The only independent information that the Anonymous appears to have added to Pollux is the use of *manikellia* for *askōmata*, and the curious use of *thyreon* for the strake which had the oar-ports. This was not a classical word and the Anonymous's source is unknown. It was probably suggested from the idea of a row of oar ports and hence derived from θυρίς (*thyris*) an opening. The classical Greek word for an oarport was θαλαμιά (*thalamia*);[393] however, it was a word little used in classical Greek literature and the Anonymous appears not to have known it. The corresponding Latin word was *columbarium*,[394] a word which survived with the same meaning into the Middle Ages, but it also was apparently unknown to the Anonymous.

Manikellia for oar sleeves is confirmed by an inventory for the Cretan expedition of 949, which specified 50 *manikelia*, together with their γοvατία (*gonatia*), for each dromon.[395] *Gonatia* must have had the sense of some kind of "joints". We suggest that they were the means by which the oar sleeves were attached either to the hull or to the oars.[396] Although it obviously proves nothing about Byzantine dromons, the construction of the oar sleeves for *Olympias* is interesting in this respect.[397] The sleeves were made from four trapezoidal pieces of leather 47 centimetres long sewn together to form a tapering cone. The large ends were in the form of a square equal to the clear distance between the hull frames; i.e. 37 centimetres. At the large end about 25 centimetres was left unsewn,

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same purpose. Such a stringer may have been the *episkalmis*.

[393] See Casson, *Ships and seamanship*, pp. 83 & 87, n. 52.

[394] See, for example, Isidore of Seville, *Etymologiae*, XIX.ii.3: "Columbaria in summis lateribus navium loca concava per qua eminent remi; dicta, credo, quod sint similia latibulis columbarum in quibus nidificant.".

[395] Appendix Four [b], §IV.7: "μανικέλια ἀνὰ ν΄, ὁμοῦ ,α σὺν τῶν γοvατίων αὐτῶν," [= Haldon, "Theory and practice", p. 227; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 672)]. *Manikel(l)ion* passed into medieval Latin in the West as *manichilium* for the same thing. See Pryor, "Galleys of Charles I of Anjou", pp. 80-81.

[396] Reiske suggested that *gonatia* were leather guards used by the oarsmen to protect their knees against abrasion from the benches when pushing against them in order to impart maximum force to the rowing stroke. See Constantine VII, *De cerimoniis*, vol. 2, p. 795. However, this is not plausible. Reiske apparently knew little about rowing. Oarsmen never used their knees to push against benches to impart greater force to their stroke. They used their feet against footrests.

[397] The following information was supplied by John Coates to John Pryor in personal communications.

thus forming four flaps. The two side flaps were secured by battons nailed to the frames either side of the oarports. The top and bottom flaps were similarly secured by battons, but nailed to the inside of the planks above and below the oarports. At the small end of the sleeves the leather was cut 14.5 centimetres square and, when sewn together, the hole was just large enough to pass the blades (18.8 centimetres wide) and looms of the oars through them. They were secured to the oars by pushing the oars through them and then pulling the oars and sleeves inboard so that the sleeves were inside out and then tying the sleeves to the oars with thin cords. The oars and sleeves were then pushed back out through the oarports. The result was reported to be satisfactory. This practical experiment leads to the suggestion that the "joints" or *gonatia* of the *manikellia* for the dromons may have been something like the battens used on *Olympias* to attach the sleeves to the hull.

According to the Anonymous, above the lower bank of oars was the wale called the *peritonon*, then another strake called the πέλα (*pela*), then another wale, and then another *thyreon* for the upper oar-bank, which presumably also had *trēmata* for the oars to come through as the lower one had.[398] Apparently the *trēmata* of the upper bank did not need *manikellia* since the inventory for the Cretan expedition of 949 specified 120 oars per dromon but only 50 *manikelia*;[399] presumably because the *trēmata* of the upper *thyreon* were much higher above the waterline than those of the lower, and were above the deck in any case so that any water coming through them would run off through scuppers. What the Anonymous intended by the plank he called a *pela* is totally obscure. The word as such appears not to have been known in either classical or medieval Greek and no word with any similar form and nautical connotation is known to us in medieval Latin or Western vernacular languages.[400]

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[398] Appendix Three, §2.13: "Ταύτης δὲ ἄνωθεν τῆς εἰρεσίας περίτονον, εἶτα σανὶς ἑτερα, ἡ λεγομένη πέλα, εἶτα περίτονον, εἶτα πάλιν θυρεόν, ἔνθα ἡ ἄνωθεν εἰρεσία. Ἄνωθεν δὲ πάντων ἡ ἐπηγκενίς, τὸ ἄρτι λεγόμενον καταπατητόν· ἐκεῖσέ που καὶ τὸ καστέλλωμα γίνεται, ἔνθα τὰς ἀσπίδας οἱ στρατιῶται κρεμῶσι.".

[399] Appendix Four [b], §§IV.7-8 [= Haldon, "Theory and practice", p. 227; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 672)].

[400] No such term is found in either Jal, *Glossaire nautique* or Kahane, *Lingua Franca*.

Πέλλα (*pella*) was used in the *De administrando imperio* at §9, l. 18, where it appears to have had the meaning of oars since it was used in conjunction with σκαρμοί (*skarmoi*) for tholes. See Constantine VII, *De administrando imperio*, §9, l. 18 (p. 58). This usage is a *hapax legomenon* in medieval Greek. Du Cange hypothesized that *pella* was derived from the Latin *pala*, which in medieval Latin could mean a blade of an oar. See Du Cange, *Glossarium*, col. 1144; Kahane, *Lingua*

The hull was topped by a "gunwale", ἐπηγκενίς (*epēnkenis*) in classical Greek but apparently known as a καταπατητόν (*katapatēton*) by the tenth century. *Epēnkenis* was well known in Greek from *Odyssey*, V.253 as meaning a gunwale.[401] According to Eustathios of Thessalonikē in his commentary on the line, this interpretation of *epēnkenis*, which presumably was therefore common, was incorrect and the term referred either to a [timber] to which the *skalmoi* were attached, or to a *peritonon*.[402] However, there is no guarantee that Eustathios actually understood all these terms any better than did the Anonymous, whose text does appear to make internal sense at this point. Indeed, the only timber to which *skalmoi* could possibly be attached would be the one below them in which they were set, and Pollux and Hesychios were agreed that that was called an *episkalmis*. It seems certain that Eustathios was wrong about this unless the term *epēnkenis* had changed meaning during the intervening centuries or unless he was thinking only of small boats. In small boats, of course, the timber in which tholes, or rowlocks, would have been set was the gunwale. It still is.

There was a pavesade, καστέλλωμα (*kastellōma*), to which marines could attach their shields, as can be seen clearly in the illustrations of the *Ilias Ambrosiana* manuscript and the Marciana Library manuscript of Pseudo-Oppian's *Kynēgetika*. [See Figures 7 and 26] In the case of the Madrid manuscript of John Skylitzēs' *Synopsis historiōn*, shields are depicted only once, on folio 34v, on the imperial dromon attacking the fleet of Thomas the Slav, and then they are misplaced on the lower hull. [See Figure 57] This word for a pavesade appears to have been the name for the bulwark of Byzantine war galleys. Theophanēs the Confessor wrote that when the future emperor Hērakleios sailed from *Africa* in 610 to seize the imperial throne, he did so with a fleet that included pavesaded ships, πλοῖα καστελλωμένα (*ploia kastellōmena*), and the *stratēgikon* attributed to Maurice said that commanders of dromons engaged in forcing crossings of rivers should similarly

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Franca, §457 (p. 328). But, whatever the Anonymous understood by the term *pela*, it was clearly not oars but rather a name for some plank or strake of the hull.

[401] Homer, *Odyssey*, V.253: "... · ἀπὰρ μακρῇσιν ἐπηγκενίδεσσι τελεύτα.".

[402] Eustathios of Thessalonikē, *Commentarii ad Homeri Odysseam*, 1533.38-43 (vol. 1, p. 213), to *Odyssey*, E.253: "Τοῦ δὲ θαμέσι, δοκεῖ εὐθεῖα εἶναι ὁ θαμὴς διὰ τοῦ ῆ. ἢ διὰ διχρόνου, ἡ θαμίς. Ἐπηγκενίδες δὲ, σανίδες ἐκ πρώρας εἰς πρύμναν τεταμέναι καὶ ἐπενηνεγμέναι. ὅθεν καὶ ἐτυμολογεῖ*ται. παρὰ γὰρ τὸ ἐπενεγκεῖν, ἐπενεγκὶς γίνεται. καὶ κατὰ μετάθεσιν, ἐπεγκενὶς καὶ κατὰ ἔκτασιν, ἐπηγκενίς. ἔστι δὲ ἐπηγκενὶς ἢ καθ' ἣν οἱ σκαλμοὶ πήγνυνται, ἢ ὅπερ κοινῶς περίτονον λέγεται παρὰ τὸ διόλου τείνεσθαι. παρὰ δὲ τοῖς παλαιοῖς φέρεται, καὶ ὅτι ἐπηγκενίδες, μακρὰ ξύλα τῆς σχεδίας. ἢ τὰ παραθέματα.".

pavesade, καστελλῶσαι (*kastellōsai*), them.[403] On Western galleys of the twelfth and thirteenth centuries the shields were also hung along the pavesades or bulwarks in a similar way. The anonymous *Itinerarium peregrinorum* of the Third Crusade said that they were arranged on the upper deck, overlapping in a circle or curve; that is, following the curve of the deck.[404] Theodore Prodromos, a leading poet at the court of John II Komnēnos and that of the early years of Manuel I, in his description of the preparations for a naval battle in his novel *Rhodanthe and Dosikles*, which was probably written in the 1140s, wrote that marines struck out at the enemy from between each two shields and then withdrew behind them for protection and that the positioning of the shields was like the tops, the crenellations, of walls and turrets, from which archers fired.[405] Prodromos did not name the types of ships involved but he was clearly referring to Byzantine warships of the early twelfth century and dromons or *chelandia* can be assumed.

Dromons did vary in size and with that must also have come variation in oarage systems, although not necessarily in fundamental or proportional structures.

In the case of dromons smaller than the norm, the *galeai* which were described by the continuator of Theophanēs the Confessor in the first part of the *Theophanēs Continuatus* as *myoparōnes* and *pentēkontoroi*, and parenthetically as *monēreis* by Leo VI, and which presumably had only one oar-bank, had only 50 oarsmen. Was this oar-bank still located below deck as it had been on the dromons of Prokopios back in the sixth century, or was it now located above

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[403] Theophanēs, *Chronographia*, A.M. 6102 (vol. 1, p. 298): "Τούτῳ τῷ ἔτει μηνὶ Ὀκτωβρίῳ δ΄, ἡμέρᾳ β΄, ἰνδικτιῶνος ιδ΄, ἦκεν Ἡράκλειος ἀπὸ Ἀφρικῆς φέρων πλοῖα καστελλωμένα, ..."; Maurice, *Ek tou Maurikiou*, §§2, 3 (p. 41).

[404] See *Itinerarium peregrinorum* (Mayer), p. 323: "In superioribus vero tabulatis clipei per girum disponuntur consertis, ...". See also the illustration in the *De rebus Siculis carmen* by Peter of Eboli in Peter of Eboli, *De rebus Siculis*, p. 104.

[405] Theodore Prodromos, *Rhodanthe and Dosikles*, bk. 5, ll. 457-68 (p. 89):

ἀλλ᾽ ἠρεμοῖεν ἐμπαρέντα τοῖς πίλοις.
ἄνω δ᾽ ἐπ᾽ αὐτῶν τῶν τεθειμένων πίλων
πληθὺς παρῃώρητο μακρῶν ἀσπίδων,
καὶ τοῦτο βουλῆς ἀνδρὸς εὐεπηβόλου.
ἀνὴρ γὰρ ἀμφοῖν ἀσπίδων ἑστὼς μέσος
πλήττειν ἐκεῖθεν εἶχε τοὺς ἐναντίους,
αὐτὸς δ᾽ ἔσωθεν εἰσιὼν τῶν ἀσπίδων
ἀτραυμάτιστος, ἀβλαβὴς ἐφεστάναι·
τύπον γὰρ εἶχεν ἡ θέσις τῶν ἀσπίδων
οἷον τὰ τειχῶν ἄκρα καὶ τῶν πυργίων,
ἀφ᾽ ὧν ὀιστεύουσιν ἄνδρες τοξόται
(τειχῶν ὀδόντας ταῦτα τὸ πλῆθος λέγει)".

deck? On the one hand, both Leo VI and Nikēphoros Ouranos, and also the Anonymous following the emperor, wrote that these *galeai* were to be used as scout ships and it might therefore be suggested that they were not intended to form part of a line of battle and that therefore there would have been no need to protect their oarsmen below deck. On the other hand, in other passages Leo VI and Nikēphoros Ouranos both distinguished *galeai* from "small and fast dromons" not armed for battle but used as scouts and for conveying messages by saying that the *galeai* should be armed against normal, or many, "eventualities". This would suggest that they were intended to go into battle and that the oarsmen would therefore be best protected below deck.[406] That being said, we will argue in Chapter Six that the major development made to Western *galeae* in the eleventh and twelfth centuries, the critical change which gave them a technological superiority and which led to the demise of the dromon and the pre-eminence of the Western *galea* as the battle galley *par excellence* in the Mediterranean, was the development of two files of oarsmen, both rowing from benches above deck: the so-called *alla sensile* oarage system in which the oarsmen were not fully seated but rather used a "stand-and-sit" stroke. It is also clear that these early Western *galeae* were emulated from Byzantine *galeai*, most probably from those encountered by the Normans and others in South Italy. It is therefore tempting to believe that, by the eleventh century at least, Byzantine *galeai* were rowed from above the deck, whether they had been in the age of Leo VI or not.

In the case of dromons larger than the norm, there is no hard evidence that tenth-century dromons did have a third file of oars and the indirect evidence suggests that they did not. In fact the Anonymous was the only Byzantine author to appear to say that some Byzantine galleys could have three oar-banks.[407] However, he was merely extrapolating from the oarage system of classical *triēreis* which he knew indirectly through Pollux. To rely on his evidence for a third oar-bank without any corroborating evidence would be injudicious.

Although they wrote that some dromons could be larger than the norm, neither Leo VI nor Nikēphoros Ouranos actually said that any had three oar-banks. One of the inventories for the Cretan expedition of 949 specified 1,000 *manikelia* for 20 dromons, 50 each, certainly

[406] See Appendix Two [a], §§10, 82; Appendix Three, §3.2; Appendix Five, §§9, 74.

[407] See above pp. 276-8 and Appendix Three, §1.7.

for the lower oars. On these dromons, the lower oar-bank must have had 25 oars per side, just as Leo VI and Nikēphoros Ouranos specified. However, the total number of oars for the 20 dromons was 120 each, a total of 2,400.[408] Obviously, it would not have been possible to have three files of oars per side if the total number of oars was only 120 and the lower bank had 50. These dromons had only two oar-banks and the extra 20 oars were spares, not a complete duplicate set as recommended by Leo VI and Nikēphoros Ouranos, but certainly spares.[409]

Makrypoulias has argued that the dromons of the 949 expedition rowed 50 oars from the lower bank and 70 from the upper, basing his argument on the fact that the armaments specified included 70 lamellar cuirasses, κλιβάνια (*klibania*), and 70 sewn shields, σκουτάρια ῥαπτὰ (*skoutaria rhapta*).[410] He argues that because of the coincidence of numbers, and because the upper oarsmen doubled as marines, this indicates that all the other 70 oars could, at least possibly, have been rowed at the same time by 70 oarsmen and that the 70 shields would all have been hung on the pavesade (*kastellōma*). However, this construction is flawed.

Throughout his study Makrypoulias assumes that all the figures in the various Byzantine texts must be inclusive. If a text refers to 120 oars, then it must have been possible for them all to have been rowed at the same time. But this was not necessarily the case. Oars break, even under conditions of normal use. One oarsman "catching a crab" could easily lead to chaos in an oar-bank and the smashing of oars. More importantly, they could be expected to be broken in large numbers in battle. Anyone outfitting a fleet for an expedition against which the enemy could be expected to engage at sea would supply the dromons with extra oars. Moreover, Makrypoulias fails to include in his construct other figures amongst the armaments that do not support his conclusion. A hundred swords, σπαθία (*spathia*), another 30 "Lydian" shields, σκουτάρια Λυδιάτικα (*skoutaria Lydiatika*), 80 trident pikes (corseques), κοντάρια μετὰ τριβελλίων (*kontaria meta tribelliōn*), 100 pikes, μεναύλια (*menaulia*), 100 throwing javelins, ῥικτάρια (*rhiktaria*), 50 "Roman" bows, τοξαρέαι Ῥωμαιαι (*toxareai*

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[408] Appendix Four [b], §§IV.7-8 [= Haldon, "Theory and practice", p. 227; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 672)].

[409] See Appendix Two [a], §5; Appendix Five, §4. Cf. Haldon, "Theory and practice", p. 337, n. 386.

[410] See Makrypoulias, "Navy", pp. 164-5 and Appendix Four [b], §§II.1, 8 [= Haldon, "Theory and practice", p. 225; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 669)].

Rhōmaiai), and 50 surcoats, ἐπιλώρικα (*epilōrika*), are all mentioned.[411] These figures for other armaments indicate clearly that there was no strict numerical relationship between the armaments specified for oarsmen or marines and the number of oars rowed from the upper bank.

In addition, no one would ever have constructed a galley with only 25 benches in the lower bank and 35 in the upper. A galley might have had a few more benches in the upper bank because of the curvature of the hull, just as *Olympias* had. However, surely not ten more. No galley known to us from any period of history had anything like 25 and 35 benches on the lower and upper decks respectively.

For the Cretan expeditions of both 911 and 949 the largest crews specified for the dromons of the imperial fleet and those of the *themata* were 230 oarsmen and 70 marines. Makrypoulias has applied his same inclusive methodology to the oarsmen that he applied to the rowing benches. Because 230 oarsmen in total were mentioned, then in order to have as many of them as possible being able to row at the same time he concludes that the upper oars must have been rowed by two oarsmen each.[412] Thus there were 50 lower oarsmen on 25 benches and 140 upper oarsmen on 35 benches. The remaining 40 are left unexplained.

However, there is no hard evidence from anywhere in the Mediterranean for the use of oars with multiple oarsman between antiquity and the sixteenth century. It is true that William of Tyre did write that in a Venetian fleet sent to *Outremer* in 1123 there were some galleys larger than *galeae* which were known as *gati*, and that these had 100 oars, each pulled by two oarsmen.[413] But this was almost certainly a mistake. William's is the only known report of oars with multiple oarsmen from the Middle Ages. His text was corrected by the author of the *Eracles*, his Old French translator, who is known to have been familiar with matters naval and maritime, to 100 oarsmen.[414]

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[411] Appendix Four [b], §§II.7, 9-10, 12-14, 20 [= Haldon, "Theory and practice", p. 225; Constantine VII, *De cerimoniis*, II.45 (vol. 1, pp. 669-70)].

[412] Alexandres suggests the same thing. See Alexandres, *Ἡ θαλασσία*, pp. 66-67.

[413] See William of Tyre, *Chronicon*, 12.22.18-21 (vol. 1, p. 574): "Erant sane in eadem classe quedam naves rostrate, quas gatos vocant, galeis maiores, habentes singule remos centenos, quibus singulis duo erant remiges necessarii.".

[414] See *Eracles*, XII.22 (p. 546): "En cele navie, si com je vos ai dit, avoit nés que l'en claime chaz qui ont bés devant ausint comme galies, mès eles sont gregneurs; en chascune ot deus gouvernaux et cent nageeurs.". On the *Eracles* author's knowledge of matters maritime see Pryor, "Eracles". See also Pryor, "From dromōn to galea", p. 109.

Moreover, consideration of the mechanics of rowing a bireme galley with two superimposed oar-banks leads inescapably to the conclusion that Makrypoulias's arrangement of the oarsmen is ergonomically impossible.

Since bireme dromons had one bank of oars below deck, the oarsmen of the lower oar-bank cannot possibly have used a "stand-and-sit" stroke because of the height limitations below deck. They must have been fully seated. Therefore, in order to coordinate and synchronise the rowing strokes of the upper oarsmen with those of the oarsmen below, it must have been necessary for them to have been fully seated also.

The space or distance between any two tholes, *skalmoi*, is referred to in a Latinization as an *interscalmium*. Because there are no Byzantine data for what this space or distance may have been on a dromon, we must proceed by analogy to other available data. On the one hand, the *triērēs Olympias*, on which the oarsmen were also fully seated, was built with *interscalmia* measuring only 0.888 metres; although, it was subsequently realized that this should have been 0.98 metres.[415] On the other hand, thirteenth-century galleys of the Kingdom of Sicily, on which the oarsmen would have used a "stand-and-sit" stroke, had *interscalmia* of approximately 1.20 metres.[416] But, without a moveable seat, it is virtually impossible for a fully-seated man to pull an oar handle through much more than a metre. Approximately a metre of the longitudinal axis of the ship should have been close to the mark for the *interscalmia* for the fully-seated oarsmen of dromons.[417]

It must be admitted that William of Tyre also ought to have been familiar with matters maritime, having made several voyages by sea. His statement is incomprehensible. However, the ship type, or possibly just a ship name, to which he referred, the *g(c)at(t)us*, was a type/name which had been quite widely mentioned early in the twelfth century but which had disappeared by his own day. Cf. below p. 412. It had long since ceased to be mentioned in any other sources. The word had probably been derived from the Arabic *qiṭ'a*. This word and its possible ship type has never been subjected to research but it is possible that William's report was based on later reports of something no longer actually known.

[415] *Olympias* was built with *interscalmia* of 0.888 metres, twice the classical Attic cubit of 0.444 metres. However, it proved to cramp the oarsmen's stroke excessively. It was realized that the archaic or Doric cubit of approximately 0.49 metres should have been used, which would have made the *interscalmia* 0.98 metres. See Coates and Morrison, "Sea trials", pp. 138, 140; Rankov, "Reconstructing the past"; Morrison, "Lessons"; Morrison, "Triereis", pp. 12-13, 18-19; Morrison, et al., *Athenian trireme*, pp. 245-6, 268-9; Morrison, *Greek and Roman oared warships*, pp. 281-2.

[416] See Pryor, "Galleys of Charles I of Anjou", pp. 64-8; idem, "From dromōn to galea", p. 110. See also below p. 435-6 & n. 22.

[417] See Coates, "Naval architecture", p. 2; Shaw, "Oar mechanics", p. 169.

It is important to bear in mind that in ship design everything was always a compromise. One range of objectives could be achieved only at the expense of others. Human comfort, stowage capacity, and seaworthiness had to be sacrificed if one wanted to build a warship which would develop maximum power from the oars for short-term speed in battle, which would have maximum manœuvrability, which would be able to carry maximum crews for battle, and which would also have sufficient sturdiness to withstand attack. And these were the requirements of which battle dromons had to be capable. Consequently, one would expect that oarsmen below deck would have been packed into the hull with mimimum headroom between their heads and the deck beams above them. And, there is also another reason why this should be so. Oars are levers and they develop their greatest mechanical advantage when as close to parallel to the water as other factors will allow. Therefore, in order to maximize the power generated by the oarsmen above deck, it would have been necessary to minimize the height of the deck above the waterline in order to reduce the angle to the waterline of both banks of oars to the minimum possible. For the same reason, the oarsmen above deck must have had their legs stretched out as straight as possible in order to minimize the height of their benches above the deck and it would have been necessary for the oarsmen below deck to have had a similar posture in order to synchronize the strokes. We have allowed for a mere 25 centimetres from the top of the oarsmen's benches to the bottom of their feet stretchers.

Because the height of the top of the head of a six-foot (1.83 metres) seated man is only around 0.95 metres above his seat, even when he is fully erect, we can assume with confidence that the deck beams of a dromon would have been no more than a metre or so above the benches of the lower oarsmen. When these leaned into their stroke, their shoulders will have been no more than around 70 centimetres above their benches and their hands no more than around 40 centimetres above the tops of their thighs. These figures could be reduced further if we assumed that oarsmen were shorter than six feet; however, for the sake of argument we have proceeded with the figure of six feet. Reducing it would make no difference to the conclusions to be drawn. Given deck beams and planks of a total thickness of around 15 centimetres, and ignoring for the moment the camber of the deck, in a dromon the minimum difference in height between the mid points of the hands of the upper and lower oarsmen on the handles of their oars cannot have been less than approximately 1.40 metres, and

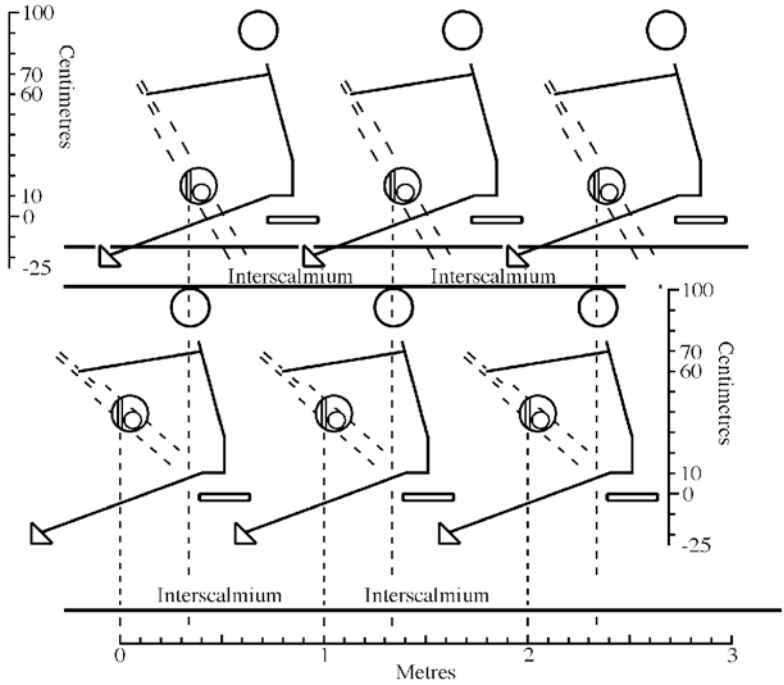


Figure 28
The oarage system of a bireme dromon of the era of the Macedonian emperors, I: *Interscalmia*.
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that is to stretch the argument as far as is possible. In *Olympias* the corresponding measurement between the lowest, *thalamian*, and highest, *thranite*, oars was around 1.45 metres.

One might have thought that this height might have been reduced by having one deck beam per *interscalmium* and placing the lower oarsmen between the beams so that their heads moved within the space between any two beams. However, this would not have been possible because the number of deck beams required would have precluded the possibility of one beam per *interscalmium*. Thirteenth-century galleys of the Kingdom of Sicily had 55 deck beams for the 27 *interscalmia* of the rowing platform, two per *interscalmium* when the staggering of the two oars per bench is taken into account.[418]

[418] See Pryor, "Galleys of Charles I of Anjou", pp. 39, 50, 54-6.

Something similar would certainly have been necessary for the structural integrity of dromons and *chelandia* and this would have meant that the tops of the lower oarsmen's heads must have been below and clear of the deck beams.

We have no data for the lengths of oars of Byzantine dromons and must again proceed by analogy to those designed for *Olympias* after experimentation and to the recorded lengths for oars of galleys of the Kingdom of Sicily. The latter had oars 6.86 metres long except for a few of 7.91 metres at bow and stern.[419] However, these were galleys in which both files of oars were rowed from above deck using a stand-and-sit stroke. The oars of *Olympias* were designed on the basis of the lengths for oars specified in Athenian naval inventories: 9 and 9.5 cubits. Using the archaic cubit of 0.49 metres, this would give them lengths of 4.41 metres and 4.655 metres.[420] After experimentation the latest oars designed for *Olympias*, which would be used on any future *Olympias Mark II*, would have a total length of 4.66 metres, with lengths from the end of the handle to the thole of 1.265 metres and from the thole to the tip of the blade of 3.395 metres, a ratio of 1:2.68. Their gearing would be 1:3.0 and their weight in hand 3.60 kilogrammes. The angle of the *thalamian* oars, the lowest oars, to the waterline when the blades were below water during the stroke would be approximately 11 degrees. The oar benches would be canted or angled outboard towards the bow. On later medieval galleys they were also canted towards the bow and for *Olympias Mark II*, it has been proposed to cant them at an angle of 18.4˚ from the right angle to the centre line, the angle whose tangent is closest to one third.[421] During the stroke the oars of *Olympias Mark II* would move through an arc of approximately 54˚ from the dead point at the beginning of the stroke before the catch in the water to the dead point at the end of it, at which point the oars would be approximately 4˚ aft of a right angle to the centre line of the ship. The mid-point of the oarsmen's hands on the handles of the oars would move forward and backward with each

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[419] See Pryor, "Galleys of Charles I of Anjou", p. 40.

[420] See Morrison, et al., *Athenian trireme*, p. 269.

[421] Alertz, "Naval architecture", pp. 159, 162; Bondioli, et al., "Oar mechanics", pp. 173, 176, 182-9; Morrison, et al., *Athenian trireme*, p. 271; communications from John Coates to John Pryor.

The gearing of an oar is the ratio of its length from the mid-point of the oarsman's hands on the handle to the thole to that from the thole to the centre of water pressure on the blade. This explains the difference between the ratio of 1:2.68 and the gearing of 1:3.0. Its weight in hand is the downward force on the mid-handle needed to raise the oar from the water and to balance it at the pivot at the thole. See also Morrison, *Greek and Roman oared warships*, pp. 333-6.

stroke approximately 0.949 metres, which is just about the maximum physically sustainable from a fixed seat, at an average angle of 23˚ to the centre line, in order to move the oar handle around 0.874 metres forward and back along the longitudinal axis of the ship. With *interscalmia* of 0.98 metres, that would allow just sufficient tolerance to allow the butt of each oar handle at the beginning of a stroke to pass past where the body of the next oarsman aft was at the end of the previous stroke in order to enable the oar stroke to be as long as physically possible, an important factor in achieving maximum oar power.

Given the total lack of any empirical evidence from Byzantine sources, this is the only reasonable point of departure for reconstructing the most probable oarage system of a dromon since the mechanics of rowing from benches below deck must have been similar in the cases of *triēreis* and dromons but totally different in the case of the later Western *galeae* which were rowed entirely from above deck.

Olympias has 27 benches each side for the *thalamian* and *zygian* oars and 31 benches for the *thranite* oars. She has an overall length from stern to stempost, excluding the ram, of approximately 34.5 metres and an overall beam amidships, including the *parexeiresiai*, of 5.45 metres. However, if *Olympias Mark II* were to be built using the archaic cubit and the number of oars were to remain the same but the length of the *interscalmia* be raised to 0.98 metres and all other lengths remain unchanged, she would have an overall length of 37.35 metres, excluding the ram. The beam would be more complex because for reasons associated with performance under oars it is proposed to eliminate the intermeshing of the blades of the three oar-banks in the water by increasing the beam at the *parexeiresiai* to 5.62 metres while keeping the beam at the waterline the same. The beam at the top of the hull proper would be approximately 4.6 metres.[422] Our best estimate for the overall length of a 100-oared bireme dromon is only 31.25 metres. Assuming that the oarsmen of the upper and lower banks were staggered on average by a half an *interscalmium*, a metre each for the twenty-five *interscalmia* would make 25.5 metres and one must then allow for prow and poop to the extremities of the stempost and sternpost. On thirteenth-century Sicilian galleys this increased the total length by around 22.5%,[423] which would give standard bireme

[422] See Morrison, et al., *Athenian trireme*, pp. 269-72.
[423] See Pryor, "From dromōn to galea", pp. 110-14.

dromons of 100 oars an overall length of approximately 31.25 metres, or at least somewhere between 31 and 32 metres. This is as accurate an estimate of their length as is possible and seems to be reasonable.

As for the beam amidships, the ratio of maximum beam at the *parexeiresiai* amidships to overall length from stempost to stern of *Olympias Mark II* would be approximately 1:6.65. That at the hull proper would be approximately 1:8.21, whereas that of thirteenth-century Sicilian galleys was 1:8.57. However, *triēreis* with *parexeiresiai* had a completely different oarage system to medieval Western galleys, whose outrigger began to curve outboard only above deck. Given the lack of any empirical data for dromons, it is necessary to make a choice. Either the hull began to flare outboard upwards from the lower oarports in a manner parallel to, but not the same as, *triēreis* with *parexeiresiai*, or it did not and dromons were straight-hulled. For reasons examined below, we believe it most likely that the upper hulls of dromons did flare outboard from above the lower oarports. However, in order to demonstrate the reasoning, we proceed from the beginning on the assumption that they were not and that the hulls were straight sided. Using the hull beam:length ratio of *Olympias Mark II* of 1:8.21 rather than the higher figure of 1:8.57 of the Sicilian galleys on the grounds that the oarage system of the former must have been more similar to that of dromons than the latter, a maximum beam amidships of around 3.80 metres for a straight-sided dromon should not have been too far from the truth.[424]

Olympias, of course, did not have a full deck and therefore calculating a depth in hold from floor to deck is not possible for her. However that of the thirteenth-century galleys of the Kingdom of Sicily, which were similar to dromons at least in the respect that they were also fully decked, was 2.04 metres and, by comparison, that of the smaller dromons was probably around 1.75-1.8 metres to the deck beams and 1.85-1.90 metres to the planks of the deck.[425]

Reducing the size of the oars of *Olympias* proportionately to the beam, which would obviously be the critical dimension in such an exercize, would give a dromon lower oars of only 3.85 metres. With a gearing ratio proportional to that of the oars of *Olympias*, the inboard

[424] The estimates of Dolley in "Warships", pp. 48-9, which were based on guesswork, were 130 feet (39.62 metres) long by 17-18 feet (5.18-5.49 metres) wide. His estimates were too high and a dromon as he reconstructed it could not possibly have been capable of any speed. Admiral Serre's estimates of 36.0 metres in length and 4.40 metres in the beam, were closer to the mark although the length was still too high. See Serre, *Marines de guerre*, vol. 1, p. 91.

[425] See Pryor, "Galleys of Charles I of Anjou", p. 45.

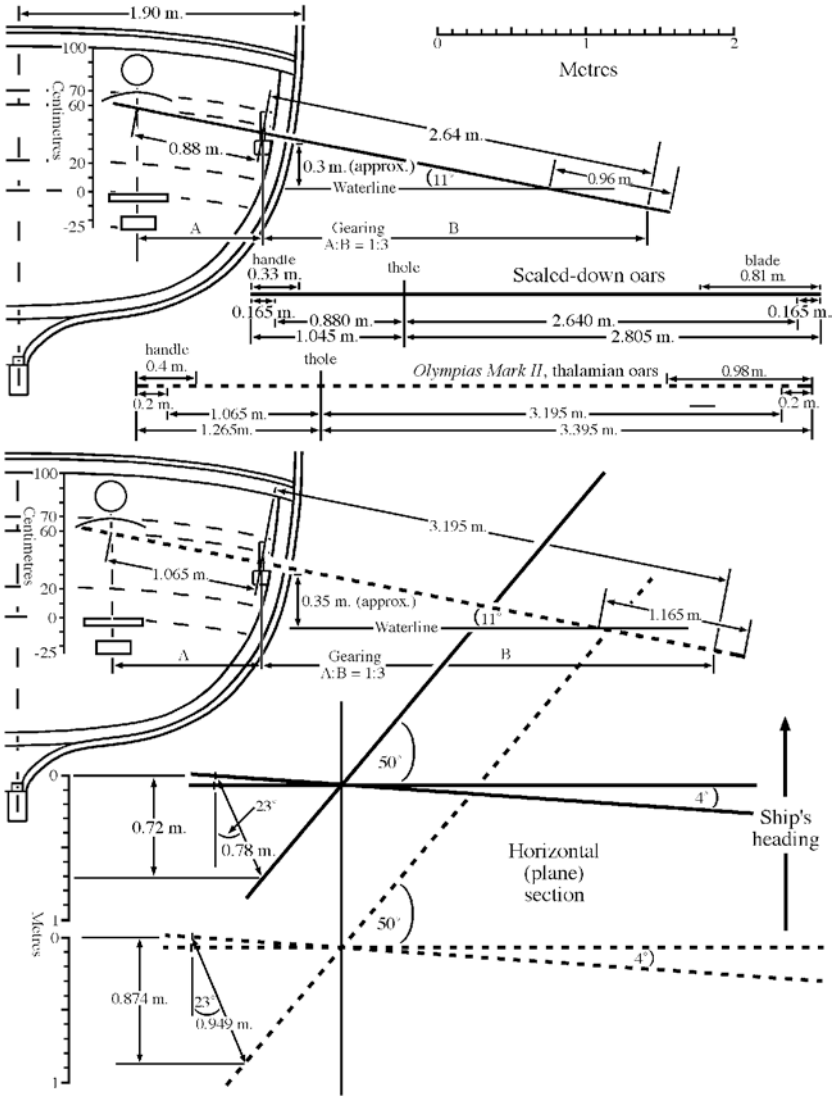


Figure 29
The oarage system of a bireme dromon of the era of the Macedonian emperors, II: straight-hulled lower midships section with *thalamian* oars of *Olympias Mark II* and scaled-down version.
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length of the oars of a dromon would then be around 1.045 metres and their outboard length around 2.805 metres. By analogy to the latest

thalamian oars designed for *Olympias*, which have eliptical blades, the blades of the oars of a dromon would be around 15 centimetres by 81 centimetres. The mid-point of the handles would be around 16.5 centimetres from the butt and the centre of water pressure on the blade a similar distance from the tip. Assuming that the angle to the waterline of the lower oars was also around 11 degrees as in *Olympias*, this would enable us to reconstruct the midships section of such a bireme dromon within quite close parameters.

One has to bear in mind that the blades of oars are wider than their looms. Thus, even if the length of a blade is, say, 50 centimetres from the tip, the point at which the loom of the oar enters the water will be above that, more or less above that according to the less or more acute angle of the oars to the water. For *Olympias Mark II* the *thalamian* oars would cross the waterline approximately 1.165 metres from the tip of the blades, even though their blades would be only 0.98 metres long. The figure for a dromon's oars, if scaled down, would be approximately 0.81 metres for the blades and 0.96 metres to the waterline. That would make the height of the oar above the waterline at the thole 0.365 metres and the height of the lower rim of the oarport only approximately 0.3 metres. In any sort of swell the oarsmen would end up rowing below water. Even light breezes of only 7-10 knots raise wavelets of up to two feet or 61 centimetres.

Moreover, there is another obvious problem. As can be seen from Figure 29, with scaled-down oars the mid point of the hands of the oarsmen on the handles would move forward and back with each stroke only 0.72 metres, using only around 72% of their *interscalmia*, or around 79% if a similar tolerance to that of the oars of *Olympias Mark II* is allowed for. Obviously, that would be extremely inefficient and no war galley would ever have evolved with oars that delivered less power and speed than what was ergonomically possible.

In fact, even though dromons were smaller than *Olympias Mark II* would be, with *interscalmia* of 0.98 metres, say one metre, there is no reason why they could not have used oars of the same length as those of *Olympias Mark II*, thus enabling them to develop more power per tonne of ship than a *triērēs*, as long as other factors were equal of course. With oars the same length as those of *Olympias Mark II* the full *interscalmia* would have been used and the bottom rim of the lower oarports would have been approximately 36 centimetres above the water line, a more acceptable configuration. The bottom rim of the *thalamian* oarports of a future *Olympias Mark II* would also be approximately 35 centimetres above the water line.

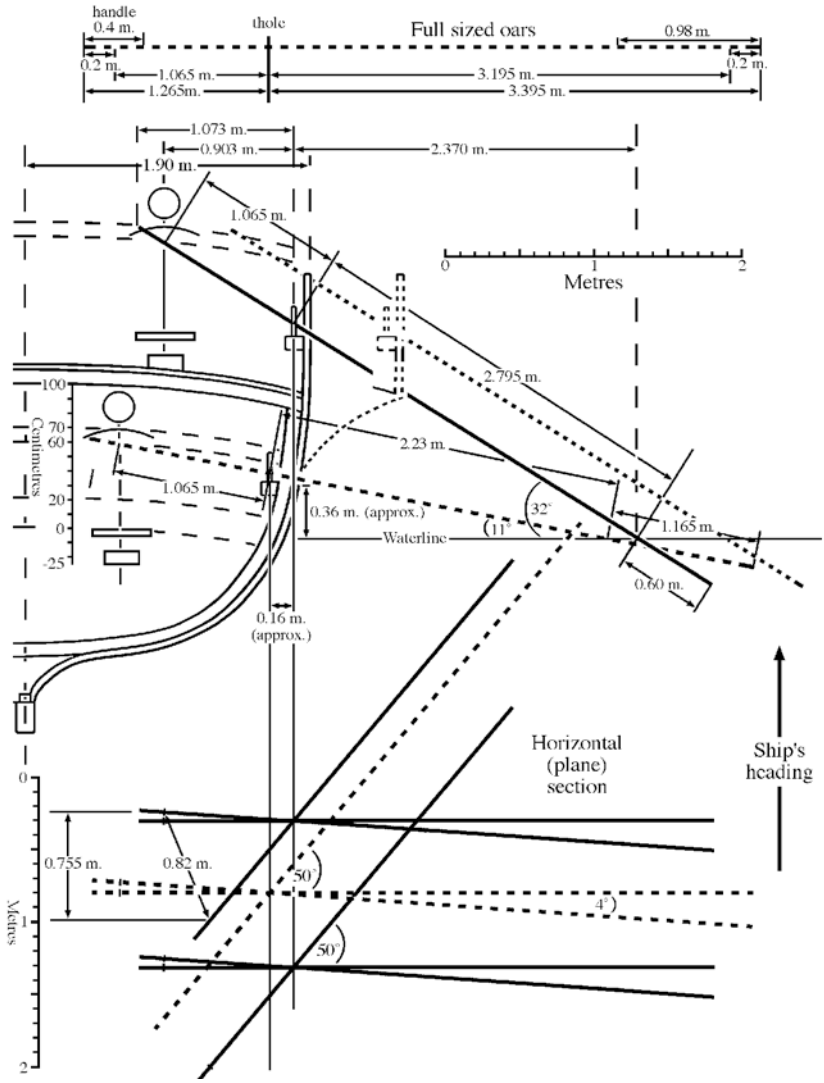


Figure 30
The oarage system of a bireme dromon of the era of the Macedonian emperors, III: straight-hulled midships section with full sized oars above and below.
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While varying with stature, with height, arm length, and torso flexibility, a seated man is indeed able to move the mid point of his hands on the handle of an oar forwards and backwards up to around a

metre with each stroke. Therefore, it would be ergonomically inefficient to design a war galley for seated oarsmen with *interscalmia* less than around a metre, as the experience of *Olympias* has shown. *Interscalmia* would never be made larger than necessary because that would lead to a decrease in the power:size ratio of the ship; however, they would also never be made smaller than what was necessary to allow oarsmen to develop their stroke and power to the maximum possible ergonomically. Around a metre seems to be just about right and that being the case the length of the oars of *Olympias Mark II* also seems to be just about right. The figures could be varied a little if required, but the general parameters seem to be unarguable.

However, the same problems are then encountered with the upper oars rowed from above deck as with scaled-down oars. Because of the less acute angle of the upper oars to the water, the length of the oar required to submerge the shoulders of the blades of the oars would have been less than it was in the case of the lower oars. In *Olympias Mark II*, the length required for the upper *thranite* oars, which have shorter blades than the *thalamian* oars, would be only around 60 centimetres, making the length from waterline to thole 2.795 metres. In a dromon the minimum difference in height between the mid points of the hands of the upper and lower oarsmen on the handles of their oars cannot have been less than around 1.40 metres and the lowest angle to the waterline that could have been possible on a straight-sided dromon with upper oars the same length as those of the lower ones would have been 32 degrees, almost exactly the same as the case of the *thranite* oars of *Olympias Mark II*. [See Figure 30]

The blades of the upper oars of such a dromon would have had to intermesh below water with those of the lower oars if the oars were of equal length, probably unworkably so in fact, and therefore the oar strokes would have had to have been synchronised. However, it is clear from the plane section of Figure 30 that it would simply not have been possible for the upper oars to have remained synchronised with the lower oars unless the upper oarsmen used only around 75.5% of the *interscalmia* available to them, moving the mid point of their hands on the oar handles forward and back only around 0.755 metres during each stroke. The problem of the blades intermeshing could be overcome by extreme flaring of the upper hull, as can be deduced from the closely dotted alternative upper oars in Figure 30. But even this would do nothing to overcome that of ergonomic inefficiency.

But the problems must have been overcome somehow for to have built war galleys in which the upper oarsmen could use only 75.5%

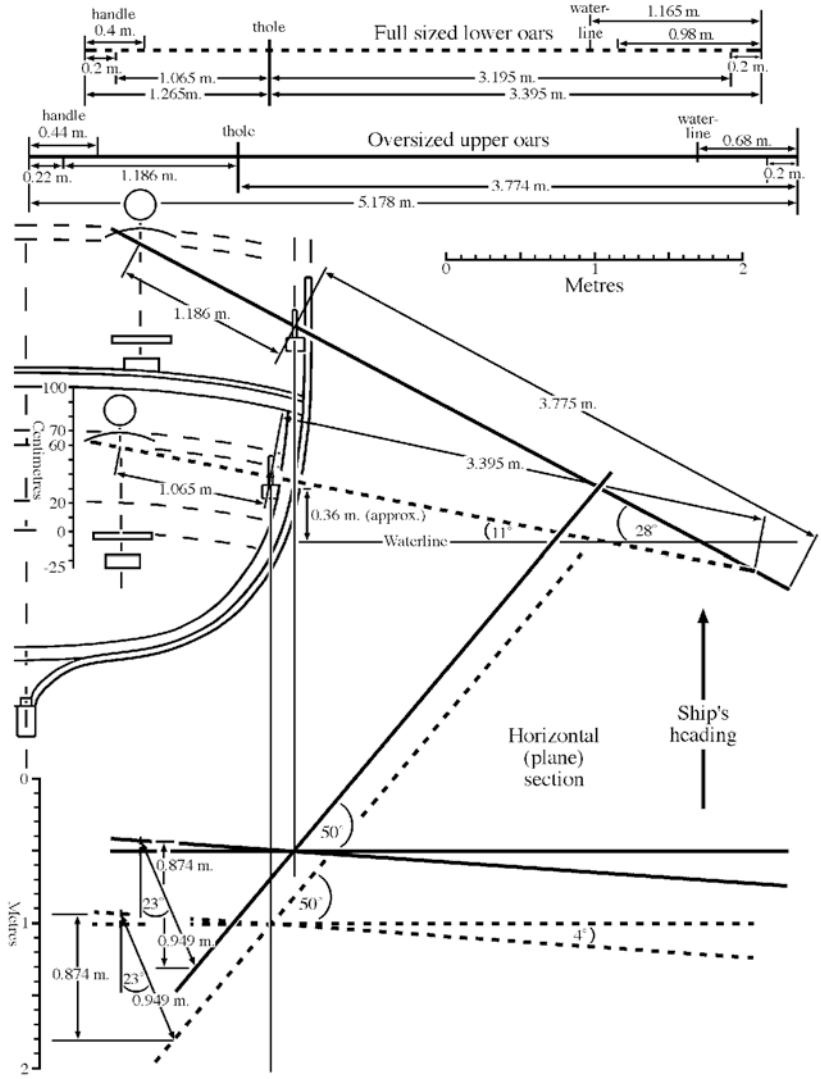


Figure 31
The oarage system of a bireme dromon of the era of the Macedonian emperors, IV: straight-sided midships section with oversized and full sized oars above and below.
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of the ergonomic capacity available to them would obviously have been unacceptable. Whatever they were, dromons were originally fast ships and they remained the premier war galleys of the Empire for

centuries. It is inconceivable that their design would have delivered less than optimum ergonomic efficiency.

There has to be another solution and the obvious one is that the upper oars must have been longer than the lower ones. [See Figure 31] With the tholes of the upper oars set approximately 16 centimetres outboard of those of the lower oars, and that is nothing more than an estimate based on a fair curve since we have no information about the upper hulls and bulwarks of dromons other than that they had to be sufficiently vertical to hang shields on them to provide effective protection, the upper oars could have been lengthened to 5.178 metres if the gearing of 1:3.0 were maintained. The angle to the waterline could have been lowered from 32˚ to 28˚, indeed it would have had to have been lowered. This would have had two benefits. It would have increased the mechanical advantage of the oars and would also have ameliorated a little the difficulty of rowing the upper oars at such steep angles.[426] At 5.178 metres, the gearing could have been maintained with handles of 44 centimetres and a mid point of the hands 22 centimetres from the butt, an inboard thole to butt length of 1.406 metres, an outboard length of 3.774 metres to the tip of the blade, and a blade immersion of 0.68 centimetres. With such oars the upper oarsmen would have worked in a horizontal plane through the same horizontal space as the lower oarsmen. The mid point of their hands on the handles would have moved through 94.9 centimetres at an average angle of 23˚ to the centreline, moving the mid point of the handles 87.4 centimetres forward and back with each stroke. Such an oarage system with longer upper oars would not have freed the blades from intermeshing below water but apart from that it would have had no particular drawbacks. If necessary, the weight in hand of the oars could have been maintained at whatever weight it was for the lower oars by re-shaping the thickness and tapering of the looms.

This is the appropriate point at which to return to the issue of the shape of the upper hull: of whether it was straight sided as assumed so far or whether it was flared outboard. A major series of problems encountered in the sea trials of *Olympias* resulted from the design of the hull and oarage system, in which the middle (*zygian*) and lower

[426] On *Olympias*, whose upper or *thranite* oars were at an angle of about 32˚ to the water when fully immersed at the end of the stroke, the oarsmen's hands were held so high that they had difficulty applying downward force to lift the blades from the water. Most changed to to an underhand grip on the handle with their inboard hand in order to spread the load on their bodies more evenly. See Morrison and Coates, *Trireme reconstructed*, p. 40.

(*thalamian*) oars intermeshed in the water. The upper tips of the blades of both also touched the bottom edge of the blades of the upper (*thranite*) oars. Particularly in the early stages of learning to row the ship the result was that oars clashed and were broken and the *thalamian* oars were often held under water by *zygian* oars fouling them from above, thus preventing recovery and actually endangering the oarsmen. Another factor contributing to the problem was that in *Olympias* the *thalamian* oarsmen could not see their oar blades because the oar sleeves, *askōmata*, covered the oarports. They had to row blind, by sound and touch. The same would have been true, of course, of the lower oars of a dromon. On *Olympias*, some of these problems were overcome or alleviated by adjustments made to the oars during the sea trials; however, one which could not be overcome was that the turbulence created in the water by the massed oars of *Olympias* reduced their effectiveness by increasing the slippage of the oar blades through the water. Water operates most efficiently as a fulcrum for an oar lever if it is still and clean. If it is disturbed, the blade slips sideways through the water more, reducing the effectiveness of the stroke.[427]

All of the problems resulting from the intermeshing oar blades and associated factors in *Olympias* led to the conclusion that the hull and oarage designs should be modified to ensure that in any future *Olympias Mark II* the oar blades would not intermesh.[428] We believe that for similar reasons Byzantine dromons would also have had hull and oarage systems which avoided having the blades of the oars of the two banks intermeshing. And, this could in fact have been achieved by a quite moderate flaring of the upper hull above the lower oarports. As a result the beam of the ships at the deck would be increased from approximately 3.80 metres to 4.46 metres. The flare on either side would only be around 33 centimetres, hardly a matter of great moment.

There would not appear to have been any particular disadvantages to doing this, and it would give the great advantage of having the two oar-banks rowing clear of each other, especially in stressed conditions such as battle. There is little or nothing in the iconography to support this interpretation, but there is nothing to contradict it either. The only probable representations of dromons that we know of are those in the manuscripts of the *Roman Vergil*, *Ilias Ambrosiana*, *Sacra Parallela*,

[427] See Shaw, "Meshing"; Morrison, et al., *Athenian trireme*, Ill. 56 (p. 198), pp. 236-41.

[428] Morrison, et al., *Athenian trireme*, p. 272.

Synopsis historiōn of John Skylitzēs, and the Panteleēmon manuscript of the Sermons of Gregory of Nazianzos. [See Figures 4, 6-8, 13-14, 34, 47, 51-3, 57] None may be said to show clearly a flaring in the upper hull; although, the first three do show a separate "band" at the top of the hull with oar ports in it. It is not inconceivable that the artists intended to depict a bank of oars rowed from above deck where the hull flared outboard. That being said, only three of the Skylitzēs illustrations show two banks or files of oars and all three are drawn in Western styles representing twelfth-century Western *galeae*.[429]

In any oarage system with banks of oarsmen superimposed vertically the parallel horizontal distance between the upper and lower oars of any *interscalmium* cannot be the same at the beginning and end of a stroke because the oar blades are pushed far forward at an acute angle to the centre line at the beginning of a stroke but end up only slightly aft of a right angle to the centre line at the end of it. The position of the upper and lower oarsmen within *interscalmia* can be adjusted to make the parallel horizontal distance between the oars more or less equal at either the beginning or end of the stroke, but not at both. One has to make a choice, or a compromise. However, it is more important for oar blades to be as evenly spaced as possible at the end of the stroke since the potential for oar clashing is greater then, when the blades are being lifted from turbulent water, than at the beginning, when the blades are moving into position through the air. As in any ship design, no doubt there would have been some degree of compromise in a dromon and there is no need to be absolute in such matters. Given our conclusion that the upper hulls of dromons were almost certainly flared outboard above the lower oarports in order to prevent intermeshing of the blades of the upper and lower oars below water and to separate the tracks of the two banks of oars in the water, and therefore because the tholes of the upper oars are approximately 47 centimetres outboard of those of the lower oars, the positioning of the tholes which gives the clearest operation for the two banks of oars is with the tholes of the upper oars only about 33 centimetres forward of those of the lower oars. Such a positioning gives a parallel clearance between the two banks of oars of approximately 33 centimetres at the end of the stroke and 15 centimetres at the beginning.

To return to the issue of multiple oarsmen for the upper oars. A mere glance at Figures 30-32 makes it apparent immediately that any

[429] See below pp. 426-30 and Appendix Seven, p. 637

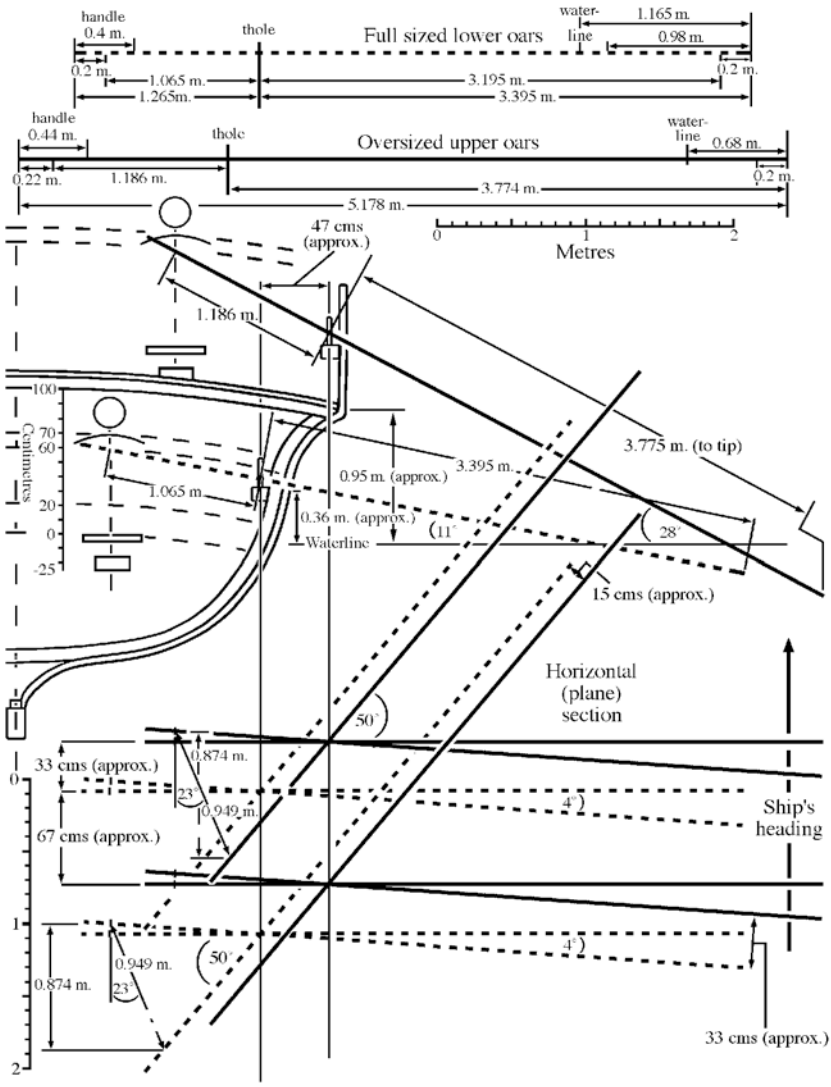


Figure 32
The oarage system of a bireme dromon of the era of the Macedonian emperors, V: midships section with oversized and full sized oars above and below and flared upper hull
© John H. Pryor

arrangement of oarsmen with two oarsmen manning each upper oar as suggested by Makrypoulias is ergonomically impossible. We adapt

Figure 32 to make the point since with the oversized upper oars of Figures 31 and 32 the upper oarsmen would be proportionately closer to the centre line than with the full-sized oars of Figure 30 and therefore there is more room for a supposed second oarsman. The arrangement is impossible in any case, but it would be even more so (sic!) without oversized oars.

The consequences are immediately apparent. Oarsmen have reasonably broad shoulders. We have allowed 50 centimetres, which would be a bare minimum. We have also allowed 20 centimetres separation between the two oarsmen. That might possibly be reduced a little, but doing so would make no difference to the conclusion reached. The mid-point of the inner oarsman's hands on the handle would be 19.6 centimetres from the butt when viewed in plane. The mid-point of the outer oarsman's hands on the loom would then be a mere 34.6 centimetres from the thole. His outer shoulder would be a ridiculous 10 centimetres or so from the thole. He would be able to move his hands forward and back only 31.4 centimetres, the oar actually moving forward and back parallel to the centre line a mere 28.9 centimetres. He would also be rowing during the pull of the stroke with the mid point of his hands on the handle of the oar somewhere down around his navel. In other words, a second oarsman added to an oar above deck would be so cramped in his stroke as to be effectively useless.

To have added a second oarsman to oars above deck would have necessitated complete redesign, not only of the oars but of the entire ship and, even if this were done, multiple-oarsmen oars pulled above deck could not have been synchronized in the stroke with single-oarsman oars below deck. It would have been simply impossible.

Finally, if 70 oarsmen did indeed row at the same time from the upper oar-bank, it would have meant that another ten bench positions would have been needed and that those dromons would have had to have been around 41-42 metres long, around four metres longer than *Olympias Mark II* and long even by the standards of late-thirteenth- and fourteenth-century galleys of the Latin West.[430] It is almost inconceivable that tenth-century dromons were as long as the latter, which were bireme and trireme galleys at the high point of their development.

We conclude both on the basis of analysis of the Byzantine evidence itself and also on that of comparison to what is known of

[430] See Pryor, "Galleys of Charles I of Anjou", p. 44.

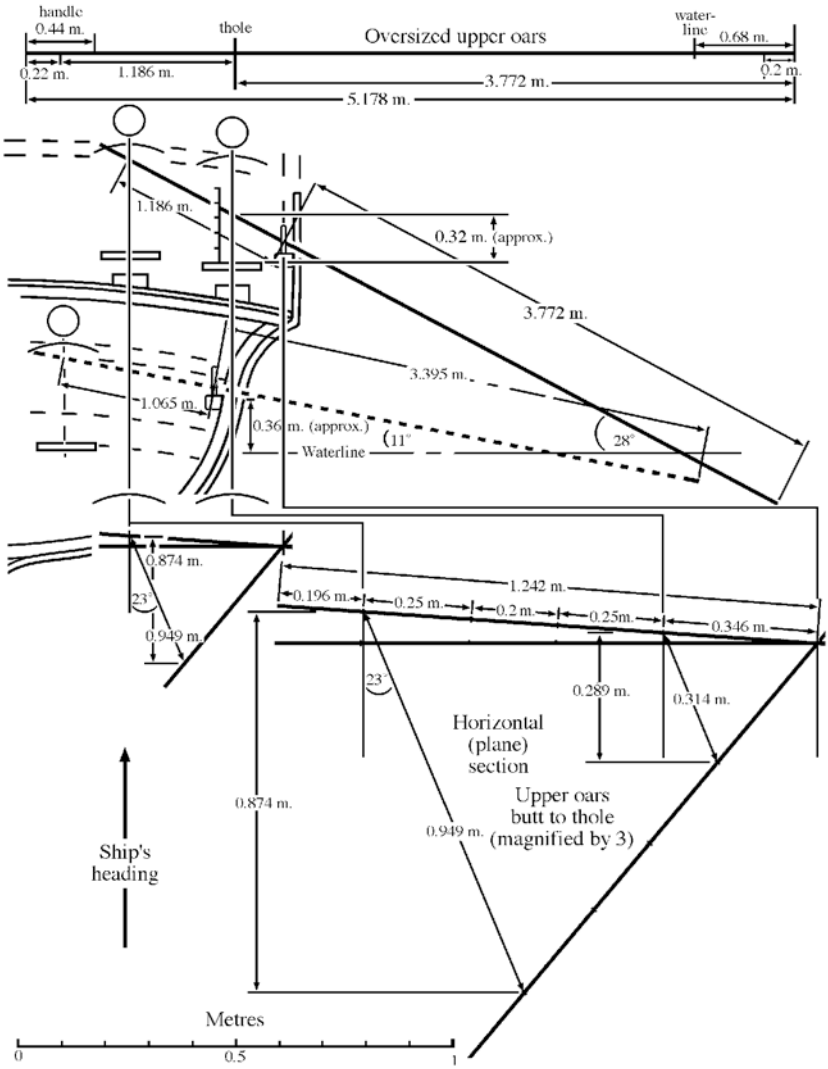


Figure 33
The oarage system of a bireme dromon of the era of the Macedonian emperors, VI: midships section with oversized and full sized oars above and below, flared upper hull, and two oarsmen for oversized oars above deck.
© John H. Pryor

galley design in general in the Mediterranean over the centuries that the dromons of the Cretan expeditions were almost certainly biremes, and biremes only, and that they rowed single-oarsman oars with 50

oarsmen on the lower benches and another 50 on the upper ones, just as Leo VI and Nikēphoros Ouranos wrote. Their upper hulls were almost certainly flared and their upper oars almost certainly longer than the lower ones. There is no evidence in the Byzantine sources that the upper oars were in fact longer than the lower ones; however, there is none that they were not either. If they were the same length as the lower ones, the problem of intermeshing blades could have been overcome by extreme flaring of the hull or pavesade outboard but that would not have solved the problem of the ergonomic inefficiency of the upper oars. In fact it must have been the case at all times that galleys with superimposed oar-banks either used oars of different lengths for the different banks or, if they did not, the ergonomic efficiency of the upper oarsmen must have been impeded, as was the case with *Olympias*.[431] And, although there is no mention of different upper and lower oars in the Byzantine sources, in fact they must have had differently-shaped blades because of the different angles at which they met the water and, that being the case, there would have been no reason for them not to have been of different lengths also.

Their tonnage can only be roughly estimated at best. Western galleys of the Kingdom of Sicily in the later thirteenth century had a deadweight tonnage, the weight of maximum cargo or military equipage, of around 40 tonnes but their overall length was 39.55 metres.[432] If bireme dromons had hull configurations below water not greatly dissimilar to the later Western galleys, then their deadweight tonnage ought to have been in the order of around 29.5 tonnes.

(k) *Horse transports*

Further research into the transportation of horses by sea during antiquity, the Middle Ages, and beyond, including the Byzantine Empire, remains an urgent desideratum.[433] There is no doubt that in antiquity political powers developed the technological capability to transport horses by sea and that they continued to have it during the Middle Ages. However, there is little evidence to suggest that this

[431] See Morrison, et al., *Athenian trireme*, Ill. 81 (p. 271).
[432] See Pryor, "From dromōn to galea", pp. 110, 114.
[433] This issue was first canvassed for the Middle Ages by John Pryor in "Transportation of horses by sea", here pp. 9-11. Since then, in spite of an obvious need for it to be addressed both in further detail and also for antiquity, no one has done so.

capability extended to more than short traverses from one station to another until the twelfth century when, first Venice, and then other Western powers, developed a capability to transport horses for long distances for the Crusades using both sailing ships and also galleys known as *taride* or *chelandre* with the same bireme *alla sensile* oarage system as the *galea*, in which both files of oars were rowed from above deck, thus leaving the hold clear for cargo or horses.[434]

According to Thucydides, it was Periklēs who first converted some old ships, νῆες (*nēes*), into horse transports (*nēes hippagōgai*) in 430 B.C.E. to transport cavalry[men], ἱππεῖς (*hippeis*), to the Peloponnēsos.[435] In the context, these were most probably sailing ships rather than *triēreis* or other galleys. That they had to be converted indicates clearly that these cavalry took their horses with them; however, it appears that at this time the Athenians could not transport horses by sea for long distances. Putting his own understanding into the mouth of Athēnagoras of Syracuse in a speech to the Syracusan Assembly, Thucydides wrote that the Athenians would not be able to bring horses with them for their invasion of Sicily in 415 B.C.E. They did transport thirty *hippeis*; however, there is no suggestion that these took their horses with them. Indeed, in initial battles the Athenians suffered heavily because they had no cavalry to resist that of the enemy. During the winter of 415-14 B.C.E. they sent to Athens requesting more money and also cavalry. Two hundred and fifty cavalry were sent with their equipment but without horses for it was expected that horses would be obtained in Sicily.[436] The Athenians did not attempt to transport horses by sea all the way to Sicily because they did not have the capability to do so.

Leo VI and Nikēphoros Ouranos included horse transports, νῆες ἱππαγωγοί (*nēes hippagōgoi*) or πλοῖα ἱππαγωγά (*ploia hippagōga*), alongside transport ships, φορτηγοί (*phortēgoi*), or supply ships, σκευοφόρα (*skevophora*), in a "baggage train", τοῦλδος (*touldos*) or τοῦλδον (*touldon*).[437] They reserved the word "sailors", ναύται (*nautai*), for the crews of these ships as though they envisaged them being sailing ships rather than galleys.

In the Cretan expeditions of 911 and 949 large numbers of cavalry were involved. The figures will continue to be debated but, whatever

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[434] See Chapter Six.

[435] Thucydides, *Peloponnesian war*, II.56.1-2 (vol. 1, p. 356).

[436] Thucydides, *Peloponnesian war*, VI.37.1, 43, 64.1, 71.2, 74.2, 93.4, 94.4 (vol. 3, pp. 252, 262, 296, 308, 312, 354, 354-6).

[437] See Appendix Two [a], §§11, 13, 23; Appendix Five, §§10, 11, 21.

they actually were, there is no doubt that considerable numbers of horses must have been transported, as can be inferred from the 40,000 *modioi* of barley collected for the expedition of 911.[438] This can only have been for horses and would have sufficed for around 245,000 horse-feed-days at sea or 185,000 horse-feed-days on campaign.[439] With, say, a four-day voyage from *Phygela* to Crete, it would have sufficed for 10,000 cavalry for the voyage and a campaign of around 15 days before re-supply or living off the land became necessary. In all probability that number of cavalry would have been unnecessary and the barley would have lasted much longer. 40,000 *modioi* suggests a supply for an extended campaign by a smaller force.

In the inventories for the Cretan expeditions of 911 and 949 there is only one reference to horse transports, probably because the compiler had no documents from the departments of the *logothetēs tōn agelōn* and the *logothetēs tou dromou*, which would have been responsible for supplying the ships.[440] However, in the passage relating to an undertaking by the *stratēgos* of Samos to provide a large quantity of nails or spikes for the expedition of 911, an inventarist wrote: "Concerning preparing a nail 5-fingers [long] for the fabric, στρῶσις (*strōsis*), of the dromons, as regards the gangways, σκάλαι (*skalai*), and as regards the mangers, πάθναι (*pathnai*), 30,000, and they [i.e., the nails] should "go" [i.e., be sent] down to *Phygela*".[441]

Skala, which was derived from the Latin *scala*, had long been

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[438] As discussed by Haldon in "Theory and practice", pp. 288, 295, 299-301. See Haldon, "Theory and practice", p. 211: "περὶ τῶν ὀφειλόντων ἑτοιμασθῆναι εἰς Θρᾳκησίους, ἤγουν τῶν κ΄ χιλιάδων τοῦ κριθαρίου ... περὶ τοῦ δέξασθαί τινα βασιλικὸν τὸν ὄντα εἰς Ἀνατολικοὺς ἑτοιμάσαι κριθάριον χιλιάδας κ΄ ..."; Constantine VII, *De cerimoniis*, II.44 (vol. 1, pp. 658-9).

The barley can only have been for horses since in both entries the inventory went on to specify quantities of wheat, σῖτος (*sitos*), biscuit, παξαμάτιον (*paxamation*), and flour, ἀρεύριον (*areurion*). These must have been for the crews of the ships and the army. Cf. Haldon, "7. Bread for the army", in "Theory and practice", pp. 294-302.

A diet of mainly barley would not have been good for horses for any length of time, but for short traverses it would not have had an adverse effect. See Hayes, *Horses on board ship*, pp. 167-79; Martin, *Transport of horses*, pp. 33-5; Smith, *Manual of veterinary hygiene*, pp. 916-17. Cf. Hyland, *Medieval warhorse*, pp. 146-7.

[439] The *modios* in question was most probably the the "sea" (*thalassios*) or "imperial" (*basilikos*) *modios*, of around 16-17 litres. 40,000 *modioi* would be roughly 660,000 litres of barley. Medieval and other evidence suggests that consumption by horses aboard ship was around 2.7 litres per horse by day and that that should be increased by around a third for horses on campaign under moderate conditions of work. See Pryor, "Modelling Bohemond's march to Thessalonikē", pp. 16-18.

[440] Haldon, "Theory and practice", p. 256. Cf. Constantine VII, *Three treatises*, pp. 161, 184.

[441] See above p. 265 n. 339.

accepted into Greek for a gangway or boarding ramp, also giving rise to the additional meaning of the word as a port or landing place.[442] In medieval Latin and Italian *scala* was used for a boarding gangway, although the word *pons*, a bridge, was also used for ramps of horse transports.[443] *Pathnē* for a manger or feed trough was a post-classical form of φάτνη (*phatnē*) for the same.[444] The combination of *pathnai* and *skalai* suggests strongly that horse transports were in question here, that the inventorist used *skalai* for boarding ramps, and that at least some dromons or *chelandia* were used as horse transports. It also indicates clearly that the horses were brought overland to *Phygela* and only there were the ships fitted out as horse transports.

What type of ships would the Byzantines have used for transporting horses? On the one hand, sailing ships would have been able to carry many more horses per ship, and to carry them more efficiently, than galleys. On the other hand, sailing ships of any size had severe limitations at destination. In the non-tidal Mediterranean, they could not be beached without wrecking them. Galleys could be. Sailing ships would be more suitable if an expedition's destination was a friendly port which had docks. Galleys would be more suitable if the destination was a defended enemy coastline. Most probably Byzantines used both sailing ships and galleys according to the needs of the occasion as Western powers did later.

We know of only four pieces of Byzantine evidence for their use of horse transports. First, Theophanēs the Confessor wrote that in 763 Constantine V put together a fleet of 800 *chelandia* carrying 12 horses each for an expedition against the Bulgars.[445] Later, in 773 or 774, another fleet carrying 12,000 "cavalry", καβαλλαρικόν (*kaballarikon*), was sent against the Bulgars; however, Theophanēs did not record whether the horses went by sea also.[446]

Secondly, the anonymous *Life* of St Antony the Younger, who in his earlier career was John Echimos, the ἐκ προσώπου (*ek prosōpou*), acting *stratēgos*, of the *thema* of the *Kibyrrhaiōtai*, reported that around 823-5 a large Muslim fleet of "*triēreis*" attacked the capital of

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[442] See Kahane and Pietrangeli, "Cultural criteria", p. 528; idem, *Lingua Franca*, §841 (pp. 568-72); Jal, *Glossaire nautique*, p. 1357.

[443] See Jal, *Glossaire nautique*, pp. 1198, 1323, 1357; Pryor, "Galleys of Charles I of Anjou", p. 55 & n. 67.

[444] See also Haldon, "Theory and practice", p. 270.

[445] Theophanēs, *Chronographia*, A.M. 6254 (vol. 1, pp. 432-3): "τῇ δὲ ις΄ τοῦ Ἰουνίου μηνὸς ἐξῆλθεν ὁ βασιλεὺς ἐπὶ τὴν Θράκην ἀποστείλας καὶ πλῶϊμον διὰ τοῦ Εὐξείνου Πόντου ἕως ω΄ χελανδίων ἐπιφερομένων ἀνὰ ιβ΄ ἵππων.".

[446] Theophanēs, *Chronographia*, A.M. 6266 (vol. 1, pp. 447-8).

the *thema*, Antalya, and that 60 horsemen deployed from them. The Muslim commander was mounted.[447] By this time Muslims certainly did have the capability to transport horses and cavalry[men] by sea,[448] but the report in the *Life* reflected a Byzantine knowledge and experience. Whether or not the author really intended to convey by his use of the word *triēreis* that the horses were transported on oared galleys rather than generic "ships" of some kind is more problematical. However, if the commander was mounted when he disembarked, as the *Life* stated, then he must have done so from a galley because sailing ships of any size could not be beached.

Thirdly, the author of the first part of the *Theophanēs Continuatus* wrote that when Thomas the Slav advanced on Constantinople in 821, he "equipped both bireme ships and other rounded corn-transporting [ships] together with horse-transporting [ships], ...", which he assembled at Mitylēnē before advancing on *Abydos*. This account was later repeated almost verbatim by John Skylitzēs. At folio 31 verso of the Madrid manuscript of his *Synopsis historiōn*, an artist working in a Byzantine style depicted Thomas's fleet advancing on *Abydos* with one of the ships carrying horses. This particular picture was almost certainly copied from an original Byzantine one and thus represents indirectly the only surviving Byzantine illustration of a horse transport.[449] In order to show the horses' heads, the artist depicted them over the gunwale, suggesting an open boat, but not revealing by that anything more than artistic licence. However, it certainly is significant that the ship was depicted as an oared galley and not as a sailing ship. Byzantine galleys could certainly transport horses.

Finally, in his description of the last and finally successful assault on Crete in 960-61 by Nikēphoros Phōkas, Leo the Deacon described the ramps used for unloading horses from the horse transports as "gangways", κλίμακες (*klimakes*). He referred to the ships of the fleet

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[447] *Vita Antonii junioris*, p. 199.

[448] It was certainly a commonplace by the ninth century. The anonymous but contemporary author of the *Life* of Pope Sergius II (844-7) reported that in 846 the Muslims who assaulted Rome with 73 ships brought 500 horses with them. *Liber Pontificalis*, 104 (Sergius II), §44 (vol. 2, p. 99).

[449] *Theophanēs continuatus*, II.13 (p. 55): "... ναῦς τε ἐξαρτύων διήρεις καὶ ἑτέρας στρογγύλας σιταγωγοὺς ἑπομένας αὐτῷ καὶ ἱππαγωγούς, ..."; John Skylitzēs, *Synopsis historiōn*, Μιχαήλ ὁ Τραυλός.7 (p. 32): " ... καὶ λοιπὸν ἀδείας τυχὼν διέθετο τὰ καθ' ἑαυτὸν κραταιότερον, ναῦς ἐξαρτύων πολεμικὰς καὶ ἑτέρας σιταγωγοὺς καὶ ἱππαγωγούς. ...".

The illustration in question is number seven of Appendix Seven, Table Ten, reproduced in Estopañan, *Skyllitzes Matritensis*, fig. 68 (p. 246); Grabar and Manoussacas, *L'illustration*, fig. 20; Skylitzēs, *Σύνοψις ἱστοριῶν*, fol. 31v; Tsamakda, *Ioannes Skylitzes*, fig. 61.

by the classical term "fire-bearing *triēreis*", which he then glossed as "dromons". Then in the next sentence he said that the ramps were run from "transports", πορθμεία (*porthmeia*). The army was thus able to

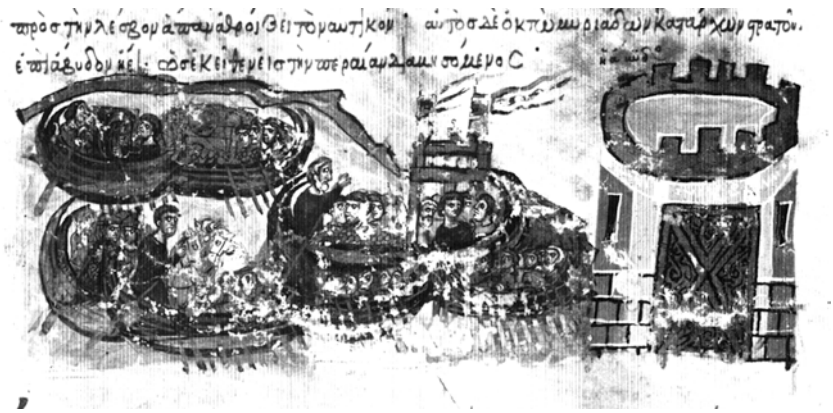


Figure 34
The fleet of Thomas the Slav advancing on *Abydos* and carrying horses aboard a galley in the *Synopsis historiōn* of John Skylitzēs (Madrid, Biblioteca Nacional, vitr. 26-2, fol. 31v), ca 1160, based on an eleventh-century original.

be landed, armed and mounted, from the sea to the land.[450] It is unclear whether the *porthmeia* were dromons or whether they were some other ships; however, the fact that they were able to close with the shore and unload the horses across ramps means that they were galleys rather than sailing ships. Leo's *klimakes* were no doubt the same as the *skalai* of the inventory for the Cretan expedition of 911.

There can be no doubt that even if Byzantines did use sailing ships as horse transports, by the ninth or tenth centuries at least, they were also capable of transporting them on galleys: dromons or *chelandia*.

Ramps had been used since antiquity for the loading and unloading of horses. Two early fourth-century mosaics from the Dermech district of Roman *Carthage* and from Piazza Armerina in Sicily,

[450] Leo the Deacon, *Historiae*, c. 3 (p. 7): "καὶ ταχυπλοήσας, πυρφόρους τε τριήρεις πλείστας ἐπαγόμενος (δρόμωνας ταύτας Ῥωμαῖοι καλοῦσι), τῇ Κρήτῃ προσώρμισεν. ἐπεὶ δὲ τῆς ἀποβάσεως ἐδόκει καιρὸς, ἔδειξε πρακτικῶς, ἣν εἶχεν ἐμπειρίαν ἔργων πολεμικῶν. κλίμακας γὰρ ἐπὶ τῶν πορθμείων ἐπιφερόμενος, ταύτας ἐπὶ τὴν ἠϊόνα προσυφαπλῶν, τὴν στρατιὰν ἔνοπλόν τε καὶ ἔφιππον ἀπὸ τῆς ὑγρᾶς ἐπὶ τὴν ξηρὰν μετεβίβαζε.".

possibly created by the same team of craftsmen, show hunters escaping pursuing beasts by riding up ramps into galleys. In the case of the Dermech mosaic (Figure 35) the ramp leads to the bow of the ship but in that of Piazza Armerina (Figure 36) it is at the stern. In both

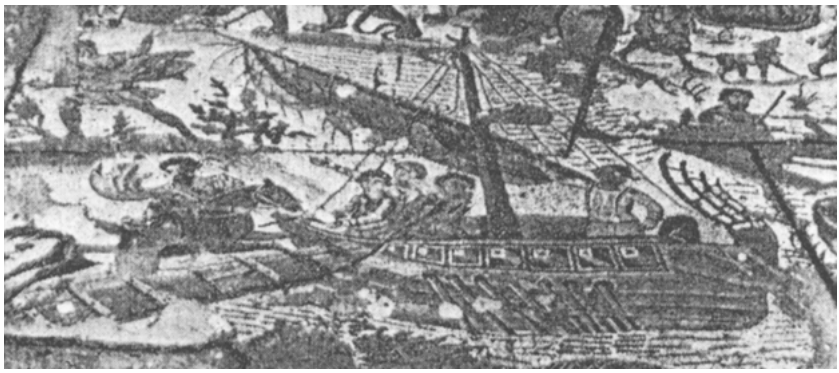


Figure 35
Mosaic of a galley from the Dermech district of Roman *Carthage*, early fourth century.

cases the ramps appear to be being hauled inboard by the crews over the gunwales rather than through any port in the hulls. As long as the ramps were run over the gunwales, they could no doubt be put anywhere. Another mosaic from Piazza Armerina of a galley loading exotic animals, presumably for the games, has ramps at both ends.[451] In such cases where ramps were run over the gunwales and horses were loaded into and out of the ships in that way, the galleys must either have been open boats without decks or else they must have had large hatches in the deck with gently sloping ramps or brows leading down into the holds.

What is primarily at issue here is the question of in what ways horses could possibly have been transported on dromons or *chelandia* of the Macedonian era. Were they already equipped with the famous ports in the hull at the stern which Western transport galleys, known as *taride* or *chelandre*, had by the thirteenth century at least, and

[451] See Mahjoubi, "Nouvelle mosaïque", esp. plate p. 265; Dunbabin, *Mosaics of Roman North Africa*, pl. XIII, N° 26 [incomplete, does not show the stern of the ship]; Pace, *Mosaici*, fig. 25 [incomplete, shows all of the ship but only part of the ramp and horse]; Casson, *Ships and seamanship*, fig. 141.

through which the 30 or even 40 horses and cavalry which they could carry could be embarked, and disembarked already mounted, via landing bridges thrust out from the ports?[452]

Perhaps the most well known account of such an action is Robert



Figure 36
Mosaic of a galley from Piazza Armerina, Sicily, early fourth century

of Clari's description of the landing of the Fourth Crusade outside Constantinople in July 1203: "..., then the fleet landed, and when they had arrived [at the shore], the knights issued forth from the horse transports (*uissiers*) all mounted; for the horse transports were made in such a way that they had a door (*wis*) that one could open easily; and then one thrust out a bridge by which the knights could issue forth onto land all mounted."[453]

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[452] See Pryor, "Transportation of horses by sea", esp. pp. 23-4, 103-120. The conclusions reached in this study were later much modified in "Naval architecture revisited", pp. 255-9. See also *idem*, "Crusade of Emperor Frederick II", pp. 124-7; *idem*, "From *dromōn* to *galea*", pp. 115-6.

[453] Robert of Clari, *Conquête de Constantinople*, §43 (pp. 161-2): "..., tant que li estores arriva, et quant il furent arrivé, si issirent li chevalier hors des uissiers tot monté; que li uissier estoient en tele maniere fait que il i avoit wis que on ouvroit bien, si lanchoit on un pont hors, par ou li chevalier pooient issir hors a tere tot monté.". Note that although Robert of Clari implied that the word *(h)uissier* was

Such ports, without landing bridges, can be seen in the fourteenth-century Paris, Bibliothèque Nationale manuscript of *Les livres des histoires du commencement du monde*. [Figure 37] The wreck of what was most probably a horse transport of this type dated tentatively to the twelfth century was discovered off *Camarina*, Sicily, in 1989.[454]

Alexandres claims that dromons of the Macedonian era could have had such ports and that they were known as "openings", θυρίδες (*thyrides*).[455] However, the only Byzantine usage known to us of the word θυρίς (*thyris*) for such ports occurs in a poem of Manganeios Prodromos describing the Norman Sicilian fleet supposedly demonstrating before Constantinople, probably in 1157.[456] Whether the usage reflected a Byzantine experience is arguable; although, it probably did from the ninth or tenth centuries at least because landing bridges to the shore would have required them.

Western horse transports of the thirteenth century were significantly larger than Byzantine dromons or *chelandia* of the tenth century. They were also shorter but beamier and deeper than contemporary Western war galleys, *galeae*. In contracts for the construction of *taride* to carry 30 horses each for Charles I of Anjou, King of Sicily, in the 1270s and 1280s it was specified that they should have an overall length of 18 Neapolitan *canne* (37.97 metres) as opposed to the 18.75 *canne* (39.55 metres) of contemporary *galeae* and the approximate 31.25 metres calculated above for dromons. Their maximum beam amidships at the deck beams was either 18.5 or 19 *palmi* (4.88 or 5.01 metres), as opposed to the 17.5 *palmi* (4.61 metres) of *galeae* and the approximate 3.80 metres which we have calculated above for straight-hulled dromons and 4.46 metres for flared-hulled dromons. But in the context here the latter dimension is irrelevant because what is important is the dimension between the centre line and the hull at the level of the lower oarsmen. Their beam

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derived from Old French *w(u)is* for a door, in fact it was derived from the Arabic *'ushārī* for a transport galley. See p. 258, n. 319 above.

[454] Di Stefano, "Antichi relitti", pp. 130-34.

[455] See Alexandres, *Ἡ θαλασσία*, p. 74. Alexandres provides no evidence for his claim.

[456] We are indebted to Michael Jeffreys for the following text of his forthcoming edition (with Elizabeth Jeffreys) of the poems of Manganeios Prodromos. Manganeios Prodromos, Poem 11, ll. 158-60:

"Οὐαὶ τῇ πόλει! Πέφθακεν εἰς τὰς Κριθὰς ὁ στόλος,
καὶ τὸ ποσὸν τῶν τριηρῶν τρὶς ἑκατὸν τριήρεις,
πρὸς τούτοις ἄκατοι πολλαὶ καὶ θύραι ταῖς ἀκάτοις,
..."

The previous edition is Manganeios Prodromos, *Poems*, poem 12.

Cf. above p. 114 & n. 206.



Figure 37
Horses unloaded from ports at the sterns of galleys in a manuscript of *Les livres des histoires du commencement du monde* (Paris, Bibliothèque Nationale, MS. Fr. 301, fol. 58v), fourteenth century.
Cliché Bibliothèque nationale de France

on the floor (*planum*), was either 13.5 or 14 *palmi* (3.56 or 3.69 metres), as opposed to the 11.25 *palmi* (2.97) metres of *galeae* amidships. Their depth in hold amidships was 8 *palmi* (2.11 metres) to

the actual deck as opposed to 2.04 metres for *galeae* and 7.5 *palmi* (1.98 metres) below the deck beams as opposed to the 1.75-1.8 metres calculated above for dromons. The horses were stabled fore-and-aft in groups of three abeam over a length of 12 *canne* (96 *palmi*, 25.31 metres) in the hold. Each group of three was allocated a space of 7.5 *palmi* (1.98 metres) with a "*cat[h]ena mortua*" half a *palmus* (13 centimetres) wide and twice as deep between each group of three. The ports in the stern quarters were 8.5 *palmi* (2.24 metres) high by 5.5 *palmi* (1.45 metres) wide and embarkation bridges of the same width and 14 *palmi* (3.69 metres) long could be thrust out from them.[457]

Taride constructed by Genoa in 1246 for the Crusade of Louis IX of France had even more depth in hold, 2.23 metres, although they were somewhat shorter (35.71 metres) and their beam at the deck amidships is not known.[458] On sailing ships, the *Statutes* of Marseilles of 1253 specified that each horse should be allowed a space three Marseillese *palmi* (75.6 centimetres) wide.[459]

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[457] Filangieri, *Registri*, vol. 12, pp. 161-3, 175-6, 242-5; vol. 13, pp. 242-3; vol. 18, pp. 302-5; vol. 24, pp. 33-7.

The surviving versions of these documents are transcriptions made by nineteenth- and twentieth-century historians; Giuseppe del Giudice, Camillo Minieri Riccio, and Erasmo Ricca. The registers were destroyed during the allied invasion of Italy in the Second World War.

The script used in the Angevin chancery was a highly abbreviated late medieval chancery gothic minuscule which was difficult to read, especially when it came to technical terminology. All historians who made transcriptions had difficulty with the technical terminology. None of the transcriptions is accurate. However, the documents followed a common form and the following is based on vol. 12, pp. 242-3 with emendations based on readings from the other documents: "Quelibet terida erit longitudinis cannarum XVIII [et altitudinis palmorum VIII], ... [Item a tabula sentine usque ad tabulam cohoperte altitudinis palmorum VIII.] ... item in plano latitudinis palm[orum] XIII et medii [XIV]; ... item debet esse altitudinis a paliolo ubi equi debent tenere pedes palm[orum] VII et med[ii de canna] in minori vel minus basso loco teride subtus laccas; [ita] quod grossicies laccarum non comprehendatur in isto numero; ... item fiat porta una in puppi [cuiuslibet teridarum] pro introitu et exitu hominum et equorum, que porta debet esse altitudinis palm[orum] VIII et med[ii] et amplitudinis palm[orum] V et med[ii], ...item quelibet terida sit rotunda in puppi ad modum conduri ad hoc quod equus possit intrare et exire insellatus et armatus; item in laccis de punta in puntam sit longitudinis [latitudinis] palm[orum] XIX [XVIII et medii]; ... item in qualibet terida sint impaliolate canne XII pro equis recipiendis, numerando a puppi usque proram, ... item de VIII ad VIII palmos sit catena una mortua, que sit altitudinis in duplum quam in latitudine, ita quod infra duas cat[h]enas sint equi tres, cum equi III debeant morari infra palmos VII et med[ium], et reliquo medio palmo erit cat[h]ena; et sic oportet poni cat[h]enas [quod] infra X cannas longitudinis morari possint ad minus habiliter et bene [in terida ipsa] equi XXX; ... item pontem unum pro recipiendis equis, latitudinis sicut est porta teride et longitudinis palm[orum] XIV; ..."

For the dimensions of *galeae* see Pryor, "From dromōn to galea", pp. 110.

[458] See Pryor, "From dromōn to galea", p. 115.

[459] Pernoud, *Marseille*, IV.25 (p. 158): "... et pro equo detur platea in latitudine 3

By the thirteenth century all Western galleys used the bireme oarage system with both oars rowed from above the deck: the *alla sensile* system. There were no oarsmen below deck.[460] Consequently, the whole of the holds could be used for stabling horses. Was this the case for Byzantine dromons or *chelandia* when used as horse transports? Assuming for the moment that such ships used for transporting horses were of the same design as battle dromons as reconstructed above, did the Byzantines remove the lower oar-bank and dismantle the thwarts? Or did they somehow try to fit the horses in below deck, leaving the lower oar-bank in place? They certainly would not have tried to stable horses above deck because, first, the weight of horses placed so high above the centre of gravity of such shallow-drafted and narrow ships would have created severe problems of stability. Secondly the animals would have been hopelessly exposed to missile attack by an enemy. But thirdly, and most importantly, the rolling of the ships would have endangered the animals themselves and made them extremely prone to injury. Horses were always shipped as close to the keel as possible for their own safety, even into the nineteenth century.[461]

If the lower oar-banks were removed, the ships would have been left with only one oar-bank and could not possibly have kept up with the fleet when under oars. Tactically, this would surely have been very dangerous. It is true that the *Stratēgikon* of Maurice, and Nikēphoros Ouranos following it, did say that the *touldos* could not keep up with the dromons.[462] However, even if we can accept that transports and horse transports would normally be heavier and slower than battle galleys, we find it difficult to accept that ships whose purpose was to assault enemy coastlines would have been so disabled as to remove half their motive power. If the lower oar-bank was not removed, then any horses would have had to have been stabled in a row down the centre lines of the ships between the two files of oars.

Now, horses cannot be seasick, cannot vomit, but they are affected

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palmorum; ...".

[460] See below, Chapter Six.

[461] See Shirley, *Transport of cavalry*, p. 33. The projected conversion of a *triērēs* to a horse transport as envisaged by the architects of the *Olympias* project, with the horses stabled abeam at the level of the *zygian* oars, would have been completely insane. The requirements of the horses themselves were completely ignored. See Morrison, et al., *Athenian trireme*, 227-30.

[462] Maurice, *Ek tou Maurikiou*, §5 (pp. 41-2): "Ἐπειδὴ δὲ αἱ σαγῆναι καὶ τὰ φορτηγὰ πλοῖα καὶ βαρύτερα οὐ δύνανται συνακολουθεῖν τοῖς δρόμωσιν, ...". Cf. Maurice, *Stratēgikon*, XIIB.21.21-3 (p. 468); Nikēphoros Ouranos, *Ek tōn taktikōn*, §122.5 (p. 101).

badly by sea travel. For transporting horses, ships need to be as stable as possible and minimizing the effects of their pitching and rolling on the horses is very important. They should be as beamy as possible and have as great a tonnage as possible.[463] Long, low ships such as medieval galleys, designed to cut through the water rather than to ride the waves, would have been far less susceptible to pitching than to rolling and, therefore, one might have expected that horses would have been stabled abeam since they do have the ability to brace themselves against any up-and-down movement between their heads and rumps by spreading their legs.[464] On British troop transports of the late-nineteenth and early-twentieth centuries they were stabled abeam since the ships used for oceanic transport at that time also rolled more than they pitched.[465] However, the historical evidence is clear that in the Middle Ages horses transported on medieval Mediterranean horse-transport galleys were stabled fore-and-aft rather than abeam.[466] There can be little doubt that the mysterious "*cat[h]ena mortua*", once thought to have been a "dead" or "standing" beam, was in fact a manger or feed trough. The words found their way into the modern record in the form that they have through a tortuous transmission process reaching back through vernacular South Italian to the Greek *phatnē* and *pathnē* for a feed trough or manger.[467] Identification of

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[463] On sea sickness see Hyland, *Medieval warhorse*, p. 148.

The British government allowance in the late nineteenth and early twentieth centuries was 10 tons (10.16 metric tonnes) gross register tonnage per horse and man. See Hayes, *Horses on board ship,* p. 29; Martin, *Transport of horses*, p. 13; Smith, *Manual of veterinary hygiene*, p. 899. Medieval oared horse transports, no matter of what vintage, could have come nowhere near this figure.

Veterinary Lieutenant Martin of the British army Veterinary Department recommended that no ship should be used for transporting horses which did not have bilge keels to counteract rolling. See Martin, *Transport of horses*, p. 3.

[464] Martin, *Transport of horses*, pp. 23-4; Smith, *Manual of veterinary hygiene*, pp. 908-9.

[465] Martin, *Transport of horses*, p. 14; Smith, *Manual of veterinary hygiene*, pp. 899-900, 905, 908-9.

[466] See Pryor, "Naval architecture revisited", esp. pp. 258-9 and cf. Harris, "Frederic af Chapman". See also Pryor, "Transportation of horses by sea", pp. 114-116 (esp. docs III & V) and nn. 88-92; idem "Naval architecture revisited", esp. pp. 258-9; idem, "From dromōn to galea", p. 116. Much of the reconstruction of stabling in these three studies is now obsolete.

[467] Contracts for the construction of *taride* (and also *galeae*) recorded by chancery scribes for the Angevin court contained technical terms in Latin forms which were Latinizations of vernacular South Italian, which was heavily influenced by Greek as a legacy of the long occupation of South Italy by Byzantium and the close contact between Byzantine-Greek society and that of South Italy.

No doubt the original vernacular term which the historians transcribed as *catena* or *cathena* was something like *pathena*. Publius Vegetius, the author of the *Mulomedicina*, who was probably the same man as Flavius Vegetius Renatus the

cat[h]ena as a manger proves in fact that the horses were stabled fore-and-aft since no other arrangement would have been possible. In the Byzantine case, of course, unless the lower oar-bank was removed, the horses could not possibly have been stabled abeam on dromons or *chelandia*.

By the early twentieth century it had been learned that using slings under the bellies of horses in horse stalls was not a good idea and their use was discontinued.[468] However, there can be little doubt that such under-belly slings were used on medieval and later horse transports. Documents from the thirteenth-century Angevin registers referred to ring bolts (*anuli*) or belaying cleats (*castaneole*) from which horses were "suspended" on horse-carrying *taride*, and they could only have

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author of the *Epitoma rei militaris*, used *patena* for a manger. See, Vegetius, *Mulomedicina*, I.56.3-4 (p. 81): "Patena quae apellatur [illa quae apellatur patena, MS. P], hoc est alveus ad hordeum ministrandum, sit munda semper, ne sordes aliquae cibariis admisceantur et noceant; loculis praeterea vel marmore vel lapide vel ligno factis distinguenda est, ut singula iumenta hordeum suum ex integro nullo praeripiente consumant.".

What "*mortua*" may have been originally is unknown. All the transcriptions have the word in this form; however, we suggest that the original abbreviated form may have been intended to represent a word such as "*maniura/maniera/manieria/maneria/maniaora*", varieties of the same word used in thirteenth-century Latin for a manger or nose bag for horses; *pathena* and *maniura/maniera/manieria/maneria/maniaora* thus being used in apposition. Anyone familiar with late thirteenth-century notarial and chancery scripts will know that to read "*mortua*" for "*maniura*" is not as far-fetched as it seems.

The only problem remaining with this reconstruction is the very small width of the troughs. It is hard to envisage how horses could have got their muzzles into troughs as narrow as 13 centimetres in order to eat. Captain Hayes recommended that mangers or feeding troughs should be at least 13 inches (33.02 centimetres) wide at the top. He recorded that at the turn of the nineteenth and twentieth centuries the British Admiralty specification for the width of feed troughs was 12 inches (30.48 centimetres). See his *Horses on board ship*, pp. 95 & 130. However, if the horses were face to face and shared feed troughs, then these would have been 26 centimetres wide and that would have been at least adequate. This is probably the solution to the problem.

[468] Martin, *Transport of horses*, pp. 23-6; Smith, *Manual of veterinary hygiene*, pp. 911-12.

The history of this issue is obscure. As early as the late eighteenth century some veterinarians and cavalry officers were beginning to question the use of slings. Philip Astley, the eighteenth-century cavalry sergeant-major and circus master was opposed to the use of them for transporting horses by sea. In 1797 a London hay and corn merchant, S. Lawson, published a book in which he said that animals were safer and better off on their feet in pens rather than in stalls in slings. See Smith, *Early history*, vol. 2, pp. 135, 229. In 1848 the veterinary surgeon J. S. Mellows expressed his opinion that if horses were actually suspended off their feet it impeded evacuation, contributing to the disease known as ship staggers. See Mellows, "Observations", pp. 102-3 and cf. Shirley, *Transport of cavalry*, pp. 23-6. Nevertheless the practice of transporting horses by sea in stalls with under-belly slings continued routinely until the Boer War.

been suspended by under-belly slings of some sort.[469] Amongst the list of equipment that keepers of arsenals, *tarsienatus*, were held responsible for in a formulary for their appointment, there was a reference to *lanzones* for transporting horses upon the sea. In this form the word is unknown in medieval Latin; however, it must have been a Latinization of some vernacular word such as *lenzo*, meaning a cloth sheet or sling.[470] There is also an unverifiable record of a clause in another document referring to a "belt of cloth and rope for placing under the stomachs of horses".[471]

Knowledge of such matters has advanced greatly in recent years and it is now known that the slings would not have suspended the horses off their feet for more than short periods. That would have killed them. Horses can be suspended off their feet for short periods, for example, for loading and offloading, and during operations and convalescence,[472] but not for long periods. The horses would still have had their feet on the floor but would have been restrained against being thrown off their feet or attempting to lie down by slings which were braced up firmly under their bellies but did not lift them off their feet.[473] That this was the case is suggested by Ambroise's report that,

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[469] Five separate documents in the registers, transcribed by four different historians, referred to these ring bolts (*anuli*) or belaying cleats (*castaneole*) from which horses were "suspended". See Filangieri, *Registri*, vol. 12, p. 162: " ... Item debet habere anulos necessarios pro ligandis et appendendis equis ipsis"; *ibid*., p. 176: "... item debet habere castaneolas necessarias de ligno pro ligandis et appendendis equis; ..."; *ibid*., p. 244: "Item debet habere castanidas de ligno necessarias pro ligandis et appendendis equis; ..."; vol. 18, p. 304: "Item debent habere castaniolas de ligno ... pro ligandis et appendendis equis"; vol. 24, p. 36; "item debet habere castinuolas de ligno necessarias pro ligandis et apponendis equis". *Apponendis* in the last document, transcribed by Ricca, is a clear misreading of *appendendis*.

[470] Filangieri, *Registri*, vol. 31, p. 65: "… lanzones pro equis transvehendis super mare ...". The document is in the manuscript, *Formularium curie Caroli Secundi regis Sicilie*, which was a copy made for the Papacy of what was Register Nine of the reconstructed registers of Charles II. The manuscript was compiled in 1306-7 but from much older materials.

[471] Unfortunately, when Bevere cited a clause from a document in the Angevin registers which read: "Cynta de tela et cordis ad ponendum sub ventribus equorum.", he gave no reference. See Pryor, "Transportation of horses", p. 113; Bevere, "Ordigni ed utensili", p. 720. A systematic search of the reconstructed Angevin registers has failed to locate this citation; however, there is no reason to doubt Bevere's veracity.

[472] See, for example, the illustrations from a manuscript of an Italian translation of the *Medicina equorum* of Jordanus Ruffus (ca 1250), from the fourteenth-century *Libro de Menescalcia de albeiteria et fisica de las bestias* of Juan Alvares de Salamiella, and from J. B. von Sind's, *L'art du manège pris dans vrais principles, suivi d'une nouvelle méthode pour l'embouchure des chevaux* (Bonn, 1762), in Dunlop and Williams, *Veterinary medicine*, pp. 186, 226, 335. Cf. Hyland, *Medieval warhorse*, p. 145.

[473] Hayes, *Horses on board ship*, pp. 143-4; Martin, *Transport of horses*, p. 23; Shirley, *Transport of cavalry*, 24.

after landing, the horses transported by Richard Coeur de Lion from Messina to Cyprus for the Third Crusade in 1191 had to be: "... exercized, / for they were all benumbed / and dazed and exhausted / From the month that they had been on the sea / And always without being able to lie down".[474] The text suggests that the horses were prevented from lying down by slings but were on their feet, not suspended off them. In 1340 the English were still using canvas slings of some sort in the stalls of horse transports,[475] and the practice continued for centuries. It appears that on Mediterranean transport galleys the horses would have been able to brace themselves against the minor amount of pitching that occurred but that slings were used to help them resist the effects of the ships' rolling and to prevent them trying to lie down.

Also contrary to earlier opinion, it is now known that medieval warhorses of the Byzantine and Crusader periods, before the days of heavy plate armour, were not especially large animals by modern standards.[476] Because the builders and fitters-out of ships would not have allowed more space for horses than was necessary, some estimate of their size can be gained from the dimensions specified for the stabling arrangements and the stern quarter ports on horse transports of the thirteenth century. Presumably the width of 75.6

Captain Hayes and lt colonel Shirley considered that slings were of use only in fine weather to enable horses to ease part of their weight on them. They should be loose enough to allow the flat of a hand to pass between the sling and the belly and should not exert pressure on the belly or chest.

[474] Ambroise, *L'estoire de la guerre sainte*, ll 1565-1576 (coll. 42-3):

Li reis la nuit sanz plus targer	That night, without delaying further, the king
Fist tanz de chevalz descharger	Had as many horses disembarked
Cum enz es eneques avoit.	As he had in his *eneques*.
L'empereres mot ne savoit	The emperor knew nought
Qu'il en eust nul amené.	That he had brought any of them.
Li cheval furent demené,	The horses were exercized,
Car il erent tut engurdi	For they were all benumbed
E deboistié e esturdi	and dazed and exhausted
D'un mois qu'orent en mer esté	From the month that they had been on the sea
E sanz jesir toz jorz esté.	And always without being able to lie down.
Sanz plus de sejor qu'il eussent,	Without more of the rest that they ought,
Que par raison aveir deussent, …	Which by right they should have had, …

The story was repeated in the *Itinerarium peregrinorum et gesta regis Ricardi*. See *Itinerarium peregrinorum* (Stubbs), II.33 (p. 192): "Nocte quoque eadem, rex in papilionibus suis moratus, fecit equos suos educi ab esneckis. ... Verum quoniam equi nostri vexatione marina per unum mensem semper stando, plurimum fuerant turbati, equis ipsis parcentes modestius insecuti sunt, ..."

[475] See Hewitt, *Organization of war*, Appendix I (p. 180).

[476] Davis, *Medieval warhorse*; Hyland, *Medieval warhorse*.

Disregard now the assumptions of Pryor on the size of horses during the age of the Crusades in "Transportation of horses by sea", p. 106.

centimetres specified in the statutes of Marseilles was just enough to stable a horse and to allow a groom to squeeze around it when necessary. Then, the minimum depth in hold below the deck beams of Angevin *taride* was 1.98 metres and this must have been considered the minimum height necessary for the horses being used. Each group of three was also allocated a length space of 1.98 metres. Such dimensions actually accord quite closely to those specified by the British Admiralty and advocated by veterinary surgeons at the turn of the nineteenth and twentieth centuries.[477] The height of the ports at the stern, 2.24 metres, was presumably just enough to allow mounted cavalry to disembark when leaning forward along a horse's neck. This data suggests that the warhorses used in the Mediterranean in the thirteenth century stood around 15 hands (1.524 metres) at the withers, were around 1.825 metres at the ears when in a normal erect stance, 66 or more centimetres wide in the belly or barrel depending on condition, and around 1.90 metres from nostril to the point of the hock.[478]

Figure 38 shows immediately that horses of this kind could not possibly have been stabled below the deck of dromons or *chelandia* as we have reconstructed them with the lower bank of oarsmen still in place. Between the inner shoulders of the oarsmen below deck there

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[477] In 1901 veterinary lieutenant Martin wrote that British Government regulations permitted three sizes, all 26.5 inches wide (67.31 centimetres) wide, but 6 feet 1 inch (1.855 metres), 6 feet 5 inches (1.955 metres), and 6 feet 9 inches (2.06 metres) long. He himself recommended stalls 8 feet (2.44 metres) long by 2 feet 4 inches (71 centimetres) wide with the height of the tweendeck to the beams of the deck above at least 7 feet 3 inches (2.16 metres) and from deck to deck at least 8 feet (2.44 metres). See his *Transport of horses by sea*, pp. 6-7, 14-16.

In 1902, according to captain Hayes, the Admiralty specifications were: minimum clear length between breast and haunch boards, 6 feet 9 inches (2.06 metres); minimum clear breadth between the side division boards, 2 feet 4 inches (71 centimetres). See his *Horses on board ship*, p. 127. Hayes himself recommended that, for horses of ordinary size (15 hands), the stall should be no less than 6 feet 6 inches (1.98 metres) long, but preferably up to eight feet (2.44 metres). The height from deck to the beams of the deck above should be at least 6 feet 9 inches (2.06 metres), of which 3 inches would be taken up by the false floor on which the horses stood, leaving 6 feet 6 inches (1.98 metres) clear height. See his *Horses on board ship*, pp. 31 & 124-5.

In 1905, Colonel Smith, who was mostly following lieutenant Martin, simply recommended a deck height of 8 feet (2.44 metres), but he acknowledged that it was frequently less than that on horse transports. He said that the official British government stall length was 6 feet to 6 feet 6 inches (1.82-1.98 metres). However, he considered this inadequate and recommended a length of 7 feet 6 inches to 8 feet (2.29-2.44 metres) and a width of 2 feet to 2 feet 4 inches (0.61-0.71 metres). See his *Manual of veterinary hygiene*, pp. 900, 909.

[478] See the calculations of Ann Hyland using her own horses in her *Medieval warhorse*, pp. 143-8.

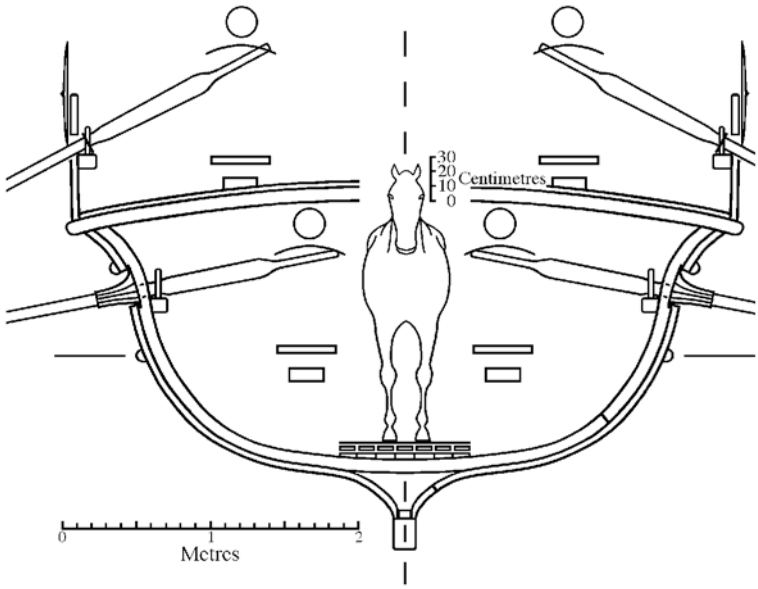


Figure 38
Horse transports of the era of the Macedonian emperors, I: standard bireme dromon with a fifteen-hand horse.
© John H. Pryor

would have been around about 75 centimetres clearance amidships, just enough one might suggest to stable a horse 66 centimetres in the barrel. However, grooms would have no way of getting to the horses to tend to them and the headroom in the hold would have been at least 10-15 centimetres too little, even if measured from the floor to the deck beams. As the hulls narrowed towards the bow and stern, the clearance between the oarsmen would have decreased and it would have become impossible to stable horses towards the extremities of the hulls.

Moreover, horses could not have been stabled directly on the floors of the ships. They slip around on their hooves and defecate and urinate in large volumes. They would have had to have been stabled on false floors of battens and planks, perforated to allow urine to run to collection points for bailing out.[479] The headroom would in fact have

[479] Captain Hayes, quoting British Admiralty regulations said that the "platforms" should made with 1.5 inch deal boards with one inch spaces between them laid on 2-

been at least 20-25 centimetres too little. One might suggest that Byzantine cavalry horses were smaller than 15 hands or that the depth in hold of dromons may have been greater than that which we have calculated, or a combination of both. The first alternative is a possibility; however, in order to fit the horses in, even amidships, they would have to have stood only around 12.15 hands. They would have been unusually small, even for Roman horses, mere ponies in fact.[480] The second alternative would not have been possible without altering the ships in fundamental ways.

If dromons and *chelandia* were used as horse transports, and *chelandia* at least certainly were, then the ships must have been specially constructed to carry horses and have been different to battle dromons. If a lower oar-bank was left in place, the ships would have had to have been significantly wider in the beam. Whatever the case, they would have had to have been deeper in the hold.

In fact their dimensions must have been entirely different. On the *taride* of Charles I of Sicily the length of stalls for the horses was 1.98 metres. So, if the length of *chelandia* or dromons on the floor was around 25 metres or a little more, as it must have been in order to accommodate the 25 oarsmen of the lower oar-banks, then around 12 horses seems just about right. This does at least make some sense of Theophanēs the Confessor's figure of 12 horses per *chelandion*. At the very least, the coincidence is striking. However, the *taride* of Charles I of Sicily were shorter but beamier and deeper than the war galleys, *galeae*, and we should assume that the Byzantines similarly modified the design of dromons or *chelandia* for carrying horses and make any comparison to Angevin *taride* rather than *galeae*. The starting point has to be sufficient beam and depth in hull to stable a row of 15-hand horses down the centre line.

A 15-hand horse will stand around 1.825 metres tall at the ears

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inch battens, the platform thus being 3.5 inches (8.89 centimetres) thick. See his *Horses on board ship*, p. 129. Colonel Smith, following lieutenant Martin, said that on British horse transports these "foot-boards" were made of planks set an inch apart to allow urine to run off, resting on battens to keep them off the deck, and crossed on the top by additional battens to prevent the horses from slipping. See Smith, *Manual of veterinary hygiene*, p. 906; Martin, *Transport of horses by sea*, pp. 19-21. Lt colonel Shirley recommended 12-18 inches of shingle flooring rather than planks and battens. See *Transport of cavalry*, pp. 26-9.

On Angevin *taride* a length of 12 canne was *impaliolate*, that is provided with a false floor, *paliolus*, on which the horses stood. This was made of oak to resist the wear and tear of hooves. See n. 457 above and Pryor, "Naval architecture revisited", pp. 257-8. Such false floors must have been at least 10 centimetres in height.

[480] The archaeological evidence collected by Hyland suggests a range from around 13.5 hands to 15.25 hands for Roman horses. See Hyland, *Equus*, p. 68.

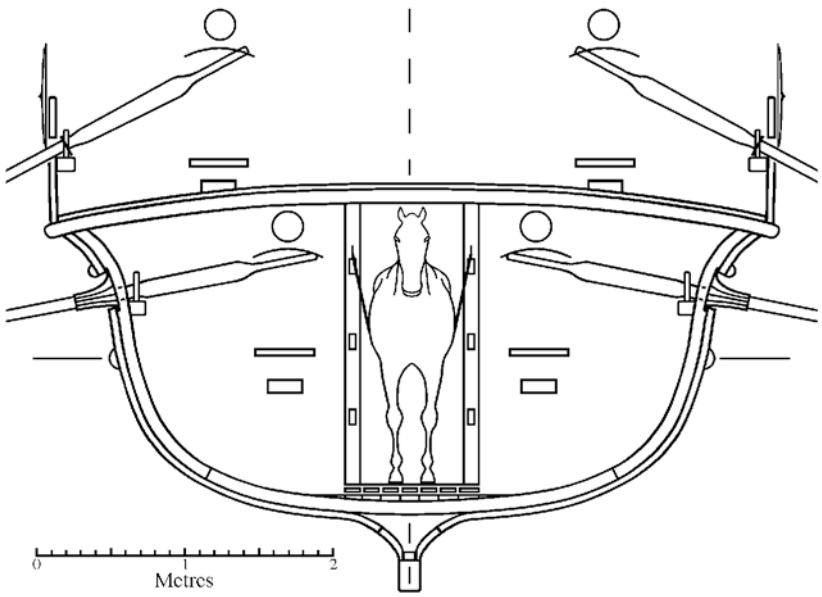


Figure 39
Horse transports of the era of the Macedonian emperor, II: modified dromon/*chelandion* with a fifteen-hand horse.
© John H. Pryor

when naturally erect, so the depth in hull must have been at least 1.86 metres below the deck beams, plus around 10 centimetres for the false floor; say 1.95 metres in all. The width of three Marseillese *palmi*, or 75.6 centimetres, specified in the statutes of Marseilles should be understood to have been the internal width of a stall. At just under 2 feet 6 inches, this equates closely, if a little generously, to what was the recommended width for stalls on British transports at the turn of the nineteenth and twentieth centuries. The horses could not have been confined too closely for health reasons.[481] They would also have had to have been separated from the oarsmen by strong rails set in upright stanchions in order to prevent injuries to themselves and the crews from them kicking out or, even worse, breaking loose if panicked and causing dangerous chaos in which both horses and men would have been liable to be severely injured. The stanchions at the corners of the stalls of horses on British transports at the turn of the nineteenth and

[481] See below pp. 329-31.

twentieth centuries were 4 inches (10.16 centimetres) wide.[482] This suggests that a minimum beam for stabling horses fore-and-aft aboard medieval transport galleys should have been around a metre. Allowing a minimum ten centimetres or so clearance between the oarsmen and the stall stanchions would mean that the oarsmen would have had to have been around 1.20 metres apart.

The beam of horse-transporting *chelandia* or dromons may have been around 4.85 metres at the deck amidships, their depth in hold around 1.95 metres, and their beam on the floor around 1.20 metres. That would just about make it possible to have a file of horses of around 15 hands stabled down the centre. But conditions for both the horses and the oarsmen must have been not only "aromatic" but also dangerous. It is very hard to imagine how horses could have been transported for anything more than very short distances under such conditions. Perhaps this explains why the inventories for the expeditions to Italy in 934 and 935 included in the *De cerimoniis*, mentioned cavalry[men] but made no explicit mention of horses.[483] The imperial authorities must have expected Hugh of Provence, the King of Italy, to supply the horses for the cavalry[men] which they were sending to him to assist in his campaign against the Lombard princes in South Italy?

A final consideration is the sheer weight of the horses. Medieval war horses of around 15 hands would have weighed around 550 kilogrammes when in good condition. Twelve horses would have weighed around 6.6 metric tonnes. Together with their equipment and supplies, they would have weighed at least 8.0 tonnes if food and water for any extended period were taken aboard. With ships of deadweight tonnage as low as that we have calculated for dromons, that dimension of extra cargo capacity could not easily be found unless other accomodations were made. If the lower bank of oarsmen

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[482] Captain Hayes, quoting Admiralty regulations, said that the upright stanchions at each corner of stalls should be 6 by 4 inches (15.24 by 10.16 centimetres). See his *Horses on board ship*, pp. 127-8. Robustness of the stalls was emphasised by both lieutenant Martin and colonel Smith. Martin, *Transport of horses*, pp. 18-21; Smith, *Manual of veterinary hygiene*, pp. 905-10.

[483] Haldon, "Theory and practice", pp. 213, 215 and commentary at p. 257. Cf. Constantine VII, *De cerimoniis*, II.44 (pp. 660-62).

Runciman related some passages in the *De administrando imperio* which referred to the *thema* of the Peloponnēsos providing 1,000 horses for some service in "Lombardy" to the expeditions of 934 and 935. Runciman, *Romanus Lecapenus*, p. 74. However, mentions in the text of the *protōspatharios* John Prōtevon as *stratēgos* of the *thema* date the reference of the passages to 921. See Constantine VII, *De administrando imperio*, §§50.26-7, 51.199-204, 52.1-15; *Volume II: commentary*, p. 204.

was left in place, the hull must have had to have been designed very differently so that the extra weight could have been borne without affecting the level of the water line. Most importantly, that itself could not have been changed without a complete reworking of the oarage systems for both banks of oars.

We conclude that, at least originally, *chelandia* were specialized horse transports, the name applied to them being derived from the "courser" rather than the "galley" meaning of the word *kelēs*. They must have been constructed differently to dromons for if the latter were capable of carrying 12 horses they would have been very inefficient battle galleys, and the evidence is clear that that was not the case. When the Anonymous wrote that *chelandia* and dromons were "both ... constructed from the same ship's timbers, even if they differ in their overall nomenclature, the one being called *dromōn* and the other *chelandion*",[484] that may have been true in a generic sense. However, it does not necessarily mean that he regarded the two types as indistinguishable, even if, given the limited nature of his understanding of Byzantine war galleys, he himself may indeed have been unable to distinguish between them.

Evidence for the capability of any maritime power to transport horses over anything more than short distances before the twelfth century is very meagre. The only Byzantine naval expedition known in any detail which must have involved the transportation of horses over long distances beyond the frontiers of the Empire was Belisarios's expedition to Vandal *Africa* in 533. Virtually nothing is known about the later expedition under the *patrikios* John sent by the emperor Leontios in 697 to recover *Africa* from the Muslims except that after capturing *Carthage* he was forced to return to Crete for supplies and reinforcements after being overwhelmed by a Muslim relief fleet.[485] Prokopios wrote that Belisarios took 5,000 *hippeis*, cavalry[men], with him; however, that figure was an ambit one, contrasted to 10,000 *stratiōtai*, soldiers, and it seems to us highly unlikely that the Byzantines possessed the technology to transport such an enormous number of horses all the way to *Africa*, a voyage which Prokopios said took three months. Certainly, some horses at least were transported all the way because at *Hērakleia* a number of horses from imperial herds in Thrace were embarked,[486] and

[484] Appendix Three, §2.16.

[485] See above, pp. 27-8.

[486] Prokopios, *History of the wars*, III.xi.2 (vol. 2, pp. 100-102): "ἤδη δὲ ξὺν αὐτοῖς καὶ τὴν ἐς Καρχηδόνα στρατείαν ἐν παρασκευῇ εἶχε, πεζοὺς μὲν στρατιώτας μύριους,

Prokopios put a mention of landing horses into the mouth of Belisarios in an address to his commanders before the landing. He then wrote that during the digging of a stockade at the place of landing they struck enough water to suffice for all the men and animals.[487] Cavalry were certainly deployed in the ensuing campaign and the final battle at *Tricamaron* was a cavalry engagement. However, in the following year, at the outset of the Gothic War in Italy, the Ostrogothic queen regent Amalasuntha claimed to have assisted Belisarios's invasion of *Africa* by furnishing a great number of horses, to which she attributed his final victory. Many of Belisarios's cavalry[men] may have in fact acquired their horses in Sicily.[488] He also captured horses from the Vandals in *Africa*.[489] In sum, it is unclear how many he actually transported all the way from the region of Constantinople.

Byzantines could certainly transport horses for short distances, as was shown during the subsequent Gothic War. In 545 Belisarios sent a message to Justinian begging for a new army and horses, and then in 547 he sailed from Rome for Sicily and then Taranto with 700 cavalry and 200 foot. He was forced by to put in to Crotone and stayed there with the infantry but sent the cavalry ahead to secure the passes and supplies for themselves and the horses. In the following year he sailed from Otranto to the relief of Rossano but the fleet was scattered by a storm and after regrouping was detered from landing by Totila's cavalry lining the beaches, which in itself suggests that Belisarios's ships did not yet have the stern ports and ramps which would later make it possible to land cavalry in the face of opposition. After retiring to Crotone, a council decided to land the men and horses and march overland to *Picenum*.[490]

Transporting horses for short distances was one thing, but doing so for long distances was quite another. In 533 Belisarios's horses were most probably transported on sailing ships. The transport fleet was said by Prokopios to have been composed of 500 ships ranging in capacity from 3,000 to 50,000 *medimnoi*, 50-825 metric tonnes, and

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ἱππέας δὲ πεντακισχιλίους, ..."; xii.6 (vol. 2, p. 112): "..., ἐπεὶ βασιλεὺς ἵπποις ὅτι μάλιστα πλείστοις τὸν στρατηγὸν ἐνταῦθα ἐδωρεῖτο ἐκ τῶν βασιλικῶν ἱπποφορβίων, ἃ οἱ νέμονται ἐς τὰ ἐπὶ Θρᾴκης χωρία.". Cf. Theophanēs, *Chronographia*, A.M. 6026 (vol. 1, p. 190).

[487] Prokopios, *History of the wars*, III.xv.29, 35 (vol. 2, pp. 138-40).

[488] Prokopios, *History of the wars*, V.iii.22-4 (vol. 3, p. 30).

[489] Prokopios, *History of the wars*, III.xvi.12, xxv.15 (vol. 2, pp. 146, 202). Cf. Theophanēs, *Chronographia*, A.M. 6026 (vol. 1, p. 191).

[490] Prokopios, *History of the Wars*, VII.xii.1-3, xxvii.13-17, xviii.3-7, xxx.1, 9-15 (vol. 4, pp. 248, 390, 394, 406, 408-10).

for such a long voyage sailing ships would certainly have been preferable to galleys.[491] But the campaigns to recover Crete in the ninth and tenth centuries make it clear that even then the Byzantines did not transport their horses all the way from Constantinople but rather embarked them at *aplēkta* in south-west Asia Minor. The cavalry and their horses were marched overland to the *aplēkta*. Krateros's expedition of ca 825-6 was launched from the *thema* of the *Kibyrrhaiōtai*. In 866 the *Caesar* Bardas used *Kepoi* at the mouth of the *Maeander* river. In 911 *Phygela* was used and for the final assault in 960 Nikēphoros Phōkas again used *Phygela*. The sources do not reveal whether *aplēkta* were used for the other Byzantine attempts to reconquer Crete but they certainly would have been.[492]

Other considerations also need to be taken into account. Horses need large amounts of water to stay in good condition, anything from 4-10 gallons (18.2-45.5 litres) per day according to conditions and what activities they are required to perform.[493] Aboard ship they would have nothing to do, but conditions would have been very cramped, hot, and humid below decks at sea on the Mediterranean in the summer and around 8 gallons or 36 litres would have been needed per horse per day.

In a contract drawn up between Louis IX of France and Venice in 1268 for transportation of Louis's projected Crusade to Tunis, the king of France's agents specified that the rations which the Venetians should supply should include 15 *quartae* of water by the measure of Paris, 28 litres, per horse per day.[494] In the *Informationes pro passagio*

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[491] Prokopios, *History of the wars*, III.xi.13 (vol. 2, p. 104).

[492] See above, pp. 46-7, 72, 305-9.

[493] Information supplied by the Department of veterinary anatomy and pathology, University of Sydney. Haldon's estimates are similar: 5-8 gallons (22.75-36.4 litres) per day. See Haldon, "Expeditionary force", p. 127; Haldon, "Theory and practice", p. 299, n. 237. Hyland concurs that horses' minimum requirement is around 4 gallons per day but that conditions on board ship would have forced consumption up. See *Medieval warhorse*, p. 146.

Lieutenant Martin reported that horses aboard ship required 8 gallons per day and Captain Hayes that the Government allowance was 10 gallons per horse per day, which allowed for wastage, which could often be large. He wrote that actual consumption even from Bombay to Liverpool in summer was no more than 5 gallons per day. See Martin, *Transport of horses*, p. 28; Hayes, *Horses on board ship*, p. 155. Lt colonel Shirley recommended 6 gallons a day, but his experience was on the cold North Atlantic run to Canada. See Shirley, *Transport of cavalry*, p. 29. Colonel, later general, Smith recommended 7-8 gallons per day and general Wolseley a minimum of 6 gallons per day. See Smith, *Manual of veterinary hygiene*, p. 27; Wolseley, *Soldier's pocket-book*, p. 74. Around 8 gallons a day should have been about right in the cramped, hot, and humid conditions below deck on medieval ships in the summer.

[494] Du Chesne, "Contractus navigii domini regis cum Venetis factus anno Domini

transmarino of Marseilles drawn up in 1318 for a projected Crusade by Count Louis of Clermont, 2,400 *millayrole* of water were to be allowed for 60 days for 120 horses: 21.15 litres per horse per day.[495] However, in both cases these horses were to be transported on very large sailing ships and the water requirements would have been lower in the conditions aboard them than in those which would be encountered on a dromon or *chelandion*. More pertinent are the specifications of a contract drawn up in 1246 between Genoese contractors and the representatives of Louis IX of France for the construction of twelve *taride* for the French fleet for the Sixth Crusade. According to the contract, these transport galleys were to have 150 oars each and to be capable of carrying up to 20 horses. Each of them was to be fitted out with butts, *bote*, for carrying water with a total capacity for the twelve ships of up to 250 *mezeroliae*, approximately 37 tonnes, 3.10 tonnes per ship, and to have 25 barrels for loading water. The contract specified that the ships were to be prepared to accompany the royal fleet for up to two years to its destination in the East. The elapsed time for which the water supplies were required to last is unknown; however, it is clear that meeting the water requirements of the horses was a major consideration.[496]

M.CC.LXVIII", in his *Historiae Francorum scriptores*, vol. 5, 435-7; here p. 437.

[495] De Boislisle, "Projet de Croisade", pp. 253-4.

The text is extremely corrupt. It was published by de Boislisle from the fourteenth-century manuscript Paris, Bibliothèque Nationale, MS. Fr. 12814, fol. 217v ff., one volume of a collection of *Memoriaux* which came from the monastery of St Germain des Prés during the French Revolution. The fourteenth-century scribe clearly had great difficulty with the technical language and the Latinizations of Marseillese Provençal in the text which he had to copy.

The only place at which horses are mentioned in the text is in a section headed: "Hee sunt mensure navium de tribus copertis" ("These are the dimensions of ships with three decks"). Part of the text then reads: "Item, si voluerint portare equos, portabit CXX cavallos." ("Item, if they wish to carry horses, it [the ship] will carry 120 knights."). Then in a section which is separated from this one in de Boisisle's text but which may well originally have been joined to it, the provisions for men and horses are specified, including "Primo, levabit necessaria pro LX diebus pro equis, videlicet: ... Item, aquam pro equis, MM.CCCC. millayrolas." ("First, it [the ship] will load necessaries for 60 days for the horses, namely: ... Item, water for the horses, 2,400 *millayrole*.").

[496] Champollion-Figeac, "Traités passés en l'année 1246 entre les commissaires du roi Saint Louis et ... Gênes ...", in his *Documents historiques*, vol. 2, part 2, N° XXIX (pp. 54-61), here XXIX.vii (pp. 59-60): "Botas pro aqua portanda usque ad mezerolias CCL, et barulos pro aqua levanda XXV, …"; "…, boutes pour aigue porter jusques à CCL mizeroles, et XXV barris pour aigue lever, …". The Old French version of the contract given at N° XXX.viii (pp. 66-7) agrees with the Latin version in all specifics.

There are problems with this contract. The number of oars specified for each *tarida* was 150 but no galley of any kind rowed that many oars at the time. Unless, perhaps, around a third of those specified were intended to be spares. Even so, the 20

Even the 12 horses per *chelandion* reported by Theophanēs the Confessor would have consumed around 430 litres of water per day. For a voyage of, say, four days, they would have consumed around 1.73 tonnes of water and that raises the question of where the large amounts of water that the horses needed could be stowed aboard dromons or *chelandia* if they still had a bank of oarsmen below deck. We will return to this problem when we address the problem of water supplies in general.[497]

Belisarios's fleet weighed anchor around the spring equinox (20 March), at the very beginning of the sailing season,[498] probably with the intention of completing the voyage before mid summer in order to avoid the worst of the heat. At 36 litres of water per horse per day, it would have meant that if there really were 5,000 horses, some 180 metric tonnes of water would have been needed for the horses alone every day. During the voyage they would have consumed around 16,200 tonnes of water. Leaving aside the additional water needs of the men, which should have been at least equal to this again, one has to question how that amount of water could have been manhandled with buckets or amphorae from the springs, small streams, and wells to be found *en route*. Such considerations suggest that the report that Amalasuntha supplied Belisarios with horses in Sicily was correct and they also help to explain why the Byzantines took their horses overland to *aplēkta* in south-west Asia Minor for the expeditions to Crete before making only very short dashes of no more than 400 kilometres to the island.

One other consideration contributes to an understanding of why it was very difficult to transport horses for long distances. They suffer

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horses to be catered for suggests quite small transport galleys. Thirty horses had been quite common earlier in the century and would be again not so many years later. And, it is clear from the oars specified that these were galleys rather than sailing ships, but only 20 sailors, *marinarii*, were required for each. This figure obviously does not agree with that for the number of oars, unless, perhaps, the *marinarii* were not oarsmen but sailors operating as deck hands. Whatever the case, it is clear that there are serious textual problems created in the transmission of the text over the centuries and the 250 *mezerolie* of water were probably intended to be for the whole 12 *taride*, giving a water supply per *tarida* of 3.093 tonnes. This figure is far more realistic than the 37 tonnes otherwise demanded. No medieval galley could take on board that weight of water and remain seaworthy.

[497] See below p. 371.

[498] According to Vegetius, the sea was closed from 11 November to 10 March. From 10 March to 15 May navigation could be resumed, but only at risk. War fleets, he said, should be more cautious than sailing ships, and for good reason. Low-lying galleys, designed to cut through the waves rather than to ride them, were much more prone to being swamped in rising seas than sailing ships. Only from 27 May to 24 September did the seas become truly safe. See Vegetius, *Epitoma*, IV.39 (pp. 156-8).

badly from cramped conditions and poor ventilation

Most illnesses suffered by horses aboard ship, such as azoturia, heat apoplexy, pneumonia, laminitis or fever in the feet, and constipation are caused by hot weather, immobility, overcrowding, or inadequate ventilation. Azoturia is a build-up of lactic acid, causing swelling of the muscle fibres, followed by degenerative changes, locomotor inability, passage of myoglobin into blood plasma and its excretion into the urine. It is induced by severe physical stress, and is alternatively called tying-up syndrome. Lack of oxygen can cause horses to go blue and they can die of suffocation.[499]

Horses breathing in pass on to their lungs air containing 20.96% oxygen and 0.04% carbon dioxide and 0.02% impurities. Their expired air contains 19.96% oxygen and 4.04% carbon dioxide and impurities. The nitrogen remains constant. The air loses in the lungs 4-5% of its oxygen and gains 3-4% carbon dioxide plus impurities. An average inhalation for horses at rest is around 4 litres and they will absorb 2.38 cubic metres of oxygen and produce 2.04 cubic metres of carbon dioxide in 24 hours. They breathe around 11.5 times per minute and take in around 2.8 cubic metres of air per hour, making around 0.7 cubic metres of air completely unbreathable every hour. Around 150 times more air must be introduced per hour than actually passes through their lungs. Fresh air per hour per horse needed to keep the critical inorganic impurities at .02% was calculated by Frederick Smith, following Francis de Chaumont, as the equation $e/p = d$, where e = the amount of carbon dioxide plus impurities in cubic feet exhaled per hour, *viz* 3, p = the limit of permissible organic impurity per cubic foot, *viz* 0.0002, and d = the amount of fresh air required in cubic feet per hour; i.e., 15,000 cubic feet, 425 cubic metres.[500]

Following De Chaumont/Smith's equation the 12 horses per *chelandion* reported by Theophanēs the Confessor would have required 5,100 cubic metres of fresh air per hour but the volume of the hold of such ships could not possibly have been more than around 150 cubic metres, probably somewhat less. It would have been necessary to change the air over 30 times an hour for the horses alone, not to mention the oarsmen. The decks must have had extensive gratings and

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[499] See Hayes, *Horses on board ship*, pp. 225-6; Martin, *Transport of horses*, pp. 38-45; Mellows, "Observations", pp. 105-6; Smith, *Manual of veterinary hygiene*, pp. 917-18. Cf. Hyland, *Medieval warhorse*, pp. 102, 169, 182, n. 171.

[500] De Chaumont, "On ventilation", p. 1031; Smith, *Manual of veterinary hygiene*, pp. 40-41, 53-6. We have translated Smith's imperial measures into metric ones. De Chaumont's equation was developed for men and adapted by Smith for horses.

forced ventilation would have had to have been used if horses were transported below deck in dromons or *chelandia* for more than very short distances. The holds of the ships would have had to have been ventilated by something like windsails and cowls, the windsails turned into the wind acting as inlets and the cowls as outlets.[501] Forced ventilation would have been necessary for the lower oarsmen also.

Even so there would have been high rates of illness among the horses during extended voyages and they would have required considerable recovery time before they could have been put to work. It was one thing for the knights of the Fourth Crusade to go mounted directly into battle from the horse transports outside Constantinople after crossing the Bosporos from *Chalkēdōn*, as Robert of Clari reported. But as Ambroise reported, it was quite another for the horses of Richard Cœur de Lion when they were landed in Cyprus. Dio Cassius reported that in 46 B.C.E. Julius Caesar's cavalry in *Africa* was driven back by that of Marcus Petreius and Titus Labienus because the horses had not yet recovered after the short voyage from Sicily.[502] Laminitis will occur in many horses if they are worked even moderately straight after landing after a long voyage. Considerable recovery time is necessary.[503] Even if launched from *aplēkta* in south-west Asia Minor, for the Byzantine campaigns against Crete, it would have been highly desirable to have unloaded the horses on Naxos or Ios to allow complete recovery before the final passage to Crete.

There is no doubt that by the tenth century maritime powers could transport cavalry[men] and horses for short distances, but long distances were another matter. Fulcher of Chartres was quite explicit about this. He commented in a chapter of his *Historia Hierosolymitana* written between 1102 and 1106 and contained in manuscripts of the first redaction of the chronicle completed by 1124, referring to the first year of the reign of Baldwin I of Jerusalem in 1101, that: "For whom [the Franks] there would have been nothing lacking, if only men and horses should not fail. Wherefore, we could not go on an expedition, except if we campaigned locally or towards

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[501] See Hayes, *Horses on board ship*, p. 43; Martin, *Transport of horses*, pp. 4-6; Mellows, "Observations", pp. 105-6; Shirley, *Transport of cavalry*, pp. 21-3; Smith, *Manual of veterinary hygiene*, pp. 900-904.

[502] Dio Cassius, *Roman history*, XLIII.ii.2 (vol. 4, p. 212). See also above pp. 311 & n. 453, 318-19 & n. 474. In fact the crossing of the Bosporos in 1203 was not made from *Chalkēdōn* as reported by Robert of Clari but rather from *Chrysopolis*.

[503] Hayes, *Horses on board ship*, pp. 208-10; Martin, *Transport of horses*, pp. 46-7; Shirley, *Transport of cavalry*, p. 31; Smith, *Manual of veterinary hygiene*, p. 921. See also Hyland, *Medieval warhorse*, p. 148.

Ascalon or *Arsuf*; indeed those who came by sea to Jerusalem could by no means bring horses with them".[504] Later, Fulcher suggested clearly just how difficult transporting horses by sea over long distances was and how big a problem water supplies were. In 1123 the Venetians sent a new Crusading fleet to the Holy Land. In all probability this was the first attempt made by a Western power to transport horses by sea across the length of the Mediterranean. Fulcher described the fleet and its voyage in the following terms:

> Who [the Venetians], having left their own land the year before, wintered on the island called Corfu, awaiting a favourable season. Their fleet was of 120 ships, not counting small boats or skiffs, of which [ships] some were spurred (*rostratae*), some indeed were transport ships, and some were triremes. ... After the routes were opened to ships in the spring season, they did not delay in fulfilling what they had long vowed to God. ... In which [ships] were 15,000 armed men, Venetians as well as the pilgrims joined to them. In addition they conveyed 300 horses with them. ... And since it was necessary that they proceed together and not scatteredly, and because the winds also veered from time to time, they carefully controlled their voyage lest they quickly become separated from each other. Therefore, sailing by short stages, by day and not by night, by necessity they put in daily at the ports which they found frequently, lest both they and their horses, suffering lack of fresh water, be oppressed by thirst.[505]

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[504] Fulcher of Chartres, *Historia Hierosolymitana*, II.vi.12 (p. 390): "quibus nulla inopia esset, si tantummodo gens et equi non defuissent. quamobrem in expeditionem ire nequibamus, nisi prope vel versus Ascalonem vel Arsuth equitaremus; et qui per pelagus Hierusalem veniebant, equos secum adducere nequaquam poterant.".

Note that this text is as given in Hagenmeyer's notes for the manuscripts of the first redaction, not as printed in his text from those of the second redaction and as translated by Fink and Ryan.

[505] Fulcher of Chartres, *Historia Hierosolymitana*, III.xiv.1-2, xv.1-4 (pp. 656-8): "qui [Venetici] anno precedenti de terra sua egressi, in insula, quae *Curpho* nuncupatur, tempus exspectantes opportunum hiemaverunt. classis quippe eorum CXX navium fuit, exceptis carinis et carabis, quarum aliae rostratae aliae quidem onerarie, aliae vero triremes fuerunt. ... Igitur postquam verno tempore patescunt viae ratibus, quod Deo diu devoverant explere non torpuerunt. ... quibus ter quina hominum armatorum milia tam de Veneticis quam peregrinis sibi adiunctis inerant. porro equos secum CCCos convehebant. ... et quia necesse erat, ut simul nec sparsim incederent, flabris etiam interdum alternantibus, nisi provide iter suum modificarent, alii ab aliis cito discreparent, propterea dietis brevibus die non nocte velificantes, portibus frequenter inventis necessario cotidie applicabant, ne recentis aquae penuriam patientes tam ipsi quam eorum equi siti gravarentur.".

Again this is the text of the first redaction as given in most of the manuscripts according to Hagenmeyer's notes. There is a significant variant in the third last line of "*diebus*" (which makes much less sense) for "*dietis*" in the text as printed from the manuscripts of the second redaction.

We believe that Fulcher was not exaggerating. The Venetian fleet took from early spring to mid-May to reach the Holy Land from Corfu, probably around two months for the 2,255 kilometres at an average speed of only around 0.85 knots, extraordinarily slow considering that the prevailing winds would have been astern on the port quarter for the most part. It suggests that the fleet did indeed sail only by day and put in wherever possible to take on water. Watering, in particular watering the horses, must have been a laborious and time-consuming exercize. We also believe that the Venetians probably moored whenever possible to open the hatches and ventilate the holds where the horses were stabled and that they probably also landed to exercize them from time to time.

(l) *Performance capabilities, water supplies, and logistics*

According to his *Life of St Theoktistē* of Lesbos, the narrator, Nikētas Magistros, was told on Paros by a hermit that from Paros he would sail to Naxos, lie there in harbour for one day, sail for Crete on the second day and reach it on the third. Since at the time Nikētas was accompanying the expedition of Himerios to the Levant and Crete, he was presumably on a war galley, a dromon or *chelandion*, and the voyage predictions read like a reflection of what a galley could expect to accomplish by sailing before the prevailing northerlies of summer south to Crete. Naxos to *Chandax*, via Ios and Thēra is only around 195 kilometres; easy sailing before the prevailing northerlies of summer in 24-36 hours, depending upon the time of the second day that they reached Crete, at an average speed of around 2.8-4.3 knots.[506]

This is one of the very few pieces of arguably reliable "data" which survive in Byzantine sources for the performance capabilities of what may have been a dromon. A search of the surviving historical record for data recording the duration times of voyages made by dromons has proved almost fruitless. Where data appears to survive, for example in Theophylaktos Simokattēs' account of the transmission of the news of the murder of the emperor Maurice from Constantinople to Alexandria,[507] there is invariably some question of unreliability. Either

[506] Nikētas Magistros, *Vita S. Theoktistae*, §13, trans. Hero (pp. 107-8).

[507] Theophylaktos Simokattēs, *Historiae*, VIII.13.7-14 (pp. 309-11). The story was later repeated by Theophanēs the Confessor. See Theophanēs, *Chronographia*, A.M. 6095 (p. 291).

Under the year A.M. 6095, Theophylaktos recounted a story of a pious copyist

the narrator was reporting something miraculous, or the type of ship was not specified, or, as in Theophylaktos's case indeed, no ship was mentioned at all even if it was no doubt presumed that the news was transmitted by sea.

Another possible case of one voyage duration that may stand up to scrutiny is that of Nicholas Mouzalōn, who wrote that he was virtually ordered to the archbishopric of Cyprus by Alexios I Komnēnos early in the twelfth century. It is tempting to think that he may have been provided with an imperial dromon for the voyage. In similar circumstances St Symeon of Mytilēnē had been given one by the Empress Theodōra when he was appointed to the bishopric of Mitylēnē.[508] Unfortunately, Mouzalōn simply used the generic for a ship, πλοῖον, when he wrote that he made Cyprus from Constantinople in 10 days.[509] The future patriarch was, however, making a point when he wrote that he made the voyage in the best possible anticipated time because his ship had excellent sailors and the Holy Spirit filled its sails. We do not know at what time of the year he made the voyage, but assuming that it was early summer with around 14.75 hours

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in Alexandria who saw in a vision the statues of Emperor Maurice and his family being dragged from their pedestals in Constantinople. Nine days later news of the murder of Maurice by Phōkas reached Alexandria. Phōkas seized the throne on 23 November 602 and, even though no ship was actually mentioned by Theophylaktos, some ship was presumed to have covered the 1,600 kilometres from Constantinople to Alexandria at the onset of winter in 9 days, an average speed of around 4.35 knots if sailing around the clock. But noone would have tried to navigate the Dardanelles or the East coast of the Aegean by night at the onset of winter. From Rhodes to Alexandria they obviously would have had to but that is only about 645 kilometres. For the rest, at that time of the year they would have had a maximum of around 9.5 hours of daylight. See USNO, *Sun and moon*, accessed 21/02/2005. On 30 November, 1800, the sun rose at 0551 hours and set at 1618 hours at Constantinople and rose at 0641 and set at 1658 at Alexandria, giving an average for the voyage from sunrise to sunset of around 9.5 hours.

The actual average speed when under way would therefore have had to have been an incredible 8.36 knots. To put this in perspective, in 1798 Nelson sailed for Alexandria from Syracuse in pursuit of the French at top speed in mid summer on 25 July. He reached Alexandria via Korōnē on 1 August in eight days: 1,610 kilometres at an average speed of 4.75 knots. If we are to believe Theophylaktos, we must believe that a seventh-century ship almost doubled the speed of what was the fastest squadron in the British Mediterranean fleet in 1798.

What then are we to make of Theophylaktos's story. Well, it was a miracle, a "miraculous narrative" as he wrote, and no doubt he intended his audience to recognize it for what it was. It wasn not to be taken seriously. At the beginning of the seventh century no ship could reach Alexandria from Constantinople in November in nine days.

[508] See above p. 172.

[509] Doanidu, "Ἡ παραίτησις Νικολάου τοῦ Μουζάλωνος", p. 119.

daylight,[510] the voyage was made at an average of around 5.0 knots, which would certainly be at the upper level of expectations, but not impossible. Did his mention of excellent sailors point to an imperial dromon?

If all conditions remained continuously favourable and it could use its sails, in early summer a dromon ought to have been able to reach Paphos from Constantinople in around 10-12 days. Any galley could, of course, make way either under sail or under oars. In favourable light conditions it might be possible to use both oars and sails, but that would have been unusual.[511] With a favourable light breeze from astern, say around *Beaufort Scale* Three, 7-10 knots with large wavelets up to 2 feet or 61 centimetres, a dromon could no doubt bowl along quite nicely under sail. In fine conditions it might make a voyage such as that from Constantinople to Rhodes in as little as 8-10 days or to Paphos in 10-12 days.

Before the prevailing North to East light winds of summer, such a dromon sailing from Constantinople at dawn, around 0430 hours, on a fine summer's day in early July might well drive across the Sea of Marmara on a west-south-west course with the wind only two to six points on the starboard stern quarter and even make *Rhaidestos*, 130 kilometres away, by evening around 1945 hours at an average speed of around 5 knots. *Hērakleia*, around 105 kilometres from Constantinople, would have been even more reachable at an average speed of around 4 knots.[512] *Proikonnēsos* was only around 50 kilometres south-south-west of *Hērakleia*, an easy run, and *Abydos* 115 kilometres from *Proikonnēsos*. Even the 155 kilometres from *Rhaidestos* to *Abydos* would not have been impossible with the assistance of the current through the Dardanelles.[513] The run from

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[510] See USNO, *Sun and moon*, accessed 21/02/2005. On 30 June 1800 the sun rose at Istanbul at 0434 hours and set at 1940 hours. It rose and set at Paphos at 0439 and 1907 hours respectively, giving an average for the voyage of 14 hours, 47 minutes from sunrise to sunset.

[511] The sea trials of *Olympias* have shown that both oars and sails may be used together but only in light breezes from astern or on the quarter. Obviously oars could not be used when a ship was heeling under sail with a wind from abeam. See Coates and Morrison, "Sea trials", p. 139; Coates, et al., *Trireme trials*, p. 39; Morrison, et al., *Athenian trireme*, pp. 258-9.

[512] In July at Istanbul the wind prevails from the north to east around 70% of the time and calms represent another 12%. The mean wind speed is only 11 knots. Winds from the west to south occur less than 3% of the time. See Great Britain, *Black Sea Pilot*, p. 72. On 30 June 1800, the sun rose at 0434 hours at Istanbul and set at 1946 hours at *Rhaidestos* and at 1944 hours at *Hērakleia*. See USNO, *Sun and moon*, accessed 21/02/2005.

[513] A run from *Rhaidestos* to *Abydos* would have been almost directly south-west.

Abydos to *Tenedos* was only around 50 kilometres. Heading south into the Aegean with the wind prevailing strongly from the north,[514] daylight passages of around 130 kilometres to Mitylēnē, 115 kilometres to Chios, about the same to Samos, perhaps two days with a stop over somewhere among the scattered islets of the Sporadhes for the 260 kilometres to Kos, and then a final day's sail of around 130 kilometres to Rhodes would bring a dromon into Rhodes from Constantinople in 8-10 days. At Rhodes in July the wind averages 76.5% from west to north at an average speed of 18 knots, driving any ship straight into it from Kos.[515] The 400 kilometres from Rhodes to Paphos ought to have been coverable before the prevailing west to north winds in three days with a first-night lay-over somewhere around *Patara* or *Phoinikous*.[516]

The scenario would, however, be very different if the wind rose to *Beaufort Scale* Four-Five (16-17 knots). That would raise waves of around 4.75 feet, 1.45 metres. All galleys at all times were designed to cut through the water rather than to ride the waves and such a wind, which is just a "moderate" to "fresh" breeze on the *Beaufort Scale*, nothing out of the ordinary, would send waves washing over the deck of any dromon. Even if the wind were astern, she would still be forced to run for the coast. If the wind were ahead, it would be worse because that would mean that the ship was attempting to beat to windward and therefore would be heeling over with one gunwale continuously under water. And in the Aegean in summer the *meltemi* can rise to become a very strong wind indeed, even up to *Beaufort Scale* Seven (28-33 knots), particularly in the channels between the islands, raising short,

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At Çanakkale near Byzantine *Abydos*, the wind in July prevails from the north to east 88% of the time at an average of 10.5 knots. See Great Britain, *Black Sea Pilot*, p. 71.

[514] In July in the Aegean the wind prevails strongly from the north to east-north-east in the northern sector, swinging to the north-west to north-north-east in the central Aegean and then to the west-north-west to north-west in the south approaching Rhodes. The strength is commonly in the order of *Beaufort Scale* One-Four, 0-16 knots, in the north, strengthening to Three-Five, 7-21 knots, in the central Aegean and to Four-Five, 11-21 knots, in the south towards Rhodes. See Great Britain, *Mediterranean Pilot. Vol. IV*, fig. 6.

[515] Great Britain, *Mediterranean Pilot. Vol. IV*, p. 33.

[516] In 1102 the small Byzantine coaster on which the Anglo-Saxon pilgrim Saewulf was travelling made *Patara* from Rhodes in late September in a day's sailing, around 95 kilometres in 11.2 hours of daylight at around 4.9 knots: good sailing. [On 30 September 1800, the sun rose at Rhodes at 0603 hours and set at 1755 hours, giving 11 hours and 12 minutes of daylight. See USNO, *Sun and moon*, accessed 21/02/2005]. See Huygens, *Peregrinationes tres*, pp. 59-61. At Paphos the wind in July prevails from the west to north around 66% of the time at a mean wind speed of a gentle 6 knots. See Great Britain, *Mediterranean Pilot. Vol. V*, p. 29.

steep seas.[517] Scale Seven winds would raise seas up to 13.5 feet (4.115 metres) and no dromon would stand a chance of continuing its voyage in such conditions. The authors of the *Olympias* project have concluded that a *triērēs* would be swamped in waves above 0.85

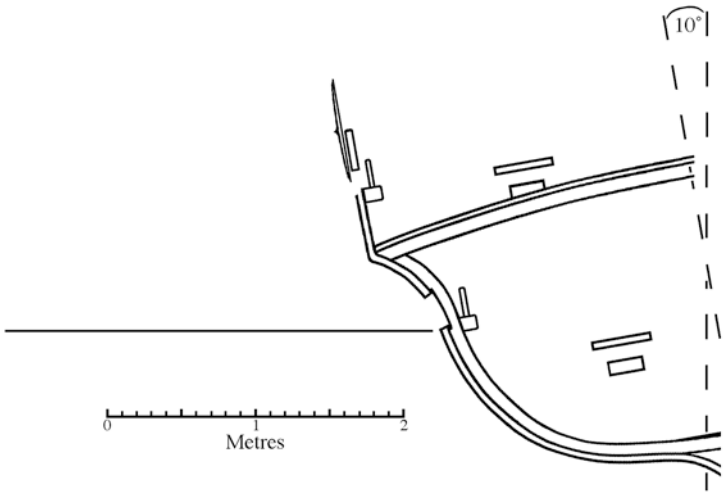


Figure 40
Bireme dromon of the era of the Macedonian emperors heeling under sail to ten degrees.
© John H. Pryor

metres,[518] and we believe that in all probability a dromon would have been also. The *meltemi* becomes strongest from July through to September and from noon through to evening, so the optimum time for a voyage from Constantinople to Rhodes would be spring, from April to early July, sailing before sunrise as soon as the light made navigation possible.

However, galleys were simply not designed to be sailed and throughout history they were always notoriously poor sailers. Because their lack of deep keels meant that they made excessive leeway when beating into the wind, because their shallow draft and low freeboard meant that they could not heel under sail very much, because their

[517] See Denham, *Aegean*, pp. xxv-xxvi.
[518] Morrison, et al., *Athenian trireme*, p. 197. Cf. Shaw, "Oar mechanics", p. 166.

narrow beam and low depth in hold meant that their hulls did not have the structural strength to carry a large press of sail, and because their extreme length:beam ratio and lateen sails meant that they carried pronounced weather helm, constantly griping, the bows coming up into the wind, galleys were always notorious for poor upwind performance under sail.[519] That is nothing to be wondered at for they were not designed to do that. And dromons may have been even worse sailers than later medieval Western galleys because with oarsmen below deck there would have been nowhere to stow ballast and without ballast any ship heeling under sail would be extremely unstable.[520] Moreover, a heel under sail of a mere ten degrees or so would put the lower rims of the lower oar ports at the flat water line and at that point it is highly questionable whether the oar sleeves would have prevented water from entering the hull, even if they were tied off.

The speed that oared ships of all kinds could maintain under oars is a matter of considerable scholarly debate. Different scholars have directed their attention to different periods and various types of oared ships and have produced results which are very difficult to reconcile.

What one would like, of course, is reliable historical data for voyages made by dromons in pressing circumstances in conditions which would suggest that the voyages were made under oars in calm conditions or at worst against against light breezes. However, little data can be found in the Byzantine sources. For the most part we are compelled to have recourse to those from the sources for classical antiquity and the Western Middle Ages.

At one end of the scale are the estimates of the capabilities of *triēreis* crews made by various scholars associated with the *Olympias* project. These estimates vary somewhat but may be represented by those of John Coates.[521] We, however, find it very difficult to credit that a crew of any galley at any time could maintain a speed such as this, around 7.5 knots under oars for 10 hours, covering some 130

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[519] Pryor, *Geography, technology, and war*, pp. 71-3; Bragadin, "Navi", pp. 393-4; Guilmartin, *Gunpowder and galleys*, pp. 205-6.

[520] It is well known that classical *triēreis* carried no ballast and therefore floated ashore even when sunk. Cf. below p. 392 & n. 634.

[521] Coates, "Naval architecture and oar systems", p. 129. Cf. Morrison, et al., *Athenian trireme*, pp. 262-7. The estimate of Coates, Platis, and Shaw in Coates, et al., *Trireme trials*, Annex F.9 (Table D), p. 85, is even higher: an average of 8.0 knots maintainable for 12 hours. That of Cotterell and Kamminga is similar: around 7.5 knots or a little higher. See Cotterell and Kamminga, *Mechanics of pre-industrial technology*, p. 259. However, this is not surprising since Cotterell and Kamminga were dependent upon Coates et al. for their data.

kilometres in a day. There is simply too little evidence to support it. In fact the various estimates of those associated with the *Olympias* project were primarily based on two voyages reported by Thucydides and one statement of Xenophōn, analysis of which has given rise to an expectation that *triēreis* could maintain speeds of this order under oars. Other voyages analyzed have begun from the assumption that these speeds were possible. But when the evidence is analyzed again,

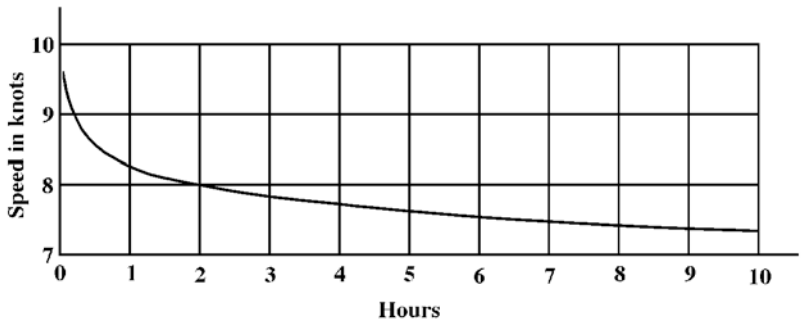


Figure 41
Curve of sustainable speed against time for a *triērēs*.
© John Coates

the expectation largely evaporates.

In his *Anabasis*, Xenophōn stated that from *Byzantion* to *Hērakleia Pontikē* was a "long day's voyage for a *triērēs* under oar". This was not a report of an actual voyage but rather an estimate of distance. In the two oldest manuscripts, both of the twelfth century, the reading was in fact an "exceedingly long day", possibly reflecting the thinking of the scribes, who could not believe it.[522] *Hērakleia Pontikē* was

[522] Xenophōn, *Anabasis*, VI.4.2 (p. 468): "Καὶ τριήρει μέν ἐστιν εἰς Ἡράκλειαν ἐκ Βυζαντίου κώπαις ἡμέρας [μάλα] μακρᾶς πλοῦς· ...".

The two manuscripts which have the added word μάλα, "very" or "exceedingly", are Rome, Biblioteca Apostolica Vaticana, MS. Gr. 1335 and Venice, Biblioteca Marciana, MS. 511. These manuscripts are the foundation of the so-called "second family" of manuscripts of the *Anabasis* and both are dated to the twelfth century, Vaticana 1335 being earlier than Marciana 511.

The manuscripts of the second family are somewhat longer than those of the first family, being based on the manuscript Paris, Bibliothèque Nationale, MS. Gr. 1641, which is dated 1320 but which was a copy of one thought to have been produced in the late ninth or early tenth centuries. It is not known whether the additions of the second family, such as μάλα here, were revisions made by Xenophōn

around 240 kilometres from *Byzantion*, of which the first 30 or so involved a hard pull up the Bosporos against the current (up to 6-7 knots) and prevailing winds. Even assuming a mid-summer voyage with 15 hours daylight,[523] this would be a voyage made at an incredible average of over 9 knots. It is simply not believable.

Then there was Thucydides' report of the famous dash by a *triērēs* from Piraeus to Mitylēnē in 428 B.C.E. to cancel the order carried by a first *triērēs* to put to death the men taken prisoner at the fall of Mitylēnē to the Athenians. Morrison calculated that this dash was accomplished in 24 hours at sea in one continuous voyage with a crew alternating at the oars in shifts at an average speed of around 7.7 knots.[524] Thucydides wrote specifically that there were no head winds and, whatever the actual speed was, it must surely have been at the upper limit of what a *triērēs* could achieve under oars. However, in our opinion, Morrison's reconstruction forces what Thucydides actually wrote beyond its sustainability and in fact no estimate of the speed of either *triērēs* involved is possible. He himself virtually admits as much.[525]

More believably, Thucydides reported that in the summer of 411 B.C.E. the Spartan admiral Mindaros took a Peloponnēsian fleet of 73 ships north from Chios to *Rhoiteion*, just inside the Dardanelles, in two days. This must have been a voyage made under oars, most

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himself in a second draft or were additions of later readers and copyists.

[523] At Istanbul on 30 June 1800, the sun rose at 0434 hours and set at 1940 hours, giving 15 hours and six minutes of daylight. See USNO, *Sun and moon*, accessed 21/02/2005.

[524] Thucydides, *Peloponnesian war*, III.36.2-3, 49.2-4 (vol. 2, pp. 56, 84-6). See Morrison, "Trireme", pp. 57-9; Morrison, et al., *Athenian trireme*, pp. 95-6, 104.

[525] The Athenians' first decision to send a *triērēs* to announce the decision to execute the prisoners was taken "after a debate". Thucydides did not say that it was after a meeting of the Athenian Assembly and he did not say at what time of day the ship set sail. Next day, after a meeting of the Assembly was held, a second *triērēs* was despatched in all haste. It left "a day and a night" later. Meetings of the Assembly began at daybreak or in the early morning and could go on until nightfall but most Assembly meetings were probably over by midday. See Hansen, *Athenian democracy*, pp. 136-7. So the first *triērēs* probably had left the previous morning. The Mitylēnēan envoys in Athens provided wine and barley for the crew of the second *triērēs*, who rowed continuously in shifts and ate when off the oars. There was no contrary wind. Since the earlier ship had not been in a hurry, the second arrived shortly after the first and was able to countermand the decision to execute the prisoners.

This is all that Thucydides reported and Morrison's re-construction of the speed of the second, chasing *triērēs* is entirely dependent upon his re-construction of the voyage of the first. Of this he guesses that it left Piraeus around midday and arrived at Mitylēnē round midday on the third day, having bivouacked on land twice overnight and having taken a midday break on land on the second day. However, there is absolutely nothing in Thucydides' account to support this.

probably in light conditions with slight onshore and offshore breezes by day and night respectively but with no influence from the *meltemi* which would have prevailed out to sea in the central Aegean. The situation was urgent and they left Chios early on the first day, bivouacked overnight at *Arginousai* and sailed again "while it was still night proper"; i.e., the Greek implies, just at the first pale glimmer of light when dawn proper was still a long way off.[526] They reached *Harmathous* at "breakfast" on the second day and *Rhoiteion* "before the middle of the night" on the second day, although some of the ships apparently failed to make *Rhoiteion* on the second day and put in at *Sigeion* and other harbours around the entrance to the Dardanelles.[527]

Morrison's reconstruction of this voyage presses the point of coastal navigation by galley fleets and of the speeds attainable by *triēreis* under oars to an unrealistic extreme. His calculations of the distances involved are 65 sea miles (110 kilometres) and 124 sea miles (210 kilometres) respectively for the two days. However, he has opted for extreme coastal routes, never taking the fleet more than a couple of kilometres offshore except for the crossing of the entrance to the Gulf of Izmir. But Thucydides did not say that this was so. In fact, since the situation was pressing, extreme coastal routes would have been counter-productive. We acknowledge, of course, the fact that galley fleets did navigate by coastal routes. But the question is one of sense and sensibility. To have made an extended detour around the shores of the Gulf of Çandarli when the entrance to it is barely eight kilometres across would have been unnecessary. Given the pressing nature of the voyage, even more incomprehensible would have been a run 25 kilometres north-east into the Gulf of Edremit before heading west to *Harmathous*. This would have added some 80 kilometres to a direct crossing from Eğribucak Point west of Ayvalik and then around the north-east coast of Lesbos to *Harmathous*, totally unnecessarily since even the direct crossing would not have taken a ship more than three kilometres or so offshore. Whereas Morrison's calculation of the speed achieved on the second day was 6.9 knots, our own calculations of the distances reduce that from Chios to *Arginousai* to around 98 kilometres at an average speed of approximately 3.65 knots and *Arginousai* to *Rhoiteion* to around 135 kilometres at an average speed over 18 hours of approximately 4.05

[526] Anyone who has been at sea on a cloudless and starlit night and has watched the dawn come up over a gentle sea will know what Thucydides meant. First light can precede dawn by an hour or more if the atmospherics are right.

[527] Thucydides, *Peloponnesian war*, VIII.101 (vol. 4, pp. 378-80).

knots. These were reasonable speeds for hardened crews to have maintained under oars for extended periods of time, although the fact that some crews were unable to maintain them to the finish at *Rhoiteion* indicates that they were at the upper limit of oarsmen's capabilities.[528]

The estimates of those associated with the *Olympias* project of the speeds which *triēreis* could sustain for extended periods were too high and even the the classical evidence does not support them. *Triēreis* were no doubt fast ships but it is implausible to argue that they were the fastest galleys ever built and could outperform war galleys of later periods. *Liburnae* were later adopted into Roman fleets because they were faster than other contemporary galleys. Dromons were developed because they were faster than *liburnae*. *Galeae* would later spread rapidly in the West and then across the Mediterranean because they had fine lines and were fast. The expressed disappointment at the performance of *Olympias* in sea trials, even acknowledging the now-known flaws in the ship's design, is excessive.[529] The ship's performance was probably closer to realistic expectations than its designers believed.

Consideration of recorded voyage times of ancient and medieval galleys and galley fleets leads to the conclusion that the capabilities of galleys under oars, including dromons, were more realistic than the expectations of some members of the *Olympias* project. That being said, the evidence of the various records varies enormously and few reports are verifiable. Invariably they had some literary, didactic, or polemical purpose and may not be read as "shipping notices"; for example, Pliny the Elder's reports of voyages to Egypt.[530] In many

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[528] See Morrison, et al., *Athenian trireme*, pp. 97-8 and map 11, 104-5.

[529] Morrison, et al., *Athenian trireme*, pp. 264-7.

[530] Pliny, *Natural History*, XIX.i.3 (vol. 5, pp. 420-22).

According to Pliny, senator Valerius Marianus (or Marinus) made Alexandria from Pozzuoli in summer on the ninth day (in 8-8.5 days) "with a very gentle breeze" "... lenissumo flatu.": 1,930 kilometres at an average speed of 5.25 knots even if the shortest high-seas route was taken. Two imperial *praefecti Aegypti*, Gaius Galerius, *praefectus* under Tiberius, and Claudius Balbillus, *praefectus* in 55 C.E., supposedly did even better. They made Alexandria from the Straits of Messina in 6-6.5 and 5-5.5 days respectively: 1,610 kilometres at 5.8 and 9.15 knots respectively.

To put this in perspective, *Cutty Sark* made Sydney from London in 1885 in 78 days: 24,140 kilometres at an average speed of around 7.25 knots. Pliny asks us to believe that Roman ships could match or better the performance of one the fastest nineteenth-century clipper ships ever built, even though the latter's average speed was greatly increased because she drove for days through the Roaring Forties at up to 15 knots. One must be careful about accepting such data. Historians are too credulous of narrative sources. Pliny's purpose in recounting such voyage times was to show what a "marvel" ("*miraculum*" was his word) the flax plant used to make linen for sails was

cases they may have represented what authors thought ought to have been possible rather than what actually happened; although that can actually be valuable. Longer voyages also incorporated time spent in ports of call and even shorter ones sometimes incorporated lay-overs by night. The data is also skewed by some reports of very short voyages at almost impossibly high speeds. It is that which explains the very high average of 5.2 knots for voyages under oars in all conditions calculated in Table 7. Excluding those short voyages, made at an average of 6.1 knots according to the reports, the average for voyages under oars of more than one day becomes 4.0 knots. The data which suggests that average rates of speed decreased according to the length of voyages must have reflected reality. There is sufficient consistency in the data to suggest that in favourable conditions fleets could maintain around four knots while at sea under oars. When layovers and watering are taken into account, average speeds for extended voyages would have fallen to no more than two knots. There is no evidence to suggest that dromons, or indeed any other types of galleys from other eras, were capable of speeds greater than this except for short sprints.

When winds were adverse and they could not use their sails, galleys could use their oars. However, an issue invariably overlooked when discussing the use of oars against adverse winds is the limitations on doing so created by waves. All winds raise waves. In the case of a standard dromon, the optimum position for a seated oarsman would have been to have the handle just below the level of his shoulders when his arms were fully extended to begin the stroke but at the end of the stroke he would have to lower his hands to lift the blade clear of the water for the return. As shown above, between the shoulders and the top of the legs of a seated man is only around 40 centimetres and as a result, the blades of the lower oars of a dromon simply could not have been raised more than around 80 centimetres above the calm waterline, meaning that in waves above 1.60 metres the lower oars could not have been used at all because the oarsmen could not have achieved a return stroke. Winds of *Beaufort Scale* Four, "moderate breezes" of 11-16 knots, will raise waves of that height at the top of the range. Even in waves between 0.80 and 1.60 metres, part of the looms would have been below wave crests during the return and that would have made rowing extremely difficult. In more than light to moderate breezes the lower oars of dromons could not have been used and the upper oars alone would have been

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but his "data" is not to be believed.

Table 7:
Some reported voyages of ancient and medieval galleys and galley fleets[531]

Aw	Anonymous, *African war*	L	Livy, *Ab urbe condita*
App	Appian, *Civil wars*	Lu	Lucan, *Civil war*
Bc	Anonymous, *Breve chronicon*	Pl	Plutarch, *Dion*
C	Caffaro, *De liberatione*	Po	Polybios, *Histories*
D	Doanidu, "Ἡ παραίτησις Νικολάου τοῦ Μουζάλωνος"	Pr	Prokopios, *History of the wars*
		RL	Pryor, "Roger of Lauria"
DS	Diodōrus Siculus, *Bibliothēkē historikē*	SL	Dotson, "Simone Leccavello"
		Th	Thucydides, *Peloponnesian War*
H	Herodotos, *Histories*	The	Theophanēs, *Chronographia*
Ip	*Itinerarium peregrinorum* (Stubbs)	X	Xenophōn, *Hellenika*

Source:	Fleet:	From:	Current:
Date of voyage:	Commander:	To:	Oars or sails:
	Composition:	Approximate distance:	Time taken:
		Voyage objective:	Approximate average speed
		Degree of haste:	

Part A: Voyages before generally favourable prevailing winds

H, VIII.66:	Persian:	*Euripos*:	Generally favourable:
480 B.C.E.:	Not stated:	*Phalēron*:	Probably sails then oars:
	Not stated:	185 kms:	3 days:
		Invasion force:	1.39 knots:
		Moderate:	
Xh, II.1.30:	Milētan:	*Aigos potamoi*:	Neutral:
405 B.C.E.:	Theopompos:	*Lakedaimōn*:	Probably both:
	Single ship:	675 kms:	after the battle to the third day, ca 42-54 hours:
		Report of victory:	6.75-8.6 knots:
		High:	
Po, V.110.5:	Macedonian:	*Sasō* island:	slightly adverse:
216 B.C.E.:	Philip V:	Kephallēnia:	Probably both:
	100 *lemboi*:	305 kms:	"on the second day" (1-1.5 days):
		Fleeing Romans:	4.6 - 6.9 knots:
		Highest:	
L, XXVI.19.11, 42.6:	Roman:	Mouth of the Ebro:	Slightly favourable:
	Publius Cornelius Scipio jr:	Cartagena:	Probably both:
209 B.C.E.:	30 quinquiremes:	475 kms:	"On the seventh day" (6-6.5 days):
		Coasting, accompanying land forces:	1.65 - 1.8 knots
		Low:	

[531] We acknowledge that interpretation of the ancient and medieval reports is problematical and our own may be subject to challenge. Distances have been rounded to the nearest five kilometres.

(Table 7 continued)

Aw	Anonymous, *African war*	L	Livy, *Ab urbe condita*
App	Appian, *Civil wars*	Lu	Lucan, *Civil war*
Bc	Anonymous, *Breve chronicon*	Pl	Plutarch, *Dion*
C	Caffaro, *De liberatione*	Po	Polybios, *Histories*
D	Doanidu, "Ἡ παραίτησις Νικολάου τοῦ Μουζάλωνος"	Pr	Prokopios, *History of the wars*
		RL	Pryor, "Roger of Lauria"
DS	Diodōrus Siculus, *Bibliothēkē historikē*	SL	Dotson, "Simone Leccavello"
		Th	Thucydides, *Peloponnesian War*
H	Herodotos, *Histories*	The	Theophanēs, *Chronographia*
Ip	*Itinerarium peregrinorum* (Stubbs)	X	Xenophōn, *Hellenika*

Source:	Fleet:	From:	Current:
Date of voyage:	Commander:	To:	Oars or sails:
	Composition:	Approximate distance:	Time taken:
		Voyage objective:	Approximate average speed
		Degree of haste:	

Part A: Voyages before generally favourable prevailing winds

L, XXIX.27.6-8:	Roman:	*Lilybaion*:	Neutral:
204 B.C.E.:	Publius Cornelius Scipio jr:	Cape Bon:	Sails:
		145 kms:	1 day (24 hours):
	50 quadriremes and quinquiremes, 400 transports:	Invasion:	3.25 knots:
		Moderate:	
L, XLV.41.3:	Roman:	Brindisi:	Slightly adverse:
167 B.C.E.:	Lucius Aemilius Paulus:	Corfu:	Probably both:
		225 kms:	9 Roman hours (10.5 hours):
	Not stated:	Opening campaign:	
		Moderate:	11.6 knots
App, II.89:	Roman:	Rhodes:	Neutral:
48 B.C.E.:	Julius Caesar:	Alexandria:	Sails:
	Unknown number of triremes:	565 kms:	Three days:
		Opening campaign:	4.2 knots:
		Moderate:	
A, 2:	Roman:	*Aponiana*:	Neutral:
47 B.C.E.:	Julius Caesar:	*Africa*:	Sails:
	"a fast ship and a few warships":	155 kms:	"After the fourth day" (3-3.5 days):
		Opening campaign:	
		Moderate:	1.0-1.15 knots:
Lucan, IX.1004-5:	Roman:	Troy:	Neutral:
48, B.C.E.:	Caesar:	Alexandria:	Probably sails:
	Not stated:	1210 kms:	7 days:
		Opening campaign:	3.9 knots:
		Moderate:	

(Table 7 continued)

Aw	Anonymous, *African war*	L	Livy, *Ab urbe condita*
App	Appian, *Civil wars*	Lu	Lucan, *Civil war*
Bc	Anonymous, *Breve chronicon*	Pl	Plutarch, *Dion*
C	Caffaro, *De liberatione*	Po	Polybios, *Histories*
D	Doanidu, "Ἡ παραίτησις Νικολάου τοῦ Μουζάλωνος"	Pr	Prokopios, *History of the wars*
		RL	Pryor, "Roger of Lauria"
DS	Diodōrus Siculus, *Bibliothēkē historikē*	SL	Dotson, "Simone Leccavello"
		Th	Thucydides, *Peloponnesian War*
H	Herodotos, *Histories*	The	Theophanēs, *Chronographia*
Ip	*Itinerarium peregrinorum* (Stubbs)	X	Xenophōn, *Hellenika*

Source:	Fleet:	From:	Current:
Date of voyage:	Commander:	To:	Oars or sails:
	Composition:	Approximate distance:	Time taken:
		Voyage objective:	Approximate average speed
		Degree of haste:	

Part A: Voyages before generally favourable prevailing winds

The, A.M. 6026:	Byzantine:	*Kaukana*:	Neutral:
533:	Belisarios:	*Kephalē Brachous* [via Malta]:	Probably sails:
	Not stated, but included 90-92 dromons:	400 kms:	"On the third day" (2-2.5 days):
		Invasion force:	3.6-4.5 knots:
		Moderate:	
Pr, III.25.21:	Vandal:	Cagliari:	Neutral:
534:	Tzazōn:	African coast:	Probably sails:
	Unspecified νῆες:	210 kms:	"on the third day" (2-2.5 days):
		Responding to news of Vandal defeat:	1.9 - 2.35 knots:
		Highest:	
D, p. 119:	Byzantine:	Constantinople:	Slightly adverse:
1107:	Not known:	Cyprus:	Sails:
	Possibly an imperial dromon:	1370 kms:	10 days:
		To take up archbishopric:	3.1 knots:
		Moderate:	
C, p. 102:	Genoese:	Genoa:	Neutral:
1097:	Not known:	*St Symeon*:	Probably both:
	12 *galeae* and a *sandanum*:	3540 kms:	Approx. 4 months from mid July to around 20 November:
		First Crusade:	
		High:	
			Approx. 0.65 knots
Ip, II, 26-31:	English:	Messina:	Neutral:
1191:	Richard Cœur de Lion:	Limassol:	Probably mainly sails:
		2175 kms:	
	Some Mediterranean *galeae*:	On Crusade:	21 days at sea (20-20.5 days):
		High:	
			2.4 knots:

(Table 7 continued)

Aw	Anonymous, *African war*	L	Livy, *Ab urbe condita*
App	Appian, *Civil wars*	Lu	Lucan, *Civil war*
Bc	Anonymous, *Breve chronicon*	Pl	Plutarch, *Dion*
C	Caffaro, *De liberatione*	Po	Polybios, *Histories*
D	Doanidu, "Ἡ παραίτησις Νικολάου τοῦ Μουζάλωνος"	Pr	Prokopios, *History of the wars*
		RL	Pryor, "Roger of Lauria"
DS	Diodōrus Siculus, *Bibliothēkē historikē*	SL	Dotson, "Simone Leccavello"
		Th	Thucydides, *Peloponnesian War*
H	Herodotos, *Histories*	The	Theophanēs, *Chronographia*
Ip	*Itinerarium peregrinorum* (Stubbs)	X	Xenophōn, *Hellenika*

Source:	Fleet:	From:	Current:
Date of voyage:	Commander:	To:	Oars or sails:
	Composition:	Approximate distance:	Time taken:
		Voyage objective:	Approximate average speed
		Degree of haste:	

Part A: Voyages before generally favourable prevailing winds

Ip, II, 26-28:	French:	Messina:	Neutral:
1191:	Philip II:	Acre:	Probably mainly sails:
	Some Mediterranean *galeae*:	2495 kms:	On the 22nd day (21-21.5 days):
		On Crusade:	
		High:	2.65 knots:
Bc, p. 898:	Sicilian:	Brindisi:	Neutral:
1228:	Frederick II:	Limassol:	Probably mainly sails:
	40 *galeae*:	1930 kms:	On the 24th day (23-23.5 days):
		On Crusade:	
		High:	1.85-1.89 knots:
Average under sails:			*2.85 knots*
Average under sails and oars:			*4.3 knots*
Overall average:			*3.45 knots*

Part B: Voyages with neutral prevailing winds

Th, III.36.2-3, 49.2-4:	Athenian:	Piraeus:	Mostly neutral:
	Unknown:	Mytilēnē:	Oars:
427 B.C.E.:	Single *triērēs*:	380 kms:	24 hours:
		Rescind command to put prisoners to death:	7.7. knots?:
		Highest:	
Pl. XXV.2:	Athenian:	Zakynthos:	Neutral:
357 B.C.E.:	Diōn:	Cape Passero:	Probably both:
	32 *triakontoroi* and 3 sailing ships:	885 kms (by the open sea):	"on the 13th day" (12-12.5 days):
		Invasion force:	1.0 – 1.05 knots:
		Probably high:	

(Table 7 continued)

Aw	Anonymous, *African war*	L	Livy, *Ab urbe condita*
App	Appian, *Civil wars*	Lu	Lucan, *Civil war*
Bc	Anonymous, *Breve chronicon*	Pl	Plutarch, *Dion*
C	Caffaro, *De liberatione*	Po	Polybios, *Histories*
D	Doanidu, "Ἡ παραίτησις Νικολάου τοῦ Μουζάλωνος"	Pr	Prokopios, *History of the wars*
		RL	Pryor, "Roger of Lauria"
DS	Diodōrus Siculus, *Bibliothēkē historikē*	SL	Dotson, "Simone Leccavello"
		Th	Thucydides, *Peloponnesian War*
H	Herodotos, *Histories*	The	Theophanēs, *Chronographia*
Ip	*Itinerarium peregrinorum* (Stubbs)	X	Xenophōn, *Hellenika*

Source:	Fleet:	From:	Current:
Date of voyage:	Commander:	To:	Oars or sails:
	Composition:	Approximate distance:	Time taken:
		Voyage objective:	Approximate average speed
		Degree of haste:	

Part B: Voyages with neutral prevailing winds

DS, XX.49.1-50.6:	Egyptian:	*Kition*:	Neutral:
306 B.C.E.:	Ptolemy I Soter:	Salamis of Cyprus:	Probably oars:
	140 *pentēreis* and *tetrēreis*, 200 transports:	80 kms:	Probably by night (10 hours):
		Approach to battle:	
		High:	4.35 knots:
Po, III.41.4-5:	Roman:	Pisa:	Slightly favourable:
218 B.C.E.:	Publius Cornelius Scipio snr:	Marseilles:	Probably both:
		420 kms:	On the fifth day (4-4.5 days):
	60 νῆες:	Coasting voyage:	
		Probably low:	2.1 – 2.35 knots:
Po, V.2.11:	Macedonian:	*Lechaion*:	Neutral:
218 B.C.E.:	Philip V of Macedon:	Patras:	Probably oars:
		130 kms:	By night (10 hours):
	Not stated:	In transit:	6.95 knots
		Probably low:	
Pr, III.13.22:	Byzantine:	Zakynthos:	Neutral:
531:	Belisarius:	Mt Etna:	Probably both:
	Not stated:	755 kms:	"on the 16th day" (15-15.5 days):
		Opening campaign:	
		Moderate:	1.1 - 1.135 knots:

Average under oars:	*6.33 knots*
Average under oars and sails:	*1.46 knots*
Overall average:	*3.9 knots*

(Table 7 continued)

Aw	Anonymous, *African war*	L	Livy, *Ab urbe condita*
App	Appian, *Civil wars*	Lu	Lucan, *Civil war*
Bc	Anonymous, *Breve chronicon*	Pl	Plutarch, *Dion*
C	Caffaro, *De liberatione*	Po	Polybios, *Histories*
D	Doanidu, "Ἡ παραίτησις Νικολάου τοῦ Μουζάλωνος"	Pr	Prokopios, *History of the wars*
		RL	Pryor, "Roger of Lauria"
DS	Diodōrus Siculus, *Bibliothēkē historikē*	SL	Dotson, "Simone Leccavello"
		Th	Thucydides, *Peloponnesian War*
H	Herodotos, *Histories*	The	Theophanēs, *Chronographia*
Ip	*Itinerarium peregrinorum* (Stubbs)	X	Xenophōn, *Hellenika*

Source:	Fleet:	From:	Current:
Date of voyage:	Commander:	To:	Oars or sails:
	Composition:	Approximate distance:	Time taken:
		Voyage objective:	Approximate average speed
		Degree of haste:	

Part C: Voyages against generally unfavourable prevailing winds

Th, VIII.101:	Peloponnēsian:	Chios:	Slightly favourable:
411 B.C.E.:	Mindaros:	*Rhoiteion*:	Oars:
	73 νῆες (presumably *triēreis*):	235 kms:	Approx. 32.5 hours:
		Approach to battle of *Kynos sēma*:	3.9 knots:
		High:	
Xh, I.1.13:	Athenian:	*Parion*:	Slightly adverse:
410 B.C.E.:	Alcibiades:	*Proikonnēsos*:	Oars:
	86 *triēreis*:	55 kms:	By night (10 Hours):
		Approach to battle of Kyzikos:	3.05 knots:
		High:	
DS, XIII.49.2-51:	Athenian:	*Heleous*:	Mostly adverse:
410 B.C.E.:	Alcibiadēs:	*Proikonnēsos*:	Oars:
	not stated:	145 kms:	By night (10 hours):
		Approach to battle of Kyzikos:	7.8 knots:
		High:	
Pl, XXV.4-5:	Athenian:	Gulf of Sidra:	Adverse:
357 B.C.E.:	Diōn:	*Hērakleia Minōa*:	Probably oars:
	32 *triakontoroi* and 3 sailing ships:	1130 kms:	Five days:
		Invasion force:	5.1 knots:
		Moderate:	
DS, XX.6.1:	Syracusan:	Syracuse:	Generally neutral:
310 B.C.E.:	Agathoklēs:	Libya:	Probably both:
	60 νῆες:	645 kms (via Nth coast of Sicily):	Till dawn on the seventh day (6-6.5 days):
		Invasion force:	
		Probably high:	2.23-2.415 knots:

(Table 7 continued)

Aw	Anonymous, *African war*	L	Livy, *Ab urbe condita*
App	Appian, *Civil wars*	Lu	Lucan, *Civil war*
Bc	Anonymous, *Breve chronicon*	Pl	Plutarch, *Dion*
C	Caffaro, *De liberatione*	Po	Polybios, *Histories*
D	Doanidu, "Ἡ παραίτησις Νικολάου τοῦ Μουζάλωνος"	Pr	Prokopios, *History of the wars*
		RL	Pryor, "Roger of Lauria"
DS	Diodōrus Siculus, *Bibliothēkē historikē*	SL	Dotson, "Simone Leccavello"
		Th	Thucydides, *Peloponnesian War*
H	Herodotos, *Histories*	The	Theophanēs, *Chronographia*
Ip	*Itinerarium peregrinorum* (Stubbs)	X	Xenophōn, *Hellenika*

Source:	Fleet:	From:	Current:
Date of voyage:	Commander:	To:	Oars or sails:
	Composition:	Approximate distance:	Time taken:
		Voyage objective:	Approximate average speed
		Degree of haste:	

Part C: Voyages against generally unfavourable prevailing winds

L, XXXI.23.4:	Roman:	Cape Sounion:	Adverse:
200 B.C.E.:	Gaius Claudius Cento:	*Chalkis*:	Probably oars:
		130 kms:	By night (10 hours):
	20 *triremes*:	Approach to engagement:	6.95 knots:
		Moderate:	
L, XLII.48.9:	Roman:	Straits of Messina:	Slightly adverse:
171 B.C.E.:	Gaius Lucretius Gallus:	Kephallēnia:	Probably both:
		690 kms:	On the fifth day (4-4.5 days):
	40 quinquiremes:	In transit:	
		Moderate:	3.45 – 3.9 knots:
A, 92:	Roman:	*Utica*:	Neutral:
46 B.C.E.:	Julius Caesar:	Cagliari:	Probably oars:
	Not stated:	250 kms:	"after the third day" (2-2.5 days):
		Returning to Rome:	
		Moderate:	2.25 - 2.80 knots:
RL, 196	Aragonese/Sicilian:	Messina:	Generally adverse:
1285:	Roger of Lauria:	Barcelona:	Mostly oars:
	Galleys:	1770 kms:	Approx. 30 days:
		Urgent recall:	Approx. 1.45 knots:
		Highest:	
SL:	Genoese:	Cape Skillaion:	Generally adverse:
1351	Simone Leccavello:	Chios:	Probably oars:
	Single galley:	320 kms:	24-30 hours:
		Carrying dispatches: high:	6.35-7.94 knots:

Average under oars	*4.75 knots*
Average under oars and sails	*3.0 knots*
Overall average	*4.4 knots*

(Table 7 continued)

Part D: Overall averages	
Average under oars in all conditions	*5.2 knots*
Average under sails in all conditions	*2.85 knots*
Average under sails and oars in all conditions	*3.8 knots*
Overall average in all conditions	*3.8 knots*
Average for voyages of 24 hours or less	*6.5 knots*
Average for voyages of 2-5 days	*3.6 knots*
Average for voyages of 6-20 days	*2.2 knots*
Average for voyages of more than 20 days	*1.8 knots*

inadequate to make headway against 16-knot breezes. On 1 August 1988, during the first circumnavigation of Poros island by *Olympias*, rowing into a wind of 20-25 knots at 20˚ off the starboard bow, waves of up to one metre meant that the *thalamian* oars could not be used and the conditions were estimated to be just about the limit for the *zygian* oars. Occasional larger waves seriously disrupted the stroke.[532]

Thucydides reported that in the lead-up to the first battle of Naupaktos in 430 B.C.E., the oarsmen of the Athenian fleet under Phormiōn were unable to recover their oars when the waves became choppy because they were ill trained. Against this, according to Polybios, at the battle of the *Aegates* islands in 241 B.C.E., the Roman admiral Gaius Lutatius Catulus successfully took the Roman fleet to sea against the wind in a heavy chop trusting in the skill of his crews, who he had drilled throughout the summer at *Lilybaion*.[533]

Rowing into head winds against any sort of a sea would have exhausted crews before many hours. On one occasion in 1992 the crew of *Olympias* could sustain a speed of three knots against headwinds gusting up to 25 knots for only 70 minutes before the crew became exhausted.[534] No doubt the hardened crews of classical *triēreis*, Byzantine dromons, and medieval *galeae* could perform better than that, but by how much?

We conclude with some observations on the performance attained by *Olympias* under oars during sea trials in 1988 when manned by a

[532] Coates, et al., *Trireme trials*, p. 45.
[533] Thucydides, *Peloponnesian war*, II.84.3 (vol. 1, p. 416); Polybios, *Histories*, I.60.9 (vol. 1, p. 166).
[534] Coates and Morrison, “Sea trials”, p. 139.

crew of cadets from the Hellenic Navy Petty Officers' Academy: fit young men but with little experience as oarsmen. After three weeks' training, on Saturday 9 June on the first leg of a voyage around the Saronic Gulf the crew managed a speed of 3.0-3.2 knots under oars for four hours in seas with a gentle zephyr breeze of four knots at 30° off the port bow. The crew also had to be resupplied with water from a tender because their consumption increased beyond what they had taken with them. On July 13 in Tselevinia Strait a sprint under oars was attempted when the wind dropped to a mere one knot. The ship attained 7.2 knots for a short while. On 14 July rowing against a headwind of 3.3 knots, which increased to 12 knots after one hour and 35 minutes, the ship covered 21.5 kilometres in 4 hours, 45 minutes at an average speed of 2.8 knots using only one of the three banks of oars but alternating the oarsmen. On July 17 the ship sailed from *Epidauros*. Commander Platis's "log" reports:

> On Sunday the 17th of July at 6.30 the ship sailed for the last leg of the Saronic Gulf voyage from *Epidaurus* to Poros. Poor [i.e., adverse] wind conditions prevailed for the most part of this leg, where the ship was rowed by two files [banks] of oars [the thranite and zygian oars] for four hours, reaching an average speed of 3.5 knots. In one part of this voyage we had a wave height [trough to crest] of 0.8 metres from the bow [i.e., the wind was ahead] and useful observations about rowing conditions *in rough water* [sic] were made.
>
> It was really difficult for the oarsmen to synchronize their stroke along the length of the ship since there were sections of the ship where the oars were catching water since they were at the crest of a wave while at other sections the oars were in the air being at the trough of a wave. The speed under these circumstances was reduced to about two knots.[535]

Commander Platis concluded that the ship proved to be safe within the conditions for which it was designed; that is, in wave heights of up to about one metre.

In 1990 *Olympias* made a voyage under oars of 26 kilometres from Ververouda to Tolo into a very light wind about 60° off the starboard bow in four hours, 45 minutes at an average of 3.4 knots. During the return voyage from Tolo to Poros three days later the best that the crew could manage in light breezes, sometimes using both oars and sails, was 52 kilometres in 6 hours, 48 minutes at an average of 4.2 knots. The ship had to be taken in tow to make its destination by

[535] Platis, "Greek crew trials", p. 343. We have emended tacitly commander Platis's English grammar and expression. Eplanations in square brackets are our own.

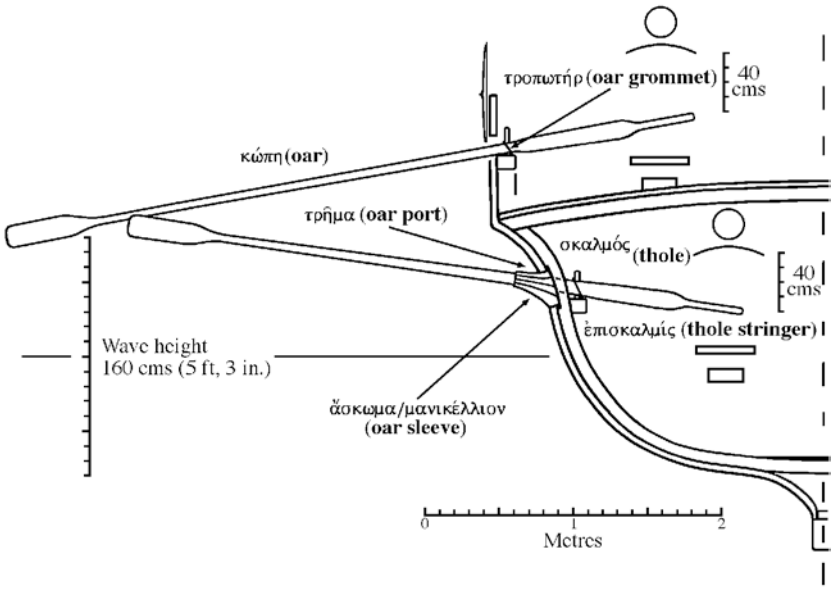


Figure 42
The oars of a dromon of the era of the Macedonian emperors, drawn in the middle of the return stroke at 67° to the centre line.
© John H. Pryor

nightfall.[536]

Over any extended period of time the best that *Olympias* could accomplish under oars, even in virtually millpond conditions, was around 3-4 knots. Even in what by the *Beaufort Scale* are at worst light to moderate breezes ahead, speed under oars was reduced to around two knots.

Our conclusions may appear to stretch the limits of credibility. What sort of a ship was it that was capable of what appears to have been such minimal performance and yet was a renowned warship at the front-line of the defence of the Empire for centuries? The simple answer, of course, to reiterate, is that ships designed for a specialized purpose, to pack the maximum punch in battle in calm sea conditions, would not have been suitable for other purposes. Would an emperor wanting to send a message from Constantinople to *Chersōn* in October, or a *stratēgos* of the *Kibyrrhaiōtai* at Antalya wanting to send a message to Constantinople in March, use a dromon? We think

[536] Shaw, "Voyage and speed trials", pp. 40, 42.

not. They would have used sailing ships capable of riding the waves and holding the sea in rough weather and of pointing into the wind on a tack. There can be no doubt that dromons were superb for the purposes for which they were designed. They would not have become and remained for centuries the battle galleys *par excellence* of the Empire had they not been. But that purpose was for battle and battle alone. No wonder that Leo VI recommended that a *stratēgos* should take his fleet out to engage the enemy only in calm conditions.[537]

According to the fourth part of the *Theophanēs continuatus*, probably written by Theodore Daphnopatēs, who should have known, when Rōmanos II proposed to send an expedition to Crete under Nikēphoros Phōkas in 960 resistance to the proposal in the Senate was only overcome by the *parakoimōmenos* Joseph Bringas, who urged that the length of the journey should not be feared.[538] In the tenth century even a voyage from Constantinople to Crete was regarded as a long-range expedition, a major undertaking, for a large fleet. Naval warfare was a matter of coasting for very limited distances and developing strategies which combined possession of the coasts and islands with what naval forces could achieve as regards control of coastal sea lanes. Even though we do not believe that the *Stadiodromikon* for the Cretan expedition of 949 actually reflected passages from mooring to mooring, it is nevertheless significant that no passage mentioned was longer than around 115 kilometres and above and beyond all other considerations it was access to fresh water supplies which determined that this should have been so.[539]

Supplies of fresh water were vitally important because it was the "fuel" which drove any galley. Unless a galley could use its sails, it would come to a stop within hours if its water ran out because dehydration would quickly enfeeble the oarsmen. Human beings have very poor resistance to dehydration. Naval forces had to provide for fresh water and provisions in advance or ensure that they could obtain them *en route*, and water could be a precious commodity in many parts of the Mediterranean during summer. Few ports in the Eastern Mediterranean were on large rivers and many had no river at all and were dependent upon wells. Some did not even have those; for example, Methōnē, which depended on cisterns. Moving into waters

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[537] Appendix Two [a], §31. Cf. Appendix Five, §29.

[538] *Theophanes continuatus*, VI.Βασιλεία Ρωμανοῦ υἱοῦ Κωνσταντίνου τοῦ πορφυρογεννήτου.9 (p. 475): "... καὶ μὴ δεδιέναι τῆς ὁδοῦ τὸ μῆκος καὶ ...". On Theodore Daphnopatēs see above p. 188, n. 62.

[539] See above pp. 264-6.

off enemy shores deprived fleets of water unless they could take it by force, which was usually not easy to do since most significant coastal water sources had been incorporated into fortified habitations. "Foraging" for water from small streams in deserted coves or wells in isolated villages taken over by force might be possible, even if dangerous, for single ships or small flotillas, but such sources would be inadequate for large fleets.

Galeae replaced dromons and *chelandia* in the late eleventh century in the West almost certainly because it was discovered that bireme galleys could be rowed from two bench positions above deck rather than from two superimposed benches. Among other problems overcome would have been that of ventilation of the hold. Fifty oarsmen working below deck would have emitted large amounts of body heat, carbon dioxide and impurities, and sweat, even if there were no horses aboard. Removal of this and replacement of oxygen would have required forced ventilation.

In human beings only around 24% of the potential energy stored in fuels in the body is converted to mechanical work. The remainder is expended as heat. In the *Daedalus* Project, which culminated in a man-powered flight of four hours from Crete to Thēra, it was calculated that the pilot would need to produce approximately 3-3.5 watts of mechanical power per kilogram of body weight, which would require 14.6 watts per kilogramme of fuel oxidation and this would require 44 millilitres of oxygen per minute per kilogramme. It was calculated that the 68-kilogramme pilot with a mechanical efficiency of 24% would produce about 13 watts per kilogramme of metabolic heat, around 900 watts, of which around 225 was in the form of work and the remaining 675 watts needed to be dissipated.[540]

Coates calculates that men working hard and producing a maximum of 400 watts on the oar breathe out 100 litres of air a minute containing 4-4.5% carbon dioxide and that their thermal efficiency as heat engines is about 20%. They produce about 1,500 watts of heat which must be removed by evaporating water in the lungs and sweating at up to two litres an hour. A normal workload of 150 watts requires removal of only around 600 watts of heat, with a corresponding reduction in sweat. Extrapolating from Coates's calculations, to ventilate the 50 men of the lower oarcrew of a dromon, each working at about 150 watts on the oars, 5 cubic metres of air would have to be drawn into and expelled from the ship's hull

[540] Nadel and Busolari, "Daedalus project", pp. 351, 359.

every minute to keep the concentration of carbon dioxide down to a practicable upper limit of 2%. But, in the very humid conditions aboard, about 5 times that amount would be needed to get rid of the evaporating sweat; total 25 cubic metres per minute, 1,500 per hour. Men working at 150 watts in still air can maintain the rate for only around a half an hour but for much longer in moving air. Because of the low height in the hold, about 8 square metres of entry area and a little more exhaust area would have been needed and there would have had to have been forced ventilation.[541] Merely having hatches of that area in the deck would not force fresh air down into the hold. The sea trials of *Olympias*, have shown that even though that ship does not have a full deck and is open to the sky at the centre line, ventilation at the level of the lowest bank of oars, the *thalamian* oars, is "barely adequate".[542] In a dromon or any galley with both a full deck and also a bank of oarsmen below deck there must have been forced ventilation of the hold by some contrivances such as windsails and/or cowls.

In fact Coates's estimates would probably have been too low. If we consider the need to maintain the level of carbon dioxide plus impurities including water vapour at no more than 0.06% so that the lower oarsmen could work effectively for an extended time, then using De Chaumont/Smith's equation, according to which human beings expel 0.6 cubic feet of carbon dioxide plus impurities per hour, as opposed to the 3 cubic feet of horses, each man would have required 85 cubic metres of fresh air per hour.[543] Fifty men would have required 4,250 cubic metres of fresh air per hour and the volume in the hold of a dromon, calculated at around 140 cubic metres would have had to have been changed completely around 30 times an hour.

Oarsmen working hard would have needed large amounts of water. Estimates of the amount of water crews require have been revised upwards dramatically in the past few decades and around eight litres per day for galley crews is increasingly supported by a range of evidence from antiquity through to the seventeenth century.[544] The *Informationes pro passagio transmarino* of Marseilles of 1318

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[541] See Morrison, *Greek and Roman oared warships*, pp. 286, 326.

[542] See Coates and Morrison, "Sea trials", p. 140; Morrison, et al., *Athenian trireme*, pp. 238, 274.

[543] See De Chaumont, "On ventilation", p. 1031.

[544] Earlier estimates of water requirements, as low as four pints (2.25 litres) per day, are now regarded as hopelessly inadequate. See Sleeswyk and Meijer, "Water supply of the Argo", pp. 133-5; Dotson, "Economics and logistics"; Pryor, *Geography, technology, and war*, pp. 75-85; idem "From dromōn to *galea*", p. 114; idem, "Geographical conditions", p. 210.

specified 3.75 *millayrole* (238 litres) of water per man for 60 days: 4 litres per day.[545] This was for men who were passengers only and must therefore have been a bare minimum.

During sea trials of *Olympias* in June-July-August the oarsmen sweated profusely and needed a litre of water per hour, just for drinking, to prevent dehydration.[546] During the *Daedalus* project, one litre of water an hour was needed by a man producing 210 watts for four hours. The consumption rate was 0.005 litres/watt.hour.[547] So an oarsman producing 150 watts per hour for 8 hours, a sustainable figure if there was adequate ventilation, would need 6 litres of water for drinking alone. To that one should add another two litres per man per day for other needs, especially for the the soupy stew of salt meat and legumes that was the staple accompaniment to biscuit in the diet of medieval crews. On French galleys of the seventeenth century the allowance was 7 litres per man per day. Eight litres per day is also an accepted requirement for troops in moderate work.[548]

If we consider the standard *ousia* of 108 men of Byzantine dromons or *chelandia*, the water requirement can be expected to have been a minimum of 108 x 8 = 864 litres per day. It would be reasonable to increase that to at least 1,000 litres or one tonne of water per ship per day when officers and marines are taken into account. And this would be to discount supernumeraries, dromons with two *ousiai*, and the various higher figures for crews discussed above. One tonne of water per day may be expected to have been an absolute bare minimum for galleys moving under oars in summer for eight hours a day, although such a figure would obviously vary according to whether the sky was overcast, whether there was a cool breeze,

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[545] De Boislisle, "Projet de Croisade", pp. 253-4.

[546] Coates and Morrison, "Sea trials", p. 138; Rankov, "Reconstructing the past", p. 138. Cf. Platis, "Greek crew trials", p. 340; Morrison, et al., *Athenian trireme*, p. 238.

During a passage in a calm on a very hot afternoon on 4 August 1988, the *thalamian* oarsmen of *Olympias* suffered particularly badly from the heat and dehydration during a pull under oars of some 4.5 miles down the east side of Poros island. See Coates, et al., *Trireme trials*, p. 46.

[547] See Nadel and Bussolari, "Daedalus project". Cf. Morrison, *Greek and Roman oared warships*, pp. 326-7. But note that in the *Daedalus* project the pilot's water was loaded with 10% glucose and 0.4 grammes per litre of sodium. Without these additives, pure water alone would not have permitted the pilot to sustain the flight. One wonders whether ancient and medieval oarsmen learned to add very small amounts of seawater to their drinking water, or whether they simply gained the salt they needed from the salted meat and fish which was part of the normal diet. The replacement of the glucose, however, would not have been so easy.

[548] See Burlet, et al., "Comment pouvait-on ramer", pp. 152-3; Wolseley, *Soldier's pocket-book*, p. 95.

whether sails could be used, and a host of other factors. The lower oarsmen of dromons, rowing in an enclosed space below deck, would undoubtedly have consumed more water than those above deck and probably more than even the *thalamian* oarsmen of *Olympias*.[549]

That for ships to run out of fresh water at sea was common is suggested by two tales included in the *Spiritual meadow* of John Moschos. In the first, an anchorite named Theodore, bound for Constantinople by ship, turned sea water into fresh when supplies ran out. In the second, a pious *nauklēros*, ship master, bound for Constantinople, prayed for rain for four days to relieve the distress of crew and passengers who had foolishly exhausted their water supplies. He was rewarded by a shower confined to the area of the ship, whose course the cloud followed.[550] The author probably intended these ships to be understood to have been sailing ships and if such distress could be occasioned by their running out of water, the dimensions of the problem must have been infinitely greater for galleys.

In 306 B.C.E. the Macedonian fleet, under the command of the later king Dēmētrios I Poliorkētēs, sailed from Gaza for Egypt. Caught by a storm off an inhospitable and enemy-controlled shore, it was forced to ride it out at anchor off the harbourless *Kasion*, which was only about 140 kilometres from Gaza. By then they were already out of water. Diodōros Siculus did not say how many days they were at sea, but the short distances involved suggest that the fleet was carrying only very limited water supplies.[551] In the twelfth century, Fulcher of Chartres reported that in 1126 a Fāṭimid fleet raiding the shipping lanes and coasts of the Kingdom of Jerusalem ran out of water off Beirut and the crews were forced to land to try to fill their "buckets", *situle*, from springs and streams. They were cut to pieces by forces from Beirut and forced to evacuate and flee towards Cyprus, no doubt to try to water in some deserted cove.[552]

When Genoa was at war with Mamlūk Egypt in 1383, Pietro Piccono was sent with four galleys on an embassy from Famagusta to Beirut on 31 July, arriving on 2 August, around tierce. Being asked to wait some days for a response but his request for reprovisioning being

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[549] Rankov reports that when rowing *Olympias* the ship was hotter and stuffier the lower down in it an oarsman was, even though *Olympias* did not have a full deck, and that the *thalamian* oarsmen also suffered from a shower of sweat from the oarsmen above them. See his "Reconstructing the past", p. 138. Cf. Morrison, et al., *Athenian trireme*, p. 238.

[550] John Moschos, *Spiritual meadow*, §§173, 174 (coll. 3041, 3041-4).

[551] Diodōrus Siculus, *Bibliothēkē historikē*, XX.74.1-3 (vol. 10, pp. 338-40).

[552] Fulcher of Chartres, *Historia Hierosolymitana*, III.56 (pp. 804-5).

refused, he left and tried to take on water somewhere 10 miles from Beirut but was repulsed. He was compelled to take it on at the *Nahr al-Ibrāhīm*. Although again refused by the Muslim authorities, he took the water by force and returned to Famagusta, arriving on 4 August around tierce. Piccono's report on what happened, dictated at Famagusta on 4 August, especially his report on the Muslim authorities' refusal to allow him to water anywhere, was confirmed in a report of his superior Niccolò Maruffo to the Doge of Genoa on 5 September. Ashtor and Kedar explain Piccono's behaviour in attempting to water by force as an attempt to provoke a *casus belli*, considering that his galleys could not possibly have run out of water in such a short time.[553] However, Beirut is about 240 kilometres south-east of, and down-wind from, Famagusta. Piccono's galleys had taken two days and a few hours to reach Beirut, most probably using their sails. But 2 August was occupied with negotiations with the governor of Beirut and it was midsummer and the return could be expected to have to be made under oars against head winds once away from the coast and the diurnal south-westerly sea breezes. Piccono would have to count on at least two and, to be safe, three or four days to return to Famagusta. By the fourteenth century there is no doubt that Western galleys could carry water for at least five days and probably more if necessary, but whether Piccono's galleys were carrying maximum supplies is another question. They were not on campaign but rather on an embassy. It is quite possible that by 2 August Piccono no longer had sufficient water to be confident about the return voyage and this may explain his actions. As it eventuated, he appears to have made the return voyage as quickly as the outward one, which was fortuitous to say the least.

The weight of fresh water must have been a real problem. Thirteenth-century Sicilian galleys, the earliest for which we have construction details, had only around 50 centimetres freeboard amidships and one tonne of water would sink them by a centimetre or so.[554] No more than a quarter or so of their 40 tonnes of deadweight tonnage could have been used for water because of the weight of the food, armaments, equipment, spare gear and myriad other essentials required. The weight of the crews would have been another 10 tonnes or so. Later evidence from Genoa suggests that light war galleys could carry between 4 and 8 tonnes of water. An inventory for the galley of

[553] Ashtor and Kedar, "Una guerra", pp. 14-16, 38-9, 40.
[554] Pryor, "From dromōn to galea", pp. 112-3.

Simone Leccavello undertaking a long voyage to the Aegean in 1351 specified 54 water *barili*, each of 79.5 litres, total 4.3 tonnes.[555] Three other inventories of 1400 and 1402 specified 70 *barili* (5.5 tonnes), 72 *barili* (5.7 tonnes), and 48 *barili* (3.8 tonnes).[556] The highest figure known to us is for 10 galleys of a fleet equipped at Savona in 1476 carrying on average 99.8 Genoese *barili* each: 7.9 tonnes.[557]

Our estimate of the deadweight tonnage of the smaller Byzantine dromons is only around 29.5 tonnes, of which around 8.5 tonnes would be the weight of the oar crew, the *ousia*, alone. It is extremely improbable that they could have carried much more than around 4.5-5 tonnes of water, enough for no more than four days or so if moving under oars, more if the sails were being used, less if carrying more than a single *ousia*.

It is no wonder that Syrianos Magistros, followed by Nikēphoros Ouranos recommended that not only *stratēgoi* but also each and every ship in a fleet should have aboard seamen familiar with the coasts and where fresh water could be obtained. As Nikēphoros wrote:

> It is appropriate for a *stratēgos* to have with him men who have accurate knowledge and experience of the sea in which he is sailing, which winds cause it to swell and which blow from the land. They should know both the hidden rocks in the sea, and the places which have no depth, and the land along which one sails and the islands adjacent to it, the harbours and the distance such harbours are the one from the other. They should know both the countries and the water supplies;[558] for many have perished from lack of experience of the sea and the regions, since winds frequently blow and scatter the ships to one region and another. And it is appropriate that not only the *stratēgos* should have men with this knowledge we have discussed but also each and every ship should have someone knowing these things to advise well when appropriate.[559]

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[555] Archivio di Stato di Genova, Antico Comune, Galearum introytus et exitus, No. 690. Reference courtesy of M. Balard.

[556] Musso, "Armamento", pp. 39-41, 41-3, 43-6, 59-60, 71-6.

[557] Varaldo, "Inventario", p. 91.

[558] Nikēphoros Ouranos and Syrianos Magistros almost certainly meant "fresh water" by ὕδατα (*hydata*). The knowledge required was that of where to obtain precious fresh water, rather than that of the "waters"; i.e., the seas.

[559] Nikēphoros Ouranos, *Ek tōn taktikōn*, §119.1.1-3 (p. 93), (checked by us against the manuscript, Oxford, Bodleian Library, MS. Baroccianus Graecus 131): "῾Αρμόζει τὸν στρατηγὸν ἔχειν μεθ᾽ ἑαυτοῦ τοὺς γινώσκοντας ἀκριβῶς τὴν πεῖραν τῆς θαλάσσης εἰς ἣν πλέει, τὸ ποῖοι ἄνεμοι κυμαίνουσιν αὐτὴν καὶ τὸ ποῖοι φυσῶσιν ἀπὸ τῆς γῆς· ἵνα δὲ γινώσκωσι καὶ τὰς κρυπτομένας πέτρας εἰς τὴν θάλασσαν καὶ τοὺς τόπους τοὺς μὴ ἔχοντας βάθος καὶ τὴν παραπλεομένην γῆν καὶ τὰς παρακειμένας αὐτῇ νήσους, τοὺς λιμένας καὶ τὸ πόσον ἀπέχουσι οἱ τοιοῦτοι λιμένες εἷς ἀπὸ τοῦ ἄλλου· ἵνα δὲ γινώσκωσι καὶ τὰ χωρία καὶ τὰ ὕδατα· πολλοὶ γὰρ ἐκ τοῦ ἔχειν ἀπειρίαν τῆς θαλάσσης

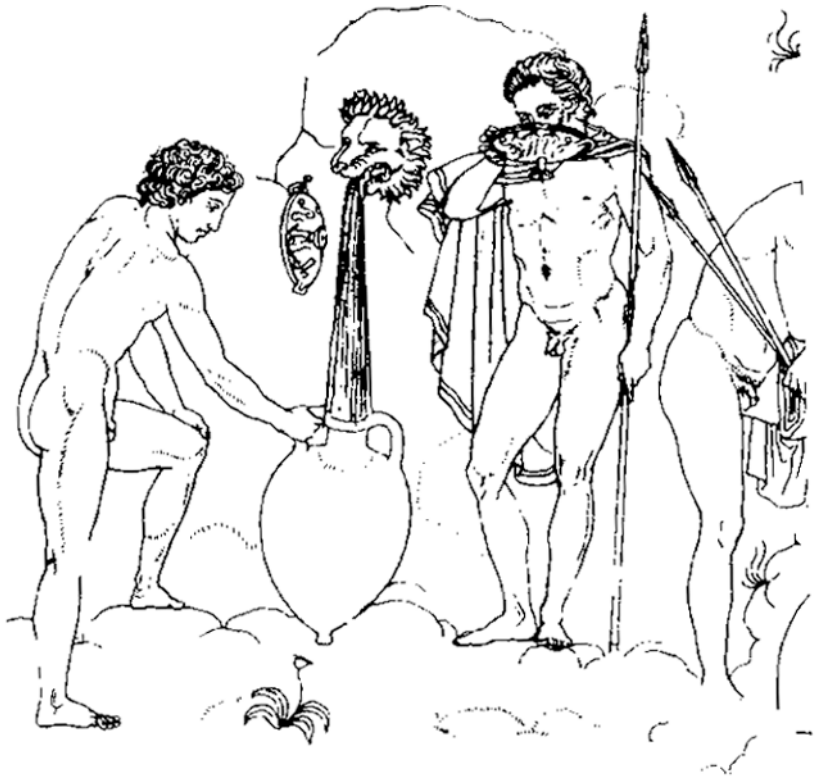


Figure 43
The *cista Ficoronica*: Jason and the Argonauts watering at the spring of the Bebrycians.

Some evidence suggests that Greek *triēreis* did not actually carry water supplies at all for more than the duration of a single passage.[560]

In what containers did Byzantine galleys carry their water supplies, if any? It is curious that neither amphorae nor barrels were mentioned by Leo VI or Nikēphoros Ouranos. However, according to one of the inventories for the Cretan expedition of 949, the Department of the

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καὶ τῶν τόπων ἀπώλοντο, ἐπειδὴ φυσῶσι πολλάκις ἄνεμοι καὶ σκορπίζουσι τὰ πλοῖα εἰς ἄλλον καὶ ἄλλον τόπον. Καὶ ἁρμόζει ἵνα μὴ μόνον ὁ στρατηγὸς ἔχῃ τοὺς γινωσκοντας ὅπερ εἴπαμεν, ἀλλὰ καὶ ἓν ἕκαστον πλοῖον ἵνα ἔχῃ τὸν ταῦτα γινώσκοντα, πρὸς τὸ βουλεύεσθαι καλῶς τὸ συμφέρον.". Cf. Appendix One, §5.1-3.

[560] Herodotos, *Histories*, 8.22 (vol. 4, p. 20); Thucydides, *Peloponnesian war*, VI.34.5, 42.1 (vol. 3, pp. 246, 260). See also Morrison, et al., *Athenian trireme*, pp. 95, 102.

Eidikon should have provided 100 κάδοι (*kadoi*) for 20 dromons.[561] There is no doubt that *kadoi* were amphorae for water supplies in classical Greece. Those depicted on the "*cista Ficoronica"* of ca 300 B.C.E., in a representation of Jason and the Argonauts watering at the spring of the Bebrycians, are estimated to have weighed around 18 kilogrammes for a capacity of 27 litres.[562] Sleeswyk and Meijer provide no authority for their estimate of the capacity of the *kadoi* of the *cista Ficoronica*. However, they are almost certainly correct. It seems that amphorae with a capacity of around 25-28 litres, weighing dry around 15-17 kilogrammes, for a total weight of 40-45 kilogrammes, were at the limit of what a single man could lift and carry on his shoulders, given their awkward shape.[563]

The water *pithos* found in the seventh-century Yassı Ada wreck was larger than these but had no handles and was not portable.[564] It was designed to be installed in place and then filled. The *kadoi* of the *cista Ficoronica* had two handles so that they could be carried and ergonomic considerations would have limited how large they could have been. The five *kadoi* per dromon that the inventory for the 949 expedition to Crete allowed could have contained no more than around 135 litres and it would not have mattered much what century was in question, a mythological Greek past or the tenth century C.E., they could not possibly have been main storage vessels for water.

There is no other mention in the inventories of amphorae which might have been for water and the only items which might possibly have had the sense of "barrels" were 30 bronze βουτία (*boutia*) listed among things provided by the Department of the *Vestiarion basilikon* to the *droungarios tou ploimou* for the 949 expedition.[565] The word

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[561] See Appendix Four [b], §III.20 [= Haldon, "Theory and practice", p. 227; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 671)].

[562] Sleeswyk and Meijer, "Water supply of the Argo", p. 133.

The "*cista Ficoronica*" is a bronze water urn from *Praeneste*, south-east of Rome, dated to the second half of the fourth century B.C.E. and of Greco-Etruscan workmanship. It was acquired by the antiquarian Francesco Ficoroni in 1738. It is now in the Villa Giulia museum of Etruscan antiquities in Rome, Inv. N° 24787. See Dohrn, *Ficoronische ciste*.

[563] See Wallace, "Amphora capacities"; Wallace Matheson, "Rhodian amphora capacities"; Peacock and Williams, *Amphorae and the Roman economy*, Table 1 (p. 52).

[564] Bass and Van Doorninck, *Yassi Ada. Volume I*, pp. 186-8.

Unfortunately no estimation of the contents, volume, and weight of the *pithos* was made when it was reconstructed from the fragments found and the director of the museum at Bodrum then put it on display in the open air, where it promptly disintegrated and had to be thrown away.

[565] See Appendix Four [b], §VII.21 [= Haldon, "Theory and practice", p. 233; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 677)].

boutia may have been a form of βοῦτζι (*boutzi*) or βοῦττις (*bouttis*) later used for a barrel. However, since these *boutia* were made of bronze, they were obviously not water barrels. They were probably buckets.

By the tenth century it is probable that Byzantines were still using amphorae as water containers but may well have begun to use barrels also. There is a reference in a Cairo *geniza* letter dated to the middle of the eleventh-century, associated with the Maghribin merchant Nahray ben Nissīm, who had settled in Egypt, to buckets which held the equivalent of "half a Byzantine barrel".[566] Here the Arabic word used for a "barrel" was *bty* [*battiya/bittiya/buttiya*]. It is clear that by that period Byzantines were well known to use barrels. How much earlier than this they had been doing so is unclear; however, the tenth-century *Parangelmata poliorkētika* attributed to Hērōn of Byzantium has at folio 7v a clear picture, the earliest known to us, of a barrel, even though the author had no word, or at least no classical word, for the object. The caption to the illustration reads "cylindrical vessel", αγγεῖον κυλινδρικ[όν] (*angeion kylindrik[on]*).[567]

It is true that the selective and incomplete nature of the inventories for the Cretan expeditions preserved in the *De cerimoniis* means that their failure to mention either barrels or amphorae cannot be regarded as hard evidence that neither were in fact used for water supplies. Nevertheless, it leaves open the possibility that there may have been some other kind of water containers. In the inventories for the Cretan expedition of 949, it was specified that the Department of the *Eidikon* should supply for 20 dromons: "5 sheets of lead each for the

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Reiske translated the 100 κουβάρια (*koubaria*) also mentioned in the inventories as *cupae*, casks or barrels. However, as we have seen above, these were almost certainly not barrels but rather reels or windlasses of some sort associated with the mooring cables. See above p. 214 and n. 154.

[566] Goitein, *Mediterranean society*, p. 321.

The letter is in the Taylor-Schechter collection of Cambridge University Library, MS. TS 12.241. It is written in Judaeo-Arabic, medieval Arabic written in Hebrew script. The relevant lines are recto 6-7, transliterated as follows: "... n'ml fy 'l'nbb' b'lnwb' kmsyin dlw w'ldlw 'ldy ystq' bh nṣf bty' rwmy' ...", translated as "... we laboured at bailing by turns of fifty buckets and each bucket holds half a Byzantine barrel ...". The Arabic *dlw* meant a "bucket", bty' a "barrel", and *rwmy'* "Roman" or "Byzantine". We are indebted to Mr. Ben Outhwaite of the Taylor-Schechter Unit of Cambridge University Library for his assistance.

[567] Hērōn, *Parangelmata poliorkētika*, §5 (pp. 36-7 and fig. 1). The anonymous author described barrels as: "... καὶ οἷα τὰ ἐκ σανίδων κυκλοτερῶς συνηρμοσμένα καὶ δεσμοῖς ἔξωθεν περιειλημμένα τὰ πρὸς ὑποδοχὴν οἴνου γινόμενα ἐλαίου τε καὶ παντὸς ὑγρου· ..." ("... and the kind [of thing] ‹made› of planks fitted together in a circle and surrounded with bands on the outside which are for storage of wine and oil and every liquid, ...").

καλυμβόματοι (*kalymbomatoi*), total of 100 sheets, weighing 3,000 *litrai*" and also "20 hides for the καλυβόματοι". Elsewhere another inventory recorded that the Department of the *Eidikon* supplied for the *kolymbomatoi* of the *chelandia* of the fleet: "5 sheets of lead each, 100 sheets, that is 3,000 *litrai*".[568] This may have been merely a repetition of the specification for the dromons revealing the confusion between *chelandia* and dromons. Many more than 20 *chelandia* were involved.

Ka(o)ly(m)bomatos is an unknown word, for which many meanings have been suggested, including sheathing for the hull. However, this makes no sense. Five sheets of lead per dromon would be of no use for a hull except, perhaps, for patching.

We have several reasons for this opinion. First, the lead sheathing found on the Kyrenia wreck of the fourth-century B.C.E., a small merchant ship only around 15 metres long, weighed over 1,200 kilogrammes.[569] Secondly, the 150 Byzantine *litrai*, which the five sheets of lead weighed, were equivalent to only around 48 kilogrammes. One kilogramme of lead has a volume of approximately 84 cubic centimetres, 48 kilogrammes of 4,032 cubic centimetres. Now, the lead sheathing found on ancient wrecks was normally one to two millimetres thick.[570] It is almost impossible that Byzantine technology would have been capable of producing sheet lead less than one to two millimetres in any case. Taking the lowest conceivable figure for the thickness, one millimetre, the 48 kilogrammes of lead would cover an area of only 4.32 square metres. Obviously, sheets of lead measuring only around 4 square metres cannot have been used for sheathing hulls. Thirdly, as we noted above,[571] sheathing of hulls with lead appears to have disappeared from the end of the first century C.E. None of the later wrecks so far excavated had it. Fourthly, why would anyone sheathe with lead the hull of a warship, which above all required a light hull for speed and manœuvrability in battle? Enough lead to sheathe the hull of a dromon some 30 metres long and 3.8 metres in the beam would weigh a great deal and would sink the hull in the water considerably, slowing the ship down commensurately.[572] Our calculation suggests that over two tonnes of lead would have been

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[568] Appendix Four [b], §§III.1-2, VI.28 [= Haldon, "Theory and practice", pp. 227, 233; Constantine VII, *De cerimoniis*, II.45 (vol. 1, pp. 671, 676)].

[569] See Hocker, "Lead hull sheathing", p. 200.

[570] See Hocker, "Lead hull sheathing", p. 197; Blackman, "Hull sheathing"; Blavatsky and Peters, "Donuzlav wreck", p. 25; Steffy, "Kyrenia ship", pp. 83-4; Fitzgerald, "The ship", p. 168.

[571] See above pp. 147-9 and n. 69.

[572] Cf. Morrison, et al., *Athenian trireme*, p. 186.

needed. Fifthly, the following entry in the inventory also specified twenty hides for the *kaly(m)bomatoi*. But no one would ever have wrapped the underwater hull of any warship in hides. They would have soaked up water and slowed the ship immeasurably.

Reiske associated *kaly(m)bomatos* with καλύβη (*kalybē*), a hut, suggesting that it was the commander's berth and that the lead and hides were to roof it and protect its sides in battle. However, in fact *krabatos* was used for the berth. It is possible that the inventorist was employing a non-technical term; however, why would he do so when the rest of the inventory was replete with technical terminology? It is certainly probable that in battle the commander's berth would have been protected in some way but noone would use a metal as weak but heavy as lead for this. Bronze, or virtually any other metal, would have been far better for the purpose. Moreover, the area that the 48 kilogrammes of lead would have covered at one millimetre thickness would have been only around 2 by 2 metres. And, in any case, a lead roof only one millimetre thick would not withstand much of an impact. Any javelin falling from a height would go straight through it. Even at, say, two millimetres thickness, it would provide little defence against heavy missiles and this would reduce the area protected to a mere 2.016 square metres. Reiske's suggestion is extremely improbable, and in fact *krabatoi* were almost certainly made of wooden frames with cloth tent coverings, as discussed above.[573]

We believe that Haldon has provided the clue to understanding *kaly(m)bomatos*. He suggests that the word should be κολυμβόματον, derived from κόλυμβος (*kolymbos*), for a well or sump, and may thus have referred to a lead sump in the ship's bilges.[574] A passage in one of the *Miracles* of St Artemios, a miracle which was probably written down in its surviving form between 658 and 668, although possibly as late as ca 692-700, referred to a ship's carpenter who repaired a problem with a ship's keel at the place where there was a κόλυμβος (*kolymbos*).[575] The root κολύμβ-, when combined with various suffixes, had reference to "swimming", "diving", "drawing water",

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[573] See Constantine VII, *De cerimoniis*, vol. 2, p. 794. Cf. above pp. 215-16 & n. 156.

[574] See Haldon, "Theory and practice", pp. 277-8.

[575] Crisafulli and Nesbitt, *Miracles of St Artemios* , miracle 27 (p. 153): "ἦν δὲ πρὸ ὀλίγου τὸ πλοῖον, ἐν ᾧ ἔπλεεν, ὑπομεῖνάν τι κατὰ τὴν τρόπιν, καὶ ἔτυχεν κατελθεῖν αὐτὸν τὸν νοσοῦντα κολύμβῳ καὶ ποιῆσαι ὅπερ ἔχρηζεν τὸ πλοῖον.".

The original composition of the collection of miracles of St Artemios may go back to the late fourth to early fifth centuries, and with that the use of the word *kolymbos*.

etc. A κολυμβήθρα (*kolymbēthra*) could be a "swimming place", "vat", "cistern", "reservoir", or even a "baptismal font". This is surely the clue. A *kaly(m)bomatos* must have been a tank of some sort.

What sort of tank could be made from five sheets of lead and a hide? Five sheets of lead suggest a open-topped tank. The hide may have been used to cover the top at sea in order to prevent spillage.

We conclude that *kaly(m)bomatoi* may have been water tanks. There is support for an hypothesis of water tanks being built from lead in Moschiōn's account of the great ship of Hierō II of Syracuse as preserved by Athēnaios of Naukratis. According to Athēnaios, Moschiōn wrote that: "There was an enclosed water tank at the bow, holding 20,000 *metrētai*, constructed from planks and pitch and cloth. Alongside it was constructed from lead sheets and planks an enclosed fish-rearing [tank]; ...".[576] Although it was the fish tank rather than the water tank which was constructed of lead, obviously the fish tank also held water and there is therefore no reason why a water tank for drinking purposes could not have been constructed in the same way. A lead water tank, possibly part of a bilge-pump system, was found on the Chiessi wreck of ca 60-85 C.E. off Elba.[577]

If the lead was hammered out to a thickness of one millimetre, supported by a wooden frame, the 4.032 square metres of sheet lead could make a tank around 90 by 90 by 90 centimetres, or any variation of that, containing around 730 litres of water. For crews of around 108 oarsmen, this would have provided a water supply of around 6.75 litres per man, around a daily allowance. If it was also shared by the officers and marines, then the allowance would obviously have had to have been less. A figure of this order may have been just about right if dromons moved for seven to eight hours per day on their voyage to Crete. We hypothesize that a *kaly(m)bomatos* was a lead-lined tank with a hide "lid", containing a day's water supply for the oarsmen.

The only other hypothesis conceded as a real possibility for the meaning of *ka(o)ly(m)bomatos* is a tank or "sump" in the hold from where bilge water was pumped out, or by extension a pump itself. Wooden ships always had limbers, or limber holes, cut in the underside of the floor timbers near the centre line to allow bilge water to drain down to the lowest point, where there was a well, or sump, or

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[576] Athēnaios of Naukratis, *Deipnosophistae* (Gulick), 5.208 (vol. 2, p. 440): "ἦν δὲ καὶ ὑδροθήκη κατὰ τὴν πρῷραν κλειστή, δισχιλίους μετρητὰς δεχομένη, ἐκ σανίδων καὶ πίττης καὶ ὀθονίων κατεσκευασμένη. παρὰ δὲ ταύτην κατεσκεύαστο διὰ μολιβδώματος καὶ σανίδων κλειστὸν ἰχθυοτροφεῖον· ...".

[577] Parker, *Ancient shipwrecks*, p. 301.

bilge box which could be pumped dry. However, there is a considerable amount of archaeological evidence for chain pumps and bilge sumps surviving from antiquity and the early Middle Ages and in all cases the pumps and sumps were wooden. That being said, there is also evidence for lead evacuation tanks at the heads of pumps above deck, connected to lead pipes which may have served to drain bilge water off to one side or the other as the deck happened to be canted at any time.[578] These are always found in the upper strata of the wrecks, frequently on top of the cargo, indicating that they have fallen down from above when the deck finally collapsed. They are never found in the lowest strata at the keel. It is possible that the lead for the *ka(o)ly(m)bomatoi* may have been intended for this purpose.

Nevertheless, we prefer the association of *kaly(m)bomatoi* with water tanks rather than bilge pumps firstly because we cannot imagine what the hides could have been used for if the latter was the case and secondly because there were perfectly well known words in Greek for pumps: κοχλίας (*kochlias*) for an Archimedes' screw-pump and ἀντλητήριον (*antlētērion*) for a bilge pump or bilge bucket.[579]

There is no mention in the Byzantine sources related to the Cretan expeditions or naval warfare of anything that might have been a water skin, such as βύρσα (*byrsa*), φλάσκη/φλασκίον (*phlaskē*/*phlaskion*), or ἀσκός/ἀσκοδαῦλα (*askos*/*askodaula*) and no way of estimating what their contents may have been even if there was.[580]

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[578] Carre and Jézégou, "Pompes à chapelet"; Foerster-Laures "Bilge and pump"; Parker, *Ancient shipwecks*, pp. 143, 204, 237, 247, 373; Santamaria, "L'épave Dramont", pp. 171-4.

[579] The dictionary definitions invariably give "bucket" rather than "pump". However, pump fits the context of many of the passages in question much better than bucket, as it does also for the Latin equivalent: *sentinaculum*. Jal appreciated that the word might mean a pump. See Casson, *Ships and seamanship*, p. 176; Carre and Jézégou, "Pompes à chapelet", p. 136; Jal, *Glossaire nautique*, p. 146.

The term also appears to have been understood as a "water raiser" in the Greek-Latin *Cyril* glosses of London, British Library, Ms. Harley 5792 in Goetz, *Glossarii Latini*, vol. 2, p. 231, l. 5: "Αντλητηριον [h]auritorium [sic]". See "Note on citations of Greek and Latin glossaries", p. lxix above.

[580] Βύρσα and ἀσκός were both classical words for wine or water skins. Ἀσκοδαῦλα is found in two Byzantine contexts which suggest that it may have been a word for water skins. In the first it is found as ἀσκοδάβλαι in the *Praecepta imperatori Romano bellum cogitanti ... observanda* amongst a list of equipment in the imperial wardrobe when on campaign. See Constantine VII, *Three treatises*, Text C (p. 106). The word is not qualified there, although Haldon does translate it as water-skins, but in the *Taktika* of Leo VI it is quite clear that ἀσκοδαῦλα referred to water skins. See Leo VI, *Taktika* (Vari), XII.123 (vol. 2, p. 99): "Χρὴ οὖν καὶ ἐν ἡμέρᾳ τοῦ πολέμου ἕκαστον στρατιώτην ἐν ταῖς σέλλαις αὐτῶν ἐπιφέρεσθαι ὕδωρ εἰς τὰ λεγόμενα φλασκία, καὶ παξαμάτιν ἐν τῷ σελλοπουγγίῳ, ..." ("And then in time of war each soldier ought to have on his saddle, water in the so-called *phlaskia*, and biscuits in his

On bireme dromons stowage of water, as well as its weight, must have been a problem. With two files of oarsmen below deck, where could water have been stowed? A 245 litre (54 gallon) capacity barrel would have a diameter at its pitch of 28 inches (71 centimetres), a head diameter of 23 inches (58.5 centimetres), a height of 36.5 inches (92.5 centimetres), and would occupy a cylindrical space of around 370 litres.[581] The only place in the hold of a dromon where barrels such as that could have been stowed would have been on the floor down the centre-line, but that space would surely have had to be reserved for the long spare gear that had to be carried: rudders, oars, yards, even masts.[582] Such gear could obviously not have been carried above deck on a warship, unless it was abandoned before battle.

In the case of galleys such as dromons with files of oarsmen below deck, in addition to the possibility of a lead water tank, we are driven to the conclusion that oarsmen carried their own water supply in a *kados*, or small barrel, or perhaps a skin. The ability to carry much larger amounts of water in a centralised water supply would in fact have been another huge advantage that the *galea* would have had over galleys like dromons when it was developed in the West towards the end of the eleventh century. If oarsmen had their own small amphora, barrel, or skin, it would explain why these are not mentioned in the Cretan inventories. They may have supplied them themselves.

The dimensions of the *kadoi* of the *cista Ficoronica* estimated by Sleeswyk and Meijer at 27 litres capacity were approximately 39 centimetres in diameter and 62 centimetres in height. The dimensions of Hellenistic Rhodian amphorae with a capacity of around 25-26 litres were approximately 35 centimetres in diameter and around 77.5 centimetres high, slightly narrower and somewhat taller.[583] For what follows we have used the shape of the *kadoi* of the *cista Ficoronica*; however, a shape closer to that of the Rhodian amphorae would make no difference to the argument. For a capacity of 27 litres, such *kadoi* would weigh around 45 kilogrammes when full and would occupy a cylindrical space of around 75,000 cubic centimetres, 0.075 cubic metres, or 75 litres. Their efficiency in terms of capacity to space occupied would have been only in the order of 0.36:1. Their dry

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saddle bag."). For "τὰ λεγόμενα φλασκία" some manuscripts have "τὰς λεγόμενας ἀσκοδαῦλας/ἀσκοδάβλας", so the word was an alternative to φλάσκη/φλασκίον for a wine- or water-skin.

[581] Kilby, *Cooper*, p. 61.

[582] See Appendix Two [a], § 5.

[583] See Wallace Matheson, "Rhodian amphora capacities", esp. pp. 295-6.

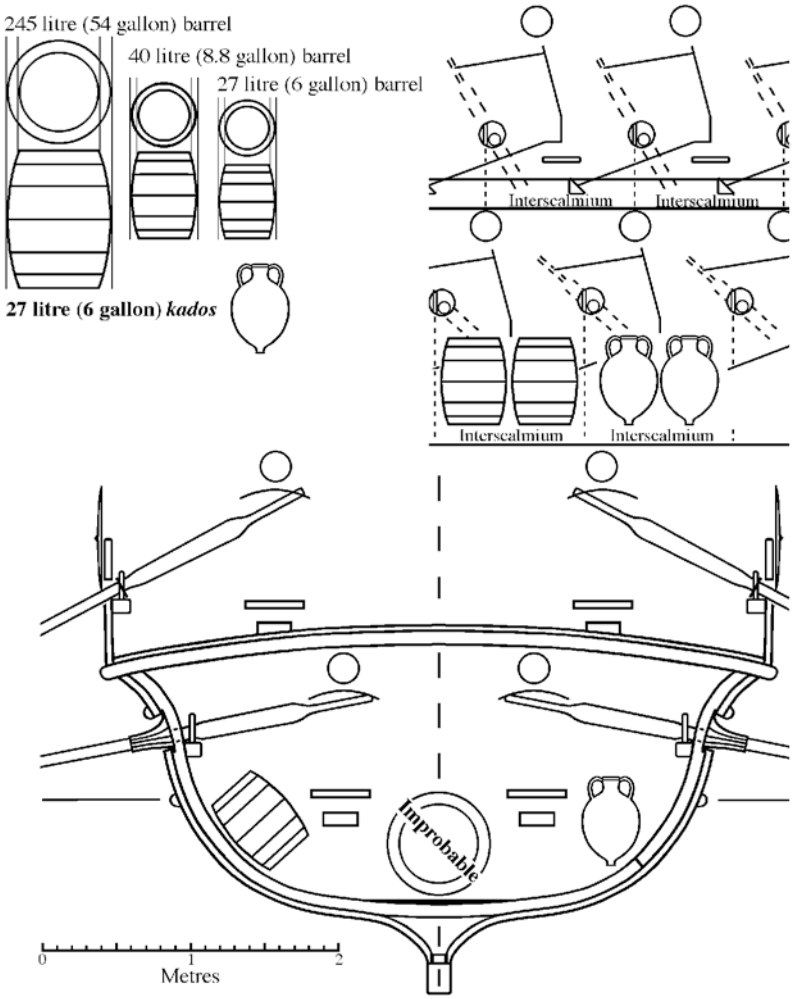


Figure 44
Stowage of barrels or amphorae aboard a bireme dromon of the era of the Macedonian emperors.
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weight to capacity ratio was around 1:1.5.

Barrels would have been much more efficient than *kadoi*. It is tempting to associate an optimum size for a small portable barrel with that of the Genoese *quartarolo* (39.75 litres) or the Neapolitan *barile* (43.625 litres). Barrels much larger than 40 litres capacity would have

been too heavy and large to be handled by one man in any case. Forty litres is also about double the size of a normal bucket and well buckets larger than that and weighing over 20 kilogrammes would become difficult to handle.

Forty litres would have weighed 40 kilogrammes, plus around 10 kilogrammes for the weight of the barrel. The barrel would have measured approximately 35.5 centimetres across the head, 45 centimetres in diameter at the pitch, and 53 centimetres in height.[584] A man could not get his arms around anything much bigger than that to lift it in any case. Such a barrel would have occupied a cylindrical space of around 84,000 cubic centimetres, 84 litres, for an efficiency rating of capacity to space occupied of 0.48:1. Barrels would also have been much more efficient than amphorae in terms of dry weight to capacity, between 1:3.5-4.5, in this case 1:4.

It would have been just possible to stow two 27-litre *kadoi* or two 40-litre barrels alongside the thwarts of the oarsmen of the lower bank between them and the hull, two for each oarsman. Half of the barrels or *kadoi* may well have been stowed similarly above deck for the oarsmen of the upper bank but obviously they could not have stayed there during battle and there must have been room to stow them below if necessary. Either that or they were jettisoned before battle.

The only logical conclusion to the problem of the water supply of dromons, a supply which then governed their cruising range, is that they may have been able to stow away around 100 40-litre barrels weighing around 5 tonnes when full or around 100 27-litre amphorae weighing around 4.5 tonnes. This would give a *dromon* a minimum range under oars in summer using one tonne of water per day of 3-4 days. With an average speed in favourable conditions of around 4 knots and an average of around 14 hours of daylight during mid-summer campaigning seasons, 3-4 days' water supply would have given Byzantine fleets a range of no more than 330 kilometres under oars. All things would have been variable of course. Conditions would have made all the difference, as also would have using the sails when possible, cool weather, and human enduranceand skill. Fleets could also have proceeded by night if out to sea away from coasts and islands or if the skies were clear and the moon was full or even if the need was great. But in normal circumstances, Byzantine fleets could not have ranged much more than around 330 kilometres under oars and in daylight without watering. If packed to the gunwales with

[584] Kilby, *Cooper*, p. 61.

supernumeraries as for the assaults on Crete, that figure would have to have been lowered. In fact we conclude that the 400 kilometres from *Phygela* to *Chandax* would almost certainly have been beyond the range of Byzantine fleets under oars and in daylight. Either they watered at Naxos or Ios, which has a better harbour and better water supplies for a large fleet, or they used their sails and also sailed by night. In fact Ios has a large anchorage sheltered from the *meltemi* and capable of accomodating any medieval fleet, with shallows at the head of the inlet ideal for beaching galleys and a small stream. It would probably have been the best final *aplēkton* before the dash to Crete.

The water requirements of horses would have added to the problems of those of the men and in themselves are sufficient to explain why the Byzantines never attempted to transport horses to Crete from Constantinople but rather brought them overland to south-west Asia Minor. Even carrying only the 12 horses that Theophanēs the Confessor recorded, a horse-transporting *chelandion* would have needed another 290 litres per day for the horses, adding around another tonne of water for a voyage of around 3-4 days and requiring 25 more 40-litre barrels or 37 more 27-litre *kadoi*, all of which would have had to have been stowed somewhere.

On the basis of the specifications for the amount of wheat, flour, and barley to be supplied for the Cretan expedition of 911 from the *themata* of *Thrakēsiōn*, *Anatolikon*, and *Kibyrrhaiōtai*, and the numbers of troops and horses specified for the same, Haldon has calculated that the troops might have been supported for around 18-24 days and the horses for between 18 and 28. He suggests that it is probable that Byzantine naval expeditions operated on a standard of carrying supplies for no more than around 24 days, which was similar to that for expeditions by land.[585] This may well have been the case, at least for short-range expeditions, but naval expeditions would certainly have had to have watered much more frequently than this.

Consider what the problems of water supplies must have really involved. The size of the fleet of 949 has been the subject of great debate.[586] It does not matter a great deal here since our conclusions stand irrespective of the exact size of the fleet, nevertheless we present our own interpretation. According to the inventories, the imperial fleet numbered a total of 150 *ousiai;* however, many of these,

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[585] Haldon, "Theory and practice", pp. 294-300.

[586] See Appendix Four [b], §§I.1-15 [= Haldon, "Theory and practice", pp. 218-21; Constantine VII, *De cerimoniis*, II.45 (vol. 1, pp. 664-5)]. See also, in particular, Makrypoulias, "Navy"; Haldon, "Theory and practice", pp. 334-9.

as well as some ships, were delegated for other duties and did not sail to Crete. Most probably 33 *chelandia* of one *ousia*, 7 larger *pamphyloi*, and 20 dromons carrying two *ousiai* each, sailed from Constantinople. In addition, the *thema* of *Aigaion Pelagos* supplied 6 *chelandia pamphyla* of 120 men and 4 *chelandia ousiaka* of 108 men which may either have joined the expedition *en route* or have been sent to Constantinople as a home guard, depending on how the text is read.[587] Samos supplied 6 *chelandia pamphyla* of 150 men and 6 *chelandia ousiaka*. The *Kibyrrhaiōtai* supplied 6 *chelandia pamphyla* of 150 men and 6 *chelandia ousiaka* of 110 men. Nine *galeai* from Antalya and an unknown number from Karpathos also joined the fleet. Four *chelandia* also came from the Peloponnēsos. The total fleet destined for Crete probably numbered 20 dromons, 49 or 53 *chelandia* of one *ousia*, 19 or 25 larger *chelandia pamphyla*, and more than 9 *galeai*, as well as, perhaps, some sailing ships about which nothing is known. A minimum figure of some 95 ships is used below. The fleet was almost certainly larger than that, but the figure of 95 ships will make the argument perfectly well.

The number of men involved is even more arguable for the reason that the word *ousia* for a standard ship's complement did not include officers, supernumeraries, and marines or soldiers. It referred only to the oarsmen. Nor is the size of the crews of *galeai* specified anywhere; although they probably had half-complements of 54 oarsmen. We estimate the fleet to have had between 13,000 and 14,000 ordinary seamen, 13,500 for the sake of argument. For the purposes of logistical analysis, to those we would need to add the ships' officers, servants, and perhaps some deck hands, adding in the order of another 40 men per large ship and 20 per *galea* as suggested above.[588] Ignoring supernumeraries, troops and horses being

[587] The text as preserved in the Leipzig manuscript reads: "... ἐάθησαν εἰς φύλαξιν τῆς πόλεως οἱ στρατηγοὶ τοῦ Αἰγαίου πελάγους μετὰ χελανδίων παμφύλων ς΄ ἀνὰ ἀνδρῶν ρκ΄ καὶ χελανδίων οὐσιακῶν δ΄ ἀνὰ ἀνδρῶν ρη΄." ("... For the guard of the City, the *stratēgoi* of *Aigaion Pelagos* with six *chelandia pamphyla*, each of 120 men and 4 *ousiaka chelandia*, each of 108 men.").

There are some problems with the text as it stands, in particular why *Aigaion Pelagos* should have had more than one *stratēgos*, assuming that the plural is not just a scribal error for what should have been the singular. Haldon emends the text to read: "... ἐάθησαν εἰς φύλαξιν τῆς πόλεως οἱ στρατηγοὶ ‹τῶν πλοϊμοθεμάτων· ὁ στρατηγὸς› τοῦ Αἰγαίου πελάγους ...." ("... For the guard of the City, the *stratēgoi* ‹of the naval *themata*: the *stratēgos*› of the Aegean Sea ..."). See "Theory and practice", pp. 218-9. It is then unclear whether the squadron of *Aigaion Pelagos* sailed to Crete or went to Constantinople; although Haldon believes that the latter was the case. See "Theory and practice", p. 306.

[588] See above pp. 260-64.

transported, and the crews of any sailing ships which may have been involved, and assuming that non-oarsmen and the second *ousia* of each dromon required only half of a full water ration since they would not have been labouring like oarsmen, the fleet would have required between 110 and 120 metric tonnes of water per day, let us say 115.

No rivers anywhere en route were large enough for fleets to sail up them beyond the salt water zone so that they could water by lowering buckets overboard. Fleets were dependent on ports for water but in the tenth century most of these would have been merely sheltered roadsteads and developed port facilities few and far between. A fleet as large as this would have had to anchor offshore or, at best, come in by turns in small numbers to whatever docks existed. It is true, of course, that galleys could be beached. However, in the largely tideless Mediterranean, beaching galleys and then loading tonnes of water onto them would not be such a bright idea. The water would have had to have been taken aboard while the galleys were afloat. Moreover, we doubt whether any ports, even Constantinople, had reticulated water supplies fed to any docks that did exist. The earliest attempt to do this known to us was Genoa's building of an aqueduct along her docks during the thirteenth century. Water would have had to have been loaded manually by bucket into portable barrels or amphorae from wells, springs, or streams, and then transported to the ships. Admittedly, there were many men in the crews but that would be useful only if there were reasonably large streams. Only one barrel at a time can be filled from a well. Even of those places mentioned in the *Stadiodromikon* for the Cretan expedition of 949 which had at least some water, *Hērakleia*, *Proikonnēsos*, *Abydos*, *Tenedos*, Mitylēnē, Samos, Naxos, Thēra, and Dia all had either unsuitable anchorages or unreliable streams or were dependent on wells. Only Chios and Ios had good anchorages and reliable streams. *Phygela* was also ideal, having over two kilometres of gently shelving beach and a large stream running into the bay.[589]

When we consider questions of watering and of *aplēkta*, we also need to consider the requirements of a fleet. Even if they consider the spatial requirements at all, and most do not, historians write as though fleets could simply be parked like cars in a multi-storey carpark, bumper to bumper with just enough room between them to open the door. But, of course it was not like that. As reconstructed, standard dromons and *chelandia* were probably around 31.25 metres long. To

[589] See Pryor, "Σταδιοδρομικόν", p. 106.

anchor such ships in even shallow water, let us say 2 fathoms (12 feet, 3.66 metres), in order for the anchor to hold the ship, the cable(s) should make an average angle to the horizontal of no more than around 33˚, preferably less. As shown above, the cables were connected to the anchors by lengths of chain which lay flat on the sea bed and enabled the anchor flukes to hold, just as on modern small craft using rope cables.[590] That would mean that a clear circle of approximately 80 metres diameter would have to be allowed for the ship to swing in. Taking the figure of 95 ships for the fleet would mean that a commander would require a roadstead at least 7.6 kilometres long to anchor the fleet in a single line so that each ship could swing safely with the wind at its anchors. If the depth of the water was greater, then the required space would increase proportionately. At four fathoms he would need 8.9 kilometres. Of course, the commander could take a chance that all the ships would swing in unison, which in actuality ships never do, and cut the clearance to a radius of 40 metres, say 3.8 and 4.45 kilometres respectively, but he would have been foolish to do so in the season of the *meltemi*. It is not known in which month the fleet of 949 sailed; however, in 960 Nikēphoras Phōkas sailed from Constantinople in July,[591] right at the beginning of the *meltemi* season, which normally continues until mid September.

Even if each of the ships were moored midway between two anchors in order to cut down the distance they would swing, they would still need around 65 metres to swing in and the whole fleet would need around 6.2 kilometres. They could, of course, be moored bow and stern by laying out a stern anchor as well as the bow anchor, and that would eliminate all swing. However, mooring ships bow and stern is a hazardous practice because if the wind springs up fresh from abeam, the anchors will almost certainly drag. Mooring ships bow and stern with the inefficient anchors of the Middle Ages during the *meltemi* season in the Aegean would not have been recommended.

With its oars run out under way, a dromon would occupy a lateral distance of around 11 metres. So a mathematical minimum shore line to run the 95 ships ashore directly by the bow would be around 1.05 kilometres. However, they would almost certainly not be driven ashore by the bow but rather beached in the time-honoured Mediterranean manner. That is, a bow anchor would be dropped off

[590] See above p. 212.

[591] *Theophanēs continuatus*, VI.Βασιλεία Ρωμανοῦ υἱοῦ Κωνσταντίνου τοῦ πορφυρογεννήτου.10 (vol. 1, p. 475).

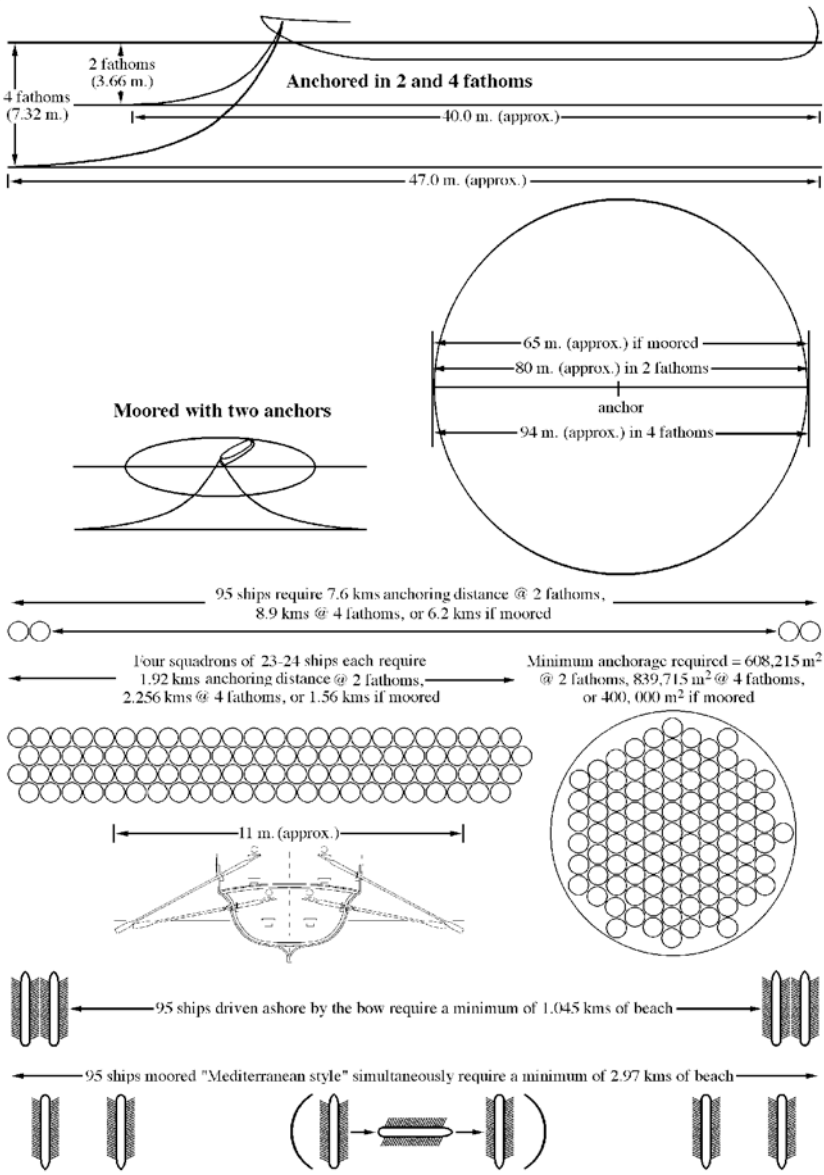


Figure 45
Anchoring, mooring, and beaching galleys.
© John H. Pryor

shore and the ships then rowed over it, reversed by backing water on one side, made ground by the stern by backing water, and made fast to land with a stern cable. That would make disembarking and embarking crews and loading supplies much easier, as well as being much better defensively in case of surprise attack. However, it would require much more length of beach, a mathematical minimum of 2.97 kilometres in order for the fleet to carry out the manœuvre simultaneously. The ships could be packed up more closely if they came in one at a time; however, that would stretch out inordinately the time needed to complete the manœuvre. Even a skilled crew would take a few minutes or so to complete it and a fleet of 95 ships would take many hours. Obviously no commander would order beaching in such a way except in the most confined geographical conditions which may have necessitated it.

Such mathematical minima are, of course, unrealistic. In practical conditions, having to contend with winds, waves, and currents and needing to allow reasonable clearance between adjacent ships, anchoring areas of perhaps 1-1.5 million square metres, mooring areas of perhaps around 750,000 square metres, or a beaching shore line of 4 or more kilometres would have been much more realistic.

If the fleet anchored in four squadrons, it would still have required 1.92 kilometres of shore line in 2 fathoms and 2.26 kilometres in 4 fathoms, or 1.56 kilometres in both if moored. A mathematically minimum space to anchor all 95 ships in a packed circle would be around 610,000 square metres in 2 fathoms and 840,000 in 4 fathoms, or 400,000 square metres in both if moored.

Both anchoring or mooring, and also watering, large fleets must have been both difficult and also laborious and time-consuming, except when a very long beach or large sheltered harbour with a substantial stream running into it was available. Chios, Ios, and *Phygela* would have been the most attractive *aplēkta* from a large fleet's logistical point of view.

However, by 949 the maritime *thema* of Samos with its own *stratēgos* was well established with its headquarters at *Kastron Samos*, modern Pythagorion, in the South-East corner of the island. Was this why Samos was included in the *Stadiodromikon*. Would Samos have been a suitable *aplēkton*? In fact the answer to this question is clearly negative. The entrance to the harbour is only around 365 metres across from Cape Foniás to the breakwater, although the natural harbour entrance is about 715 metres across. It is roughly circular with an inner radius of around 365 metres. The capacity is around 420,000

square metres, with an average depth of 3-4 fathoms, 5.5-7.3 metres. There is no way in the world that the entire fleet of 949 could have moored here and nor are the beaches around from the rocks at the northern point of the bay to the natural breakwater point anywhere near long enough to have beached all the ships; although, if some were beached and some moored, the fleet might just have been able to squeeze in. However, there was no sizable stream in the cove and in Roman times there had been an aqueduct bringing water to the town. It may have been still operative in the tenth century but that is not known for sure. If not, watering would have had to have been done from wells. *Kastron Samos* may have been a well-sheltered anchorage for a small squadron of a *thema*, but it was hopelessly inadequate as an *aplēkton* for a fleet such as that of 949. The problem of rotating the ships to get them close to the shore for watering would have been almost insurmountable.

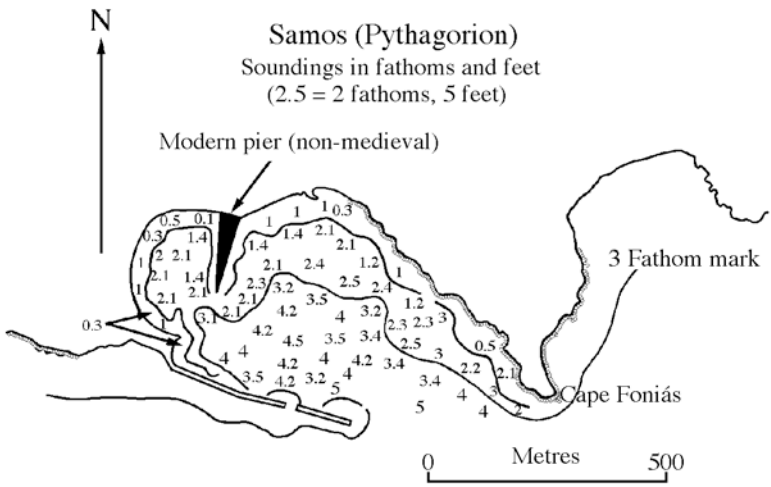


Figure 46
The harbour of *Kastron Samos*, adapted from Great Britain, Admiralty, Hydrographic Office, Chart N° 1568 of 1967.
© John H. Pryor

With portable *kadoi* of 27 litres or barrels of 40 litres, watering the crews of the fleet of 949 with 115 tonnes of water from wells would have needed around 4,250 *kados*-manlifts or 2,875 barrel-manlifts per

day. A supply of 345 tonnes for three days would have needed 12,750 *kados*-manlifts or 8,625 barrel-manlifts. Yes, there were large numbers of men in the crews, but they would all have to have taken their turn at limited access to springs, small streams, or wells.

How big were well buckets? Again there would have been an ergonomic optimum. The bigger and heavier the full bucket, the more men, or the longer the time, needed, to raise and empty it. An optimum size for a bucket may have been around 20 litres. A bucket with an internal diameter of 28 centimetres and a height of 32.5 would have a capacity of 19.7 litres and its size seems to be about right. If so, the number of well-lifts required would be double that of barrel-lifts. How long would 17,250 well-lifts in Samos harbour have taken?

These figures could be varied considerably without affecting the obvious conclusion. Watering large fleets must have been extremely laborious and time consuming and this helps to explain why extended expeditions were regarded as such monumental undertakings. In fact we believe that we barely begin to comprehend the enormousness of the logistics of galley warfare in the Middle Ages.

(m) *Armaments*

Dromons had an array of weapons, of which the most important were the flame-throwers (*siphōnes* or *siphōnia*), tubes from which Greek Fire could be projected. [See Appendix Six]

As well as the *siphonēs*, both Leo VI and Nikēphoros Ouranos referred to "cranes", γεράνια (*gerania*), shaped like a capital letter gamma, that is like a "Γ", which could turn on their upright post until the arm was over an enemy ship and then pour combustibles, either flaming pitch or the same "processed" fire, πῦρ ἐσκευασμένον (*pyr eskevasmenon*), used in the *siphonēs*, onto them.[592] Then they said that the combustibles were poured on the enemy ship when the μάγγανον (*manganon*) was turned or tipped. Presumably this was at the end of the arms of the cranes. *Manganon* was a word with many connotations

[592] Appendix Two [a], §67; Appendix Five, §61.

These *gerania* were quite probably the same things as the κηλώνεια (*kēlōneia*) mentioned by the author of the *Vita Basilii* in the *Theophanēs continuatus* as having been used by the *droungarios tou ploimou* Nikētas Ōoryphas to suspend alive Christian apostates captured in the fleet of the Muslims of Crete at the battle of the Gulf of Corinth in 879 before dropping them into cauldrons of boiling pitch. See *Theophanēs continuatus*, V.61 (p. 301). In classical Greek a κήλων (*kēlōn*) or *kēlōneion* was a pivoted swing beam.

in Byzantine military practice. Its original meaning was a block of a block-and-tackle. However, by extrapolation it appears to have become applied to many types of engines of war which used blocks-and-tackles. Perhaps it should be understood here as something like a hinged cauldron which could be tipped over by means of some trip mechanism operated from the post of the *geranion*. Whatever the case, *geranion* or γέρανος (*geranos*) had clearly become associated with pivoting cranes. In the *Peri mēchanēmatōn* attributed to Athēnaios Mēchanikos a machine referred to as a *karchēsion* was described. This had a pivoting arm named as a *geranos*, at the end of which was a hooked ladder for grappling onto walls.[593]

In addition to the *siphōnes* and *gerania*, normal weapons included "bow-*ballistae*" at the prow, stern, and along the sides called τοξοβαλίστραι (*toxobalistrai*), which could fire quarrels known as "mice", μύες (*mues*), or "flies", μυῖαι (*muiai*).[594] Before the invention of Greek Fire, the *Stratēgikon* attributed to Maurice had recommended the mounting of small *ballistae* protected by mats at the prow.[595] And, according to John Kaminiatēs, the Muslim ships which assaulted Thessalonikē also had catapults or *ballistae* which they used to fire rocks against the defenders.[596] In specifying siege machinery required for attacks on fortresses the inventory for the Cretan expedition of 949 referred to the "blocks", τροχιλία (*trochilia*), of large bow-*ballistae*, suggesting that they were so powerful that the strings had to be drawn by block and tackle systems.[597] Other projectiles familiar in Latin and

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[593] See Wescher, *Poliorcétique*, pp. 35-7.

[594] Appendix Two [a], §60; Appendix Five, §57. See also *Theophanēs continuatus*, V.59 (p. 298): "..., καὶ τοῖς πετροβόλοις ὀργάνοις καὶ τοξοβαλλίστραις καὶ ταῖς ἐκ χειρῶν τῶν λίθων ἀφέσεσι ...".

We use the literal, if clumsy, "bow-*ballistae*" here because the Byzantines, like their Greek and Roman forebears, used the words *ballista* and βαλλίστρα (*ballistra*) indiscriminately for two distinct types of engines: bow-*ballistae*, large crossbows firing bolts or arrows on the one hand, and catapults hurling rocks on the other. The bow-*ballistae* here were engines mounted on ships.

[595] Maurice, *Ek tou Maurikiou*, §5 (p. 41): "Εἰς ἕκαστον δὲ δρόμωνα, εἰ ἐνδέχεται, ποιῆσαι τοξοβαλλίστρας ἀπὸ κιλικίων σκεπομένας ἐν ταῖς πρῴραις ἵνα τοὺς ἐπερχομένους ἐχθροὺς μακρόθεν ἀποδιώκωσιν· ...". Cf. Maurice, *Stratēgikon*, XIIB.21.12-15 (p. 468).

[596] John Kaminiatēs, *De expugnatione Thessalonicae*, 29.3 (p. 27): "ἄλλοι τοῖς πετροβόλοις ἐγκαθήμενοι τὰς ὑπερμεγέθεις ἐκείνας τῶν πετρῶν χαλάζας μετεωρίζοντες ἔπεμπον.". Such engines for firing rocks may have been either bow-*ballistae* which used a bow mechanism but fired rocks instead of bolts or they may have been catapults.

[597] See Haldon, "Theory and practice", p. 225: "..., τοξοβολίστραι μεγάλαι μετὰ τροχιλίων καὶ κόρδων μεταξοτῶν, ..."; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 670).

Arabic sources also appear in the sources: pots containing quicklime, Greek Fire, venomous reptiles which were hurled by catapults and which smashed on impact, small iron caltrops to impede enemies' movement on their decks, large caltrops wrapped in combustibles and hurled aflame onto enemy ships.

The large catapults or bow-*ballistae* were presumably fixed on swivel mounts of some sort so that they could be aimed. In addition to them, the inventories for the Cretan expedition of 949 also mentioned "hand-bow-*ballistae*", χειροτοξοβολίστραι (*cheirotoxobolistrai*), which were said to have had silk bow strings, χόρδαὶ μεταξοταί (*chordai metaxotai*), and some things known as ναύκλαι (*navklai*).[598] These were apparently crossbows. *Navkla* is an unknown word. It clearly meant some part of a crossbow and had nothing to do with the Latin *navicula* and small boats as such. It may well have referred to whatever mechanism was used to draw the strings on such ballistae or, by analogy to the hull of a ship, to a cup or socket in which the bolts rested before release.[599]

Μεταξοταί appears to have referred to silk, μέταξα (*metaxa*) thence to silk bowstrings. Even though silk would have been a suitable fibre for bow strings because of its strength and hard-wearing qualities, we have reservations about its widespread use for such purposes because of its cost and because no sources known to us from the Latin West in the High Middle Ages, when the crossbow became widely disseminated, referred to silk bowstrings, even though silk was freely available in the West by that time. However, the *Parangelmata poliorkētika* attributed to Hērōn of Byzantium also referred to ropes under tension which might be made from silk as well as from other materials. Elsewhere in the inventories for the Cretan expedition of 949 both silk, and also silk and spartum, bowstrings were mentioned.[600] So, the evidence that the Byzantines really did use silk for bowstrings appears to be undeniable. Reiske suggested the possibility of hemp strings reinforced with silk for additional strength, which is also a possibility.[601]

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[598] See Appendix Four [b], §II.15: "ναύκλας μετὰ χειροτοξοβολίστρων καὶ χόρδων μεταξοτῶν κ΄" [= Haldon, "Theory and practice", p. 225; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 670)].

[599] Haldon suggests a boat-shaped platform or frame upon which the bow-*ballistae* were mounted. See "Theory and practice", pp. 271-2.

[600] See Appendix Four [b], §§III.17, VI.27 [= Haldon, "Theory and practice", pp. 227, 233; Constantine VII, *De cerimoniis*, II.45 (vol. 1, pp. 671, 676)]. See also Hērōn, *Parangelmata poliorkētika*, §44 (p. 90).

[601] See Constantine VII, *De cerimoniis*, vol. 2, p. 791.

There is debate about what *cheirotoxobolistrai* were, about what the prefix *cheiro-* (hand-) may have referred to. It may be thought to have referred to a "hand-held" bow-*ballista*; that is, a "crossbow". However, Anna Komnēnē later wrote that the crossbow of the Latins, which she called a τζάγγρα (*tzangra*), was unknown to the Byzantines.[602] Kolias concluded that *cheirotoxobolistrai* were not crossbows but rather larger *ballistae* shooting the *mues* or *muiai*, pointing to the first use of *tzangra* in Byzantine sources in the eleventh-century *Parekbolai* and the *Stratēgikon* of Kekaumenos as τζαρχῶν (*tzarchōn*) and τζάγραι (*tzagrai*) respectively. Haldon has suggested that the *cheiro-* prefix may have referred to the bow-*ballistae* being hand-drawn as opposed to those which had to be drawn by some mechanism.[603] However, Dennis believes that the *cheirotoxobolistrai* were in fact hand-held crossbows.[604] If the *cheirotoxobolistrai* were actually crossbows, then perhaps their use had been discontinued by the age of Anna Komnēnē, as Dennis suggests, or else the *tzangra* was a more effective and powerful version of the crossbow, it may even have been Persian in origin.[605] We ourselves are inclined to the latter alternative; namely, that Byzantines did have hand-held and hand-drawn crossbows but that the Latin weapon which appeared in the later eleventh century was more powerful and different in some way.

According to Leo VI, §73, and Nikēphoros Ouranos, §67, a fully armed, ἐξωπλισμένος (*exōplismenos*), dromon should have soldiers, στρατιῶται (*stratiōtai*), fully armed as κατάφρακτοι (*kataphraktoi*). The oarsmen of both upper and lower oar banks were all soldiers according to Leo, §8, and Nikēphoros, §7; however, only those above deck were armed as *kataphraktoi*. According to Leo, §14, and Nikēphoros, §12, as well as the oarsmen all other men stationed above deck, from the *kentarchos* down to the last man, were also armed as *kataphraktoi*. Those not fully armoured, including the archers, wore padded felt jackets known as νευρικά (*neurika*) rather than the mail corselets, λωρίκια (*lōrikia*), or lamellar cuirasses (coats of armour of overlaid plates), κλιβάνια (*klibania*), of the *kataphraktoi*.[606]

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[602] See Anna Komnēnē, *Alexiade*, X.viii.6 (vol. 2, pp. 217-218).

[603] See Haldon, "Theory and practice", pp. 271-2.

[604] Kolias, *Byzantinische Waffen*, pp. 239-53, esp. pp. 245-6. Dennis also discusses the alternative use of μύες and μυῖαι for the quarrels. See Dennis, "Flies, mice, and the Byzantine crossbow".

[605] There is enormous disagreement about the meaning of all of these terms. See Chevedden, "Artillery", esp. pp.146-52.

[606] See Appendix Two [a], §§8, 14, 73; Appendix Five, §§7, 12, 66.

As well as body armour, marines and oarsmen were variously armed with shields, σκουτάρια (*skoutaria*), helmets, κασσίδες (*kassides*), vambraces, χειρόψελλα (*cheiropsella*), swords, σπαθία (*spathia*), bows, τόξα (*toxa*) or τοξάρια (*toxaria*), arrows, σαγίται (*sagitai*), pikes, μέναυλα (*menaula*), and throwing javelins, ῥιπτάρια (*rhiptaria*). The Anonymous merely repeated most of this from Leo's *Naumachika Leontos Basileōs*, §14, changing contemporary terms to pretentious classical equivalents, but he did add leggings or greaves, κνημῖδες (*knēmides*), and rigging cutters, δρέπανα (*drepana*).[607]

(n) *Tactics, strategy, and techniques*

In Chapters Seven and Eight of his treatise, the Anonymous turned to tactics and strategies. Chapter Eight breaks off in the manuscript at the point where he was about to discuss battle formations but, even so, he had already suggested meanings for sailing around, περίπλους (*periplous*), sailing past, παράπλους (*paraplous*), sailing through, διέκπλους (*diekplous*), to outflank, ὑπερκερᾶσαι (*hyperkerasai*), and was in the midst of discussing encircling, κυκλικόν (*kyklikon*).[608] Of these *diekplous* was used for the battle manœuvre of breaking the line by Herodotos, Xenophōn, and Thucydides, was scholiated in many manuscripts of Thucydides, and the scholion appears to have been known to the Anonymous.[609] *Periplous* was used for a battle manœuvre of encircling by Xenophōn,[610] but there is no evidence that the Anonymous knew Xenophōn. *Kyklikon*, an adjective, was most probably derived by the Anonymous from κύκλος, *kyklos*, "the circle", used by Thucydides for the defensive ring adopted by the Peloponnēsian fleet at the first battle of Naupaktos in 430 B.C.E. to prevent the Athenians under Phormiōn breaking their line by a *diekplous*. Thucydides described the Peloponnēsians forming their fleet into a defensive circle with the prows facing outwards while the Athenians sailed around them in a circle. The Anonymous appears to have changed Thucydides' noun for the formation, *kyklos*, to the adjective κυκλικός, *kyklikos*, which should have meant "encircling".

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[607] Appendix Three, §5.1.
[608] Appendix Three, §§7.4, 8.1.
[609] Herodotos, *Histories*, VI.12, VIII.9 (vol. 3, p. 158; vol. 4, p. 10); Xenophōn, *Hellenika*, I.vi.31 (vol. 1, p. 62); Thucydides, *Peloponnesian war*, I.49.3 (vol. 1, p. 82); Hude, *Scholia*, I.49.3 (p. 44). See Appendix Three, n. 83.
[610] Xenophōn, *Hellenika*, I.vi.31 (vol. 1, p. 62).

No doubt the rest of the Anonymous's sentence would have made clear how he interpreted Thucydides if the subsequent folios of the manuscript had not been lost; however, it is most probable that in fact he was merely paraphrasing Thucydides and meant nothing at all by the change.[611] Neither *paraplous*, nor its verbal equivalent, nor *hyperkerasai*, were used with the sense of the battle manœuvres assigned to them by the Anonymous in any classical source known to us. Nor were his supposed meanings of any of these words derived by him from Pollux, Hesychios, or Phōtios. He appears to have been indulging in elementary etymological speculation, extrapolating from the known meaning of *diekplous*. In any case, any tactics to which *diekplous* and these other words might possibly have referred had passed away long ago with the waterline ram. The *Anonymous* is of no value for naval tactics and strategies in the tenth century.

For these, since the chronicles and other sources are devoid of all but the most spare and sketchy descriptions of battles, we are primarily dependent on the *Naumachika* of Leo VI and its paraphrase by Nikēphoros Ouranos, even though there must be serious doubt about the practicality of many of the emperor's recommendations.[612]

It is clear that by the heyday of the dromon naval tactics and strategies were very different to those of the age of the *triērēs*. Reduced to a fundamental, these differences can be attributed to the disappearance of the only "ship-killing" weapon ever known before the invention of explosive projectiles: the ram. For all its potency in some circumstances, Greek Fire was never the ship-killer that the ram had been and no system of battle tactics was ever built around it.[613] The weapon was obviously effective in certain circumstances but there are many uncertainties about what those were. Byzantine chroniclers frequently attributed fleet victories to the use of Greek Fire; however, they rarely mentioned its use when fleets were defeated, even though it must obviously have been used on many such occasions. Only some twenty years after Kallinikos's Greek Fire scattered the Umayyad armada at Constantinople in 672-8, the fleet

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[611] See Appendix Three, §8.1 and nn. 85-6; Thucydides, *Peloponnesian war*, II.84.3 (vol. 1, p. 416).

[612] We are well aware of the fact that in some cases the strategies and tactics recommended in the tenth century had a long history in the tactical literature stretching back to antiquity. However, to have traced the textual traditions would have been beyond the scope of this work. We have limited the analysis of that tradition to those works which we can demonstrate that Leo VI actually knew directly.

[613] To characterise Greek Fire as comparable to "the atomic bomb in our own day", as did Ellis Davidson, is grossly misleading. See Ellis Davidson, "Secret weapon", p. 61.

sent to *Africa* under the *patrikios* John was unable to resist naval forces sent from Egypt and he had to abandon *Carthage*. One occasion on which it was used by a defeated force was during the revolt of Thomas the Slav, when the fleet of the *Kibyrrhaiōtai*, which had joined the revolt, had it.[614] The flame-throwing *siphōn* form of Greek Fire had a limited range and required both calm conditions and a following wind. Ships had to be closely engaged before the weapon could be used. Conventional missiles and projectiles would have had a much longer range and Greek Fire probably never displaced them. Moreover, enemy ships would almost have had to have been willing to allow the Byzantines to close up to use the weapon. If they chose to stay out of range, it would have been ineffective.

As demonstrated above, the spur was not designed to puncture a hull and sink a ship but rather to destroy its motive power by smashing its oars. No other weapons, neither projectiles nor any other, now had ship-killing capabilities. Battle tactics therefore changed. Objectives changed from attempts to deliver a knock-out blow to degrading attrition. Rather than manœuvring to obtain a position to ram and sink, tactics became to degrade an enemy ship's ability to resist so that it could be boarded and captured. These objectives remained unchanged until the days of galley warfare in the Mediterranean were over. The preliminary phases of battle therefore became extensive exchanges of missiles of various types.

The Byzantine Empire, especially in its heyday from the seventh to tenth centuries, has had something of a reputation as a power with a major maritime focus but a close scrutiny of the record does not really support this.

In spite of the fact that some crews in Byzantine fleets at various times were well regarded, for example the *Mardaites* of the *thema* of the *Kibyrrhaiōtai*, there is little evidence to suggest that in general Byzantine seamen were so skilled that this gave Byzantine fleets any edge over their oponents. It is true that Byzantine squadrons managed to defeat the *Rhōs* on all occasions when they attacked Constantinople: in 860, probably in 907 under Oleg of Kiev, in 941 under Igor, and in 1043 under Jaroslav I. A fleet also defeated the *Rhōs* on the Danube in 972. However, rather than being attributable to any qualities of Byzantine seamen, these victories were due to the triple advantages of Greek Fire, dromons and *chelandia* being much

[614] Genesios, *Basileiai*, B.5-6 (pp. 28-9); *Theophanēs continuatus*, II.14 (p. 60); John Skylitzēs, *Synopsis historiōn*, Μιχαὴλ ὁ Τραυλός.8 (p. 35).

larger than the Norse river boats of the *Rhōs*, and (except in 972) being able to fight in home waters against an enemy far from home. The last is true also of the defeat of the Muslim asssaults on Constantinople in 672-8, and 717-18. In both cases it was the advantage of campaigning in home waters rather than hundreds of miles from sources of supplies, the problems faced by the Muslims of surviving through the winters, and Greek Fire, that proved decisive. With the exception of the factor of Greek Fire, the same is probably true of the victories over the fleets of Thomas the Slav in 822-3.

In general the record of Byzantine fleets from the seventh to the tenth centuries was hardly impressive.[615] To be sure, they did achieve some notable victories: the Veneto-Byzantine victory at Syracuse in 827-8, the defeat by storm of the Muslim fleet off Cape *Chelidonia* in 842, the victory of Nikētas Ooryphas over the Cretans in the Gulf of Corinth in 879, Nasar's victories off western Greece and off *Punta di Stilo* in 880, the victory of Himerios on the "Day of the Apostle Thomas", probably in 905, the defeat of Leo of Tripoli off Lemnos in 923, the victory of Basil Hexamilitēs over the fleet of Tarsos off *Lycia* in 956, and the defeat of an Egyptian squadron off Cyprus in 965. Against that record, however, have to be balanced many disastrous defeats: of Constans II at the battle of the masts off *Phoinikous* in 655, the defeat of Theophilos, the *stratēgos* of the *Kibyrrhaiōtai*, off Antalya in 790, a defeat off Thasos in 839, the defeat of Constantine Kontomytēs off Syracuse in 859, the annihilation of a fleet off Milazzo in 888, a defeat off Messina in 901, the disastrous defeat of Himerios north of Chios in 912, the defeat of an expedition in the Straits of Messina in 965, and defeats off Tripoli in 975 and 998.

Although the tide of Byzantine naval success ebbed and flowed over the centuries as other circumstances dictated, nothing suggests that the quality of the empire's seamen was in any way decisive. Indeed, there are occasional pieces of evidence which suggest that all was not always happy in the fleets. Sometime between 823 and 825 John Echimos confiscated the properties of seamen of the *Kibyrrhaiōtai*. After he had become a monk and taken the name Antony, he was interrogated as to his reasons for doing so on the orders of the emperor Theophilos. According to the author of his *Life*, his explanation was that they had been supporters of Thomas the Slav and were "hostile to Christians", thus implying that they were

[615] It is not possible to be exhaustive here. What follows is a limited, but balanced, summary of the more important Byzantine victories and defeats in fleet engagements as canvassed in Chapter One.

iconoclasts, and that he had confiscated their property and given it to supporters of Theophilos's father Michael II. In spite of this explanation, the emperor initially imprisoned him and had him interrogated, suggesting that there was more to the story and that he rejected the explanation.[616] The fleet of the *Kibyrrhaiōtai* had joined the rebellion of Thomas the Slav, as it did later those of Bardas Sklēros in 976-9 and Bardas Phōkas in 987-9, and it is clear that at times there must have been serious disaffection in what was the front-line fleet of the empire in the ninth and tenth centuries.

In 880 the expedition sent under the command of Nasar, the *droungarios tou ploi mou*, to counter the attack in the Ionian sea by the Aghlabid fleet was forced to a temporary halt at Methōnē by the desertion of a large part of the crews.[617] Why they deserted is unknown, but we can be fairly sure that it was not a simple question of their "being terrified in the face of danger" as the *Vita Basilii* of the *Theophanēs continuatus* suggested. In the tenth century, according to the *Life* of St Neilos of Rossano, the populace of Rossano in Calabria destroyed the fleet of their *thema* to avoid having to serve in it.[618] How many other instances of dissent do we know nothing about?

In Constitution XVIII of Leo VI's *Taktika*, the emperor advised his *stratēgoi* to attack the Muslims at sea if they were invading by land and to assault their territory left undefended by any of their naval expeditions. Byzantine squadrons should assault Tarsos and Adana while the army advanced through the Tauros passes.[619] This seems to have referred to the ages-old, incessant campaigning across the frontiers; however, inserted in Constitution XX was a paragraph recommending that the naval *stratēgoi*, πλωίμοι στρατηγοί (*plōimoi stratēgoi*), should strike pre-emptively from Cyprus against the fleets of Egypt, Syria and *Cilicia* before they could unite. Since Cyprus was not recovered for the empire definitively until 965, the paragraph was probably a result of the temporarily-successful expedition of Himerios to Cyprus and the Levant in 910-11, before his catastrophic defeat off Chios in April 912.[620] Since Leo's *Taktika* is generally thought to have

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[616] *Vita Antonii junioris*, p. 209.
[617] *Theophanēs continuatus*, V.62 (pp. 302-3).
[618] *Vita S. Nili*, IX.60 (col. 105).
[619] Leo VI, *Taktika* (PG), XVIII.138-40 (coll. 979-80).
[620] Leo VI, *Taktika* (PG), XX.212 (col. 1071). However, we have edited it from the better text in the manuscript, Milan, Biblioteca Ambrosiana MS. B 119-sup. [Gr. 139] at folio 314v, where it is numbered as Constitution XIX, §210: "σι΄ ἐάν πολεμῇς πρὸς ἀνθρώπους ἐκ πολλῶν τόπων συλλεγομένους, ὦ στρατηγέ, δέον σε μὴ περιμένειν ἕως οὗ εἰς ἓν συναχθῶσιν, ἀλλὰ ἔτι ἐσπαρμένοις αὐτοῖς καὶ δισπαρμένοις, ἢ κατὰ τῆς ἰδίας χώρας ἕκαστον ἢ εἰς ἑτέρους τόπους πρὸ τοῦ συνελθεῖν αὐτοὺς, ἐπιτίθου· καὶ

been compiled ca 905-6, this paragraph must have been added to it later, after 910 but before the defeat of Himerios and the death of the emperor on 11 May 912.

Naval warfare became more unpredictable. No longer could any power hope to have such an advantage in weaponry or the skill of crews that success could be expected. Weaponry and skill could still make a difference of course, but rarely a decisive one.[621] More often than not victory or defeat became a matter of circumstances, admiralship, and numbers. To commit to battle was to risk the unpredictable fortunes of war and really decisive victories were hard to achieve in any case. A victor could rarely prevent large sections of defeated fleets escaping the field and the Mediterranean powers could replace ships, if not skilled crews, remarkably quickly in any case.

Caution became the first priority. Syrianos Magistros advised that a fleet should always proceed with four light and fast scout ships out ahead, with two up to six miles or so out and the other two between them and the fleet. A *stratēgos* should always have good intelligence of the enemy and should engage the enemy only if he had superior numbers, not even if the forces were equal unless the enemy forced the engagement. He should not engage at all unless the enemy posed a danger. Some of these recommendations were later repeated by Nikēphoros Ouranos.[622] Leo VI advised planning attacks with forethought, being wary of committing to general engagements, only doing so when confident of superiority over the enemy, and against becoming over confident.[623] The first priority of a *stratēgos* was to preserve his own forces intact and then to search for any opportunity

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νῦν δὲ τοῖς ἐξ Αἰγύπτου καὶ Συρίας καὶ Κιλικίας συναγομένοις βαρβάροις πρὸς τὴν κατὰ Ρωμαίων ἐκστρατείαν δεῖ τοὺς πλωίμους στρατηγοὺς σὺν τῷ ναυτικῷ στολῷ τὴν Κύπρον καταλαβόντας, πρὸ τοῦ ἑνωθῆναι τὰς βαρβαρικὰς ναῦς, ἀποσείλαι κατ᾽ αὐτῶν πλώιμον δύναμιν ἱκανὴν καταγωνίσασθαι τὴν βαρβαρικὴν ναυμαχίαν ἔτι διηρημένην, ἢ τὰς ναῦς ἐκείνων ἐμπρῆσαι πρὸ τοῦ ἀποπλεῦσαι τῆς ἰδίας.”.

The attribution of the paragraph to being a product of Himerios’s expedition was that of Vasiliev. See Vasiliev/Canard, *Byzance et les Arabes. Tome II, part 1*, p. 211.

[621] For a later exception see Pryor, “Roger of Lauria”.

[622] See Appendix One, §§6.1-3, 9.8, 9.10-11, 9.14; Nikēphoros Ouranos, *Ek tōn taktikōn*, §§119.4-6.

Such recommendations were not limited to naval warfare. Nikēphoros Phōkas recommended that general engagements should be avoided except when the enemy had fled or was crippled. Even enemy forces of strength equal to one’s own were to be avoided. See Nikēphoros Phōkas, *Praecepta militaria*, IV.19 (p. 50). Cf. Nikēphoros Ouranos, *Praecepta militaria*, ch. 61.19, in McGeer, *Dragon’s teeth*, p. 132.

[623] See Appendix Two [a], §§17, 36-7, 40, 74-5. Cf. Appendix One, §§15, 34-6, 67-8; Appendix Three, §3.1. On the recommendation to ensure superiority in numbers cf. above p. 181.

or strategem that would enable him to attack the enemy with the least risk to his own forces. Thus Leo VI recommended giving battle in waters of one's own choice off enemy coasts and laying ambushes.[624] The recommendation to engage off enemy coasts so that the crews of the enemy would not fight to the death but would seek safety in flight confirms the fact that almost all medieval galley warfare was coastal. Both Syrianos Magistros and Nikēphoros Ouranos also made that perfectly clear.[625]

Expeditionary objectives could frequently be achieved best by preserving one's forces intact and actually avoiding battle since naval warfare was essentially amphibious warfare whose purpose was to secure control of terrestrial objectives rather than to attempt to control maritime space. The latter was an unrealistic and vain hope given the limitations of medieval naval technology with respect to the vast expanses of the sea. Limited water supplies and cruising ranges, lack of any weapon capable of quickly destroying enemy ships, performance capabilities inadequate to force an enemy to engage if he did not wish to do so, and limitations of visibility, meant that control of maritime space was never achievable.

The masthead height of the foremast of a standard dromon as we have reconstructed it was only around 10.65 metres above sea level. [See Figure 20] There were, admittedly, larger dromons; however, for what follows a couple of metres more of masthead height would make no difference to the conclusions reached. With a foremast height of 10.65 metres above sea level, the theoretical horizon of a lookout at the masthead would have been only around 11.8 kilometres. Theoretically, the peak of a lateen sail 21 metres above sea level could be seen a further 51.7 kilometres away but, of course, no man could see 63.5 kilometres with unaided sight. In all probability, around 15-20 kilometres would have been the limit of visibility from the

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[624] See Appendix Two [a], §§40, 53; Appendix Five, §§38, 51; Appendix Eight [a], p. 246. Note that in §40, even though following Syrianos Magistros quite closely at this point, Leo VI actually reversed Syrianos's advice, who had advised setting up battle close to shore if off one's own territory so that there would be a refuge if defeated but out to sea if off enemy territory. See Appendix One, §9.42-4. Leo seems to have been influenced by another sentence of Syrianos which said that off foreign territory ships positioned at the seaward end of a line would be most likely to desert while off one's own territory it would be those at the landward end. *Ibid*., §9.23.

Polybios commented on the Roman victory over Hasdrubal's forces at the mouth of the Ebro in 217 B.C.E. that having Hasdrubal's land forces occupying the shore line was in fact a disadvantage to the Carthaginian fleet because it ensured a safe and easy retreat for the ships' crews, who abandonned the fight with little resistance. See Polybios, *Histories*, III.96.2-5 (vol. 2, pp. 236-8).

[625] Cf. above pp. 369-61 and nn. 559.

masthead of a dromon.[626] Scout ships could not, therefore, patrol a space more than 30-40 kilometres in advance of a fleet and probably no more than 30, since they were always said to have been smaller than standard dromons and would have had lower mastheads. In fact, in order to be able to actually read signals with unaided eyesight and communicate them back to the fleet, distances must have been even less than this. Syrianos Magistros advised that a fleet should always proceed with scout ships out ahead, up to six *milia* or so. Two scout ships should be 6 *milia* ahead and another two should be between them and the fleet to relay any messages.[627] Six *milia* was only around 8 kilometres. If the forward scout ships then had a range of visibility of another 8-16 kilometres, then the real maritime space that could be observed was only around 25 kilometres at best.

Moreover, even if scouts descried an enemy fleet 25 kilometres away, it would take hours for the fleets to come to engagement, even if they both cooperated and sailed at full speed to engage. If the weather conditions were favourable for one fleet, they would invariably be unfavourable for the other. If either fleet sought to avoid engagement, it could never be forced to do so unless trapped somehow.

Even narrows such as the Straits of Otranto are approximately 110 kilometres wide and the entrance to the Aegean between Crete and Rhodes is approximately 180 kilometres wide; although, Karpathos does straddle the gap. No medieval power could ever hope to control ingress and exit through such maritime spaces.

In such circumstances naval forces could rarely be more than an adjunct to land forces, sea power to land power.[628] We are accustomed to think of the Byzantine Empire as a great naval power, at least in the various periods of its prosperity. And in the sense that it was an empire for which the sea lanes in the Aegean, southern Adriatic, Black Sea, and along the south coast of Asia Minor were vitally important that is true. However, in reality Byzantine naval forces were always very secondary to the land armies and the use of sea power was

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[626] From the masthead of *Olympias*, which was approximately 11.5 metres above sea level, the horizon was 11.25 kilometres distant. A lookout could just see the deck of a similar low-hulled ship at a range of 16.1 kilometres. See Coates in Morrison, *Greek and Roman oared warships*, p. 258. No data are given for the visibility of sails over the horizon.

[627] Appendix One, §§6.1-3.

[628] This has been appreciated by Treadgold and Dvornik also, but not we believe for the correct reasons. See Treadgold, *Byzantium and its army*, p. 91; Dvornik, *Intelligence services*, pp. 153-4.

merely an adjunct to that of the land.[629] By ithemselves they rarely achieved very much. The reconquest of Crete in 960-61 was an exception to the rule, but that followed at least four previous failed attempts. The history of the Empire reveals that most naval expeditions accompanied terrestrial expeditions. Naval forces ferried land forces and protected their maritime flanks and supply lines. Most naval engagements occurred in these circumstances rather than in those of opposing fleets seeking each other out. Control of the land meant control of the sea because control of the land carried with it both control of the refuges to which all galley fleets had to have recourse in inclement weather and also control of the water supplies without which they could not operate for more than a few days. It also helps to explain the extensive record of fleets lost when caught at sea in inclement weather off coasts that were either geographically or humanly hostile. Reading the record of Byzantine and also Muslim fleets destroyed at sea by storms, and contemplating the horrific loss of human life involved, gives a sobering perspective on the essential futility of naval warfare in the Byzantine-Muslim period. Rarely did naval victories lead to long-term or extensive political gains.

It is no accident that only two Byzantine "admirals" ever became emperor: Apsimaros (Tiberios III), who had been *droungarios* of the *Kibyrrhaiōtai*, and Rōmanos I Lekapēnos, who had been *droungarios tou ploimou*. Nor is it an accident that only once did an emperor take command of the navy as a whole and attempt to seek out and destroy an entire enemy fleet. Constans II did that at the Battle of the Masts off *Phoinikous* in 655, with disastrous consequences.[630] As opposed to this, emperors took command of land armies on many occasions. The secondary character of the fleets in the Byzantine polity is reflected in the rank accorded to their commanders in the various lists of precedence compiled in the ninth and tenth centuries. In the *Taktikon Uspenskij*, composed around 842-3, the *droungarios tou ploimou* of the imperial fleet in Constantinople ranked only in eighty fourth position among the officers of state and the *stratēgos* of the *Kibyrrhaiōtai*, although ranked twenty fifth overall, ranked only

[629] This has also been appreciated by Treadgold. As he says: "It should also be recognized that behind the Byzantines' excessive indifference to maritime defence lay the correct belief that the empire was essentially a land power. Arabs on Sicily and Crete were a major nuisance, but not a major threat to the empire's vital interests.". See Treadgold, *Byzantine revival*, p. 260. However, Treadgold does not perhaps appreciate the technical reasons why sea power always remained an adjunct to land power in the empire; namely, the limitations of medieval naval technology.

[630] See above p. 25.

eleventh among the 18 *stratēgoi* of the *themata*. In the *Klētorologion* of Philotheos of 899 he ranked thirty eighth out of 60 and the *stratēgos* of the *Kibyrrhaiōtai*, although ranked twenty first overall, was only the fifteenth of 25 *stratēgoi* of the *themata*. The other two *stratēgoi* of naval *themata*, those of Samos and of *Aigaion Pelagos*, were third- and fourth-last respectively among the *stratēgoi*, ranking only above those of far-off Dalmatia and *Chersōn*. According to the *De cerimoniis*, during the reign of Leo VI the annual cash salaries, ῥόγαι (*rhogai*), paid to the *stratēgoi* of the *Kibyrrhaiōtai*, Samos and *Aigaion Pelagos* were only 10 pounds of gold and they came last in a list headed by the *stratēgoi* of *Anatolikon*, *Armeniakon*, and *Thrakēsiōn*, who received 40 pounds. Others received 30 or 20 pounds. Only *kleisourarchai* in command of territories smaller than *themata* received less, as well as the *stratēgoi* of the West, who were self-supporting. In the *Taktikon Beneševič* of 934-44, the *stratēgos* of the *Kibyrrhaiōtai* was only the twenty first of 32 *stratēgoi* and those of *Aigaion Pelagos* and Samos were fourth- and fifth-last respectively. The *droungarios tou ploimou* ranked a further 17 places below the *stratēgos* of *Aigaion Pelagos*. By the time of the Escorial *Taktikon* of ca 971-75, the *stratēgoi* of the *Kibyrrhaiōtai*, Samos, and *Aigaion Pelagos* ranked fifty fifth, sixty seventh, and sixty eighth respectively, with the *droungarios tou ploimou* in a miserable hundred and thirtieth position.[631]

Appreciation of the fact that all medieval naval warfare was essentially coastal and amphibious warfare is important since many of the recommended strategies and tactics were devised in that context. Ambushes, for example, are easily comprehensible in coastal warfare. Reserve squadrons might be hidden behind islands or promontories. They are more difficult to envisage on the high seas. How could one hide reserve squadrons on the high seas except behind fog banks, which are unusual in the Mediterranean, or if one came out of the sun with it at one's back and catching the enemy with it in his eyes? It should be added, however, that to do so was indeed a favourite tactic.[632]

Leo VI also appears to have recommended attacking when enemy fleets had been "shipwrecked" or scattered by squalls or when they were caught ashore making repairs, attacking even during a storm or

[631] See Constantine VII, *De cerimoniis*, I.50 (vol. 1, pp. 696-7); Oikonomides, *Listes de préséance*, pp. 57, 102-4, 246, 264-8.

[632] Roger of Lauria did so at the battle of the Gulf of Naples on 5 June 1284. See Pryor, "Roger of Lauria", p. 192.

at night, and to have warned against lack of vigilance when moored because the enemy might attack by day or night.[633] However, there must be serious doubts about the practicality of some of this advice. If an enemy fleet was in difficulties in a storm, surely one's own would be also? And, even if it is true that ancient and medieval galleys still floated when waterlogged because they carried as little ballast as possible and were buoyant,[634] nevertheless, what would be the point of attacking a waterlogged wreck? Moreover, engaging at night was highly dangerous because of the impossibility of maintaining formation, of signalling effectively, and of manœuvring in squadrons. Battles at night would inevitably degenerate into ship-to-ship mêlées whose outcomes would be totally unpredictable. Only two naval battles which took place at night are known to us from the Middle Ages. The second occurred by accident rather than design: the battle of *Las Hormigas* in 1285. However, it does appear that Nasar did succeed in destroying the Aghlabid fleet somewhere off western Greece in 880 by deliberately attacking at night and that he gained a major victory because the Muslims were unprepared and could not rally to organize themselves.[635] He must have been extremely confident and have taken a fearful gamble.

The primary consideration remained to avoid being caught unawares and taken by surprise. In 822 one of the fleets of Thomas the Slav was caught unawares by the imperial fleet in port somewhere in Thrace at the *Byrides* and was destroyed by Greek Fire.[636] In 879 Nikētas Ōoryphas transported his fleet by land across the isthmus of Corinth to take the Cretan Muslims by surprise in the Gulf of Corinth and defeat them before they had a chance to rally.[637]

Both caution and common sense required close attention to the weather. As we have seen, Constantine VII possibly had a treatise on these matters compiled from submissions sent to him.[638] Leo VI

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[633] See Appendix Two [a], §§33, 57; Appendix Two [b]), §§1, 5. Cf. Appendix Five, §§31, 54; Appendix Eight [a], p. 245.

[634] There are many examples from antiquity. See Morrison, et al., *Athenian trireme*, pp. 127-8; Morrison, *Greek and Roman oared warships*, p. 30. After the battle of *Sybota* of 433 B.C.E. between the Corinthians and the *Korkyraioi*, the victorious Corinthians were able to recover their own wrecks, ναυαγίαι (*navagiai*), and a relieving Athenian squadron had to make its way up Corfu Strait through floating corpses and wrecks. See Thucydides, *Peloponnesian war*, I.50.5-I.51.4 (vol. 1, pp. 86-8).

[635] Pryor, "Roger of Lauria", pp. 195-200; *Theophanēs continuatus*, V.63 (p. 304). On the battle see Vasiliev/Canard, *Byzance et les Arabes. Tome II, part 1*, pp. 95-8.

[636] *Theophanēs continuatus*, II.16 (p. 64).

[637] *Theophanēs continuatus*, V.61 (pp. 300-301).

[638] See above p. 191 & n. 78.

enjoined his *stratēgoi* to acquire practical experience of meteorology and astronomy and to take account of relationships between weather, the seasons, the stars, and signs of the zodiac. Voyages and engagements should only be undertaken in calm weather.[639] Once again, however, the practicality of some of this advice is questionable. It was all very well to advise a *stratēgos* to be acquainted with practical meteorology but, unless he had grown up as a sailor all his life, it was not a skill he was likely to learn overnight. Much more probably, Byzantine aristocrats of the type who were habitually appointed to command of fleets would have depended for such knowledge upon veteran mariners such as their *prōtokaraboi*, just as Nikēphoros Ouranos recommended.[640]

If we really can trust Leo VI, Byzantine naval expeditions appear to have been rather formally organized, perhaps too formally. They may have been only too predictable to enemies and too easy for spies to find out about. The Byzantines themselves, of course, both employed spies and also sent out scouting expeditions to gather intelligence about the deployment of Muslim naval forces. Muslim powers did the same, employing their Christian as well as Muslim subjects. All powers at all times used spies. Prokopios referred to both the Byzantines and Persians using them.[641] Merchants and political envoys were no doubt particularly useful and that they might act as spies was a commonplace.[642]

According to Theophanēs the Confessor, when the later caliph Muʿāwiya ibn Abī Sufyān, who was then still governor of Syria, raided Cyprus in 648, he was able to break off the assault on the island and sail for *Arados* when he was informed by spies or by scout ships that a large relieving force under the *koubikoularios* Kakorizos had set out against him.[643] The *Vita Basilii* of the *Theophanēs continuatus* recounted the story of an Muslim spy sent from Syria around 880 in preparation for an attempted Egyptian/Syrian naval expedition against Byzantium who was so impressed by the naval forces gathered at Constantinople that his report to home dissuaded his masters from

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[639] See Appendix Two [a], §§2, 31, 40, 49; Appendix Two [b], §4. Cf. Appendix Five, §§2, 29, 38, 47; Appendix Eight [a], p. 245.

[640] See above p. 360.

[641] Prokopios, *History of the Wars*, I.xxi.11 (vol. 1, p. 196).

[642] On military intelligence and espionage in general in Byzantino-Muslim warfare see Christides, "Military intelligence"; Dvornik, *Intelligence services*, pp. 235-61; Koutrakou, "Diplomacy and espionage"; *idem*, "Spies of towns".

Here we distinguish between "spies" gathering intelligence and "scouts" of military expeditions, even though the two are frequently confused in the sources.

[643] Theophanēs, *Chronographia*, A.M. 6140 (vol. 1, pp. 343-4).

their attempt.[644] The story reads like a didactic fancy but it surely reflects a well-known reality of Muslim espionage against Byzantine forces. It should be emphasized that assembling naval expeditions in particular was not something that could be done overnight. Preparations might take months or even years and such preparations would come to the notice of enemy powers via reports of spies or merchants, or merchants who were spies, or political envoys who were also spies.

In the ninth century, according to the *Life* of St Gregory of Dekapolis, Gregory was suspected by the men of Otranto of being a spy for the Muslims since they put a turban on his head. Also in the ninth century, according to the *Life* of St Elias the Younger, the saint and one of his disciples were arrested and imprisoned as "spies of towns", κατάσκοποι τῶν πόλεων (*kataskopoi tōn poleōn*), near *Bouthrōton* in *Epiros* by agents of the *stratēgos* of the *thema* of *Nikopolis* on suspicion of spying for a nearby Muslim force. In the eleventh century, Kekaumenos related the story of a flotilla of 5 Muslim ships which put in to *Dēmētrias* pretending to wish to trade but which then sacked the town when a traitor helped them.[645]

Leo VI stressed the need for secrecy when it came to the technology and stratagems of naval warfare.[646] However, preparations for large-scale naval expeditions would almost certainly have been impossible to keep hidden from enemy eyes and ears.

Squadrons were collected from ships of the thematic and imperial fleets and then assembled at various *aplēkta*, depending upon objectives. Leo VI advised that when the assembled fleet set out it should proceed in squadrons, "according to the formation which has been exercized", with sufficient distance between each ship to prevent collisions under oars. This latter he derived from the excerpt on crossing rivers from the *Stratēgikon* attributed to Maurice.[647] A reading of §30 of the Emperor's *Naumachika Leontos Basileōs* rather gives the impression of the ships moving on the sea as though they were pieces on a chess board and, impressed by this paragraph, R. H. Dolley once wrote that: "... preliminaries over, the fleet weighed anchor and stood out to sea. This operation had to be carried out in

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[644] See *Theophanēs continuatus*, V.68 (pp. 308-9). Cf. Dvornik, *Intelligence services*, pp. 147-8; Koutrakou, "Diplomacy and espionage", p. 132.

[645] *Vita S. Gregorii tou Dekapolitou*, §13 (p. 58); *Vita di Sant' Elia il giovane*, §28 (pp. 42-5); Kekaumenos, *Stratēgikon* (Spadaro), §84 (pp. 124-7).

[646] See Appendix Two [a], §71; Appendix Five, §64.

[647] See Appendix Two [a], §§25, 30; Appendix Two [b], §4. Cf. Appendix Five, §§23, 28; Maurice, *Ek tou Maurikiou*, §4 (p. 41).

perfect order, the different squadrons weighing in regular succession and keeping station to the best of their abilities".[648] However, the meaning of the Emperor's instructions requires consideration. What did he mean by "according to the formation which has been exercized"? It cannot have been battle formation because no fleet would make a voyage in battle formation. Even if weather conditions made it possible to do so, there would be no purpose in maintaining a fleet in battle formation until the final approach to battle and attempting to do so would only lead to the very collisions that Leo and Maurice envisaged and warned about. Moreover, later experience showed clearly that even attempting to move and make progress while in battle formation slowed fleets down so that approaches to battle became played out in slow motion.[649] No commander would wish to move so slowly during transit voyages. Additionally, Syrianos Magistros specifically advised against drawing up in battle formation too much in advance of engagement so that the enemy would not have time to adopt an appropriate counter formation.[650] But why would a *stratēgos* exercize a formation for a voyage in transit? During transit voyages from one *aplēkton* to another, squadrons would surely have proceeded independently, if perhaps in loose contact. This conclusion is supported by the specification in the *Ek tou kyrou Leontos tou Basileōs*, §3, from Constitution XX.220 of Leo's *Taktika*, that destinations should be given to squadron commanders in sealed orders not to be opened until after they were at sea, and in the specification of the inventory for the 949 Cretan expedition that the fleet should proceed in four *themata* or squadrons.[651]

Dromons and *chelandia* formed the main body of a fleet, with a *touldos or touldon*, a baggage train of horse transports and supply ships bringing up the rear.[652] These appear to have been sailing ships, except if perhaps some of the horse transports were galleys designed for amphibious landings.[653] They were sent off to safety in the event of battle. Apparently preceding and shadowing the main body of the fleet, according to Leo VI, following Syrianos Magistros, were

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[648] Dolley, "Naval tactics", p. 329.

[649] See Guilmartin, *Gunpowder and galleys*, pp. 54 (Prevesa, 1538), 201-3, 248 (Lepanto, 1571).

[650] Appendix One, §§9.31, 39.

[651] Appendix Two [b], §3. See also above p. 267-8 and n. 349.

[652] See Appendix Two [a], §§11, 13, 22, 23; Appendix Five, §§10, 11, 20, 21. This may have come from the *Stratēgikon* attributed to Maurice. See Maurice, *Ek tou Maurikiou*, §5 (pp. 41-2). Very interestingly, Ibn Mankalī's translator knew that horse transports *hippagogoi*, were *tara'īd* in Arabic. See Appendix Eight [a], p. 243.

[653] See above pp. 274-5, 305.

numbers of light dromons, faster than the norm, variously called *monēreis* or *galeai*, used for purposes of scouting and communications.[654] However, there is a serious problem with this. It is a landlubbers' misconception that smaller and lighter ships will be faster than larger and heavier ones. But this is not in fact the case if the designs are the same and the ships differ only in scale.[655] Either that or even though they were popularly known as a type of dromon, *galeai* really did have some different design characteristics which made them faster than standard dromons and *chelandia*. As early as the fourth century Vegetius reported that in order to avoid detection Roman scout ships, *scaphae*, rowing only 40 oars, had their sails, rigging and pitch on their hulls dyed blue, and that the crews also wore clothes dyed blue.[656] The expedition of the *tourmarchēs* Melitōn to Crete around 920-21, with four *chelandia*, found him scouting around Kythēra and in 960 Nikēphoros Phōkas used the *stratēgos* of *Thrakēsiōn* to reconnoitre, κατασκόπέω (*kataskopeō*), Crete.[657]

Signals were important. In battle, when voice or trumpet could not be heard, flags were used. Leo VI's discussion of signalling suggests that the same essential principle was used as in signalling-by-flags in the modern era, different flags and different positions conveying different messages. It is puzzling, however, that the emperor mentioned neither the smoke signalling nor the signalling by mirror, κάτοπτρον (*katoptron*), that were mentioned in the *Naumachiai* of Syrianos Magistros, a text with which he was familiar as we have seen, and which were later repeated by Nikēphoros Ouranos.[658]

Quite complex orders to a fleet could apparently be conveyed from the flagship by use of a signal flag or banner, called a καμελαύκιον (*kamelaukion*) by Leo VI, by raising or lowering it, by inclining it to right or left, shifting it to the right or left, by waving it, and by changing its patterns or colours or those of its "head", κεφαλή (*kephalē*).[659] The emperor appears, however, to have derived this from a passage in the *Stratēgikon* attributed to Maurice dealing with the use of flags, βάνδα (*banda*), by divisional army commanders, μεράρχοι

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[654] See Appendix Two [a], §§10, 33, 76-77, 81; Appendix Three, §3.2; Appendix Five, §§9, 31, 69-70, 74. Cf. Appendix One, §6.2, Appendix Eight [a]. p. 243.

[655] See above pp. 130-31 and n. 26.

[656] Vegetius, *Epitoma*, IV.37 (pp. 153-4).

[657] See *Vita S. Theodori*, pp. 287 and cf. above p. 191; Leo the Deacon, *Historiae*, I.3 (p. 9).

[658] See Appendix One, §7.1; Nikēphoros Ouranos, *Ek tōn taktikōn*, §119.2 (5) (p. 94).

[659] See Appendix Two [a], §§41, 44-8; Appendix Five, §§39, 42-6; Appendix Eight [a], pp. 246-7, [b], p. 122.

(*merarchoi*), for conveying orders.[660] The "head" of a *bandon*, and hence no doubt of a *kamelaukion*, was the main part of the flag, its field, as opposed to the tails or streamers, φλάμουλα (*phlamoula*), attached to its fly.[661] [Cf. Figure 26]

A fleet was to be exercized in carrying out commands signalled to it in these ways. Leo VI wrote that the signals included those to engage with the enemy and to disengage, to slow or speed up an advance, to set up an ambush or come out from one, and to come to the assistance of a section in difficulties. Clearly the emperor was able to envisage signals which were more complex than general orders to the whole fleet to attack or retreat, etc. Squadrons could be identified both to do something and to have something done for them; as, for example, "Squadron one reinforce squadron five". This has implications for what signal flags must actually have been. Squadrons were probably under the command of *komētes* in the tenth century, even though Leo VI and Nikēphoros Ouranos also used other classical or non-technical terms for such commanders: *navarchos*, *hēgemōn*, *archēgos*. The *Stratēgikon* attributed to Maurice referred to such squadrons as ταγμάτα (*tagmata*) or μέρη (*merē*) and to their commanders as μοιράρχαι (*moirarchai*), μεράρχαι (*merarchai*), or ἄρχωντες *(archōntes*). However, these were all terms used in land armies in the sixth and seventh centuries and whether they were used in fleets in the tenth century is questionable. But, that the ships of different squadrons were identified by their own squadron flags, βάνδα (*banda*), as the *Stratēgikon* said, can hardly be doubted.[662]

Leo VI equated what was the contemporary term for a signal flag, *kamelaukion*, apparently by analogy to the imperial "cap" or diadem, καμηλαύκιον (*kamēlaukion*), to the classical term for a battle flag, φοινίκις (*phoinikis*).[663] In classical Greece, the *phoinikis* had been a red or purple banner. Leo indicated by his use of the imperfect "they

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[660] See Maurice, *Stratēgikon*, IIIB.16 (pp. 260-62): "Χρὴ τὸ ἰδικὸν τοῦ μεράρχου βάνδον μὴ μόνον ἐξηλλαγμένον τὸ εἶδος παρὰ τὰ ἄλλα, τὰ ὑπ᾽ αὐτὸν βάνδα, ποιῆσαι, ἵνα εὐεπίγνωστόν ἐστι πᾶσι τοῖς ὑπ᾽ αὐτὸν βανδοφόροις, ἀλλὰ μὴν καὶ διὰ κινήσεώς τινος ξένης ἐν τῷ ἵστασθαι, οἷον ἢ ἄνω ἢ κάτω ἢ δεξιὰ ἢ ἀριστερὰ συνεχῶς ἐπικλίνειν καὶ ἐγείρειν τὴν κεφαλὴν τοῦ βάνδου ἢ πυκνῶς τινάσσειν ὀρθόν, ὥστε καὶ ἐντεῦθεν αὐτὸ ἐν ταῖς συγχύσεσιν εὐκόλως ὑπὸ τῶν λοιπῶν βάνδων γνωρίζεσθαι.".

[661] On Byzantine battle flags in general see Babuin, "Standards"; Dennis, "Byzantine battle flags".

[662] Maurice, *Ek tou Maurikiou*, §§2, 3 (p. 41).

[663] See Appendix Two [a], §47: "Ἓν γὰρ πολέμου καιρῷ σημεῖον εἶχον τῆς συμβολῆς αἴροντες εἰς ὕψος τὴν λεγομένην φοινικίδα· ἦν δὲ τὸ λεγόμενον καμελαύκιον ἐπὶ κονταρίου ὑψούμενον, μέλαν τὴν χρόαν καὶ ἄλλα τινὰ κατὰ τὸν ὅμοιον τρόπον ὑποδεικνύμενα.". Cf. Appendix Five, §45.

used to have", εἶχον (*eichon*), that this was an ancient device no longer used but one which he equated to the contemporary *kamelaukion*. However, the *kamelaukion* was black, not red. In his version of the emperor's text, Nikēphoros Ouranos omitted the equation of the *kamelaukion* to the *phoinikis* but confirmed that its colour was black. Again there is something rather puzzling here. Black would be an extremely poor colour for a signal flag, very difficult to see against the dark blue background of sky and sea, especially in poor weather. Syrianos Magistros had said that signals were made with very white fabric waved around and Nikēphoros Ouranos paraphrased him but limited the context to those of scout ships sent on ahead, almost as though he knew that Syrianos rather than the emperor was correct but wished to avoid a clash with Leo VI's recommendations which he was obliged to repeat.[664]

A *kamelaukion* had a head, *kephalē*, whose appearance and colour could be altered, and presumably tails or streamers, *phlamoula*, although these were not named by Leo VI.[665] As we saw above in the context of the helmsmen, *siphōn* operators, and bow-hands, Leo VI's specification of the numbers of personnel was not necessarily the total on board. Should we assume that each dromon had only one *kamelaukion*, or may we read him as referring to a generic and that dromons may have had many such *kamelaukia*? Here we point out that one of the inventories for the Cretan expedition of 949 said that each dromon should have 50 *kamelaukia*.[666] This text has invariably been interpreted as referring to *kamēlaukia* caps, but why should it be? Indeed, what could have been the purpose of 50 soft caps in the context of an inventory of a dromon's armaments? We do not deny that elsewhere the meaning of *kamelaukion* obviously was a cap of some sort,[667] but here they cannot have been caps for the lining of helmets because the same inventory specified 80 helmets. Why should the specification not have referred to a sophisticated system of signalling flags used by the Byzantines? How could a commander

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[664] See Appendix One, §7.1: "Σημεῖα δὲ κατὰ μὲν θάλατταν τὰ λευκότερα τῶν ὑφασμάτων κινούμενα,...": Nikēphoros Ouranos, *Ek tōn taktikōn*, §119.2 (5) (p. 94), checked by us against the manuscript Oxford, Bodleian Library, MS. Baroccianus Graecus 131: "Σημάδιον ποιοῦσιν εἰς τὴν θάλασσαν πρὸς τοὺς ὀπίσω τὰ προαποστελλόμενα πλοῖα εἰς βίγλαν λίνα λευκὰ κινούμενα ...".

[665] See Appendix Two [a], §§44-6; Appendix Five, §§42-4.

[666] See Appendix Four [b], §II.21 [= Haldon, "Theory and practice", p. 225; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 670)].

[667] Nikēphoros Phōkas, followed by Nikēphoros Ouranos, clearly used the term with this meaning. See Nikēphoros Phōkas, *Praecepta militaria*, I.3 (p. 12); cf. Nikēphoros Ouranos, *Taktika*, c. 56.3, in McGeer, *Sowing the dragon's teeth*, p. 90.

change the "colour" and "appearance" of a flag without actually changing the flag. And, that is what Nikēphoros Ouranos appears to have said. Where Leo VI had written that it might be changed by having its head sometimes made to look different, Nikēphoros altered that to read that it should actually be changed or exchanged, for another flag is the implication. We suggest that Byzantine dromons may have carried a whole wardrobe of *kamelaukia* for signalling. If it was not beyond the ability of the British navy in the eighteenth century to develop such a wardrobe, why should it have been beyond that of the Byzantines? They had a very long tradition of naval warfare to draw upon. Such a wardrobe of *kamelaukia* flags would have been necessary to convey the kind of complex messages Leo VI envisaged. If it was not beyond the ingenuity of Kleoxenos, Dēmokleitos, and Polybios himself to devise a system of signalling with fires which could represent letters of the Greek alphabet, why should it have been beyond the ability of others to have devised a similar system with flags?[668]

In the approach to battle it was essential to draw up a fleet in formation. Syrianos Magistros emphasized the importance of this and discussed how the commander should maintain the formation.[669] A disorganized fleet dared not engage because its ships would be unable to lend support to each other and would be overwhelmed. This was the cardinal sin that Constans II supposedly committed in 655 when he went into the Battle of the Masts without bringing his fleet into formation and was annihilated, barely escaping with his life.[670] In 904 the *droungarios tou ploimou* Eustathios Argyros had to break off his attack on the fleet of Leo of Tripoli because he had not been able to draw up in a counter formation, ἀντιτάξασθαι (*antitaxasthai*), his own fleet.[671] Leo then went on to sack Thessalonikē. The reverse occurred in 956 or 957 when Basil Hexamilitēs, the *stratēgos* of the

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[668] Polybios, *Histories*, X.43.1-X.47.11 (vol. 4, pp. 206-218). A possibility which escaped Babuin, "Standards", p. 22; Kolias, "Kamelaukion".

[669] Appendix One, §9.4-7.

[670] Theophanēs, *Chronographia*, A.M. 6146 (vol. 1, p. 346): "τοῦ δὲ βασιλέως μηδὲν ποιησαμένου πρὸς παράταξιν ναυμαχίας, ..."; al-Ṭabarī, *Ta'rīkh* (Yar-Shater), A.H. 31 (vol. 15, p. 76).

We say "supposedly" because according to al-Ṭabarī both fleets were in fact drawn up in tight formation. However, whether the Byzantines were actually in formation or not is unimportant. What is important is that both Theophanēs and al-Ṭabarī knew that they ought to have been in formation.

[671] See *Theophanēs continuatus*, V.20 (pp. 366-7): "ἀποστέλλει οὖν ὁ βασιλεὺς τὸν Εὐστάθιον τὸν τηνικαῦτα δρουγγάριον μετὰ στόλου κατὰ τοῦ Τριπολίτου· ὃς μὴ δυνηθεὶς ἀντιτάξασθαι τούτῳ ἀντεστράφη κενός.".

Kibyrrhaiōtai, successfully beat back a fleet from Tarsos larger than his own because he managed to form his own fleet into a counter formation, ἀντιπάραταξις (*antiparataxis*), before engagement.[672] One of the classic battle tactics was to disorganize an enemy's formation by feigning flight until the enemy ships in pursuit became strung out and then either to send in fresh reinforcements against the disorganized enemy or to turn around in formation and overwhelm the disorganized enemy ships one by one.[673] The Carthaginians employed the tactic at the battle of *Eknomos* in 256 B.C.E. and a millennium and a half later Roger of Lauria used the tactic to great effect at the Battle of the Gulf of Naples on 5 June 1284.[674]

It was also essential to maintain formation as long as possible. According to Theophanēs the Confessor, in 790 a Muslim fleet moving north from Cyprus in fair weather was carried about at sea. There is a sense in the Greek that the Muslim fleet was disorganized. Perhaps as a consequence, one of the two Byzantine commanders, Theophilos, the *stratēgos* of the *Kibyrrhaiōtai*, was over confident, moved out ahead to engage by himself, and was captured by the enemy.[675]

According to Leo VI, the standard formation was the line abreast in a shallow, crescent-moon semi-circle, with the flagship at the centre of the line in its "deep", and the stronger and larger dromons at the ends of the line. This was also supposedly the best formation for making a fighting retreat by backing water.[676] Other formations may also have been used in various circumstances: a straight line, or several lines or squadrons, some of which could attack from the flanks or the rear once the enemy was engaged by the main formation.[677]

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[672] See *Theophanēs continuatus*, VI.Αυτοκρατορία Κωνσταντίνου.29 (p. 453).

[673] See Appendix Two [a], §§54, 56; Appendix Five, §§52-3; Appendix Eight [a], p. 248, [b], p. 123.

[674] Polybios, *Histories*, I.27.7-10 (vol. 1, p. 76); Pryor, "Roger of Lauria", pp. 189-95.

[675] Theophanēs, *Chronographia*, A.M. 6282 (vol. 1, p. 465): "οἱ δὲ Ἄραβες κινήσαντες ἀπο τῆς Κύπρου, καὶ εὐδίας αὐτοὺς καταλαβούσης, περιεφέροντο ἐν τῷ πελάγει. ἀναφανέντων δὲ αὐτῶν τὴν γῆν. εἶδον αὐτοὺς οἱ στρατηγοί, καὶ παραταξάμενοι ἡτοιμάσθησαν τοῦ πολεμεῖν. Θεόφιλος δέ, ὁ τῶν Κιβυραιωτῶν στρατηγός, ῥωμαλέος ἀνὴρ καὶ ἱκανώτατος ὤν, θαρσήσας καὶ πάντων προεξελθὼν τούτοις τε συμβαλών, ἐκρατήθη ὑπ᾽ αὐτῶν, ...".

According to the *Mēnologion* of Basil II (Rome, Biblioteca Apostolica Vaticana, MS. Vat. Gr. 1613), Theophilos attacked in his dromon but was abandoned by the three other *stratēgoi* with him because they were envious of his valour. See Anonymous, *Menologion*, coll. 285-8.

[676] See Appendix Two [a], §§2, 28, 42, 49, 50, 78; Appendix Two [b], §2; Appendix Five, §§26, 32, 47, 48, 71; Appendix Eight [a], p. 247, [b], p. 123.

[677] See Appendix Two [a], §§51-2; Appendix Five, §§49-50; Appendix Eight [a],

This latter would seem to have been dependent upon having an overwhelming superiority in numbers. As Leo VI himself wrote, in what must be something of a classic of understatement, the same was true of the tactic to disengage a formation that had fought the enemy to a standstill and then to send in reinforcements.[678]

There is no doubt that the crescent-moon line abreast formation was that which was used normally. Evidence for it goes back to antiquity and it remained the standard battle formation until the end of the days of galley warfare in the Mediterranean. Its objective was to overwhelm the ends of an enemy line so that galleys at the ends of one's own line could turn in the enemy's galleys and attack their exposed flanks where they were most vulnerable.

There are obvious problems with some of the rest of the emperor's advice. Much of it was paraphrased from Syrianos Magistros and Maurice.[679] To use the crescent formation for a fighting retreat as he advised would be ludicrous. It would certainly prevent the enemy overwhelming isolated ships; however, backing water is both extremely tiring and extremely slow and also makes it very difficult to hold a course because rudders are ineffective.[680] A fleet worsted in battle would have great difficulty holding formation if backing water and would never succeed in disengaging from the enemy and escaping by doing so. The oncoming enemy would simply keep pressing onto the retreating ships backing water until their crews were exhausted and could be overwhelmed. Almost certainly, the emperor got the idea for this recommendation from Thucydides, either directly or indirectly. But Thucydides' context was one of a small Athenian squadron of twelve ships retreating by backing water into harbour in the face of superior Peloponnēsian forces in order to cover their retreat and that of their worsted *Korkyraioi* allies.[681] The tactic could work if retiring back into a protected position, but not if caught exposed at sea. In 87 B.C.E. the Rhodian fleet also used retiring by backing water to effect a retreat back into the safety of Rhodes harbour in the face of a superior fleet of Mithridatēs VI Eupator of Pontos.[682]

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pp. 247-8, [b], p. 123.

[678] See Appendix Two [a], §55; Appendix Five, §52; Appendix Eight [a], p. 248, [b], p. 123.

[679] See Appendix One, §§9.30-41; Maurice, *Ek tou Maurikiou*, §§3, 7 (pp. 41-2).

[680] See Shaw, "Rowing astern". Cf. Morrison, et al., *Athenian trireme*, p. 247. Academic references are unnecessary. Pryor has experienced it himself on many occasions on the water.

[681] See Thucydides, *Peloponnesian war*, III.78.3 (vol. 2, p. 136).

[682] Appian, *Mithridatic Wars*, 24 (p. 282).

To adopt a straight front when one wanted to use the *siphōnes* for Greek Fire, as the emperor recommended in §51, makes no apparent sense. When two opposing crescent formations clashed head on, they would inevitably straighten out in any case as the galleys engaged successively from the ends of the lines towards their middles. Why would maintaining a straight line rather than a crescent in the approach make any difference if one intended to use the *siphōnes*? It is possible that what the emperor had in mind was that in order to use the *siphōnes* one would have to engage with the enemy ships more closely than would be necessary for a missile exchange and, if so, it may be that he had in the back of his mind some passages from Syrianos Magistros which he did not reproduce but which had the idea of an engagement from the convex side of a crescent. According to Syrianos, beginning in a straight line, the fleet engaged at the ends of the line and then its centre pressed forward forming a convex crescent until the whole fleet was engaged. The objective was to break through the enemy line at the centre and split it into two by positioning one's strongest ships in the centre of one's own line.[683] It is just possible that this passage gave Leo VI the idea of how to engage closely in order to bring the *siphōnes* into play, but it makes little apparent sense.

For lack of any ship-killing weapon it is highly improbable in fact that any tactical manœuvres whatsoever could have proved decisive. Medieval naval battles became a matter of approach in formation, attempts to hold formation above all costs in order to protect the vulnerable sides and sterns of the ships, and then an inital phase of engagement by extensive exchanges of missiles designed to degrade the enemy's manpower before close engagement and boarding. Missile exchange at a distance continued to be the initial phase into the High Middle Ages throughout the Mediterranean.[684] That was why dromons had a forecastle, a *pseudopation*, at the prow, from which marines could hurl missiles against an enemy ship.[685]

Such missiles employed the same processed fire material as used in the *siphōnes* but hurled by catapult, either in pottery jars or in the form of caltrops wrapped round with tow and soaked in it.[686] There can be no doubt that the former at least were used because examples

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[683] See Appendix One, §§9.35-40.

[684] See Alexandres, *Ἡ θαλασσία,* p. 62; Pryor, "Roger of Lauria", pp. 179, 186-7, 207.

[685] See Appendix Two [a], §6; Appendix Five, §5; Appendix Eight [a], p. 242, [b], p. 21. Cf. above p. 203.

[686] See Appendix Two [a], §§63, 65; Appendix Five, §60.

survive.[687] Then there were the other more conventional missiles that one would expect: ordinary caltrops, arrows shot by bows, rocks, and the small "arrows" or bolts known as "flies" or "mice" and shot by bow-*ballistae*.[688] Quite probably the jars of unslaked lime mentioned by Leo VI were also used but one may have one's doubts about the practicality of jars full of poisonous reptiles.[689] From his tone, even the emperor seems to have had doubts about that one. The most effective missiles and those which formed the bulk of those exchanged were rocks, caltrops, arrows from bows, "flies" or "mice" from the bow-*ballistae*, and then javelins when closed up somewhat more. The large numbers of such missiles mentioned in the inventories for the Cretan expedition of 949, and the absence of more "exotic" projectiles in them, show that this was so: in particular, 10,000 caltrops, 50 bows and 10,000 arrows, 20 hand-held bow-*ballistae* and 200 "mice", and 100 javelins per dromon.[690] In the spring of 822 the fleet of Thomas the Slav opened its engagement with the imperial fleet in the Golden Horn by hurling rocks.[691]

The importance of proper management of the preliminary missile phase was indicated by the emperor's insistance on using them effectively, not wasting them against an enemy protected by shields, and ensuring that neither supplies were exhausted nor the crews exhausted themselves in hurling them. The Muslims of *Cilicia*, he wrote, were well trained in naval warfare and covered up with their shields until an enemy had exhausted his missiles before engaging.[692] He appears to have appreciated that battles were not won in missile phases and that, although these might influence the outcome, hand-to-hand combat decided it.

In the final phase of battle opposing ships grappled. The words used by the Anonymous, Leo VI, and Nikēphoros Ouranos to describe this phase were δεσμός (*desmos*), a bond, and δεσμεῖν (*desmein*), to bind or fetter, both connected to δεσμεύειν (*desmeyein*), to bind or fetter or tie together. We have chosen "couple" and "to couple" as the

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[687] See Christides, "New light", pp. 19-25.

[688] See Appendix Two [a], §§14, 60, 62; Appendix Five, §§12, 57, 59.

[689] See Appendix Two [a], §§60-61; Appendix Five, §§57-8; Appendix Eight [b], p. 124. Or did the emperor have a recollection of the report of John Malalas that the asp which killed Cleopatra was one of those which she carried in her ships for purposes of battle. See John Malalas, *Chronographia*, trans. Jeffreys, et al., p. 116.

[690] See Appendix Four [b], §§II.13-18 [= Haldon, "Theory and practice", p. 225; Constantine VII, *De cerimoniis*, II.45 (vol. 1, pp. 669-70)].

[691] *Theophanēs continuatus*, II.15 (p. 62).

[692] See Appendix Two [a], §§15-17; Appendix Five, §§13-15; Appendix Eight [a], p. 244; Leo VI, *Taktika* (PG), XVIII.121-2 (coll. 973-6).

closest translation of what we believe was intended. When the crew of an enemy ship was sufficiently degraded to make boarding and capturing realistic, iron rods, καμάκες σίδηραι (*kamakes sidērai*), no doubt with grappling hooks at both ends, were used to grapple with it and couple it so that it could not escape. The tactic used in defence against enemy ships trying to do the same was to keep the ships apart by using even longer poles: ἀκόντια (*akontia*) or κοντάρια (*kontaria*). The bronze poles, ἀκόντια χαλκᾶ (*akontia chalka*), mentioned in the inventories for the Cretan expedition of 949, may possibly have been for this purpose; although, they probably were not. Bronze would not have been a very good material since the poles would have been heavy to wield and bronze is also soft, but brittle, easily broken by an iron axe.[693] Coupling and preventing coupling were apparently procedures which required considerable practice and exercize, to judge from Leo VI's insistence on the point and his words of warning that the procedure was not always advantageous.[694]

From this point the fully-armed soldiers on the upper oar banks of the dromons came into play.[695] During the missile phase, they were almost certainly stationed on those parts of the decks called by the Anonymous, by analogy to the half-decks of *triēreis*, κατάστρωματα (*katastrōmata*), along the sides behind their shields slung on the *kastellōmata*; although, neither of these were words used by Leo VI and Nikēphoros Ouranos. At this point fights must have degenerated into hand-to-hand mêlées. The only potentially decisive weapons left at this point were the "cranes" called γερανία (*gerania*), which if we can believe Leo VI could pour Greek Fire already alight onto the deck of an enemy ship coupled alongside, and the rocks or iron weights hurled from the *xylokastra* in attempts to smash the deck and ultimately the hull of the enemy ship.[696] However, we have reservations about the practicality of both of these suggestions of the

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[693] See Appendix Two [a], §§28, 68; Appendix Five, §§26, 62. Cf. Appendix Three, §5.2. See also Appendix Four [b], §VII.18 [= Haldon, "Theory and practice", p. 233; Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 677)]. It is interesting that Ibn Mankalī chose not to include the recommendations on coupling in his treatises.

Note also that the *akontia chalka* appear in the inventories immediately before what appear to be items of cooking equipment. They may have been rods for suspending pots over fires.

[694] See Appendix Two [a], §§28, 37, 68; Appendix Five, §§26, 35, 62. Cf. Appendix Three, §5.2.

[695] See Appendix Two [a], §§9, 14, 20, 73; Appendix Five, §§8, 12, 18, 66. Cf. Appendix Three, §§2.7, 5.pr., 1.

[696] See Appendix Two [a], §§7, 67; Appendix Five, §§6, 61. Ibn Mankalī included the towers, rocks and weights, but not the cranes. See Appendix Eight [a], p. 242, [b], p. 22.

emperor. Both sinking and, especially, setting fire to an enemy ship coupled alongside would pose obvious dangers to one's own ship.

Finally, we consider two techniques recommended by Leo VI which appear to us to be once again the fire-side musings of an arm-chair sailor. In one paragraph, the emperor recommended thrusting pikes, μέναυλα (*menaula*), through the oar-ports, *trypēmata*, of the lower oar-bank of a dromon and thus slaughtering the enemy.[697] He said that he had recently devised this technique himself, which immediately arouses suspicions in any case. First, in order for pikemen to thrust pikes out through the lower oar-ports, the oar sleeves would have to be removed so that they could see. This would leave the dromon prone to flooding. Secondly, one would also have to remove the oars, thus robbing the ship of motive power. Thirdly, what could such pikes actually hit? They obviously could not hit anyone on the deck of the enemy ship because they would be right down close to the waterline. Therefore, in order to actually hit anyone on the enemy ship, they would have to be thrust through its own lower oar-ports. But these were covered by their own oar sleeves and so the pikemen would be operating blind. Fourthly, ships move constantly in relation to each other, even in battle. Even if coupled together, they would still pitch and roll relative to each other. A pike with its haft inside the oar-port of the attacking ship and its head through the oar-port of the other, would either cause chaos on the thwarts of the attacking ship as the haft was thrown around all over the place or it would be instantly snapped if the two opposed oar-ports changed their relative positions sufficiently.

In the very next paragraph, Leo VI also recommended holing the hull of an enemy ship from the lower oar-bank and Nikēphoros Ouranos added that pikes were to be used for the purpose.[698] However, pikes would make very ineffective boring instruments. The *magistros* was probably just trying to guess at how the emperor had thought that it could be done by analogy to the preceding paragraph. Moreover, below the water line the hull of any galley curved sharply in towards its keel, and thus away from any ship lying alongside it. It is difficult to imagine how anyone operating from the lower oar-bank of a dromon could make any hole in the hull of an enemy ship below the

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[697] See Appendix Two [a], §69; Appendix Five, §63.

Dolley also doubted, correctly, whether this technique was "really practical". See his "Naval tactics", p. 333. Ibn Mankalī chose not to include it.

[698] See Appendix Two [a], §70; Appendix Five, §64. Again, Ibn Mankalī chose not to include this recommendation.

water line. The angle of approach to the hull of any instrument used for the purpose would surely be so acute as to make it impossible to get a grip on it in order to penetrate it. Moreover, with both ships constantly moving with the seas, how could the instrument be kept in one place long enough to perform the task?

CHAPTER FIVE

THE DEMISE OF THE DROMON

Detailed sources for dromons gradually disappeared after the tenth century as the intellectual movements which gave rise to the encylopaedic literature of which the military manuals, *De cerimoniis* inventories, and other compendia were a part, waned. The term *dromōn* continued to be used in Byzantine narrative and documentary sources through to the end of the twelfth century; however, few details emerge from these mentions to add to what is known from the tenth century. From the twelfth century the references increasingly have the appearance of literary anachronisms and although pictorial representations of Byzantine galleys begin to survive again, they are never sufficiently realistic to found any details of reconstruction on them. None show more than a single mast or more than one file of oars.[1]

Considerable numbers of graffiti of ships survive in churches and other buildings dating from the twelfth century and later; however, as discussed above, their dating is impossibly indeterminate for the most part and in many cases they may not even have been intended to represent Byzantine ships. They may well have represented Western ships.[2] There are also two surviving seals dating from the later twelfth or early thirteenth centuries which do depict what must have been intended to be Byzantine galleys. The first belonged to a Manuel Raoul, of the well-known Byzantine family of the Raoul, descended from a Latin who had settled in the Empire. It depicts a galley with three oarsmen and one helmsman and flying a tri-streamered flag. The other belonged to a Theodōra Komnēnē, wife of an Isaakios who was a *megas doux* but who is otherwise unidentified. The galley has four oarsmen, probably a helmsman, and again a tri-streamered flag.

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[1] Christides has reproduced what he says are illustrations of bireme dromons in "Ibn al-Manqalī (Manglī)", pp. 89-93 and figs 4, 5, 6, which he has taken from Anderson, *Oared fighting ships*, fig. 11 and plate 7B, where the ships were, indeed, described as dromons. However, Anderson cited no sources and was in fact being loose with his terminology. The illustrations were not of dromons at all. They were of Genoese and Sicilian *galeae* of the twelfth and early thirteenth centuries in the *Annales Ianuenses* of Genoa and the *De rebus Siculis carmen* of Peter of Eboli. See Figures 50, 54.

[2] See above, pp. 239 & nn. 246-7.

Neither seal is sufficiently detailed to deduce anything about the construction of the galleys.[3]

The chronicle ascribed to Pseudo Symeon magistros said that the fleet led by Nikēphoros Phōkas against Crete in 960 was composed of 2,000 *chelandia* equipped with Greek Fire, 1,000 *dromōnes*, and 360 transports (*karabia*).[4] However, use of the words gradually became less frequent. Kekaumenos equated long ships, μακραὶ νῆες (*makrai nēes*), with *chelandia* and wrote that they should be manned by archers, τοξόται (*toxotai*). He also referred to *dromōnes* in the hands of the *stratēgos* of *Ragusa*, Katakalōn Klazomenitēs, in the context of raids in the Adriatic by the Serbian *toparchēs* of *Zenta* and *Stamnos*.[5] However, use of the words gradually became less frequent. Michael Attaleiatēs (ca 1020 - post 1085) did not use the words *dromōn* and *chelandion* at all. He invariably used the classical word *triērēs* to refer to a warship. John Skylitzēs (fl. second half of the eleventh century) did refer to *dromōnes*, in particular the "imperial dromon", βασιλικὸς δρόμων (*basilikos dromōn*), on several occasions, but without giving any details of the ships,[6] as did Nikēphoros Bryennios (ca 1064-1136/7), who also mentioned an "imperial dromon" for the use of the emperor on four occasions.[7] By the twelfth century, George Kedrēnos could still refer to *chelandia* in action against the Bulgarians in the fleet of Constantine V; however, he was just copying his source, in this case probably Theophanēs the Confessor.[8] John Zōnaras († post 1159?) did not use the word *dromōn*. When referring to ships and fleets, he invariably used generic or classical words such as *ploia*, *nēes*, *stolos*, and *triēreis*.

The *Alexiad* of Anna Komnēnē is more problematical since the first draft of it, and also large sections of what now survives, were arguably written by her husband, the *Caesar* Nikēphoros Bryennios. Yet other sections betray their origins in reports of various military

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[3] Zacos, *Byzantine lead seals*, plate 189, nos 2751, 2751a.

[4] Pseudo Symeon magistros, *Chronographia*, p. 758. Cf. *Theophanēs continuatus*, VI.Βασιλεία Ῥωμανοῦ υἱοῦ Κωνσταντίνου τοῦ Πορφυρογεννήτου.10 (p. 475). The figures are obviously inflated in both cases.

[5] Kekaumenos, *Stratēgikon* (Spadaro), §74 (pp. 108-11).

[6] See John Skylitzēs, *Synopsis historiōn*, Κωνσταντῖνος ὁ υἱός Λέοντος.13 (p. 210), Ῥωμανὸς ὁ Λακαπηνός.6, 18 (pp. 215, 223-4), Βασίλειος καὶ Κωνσταν῀ινος.7 (p. 258), Κωνσταντῖνος ὁ Μονομάχος.6 (p. 431).

[7] Nikēphoros Bryennios, *Hyle historias*, I.4, 21, III.22, 24 (pp. 81, 125, 249, 251).

[8] George Kedrēnos, *Synopsis historiōn*, vol. 2, p. 15, l. 6. Cf. Theophanēs, *Chronographia*, A.M. 6257 (p. 437). But see also George Hamartolos, *Chronikon syntomon*, IV.ccliii.33 (col. 944).



Figure 47
Dromon in a manuscript of the Sermons of St Gregory of Nazianzos (Mount Athos, Panteleēmon, Cod. 6, fol. 138r), twelfth century.

commanders.[9] Which words were Anna's and which were those of her sources, particularly in the sections dealing with military campaigns, is problematical. In one passage the surviving text equated Venetian *dromōnes* to *triēreis*.[10] In another, identified as having the literary footprint of Nikēphoros, the imperial fleet under Nicholas Maurokatakalōn in 1096 was referred to as being composed of "*diēreis*, *triēreis*, and some *dromades neēs*",[11] which, in the context, may equally have meant either "swift" ships or ships "of the type of dromons". In yet another, most probably derived from reports of Landulf and Tatikios, the commanders of the Byzantine fleet, the Pisan fleet of the First Crusade was described as being composed of *diēreis*, *triēreis*, and *dromōne,* as well as other fast-sailing ships.[12] In

[9] Howard-Johnston, "Anna Komnene". Cf. Macrides, "The pen and the sword".

[10] Anna Komnēnē, *Alexiade*, VI.v.9 (vol. 2, p. 54): "Καιροῦ δ' ὀλίγου παρερρυηκότος δρόμωνάς τε καὶ τριήρεις εὐτρεπίσαντες οἱ Βενέτικοι ...".

[11] Anna Komnēnē, *Alexiade*, X.viii.3 (vol. 2, p. 216): "..., τὰς τοῦ ὅλου στόλου διήρεις καὶ τριήρεις καὶ τινας δρομάδας ἀναλαβόμενος ναῦς ...". Cf. Howard-Johnston, "Anna Komnene", n. 50 (p. 283).

[12] Anna Komnēnē, *Alexiade*, XI.x.1 (vol. 3, p. 42): "... διήρεις τε καὶ τριήρεις καὶ δρόμωνας καὶ ἕτερα τῶν ταχυδρόμων πλοίων ...". Cf. Howard-Johnston, "Anna Komnene", n. 64 (p. 292).

his own *Hyle historias*, Nikēphoros Bryennios only once used the classical term *triēreis*. Elsewhere, except for when he referred to the "imperial dromon", he used the generic *nēes* for "ships", even when it is clear that the ships in question were war galleys.[13] It is most probable that Anna replaced generic and contemporary terms used by her sources with the classical terms *diēreis* and *triēreis*.

In another passage of the *Alexiad* describing the battle of Corfu in 1084 and referring to Venetian ships, νῆες (*nēes*), which would probably have been galleys of a Western rather than Byzantine type by that time, but which presumably reflected Anna's, or her source's, understanding of Byzantine galleys, she suggested that they had multiple wales, at least two of which were normally underwater. She wrote that because the Venetian ships had been unloaded, they were sailing light and the water did not come up to even the second wale, *zōstēr*.[14] That Byzantine galleys did indeed have multiple wales is confirmed by a passage in *Rhodanthe and Dosikles*. Theodore Prodromos wrote that: "As much of them [the ships] as were not submerged but rode above the waves of the sea, from the second wale to the third, ...".[15] Prodromos also referred to the hulls of *triēreis* being covered from the second to the third wales with thick, matted felt in which incoming enemy missiles would stick, so that they could not come inboard, thus avoiding injury to the crews.[16] Since there would have been solid hull between the second and third wales, this does not make any sense; however, there is at least a clear reference to three wales. Nikētas Chōniatēs, who is considered to have begun writing his *Historia* at Constantinople under the Angeloi emperors but who completed it in exile at *Nicaea* after 1204, also indicated that Byzantine galleys had at least three wales. Describing the Sicilian

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[13] Nikēphoros Bryennios, *Hyle historias*, III.3 (p. 215). Cf. II.27, III.3 (pp. 199, 215).

[14] Anna Komnēnē, *Alexiade*, VI.v.7 (vol. 2, p. 53): "... ὡς μήδ' ἄχρι δευτέρου ζωστῆρος τοῦ ὕδατος φθάνοντος, ...". In our opinion, the passage in which this occurs, describing the naval battle of Corfu between the Venetians and the forces of Robert Guiscard, also bears the literary imprint of Nikēphoros Bryennios; although, it is not one of those identified as such by Howard-Johnston.

[15] Thodore Prodromos, *Rhodanthe and Dosikles*, bk. 5, ll. 449-51 (p. 89): "ὅσον γὰρ αὐταῖς οὐκ ἐβαπτίσθη κάτω, / ἀλλ' ὑπερέπλει τῆς θαλάσσης τὴν ῥάχιν, / ἐκ δευτέρου ζωστῆρος ἄχρι καὶ τρίτου / ...".

[16] Theodore Prodromos, *Rhodanthe and Dosikles*, bk. 5, ll. 451-9 (p. 89): "ἐκ δευτέρου ζωστῆρος ἄχρι καὶ τρίτου / πίλοις κατεσκέπαστο ναστοῖς, παχέσι· / βουλῆς σοφῆς εὕρημα καὶ στρατηγίας, / ὡς ἂν τὰ πλεῖστα τῶν τεταμένων βελῶν / ἐκεῖ παρακλώθοιντο, μηδ' ἐς τὸ πρόσω / ἔχοιεν ἐλθεῖν καὶ βαλεῖν τοὺς ἐν μέσῳ, / ἀλλ' ἠρεμοῖεν ἐμπαρέντα τοῖς πίλοις. / ἄνω δ' ἐπ' αὐτῶν τῶν τεθειμένων πίλων / πληθὺς παρῃώρητο μακρῶν ἀσπίδων, ...".

fleet that attacked *Thebes* and Corinth in 1147, he wrote that the Sicilian commander ordered his ships to be so loaded with booty that they sank up to the third wale. Again his comment is likely to have been based on whatever knowledge he had of Byzantine, rather than Sicilian, galleys. When Nikētas referred to Sicilian *triēreis* being so overloaded that they were submerged nearly to the level of the upper *eiresia*, file of oarsmen, thus implying a construction similar to that of tenth-century bireme dromons with superimposed banks of oarsmen, he was undoubtedly engaging in some classical allusion.[17] Whether they were classical Greek *triēreis* or tenth-century dromons or any other galleys, the only way that galleys with such an oarage system could be submerged to the level of the upper bank of oarsmen would be if they had been sunk and the hulls entirely flooded. Taken together, these three passages suggest that Byzantine galleys had at least three wales, one below water, a second at or around the water line, and a third on the upper hull.[18]

In the mid twelfth century, in a eulogy for the emperor Manuel I probably delivered after the Norman attack on the Empire in 1157, Michael the Rhetor mentioned *dromōnes* amongst other types of ships in a fleet put together by Manuel to counter the attack,[19] and Eustathios of Thessalonikē (ca 1115-1195/6), in another eulogy for Manuel dated to Lent 1176, mentioned *dromōnes*, horse transports, and *triēreis* in a fleet raised by Manuel to counter the Venetian threat in 1172.[20] Once again, these sources were orations composed in a classicizing style and neither of them can be relied upon, even so far as to maintain that galleys called *dromōnes* still actually existed in Byzantine fleets of the mid twelfth century.

When the word *dromōn* began to be used in Western literary sources in various transliterations such as *dromundus*, *dermundus*, etc., it became applied indiscriminately to large ships of any kind. It

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[17] Nikētas Chōniatēs, *Historia*, p. 74, ll. 33-4: "... ἀλλ᾽ ὅρον τιθεὶς τῆς ἐφέσεως τὸ καὶ εἰς τρίτον ζωστῆρα τῇ ὁλκῇ τῶν χρημάτων τὰς πάσας ἢ τὰς πλείους νῆας βαπτίζεσθαι, ..."; p. 76, ll 94-5: "... καὶ τῆς ἄνω εἰρεσίας ἐγγύς που βαπτομένας τῷ ῥεύματι.". Cf. Heliodōros, *Aithiopika*, I.i (p. 3): "τὸ γὰρ ἄχθος ἄχρι καὶ ἐπὶ τρίτον ζωστῆρα τῆς νεὼς τὸ ὕδωρ ἀνέθλιβεν· ...".

It is just possible that in the early twelfth century some Western galleys still had superimposed banks of oarsmen emulated from the dromon. See below pp. 424-6. However, it is more probable that they did not and that Chōniatēs' mental model was a Byzantino-Greek classical conceit.

[18] Western galleys of the thirteenth century normally had five wales. See Pryor, "Galleys of Charles I of Anjou", pp. 48-9.

[19] Michael Rhetor, "Oratio ad Manuelem imperatorem [2]", p. 156.

[20] Eustathios of Thessalonikē, "Oratio ad Manuelem imperatorem [2]", p. 37.

was known to the Anglo-Saxon earldorman Æthelweard, probably from Isidore of Seville, as early as the 980s. He used *dromo* to translate the Latin *longae naves* or the Anglo-Saxon words *ceol* ("keel") and *scip* into Latin for his chronicle when referring to the ships of the Danes and Anglo-Saxons when they first arrived in Britain.[21] Geoffrey Malaterra used the word in contradistinction to what were other names known to him for types of oared galleys: *galeae*, *catti*, and *golafri*.[22] The *Liber Maiolichinus de gestis Pisanorum illustribus* on the Pisan expedition to the Balearics of 1114-15 described the fleet as being composed of:

> Gatti, drumones, garabi, celeresque galee,
> Barce, currabii, lintres, grandesque sagene,
> Et plures alie variantes nomina naves.[23]

Sometimes, however, the word was definitely applied specifically to sailing ships. For example, the Anglo-Saxon pilgrim Saewulf, who went to the Holy Land in 1102-3, referred to the ship on which he left for home from Jaffa as a *dromundus* but his evidence makes it clear that this was a sailing ship.[24]

This Western literary usage may have one or both of two explanations. Westerners may simply have adopted the word in transliteration for large ships of any kind because *dromōn* had become the standard nomenclature for major units of Byzantine fleets and the

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[21] Æthelweard, *Chronicle*, I.3 (p. 7): "Advecti igitur sunt praefati iuvenes explentes petitionem regis senatusque, cum tribus dromonibus armis ornati, ..." Æthelweard may have taken this passage directly from the Latin text of the *Historia ecclesiastica gentis Anglorum* of the Venerable Bede, I.xv: "Tunc Anglorum sive Saxonum gens invitata a rege praefato, in Brittaniam tribus longis navibus advehitur.", with "*tribus longis navibus*" glossed as "*tribus dromonibus*" on the authority of Isidore of Seville. See Bede, *Historia ecclesiastica*, p. 68. On Isidore see pp. 126 & n. 14, 128, 134-5 above.

Alternatively Æthelweard may have derived this passage from a manuscript that was an ancestor of that now known as Ms. E of the *Anglo-Saxon chronicle*, Oxford, Bodleian, MS. Laud Misc. 636, where the word for ship was *ceol*. This passage appears only in MS. E. See *Anglo-Saxon chronicle*, p. 10. Æthelweard also used *dromones* in other passages apparently derived from MS E of the *Anglo-Saxon Chronicle* which post-dated Bede's *Historia ecclesiastica*, where the word for ship was *scip*. See Plummer and Earle, *Saxon chronicles*. See Æthelweard, *Chronicle*, III.1 (p. 26) [= MS. E, annus 787], III.4 (p. 31), III.4 (p. 33), IV.3 (p. 41) [= MS. E, *annus* 875], IV.3 (p. 44) [= MS. E, *annus* 882].

[22] Geoffrey Malaterra, *De rebus gestis*, II.8 (p. 32): "Nostri denique tantum modo germundos et galeas, Sicilienses vero cattos et golafros, sed et dromundos, et diversae fabricae naves habebant.".

[23] *Liber Maiolichinus*, ll. 106-8 (p. 10).

[24] See Pryor, "Voyages of Saewulf", pp. 49-51.

word had then become diffused as such in the nautical lingua franca of the Mediterranean. However, even if so, by the twelfth century the word may have become applied already to transports sailing ships as well as galleys, both in the Empire and across the Mediterranean at large. No eleventh- or twelfth-century Byzantine sources elucidate the issue because they simply used the word without ever attributing to it any specific characteristics of either sailing ships or galleys.

The word became widely used in Old French literature, probably for the first time in the surviving literature in the *Chanson de Roland*. In the Old French version of the Oxford manuscript, Bodleian Library, MS. Digby 23, the Muslim *amīr* Valdabron was said to be the master of 400 *drodmunz*. The *amīr* Baligant summoned his men from forty kingdoms and commanded his great *drodmunz* to be made ready and later was said to have: "I do not know to tell you how many *drodmunz* ...".[25] In various forms (*dromon, dromont, dromunt, dromund*) the word appeared also, for example, in *La chevalerie d'Ogier de Danemarche*,[26] in the *Chanson de Guillaume*,[27] in *Le couronnement de Louis*,[28] in the *Charroi de Nimes*,[29] in *Aliscans*,[30] in *La Fin d'Elias*,[31] in the Anglo-Norman *Roman de Rou* of Wace,[32] in the *Roman d'Auberon*,[33] and in *Blancandin et l'orguielleuse d'amour*.[34] Benoit de Sainte-Maure used it in his *Roman de Troie* of ca 1160-70, as did Chrétien de Troyes in his romance *Cligés* of ca 1176.[35] *Chelandion* also found its way into Old French as *calant* and *chalant*; although, these terms were used less widely than the various forms of *dromōn*.[36]

Use of the word spread as far as Norway and Iceland but not, to the best of our knowledge, to Germany. In the Old French and Anglo-Norman versions of the twelfth-century *chanson* of *Bueve de Hantone*

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[25] *Chanson de Roland. Vol. 1: La version d'Oxford*, ll. 1564, 2624, 2730. The word also appears in other forms (*dormun*, *dromon*) in other MSS. See vol. 2, ll. 2810, 2918; vol. 4, ll. 4537, 4728; vol. 7, ll. 931, 2310.

[26] *Ogier de Danemarche*, ll. 2325, 2348, 3070.

[27] *Chanson de Guillaume*, vol. 2, ll. 213, 2368, 3008, 3059, 3517.

[28] *Couronnement de Louis*, l. 1327.

[29] *Charroi de Nimes*, l. 212.

[30] *Aliscans*, ll. 18, 2268.

[31] *Fin d'Elias*, l. 1254.

[32] *Roman de Rou*, pt II, l. 2002.

[33] *Roman d'Auberon*, ll. 2421, 2424.

[34] *Blancandin*, ll. 2743, 2948, 3188, 3864, 4308.

[35] *Cligés*, l. 6575; *Roman de Troie*, l. 27, 566.

[36] *Blancandin*, ll. 2134, 2187, 2752, 3952, 5300, 5311; *Ogier de Danemarche*, l. 2325; *Le Chevalier au Cygne*, l. 142; *Fin d'Elias*, l. 1256; *Aliscans*, ll. 17, 2267; Mortier, ed., *Chanson de Roland*, vol. 4, ll. 4588, 4726; vol. 7, ll. 2253, 2309; *Roman de Rou*, pt II, l. 4039; *Chanson de Guillaume*, ll. 1725, 2354, 3517, 3522.

(Old French) or *Boeve de Haumtone* (Anglo-Norman), *dromont* (Old French) and *dromoun* (Anglo-Norman) was used for ships, as also was *calant*. In the Anglo-Norman version *dromoun* was used for a Muslim ship.[37] In the thirteenth century, the *chanson* was rendered into Old Norse as *Bevers Saga* and in it the hero was taken by ship to Egypt on a *drómundr* full of heathens.[38] Even earlier, in the *Saga inga konungs og bræðra hans* of the *Heimskringla* of Snorri Sturluson, nine ships under Jarl Rögnvald of the Orkneys and Erling Skakki on their way to the Holy Land came upon a large *drómundr*. It was not said whether this ship was a sailing ship or a galley but from the fact that the "heathen" (*heiðnir*) aboard the *drómundr* were able to rain weapons and stones and pots of boiling pitch and oil down upon the Norse ships, most probably a large sailing ship was intended.[39] In *Grettis saga Ásmundarsonar*, Grettir's brother Thorstein Asmundson was nicknamed "*Dromund*" because he was tall but slow of mien, suggesting that these were qualities that the Norse associated with the word and what they understood of the ship type by that time.[40]

Forms of both *dromōn* and *chelandion* also continued to be used in Arabic sources. Writing in the early eleventh century, ante 1034, Yaḥyā ibn Sa'īd al-Anṭāki, wrote under the year 999 that when Basil II besieged Tripoli, two *shalandiyyāt* supplied his forces from the sea. In his monumetal *Al-Kāmil fī 'l-ta'rīkh*, Ibn al-Athīr used the word *shalandiyyāt* on four occasions. Under the year A.H. 201 he reported that the Muslims captured nine large *marākib* ships with their men as well as *shalandiyyāt*, which in this context he may have intended to refer to the ships' boats. In A.H. 244, the governor of Syria, Al-'Abbās ibn al-Fadl ibn Ya'qūb, was said to have sent a fleet against Syracuse which encountered a Christian fleet of 40 *shalandiyyāt*. When the capture of Enna was announced to the Byzantine Emperor, he was said to have sent a fleet of 300 *shalandiyyāt* to Sicily under the command of a *patrikios*. Finally, the fleet sent to *Ifrīqiya* by the Almohad Caliph 'Abd al-Mu'min in A.H. 554 included 70 *shawānī*,

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[37] *Bueve de Hantone*, ll. 1603, 8248; *Boeve de Haumtone*, l. 354 and cf. l. 2744.

[38] *Bevers saga*, §5 (p. 295): "Nú taka þeir sveininn og fluttu hann út til hafsins og fundu þar einn drómund fullan af heiðingjum.".

[39] Snorri Sturluson, *Heimskringla*, Saga Inga konungs og bræðra hans, §17 (vol. 2, p. 780): "En Rögnvaldur og Erlingur skakki hittu á drómund einn í hafi og lögðu til níu skipum og börðust við þá. En að lyktum lögðu þeir snekkjurnar undir drómundinn. Báru þa heiðnir menn ofan á þá bæði vopn og grjót og grýtur fullar af vellanda biki og viðsmjörvi.". Cf. *Orkneyinga Saga*, §88 (p. 224).

[40] *Grettis Saga*, ch. 13 (p. 34): "Þu Rannveig áttu þann son, er Þorsteinn hét, manna fríðastr ok sterkr maðr, raddmaðr mikill ok hár maðr á vǫxt ok nǫkkut seinligr í viðbragði; því var hann drómundr kallaðr.".

ṭarā'id, and *shalandiyyāt*.[41]

Four texts from the late-twelfth and early-thirteenth centuries suggest that by that time at least the word *dromōn* had indeed become applied to transport ships and that Byzantines had begun to use a bireme *galea*, probably as developed in the Latin West, as their main battle galley. One of the last references to dromons to add any detail to the mere mention of the ships occurs in the chronicle of the historian of the Crusader States, archbishop William of Tyre. Writing of the Byzantine fleet sent to the Holy Land in 1169 by Manuel I Komnēnos to join the Franks of *Outremer* in a combined assault on Egypt, William wrote that it was composed of 150 "*longae naves rostrate*, arranged with twin *ordines* of oars", which he said were commonly known as *galee*, as well as 60 "[*naves*] *maiores ad deportandos equos deputate*", horse transports equipped with stern ports and ramps for embarking and disembarking, and 10 or 12 "[*naves*] *maxime que dromones dicuntur*", very large transports called *dromones*.[42]

Either William did not understand the traditional Byzantine meaning of *dromōn* or else by the time that he was writing the word *dromōn* really had become applied to transport ships. On the one hand, if in fact he misunderstood the Byzantine terminology, he may be read as saying that the Byzantine fleet had 150 battle galleys, presumably dromons, which he then equated with Western *galee* with which he was familiar, and 60 specialized horse transports as well as 10 or 12 general transports. William used the classical "*rostrate*", "rammed"/"with rams", to describe the *longae naves* or *galee*; however, this was merely conventional classicizing affectation and the reference must have been to spurs. Then, he said that they had twin *ordines* of oars. If this was not yet another literary allusion,[43] it may

[41] Yaḥyā ibn Sa'īd, *Histoire*, p. 459; Ibn al-Athīr, *Al-Kāmil* (Tornberg), vol. 6, p. 339. Ibn al-Athīr, *Al-Kāmil* (Fagnan) pp. 227, 228, 585. Cf. above pp. 48, 98. We have not attempted to comb systematically the Arabic sources for the use of the words since there is little point in doing so. These are merely two instances which have come to our attention.

[42] William of Tyre, *Chronicon*, 20.13.7-17 (vol. 2, p. 927): "Erant sane in prefato exercitu naves longe, rostrate, geminis remorum ordinibus instructe, bellicis usibus habiliores, que vulgo galee dicuntur, centum quinquaginta, item his maiores ad deportandos equos deputate, ostia habentes in puppibus ad inducendos et educendos quoque eos patentia, pontibus etiam, quibus ad ingressum et exitum tam hominum quam equorum procurabatur commoditas, communite, sexaginta, item harum maxime, que dromones dicuntur, alimentis varii generis armisque multiplicibus, machinis quoque et tormentis bellicis usque ad summum referte, decem aut duodecim.". Cf. above, pp. 109, 114-15.

[43] William's mental model may well have been derived from Isidore of Seville.

have been intended to refer either to two files of oars, both rowed from a single bank above deck, or to two superimposed banks of oars. *Ordo* could have either meaning. If William did misunderstand the Byzantine terminology, then the latter meaning of *ordo*, two superimposed banks, is possibly correct and William may therefore be a witness to the survival of the traditional dromon to the late twelfth century. On the other hand, if William recorded the composition of the Byzantine fleet correctly, then we have the first evidence for the passing of the dromon as a battle galley and the adoption by the Byzantines of some type of bireme *galea* in its place. In this case *ordo* almost certainly referred to two files of oars rowed from the same benches above deck.

There are four reasons for believing that William did in fact record the composition of the fleet correctly and that therefore he is the first witness to the demise of the dromon as a war galley. First, William had been to Constantinople on two occasions and must have been familiar with Byzantine war galleys. It had been he who had been sent to Constantinople in 1168 by Amalric I of Jerusalem to negotiate with Manuel I Komnēnos for this very same combined assault on Egypt and he wrote that the terms of the agreement for the expedition were drawn up in documents which he himself brought back to Jerusalem. These would surely have contained the specifications for the fleet. William also spent another seven months in Constantinople later, in 1179-80, on his way home from attending the Third Lateran Council.[44] Secondly, in his description of this Byzantine expedition to Egypt Nikētas Chōniatēs also wrote that the fleet was composed of 200 long ships, *makrai nēes*, of which 60 were *triēreis* sent to Acre under Theodore Maurozomēs to embark the Frankish cavalry, amongst other purposes. The identity in the figures is too striking to ignore and there is no evidence that Nikētas either had access to a manuscript of William of Tyre or could even read Latin. Nikētas is therefore an independent witness to the veracity of William's account, at least in so far as the number of horse transports are concerned. This being so, there is no reason *per se* to question the rest of it.[45] And, thirdly, the

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See Isidore of Seville, *Etymologiae*, XIX.i.23: "Biremes autem naves sunt habentes remorum ordinem geminum.". William's use of the less expected *gemini* rather than the more obvious *duo* to qualify *ordines*, suggests that he had Isidore in mind.

[44] William of Tyre, *Chronicon*, 20.4, 22.4 (vol. 2, pp. 916, 1009-1010).

[45] Nikētas Chōniatēs, *Historia*, Βασίλεία Μανουὴλ τοῦ Κομνηνοῦ.Ε΄ (p. 160, ll. 36-44): "..., στόλον καταρτύει βαρὺν κατὰ του... ἀπὸ δὲ τουτωνὶ τῶν τριηρέων ἑξήκοντα τῷ Μαυροζώμῃ παραδοὺς Θεοδώρῳ πρὸς τὸν ῥῆγα ἐξέπεμψε, προκαταγγελοῦντα μὲν καὶ τὴν ὅσον οὐδέπω τοῦ λοιποῦ στόλου ἀναγωγὴν καὶ τὴν ἐκεῖσε τοῦ Κοντοστεφάνου

anonymous author of the Old French translation of William of Tyre, known as the *Eracles*, did not change William's specifications for the expedition of 1169, even though he was generally well versed about naval matters and did not hestitate to alter or gloss William's text on other occasions when he thought him to be wrong or unclear.[46]

Nikētas Chōniatēs used the word *dromōnes* only in one instance. In all other cases he used either various circumlocutions or else the classical word *triēreis*. The one exception occurred in his description of the Venetian fleet of the Fourth Crusade of 1202-4, which he said consisted of "110 horse-carrying *dromōnes* and sixty long ships, νῆες δὲ μακραί (*nēes de makrai*)".[47] It is well known from Latin sources that the horse transports for the Fourth Crusade were *usserii/huissiers/ oxerii*, which were transport galleys of the type of *taride*, emulated from Muslim *ṭarā'id*, or *chelandra*, derived from the Byzantine *chelandion*.[48] These 110 "*dromōnes*" were not battle galleys but rather horse transports with stern ports and ramps for embarking and disembarking cavalry. The sixty long ships referred to by Nikētas were the galleys of the Venetian battle fleet. It should be borne in mind that Nikētas was in Constantinople in 1203-4 and was an eye witness to the assault. His apparent misapplication of the term *dromōn* is further evidence that by the time he was writing, it had indeed become applied to transport ships and that Byzantines had adopted some other type of galley as their battle galley.

The third instance in the same period of the application of the term *dromōn* to some type of ship distinguished from a war galley occurs in the *Itinerarium peregrinorum.* Describing a relief fleet of 15 ships sent by Ṣalāḥ al-Dīn to the relief of Acre in 1190 during the Third Crusade, the author described it as being composed of three larger ships, "which they call *dromones* in the vernacular", following behind lighter and swifter *galee*. Again, a contemporary eye-witness used a

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ἄφιξιν, διαναστήσοντα δὲ κἀκεῖνον ὡς εἴη ἑτοιμασάμενος τὰ πρὸς ἔξοδον, ἅμα δ' ἀποκομίσοντα καὶ τὰ τῶν Ἱεροσολυμιτῶν ἱππέων ὀψώνια, ὅσοι συνεκστρατεύειν ἤμελλον τῷ ῥηγὶ συνεφαπτομένῳ τοῦ πολέμου καὶ κατ' Αἰγυπτίων τιθεμένῳ τὴν κίνησιν, καθ' ὧν ὁ στόλος ὁ Ῥωμαϊκὸς συγκεκρότητο.".

It should be noted that Nikētas did not derive these figures from John Kinnamos. Kinnamos described the fleet as being composed of "vessels, horse transports, and very numerous warships" ("..., στόλον νεῶν ὁ βασιλεὺς τεκτηνάμενος ἱππαγωγῶν τε καὶ πολεμιστηρίων ...") but did not give any figures. John Kinnamos, *Historiae*, VI.9 (p. 278).

[46] *Eracles*, XX.13 (p. 961). Cf. above p. 286 and nn. 413-14.

[47] Nikētas Chōniatēs, *Historia*, Βασιλεία Ἀλεξίου τοῦ Αγγελοῦ.Β΄ (p. 539): "... δρομώνων μὲν ἱππαγωγῶν ἑκατὸν δέκα, νηῶν δὲ μακρῶν ἑξήκοντα, ...".

[48] See Pryor, "Transportation of horses by sea", p. 21; Idem, "Crusade of Frederick II", pp. 125-7.

Latin form of *dromōn* to describe ships that were larger and slower than those that he equated with Western battle galleys.[49]

Finally, in Old French, the continuation of the chronicle of William of Tyre attributed to Ernoul, similarly identified the term *dromōn* in its Old French form of *dromont* with a large sailing ship. The report that while Richard Cœur de Lion was en route from Cyprus to Acre in 1191, his fleet fell in with and sank a large Muslim sailing ship sent by Ṣalāḥ al-Dīn from Beirut or from Egypt in a last attempt to relieve Acre was one recorded in several sources, both Arabic and Latin.[50] In the chronicle attributed to Ernoul the ship was said to have been a *dromont*.[51] In his chronicle of the Fourth Crusade, Robert of Clari on one occasion used the word *dromon* in apposition to *huissier* to refer to the horse transports constructed by Venice for the Crusade,[52] just as Nikētas Chōniatēs did.

The texts of William of Tyre, Nikētas Chōniatēs, the *Itinerarium peregrinorum*, Ernoul, and Robert of Clari suggest clearly that by the turn of the twelfth and thirteenth centuries the term *dromōn* and its Latin equivalents had become applied to transport ships and was no longer used for battle galleys. No other text known to us suggests anything to the contrary. In his *Chronikē syngraphē*, George Akropolitēs, the historian of the Empire of Nicaea, used *dromōn* amongst various other words for ships but without making it possible to tell whether he was referring to a warship type still currently in use.[53]

From the thirteenth century even the mere use of the word *dromōn* became infrequent. It was gradually replaced by other terms, especially κάτεργον (*katergon*), which appears to have been derived

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[49] *Itinerarium peregrinorum* (Mayer), p. 348: "Tres maiores naves subsequuntur, quas vulgo dromones appellant, galee vero leviores et ad quelibet attemptanda agiliores precedunt.".

[50] See Pryor, *Geography, technology, and war*, pp. 120-21.

[51] Morgan, *Continuation*, §120 (p. 121): "Dedenz ce qu'il ariva devant la cité d'Acre, Salahadin faiseit venir une grant nave d'Egipte que l'on diseit le dromont, ...".

[52] Robert of Clari, *Conquête de Constantinople*, §10 (p. 130): "Quant li pelerin furent tot asanlé en Venice et il virrent le rike navie qui faite estoit, les rikes nes, les grans dromons et les uissiers a mener les chevax, et les galies, ...".

[53] George Akropolitēs, *Opera*, §48 (vol. 1, p. 87): "τὰ μὲν οὖν χρειώδη ἑαυτοῖς περιεποιοῦντο, σπάνιν δὲ τῶν ἀναγκαίων τοῖς Ῥωμαίοις ἐκ τούτου συνέβη γίνεσθαι, ἐφ ᾧ τυγχάνειν δρόμωνας καὶ ἕτερα ξύλα τοῖς Γενουΐταις πειρατικά."; §85 (vol. 1, p. 181): "ἔπεισεν οὖν αὐτοὺς εἰσιόντας ἐν ὅσαις εἶχον τριήρεσι καὶ τισιν ἑτέροις πλοίοις λεμβαδίοις οἷον καὶ δρόμωσι, ...". See also Akropolitēs' funeral oration for John III Doukas Vatatzēs. Ibid., vol. 2, p. 15: "ὁ δὲ τὸ σκάφος παραλαβὼν σμικρότατον πάνυ καὶ ὅσον οὐχ ἁπλῶς κοίλην νῆα ἀλλ᾽ οὐδὲ δρόμωνα ἢ λέμβος λογίζεσθαί τε καὶ φαίνεσθαι, ...".

from κατά and ἔργον, having the sense of any works or service or anything else owed or needed for naval warfare. It was originally applied not to ships per se but rather to crews, to populations owing military service, and even to armaments.[54] Only from the twelfth century did it become used to describe an actual category of ships, and even then it appears to have become used as a generic for a warship

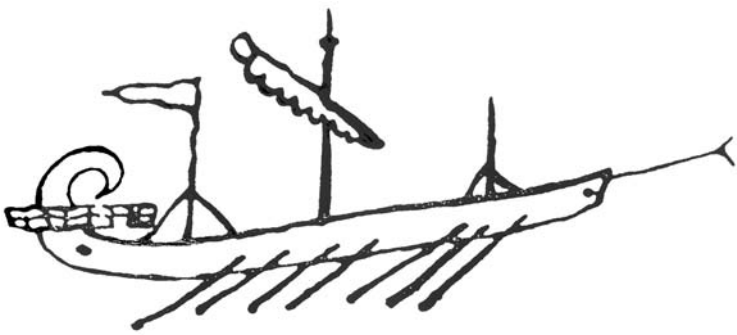


Figure 48
Graffito of a *katergon*? From the monastery of the Blatadōn at Thessalonikē, post 1355.

rather than with any specific reference to a ship type. Anna Komnēnē referred to the personal galley of Nicholas Maurokatakalōn's vice-admiral in 1096 as having been called by the crew the "*katergon exkoussaton*".[55]

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[54] See Haldon, "Theory and practice", p. 211: "περὶ τοῦ ἑτοιμασθῆναι καρφίον ἁρπάγιον κοινοστομαῖον λόγῳ χελωνῶν καὶ σκαλῶν καὶ λοιπῶν κατέργων χιλιάδας γ΄, ..." and commentary at p. 270. Cf. Constantine VII, *De cerimoniis*, II.44 (vol. 1, pp. 658-9).

The people of Samos were referred to as *katergon* in a chrysobull of Manuel I of 1158. See Diplomata et acta monasterii Sancti Ioannis Theologi in Patmo insula, N° XXVIII, in Miklosich and Müller, *Acta et diplomata*, vol. 6, p. 111.

According to Michael Chōniatēs, *katergokistai* were responsible for the administration of the obligation called *ktisis katergōn* or *katergoktisia* which was imposed on coastal populations. See Michael Chōniatēs, *Ta Sōzomena*, vol. 2, p. 107.

[55] See Anna Komnēnē, *Alexiade*, X.viii.3 (vol. 2, p. 216): "... δεύτερον κόμητα μετὰ τοῦ ἰδίου κατέργου ἐξκουσσάτου ...". Cf. XII.viii.8 (vol. 3, p. 81). *Exkoussatos* was not a Greek word. It appears to have been Anna's rendering of the Latin *excusatus*, having the sense here of "reserved [for the use of]".

Howard-Johnston identifies X.viii as the work of Nikēphoros Bryennios and XII.viii as a passage based on military reports, perhaps by the *megas doux* Isaac Kontostephanos. See Howard-Johnston, "Anna Komnene", pp. 279, 283.

See also the continuation of the chronicle of George Hamartolos. George

A note added in a later hand to folio 18 of a tenth-century manuscript of a *Mēnaion*, Offices of the Greek Church, for April and early May, recorded the death in 1179 of a certain Constantine Doukas and his service at a siege of Ancona, and mentioned that he had been surrounded there by German and Venetian *katerga*.[56] The Greek version of the *Chronicle of the Morea* recorded that a fleet sent to the *Morea* in 1263 by Michael VIII Palaiologos was composed of *katerga*, *karabia*, and ταρέτες (*taretes*). *Taretes* was an adoption into Byzantine Greek of the Latin *taride* for horse transports, suggesting that by the thirteenth century the Byzantines had not only abandoned dromons in favour of *galeae* but had also abandoned *chelandia* as horse transports in favour of *taride*. A chrysobull of Alexios III Komnēnos of Trebizond for the Venetians, dated to 1364, also referred to *katerga*.[57] Some of the fourteenth-century "short chronicles" consistently used *katergon* for both Byzantine and Western galleys.[58] The text known as the *Traité des offices* attributed to pseudo-Kodinos and composed ca 1350-1360 referred in many places to *katerga* and even to an "imperial *katergon*" but never to either dromons or *chelandia*.[59] By the fifteenth century, in the anonymous verse chronicle known as the *Chronicle of the Tocco*, *katergon* (and *katirgon*) was clearly used as a Greek equivalent for the contemporary Latin *galea*.[60] The references could be multiplied but there is little point in doing so. Eventually, the word gave rise to the Ottoman Turkish *kadirga* for a war galley.[61]

We conclude with a comment on change of terminology in manuscripts of the "letter" attributed to Pseudo-John of Damascus and the *Letter of the three Patriarchs*. The version of the *Letter of the*

Hamartolos, *Chronikon syntomon*, VI.viii.2 (col. 1228B): "..., καὶ μετὰ συντομίας ἔπεμψεν κάτεργα εὐθέως, ...".

[56] The manuscript is Paris, Bibliothèque Nationale, MS. Gr. 1564. Previously it was Cod. Reg. 2476 in the French royal library and this note was excerpted from it by B. Montfaucon in his notice on the manuscript. Montfaucon, *Palaeographia Graeca*, pp. 47-8. Constantine Doukas is known from no other source. See Polemis, *The Doukai*, p. 191. The dating to 1179 is incorrect and should probably refer to the siege of Ancona in 1173. The note says that Constantine died seven days after returning home from the siege. See also Ahrweiler, *Byzance et la mer*, pp. 260-61.

[57] *Chronicle of the Morea*, l. 4579 (p. 302); Miklosich and Müller, *Acta et diplomata*, vol. 3, No. XXXIII (p. 131): "..., τῶν ἀρχόντων καὶ κεφαλάδων μου, τῶν κατέργων, καραβίων καὶ ἑτέρων τοιούτων ξύλων μου, ...".

[58] See Schreiner, *Kleinchroniken*, vol. 1, pp. 65, 68, 80, 85, 86.

[59] Pseudo-Kodinos, *Traité des offices*, pp. 167, 186, 236, 237, 286, 287.

[60] *Chronicle of the Tocco*, ll. 335, 478, 533, 546, 562, 599, 611, 1136, 1144, 1838, 1895, 3621, 3747, 3774, 3800-1, 3804.

[61] See Kahane and Tietze, *Lingua Franca*, §785 (pp. 523-6).

three Patriarchs found in the manuscript of the monastery of the Iviron, Mt Athos, Codex 381, which is dated to 1426, contains the following clause: "... and capturing these areas in a naval manner by means of *katerga*, in number 120, ...".[62] Here the word for ships was *katerga*. However, this manuscript was a late reworking of an earlier version of the *Letter of the three Patriarchs* which had many variants, including an ending incorporating material from the letter of Pseudo-

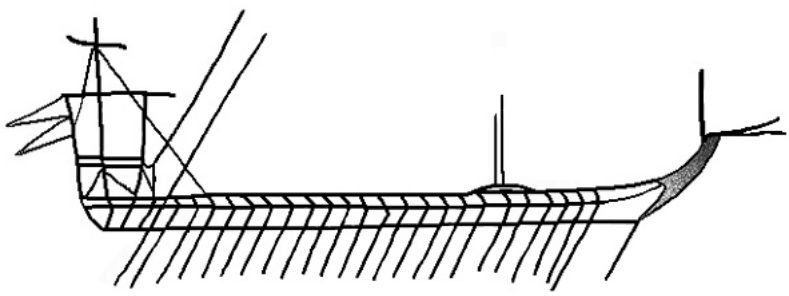


Figure 49
Graffito of a *katergon*? From Hagia Sophia, Trebizond, probably fourteenth century.

John of Damascus, where the corresponding word was "δρόμορσι", editorially emended to "δρόμωσι".[63] The use of *katerga* by the scribe of the Iviron manuscript either represented his inability to make sense of the reference to dromons in the earlier manuscript or his knowledge that dromons had been superseded by *katerga*.

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[62] Munitz, *Letter of the three Patriarchs*, §15 (p. 101): "... καὶ καταλαβῶν τὰ ἐκεῖσε ναυστολικῶς διὰ κατέργων τὸν ἀριθμὸν ρκ΄, ...".

[63] See above p. 170 & n. 32.

CHAPTER SIX

THE TRIUMPH OF THE *GALEA*

The question remains. Why did the galley which had become known as the *dromōn* disappear? Or to rephrase the question, why did the word *dromōn* cease to be used for war galleys? Byzantines, and others, continued to have war galleys but they discontinued the use of the word *dromōn* and its variants for them. The dromon itself had developed in late antiquity because it had some significant performance advantages over the Roman *liburna* which have never been explained. We have suggested that these were related to the replacement of polyremes by monoremes, of the ram by the spur, of the square sail by the lateen, of part decks by full decks, and to the development of new hull design characteristics, particularly at the bow, which gave greater speed, especially in battle. In its hey-day in the tenth century, the dromon had been one of the bulwarks of the Byzantine Empire, together with the armies of the *themata*. Yet from the twelfth century it gradually disappeared as a battle galley, its name became applied to transport ships, and eventually even its name faded from use. These developments must have been a product of the evolution of some new form of naval technology which gradually replaced the dromon as the paramount battle galley in the Mediterranean. The only convincing candidate for this historical role is the bireme galley, becoming known as *galea*, which was developed and improved over time in the Latin West from the eleventh century until it attained a standard form by the late thirteenth. There is no evidence to suggest that any form of galley developed in the Muslim world ever had performance characteristics of such superiority that it, rather than the Latin *galea*, could have played this historic role.

Early Western *galeae* were almost certainly modelled originally on Byzantine *galeai*, or at least that is where the word came from, since, as we have seen, *galeai* was used for monoreme dromons at least as early as 905-6 by Leo VI, whereas the earliest known use of the Latin term is in late eleventh-century Italo-Norman chronicles.[1] The very

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[1] See Leo Marsicanus, *Chronica*, III.25 (p. 716): "..., duabus galeis armatis insulam ingressus est, ..." [written ca 1087-1105]; William of Apulia, *Gesta*, V.339 (p. 297): "Quamque magis celerem cognoverat esse galeram / Scandit; ibi posito Roberti corpore transit, ..." [written ca 1095-99]; Geoffrey Malaterra, *De rebus gestis*,

fact that the term does first appear in Latin in these sources from South Italy adds to the weight of evidence suggesting an adaptation of the ship type and an adoption of the use of the term for it in South Italy from the Byzantine originals no doubt encountered there by the Normans and others. Very little is, in fact, known about early Western *galeae* even though references to them proliferated extremely rapidly in the chronicles from the early twelfth century. Although frequently mentioned, they were never described in any detail and documentary sources recording construction specifications for them do not survive before the late thirteenth century. All that is known about early Western *galeae* is that they were fast and had fine lines.[2]

It is not even clear whether they were monoreme galleys at this time, as Byzantine *galeai* had been, or whether they were already biremes. Pictorial evidence does not help a great deal since Western art depicted no more than schematic monoreme "banana boats" before the mid twelfth century. The first clear evidence for the construction of *galeae* occurs in marginal miniatures in the Paris, Bibliothèque Nationale, MS. Suppl. Lat. 773 manuscript of the *Annales Ianuenses* of Genoa. These annals were commenced as a private record by the Genoese consul Caffaro around 1100, were adopted officially by Genoa in 1152, and were continued by him to 1163. Thereafter, various scribes continued them until 1294.[3] Seven miniatures accompanying references to *galeae* in twelfth-century entries in the annals show galleys with marked stern ornaments, pronounced spurs, and either one or two rows of oar ports.

Although Caffaro's editor, Belgrano, thought that the miniatures

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IV.25 (p. 103): "..., navicula in qua episcopus erat, sociis armis carentibus, a duabus piratarum navibus, quas galeas appellant, hostiliter aggreditur." [written ante 1099]; *Anonymous chronicle of Bari*, p. 153: "Capta est galea Petri de Gira a Saraceni in Malea. Et galea quatuor Barenses compraehensae sunt a stolo imperatore.", cf. p. 155 [written ca 1115 but based on much earlier sources].

If the famous *Chanson de Roland* really can be dated to the late eleventh century, then we can also add it to the Italo-Norman texts. The word *galies/galees* is used twice in the Oxford manuscript of the text for ships among the fleet of the emir Baligant. See *Chanson de Roland*, vol. 1, ll. 2625, 2729.

The text "Tunc rex Aelfredus iusssit cymbas et galeas, id est longas naves, fabricari per regnum ...", in Asser's *Life of king Alfred*, has been shown to be a later interpolation from Matthew Paris. See Asser, *Life of King Alfred*, §50c (p. 39) and n. to §50c.

[2] See Amatus of Monte Cassino, *L'ystoire de li Normant*, V.14 (p. 151): "... et fist armer de moult sollempnels mariniers .ij. galéez subtilissime et moult vélocissime; ..." [written ca 1078-83].

On early *galeae* and the use of the word see Pryor, "From dromōn to galea", pp. 108-10; Kahane, "Two nautical terms", pp. 428-39.

[3] See Face, "Caffaro".

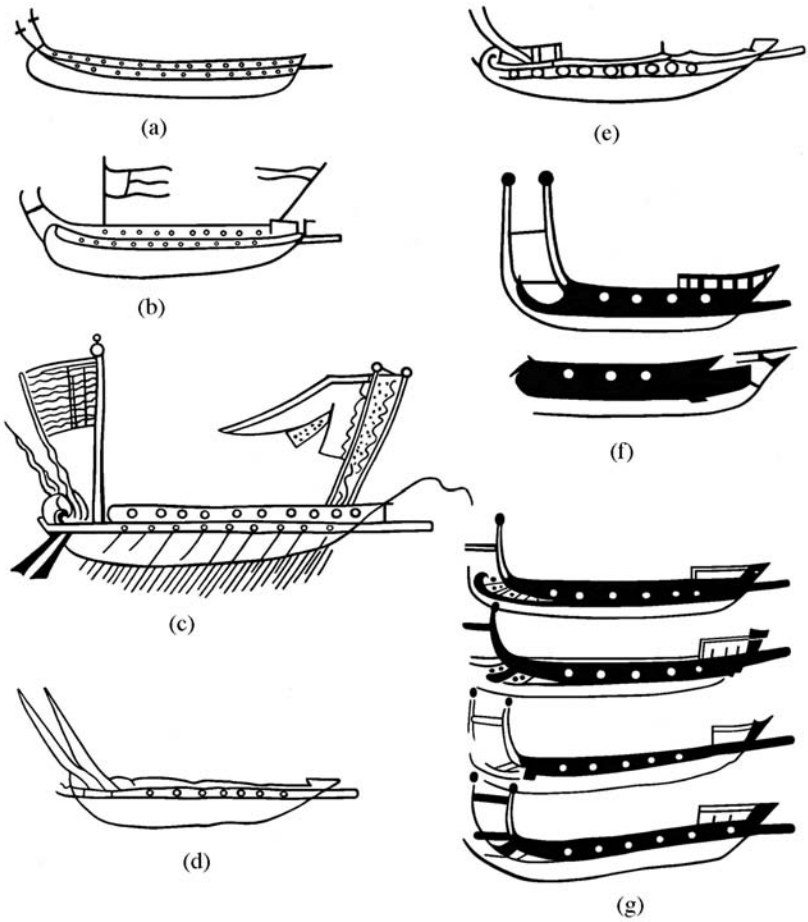


Figure 50
Galleys in the *Annales Ianuenses* of Genoa (Paris, Bibliothèque Nationale, MS. Suppl. Lat. 773), ca 1160-1200.
(a) accompanying the entry for 1125
(b) accompanying the entry for 1136
(c) accompanying the entry for 1165
(d) accompanying the entry for 1168
(e) accompanying the entry for 1170
(f) accompanying the entry for 1175
(g) accompanying the entry for 1191
© John H. Pryor

were all drawn by the same artist, it is important to note that the three earliest miniatures of *galeae* accompanying entries for 1125, 1136, and 1165, which date from the lifetime of Caffaro, have two rows of oar ports, whereas all of those later than this, accompanying entries for 1168, 1170, 1175, and 1191, have only single rows of oar ports.[4]

The style of depiction of the galleys also varies considerably, leading to the conclusion that either the miniatures were not all done at the one time by the same artist or that if, as they now are in the Bibliothèque Nationale manuscript, they were all done at the one time by the same artist, then the originals which he copied were not. The differences between them may therefore provide evidence of changes in *galea* design over the twelfth century. The first three miniatures show the upper row of oarports in a band at the top of the hull above the spur and the lower in another band either at the level of the spur or below it. The evidence of these three miniatures is admittedly exiguous and no corroborating corollary evidence from any other pictorial sources dated to the first half of the twelfth century is known to us. Nevertheless, they may sustain a tentative hypothesis that in the early twelfth century Genoese *galeae* were biremes with two superimposed banks of oars, both rowed through oarports, one above deck and the other below it, just as Byzantine dromons had been. If this was the case, then it raises a second possibility that the Byzantine *galeai* on which early Western *galeae* were modelled had also become biremes by the late eleventh century, whereas in the Macedonian age they had been monoremes distinguished from bireme *dromōnes* and *chelandia*. Such a development would have been yet another instance of the gradual evolution over time of ship types and the names applied to them, particularly of the tendency of ship types to grow larger, parallelling that by which biremes also became called *dromōnes* between the sixth and tenth centuries. The four later Genoese miniatures suggest a possibility that from some time in the second half of the twelfth century a change was made to another oarage system which required only one row of oar ports in the hull. That being said, the evidence is inadequate to sustain the thesis and it is more probable that Western *galeae* were from the beginning associated with a new and different oarage system and that the differences in the miniatures of the *Annales Ianuenses* were a product of artistic style only.

More revealing than the miniatures of the *Annales Ianuenses* are three illustrations of galleys in the Madrid, Biblioteca Nacional, vitr.

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[4] Caffaro, *Annali*, vol. 1, pp. xxv-xxvi.

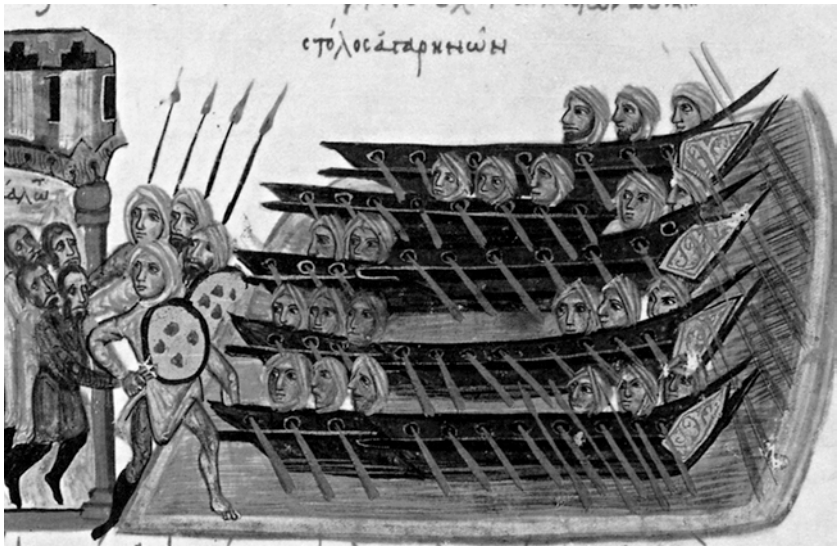


Figure 51
Bireme Muslim galley in the *Synopsis historiōn* of John Skylitzēs (Madrid, Biblioteca Nacional, vitr. 26-2, fol. 111v), ca 1160.



Figure 52
Bireme galleys in the *Synopsis historiōn* of John Skylitzēs (Madrid, Biblioteca Nacional, vitr. 26-2, fol. 145r), ca 1160.

26-2 manuscript of the *Synopsis historiōn* of John Skylitzēs.[5] These show clearly for the first time,[6] bireme galleys which have a different oarage system. One file of oars is rowed through oarports but the other is worked from above the gunwale.



Figure 53
Bireme galleys in the *Synopsis historiōn* of John Skylitzēs (Madrid, Biblioteca Nacional, vitr. 26-2, fol. 146v), ca 1160.

The first of these three important illustrations (folio 111v) purports to show four Muslim galleys, drawn in a style similar to that of the *Annales Ianuenses*, of which the bottom-most has a second file of three oars at the stern rowed from above the gunwale in addition to a file rowed through oarports in the hull. [See Figure 51]

The second (folio 145r) shows three bireme galleys with this same oarage system drawn in a different and extremely distinctive style found in none of the other 49 illustrations of galleys in the manuscript. [See Figure 52] The third occurs in a series of illustrations by an artist drawing in eclectic styles. In one of these (folio 146v), he depicted four galleys in a Western style similar to that of the *Annales Ianuenses*

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[5] See Appendix Seven.

[6] The Roman *liburnae* of Trajan's column also had a file of oars worked over the gunwale. See Lepper and Frere, *Trajan's column*, plates 25, 26, 34, 35, 58, 59, 61, 63.

but again, in two of them, with one file of oars rowed through oarports and the other from above the gunwale. If, as Wilson has argued, the original Constantinopolitan manuscript was brought to Sicily in 1158, and the extant Madrid copy was made shortly after that, then these illustrations are the earliest depictions of this distinctive new bireme oarage system for medieval Western galleys. They would predate the earliest of the *Annales Ianuenses* miniatures showing only a single row of oar ports, which presumably depict this same oarage system, even though they do not show the files of oars, by around a decade and a half.

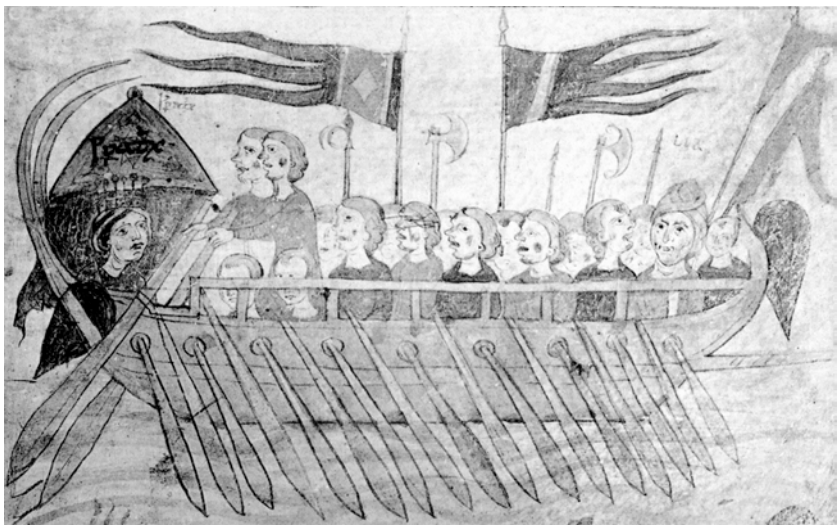


Figure 54
Sicilian galley in a manuscript of the *De rebus Siculis carmen* of Peter of Eboli (Berne, Burgerbibliothek, MS. 120, fol. 119r), early thirteenth century.

There is no doubt that all three of these Skylitzēs illustrations were based on Western models. The artists of folios 111v and 146v were drawing galleys in the style of the *Annales Ianuenses* but with this new type of bireme oarage system. The galleys of folio 145r are extremely similar in design to one shown in the South Italian or Sicilian manuscript of the *De rebus Siculis carmen* by Peter of Eboli, dated to ca 1200. For the first time, this illustration shows a bireme galley with this same oarage system, but with both files of oarsmen

clearly shown above deck.[7] It is almost impossible to believe anything else than that the Skylitzēs artist of folio 145r and the illustrator of Peter of Eboli belonged to the same artistic tradition and were depicting a galley type which had become standard in the Latin West, or at the very least in Sicily and South Italy, by the sixth or seventh decades of the twelfth century.

This bireme oarage system was in fact what later became known in the late Middle Ages as the *alla sensile* system. Two oarsmen each rowed single oars from the same bench above deck. They used a stand-and-sit stroke as opposed to the fully seated stroke that had been used on classical and Byzantine galleys. The inboard oar was rowed through an oarport in an outrigger, which now reappeared on war galleys in the Mediterranean for the first time since the replacement of *triēreis* by *liburnae*. The outboard oar was rowed from a thole mounted on the outrigger's "gunwale", the *apostis*. The earliest documents which confirm that Western galleys were fully decked and used this *alla sensile* oarage system date from between 1269 and 1284 from the chancery of the Angevin Kingdom of Sicily during the reign of Charles I of Anjou.[8]

Comparing the illustrations of the Skylitzēs manuscript, the four later miniatures of the *Annales Ianuenses*, and the Peter of Eboli illustration, it is apparent that on folios 145r and 146v of the Skylitzēs manuscript the lower banks of oars are rowed through oarports in the hull below the level of the spur and a narrow band on the upper hull which can be presumed to have represented the outrigger or bulwark above the deck. However, on folio 111v of the Skylitzēs manuscript and in both the *Annales Ianuenses* miniatures and the Peter of Eboli illustration the oar ports are in this upper band of the hull. In the latter cases, there can be no doubt that what is represented was the *alla sensile* oarage system. In the case of folios 145r and 146v of the Skylitzēs manuscript it is just possible that a transitional oarage system between the new *alla sensile* system and the older one was still in use and that the lower bank of oars was rowed from below deck. However, more probably the artists of these folios were simply being inaccurate and the artist of folio 111v had it right. The illustrations of

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[7] On the interpretation of this illustration see Pryor, "Galleys of Charles I of Anjou", pp. 63, 71, 73; idem, "From dromōn to galea", p. 110.

[8] See Pryor, "Galleys of Charles I of Anjou", pp. 69-73. The reconstruction there was based on the assumption that the oarsmen still used a fully seated stroke. Pryor later changed his opinion on this matter and accepted that a stand-and-sit stroke was used on these Angevin galleys, presenting a revised reconstruction of the oarage system in "From *dromōn* to *galea*", pp. 112-114.

the Skylitzēs manuscript, which have been hitherto almost unnoticed by maritime historians,[9] are thus extremely important and provide the oldest evidence for the appearance of the *alla sensile* oarage system. They give a far more definite picture of it than do the miniatures of the *Annales Ianuenses* and the best evidence for it before the Peter of Eboli illustration.

Even if early Western *galeae* had two superimposed banks of oars, by the mid twelfth century this was certainly no longer the case and by the turn of the twelfth and thirteenth centuries only one text known to us suggests the use of any oarage system different to the *alla sensile*: the anonymous *Itinerarium peregrinorum* and the chronicles derived from it. In a very curious passage, its author, while reflecting on the contrasts between ancient and "modern" naval warfare, clearly used "*ordo*" in the sense of superimposed banks of oars.[10] However, whether he really meant that Western galleys of the end of the twelfth century had superimposed banks of oars is debatable because he was indulging in a passage of classicizing erudition based on Vegetius.[11] That being said, he did continue on and in two places definitely referred to two superimposed banks of oars on some Crusader galleys at Acre in 1190. First, he said that on galleys which sortied to engage the Egyptian fleet coming out to fight from Acre, the shields were arranged around the "upper benches", and that the oarsmen "sat in the lowest part, so that those who were in the highest part for fighting might fight in freer space".[12] This could only mean that the decks and their oar benches were cleared for marines and that the oarsmen rowed from below deck. Secondly, in his description of the ensuing battle, he said of one *galea* that:

> By now the enemy had boarded another [galley] and having dislodged the marines [was] master of the upper deck. But those to whom the lower post had been assigned tried to escape with the help of the oars. Extraordinary

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[9] However, see now Babuin, "Illuminations".

[10] *Itinerarium peregrinorum* (Mayer), p. 322: "Apud veteres siquidem in huiusmodi navibus [liburne] numerosior exigebatur ordo remorum, quibus gradatim per tabulata distincta surgentibus undas alii longissimo, alii breviore vexabant impulsu. *Ternos* autem *vel quaternos* ordines sepius habebant et *quinos interdum*, sed et *senos* naves quedam *in Actiaco prelio*, ... Ceterum omnis illa vetustatis magnificentia imminuta defluxit, nam classis bellica, que senis olim decurrebat ordinibus, nunc binos raro excedit.".

[11] Cf. Vegetius, *Epitoma*, IV.33, 37 (pp. 151, 153).

[12] *Itinerarium peregrinorum* (Mayer), p. 323: "In superioribus vero tabulatis clipei per girum disponuntur conserti, et in imo considunt remiges, ut spatio liberiore dimicent, qui ad pugnam in suppremo consistunt.".

> and terrible was the conflict; for the oars being pulled in opposite ways, the galley was driven sometimes this way by our [men], sometimes that way as the Turks drove [it]. At length our men prevailed, and being dislodged by the onset of the Christians the enemy rowing above was overcome.[13]

This tale of a galley being driven now one way and now the other by two banks of oars being rowed in opposite directions, one below deck and the other above it, could only have been possible if the galley had two banks of oars arranged in the same way that Byzantine dromons had had. But the entire story is a mere fancy. Even if oars were on two superimposed banks, they could not possibly have been rowed in opposite directions without becoming hopelessly entangled. Certainly, the oars of the three banks of *Olympias* could not have been because their blades intermeshed at the waterline.[14] Moreover, even if a galley did have banks of oars whose blades were normally clear of each other at the waterline, it would not have been possible for antagonists to row them in opposite directions unless each played the game and cooperated. In this case, the Muslims on the deck could easily have fouled the oars of the Christians below by the simple expedient of rising from their benches until the angle of their oars to the water was sufficient for the blades to intermesh with those of the Christians. Equally, the Christians below could have fouled the oars of the Muslims above by simply raising theirs out of the water until they intermeshed. No matter which of the two antagonists was trying to escape, the other could easily have prevented it and smashed oars and chaos would have been the result in either case. We conclude that this tale was nothing more than a raconteur's fanciful entertainment.

This conclusion from the logic of the text is confirmed by consideration of the same incident as it was related by Ambroise. Ambroise had been on the Third Crusade and his poem was dependent either on the *Itinerarium peregrinorum* or on a now-lost chronicle common to both. He wrote that: "On the fleets was the din of battle, /

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[13] *Itinerarium peregrinorum* (Mayer) p. 324: "Aliam vero iam hostis victor superioris tabulati bellatoribus depulsis invaserat. At hii, quibus inferior statio fuerat deputata remorum auxilio elabi contendunt. Mirum quidem et miserandum certamen, nam remis in diversa tendentibus, nunc huc nostris nunc illuc Turcis agitantibus galea depellitur, nostri tamen prevalent, et hostis superius remigans christicolarum superventu detrusus succumbit.".

[14] The modified design for any future *Olympias Mark II* does, however, allow for the blades of the *thranite* oars to be clear of those of the *thalamian* oars in the water. It might theoretically be just possible for the two banks of oarsmen to row in opposite directions if both cooperated with each other. Information supplied by John Coates.

Each was often driven back, / Often together did they come".[15] This passage incorporated the same essential idea of ships being driven back and forth as that of the *Itinerarium peregrinorum* but is believable because it did not connect it with the conception of a single galley being rowed in opposite directions by two banks of oars.

There remains the story of the benches above deck being evacuated to give marines more freedom of action while the galleys were rowed from "below". This cannot be definitively disproved; although, three considerations suggest that it also was a fabrication. First, since the anonymous Templar chaplain was extrapolating from a comparison to Roman *liburnae* with superimposed banks of oars as described by Vegetius, it is probable that this first part of his story was also a classicizing literary affectation. Secondly, if the Crusaders vacated the upper oar benches before going out to face the Muslim fleet so that the marines would have more freedom of action, not intending to use the benches above deck for rowing, why did they apparently leave the oars for them on board where the Muslims could gain access to them? Thirdly, Ambroise made no mention of this story.

Having cast doubt on the veracity of the testimony of the *Itinerarium peregrinorum* that at least some galleys at Acre during the Third Crusade had superimposed banks of oars, there is no other evidence to suggest that Western galleys used any oarage system other than the *alla sensile* by that time, irrespective of whether they were monoremes or biremes. There is a possibility that they may have done so in the eleventh and early twelfth centuries; however, the evidence for this is extremely scanty.

The development of the *alla sensile* oarage system permitted the replacement of the fully-seated stroke of the dromon, which had been necessitated by the fact that dromons had a file of oars below deck, by a stand-and-sit stroke which could be used above deck because of the absence of height limitations. Because oarsmen using the stand-and-sit stroke pulled the oar through the stroke by falling back onto the bench, the whole weight of their bodies and the power of their legs could be thrown into the stroke. In the fully-seated stroke, on the other hand, oarsmen used mainly their arms and upper body to power the stroke. Even though there were footrests for the oarsmen to brace their feet against, because the benches and footrests were fixed in place, their legs were constrained in the one position and less drive could be

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[15] Ambroise, *L'estoire de la guerre sainte*, ll. 3315-17 (col. 89): "As estoires iert la huee, / Chascone iert sovent remuee / Sovent ensemble s'ajostouent".

obtained from them.

The stand-and-sit stroke should have permitted more power to be applied to the oars and consequently have resulted in an increase in speed and in the endurance of oarsmen. However, there is no hard data to confirm this and, indeed, some recent research suggests the opposite. On the one hand, examining the oar mechanics and power of classical galleys such as *Olympias* using fully-seated oarsmen, Shaw calculated that a cruising speed of 7.5-8 knots could be maintained all day by the oarsmen applying 135-160 watts of power to their oars. On the other hand, similarly examining the oar mechanics and power of Renaissance galleys using the *a scaloccio* oarage system,[16] Bondioli and his colleagues calculated that for these galleys to maintain six knots in zero wind conditions the lead oarsman would need to apply 289 watts of power to the oar.[17] *A scaloccio* rowing is considered to have been inefficient, delivering only 25% efficiency of the actual human power applied to effective propulsion power. The efficiency of fully-seated oarsmen is considered to have been around twice that figure.[18] However, no similar research has been conducted for the oarage system which lay chronologically between these other two: the *alla sensile* oarage system. With respect to the question raised here, namely, why was the dromon succeeded by the Western bireme *galea*, there is an obvious need for similar modelling and power calculations to be applied to their oarage systems.

Even if the power advantage of the stand-and-sit stroke over the fully seated stroke can be questioned, there is no doubt that the *alla sensile* system certainly did involve other changes that must have produced an increase in power and speed. The following discussions of these changes are couched in theoretical terms and we realize, of course, that in practical terms there would have been trade-offs and compromises and that the various factors had to be harmonized in concert with others to produce the best overall results.[19]

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[16] *A scaloccio*: the oarage system which succeeded the *alla sensile* system in the Renaissance. A stand-and-sit stroke was still used but instead of each oarsman rowing a single oar, multiple oarsmen rowed on one larger oar.

[17] Shaw, "Oar mechanics", p. 169; Bondioli, et al., "Oar mechanics", Table 12/2 (p. 201).

[18] Communication from John Coates to John Pryor. See also Coates, "Naval architecture", p. 5.

[19] The following discussion of the *alla sensile* oarage system, especially as it pertains to the galleys of Charles I of Anjou, supersedes all previous discussions of it by John Pryor, especially Pryor, "From dromōn to galea", pp. 112-14; idem, "Galleys of Charles I of Anjou", pp. 69-73. It should be stressed that with the exception of a few fundamental dimensions, the width of the deck, the depth in hold, and the length

The gearing ratio of oars may be expressed as the ratio A:B, where A is the length from the mid point of the oarsman's hands on the handle to the thole, and B is that from the thole to the centre of water pressure on the blade.[20] The mechanical advantage of an oarsman then becomes the ratio C:B where C is the overall length of the oar from the mid point of the hands on the handle to the centre of water pressure on the blade. Therefore the greater A can be made with respect to B, the higher the mechanical advantage of the oarsman becomes and the more effective power he can deliver to the oar. The addition of an outrigger to the hull makes one or both of two things possible. Either A can be increased with respect to B and therefore the mechanical advantage improved, or B can also be increased proportionately so that the entire oar becomes longer and heavier and can deliver more power without requiring any increase in the effort required of the oarsman as long as the balance and weight in hand of the oar remains the same. A compromise combination of both can also be achieved. Thus the development of galleys with outriggers must have produced an increase in effective power over what the oarsmen of galleys without outriggers could deliver.[21]

Both outriggers and a stand-and sit stroke would also increase speed for other reasons. If the maximum length of a seated oarsman's stroke is D, an oar of length E with a thole at the hull will move the hull the distance F for each stroke. [Figure 55 (a)] A longer oar of length G will move the hull a greater distance H. The further the centre of water pressure on the blade of the oar is from the thole, the greater the distance the hull will be moved by a stroke of the oar. This is the first consideration. It is desirable to make the distance between the centre of pressure on the blade and the thole as great as possible, balancing that against the increase in the weight of the oar and the difficulty for an oarsman to manage it the longer the oar becomes.

Consider the stand-and-sit stroke. As shown above, the approximate length of the *interscalmium* of a dromon, and of the length of an oarsman's stroke, must have been around a metre. However, that of the oarsmen of Angevin galleys of the late thirteenth century using a stand-and-sit stroke is calculated to have been

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of oars, the oarage system of thirteenth-century *alla sensile* bireme galleys is totally unknown and that what follows is the product of comparison to classical evidence, the experimentation with *Olympias*, and deduction.

[20] See above p. 290 and n. 421.

[21] These superior features of the *galea* over the dromon were pointed out by Dotson in "Galley design", p. 22.

approximately 1.20 metres.[22] If the length of the stroke is increased

[22] The dimensions of the galleys of Charles of Anjou here are based on a document dated 20 January 1275 which referred to galleys to be constructed "according to the plan and size and *gallipum* (model) of a certain "red galley of our court which came from Provence". This has been collated with another, dated 10 November 1278, which referred to galleys with the same specifications, presumably also based on the "red galley" of Provence. See Filangieri, *Registri*, Reg. 63, no. 486 (vol. 12, pp. 126-9), Reg. 89, no. 88 (vol. 21, pp. 264-6). Here the text concerns the hull only. The full text may be found in Pryor, "Galleys of Charles I of Anjou", pp. 38-44. There is another document, dated 15 December 1283, which for some reason did not find its way into the registers reconstructed by Filangieri and the other archivists, which refers to galleys constructed "according to the model of a galley of the court". These were marginally larger than the red galley of Provence and had oars which were 27 *palmi* long rather than 26. See Minieri Riccio, *Saggio*, vol. 1, no. 204 (pp. 207-8).

"In primis dicta galea rubea est longitudinis de palma in palmam cannarum XVIII et palmorum VI; et in carina est longitudinis cannarum XIII et palmorum III. Item puppis eiusdem galee armat in altitudine palmorum XIV minus tertio; et in prora armat in altitudine palmorum XI et tertium. In medio armat per altitudinem de tabula in tabulam palmorum VIII minus quarto. … Altitudo [Latitudo] de cinta in cintam in medio corporis eiusdem galee est palmorum XIV; et in dalfino amplitudo de cinta in cintam in prora est palmorum VI et tertii, et in puppi palmorum VI. Item a prima tabula fundi superius usque ad cintam in medietate ipsius sunt palmi V. Item habet predicta galea a banco puppis usque ad iugum prore lactas LV, numerato iugo, quarum quelibet est longitudinis palmorum XVII *et medii*.* … Item palleria in medio ipsius galee est altitudinis palmorum III [tertiorum]. Altitudo de tabula fundi usque ad tabulam cohoperte est palmorum VIII minus quarti. Item amplitudo sive planum fundi in medio corporis ipsius galee ab uno genu ad aliud ad cordam tesam est palmorum XI et quarti. Item distantia de una cursia est amplitudinis palmorum II et medii et altitudinis palmorum I et medii. … Galea ipsa navigat cum remis CVIII, quodlibet de palmis XXVI; verumtamen, debeant fieri aliqui de palmis XXX in puppi et prora.". *Missing from the text as published in Filangieri, *Registri*.

Translation: "Firstly the said red galley is 18 *canne* and six *palmii* [39.55 m.] long from the extremity of the stempost to that of the sternpost; and it is 13 *canne* and 3 *palmi* [28.21 m.] long on the keel. Item, the poop of the same galley rises in height by 14 *palmi* minus a third [3.60 m.]; and at the prow it rises in height by 11 *palmi* and a third [2.99 m.]. Amidships it rises in height from the planks of the floor to those of the deck by 8 *palmi* minus a quarter [2.04 m.]. … The beam from wale to wale in the midships of the same galley is 14 *palmi* [3.69 m.]; and at the *dalfinum** the beam from wale to wale at the prow is 6 *palmi* and a third [1.67 m.] and at the poop 6 *palmi* [1.58 m.]. Item, from the first plank of the floor up to the wale in the midships of the same [galley] there are 5 *palmi* [1.32 m.]. Item, from the [aftermost] bench of the poop to the yoke** of the prow the aforesaid galley has 55 deck beams, including the yoke, each of which is of a length of 17 *palmi* and a half [4.61 m.]. … Item, the ceiling in the midships of the same galley is one third of a palmus [0.09 m.]. The height from the planks of the floor to the planks of the deck is 8 *palmi* minus a third [2.02 m.]. Item, the beam or plane of the floor in the midships of the same galley is 11 *palmi* and a quarter [2.97 m.] from one *genu**** to the other [measured] with a taught line. Item, the dimension of a centre gangway is 2 *palmi* and a half in beam and 1 *palmi* and a half in height. The same galley sails with 108 oars, each of 26 *palmi* [6.86 m.]; however, there should be some at the poop and the prow of 30 *palmi* [7.91 m.].". **Dalfinum* (or *delfinum*): probably the frame section at the extremities of the rowing platform. ***Iugum prore*: The transverse beam which carried the forward ends of the *aposticii*, the outboard beams defining the rowing platform. ****Genu*: the internal turn of the frames at the maximum beam of the floor.

from D by 20% to I, then the hull will move not F for each stroke but the greater distance J. There should be an appropriate increase in

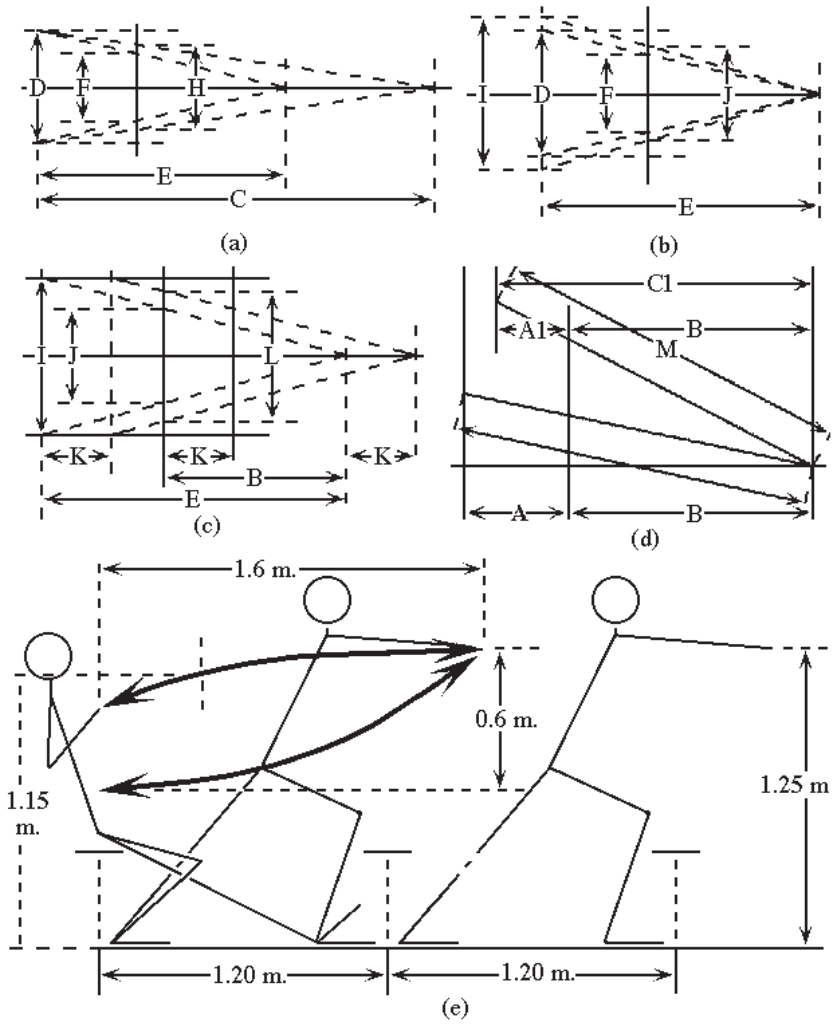


Figure 55
The *alla sensile* bireme oarage system.
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Calculation of the *interscalmium* at approximately 1.20 metres is based on analysis of the frames, deck beams, and overall dimensions. It is not specified in the document. See Pryor, "Galleys of Charles I of Anjou", pp. 64-8. However, it agrees with the lengths of *interscalmia* of Renaissance trireme *alla sensile* galleys, 1.2-1.25 metres.

speed. [Figure 55 (b)]

If an outrigger is added at a distance K from the gunwale of the hull and the oar handle and centre of pressure on the blade is moved an equivalent distance outboard, even with the distance between the thole and centre of pressure on the blade being the same, B, and the length of the stroke being also the same, I, each stroke moves the hull at the gunwale through the water not the distance J but rather the greater distance L, with a corresponding increase in speed. [Figure 55 (c)]

Compare the *alla sensile* system in which both oars were rowed from above deck to the superimposed banks system. An oar with a gearing ratio A:B at any particular angle to the water will have a distance B from the centre of water pressure on the blade of the oar to the thole. [Figure 55 (d)] It is desirable not to decrease B because each stroke would then move the hull a shorter distance. Therefore, for an oar of any given length M, the greater the angle of the oar to the water the higher must become the gearing A1:B and the lower the mechanical advantage C1:B. This means that the lower a galley rides in the water, and therefore the lower the angle of the oars to the water, the higher will be the mechanical advantage of the oarsmen and the greater the effective power that they can apply to their oars.

Finally, the stand-and sit stroke must also have produced one other huge advantage. Because the buttocks of the oarsmen were not fixed in one place but rather could move, the result would have been similar to that of having had a moveable seat. The *interscalmia* of Angevin galleys of approximately 1.2 metres must have evolved for ergonomic reasons, just as those of around 1.0 metres for fully-seated-oarsmen galleys had in the past. In fact, if a seated man rises to his feet and keeps one foot anchored under and behind his seat and then stretches the other forward to the maximum extent of his arms, that foot will in fact move approximately 1.20 metres. A man of average height rising off his seat to stand for the pull would have his fists around the oar handle at about 1.25 metres above deck and the distance from his shoulder-blades to his grip on the oar at the end of his stretched-out arms would have been about 0.75 metres. With *interscalmia* of 1.20 metres and thwarts of approximately 20 centimetres, as suggested for *Olympias Mark II*, when he thrust his inboard foot forward to just under the bench in front, his grip on the oar would be approximately 1.5 metres aft of the centre of his own bench. Then, when he fell back onto it at the end of the pull and closed his arms and the oar into his chest, his shoulder-blades would have been some 40 centimetres forward of his thole and the grip on the oar would have been pulled

through a distance of some 1.6 metres. [Figure 55 (e)] The resulting increase in stroke length over what could be achieved with a fixed-bench, fully seated stroke would have been extremely significant.

The galleys built according to the model of the red galley of Provence had oars which were 26 Neapolitan *palmi*, 6.86 metres, long, except for some at the poop and prow of 30 *palmi*, 7.91 metres, suggesting that the rowing platform, *telaro*,[23] narrowed somewhat towards the stern and the bow. Nothing in the Angevin documents suggests that oars used from an inboard position and those used from an outboard position were different in length and we must therefore conclude that they were all the same length. They may have had different gearings since from the fourteenth century, there is no doubt that oarsmen pulling individual oars *alla sensile* did use oars of different lengths and gearings which actually necessitated rowing in different ways.[24] However, since the Angevin contracts did specify that the oars at bow and stern were different but not that the inboard and outboard oars were, we have assumed that they had the same gearing.

The rowing benches would have been canted or angled outboard towards the bow. For *Olympias Mark II*, it is proposed to cant the benches at 18.4˚ to the centre line, the angle whose tangent is closest to one third, and on later medieval galleys they were also canted.[25] Canting the benches outboard on an *alla sensile* galley would in fact work only if the tangent of the angle of cant was indeed one third. Any higher or lower angle would not work, in theory. Of course, within the parameters of the technology of medieval shipbuilding, with plastic materials, inexactitude of measurements, and the variable ergonomics of human movement, any figure between around 16˚ and 20˚ would no doubt have been possible. There may have been perhaps even more latitude than that since oars would have moved quite significantly inboard and outboard of the thole during the stroke.

The actual positioning of the benches could be varied somewhat and in actuality may well not have corresponded exactly to that reconstructed here. However, it must have been at least similar. Assuming an angle of cant of 18.4˚, and that when the outboard

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[23] This word was not used in the Angevin documents and there was no term for the rowing platform as a whole which was. However, the vernacular *telaro* was certainly used elsewhere for it.

[24] Alertz, "Naval architecture", esp. p. 149; Bondioli, et al., "Oar mechanics", esp. p. 179.

[25] Morrison, et al., *Athenian trireme*, p. 271; Alertz, "Naval architecture", pp. 159, 162; Bondioli, et al., "Oar mechanics", pp. 173, 176, 182-9.

oarsmen rose to their feet and put their outboard legs forward, the mid point of their outboard feet should end up no closer to the edge of the deck than 15 centimetres, that the length of their pace from the mid-point of the bench to the mid-point of their outboard foot was 1.2 metres, and calculating that their shoulders and benches were some 50 centimetres across, the centre point of their benches should have been some 0.77 metres inboard of the edge of the deck.

At the edge of the deck, the height of the galley above the waterline amidships would have been 0.55 metres. The deck itself is calculated to have had a camber of 0.27 metres from the centre-line to the edge and the oarsmen's feet would have been approximately 15 centimetres above the edge of the deck. The oars were 6.86 metres long, would have had handles of 0.4 metres and blades 0.8 metres by 0.15 metres, the loom and blade being submerged by around one metre during the pull. The centre of pressure on the blades would have been 0.2 metres from the tip and if they had a gearing of 1:3.25, which is at the high end of the range, and an angle to the water of around 20˚, which must have been the case, an outboard oarsman using a stand-and-sit stroke would have been capable of moving the oar through an arc of 66˚. The tholes would have been some 0.88 metres outboard of the edge of the deck. [See Figure 56] At the end of the stroke the thole would have moved approximately 4.8 metres and the mid-point of the oarsman's hands approximately 6.4 metres.[26]

With inboard and outboard oarsmen both using a stand-and-sit stroke from above deck, and both using oars with the same length and gearing, it is in fact impossible for them to have both used the same bench, even if it was canted. Because of the width of the human torso and the need for some clearance between the oarsmen, the inboard oars would have begun the stroke forward of the outboard oars but have finished it aft of them, which would have been impossible. Even lowering the gearing of the inboard oars massively, which would have thrown out completely the synchronicity of the strokes, would not have obviated this. In fact the only way that the system could have worked with oars of the same length and gearing is if they occupied

[26] Discounting slippage, one of the practical considerations left aside in this theoretical discussion, which would reduce this figure somewhat. In practice all oar blades move somewhat in the water because the weight applied to them by oarsmen does force some water to move. Slippage increases when water is disturbed, which is a compelling reason to have an oarage system in which the blades of different files of oars do not intermesh with each other in the water but rather are in water clear of each other.

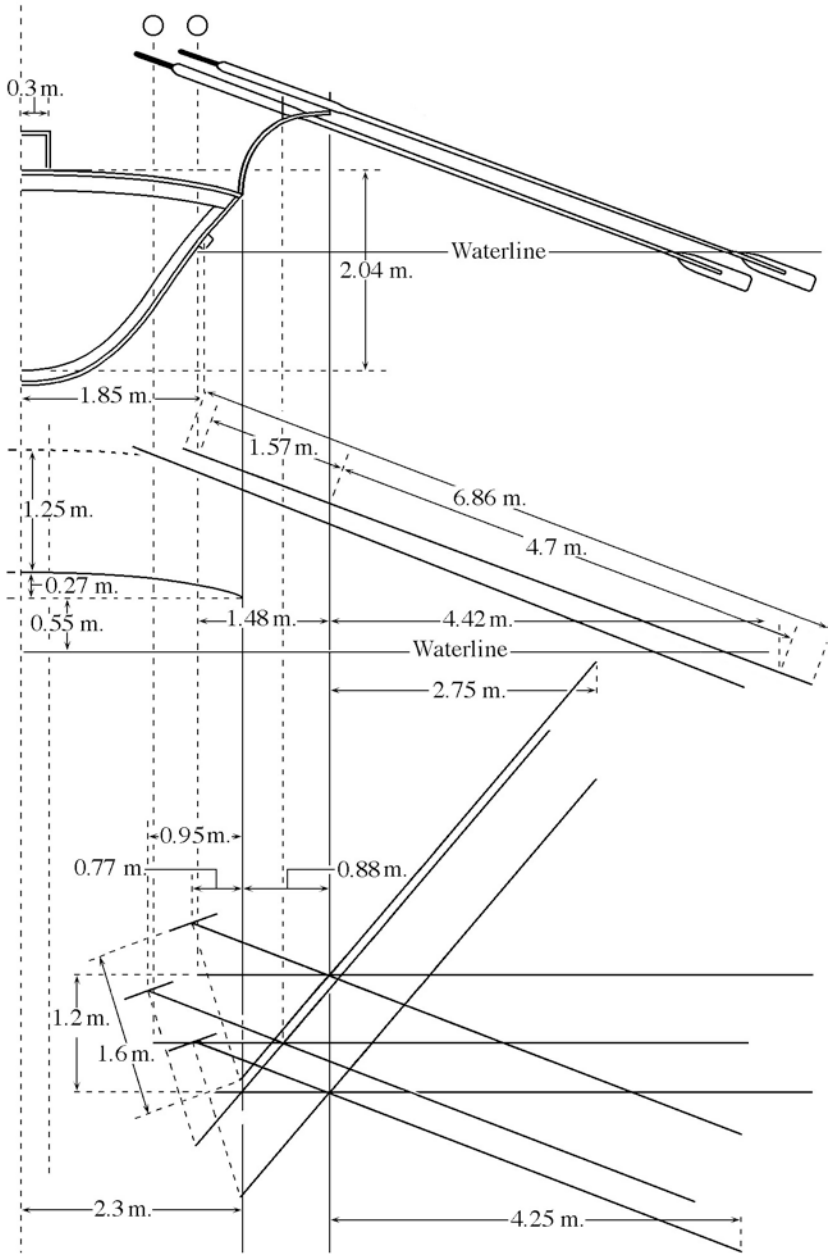


Figure 56
Galleys of Charles I of Anjou, ca 1269-1284, and the bireme *alla sensile* oarage system.
© John H. Pryor

separate benches and the inboard oarsmen were only slightly inboard of the outboard ones. It is significant that the *telaro* of the Angevin galleys, which rowed 54 oars on each side, 27 in each file, stretched a distance of 55 deck beams from the aftermost bench to the yoke of the prow. Since the tholes were set to correspond to alternate deck beams, there was a half an *interscalmium* in excess and that is to be explained by alternate staggering of the oarsmen's benches. It also explains why the Peter of Eboli illustration shows the oars of the two files staggered and inboard oarsmen visible between the outboard ones. [See Figure 54] This was not artistic licence but rather a careful representation of reality.

The conditions governing the positioning of the inboard oars would have been, first, that the gearing would have been the same as that of the outer oars so that the stroke could be synchronised. Secondly, the oars should have been as far outboard as possible for maximum power. If possible, thirdly, the blades should have rowed in clear water and not intermeshed with those of the outer oars. Positioning the inboard oarsmen approximately 95 centimetres inboard of the edge of the deck would have allowed all conditions to be met. The blades would have been clear of each other in the water and the stroke of both inboard and outboard oars would be virtually identical. The *columbaria*, oarports, of the inboard oars in the fabric of the *telaro* would have needed to be elongated to allow the oars to work against the thole thongs and then through them, but that was almost certainly the case in all periods, as is shown in some depictions occasionally.[27]

Marino Sanudo Torsello wrote between 1310 and 1320 that: "It should be known that in the year of the Lord 1290, two oarsmen used to row on a bench on almost all galleys which sailed the sea. Later more perceptive men realized that three oarsmen could row on each of the aforesaid [benches]. Almost everyones uses this nowadays".[28] Here Sanudo referred to the trireme *alla sensile* oarage system which replaced the bireme one of the twelfth and thirteenth centuries because

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[27] Most notably the Victory of Samothrace monument in the Louvre. See Morrison, *Greek and Roman oared warships*, fig. 20 (pp. 219-21). More normally oarports were depicted in a merely stylized way as circular openings. But see also Odysseus' ship on an Attic red-figure wine jar in the British Museum in Morrison, et al., *Athenian trireme*, fig. 47 (p. 168)

[28] Sanudo Torsello, *Secreta fidelium crucis*, II.iv.5 (p. 57): "Sciendum quod in M.CCXC. anno Domini, quasi in omnibus galeis quae transfretabant per mare, duo in banco remiges remigabant: postmodum perspicaciores homines, cognoverunt quod tres possent remigare remiges super quolibet praedictorum, quasi omnes ad praesens hoc utuntur.".

he clearly stated that three oarsmen shared the same bench. The stand-and-sit stroke was still used but the oars had different lengths and gearings. It was this that made it possible for three oarsmen to share the same bench, all rowing from tholes set in the *apostis* and none through oar ports in the fabric of the *telaro*.[29]

Because dromons had a bank of oars below deck, their decks must have been higher above water than the decks of *alla sensile* galleys needed to be. Amidships, the freeboard of the hulls of Angevin galleys at the deck was only in the order of 0.55 metres and the oars had an angle to the water of around 20˚.[30] As shown above,[31] the decks of dromons amidships must have been a minimum of around 0.95-1.0 metres above the plane waterline and the minimum angle of the upper oars to the waterline can not have been less than around 28˚. The *alla sensile* system must have produced an increase in mechanical advantage and power efficiency over what dromons were capable of.

The *alla sensile* system almost certainly delivered other advantages as well. Having all oarsmen above deck to double as marines in battle may have outweighed the advantage of having half of them protected from missile attack below deck. Having all of them above deck in fresh air rather than having half of them working in fetid conditions below deck must have contributed to an increase in endurance. The hold would also have been freed up for armaments and spare gear, and especially for provisions and water, thus undoubtedly increasing crusing range.

Discussion of the advantages of the *alla sensile* system has been couched in theoretical terms. In practical terms, all advantages would have had their disadvantages. Increases in the length and weight of oars would have increased the difficulty for oarsmen to manage them, unless the gearing, balance, and weight in hand was maintained somehow. Moving the hull a greater distance for each stroke by either using a longer stand-and-sit stroke or by the use of an outrigger would have demanded greater effort from the oarsmen unless the mechanical advantage was also improved. No doubt, the lengths and weights of oars, their balance, their gearing, their mechanical advantage, and their

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[29] This second transition from the bireme *alla sensile* oarage system of the eleventh-thirteenth centuries, using oars of the same length pulled from alternating benches through *columbaria* and from tholes on the *apostis*, to the trireme *alla sensile* system of the fourteenth-fifteenth centuries, using oars of different lengths all pulled from the same bench against tholes on the *apostis*, has never been researched. It remains a *desideratum* but is beyond the scope of this book.

[30] See Pryor, "From dromōn to galea", p. 114.

[31] See above pp. 288-304, esp. Figure 32.

design, would all have been elements of formulae which would have been experimented with over time to eventually produce the best possible compromise. Whatever the case, it was almost certainly the development of the *alla sensile* oarage system which led to the demise of the system of superimposed banks of oarsmen on more than one level which had dominated naval warfare in the Mediterranean for 1500 years and which had culminated in the Byzantine dromon.

The technological advantages of the new bireme *galea* may well have given the West a technological edge over the Muslim and Byzantine worlds in the crucial period ca. 1075 to 1150. When the new Western design with its superior features began to be emulated in the Byzantine and Muslim worlds is unclear; however, the Byzantine evidence at least suggests that emulations of the *galea* as *katergon* replaced the dromon in the course of the twelfth century. Such technological factors have not been considered by those who have addressed the issue of the rise of Western sea power in the twelfth and thirteenth centuries and the apparent decline of the navies and merchant marines of the Byzantine and Muslim worlds.[32]

[32] See, for example, Abu Lughod, *Before European hegemony*; Lewis, "Balkan peninsula"; Lewis and Runyan, *Naval and maritime history*, chs 3-4; Rose, "Islam versus Christendom"; Santamaria-Arandez, "Reconquista"; Tůma, "Puzzle of a decline and a rise". I also failed to consider it in *Geography, technology, and war* [JHP].

CONCLUSION

We began this study with two questions to which we had been led in the course of our research into the war galley known to the Byzantines as the *dromōn*. The first of these was whether there ever actually existed a particular and distinctive ship type to which this term corresponded, or whether, rather, it was applied to a series of ship types evolving over the centuries? If so, was it possible for us to ascertain from the sources how these ship types actually did evolve? The second of these questions was whether or not Byzantine authors ever really intended to refer specifically to ship types known to them in their own ages by the various terms which they used, such as *dromōn*, *chelandion*, *triērēs*, etc.? A corollary to this second question concerned the degree to which Byzantine authors either consciously or subconsciously used classical terminology in reference to the events and technology of their own ages. Consideration of these questions led to the examination of the relationships between the use of terminology in texts and the physical reality of Byzantine war galleys which was the central enquiry of this book. Ultimately the objective remained what it had been at the outset; namely, to recover for the use of historians as much as is possible of the physical reality of the galleys referred to as *dromōnes* over a period of some seven centuries from ca. 500 to ca. 1200. Beyond that we have attempted to explore the relationships between the technology available to the Byzantines, the physical world in which their naval forces had to operate, and the objectives to which they aspired.

We have been able to demonstrate conclusively that the terminology of Byzantine texts is a maritime historian's minefield. They can rarely be accepted at face value and their testimony must always be weighed against other evidence. Unless there is corroborating evidence elsewhere, it must always be regarded with suspicion. Theophanēs the Confessor and Anastasius Bibliothecarius used classical terminology parenthetically to *dromōn*/*dromon* without intending anything technical by their use of it. The Anonymous's *Naumachika syntachthenta para Basileiou patrikiou kai parakoimoumenou* is replete with classical anachronisms and even the *Naumachika* of Leo VI and the *Peri thalassomachias* of Nikēphoros Ouranos show traces of the same thing. The chronicles are equally suspect. The various tactical manuals are also replete with impractical

advice based on arm-chair sailoring. Even the fleet inventories for the Cretan and Italian expeditions contained in the *De cerimoniis* attributed to Constantine VII are suspiciously prone to a charge of bureaucratisation. Apart from that, they are certainly incomplete and maritime historians must use them with care.

What is actually known about the galleys called *dromōnes* remains frustratingly little. Unless new sources are discovered, or unless maritime archaeology comes to the rescue, we will almost certainly continue to see this most famous of early medieval warships through a glass darkly. However, we believe that we have been able to establish at least a few certainties, some probabilities, and a wide range of possibilities.

The early use of the term *dromōn* was almost certainly philological rather than technical in import. The word began to be used with reference to some Romano-Byzantine war galleys, especially *liburnae*, at the latest by the late fifth or early sixth centuries, surely because they had unusual speed or manœuvrability of some kind. This was most probably a consequence of changes in construction characteristics already under way at the time.

The evidence for such changes in the construction characteristics of war galleys from the sixth century is conclusive: the lateen sail replacing the square sail, the spur replacing the ram, a bank of oars rowed from below a full deck, and changes in hull design, especially at the bow. It is also probable that some degree of change from shell to skeletal hull construction was involved, but that ought not to have affected performance. The chronological coincidence between the evidence for these changes and the appearance in the texts of the term *dromōn* is so striking, given the fact that no other new word for a type of ship appeared at the same time, that it is reasonable to draw the conclusion that the changes eventually differentiated these galleys from earlier Roman warships and that the word became applied to the now differentiated galley type.

Adoption of the word *dromōn* into Arabic and Latin in various forms between the sixth and eighth centuries makes it clear that the new galley type was common to the Romano-Byzantine world from the beginning and that it was adopted immediately by the Muslims when they took to the sea.

There never was a single *dromōn*. The term was applied to galleys which evolved over the centuries from what they had been when the term was first applied to them in the late-fifth and early-sixth centuries, to what they became in their heyday in the fleets of the tenth

century under the Macedonian emperors. Between the sixth and tenth centuries, the primary reference of the term changed from being to monoreme galleys of 50 oars to being to bireme galleys of 100-108 oars. The evolution of the ships between the sixth and tenth centuries remains almost a complete unknown. Thereafter, however, the term remained applied to galleys with two superimposed banks of oars. Dromons became obsolescent as battle galleys from the twelfth century almost certainly as a result of the progressive development of the bireme *galea* in the Latin West and then its emulation in the Byzantine and Muslim worlds. When the new *galea* of the West became adopted into Byzantine fleets in the twelfth century, use of the terms *dromōn* and *chelandion* gradually became anachronistic and was discontinued and replaced by *katergon* and *taretes*.

Ironically, in this self-same last period of life of dromons and *chelandia*, the words themselves became widely emulated in Latin, Old French, Norse, and Arabic literature but increasingly with reference to large transport ships. By the mid twelfth century Byzantines themselves appear to have been using the word *dromōn* with reference to transport ships.

The evidence for the construction of dromons must be regarded with much more circumspection than has hitherto been the case. The anonymous treatise commissioned by Basil the *parakoimōmenos* has little credibility as a guide to the real construction of dromons and *chelandia* in the tenth century because it has been shown to be primarily an exercise in antiquarian philology. We have identified a number of sources which the Anonymous used but there may well be yet others which have escaped us. He himself is not to be condemned for this since he was merely doing what any moderately well educated Byzantine writer of the period would have done to impress a patron. Rather, it is those modern scholars, and maritime historians in particular, who have assumed that he was actually describing the construction of a tenth-century dromon who have been at fault. Only where what he says can be corroborated from other sources or is in accordance with the common characteristics of ships of all kinds can he be relied upon. Beyond that, he can at least be tentatively relied upon where he appears to have supplied unique information; for example, in the use of *katapatēton* for a gunwale, *bordōnes* for some part of the poop, *kathormeis* for the yard crutches, and *manikellia* for the leather oar sleeves.

In the cases of other authors who used the term *dromōn*, and indeed *chelandion* and other terms also, we can rarely see beyond their use of

the terms. Even a close scrutiny of the treatises of Leo VI and Nikēphoros Ouranos reveals very little about the construction characteristics of the dromons to which they referred, barely enough to enable us to distinguish the actual galleys of their age from their classical predecessors or medieval successors. Yet these galleys did exist and undoubtedly were different. The problem remains that of the relationship between the terminology of the sources and the tangible objects to which they refer.

We can be confident that standard dromons had two banks of oars with 25 benches in each file, that one was rowed from below deck and one from above, that they had lateen rather than square sails, and spurs rather than rams. Spurs were not built as integral parts of the hull but rather were separate beams held to the stemposts by couplings, probably iron chains. Dromons certainly had two masts, the larger being the foremast, which had a blockmast, and the smaller the midships mast, which had a "beaked" masthead. Both, together with their yards, could be lowered onto crutches before battle or when not under sail. The yards were held to the masts by parrels. The shields of the marines could be ranged along a pavesade on each bulwark and some dromons at least had castles on either side aft of the foremast. There was a berth for the commander or dignitaries at the poop, sheltered by a round tent, some kind of stern ornament, and two quarter rudders attached to a through beam in housings outboard and controlled by tackles. The poop was probably stepped up from the deck. The prow had a fortified foredeck above the main *siphōn* and catheads for the anchors. We can also be confident of some details of construction: a keel, frames composed of floor timbers and futtocks, a full deck, a bung-hole, thwarts on either side for the oarsmen, both above and below deck, oars held to tholes by oar-grommets, oarports in the hull, the oarports of the lower bank sealed by leather oar sleeves, a flared upper hull and upper and lower oars of different lengths, all oars pulled by a single oarsman, at least three external wales, and a pavesade topped by a gunwale above deck. The main armaments were bow-*ballistae*, cranes, and *siphōnes* for Greek fire, in addition to crossbows and normal bows, javelins, swords and other hand-held weapons. However, beyond this, virtually nothing can be certified. Even the estimated dimensions of 31.25 metres in length and 4.46 metres in beam can only be deduced from the need for maximum performance and the seated oarage system.

As well as with reference to standard biremes, the word *dromōn* was also used with reference to monoreme *galeai* and there were

certainly some dromons which were larger than the standard biremes. However, there is no evidence that will withstand scrutiny that dromons were ever triremes or had had three masts.

Dromons had evolved in the way that they had to deliver optimum performance in battle. That was their purpose. They were designed to give maximum short-term speed and manœuvrability in calm conditions. Even if from astern, winds of more than *Beaufort Scale* Four-Five, moderate to fresh breezes, would force them to run for land. Their sails could almost certainly be used only when the wind was astern and against the wind under oars the lower oars could not have been used in more than light breezes and the ships would quickly have come to a standstill. Average speed under oars in all conditions was probably around four knots and average speeds for extended voyages no more than around two knots, calculated round the clock. Water requirements for the crews would have been high and stowage space available for it low. We conclude that oarsmen carried their own water supplies and that it would have been sufficient for no more than 3-4 days or so under oars, giving dromons a range of around 330 kilometres under oars. Stowage of water for horses would have exacerbated all problems. Taking on the large quantities of water necessary for men and animals from wells and small streams would have been extremely time consuming and finding anchorages or beaches large enough to accommodate fleets as large as those of the Cretan expeditions would not have been easy.

Chelandia are even more problematic. There can be no doubt that they were developed originally as an adaptation of dromons for the purpose of transporting horses by sea and landing them onto beaches in the face of opposition. However, if dromons had evolved to be battle galleys with maximum performance capabilities, as they surely had done, then *chelandia* can not possibly have been exactly the same in design. They must have had more depth in hold and width in the beam. However, the confusion of terminology in the sources and the use of the word *chelandia* for battle galleys by some of them, including Latin and Arabic texts, suggests clearly that even if they originated as horse transports, *chelandia* did not remain confined to that role alone. They were emulated in the Latin West and in the Muslim world, in both roles, as early as the ninth century.

Byzantines could certainly transport horses by sea for short distances but for long distances there is only the evidence of Belisarios's expedition to Vandal *Africa* and how many horses were transported the whole distance and in what sort of ships is not known.

The evidence for the Vandal and Gothic wars suggests that at that time the Byzantines did not transport horses on galleys equipped with ports in the hull and landing bridges. The earliest evidence for that is the inference of the ninth-century *Life* of St Antony the Younger. However, the Byzantines certainly did have such horse transports by the time of the 911 expedition to Crete. The horses would have been stabled below deck in fore-and-aft stalls with slings to prevent them being thrown about and there is no evidence to suggest that *chelandia* could carry any more than 12 horses each. By the ninth and tenth centuries, transporting horses in any numbers for more than short distances was avoided, as the evidence of the Cretan expeditions makes clear. Stowing away water supplies for the horses would have been a major problem, as would have been ventilating the holds to avoid the illnesses which are caused in horses by lack of oxygen and build-up of carbon dioxide and impurities.

Crews included a standard ship's complement or *ousia* of 108 oarsmen arranged in two oar banks, *elasiai*, of 50 oars, one above and one below deck, and these oarsmen, certainly those above deck, were armed and could also fight as marines. There must have been forced ventilation of the holds by wind sails and cowls for the lower oarsmen. Total crews varied from around 120 to around 160 when "captains" (*kentarchoi*), helmsmen (*prōtokaraboi*), bow-hands, trumpeter, *siphōn* operators, and marines were taken into account. Supernumerary crews or marines could also be taken aboard, but only if their weight was compensated for by stripping the ships of water, provisions, armaments, or spare gear. *Stratēgoi* were normally in command of fleets, except for the *droungarios tou ploimou* in command of the imperial fleet at Constantinople. "Vice-admirals" and "rear admirals", *tourmarchai* and *droungarioi*, served under *stratēgoi*, and there were also squadron commanders, *komētes*.

On the one hand, there is little in the naval record to suggest that Byzantine crews were ever markedly superior in skills to those of their opponents. On the other hand, there is a tantalyzing smattering of evidence to suggest that at times there was considerable disaffection amongst the crews of various fleets.

The disappearance of the waterline ram and its replacement by the spur led to a complete revolution in battle tactics because Greek Fire was never a ship-killing weapon and no tactical system was ever built around it. It required both calm conditions and following winds to be effective. Engagements became characterized by extensive exchanges of missiles intended to degrade enemy crews. Maintenance of

formations during initial stages of engagements became of paramount concern and we have argued that the Byzantines developed a sophisticated system of signalling flags to control battle formations as well as for other purposes. The crescent moon formation became the battle formation par excellence, designed to prevent the enemy breaking the line and attacking the poorly defended sterns of the galleys. When missile exchanges had been exhausted or enemy crews had been degraded sufficiently, the formations closed and grappled, using iron grappling rods to prevent defeated enemy ships escaping. Only then did the marines come into play, boarding and taking enemy ships.

In fact battle was to be avoided if at all possible and strategic objectives were to be attained by other means. To a degree this was a product of the difficulty of obtaining, and the ineffectiveness of, victory in battle at sea. Maritime space could not be controlled and naval forces could be quickly rebuilt. Sea power was always only an adjunct to land power. Fleets and their "admirals" remained secondary to armies and their "generals" throughout the history of the Empire and this was reflected in relative success in seizing the throne.

Leo VI stressed the need for secrecy when it came to the technology and stratagems of naval warfare; however, preparations for large-scale naval expeditions would almost certainly have been impossible to keep hidden from enemy spies, who were ubiquitous. Espionage must have played a major role in negating the effectiveness of naval expeditions.

Operationally, the epoch separates quite neatly into five periods, beginning with an inital one in which Romano-Byzantine hegemony at sea was challenged by the Goths and Vandals, who were both overcome in the mid sixth century. In the 150 years or so of this first period there really only two major fleet encounters, the defeat of Flavius Basiliskos off Cape Bon in 468 and the victory of John over the Goths off *Senogallia* in 551. This initial period was followed by one marked by peace at first and then an assault by the Umayyads lasting a hundred years until it was fought to a standstill by the Byzantines ca 750. In this period the great fleet engagement was the disastrous Byzantine defeat at the Battle of the Masts off *Phoinikous* in 655 but the decisive turning points were the defeat of the Muslim assaults on Constantinople in 672-8 and 717-18, in both of which Greek Fire proved to be a decisive weapon. The period ca 750-875 was one of chaos on all sides with both Muslims and Byzantines having successes at various times. It was also marked by the advent of

new powers, especially the Aghlabids in *Ifrīqiya*, the Umayyads in *al-Andalus*, and the Carolingians in the West to some degree in the ninth century. The two major strategic changes were the loss of Crete to Andalusi corsairs and the loss of Sicily to the Aghlabids, who controlled most of the island by 875. However, the Empire responded brilliantly in the fourth period to the death of Basil II in 1025. Crete and Cyprus were both recovered, *Rhōs* attacks on Constantinople were beaten off, and the Muslims were expelled from the Italian mainland. In spite of important defeats, such as that of the *Kibyrrhaiōtai* by the Muslims of Tarsos in 898 and of Himerios by Leo of Tripoli off Chios in 912, the Byzantines also had major victories, especially those of Nasar in the Ionian in 880 and Basil Hexamilitēs off *Cilicia* in 956. However, ironically it was the self-same imperial sucess which then led to neglect of naval forces in the eleventh century in the final period. By the accession of Alexios I Komnēnos in 1081, the Empire had virtually no naval forces. This last period saw the triumph of the Latin West in spite of the efforts of the first three Komnēnoi emperors to rebuild Byzantine fleets and in spite of the efforts at sea of the Almoravids and Almohads in the Maghrib. Subsequently, the appalling neglect of the entire apparatus of state by the Angeloi emperors between 1185 and 1203-4 resulted in the almost complete disappearance of imperial naval forces and those few that were left in 1203-4 were overwhelmed by the Venetians. In this last period the Byzantines had no naval victories at all except for a possible defeat of the Sicilians off Cape Malea in 1149 and that of the Venetians in 1171-2, a victory gained by strategy and disease rather than by action.

It was the development of the bireme *galea* in the Latin West which precipitated the demise of the dromon. Since the Latin *galea* first appeared in Norman Italy, it is difficult to believe anything other than that it was adapted in some way or ways from the earlier Byzantine monoreme *galea*, but exactly how remains unknown. The Latin ship was obviously superior to all battle galleys existing at the time since it proliferated very rapidly across the West, yet we know very little about it until the late 1260s when surviving Angevin chancery registers contain specification details. Until then we are reliant on the interpretation of a few pictures, especially the depiction of a *galea* in the Berne manuscript of the *De rebus Siculis carmen* of Peter of Eboli. No specifications for them survive from the maritime republics before the fourteenth century. The critical design change was the development of the *alla sensile* oarage system in which two oars were rowed from the same bench position above deck using the

stand-and-sit stroke and this was made possible by the introduction of an outrigger, the *telaro*. The stand-and-sit stroke lengthened the stroke by around 50% and must have produced a great increase in power; however, the ergonomics of *alla sensile* rowing by comparison to fully-seated rowing remains to be investigated scientifically. *Alla sensile* rowing of both oars from above deck must also have delivered other significant advantages, particularly in terms of fresh air producing an increase in oarsmen's endurance and of freeing up the hold for provisions, water, armaments, and spare gear. Cruising ranges must have increased dramatically. These technological advantages remain to be drawn into historical discussion of the rise to maritime predominance of the Latin West in the twelfth and thirteenth centuries. They may well, for example, have been critical in enabling the Latin West to project its sea power into Levantine waters and by doing so to have facilitated the establishment and development of the Crusader states in the twelfth century and their defence in the thirteenth.

Postscript

At the very eleventh last hour, and fifty nine minutes, when this book was in the final stages of production, there came the news that at long last some wrecks of Byzantine-period ships had been discovered in Istanbul. In communications received from Professors Cemal Pulak and Felipe Castro of the Institute of Nautical Archaeology at Texas A&M University, the news has been relayed that early in 2005, during excavations for a new metro extension and underground railway system in Istanbul, seven wrecks of ships, dated to the late tenth or early eleventh centuries on the grounds of the amphorae found with one of them, have been found in the Theodosian harbour or harbour of Eleutherios on the south, Sea of Marmara, coast of the city. Even more recently a wreck probably to be dated to the sixth-eighth centuries has been found. More ships are quite likely to be discovered in the future since only a fraction of the site has been excavated.

Preliminary excavations are being conducted by Professor Pulak under the directon of the Istanbul Archaeological Museums. He has been excavating, recording, and recovering a small merchantman around 11-12 metres in length, of which the keel and a considerable amount of the hull amidships is preserved. Unfortunately neither the bow nor the stern remains. There are six other wrecks. Two of these

have their keelsons preserved and one small boat has its mast step still in place. Judging from its position in the boat, this boat was sprit-rigged. Two of the ships are lying on their sides and may well have a considerable amount of hull planking above the turn of the bilge preserved.

Most excitingly, two of the ships appear to have been " long ships", one them being around 20 metres long. They appear to have been carefully constructed and to have had rather light timbers by comparison to the merchantman, suggesting that they were special craft for some purpose, perhaps for navigating the Bosporos. They appear to have been too short to have been been war galleys such as dromons or *chelandia* and since no decorative carving has been found on them, they were probably not ceremonial barges either. A quantity of hay is reported to have been found on one of them. If this proves to have been a Byzantine horse transport, it will be a sensational discovery.

(Information courtesy of Cemal Pulak)

John H. Pryor, 16 February, 2005.

APPENDIX ONE

SYRIANOS MAGISTROS, *ΝΑΥΜΑΧΙΑΙ ΣΥΡΙΑΝΟΥ ΜΑΓΙΣΤΡΟΥ*, EDITION AND TRANSLATION[1]

Technical terms, the understanding and translation of which are discussed elsewhere in the text, are asterisked the first time they are used. They may be accessed through the Index.

[1] Edited from a microfilm of folios 333r-338v of the tenth-century manuscript Milan, Biblioteca Ambrosiana, MS. B 119-sup. [gr. 139], referred to by Dain and hereafter here also as MS. A. See pp. 179-81 above. A text was published in Dain, *Naumachica*, pp. 43-55; however, Dain's photographs of the Ambrosiana manuscript were destroyed in World War Two and he was compelled to rely on his notes made in 1931. His transcription was relatively speaking quite accurate; however, it did contain some errors which have been corrected here tacitly.

Ναυμαχίαι Συριανοῦ Μαγίστρου

δ΄

1[2] ... τεταγμένοι, τελευταῖοι δὲ οἱ πρῳρᾶται· ἐπιβαίνουσι δὲ τοὐναντίον.

2 Χρήσιμον δὲ τοῦτο ὀπηνίκα ἀλλοτρίᾳ γῇ προσπελάσαι βουλόμεθα· οἱ γὰρ ταύτης οἰκήτορες εἰδότες πόρρωθεν τὸν στόλον κατάγοντα πολλάκις εἰς ἀλλήλους συνέρχονται, ἐπιτρέχουσι δὲ κατὰ τῶν ἡμετέρων ἐξιόντων πλοίων καὶ τῶν μὲν ὧδε, τῶν δ᾽ ἀλλαχοῦ ὡς ἔτυχε φερομένων ἐπιθυμίᾳ τῆς τῶν πολεμίων περιουσίας, οὐκ εἰδότες τὰ παρ᾽ ἐκείνοις τελούμενα.

3 Διὸ δὴ ἀναγκαῖον αὐτοὺς ἀποβάντας τῶν πλοίων καθάπερ ἐν φάλαγγι συντετάχθαι, ἔστ᾽ ἂν διά τινων σημείων καταμηνύσωσιν αὐτοῖς [οἷς] οἱ σκοποὶ εἴτε τὸ ἀμέριμνον καὶ ἀνύποπτον διὰ τῆς ἡσυχίας, εἴτε τὴν εἰς μάχην ἑτοιμασίαν καὶ τὸ πλῆθος αὐτῶν διὰ τῆς φωνῆς τῆς σάλπιγγος ἤ τινος τῶν ἄλλων σημείων.

4 Ἀναγκαῖον δὲ καὶ τἄλλα τοὺς ἐρέτας παιδεύειν ὅσα ποιεῖν ὑπὸ τῶν κυβερνητῶν διακελεύονται, καὶ πρό γε τούτων τὸ νήχεσθαι, οὐ μόνον φαινομένους, ἀλλ᾽ ἔστιν ὅτε καὶ δύνοντας· ἀνὴρ γὰρ δύτης ποτὲ ἐπὶ μακρὸν κατὰ βάθος διανηξάμενος καὶ τὰ πείσματα τῶν ἀγκυρῶν διατεμὼν τῶν Περσῶν τὰς ναῦς ἐπιόντων τῶν ἀνέμων συνέτριψεν, ἄλλος δὲ ὑπὸ πολεμίας νηὸς διωκόμενος καὶ νῦν μὲν ὧδε καταδυόμενος, νῦν δὲ ἀλλαχοῦ μακρόθεν ἀναφαινόμενος, τὰς τῶν πολεμίων ἐξέκλινε χεῖρας.

ε΄ Ὅτι χρὴ τὸν στρατηγὸν ἔχειν μεθ᾽ ἑαυτοῦ πάντοτε τοὺς πεπειραμένους τῶν κατὰ θάλατταν καὶ τὰ παρακείμενα τούτοις χωρία.

1 Ὅτι μὲν οὖν χρὴ πάντως ἔχειν μεθ᾽ ἑαυτοῦ τὸν στρατηγὸν τοὺς εἰδότας τὰ κατὰ θάλατταν δι᾽ ἧς καὶ πρὸς ἣν ἀπαγομεθα, φανερόν· λέγω δὴ τήν τε τῆς θαλάσσης πεῖραν, ὅπως καταπνεομένη κυμαίνεται καὶ τοὺς ἀπογείους ἀνέμους καὶ

[2] Cf. Appendix Two [a], §8.

4

1 ... drawn up, and last the officers commanding the prow. They stand opposite.

2 This is useful when we wish to put into a foreign land, for the inhabitants there, realizing from a distance that the fleet is approaching, often gather together and hasten to attack our ships as they go out[3] while [our ships] are carried haphazardly some in one direction and some in another in their eagerness for the possessions of the enemies, and they [the enemies] do not know what is going on.

3 And so they must disembark from the ships and draw themselves up as though in line abreast,[4] until scouts indicate to them by certain signals either that [their arrival] is unexpected and unsuspected because of the quiet, or [the enemy's] readiness for battle and their numbers, through trumpet calls or some other signs.

4 It is necessary also to train the oarsmen in all they have to do under the instructions of the helmsmen and above all how to swim, not only on the surface but also, on occasion, under water. For a diver once swam under water for some distance and cut the anchor cables and was able to destroy the Persian ships when the wind changed; and another who was pursued by an enemy ship was able to escape the enemy's clutches by diving first at one spot and then reappearing in another a long way off.

5 That a commander must always have with him men with knowledge of the sea and the adjacent districts.

1 It is indeed obvious that a *stratēgos** should always have with him men who know the characteristics of the sea through which and towards which we are sailing; I mean, experience of the sea, what waves it produces in a gale,

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[3] The verb ἐξέρχομαι meaned "to go out", or "to march out" and here referred to the ships. However, the sense seems to demand the meaning of the men disembarking from the ships.

[4] Paragraph 9.30 below makes it clear that what Syrianos meant by the classicizing affectation "phalanx" had nothing to do with the ancient Macedonian phalanx but rather was a line abreast or abeam, whether straight, crescent-shaped, or convex. We have translated the Greek "φάλαγξ" by "line abreast" or 'line abeam" throughout. On Syrianos's use of φάλαγξ, see Zuckerman, "Military compendium", p. 212.

ἀνέμους καὶ τοὺς ὑφάλους λίθους καὶ τοὺς ἀβαθεῖς τόπους, ὁμοίως δὲ καὶ τὴν παραπλεομένην γῆν καὶ τὰς παρακειμένας αὐτῇ νήσους, τοὺς λιμένας, τὰ ἐξ ἑτέρου τούτων εἰς ἕτερα διαστήματα, τὰ χωρία, τὰ ὕδατα· πολλοὶ γὰρ ἀπειρίᾳ τῆς θαλάσσης καὶ τῶν τόπων ἀπώλοντο, καθάπερ καὶ πλεῖστοι τῶν ἄλλων.

2 Χρὴ δὲ οὐ μόνον ἐκείνης τῆς θαλάσσης πεῖραν ἔχειν αὐτοὺς ἀλλὰ καὶ τῶν παρακειμένων αὐτῇ χωρίων· πολλακις γὰρ ἄνεμοι καταπνεύσαντες ἄλλην ἀλλαχοῦ τῶν νηῶν διεσκέδασαν.

3 Οὐκοῦν χρὴ οὐ μόνον τὸν στρατηγὸν ἔχειν αὐτούς, ἀλλὰ δὴ καὶ τῶν νηῶν ἑκάστην ἔχειν τινὰ τὸν ταῦτα εἰδότα, ὥστε τὰ περί τούτων εἰδότα καλῶς τὸ συμφέρον βουλεύεσθαι· λαίλαπος γὰρ πολλάκις καταλαβούσης οὔτ᾽ τῷ στρατηγῷ οὔτε ἀλλήλαις ἀκολουθεῖν δύνανται.

4 Ἀναγκαῖον δὲ καὶ τὸ δύο πάντως τινὰς τῶν ἐρετῶν εἶναι καθ᾽ ἑκάστην ναῦν τοὺς δυναμένους ἀνανεοῦν τὰ διά τινα τύχην ἐπισυμβαίνοντα ταῖς ναυσὶ τρήματα τε καὶ θραύσματα, πάντας τε εἰδέναι τοὺς ἐρέτας ὅπως καὶ πρὸ τῆς τέχνης αὐτοὶ ἐμφράττειν τὰ τρήματα κατὰ θάλατταν δύνανται διὰ τῶν προχείρων ἱματίων ἢ στρωμάτων, ἀλλὰ μὴ τοὺς ἄλλους καλεῖν πόρρωθεν ἢ πρὸ καιροῦ τῆς σωτηρίας ἀπογινώσκειν.

ς΄ Περὶ σκοπῶν.

1 Πολλάκις ἀγνοοῦντες τοῦ ποτέ εἰσιν οἱ πολέμιοι ἀπαράσκευοι συναντῶμεν αὐτοῖς. Οὐκοῦν ἀναγκαῖον κατά τε γῆν διερχομένους καὶ θάλατταν προπορεύεσθαί τινας τῶν ἡμετέρων κατασκοπήσοντας καὶ ἀπαγγελοῦντας τὴν τῶν ἐχθρῶν ἐπιφάνειαν καὶ πρότερον μὲν διὰ σημείων καταμηνύειν αὐτήν, ἔπειτα δὲ καὶ διὰ στόματος τάχιον ἐπιστρέφοντας καὶ λέγοντας καὶ τὸν τόπον ἐν ᾧ κατεῖδον αὐτοὺς καὶ τὸ πλῆθος ὅσον τούτων καθέστηκεν.

2[5] Καὶ κατὰ θάλατταν μὲν τὰς κουφοτέρας καὶ ταχυτέρας τῶν νηῶν ἀποστέλλειν, δυνατωτέρους μάλιστα καὶ καρτερικοὺς ἢ ἀνδρειοτέρους τοὺς ἐρέτας ἐχούσας· οὐ γὰρ πολεμεῖν, ἀλλὰ μανθάνειν καὶ ἀπαγγέλλειν τοῖς ἀποστειλασιν εἰς χρείαν κατέστησαν.

[5] Cf. Appendix Two [a], §10.

what are the off-shore winds, the hidden rocks, and the places which have no depth, likewise the coast along which one sails and the islands adjacent to it, the harbours, the distances from each to the others, the area and the [fresh] water. For many have perished through lack of knowledge of the sea and the [surrounding] areas, as have very many of the other [men].

2 They must have experience not only of that [area of the] sea but also the adjacent districts for winds often get up and scatter the ships in different directions.

3 And so not only should the *stratēgos* have such [experienced] men but each of the ships should have someone with this knowledge so that he can give good advice on these [matters] when necessary; for frequently when a squall springs up [ships] can follow neither the *stratēgos* nor each other.

4 It is also necessary that there should always be in each ship two oarsmen capable of repairing the holes and damage that happen accidentally in ships, and that all the oarsmen should know how they can block holes at sea with the clothes or bedding that are at hand before a repair [is made], but should not summon the others from a distance or despair of safety prematurely.

6 Concerning scouts

1[6] Often when we are unaware of the position of the enemy we encounter them without preparation. Thus it is necessary, when proceeding both by land and sea, for some of our men to set off in advance to reconnoitre and to report the situation of the enemy, and to pass this information back first through signals and then orally, returning quickly and reporting the place in which they had seen them and how large is their number.

2 At sea the lighter and faster of the ships should be sent, manned with the more capable and strong or brave oarsmen. Their duties are not to fight but to find out and report back to those who sent them.

[6] Cf. Appendix Two [a], §10.

3 Ἐπεὶ δὲ πολλάκις οἱ ἐχθροὶ κατὰ πλευρὰν ἀκρωτηρίου ἢ ποταμὸν ἢ λιμένα ἢ νῆσον ἑαυτοὺς κατακρύψαντες, εἶτα ἐκεῖθεν ἐξιόντες τὴν προπορευομένην συνέλαβον, χρὴ τέτταρας αὐτὰς εἶναι, δύο μὲν ἀπεχούσας τοῦ παντὸς στόλου ὡσει μίλια ἓξ καὶ μεταξὺ τούτων ἑτέρας δύο, ἵνα αἱ δεύτεραι ὑπὸ τῶν προτέρων διά τινων σημείων, οἷς ἂν ἀλλήλαις συντάξωσιν, μηνυθεῖσαι τὴν τῶν ἐχθρῶν ἐπιφάνειαν καὶ αὗται τὰ ὅμοια πρὸς τὸν στόλον ποιήσασαι ὡς ἤδη τῶν πολεμίων παρόντων πρὸς πόλεμον ἅπαντες παρασκευασθήσονται.

4 Κατὰ δὲ γῆν ἀποστέλλειν τοὺς μάλιστα κουφοτέρους τε καὶ ταχυτέρους τῶν ἄλλων. Δεῖ δὲ πρὸς τούτοις αὐτοὺς εἶναι ὀξυδερκεῖς, εὐηκόους, ἐπιτηδείους πρός τε κατασκοπὴν καὶ ἀπαγγελίαν τῶν ὁραθέντων ἢ ἀκουσθέντων, μόνας τὰς μαχαίρας ἐπιφερομένους, εἶναι δὲ καὶ αὐτοὺς ὁμοίως τέτταρας, δύο μὲν προπορευομένους καὶ μετ᾽ ἐκείνους ἑτέρους δύο, τοσοῦτον[7] τῶν προτέρων ἀπέχοντας ὅσον ὁρᾶν αὐτοὺς ἢ ἀκούειν τούτων δύνανται, οὐ μόνον διὰ τὰς καμπὰς τῶν χωρίων, ἀλλὰ καὶ τὸ ἐκ μακροῦ δεῖν προτρέχειν αὐτούς, ὥστε τῶν σημείων πόρρωθεν κατὰ διαδοχὴν γινομένων καὶ τοῦ στρατηγοῦ ταῦτα μανθάνοντος οἰκονομεῖν αὐτὸν δύνασθαι τὸ συμφέρον.

ζ΄ Περὶ σημείων οἷς σκοποὶ κέχρηνται.

1 Σημεῖα δὲ κατὰ μὲν θάλατταν τὰ λευκότερα τῶν ὑφασμάτων κινούμενα, μάλιστα δὲ καπνὸς βαθὺς εἰς ὕψος αἰρόμενος· τὸ μὲν γὰρ ἐν ὕδασι φαίνεται, τὸ δὲ ἐν ἀέρι, καὶ τὸ μὲν βραχὺ καὶ χθαμαλὸν καὶ διὰ τοῦτο πόρρωθεν δυσθεώρητον, τὸ δὲ διὰ τὸ μέγεθος καὶ τὸ ὕψος πόρρωθεν ἐξελέγχεται. Εἰ δὲ καὶ κατὰ νώτου τὸν ἥλιον ἔχωσιν, δυνατὸν καὶ διὰ κατόπτρου ἢ καὶ σπάθης συχνὰ κινουμένης διδάξαι πόρρωθεν τὸ ζητούμενον.

2 Κατὰ δὲ γῆν σημεῖόν ἐστιν ἡ τῶν σαλπίγγων πολυφωνοτέρα· ταύτῃ γὰρ χρησόμεθα πλήθους πολεμίων ἀναφανέντος·[8] ὀλίγων γὰρ ὄντων αὐτῶν ἢ ἀγνοούντων τὴν ἡμετέραν παρουσίαν οὐ χρὴ ταύταις κεχρῆσθαι, ἵνα μὴ καὶ μᾶλλον ὑπ᾽ αὐτῶν ἐλεγχώμεθα, ἀλλ᾽ ὑποστρέφοντας αὐτίκα ἀπαγ-

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[7] τοσοῦτον, thus Dain: τοσούτον, MS. A.

[8] πλήθους πολεμίων ἀναφανέντος, thus Dain following K. K. Müller, *Eine griechische Schrift über Seekrieg* (Würzburg, 1882): πλῆθοῦς πολεμίων ἀναφανέντων, MS. A.

3 Since the enemy often conceal themselves behind a headland or in a river or harbour or island and then emerge to capture the ship sent in advance, there should be four of these, two keeping about six miles ahead of the main fleet and the other two in between so that the second group are informed of the disposition of the enemy by the former through certain signals which they will have arranged with each other, and should have done the same with the fleet. Thus, when the enemy comes up, everyone will be prepared for war.

4 On land you should send out the lightest and most fast-moving troops. In addition they should be sharp-eyed and with good hearing and ready to observe and report what has been seen and heard. They should be armed with daggers only. Again there should be four of them, two sent out in front and the other two behind them but keeping a distance that enables them to see and hear them; this is not only to allow for irregularities in their terrain but also for the need to run ahead for some way so that signals can be passed over a distance by relay and when the *stratēgos* has the information, he can then make the appropriate dispositions.

7 Concerning the signals which scouts use

1 At sea signals are made with very white fabric waved around and especially with thick smoke rising up high. The first is visible over water and the second in the air. The first is brief and low and thus difficult to see from a distance. The second can be distinguished from far off because of its size and height. If they[9] have the sun at their back, it is possible to send the required information for a distance by means of a mirror or a quickly moving sword.

2 On land a signal is given by a trumpet with many tones. We will use these [signals] when a mass of the enemy appears. But if there are few of them or they are unaware of our presence, we should not use the trumpets to prevent their noticing us and immediately turning back to make a

[9] "They" must refer to the main fleet here.

γέλλειν. Ἔτι σημεῖον οὐ μόνον ἡ τῆς σάλπιγγος φωνή, ἀλλὰ καὶ ἡ ταύτης ἡσυχία, ἡ μὲν τὴν τῶν ἐχθρῶν παρουσίαν μηνύουσα, ἡ δὲ τὸ ἀμέριμνον καὶ ἀνέτοιμον.

η΄ Περὶ στρατηγικῶν σημείων.

1[10] Τὰ δὲ στρατηγικὰ σημεῖα δεῖ πάντως παρὰ πάντων γνωρίζεσθαι τί τούτων ἕκαστον βούλεται, ὥστε ἑνός τινος τούτων ὑποδειχθέντος καὶ τοῦ στόλου τί ποτέ ἐστιν τῶν σημείων γνωρίζοντος ῥᾳδίως αὐτὸν πράττειν τὰ κελευόμενα.

θ΄ Πῶς δεῖ συντάττειν τὰς ναῦς πολεμεῖν μέλλοντας.

1 Μέλλοντες δὲ περὶ ναυμαχίας διδάξαι ἀναγκαῖον εἰπεῖν πρότερον περὶ συντάξεως νεῶν ᾗ δὴ[11] θαλάττιος φάλαγξ ἐστίν. Καὶ γὰρ ὥσπερ ἐν ταῖς πεζικαῖς φάλαγξιν διὰ τῆς εὐταξίας τοῦ στρατεύματος μᾶλλον ἢ τῶν ἄλλων τὸ κράτος ἡμῖν περιγίνεται, οὕτω κἀν ταῖς ναυμαχίαις· τὸ γὰρ ἄτακτον ἑτοιμότερον εἰς διάλυσιν.

2 Καὶ πρότερόν γε ῥητέον ὅτι τῶν πολεμικῶν νεῶν αἱ μέν εἰσιν μέγισταί τε καὶ πολυάνθρωποι καὶ διὰ τοῦτο ἀργότεραι τῶν ἄλλων καὶ ἀσφαλέστεραι, αἱ δὲ μικραί τε καὶ κοῦφαι καὶ ὀλιγάνθρωποι, αἱ δὲ μέσως πως ἔχουσιν πρὸς ἑκατέρας αὐτῶν.

3 Χρὴ ταῖς μὲν μεγίσταις μάλιστα μὲν κεχρῆσθαι ἐν ταῖς κατὰ θάλατταν μάχαις, ἔστιν δ᾽ ὅτε καὶ κατὰ λίμνας πολλάκις, οὐ μὴν καὶ κατὰ ποταμούς· οὐ γὰρ ῥᾳδίως διὰ τὸ βάρος ἀναφέρεσθαι δύνανται καὶ μάλιστα ὅταν ἡ γῆ ὑπὸ τῶν πολεμίων δεσπόζηται. Ταῖς δὲ μέσαις καὶ βραχυτέραις οὐδὲν κωλύει καὶ κατὰ ποταμοὺς κεχρῆσθαι.

4 Μέλλοντες δὲ ναυμαχεῖν τὰς μὲν ἰσχυροτέρας τε καὶ πολυανθρωποτέρας τῶν νεῶν τῶν ἄλλων προτάξομεν[12] κατὰ πλευρὰν συνταττομένας ἀλλήλαις. Ἀφίστασθαι δὲ τοσοῦτον ἑτέραν τῆς ἑτέρας ὅσον μὴ ὑπ᾽ ἀλλήλων τὸν ἀγῶνα κωλύεσθαι μήτε συμφύρεσθαι πρὸς ἑαυτὰς καὶ τὸν καθοπλισμὸν δὲ τῶν ἐν αὐταῖς στρατιωτῶν ἀσφαλέστερον τῶν ἄλλων εἶναι· καὶ γὰρ καὶ ἐν ταῖς πεζικαῖς φάλαγξι τοὺς πρωτοστατοῦντας ἀσφαλέστερον καθοπλίζομεν ἅτε δὴ πρώτους καὶ εἰς χεῖρας ἀναδεχομένους τὴν μάχην. Τὰς δ᾽ ἄλλας τῶν νεῶν κατόπιν ἀκολουθεῖν συντεταγμένας ὁμοίως

[10] Cf. Appendix Two [a], §48.
[11] ᾗ δη, thus Dain on the authority of A. M. Desrousseaux: ἤδη, MS. A.
[12] προτάξομεν, thus Dain: προτάξωμεν, MS. A.

report. Thus a signal is made not only with a trumpet-call but by its absence, the one announcing the arrival of the enemy, the other that they are unprepared and off their guard.

8 Concerning signals of *stratēgoi*.

1 What each of the signals of the *stratēgos* means should always be understood by everyone, so that when one of them is given, the fleet can recognize which it is and easily carry out the order.

9 How to form up ships in preparation for war.

1 Before giving instructions on naval warfare, we should discuss the formation of ships which makes up a naval line abeam. For in naval warfare, as in infantry lines abreast, the survival of our authority depends more on the good discipline of the expedition than on anything else. A disorderly [force] is more liable to collapse.

2 First it must be said that some warships are very large and heavily crewed and because of this are slower than the others and safer. Others are small, light and with few crew, while others are between these extremes.

3 Use should be made of the largest [ships] especially in war at sea and also on many occasions in harbours, but not in rivers since because of their size they cannot be manœuvred easily, particularly when the shore is controlled by the enemy. But there is nothing to prevent the use of the mid-sized and smaller [ships] in rivers.

4 When about to engage in naval warfare, we should arrange the stronger and more heavily crewed of the ships alongside each other and place them in front of the rest. Each should be far enough away from the next so as to prevent their obstructing each other during the conflict and their colliding with each other, and the equipment of the soldiers aboard should be better than that of the rest. For in infantry lines abreast we arm those in the front ranks better because they are the first to engage in battle and at close quarters. The remaining ships should follow behind, drawn

ταῖς πρωτοστατούσαις, ἀλλ᾽ οὐχ ὡς ἔτυχεν ἐπιφερομένας.

5 Φυλάξομεν δὲ τὴν τάξιν οὐ μόνον ἐν αὐτῷ τῷ ἀγῶνι, ἀλλὰ γὰρ καὶ ἐν τῷ πορεύεσθαι πρὸ τῆς τῶν ἐχθρῶν παρουσίας εὐκαίρως ταύτην τηρήσομεν, ἐπεὶ καὶ ἐν ταῖς πεζομαχίαις τοῦτο ποιοῦμεν· τὸ δ᾽ αἴτιον ἵνα πρότερον ἐθίζοντα τὰ στρατεύματα τὴν ἐν πολέμοις εὐταξίαν ἐν καιρῷ ταύτην ἔχοιεν.

6[13] Τὸν δέ γε παντὸς τοῦ στόλου ἡγούμενον ἀναγκαῖον προπορευόμενον τοῦ παντὸς στόλου τοσοῦτον ὅσον ὁρᾶν τὸ πᾶν μῆκος τῆς φάλαγγος δύνασθαι, διορθοῦν αὐτὴν εἰς εἴ τι καὶ ἁμαρτάνει, φέρειν τε μεθ᾽ ἑαυτοῦ ἐκ τῶν ταχυτέρων νεῶν δύο ἀποφερούσας τὰ ἐκείνου προστάγματα, αὐτὸν δὲ ἀπέναντι τοῦ μέσου προπορεύεσθαι μικρὸν ἐφ᾽ ἑκάτερα τὰ μέρη μεταφερόμενον, ἵνα μὴ αὐτὸς καθ᾽ ἕκαστον μέρος τῆς φάλαγγος διατρέχων τὸ μὲν εἰς εὐταξίαν ἄγει διὰ τῆς παρουσίας αὐτοῦ, τὸ δὲ εἰς ἀταξίαν μεθίσταται παρελθόντος αὐτοῦ.

7 Ἔργον γὰρ τουτὶ μέγιστον κἀν ταῖς μελέταις διὰ παντὸς προστάττειν τὸν στρατηγόν, ὥστε παρατεταγμένων τῶν νηῶν τὰς μὲν προλαμβανούσας ἀμελείᾳ τῶν ἡγεμόνων αὐτῶν συνέχειν τὰς ἄλλας ἐκδεχομένας, τὰς δὲ βραδυνούσας ἐπελαύνειν ἔστ᾽ ἂν τῶν ἄλλων νηῶν ἐν ἴσῳ γένωνται.

8[14] Δεῖ δὲ τὰ πρὸς πόλεμον εὐτρεπισθέντα καλῶς πρὸ παντὸς ἄλλου καθ᾽ ἑαυτὸν τὸν στρατηγὸν σκέψασθαι καὶ μετὰ τῶν χρησιμωτέρων βουλεύσασθαι εἰ δεῖ πάντως πολεμῆσαι ἢ μή. Ἀνάγκη δὲ τῷ μέλλοντι περὶ πολέμου βουλεύσασθαι εἰδέναι καλῶς τήν τε ἡμετέραν τήν τε τῶν ἐναντίων δύναμιν, πόσα τε παρ᾽ ἡμῖν ἐστιν πλοῖα καὶ πόσα τῶν ἐναντίων· εἶτα πόσα μεγάλα καὶ πολυάνθρωπα καὶ ὅσα μικρά τε καὶ ὀλιγάνθρωπα, ἵνα μὴ πολλάκις ἐξ ἀγνοίας κατὰ πλειόνων φερόμενοι ῥᾳδίως ὑπ᾽ αὐτῶν καταπολεμώμεθα·

9 εἶτα τὸ στράτευμα ἢ νεόλεκτον ἢ πεπειραμένον πολέμου· εἶτα τὸν καθοπλισμὸν καὶ τὴν τοῦ λαοῦ πρόθεσιν εἰς τὸν προκείμενον πόλεμον. Μανθάνομεν δὲ ταῦτα ἔκ τε τῶν ἡμετέρων κατασκόπων καὶ τῶν προσφύγων καὶ οὐχ ἑνί τινι

[13] Cf. Appendix Two [a], §50.
[14] Cf. Appendix Two [a], §§36, 74.

up like those in front but not haphazardly.

5 We should keep the formation not only during the conflict itself but should preserve it satisfactorily also during the manœuvring before the arrival of the enemy, since this is what we also do in infantry warfare. The reason for this is to enable the expedition which has become used to its good battle formation to maintain it in a crisis.

6 The commander of the entire fleet should proceed in front of the entire fleet as far as is necessary to enable him to view the whole length of the line abeam. He should correct any fault and have with him two of the faster ships to carry his instructions. He himself should proceed in front of the middle, veering a little to each side so that, by passing by each side, he prevents the one remaining in good order because of his presence and the other falling into disorder because of his departure.

7 Even during exercizes, it is especially important for the *stratēgos* always to give orders that, when the ships are in formation, those that are ahead through the negligence of their commanders should keep with the others that are following, and that those that are lagging behind should move forward until they are up with the other ships.

8 The *stratēgos* should above all else consider carefully within himself the preparations for war, and amongst the more useful points for him to deliberate is whether or not it is entirely necessary to make war. A [*stratēgos*] who is considering war should have good knowledge of both our strength and that of the opposition, how many ships we have and how many the opposition has, then how many are large and heavily crewed and how many are small and lightly crewed, to prevent our frequent and easy defeat by [the enemy] when for lack of information we attack greater numbers.

9 And then [he should know whether] the [enemy] expedition is newly recruited or experienced in battle; and next the equipment and the attitude of the men towards the proposed war. We learn these things both from our own

λέγοντι πιστεύοντες, ἀλλὰ πολλοῖς συμφωνοῦσιν.

10 Ἑκατέραν δὲ τῶν δυνάμεων παραβάλλοντες τήν τε ἡμετέραν τήν τε τῶν πολεμίων, εἰ μὲν ὑπερβάλωμεν τῇ δυνάμει τῶν ἐναντίων, πολεμῶμεν αὐτοὺς οὐ καταφρονοῦντες αὐτῶν διὰ τὴν ὑπερβολὴν τῆς δυνάμεως· πολλοὶ γὰρ τῷ πλήθει θαρρήσαντες ὑπὸ ἐλαττόνων ἡττήθησαν.

11 Εἰ δὲ ἰσάζει ἀμφοτέρων ἡ δύναμις κατά τε ῥώμην σώματος καὶ ἀνδρείαν καὶ καθοπλισμὸν καὶ τἆλλα, εἰ μὲν καθ᾽ ἡμῶν οὐ προέρχονται οἱ πολέμιοι, ἵνα καὶ ἡμεῖς μένωμεν φυλάττοντες ἑαυτοὺς καὶ τὰ ἴδια, ἀλλὰ μὴ πολεμῶμεν αὐτούς· εἰ δὲ ἐπέρχονται καθ᾽ ἡμῶν ἢ τὴν ἡμετέραν ληίζονται, πολεμῶμεν αὐτούς.[15]

12 Εἰ δὲ πολλῷ πλέον ἡμῶν κατισχύουσιν οἱ πολέμιοι, μέγας δὲ ταῖς ἡμετέραις πόλεσιν ἐπήρτηται κίνδυνος, παραιτουμένους τὸν πόλεμον σοφίᾳ μᾶλλον ἢ δυνάμει τῶν πολεμίων καταγωνίσασθαι, ἄλλά τε πολλὰ ἐπισκοποῦντας καὶ δὴ καὶ καιρὸν καὶ χρόνον καὶ τόπον, δι᾽ ὧν πολλάκις οἱ χείρονες τῶν κρειττόνων περιεγένοντο· χρόνον μὲν καθ᾽ ὃν προσβάλλοντες τοῖς ἐχθροῖς τοὺς ἀνέμους συμμάχους κεκτήμεθα, ὥσπερ ὡς τὰ πολλὰ γίνεται ἐπί τε τῶν ἐτησίων καὶ ἀπογείων ἀνέμων· τόπους δὲ τὴν μεταξὺ δύο γαιῶν θάλασσαν ἢ ποταμὸν καθ᾽ ἣν τὸ πλῆθος τῶν πολεμίων διὰ τὴν τῆς θαλάσσης στενότητα ἄχρηστον εἰς πόλεμον γίνεται. Γίνεται δὲ τοῦτο τριχῶς ἢ μεταξὺ δύο νήσων ἢ μεταξὺ ἠπείρου τε καὶ νήσου ἢ μεταξὺ δύο ἠπείρων.

13 Ἔστι δὲ καὶ ἄλλως περιγενέσθαι τῶν πλειόνων, ἐπειδὰν εἰς διάφορα διαιρεθῶσι συστήματα ὥστε συμμαχεῖν ἀλλήλοις μὴ δύνασθαι. Γίνεται δὲ τοῦτο ὅταν ἐκ διαφόρων τόπων μακρὰν ἀλλήλων ἀφεστηκότες εἰς ἀλλήλους συνέρχωνται, ἢ ὅταν ἐξ ἑνὸς τόπου εἰς διαφόρους ἐπαναστρέφωσιν, ἢ καὶ ἄλλως κατὰ τὴν ἀλλοτρίαν εἰς διάφορα συστήματα διαιρούμενοι· τινὲς δὲ τούτων τοῖς μὲν πρότερον, τοῖς δὲ ὕστερον συμπλακέντες ἀμφοτέρων κατηγωνίσαντο.

14 Καὶ ταῦτα μὲν εἴρηται πλείστην καθ᾽ ἡμῶν δύναμιν ἐχόντων τῶν πολεμίων καὶ κινδύνων ἐπικειμένων κατὰ τῶν ἡμετέρων πραγμάτων ἐν τῷ τὸν πόλεμον ἡμᾶς παραιτεῖσθαι. Εἰ δὲ μηδεὶς ἡμῖν ἕτερος ἐπήρτηται κίνδυνος

[15] εἰ δὲ ἐπέρχονται ... ποδεμῶμεν αὐτούς omitted by Dain.

scouts and from deserters, and we do not believe what one man says but what many agree upon.

10 If, after comparing each of the forces, both ours and that of the enemy, we are superior to the force of the opposition let us make war on them, but without despising them because of the superiority of our force. Many have trusted in numbers and have been defeated by a smaller [force].

11 But if the forces on each side are equal in strength of body, bravery, equipment and the rest, and if the enemy does not come out against us so that we can continue protecting ourselves and our property, we should not make war on them. If they come out against us and ravage our territory, we should make war on them.

12 If the enemy is overwhelmingly stronger than us and a great danger hangs over our cities, then we should avoid war and overcome the enemy by wisdom rather than might, taking into account many other matters, especially the weather, time and place, factors through which the weaker often get the better of the stronger: time, by attacking the enemy at a moment when we have the winds as allies, as happens frequently with Etesian and off-shore winds; place [by using] the sea between two pieces of land, or a river, [areas] in which the numbers of the enemy are useless because of the narrowness of the sea. This happens in three ways: between two islands, or between the mainland and an island, or between two mainlands.

13 There is also another way to overcome larger numbers when they are divided into different groups and so cannot support each other. This happens when they come together again after being positioned in several widely spaced places, or when they are sent to different places from being in one, or when in other ways they are scattered in unfamiliar territory in different groups. Some, having engaged first one and then the other group, overcome both.

14 This is relevant when the enemy has a vastly superior force and danger threatens our affairs while we are avoiding war. If no other danger hangs over us when we are considering war, there should be no war. It is better to enter enemy

παραιτουμένοις τὸν πόλεμον, οὐ δεῖ πολεμεῖν. Ἄμεινον δὲ κατὰ τῆς πολεμίας ἀντεισάγεσθαι, ὡς μήτε δειλίαν ἡμῶν τοὺς πολεμίους καταγινώσκειν παραιτουμένων τὸν πόλεμον καὶ ἡμᾶς τοὺς πολεμίους ἀντιλυπεῖν τὰ ἴσα δύνασθαι· ἔστι δ᾽ ὅτε τούτου γενομένου ἀφέντες τὴν ἀλλοτρίαν οἱ πολέμιοι ἐπὶ τὴν ἰδίαν ἀνέστρεψαν.

15[16] Τῆς τοίνυν συγκρίσεως ἑκατέρας δυνάμεως οὕτω πως γενομένης καὶ τὸν πόλεμον ἡμῶν ἐχομένων χρὴ τὸν στρατηγὸν πάντας εἰς ἑαυτὸν συγκαλέσαντα προτρεπτικὸν εἰς πόλεμον ποιήσασθαι λόγον, διαβάλλοντα μὲν τοὺς ἐναντίους μετὰ τοῦ πιθανοῦ, ἐπαινοῦντα δὲ τοὺς ἰδίους.

16 Πρὸς τούτοις ἐπιφέρειν ὡς εἴ τις τῶν πάντων ἀπορραγεὶς τῆς ἰδίας τάξεως πρὸς λειποταξίαν ἐκκλίνειν, αὐτὸς τὰς ἐσχάτας ὑπομένει τιμωρίας· εἰ δὲ γυνὴ καὶ οἱ παῖδες καὶ εἴ τις ἄλλος κατὰ τὸν οἰκόν ἐστιν, τῶν ἰδίων οἴκων καὶ τῆς ἰδίας πατρίδος ἀπελασθήσεται καὶ κατοικήσουσι γῆν πολλῶν κακῶν γέμουσαν. Εἶτα μετὰ ταῦτα τίς ὑπὲρ γυναικῶν καὶ παίδων καὶ γονέων οὐ προκινδυνεύει καὶ τὸν θάνατον τοῦ ζῆν οὐ προκρίνει; Τοῦτο γὰρ καὶ ἡ ἄλογος βούλεται φύσις· πολλάκις γὰρ ἡ τεκοῦσα ὑπὲρ τῶν νεοσσῶν εἰς χεῖρας ἑαυτὴν δίδωσι τοῦ ἀγρεύοντος· δεινὸν δὲ τὴν μὲν ἄλογον φύσιν τῶν οἰκείων ὑπερασπίζεσθαι ἡμᾶς δὲ λογικοὺς ὄντας καταφρονεῖν τῶν ἰδίων.

17 Εἶτα πάλιν ἐπιστρέφειν πρὸς τὴν ἀπειλὴν ἐπιφέροντα καὶ τὰς τῶν ἀπειλουμένων αἰτίας, οἷον ὅτι χρὴ διὰ τοῦτο τοὺς λειποτάκτας πολλαῖς πρότερον ταῖς τιμωρίαις καθυποβάλλοντα πυρὶ μᾶλλον ἢ ξίφει εἰς ἔσχατον παραδίδοσθαι, πρῶτον μὲν ὅτι Θεοῦ κατεφρόνησαν καὶ τῆς ἰδίας ἠλόγησαν πίστεως, εἶτα γυναικός, παίδων, γονέων, ἀδελφῶν καὶ τῶν ὁμοπίστων, καὶ ταῦτα δυναμένους περιγενέσθαι τῶν ἐναντίων.

18 Δεῖ δὲ πρὸς τούτοις ἐπερωτᾶν τὸν στρατηγὸν καὶ τὸ πλῆθος εἰ καὶ αὐτοῖς ταῦτα δοκοίη, συμφωνούντων δὲ αὐτῶν τῷ στρατηγῷ καὶ ψηφιζομένων θάνατον κατὰ τῶν λειποτακτούντων ἐπὶ τὸν ἔπαινον πάλιν τὸν στρατηγὸν στρέφεσθαι, τί λέγοντα· «Ἐγὼ δὲ οἶμαι ὡς οὐκ ἄν τις τῶν πάντων λειποτακτήσειεν ὁρῶν τῶν ἄλλων τὸ πρόθυμον, ἀλλὰ καί, εἴ τις παρ᾽ ὑμῖν ἐστιν πρὸς λειποταξίαν ἐκκλίνων τὴν

[16] For §§15-18 cf. Appendix Two [a], §35.

14 territory as a result of provocation, so the enemy cannot accuse us of cowardice when avoiding war and we can inflict equal damage on the enemy. Sometimes when this happens, the enemy abandon foreign territory and return to their own.

15 When the comparison between each force has been made in this sort of way and we are at war, the *stratēgos* must summon everyone to him and make a speech exhorting the men to war, belittling the enemy in a credible manner and praising our own men.

16 In addition he should point out that if any of the men should break rank and desert, he must expect the ultimate vengeance. If his wife, children, or anyone else is found at home, they will be driven from their homes and native country to inhabit a land full of misery. Who after that would not hazard all for wives, children, and parents and prefer death to life? This is what irrational beasts choose, for often the mother abandons herself to the hands of the hunter to save her chicks. It would be strange for irrational beasts to protect their offspring and for us rational beings to have no concern for ours.

17 Then he should return to threats and add reasons for what had been threatened; for example, that he should have subjected the deserters to many punishments earlier and then handed them over for the ultimate penalty by fire rather than the sword, first because they had rejected God and disregarded their own faith, and also their wife, children, parents, brothers, and fellow believers, and this when they were able to get the better of the opposition.

18 In addition the *stratēgos* should ask the mass if this is their opinion, and when they agree with the *stratēgos* and vote for death for those who desert, the *stratēgos* should revert to praise, saying something like this: “I think that not one man from the whole [force] will desert when he sees the enthusiasm of everyone else, but should any of you have any inclination towards desertion, he will be stirred up to

γνώμην, πρὸς τὸν ὅμοιον τῶν ἄλλων διαναστήσεται ζῆλον».

19 Εὐχῇ δὲ τελευταῖον τὸν λόγον σφραγίσαντα τῶν νηῶν ἐπιβῆναι προτρέπειν καὶ εἰς τάξιν πολέμου καθίστασθαι καὶ οὕτως κατὰ τὰ πρότερον εἰρημένα τὴν ὅλην συνταξαντα φάλαγγα τοὺς ἐναντίους ἐπιζητεῖν.

20 Ἤδη δὲ τῶν πολεμίων πλησιαζόντων χρὴ τὸν στρατηγὸν διατρέχοντα πρὸ τοῦ μετώπου τῆς φάλαγγος προτρέπειν ἔτι προθυμοτέραν τὴν μάχην ποιήσασθαι καὶ εἰς χρηστὰς ἐλπίδας ἄγειν τὸ στράτευμα, εἶτα κατὰ νώτου παντὸς τοῦ στόλου γενόμενον, ἄν τε καθ᾽ ἕνα ζυγόν, ἄν τε κατὰ δύο ἡ φάλαγξ τῶν νηῶν ᾖ, τὰς βραδυνούσας συνελαύνειν καὶ ἀποκαθιστᾶν ἐπὶ τοὺς ἰδίους ζυγούς.

21 Κἂν μὲν ὀκνηροτέρους τοὺς στρατιώτας ὁρᾷ πρὸς τὴν μάχην, πρὸ τῶν ἄλλων αὐτὸν μικρὸν ἐξιόντα τοῖς ἐναντίοις συμπλέκεσθαι παρ᾽ ἑκάτερα τὰς ἰσχυροτέρας καὶ πολυανθρωποτέρας τῶν νηῶν μεθ᾽ ἑαυτοῦ ἔχοντα. Εἰ δὲ προθυμοτέρους τοὺς στρατιώτας ὁρᾷη πρὸς τὴν μάχην, αὐτὸν μὲν κατὰ τὸ μέσον τῆς φάλαγγος ἐπακολουθοῦντα κατασαλπίζειν τε καὶ προθυμοτέρους τοὺς οἰκείους ποιεῖν, τοὺς δὲ ὀκνηροτέρους ἀπειλεῖν φοβερώτερον, ἐφ᾽ ἑκατέρου δὲ τῶν ἄκρων τῆς φάλαγγος ἐπιστῆσαί τινας τῶν ἀσφαλεστέρων εἰς τὸ συνέχειν τὴν φάλαγγα.

22 Ἔστιν δὲ ὅτε καὶ οἱ κατὰ τὸ μέτωπον τῆς φάλαγγος τεταγμένοι λειποταξίας δόξαν ἐμφαίνουσιν, ὁπότε τὰς κώπας ἠρεμούσας κατέχουσιν ἢ ὀκνηρότερον αὐτὰς ἕλκουσιν, ποτὲ δὲ οἱ κατόπιν ἐπιφερόμενοι· διὸ δὴ ἐκεῖ τὸν στρατηγὸν σπουδαίως παραγενόμενον ἢ ἀντ᾽ αὐτοῦ ἕτερον τοὺς μὲν ῥᾳθύμους διεγείρειν, τοὺς δὲ ἀτάκτους εἰς τάξιν ἄγειν.

23[17] Εἰ δὲ μηδὲν τούτων ὁρᾶται γινόμενον, τινὰ δὲ μέρη λειποταξίας ὑπόληψιν ἔχουσιν, ἐπ᾽ ἐκεῖνα τὸν στρατηγὸν τὸν ὀφθαλμὸν ἔχειν καὶ καταμανθάνειν καὶ ἀποστέλλειν πρὸς αὐτούς τινας τῶν κουφοτέρων νηῶν ἐπαπειλοῦντα θάνατον ἐκ τοῦ παραυτίκα εἴ τις τῶν ἄλλων πολεμούντων λειποτακτήσειεν. Ὑπόληψιν δὲ λειποταξίας ἔχουσιν ἐν μὲν ἀλλοτρίᾳ οἱ κατὰ τὸ πέλαγος τεταγμένοι, ἐν δὲ τῇ ἡμετέρᾳ οἱ κατὰ τὴν ἤπειρον.

24 Χρησιμώτατον δὲ καὶ τὸ προαφορίζειν τινὰς καθ᾽ ἓν ἢ καὶ

[17] Cf. Appendix Two [a], §40.

emulate the zeal of others".

19 Then, marking the end of his speech with a prayer, he should hasten on board the ships and establish the battle formation and thus, having set up the whole line abeam in the way described previously, he should seek out the opposition.

20 When the enemy is quite near, the *stratēgos* should move rapidly before the front line of the line abeam and urge them to prepare for war even more enthusiastically and instil good hope into the expedition. Then he should go to the back of the whole fleet, whether the line abeam of ships is arranged in one rank or two, and stir up those that are lagging behind and see that they are in their own ranks.

21 If he sees that the soldiers are rather reluctant for battle he should go out a little in front of the others and engage with the opposition, having with him on each side the strongest and most heavily crewed of the ships. Should he see that the soldiers are rather eager for battle, he should follow in the middle of the line abeam and sound the trumpet and make his own side even more enthusiastic while he threatens the reluctant fighters more terribly. He should position some of the most reliable on each wing of the line abeam to hold the line abeam together.

22 Sometimes those stationed in the front of the line abeam show a tendency to break rank when they hold their oars at rest, or use them less vigorously, or when those behind bear down on them. For this reason the *stratēgos*, or someone else in his place, should be there energetically, and should rouse up those who are slacking and bring the disorderly back into formation.

23 If none of these things are seen to be happening, the *stratēgos* should have his eye on those sections where he suspects there might be desertion and notice [what is happening] and send some of the lighter ships to them, threatening immediate death if any of the others who are fighting should desert. In foreign territory those positioned on the open sea are more likely to desert while in our territory it is those positioned by the coast.

24 It is very useful to position in advance at one or the other

καθ᾽ ἑκάτερον ἄκρον τῆς ὅλης φάλαγγος, αἳ μέσως πως ἔχουσιν πρός τε τὰς μείζονας τῶν πολεμίων καὶ τὰς κουφοτέρας αὐτῶν, ὡς μήτε ὑπὸ τῶν μείζόνων καταλαμβάνεσθαι τῶν ἐχθρῶν φευγούσας, μήτε ὑπὸ τῶν χειρόνων καταγωνίζεσθαι.

25 Προτρέπειν δὲ αὐτάς, ἐπειδὰν ἴδοιεν εἰς χεῖρας ἡκούσας τὰς φάλαγγας, ὑπερφαλαγγίσαι τε καὶ κατὰ νώτου γένεσθαι τῶν ἐναντίων· ἀσθενέστερον γὰρ ἕξουσιν εὖ οἶδ᾽ ὅτι οἱ πολέμιοι πρὸς τὴν μάχην διαιρούμενοι, τῶν μὲν κατὰ τῶν ἔμπροσθεν ἀγωνιζωμένων, τῶν δὲ ἄλλων ἄλλοτε κατὰ τῶν ὄπισθεν ἐπιστρεφομένων, ἵνα μὴ κατὰ νώτου τούτων μαχέσωνται.

26 Ὡς ἂν δὲ οἱ πολέμιοι ὁρῶντες κατὰ πρόσωπον τοὺς ὑπερφαλαγγίζοντας μὴ συμπαρεκτείνωσιν καὶ αὐτοὶ τὴν ἰδίαν φάλαγγα καὶ κωλύσωσιν αὐτῶν τὴν διάβασιν, χρὴ τὰς εἰρημένας ναῦς μὴ κατὰ πρόσωπον τῶν ὑπεναντίων, ἀλλὰ κατὰ νώτου φέρεσθαι τῶν ἰδίων, ἔστ᾽ ἂν ἀμφοτέρων αἱ φάλαγγες εἰς χεῖρας ἀλλήλων ἥξωσιν· ἐπειδὰν δὲ συμπλακείσας τὰς φάλαγγας ἴδωσιν, τότε καὶ αὐτοὺς ὑπερφαλαγγίσαντας κατὰ νώτου γενέσθαι τῶν ἐναντίων, τοσοῦτον ἐκείνων ἀπέχοντας ὅσον μὴ καταλαμβάνεσθαι ὑπὸ τῶν ἰσχυροτέρων αὐτῶν δύνασθαι, πλησιάζειν δὲ μάλιστα καὶ καταθορυβεῖν ἐκείνους οἳ κατὰ τῶν ἡμετέρων θερμότερον ὑπεμβαίνουσιν.

27[18] Καλὸν δὲ τὰς τοιαύτας ναῦς κατὰ τὰ ἄκρα προαφορίζειν οὐ μόνον τοῦ ποιῆσαι, ἀλλὰ καὶ τοῦ μὴ παθεῖν ἕνεκα· τῶν γὰρ πολεμίων τοῦτο πράττειν ἐπειγομένων καὶ αὐτῶν ἀντεξαγομένων πρὸς τὴν ἐκείνων ἀπάντησιν, ἅτε δὴ ἐπὶ τοῦτο προαφορισθείσας αὐτὰς τὸ ἀμέριμνον τοῖς ἰδίοις ποιήσουσιν.[19] Τὸ δὲ τοιοῦτον γίνεται ὅταν ναυσὶ τῶν ἐχθρῶν πλεονάζωμεν.

28 Τινὲς δὲ τὴν ὁρμὴν τοῦ στόλου ὀξυτέραν εἶναί φασι προθυμίας[20] τε τῶν οἰκείων ἕνεκα καὶ δειλίας[21] τῶν ἐναντίων· τινὲς δὲ ἀσφαλέστερον ἔδοξαν ἠρέμα κινουμένας τοῖς πολεμίοις συμπλέκεσθαι, οἱ δὲ καὶ μὴ κινουμένας. Ἐμοὶ δὲ ἀσφαλέστερον εἶναι δοκεῖ τὴν τοῦ

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[18] Cf. Appendix Two [a], §55.

[19] ποιήσουσιν, thus Dain, following Müller, *Griechische Schrift*: ποιήσωσιν, MS. A.

[20] προθυμίας, thus Dain, following Müller, *Griechische Schrift*: προθυμία, MS. A.

[21] δειλίας, thus Dain, following Müller, *Griechische Schrift*: δειλία, MS. A.

wing of the whole line abeam, some ships which are between the larger and the lighter of the enemy ships, so that they are not captured by the larger enemy ships if they flee nor are overcome by the inferior ones.

25 These should be encouraged, when they see that the lines abeam are coming to blows, to make an outflanking movement and approach the rear of the opposition. For I am well aware that the enemy will be in a weaker position when divided in the battle, with some fighting those in front and others turning sometimes towards those behind so as not to be fighting at their backs.

26 So that the enemy also do not extend their own line abeam and prevent the manœuvre when they see the outflanking movement in front of them, the ships just mentioned should not come to hands with their opponents but be positioned at the rear of their own fleet until both lines abeam engage with each other. When they see that the lines abeam are engaged, then they should make the outflanking movement and come behind the opposition, keeping as far away from them as will prevent their capture by the stronger [enemy ships], but still coming close and shouting down those who are making the most vigorous onslaughts on our men.

27 It is a good idea to position such ships on the wings beforehand not only to enable them to act but also to prevent damage, for while the enemy is being compelled to act and is coming out to meet them, since they have been positioned for this purpose, these will relieve the pressure on our men. This manœuvre takes place when we have more ships than the enemy.

28 Some say that the onslaught of the fleet is made more effective through the enthusiasm of our men and the cowardice of the opposition. Some say that the [ships] engage with the enemy more safely when moving steadily, others when they are not moving.[22] It seems to me safest to

[22] How one might engage the enemy while remaining stationary escapes us.

λαοῦ ὁρῶντας διάθεσιν πρὸς τὸν πόλεμον οἰκονομεῖν τὸ συμφέρον·

29 οἷον εἰ μὲν ὀκνηροτέρους πρὸς τὴν μάχην ὁρῶμεν τοὺς ἰδίους, σὺν βοῇ κρατίστῃ καὶ θορύβῳ πολλῷ καὶ τάχει κατὰ τῶν ἐχθρῶν ὁμοῦ συνελαύνειν αὐτάς· εἰ δὲ προθυμοτέρους ὁρῶμεν αὐτοὺς, ἠρέμα κινεῖσθαι τὴν τάξιν φυλάττοντας· εἰ δὲ πρὸς τὴν πολεμικὴν σύνταξιν δυσκόλως ἔχουσι, καθόλου ἠρεμεῖν τὴν τάξιν φυλάττοντας καὶ τοὺς ἐναντίους ἐκδεχομένους· ἐν γὰρ τῷ κινεῖσθαι ταύτην ἀπόλλυσιν. Ἐπειδὰν δὲ αὐτοὺς ἴδωσιν πλησιαίτερον γενομένους, τότε καὶ αὐτοὺς κινηθέντας ὀξύτερον σὺν βοῇ πολλῇ τοῖς ἐναντίοις[23] συμπλέκεσθαι.

30[24] Εἷς μὲν δὴ τρόπος οὗτος παρατάξεως καθ᾽ ὃν τὴν φάλαγγα τείνοντες τοῖς ἐναντίοις συμπλεκόμεθα. Ἔστιν δ᾽ ὅτε καὶ τὴν εὐθεῖαν κοιλώσαντες φάλαγγα μηνοειδῆ ταύτην ποιοῦμεν. Γίνεται δὲ τοῦτο ὅταν ἰσχυροτέρους ὁρῶμεν τοὺς ἐναντίους καὶ τὴν τάξιν φυλάττοντας, ἄλλως τε παραιτεῖσθαι τὸν πόλεμον οὐ δυνάμεθα φειδοῖ τῶν ἰδίων. Τότε γὰρ δὴ τότε κατὰ τὰ ἄκρα τοῦ σχήματος τὰς μάλιστα ἀσφαλεστέρας συντάξαντες τὰς μὲν μέσας μετ᾽ ἐκείνας τάξομεν καὶ μετ᾽ αὐτὰς τὰς ἀσθενεστέρας· ἀνάγκη γὰρ τὰς πολεμίας νῆας τῆς εἰσόδου φυλάττεσθαι τοῦ μὴ παθεῖν ἕνεκα ἑκατέρωθεν βεβλημένων.

31 Τὸ δὲ σχῆμα μὴ λίαν ἔστω βαθύ, ἀλλ᾽ ἔλαττον πάντως ἡμικυκλίου, ἵνα τῶν πολεμίων συνερχομένων κατὰ τῶν ἄκρων τῆς φάλαγγος καὶ οἱ κατὰ τὸ βάθος αὐτίκα φθάνειν δύνανται τοῖς οἰκείοις συμμαχήσοντες. Τὸ δὲ τοιοῦτον τῆς φάλαγγος σχῆμα οὐ δεῖ ἐκ μακροῦ ἄγειν, ἀλλὰ πλησιαζόντων τῶν πολεμίων, ἵνα μὴ πόρρωθεν ἰδόντες τὸ σχῆμα τῆς φάλαγγος οἱ πολέμιοι καὶ αὐτοὶ πρὸς τὸ συμφέρον αὐτοῖς τὴν ἰδίαν διατυπώσουσι φάλαγγα,

32 τὰς μὲν ἰσχυροτέρας κατὰ τὰ ἄκρα τάττοντες, τὰς δὲ ἀσθενεστέρας κατὰ τὸ μέσον καὶ ἢ διασχισθέντες καὶ τὸν ἔξω τόπον λαμβάνοντες ἢ κατὰ δύο ζυγοὺς συνερχόμενοι, καὶ τὸν μὲν χωρεῖν κατὰ τοῦ βάθους τῆς ἡμετέρας προτρέποντες, τὸν δὲ κατόπιν ἀκολουθειν, καὶ τοὺς μὲν

[23] τοῖς ἐναντίοις, thus Dain, following Müller, *Griechische Schrift*: τοὺς ἐναντίους, MS. A.

[24] Cf. Appendix Two [a], §50.

consider the attitude of the men to the battle and then take appropriate action.

29 For example, if we see that our men are reluctant for battle, we should drive them against the enemy with loud shouts and much noise and speed. If we see that they are quite enthusiastic, they should advance steadily, keeping the formation. If they are in a difficult position facing the enemy formation, they should maintain the formation and stay completely still, waiting for the opposition, for they lose it by moving. When they see them coming close, then they should start moving and engage the opposition with loud shouts.

30 This is one method of drawing up a formation in which we employ a line abeam and engage the opposition. There are also times when we can hollow out the straight line abeam and make it crescent-shaped. This can be done when we see that the opposition is stronger and is maintaining his formation, especially when we cannot force battle out of consideration for our own men. Particularly then, we should position the safest [ships] at the wings of the arrangement and place the mid-sized next to them and after them the weaker ones, for we must keep the enemy ships from the entrance to prevent damage when they are attacked from both sides.

31 The arrangement should not be too deep but certainly less than a semi-circle so that when the enemy attacks the wings of the line abeam those at the deepest point can come to support their own side. This arrangement of line abeam should not be set up too far ahead but only when the enemy are approaching, to prevent their seeing the arrangement of the line abeam from a distance and then deploying their own line abeam in a way that suits themselves,

32 by putting the stronger [ships] on the wings and the weaker towards the middle and either dividing themselves and taking the outside position or marshalling in two ranks and making one advance to the deepest part of our line and the other follow behind. The wings of the second rank then

ἄκρους τοῦ δευτέρου ζυγοῦ τοῖς ἄκροις συμπλέκεσθαι, τὰς δὲ μέσας ταῖς προλαβούσαις ἀκολουθεῖν, ἵνα ταύτας ὁρῶντες οἱ παρ᾽ ἑκάτερα τῆς μηνοειδοῦς φάλαγγος τεταγμένοι μὴ συνέρχωνται κατὰ τῶν προλαβόντων, ὡς μὴ κατὰ νώτου αὐτῶν γενέσθαι τοὺς κατὰ τὸν δεύτερον ζυγὸν τεταγμένους.

33 Διὸ δὴ τοῦτον τὸν τρόπον ἀντιπαρατattομένων τῶν ἐναντίων οὐ χρὴ τὰς πλησιαζούσας ταῖς ἄκραις κατὰ τῶν προλαβόντων τῶν πολεμίων συνέρχεσθαι, ἀλλ᾽ ἀναμένειν τοὺς ἐπὶ τοῦ δευτέρου ζυγοῦ τῶν πολεμίων, καταλαμβανούσας δὲ ἢ συμπλέκεσθαι αὐταῖς ἢ τὴν εἴσοδον παραχωρούσας κατὰ νώτου τῶν ἐχθρῶν γενέσθαι.[25]

34 Δεῖ δὲ πάντως τὸν ἐντὸς φεύγειν τόπον, ἵνα μὴ ὑπὸ τῶν ἐκτὸς συνωθούμενοι καὶ πυκνούμενοι οὐ μόνον ἐνεργέστερα τὰ βέλη τῶν ἐχθρῶν καθ᾽ ἡμῶν γένωνται, ἀλλὰ καὶ ὑφ᾽ ἑαυτῶν διὰ τὴν πύκνωσιν συντριβώμεθα.

35[26] Ἔστι δὲ οὐ μόνον κατὰ τὴν κοίλην ἐπιφάνειαν τοῦ μηνοειδοῦς σχήματος τοῖς πολεμίοις συμπλέκεσθαι, ἀλλὰ καὶ κατὰ τὴν κυρτὴν αὐτοῦ ἐπιφάνειαν ἐπὶ τοὺς πολεμίους ταύτην στρέψαντας, οὐκ ἐπὶ τὸν αὐτὸν τόπον ἑκάστης τῶν νηῶν τεταγμένης, καθάπερ ἐπὶ τῆς μηνοειδοῦς ἐλέγομεν φάλαγγος, ἀλλὰ τὰς μὲν ἰσχυροτέρας τε καὶ πολυανθρωποτερας τῶν νηῶν τεταγμένας, κατὰ τοῦ μέσου, τῶν δὲ μέσων μετ᾽ ἐκείνας καὶ πρὸς τοῖς ἄκροις τῶν εὐτελεστέρων, ἵνα προηγουμένως μὲν αἱ μέγισται τοῖς ἐναντίοις συμπλέκωνται, αἱ δ᾽ εὐτελέστεραι φυλάττοιντο ἐν ἀποστάσει πρὸς τοῖς ἄκροις φερόμεναι.

36 Δεῖ δὲ καὶ ἐπ᾽ αὐτῶν τῶν ἄκρων τάττειν ἀνὰ δύο τινὰς τῶν κρατίστων εἰς φυλακὴν τῶν ἀσθενεστέρων. Εἰ δὲ πλεονάζομεν τῷ ἀριθμῷ τῶν νηῶν πρὸς τὰς τῶν πολεμίων, τούτων τὸ πλέον κατόπιν τάττειν κατὰ τοῦ μέσου τῆς φάλαγγος, ἵνα προηγουμένως μὲν τῶν μεγίστων συμπλεκομένων τοῖς ἐναντίοις κατόπιν αὐτῶν καὶ αὗται φερόμεναι συμμαχῶσιν αὐταῖς ἢ ἐκείναις ἃς μᾶλλον ὁρῶσι καταπολεμουμένας τῶν ἄλλων.

37 Γίνεται δὲ καὶ τοῦτο τὸ σχῆμα πρότερον μὲν εἰς εὐθεῖαν

[25] γενέσθαι, thus Dain: γίνεσθαι, MS. A.
[26] For §§35-41 cf. Appendix Two [a], §40.

32 engage with the wings while those in the middle follow those that have moved up already. So, on seeing these [those moving up], those drawn up on each side of the crescent-shaped line abeam do not attack those who have come up there, so as not to have those positioned in the second rank at their backs.[27]

33 So, when the opposition draw themselves up in this defensive manner, the [ships] that are approaching the wings should not attack the [ships] of the enemy that arrive first at the wings but should wait for the second rank of the enemy. When they have caught up they should either engage them or allow them an entrance and come to the rear of the enemy.

34 They should always avoid the inner position, otherwise they will be crowded by those outside and hemmed in and not only will the weapons of the enemies land on us more violently but we will be crushed by our own in the confusion.

35 It is possible to engage the enemy not only on the concave side of a crescent-shaped arrangement but also on the convex side, turning this against the enemy, though not with each of the ships positioned in the same place that we proposed in the crescent-shaped line abeam but with the stronger and heavily-crewed ships drawn up in the middle, the mid-sized [ships] next, and the inferior [ships] towards the wings, so that the largest can start the engagement with the opposition while the inferior ones keep their distance on the wings.

36 You should also position on each of the wings two of the strongest [ships] to protect the weaker. If we are superior to the enemy in numbers of ships, you should position more of these [the strongest] behind the middle of the line abeam, so that when the largest start the engagement with the opposition these are behind them and can be brought up in support of whichever group they see is being hard pressed by others.

37 This arrangement develops first of all when [its ships] are

[27] What this paragraph is trying to say escapes us.

συνταττομένων καὶ μέσον μὲν τεταγμένων τῶν μεγίστων τε καὶ πολυανθρωποτέρων, εἶτα μετ᾽ ἐκείνας τῶν μέσων καὶ μετὰ ταύτας τῶν ἀσθενεστέρων· καὶ οὕτως τῶν μὲν ἄκρων ὑποκρατουμένων τῆς φάλαγγος, τῶν δὲ μέσων προαγόντων, ἑπομένων δὲ καὶ τῶν ἄλλων μεχρί τῶν ἄκρων τὴν κατὰ τὸ πλάτος τάξιν οὐ παρερχομένων.

38 Δεῖ δὲ κατὰ τοῦτο τὸ σχῆμα τοῖς ἐναντίοις συμπλεκομένους ἡμᾶς ἀπέχειν καὶ μᾶλλον ἀλλήλων ποιήσομεν τὰς ναῦς, ὥστε μεῖζον τὸ σχῆμα κατὰ μῆκος γενέσθαι, φυλαττομένους τὴν μεταξὺ τοῦ σχήματος πύκνωσιν ὑπὸ τῶν πολεμίων συνωθουμένους, τὸν δὲ στρατηγὸν ἐντὸς περιερχόμενον τῆς φάλαγγος κατασαλπίζειν καὶ προθυμοτέρους τοὺς ἰδίους ποιεῖν καὶ μάλιστα καθὸ μέρος ὁρᾷ τὴν μάχην ἀκμάζουσαν.

39 Δεῖ δὲ καὶ τοῦτο τὸ σχῆμα μὴ πόρρωθεν ἄγειν, ἵνα μὴ μεταποιεῖν οἱ πολέμιοι τὰς ναῦς δύνωνται πρὸς τὸ χρησιμότερον αὐτοῖς τῆς μάχης κατεπειγούσης. Χρώμεθα δὲ καὶ τούτῳ τῷ σχήματι ὅταν διασχίσαι τὴν φάλαγγα τῶν ἐναντιων διανοώμεθα καὶ διαλῦσαι τὴν τάξιν αὐτῶν.

40 Συμβάλλεται δὲ ἡμῖν τοῦτο μάλιστα ὁπόταν οἱ ἐναντίοι τῇ μηνοειδεῖ κέχρηνται φάλαγγι, ὥστε διὰ μέσου ἐκείνης χωρούσης τῆς κυρτοειδοῦς φάλαγγος ἐν τάξει τὴν μάχην ποιεῖν ἀντία τῶν κατὰ τὴν κυρτὴν ἐπιφάνειαν τεταγμένων νηῶν ἀφ᾽ ἑκάστης συμπλεκομένης ταῖς ἐναντίαις.

41 Ἰστέον δὲ ὅτι τῶν πολεμίων χρωμένων τῇ μηνοειδεῖ[28] φάλαγγι καὶ ἡμῶν τῇ ἐναντίᾳ οὐκέτι κατὰ τὰ προειρημένα τάξομεν τὰς μὲν πολυανθρώπους κατὰ τὸ μέσον τῆς κυρτοειδοῦς φάλαγγος καὶ μετ᾽ ἐκείνας τὰς ἄλλας, ἀλλὰ τὰς μὲν πολυανθρώπους κατὰ τῶν πολυανθρώπων καὶ τὰς ἀσθενεστέρας κατὰ τῶν ασθενεστέρων καὶ μέσας ὁμοίως κατὰ τῶν ἴσων.

42 Ῥητέον δὲ καὶ περὶ τῶν τόπων τῆς θαλάσσης καθ᾽ οὓς ὀφείλομεν ναυμαχεῖν. Εἰ μὲν γὰρ τὴν πολεμίαν παραπλέοντες τὴν ναυμαχίαν ποιεῖν μέλλομεν, κατὰ πέλαγος ταύτην ποιῶμεν παραιτουμένους τὴν πρόσγειον μάχην· εἰ δὲ τὴν ἡμετέραν, οὐ πόρρω μακρὰν ἀφεστηκόντες τῆς γῆς, ἵνα ἠττηθέντες καὶ σῴζεσθαι διὰ πελάγους οὐ συγχωρούμενοι ἐπὶ τὴν γῆν καταφεύγωμεν.

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[28] μηνοειδεῖ, thus Dain, following Müller, *Griechische Schrift*: μονοειδεῖ, MS. A.

formed up in a straight line, with the largest [ships] with the heaviest crews in the middle, then the mid-sized next to them and the weaker next to those. Thus the wings of the line abeam are held back, those in the middle press forward with the others as far as those on the wings, moving along the breadth of the line.

38 When we engage the opposition using this arrangement we must keep our distance from each other, and we shall place the ships so that the arrangement is greater in its length, while we maintain close order within the arrangement as we are pushed together by the enemy. And the *stratēgos*, who is positioned in the line abeam, should sound the trumpet and urge our men on, especially in any place where he sees the battle is at its height.

39 Do not set up this arrangement too far ahead in case the enemy is able to reposition his ships more conveniently whilst the battle is getting under way. We use this arrangement when we intend to split the line abeam of the opposition and break up their formation.

40 We can achieve this whenever the opposition has used the crescent-shaped line abeam and as a result the convex line abeam can sail through its middle in formation and give battle to those drawn up opposite in the convex line, each ship engaging those in front.

41 You should know that when the enemy employs the crescent-shaped line abeam and we use the opposite [formation], we shall not form up the ships as described above, with the heavily crewed ships in the middle of the convex line abeam and the others next to them, but with the heavily crewed ships against heavily crewed, weaker against weaker, and the mid-sized ships against their equals.

42 Some comments must be made about the areas of the sea in which we have to make naval war. If we are about to make naval war whilst sailing past enemy territory, let us set it up on the open sea, even though they wish to give battle close to the shore, if we are sailing past our territory, whilst at no great distance from land so that if we are defeated and cannot escape towards the open sea, we can take refuge on land.

43 Οὐκοῦν χρὴ διὰ ταῦτα καὶ τοῖς ἐπὶ τῆς στερεᾶς καταμηνύειν τὸν τόπον ἐν ᾧ πολεμεῖν μέλλομεν, καὶ οὐ τοῦτο μόνον, ἀλλὰ δὴ καὶ πρότερον τὴν ἤπειρον παραπλέοντες καὶ μανθάνοντες ποῦ ποτέ εἰσιν οἱ πολεμίοι μηνύειν τοῖς ἠπειρώταις, κἀκείνους πάλιν τὰ ὅμοια μανθάνοντας καταμηνύειν τῷ στόλῳ τὸν δυνατὸν τρόπον· πολλάκις γὰρ οἱ ἐχθροὶ τὸν μὲν στόλον λανθάνουσιν ὅποι εἰσιν, ὑπὸ δὲ τῶν ἠπειρωτῶν γινώσκονται, ἢ τοὐναντίον.

44[29] Τινὲς δὲ καθόλου τὴν πρόσγειον διαβάλλουσι μάχην, τί λέγοντες· ὡς οἱ πολλοὶ τὸν πόλεμον δεδοικότες ἐπι τὴν γῆν καταφεύγουσιν· ἐγὼ δὲ οὐκ ἂν τοῦτο οἶμαι τολμῆσαί τινας, τοῦ στρατηγοῦ τὰ προειρημένα φυλάττοντος.

ι΄ Πῶς δεῖ τὸν στρατηγὸν μετὰ τὴν μάχην περὶ τοῦ στόλου οἰκονομεῖν.

1 Τοῦ τοίνυν πολέμου κρατηθέντος, εἰ μὲν τῶν πολεμίων κατισχύσομεν ἄν τε καθόλου ἄν τε ἐπὶ μέρους, οὐ χρὴ τὸν στρατηγὸν ἅτε δὴ τοὺς πολεμίους νενικηκότα ἀδεέστερον διατίθεσθαι, ἀλλ᾽ ἐκείνῃ τῇ ἀσφαλείᾳ κεχρῆσθαι ᾗτινι καὶ πρὸ τοῦ πολέμου ἐκέχρητο.

2 Εἰ δὲ ὑπὸ τῶν ἐχθρῶν νενικήμεθα, μηδ᾽ οὕτως ἀπογινώσκειν, ἀλλ᾽ ἐπισυνάγειν τὰς ὑπολειφθείσας καὶ καιρὸν δευτέρας ἐπιζητεῖν μάχης.

[29] Cf. Appendix Two [a], §40.

43 For this reason, therefore, we must indicate to those on land the place where we intend to fight, though not only this. When we have previously sailed past the mainland and learned where the enemy are, we should also inform those on the mainland and they should also, when they have similar information, inform the fleet as far as is possible. For the enemy frequently do not know where the fleet is and find this out from those on the mainland, and vice versa.

44 Some avoid battle close to the shore entirely, giving reasons such as this, that most of the men fear war and would flee to the land. I, however, do not think that any man would dare to do this if the *stratēgos* takes the precautions outlined above.

10 How the *stratēgos* should deal with the fleet after the battle.

1 If, when the war has taken place, we have got the better of the enemy, either completely or in part, the *stratēgos* should not be less vigilant because he has defeated the enemy but should act as cautiously as he did before the war.

2 If we have been defeated by the enemy, we should not despair but collect up the surviving [ships] and seek an opportunity for a second battle.

APPENDIX TWO [a]

LEO VI, *ΝΑΥΜΑΧΙΚΑ ΛΕΟΝΤΟΣ ΒΑΣΙΛΕΩΣ*, EDITION AND TRANSLATION[1]

AND

APPENDIX TWO [b]

LEO VI, *ΕΚ ΤΟΥ ΚΥΡΟΥ ΛΕΟΝΤΟΣ ΤΟΥ ΒΑΣΙΛΕΩΣ*, EDITION AND TRANSLATION

Technical terms, the understanding and translation of which are discussed elsewhere in the text, are asterisked the first time they are used. They may be accessed through the Index.

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[1] Edited from a microfilm of folios 323r-331v of the tenth-century manuscript Milan, Biblioteca Ambrosiana, MS. B 119-sup. [gr. 139], referred to by Dain and hereafter here also as MS. A. In this manuscript, Constitution XIX of Leo VI's *Taktika*, *Περὶ θαλασσομαχίας*, was excerpted from the rest of the *Taktika* and transferred to the beginning of the section on naval warfare in the manuscript under the heading *Ναυμαχικὰ Λέοντος Βασιλέως*. See above pp. 180-81.

A text was published in Dain, *Naumachica*, pp. 19-33; however, Dain's photographs of the Ambrosiana manuscript were destroyed in World War Two and he was compelled to rely on his notes made in 1931. It is clear that at some points he confused the text of the Ambrosiana manuscript with those of Constitution XIX in other manuscripts of the *Taktika*.

We have compared this text to the composite one published by Migne from the edition of Joannes Meursius the elder in PG, 107. Although the wording is frequently different, the PG edition adds nothing to the understanding of this text.

Ναυμαχικὰ Λέοντος Βασιλέως

Περὶ ναυμαχίας βουλόμεθα διατάξασθαι, περὶ ἧς οὐδὲν μὲν ἐν τοῖς παλαιοῖς τακτικοῖς κεκανονισμένον εὕρομεν· ἀφ᾽ ὧν δὲ σποράδην ἀνέγνωμεν καὶ δι᾽ ὀλίγης πείρας τοῦ νῦν καιροῦ παρὰ τῶν πλωΐμων ἡμῶν στρατηγῶν ἀνεμάθομεν, τὰ μὲν πεποιηκότων, τὰ δὲ παθόντων, ἀναλεξάμενοι μικρά τινα καὶ ὅσον ἀφορμὴν δοῦναι τοῖς ἐπὶ θαλάσσης μάχεσθαι μέλλουσιν διὰ τῶν ποτε λεγομένων τριηρῶν, νῦν δὲ δρομώνων καλουμένων, ἐν ὀλίγοις διορισόμεθα.

β΄[2] Πρῶτον μὲν οὖν, ὦ στρατηγὲ τῆς ναυτικῆς δυνάμεως, δεῖ εἶναί σε ἐπιστήμονα τῆς ναυμαχικῆς ἐμπειρίας καὶ τάξεως, καὶ προσκοπεῖν, καὶ προγινώσκειν τὰς τῶν ἀέρων καὶ τῶν πνευμάτων κινήσεις διὰ τῆς τῶν φαινομένων ἀστέρων καὶ ἐν ἄστροις σημείων πείρας καὶ τῶν κατὰ τὸν ἥλιον τε καὶ τὴν σελήνην γινομένων ἐπισημειώσεων· ἐπιγινώσκειν δὲ καὶ τῆς τῶν καιρῶν ἐναλλαγῆς τὴν ἀκρίβειαν, ὡς ἂν ἔχων περὶ ταῦτα ἐμπείρως διαφυλάττῃ ἀσφαλὴς καὶ ἀκίνδυνος ἀπὸ τῶν τῆς θαλάσσης χειμώνων.

γ΄ Κατασκευασθῆναι δὲ δεῖ καὶ δρόμωνας ἀρκοῦντας πρὸς ναυμαχίαν κατὰ τῶν ἀντιστρατευομένων πλωΐμων πολεμίων καὶ πρὸς τὴν ἐκείνων κατάστασιν καὶ τῶν σῶν ποιήσασθαι τὴν κατασκευὴν δυνατὴν πρὸς ἅπαντα ἐκείνοις ἀντιμάχεσθαι.

δ΄ Ἡ δὲ τῶν δρομώνων κατασκευὴ μήτε πάνυ ἔστω παχεῖα, ἵνα μὴ ἀργοὶ γένωνται ἐν ταῖς ἐλασίαις, μήτε λίαν εἰς λεπτότητα ἐξειργασμένη, ἵνα μὴ ἀσθενὴς οὖσα καὶ σαθρὰ ταχέως ὑπὸ τῶν κυμάτων καὶ τῆς τῶν ἐναντίων συγκρούσεως διαλύηται· ἀλλὰ σύμμετρον ἐχέτω τὴν ἐργασίαν ὁ δρόμων, ἵνα καὶ ἐλαυνόμενος μὴ λίαν ἐστὶν ἀργὸς καὶ κλυδωνιζόμενος ἢ παρὰ τῶν ἐχθρῶν συγκρουόμενος ἰσχυρότερος διαμένῃ καὶ ἄρρηκτος.

ε΄ Ἐχέτωσαν δὲ καὶ πάντα πρὸς ἐξαρτισμὸν δρόμωνος ἀπαραλειπτὰ καὶ διπλᾶ, οἷον αὐχένας, κώπας, σκαρμοὺς, σχοινία, κάρυα, καὶ τὰ ἄρμενα δὲ αὐτῶν καὶ κερατάρια και κατάρτια καὶ ὁπόσα ἄλλα ἡ ναυτικὴ τέχνη πρὸς χρείαν ἀπαιτεῖ. Ἐχέτω δὲ καὶ ἐκ περισσοῦ ξύλα τινὰ ἐγκοίλια καὶ σανίδας καὶ

[2] The numbering of this paragraph in the manuscript is β΄ [2]. There is no numbering for the first paragraph. From here to paragraph 59 Dain's Greek numbering is out by one in each case. From paragraph ξ΄ [60] Dain's Greek numbering coincides with that of the manuscript. Paragraphs 60 and 61 in Dain's text are a single paragraph ξ΄ [60] in the manuscript.

The Naval Warfare *of the emperor Leo*

We wish to discuss naval warfare, [a topic] on which we have found no prescription in the old tactical [manuals]. We have read these at random and we have acquired a little experience of the present time from our naval *stratēgoi**, both of what they had done and what they had suffered, [and] having selected some brief [examples] to give something of a starting point for those about to fight at sea in [what were] once called *triēreis** (triremes) but [are] now known as dromons, we will set [this] out succinctly.

2 First, *stratēgos* of the naval force, you must have knowledge of naval practice and formation, and [know how] to look out for and anticipate shifts in the airs and breezes through experience of the stars that appear and of the signs in the stars and [through experience of] the marks that happen on the sun and the moon. And [you must] have a precise knowledge of the change of the seasons, so that, being experienced in these, you may be preserved safe and sound from storms at sea.

3 [You] must equip dromons that are adequate for naval warfare against the enemy ships campaigning against you and against their condition, and [you must] make your [ships'] equipment able to withstand them in all respects.

4 The construction of the dromons should be neither too heavy, or they will be sluggish when under way, nor built too lightly, or they will be weak and unsound and quickly broken up by the waves and the attacks of the opposition. Let the dromon have suitable workmanship so that it is not too sluggish when under way and remains sturdy and unbroken when in a gale or struck by the enemy.

5 There should be a complete supply in duplicate of the fittings of a dromon, such as rudders (*auchēnes**), oars, tholes (*skarmoi**), oar-grommets (*schoinia**), blocks (*karya**), and their sails, and yards (*kerataria**), and masts (*katartia**), and everything else the nautical art considers necessary. [The ship] should also have

στυππία καὶ πίσσαν καὶ ὑγρόπισσον· καὶ ναυπηγὸν μετὰ πάντων τῶν ἐργαλείων αὐτοῦ ἕνα τῶν ἐλατῶν, οἷον σκεπάρνου, τρυπάνου, πρίονος καὶ τῶν ὁμοίων.

ς΄ Ἐχέτω δὲ πάντως τὸν σίφωνα κατὰ τὴν πρῴραν ἔμπροσθεν χαλκῷ ἠμφιεσμένον, ὡς ἔθος, δι᾽ οὗ τὸ ἐσκευασμένον πῦρ κατὰ τῶν ἐναντίων ἀκοντίσει. Καὶ ἄνωθεν δὲ τοῦ τοιούτου σίφωνος ψευδοπάτιον ἀπὸ σανίδων, καὶ αὐτὸ περιτετειχισ-μένον σανίσιν, ἐν ᾧ στήσονται ἄνδρες πολεμισταὶ τοῖς ἐπερχομένοις ἀπὸ τῆς πρῴρας τῶν πολεμίων ἀντιμαχόμενοι ἢ κατὰ τῆς πολεμίας νηὸς ὅλης βάλλοντες δι᾽ ὅσων ἂν ἐπινοήσωσιν ὅπλων.

ζ΄ Ἀλλὰ καὶ τὰ λεγόμενα ξυλόκαστρα περὶ τὸ μέσον τοῦ καταρτίου ἐν τοῖς μεγίστοις δρόμωσιν ἐπιστήσουσι περι-τετειχισμένα σανίσιν, ἐξ ὧν ἄνδρες τινὲς εἰς τὸ μέσον τῆς πολεμίας νηὸς ἀκοντίσουσιν ἢ λίθους μυλικοὺς ἢ σίδηρα βαρέα, οἷον μαζία ξιφοειδῆ, δι᾽ ὧν ἢ τὴν ναῦν διαθρύψουσιν, ἢ τοὺς ὑποκειμένους συνθλάσουσι, σφοδρῶς καταφερόμενα, ἢ ἕτερόν τι ἐπισχύσουσιν ἢ ἐμπρῆσαι δυνάμενον τὴν ναῦν τῶν πολεμίων ἢ τοὺς ἐν αὐτῇ θανατῶσαι. Ἕκαστος δὲ τῶν δρομώνων εὐμήκης ἔστω καὶ σύμμετρος, ἔχων τὰς λεγομένας ἐλασίας δύο, τήν τε κάτω καὶ τὴν ἄνω.

η΄ Ἑκάστη δὲ ἐχέτω ζυγοὺς τὸ ἐλάχιστον κε΄ ἐν οἷς οἱ κωπηλάται καθεσθήσονται, ὡς εἶναι ζυγοὺς τοὺς ἅπαντας κάτω μὲν κε΄, ἄνω δὲ ὁμοίως κε΄, ὁμοῦ ν΄. Καθ᾽ ἕνα δὲ αὐτῶν δύο καθεζέσ-θωσαν οἱ κωπηλατοῦντες, εἷς μὲν δεξιά, εἷς δὲ ἀριστερά, ὡς εἶναι τοὺς ἅπαντας κωπηλάτας ὁμοῦ τοὺς αὐτοὺς καὶ στρατιώτας τούς τε ἄνω καὶ τοὺς κάτω ἄνδρας ρ΄. Ἔξω δὲ τούτων τὸν κένταρχον τοῦ δρόμωνος καὶ τὸν τὸ φλάμουλον κατέχοντα καὶ τούς δύο κυβερνήτας τῶν τοῦ δρόμωνος αὐχένων, οὓς καλοῦσι πρωτοκαράβους, καὶ εἴ τινα ἕτερον δέον εἰς τὴν τοῦ κεντάρχου ὑπηρεσίαν. Τῶν δε πρῳραίων ἐλατῶν οἱ τελευταῖοι δύο, ὁ μὲν ἔστω σιφωνάτωρ, ὁ δὲ ἕτερος ὁ τὰς ἀγκύρας βάλλων κατὰ θάλασσαν, ἤγουν τὰ σίδηρα· ἔστω δὲ καὶ ὁ πρῳρεὺς ἄνω τῆς πρῴρας καθήμενος ἔνοπλος. Καὶ ὁ τοῦ ναυαρχου δέ, ἤτοι τοῦ κεντάρχου, κράβατος ἐπὶ τῆς πρύμνης γινέσθω, ὁμοῦ μὲν ἀφωρισμένον δεικνύων τὸν ἄρχοντα, ὁμοῦ δε

some extra timbers, [that is] floor timbers (*enkoilia**), and planks, and tow, pitch, and liquid pitch. And, one of the oarsmen [should be] a shipwright with all the tools, such as an adze, an auger, a saw, and the like.

6 Most importantly [the ship] should have a *siphōn** (flame-thrower) in front at the prow, bound in bronze, as is usual, through which processed fire can be hurled against the enemy. Above this *siphōn* [there should be] a false floor (*pseudopation**) of planks, itself fortified with planks, on which marines can stand to fight those attacking from the prow of the enemy or to throw whatever weapons they can devise against the whole enemy ship.

7 Moreover they will set up the so-called *xylokastra** (wooden castles), fortified with planks, around the middle of the mast on the largest dromons, from which men will throw into the middle of the enemy ship mill stones or heavy iron [weights], like sword-shaped blooms,[3] with which they will either break up the ship or crush those underneath as [the weights] crash down heavily, or they will be able to achieve some other result, either setting fire to the enemy ship or killing those in it. Each of the dromons should be long and [well] proportioned with two *elasiai** (oar-banks), one below and one above.[4]

8 Each [oar-bank] should have at a minimum twenty-five *zygoi** (thwarts), on which the oarsmen will be seated, so that in all there are twenty five thwarts below and similarly twenty five above, making a total of fifty. Two oarsmen should sit on each of these [thwarts], one on the right and the other on the left, so that all the oarsmen together themselves [are] also soldiers, both those above and those below, [total] one hundred men.[5] Apart from these [there should be] the *kentarchos** ("captain") of the dromon and the one who keeps the standard and the two *kybernētai** (helmsmen) [in charge] of the rudders of the dromon, who they[6] call *prōtokaraboi**, and anyone else who is required in the service of the *kentarchos*. Of the last two oarsmen at the prow, one should be the *siphōnatōr** (operator of the flame-thrower), the other should be the one who throws the anchors, that is the "irons", into the sea. The bowman sta-

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[3] Μαζίον: literally, a "lump" or "mass".
[4] This sentence belongs with §8 but is included here in §7 in the manuscript.
[5] Cf. above pp. 254-6, 260-61.
[6] That is, people of the present day, the tenth century.

καὶ φυλάττων ἐν καιρῷ συμβολῆς ἀπὸ τῶν ῥιπτομένων βελῶν παρὰ τῶν ἐναντίων, ἐξ οὗ καὶ ἕκαστα βλέπων πρὸς τὴν χρείαν μάλιστα κελεύσει ὁ ἄρχων τὸν δρόμωνα.

θ΄ Καὶ ἕτεροι δὲ δρόμωνες κατασκευαζέσθωσάν σοι τούτων μείζονες, ἀπὸ διακοσίων χωροῦντες ἀνδρῶν ἢ πλέον τούτων ἢ ἔλαττον κατὰ τὴν χρείαν τὴν δέουσαν ἐπὶ καιροῦ κατὰ τῶν ἐναντίων· ὧν οἱ μὲν ν΄ εἰς τὴν κάτω ἐλασίαν ὑπουργήσουσιν, οἱ δὲ ρ΄ και ν΄ ἄνω ἑστῶτες ἅπαντες ἔνοπλοι μαχήσονται τοῖς πολεμίοις.

ι΄ Ἔτι δὲ καὶ κατασκευάσεις δρόμωνας μικροτέρους γοργοτάτους, οἱονεὶ γαλέας ἢ μονήρεις λεγομένους, ταχινοὺς καὶ ἐλαφφούς, οἷσπερ χρήσῃ ἐν τε ταῖς βίγλαις καὶ ταῖς ἄλλαις σπουδαίαις χρείαις.

ια΄ Καὶ ἑτέρας δὲ ναῦς ποιήσεις φορτηγοὺς καὶ ἱππαγώγους τούλδου δίκην, αἵτινες τὴν ἀποσκευὴν ἅπασαν τῶν στρατιωτῶν βαστάσουσιν, ἵνα μὴ δι᾽ αὐτὴν βαροῦνται οἱ δρόμωνες καὶ μάλιστα ἐν ἀγῶνος καιρῷ, ὅτε δὲ χρεία μικρᾶς δαπάνης ἢ ὅπλων ἢ ἄλλης ὕλης ἐκεῖθεν ἀναλαμβάνωσι τὰς διοικήσεις.

ιβ΄ Τὸν δὲ τῶν δρομώνων ἀριθμὸν καὶ τῶν ἐν αὐτοῖς στρατιωτῶν ἀνεικαστόν ἐστιν καὶ ἄδηλον διορίσασθαι·[7] ἡ γὰρ κατὰ τὸν καιρὸν χρεία πρὸς τὴν τῶν ἀντιμαχομένων πολεμίων δύναμιν, ὡς ἂν ἀπαιτήσῃ καὶ τὸ πλῆθος τῶν δρομώνων. Καὶ πάλιν τὸν ἀριθμὸν τοῦ ἐν αὐτοῖς λαοῦ κατὰ τὸ μέγεθος τῶν πλοίων καὶ τὴν δέουσαν ἐν αὐτοῖς πολεμικὴν ὅπλισιν οὕτω καὶ ποιήσεις.

ιγ΄ Προσέτι δὲ καὶ τὰ σκευοφόρα καὶ ἱππαγωγὰ πλοῖα τοὺς ἐν αὐτοῖς ἀρκοῦντας ἕξουσι ναύτας, οὐδὲ αὐτοὺς ἀνόπλους, ἀλλὰ καὶ τόξα ἔχοντας καὶ σαγίτας καὶ ῥιπτάρια καὶ εἴ τι χρειῶδες πρὸς πόλεμον ἕτερον διὰ τὰς ἀναγκαίας περιστάσεις. Ἐπιφερέσθωσαν δὲ καὶ περισσὰ ὅπλα· ποτὲ γαρ καὶ λειπόντων ὅπλων, ἐκεῖθεν οἱ στρατιῶται λάβωσιν. Τὰ δὲ τοιαῦτα πλοῖα καὶ ἅρματα ἐχέτωσαν καὶ μάγγανα καὶ τὰ ἄλλα ὅπλα πρὸς χρείαν, εἰ τύχῃ μή ποτε ἐπιλείπωσιν καταδαπανώμενα ἐν ταῖς μάχαις.

[7] Cf. Appendix Three, §3.1.

tioned above the prow should be under arms. The *krabatos** of the *navarchos** or the *kentarchos* should be at the stern, both indicating [that] the *archōn** (commander) is set apart, and also protecting him at a time of attack from the missiles thrown by the opposition. And from here the commander can see everything and give orders for the dromon as necessary.

9 Other dromons should also be constructed for you [which are] larger than these, with space for two hundred men, perhaps more or fewer according to the compelling need of the moment against the opposition. Of these, fifty should serve on the lower oar-bank and one hundred and fifty, stationed above and all armed, will fight the enemy.

10 As well, you will also construct smaller, very fast dromons, that is [those] known as *galeai** or *monēreis* (monoremes), speedy and light, which you will use as sentinels and for other essential tasks.[8]

11 And you will build other ships [as] *phortēgoi** (supply) [ships] and horse transports, like a baggage-train, which will carry all the equipment of the soldiers, so that the dromons are not burdened with it; and especially in time of battle, when there is need of a small supply of weapons or other materiel, [these] undertake the distribution.

12 About the number of dromons and the soldiers in them, it is impossible and unrealistic to be prescriptive. For the number of dromons required varies according to the needs of the moment, when facing the opposing enemy forces. Once again, you will supply the number of the force in them according to the size of the ships and the warlike armament required in them.

13 As well the *skevophora** (supply [ships]) and the horse transports will have sufficient *nautai** (sailors) on board, and these [should] not be unarmed but [should] have bows and arrows and javelins and anything else [that might be] necessary in another battle in difficult circumstances. Extra weapons should also be loaded, for sometimes when there is a shortage of weapons the soldiers can draw on these. Ships of this sort should also have arms, *mangana*,*[9] and other weapons as needed, so that they should never run short when used up in battle.

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[8] Cf. Appendix One, §6.1-2; Appendix Three, §3.2.
[9] Cf. §67 below.

ιδ΄ Ἐκτὸς δὲ τῶν στρατιωτῶν ἤτοι τῶν ἄνω ἐλατῶν, ὅσοι ἄν εἰσιν, ἀπό τε τοῦ κεντάρχου καὶ ἐφεξῆς ἕως τοῦ ἐσχάτου, κατάφρακτοι ἔσονται ὅπλα ἔχοντες οἷον σκουτάρια, μέναυλα, τόξα, σαγίτας ἐκ περισσοῦ, σπαθία, ῥιπτάρια, λωρίκια, κλιβάνια, εἰ καὶ μὴ ὄπισθεν, ἀλλὰ πάντως ἔμπροσθεν πέταλα ἔχοντα, κασσίδας, χειρόψελλα, καὶ μάλιστα οἱ ἔμπροσθεν ἐν τῇ προσβολῇ τῆς μάχης κατὰ χεῖρας συμπλεκόμενοι καὶ ἀγωνιζόμενοι. Οἱ δὲ μὴ ἔχοντες λωρίκια ἢ κλιβάνια, πάντως φορείτωσαν τὰ λεγόμενα νευρικά, ἅπερ ἀπὸ διπλῶν κεντούκλων γίνεται. Καὶ οὗτοι ὄπισθεν τῶν ἄλλων σκεπόμενοι τόξοις χρήσονται. Καὶ λίθους δὲ δυναμένους ἀπὸ χειρῶν ῥίπτεσθαι πλείστους ἐχέτωσαν ἤτοι κόχλακας ἐν τοῖς δρομωνίοις, οὕσπερ κατὰ πολεμίων βάλλοντες οὐκ ἔλαττον τῶν ἄλλων ὅπλων αὐτοὺς καταβλάψουσιν· ὅπλα γάρ εἰσιν οἱ λίθοι εὐπόριστα καὶ ἀνελλιπῆ.

ιε΄ Μὴ μέντοι οὕτως βαλλέτωσαν τοὺς λίθους μόνον ὥστε τὴν δύναμιν αὐτῶν ἐν τούτοις ἐκδαπανῆσαι καὶ στῆναι τοῦ λοιποῦ ἢ καὶ τὰ ὅπλα τὰ βαλλόμενα ἀποκενῶσαι, μή ποτε οἱ ἐναντίοι σύσκουτα ποιήσαντες καὶ τὰς βολὰς ὀπωσοῦν δεξάμενοι, εἶτα τῶν βελῶν πληρωθέντων καὶ τῶν βαλόντων ἀποκαμνόντων, ἀθρόοι ἀναστάντες ἀπαρξωνται ταῖς σπάθαις καὶ τοῖς μεναύλοις ἀμύνεσθαι, καὶ ἀκοπίαστοι[10] τῇ ἀθρόᾳ κινήσει ἀναφανέντες καὶ τοῖς κεκοπιακόσι στρατιώταις ἐπιτιθέντες ἰσχυρότεροι γένωνται καὶ εὐκόλως αὐτοὺς καταπολεμήσωσιν. Φιλεῖ γὰρ τὰ τοιαῦτα τὸ βάρβαρον.

ις΄ Ὑπομένουσι γὰρ Σαρακηνοὶ τὴν βίαν τῆς προσβολῆς καὶ ὅταν ἀποκαμόντας ἴδωσιν καὶ τῶν ὅπλων κενωθέντας ἢ σαγιτῶν ἢ λίθων ἢ ἑτέρων τινῶν, τότε ἀναπηδῶντες ὁμοῦ τε καταπλήττουσιν καὶ ταῖς ἐκ χειρὸς ἀπὸ σπαθίων καὶ μεναύλων προσβολαῖς εὐρώστως τε καὶ ἀκμαιότερον ἐπέρχονται.

ιζ΄ Διὸ φυλάττεσθαι χρὴ τὰ τοιαῦτα καὶ μετὰ τοῦ δέοντος σκοποῦ ποιεῖσθαι τὴν προσβολήν, ἵνα μᾶλλον οἱ πολέμιοι πάθωσι τὰ πρὸς βλάβην γινόμενα ἢ οἱ ἡμέτεροι στρατιῶται. Δεῖ γὰρ αὐτοὺς τὴν οἰκείαν δύναμιν καὶ τὰς βουλὰς φυλάττειν ἀπ᾽ ἀρχῆς ἄχρι τέλους τῆς μάχης καὶ μετρεῖν τῶν ἐναντίων τὴν διάθεσιν καὶ οὕτως τὴν μάχην διασκευάζειν.[11]

ιη΄ Πρὸς τούτοις φροντίσεις, ὦ στρατηγέ, καὶ τῆς δεούσης τῶν

[10] ἀκοπίαστοι, thus Dain: ἀκοπίατοι MS. A.
[11] διασκευάζειν, thus Dain: διασκεδάζειν MS. A.

14 Apart from the soldiers or the upper oarsmen, [all others] however many there might be, from the *kentarchos* down to the last [man], should be *kataphraktoi** - having weapons such as shields, pikes, bows, extra arrows, swords, javelins, corselets, lamellar cuirasses (certainly with plates in front even if not at the back), helmets, [and] vambraces - especially those engaged in fighting hand-to-hand in the front line of attack in battle. Those who do not have corselets or lamellar cuirasses should certainly wear what are known as *neurika**, which are made from double layers of felt. And these, protected behind the others, should use bows. There should also be in the dromons large quantities of stones or pebbles that can be hurled by hand; [when] they throw these at the enemy, they can hurt them no less than [with] other weapons, for stones are weapons that are easily obtained and abundant.

15 But they should not just throw the stones in such a way that they expend their energy on these and do nothing thereafter, or consume the throwing weapons, in case the opposition links shields and absorbs the missiles however they might, then, when these are used up and those throwing them are exhausted, come out all together and begin to counter-attack themselves with swords and pikes, and seemingly unwearied in their mass movement and attacking soldiers who are already weary, they are stronger and easily overpower them. Barbarians like [doing] such [things].

16 For the Saracens endure the impetuosity of the attack and, when they see [that their attackers] are tiring and have used up their weapons, or arrows, or stones, or whatever else, then they rush out all together and both take them by surprise and [also] in hand-to-hand fighting with swords and pikes attack vigorously and more energetically.

17 So precautions should be taken against such situations and the attack should be made with the necessary forethought, so that it is the enemy who suffers harm rather than our soldiers. They must preserve their own energy and projectiles from the beginning to the end of the battle and measure the condition of the enemy and make ready for the battle accordingly.

18 In addition, *stratēgos*, you will consider the essential supplies

στρατιωτῶν δαπάνης, ὥστε ἔχειν αὐτοὺς τὰ ἀναγκαῖα, ἵνα μὴ τούτων λειπόμενοι ἢ στασιάσωσιν ἢ ἐν τῇ ἰδίᾳ χώρᾳ ὄντες τοὺς συντελεστὰς καὶ ὑπηκόους ἡμῶν τυραννῶσιν καὶ ἀδικῶσιν τῇ σπάνει τῶν ἀναγκαίων ἀναγκαζόμενοι. Ἀλλ᾽, εἴ γε δυνατόν, ἐν τάχει τὴν πολεμίαν καταλάβῃς γῆν καὶ ἐξ αὐτῆς ἅπαντα τὰ ἐπιτήδεια προσλάβῃς.

ιθ΄ Παραγγείλῃς[12] δὲ καὶ τοῖς ἄρχουσι μηδένα τῶν ὑπ᾽ αὐτοὺς στρατιωτῶν ἀδικεῖν ἢ τὸ οἰονοῦν δῶρον παρ᾽ αὐτῶν λαμβάνειν ἢ τὰς λεγομένας συνηθείας. Περὶ γὰρ τῆς σῆς ἐνδοξότητος τί χρὴ λέγειν ὡς οὐδὲ ἐνθυμηθῆναι τι τοιοῦτον δέον μήτι γε διαπράξεσθαι, μήτε δῶρον τὸ οἱονδήποτε ἀπὸ μικροῦ ἢ μεγάλου ἀνθρώπου τοῦ ὑπὸ σὲ τελοῦντος λαμβάνειν τὸ σύνολον.

κ΄ Τοὺς δὲ στρατιώτας ἀνδρείους ἐπιλέγου καὶ προθύμους καὶ μάλιστα τοὺς εἰς τὰ ἄνω τοῦ δρόμωνος τασσομένους, οἵτινες καὶ ἀπὸ χειρὸς τοῖς πολεμίοις συμπλέκονται. Εἰ δέ τινας τῶν στρατιωτῶν ἀνάνδρους ἐπιγνῷς, τούτους εἰς τὴν κάτω ἐλασίαν παράπεμπε, καὶ εἴ ποτέ τις πληγῇ ἢ πέσῃ τῶν στρατιωτῶν, τὸν ἐκείνου τόπον ἐκ τῶν κάτω ἐξ ἀνάγκης ἀναπληρώσεις.

κα΄ Χρὴ γάρ σε πάντως εἰδέναι τὴν ἑκάστου τῶν ὑπὸ σὲ στρατιωτῶν ἕξιν καὶ διάθεσιν καὶ τὴν ἄλλην πρὸς ἀνδρείαν ποιότητα, ὥσπερ οἱ κυνηγέται τῶν κυνῶν ἑκάστου τὰς ἐπιτηδειότητας ἐπιγινώσκοντες ἔχουσιν εὐκαίρους αὐτοὺς πρὸς ὃ βούλονται.

κβ΄ Οὕτως οὖν διαθήσεις ἕκαστα καθὼς ἂν συνίδῃς ἀρκοῦντα πρὸς τὴν προκειμένην ἐκστρατείαν, τούς τε δρόμωνας καὶ τοὺς ἐν αὐτοῖς στρατιώτας, τά τε ὅπλα καὶ τὰς δαπάνας καὶ τὴν ἄλλην ἐν ἑτέροις πλοίοις ἀποσκευήν, ἥντινα οἰονεὶ τοῦλδον ἐν ἀσφαλέσι τόποις σε χρῆ καθιστᾶν, ὅταν καιρὸς ἐλπίζηταί σοι μάχης.

κγ΄ Καὶ προσέτι, εἴ γε χρεία τοιαύτη καλέσει, καὶ ἵππους ἐν τοῖς ἱππαγωγοῖς πλοίοις προσεπιρρίπτειν ὥστε κατὰ τῆς πολεμίας ἔχειν καβαλλαρίους· καὶ ἁπλῶς πάντα ἀπαρτίσας ὁδοιπορήσεις δεόντως.

κδ΄ Καὶ πρῶτον μὲν πρὸ τοῦ ἀποκινῆσαι ἁγιασθήτωσαν ἅπαντα τὰ φλάμουλα τῶν δρομώνων διὰ θείας τῶν ἱερέων ἱερουργίας καὶ εὐχῆς ἐκτενοῦς πρὸς τὸν τῶν ὅλων Θεὸν ὑπὲρ εὐοδώσεως τοῦ στρατοῦ κατὰ τῶν πολεμίων. Ἔπειτα καὶ διαλαλήσεις πρὸς

[12] Παραγγείλῃς, thus Dain: Παραγγείλεις MS. A.

of the soldiers, for them to have what is necessary, so that they do not rebel for lack of these things or, if in their own territory, oppress and mistreat the tax payers and our subjects, compelled by scarcity of what is necessary. But, if possible, you should quickly capture enemy land and obtain from it everything that is required.

19 You should also instruct the commanders that they are not to wrong any of the soldiers under them or to accept any gift whatever from them or what are known as the customary perquisites.[13] But concerning your Gloriousness, what should [I] say as you have neither considered doing any such [thing], nor taken any gift whatsoever from any man great or small serving under you?

20 Choose courageous and vigorous soldiers, especially those stationed on the upper [part] of the dromon, who engage the enemy in hand-to-hand fighting. If you realize that any of the soldiers are cowardly, send them to the lower oar-bank, and if any of the soldiers should be wounded or fall you should fill his place from those below out of necessity.

21 You should above all be aware of the condition and general level of bravery of each soldier under you, as huntsmen know the capabilities of each of their dogs and have them ready for their requirements.

22 You will arrange everything as you see is sufficient for the proposed expedition: the dromons, and the soldiers in them, the weapons and the supplies and the remaining equipment in other ships, which you should station like a baggage train in safe places at whatever time you anticipate a battle.[14]

23 In addition, if such a need arises, you should load horses onto the horse-transport ships so that you have cavalry [to use] against the enemy. Then, [to put it] simply, having completed all preparations, you will proceed suitably.

24 First, before moving off, all the standards of the dromons should be blessed during a celebration of the Liturgy by the priests, and by a lengthy prayer to the God of all for the successful venture of the *stratos** against the enemy. Then you

[13] It was a long practised custom in the Greco-Roman and Byzantium worlds for offices to be acquired by payment of a fee or perquisite (συνήθεια), to those who had the dispensation of them.

[14] Cf. Maurice, *Ἐκ τοῦ Μαυρικίου*, §§1, 5, (pp. 41-2).

ἅπαντα τὸν λαὸν καὶ πρὸς τοὺς ἄρχοντας ἰδίως τὰ δέοντα καὶ ἁρμόζοντα τῷ καιρῷ καὶ οὕτως προθυμοποιήσας τὸν στρατὸν ἀποκινήσεις, ἐπιτηδείου ἀνέμου πνεύσαντος καὶ μὴ ἐναντίου.

κε΄ Οὐχ ὡς ἔτυχεν ἁπάντων τῶν δρομώνων πορευομένων, ἀλλ᾽ ἐπιστήσεις αὐτοῖς[15] ἄρχοντας ἢ κατὰ πέντε ἢ κατὰ τρεῖς δρόμωνας, ἕνα τὸν λεγόμενον κόμητα, ὅστις ναύαρχός τε καὶ ἡγεμὼν τῶν ὑπ᾽ αὐτῶν δρομώνων ὑπάρχων φροντίσει προσεχέστερον περὶ πάντων εὐκόλως καὶ διατάξει πρὸς ἕκαστα.

κς΄ Οἱ δὲ εἰρημένοι ἄρχοντες ὑπὸ σὲ τελοῦντες ἀπὸ σοῦ καὶ τὰ παραγγέλματα δέξονται καὶ τοῖς ὑπ᾽ αὐτοὺς μεταδώσουσιν. Καὶ ταῦτα μὲν ἐπι τοῦ βασιλικοῦ λεγομένου πλωΐμου·˝ἐπὶ δὲ τῶν θεματικῶν δρομώνων[16] καὶ δρουγγάριοι ἐπιστήσονται καὶ τουρμάρχαι, καὶ αὐτοὶ τῷ στρατηγῷ ὑποταγήσονται καὶ τοῖς ἐκείνου παραγγέλμασιν ὑπακούσουσιν.

κζ΄ Οὐκ ἀγνοῶ δὲ ὅτι κατὰ τὴν ὁμοίωσιν τοῦ βασιλικοῦ πλωΐμου καὶ οἱ τῶν ἄλλων θεμάτων πλώϊμοι στρατηγοὶ δρουγγάριοι ἐκαλοῦντό ποτε τοῖς πρώην χρόνοις καὶ οἱ ὑπ᾽ αὐτοὺς κόμητες μόνον καὶ κένταρχοι· ἀλλὰ νῦν εἰς στρατηγίδα ἡ ἑκάστου τῶν δρουγγαρίων ἀρχὴ ἀναβέβηκεν καὶ οὕτω καλουμένη ταῖς στρατηγικαῖς καταμερίζεται τάξεσιν.

κη΄ Γυμνάσεις δὲ διαφόρως τούς τε πλωΐμους στρατιώτας καὶ αὐτοὺς τοὺς δρόμωνας, ποτὲ μὲν καθ᾽ ἕνα ἕκαστον ἄνδρα, ποτὲ δὲ κατὰ πλείονας, ὥστε κατέναντι ἀλλήλων ἐπέρχεσθαι σπαθίοις καὶ σκουταρίοις χρωμένους· καὶ αὐτοὺς δὲ ὅλους δρόμωνας κατ᾽ ἀλλήλων ὡς ἐπὶ παρατάξεως ἐπερχομένους καὶ ποτὲ δεσμοῦντας, ποτὲ δὲ ἀπολύοντας καὶ διαφόρως κατ᾽ ἀλλήλων προσβάλλοντας, ποτὲ δε καὶ ἀκοντίοις ὠθοῦντας τὰ πλοῖα τῶν ἐναντίων, ὥστε μὴ πλησιάζοντας δεσμεῖν· οὐ γὰρ ἀεὶ τὸ διὰ καμάκων σιδηρῶν δεσμεῖν ἀλλήλους τοὺς ἀντιπολεμοῦντας χρήσιμον διὰ τοὺς ἀφεύκτους καὶ ἀναγκαίους κινδύνους.

κθ΄ Καὶ ἑτέρως δὲ γυμναζέσθωσαν ὡς ἂν νοήσῃ ἡ σὴ ἐνδοξότης τὰς κατὰ τῶν ἐναντίων ἐνδεχομένας ἐπινοίας, ὡς ἂν ἐντεῦθεν ἐθίζωνται πρὸς τοὺς κτύπους καὶ βοὰς καὶ τὴν ἄλλην κίνησιν τοῦ πολέμου, καὶ μὴ ταράσσωνται ὡς ἀγυμνάστως καὶ ἀθρόον καὶ παρὰ δόξῃ ἐπὶ ταῦτα ἐρχόμενοι.

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[15] αὐτοῖς, thus Dain: αὐτοὺς MS. A.

[16] [ἐπὶ δὲ τῶν θεματικῶν δρομώνων], thus Dain. MS. A omits this. However Dain's emendation is required by "μὲν" in the previous clause.

will address the entire force and the commanders with suitable words fitting to the occasion and, having thus inspired the *stratos*, you will move off when a favourable wind, and not an adverse one, has arisen.

25 The dromons should not proceed haphazardly, but you will put in them commanders [in charge] of every five or three dromons, a so-called *komēs** (count), who as *navarchos* and *hēgemōn** of the dromons under them, will have particular responsibility in all matters and make every arrangement.

26 These commanders who have just been mentioned serve under you and will receive instructions from you and will pass them on to those under them. This is the system in what is known as the imperial fleet. [In the thematic dromons] both *droungarioi** and *tourmarchai** will be appointed and they will be subordinate to the *stratēgos* and obey his instructions.

27 I am not unaware that by analogy with the imperial fleet the naval *stratēgoi* also of the other themes were once in previous times called *droungarioi* and those under them were only *komētes* and *kentarchoi*. But now in a *stratēgos*'s command the office of each of the *droungarioi* has risen and is classed, under this name (i.e., *stratēgos*), in the ranks of *stratēgos*.[17]

28 You will exercize both the naval soldiers and the dromons in different ways, sometimes as each individual man and sometimes in groups, when they attack each other with swords and shields. And [you will make] all the dromons attack each other as if in formation, sometimes coupled together, sometimes not coupled and attacking each other in different ways, sometimes also pushing the ships of the opposition away with poles so that they do not come close and couple. For it is not always advantageous for [those] warring to couple themselves together with *kamakes sidērai** (iron rods) because of the unavoidable and inevitable dangers.

29 They should also be exercized in other ways, as your Gloriousness perceives the techniques [to be] expected against the opposition, so that thereafter they are accustomed to the blows, cries, and general commotion of war and will not be confused through being untrained should they encounter these things all at the same time and unexpectedly.

[17] Cf. above pp. 267-8.

λ΄ Οὕτως οὖν γυμνασθέντες καὶ διατεθέντες πλεύσουσιν ἐν τάξει συνηγμένοι τοσοῦτον ἐφ᾽ ὅσον ἀλλήλοις μὴ ἐμποδίζειν ἐν ταῖς ἐλασίαις καὶ ἐν ταῖς ὡς εἰκὸς κατὰ θάλασσαν ὑπὸ τῶν ἀνέμων βίαις· ἀλλ᾽ οἱονεί τις παράταξις γεγυμνασμένη, οὕτω πορευέσθωσαν. Καὶ ἐν ταῖς ὁρμησίαις δὲ τῶν ἀπλήκτων εὐτάκτως τὸν κατάπλουν ποιείτωσαν καὶ καταγέτωσαν ἐνορδίνως ἐξορμῶντες πρὸς τὴν ξηρὰν ἢ εἰς λιμένα πάντως, ἢ εἰς ὕφορμον τόπον ἐν ᾧ ζάλης συμβαίνουσης οὐ κλυσθήσονται.

λα΄ Δεῖ δέ σε καὶ τὴν τοῦ ἀνέμου ἐπιφορὰν προειδέναι διὰ τῶν σημείων κατὰ τὸν καιρόν καὶ πρὸς ταύτην καὶ τὸν τόπον τῆς ὁρμησίας ἐκλέξασθαι, καὶ εἰ μή τις κατεπείγῃ ἀνάγκη, μὴ ἄνευ πνεύματος αἰσίου καὶ γαλήνης καὶ ἀσφαλοῦς ἐλπίδος σωτηρίας ἐπιρρίπτειν σεαυτὸν εἰς ἀνεπιτήδειον πλοῦν, ἀλλ᾽ ὑφορᾶσθαι καὶ τὰς λεγομένας τῶν ναυτικῶν παρασημασίας τῶν ἄστρων καὶ ὅσα ἄλλα συμφέροντα, καὶ οὕτως ποιεῖσθαι τὴν πορείαν.

λβ΄ Ἐν δὲ τοῖς ἀπλήκτοις, εἰ μὲν ἐν τῇ ἰδίᾳ ὁρμεῖς χώρᾳ καὶ μηδένα φόβον ἔχεις ἀπὸ τῶν πολεμίων, καὶ οὕτως μετὰ εὐταξίας ἀναπαύεσθαι τὸν στρατὸν καὶ ἐν νυκτὶ καὶ ἐν ἡμέρᾳ, μηδένα τῶν ἐπιχωρίων βλάπτοντας ἢ ἀδικοῦντας ἢ καρποὺς ἁρπάζοντας ἢ φθείροντας.

λγ΄ Εἰ δὲ ἐν τῇ πολεμίᾳ γῇ πλησιάζεις ἢ πολεμίους παρεῖναί που ἐλπίζεις, πάντως χρή σε βίγλας ἔχειν μακρόθεν καὶ κατὰ γῆν και κατὰ θάλατταν, καὶ ἀγρύπτως διατελεῖν καὶ κατησφαλισμένον καὶ ἕτοιμον εἶναι εἰς παράταξιν· πολλαὶ γὰρ αἱ τῶν πολεμίων ἐπιβουλαί. Καὶ γὰρ ἢ κατὰ γῆς εὑρόντες σε ὁρμοῦντα βιάσονται, εἰ τύχοι δὲ καὶ τὰς ναῦς ἐμπρήσουσιν, ἢ διὰ θαλάσσης ἀναφανέντες προσβολὴν ποιήσουσι νυκτὸς καὶ ἡμέρας. Καὶ ἐὰν ἀνέτοιμος ἐν ἑτοίμοις εὑρέθῃς, προτερήσουσιν οἱ ἐναντίοι κατὰ σοῦ, εἰ δέ σε ἕτοιμον εὑρήσουσιν, ἄπρακτος αὐτοῖς ἡ ἐπιβουλὴ γενήσεται.

λδ΄ Ἐπεὶ δὲ τούτων συμμέτρως ἐμνήσθημέν τε καὶ διεταξάμεθα, φέρε λοιπὸν και ὅπως παρατάξεις καὶ τὰς προσβολὰς τὰς ἐν ταῖς μάχαις ποιήσεις ὡς ἐν συνόψει διορισώμεθα, καθ᾽ ὃν τρόπον καὶ ἐν ταῖς κατὰ γῆν πολεμικαῖς προσβολαῖς διεταξαμεθα.

λε΄ Ὅταν τοίνυν ἐλπίζηταί σοι πολέμου καιρός, ὦ στρατηγέ, συνελθόντων τῶν στρατιωτῶν κατὰ τὰς τάξεις ἑκάστων διῃρη-

30 When they have been exercized and organized, they will sail in formation, with a sufficient distance between each [ship] to prevent their colliding when rowing,[18] and in the wind gusts to be expected at sea. Moreover, they should proceed according to the formation which has been exercized. In the moorings of the *aplēkta** they should make their *kataplous* (landing) in good order,[19] and they should put in to shore in a regular manner, making for dry land, or especially to a harbour, or to a mooring, in which they will not be battered should a squall arise.

31 You should anticipate the direction of the wind through the seasonal signs and then choose the mooring place accordingly. If there is no urgent need, do not throw yourself into an inauspicious voyage without a favourable wind, a calm [sea] and a secure expectation of safety, but also take into account what are known by sailors as the stars' signs and all other relevant matters, and then proceed appropriately.

32 In the *aplēkta*, if you moor in [our] own territory and have no fear of the enemy at all, [you may] thus [allow] the *stratos* to rest in good order by both day and night, harming none of the local inhabitants or wronging them or seizing their produce or doing any damage.

33 But if you approach enemy land or you expect the enemy to appear somewhere, you must certainly have scouts some way off on both land and sea, and [you] should remain vigilant and alert and ready for [drawing up] the formation. For the devices of the enemy are many. Either, finding you moored to the land, they will attempt to burn the ships or, appearing by sea, they will make an attack night and day.[20] And if you find yourself ill-prepared amongst the prepared, the opposition will get the better of you; but if they find you prepared, their devices will achieve nothing.

34 Since we have now recalled these matters adequately and discussed [them], let us then briefly indicate how you will organize formations and attacks in battles, in the way in which we discussed attacks in battles on land.

35 Whenever, *stratēgos*, you anticipate a period of fighting, when the soldiers have come together, each drawn up in their forma-

[18] Cf. Maurice, *Ἐκ τοῦ Μαυρικίου*, §7 (p. 42).
[19] Cf. Maurice, *Ἐκ τοῦ Μαυρικίου*, §4 (p. 41).
[20] Cf. Maurice, *Ἐκ τοῦ Μαυρικίου*, §6 (p. 42).

μένων, ὑπαναγνωσθήσεται αὐτοῖς τὰ στρατιωτικὰ ἐπιτίμια ἅπερ ἡμῖν ἐν τῷ περὶ τῆς κατὰ γῆν στρατιωτικῆς γυμνασίας εἴρηται, καὶ ἐπιρρώσεις αὐτοὺς καὶ ἐνισχύσεις λόγοις προσήκουσι παρορμῶν καὶ ἐπαλείφων πρὸς τοὺς ἀγῶνας, ἵνα τὸ μὲν διὰ τὸν φόβον τῶν ἐπιτιμίων, τὸ δὲ διὰ τὴν τῆς σῆς ἐνδοξότητος παραίνεσιν ἀνδρεῖοι καὶ εὔτολμοι γένωνται καὶ ἐν τοῖς μέλλουσι πολεμικοῖς κινδύνοις ἐκ χειρὸς ἀγωνιζόμενοι.

λς΄ Δεῖ δέ σε μᾶλλον δι᾽ ἐφόδων μὲν καὶ ἄλλων ἐπιτηδευμάτων τε καὶ στρατηγημάτων μεθοδεύειν κατὰ τῶν πολεμίων ἢ δι᾽ ὅλου τοῦ ὑπὸ σὲ πλωΐμου στόλου, ἢ διὰ μέρος αὐτοῦ. Μὴ μέντοι χωρὶς ἀνάγκης μεγάλης ἐπὶ τοῦτο κατεπειγούσης εἰς δημόσιον πόλεμον σεαυτὸν ἐπιρρίπτειν· πολλὰ γὰρ τὰ τῆς λεγομένης τύχης ἐναντιώματα καὶ τὰ τοῦ πολέμου παράδοξα.

λζ΄ Διὰ τοῦτο χρή σε ἀεὶ παραφυλάττεσθαι καὶ μὴ πρὸς δημοσίας, ὡς εἴρηται, παρατάξεις ἀποθρασύνεσθαι, μάλιστα ἐν πλοίοις, ὅπου δεσμούντων ἀλλήλους ἄφευκτος καὶ βιαία ἡ ἐκ χειρὸς μάχη γίνεται καὶ οὐκ ἔστι δυνατὸν τοῦ συμφέροντος ἐπιλαβέσθαι.

λη΄ Καὶ ταῦτα μὲν φυλάττεσθαι εἰ μὴ ἄρα θαρρεῖς καὶ τῷ πλήθει τῶν δρομώνων καὶ τῇ ἀνδρείᾳ καὶ ὁπλίσει καὶ προθυμίᾳ τῶν στρατιωτῶν ἐπικρατέστερος εἶναι τῶν πολεμίων.

λθ΄ Οὔτε γὰρ πλῆθος πλοίων οὔτε μέγεθος κατορθώσει πόλεμον, εἰ μὴ τοὺς ἐν αὐτοῖς πολεμοῦντας ἔχουσιν εὐψύχους καὶ γενναίους καὶ προθύμους εἰς τὴν κατὰ τῶν ἐναντίων ἐγχείρησιν, καὶ πρό τούτων εἰ μὴ τὴν θείαν εὐμένειαν καὶ συμμαχίαν ἔχουσι διὰ καθαρότητος βίου καὶ δικαιοσύνης πρὸς τε τοὺς συντελεστὰς καὶ πρὸς τοὺς πολεμίους, εἴ[21] τίς ἐστι τὸ μηδὲν ἀνόσιον ἐν τοῖς αἰχμαλώτοις διαπράττεσθαι ἢ αἰσχρὸν ἢ ἀφιλάνθρωπον, καὶ τὸ μὴ ἀδικούμενον μὴ ἀδικεῖν, τοὺς δὲ ἀδικοῦντας μετὰ τῆς τοῦ Θεοῦ βοηθείας ἀμύνεσθαι.

[21] εἴ, thus Dain: ἤ MS. A.

formations, the military code of penalties, which we have discussed in the [handbook] on land-based military training,[22] should be read out to them, clause by clause. And you will encourage and strengthen them with appropriate speeches, rousing and inciting [them] to the contest, so that, partly out of fear of punishment and partly because of your Gloriousness's admonitions, they become brave and daring, even when fighting hand-to-hand in the coming dangers of engagement.[23]

36 You must indeed deal with the enemy through attacks and other practices and stratagems, either with the whole of the naval fleet under you or with part of it. However, without some urgent compelling reason for this, you should not rush into a general engagement.[24] For there are many obstacles [in the workings] of so-called Tyche[25] and events in war [are] contrary to expectation.

37 You must therefore always be on guard and, must not be over confident, as has been said, about general formations, especially where ships are coupled to each other, when fierce hand-to-hand fighting is inevitable and it is not possible to gain any benefit.

38 [You should] take these precautions if indeed you are not confident of being superior to the enemy in the number of the dromons and the bravery, armament, and enthusiasm of the soldiers.

39 For neither the number nor the size of the ships will bring an engagement to a successful conclusion if they do not have fighting in them [men] of good spirit, and [who are] stalwart and enthusiastic in attacks on the opposition, and more important than this, if they do not have divine favour and support through the purity of [their] lives and [their] just behaviour both to the tax payers and to the enemy; if they do nothing contravening divine laws or disgraceful or inhuman to the prisoners, do not injure when no injury has been done, and wrong-doers are dealt with through God's assistance.

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[22] The emperor referred here to regulations included in his *Taktika* at Constitution VIII, §§19-27. See Leo VI, *Taktika* (PG), coll. 765-8. These regulations were based on much older material which, in differing versions, dated back to the age of Justinian I and before. See also Ashburner, "Byzantine mutiny act".

[23] Cf. Appendix One, §9.15-18.

[24] Cf. Appendix One, §9.8.

[25] Tyche: personification of "Fate", often used in Byzantine thinking as a substitute for divine intervention.

μ΄ Ἐὰν δὲ πάντως ἀπαιτεῖται[26] καὶ μάχης καιρός, διατάξεις τοὺς δρόμωνας ποικίλως[27] καὶ διαφόρως, κάθως ἂν ὅ τε καιρὸς καὶ ὁ τόπος ἀπαιτῇ.[28] Ὥστε ἐὰν θαρρῇς ἐπικρατέστερος εἶναι τῶν πολεμίων, ὡς εἴρηται, καὶ διὰ τοῦτο πρὸς μάχην συμβάλλειν ὡς ἐλπίζων νικήσειν αὐτούς, μὴ ἐν τῇ ἰδίᾳ σου γῇ πλησίον ποιήσεις τὴν μάχην, ἐν ᾗ ἐλπίσουσιν οἱ στρατιῶται τὸ δὴ λεγόμενον καταξυλώσαντες σωθῆναι, ἀλλὰ μᾶλλον πλησίον τῆς τῶν ἐναντίων γῆς, ἵνα αὐτοὶ τὴν σωτηρίαν ἐλπίσαντες ἐν τῇ ἰδίᾳ γῇ τὴν φυγὴν παρὰ τοὺς ἀγῶνας προτιμήσωνται. Στρατιώτης γὰρ εἰς δειλίαν ἐν ἀνάγκῃ πολέμου περιπίπτων τὴν σωτηρίαν διὰ τῆς φυγῆς ἐλπίσει καὶ ταχέως ῥίψει τὰ ὅπλα καὶ οὐδὲν αὐτῆς προτιμήσεται· ὀλίγοι γὰρ οἱ ἐν καιρῷ παρατάξεως τὸ ἀποθανεῖν τοῦ ἀδόξως φυγεῖν προκρίνοντες, εἴτε ἐν τοῖς βαρβάροις εἴπῃς, εἴτε ἐν τοῖς Ῥωμαίοις.

μα΄ Πρὸ δὲ τῆς τοῦ πολέμου ἡμέρας χρή σε βουλεύεσθαι μετὰ τῶν ὑπὸ σὲ ἀρχόντων τί δεῖ πρᾶξαι, καὶ ὅπερ ἀναφανῇ διὰ τῆς κοινῆς βουλῆς χρήσιμον τοῦτο στοιχειῶσαι.[29] Καὶ παραγγεῖλαι τοῖς ἄρχουσι τῶν δρομώνων, ὥστε εἶναι αὐτοὺς ἑτοίμους ἐκπληρῶσαι τὰ βουλευθέντα, εἴπερ μὴ ἐναντίον τι΄ ἀπαντήσῃ[30] ἐκ τῆς ἐφόδου τῶν πολεμίων. Ἀλλὰ καὶ τότε ἑτοίμους εἶναι πάντας ἀποβλέποντας εἰς τὸν σὸν δρόμωνα, ὥστε ἐξ αὐτοῦ λαβεῖν σημεῖον τί ἄρα ποιῆσαι προσήκει, καὶ τούτου δοθέντος συντόμως γίνεσθαι τὸ ὑποδειχθέν.

μβ΄ Πάντως γὰρ δεῖ σε, ὦ στρατηγέ, δρόμωνα εἴχειν τὸν ἴδιον ἐξ ἅπαντος τοῦ στρατοῦ ἐπιλέκτους ἔχοντα τοὺς στρατιώτας μεγέθει σώματος καὶ ἀνδρείᾳ καὶ ἀρετῇ καὶ τῇ ἄλλῃ πανοπλίᾳ διαφέροντας· καὶ τὸν δρόμωνα δὲ μεγέθει καὶ γοργότητι τῶν ἄλλων ἁπάντων διαφέροντα, ὡς κεφαλήν τινα τῆς παρατάξεως ἁπάσης· καὶ καταστῆσαι τὸν τῆς σῆς ἐνδοξότητος τοιοῦτον δρόμωνα, τὸν δὴ λεγόμενον πάμφυλον.

μγ΄ Ὁμοίως δὲ καὶ τοὺς ἄλλους ὑπὸ σὲ ἄρχοντας ὅσοι ἔχουσιν ὑπ᾽ αὐτοὺς τίνας δρόμωνας ἐξ αὐτῶν ἐπιλέξασθαι ἄνδρας καὶ ἔχειν ἐν τοῖς οἰκείοις, ὥστε καὶ αὐτοὺς διαφέρειν τῶν ἄλλων. Καὶ τούτους δὲ πάντας καὶ τοὺς λοιποὺς πρὸς τὸν σὸν ἀποβλέπειν δρόμωνα καὶ παρ᾽ αὐτοῦ ῥυθμίζεσθαι καὶ κανονίζεσθαι κατὰ

[26] ἀπαιτεῖται, thus Dain: ἀπαιτῆται MS. A.
[27] ποικίλως, thus Dain: ποικίλους MS. A.
[28] ἀπαίτῃ, thus Dain: ἀπαιτεῖ MS. A.
[29] στοιχειῶσαι, thus Dain, following Desrousseaux: στοιχεῖσαι MS. A.
[30] ἀπαντήσῃ, thus Dain: ἀπαντήσει MS. A.

40 If, even so, the time requires a battle, you will form up the dromons in a variety of ways, as the time and place requires. Thus, if you are confident of your superiority over the enemy, as has been said, and because of this you are engaging in battle since you expect to defeat them, do not set up the battle near your own land, in which [any] soldiers who, so to speak, abandon ship, expect to take refuge, but rather near the land of the opposition, so that they, expecting to find safety in their own land, might prefer flight to the conflicts.[31] For a soldier, succumbing to cowardice under the pressure of battle, will hope for safety in flight and will quickly abandon his weapons and prefer nothing to it [safety]. [There are] few who in the time of battle prefer death to an inglorious retreat, whether you speak of the barbarians or the Romans.

41 Before the day of the engagement you must discuss with the commanders under you what should be done, and what appears useful to the general intention should become the basic [plan]. [You must] issue instructions to the commanders of the dromons so that they are ready to carry out what has been planned, unless indeed a contrary decision emerges after an enemy attack. But then everyone [must] be prepared to watch your dromon, so as to be able to receive the signal for what is appropriate to do and then, when it has been given, perform promptly what has been indicated.

42 You must certainly, *stratēgos*, have your own dromon with soldiers picked from the entire *stratos* for size of body and courage and skill and conspicuous for the rest of their armament. And the dromon should stand out from all the others by its size and speed since it is the head of the entire formation. And you should set up the dromon of your Gloriousness [to be] of the kind known as *pamphylos**.

43 Similarly the other commanders under you, who have some dromons under them, [must] choose men from these and have them in their own [ships], so that they also are distinguished from the rest. And all these, and the remaining [ships] [should] watch your dromon and organize and arrange themselves by it

[31] Cf. Appendix One, §§9.23 & 9.44.

τὸν τοῦ πολεμοῦ καιρόν, εἰ μὴ ἄρα ἕτερόν τι παράδοξον τῶν βεβουλευμένων ἀναφανῇ καὶ δέεται μεθόδου ἑτέρας.

μδ΄ Εἶναι δὲ σημεῖον ἱστάμενον ἐν τῷ σῷ δρόμωνι εἴτε βάνδον εἴτε φλάμουλον εἴτε τι ἕτερον εἰς τόπον ὑψηλόν, ἵνα δι᾽ αὐτοῦ σημαίνοντός σου τί δεῖ πράττειν, εὐθέως ἐπιλαμβάνωνται τοῦ δόξαντος ἔργου οἱ λοιποί, εἴτε συμβάλλειν εἰς πόλεμον χρή, εἴτε ἀναχωρεῖν ἀπὸ πολέμου, εἴτε ἐξελίσσειν εἰς κύκλωσιν κατὰ τῶν πολεμίων, εἴτε εἰς βοηθείαν καταπονουμένου μέρους συνδραμεῖν, εἴτε ἀργῆσαι τὴν ἐλασίαν, εἴτε ταχύτερον ἐλαύνειν, εἴτε ἔγκρυμμα δέον γενέσθαι, εἴτε ἀπὸ ἐγκρύμματος ἐξελθεῖν ἢ ἄλλα τινὰ καθ᾽ ἕκαστα ἀπὸ σημείων τοῦ σοῦ δρόμωνος ἅπαντα ὑποδέχεσθαι ἀφορῶντας ὅπως δεῖ ποιεῖν.

με΄ Οὐ γὰρ δύναταί τις ἐν τοιούτῳ καιρῷ ἀπὸ φωνῆς ἢ βουκίνου παραγγέλλειν τὰ δέοντα διά τε τὸν θόρυβον καὶ τὸν τάραχον καὶ τὸν τῆς θαλάσσης ἦχον καὶ τὸν ἄλλον κτύπον τῆς τε συγκρούσεως[32] καὶ κωπηλασίας τῶν δρομώνων καὶ πολλῷ πλέον τῆς βοῆς τῶν πολεμούντων.

μς΄ Τὸ δὲ σημεῖον ὑποσημαινέτω ἢ ὀρθὸν ἱστάμενον ἢ ἐπὶ δεξιὰ κλινόμενον ἢ ἐπ᾽ ἀριστερὰ καὶ ἐπὶ δεξιὰ μεταφερόμενον πάλιν ἢ ἐπ᾽ ἀριστερὰ ἢ τινασσσόμενον ἢ ὑψούμενον ἢ καμηλούμενον ἢ παντελῶς ἐπαιρόμενον ἢ μετατιθέμενον ἢ διὰ τῆς ἐν αὐτῷ κεφαλῆς ἄλλοτε ἄλλως φαινομένης ἀλλασσόμενον ἢ διὰ σχημάτων ἢ διὰ χρωμάτων οἷόν ποτε τοῖς παλαιοῖς ἐγίνετο.[33]

μζ΄ Ἐν γὰρ πολέμου καιρῷ σημεῖον εἶχον τῆς συμβολῆς αἴροντες εἰς ὕψος τὴν λεγομένην φοινικίδα· ἦν δὲ τὸ λεγόμενον καμελαύκιον ἐπὶ κονταρίου ὑψούμενον, μέλαν τὴν χρόαν καὶ ἄλλα τινὰ κατὰ τὸν ὅμοιον τρόπον ὑποδεικνύμενα. Ἀσφαλέστερον δὲ τάχα διὰ τῆς σῆς χειρὸς τὰ σημεῖα ὑποδειχθήσεται.

μη΄ Καὶ οὕτως ἔστω σοι ἡ ἐνέργεια, ὦ στρατηγέ, τῶν τοιούτων σημείων γεγυμνασμένη ὥστε πάντας τοὺς ὑπὸ σὲ ἄρχοντας ὅσοι δρομώνων ἡγοῦνται ἔχειν τὴν πεῖραν ἀσφαλῆ τῶν τοιούτων ὑποδειγμάτων καὶ διὰ τί γίνεται ἕκαστον καὶ πότε καὶ πῶς, καὶ

[32] Cf. Thucydides, *Peloponnesian war*, VII.70.6 (vol. 4, p. 140): "καὶ τὸν κτύπον μέγαν ἀπὸ πολλῶν νεῶν ξυμπιπτουσῶν ἔκπληξίν τε ἅμα καὶ ἀποστέρησιν τῆς ἀκοῆς ὧν οἱ κελευσταὶ φθέγγοιντο παρέχειν.".

[33] In MS. A "οἷόν ποτε τοῖς παλαιοῖς ἐγίνετο." is part of §47.

during the time of engagement, in case anything should happen contrary to what had been planned and should require different conduct.

44 [There must] be a signal placed on your dromon, either a banner or a standard or something else in a high place, so that when you signal what should be done, the rest can immediately understand the action decided on, whether they should join in the engagement, or withdraw from the engagement, or begin an encirclement of the enemy, or hasten to the assistance of a section in difficulties, or slow the rowing down, or speed up the advance, or [whether] they should set up an ambush or come out of ambush, or anything else; they should receive each and every [command] from the signals of your dromon, noticing how it is necessary to act.

45 For no one can give the necessary [orders] at such a time by voice or by trumpet, because of the hullabaloo and confusion, the noise of the sea and the other din from the collisions and rowing of the dromons and, even more, the shouts of those fighting.

46 The signal should indicate commands by being held upright, or being inclined to the right or left, or being shifted to the right again or to the left, or by being waved, or raised or lowered, or completely removed, or having its position moved, or being changed by having its "head" (*kephalē**) sometimes made to look different, or through patterns or colours, as used to be done in the past.[34]

47 For in time of engagement they [the ancients] used to have a signal for attack, raising on high the so-called *phoinikis**.[35] This was the so-called *kamelaukion**, raised on a pole, black[36] in colour, and some other [objects] displayed in a similar way. It is very much safer [when] signals will be displayed by your hand.

48 Your technique, *stratēgos*, in these signals should be well practised so that all the commanders under you who are in charge of dromons are very experienced in these signs,[37] and why each is made, and when and how, and should not make

[34] Cf. Maurice, *Stratēgikon*, VII B.16 (pp. 260-62).

[35] Cf. above pp. 397-8.

[36] Note that Dain misread the manuscript at this point, reading "red", ἐρυθρὸν (*erythron*), for "black", μέλαν (*melan*). The *kamelaukion* was black not red, as some have been misled by Dain to believe.

[37] Cf. Appendix One, §8.

μὴ διασφάλλεσθαι, ἵνα περὶ ταῦτα καλῶς ἐγγυμνασάμενοι ἐν καιρῷ χρείας ἕτοιμοι γένωνται πρὸς τὸ γνωρίζειν αὐτὰ καὶ πράττειν συντόμως τὰ δι᾽ αὐτῶν κελευόμενα.

μθ΄ Τὴν δὲ τῶν δρομώνων παράταξιν ἐν καιρῷ προσβολῆς, εἴπερ, ὡς εἴρηται, τοσαύτη πάρεστιν ἀνάγκη ἢ εὐκόλως τὴν νίκην ἐλπίζεις, ποιήσεις καθὼς ἂν συνίδῃς ἁρμόδιον εἶναι πρός τε τὸν καιρὸν καὶ τὸν τόπον καὶ πρὸς τὴν τῶν πολεμίων παρασκευὴν καὶ παράταξιν· οὐ γὰρ νῦν ἐστι λέγειν ἀσφαλῶς περὶ τῶν τότε μελλόντων συμβήσεσθαι.

ν΄ Ποτὲ μὲν μηνοειδῶς οἷον σιγματοειδῶς εἰς ἡμικυκλίου τάξιν, τοὺς μὲν ἄλλους δρόμωνας ἔνθεν κἀκεῖθεν οἷον κέρατά τινα ἢ χεῖρας καὶ μάλισατα ἐν τῷ ἄκρῳ προάγοντας τοὺς ἰσχυροτέρους καὶ μείζονας· ἐν δὲ τῷ βάθει τοῦ ἡμικυκλίου οἱονεί τινα κεφαλὴν τὴν σὴν ἐνδοξότητα ὥστὲ πάντα περισκοπεῖν κὰ διατάττειν, καὶ διοικεῖν καὶ ὅπου δεῖ βοηθείας ἐπιβοηθεῖν μεθ᾽ ὧν ἂν βούλῃ εἰ·ς τοῦτο αὐτὸ εὐκαιρούντων. Το δὲ σχῆμα τὸ μηνοειδὲς γινέσθω ὥστε τοὺς ἐμπίπτοντας πολεμίους ἔσωθεν ἀποκλείεσθαι τῆς κυκλώσεως.

να΄ Ποτὲ δὲ παρατάξεις ἰσομετώπους τὰς ναῦς ἐπ᾽ εὐθείας ὥστε χρείας καλούσης ἐμπίπτειν τοῖς πολεμίοις κατὰ πρῴραν καὶ διὰ τοῦ πυρὸς τῶν σιφώνων κατακαίειν τὰς ἐκείνων ναῦς.

νβ΄ Ποτὲ δὲ καὶ εἰς διαφόρους μερίζεσθαι παρατάξεις εἴτε δύο ἢ τρεῖς κατὰ τὴν ποσότητα τῶν ὑπὸ σὲ δρομώνων. Καὶ τῆς μιᾶς παρατάξεως συμβαλούσης ἡ ἄλλη ἐμπεσεῖται κατὰ τῶν πολεμίων ἤδη ἐμπεπλεγμένων ἢ ὄπισθεν ἢ ἐκ πλαγίου καὶ διὰ τῆς βοηθείας τῆς ἐπελθούσης κατ᾽ αὐτῶν ἀπαγορεύσουσιν οἱ ἐναντίοι τὸ μάχεσθαι.

νγ΄ Ποτὲ δὲ καὶ δι᾽ ἐγκρύμματος· ἀποπλανωμένων γὰρ τῶν πολεμίων καὶ ἐμπιπτόντων ὡς πρὸς ὀλίγους, ἀναφανὲν ἀθρόως τὸ ἔγκρυμμα καὶ τάραξαν αὐτοὺς τὸν τόνον τῆς ἐνστάσεως αὐτῶν.

νδ΄ Ἄλλοτε δὲ δι᾽ ἐλαφρῶν καὶ ταχυτάτων δρομώνων συμβαλλόντων αὐτοῖς καὶ σχηματιζομένων φυγήν, ἐκείνων δὲ ἐν τῇ διώξει κοπουμένων καὶ βιαζομένων μέν, μὴ καταλαμβανόντων

mistakes. Thus, being well practised in these, in time of need they are ready to recognize them and do quickly what is ordered by them.

49 In time of attack, if indeed, as has been said, there is a great need [for one] or you expect an easy victory, you will organize the formation of the dromons as you consider is suitable to the weather and the topography and the preparation and formation of the enemy. It is not possible now to give precise instructions for what may happen in the future.

50 Sometimes [you should draw up] a crescent-shaped or sigma-shaped [i.e., capital sigma "C"] formation in a semi-circle,[38] with the rest of the dromons placed on one side and the other [i.e., of the flagship] like horns or hands and making sure that the stronger and larger [ships] are placed on the tip. Your Gloriousness [should be positioned], like a head in the deep of the semi-circle,[39] so that you can observe and control and oversee everything and where if help is needed provide assistance with whatever [ships] you wish that are to hand for this purpose. The crescent arrangement should be such that, as the enemy attack, they are enclosed within the curve.

51 Sometimes you will form up the ships on an equal front in a straight [line],[40] so that, when the need summons, [you can] attack the enemy at the prow and burn their ships with fire from the *siphōnes*.

52 Sometimes it [the fleet] should be divided into several formations,[41] either two or three according to the number of dromons under you. When one formation has attacked, the other falls on the enemy either at the rear or from the flank when they are already engaged, and with these reinforcements attacking them the enemy breaks off fighting.

53 Sometimes [you should] use an ambush. For when the enemy are deceived and are attacking an apparently small [force], the sudden and disturbing appearance of the ambushers will take the heart out of their resistance.

54 On other occasions, when light and very fast dromons have attacked the enemy and are pretending flight, and they [the enemy] are wearied by the pursuit and exhausted and are not

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[38] Cf. Appendix One, §9.30.
[39] Cf. Appendix One, §9.6.
[40] Cf. Maurice, *Ἐκ τοῦ Μαυρικίου*, §7 (p. 42); Appendix One, §§9.35-41.
[41] Cf. Maurice, *Ἐκ τοῦ Μαυρικίου*, §3 (p. 41).

δὲ τοὺς φεύγοντας, ἢ καὶ τινων ἀποκοπτομένων ἀλλήλων τῆς συνεχείας, ἕτεροι σου δρόμωνες ἄκοποι καὶ ἀναπεπαυμένοι κατὰ τῶν κεκοπωμένων ὁρμήσαντες νικήσουσιν αὐτούς ἤ, εἰ καὶ τὰ δυνατὰ τῶν ἐχθρῶν πλοῖα παρελθεῖν ἰσχύσας τις, τοῖς ἀσθενεστέροις ἐπιτεθῇ.

νε΄ Ποτὲ δὲ συμβαλὼν καὶ ἱκανῶς ἐκ χειρὸς πολεμήσας ταῖς ἐναντίαις ναυσὶ τοῦ τελείως κοπωθῆναι τοὺς εναντίους, ἀποπλέζεις[42] μὲν τοὺς δρόμωνας, ἑτέρους δὲ πάλιν ἐπιπέμψεις τοῖς πολεμίοις ἀκοπιάτους τοῖς κεκοπωμένοις καὶ ἐκλυθεῖσιν ἀπὸ τῆς μάχης, καὶ οὕτως τὴν κατ᾽ αὐτῶν νίκην ἐργάσῃ· μάλιστα δὲ τοῦτο γίνεται ὅταν περισσοτέρους αὐτὸς ἔχῃς δρόμωνας ὑπὲρ τοὺς πολεμίους.

νς΄ Ποτὲ δὲ φυγὴν προσποιούμενος μετὰ δρομώνων ταχινῶν πρὸς δίωξιν ἐκκαλέσῃ τοῦς πολεμίους κατὰ πρύμναν ἔχων αὐτούς. Κακεῖνοι ὁρμήσαντες διώκειν διαλύσουσι τὴν τάξιν αὐτῶν. Καὶ οὕτως συντόμως ἀνθυποστρέψας διεσπαρμένοις τοῖς διώκουσι μάλιστα καὶ πλεῖον ἐκείνων δρόμωνας ἔχων ἐπέλθῃς αὐτοῖς κατὰ πρῴραν· καὶ ἢ καθ᾽ ἕνα ἢ κατὰ δύο ἐπάγων τοὺς σοὺς δρόμωνας τῷ ἑνὶ πλοίῳ τῶν πολεμίων νικήσεις αὐτούς.

νζ΄ Προσβάλλειν δὲ πολεμίοις χρὴ ἐν ναυμαχίᾳ καὶ ὅταν τύχῃ αὐτοὺς ναυαγῆσαι καὶ ὅταν ἀπὸ ζάλης διαταραχθέντες ἀτονήσωσιν, ἢ ἐν νυκτὶ ἐπελθόντα ἐμπρῆσαι τὰς ἐκείνων ναῦς, ἢ ἐν τῇ χέρσῳ ἀσχολουμένων, ἢ ὡς ἂν ἡ χρεία καλέσῃ καὶ αὐτὸς ἐπινοήσῃς οὕτως καὶ ποιήσεις τὰς προσβολάς.

νη΄ Ποικίλης γὰρ οὔσης τῆς τῶν ἀνθρώπων γνώμης ἀδύνατόν τινα τὰ μέλλοντα ἐμπίπτειν ἐν ταῖς τοιαύταις παρατάξεσιν ἢ προγινώσκειν ἢ προλέγειν ἅπαντα· διὸ οὐδὲ τὰς κατ᾽ αὐτῶν ἀντιπαρατάξεις ἐν τῷ παρόντι λόγῳ δυνατόν μεθοδεύειν, ἀλλ᾽ εἰς τὴν θείαν πρόνοιαν ἅπαντα ταῦτα ἀνατιθέναι καὶ δέεσθαι τοῦ Θεοῦ ἵνα ἐν τοῖς τοιούτοις ὀξέσι καιροῖς δύναταί τις καὶ βουλεύεσθαι καὶ διανοεῖσθαι καὶ πράττειν τὰ δέοντα.

νθ΄ Πολλὰ δὲ καὶ ἐπιτηδεύματα τοῖς παλαιοῖς καὶ δὴ καὶ τοῖς νέοις ἐπενοήθη κατὰ τῶν πολεμικῶν πλοίων καὶ τῶν ἐν αὐτοῖς πολεμούντων· οἷον τό τε σκευαστόν πῦρ μετὰ βροντῆς καὶ καπνοῦ προπύρου διὰ τῶν σιφώνων πεμπόμενον καὶ κατακαίον αὐτά.

[42] ἀποπλίζεις MS. A. We emend to ἀποπλέζεις following Appendix Five, §52.

54 able to overtake [those] in retreat, either when some of them are cut off from each other in the main [fleet], other fresh and rested dromons of yours, setting on the exhausted ships, will defeat them or, if some [dromon] is able to pass the powerful enemy ships, it should attack the weaker [ones].

55 Sometimes, when you have attacked and fought the opposing ships sufficiently at close quarters until the enemy are completely exhausted, you will disengage the dromons and send in other fresh [ones] against enemies who are weary and downcast from battle. And thus you will gain the victory over them. This can best be done when you have more dromons than the enemy.[43]

56 Sometimes, when [you] are pretending to flee with fast dromons you may incite the enemy to pursuit, having them at your stern. They, having set off in pursuit, will break up their formation.[44] And so, turning round quickly, you should attack them at the prow as they pursue in disorder, especially having more dromons than they. And bringing up your dromons, either singly or in twos, against a single enemy ship, you will defeat them.

57 It is necessary to attack the enemy in battles at sea, both when they happen to be shipwrecked and whenever they are disheartened, having been scattered in a squall.[45] Either burn their ships, attacking by night or when they are occupied on shore, or you should make an attack when the need arises and when you can devise [it].

58 Since men's opinion is varied, it is impossible for anyone either to foresee or to foretell all that will take place in such formations. Thus it is not possible in the present discussion to deal with counter formations against them, but [one must] leave all this to divine providence and pray God that in such moments of acute crisis one is able to devise and invent and put into practice what is required.

59 Many devices have been invented by men of old and especially in recent times against enemy ships and those fighting in them; such as the processed fire, which is expelled from *siphōnes* with thunder and *propyra**, forefire[46] smoke and sets them on fire.

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[43] Cf. Appendix One, §9.27.
[44] A standard battle tactic. See Pryor, "Roger of Lauria", p. 203.
[45] Cf. Appendix Two [b], §5.
[46] Cf. Appendix Five, §56.

ξ΄. Καὶ τοξοβαλλίστραι δὲ ἔν τε ταῖς πρύμναις καὶ ταῖς πρῴραις καὶ κατὰ τῶν δύο πλευρῶν τοῦ δρόμωνος ἐκπέμπουσαι σαγίτας μικρὰς τὰς λεγόμενας μυίας. Καὶ θηρία ἕτεροι ἐπενόησαν ἐν χύτραις κεκλεισμένα καὶ κατὰ τῶν πλοίων τῶν πολεμίων ῥιπτόμενα· οἷον ὄφεις καὶ ἐχίδνας καὶ σαύρας καὶ σκορπίους καὶ τὰ ὅμοια τούτων ἰοβόλα· ὧν συντριβομένων τὰ θηρία δάκνουσι καὶ συμφθείρουσι διὰ τοῦ ἰοῦ τοὺς πολεμίους ἔσωθεν τῶν πλοίων.

ξα΄ Καὶ χύτρας δὲ ἄλλας ἀσβέστου πλήρεις ὧν ῥιπτομένων καὶ συντριβομένων ὁ τῆς ἀσβέστου ἀτμὸς συμπνίγει καὶ σκοτίζει τοὺς πολεμίους καὶ μέγα ἐμπόδιον γίνεται.

ξβ΄ Καὶ τρίβολοι δὲ σιδηραῖ ῥιπτόμεναι ἐν τοῖς πλοίοις τῶν πολεμίων οὐ μικρὰ λυπήσουσιν αὐτοὺς καὶ ἐμποδίσουσιν πρὸς τὸν κατὰ τὴν ὥραν ὀφείλοντα ἀγῶνα.

ξγ΄ Ἡμεῖς δὲ κελεύομεν καὶ πυρὸς σκευαστοῦ γεγεμισ-μένας χύτρας ἐπιρρίπτεσθαι κατ᾽ αὐτῶν κατὰ τὴν ὑποδειχθεῖσαν μέθοδον τῆς αὐτῶν σκευασίας· ὧν συντριβο-μένων εὐκόλως τὰ πλοία τῶν πολεμίων κατακαήσεται.

ξδ΄ Χρήσασθαι δὲ καὶ τῇ ἄλλῃ μεθόδῳ τῶν διὰ χειρὸς βαλλομένων μικρῶν σιφώνων ὄπισθεν τῶν σιδηρῶν σκουταρίων παρὰ τῶν στρατιωτῶν κρατουμένων, ἅπερ χειροσίφωνα λέγεται, παρὰ τῆς ἡμῶν βασιλείας ἄρτι κατεσκευασμένα· ῥίψουσι γὰρ καὶ αὐτὰ τὸ σκευαστὸν πῦρ κατὰ τῶν προσώπων τῶν πολεμίων.

ξε΄ Καὶ τρίβολοι δὲ μείζονες σιδηραῖ ἢ ἐν σφαιρίοις ξυλίνοις ἦλοι ὀξεῖς ἐμπεπηγμένοι, στυππίοις δὲ καὶ ἑτέρᾳ ὕλῃ ἐνειλημένοι[47]· ‹a}›[48] ἐμπυρισθέντα καὶ κατὰ τῶν πολεμίων βαλλόμενα, εἶτα πίπτοντα ἐν τοῖς πλοίοις διὰ πολλῶν μερῶν ἐμπρήσουσιν αὐτά.

ξς΄ Ἀλλὰ εἰ καὶ διὰ τὸ σβέσαι οἱ πολέμιοι τὴν αὐτῶν φλόγα πατέσουσιν αὐτὰ οἱ πλεῖστοι τοὺς πόδας πληγήσονται κατ᾽ αὐτὴν τὴν συμβολὴν τοῦ πολέμου καὶ οὐ μικρὸν ἔσται τοῖς ἐναντίοις ἐμπόδιον.

ξζ΄ Δυνατὸν δὲ καὶ διά τινων γερανίων λεγομένων ἤ τινων ὁμοίων ἐπιτηδευμάτων γαμματοειδῶν[49] κύκλῳ περιστρεφο-μένων ἢ πίσσαν ὑγρὰν πεπυρωμένην ἢ σκευὴν ἤ τινα ὕλην ἑτέραν ἐπιχύσαι τοῖς πολεμικοῖς πλοίοις διὰ τῶν δρομώνων δεσμου-μένοις τοῦ μαγγάνου στρεφομένου κατ᾽ αὐτῶν.

ξη΄ Δυνατὸν δὲ καὶ ὁλόκληρον τὴν ναῦν ἀνατρέψαι τῶν πολε-

[47] ἐνειλημένοι, thus Dain: ἐνειλημένα MS. A.
[48] Thus Dain, as added to MS. A by Desrousseaux. MS. A does not have this.
[49] γαμματοειδῶν, thus Dain: γαμματοειδῶς MS. A.

60 And there should be *toxobalistrai** (bow-*ballistae*)[50] at the sterns and the prows and along the two sides of the dromon to shoot the small arrows known as *muiai** (flies). And others have thought of putting poisonous creatures into jars and throwing [them] into the ships of the enemy; such as snakes, vipers, lizards, scorpions and other such venomous [creatures]. When [the jars] break, the creatures bite and destroy with their venom the enemy in the ships.

61 And other jars full of unslaked lime; when thrown and broken, the fume from the lime chokes and kills the enemy and causes great confusion.

62 Iron caltrops thrown into the ships of the enemy will cause them no little harm and will hinder [them] in the struggle in which they should be engaged at that time.

63 We give instructions [that] jars full of processed fire, made according to the usual method of construction, are to be thrown at them. When they break, the ships of the enemy will easily be set on fire.

64 You should also employ the other method, with small *siphōnes* throwing [i.e., the fire] by hand which are held behind iron *skoutaria** (shields) by the soldiers. These are known as hand-*siphōnes* and were recently invented by our Majesty. They also throw processed fire into the faces of the enemy.

65 Also larger iron caltrops or sharp nails embedded in wooden balls and wrapped round with tow and other matter, these when ignited and thrown against the enemies, and then landing on the ships, will set them on fire in many parts.

66 If the enemies stamp on the flame to extinguish [it], most of them will injure their feet during the clash of battle and this will be no small nuisance for the opposition.

67 It is also possible by means of some [things] called *gerania** (cranes) or some similar contrivances, shaped like a [capital letter] gamma (i.e., a "Γ" shape), turning in a circle, to pour either wet flaming pitch or the processed [fire] or anything else into the enemy ships when they are coupled to the dromons when the *manganon* is turning over them.

68 It is also possible to capsize an entire enemy ship if – having

[50] Cf. Maurice, *Ἐκ τοῦ Μαυρικίου*, §3 (p. 41).

68 μίων ἐὰν πλευρὰν παρὰ πλευρὰν δήσας αὐτὴν τῷ δρόμωνι, καὶ τῶν πολεμίων ἐπὶ ἓν μέρος, ὡς ἔθος ἔχουσι, πρὸς τὴν ἐκ χειρὸς μάχην συνδραμόντων καὶ δοκούντων ἐπακουμβίζειν τὸ ἑαυτῶν πλοῖον τῷ δρόμωνι, ἐπέλθῃ μὲν ἕτερος δρόμων κατὰ τῆς πλευρᾶς τῆς ἐν τῇ πρύμνῃ τῆς πολεμίας καὶ ταύτην ὠθήσῃ σφοδρῶς τῇ συγκρούσει, καὶ ὁ μὲν δρόμων δυνηθῇ λύσας ἑαυτὸν τοῦ δεσμοῦ ὑποχωρῆσαι μικρὸν ὥστε μὴ εἶναι ὡς ἀκούμβισμα τῆς πολεμίας, βαρήσῃ[51] δὲ ὁ ἕτερος δρόμων πάσῃ δυνάμει, πάντως ἀνατρέψει σὺν αὐτοῖς τοῖς ἀνδράσι τὴν πολεμίαν ναῦν. Δεῖ δὲ κανονίσαι τὸν δεσμὸν μὴ πάντως κατ' ἰσότητα γένεσθαι, ἀλλὰ μικρὸν ἀφεῖναι γυμνά τινα πλευρὰ κατὰ πρύμναν τῆς πολεμίας, δι' ὧν ἐμπεσὼν ὁ δρόμων ὠθήσει πρὸς τὴν ἀνατροπὴν τῶν πολεμίων τὴν ναῦν.

ξθ΄ Πρὸς τούτοις καὶ τὸ νῦν ἡμῖν ἐπινοηθέν, ὥστε ἀπὸ τῆς κάτω τοῦ δρόμωνος ἐλασίας διὰ τῶν ὀπῶν ἤτοι ἀπὸ τρυπημάτων τῶν κωπίων ἐκφερόμενα μέναυλα κατασφάττειν τοὺς πολεμίους, τῶν πανύ μοι ἀναγκαίων δοκεῖ.

ο΄ Ἀλλὰ καὶ ἕτερον τούτου ἀναγκαιότερον, εἴ γε χειρῶν εὐφυῶν ἐπιτύχῃ, τὸ διὰ τῆς κάτωθεν τοῦ δρόμωνος ἐλασίας τῇ ὑποδειχθείσῃ μεθόδῳ δι' ὀπῆς παρασκευάσει πλησθῆναι ὕδατος τὴν ναῦν τῶν πολεμίων.

οα΄ Εἰσὶ δὲ καὶ ἕτερα τοῖς ἀρχαίοις ἐπινοηθέντα ἐν τῷ πλωΐμῳ πολέμῳ ἐπιτηδεύματα, καὶ ἔτι δὲ ἐπινοηθῆναι δυνάμενα, ἅπερ ἐν τῷ παρόντι γράφειν διὰ τὴν συντομίαν ἀνοίκειον ἡγησάμεθα, τινὰ δὲ καὶ ἀσύμφορα διὰ τὸ μὴ φαυλίζεσθαι τοῖς πολεμίοις καὶ μᾶλλον ἐκείνους[52] χρῆσθαι αὐτοῖς καθ' ἡμῶν. Τὰ γὰρ στρατηγήματα ἅπαξ κατανοηθέντα δύνανται ἀντιστρατηγεῖσθαι καὶ καταμεθοδεύεσθαι παρὰ τῶν πολεμίων· ἀλλ' ἕκαστον τὸ ἐπινοηθὲν μέχρι τῆς πράξεως ἔχειν ἐν μυστηρίῳ.

οβ΄ Ἐν δὲ τῷ βιβλίῳ τῶν ἀρχαίων τακτικῶν καὶ στρατηγημάτων ζητῶν τις εὑρήσει καὶ τὰ τούτων πλείονα· οὐ γὰρ δυνατόν, ὡς εἴρηται, πρὸς ἕκαστα τὰ ἐμπίπτειν μέλλοντα διὰ τὸ ἄπειρον αὐτῶν γράφειν, ἀλλὰ τὰ ἱκανά.

ογ΄ Πλὴν κεφαλαῖον εἰπεῖν, ἔστωσαν οἱ δρόμωνες ἐξωπλισμένοι τελείως, ἀπό τε στρατιωτῶν ἀνδρείων καὶ ἐκ χειρὸς μάχεσθαι δυναμένων καὶ τῷ τῆς ψυχῆς παραστήματι τολμηρῶν καὶ πεπαιδευμένων καὶ γεγυμνασμένων· οὗτοι δὲ ἔστωσαν καθω-

[51] βαρήσῃ, thus Dain: βαρήσει MS. A.
[52] ἐκείνους, thus Dain: ἐκείνοις MS. A.

68 coupled it side by side to the dromon, and the enemy rush to one side, as is their habit, to engage in hand-to-hand-fighting and expect their own ship to lay against the dromon – another dromon were then to run at the side of the enemy vessel towards the stern and strike it hard as they collide, and if the one (first) dromon should be able to free itself from the coupling and back off a little so that it is not laying against the enemy, and if the other (second) dromon were to weigh down with all vigour, it will capsize the enemy ship and her crew completely. You should organize the coupling so that it does not hold the [enemy] ship evenly but leaves at the enemy ship's stern some of the sides a little exposed, where the dromon will be able to attack and exert pressure to capsize the enemy ship.

69 In addition, [there is] the [technique] we have recently devised so that when pikes are thrust from the lower bank of the dromon through the holes or *trypēmata** (oarports) of the oars, they slaughter the enemy; this seems to me especially useful.[53]

70 But there is another [technique] even more useful than this, if it falls to experienced hands, [and that is] when the enemies' ship is filled with water through a hole made by the dromon's lower oar-bank by the usual method.[54]

71 There are other devices for naval warfare invented by the ancients and [others] that can still be invented, which we have considered it inappropriate to describe at present in summary. And [there are] some which are inadvisable [to mention] since they may be taken over by the enemy, and indeed they may use them against us. For once stratagems have been invented, a counter-stratagem and defence can be devised by the enemy. Every [scheme] once invented [should be] kept secret until it is carried out.

72 Anyone who looks into the book on ancient tactics and strategies will find more on these [matters]. For it is impossible, as has been said, to write about every future [event] that will happen, but [this is] sufficient.

73 But to mention the main point, the dromons should be completely armed, with brave soldiers capable of fighting at close quarters, and bold in their mental attitude, and trained and exercized. These should be armed with the weapons with which

[53] Cf above p. 405.
[54] Cf. above pp. 405-6.

πλισμένοι ὅπλοις ὁποίοις καὶ ὁ ἐν τῇ ξηρᾷ στρατιώτης ὁπλισθῆναι διώρισται, δηλονότι κατάφρακτος. Καὶ οὕτω πάντες οἱ τῆς ἄνω ἐλασίας ὁπλισθήσονται.

οδ΄ Πρὸς δὲ τὴν τῶν ἐχθρῶν ποιότητα τῶν ποσότητα τῶν πλοίων, καὶ αὐτός, ὦ στρατηγέ, διασκευάσεις τοὺς δρόμωνας καὶ καθοπλίσεις ὅπως μὴ ἐλάττονα στρατὸν ἔχῃ ὁ ἡμέτερος δρόμων τοῦ πολεμίου, ὅστις μάλιστα εἰς ἴσην μάχην ἐλθεῖν ἑτοιμάζεται διὰ τοῦ εἰς ἀλλήλους δεσμοῦ,[55] ἀλλ᾽ εἰ δυνατὸν καὶ πλείονα· ἀμφοτέρων γὰρ ἀνδρείως μαχομένων, οἱ πλείονες ὑπερνικήσουσιν.

οε΄ Ἐὰν γὰρ συνορᾷς ἔχειν τοὺς πολεμίους πλοῖα πλείονα στρατὸν ὑποδεχόμενα, οὐσιώσεις καὶ αὐτὸς τοὺς ἴσους[56] δρόμωνας ἐν πλήθει. Ἐκλέξῃ δὲ ἀπὸ πάντων τοὺς ἀρίστους καὶ ἐξ αὐτῶν ἐξοπλίσεις τὴν ἀρκοῦσαν δύναμιν διὰ δρομώνων τελείων καὶ ἰσχυροτάτων· ὥστε εἰ οὕτω τύχῃ ἢ τῶν δύο τὸν στρατὸν εἰς ἕνα ἐμβιβάσῃς ἢ ἐκ πάντων ἐπιλέξῃ τοὺς ἀρίστους, ὡς εἰρηται· καὶ γενήσονται ἄχρι καὶ διακοσίων στρατιωτῶν ἢ καὶ πλείονες κατὰ δρόμωνα ἕνα, ὡς ἂν καὶ τῷ πλήθει καὶ τῷ μεγέθει τῶν δρομώνων καὶ τῇ εὐτυχίᾳ τῶν στρατιωτῶν ἐπικρατέστερος τῶν πολεμικῶν πλοίων γενόμενος, σὺν θεῷ τὴν κατ᾽ αὐτῶν νίκην ἀπολάβῃς.

ος΄ Δεῖ δέ σε καὶ μικροτέρους ἐξοπλίζειν δρόμωνας καὶ ἐλαφροτέρους τῶν συνηθῶν, ὥστε καὶ διώκοντας καταλαμβάνειν τοὺς πολεμίους καὶ διωκομένους μὴ καταλαμβάνεσθαι καὶ τούτους ἔχειν ἐν καιρῷ τῆς ἁρμοζούσης αὐτοῖς χρείας, ὥστε δύνασθαι αὐτούς ἢ κακόν τι ποιήσαι τοὺς ἐχθροὺς ἢ μὴ παθεῖν τι κακὸν παρ᾽ αὐτῶν.

οζ΄ Μικροὺς δὲ καὶ μεγάλους δρόμωνας κατὰ τὴν ποιότητα τῶν πολεμίων ἐθνῶν κατασκευάσεις. Οὐ γὰρ ὁ αὐτός ἐστιν στόλος τῶν πλοίων τῶν τε Σαρακηνῶν καὶ τῶν λεγομένων Ῥῶς βορείων Σκυθῶν. Οἱ μὲν γὰρ Σαρακηνοὶ κουμβαρίοις χρῶνται μείζοσι καὶ ἀργοτέροις, οἱ δὲ οἷον ἀκατίοις μικροῖς καὶ ἐλαφροτέροις

[55] δεσμοῦ, thus Dain: δέσμους MS. A.
[56] ἴσους, thus Dain, following Desrousseaux: σοὺς MS. A.

the land soldier is decreed to be armed, that is, [as a] *kataphraktos*. All those in the upper oar-bank should be armed like this.

74 You yourself, *stratēgos*, will equip the dromons to match the quality of the enemy and the quantity of [their] ships and will arm them so that our dromon has a *stratos* no less than [that of the dromon] of the enemy, [and], indeed, one that is prepared for an even fight when coupled to each other, but if possible greater; for, when both sides fight bravely, the greater will be victorious.[57]

75 If you realize that the enemy has ships with a greater *stratos*, you yourself will *ousia**[58] an equivalent number of dromons. From all these [ships] you will select the best and from these you will arm an adequate force of effective and very strong dromons. Thus, if this is [what] happens, you either combine the crew from two [ships] into one or, as has been said, you select the best from all [the crews]. There should be up to two hundred, or more, soldiers in one dromon, so that, being superior to the enemy ships in both number and size of the dromons and in the good fortune of the soldiers, with God you will achieve victory over them.

76 You must also arm dromons [which are] smaller and lighter than the usual so that, when pursuing they overtake the enemy, or, when being pursued, they are not overtaken, and [you should] have these at a time of appropriate need for them, so that they can either inflict some damage on the enemy or not suffer damage from them.[59]

77 You will equip small and large dromons according to the quality of the enemy nation. For the fleet of ships of the Saracens is not the same as that of the so-called Russians, northern Skythians.[60] The Saracens use larger and slower *koumbaria*,[61] while the Skythians use *akatia**, which are small,

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[57] Cf. Appendix One, §9.8.

[58] Note the verb οὐσιώσεις, the verbal action of providing an οὐσία. The verb οὐσιόω thus meant to provide a ship with a crew. See also Appendix Five, §68.

[59] Cf. above pp. 130-31.

[60] Skythians, from the ancient people known to the Greeks and Romans. A generic term used by Byzantines for peoples to the North outside the frontiers of the Empire.

[61] "Κουμβάριον" was a transliteration into Greek from Arabic. The original Arabic word was most probably *qunbār* (pronounced *qumbār*), which was used in documents of the Cairo Geniza for a large sailing ship. See Goitein, *Mediterranean society*, pp. 306, 331, 480 n. 6. Christides has suggested that the Arabic may have been *marqib*

καὶ γοργοῖς, οἱ Σκύθαι· διὰ ποταμῶν γὰρ εἰς τὸν Εὔξεινον ἐμπίμτοντες πόντον οὐ δύνανται μείζονα ἔχειν πλοῖα.

οη΄ Καὶ ταῦτα μὲν περὶ παρατάξεων εἰρήσθω. Ὅταν δὲ ἀπαλλαγῆναι βούλῃ τῆς μάχης, μηνοειδῶς, ὡς εἴρηται, τὴν παράταξιν τῶν δρομώνων ποιήσας οὕτως ὑποχωρήσεις διὰ τὸ ἀσφαλὲς εἶναι τὸ τοιοῦτον σχῆμα ἐν ταῖς τοιαύταις καὶ προόδοις καὶ ὑποχωρήσεσιν, ὡς μαρτυροῦσι τινες τῶν παλαιῶν τούτῳ τῷ τρόπῳ χρησάμενοι.

οθ΄ Μετὰ δὲ τὴν λύσιν τοῦ πολέμου δέον σε, ὦ στρατηγέ, τὰ ὡς εἰκὸς κρατηθέντα ἀπὸ τῶν πολεμίων λάφυρα ἐξ ἴσου διαμερίζειν τοῖς στρατιώταις καὶ ἀριστοποιεῖν καὶ φιλοφρονεῖσθαι αὐτούς, καὶ τοὺς μὲν ἀριστεύσαντας καὶ δωρεῶν καὶ τιμῶν ἀξιῶσαι, τοὺς δέ ἀνάξιόν τι στρατιώτου ποιήσαντας ἐπιτιμῆσαι δεόντως.

π΄ Γίνωσκε δέ, ὦ στρατηγέ, ὅτι πλῆθος δρομώνων ἀνάνδρους ἐχόντων στρατιώτας οὐδὲν ἰσχύει, οὐδ᾽ ἂν καὶ πρὸς ὀλίγους μαχήσωνται τοὺς ἐναντίους ἀνδρείους καὶ εὐψύχους· οὔτε γὰρ πλῆθος ἀνδρῶν κατὰ ὀλίγων ἰσχύσει εἰ μὴ καὶ τῇ προθυμίᾳ καὶ τῇ ὁπλίσει στρατιῶται ἀληθεῖς ἀποδείκνυνται. Τί γὰρ οὐκ ἐργάσονται δεινὸν καὶ ὀλίγοι λύκοι πρὸς πολλὰς χιλιάδας ποιμνίου;

πα΄ Διὸ χρή σε συνορᾶν ἅπαντα μετὰ ἀκριβείας πάσης τὰ τῶν ἐχθρῶν ὡς διάκεινται καὶ οὕτως τήν τε τῶν δρομώνων κατασκευὴν καὶ τὴν τῶν στρατιωτῶν ὅπλισιν καὶ τὸ πλῆθος αὐτῶν καὶ τὸ μέγεθος καὶ τὰ ἄλλα ἐπιτηδεύματα ἁρμοδίως κατὰ τῶν ἐναντίων παρασκευάζειν.

Ἔχειν δὲ καὶ μικροὺς καὶ ταχεῖς δρόμωνας οὐ πρὸς πόλεμον ἐξωπλισμένους, ἀλλὰ πρὸς τὰς βίγλας καὶ τὰ μανδάτα καὶ τὰς ἄλλας ἀπαντώσας ὁμοίως χρείας· καὶ ἔτι τά τε μονήρια λεγόμενα καὶ τὰς γαλέας, πλὴν καὶ αὐτοὺς ἐνόπλους διὰ τὰ ὡς εἰκὸς καὶ κατὰ τύχην ἐμπίπτοντα.

πβ΄ Καὶ σὲ δὲ αὐτὸν διὰ πάντων εἶναι δεῖ σπουδαῖον καὶ γενναῖον καὶ ἀτάραχον καὶ ὀξὺν ἐν ταῖς ἐναγκαίαις μάλιστα τῶν πραγμάτων ἐγχειρήσεσί τε καὶ πράξεσιν, ἵνα καὶ Θεῷ εὐάρεστος καὶ τῇ ἡμετέρα ἐκ Θεοῦ βασιλείᾳ εὔχρηστός τε καὶ δόκιμος ἀναφανεὶς στρατηγὸς ἀμφοτέρωθεν κερδήσῃς τὰς ἀξίας τῶν πόνων ἀμοιβάς, ἐκ Θεοῦ μὲν μισθοὺς ἀθανάτους ὑπὲρ τῆς αὐτοῦ κληρονομίας ἀγωνιζόμενος, ἐξ ἡμῶν δὲ καὶ τιμὰς καὶ

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kabīr, "large ship", but this seems much less likely. See Christides, *Conquest of Crete*, p. 66.

lighter, and fast, as they cannot have larger ships when raiding down rivers to the Black Sea.

78 That is enough about formations. When you wish to disengage from a battle, having, as has been said, drawn the formation of the dromons into a crescent, you will withdraw in this way since this arrangement is safe in advances and retreats of this kind,[62] as some of the ancients indicate [by their] having used this method.[63]

79 When the engagement has ended, *stratēgos*, you should divide the spoils that have been acquired from the enemy as is usual equally among the soldiers and praise them and make much of them, and reward the outstanding soldiers with gifts and honours, and you should penalize accordingly those whose behaviour has been unbecoming to a soldier.

80 You should appreciate, *stratēgos*, that a number of dromons with cowardly soldiers achieves nothing, not even when fighting a few opponents [if these are] brave and of good heart; neither will a number of men achieve anything against a few unless they prove to be true soldiers in energy and arms. Will not a few wolves do great damage to many hundreds of thousands of sheep?

81 Therefore you should observe with great accuracy the enemy's situation and then prepare the equipment of the dromons, the armament of the soldiers, their number, the size [of the ships], and other needs in a manner appropriate to the opposition.

Equally, [there is] need to have small and fast dromons [which are] not armed for battle but can be used as scouts, for messages and other similar purposes. And also what are known as *monēreis* (monoremes) and also *galeai*, except that they should be armed against normal eventualities.

82 You should be keen, valiant, calm, and alert throughout everything, particularly in the inevitable conflicts and periods of action; thus you may be pleasing to God and serve our Majesty under God and be a renowned *stratēgos* and you will gain due recompense for your labours from both, an eternal reward from God for your struggles on behalf of his dominion, and honours and their attendant gifts from myself, when you

[62] Cf. Appendix Two [b], §2.

[63] See Thucydides, *Peloponnesian war*, III.78.3 (vol. 2, p. 136), and cf. VII.70.4 (vol. 4, p. 138).

δωρεὰς τὰς προσηκούσας, μὴ ψευδόμενος τὴν κλῆσιν, ἀλλ᾽ ἀληθὴς στρατηγὸς καὶ ὢν καὶ καλούμενος. Τοσαῦτα καὶ περι ναυμαχίας ὡς ἐν συνόψει μετρίως εἰρήσθω.

APPENDIX TWO [b]

LEO VI, *ΕΚ ΤΟΥ ΚΥΡΟΥ ΛΕΟΝΤΟΣ ΤΟΥ ΒΑΣΙΛΕΩΣ* EDITION AND TRANSLATION[64]

Ἐκ τοῦ Κύρου Λέοντος τοῦ βασιλέως

1[65] Ἱστορήσω σοι ἔτι καὶ ἕτερον ναυτικοῦ στόλου στρατήγημα· ὅταν γὰρ εἰς τόπους λιμένας μὴ ἔχοντας καὶ ψαμμώδεις τὴν ἀπόβασιν μέλλῃς ποιήσασθαι, ἐὰν οὕτω τύχῃ ἐν καιρῷ ναυτικῆς στρατηγίας, σάκκους πολλοὺς γεμίσας ἄμμου καὶ τοῖς σχοινίοις προσδήσας ἀπὸ ἑκάστου δρόμωνος ἐκκρεμάσεις τοὺς ἀρκοῦντας οἱονεὶ σιδηρὰς ἀγκύρας, καὶ οὕτως τὸν λεγόμενον πελαγολιμένα ποιήσας εὐκόλως κατὰ τὸν τόπον νυκτὸς ἐπελθὼν τὴν βεβουλευμένην σοι καταδρομὴν ποιήσεις.

2[66] Πολεμίου ποτὲ ναυτικοῦ στόλου μετὰ οἰκείας δυνάμεως ναυτικῆς ὑποχωρῶν στρατηγὸς μηνοειδῆ παράταξιν ποιούμενος ὑποστρεφέτω πλέων κατὰ πρύμναν καὶ οὕτως βουλευέσθω ἀποχωρίζεσθαι τῶν πολεμίων· καὶ γὰρ οὐ φεύγων, ἀλλὰ φυγομαχῶν, ἑτοίμους ἕξει τὰς ναῦς καὶ πάλιν ἐπελθεῖν τοῖς πολεμίοις κατὰ πρῴραν. Εἴ γε καὶ τούτου χρεία γένηται, τὰς πρῴρας ἔχειν πρὸς αὐτούς· καὶ γὰρ οὐδὲ θαρρήσουσιν ἐν τῷ κοιλώματι εἰσελθεῖν τὴν κύκλωσιν ὑφορώμενοι.

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[64] Edited from a microfilm of folios 331r-v of the tenth-century manuscript Milan, Biblioteca Ambrosiana, MS. B 119-sup. [gr. 139]. A text was published in Dain, *Naumachica*, pp. 35-8.

[65] Constitution XX, §196 of Leo VI, *Taktika* (PG).

We believe that we have translated the Greek accurately here; however, we have no idea what the emperor supposed this paragraph to mean. He appears to have thought that if a fleet made landfall on an open beach where there was no harbour into which to put, that one would then need to construct a "sea-harbour", πελαγολιμέν (*pelagolimen*), by lowering sandbags to the sea bed to hold the ships in position. Why one could not use for this purpose the multiple anchors that all medieval ships carried, escapes us. Then, the emperor appears here not to have appreciated that dromons could simply be beached, thus negating the need for any such "sea-harbour"; although, elsewhere he did appreciate that fleets could be beached. In any case, why constructing such a "sea-harbour" would contribute to making a raid successful appears to be entirely obscure.

[66] Constitution XX, §201 of Leo VI, *Taktika* (PG).

have not fallen short of your calling but are a true *stratēgos* in both name and deed. Enough has now been said sufficiently on naval warfare in this brief survey.

APPENDIX TWO [b]

LEO VI, *FROM THE LORD LEO, THE EMPEROR*, EDITION AND TRANSLATION

From the Lord Leo, the Emperor

1 I will tell you now of yet another stratagem for a naval fleet. When you intend to make a landing in sandy places which do not have harbours, should this happen during your period of naval command, having filled many sacks with sand and having tied [them] with ropes, you will hang a sufficient number like iron anchors from each dromon; and having in this way constructed what is known as a 'sea harbour', attacking the place by night, you will easily carry out your planned raid.

2 A *stratēgos* retiring on some occasion before an enemy fleet with his own naval force, making a crescent formation should withdraw, sailing by the stern [i.e., backing water], and should plan to disengage from the enemy in this way; for by not fleeing but making a fighting retreat, he will have his ships ready to attack the enemy once again from the prow. If there is need of this, [you should] have the prows towards them, for they will not have the courage to enter the hollow, suspecting encirclement.

3[67] ῾Ων ἕνεκα, εἰ[68] τόπων ἢ πόλεων ἐκπέμπειν μέλλεις ναυτικὸν στόλον, κρύπτειν σε δεῖ καὶ τοὺς τόπους καὶ τὰς πόλεις ὥστε μηδένα προγνῶναι ποῦ μέλλει γίνεσθαι ὁ κατάπλους. ῞Ενταλμα δὲ γράψας καὶ σφραγισάμενος αὐτὸ ἀσφαλῶς ἐπίδος τῷ καθισταμένῳ παρὰ σοῦ ναυάρχῳ, ἵνα κατὰ τὸ πέλαγος ἐξελθὼν τότε λύσῃ τὴν σφραγῖδα καὶ μάθῃ ποῦ μέλλει πορεύεσθαι· οὕτως γὰρ ποιήσας λάθῃς τοὺς πολεμίους.

4[69] Τῷ δὲ ἀγαθῷ στρατηγῷ χρέος ἐστὶν πρὸς πᾶν ἔθνος ἁρμοζομένῳ διαφόρους πρὸς ἕκαστον τὰς στρατηγίας ἐπινοεῖσθαι. Εἰ δέ ποτε καὶ ναυαρχίας καιρὸς ἐπιστῇ, ἀκίνδυνον τὴν τοῦ στόλου τάξιν διαφυλάξει ἔμπειρος ὢν τῆς τοῦ ἀέρος κινήσεως. Καὶ τὰς οὐραγίας δέ, ἤτοι τοὺς ὀπισθοφύλακας, εὐτάκτως συναγαγεῖν, ἵνα μὴ ὑπὸ τόπου ἢ ὑπὸ ζάλης θαλασσίας ἢ ὑπὸ πολεμίων ἀναγκαζόμενοι φθείρωνται.

5[70] Ἐν τοῖς ναυτικοῖς μάχαι συνάπτονται ἢ ὅταν οἱ πολέμιοι ναυαγήσωσιν, ἢ ὅταν ὑπὸ χειμῶνος ταλαιπωρηθῶσιν.

[67] Constitution XX, §220 of Leo VI, *Taktika* (PG).
[68] εἰ thus Dain: ἢ MS. A.
[69] Epilogue, §§44, 45 of Leo VI, *Taktika* (PG).
[70] Epilogue, §47 fin. of Leo VI, *Taktika* (PG).

3 For these reasons,[71] if you intend to send a naval fleet from[72] places or cities you should conceal both the places and the cities so that no one can know in advance where the landing is to be. When you have written your order and sealed it securely, hand it over to the squadron commander appointed by you so that when he is on the open sea, he will then break the seal and learn where he is to make for. By doing this you will escape the enemy's notice.

4 The good *stratēgos* needs to adapt himself to every nation and to devise different strategies for each Should the weather ever put a stop to a naval expedition, he will keep the fleet's formation intact, since he is experienced in the wind's movement. And he should assemble the rear guard, that is, the last ranks, in good order, so that they are not scattered by the place or a squall at sea, or by harrassment of the enemy.

5 In naval matters battles are joined either when the enemy have been shipwrecked or when they are in difficulties in a storm.[73]

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[71] "For these reasons" referred to cautious conduct and the need to gather intelligence when dealing with representatives of foreign or enemy powers. See Leo VI, *Taktika* (PG), Constitution XX, §219.

[72] The sense of this passage demands "to" rather than "from" at this point, in spite of the fact that the Greek is quite clear. The edition of the clause in Leo VI, *Taktika* (PG) at Constitution XX, §220 is the same, with the minor emendation of ἢ for εἰς in accordance with MS. A and others, which makes no change to the sense. However, like us, Meursius obviously sensed that an emendation was necessary and in his Latin translation wrote: "Ad quae loca vel civitates classem emissurus es nemini indicare oportet, ...". See Leo VI, *Taktika* (PG), col. 1075.

[73] Cf. Appendix Two [a], §57.

APPENDIX THREE

ANONYMOUS, *ΝΑΥΜΑΧΙΚΑ ΣΥΝΤΑΧΘΕΝΤΑ ΠΑΡΑ ΒΑΣΙΛΕΙΟΥ ΠΑΤΡΙΚΙΟΥ ΚΑΙ ΠΑΡΑΚΟΙΜΟΥΜΕΝΟΥ*, EDITION AND TRANSLATION[1]

Technical terms, the understanding and translation of which are discussed elsewhere in the text, are asterisked the first time they are used. They may be accessed through the Index.

[1] Edited from a microfilm of folios 339-42 of the unique tenth-century manuscript Milan, Biblioteca Ambrosiana, MS B 119-sup. [gr. 139], referred to by Dain, and hereafter here also, as MS. A. A text was published in Dain, *Naumachica*, pp. 61-8. Cf. above pp. 183-6

Dain's edition is most unsatisfactory; see also the comments of Mazzuchi, "Basilio Parakimomenos", p. 294, n. 78. His misreadings and omissions have been corrected tacitly here. However, because Dain's text has been cited so often in so many different contexts by maritime historians, for the sake of convenience we have retained his numbering of the sections and paragraphs.

We have not indicated the presence or absence of apostrophes, iota subscripts, or the enclitic usage.

As far as maritime historians are concerned, the most serious errors in Dain's edition, which have been corrected here, occur in §§2.1, 2.3, 2.5, 2.10, 2.13, 3.1, 4.1 and after 7.5.

Ναυμαχικὰ συνταχθέντα παρὰ Βασιλείου πατρικίου καὶ παρακοιμουμένου

Αὐσονίων σοφίης δεδιδαγμένος ἔξοχα ἔργα

Καὶ στίχας ἠδὲ φάλαγγας ἰδ᾽ ἀρραγέας παρατάξεις
Ὁπλιτῶν πρυλέων, κρατερῶν πάλιν ἱπποκορυστῶν
Ἱστορικαῖς σελίδεσσιν ὑπ᾽ εὐγενέων βασιλήων,
Δειχθεὶς Αὐσονίων στρατιῆς πανυπέρτατος ἀρχός,[2]

Χαμβδᾶν ἠττήσας Ἀράβων γένος ἐξεναρίζεις,
Νηῶν ‹δ᾽›[3] ὠκυπόρων δεδαήμεναι εἴ ποτε βούλῃ,[4]
Ἄνδιχα ναυμαχίης[5] ὄφρ᾽ εὐκλέα μήσεαι ἔργα,
Βίβλου τῆσδε, φέριστε, νοήματα πάντα κατ᾽ αἶσαν

Ὄμμασι σοῖς σκοπίαζε καὶ ἐν φρεσὶ βάλλεο σῇσιν.
Ἔνθεν δὴ, Βασίλειε, πέδον Κρήτης ἀλαπάξεις
Καὶ γενεὴν ὀλέσεις Καρχηδονίων μεγαθύμων.

Προοίμιον

1 Εἴπερ καὶ ἄλλο τι τῷ βίῳ λυσιτελεῖν οἶδε καὶ συνιστᾶν πολιτείαν καὶ μείζονα τὸν ἐλόμενον τῶν ἐχθρῶν ἀποδεικνύναι, οἶμαι μηδενὸς ἀπολείπεσθαι τούτων ἢ τὰ δεύτερα φέρειν τὸ περὶ ναυμαχίαν γυμνάζεσθαι καὶ περὶ ταύτην ἐνασχολεῖσθαι καὶ ταύτῃ πλέον τῶν ἄλλων σεμνύνεσθαι.

2 Καλὸν μὲν γὰρ καὶ τὸ ἐν ἠπείρῳ τακτικοῖς ἐγγυμνασάμενον πρότερον παρατάττεσθαι καὶ καταγωνίζεσθαι τοὺς ἐχθροὺς καὶ ἀφειδῶς τούτους διώκειν νῶτα διδόντας καὶ τοὺς προστυχόντας αἱρεῖν καὶ τοὺς πορρωτάτω ἐλπίζειν αἱρήσεσθαι καὶ καταλαβεῖν· κάλλιον δὲ ὅσῳ καὶ δυσχερέστερον τὸ ταῖς ναυσὶν ἐφορμεῖν τε καὶ ναυλοχεῖν, ἀνθορμεῖν τε καὶ ἀντεφορμεῖν καὶ τὰς τῶν ἐχθρῶν νῆας καταλαμβάνειν τε καὶ περικυκλοῦν.

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[2] ἀρχός, thus Dain: ἄρχος MS. A.
[3] δ᾽ was added to MS. A in Brunck, *Analecta*, vol. 3, p. 277 (no. 896).
[4] Βούλῃ, thus Dain: βούλει MS. A.
[5] ναυμαχίης, thus Dain: ναυμαχίας MS. A.

Naval warfare, commissioned by Basil, the patrikios and parakoimōmenos**

Having been instructed in the outstanding works of the wisdom of the Ausonians[6]
and in files and phalanxes and unbroken battle-lines
of close-massed hoplites, indeed of mighty chariot marshalls,
in the pages of history by well-born kings,
having been shown to be the all supreme leader of the Ausonians' army,
having defeated Chambdan,[7] you despoil the Arab race,
and if ever you wish to learn about swift-moving ships
so that, far from war at sea, you may recall doughty deeds,
gaze with your eyes, best [of men], on all the thoughts [contained] duly
in this book and cast them within your mind.
Then indeed, Basil, you will sack the plain of Crete
and destroy the race of great-hearted Carthaginians.

Preface

1 If there is anything else that can be beneficial to life and supports the state and demonstrates that he who choses it is greater than the enemy, I think [that] to be concerned with naval warfare and to be preoccupied with this and devoted to it more than anything else falls behind none of these nor takes second place.[8]

2 For it is good that the [force] that has been trained previously in tactics on land should be drawn up and contend with the enemy and pursue them relentlessly as they turn their backs and seize those whom they chance upon and expect to seize and capture those further off. But how much better, and more difficult, to attack (*ephormein*) with ships and *naulochein*, and *anthormein*

[6] Ausonians: mythological early inhabitants of Ausonia (Italy). In Byzantine political rhetoric "Ausonian" had reference to the most ancient, Roman layer of Byzantium's classical heritage. Here the word simply meant "Byzantine".

[7] Sayf al-Dawla 'Alī I (Ḥamdānid emir of Aleppo, 945-67).

[8] A syntactically confused sentence whose import is the hardly profound thought that the study of naval warfare is of great importance.

3 Συμβαίνει γὰρ ἐν μὲν ταῖς κατ᾽ ἤπειρον παρατάξεσιν πλείονας κατέχεσθαι τοὺς χείρονας, ἐλάττονας δὲ ἢ καὶ πάνυ βραχεῖς τοὺς κρείττονας, ἑκάστου τὴν οἰκείαν καὶ μόνον σωτηρίαν μηχανωμένου τε καὶ ἐπιτηδεύοντος· ἐν δὲ ταῖς κατὰ θάλατταν ἅμα τῷ ἀγεννεῖ καὶ ὁ γενναῖος πεσεῖται καὶ καταδύσει ἐν τῷ βυθῷ ἢ καὶ ὑποφθάσειε καταληφθεὶς μηδὲν πλέον τοῦ ἀσθενοῦς ἐνδειξάμενος.

4 Καὶ ταῦτά μοι δίδως νεανιεύεσθαι ὁ στρατηγικώτατος σὺ καὶ κατορθώμασι πᾶσι κοσμούμενος, ὁ κραταιὸς θεράπων τοῦ κραταιοῦ βασιλέως ἡμῶν, ὁ τοῦ ἀσφαλοῦς ἀσφαλὴς ὑπηρέτης καὶ τοῦ ἀνδρείου ἀνδρεῖος, ὁ τοῖς κατ᾽ ἤπειρον ἀγωνίσμασι καὶ αὐτοὺς βασιλέας εὐφράνας εὐμενῶς ἔχοντας καὶ πᾶν τὸ ὑπήκοον γαλήνης καὶ χαρμονῆς καθυποδείξας μεστόν, ὁ τὰ τῶν ἄλλων ἁπάντων ἀνδραγαθήματα τῶν τε νῦν ὄντων τῶν τε πάλαι γεγενημένων ταπεινώσας καὶ κάτω θέμενος, καὶ τὰ κατὰ θάλασσαν εἴ που δεήσοι τοῖς κατ᾽ ἤπειρον δείξων παρόμοια.

5 Πείθομαι γάρ, οὕτως ἔχω, καὶ οὕτω λογίζομαι καὶ τοιαύταις ἐλπίσιν ἐπαίρομαι. Τοῖς σοῖς γὰρ ἑκάστοτε τὰ τῶν ἄλλων παρατιθεὶς καὶ παρεξετάζων ὥσπερ τινὸς ἔργα παιδὸς ὑπ᾽ ἀνδρὸς τελείου εὑρίσκω ἡττώμενα καὶ ἀπολειπόμενα καὶ οἷον διαπαιζόμενα.[9]

6 Οἱ μὲν οὖν ἄλλοι πάντες ὅσοι μεγάλα κατώρθωσαν τὸν ἄνετον εὐθὺς αἱροῦνται βίον καὶ εὐδιάχυτον καὶ δευτέροις ἀποκνοῦσιν ἐγχειρεῖν[10] κατορθώμασιν, ἵνα μὴ πολλάκις τοῖς ὕστερον ἀτυχήσαντες καὶ τὴν τῶν προτέρων ὑπόληψιν ἀμαυροτέραν παράσχωσιν. Αὐτὸς δὲ ἀεὶ τῶν πρώτων ἐκτελεῖς τὰ δεύτερα μείζονα καὶ τῇ τούτων ὑπερβολῇ πάντων περιγινόμενος μηχανᾷ τῷ μεγέθει τῶν δευτέρων ἀποκρύπτειν τὰ πρῶτα.

7 Καὶ πάσχειν ταὐτὸν συμβαίνει τοῖς εὐνοοῦσί τε καὶ δυσμεναίνουσιν· ἡττώμενοι γὰρ ἐπίσης ἀγάλλονται τε καὶ χαίρουσιν, οἱ μὲν ὅτι τῇ σῇ προμηθείᾳ νικῶσι τε καὶ νενικήκασιν, οἱ δὲ ὅτι μὴ παρ᾽ ἄλλων ἡττήθησαν ἢ παρὰ σοῦ τοῦ πάντας νικῶντος εὐβουλίᾳ καὶ ῥώμῃ· δι᾽ ὧν ἀνάγκη τούτους

[9] διαπαιζόμενα, thus Dain: διαπεζόμενα MS. A.
[10] ἐγχειρεῖν, thus Dain: ἐνχειρεῖν MS. A.

and *antephormein*, and to capture the ships of the enemy and also to surround [them].[11]

3 For it happens in battle lines on land that larger [forces] can restrain inferior, and fewer, even if very puny, [can restrain] stronger, since each man is devising and contriving his safety alone. But in [those] at sea the noble will fall with the ignoble and plunge into the deep or may suddenly be made captive without achieving more than a feeble [man].

4 You permit me to express my youthful exuberance on these matters,[12] you most eminent *stratēgos**, adorned with great endeavours, the valiant attendant of our valiant emperor, the sure and brave servant of a sure and brave [lord], you who by conflicts on land have gladdened the emperors themselves, feeling secure, and have demonstrated that their every subject is full of peace and joy, you who have humbled and brought low the valiant deeds of all other [men] both who live now and were born in former times, you who will show, if ever there should be need, that [deeds] at sea are equal to those on on land.

5 I obey, for this is my opinion and this is my belief and I am borne up by hopes of this kind. For every time that I compare the [deeds] of others to yours and examine [them] together I find [that it is] as though the actions of a child are outmatched, outstripped, and outplayed by [those] of a grown man.

6 Indeed all the others who have achieved great things immediately choose the quiet and comfortable life and decline to undertake further endeavours less perchance they may often fail in their subsequent [actions] and render the recollection of their former [deeds] less glorious. But you always accomplish subsequent [actions] that are greater than the first and, becoming superior to all, in your pre-eminence in these [matters] you contrive to conceal your first [achievements] by the magnitude of the subsequent ones.

7 However, it happens that both those who favour [you] and those who bear [you] ill-will suffer the same [thing]. When they are defeated they rejoice and take pleasure equally, the one group because they are victorious and remain so through your forethought, the other because they have been defeated by no

[11] On the meaning of these terms according to the Anonymous, and his probable sources, see below §7.2.

[12] Cf. above pp. 184-5.

ὑπείκειν καὶ ὑποτάττεσθαι, καὶ τῆς ἄλλων νίκης αἱρεῖσθαι μᾶλλον τὴν ἐκ σοῦ προσγενομένην ἧτταν αὐτοῖς, μεθ᾽ ὧν ἡττῶνται ποιηταί τε καὶ ῥήτορες, ὥσπερ ἐκεῖνοι τοῖς ἔργοις οὕτω καὶ οὗτοι τοῖς λόγοις ἀπολειπόμενοι.

8 Πάντες μὲν οὖν διὰ ταῦτα ὡς ἰσχύος ἕκαστος ἔτυχεν ἔχων, τὴν εὐφημίαν σοι προσάγειν καὶ τὸν ἐκ λόγων ἔπαινον ἐγχειροῦσιν. Καὶ οὐ διότι μὴ ἀξίως προσάγειν σοι δύνανται, ἤδη καὶ τοῦ παντὸς ἐλαττοῦσθαι βούλονται, ἀλλ᾽ εὐφημοῦντες ὅσον ἕκαστος οἷός τε ᾖ τὸ πᾶν προσενηνοχέναι σοι καὶ μηδενὸς ἁμαρτάνειν οἴονται· φίλον γὰρ καὶ Θεῷ καὶ ἀνθρώποις ἐστὶ τὸ εἰς δύναμιν.

9 Ὧν καὶ ἡμεῖς ἐσμὲν οἱ ταῖς σαῖς κατ᾽ ἐχθρῶν ἀριστείαις πολλάκις ἐφησθέντες καὶ συνεχῶς τούτων κατεντρυφήσαντες καὶ τερφθέντες ὅσον εἰκὸς καὶ μεγάλην σοι διὰ ταῦτα τὴν χάριν ὀφείλοντες ὅτι κἂν ταύταις ἴσα τοῖς πᾶσι κεκοινωνήκαμεν καὶ κοινῶς εὐφράνθημεν καὶ ἠγαλλιασάμεθα.

10 Ἀνθ᾽ ὧν σοι τήνδε τὴν συλλογὴν δι᾽ ἐντολῆς σῆς συνειλέχαμεν ἐκ πολλῶν μὲν ἱστοριῶν, πολλῶν δὲ στρατηγικῶν συλλεξάμενοί τε καὶ ἐκλεξάμενοι, δῶρον σοι πάντων ἐρασμιώτερον καὶ τῶν ἄλλων, ὡς εἰπεῖν, ποθεινότερον, πλὴν ὅτι καὶ πολλὰ κατὰ τύχην καὶ τόλμαν οὐκ ἀναλόγως ταῖς παρασκευαῖς εὕρομεν ἀποβαίνοντα ὥσπερ καὶ μυριάδας ὅτι πλείστας καί τινας τόλμας καὶ μεγάλας παρασκευὰς καθαιροῦντας τοὺς σὺν νῷ καὶ μετὰ λογισμοῦ κινδυνεύειν ἐθέλοντας. Ἀλλ᾽ ἐγχειρητέον ἤδη ἔργου ἐχομένους καὶ μὴ τοῖς προοιμίοις ἐπὶ πολὺ ἐμβραδύνοντας.

1.[13] Περὶ τῶν τῆς νεὼς μερῶν

1 Καὶ πρῶτον μὲν περὶ τῶν τῆς νεὼς λεκτέον μερῶν. Εἴδη[14] γὰρ νεῶν περίεργον ἂν εἴη λέγειν ἐν τῷ παρόντι· ὥσπερ γὰρ ἄνθρωπος ἀνθρώπου τῇ βραχύτητι διενήνοχεν καὶ τῷ μεγέθει ἢ

[13] α΄ (1) in the margin of MS. A.

[14] A Platonic term, referring to the concept of ‘Forms’ or ‘Ideas’, translated here as “kinds”. The following sentences also use Platonic phraseology.

others than by you, who are superior to all in good counsel and might. And so, they must yield and submit and prefer the defeat brought upon them by you to victory over others. And, with them, poets and rhetoricians are defeated for, while they (the former) fall short in their deeds, these (the latter) fall short in their words.

8 All therefore for these reasons, according to the ability each possesses, attempt to offer you adulation and praise in words. And it is not because they are not able to approach you worthily, for already they wish to be diminished in every respect,[15] but in offering you adulation as best each can, they think that they have offered you everything and fall short in nothing; for acting within one's capabilities is acceptable to both God and men.

9 We are amongst those who have often delighted in your deeds of valour against the enemy and have endlessly rejoiced in them and taken all the pleasure that is usual and owe you great gratitude for this because, even if we have shared in your exploits equally with everyone else, we rejoice and take delight in common.

10 In return for this we have, on your instructions, gathered together this collection, having selected and chosen from many histories and from many manuals on strategy, a gift[16] more pleasurable than all and more desirable, so to say, than the rest. However, we have discovered that many [things] come about by chance and daring and not according to their preparation, just as those planning hazardous undertakings with care and forethought bring many hundreds of thousands of ventures and great schemes to nothing. But we must make the attempt, having already begun the task, and should not linger too long over these introductory remarks.

1. Concerning the parts of the ship

1 First we must discuss the parts of the ship. It would be inappropriate for the present to discuss kinds of ships; for, just as one man differs from another in smallness and largeness or

[15] A confused, and confusing, modesty topos.
[16] That is, this text that he presents to Basil.

τῇ ἀνδρείᾳ ἢ ἀνανδρείᾳ ἢ τινι τούτων, πάντων δε εἶδός ἐστι τὸ αὐτό, κἂν ὁ μὲν τύχῃ πολλοῖς κομῶν κατορθώμασιν, ὁ δὲ πολλοῖς ἐλαττώμασι, καὶ κοινῶς μὲν ὅ τε δειλὸς ὅ τε μὴ δειλός, ὅ τε σμικρὸς ὅ τε μὴ σμικρός, ὅ τε χρηστὸς καὶ ὁ μὴ χρηστὸς ἄνθρωπος εἴρηται, ἰδίως δὲ ἄλλος ἄλλο τι ὠνόμασται καὶ ἢ δι᾽ ἀρετὴν ἢ διὰ κακίαν ἢ διὰ μέγεθος οἰκείαν προσηγορίαν ἐκτήσατο,

2 οὕτω δὴ καὶ ἐπὶ νηῶν· κοινῷ μὲν ὀνόματι πᾶσαι καλοῦνται νῆες, ἰδίως δὲ αἱ μὲν τριήρεις, αἱ δὲ διήρεις, αἱ δὲ μονήρεις κατὰ τὸ ἀνάλογον τῆς εἰρεσίας κτησάμεναι τὰ ὀνόματα, ὕλη[17] δὲ πασῶν ἐστιν ἡ αὐτή[18] κἂν τῇ κατασκευῇ πολὺ διαφέρουσιν, καὶ αἱ μὲν μείζοσιν, αἱ δὲ μείοσιν, καὶ αἱ μὲν πλείοσιν, αἱ δὲ ἐλάττοσιν ξύλοις κατασκευάζονται. Διόπερ, ὡς εἴρηται, περὶ τῶν μερῶν αὐτῶν εἴπωμεν ἐξ ὧν τὴν γένεσιν ἔχουσι καὶ τὴν σύστασιν.[19]

2.[20] Μέρη νεώς[21]

1 Δρύοχον,[22] τρόπις, τροπίδια, σπεῖρα,[23] τροποί· — Καὶ δρύοχον μὲν σὺν πολλοῖς ἄλλοις νοείσθω τε καὶ λεγέσθω τὸ καλούμενον παρὰ πᾶσι κοράκιον, ὃ συνέχει πάντα καὶ συγκρατεῖ καὶ ᾧ προσδέδενται καὶ οἱονεὶ ἐπερείδονται τὰ λοιπά. Κοινῶς μὲν γὰρ ὠνόμασται δρύοχον ἅπαν ξύλον ἐπίμηκες συνέχον καὶ οἱονεὶ προσηλοῦν[24] ἕτερα βραχέα τε καὶ πολλά. Νοείτω δ᾽ ἂν οὕτω καὶ τὸ περίτονον. Σημαίνει δὲ καὶ τὴν ὀπὴν τοῦ πελέκεως ἐν ᾗπερ ὁ στειλειὸς ἐντίθεται, ὡς καὶ Ὅμηρος·

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[17] An Aristotelian term for primordial matter.

[18] αὐτὴ MS. A., with ε (= ἑαυτὴ) added in a second hand.

[19] These are general Platonic terms for ‘being’ and ‘coming to be’.

[20] No numbering in MS. A.

[21] Even the form of the rest of this treatise closely follows and reflects that of Pollux. It is a very juvenile exercize.

[22] Cf. Pollux, *Onomasticon* (Bethe), I.85 (vol. 1, p. 27): “δρύοχον, τρόπις, [τρόπιδες], τροπίδια, στεῖρα [τροποιν].”.

[23] On the Anonymous’s understandings of σπεῖρα see below §2.3. However, for his *speira*, read *steira*, “cutwater” on the basis of Pollux, *Onomasticon* (Bethe), I.85.

[24] We translate προσηλόω in the sense of “fasten together”, rather than in the classical sense of “to nail” since a piece of wood cannot “nail” anything.

bravery or cowardice or some other respect but is nevertheless of the same kind, even if one happens to be adorned with many achievements and another with many defects, and in general usage both the craven and the not craven, both the small and the not small, both the reliable and the not reliable, are called "man", while on particular points different men have different appellations and achieve separate categorization because of good qualities or bad qualities or size,

2 thus it is with ships. All are known by the general name of ships, but in more precise usage some [are known as] triremes, others as biremes, and others as monoremes, taking their names according to their *eiresia** (oarage). All have the same matter, even if they differ greatly in their method of construction and some are constructed from larger timbers and others from smaller [ones], some from more and others from fewer. Wherefore, as has been said, let us discuss their parts, from which they derive their creation and their existence.

1. Parts of a ship

1 Stock (*dryochos*/*dryochon**), keel, garboard strakes (*tropidia**), *speira**, through beams (*tropoi**). — And you should class and consider in many respects as a *dryochos*/*dryochon* what is called by everyone the *korakion**, which clasps and holds everything together and to which other things are attached, and, as it were, supported by it. Generally every long continuous timber which fastens together many other short timbers is known as a *dryochos*/*dryochon*. You should also class the wale (*peritonon**) in this way. It also means the hole in the axe into which the haft is placed,[25] as Homer [says]:

[25] In fact this was not the meaning of *dryochos* and the Anonymous misunderstood Homer's line, which said that the axes were set up in a row, like *dryochoi*: "He set up in a row like *dryochoi*, twelve [axes] in all;".

Ἴστασχ᾽ ἐξειὴς[26] δρυόχους δύο καὶ δέκα πάντας.[27]

2 Τροπίδια δὲ τὰ προσηρμοσμένα τῇ τρόπει, περὶ ἧς ὕστερον ἐροῦμεν τῷ πλείονος δεῖσθαι λόγου ταύτην ἢ τὰ λοιπά.[28] Ἐξ αὐτῆς γὰρ ἅπαν ἄρχεται μέρος, καὶ ταύτην ὡσπερεὶ θεμέλιον ἔχει.

3 Σπεῖρα δὲ παρὰ μὲν ἀρχιτέκτοσι τῶν στύλων οἱ πρὸς τῇ βάσει λίθοι.[29] Εὕρηται δὲ καὶ παρ᾽ Αἰολεῦσι τὸ ἄρμενον, ὡς ἐν τῷ

Τηλοῦ δὲ σπεῖρον καὶ ἐπίκριον ἔμπεσε πόντῳ.[30]

Σημαίνει δὲ καὶ τὸ ἱμάτιον, ὡς ἐν τῷ

Σπεῖρα κάκ᾽ ἀμφ᾽ ὤμοισι βαλών·[31]

καὶ παρὰ τῷ ποιητῇ, ὡς ἐν τῷ

Αἴ κεν ἄτερ σπείρου κεῖται πολλὰ κτεατίσσας.[32]

4 Τροποὶ δὲ οἱ τροπωτῆρες·[33] καὶ Ὅμηρος·

Ἠρτύναντο δὲ κώπας τροποῖς[34] ἐν δερματίνοισιν.[35]

Ἐξ οὗ καὶ τροπώσασθαι λέγεται τὸ τὴν κώπην συνδῆσαι τῷ τροπωτῆρι.[36]

5 Τρόπις δὲ τὸ κατώτατον μέρος τῆς νηὸς καὶ οἷον θεμέλιος. Ταύτης δὲ τὸ μὲν ἓν μέρος ἐξ οὗ ἡ πρῴρα διανίσταται προεμβολὶς καλεῖται, τὸ δὲ πρὸς τὴν πρύμναν ποδόστημα, ἔνθα

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[26] ἐξειὴς, thus Dain: ἐξείης MS. A.

[27] Homer, *Odyssey*, 19.574 (vol. 2, p. 277): "Ἴστασχ᾽ ἑξείης, δρυόχους ὥς, δώδεκα πάντας:".

[28] Cf. Phōtios, *Lexicon* (Naber), vol. 2, p. 229: "τροπίδια· τὰ εἰς τρόπιν νεὼς εὐθετοῦντα ξύλα· ...".

[29] Cf. Pollux, *Onomasticon* (Bethe), I.85 (vol. 1, p. 27): "μέσον δὲ τῆς προεμβολίδος καὶ τοῦ ἐμβόλου ἡ στεῖρα καλουμένη." [rejected by the Anonymous]; Hesychios, *Lexicon* (Schmidt), Σ.1445 (vol. 4, p. 64): "Σπεῖρα· οἱ πρὸς τῇ βάσει λίθοι. καὶ τῆς νεὼς σκεῦός τι. καὶ σύστρεμμα ἐκ σχοινίου, ἢ ῥάκη.". On "stones at the base of pillars", see above pp. 197-8.

[30] Homer, *Odyssey*, 5.318 (vol. 1, p. 204): "τηλοῦ δὲ σπεῖρον καὶ ἐπίκριον ἔμπεσε πόντῳ.".

[31] Homer, *Odyssey*, 4.245 (vol. 1, p. 148): "σπεῖρα κάκ᾽ ἀμφ᾽ ὤμοισι βαλών, οἰκῆι ἐοικώς, …".

[32] κτεατίσσας, thus Dain: κτεατίσας MS. A.
Homer, *Odyssey*, 2.102 (vol. 1, p. 52): "αἴ κεν ἄτερ σπείρου κεῖται πολλὰ κτεατίσσας.". Cf. Hesychios, *Lexicon* (Schmidt), Σ,1445 (vol. 4, p. 64): "... καὶ ἱμάτια. καὶ ἱστια. ἄλλοι εἶδος ἱματίου εὐμέγεθες γυναικείου".

[33] Cf. Pollux, *Onomasticon* (Bethe), I.88 (vol. 1, p. 28): "οἱ δὲ περὶ στεῖραν ἑκατέρωθεν παρατεινόμενοι τροποὶ πρῶτος καὶ δεύτερος, ὁ καὶ θαλάμιος." [rejected by the Anonymous].

[34] τροποῖς MS. A.: τρόποισ᾽ Dain.

[35] Homer, *Odyssey*, 4.782 (vol. 1, p. 176): "ἠρτύναντο δ᾽ ἐρετμὰ τροποῖς ἐν δερματίνοισιν,".

[36] Cf. Hesychios, *Lexicon* (Schmidt), T.1503 (vol. 4, p. 180): "τροπώσασθαι· τὸ τὴν κώπην πρὸς τόν σκαλμὸν δῆσαι τῷ τροπωτῆρι. ἢ διὰ μηχανῆς νικῆσαι".

He set up in a row all twelve *dryochoi*.

2 *Tropidia* are [what are] attached to the keel, about which we will speak later since this needs more discussion than the rest. Every part begins from this and uses this as if it were a foundation.

3 *Speira* [is the name given] by architects to the stones at the base of pillars. It is also found among the Aiolians [as a term for] sail, as in

The sail (*speiron*) and yard arm fell far away into the sea.

It also means clothing, as in

putting filthy clothing (*speira*) around his shoulders;

and by the poet [Homer], as in

if he, though having acquired great wealth, were to lie
without a shroud (*speiron*).

4 *Tropoi** are the oar-grommets (*tropōtēres**), and Homer [says]:

They attached the oars in the leather oar-grommets.

Hence fastening the oar with the oar-grommet is called "grommeting up".

5 The keel is the lowest part of the ship and its foundation, as it were. One part of this, from which the prow extends, is called *proembolis**. That by the stern [is called] *podostēma**, where a

δὴ καὶ σκηνὴ πήγνυται τῷ στρατηγῷ ἢ τριηράρχῳ, ἤγουν κράβατος.[37] Ἐν οἷς δὲ ὁ κράβαττος ἐπερείδεται, τροχαντῆρες καὶ ἄφλαστα, οἱ λεγόμενοι βόρδωνες.[38]

6 Τῆς δὲ πρύμνης τὰ μέρη πάλιν ἑκάτερα πέτασοι καὶ σχιστὰ καὶ ἐπωτίδες λέγονται, ἐν οἷς ἐπίκεινται τὰ πηδάλια. Καὶ τὸ μὲν ἄκρον τοῦ πηδαλίου ἤτοι τοῦ αὐχένος λέγεται οἴαξ·[39] ὅπου δὲ ὁ κυβερνήτης ἐπικλίνεται ἄγκλιμα καλεῖται.[40] Τὸ δὲ πᾶν οἴαξ τε καὶ πηδάλιον, τὸ δὲ τελευταῖον ὑπερύπτιον, τὸ δὲ λοιπὸν αὐχήν.[41] Τὸ δὲ μέσον τῆς πρύμνης καὶ νεὼς μέχρι τῆς πρῴρας ἀσάνιδον.[42]

7 Τὰ δὲ ἑκατέρωθεν τῶν τοίχων κατάστεγα κατάστρωμα λέγεται καὶ θρᾶνος καὶ σανιδώματα, ὧν ἄνωθεν ἡ πρώτη εἰρεσία καὶ οἱ ὁπλῖται καὶ τοξόται καὶ πελτασταί, κάτωθεν δὲ τοῦ σανιδώματος ἡ δευτέρα ἥτις δι᾽ ὅλου ἐρέττει, τυχόντων ἐπὶ τοῦ καταστρώματος ἄνωθεν πολεμούντων. Καὶ οἱ μὲν ἐπὶ τοῦ θράνους καθήμενοι θρανῖται λέγονται, οἱ δὲ εἰς τὰ ζυγὰ ζύγιοι· καὶ θαλάμιοι δὲ ἔστιν ὅτε εἰ ἔχει τρεῖς εἰρεσίας ἡ ναῦς.[43]

8 Καὶ τὸ μὲν ἔδαφος αὐτῆς κύτος καὶ ἀμφιμήτριον ὀνομάζεται.[44] Πλέουσα δὲ ἰδιωτικῶς ἐκεῖ δήπου καὶ θυρίς ἐστιν εἰς ἐκροὴν τοῦ ὕδατος, ἥτις εὐδίας[45] καλεῖται. Ταύτην δὲ δηλονότι τὴν πλέουσαν συνέχουσι τὰ ἕρματα, ἤτοι αἱ λεγόμεναι ἕδραι· καὶ τὰ ἰκρία, ἃ ἐγκοίλια καλοῦνται.

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[37] Cf. Pollux, *Onomasticon* (Bethe), I.89 (vol. 1, p. 29): "τὰ δὲ περὶ τὴν πρύμναν προύχοντα ξύλα περιτόναια καλεῖται. ἐκεῖ που καὶ σκηνὴ ὀνομάζεται τὸ πηγνύμενον στρατηγῷ ἢ τριηράρχω.".

[38] βόρδωνες MS. A: βάρδωνες Dain. Cf. Hesychios, *Lexicon* (Schmidt), T.1523 (vol. 4, p. 181): "τροχαντῆρες· πρὸς τὰ πηδάλια. καλεῖται τῆς πρύμνης μέρος.".

[39] Cf. Pollux, *Onomasticon* (Bethe), I.89 (vol. 1, p. 29): "τὸ δὲ ἄκρον τοῦ πηδαλίου [οἴαξ· τὸ δὲ πᾶν] οἴαξ τε καὶ πηδάλιον [καλεῖται].".

[40] Cf. Pollux, *Onomasticon* (Bethe), I.90 (vol. 1, p. 29): "ἵνα δὲ κατακλίνεται ὁ κυβερνήτης, ἄγκλιμα καλεῖται.".

[41] Cf. Pollux, *Onomasticon* (Bethe), I.89-90 (vol. 1, p. 29): "τὸ δὲ μέσον αὐτοῦ φθεὶρ ἢ ῥίζα ἢ ὑπόζωμα, τὸ δὲ τελευταῖον πτερύγιον, τὸ δὲ λοιπὸν αὐχήν.".

[42] Cf. Pollux, *Onomasticon* (Bethe), I.90 (vol. 1, p. 29): "[τὸ] μέσον δὲ τῆς πρύμνης σανίδιον, οὗ τὸ ἐντὸς ἐνθέμιον, τὸ δ᾽ ἀπηρτημένον αὐτῷ ἐπισείων.".

[43] Cf. Pollux, *Onomasticon* (Bethe), I.87 (vol. 1, p. 28): "καὶ τὸ μὲν ἔδαφος τῆς νεὼς ... καλοῖτο δ᾽ ἂν καὶ θάλαμος, οὗ οἱ θαλάμιοι ἐρέττουσι· τὰ δὲ μέσα τῆ νεὼς ζυγά, οὗ οἱ ζύγιοι κάθηνται, τὸ δὲ περὶ τὸ κατάστρωμα θρᾶνος, οὗ οἱ θρανῖται.".

[44] Cf. Pollux, *Onomasticon* (Bethe), I.87 (vol. 1, p. 28): "καὶ τὸ μὲν ἔδαφος τῆς νεὼς κύτος καὶ γάστρα καὶ ἀμφιμήτριον ὀνομάζεται.".

[45] εὐδίας, thus Dain, following Hesychios: εὐδιὰς MS. A.

tent or berth (*krabattos**) is fixed for the *stratēgos* or *triērarchos**.[46] [Those things] on which the berth is supported [are] *trochantēres** and *aphlasta**, the so-called *bordōnes**.

6 The parts on each side of the stern are called "spreaders" (*petasoi**) and "dividers" (*schista**) and *epōtides**, on which the rudders (*pēdalia**) rest. The top of the rudder or shaft (*auchēn**) is called the tiller (*oiax**). Where the helmsman (*kybernētēs**) leans is called the *anklima**. The whole [is called] both tiller and rudder, the last [part] is the *hyperyption** and the rest is the shaft**.** The middle of the stern and the ship as far as the prow is undecked (*asanidon**).

7 The covered [parts] on each side of the hulls are called [the] deck (*katastrōma**) and [the] bench (*thranos**) and planking (*sanidōmata**). Above these is the first oar-bank and the hoplites and archers and peltasts.[47] Below the planking is the second [oar-bank] which rows through everything, when there is fighting on the deck above. Those sitting on the *thranos* are called *thranitai**, those on the thwarts (*zyga**) [are called] *zygioi**, and sometimes [there are] *thalamioi** if the ship has three oar-banks.

8 And the bottom [of the ship] is named the hold (*kytos**) and the floor (*amphimētrion**). And somewhere there, when sailing *idiōtikōs** there is an opening, which is called a *eudias** (bung hole), for the removal of water. Indeed as [the ship] sails, the shores (*hermata**), that is, what are known as seats (*hedrai**), close this; and [there are] the decking [timbers] (*ikria**), which

[46] Cf. above pp. 215-16 & n. 156, 269.

[47] "Hoplites" and "peltasts" were, of course, classical terms for types of soldiers and quite irrelevant to tenth-century military practise.

9 Τῆς δὲ πλεούσης μέσον ἐπὶ τῆς τρόπιος προσαρμόζεται ἡ τράπεζα, ἧς ἐντὸς ὁ ἱστὸς ἵσταται, ἤτοι τὸ κατάρτιον. Τοῦ δὲ καταρτίου τὸ μὲν προσηλούμενον τῇ τραπέζῃ κατώτερον μέρος πτέρνα καλεῖται, ἐξ οὗ καὶ τὸ ἐξεπτέρνισεν, ὅταν ὑπὸ ἀνέμου βιαζομένη ἔξω τῆς τραπέζης ἐκβῇ.[48]

10 Ἱστοδόκη δὲ καὶ κεραία τὸ κερατάριον. Ἱστίον δὲ τὸ ἄρμενον.[49] Καὶ οἱ λεγόμενοι καθορμεῖς ἐπὶ τῆς τρόπιος στερεῶς προσήλωνται κατὰ στοῖχον τρεῖς ὄντες, ἐφ᾽ ὧν ἡ κεραία καταγομένη ἐπίκειται. Καὶ τρεῖς δὲ σταμῖνες[50] ἤγουν στημονάρια ἵστανται καὶ αὐτὰ κατὰ στοῖχον οἷς ἐπερείδεται τὸ κατάστρωμα.[51]

11 Εἰσὶ δὲ καί τινα ξύλα διάτονα διήκοντα ἀπὸ τοῦ ἑνὸς τοίχου τῆς νηὸς ἕως τοῦ ἑτέρου, ἐφ᾽ ὧν ἐπίκειται· τὰ δὲ τοὺς τοίχους ἔξωθεν συνέχοντα περίτονα καλοῦνται.[52]

12 Ἡ δὲ σανὶς δι᾽ ἧς αἱ κῶπαι ἐξέρχονται θυρεόν, καὶ ὅθεν μὲν ἐκδέδενται σκαλμός, ᾧ δὲ ἐνδέδενται τροπωτήρ.[53] Τὸ δὲ ἐπὶ τῶν σκαλμῶν ἐπισκαλμίς. Δι᾽ ὧν δὲ εἴρεται ἡ κώπη τρήματα.[54] Τὸ δὲ πρὸς αὐτῷ τῷ σκαλμῷ δέρμα ἄσκωμα, τὸ παρ᾽ ἡμῖν μανικέλλιον.[55]

13 Ταύτης δὲ ἄνωθεν τῆς εἰρεσίας περίτονον, εἶτα σανὶς ἑτέρα, ἡ λεγομένη πέλα, εἶτα περίτονον, εἶτα πάλιν θυρεόν, ἔνθα ἡ ἄνωθεν εἰρεσία. Ἄνωθεν δὲ πάντων ἡ ἐπηγκενίς, τὸ ἄρτι λεγόμενον καταπατητόν· ἐκεῖσέ που καὶ τὸ καστέλλωμα γίνεται, ἔνθα τὰς ἀσπίδας οἱ στρατιῶται κρεμῶσι.

14 Τῆς δὲ πρῴρας πλησίον ἑκατέροις τοῖς μέρεσι περίβολοι ἐμπε-

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[48] Cf. Pollux, *Onomasticon* (Bethe), I.91 (vol. 1, p. 29): "καὶ τὸ μὲν ὑποδε-χόμενον τὸν ἱστὸν ληνός [καλεῖται], το δὲ ἐναρμοζόμενον αὐτῷ πτέρνα, ...".

[49] Cf. Dindorf, *Scholia Graeca*, B.427 (vol. 1, p. 117): "ἱστίον τὸ ἄρμενον, ...".

[50] σταμῖνες, thus Dain: σταμίδες MS. A.

[51] Cf. Pollux, *Onomasticon* (Bethe), I.92 (vol. 1, p. 30): "τὰ δὲ ξύλα ἐφ᾽ ὧν αἱ σανίδες ἐπίκεινται, κανόνια καὶ σταμῖνες.".

[52] Cf. Pollux, *Onomasticon* (Bethe), I.92 (vol. 1, p. 30): "τὸ δὲ συνέχον ἄνωθεν ἑκατέρους τοὺς τοίχους περιτόναιον καλεῖται.".

[53] Cf. Pollux, *Onomasticon* (Bethe), I.87 (vol. 1, p. 28): "καὶ ὅθεν μὲν αἱ κῶπαι ἐκδέδενται [σκαλμός, ᾧ δὲ ἐκδέδενται], τροπωτήρ, ...".

[54] τρήματα, thus Dain: τρίματα MS. A.

[55] Cf. Pollux, *Onomasticon* (Bethe), I.88 (vol. 1, p. 28): "τὸ δ᾽ ὑπὸ τὸν σκαλμὸν [ἐπισκαλμίς]. ... δι᾽ ὧν δὲ διείρεται ἡ κώπη, τρήματα. τὸ δὲ πρὸς αυτῷ τῷ σκαλμῷ δέρμα ἄσκωμα.".

are called the floor timbers (*enkoilia**).

9 When [the ship] is sailing, the mast step (*trapeza**), in which the mast (*histos**), that is, the *katartion**, is set up, is fixed in the middle on to the keel. The lower part of the *katartion* which is fixed in the mast step is called the heel (*pterna**); hence [the expression] "is unheeled" when it comes out of the mast step under pressure from the wind.

10 [There is] the mast receiver (*histodokē**) and the yard, the *keratarion**. The sail (*histion*) [is] the sail (*armenon*). And what are known as the *kathormeis** are fixed firmly in a row on the keel, there being three of them, on which the yard (*keraia*) rests [when] lowered. And three futtocks (*stamines**), or *stēmonaria*, on which the deck is supported, are also fixed in a row.

11 There are also some timbers (*xyla diatona**) which stretch from one side of the ship to the other and by which it is braced. Those [timbers] which enclose the sides on the outside are called wales.

12 The strake through which the oars come out [is the] *thyreon**, and [that] from which they are hung [is the] thole (*skalmos**), and what they are hung with [is] the oar-grommet. What is on the tholes [is] the *episkalmis**. [The parts] through which the oar is passed [are] oarports (*trēmata**). The hide over the thole [is the] *askōma**, the *manikellion** according to us.

13 Above this oar-bank [is] the wale, then another plank, called *pela**, then a wale, and then a *thyreon* again, where the upper oar-bank [is]. Above everything [is] the gunwale (*epēnkenis**), known lately as the *katapatēton**. Somewhere here there is also the pavesade (*kastellōma**) where the soldiers hang their shields.

14 Near the prow on both sides *periboloi** (catheads) are fixed

14 πηγμένοι ἵστανται δι᾽ ὧν αἱ ἄγκυραι κρέμανται, αἱ τὴν ναῦν ἱστῶσι χαλώμεναι.[56] Ἐπὶ δὲ τῆς πρῴρας ὁ σίφων ὃς κατακόραξ[57] λέγεται ἐνεργῶν ὅταν ὦσιν αἱ νῆες ἀντίπρῳροι· καὶ δύο δὲ πλάγιοι καὶ αὐτοὶ ἐνεργοῦντες ὅταν πλάγιως προσβάλωσι.

15 Τὰ δὲ τῆς νεὼς σχοινία· κάλοι, πρότονοι, πείσματα, ἀπόγαια, πρυμνήσια, καὶ ἔμβολοι, οἳ τοὺς οἴακας συνέχουσιν καὶ δι᾽ ὧν εἰς τὸν τροχαντῆρα ἀποδεσμῶνται.[58]

16 Αὗται μὲν αἱ ὀνομασίαι οἰκεῖαι χελανδίου καὶ δρόμωνος· ἐκ τῶν αὐτῶν γὰρ νηΐων ξύλων ἀμφοτέρων αἱ κατασκευαὶ γίνονται, εἰ καὶ περὶ τὴν καθόλου κλῆσιν διενηνόχασι· καὶ τὸ μὲν δρόμων ὠνόμασται, τὸ δὲ χελάνδιον.

3.[59] Περι τῶν ὀνομασιῶν τῶν νηῶν τῶν πρὸς πόλεμον ἐπιτηδείων

1 Καὶ τὸν μὲν τῶν δρομώνων[60] ἀριθμὸν καὶ τῶν ἐν αὐτοῖς στρατιωτῶν ἀνείκαστόν ἐστι καὶ ἄδηλον διορίσασθαι[61] ὅτι μηδὲ ἐν τοῖς ἱστορήσασι περὶ τούτων παλαιοῖς εὕρομεν ἐφ᾽ ἑνὸς ἀριθμοῦ δὶς τὴν αὐτὴν διαφυλαττομένην καὶ τηρουμένην τάξιν τῆς ναυτικῆς στρατιᾶς, ἀλλὰ πρὸς τὸ τῶν ἐναντίων πλῆθος τοὺς ἴσους πολλάκις ἢ καὶ πλείονας ἐντάττουσάν τε καὶ ἀντεξάγουσαν κατὰ τὸ τῶν δρομώνων καὶ τῶν ἀνδρῶν πλῆθος καὶ μέγεθος.

2 Ἦν γὰρ καὶ μειζόνων πλῆθος δρομώνων καὶ νῦν εἶναι χρὴ οἷς ἐπιστῶσιν τὰ λεγόμενα πάντως ξυλόκαστρα, ἀλλὰ καὶ μέσαι τριήρεις καὶ μονήρεις τινὲς ταχιναί, λεπταὶ γαλέαι, αἷς ἐν ταῖς βίγλαις[62] χρηστέον πρὸς ἐρεθισμὸν τῶν ἐναντίων καὶ διάλυσιν τάξεων καὶ ὅσα τῷ της ναυμαχίας εἴδει συντελεῖν εἴωθεν, οἷον

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[56] Cf. Pollux, *Onomasticon* (Bethe), I.93 (vol. 1, p. 31): "ἄγκυραι ἀμφίβολοι, ἀμφίστομοι, ἑτερόστομοι· ...".

[57] κατακόραξ, thus Dain: κατακόρακα MS. A.

[58] Cf. Pollux, *Onomasticon* (Bethe), I.93 (vol. 1, p. 31): "... ἱστός, ἱστοδόκη, κεραία, σχοινία, κάλοι, πρότονοι, καλῴδια, πείσματα, ἀπόγυα, [ἐπίγυα], πρυμνήσια· ...". Cf. Hesychios, *Lexicon* (Schmidt), T.1523 (vol. 4, p. 181): "τροχαντῆρες· πρὸς τὰ πηδάλια. καλεῖται τῆς πρύμνης μέρος.".

[59] β΄ (2) in the margin of MS. A.

[60] δρομώνων, thus Dain: δρομόνων MS. A.

[61] Cf. Appendix Two [a], §12: "Τὸν δὲ τῶν δρομώνων ἀριθμὸν καὶ τῶν ἐν αὐτοῖς στρατιωτῶν ἀνεικαστόν ἐστιν καὶ ἄδηλὸν διορίσασθαι· ...".

[62] Cf. Appendix Two [a], §10: "Καὶ ἔτι δὲ κατασκευάσεις δρόμωνας μικροτέρους

14 from which are suspended the anchors, which halt the ship when they are let down. On the prow [is] the flame-thrower (*siphōn**) called the *katakorax**, which functions when the ships are prow to prow. And [there are] also two at the sides, which function when engaged by the side.

15 The ship's cordage: brails, forestays, stern cables, mooring lines, bow mooring lines, stern mooring lines, and *emboloi**, which restrain the tillers and by which these are bound to the *trochantēr*.

16 These are the terms appropriate to a *chelandion* and a dromon. Both are constructed from the same ships' timbers, even if they differ in their overall nomenclature, the one being called *dromōn* and the other *chelandion*.

3. Concerning terms for the ships that are suitable for war

1 About the number of dromons and of the soldiers in them it is impossible and unrealistic to be prescriptive, because not even in the ancient [writers] who discuss these matters do we find one single figure kept and observed twice for the battle line (*taxin*) for a naval expedition, but [an expedition] usually marshalling and drawing up against the opposing [force], [dromons] equal to or greater than [those of the enemy] in respect of the quantity and size of dromons and men.

2 There used to exist a number of larger dromons and now there should be [constructed] those on which are placed what are called wooden castles (*xylokastra**), but also [there should be] middle-sized triremes and some fast monoremes, light *galeai*,* which should be used as scouts, to provoke the opposition and

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γοργοτάτους, οἱονεὶ γαλέας καὶ μονήρεις λεγομένους, ταχινοὺς καὶ ἐλαφρούς, οἷσπερ χρήσῃ ἐν τε ταῖς βίγλαις καὶ ταῖς ἄλλαις σπουδαίαις χρείαις.".

ἐφολκίδες, λέμβοι, κέλητες, ἐπακτρίδες, ἐπακτροκέλητες, νῆες στρατιώτιδες, ὁπλιταγωγοί, ἱππαγωγοί, φορτηγοί.[63]

3 Εἰσι δὲ καί τινα πλοῖα κριοὶ καὶ τράγοι λεγόμενα, οἷς χρησαμένους Λυκίους ἀνέγνωμεν, ὡς εἰκάζειν ὅτι τοιοῦτόν τι πλοῖον καὶ ὁ ταῦρος ἦν ὁ τὴν Εὐρώπην ἀπαγαγών.[64]

4.[65] Περὶ τῶν ὀνομασιῶν τῶν ἀρχόντων τοῦ πλωΐμου στρατεύματος

1 Αἱ δὲ τῶν τοῦ τοιούτου πλωΐμου στρατεύματος ἡγεμόνων ὀνομασίαι εἰσὶν αἵδε. Στρατηγός, ὁ πάντων ἄρχων ἤγουν στρατιωτῶν καὶ τῶν αὐτῶν ἡγεμόνων· κόμης,[66] ὁ ἐπὶ τρισὶν ἢ καὶ πέντε δρόμωσιν τεταγμένος ἡγεμονεύειν.[67]

2 Ἑκατοντάρχης ὁ ἐπὶ μιᾶς νηὸς ἑκατὸν ἀνδρῶν ἡγούμενος ὅστις καὶ τριήραρχος κέκληται. Ἔστι δὲ ὁ λεγόμενος κένταρχος· κέντουμ γὰρ παρὰ Ῥωμαίοις ὁ ἑκατὸν ἀριθμὸς προσηγόρευται καὶ κένταρχος ὁ ἑκατὸν ἀνδρῶν ἡγούμενος. Ἐπὶ δὲ τῶν θεματικῶν δρομώνων δρουγγάριοι καὶ τουρμάρχαι ὑπὸ τὴν τοῦ στρατηγοῦ χεῖρα καὶ αὐτοὶ τελοῦντες.[68]

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[63] This list of terms for both specific types of ships and boats and also the uses to which ships might be put was fundamentally classical rather than Byzantine; although, such words as *hippagōgos* and *phortēgos* were still used in the tenth century. We have given the best understanding of the classical meanings of the terms now available; however, it should not be thought that the Anonymous realized what they had once meant. In fact, once again, he simply lifted them from Pollux. Cf. Pollux, *Onomasticon* (Bethe), I.82-3 (vol. 1, p. 26): "Περὶ νεῶν καὶ ναυτικῶν ὀνομάτων. ... ἐφολκίδες, λέμβοι, κύδαροι, γαῦλοι, κέλητες, κελήτια, ἐπακτρίδες, ἐπακτροκέλητες [βαρεῖς], ... λέγοιτο δ' ἂν ταχεῖα ναῦς ... ὁπλιταγωγός, [στρατιῶτις, στρατηγίς, ἱππαγωγός], φορτίς, φορτηγός, ...".

[64] Cf. Pollux, *Onomasticon* (Bethe), I.83 (vol. 1, p. 27): "[Λύκια] [[λεγόμενα]] κριοὶ καὶ τράγοι, ὡς εἰκάζειν ὅτι τοιοῦτόν το πλοῖον καὶ ὁ ταῦρος ἦν ὁ τὴν Εὐρώπην ἀπαγαγών.".

[65] γ΄ (3) in the margin of MS. A.

[66] Cf. Appendix Two [a], §25: "... ἕνα τὸν λεγόμενον κόμητα, ὅστις ναύαρχός τε καὶ ἡγεμὼν τῶν ὑπ' αὐτῶν δρομώνων ὑπάρχων φροντίσει προσεχέστερον περὶ πάντων εὐκόλως καὶ διατάξει πρὸς ἅπαντα.".

[67] Cf. Appendix Two [a], §25: "... ἀλλ' ἐπιστήσεις αὐτοῖς ἄρχοντας ἢ κατὰ πέντε ἢ κατὰ τρεῖς δρόμωνας, ...".

[68] Cf. Appendix Two [a], §26: "... ἐπὶ δὲ τῶν θεματικῶν δρομώνων καὶ δρουγγάριοι ἐπιστήσονται καὶ τουρμάρχαι, καὶ αὐτοὶ τῷ στρατηγῷ ὑποταγήσονται καὶ τοῖς ἐκείνου παραγγέλμασιν ὑπακούσουσιν.".

break up their battle lines, and all the [ships] that usually form a part of the pattern of naval warfare, such as ships' boats (*epholkides*), light galleys (*lemboi*), merchant galleys (*kelētes*), small galleys (*epaktrides*), light *kelētes* (*epaktrokelētes*), troop transports, hoplite transports, horse transports, [and] supply vessels.

3 There are also other ships called rams (*krioi*) and goats (*tragoi*) which we have read that the Lycians used, from which [we may] conjecture that the bull that carried off Europa was a type of boat.

4. Concerning the terms for the commanders (*archontes**) of the naval force

1 The terms for the officers (*hēgemones**) of a naval force of this sort are as follows. A *stratēgos* [is] the commander of all, or rather of the soldiers and their officers; a *komēs** is appointed to command three or five dromons.

2 A *hekatontarchēs** is the officer of a ship of one hundred men, and is also called a *triērarchos**. There is also what is called a *kentarchos**, for *centum* is the Roman word for the number one hundred and a *kentarchos* is the officer [in charge] of one hundred men. In the thematic dromons [there are] *droungarioi** and *tourmarchai** [who] themselves serve under the hand of the *stratēgos*.

3 Ἐφ᾽ ἑκάστης δὲ τῶν νεῶν ἄρχοντές εἰσὶν οἵδε· τριήραρχος καὶ πεντηκόνταρχος, ἑκατόνταρχος τε καὶ ναύαρχος καὶ ἐπιστολεύς. Λέγεται δὲ ὁ ἐπὶ τοῦ στόλου διάδοχος τοῦ ναυάρχου· ναύαρχος δ᾽ ἂν ὀνομάζοιτο ὁ παρ᾽ ἡμῖν πρωτοκάραβος. Προσθετέον δὲ τούτοις καὶ τριηραύλην καὶ κελευστήν· ἔστι δὲ ὁ μὲν βουκινάτωρ,[69] ὁ δὲ κελευστὴς ὁ τὸ φλάμουλον κατέχων.[70]

5.[71] Περὶ τῶν στρατιωτῶν ὁποίους δεῖ εἶναι τοὺς ἐπὶ τοῦ καταστρώματος ἃ σανιδώματα καλοῦνται

1 Εὐψύχους καὶ ῥωμαλέους καὶ προθύμους εἰς τὴν κατὰ τῶν ἐναντίων ἐγχείρησιν, ἐπεὶ κοινῶς καὶ μάχιμοι κέκληνται. Τὰ δὲ τῶν τοιούτων ὅπλα ἀσπίδες, θώρακες, κνημῖδες, κράνη τε καὶ ξίφη, δόρατά τε καὶ δρέπανα καὶ χειρόψελλα.[72] Καὶ τοξεία ἐστὶν ὅτε τὸ πᾶν ἐκ διαστήματος ἐνεργοῦσα κατὰ τῶν ἐν ταῖς χερσὶ τὴν ἰσχὺν καὶ δύναμιν ἐχόντων ἐναντίων ὁπλιτῶν.

2 Πάντως δὲ ἀνδρεῖοι ἔστωσαν καὶ τῶν κατὰ πόλεμον ἐμπειρότατοι,[73] ὡς ἂν ἐν τούτοις οἱ κυβερνῆται θαρροῦντες προσβάλλωσι ναυσὶ πολεμίαις καὶ προσδεσμῶσιν εὐκόλως, διακόπτοντες ταύτας καὶ καταδύοντες.

6.[74] Περὶ τῶν ὁπλίσεων ἑκάστης νηός

1 Πρὸς τούτοις δὲ καὶ αἱ τῶν νηῶν ἑκάστης ὁπλίσεις ἔστωσαν αἵδε· δέρρεις καὶ διφθέραι[75] καὶ σίφωνες καὶ ὅσα ἐν τῷ περι

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[69] βουκινάτωρ, thus Dain: ιβυκινάτωρ MS. A.

[70] Cf. Pollux, *Onomasticon* (Bethe), I.96 (vol. 1, p. 32): "ἄλλης δὲ χρείας τριήραρχος, πεντηκόνταρχος, ναύαρχος, ἐπιστολεύς· οὕτω γὰρ ἐκαλεῖτο ὁ ἐπὶ τοῦ στόλου διάδοχος τοῦ ναυάρχου. ὁ δὲ στόλος καλοῖτ᾽ ἂν καὶ ἀπόστολος. [προσθετέον δὲ τούτοις] [καὶ τριηραύλην καὶ κελευστήν]."; I.119 (vol. 1, p. 39): "Τὰ δὲ τῆς νάυμαχίας· αἱ μὲν φέρουσαι τριήρεις, μακρὰ πλοῖα, ταχεῖαι νῆες, κατάφρακτα πλοῖα, οἱ δὲ ἄρχοντες τριήραρχοι καὶ πεντηκόνταρχοι, καὶ ναύαρχοι καὶ ἐπιστολεῖς. Τὸ [δὲ] πρᾶγμα, [ναυαρχίᾱ, τριηραρχία, πεντηκονταρχία. τῆς δὲ τοῦ ναυάρχου νεὼς [τὸ] ὄνομα, ναυαρχὶς, καὶ στρατηγίς.".

[71] δ΄ (4) in the margin of MS. A.

[72] Cf. Pollux, *Onomasticon* (Bethe), I.120 (vol. 1, p. 39): "Τὰ δὲ τῶν ἐμπλεόντων ἀσπίδες, θώρακες, κνημῖδες, κράνη, ξίφη, δορυδρέπανα, χεῖρες σιδηραῖ· ...".

[73] Cf. Appendix Two [a], §20.

[74] ε΄ (5) in the margin of MS. A.

[75] διφθέραι, thus Dain: δίφθεραι MS. A. Cf. Pollux, *Onomasticon* (Bethe), I.94

3 In each of the ships, the commanders are as follows: *triērarchos* and *pentēkontarchos**, *hekatontarchos* and *navarchos** and *epistoleus**; he is known in the fleet as the deputy of the *navarchos*. A *navarchos* would be called *prōtokarabos** by us. To these should be added the trireme's flute-player (*triēraulēs**) and the *keleustēs**, the first is the trumpeter and the *keleustēs* is in charge of the standard.

5. Concerning the soldiers who should be on the *katastrōma** which is called *sanidōmata*

1 [These should be of] good spirit, sturdy and eager for the encounter with the opposition since they are generally called warriors. The weapons of such men [should be] shields, breast plates, greaves, helmets and swords, spears, rigging cutters and vambraces. And bows [are needed] sometimes, functioning over a distance against enemy hoplites who are strong and powerful in hand-to-hand [fighting].

2 All in all, these should be brave men with considerable experience in battle, so that the helmsmen can rely on them in attacks on enemy ships and couple [ships] easily, and break through [their line] and sink [them].

1. Concerning the armaments of each ship

1 In addition the armaments of each of the ships should be these: leather hides and screens (*diphtherai*) and *siphōnes* and

(vol. 1, p. 31): "... δέρρεις, διφθέραι. ...".

μερῶν αὐτῆς περιελάβομεν.

2 Ἔτι δὲ καὶ πρὸς τὰς ἐμβολὰς τῶν ἐναντίων βύρσαι ταύταις προσηλούσθωσαν, ὅπως ὁ σίδηρος περιολισθαίνῃ πρὸς τὸ ἀντίτυπον ἀντιλαβὴν οὐκ ἔχων, ὡς ἂν οἱ ὁπλῖται τοῖς κοντοῖς ἀπωθοῦντες ἀπ᾽ ἀλλήλων τὰ σκάφη διάγωσιν[76] εἰς τὴν ἑαυτῶν σωτηρίαν, εἰ μὴ πρὸς χεῖρας θαρροῦσι παρακερδαίνοντες.

7.[77] Περὶ τῆς τῶν ἱστορικῶν λέξεων διασαφήσεως

1 Ἐπεὶ δὲ ὡς ἐχρῆν περὶ ταῦτα διήλθομεν, ἔλθωμεν δὴ καὶ ἐπὶ τῶν λέξεων τῶν ἐν τοῖς ἱστορικοῖς τεταγμένων τὴν διασάφησιν. Ἐπιτριηράρχημα ὁ χρόνος ἐστὶν ὅν τις ἐπετριηράρχησε, ἐξήκοντος μὲν αὐτῷ τοῦ καιροῦ, βραδύνοντος δὲ τοῦ διαδόχου.[78] Συγκεκροτημένον τὸ καλῶς πεπληρωμένον· τὸ δὲ ὡς ἑτέρως ἀποπλήρωτον ἀσυγκρότητον.[79]

2 Ναυλοχεῖν τὸ τοὺς πολεμίους παραφυλάττειν· ἀνθορμεῖν δὲ καὶ ἀντεφορμεῖν τὸ ἀντικαθεστηκέναι πρὸς ναυμαχίαν ἐστι καὶ ἐξορμεῖν τὸ προσεκπλεῦσαί που· περιορμεῖν δὲ τὸ προσκαθεζεσθαι νήσῳ πολιορκητικῶς.[80]

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[76] Cf. Appendix Two [a], §28. Cf. also Pollux, *Onomasticon* (Bethe), I.120 (vol. 1, p. 39): "πρὸς δὲ τὰς ἐπιβολὰς αὐτῶν ἀντεσοφίζοντο βύρσας προσηλοῦντες [πρὸς τὰ τοιχίσματα τῶν νεῶν], ὅπως ὁ σίδηρος ὀλισθάνῃ, πρὸς τὸ ἀντίτυπον ἀντιλαβὴν οὐκ ἔχων. [κοντοῖς] ἀπεωθοῦντο καὶ διῆγον ἀπ᾽ ἀλλήλων τὰ σκάφη.". Pollux's source was almost certainly Thucydides. See Thucydides, *Peloponnesian war*, VII.65.2 (vol. 4, p. 128): "τὰς γὰρ πρῴρας καὶ τῆς νεὼς ἄνω ἐπὶ πολὺ κατεβύρσωσαν, ὅπως ἂν ἀπολισθάνοι καὶ μὴ ἔχοι ἀντιλαβὴν ἡ τῶν σιδηρῶν χειρῶν (65.1᾽) χεὶρ ἐπιβαλλομένη.".

[77] ς΄ (6) in the margin of MS. A.

[78] Cf. Pollux, *Onomasticon* (Bethe), I.123 (vol. 1, p. 40): "τῷ δὲ θᾶττον ποιήσαντι τοῦτο ἆθλον στέφανος ἦν. ἔστι δὲ αὐτῷ λόγος καὶ περὶ τοῦ τριηραρχήματος· ἐπιτριηράρχημα δέ ἐστιν ὃ χρόνος ὅν τις ἐπετριηράρχησεν ...".

[79] Cf. Pollux, *Onomasticon* (Bethe), I.121 (vol. 1, p. 40): "καὶ τὰ μὲν καλῶς, πεπληρωμένα, συγκεκροτημένα, τὰ δὲ ὡς ἑτέρως ἀπλήρωτα [καὶ ἡμιπλήρωτα] [καὶ ἀσυγκρότητα].".

[80] Cf. Pollux, *Onomasticon* (Bethe), I.122 (vol. 1, p. 40): "τὸ δὲ φυλάττειν τινὰς ἐφορμεῖν καὶ ναυλοχεῖν, καὶ τὸ ἀντικαθεστηκέναι πρὸς ναυμαχίαν ἀνθορμεῖν [καὶ ἀντεφορμεῖν, καὶ τὸ προσεδρεύειν] [προσορμεῖν], καὶ [τὸ] προεκπλεῦσαι προεξορμεῖν καὶ προορμεῖν, καὶ τὸ στήσασθαι τὴν ναῦν προσορμίσασθαι, καὶ τὸ ἐν κύκλῳ περιπλεῖν νῆσον καὶ προσκαθῆσθαι νήσῳ πολιορκητικῶς ἀπὸ νεῶν, περιορμεῖν. καὶ περιορμίζειν τὴν ναῦν περὶ τὸ χῶμά φησι Δημοσθένης.".

everything we mentioned in the [section] concerning parts [of a ship].

2 Moreover, also let there be hides fastened to the [ships] against "ramming" by the opposition, so that the iron might glance off in the opposite direction and does not take hold, [and] so that the hoplites, fending the vessels off from each other with spears, achieve their own safety, even if they had no great expectation of success in hand to hand fighting.

7. Concerning the interpretation of historical vocabulary

1 Since we have investigated these topics as was required, let us discuss the vocabulary found in the historians. *Epitriēarchēma* [is] the additional period a man serves as *triērarchos* beyond the expiry of his office, in the absence of his successor. *Synkekrotēmenon* (welded together) means fully trained and conversely *asynkrotēton* (not welded together) means poorly trained.

2 *Naulochein* [means] to be on the watch for the enemy. *Anthormein* and *antephormein* [mean] to take position for fighting a naval battle, and *exormein* [means] to set sail for somewhere. *Periormein* [means] to set up a siege round an island.

3 Καὶ τὸ μὲν εἰς τοὐπίσω τὴν ναῦν ἀνακρουσασθαι τὸ εἰς ἐμβολὴν ὑπάγειν ἐστί· τὸ δὲ εἰς τὴν πρύμναν κρούσασθαι.[81] Καὶ τὸ μὲν εἰς τοὐπίσω τὴν ναῦν ἀνακρουσασθαι τὸ εἰς ἐμβολὴν ὑπάγειν ἐστί· τὸ δὲ εἰς τὴν πρύμναν κρούσασθαι.[82] Καὶ ἀναγωγὴ μὲν ἐστὶν ὁ ἀπὸ τοῦ λιμένος ἐπὶ τὸν πόντον πρὸς πόλεμον πλοῦς, καὶ ἀνταναγωγὴ καὶ ἀντεπίπλευσις· ἀνάπειρα δὲ ἡ πρὸς ναυμαχίαν ἀντεπιστροφή.

4 Καὶ περίπλους μέν ἐστιν ὁ πρὸς περικύκλωσιν πλοῦς· παράπλους δὲ ὅταν πλαγίως τοῖς πολεμίοις οἱ ἕτεροι πλησίστιοι περιπλέωσι, καὶ διέκπλους ὅταν ἐμβάλωσιν αἱ νῆες κατὰ τὸ μέσον τῶν πολεμίων καὶ πάλιν ὑποστρέψωσι καὶ πάλιν ἐμβάλωσι,[83] διακόπτοντες καὶ βυθίζοντες τὰς τῶν ἐναντίων. Καὶ ὑπερκερᾶσαι μέν ἐστι τὸ τὰ τῶν ἐναντίων κέρατα περικυκλῶσαι, ὥσπερ ὑπερκερασθῆναι τὸ ὑπὸ τῶν ἐναντίων περικυκλωθῆναι.

5 Παρεξειρεσία δέ ἐστι τὸ ὄπισθεν μέρος τῆς πρύμνης, ἔνθα τὰ παράπτερα τῶν νεῶν εἰσιν, ἃ ἐπωτίδες κέκληνται· λέγεται δὲ οὕτως διὰ τὸ παρεκτὸς τῆς εἰρεσίας εἶναι τὸ πηδάλιον οἱονεὶ ἐρέττον καὶ ἰθύνον τὴν ναῦν.

6 Ταῦτα μὲν οὖν ἱκανῶς ἡμῖν διείλεκται καὶ οὐδὲν παρεῖται τῶν ὀφειλομένων μνημονευθῆναι· μετιτέον δὲ ἤδη ἐπὶ τὰ εἴδη τῶν παρατάξεων.

8.[84] Ναυμαχίας παράταξις κυκλική

1 Κυκλικὸν[85] καλεῖται τὸ σχῆμα τῆς τάξεως ὅταν τῷ μὴ διδόναι διέκπλουν ...[86]

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[81] Cf. Pollux, *Onomasticon* (Bethe), I.125 (vol. 1, p. 41): "καὶ τὸ μὲν εἰς ἐμβολὴν ὑπαγαγεῖν εἰς τοὐπίσω τὴν ναῦν ἀνακρούσασθαι, τὸ δ᾽ εἰς φυγὴν πρύμναν κρούσασθαι᾽· ". Hesychios, *Lexicon* (Schmidt), A.4375 (vol. 1, p.175): "ἀνάκρουσις· ἐν ναυμαχίᾳ ἐλέγετο ἐπὶ τοῦ πρύμναν κρούειν".

[82] Cf. Pollux, *Onomasticon* (Bethe), I.125 (vol. 1, p. 41): "καὶ τὸ μὲν εἰς ἐμβολὴν ὑπαγαγεῖν εἰς τοὐπίσω τὴν ναῦν ἀνακρούσασθαι, τὸ δ᾽ εἰς φυγὴν πρύμναν κρούσασθαι᾽· ". Hesychios, *Lexicon* (Schmidt), A.4375 (vol. 1, p.175): "ἀνάκρουσις· ἐν ναυμαχίᾳ ἐλέγετο ἐπὶ τοῦ πρύμναν κρούειν".

[83] Cf. Hude, *Scholia*, I.49.3 (p. 44): "διέκπλοι· διέκπλους ἐστὶ τὸ ἐμβαλεῖν καὶ πάλιν ὑποστρέψαι καὶ αὖθις ἐμβαλεῖν.".

[84] ζ΄ (7) in the margin of MS. A.

[85] The following incomplete sentence appears to have been based on Thucydides' account of the first battle of Naupaktos in 430 B.C.E. See Thucydides, *Peloponnesian war*, II.83.5 (vol. 1, p. 412): "καὶ οἱ μὲν Πελοποννήσιοι ἐτάξαντο κύκλον τῶν νεῶν ὡς μέγιστον οἷοί τ᾽ ἦσαν μὴ διδόντες διέκπλουν, ...".

3 To bring the ship into reverse for "ramming" is *anakrousasthai*;[87] [to bring it] by the stern [is] *krousasthai*. *Anagōge* (bringing up) is the departure from harbour to the open sea for battle,[88] and [so is] *antanagōgē* (bringing up against) and *antepipleusis* (sailing against).[89] *Anapeira* is the turning around for a naval battle.[90]

4 *Periplous* (sailing round) is the sailing movement of encirclement. *Paraplous* (sailing past) is when each group sails past the enemy side on with full sails. *Diekplous* (sailing through) is when the ships attack through the line of the enemy and turn around and attack once again, destroying and sinking the [ships] of the opposition. And *hyperkerasai* (outflanking) is the encirclement of the wings of the opposition just as 'to be outflanked' is to be encircled by the enemy.

5 The *parexeiresia** (outrigger) [is] the rear part of the stern where the *paraptera* of the ships are, which are called *epōtides*. It is called this because the rudder, which, as it were, directs and guides the ship, is outside the *eiresia*.*[91]

6 We have now said sufficient on this subject and nothing has been omitted that should have been mentioned. We should now proceed to the types of battle-lines.

8. The encircling formation of a sea battle

The arrangement of the formation is called *kyklikon** (encircling) when by not making a *diekplous* (sailing through) ...

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[86] The text ends at the end of the last line of fol. 342v but appears to have been continued in subsequent folios which have been lost.

[87] The Anonymous's sources were Pollux and Hesychios but in following them he got it all wrong since no galley would "go into reverse", or backwater in order to ram. The confusion arose from Pollux's reading of Thucydides' description of the battle of Syracuse. See Thucydides, *Peloponnesian war*, VII.70.4 (vol. 4, p. 138): "..., αἱ μὲν ἐμβολαὶ διὰ τὸ μὴ εἶναι τὰς ἀνακρούσεις καὶ διέκπλους ὀλίγαι ἐγίγνοντο, ...". Thucydides wrote that conditions were so crowded in Syracuse harbour that ramming was impossible because the ships could not backwater to give themselves room or perform the break through the line, *diekplous*. There was no room to manœuvre to ram. However, in reading him, Pollux and Hesychios associated "backing water" (*anakrousis*) with "ramming" (*embolē*) and the Anonymous slavishly followed them.

[88] Cf. Pollux, *Onomasticon* (Bethe), I.102 (vol. 1, p. 34).

[89] Cf. Pollux, *Onomasticon* (Bethe), I.124 (vol. 1, p. 40).

[90] Cf. Pollux, *Onomasticon* (Bethe), I.123-4 (vol. 1, p. 40).

[91] Cf. above pp. 218-24.

APPENDIX FOUR

FLEETS, ARMAMENTS, AND EQUIPMENT FOR DROMONS, *PAMPHYLOI*, AND *OUSIAKA CHELANDIA* ACCORDING TO THE INVENTORIES FOR THE EXPEDITIONS TO CRETE OF 911 AND 949 IN THE *DE CERIMONIIS AULAE BYZANTINAE* ATTRIBUTED TO CONSTANTINE VII PORPHYROGENNETOS[1]

[a] THE EXPEDITION OF 911

[b] THE EXPEDITION OF 949

Technical terms, the understanding and translation of which are discussed elsewhere in the text or appendices, are asterisked the first time they are used. They may be accessed through the Index.

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[1] Texts adapted from Haldon, "Theory and practice", pp. 203-13, 219-33 with reference to Constantine VII, *De cerimoniis*, II.44, II.45 (vol. 1, pp. 651-60, 664-5, 669-77). The translations are our own. The text here includes only those sections of *De cerimoniis*, II.44 & II.45 related to the naval forces *per se*, not the complete text.

We have followed the abbreviations for νόμισματα/*nomismata* used by Reiske and Haldon, two large commas [,,], and that used by Haldon for μιλιαρήσια/*miliarēsia*, ∠. For the abbreviations for 0 *miliaresia* used by Reiske and Haldon, we have used zero/μ [0/μ]. We have expanded their abbreviations for *kentēnarion/kentēnaria*. For the archaic letter *koppa*, representing the numeral 90, we have used #.

On the expedition of 911 see Vasiliev, *Byzance et les Arabes.Tome I*, pp. 208-16; Haldon, "Theory and practice", pp. 239-42. For that of 949 see Vasiliev/Canard, *Byzance et les Arabes. Tome II, part 1*, pp. 320-41. This should be read, however, with much caution. Vasiliev/Canard did not appreciate that an *ousia* was a ship's company rather than an actual ship and this effects much of their analysis. See also Haldon, "Theory and practice", pp. 334-9.

[a] The expedition of 911[2]

	Ἡ γενομένη ἐξόπλισις καὶ ἔξοδος καὶ τὸ ποσὸν τῆς ῥόγας καὶ τοῦ λαοῦ τοῦ ἀποσταλέντος κατὰ τῆς θεολέστου Κρήτης μετὰ τοῦ πατρικίου Ἡμερίου καὶ λογοθέτου τοῦ δρόμου ἐπὶ Λέοντος τοῦ φιλοχρίστου δεσπότου.	The fitting out and the cost and the sum of the pay and of the force sent against the impious Crete with the *patrikios** and *logothetēs tou dromou** Himerios in the time of the Lord Leo, beloved of Christ.
1	Τὸ βασιλικοπλόϊμον χιλιάδες ιβ΄. Ῥῶς ψ΄.	The imperial fleet, 12,000; *Rhōs*, 700.
	ἐδέξατο ὁ στρατηγὸς τῆς τῶν Κιβυρραιωτῶν ἔχειν στρατὸν ͵εχ΄, καὶ διπλοῦς ͵α΄· ὁμοῦ ͵ϛχ΄.	The *stratēgos* of the *Kibyrrhaiōtai* undertook to provide a force of 5,600, and 1,000 reserves; 6,600 in all.
	ἐδέξατο ὁ στρατηγὸς τῆς Σάμου ἔχειν στρατὸν ͵δ΄, καὶ διπλοῦς ͵α΄· ὁμοῦ ͵ε΄.	The *stratēgos* of Samos undertook to provide a force of 4,000, and 1,000 reserves; 5,000 in all.
	ἐδέξατο ὁ στρατηγὸς τοῦ Αἰγαίου πελάγους ἔχειν στρατὸν ͵γ΄, καὶ διπλοῦς ͵α΄· ὁμου ͵δ΄. ὁμοῦ τὸ πᾶν ξιλιάδες κη΄ καὶ τ΄.	The *stratēgos* of *Aigaion Pelagos* undertook to provide a force of 3,000, and 1,000 reserves, 4,000 in all. In all a total of 28 thousand and 300.
	Διὰ τοῦ βασιλικοῦ πλοΐμου	Concerning the imperial fleet
2	Δρόμωνες ξ΄ ἔχοντες ἀνὰ ἀνδρῶν κωπηλατῶν σλ΄ καὶ ἀνὰ πολεμιστῶν ο΄· ὁμοῦ χιλιάδες ιη΄. πάμφυλοι μ΄ ἐξ ὧν οἱ μὲν κ΄ πάμφυλοι ἀνὰ ἀνδρῶν ρξ΄, οἱ δὲ ἕτεροι κ΄ ἀνὰ ἀνδρῶν ρλ΄, καὶ Ῥῶς ψ΄·	60 dromons having 230 oarsmen and 70 marines each; in all 18,000. 40 *pamphyloi**, of which 20 *pamphyloi* [have] 160 men each [and] the other 20 [have] 130 men each, and

[2] Haldon, "Theory and practice", pp. 203, 205, 207, 209, 211, 213.

ὁμοῦ ,εω΄. ὁμοῦ τὸ πᾶν χιλιάδες κγ΄ καὶ ω΄ [δύο,[3] Reiske].

700 *Rhōs*; in all 5,800. In all the total 23,800.

Διὰ τοῦ θέματος τῶν Κιβυρραιωτῶν

Concerning the *thema** of the *Kibyrrhaiōtai*

3 Δρόμωνες ιε΄ ἔχοντες ἀνὰ ἀνδρῶν κωπηλατῶν σλ΄ καὶ ἀνὰ πολεμιστῶν ο΄· ὁμοῦ χιλιάδες δ΄ καὶ φ΄.

15 dromons each having 230 oarsmen and each 70 marines; in all 4,000 and 500.

πάμφυλοι ις΄ ἔχοντες οἱ μὲν ς΄ ἀνὰ ἀνδρῶν ρξ΄, οἱ δὲ ἕτεροι ι΄ ἀνὰ ἀνδρῶν ρλ΄· ὁμοῦ χιλιάδες β΄ καὶ σξ΄.

16 *pamphyloi*, 6 of them each having 160 men, the other 10 each 130 men; in all 2,000 and 260.

ὁμοῦ τὸ πᾶν χιλιάδες ς΄ καὶ ψξ΄.

In all, the total 6,000 and 760.

Διὰ τοῦ θέματος τῆς Σάμου

Concerning the *thema* of Samos

4 Δρόμωνες ι΄ ἔχοντες ἀνὰ ἀνδρῶν κωπηλατῶν σλ΄ καὶ ἀνὰ πολεμιστῶν ο΄· ὁμοῦ ,γ΄.

10 dromons each having 230 oarsmen and each 70 marines; in all 3,000.

πάμφυλοι ιβ΄, ἔχοντες οἱ μὲν δ΄ ἀνὰ ἀνδρῶν κωπηλατῶν ρξ΄, οἱ δὲ η΄ ἀνὰ ἀνδρῶν ρλ΄· ὁμοῦ ,αχπ΄.

12 *pamphyloi*, 4 of them each having 160 oarsmen, the [other] 8 each 130 men; in all 1,680.

ὁμοῦ τὸ πᾶν διὰ τοῦ θέματος τῆς Σάμου ,δχπ΄.

In all, the total for the *thema* of Samos 4,680.

Διὰ τοῦ θέματος τοῦ Αἰγαίου Πελάγους

Concerning the *thema* of *Aigaion Pelagos*

5 Δρόμωνες ζ΄ ἔχοντες ἀνὰ ἀνδρῶν κωπηλατῶν σλ΄ καὶ ἀνὰ πολεμιστῶν ο΄· ὁμοῦ ,βρ΄.

7 dromons each having 230 oarsmen and each 70 marines; in all 2,100.

πάμφυλοι ζ΄ ἔχοντες οἱ μὲν γ΄ ἀνὰ ἀνδρῶν ρξ΄, οἱ δὲ ἕτεροι δ΄ ἀνὰ ἀνδρῶν ρλ΄·

7 *pamphyloi*, 3 of them each having 160 men, the other 4 each 130 men; in all 1,000.

[3] A copyist's error in the manuscript. See Haldon, "Theory and practice", pp. 247 n. 39.

ὁμοῦ ,α΄.

ὁμοῦ τὸ πᾶν διὰ τοῦ θέματος τῆς Αἰγαίου Πελάγους ,γρ΄. In all, the total for the *thema* of *Aigaion Pelagos* 3,100.

Διὰ τοῦ θέματος Ἑλλάδος — Concerning the *thema* of *Hellas*

6 Δρόμωνες ι΄ ἔχοντες ἀνὰ ἀνδρῶν κωπηλατῶν σλ΄ καὶ ἀνὰ πολεμιστῶν ο΄· ὁμοῦ ,γ΄. 10 dromons each having 230 oarsmen and each 70 marines; in all 3,000.

Διὰ τῶν Μαρδαϊτῶν — Concerning the Mardaites

7 Μαρδαΐται, στρατὸς σὺν ἀρχόντων, ,δπζ΄, καὶ κατὰ προσθήκην ἕτεροι ,α· ὁμοῦ ,επζ΄. The Mardaites, army with officers 4,087, and as an auxiliary another 1,000; in all 5,087

ὁμου τὸ πᾶν διά τε τοῦ βασιλικοῦ πλοΐμου, διά τε τῶν θεμάτων δρόμωνες ρβ΄,[4] πάμφυλοι οε΄, ἄνδρες κωπηλάται χιλιάδες λδ΄ ‹καὶ σ΄› καὶ πολεμισταὶ ,ζτμ΄ καὶ Ῥῶς ψ΄ καὶ Μαρδαΐται ,επζ΄. In all the total for the dromons of the imperial fleet and the *themata* 112, 75 *pamphyloi*, 34,000 oarsmen ‹and 200› and 7,340 marines and 700 *Rhōs* and 5,087 Mardaites.

Αἱ ῥόγαι διὰ τοῦ βασιλικοῦ πλοΐμου — The pay for the imperial fleet

8 Στρατὸς σὺν ἀρχόντων χιλιάδες ιβ΄ καὶ φβ΄. ῥόγα κεντηνάρια ιε΄, λίτραι # : ,, ι΄. The men of the fleet together with officers 12,000 and 502. Pay of 15 *kentēnaria*, 90 *litrai*, 10 *nomismata*.

προσθήκην αὐτῶν ,α ἀνὰ νομ. ε΄, γινόμενον λίτραι ξθ΄, νομ. λβ΄. Their auxiliary of 1,000 each 5 *nomismata*, making 69 *litrai*, 32 *nomismata*.

Ῥῶς ψ΄. ῥόγα κεντηνάριν α΄. 700 *Rhōs*; pay of 1 *kentēnarion*.

ὁμοῦ διὰ τοῦ πλοΐμου καὶ τῶν Ῥῶς ῥόγα κεντηνάρια ιζ΄, λίτραι νθ΄ ,, μβ΄ In all for the fleet and the *Rhōs* pay of 17 *kentēnaria*, 59 *litrai*, 42 *nomismata*.

Διὰ τοῦ θέματος τῶν — Concerning the *thema* of the

[4] Sic MS; *recte* ριβ΄ (112).

	Κιβυρραιωτῶν	*Kibyrrhaiōtai*
9	Στρατὸς σὺν ἀρχόντων ,ϛψξ΄. ῥόγα κεντηνάρια β΄, λίτραι κα΄ ,, μβ΄ σὺν τοῖς διπλοῖς.	Men of the fleet together with officers 6,760. Pay 2 *kentēnaria*, 21 *litrai*, 42 *nomismata* with the reserves.
	Διὰ τοῦ θέματος τῆς Σάμου	Concerning the *thema* of Samos
10	Στρατὸς σὺν ἀρχόντων ,δχπ΄, καὶ ἀπὸ τῶν διπλῶν ,α. ῥόγα κεντηνάρια β΄, λίτραι α΄ ,, ια΄.	Men of the fleet together with officers 4,680, and 1,000 from the reserves. Pay 2 *kentēnaria*, 1 *litra*, 11 *nomismata*.
	Διὰ τοῦ θέματος τοῦ Αἰγαίου Πελάγους	Concerning the *thema* of *Aigaion Pelagos*
11	Στρατὸς σὺν ἀρχόντων ,γρ΄ καὶ ἀπὸ τῶν διπλῶν ,α. ῥόγα κεντηνάριν α΄, λίτραι νδ΄ ,, γ΄.	Men of the fleet together with officers 3,100, and 1,000 from the reserves. Pay 1 *kentēnarion*, 54 *litrai*, 3 *nomismata*.
	Διὰ τῶν Μαρδαϊτῶν τῆς δύσεως	Concerning the Mardaites of the West
12	Στρατὸς σὺν ἀρχόντων ,δπζ΄. ῥόγα κεντηνάρια δ΄, λίτραι ξς΄ ,, λβ΄. καὶ ἡ προσθήκη ἀνδρῶν ,α ἀνὰ ,, η΄, γινόμενον κεντηνάριν α΄, λίτραι ια ,, η΄.	Men of the fleet together with officers 4,087. Pay 4 *kentēnaria*, 66 *litrai*, 32 *nomismata*. And the auxiliary of 1,000 men 8 *nomismata* each, making 1 *kentēnarion*, 11 *litrai*, 8 *nomismata*.
	ὁμοῦ τὸ πᾶν διὰ τῶν Μαρδαϊτῶν τῆς δύσεως ῥόγα κεντηνάρια ε΄, λίτραι οζ΄ ,, μβ΄.[5]	In all the total for the pay of the Mardaites of the West 5 *kentēnaria*, 77 *litrai*, 42 *nomismata*.
	καὶ ὁμοῦ τὸ πᾶν διά τε τοῦ βασιλικοῦ πλοΐμου, τῶν	And in all the total for the pay of the imperial fleet, the

[5] Sic MS; *recte* μ΄ (40).

Ῥῶς, τῶν θεματικῶν πλοΐμων καὶ τῶν Μαρδαϊτῶν δύσεως ῥόγα κεντηνάρια κθ΄, λίτραι ιγ΄ ,, ξς΄.

Rhōs, the thematic fleets, and the Mardaites of the West, 29 *kentēnaria*, 13 *litrai*, 66 *nomismata*.

Διὰ τοῦ προχρέου

Concerning mobilization pay

13 ...

...

ἰστέον, ὅτι ἐδέξατο ὁ στρατηγὸς τῶν Κιβυρραιωτῶν καὶ ὁ κατεπάνω τῶν Μαρδαϊτῶν Ἀτταλίας, ἵνα ὁ μὲν στρατηγὸς εὐτρεπίσῃ χελάνδια δύο ἀπὸ τῶν οὐσιῶν τῶν πουρμαρχῶν, ὁ δὲ κατεπάνω τῶν Μαρδαϊτῶν εὐτρεπίσῃ γαλέας, καὶ διὰ Μαρτίου μηνὸς ἀποστείλωσι αὐτα εἰς Συρίαν, ἵνα περὶ πάντων τῶν ἐκεῖσε μελετωμένων καὶ πραττομένων ἐνέγκωσιν ἀπόκρισιν καὶ ἀληθὲς μανδᾶτον.

Note that the *stratēgos* of the *Kibyrrhaiōtai* and the *katepanō* of the *Mardaites* of Antalya undertook that the *stratēgos* would prepare two *chelandia* from the *ousiai** of the *tourmarchai*, the *katepanō* of the *Mardaites* would prepare *galeai**, and during the month of March would despatch them to Syria, so that they might bring back a report and a true account regarding everything prepared and done there.

Περὶ τῶν ὀφειλόντων ἑτοιμασθῆναι εἰς Θρᾳκησίους, ἤγουν

Concerning what should have been prepared in *Thrakēsion*, that is to say

14 τῶν κ΄ χιλιάδων τοῦ κριθαρίου καὶ περὶ τῶν μ΄ χιλιάδων τοῦ τε σίτου καὶ τοῦ παξαματίου καὶ ἀρευρίου καὶ περὶ τοῦ οἴνου τῶν λ΄ χιλιάδων καὶ περὶ τῶν σφακτῶν τῶν ι΄ χιλιάδων.

of the 20,000 [*modioi*] of barley, and concerning the 40,000 of wheat and biscuit, and flour and concerning the 30,000 of wine and concerning the 10,000 [animals] for slaughter.

15 καὶ περὶ τοῦ ἑτοιμασθῆναι λινάριον λόγῳ τῶν προπύρων καὶ καλαφατήσεως χιλιάδας ι΄, ἵνα ἔχῃ εἰς τὰ Φύγελα, καὶ καρφία χιλιάδας ς΄ λόγῳ τῆς ἡλώσεως

and concerning the preparation of 10,000 [measures of] flax for the *propyra** and the caulking, let them be held at *Phygela*, and 6,000 nails for the nailing of the

τῶν δρομώνων. ἐδέξατο περὶ τούτων ὁ πρωτονοτάριος τῶν Θρᾳκησίων. ἐδέξατο καὶ ὁ Λιμνογάλακτος, ἵνα συνδράμῃ αὐτὸν εἰς τὸν οἶνον.

dromons. The *prōtonotarios* of the *Thrakēsion* undertook these items. And the [official] of *Limnogalaktos* likewise undertook to assist him with the wine.

16 περὶ τοῦ ἑτοιμασθῆναι καρφίον πενταδακτυλαῖον λόγῳ τῆς στρώσεως τῶν δρομωνίων, εἰς τὰς σκάλας καὶ εἰς τὰς πάθνας χιλιάδας λ΄, καὶ κατέλθωσιν εἰς τὰ Φύγελα. ἐδέξατο δὲ περὶ τούτου ὁ στρατηγὸς τῆς Σάμου τοῦ λαμβάνειν ἔξοδον παρὰ τοῦ πρωτονοταρίου.

Concerning preparing a nail 5-fingers [long] for the fabric of the dromons, as regards the gangways and as regards the mangers, 30,000, and they [i.e., the nails] should "go" [i.e., be sent] down to Phygela. The *stratēgos* of Samos undertook to obtain the expenses concerning this from the *prōtonotarios*.

17 περὶ τῶν σανδαλίων τῶν καμοθέντων λόγῳ τῶν δρομωνίων εἰς τὸν τρέχοντα, ἵνα ἀποσταλῇ τῆς ἑταιρείας μετὰ κελεύσεως πρὸς τὸν κατεπάνω, καὶ δώσῃ αὐτὸν πρωτοκαγκελλάριον καὶ πᾶσαν συνδρομήν, καὶ κρατήσῃ τοὺς Κορφιτιάνους Ἡρακλείας, καὶ ἐπάρῃ ναύτας ὑπὲρ ἑκάστου σανδάλιου δ΄. ἀποστείλῃ δὲ αὐτὰ διὰ συντομίας διὰ τοῦ πρωτοκαγκελλαρίου. ἵνα δὲ ἔχῃ ἕκαστον σανδάλιον τὸ κατάρτιον αὐτοῦ καὶ τὸ κερατάριον καὶ ἀνὰ κωπίων δ΄ καὶ τὸ παρακώπιον.

Concerning the *sandalia* made for the *dromōnia*: for the courier, let him be despatched from the *hetaireia* with an order for the *katepanō*, who should give him a *prōtokankellarios* and full support, and let him then hold the *Korphitianoi* of *Hērakleia* and take four sailors for each *sandalion*. He should send them off without delay through the *prōtokankellarios*. Each *sandalion* should have a mast and a yard and each 4 oars and the steering oar.

[b] The expedition of 949[6]

[b].I

	Ἡ κατὰ τῆς νήσου Κρήτης γενομένη ἐκστρατεία καὶ ἐξόπλισις τῶν τε πλοΐμων καὶ καβαλλαρικῶν ἐπὶ Κωνσταντίνου καὶ Ῥωμανοῦ τῶν Πορφυρογεννήτων ἐν Χριστῷ πιστῶν βασιλέων εἰς ἰνδικτίονα ζ΄.	The expedition which took place against the island of Crete and the arming of both the ships and the cavalry, under Constantine and Rōmanos,[7] the emperors born in the purple, faithful in Christ, in indiction seven.
1	Τὸ βασιλικὸν πλόϊμον οὐσίαι ρν΄, ἐξ ὧν πάμφυλοι ς΄ καὶ οἱ ἀρτίως κατασκευασθέντες β΄.	The imperial fleet, 150 *ousiai*, of which 6 [were] hand-picked (*pamphyloi*)* and 2 recently mobilised.
	οὐσιακὰ χελάνδια ρ΄. ἐξ αὐτῶν τῶν ρ΄ οὐσίων [Ρουσίων, Reiske] ἔν τε Δυρραχίῳ καὶ ἐν Δαλματίᾳ οὐσίαι ζ΄, ἐν Καλαβρίᾳ οὐσίαι γ΄, μετὰ τοῦ ὀστιαρίου Στεφάνου καὶ νιψιστιαρίου εἰς τὴν Ἱσπανίαν δουλία οὐσίαι γ΄.	100 *ousiaka chelandia*,* of which 100 *ousiai*, 7[8] *ousiai* in *Dyrrachion* and Dalmatia, 3 *ousiai* in Calabria, 3 *ousiai* with the *ostiarios* and *nipsistiarios* Stephen for service in Spain.
	εἰς φύλαξιν τῆς θεοφυλάκτου πόλεως πάμφυλος α΄ καὶ οὐσίαι κδ΄.	As defence for the God-guarded city, one *pamphylos* and 24 *ousiai*.
2	τὰ μέλλοντα ταξειδεῦσαι ἐν Κρήτῃ	The [ships] intended to campaign in Crete
	πάμφυλοι ζ΄, οὐσιακὰ χελάνδια λγ΄, ὁμοῦ χελάνδια μ΄.	7 *pamphyloi*, 33 *ousiaka chelandia*, 40 *chelandia* in all.

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[6] Haldon, "Theory and practice", pp. 219, 221.

[7] The future Rōmanos II, son of Constantine VII, born 939 and crowned co-emperor with his father on 6 April 945.

[8] Treadgold suggested emendation of ζ΄ to κ΄. See Treadgold, "Army", p. 146. We reject this because it was based on an attempt to make the figures add up rather than on a different reading of the manuscript. Haldon also rejects it but suggests the attractive emendation of "ἐξ αὐτῶν τῶν Ρουσίων ..." to "ἐξ αὐτῶν τῶν ρ΄ οὐσίων ..." on the grounds that the *Rhōs* are always referrred to elsewhere as Ῥῶς not Ῥουσίων. See "Theory and practice", p. 219. Since we are not convinced that the figures were ever actually intended to add up, and since Haldon's emendation makes them come close to doing so in any case, we prefer his emendation to Treadgold's.

δρόμωνες κ΄ ἀνὰ οὐσιῶν β΄. οὐσίαι μ΄.

20 dromons, each of two *ousiai*. 40 *ousiai*.

3 οἱ Ῥῶς ἄνδρες φπδ΄ καὶ παιδία τὰ ποιοῦντα ταξειδεῦσαι ἄνδρες με΄, ὁμοῦ Ῥῶς χκθ΄.

The *Rhōs*, 584 men and servants going to campaign, 45 men: 629 *Rhōs* in all.

4 οἱ Τουλμάτζοι ἄνδρες τξη΄, οἱ αἰχμάλωτοι ἄνδρες ψ΄ [,ψ, Reiske][9]

The *Toulmatzoi*, 368 men; the prisoners, 700 men**.**

5 ἐάθησαν εἰς φύλαξιν τῆς πόλεως οἱ στρατηγοὶ ‹τῶν πλοϊμοθεμάτων· ὁ στρατηγὸς› τοῦ Αἰγαίου πελάγους μετὰ χελανδίων παμφύλων ς΄ ἀνὰ ἀνδρῶν ρκ΄ καὶ χελανδίων οὐσιακῶν δ΄ ἀνὰ ἀνδρῶν ρη΄.

For the guard of the City, the *stratēgoi* of *Aigaion Pelagos* with six *chelandia pamphyla*,* each of 120 men and 4 *ousiaka chelandia*, each of 108 men.

6 κατελείφθη δὲ καὶ μία οὐσία εἰς τὸ κόψαι τὴν τῆς ὀγδόης ἰνδ. [ικτίονος] ξυλήν.

Also left behind was one *ousia* to cut the wood for the eighth indiction.

7 ὁ στρατηγὸς τῆς Σάμου μετὰ χελανδίων παμφύλων ς΄ ἀνὰ ἀνδρῶν ρν΄ καὶ χελανδίων οὐσιακῶν ς΄ ἀνὰ ἀνδρῶν ρή.

The *stratēgos* of Samos with 6 *chelandia pamphyla*, each of 150 men, and 6 *chelandia ousiaka*, each of 108 men.

8 ἀπεστάλησαν δὲ μετὰ τοῦ πρωτοσπαθαρίου Ἰωάννου καὶ ἀσηκρήτης ἐν Ἀφρικῇ χελάνδια γ΄ καὶ δρόμονες δ΄ ἀνὰ ἀνδρῶν σκ΄.

There were sent away to Africa with the *prōtospatharios* and *asēkrētis* John, 3 *chelandia* and 4 dromons, each of 220 men.

9 ὁ στρατηγὸς τῶν Κιβυρραιωτῶν μετὰ χελανδίων παμφύλων ς΄ ἀνὰ ἀνδρῶν ρν΄ καὶ χελανδίων οὐσιακῶν ς΄ ἀνὰ ἀνδρῶν ρι΄·

The *stratēgos* of the *Kibyrrhaiōtai* with six *chelandia pamphyla*, each of 150 men and 6 *chelandia ousiaka*, each of 110 men.[10]

10 κατελείφθη δὲ καὶ εἰς φύλα-

There were also left behind as

[9] A printing error for ψ΄ 700.

[10] Treadgold emended "ρι΄" [110] to "ρη΄" [108]. See Treadgold, "Army", p. 146. However, this was not based on a re-reading of the manuscript but rather on analogy to the figures elsewhere. We see no necessity to make the emendation because of the close approximation of the figures in any case and because of the analogy with the 110 men of the *ousiai* for the dromons.

ξιν τοῦ θέματος πάμφυλοι β΄, οὐσιακὰ δ΄. Κατελείφθη δὲ καὶ εἰς τὸ κόψαι τὴν τῆς ὀγδόης ἰνδικτίονος ξυλῆν οὐσίαι β΄.

a guard for the theme 2 *pamphyloi*, 4 *ousiaka [chelandia]*. There were also left behind 2 *ousiai* to cut wood for the eighth indiction.

11 κατελείφθη δὲ καὶ εἰς φύλαξιν τοῦ κυροῦ Στεφάνου τοῦ γυναικαδελφοῦ τοῦ βασιλέως ἐν Ῥόδῳ οὐσία α΄ καὶ δρομόνων δ΄ ἀνὰ ἀνδρῶν σκ΄.

There were also left behind in Rhodes to guard[11] the lord Stephen, the brother in law of the emperor, one *ousia* and 4 dromons, each of 220 men.

12 γαλέαι τῆς Ἀτταλίας ιε΄. ἐξ αὐτῶν κατελείφθη εἰς φύλαξιν τοῦ θέματος γαλέαι ς΄.

15 *galeai* of Antalya. Of these 6 *galeai* were left behind as a guard for the theme.

13 γαλέαι τῆς Ἀντιοχείας β΄. Κατελείφθησαν καὶ αὗται εἰς φύλαξιν τοῦ αὐτοῦ θέματος.

Two *galeai* of Antioch. These were also left behind as a guard for the same theme.

14 γαλέαι τῆς Καρπάθου. Κατελείφθησαν εἰς φύλαξιν τῆς νήσου Καρπάθου γαλέα α΄.

Galeai of Karpathos. There was left behind one *galea* as a guard for the island of Karpathos.

15 ἀπὸ τοῦ θέματος Πελοποννήσου ὁ τουρμάρχης τῆς παραλίου μετὰ χελανδίων δ΄.

From the theme of Peloponnesos the *tourmarchēs** of the coast with four *chelandia*.

……. …….

[b].II[12]

Ἔστιν ἡ ἐξόπλισις δρόμονος α΄ The arming of one dromon is

[11] To watch him rather than to protect him. He was a prisoner. This was Stephen Lekapēnos, son of emperor Rōmanos I Lekapēnos and brother in law of Constantine VII through the marriage of the latter to his sister Helena in 919. On 20 December 944 Stephen and his brother Constantine deposed their father in order to prevent the accession of Constantine VII, to whom Rōmanos had given precedence over them in his will of 943. When Constantine VII seized the throne outright on 27 January 945, Stephen and Constantine Lekapēnos were sent into prison in exile. The former was sent first to Prōtē in the Princes' islands in the Sea of Marmara, then to *Proikonnēsos*, then to Rhodes, and later to Mitylēnē. He died in 967.

[12] Haldon, "Theory and practice", p. 225.

1	κλιβάνια ο΄.	70 *klibania** (lamellar corselets)
2	λωρίκια ψιλὰ λόγῳ τῶν πρωτοκαράβων καὶ σιφωναρίων καὶ προρέων ιβ΄,	12 *lōrikia** (light hauberks) for the helmsmen and the operators of the *siphōnes** and the bow hands*
3	ἕτερα λωρίκια κοινὰ ι΄,	10 other standard corselets
4	κασίδια π΄,	80 helmets
5	αὐτοπρόσωπα ι΄,	10 helmets with visors
6	χειρόψελλα ζυγαὶ η΄,	8 pairs of vambraces
7	σπαθία ρ΄,	100 swords
8	σκουτάρια ῥαπτὰ ο΄,	70 sewn shields
9	σκουτάρια Λυδιάτικα λ΄,	30 "Lydian" shields
10	κοντάρια μετὰ τριβελλίων π΄,	80 trident pikes (corseques)
11	λογχοδρέπανα κ΄,	20 *longchodrepana** (lance-sickles) (rigging cutters)
12	μεναύλια ρ΄,	100 pikes
13	ῥικτάρια ρ΄,	100 javelins
14	τοξαρέας Ῥωμαίας σὺν κόρδων διπλῶν ν΄,	50 "Roman" bows with double strings[13]
15	ναύκλας μετὰ χειροτοξοβολίστρων καὶ χόρδων μεταξοτῶν κ΄,	20 *navklai** with *cheirotoxobolistrai** (hand-spanned crossbows) and silk strings[14]
16	σαγίτας χιλιάδας ι΄,	10,000 arrows
17	μῦας σ΄,	200 "mice/flies" (quarrels)[15]
18	τριβόλια χιλιάδας ι΄,	10,000 caltrops
19	ἀγρίφους μετὰ ἀλυσιδίων δ΄,	4 grapnels with chains
20	ἐπιλώρικα ν΄,	50 surcoats
21	καμελαύκια ν΄,	50 *kamelaukia**
22	ὁ δρόμων ὀφείλει ἔχειν ἄνδρας τ΄, οἱ μὲν σλ΄ πλόϊμοι κωπηλάται ἤτοι καὶ πολεμισταί, καὶ οἱ ἕτεροι ο΄ ἄνδρες πολεμισταὶ ἀπὸ τῶν καβαλλαρικῶν θεμάτων καὶ ἀπὸ τῶν ἐθνικῶν.	The dromon should have 300 men, of these 230 men of the ship [should be] oarsmen and also marines, and the other 70 men marines from the cavalry *themata* and the barbarians.

[13] See Haldon, "Theory and practice", p. 271.
[14] See Haldon, "Theory and practice", pp. 271-2.
[15] See Haldon, "Theory and practice", p. 273 & n. 111.

	διὰ τῶν ἓξ παμφύλων	for the six *pamphyloi*
23	δόρκας ὅσας ὁδηγήσει ὁ Θεὸς τὸν βασιλέα τὸν ἅγιον·	as many hide shields as God may guide the holy emperor [to provide]
24	κλιβάνια ἀνὰ ξ΄,	60 lamellar corselets each
25	κασίδια ἀνὰ ξ΄,	60 helmets each
26	λωρίκια ἀνὰ ι΄.	10 hauberks each
	διὰ τῶν οὐσιακῶν χελανδίων	for the *ousiaka chelandia*
27	κλιβάνια ἀνὰ ι΄,	10 lamellar corselets each
28	κασίδια ἀνὰ ι΄,	10 helmets each
29	λωρίκια ψιλὰ β΄, καὶ κοινὰ η΄.	2 light hauberks and 8 standard ones
	…….	…….

[b].III[16]

	Διὰ τῶν ὀφειλόντων φροντισθῆναι ἀπὸ τοῦ σεκρέτου τοῦ εἰδικοῦ εἰς ἐξόπλισιν τῶν κ΄ δρομονίων	Concerning the equipment which should have been provided by the Department of the *Eidikon* for the arming of 20 dromons
1	μολίβιν [Μολίβιον, Reiske] λόγῳ τῶν κολυμβωμάτων [καλυμβομάτων, Reiske] ἀνὰ χαρτῶν ε΄. ὁμοῦ χάρται ρ΄, σταθμίον [στι, Reiske] λίτραι γ.	5 sheets of lead each for the *ka(o)lymbomatoi*,* total of 100 sheets, weighing 3,000 *litrai*
2	βυρσάρια λόγῳ τῶν αὐτῶν κολυμβωμάτων [καλυβομάτων, Reiske] κ΄,	20 hides for the same *kolymbomatoi*[17]
3	πέταλα μεγάλα [λόγω/] πορτῶν τ΄,	300 large *petala* of *portai*[18]

[16] Haldon, "Theory and practice", p. 227.
[17] See Haldon, "Theory and practice", pp. 227-8.
[18] Elsewhere, the inventories use a similar phrase in specifying various items of gear needed for siege engines. See Haldon, "Theory and practice", pp. 225, 227 and

4	τριβόλια χιλιάδες φ΄,	500,000 caltrops[19]
5	πελέκια σ΄,	200 double-bladed battle axes
6	τζικούρια φ΄,	500 single-bladed battle axes
7	κέντουκλα κατὰ περίσσειαν σ΄,	200 extra [lengths of] felt
8	ἀρμενόπουλα κατὰ περίσσειαν ρ΄,	100 extra *armenopoula** (small sails)
9	χάλκωμα ἀργὸν λίτραι σ΄,	200 *litrai* of unworked bronze
10	κασσίτερον λίτραι σ΄,	200 *litrai* of tin
11	μολίβιν [μολίβιον, Reiske] ἀργὸν λίτραι σ΄,	200 *litrai* of unworked lead
12	κηρὶν [κηρίον, Reiske] λίτραι ρ΄,	100 *litrai* of wax
13	σκαφίδια σ΄,	200 spades
14	καλδάρια σ΄,	200 tubs
15	καπούλια χιλιάδας β΄,	2,000 levers[20]
16	πτυάρια χιλιάδα α΄,	1,000 spades
17	κόρδας μεταξωτὰς παχέας σπαρτίνας ε΄,	5 heavy silk-spartum bow strings[21]
18	καὶ εἰς τὰς μικρὰς τοξοβολίστρας σπαρτίνας ε΄,	and another 5 spartum [bow strings] for the small bow-*ballistae**
19	βυρσάρια λόγῳ τῶν χελανδίων ρ΄,	100 hides for the *chelandia*
20	κάδους ρ΄,	100 *kadoi** (amphorae)
21	ἀτέγια κιλικέϊνα κατὰ δρομώνιν [δρομόνιον, Reiske] ι΄, ὁμοῦ σ΄,	10 "Cilician" [goat's hair] covers for each dromon, in total 200
22	σφενδόναι πετζέϊναι κδ΄.	24 leather slings

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cf. Constantine VII, *De cerimoniis*, II.45 (vol. 1, pp. 670, 671): "..., καὶ ἡ τούτων ἐξόπλισις. ... πέταλα πορτῶν λόγῳ ἐνδύσεως τῶν διαφόρων τροχιλίων, ...", "..., πέταλα πορτῶν εἰς τὰ τροχίλια σ΄, ...". Here the *petala* of the *portai* clearly had something to do with *trochilia*, the sheaves of blocks, or the blocks themselves.

A block has various parts - a "shell" (the casing) - a "sheave" (the pulley) - a "pin" (the spindle on which the sheave turns) - a "swallow" (the hole in which the sheave is set) - a "strop" (a rope around the casing to hold the casing together) - and an "eye" (a ring formed by running the strop around a ring to allow the block to be fastened to something else). *Porta* was not a classical Greek word but Latin *porta/portus* could have the sense of an "opening" or a "hole". *Petaleion/petalon* could mean a "leaf", hence something flat and round, a plate, or a covering over something. Our best guess at the meaning of *petala* of *portai* is therefore the casings of the swallows of blocks. Cf. Haldon, "Theory and practice", p. 276.

[19] See Haldon, "Theory and practice", p. 278.

[20] Cf. Haldon, "Theory and practice", p. 276.

[21] See Haldon, "Theory and practice", p. 278.

23	Ιστέον, ὅτι ἡ ἔξοδος τῶν ἀρμένων καὶ τῶν διφθερίων ὀφείλει ἐξέρχεσθαι ἀπο τὸ εἰδικόν.	Note that the expense of the sails and the leather [screens] should come from the *Eidikon*.

[b].IV[22]

	Διὰ τῶν ὀφειλόντων φροντισθῆναι ἀπὸ τοῦ σεκρέτου τοῦ βασιλικοῦ βεστιαρίου εἰς ἐξόπλισιν τῶν κ΄ δρομονίων.	Concerning the equipment which should have been provided by the Department of the *Vestiarion basilikon* for the arming of 20 dromons
1	Σιφώνια ἀνὰ γ΄, ὁμοῦ ξ΄,	3 *siphōnia* each, in total 60[23]
2	καὶ κατὰ περίσσειαν γονάτια ἀκόντια μετὰ βουκολίων μ΄,	and 40 extra *gonatia akontia** for the *boukolia** [of the *siphōnia*][24]
3	ἄρμενα κ΄,	20 sails
4	διφθέρια ξ΄,	60 leather [screens]
5	παραπελέκια κ΄,	20 anti-axe [screens]
6	καστελώματα [καστελόματα, Reiske] κατὰ τύπον,	*kastelōmata** (pavesades) according to the norm
7	μανικέλια ἀνὰ ν΄, ὁμοῦ ͵α σὺν τῶν γονατίων αὐτῶν,	50 *manikelia** (oar sleeves) each, in total 1,000, together with their *gonatia**
8	κωπία ἀνὰ ρκ΄, ὁμοῦ ͵βυ΄,	120 oars each, in total 2,400
9	χαλκίσια κ΄ μετὰ καὶ τὰ λοιπὰ μάγγανα,	20 *chalkisia** (block masts), together with the rest of the *mangana** (blocks)[25]
10	ψελλία κ΄,	20 *psellia** (parrels)
11	μαξιλάρια μ΄,	40 fenders?[26]

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[22] Haldon, "Theory and practice", p. 227. Most of the items in this list are repeated in the inventories, together with others, in another list of additional items provided from the treasury of the *Vestiarion basilikon* to the *droungarios tou ploimou**. See Part F below.

[23] See Haldon, "Theory and practice", pp. 278-80.

[24] See Haldon, "Theory and practice", pp. 280-81.

[25] Cf. Haldon, "Theory and practice", p. 281.

[26] Μαξιλάριον was not a classical Greek term. Haldon suggests that its meaning was related to that of Modern Greek μαξιλάρι (*maxilari*) a pillow or cushion and a "fender" in a nautical context. See Haldon, "Theory and practice", p. 281. The reservation that we have about this is that two fenders per dromon seems very few.

12	περόνια κ΄, καταπρόσωπα σὺν τῶν κατακοράκων αὐτῶν,	20 *peronia** (spurs), the *kataprosōpa** (face things) [of the bows] together with their *katakorakes** (couplings)[27]
13	σίδηρα βολιστικὰ ρκ΄,	120 *sidēra bolistika** (anchors)
14	σιδηροβόλια ρκ΄,	120 *sidērobolia** (anchor chains)
15	ἀναγοκατάγοντα σὺν τῶν ἱμανταρίων αὐτῶν κ΄,	20 *anagokatagonta** (windlasses) with their cables[28]
16	περιπετόμενα ἀνὰ κδ΄, ὁμοῦ υπ΄,	24 *peripetomena**[29] each, in total 480
17	φιλουρέαι ἀνὰ ιβ΄, ὁμοῦ σμ΄,	12 Linden cables (cables made from the inner bark of the Linden tree) each, in total 240
18	σείστας σ΄,	200 crowbars
19	τζόκους υ΄,	400 sledge-hammers
20	ἀξινορύγια υ΄,	400 mattocks
21	περόνας κατὰ περίσσειαν σ΄	200 extra belaying pins
22	καρφὶν ἁρπάγίν [καρφίον ἁρπάγιον, Reiske] χιλιάδας γ΄,	3,000 hooked/barbed spikes
23	γυλαρικὸν[30] καρφὶν [καρφίον, Reiske] ,γ,	3,000 screw spikes
24	τετραδακτυλιαῖον καρφὶν [καρφίον, Reiske] ,ς,	6,000 "four-finger-long" spikes
25	καὶ τῆς παρηλώσεως χιλιάδες ιβ΄,	and 12,000 for fastening
26	σίδηρον ἀργὸν λίτραι ,γ,	3,000 *litrai* of unworked iron
27	κατζία π΄.	80 braziers

[27] Haldon, "Theory and practice", pp. 227, n. 83, 281-3, points out that this entry can be read in two ways. As it stands with the punctuation of the manuscript, it can be read as two separate items: "20 *peronia*. The *kataprosōpa* together with their *katakorakes*." If the full stop is removed, however, the text can be read as a single item. We prefer this because otherwise the specification "καταπρόσωπα σὺν τῶν κατακοράκων αὐτῶν" would have to stand as the only item in the entire list not given a numerical value and because we have made sense of what *kataprosōpa* and *katakorakes* probably meant in the context of *peronia*. See above pp. 208-9.

[28] See Haldon, "Theory and practice", p. 283.

[29] Cf. Haldon, "Theory and practice", p. 283.

[30] Cf. G.13: γυραρικὸν.

[b].V[31]

	Ὑπὲρ ἐξοπλίσεως τετραρέων [τετραραίων, Reiske] δ΄, λαβδαρέων δ΄, μαγγανικῶν δ΄.	On the arming of four *tetrareai*, four *lambdareai*, four *manganika*[32]
1	κρικέλλια λ΄,	30 rings
2	πάγουροι ιε΄,	15 clamps[33]
3	ψελλία λ΄,	30 shackles/parrels?
4	καὶ λόγῳ τῶν μεγάλων τοξοβολίστρων,	and for the large bow-*ballistae*,
5	κριοὶ εἰς τὰς χελώνας ιε΄,	15 rams for the tortoises,
6	δακτύλιοι ιε΄,	15 bolts
7	βαρέας μεγάλας κ΄,	20 large weights
8	καὶ μικροτέρας λ΄,	and 30 smaller [ones]
9	καὶ λόγῳ τῶν μεγάλων τοξοβολίστρων σίδηρα κατὰ τύπον,	and iron/chains? for the large bow-*ballistae* according to the norm
10	πίσσα λίτραι χιλιάδες ι΄,	10,000 *litrai* of pitch
11	ὑγροπίσσιν μαγαρικὰ στρογγύλα τ΄,	300 round pots of liquid pitch
12	κεδρέα μαγαρικὰ ν΄,	50 pots of pine distillate[34]
13	λινάριν [λινάριον, Reiske] λίτραι χιλιάδες η΄,	8,000 *litrai* of linen
14	κανάβιν [κανάβιον, Reiske] χιλιάδες β΄,	2,000 *litrai* of hemp

[31] Haldon, "Theory and practice", p. 229. This inventory is a confused, composite one which incorporates items both for engines and also for ships. At least by item 10 the inventory has moved to items for ships and it is entirely possible that in fact the entire inventory should in fact belong to the previous inventory for the 20 dromons.

[32] The latest discussion of these engines is in Haldon, "Theory and practice", pp. 273-5, who argues that τετραρέα were catapults powered by men hauling on ropes (such as are frequently depicted in medieval manuscripts of chronicles of the Crusades), that λαβδαρέα were either another form of stone throwers or a three-legged anti-personnel device set up around encampments to hinder enemy attacks, and μαγγανικά, some sort of large bow-*ballistae* using blocks and tackles to draw them.

[33] The coincidence between items E.2, 3, 5 and items G.7, 8, 9 below again casts doubt on the authenticity of this inventory.

[34] According to Pliny, *pix* and *cedrium* were distillates from the wood of the pitch pine: *taeda*. See Pliny, *Natural history*, XVI.21-2 [52-3] (vol. 4, pp. 420-23): "Pix liquida in Europa e taeda coquitur, navalibus muniendis multosque alios ad usus. lignum eius concisum furnis undique igni extra circumdato fervet. primus sudor aquae fluit canali; hoc in Syria cedrium vocatur, cui tanta vis est ut in Aegypto corpora hominum defunctorum perfusa eo serventur. sequens liquor crassior iam picem fundit; ...". See also Meiggs, *Trees and timber*, pp. 410-16, 467-71.

15	σανδάλους κ΄,	20 ship's boats[35]
16	σφενδόναι σιδηραῖ ιβ΄,	12 iron slings
17	σιδηροβολιστικὰ κατὰ περίσσειαν ν΄,	50 extra iron anchors
18	σιδηρόβολα ν΄,	50 anchor chains
19	φιλουρέαι ρ΄,	100 Linden cables
20	περιπετόμενα ρ΄,	100 *peripetomena*
21	σπαρτίνας ρ΄,	100 *spartinai** (*spartum* cables)
22	λεπτάρια σ΄,	200 *leptaria**
23	τετράκουλα εἰς τὰ σιφώνια ρ΄,	100 *tetrakoula** for the *siphōnia*[36]
24	λινάριον εἰς τοὺς σφόγγους ν΄ [υ΄, Reiske],	50 [400] *linaria* (some things made of flax) for the *sphongoi** (sponges)
25	σκαλοδέματα υ΄.	400 *skalodemata** (mooring cables)[37]
26	οἱ ‹ὀκτω;› [πεντήκοντα, Reiske], πάμφυλοι σιφώνια κδ΄·	24 *siphōnia* for the 8 [50] *pamphyloi*
27	τὰ μ΄ οὐσιακὰ σιφώνια π΄.	80 *siphōnia* for 40 *ousiaka* [ships]
28	καρφὶν [καρφίον, Reiske], στεγαδερὸν χιλιάδες ς΄.	6,000 deck nails

[b].VI[38]

Τὰ ἀπὸ τοῦ σεκρέτου τοῦ εἰδικοῦ ἐξοδιασθέντα ὑπὲρ τοῦ ταξειδίου τῆς Κρήτης	What was expended from the Department of the *Eidikon* for the expedition to Crete

[35] By this point the inventory has certainly changed from items for engines to items for ships. *Sandaloi* were small boats, as in σανδάλιον, σάνδαλις, σάνδαλος. See Jal, *Glossaire nautique*, p. 1315. This would make no sense in the context of engines, unless the word had an unknown meaning with relation to them. The equation between the number of *sandaloi*, 20, and the 20 dromons in the previous inventory can hardly be coincidental.

[36] Cf. Haldon, "Theory and practice", p. 283.

[37] See Haldon, "Theory and practice", p. 283.

[38] Haldon, "Theory and practice", pp. 229, 231, 233. We have omitted some items in this inventory between items 1-2 and 21-2 which appear not to have been related to the naval forces *per se*.

1 Ἐπήρθη ἀπὸ τὸν ζυγὸν λόγῳ ἀγορᾶς διαφόρων εἰδῶν τοῦ ταξειδίου τῆς Κρήτης σὺν ἐξοπλίσει τῶν θ΄ Ῥουσικῶν καραβίων καὶ τῶν β΄ μονερίων τῶν αἰχμαλώτων σὺν τῶν ὁρισθέντων ἀπὸ κελεύσεως δοθῆναι τὰ κατὰ περίσσειαν διαφόρων εἰδῶν εἰς τὸν θεόσωστον βασιλικὸν στόλον τοῦ βασιλικοῦ πλοΐμου καὶ λοιπῶν χρυσοῦ [χ΄, Reiske] λίτραι κδ΄, τὰ καὶ ἐξοδιασθέντα οὕτως.

24 *litrai* in gold was taken from the mint for the purchase of various items for the expedition to Crete, together with the equipping of the 9 *karabia* of the *Rhōs* and the 2 *monēreis* of the prisoners, together with the various extra supplies and remaining items ordered by command to be given to the God-preserved imperial fleet of the imperial navy, and which was disbursed as follows.

…….. ……..

2 ἐδόθη ὑπὲρ ἀγορᾶς τῶν πανίων τῶν ῥασιακῶν λόγῳ ποιήσεως ἀρμένων ενὲα [ενέα, Reiske], ἀνὰ πηχῶν λ΄ τῶν θ΄ καραβίων τῶν Ῥῶς,

There were provided for the purchase of bolts of cloth for the manufacture of 9 sails, each of 30 *pecheis*, for the 9 *karabia** of the *Rhōs*,

3 καὶ ἑτέρων ἀρμένων β΄ ἀνὰ πηχῶν κη΄ τῶν β΄ μονερίων τῶν αἰχμαλώτων σὺν τῶν δοθέντων πανίων ῥασικῶν κατὰ περίσσειαν τοὺς αὐτοὺς Ῥῶς[39]

and another two sails, each of 28 *pecheis*, for the two *moneria** of the prisoners, together with extra bolts of cloth provided for the said *Rhōs*,

4 ὑπὲρ πανίων διὰ τῶν ἀμφοτέρων ‹νομίσματα›[40] ,αρνδ΄,

for the bolts for them [i.e., the ships] all, 1154 ‹*nomismata*›,[41]

5 τὰ καὶ ἀγορασθέντα ἀπὸ τοὺς ἀββάδας εἰς τὰ ἐνοικηκὰ

and which were purchased[42] from the monks as rent for[43]

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[39] Reiske and Haldon have a full stop here but it does not appear in the manuscript and we have omitted it since the whole sentence flows on to 1154 [nomismata].

[40] Additions supplied by Haldon are between arrows.

[41] See Haldon, "Theory and practice", p. 284. The figure of 1154 nomismata is impossibly high. Haldon suggests that the copyist of the manuscript mistook the abbreviation for nomismata for an α (the numerical figure for 1,000), thus inadvertently making "154 nominsmata" into "1154 ‹nomismata›". "Theory and practice", p. 229, n. 92.

[42] "ἀγορασθέντα ἀπὸ τοὺς ἀββάδας", which should mean "purchased from the monks", here clearly had the meaning of "paid by the monks".

τῆς μονῆς τοῦ κυροῦ Ῥωμανοῦ καὶ ἀπὸ τοὺς ἀναγναφαρίους τοῦ φόρου ‹καὶ› ἀπὸ διαφόρων προσώπων ‹διὰ› τῶν τριῶν, νομ. τκ΄ καὶ δ΄ [∠ δ, Reiske], τὰ καὶ ἀγορασθέντα κατενώπιον τοῦ σακελλαρίου καὶ τοῦ βεστιαρίου.

the monastery of the lord Rōmanos, and from the drapers on the market, ‹and› from various people, ‹for› the three [groups], 320 *nom[ismata]*, and 4 *miliaresia*, and that purchased under the supervision of the [Departments of the] *Sakellarios* and the *Vestiarion*.

6 ἐδόθησαν ὑπὲρ μισθοῦ τῶν ἁρμενοράφων τῶν καμόντων τὰ αὐτὰ ἄρμενα σὺν ἀγορᾶς νήματος ,, λγ΄.

There were provided for the payment of sailmakers who made the said sails, together with the purchase of thread, 33 *nomismata*.

7 ἐδόθη ὑπὲρ ἀγορᾶς ξυλοκεραίων λόγῳ τῶν αὐτῶν ια΄ καραβίων ,, ‹...›

There were provided for the purchase of wooden yards for the said 11 *karabia*, ? *nomismata*

8 ἐδόθη ὑπὲρ ἀγορᾶς σχοινίων λόγῳ κρυπτῶν ἐπικήρων καὶ ποδιοδρόμων τῶν αὐτῶν ια΄ ἁρμένων ,, γ΄.

There were provided for the purchase of cordage for the concealed waxed (or perishable) [boltropes] and sheets of the said 11 sails, three *nomismata*.[44]

9 ἐδόθη ὑπὲρ ἀγορᾶς διφθερίων ιδ΄, : ξβ΄, ὡς τῶν ἑτέρων ιθ΄ διφθερίων δοθέντων ἀπὸ τῶν ἀποκειμένων εἰς τὸ εἰδικόν.

There were provided for the purchase of 14 leather screens: 62 [*nomismata*], the other 19 leather screens having been provided from those stored in the *Eidikon*.

10 ἐδόθη ὑπὲρ ἀλειφῆς τῶν αὐτῶν διφθερίων ,, ζ΄ 0/μ [,, ζ 0/μ,

There were provided for the greasing of the said leather

[43] "εἰς τὰ ἐνοικηκὰ" possibly means "drawn on the rents of". Cf. Haldon, "Theory and practice", p. 228.

[44] Cf. Haldon, "Theory and practice", p. 284. The meaning of κρυπτὰ ἐπίκηρα and ποδιόδρομος is very unclear. Κρυπτὰ implies something concealed, ἐπίκηρα something either waxed or perishable. What they mean together is anybody's guess. Bolt ropes for the edges of the sails seems most probable. Waxed ropes used for the bolt ropes of sails might be concealed, but they would not be especially perishable. Ποδιόδρομος we have translated as "sheets" on the analogy to classical Greek ποῦς and medieval Latin and Italian *poggia/pozia* for a sheet of a sail. However, what the qualification δρόμος attached to ποδιό- here was meant to signify escapes us.

Reiske].

screens, seven *nomismata*, 0 [*miliaresia*].

11 ἐδόθη ὑπὲρ ἀγορᾶς μαγγάνων λόγῳ τῶν αὐτῶν ια΄ καραβίων ,, θ΄, ‹∠› ς΄ [,, θ ς΄, Reiske].

There were provided for the purchase of blocks for the said 11 *karabia*, 9 *nomismata*, 6 [*miliaresia*].

12 ἐδόθη ὑπὲρ ἀγορᾶς κωπίων τπε΄ ,, ε΄.

There were provided for the purchase of 385 oars, 5 *nomismata*.

13 ἐδόθη ὑπὲρ ναυπηγήσεως τῶν αὐτῶν ια΄ καραβίων τῶν τε σχιστῶν καὶ τῶν περιβόλων αὐτῶν καὶ λοιπῶν ,, ια΄.

There were provided for the construction of the said 11 *karabia*, both their *schistai** and their *periboloi*,* and everything else, 11 *nomismata*.

14 ἐδόθη ὑπὲρ καλαφατήσεως τῶν αὐτῶν ια΄ καραβίων ,, λγ΄.

There were provided for the caulking* of the said 11 *karabia*, 33 *nomismata*.

15 ἐδόθη ὑπὲρ ἀγορᾶς ἑτέρων πανίων ῥασιακῶν ρ΄ τῶν δοθέντων κατὰ περίσσειαν εἰς τὸν αὐτὸν στόλον ,, κη΄, ∠ ιβ΄.

There were provided for the purchase of another 100 bolts of cloth extra to that provided for the said fleet, 28 *nomismata*, 12 *miliaresia*.

16 ἐδόθη ὑπὲρ ἀγορᾶς βυρσαρίων βοείων ρκβ΄ ,, πη΄ 0/μ.

There were provided for the purchase of 122 ox hides, 88 *nomismata*, 0 [*miliaresia*].

17 ἐδόθη ὑπὲρ ἀγορᾶς κεντούκλων σ΄ τῶν δοθέντων κατὰ περίσσειαν ὁμοίως εἰς τὸ βασιλικὸν πλόϊμον ,, κη΄ 0/μ.

There were provided for the purchase of 200 [lengths of] felt, extra to those provided for the imperial ships, 28 *nomismata*, 0 [*miliaresia*].

18 ἐδόθη ὑπὲρ ἀγορᾶς κιλικίων ,α τῶν ς΄ ,, ρξς΄, ∠ ς΄.

There were provided for the purchase of 1,000 "Cilicians" (goats' hair covers), each at 6 [*miliaresia*], 166 *nomismata*, 6 *miliaresia*.

19 ἐδόθη ὑπὲρ ἀγορᾶς σχοινίων λεπταρίων καὶ χαρταρίων

There were provided for the purchase of cordage, *lepta-*

καὶ λοιπῆς ἐξόδου ,, ις΄ ∠ ς΄,

ria,* and *chartaria*[45] and the rest of the outlay, 16 *nomismata*, 6 *miliaresia*,

20 λόγῳ ποιῆσαι ἀτεγίων κιλικίνων ρ΄ ,, ρπγ 0/μ.

[There were provided] for the making of 100 "Cilician" (goats' hair) covers, 183 *nomismata*, 0 [*miliaresia*].

21 ἐδόθη ὑπὲρ ἀγορᾶς κασσιτέρου [κασιτέρου, Reiske] λίτραι σ΄ ,, λδ΄.

There were provided for the purchase of 200 *litrai* of tin, 34 *nomismata*.

…….. ……..

22 ἐδόθη ὑπὲρ ἀγορᾶς ἑτέρου κασσιτέρου [κασιτέρου, Reiske] λίτραι σ΄ τὰ δοθέντα Μιχαὴλ χυτῇ λόγῳ κατακολλήσεως διαφόρων ἔργων τῶν σιφουνίων τοῦ βασιλικοῦ πλοΐμου ,, λ, 0/μ.

There were provided for the purchase of another 200 *litrai* of tin, which was provided to the caster Michael for the brazing together of various parts of the siphons for the imperial fleet, 30 *nomismata*, 0 [*miliaresia*].

23 ἐδόθη ὑπὲρ ἀγορᾶς κηρίου λίτραι ρ΄ ,, ε΄.

There were provided for the purchase of 100 *litrai* of wax, 5 *nomismata*.

24 ἐδόθη ὑπὲρ ἀγορᾶς μολιβίου ἀργοῦ λίτραι σ΄ ,, δ΄.

There were provided for the purchase of 200 *litrai* of unworked lead, 4 *nomismata*.

25 ἐδόθη ὑπὲρ ἀγορᾶς χαλκώματος διαφόρου τῷ δοθέντι λόγῳ τῆς ὑπουργίας τοῦ δρουγγαρίου τοῦ πλοΐμου ὑπὲρ κακαβίων μεγάλων β΄, καὶ ἑτέρων κακαβίων μεσαίων β΄, καὶ χυτροκακαβίων γανωτῶν δ΄, καὶ κουκουμίων μεγάλων β΄, καὶ τιγανίων μεγάλων β΄, χαλκοσταμνίου γανωτοῦ

There were provided for the purchase of various [items] of bronze which was given for the service of the *droungarios* of the fleet, for two large cauldrons, and two other medium cauldrons, and four tinned pot-cauldrons, and two large kettles, and two large frying pans, one tinned bronze urn,

[45] What *chartaria* mean in this context is obscure. Haldon, "Theory and practice", p. 231, n. 102 suggests sheets or strips of anything, such as lead or leather.

	ἑνὸς, φλασκίων γανωτῶν β΄, χερνιβοξέστων β΄ ,, κδ΄.	two tinned flasks, two sets of pitcher and basin, 24 *nomismata*.
26	ὁμοῦ τὸ πᾶν ἔξοδος χρυσοῦ [χ΄, Reiske] λίτραι κα΄ ,, νζ΄, μιλιαρήσια ς΄.	In all, the total outlay [was] 21 *litrai* of gold, 57 *nomismata*, 6 *miliaresia* in gold.
27	ἐδόθησαν παρὰ τοῦ εἰδικοῦ κόρδαι μεταξωταὶ σπαρτίναι. ἐδόθησαν ἕτεραι κόρδαι μεταξωταὶ μικραὶ λόγῳ τῶν τοξοβολίστρων.	Silk and spartum bowstrings were provided from the *Eidikon*. Other small silk bowstrings were provided for the bow-ballistae.
28	ἐδόθη ὁμοίως παρὰ τοῦ εἰδικοῦ λόγῳ τῶν κολυμβωμάτων [καλυβομάτων, Reiske] τῶν χελανδίων τοῦ βασιλικοῦ πλοΐμου ἀνὰ χαρτίων ε΄ μολίβιν [μολίβιον, Reiske] χαρτία ρ΄, σταθμίον [στι, Reiske] λίτραι ,γ [γ΄, Reiske].	Likewise there were provided from the *Eidikon* for the *kolymbōmatoi* of the *chelandia* of the imperial ships, 5 sheets of lead each, 100 sheets, that is in weight 3,000 *litrai*.
29	ἐδόθη τὸν δρουγγάριον τοῦ πλοΐμου ἀπὸ τοῦ κάτω ἁρμαμέντου[46] [κατεπάνω τοῦ ἅρματος, Reiske]	There were provided to the *droungarios* of the fleet from the lower armoury
30	σπαθία ,γ,	3,000 swords
31	σκουτάρια ,γ,	3,000 shields
32	κοντάρια ,γ,	3,000 pikes
33	σαγίτας χιλιάδες σμ΄,	240,000 arrows
34	ἑτέρας σαγίτας λόγῳ τῶν τοξοβολίστρων μύας χιλιάδες δ΄.	another 4,000 arrows, [i.e.,] "mice/flies", for the bow-ballistae.

[b].VII[47]

Τὰ ἀπὸ τοῦ σεκρέτου τοῦ βεστιαρίου δοθέντα τῷ δρουγγαρίῳ τῶν πλοΐμων κατὰ	What was provided as additional [things] from the Department of the *Vestiarion*

[46] Emendation suggested by Oikonomides, "Τὸ κάτω ἁρμαμέντον".
[47] Haldon, "Theory and practice", p. 233.

	περίσσειαν ὑπὲρ τοῦ ταξειδίου τῆς Κρήτης.	to the *droungarios tōn ploimōn* for the expedition to Crete
1	σείστας ρν΄,	150 crowbars
2	περόνας τῶν χελανδίων ρλ΄,	130 *peronai* for the *chelandia*
3	σφενδόβολα σιδηρᾶ ιβ΄,	12 iron slings
4	τζόκους σμ΄,	240 sledge hammers
5	τζαπία τ΄,	300 mattocks
6	περόνια σιδηρᾶ μεγάλα τοῦ ξυλοκάστρου ιβ΄,	12 large iron *peronia* for the *xylokastron**
7	πάγουροι σιδηροῖ ιε΄,	15 iron "crabs" (clamps?)
8	ψελλία σιδηρᾶ λ΄,	30 iron hoops (shackles?)
9	δάκτυλοι ιε΄,	15 "fingers" (bolts?)
10	κατζία η΄,	8 braziers
11	βαρέας ι΄,	10 weights[48]
12	χειροβαρέαι κδ΄,	24 hand weights
13	καρφὶν [καρφίον, Reiske] γυραρικὸν[49] χιλιάδες δ΄,	4,000 screw spikes
14	καρφὶν ἁρπάγιν [καρφίον ἁρπάγιον, Reiske] χιλιάδες β΄,	2,000 hooked/barbed spikes
15	τετραδακτυλαῖον ,ε,	5,000 [spikes] "four-finger-long"
16	τῆς παρηλώσεως ,η,	8,000 [spikes] for fastening
17	στεγαδερὸν ,ς,	6,000 deck nails
18	ἀκόντια χαλκᾶ ιε΄,	15 bronze [headed] *akontia**(boathooks)[50]
19	γανωτὰ χαλκᾶ λ΄,	30 tinned bronze [somethings][51]

[48] Cf. Haldon, "Theory and practice", p. 276.

[49] Cf. D.23: γυλαρικὸν.

[50] In classical Greek a κοντος could be a gaff or boathook. See Jal, *Glossaire nautique*, p. 890. Obviously one would not make the entire implement from bronze but might well make the head from bronze rather than iron in order to resist corrosion. Cf. above p. 404.

[51] This and the following three items look suspiciously like cooking equipment. The tinned bronze [somethings] may well have been tinned cooking pots. Cooking in untinned bronze or copper pots is not a good idea; even though many bronze cooking pots have been found in Byzantine contexts, for example in the seventh-century Yassı Ada shipwreck. See Bass, et al., *Yassi Ada volume I*, 269-73. Haldon, "Theory and practice", p. 284 suggests that *drakton* was derived from δράξ or δράγμα, for a handful, and that a *paradraktion* would be a cup or vessel of some kind. He suggests that here the word may have referred to some part of a block and tackle system and points out that the verb δράω/δράσσομαι is used in the *Stratēgikon* of Kekaumenos for

20	παραδράκτια χαλκᾶ λ΄,	30 bronze *paradraktia*[52]
21	βουτία χαλκᾶ λ΄,	30 bronze *boutia**
22	ἀναγοντιτέα χαλκᾶ ιε΄,	15 bronze *anagontitea**[53]
23	σχοινία σιδηρόβολα ξ΄,	60 *schoinia sidērobola* (iron anchor chains)
24	περιπετόμενα ρμ΄,	140 *peripetomena*
25	σπαρτίνας ρμ΄,	140 *spartinai* (spartum cables)
26	λεπτάρια σκ΄,	220 *leptaria*
27	σκαλοδέματα τ΄,	300 *skalodemata* (mooring cables)
28	κουβάρια ρ΄,	100 *koubaria**[54]
29	κανάβι [κανάβιον, Reiske] λίτραι ,β,	2,000 *litrai* of hemp
30	καὶ ἀντὶ λιναρίου χιλιάδων ζ΄, ,, π΄,	and instead of 7,000 [*litrai*] of linen, 80 *nomismata*
31	καὶ ὑπὲρ ἀγορᾶς πίσσης χιλιάδες ι΄, καὶ ὑγροπισσίου χιλιάδες τ΄, καὶ κεδρέας χιλιάδες ρ΄, ,, κγ΄,	and for the purchase of 10,000 [*litrai*] of pitch, and 300,000 [*litrai*] of liquid pitch, and 100,000 [*litrai*] of cedar resin, 23 *nomismata*
32	σίδηρον ἀργὸν λίτραι ,γ,	3,000 *litrai* of unworked iron
33	κριοὶ σιδηροῖ μεγάλοι ι΄.	10 large iron “rams”

siege hooks, ἁρπαγαί (*harpagai*), lowered from walls to seize the rams of attackers. Against this we consider that they may have been bronze tripods or something similar with hooks for suspending pots over fires. The bronze *boutia* were almost certainly bronze buckets or tubs with handles for carrying or hanging.

[52] See Haldon, “Theory and practice”, p. 284.

[53] See Haldon, “Theory and practice”, p. 284.

[54] See Haldon, “Theory and practice”, p. 284.

APPENDIX FIVE

NIKĒPHOROS OURANOS, *ΠΕΡΙ ΤΗΑΛΑΣΣΟΜΑΧΙΑΣ*, EDITION AND TRANSLATION[1]

Technical terms, the understanding and translation of which are discussed elsewhere in the text or appendices, are asterisked the first time they are used. They may be accessed through the Index.

[1] Edited from a microfilm of the fourteenth-century manuscript Munich, Bayerische Staatsbibliothek, Cod. Monac. 452, folios 82r-89v, referred to by Dain and hereafter here also as MS. N. Dain had wished to publish his edition from this manuscript but his transcripts were lost in the War and he was compelled to use those he had made from the sixteenth-century manuscript, Florence, Biblioteca Medicea Laurenziana, MS. Laurentianus LVII-31, referred to by Dain and hereafter here also as MS. l. MS. l was copied from MS. N at Corfu by Antonios Eparchos in 1564. We have compared the Laurentian manuscript to the Munich one but have noted readings from the former only where they effect the understanding of the text.

The text in MS. N (Cod. Monac. 452) is not rubricated. It has no titles and lacks the initial letters of paragraphs, which were no doubt intended to be added in red later. It also has no paragraph numbers in the manuscript. A heading has been added in a later hand: *Περὶ τοῦ γινομένου εἰς τὴν θαλάσσαν στόλου* (*Concerning an expedition taking place at sea*). However, for the sake of convenience we have retained Dain's invented title, *Περὶ θαλασσομαχίας*, and his paragraph numbering.

Phonetic orthographic variants in the manuscript have not been noticed; for example, the oblique cases of δρομων- are frequently spelled δρωμων-.

Περὶ Θαλασσομαχίας

1 Ἀφ᾽ ἧ˝ δὲ εἴπομεν ταῦτα ἀπαρτὶ ἵνα διαταξώμεθά σοι καὶ περὶ τῆς γινομένης εἰς τὴν θάλασσαν μάχης διὰ τῶν δρομώνων· πλὴν εἰς μὲν τὰ πολλὰ[2] τακτικα οὐδὲν εὕρομεν περὶ αὐτῆς, ἐξ ὧν δὲ ἔγνωμεν ἡμεῖς σκορπιστὰ ὧδε καὶ ἐκεῖ καὶ εἰς ὅσα ἐλάβομεν ὀλίγην πεῖραν. Ἐξ ὧν ἀνεμάθομεν παρὰ τῶν πλοΐμων στρατηγῶν τῆς βασιλείας ἡμῶν — ἄλλα μὲν γὰρ ἐποίησαν ἐκεῖνοι ὄπισθεν, ἄλλα δὲ ἔπαθον ὕστερον — ἐκ τούτων ἡμεῖς ἀναλεξάμενοι ὀλίγα ὅσον ἀφορμὴν δοῦναι τοῖς μέλλουσι μάχεσθαι καὶ εἰς τὴν θάλασσαν διὰ τῶν δρομώνων ἵνα διορισώμεθα ἐν ὀλίγοις λόγοι˝.

2 Πρῶτον μέν, στρατηγὲ, τοῦ στόλου ὀφείλει˝ ἔχειν πει῀ραν καὶ γινώσκειν τῶν ἀέρων καὶ ἀνέμων τας κινήσεις· ἵνα δὲ προσκοπῇς καὶ προγινώσκῃς αὐτας ἀπὸ τῶν φαινομένων ἀστέρων καὶ ἀπὸ τῶν σημαδίων τῶν γινομένων εἰς τὰ ἄστρα καὶ εἰς τὸν ἥλιον καὶ εἰς τὴν σελήνην. Ἁρμόζει δὲ γινώσκειν καὶ σὲ τὰς ἐναλλαγὰς τὴν καιρῶν· ἀπὸ γὰρ τοῦ ἔχειν πεῖραν εἰς αὐτὰ φυλάττεσθαι ἔχεις ἀσφαλης καὶ ἀκίνδυνος ἀπὸ τῶν χειμώνων τῆς θαλάσσης.

3 Ἁρμόζει καμωθῆναι καὶ δρόμωνας εἰς πόλεμον τῶν πολεμίων ἀρκοῦντας τὸν διὰ θαλάσσης· πλὴν ὥς ἐστιν ἡ κατάστασις τοῦ στόλου τῶν πολεμίων, οὕτως ἵνα ποιήσῃς καὶ σὺ τὴν κατασκευὴν τῶν σῶν δρομώνων δυνατὴν εἰς πάντα προς τὸ ἀντιμάχεσθαι. Ἡ δὲ κατασκευὴ τῶν δρομώνων μήτε πολὺ ἔστω παχεῖα, ἵνα μὴ γένωνται ἀργοὶ εἰς τὰς ἐλασίας, μήτε πάλιν κατὰ πολὺ λεπτή, ἵνα μὴ ὑπάρχῃ ἀδύνατος καὶ σαθρὰ καὶ παραλυθῇ ταχέως ὑπὸ τῶν κυμάτων καὶ ὑπὸ τῆς συγκρούσεως τῶν πολεμίων, ἀλλὰ σύμμετρον ἐχέτω τὴν κατασκευὴν ὁ δρόμων, ἵνα καὶ ἐλαυνόμενος μὴ ὑπάρχῃ ἀργὸς πολὺ, καὶ κλυδωνιζόμενος ὑπὸ τῶν κυμάτων ἵνα μὴ παραλύηται, ἢ συγκρουόμενος παρὰ τω῀ν ἐχθρῶν ἵνα εὑρίσκηται παρ᾽ αὐτοὺς ἰσχυρότερος.

4 Ἐχέτωσαν δὲ οἱ δρόμωνες ἀνελλιπη῀ καὶ διπλᾶ πάντα τὰ προς ὅπλισιν αὐτῶν, οἷον αὐχένια, κωπία, σκαρμούς, τροπωτῆρας καὶ τὰ ἄρμενὰ δὲ αὐτῶν καὶ κερατάρια καὶ κατάρτια καὶ ἄλλα ὅσα ἡ ναυτικὴ τέχνη ἀπαιτεῖ. Ἐχέτω δὲ ὁ δρόμων καὶ ἐκ περισ-

[2] Πολλὰ MS. N: παλαιὰ MS. l.

On fighting at sea

1 **(= Leo VI, §1)** After speaking of these points let me now discuss with you the warfare that takes place at sea with dromons. We have found nothing on this except in many tactical [manuals], from which I have gathered [some information] scattered here and there, and from events in which we acquired a little experience. On some matters we learned from the naval *stratēgoi** of our empire[3] some things [that] they had done previously [and] others they suffered later. Having selected a few points from these that can give an introduction to those intending to fight also at sea with dromons, let me set [these] out in succinct words.

2 **(= Leo VI, §2)** First, *stratēgos*, you should have experience of the fleet and should know the movements of the airs and winds. You should look out for and anticipate these from the stars that appear and from the signs that happen in the stars, the sun, and the moon. It is appropriate for you to have knowledge of the changes of the seasons, for from experience in these you may be preserved safe and sound from storms at sea.

3 **(= Leo VI, §§3, 4)** It is appropriate that dromons should be built [that are] adequate for fighting the enemy at sea. However, you should make the equipment of your dromons correspond to the condition of the fleet of the enemy [and] able to withstand them in all respects. The construction of the dromons should be neither too heavy, or they will be sluggish when under way, nor on the other hand too light**,** or they will be weak and unsound and quickly broken up by the waves or the attacks of the enemy. Let the dromon have suitable construction, so that it is not sluggish when sailing and is not broken up by waves in a gale and, when struck by the enemy, proves stronger than them.

4 **(= Leo VI, §5)** The dromons should have a complete supply in duplicate of their tackle, such as rudders (*auchēnes**), oars, tholes (*skarmoi**), oar-grommets (*tropōtēres**), and their sails and yards and masts and everything the nautical art demands.

[3] Note that even though Nikēphoros Ouranos was only a *magistros* himself and not, of course, emperor, he preserved Leo VI's syntax here and elsewhere, and wrote as though he were the emperor.

σοῦ ξύλα τινὰ κάτω εἰς τὸν πάτον καὶ σανίδας καὶ στυππεῖα καὶ πίσσαν καὶ ὑγρόπισσον· καὶ ναυπηγὸν ἕνα ἐκ τῶν ἐλατῶν μετὰ πάντων τῶν ἐργαλείων αὐτου῎ οἷον σκεπάρνου, τρυπάνου, πρίονος καὶ εἴ τι ὅμοιον.

5 Ἐχέτω δὲ ὁ δρόμων τὸν σίφωνα ἔμπροσθεν εἰς τὴν πρῴραν καλοένδυτον[4], ὡς ἔχει ἡ συνήθεια, ἵνα δι᾽ αὐτοῦ ἀπολύῃ τὸ σκευαστὸν πῦρ κατὰ τῶν ἐχθρῶν. ῎Ανωθεν δὲ τοῦ τοιούτου σίφωνος ἐχέτω ὡς πάτον ἀπὸ σανίδων περιτετειχισμένον[5] γυρόθεν[6] μετὰ σανίδων, προς τὸ ἵστασθαι εἰς αὐτὸ ἄνδρας πολεμιστὰς οἵτινες ἵνα μάχωνται πρὸς τοὺς ἐπερχομένου῎ ἀπὸ τῆς πρῴρας πολεμίους ἢ καὶ βέλη ὅσα ἂν θέλωσι καὶ ἐπινοήσωσιν ἵνα ῥίπτωσιν ἀπ᾽ ἐκεῖ οὐκ εἰς τὴν πρῴραν καὶ εἰς τὴν πρύμναν τοῦ πολεμικοῦ, ἀλλὰ καὶ εἰς ὅλον τὸ πολεμικόν.

6 Ἀλλὰ καὶ τὰ ξυλόκαστρα περιτετειχισμένα ὑπὸ σανίδων ἵνα στήκωσιν εἰς τοὺς μεγάλους δρόμωνας πρὸς τὸ μέσον τοῦ καταρτίου πρὸς τὸ στήκειν ἄνδρας εἰς αὐτὰ καὶ ῥίπτειν μέσον εἰς τὸ πολεμικὸν ἢ λίθους μεγάλους μυλικοὺς ἢ σίδηρα βαρέα, οἷον μαζία ὡς ξιφάρια, ἵνα δι᾽ αὐτῶν συντρίψωσι τὸν πολεμικὸν δρόμωνα ἢ τοὺς ὄντας εἰς αὐτὸν ἵνα κατακλάσωσιν ἐπάνω αὐτοῦ πίπτοντα[7]· οἱ δὲ ἱστάμενοι εἰς τὰ ξυλόκαστρα ὀφείλουσιν ἐπιχέειν τί εἰς τὸ πολεμικὸν τὸ δυνάμενον ἐμπρῆσαι αὐτὸ ἢ φονεῦσαι τοὺς ὄντας εἰς αὐτό. Εἷς δὲ ἕκαστος ἐκ τῶν δρομώνων ἔστω μακρός, σύμμετρος καὶ ἐχέτω τας δύο ἐλασίας τὴν ἄνω καὶ τὴν κάτω.

7 Διὰ δὲ ἑκάστης ἐλασίας ἐχέτω ζυγοὺς τὸ ὀλιγότερον εἴκοσι πέντε εἰς οὓς κάθηνται οἱ ἐλάται, πρὸς τὸ εἶναι ζυγοὺς[8] ἄνω μὲν εἴκοσι πέντε, κάτω δὲ ὁμοίως εἴκοσι πέντε, ὁμοῦ πεντήκοντα ζυγούς.῎Ινα δὲ καθέζωνται εἰς ἕνα ἕκαστον ζυγὸν ἐλάται δύο, εἷς μὲν δεξιά, εἷς δὲ ἀριστερά, πρὸς τὸ εἶναι ὅλους τοὺς ἐλάτας, τοὺς ἄνω καὶ τοὺς κάτω, ἑκατόν· οἱ δὲ αὐτοὶ ἵνα ὦσι καὶ στρατιῶται.῎Εξω δὲ τούτων ἵνα ὑπάρχῃ ὁ κένταρχος τοῦ δρόμωνος καὶ ὁ κρατῶν τὸ φλάμουλον καὶ οἱ δύο πρωτοκάραβοι, καὶ ἄλλος ὅστις ἁρμόζει εἰς ὑπηρεσίαν τοῦ κεντάρχου. Οἱ δὲ πρῳραῖοι ἐλάται δύο οἱ ὄντες εἰς τὴν ἄκραν, ὁ μὲν εἷς ἔστω σιφωνάτωρ, ὁ δὲ ἄλλος ἵνα βάλλῃ τὰ σίδηρα εἰς

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[4] καλοένδυτον MSS N & l. Dain emended to χαλκῷ ἔνδυτον on the basis of Leo VI, *Naumachika Leontos Basileōs* (Appendix Two [a]), §6, which is reasonable.

[5] περιτετειχισμένον, thus Dain: περιτετειχισμένων MSS N & l.

[6] γυρόθεν, thus Dain: γυρῶθεν MSS N & l.

[7] πίπτοντα, thus Dain: πίπτοντας MSS N & l.

[8] ζυγοὺς, thus Dain: ζυγὰ MSS N & l.

The dromon should have some extra timbers below the deck (*patos*)[9], and planks, tow, pitch and liquid pitch. And one of the oarsmen [should be] a shipwright with all the tools, such as an adze, an auger, a saw, and such like**.**

5 **(= Leo VI, §6)** The dromon should have a *siphōn** (flame-thrower) in front at the prow, bound well [emend to "in bronze"] as is the custom, so that processed fire can be thrown through it against the enemy. Above this *siphōn* there should be a kind of floor of planks fortified all around with planks, so that marines can stand on it to fight the enemy attacking from the prow, or so that they can throw whatever weapons they want and can devise from there, not at the prow and stern of the enemy but at the whole enemy [ship].

6 **(= Leo VI, §7)** Moreover, they should set up *xylokastra** (wooden castles), fortified with planks, on the large dromons towards the middle of the mast, so that men can stand on them and throw into the middle of the enemy [ship] great mill stones or heavy iron [weights], like sword-shaped blooms, so that they can smash the enemy dromon with these or crush those on board it as [the weights] fall on to it. Those standing on the wooden castles should also pour onto the enemy ship a substance that can set it on fire or kill those on it. Each of the dromons should be of a suitable length and should have two *elasiai** (oar-banks), one above and one below.

7 **(= Leo VI, §8)** For each oar-bank there should be at least twenty-five *zygoi** (thwarts) on which the oarsmen sit, so that there are 25 thwarts above and similarly 25 below, making a total of fifty thwarts. Two oarsmen should sit on each thwart, one on the right and one on the left, so that in all, with those above and those below, there should be one hundred oarsmen; and these should also be soldiers. Apart from these, there should be the *kentarchos** ("captain") of the dromon and the one who keeps the standard and two *prōtokaraboi** (helmsmen), and whoever else is suitable to serve the *kentarchos*. Of the two oarsmen at the prow who are at the end,

[9] *Patos* was not a technical term for a deck. However, its sense of "something trodden upon" seems to imply the deck here.

τὴν θάλασσαν· ὁ δὲ πρῳρεὺς[10] ἵνα καθέζηται ἐπάνω τῆς πρῴρας ἐξωπλισμένος μετὰ τῶν ἁρμάτων αὐτοῦ. Ὁ δὲ κράβατος τοῦ κεντάρχου ὀφείλει γίγνέσθαι ἐπὶ τῆς πρύμνης· ἅμα μὲν ἵνα ὑπάρχῃ παρὰ μίαν ἀφωρισμένος εἰς αὐτὸν ὁ ἄρχων, ἅμα δὲ ἵνα φυλάττηται εἰς καιρὸν συμβολῆς πολέμου ἀπὸ τῶν ῥιπτομένων βελῶν παρὰ τῶν πολεμίων· ἀπὸ δὲ τοῦ τοιούτου κραβάτου βλέπει πάντα ὁ ἄρχων καὶ πρὸς τὴν χρείαν κελεύει τὸν δρόμωνα.

8 Ὀφείλουσι δὲ γίνεσθαι καὶ ἄλλοι δρόμωνες μεγαλώτεροι χωροῦντες ἀπὸ διακοσίων ἀνδρῶν ἢ πλέον τούτων ἢ ὀλιγώτερον πρὸς τὴν χρείαν τὴν ἀπαιτοῦσαν τότε εἰς τὸν καιρὸν κατὰ τῶν πολεμίων· καὶ οἱ μὲν πεντήκοντα ἵνα ἐνεργῶσιν εἰς τὴν κάτω ἐλασίαν, οἱ δὲ ἑκατὸν πεντήκοντα ἵνα στήκωσιν ὅλοι ἄνω ἐξωπλισμένοι μετὰ τῶν ἁρμάτων καὶ πολεμῶσι πρὸς τοὺς ἐχθρούς.

9 Ἵνα δὲ ποιήσῃς καὶ μακροτέρους δρόμωνας ὡς γαλέας καὶ μονήρια[11] γοργὰ καὶ ἐλαφρὰ πρὸς τὸ ἔχειν αὐτὰ εἰς τὰς βίγλας καὶ εἰς τὰς ἄλλας σπουδαίας χρείας.

10 Ἵνα δὲ ποιήσῃς καὶ ἄλλα πλοῖα φορτικὰ καὶ ἄλλα πλοῖα πάλιν εἰς ἅπερ ἂν ὦσι τὰ ἱππάρια, τὰ λεγόμενα ἱππαγωγά, ἅπερ ὀφείλουσιν εἶναι εἰς τὸν στόλον ὡς τοῦλδον καὶ βαστάζειν καὶ τὰ πράγματα καὶ τὰς χρείας τῶν στρατιωτῶν διὰ τὸ μὴ βαρεῖσθαι εἰς αὐτα[12] τοὺς δρόμωνας, ἐξαιρέτως εἰς καιρὸν πολέμου, ὅταν ἔχωσιν οἱ δρόμωνες χρείαν ὀλίγην τροφῆς ἢ ἅρμάτων ἢ ἄλλων τινῶν, ἵνα ἀναλαμβάνωται τὰς διοικήσεις αὐτῶν ἀπὸ τῶν φορτηγῶν καὶ τῶν λοιπῶν πλοίων ὧν εἴπομεν. Τὸ δὲ πόσοι δρόμωνες γένωνται καὶ πόσοι στρατιῶται ἵνα ὦσιν εἰς σὐτοὺς οὐ δυνάμεθα ὁρίσαι, ἀλλ᾽ ὡς ἔχει καὶ ἀπαιτεῖ ἡ χρεία πρὸς τὸν καιρὸν καὶ τὴν δύναμιν τῶν πολεμίων οὕτως ἵνα ποιήσῃς καὶ τὸ πλῆθος τῶν δρομώνων. Καὶ πάλιν πρὸς τὸ μέγεθος τῶν δρομώνων ἵνα ποιήσῃς ἀριθμὸν τοῦ λαοῦ τοῦ ὀφείλοντος εἶναι εἰς αὐτούς καὶ τὴν ἁρμόζουσαν αὐτῶν πολεμικὴν ἐξόπλισιν.

11 Τὰ δὲ φορτικὰ καὶ ἱππαγωγὰ πλοῖα ἐχέτωσαν τοὺς ἀρκοῦντας εἰς αὐτὰ ναύτας ἔχοντας τὴν ἐξόπλισιν αὐτῶν, οἷον τοξάρια καὶ σαγίτας καὶ ῥιπτάρια καὶ ἄλλο εἴ τι ἔχει χρειῶδες εἰς τὸν πόλε-

[10] πρῳρεὺς, thus Dain: πρωραῖος MS. N, προραῖος MS. l.
[11] μονήρια, thus Dain: μονέριὰ MSS N & l.
[12] αὐτὰ, thus Dain: αὐτὰς MSS. N & l.

one should be the *siphōnatōr* (operator of the flame thrower), and the other should throw the "irons" (the anchors) into the sea. The bowman should be stationed above the prow and equipped with his weapons. The *krabatos** (berth) of the *kentarchos* should be at the stern, both so that the *archōn** (commander) should be set apart in it, and also so that he is protected in time of attack from the missiles thrown by the enemy. For the commander can see everything from this berth and give orders for the dromon as necessary.

8 **(= Leo VI, §9)** Other larger dromons should be prepared with space for two hundred men, perhaps more or fewer according to the need demanded by the moment against the enemy. Fifty should operate from the lower oar-bank and one hundred and fifty should all be placed above, fully armed with their weaponry, and should fight the foe.

9 **(= Leo VI, §10)** You should also build other longer [emend to "shorter"][13] dromons, such as *galeai** and fast, light *monēria* (monoremes), so as to have them for sentinels and other essential tasks.

10 **(= Leo VI, §§11, 12)** You should build other *ploia phortika* (supply ships) and others again on which horses can be loaded, called horse transports. These should be in the fleet as a kind of baggage-train and should carry equipment and the necessities of the soldiers so that the dromons are not burdened with them; especially in time of battle, when the dromons' needs for food, arms, and other things are small, they should undertake the distribution of these from the supply [ships] and the other ships that I have mentioned. We cannot be prescriptive about how many dromons should be built nor how many soldiers should be in them, but you should build the number of dromons as the situation requires according to the demands of the moment and the enemy force**.** Once again, according to the size of the dromons you should supply the number of the force that should be in them and an appropriate warlike armament for them.

11 **(= Leo VI, §13)** The supply ships and horse transports should have on board sufficient *nautai** (sailors) with their armament, such as bows and arrows and javelins and anything else neces-

[13] Μακροτέρους means "longer". Here it is most probably a mistake for μικροτέρους, meaning "shorter".

μον διὰ τὰς ἀναγκαίας περιστάσεις. Ἐχέτωσαν δὲ οἱ τοιοῦτοι ναῦται καὶ ἅρματα ἐκ περισσοῦ· πολλάκις γὰρ λείπουσιν ἅρματα εἰς τοὺς στρατιώτας καὶ ἀναλαμβάνονται ἐξ αὐτῶν. Ἀλλὰ καὶ αὐτὰ τὰ πλοῖα ἁρμόζει ἵνα ἔχωσι μάγγανα καὶ ἅρματα ὅσα εἰσι πρὸς χρείαν μή ποτε καὶ συμβῇ ἵνα λείψωσι καταδαπανώμενα εἰς τοὺς πολέμους.

12 Χωρὶς δὲ τῶν στρατιωτῶν ἤγουν τῶν ἄνω ἐλατῶν ὅσοι ἂν ὦσιν ἀπὸ τοῦ κεντάρχου καὶ ἕως τοῦ ἐσχάτου ὀφείλουσιν εἶναι κατάφρακτοι, ἅρματα ἔχοντες σκουτάρια, μέναυλα, τοξάρια, σαγίτας ἐκ περισσοῦ, σπαθία, ῥιπτάρια, λωρίκια, κλιβάνια ἔχοντα ἔμπροσθεν πέταλα εἰ τάχα καὶ ὄπισθεν οὐκ ἔχουσι, κασσίδας, χειρόψελλα, καὶ ἐξαιρέτως οἱ ἀγωνιζόμενοι καὶ πολεμοῦντες εἰς χεῖρας ἐν τῇ συμβολῇ τῆς μάχης. Οἱ δὲ λοιποὶ πάντες οἱ μὴ ἔχοντες λωρίκια ἢ κλιβάνια, ἵνα φορῶσι τὰ λεγόμενα νευρικά, ἅπερ γίνονται ἀπὸ διπλῶν κενδούκλων. Καὶ ἵνα στήκωσιν οὗτοι ὄπισθεν τῶν ἄλλων διὰ τὸ σκέπεσθαι ὑπ᾽ αὐτῶν ἵνα τοξεύωσιν. Ἐχέτωσαν δὲ εἰς τοὺς δρόμωνας καὶ λίθους καὶ τοξάρια[14] πολλὰ δυνάμενα ῥίπτεσθαι πολλά· ῥίπτουσι γὰρ αὐτὰ κατὰ τῶν πολεμίων ἀπὸ χειρῶν καὶ οὐ βλάπτουσιν αὐτοὺς ὀλιγώτερα παρὰ τὰ ἄλλα ἅρματα· ἅρματα γάρ εἰσι καὶ οἱ λίθοι εὐκόλως εὑρισκόμενα καὶ ἀνελλιπῆ.

13 Πλὴν μὴ ῥίπτωσι τοὺς λίθους μόνον ὥστε καταδαπανηθῆναι τὴν δύναμιν αὐτῶν καὶ ἀποσταθῆναι ἢ καὶ αὐτὰ τὰ ῥιπτόμενα πληρῶσαι, ἵνα μὴ ποιήσωσι σύσκουτα οἱ ἐχθροὶ καὶ δέξωνται τὰ ῥιπτόμενα, καὶ ἀφ᾽ οὗ πληρωθῶσιν ἐξαίφνης ἄρξωνται πολεμεῖν μετὰ τῶν σπαθίων καὶ τῶν μεναύλων καὶ εὑρηθῶσιν οἱ μὲν ἐχθροὶ ἀπὸ ἀναπαύσεως καὶ γένωνται ἰσχυρότεροι, οἱ δὲ ἡμέτεροι ἀπὸ κόπου καὶ καταπονηθῶσιν εὐκόλως.

14 Ποιοῦσι δὲ τοῦτο οἱ Σαρακηνοὶ καὶ ὑπομένουσι πρῶτον τὴν βίαν τοῦ πολέμου, καὶ ὅτε ἴδωσι τοὺς ἡμετέρους ἀποσταθέντας καὶ πληρώσαντας τὰ ῥιπτόμενα παρ᾽ αὐτῶν οἷον σαγίτας καὶ λίθους ἢ ἄλλα τινά, τότε ἀναπηδῶσι καὶ ἅμα μὲν ἐκφοβοῦσι τοὺς ἡμετέρους, ἅμα δὲ καὶ πολεμοῦσιν ἀπὸ χειρὸς μετὰ σπαθίων καὶ μεναύλων ἰσχυρῶς καὶ μετὰ δυνάμεως.

15 Διὸ πρέπει μετὰ σκοποῦ ποιεῖν τὴν συμβολὴν τὴν τοῦ πολέμου, ἵνα μᾶλλον οἱ πολέμιοι πάθωσιν ὅσα εἰσὶ πρὸς βλάβην, οὐχ οἱ ἡμέτεροι· ἁρμόζει γὰρ τοὺς ἡμετέρους φυλάττειν τὴν ἰδίαν

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[14] τοξάρια, thus MSS N & l. However, obviously, one does not throw bows. There are, apparently, manuscript errors here. Leo VI had "κόχλακας", pebbles. We suggest that *toxaria* should possibly have been *riptaria*, missiles.

sary for battle in difficult situations. These sailors should also have extra weapons. For often soldiers run short of weapons and they can draw on these. It is also appropriate for these ships to have *mangana** [15] and other arms as needed, to prevent these running short when used up in battle.

12 **(= Leo VI, §14)** Apart from the soldiers or upper oarsmen, [all others] however many there might be, from the *kentarchos* down to the last [man] should be *kataphraktoi** — having [as] weapons shields, pikes, bows, extra arrows, swords, javelins, corselets, lamellar cuirasses with plates in front even if they have none behind, helmets, [and] vambraces — especially those engaged in hand-to-hand fighting in the front line of attack in battle. All the rest who do not have corselets or lamellar cuirasses should wear what are called *neurika*, which are made from double layers of felt. These should stand behind the others to be protected by them as they use their bows**.** There should also be on the dromons stones and many *toxaria* (bows) able to be thrown far. For they can throw these at the enemy by hand and these arms do no less harm than others, for stones are arms that are easily obtained and abundant.

13 **(= Leo VI, §15)** However, they should not just throw the stones in such a way that their energy is expended and they break off, or use up the missiles, in case the enemy links shields and absorbs the missiles and, when these are used up, then suddenly begins to fight with swords and pikes, and since the enemy are not weary they are stronger while our [men] are also easily worn down because of their exertions.

14 **(= Leo VI, §16)** The Saracens do this and at first they endure the impetuosity of the battle and when they see that our men are breaking off and have used up the missiles [they have] with them, such as arrows and stones or other such things, then they rush out and both terrify our men and also fight hand-to-hand with swords and pikes strongly and with vigour.

15 **(= Leo VI, §17)** So you should make your attack on the enemy with forethought, so that it is rather the enemy who suffer harm [and] not our [men]. It is appropriate that our [men] preserve

[15] Cf. §61 below.

δύναμιν καὶ τὰς βουλὰς αὐτῶν ἀπ᾽ ἀρχῆς ἕως τέλους τῆς μάχης καὶ μετρεῖν καὶ τῶν πολεμίων τὴν δύναμιν καὶ τὴν προθυμίαν καὶ οὕτως ποιεῖν τὸν πόλεμον.

16 Φρόντισον δὲ, στρατηγέ, καὶ περὶ τῆς δεούσης τῶν στρατιωτῶν δαπάνης πρὸς τὸ ἔχειν αὐτοὺς τὰ ἀναγκαῖα ἵνα μὴ γένηται λεῖψις τούτων εἰς αὐτοὺς καὶ ἢ στασιάσωσιν ἢ ἀδικῶσι καὶ τυραννῶσι τοὺς ὄντας εἰς τὴν ἡμετέραν χώραν ἀναγκαζόμενοι διὰ τὴν λεῖψιν τῶν χρειωδῶν. Ἀλλ᾽, εἰ δυνατόν ἐστιν, ἄπελθε ἐν τάχει εἰς τὴν πολεμίαν γῆν καὶ ἐξ αὐτῆς ἐχέτω τὰς χρείας ὁ στρατός.

17 Παράγγειλον δὲ καὶ τοῖς ἄρχουσιν ἵνα μὴ ἀδικῶσί τινα ἐκ τῶν ὑπὸ χεῖρα αὐτοῖς στρατιωτῶν ἢ δῶρόν τι παρ᾽ αὐτῶν λαμβάνωσιν[16] ἢ τὰς λεγομένας συνηθείας· τὴν γὰρ ἐνδοξότητά σου οἴδαμεν ὡς οὐδὲ ἐθυμηθῆναι δύνασαι τοιοῦτόν τι, ἐπειδὴ οὐδὲ ἁρμόζει σοι δῶρον οἱονδήποτε ἀπὸ μικροῦ ἢ μεγάλου ἐκ τῶν ὑπὸ χεῖρα σοι λαμβάνειν τὸ σύνολον.

18 Τοὺς δὲ στρατιώτας ἐπιλέγου ἀνδρείους καὶ χρησίμους, ἐξαιρέτως τοὺς εἰς τὴν ἄνω ἐλασίαν ὄντας, οἵτινες καὶ πολεμοῦσιν ἀπὸ χειρὸς πρὸς τοὺς πολεμίους. Ἂν δ᾽ εὕρῃς τινὰς ἐκ τῶν στρατιωτῶν ἀνάνδρους, ἀπόλυε αὐτοὺς εἰς τὴν κάτω ἐλασίαν, καὶ ἂν λάβῃ ἢ ἀποθάνῃ τις ἐκ τῶν στρατιωτῶν, ἵνα ἀναπληρώσῃς ἐκ τῶν κάτω τὸν ἐκείνου τόπον.

19 Ἁρμόζει γάρ ἵνα γινώσκῃς καὶ ἑνὸς ἑκάστου ἐκ τῶν ὑπὸ σὲ στρατιωτῶν τὴν ἕξιν καὶ τὴν ἀνδρείαν καὶ τὴν ἐπιτηδειότητα, ὥσπερ οἱ κυνηγοὶ γινώσκουσιν ἑνὸς ἑκάστου σκυλίου τὰς ἐπιτηδειότητας καὶ ἔχουσιν αὐτὰ ἕτοιμα εἰς ὃ θέλουσιν.

20 Οὕτως ἵνα ποιήσῃς καθὼς πάντα γινώσκεις ὅτι ἀρκοῦσι πρὸς τὸ ταξίδιον ὅπερ ἔχεις, οἷον τοὺς δρόμωνας καὶ τοὺς ἐν αὐτοῖς στρατιώτας καὶ τὰ ἅρματα καὶ τὰς τροφὰς καὶ τὴν ἄλλην ἀποσκευὴν τοῦ στόλου ἥτις ὀφείλει εἶναι εἰς ἄλλα πλοῖα, ὡς ἀνωτέρω εἴπομεν· ἣν καὶ ποιῆσαι ἔχεις εἰς τοῦλδον καὶ ἀφεῖναι αὐτὴν εἰς ἀσφαλεῖς τόπους ὅταν ἐλπίζῃς πόλεμον.

21 Ἂν δὲ γένηται χρεία, ἵνα ἔχῃς καὶ ἱππάρια εἰς τὰ ἱππαγωγὰ πλοῖα πρὸς τὸ ἔχειν σε καὶ καβαλλαρίους εἰς τὴν χώραν τῶν πολεμίων καὶ ἁπλῶς ἵνα πάντα τελειώσῃς καὶ οὕτως ἵνα περιπατήσῃς ὡς ἁρμόζει.

22 Καὶ πρῶτον μέν, πρὶν ἀποκινήσῃς, ἵνα λειτουργηθῶσι πάντα τὰ φλάμουλα τῶν δρομόνων, εἰ γένηται παρὰ τῶν ἱερέων εὐχὴ πρὸς τὸν Θεὸν ὑπὲρ κατευοδώσεως τοῦ στρατοῦ κατὰ τῶν πολεμίων.

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[16] λαμβάνωσιν, thus Dain: λαμβανεῖν MSS N & l.

their own energy and intentions from the beginning to the end of the battle and measure the energy and eagerness of the enemy and organize the battle accordingly.

16 **(= Leo VI, §18)** Take consideration, *stratēgos*, for the essential supplies of the soldiers, for them to have what is necessary, and so that a lack of these things does not arise and they either rebel or oppress and mistreat those in our territory, compelled through lack of necessities. But, if possible advance quickly into enemy land and let the *stratos** satisfy its needs there.

17 **(= Leo VI, §19)** Instruct your commanders that they are not to wrong any of the soldiers under them or to accept any gift from them or what is known as the customary perquisites. I know that your Gloriousness has not been able to consider any such [thing], since it is not in your character to acccept any gift whatsoever from [anyone] great or small under your command.

18 **(= Leo VI, §20)** Choose courageous and reliable soldiers, especially those on the upper oar-bank who fight the enemy hand to hand. If you find [that] any of the soldiers are cowardly, dismiss them to the lower oar-bank, and if any of the soldiers should be captured or die, you should fill his place from those below.

19 **(= Leo VI, §21)** It is appropriate for you to know the attitude and bravery and capability of each soldier under you, as huntsmen know the capabilities of each single dog and have them ready for their requirements.

20 **(= Leo VI, §22)** You should arrange everything as you know is sufficient for the campaign you have, such as the dromons and the soldiers in them and arms and food and the remaining equipment for the fleet, which should be in other ships, as we said above; this you should organize as a baggage-train and leave in safe places when you anticipate fighting**.**

21 **(= Leo VI, §23)** If the need arises, you should also have horses on the horse-transport ships so that you have cavalry in enemy territory, and [to put it] simply you should arrange everything and thus advance appropriately.

22 **(= Leo VI, §24)** First, before you move off, the standards of the dromons should be blessed, [preferably] with a prayer to God from the priests for the successful venture of the army against

Εἶτα ἵνα διαλαλήσῃς πρὸς τὸν ὅλον τὸν λαὸν καὶ πρὸς τοὺς ἄρχοντας πάλιν ἰδίως τὰ ἁρμόζοντα πρὸς τὸν καιρὸν καὶ οὕτως ἵνα προθυμοποιήσῃς τὸν στρατὸν καὶ ἀποκινήσῃς ὅταν πνεύσῃ ἐπιτήδειος ἄνεμος καὶ οὐκ ἐναντίος.

23 Πλὴν μὴ περιπατῶσιν ὡς φθάσουσιν οἱ δρόμωνες, ἀλλὰ στῆσον εἰς αὐτοὺς ἄρχοντας ἢ κατὰ πέντε ἢ κατὰ τρεῖς, ἕνα τὸν λεγόμενον κόμητα, ὅστις ἔστω ἀρχηγὸς τῶν δρομώνων ὧν ἔχεις ἀποδοῦναι αὐτῷ, ἵνα φροντίσῃ ἐπιμελῶς περὶ πάντων καὶ διατάξῃ πρὸς ἅπαντα.

24 Οἱ δὲ τοιοῦτοι ἄρχοντες τῶν δρομώνων ὀφείλουσιν εἶναι ὑπὸ σὲ καὶ δέχεσθαι παρὰ σοῦ τὰ παραγγέλματα καὶ λαλεῖν αὐτὰ πάλιν εἰς τοὺς ὑποχειρίους αὐτῶν. Καὶ ταῦτα μὲν ἵνα γίνωνται ἐπὶ τοῦ βασιλικοῦ πλοΐμου· ἐπὶ δὲ τῶν θεματικῶν καὶ Ῥωμαίων [Ῥωμαϊκῶν][17] ἵνα ὦσι δρουγγάριοι καὶ τουρμάρχαι, καὶ ἵνα ὑποτάσσωνται καὶ αὐτοὶ τῷ στρατηγῷ καὶ ποιῶσι τὰ παραγγελλόμενα παρ᾽ αὐτοῦ.

25 Οὐκ ἀγνοῶ δὲ ὅτι κατὰ τὴν ὁμοίωσιν τοῦ βασιλικοῦ πλοΐμου καὶ οἱ τῶν πλευστικῶν θεμάτων στρατηγοὶ δρουγγάριοι ἐλέγοντο τὸ παλαιὸν καὶ οἱ ὄντες ὑπ᾽ αὐτοὺς ἐλέγοντο κόμητες καὶ κένταρχοι μόνον· ἀλλὰ νῦν τὸ δρουγγαράτον ἑνὸς ἑκάστου εἰς τὴν στρατηγίδα ἀνέβη καὶ καλεῖται ἡ κεφαλὴ στρατηγὸς καὶ κρατεῖ ἀξιώματα καὶ οἱ βαθμοὶ μερίζονται εἰς τὰς στρατηγικὰς τάξεις.

26 Ἵνα δὲ γυμνάσῃς καὶ τοὺς πλοΐμους στρατιώτας καὶ αὐτοὺς τοὺς δρόμωνας κατὰ ἄλλο καὶ ἄλλο σχῆμα· καὶ ἄλλοτε μὲν ἵνα ποιήσῃς τὴν γυμνασίαν κατὰ ἕνα ἕκαστον ἄνδρα, ἄλλοτε δὲ καὶ κατὰ περισσοτέρους, καὶ ἵνα δέχωνται κατέναντι ἀλλήλων μετὰ σπαθίων καὶ σκουταρίων. Καὶ αὐτοὺς δὲ τοὺς δρόμωνας οὕτω γυμνάσῃς ἵνα ἐπέρχωνται κατ᾽ ἀλλήλων ὡς ἐπὶ παρατάξεως· καὶ ἄλλοτε μὲν ἵνα δεσμῶσιν, ἄλλοτὲ δὲ ἵνα ἀπολύωσιν καὶ ἵνα ποιῶσι καὶ αὐτοὶ κατ᾽ ἄλλο καὶ ἄλλο σχῆμα ὡς δῆθεν κατὰ ἀλλήλων τὴν συμβολὴν τοῦ πολέμου· καὶ ἵνα μετὰ τῶν κονταρίων προωθῶσι τὰ πλοῖα τῶν πολεμίων πρὸς τὸ μὴ πλησιάσαι καὶ δῆσαι αὐτούς· οὐ γάρ ἐστι πάντοτε χρήσιμον ἵνα οἱ πολεμοῦντες δεσμῶσιν ἀλλήλους μετὰ σιδηρῶν καμακίων· γίνονται γὰρ ἐκ τούτου κίνδυνοι πολλάκις οὓς οὐ

[17] This emendation was suggested to us by John Haldon on the grounds that the distinction made here was between the traditional "Roman" *themata* and the new "Armenian" *themata* of Nikēphoros's own age such as *Lycia*, *Cilicia*, and Northern Syria.

the enemy. Then you should address the entire force, and the commanders especially, with suitable words for the occasion, and so you should inspire the *stratos** and move off when a favourable, and not adverse, wind blows.

23 **(= Leo VI, §25)** However, the dromons should not advance in the order in which they arrive, but put commanders in them [in charge] of every five or three, a so-called *komēs**, who should be leader of the dromons you have handed over to him, so that he can have special responsibility in all matters and make all arrangements.

24 **(= Leo VI, §26)** These commanders of the dromons should be under you and receive their instructions from you and report them in turn to those under their command. This should be the system in the imperial fleet. In the thematic and Roman [fleets] there should be *droungarioi** and *tourmarchai** and they should be subordinate to the *stratēgos* and carry out his instructions.

25 **(= Leo VI, §27)** I am not unaware that by analogy with the imperial fleet the *stratēgoi* of the naval themes were formerly called *droungarioi* and those under them were called *komētes* and *kentarchoi* only. But now [the position of] *droungarios* of each [theme] has risen to that of *stratēgos* and the head [of the naval theme] is called *stratēgos* and holds *axiōmata*,[18] and the positions are classed in the ranks of *stratēgos*.

26 **(= Leo VI, §28)** You should exercize the naval soldiers and the dromons in one manner or another. Sometimes you should hold the exercize as each individual man and sometimes in larger groups so that they engage each other with swords and shields. And you should exercize the dromons in such a way that they attack each other as if in formation. Sometimes they should couple and sometimes uncouple and in one manner or another they should practice the clash of battle against each other. They should push the ships of the enemy away with poles to prevent their coming close and coupling. For it is not always advantageous for those fighting to couple themselves together with *sidērai kamakes** (iron rods), for dangers often develop from this which no one can escape.

[18] *Axiōmata*: "Dignities". *Axiōmata* pertained to those official positions for which the emperor conferred the insignia of office. See Oikonomides, *Listes de préséance*, pp. 281-90.

δύναταί τις φυγεῖν.[19]

27 Γύμναζε δὲ αὐτοὺς καὶ κατ᾽ ἄλλον τρόπον πρὸς τὰς ἐπινοίας ἃς ἔχεις νοῆσαι[20] ὅτι ἐνδέχονται γένεσθαι κατὰ τῶν πολεμίων, ἵνα ἐκ τούτου συνεθίζωνται πρὸς τοὺς κτύπους καὶ τὰς κραυγὰς καὶ τὴν ἄλλην κίνησιν τοῦ πολέμου καὶ μὴ ταράσσωνται ὡς ἀγύμναστοι καὶ ἐξαίφνης ἀνελπίστως ἐρχόμενοι εἰς αὐτά.

28 Οὕτω γύμνασον καὶ συνέθισον αὐτούς· εἶτα ὀφείλουσι πλέειν μετὰ συντάξεως συνηγμένοι τοσοῦτον ὅσον μὴ ἐμποδίζειν ἀλλήλοις εἰς τὰς ἐλασίας καὶ εἰς τὰς βίγλας τῶν ἀνέμων τὰς γινομένας εἰς τὴν θάλασσαν, ἀλλ᾽ ὡς παραταγὴ πολλὰ γυμνασθεῖσα, οὕτως ἵνα πλέωσιν. Ὅταν δὲ συσκαλῶσαι πρὸς τὸ ἀπληκεῦσαι ὀφείλουσι, ποιεῖν τὸ σκάλωμα μετὰ τάξεως καὶ φέρειν τοὺς δρόμωνας ἐνόρδινα ἢ εἰς λιμένα ἢ εἰς ἄλλον τόπον ἐπιτήδειον εἰς τὸ σκαλῶσαι ἵνα καὶ ζάλη ἄν συμβῇ μὴ λάβωσι.

29 Ἁρμόζει δὲ προγινώσκειν ἀπὸ τῶν σημαδίων τῶν γινομένων τῶν ἀστέρων, τοῦ ἡλίου καὶ τῆς σελήνης τὸ ποῖος ἄνεμος μέλλει πνεῦσαι εἰς τὸν καιρὸν ἐκεῖνον. Καὶ πρὸς τὸν ἄνεμον ἐκλέγου καὶ τὸν τόπον τοῦ σκαλώματος· καὶ εἴπερ οὐ κατεπείγει σε ἀνάγκη μὴ ἀποκινήσῃς εἰς ἀνεπιτήδειον πλοῦν, ἀλλ᾽ ὅτε ἐστιν ἄνεμος ἐπιτήδειος καὶ γαλήνη καὶ ὅταν ἔχῃς βεβαίαν ἐλπίδα σωτηρίας· ἁρμόζει γὰρ ὑφορᾶσθαι καὶ τὰ σημάδια τῶν ἄστέρων ἅπερ παρατηροῦσιν οἱ πλόϊμοι καὶ ἄλλα ὅσα εἰσὶ συμφέροντα, καὶ οὕτως ἵνα πλεύσῃς.

30 Εἰς δὲ τὰ ἄπληκτα ἂν μὲν σκαλώσῃς εἰς τὴν ἡμετέραν χώραν καὶ οὐκ ἔχῃς φόβον ἀπὸ τῶν πολεμίων, σκάλωσον μετὰ τάξεως καὶ μηδένα τῶν ἐντοπίων βλάπτῃς ἢ ἀδικῇς, μηδὲ ἁρπάζῃ κακός, μηδὲ ποιῇ ἐρήμωσιν εἰς αὐτούς.

31 Ἂν δὲ πλησιάζῃς εἰς τὴν πολεμίαν γῆν ἢ ἂν ἐλπίζῃς ὅτι ἐγγύς εἰσί που οἱ πολεμίοι, πρέπει πάντως ἵνα καὶ βίγλας ἔχῃς ἀπὸ μακρόθεν καὶ εἰς τὴν θάλασσαν ἀσφάλειαν πολλὴν καὶ ὑπάρχῃς ἄγρυπνος ὡς εἰς παράταξιν, ἐπειδὴ πολλαί εἰσιν αἱ ἐπιβουλαὶ τῶν πολεμίων. Καὶ γὰρ ἢ εἰς τὴν γῆν εὑρήσουσι[21] καὶ πολεμησουσί σοι, ἂν τύχῃ δὲ ἵνα ἐμπυρίσωσι καὶ τὸν στόλον καὶ ἵνα φανῶσι πρὸς τὴν θάλασσαν καὶ ποιήσωσι πρὸς σὲ συμβολὴν

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[19] φυγεῖν, thus Dain and MS l: φυγῆν MS. N.

[20] νοῆσαι, thus Dain: νοήσειν MSS N & l.

[21] εὑρήσουσι, thus Dain, who deleted "ἄν", which immediately follows in MSS N & l.

27 **(= Leo VI, §29)** Exercize them in other ways according to the techniques you have perceived that they can expect from the enemy, so that in this way they are accustomed to the blows, cries and general commotion of war and will not be confused through being untrained should they encounter these things suddenly and unexpectedly.

28 **(= Leo VI, §30)** Exercize them and accustom them. Then they should sail in formation, a sufficient distance apart to prevent their colliding with each other when rowing and on the watch for the winds that happen at sea. Moreover, they should proceed according to the formation which has been often exercized**.** When they have to put in at an *aplēkton* (naval station) they should make the *skalōma* (landing) in formation and bring the dromons up in a regular manner either into harbour, or another place suitable for landing, so that they will not be damaged should a squall arise.

29 **(= Leo VI, §31)** It is appropriate to anticipate from the signs given by the stars, sun and moon what wind is likely to blow at that season. And choose your landing-place according to the wind. If there is no urgent need, do not move off on an inauspicious voyage, but [only move off] when there is a favourable wind and calm [sea] and when you have sure expectation of safety. It is appropriate to take into account the stars' signs that seamen observe and all other relevant matters and then set sail.

30 **(= Leo VI, §32)** If you land in *aplēkta* in our own territory and you have no fear from the enemy, land in good order and do not harm any of the local inhabitants nor should any evil [man] do them wrong or seize or lay their land waste.

31 **(= Leo VI, §33)** But if you approach enemy land or you expect the enemy to be near you, you should always have scouts some way off and great security at sea and be alert in the formation, since the devices of the enemy are many. For either they will find [you] on land and attack you, if they are able to set fire to the fleet, and should they appear at sea they will attack you fiercely either by night or by day. And if you find yourself

πολέμου ἢ τὴν νύκτα ἢ τὴν ἡμέραν. Καὶ ἂν εὑρέθῃς σὺ ἀνέτοιμος καὶ ἐκεῖνοι ἕτοιμοι πάντως, ἵνα σε νικήσωσιν, ἂν δὲ εὕρωσι σε ἕτοιμον, ἴσως ἵνα γένηται ἄπρακτος ἡ ἐπιβουλὴ αὐτῶν.

32 Ἐπεὶ δὲ συμμέτρως περὶ τούτων διεταξάμεθα, εἴπωμεν ἄρτι ἐν συντόμῳ καὶ πῶς ἵνα παρατάξῃς καὶ τῶς ἄρα ποιήσῃς τὰς συμβολὰς εἰς τοὺς πολεμίους καθὼς διεταξάμεθα καὶ εἰς τὰς γινομένας εἰς τὴν ξηρὰν συμβολὰς τῶν πολεμίων.

33 Ὅταν δὲ ἐλπίζῃς καιρὸν πολέμου, στρατηγέ, σύνταξον τοὺς στρατιώτας καὶ χώρισον κατὰ τάξεις αὐτῶν καὶ ἀνάγνωθι αὐτοῖς τὰ στρατιωτικὰ ἐπιτίμια, ἅπερ εἴπομεν εἰς τὴν στρατιωτικὴν γυμνασίαν τῆς ξηρᾶς καὶ προθυμοποίησον καὶ ἐνδυνάμωσον αὐτοὺς ἀπὸ λόγου καὶ παραινέσεως καὶ διέθισον εἰς τὸν πόλεμον, ἵνα τὸ μὲν διὰ τὸν φόβον τῶν ἐπιτηδείων, τὸ δὲ διὰ τὴν σὴν παραίνεσιν γένωνται ἀνδρεῖοι καὶ τολμηροὶ καὶ εἰς τοὺς μέλλοντας κινδύνους τοῦ πολέμου ἀγωνίζωνται ἀπὸ χειρός.

34 Ἁρμόζει δὲ ἵνα δι᾽ ἐπιδρομῆς καὶ διὰ ἄλλων τινῶν ἐπιτηδευμάτων καὶ στρατηγημάτων ποιῇς τέχνας κατὰ τῶν πολεμίων καὶ ἢ[22] μεθ᾽ ὅλου[23] τοῦ ὑπὸ σὲ λαοῦ καὶ στόλου, ἢ μετὰ μέρους τινὸς ἐξ αὐτοῦ· χωρὶς γὰρ ἀνάγκης μεγάλης κατεπειγούσης οὐκ οφείλεις ποιεῖν δημόσιον πόλεμον· πολλὰ γὰρ συμβαίνουσιν ἐναντιώματα καὶ πολλὰ γίνονται εἰς τὸν πολέμον ἃ πρότερον οὐκ ἄν τις ἤλπισε.

35 Διὰ τοῦτο πάντοτε ὀφείλεις φυλάττεσθαι καὶ μὴ ποιεῖν παραταγὰς[24] ἐξαιρέτως εἰς τὴν θάλασσαν ἔνθα δεσμοῦνται μετ᾽ ἀλλήλων οἱ δρόμωνες καὶ γίνεται μάχη ἀπὸ χειρῶν, ἣν οὐ δύναται τις φυγεῖν οὐδὲ εὑρεῖν τὸ συμφέρον αὐτοῦ.

36 Καὶ ταῦτα μὲν ὀφείλεις φυλάττεσθαι εἴπερ οὐ θαρρεῖς εἰς τὸ πλῆθος τῶν δρομώνων καὶ εἰς τὴν ἀνδρείαν καὶ ἐξόπλισιν καὶ προθυμίαν τῶν στρατιωτῶν ὡς ἵνα νικήσῃς τοὺς πολεμίους.

37 Οὐ γὰρ ἐκ τοῦ ἔχειν σε πλοῖα πολλὰ καὶ μεγάλα γίνεται ἡ νίκη

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[22] "... ἢ μεθ᾽ ὅλου τοῦ ὑπὸ σὲ λαοῦ καὶ στόλου, ἢ ...", as emended by us by comparison to Leo VI, *Naumachika Leontos Basileōs*, §36 because "... μὴ μεθ᾽ ὅλου τοῦ ὑπὸ σὲ λαοῦ καὶ στόλου, μηδὲ ..." as in MSS N & l does not make sense.

[23] μεθ᾽ ὅλου, thus Dain: μετὰ ὅλου MSS N & l.

[24] This does not make sense. Παραταγή is an unexpected form. The sense required by comparison to Leo VI, *Naumachika Leontos Basileōs*, §37 is "attack" and the forms required should be either παράταξις or παρατάγματα. Obviously, making attacks was of paramount importance, as Nikēphoros himself emphasized in many places. It appears that either Nikēphoros himself or, more probably, someone else involved in the manuscript transmission process, extrapolated from Leo VI's warning against over confidence in attack in §37 to a general veto on attacks.

unprepared and they are quite prepared, they will defeat you; but if they find you prepared, perhaps their devices will achieve nothing.

32 **(= Leo VI, §34)** Since we have discussed these [matters] adequately, let us now say briefly how you should organize a formation and make attacks on the enemy, as we have indicated also for attacks that take place on dry [land].

33 **(= Leo VI, §35)** When you anticipate a period of fighting, *stratēgos*, draw up the soldiers and divide them into their formations and read them the military code of penalities which we discussed in the course of land-based military training; and encourage and hearten them with a speech and exhortation and accustom them to war, so that partly through fear of the regulations and partly through your exhortation, they become brave and daring and fight hand-to-hand in the coming dangers of engagement.

34 **(= Leo VI, §36)** It is appropriate that, through incursions and other practices and stratagems, you should contrive ruses against the enemy, and not with the whole of the force and the fleet under you nor with a part of it. For without some urgent and compelling reason you should not begin a general engagement. Many obstacles arise and many things happen in war which no one would previously have anticipated.

35 **(= Leo VI, §37)** Therefore you should always be on guard and should not make attacks, especially at sea where the dromons are coupled to each other and hand-to-hand fighting takes place, which no one can avoid or find [any] benefit from.

36 **(= Leo VI, §38)** And you should take these precautions if you are not confident in the number of the dromons, the bravery, armament, and enthusiasm of the soldiers to enable you to defeat the enemy.

37 **(= Leo VI, §39)** Victory in war does not depend on your pos-

τοῦ πολέμου, ἀλλ᾽ ἐκ τοῦ ἔχειν εἰς αὐτὰ πολεμιστὰς τολμηροὺς καὶ προθύμους κατὰ τῶν πολεμίων καὶ πρὸ πάντων ἐκ τοῦ ἔχειν σε τὴν τοῦ θεοῦ βοήθειαν καὶ συνέργειαν καὶ ἀπὸ τοῦ ἔχειν αὐτοὺς καθαρὸν βίον καὶ φυλάττειν δικαιοσύνην καὶ πρὸς τοὺς ἡμετέρους καὶ εἰς τοὺς πολεμίους, εἰ δὲ οὐδὲν ποιοῦσιν εἰς τοὺς αἰχμαλώτους ἢ αἰσχρὸν ἢ ῥυπαρόν, ἢ ὅσα εἰσὶν εἰς αἰσχύνην αὐτῶν, ἢ εἴπερ οὐ δεικνύουσιν εἰς αὐτοὺς ὠμότητα καὶ ἀπήνειαν, καὶ οὐκ ἀδικεῖς ἔθνος τύχον ἢ ἄλλους τινὰς μὴ ἀδικούμενος παρ᾽ αὐτῶν· τοὺς γὰρ ἀδικοῦντας πρέπει ἀμύνεσθαι, μετὰ τῆς τοῦ Θεοῦ βοηθείας.

38 Εἰ δὲ ἀπαιτεῖ ἵνα γένηται δημόσιος πόλεμος, παράταξον τοὺς δρόμωνας εἰς διάφορα καὶ ποικίλα σχήματα καθὼς ὁ καιρὸς καὶ ὁ τόπος ἀπαιτεῖ. Πλὴν ἂν θαρρῇς ἵνα νικήσῃς τοὺς πολεμίους καὶ διὰ τοῦτο ποιεῖς δημόσιον πόλεμον, μὴ ποιήσῃς τὴν μάχην πλησίον τῆς ἡμετέρας γῆς· ἐκεῖ γὰρ ἂν ἴδωσιν ἀνάγκην οἱ στρατιῶται ἐλπίζουσιν ἵνα καταξυλώσωσι καὶ σωθῶσιν· ἀλλὰ μᾶλλον πλησίον τῆς γῆς. Ἐκεῖ γὰρ ἂν ἴδωσιν ἀνάγκην οἱ στρατιῶται καὶ ἐμπέσωσιν εἰς δειλίαν, ἐλπίζουσιν ἵνα σωθῶσι διὰ τῆς γῆς καὶ ῥίπτουσι γοργὸν τὰ ἅρματα καὶ οὐδὲν προτιμῶνται παρὰ τὴν φυγὴν οἳ εἰς καιρὸν παραταγῆς προκρίνουσι τὸ ζῆν παρὰ τὸ φυγεῖν.

39 Πρὸ δὲ τῆς ἡμέρας τοῦ πολέμου ἁρμόζει βουλεύεσθαι μετὰ τῶν ὑπὸ σὲ ἀρχόντων τί πρέπει ἵνα ποιήσῃς, καὶ ὅπερ ἀπὸ κοινῆς βουλῆς φανῇ χρήσιμον τοῦτο ἵνα ποιήσῃς. Καὶ παράγγειλον τοῖς ἄρχουσι τῶν δρομώνων ἵνα ὦσιν ἕτοιμοι πρὸς τὸ τελειῶσαι τὰ βουλευθέντα κἂν ἄρα καὶ ἄλλο τι τύχον ἐναντίον ἀπαντῇσῃ ἐκ τῆς ἐπιδρομῆς τῶν ἐναντίων. Πλὴν καὶ τότε ὅταν ἀπαντήσῃ τὸ ἐναντίον καὶ οὐ ποιήσῃς τὰ βουλευθέντα, ἁρμόζει πάντως ἑτοίμους ἅπαντας εἶναι καὶ βλέπειν εἰς τὸν σὸν δρόμωνα πρὸς τὸ λαβεῖν ἐξ αὐτοῦ σημάδιον τί ἄρα ὀφείλουσι ποιῆσαι· ἀφ᾽ ὅτου δὲ ἴδωσι τὸ τοιοῦτον σημάδιον, ἵνα ποιῶσι καὶ ἐκεῖνοι συντόμως ὅπερ ἂν δείξῃς αὐτοῖς.

40 Πάντως γὰρ ἁρμόζει σοι, στρατηγέ, ἐπιλέξασθαι ἐξ ὅλου τοῦ στρατοῦ στρατιώτας καὶ μεγαλωτέρους καὶ ἀνδρειοτέρους, ἔχοντας καὶ ἀρετὴν περισσοτέραν καὶ ἐξόπλισιν μείζονα, καὶ ἔχειν αὐτοὺς εἰς τὸν δρόμωνα τὸν σὸν καὶ ποιῆσαι αὐτὸν πάμφυλον. Καὶ αὐτὸς δὲ ὁ δρόμων ὁ σὸς ὀφείλει καὶ μεγαλώτερος εἶναι παρὰ τοὺς ἄλλους πάντας καὶ ὡς κεφαλὴ τῆς παρατάξεως ὅλης φαίνεσθαι.

41 Ὁμοίως δὲ ἁρμόζει καὶ τοὺς ἄλλους τοὺς ὑπὸ σὲ ἄρχοντας ὅσοι

sessing many large ships but on their having bold fighting men enthusiastic against the enemy, and above all from your having God's help and support and from their living pure lives and preserving justice towards our [subjects] and the enemy, if they do nothing disgraceful or foul to the prisoners, or what is a disgrace to them, or if they do not treat them roughly or harshly, and if you do not injure any people, or any one else, when you are not injured by them. Wrong-doers should be dealt with through God's assistance.

38 **(= Leo VI, §40)** If a general battle is required, form up the dromons in a variety of different ways, as the **season** and topography require. However, if you are confident that you will defeat the enemy and you are starting a general battle for this reason, do not set up the battle near our land for, if they see the need the soldiers would expect to abandon ship there and find refuge, but rather near [enemy] land. For, if the soldiers see the need and succumb to cowardice, they, who in a time of conflict prefer life to flight, would hope to find refuge on land there and would abandon their weaponry quickly and put nothing before flight.

39 **(= Leo VI, §41)** Before the day of engagement it is appropriate to discuss with the commanders under you what you should do and you should act on what appears to the general consensus to be useful. Issue instructions to the commanders of the dromons to be ready to carry out what has been planned unless indeed a contrary decision emerges after an incursion of the opposition. However, when a contrary decision is made and you do not carry out what has been discussed, then it is nevertheless appropriate for all to be prepared and to watch your dromon to receive from it the signal for what they should do. When they see this signal, they should do promptly whatever you have indicated.

40 **(= Leo VI, §42)** It is certainly appropriate, *stratēgos*, for you to select from the whole *stratos** larger and braver soldiers with superior skills and better armament, and to have them on your dromon and to make it *pamphylos**. And your dromon should be larger than all the others and should be obvious as the head of the entire formation.

41 **(= Leo VI, §43)** Similarly, it is appropriate that each of the

ἔχουσιν ὑποχειρίους αὐτῶν[25] δρόμωνας, ἵνα εἷς ἕκαστος ἄρχων ἐπιλέξηται ἐκ τῶν ὑποχειρίων αὐτοῦ δρομώνων ἄνδρας καὶ παμφυλεύσῃ[26] τὸν ἴδιον δρόμωνα καὶ παμφυλεύσῃ αὐτὸν καὶ καταστήσῃ. Πλὴν καὶ αὐτοὶ οἱ ἄρχοντες καὶ οἱ λοιποὶ πάντες ὀφείλουσι βλέπειν πρὸς τὸν δρόμωνα τὸν σὸν καὶ παρ᾽ αὐτοῦ ἵνα κανονίζωνται καὶ πανθάνωσι τί ὀφείλουσι ποιῆσαι εἰς τὸν καιρὸν τοῦ πολέμου, ἂν ἄρα συμβῇ τι ἀνέλπιστον καὶ ἐναντίον πρὸς ἃ ἔχεις βουλεύσασθαι· καὶ πρέπει ἵνα γένηται πρὸς ἐκεῖνο πάλιν ἄλλη μέθοδος.

42 Ἔστω δὲ σημάδιον ἱστάμενον εἰς τὸν σὸν δρόμωνα, εἴτε φλάμουλον, εἴτε βάνδον, εἴτε ἄλλο τι, καὶ στηκέτω εἰς τόπον ὑψηλόν, ἵνα δεικνύῃς δι᾽ αὐτοῦ τί πρέπει ποιεῖν καὶ παραυτὰ ποιῶσι τοῦτο οἱ λοιποὶ δρόμωνες εἴτε συμβολὴν πόλεμου, εἴτε ἀναχώρησιν ἀπὸ πολέμου, εἴτε ἵνα γυρισθῶσι μετὰ συντάξεως εἰς τὸ κυκλῶσαι τοὺς πολεμίους, εἴτε ἵνα συναχθῶσιν εἰς βοήθειαν μέρους τινὸς καταπονουμένου, εἴτε ἵνα ἀργήσωσι τὴν ἐλασίαν, εἴτε ταχύτερον ἐλαύνωσιν, εἴτε ἔγκρυμμα ἁρμόζει γενέσθαι, εἴτε ἀπὸ ἐγκρύμματος ἵνα ἐξέλθωσιν ἢ ἄλλα τινά, ἵνα μανθάνῃ ὁ στόλος ὅλα ἀπὸ σημαδίων τοῦ σοῦ δρόμωνος καὶ γινώσκωσι πῶς ὀφείλουσι ποιεῖν.

43 Οὐ γὰρ δύναταί τις ἀπὸ φωνῆς ἢ βουκίνου παραγγέλλειν τὰ δέοντα διά τὸν θόρυβον καὶ τὴν τάραχὴν καὶ τὸν ἦχον τῆς θαλάσσης καὶ διὰ τὸν ἄλλον κτύπον τῆς συγκρούσεως καὶ τῆς ἐλασίας τῶν δρομώνων καὶ τὸ πλέον διὰ τὴν κραυγὴν τῶν πολεμούντων.

44 Τὸ δὲ σημεῖον ὅτε θέλει δεῖξαί τι, ἢ ὀρθὸν ἱστάμενον ἵνα δεικνύῃ αὐτό, ἢ ἐπὶ τὰ δεξιὰ κλινόμενον ἢ ἐπὶ τὰ ἀριστερά, ἢ τινασσόμενον, ἢ ὑψούμενον, ἢ χαμηλούμενον, ἢ παντελῶς ἐπαιρόμενον, ἢ μετατιθέμενον, ἢ ἵνα ἐναλλάσσηται, ἡ κεφαλὴ τοῦ τοιούτου σημείου και φαίνηται ἄλλῃ καὶ ἄλλῃ, ἢ ἀπὸ τοῦ σχήματος, ἢ ἀπὸ τῆς χρόας, ἤγουν ἵνα ἐναλλάσσηται ἢ τὸ σχῆμα ἢ τὴν χροιὰν αὐτῆς καθὼς ἐποίουν οἱ παλαιοί.

45 Εἰς γὰρ τὸν καιρὸν τοῦ πολέμου εἶχον σημάδιον τῆς συμβολῆς καμελαύκιον[27] μαῦρον ὑψούμενον ἐπὶ κονταρίου· εἶχον δὲ καὶ ἄλλα σημεῖα τινα ὑποδεικνύμενα αὐτοῖς ὁμοίως. Ἀσφαλέστερον δέ ἐστιν ἵνα σὺ αὐτὸς μετὰ χειρὸς σου δεικνύῃς τὰ σημάδια.

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[25] αὐτῶν, thus Dain: αὐτῶν MSS N & l.

[26] παμφυλεύσῃ, thus Dain: παμφιλεύσῃ MSS N & l, both here and in the next clause.

[27] καμελαύκιον, thus Dain: καμαλαύκιον MS. N, καμαυλαύκιον MS. l.

commanders under you, who have dromons subordinate to them, should choose men from the dromons subordinate to them and make their own dromon *pamphylos** and keep it *pamphylos* and maintain it. However, these commanders and all the others should watch your dromon and regulate themselves by it and learn what they have to do in time of engagement, in case anything unexpected happens and contrary to what you have planned. In these circumstances a different conduct should be developed.

42 **(= Leo VI, §44)** Let there be a signal placed on your dromon, a standard or a banner or something else, and put it in a high place so that you can use it to show what needs to be done and the rest of the dromons can immediately do it, an attack in engagement or withdrawal from engagement, or for them to curve in formation to encircle the enemy, or to go to the assistance of a section in difficulties, or to slow the rowing down, or speed up the advance, or whether it is appropriate to set up an ambush or come out of an ambush, or anything else, so that the fleet can receive all [commands] from signals from your dromon and know what they ought to do.

43 **(= Leo VI, §45)** For no one can give the necessary [orders] by voice or by trumpet because of the hullabaloo and confusion and the noise of the sea and the other din from the collisions and the rowing of the dromons and, even more, the shouts of those fighting.

44 **(= Leo VI, §46)** When the signal is to convey a message, it should do so either standing upright or inclining to the right or to the left, or being waved, or raised or lowered, or completely removed, or altering its position, or it should be changed, and the signal's head should look different, either in pattern or colour, or it should be changed in pattern or colour as the ancients used to do.

45 **(= Leo VI, §47)** For in time of engagement they used to have a signal for attack a black *kamelaukion** raised on a pole; they had some other signals displayed in a similar way. It is safer for you to show the signals with your own hand.

46 Ποίησον δέ, στρατηγέ, πάντας ὑπὸ σὲ ἄρχοντας ὅσοι κρατοῦσι δρόμωνας ἵνα ἔχωσιν ἀσφαλῆ τὴν πεῖραν τῶν τοιούτων σημαδίων καὶ γύμνασον αὐτοὺς εἰς ταῦτα ἵνα γινώσκωσι τὸ σημάδιον ἓν ἕκαστον διὰ τί γίνεται καὶ πῶς καὶ μή πως σφάλλωνται, ἀλλὰ μᾶλλον ἵνα γυμνασθῶσι καλῶς εἰς αὐτὰ καὶ ποιῶσι συντόμως τὰ κελευόμενα.

47 Εἰ δέ ἐστι τοσαύτη ἀνάγκη ἢ ἐλπίζεις ὅτι εὐκόλως νικήσεις καὶ μέλλεις ποιῆσαι δημόσιον πόλεμον, ποίησον τὴν παραταγὴν τῶν δρομώνων καθὼς γινώσκεις ὅτι ἔνι ἁρμόδιον καὶ πρὸς τὸν καιρὸν καὶ πρὸς τὸν τόπον καὶ πρὸς τὴν ἑτοιμασίαν τῶν πολεμίων καὶ πρὸς τὴν παραταγὴν αὐτῶν· οὐ γὰρ δυνάμεθα ἄρτι λέγειν μετ᾽ ἀσφαλείας περὶ τῶν μελλόντων συμβαίνειν.

48 Ἄλλοτε μὲν ἵνα ποιήσῃς ὡς σῖγμα τὴν παραταγὴν καὶ τοὺς μὲν ἄλλους δρόμωνας ἵνα ποιήσῃς ἔνθεν κακεῖθεν οἷον κέρατα ἢ κεῖρας ἢ τὰς ἄκρας ἵνα στήσῃς ἐξαιρέτως τοὺς ἰσχυροτέρους καὶ μεγαλωτέρους· εἰς δὲ τὸ βάθος ἤγουν εἰς τὴν μέσην ὑπάρχῃς σὺ πρὸς τὸ περιβλέπειν ἐκεῖθεν πάντα καὶ διατάττειν καὶ διοικεῖν καὶ βοηθεῖν ἔνθα ἐστὶ χρεία βοηθείας· ἔχε δὲ καὶ εὐκαίρους τινὰς πρὸς τὸ ἐπιβοηθεῖν μετὰ σοῦ ὅτε ἐστὶ χρεία βοηθείας· τὸ δὲ σχῆμα τοῦτο τῆς παραταγῆς τὸ ὂν ὡς σῖγμα διὰ τοῦτο γίνεται διὰ τὸ ἀποκλείεσθαι ἔσω τοῦ κύκλου τῆς παραταγῆς τοὺς ἐπερχομένους πολεμίους.

49 Ἄλλοτε δὲ πάλιν ἵνα παρατάξῃς τοὺς δρόμωνας ὀρθὰ πρὸς τὸ ἔχειν ἴσα τὰ μέτωπα αὐτῶν, ἵνα ὅταν γένηται χρεία ἐπιπίπτωσιν εἰς τὰς πρῴρας τῶν πολεμικῶν καὶ διὰ τῶν σιφώνων τοῦ πυρὸς κατακαίωσιν αὐτάς.

50 Ἄλλοτε δὲ ἵνα χωρίσῃς τοὺς δρόμωνας καὶ εἰς διαφόρους παραταγάς, εἴτε εἰς δύο, εἴτε εἰς τρία, πρὸς τὸ πλῆθος τῶν δρομώνων ὧν ἔχεις. Καὶ ὅταν ποιήσῃ συμβολὴν ἡ μία παραταγή, ἵνα ἐπιπέσῃ καὶ ἡ ἄλλη ἢ ὄπισθεν ἢ ἐκ πλαγίου κατὰ τῶν πολεμίων ὡς ἔτι εἰσὶν ἐμπεπλεγμένοι καὶ βλέποντες ὅτι ἐπῆλθε βοηθεία κατ᾽ αὐτῶν παραυτὰ ἐξατονοῦσιν.

51 Ἄλλοτε δὲ καὶ δι᾽ ἐγκρύμματος πολέμησον αὐτοῖς· πλὴν πλάνησον τούτους πρῶτον δι᾽ ὀλίγων τινῶν, καὶ ὅταν ἐπιπέσωσι κατ᾽ αὐτῶν, τότε ἵνα φανῇ τὸ ἔγκρυμμα καὶ παρατάξῃ καὶ ἐκλύσῃ αὐτούς.

52 Ἄλλοτε δὲ ἀπόλυσον τοὺς δρόμωνας ἐλαφροὺς καὶ γοργοὺς ἵνα ποιήσωσι πρὸς ἐκείνους συμβολὴν πολέμου πρὸς τὰ πολεμικὰ καὶ ἵνα πολεμήσῃς αὐτὰ ἀπὸ χειρῶν ἕως οὗ κοπωθῶσι τελείως

46 **(= Leo VI, §48)** Ensure, *stratēgos*, that all the commanders under you who have control of dromons are very experienced in these signals, and [you should] practice them in these so that they know why each signal is made, and how, and they make no mistakes, but rather are well practised in these matters and do [what is] ordered promptly.

47 **(= Leo VI, §49)** If there is a great need or you expect that you will be easily victorious, and you intend to make a general attack, organize the formation of the dromons as you know is suitable to the weather, the topography, the readiness of the enemy and their formation. We cannot now speak precisely about what might happen.

48 **(= Leo VI, §50)** On other [occasions] you should make a formation like a [capital letter] sigma (i.e., a "C" shape) and you should put the rest of the dromons on one side and the other like horns or hands and you should make sure that you position the stronger and larger on the tips. You yourself should be at the deepest [point], that is, in the middle, to be able to see everything from there and control and oversee and assist where there is need of assistance. Have by you at hand some [ships] to go off to help where there is need of assistance. This sigma-shaped formation is used for this purpose, to enclose the enemy's attacking formation within the circle.

49 **(= Leo VI, §51)** On other [occasions] again you should form up the dromons in a straight [line] to have an equal front, so that when the need arises, they can attack the enemy [ships] at the prow and burn them with fire from the *siphōnes*.

50 **(= Leo VI, §52)** On other [occasions] you should divide the dromons into several formations, either into two or into three, according to the number of dromons you have. When one formation has made an attack, the other should fall on the enemy either at the rear or the flank when they are still engaged, and when they see that reinforcements are attacking them, they are immediately disheartened.

51 **(= Leo VI, §53)** On other [occasions] fight them with an ambush. However, first deceive them with a small [force] and, when they attack these, then the ambushers should appear and confuse and scatter them.

52 **(= Leo VI, §§54, 55)** On other occasions you should send out light and fast dromons to make a warlike attack on them [the enemy] against the enemy [ships], and so that you fight them at

οἱ πολέμιοι. Καὶ τότε ἵνα ἀποπλέξῃς τοὺς πολεμοῦντας μετ᾽ αὐτῶν δρόμωνας κατὰ τῶν πολεμίων ὡς ἔτι εἰσὶν ἀπὸ κόπου καὶ ἐξελύθησαν ἀπὸ τῆς μάχης καὶ οὕτως ἵνα ποιήσῃς τὴν κατ᾽ αὐτῶν νίκην. Τοῦτο δὲ γίνεται ἐξαιρέτως ὅταν περισσοτέρους δρόμωνας ἔχεις παρὰ τοὺς πολεμίους.

53 Ἄλλοτε δὲ σχηματίσθητι ὅτι φεύγεις· πλὴν ἔχε εἰς τὴν τοιαύτην φυγὴν δρόμωνας ταχεῖς καὶ ποίησον τοὺς πολεμίους ἵνα διώκωσιν ἐξοπίσω. Καὶ ὅταν ἴδῃς ὅτι διώκοντες παρέλυσαν τὴν δύναμιν αὐτῶν, τότε ὑπόστρεψον συντόμως ὡς ἔτι εἰσὶν ἐσκορπισμένα τὰ πολεμικὰ καὶ ἐπίπεσον αὐτοῖς ἀπὸ τῶν ἔμπροσθεν· πλὴν ἔχε παρ᾽ ἐκείνους δρόμωνας περισσοτέρους ἵνα ἢ εἷς κατὰ ἑνὸς ἢ δύο ἐκ τῶν σῶν δρομώνων ἐπέρχωνται κατὰ ἑνὸς πολεμικοῦ, καὶ οὕτω νικήσεις αὐτούς.

54 Ἁρμόζει δὲ ποιεῖν συμβολὴν πρὸς πολεμίους εἰς θάλασσαν καὶ ὅταν συμβῇ κινδινεῦσαι αὐτοὺς εἰς τὴν θάλασσαν καὶ ὅταν ἀπὸ ζάλης ἐξατονήσωσι ταραχθέντες ἢ ἵνα ἐπέλθῃς εἰς νύκτα καὶ ἐμπρῆσῃς τὰ πλοῖα αὐτῶν ἢ ὡς ἔτι περισπῶνται ἐκεῖνοι εἰς τὴν ξηρὰν ἢ ὡς ἀπαιτεῖ ἡ χρεία καὶ δυνήθῃς ἐπινοήσαι καὶ σύ, οὕτως ἵνα ποιήσῃς τὰς συμβολὰς αὐτῶν.

55 Οἱ γὰρ ἄνθρωποι πολλάκις ἔχουσι γνώμας καὶ ἀδύνατόν ἐστι προγινώσκειν τινὰ ἢ προλέγειν ὅλα τὰ μέλλοντα συμβαίνειν εἰς τὰς τοιαύτας παραταγάς· καὶ διὰ τοῦτο οὐ δυνάμεθα εἰπεῖν ἀρτίως ὅλας τὰς κατ᾽ αὐτῶν ἀντιπαρατάξεις, ἀλλὰ μᾶλλον ὀφείλομεν ἀνατιθέναι ταῦτα πάντα τῇ προνοίᾳ τοῦ Θεοῦ καὶ παρακαλεῖν αὐτὸν ἵνα εἰς τοὺς τοιούτους κατεπείγοντας καιροὺς δύνηταί τις καὶ βουλεύεσθαι καὶ ἐνθυμεῖσθαι καὶ τὰ ἁρμόζοντα ποιεῖν.

56 Πολλὰ δὲ ἐπιτηδεύματα καὶ οἱ παλαιοὶ καὶ οἱ νέοι ἐποίησαν κατὰ τῶν πολεμικῶν πλοίων καὶ τῶν πολεμούντων εἰς αὐτά· οἷον τὸ σκευαστὸν πῦρ, ἤγουν τὸ λαμπρόν, μετὰ βροντῆς καὶ καπνοῦ τῶν προπύρων πεμπόμενον διὰ τῶν σιφώνων καὶ κατακαῖον αυτά.

close quarters until the enemy are completely exhausted.[28] Then you should disengage the dromons fighting with them, against the enemy, when they are still exhausted and downcast from the battle, and thus you may achieve victory over them.[29] This is best done when you have more dromons than the enemy.

53 **(= Leo VI, §56)** On other occasions, pretend that you are fleeing; however, for this kind of flight have fast dromons and make the enemy follow behind. When you see that they have broken up their force in the pursuit, then immediately turn while the enemy are still scattered and attack them from the front. However, you should have more dromons than them, so that either one of your dromons attacks one enemy ship or two attack one, and thus you will defeat them.

54 **(= Leo VI, §57)** It is appropriate to make an attack on the enemy at sea, both when they happen to be in danger at sea and when they are disheartened after being scattered in a squall; either you should attack and burn their ships at night or when they are still dispersed on dry land, or you should make attacks on them as need arises and as you can devise.

55 **(= Leo VI, §58)** Men often have opinions and it is impossible to foresee everything or to foretell all that is likely to happen in these formations. Because of this we cannot discuss precisely all counter formations against them [the enemy] but we ought rather to leave all this to the providence of God and pray to Him that in such moments of urgent crisis one will be able to devise, invent, and act upon appropriate [measures].

56 **(= Leo VI, §59)** Men of old and of recent times have invented many devices against enemy ships and those fighting in them; such as processed, that is brilliant, fire, which is expelled from *siphōnes* with thunder and smoke from the *propyra* and sets them alight.[30]

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[28] Nikēphoros breaks off Leo VI's §54 here, in the process clearly changing Leo's meaning. It is almost as though either the feigned retreat referred to by Leo, which was a standard naval manœuvre in the Middle Ages, was not used in the Byzantine navy in the age of Nikēphoros, or, and more probably, someone else involved in the manuscript transmission process was unfamiliar with the stratagem.

The changes to Leo's §§54-55 made by Nikēphoros in this §52 are the most radical in the whole constitution.

[29] This makes no sense without the mention of sending in a second squadron, here omitted from the paraphrase of Leo VI, *Naumachika Leontos Basileōs*, §55.

[30] Although the vocabulary is the same as that of Leo VI here, the meaning syntactically is different. *Propyra* has become a nominal rather than adjectival form.

57 Καὶ τοξοβαλίστρας[31] καὶ εἰς τὰς πρύμνας τοῦ δρόμωνος καὶ τὰς πρῴρας καὶ εἰς τὰ δύο πλευρὰς αὐτοῦ ῥιπτούσας σαγίτας μικρὰς τὰς λεγομένας μυίας. Ἄλλοι δὲ καὶ θηρία ἐπενόησαν ἀποκεκλεισμένα εἰς τζυκάλια καὶ ῥιπτόμενα ἔσωθεν τῶν πολεμικῶν πλοίων· οἷον ὄφεις καὶ ἐχίδνας καὶ σαύρας καὶ σκορπίους καὶ τὰ ἄλλα ὅσα ἔχουσιν ἰόν· κλῶνται γὰρ τὰ τζυκάλια καὶ ἐκβαίνουσι τὰ θηρία καὶ δάκνουσι καὶ φονεύουσι διὰ τοῦ ἰοῦ τοὺς ἔσωθεν τῶν πλοίων.

58 Ἐπενόησαν δὲ καὶ ἕτερα τζυκάλια γέμοντα ἀσβέστου καὶ ῥιπτομένων τῶν τζυκαλίων καὶ κλωμένων ὁ ἀτμὸς τοῦ ἀσβέστου σκοτίζει καὶ συμπνίγει τοὺς πολεμίους καὶ γίνεται μέγα ἐμπόδιον εἰς αὐτούς.

59 Καὶ τρίβολια δὲ σιδηρᾶ ῥιπτόμενα εἰς τὰ πλοῖα τῶν πολεμίων οὐκ ὀλίγα λυποῦσιν αὐτοὺς καὶ ἐμποδίζουσιν εἰς τὸν γινόμενον πόλεμον πρὸς τὴν ὥραν.

60 Ἡμεῖς δὲ τζυκάλια κελεύομεν γέμοντα πυρὸς σκευαστοῦ ἵνα ῥίπτωνται ἔσωθεν τῶν πολεμικῶν πλοίων· κλωμένων γὰρ τῶν τζυκαλίων, εὐκόλως κατακαίονται τὰ πλοῖα. Κρατείτωσαν δὲ ὄπισθεν τῶν σιδηρῶν σκουταρίων χειροσίφωνα ἅπερ ἐποίησεν ἄρτι ἡ βασιλεία μου, ἵνα καὶ αὐτὰ ἀπολύσωσι τὸ σκευαστὸν πῦρ εἰς τὰ πρόσωπα τῶν πολεμίων. Καὶ τρίβόλια δὲ μεγάλα σιδηρᾶ ἢ ἡλάρια ὀξέα ἐμπεπηγμένα εἰς ξύλα στρόγγυλα ὡς πῶμα καὶ ἐντετυλιγμένα ὡς στυππεῖα καὶ εἰς σκευὴν καὶ εἰς νάφθαν καὶ εἰς τὰ λοιπὰ τὰ καίοντα ῥιπτόμενα κατὰ τῶν πολεμίων ἀπὸ πολλῶν μερῶν καὶ πίπτοντα εἰς τὰ πλοῖα αὐτῶν ἐμπρήσουσιν αὐτά. Ἂν δὲ καταπατήσωσιν οἱ πολέμιοι τὴν φλόγα αὐτῶν διὰ τὸ σβέσαι αὐτήν, καῆναι ἔχουσι οἱ πόδες αὐτῶν εἰς αὐτὴν τὴν συμβολὴν τοῦ πολέμου καὶ οὐ μικρὸν ἔχει γενέσθαι ἐμπόδιον εἰς τοὺς πολεμίους.

61 Δυνατόν δὲ ἐστι καὶ τὸ διὰ γερανίων ἢ ἄλλων ἐπιτηδευμάτων ὁμοίων· ἵνα ὦσιν ὡς γάμμα καὶ στρέφωνται γύρωθεν ἐπιχῦσαι εἰς τὰ πολεμικὰ πλοῖα καὶ ὑγρόπισσον βραστὸν ἢ σκευὴν ἢ ἄλλην τινὰ ὕλην· πλὴν ἵνα δεσμήσωσι πρῶτον τὰ πολεμικὰ οἱ δρόμωνες καὶ τότε ἵνα στρέφωνται τὸ μάγγανον καὶ ἐπιχέῃ ἅπερ εἴπομεν.

62 Δυνατὸν δέ ἐστι καὶ τὸ περιεγεῖραι ὁλόκληρον τὸν πολεμικόν, ἂν δήσῃς αὐτὸ εἰς τὸν δρόμωνα πλευρὰν παρὰ πλευρὰν και;

[31] τοξοβαλίστρας, thus Dain: τοξοβολίστρας MSS N & l.

57 **(= Leo VI, §60)** There should be *toxobalistrai** (bow-ballistae) at the stern of the dromon and the prow and along the two sides to shoot the small arrows known as *muiai** (flies). Others have thought of putting poisonous creatures into pots and throwing [them] into the enemy ships; such as snakes, vipers, lizards, scorpions and other venomous [creatures]; for the pots break and the creatures come out and bite and kill with their venom those in the ships.

58 **(= Leo VI, §61)** They have also devised other pots full of unslaked lime and when these pots are thrown and broken, the fume from the lime kills and chokes the enemy and causes them great confusion.

59 **(= Leo VI, §62)** Iron caltrops thrown into the ships of the enemy cause them no little harm and hinder them in the fighting taking place at that time.

60 **(= Leo VI, §§63-66)** We give instructions that pots full of processed fire should be thrown into the enemy ships; when the pots break, the ships are easily burned. Hand-*siphōnes*, which my Majesty (i.e., Leo VI) recently made, should be held behind iron shields so that they too throw processed fire into the faces of the enemy. Large iron caltrops or sharp nails embedded in round [pieces of] wood like a disk, and wrapped round with tow [soaked] in the processed [fire] and naphtha and other combustibles, and thrown at the enemy from many directions and landing on their ships, will set them ablaze**.** If the enemies stamp on the flame to extinguish it, their feet will be burned during this attack and this is no small inconvenience for the enemies.

61 **(= Leo VI, §67)** There can also be [made] a [device] by means of *gerania** (cranes) or other similar contrivances. These should be shaped like a [capital letter] gamma (i.e., a "G" shape) and should turn around to pour burning wet pitch or the processed [fire] or anything else onto the enemy ship. However, the dromons should first couple to the enemy [ships] and then they should turn the *manganon* and it should pour the [substances] we have mentioned.

62 **(= Leo VI, §68)** It is possible to overturn an entire enemy [ship] if you couple it to the dromon side by side, and the enemy rush

συναχθῶσιν οἱ πολέμιοι εἰς τὸ μέρος ἐκεῖνο τὸ ὂν εἰς τὸν δρόμωνα ὡς ἔχουσιν ἔθος πρὸς τὸ ποιῆσαι ἀπὸ χειρὸς μάχην ἐλπίζοντες ὅτι ἐπακουμβίζει τὸ πλοῖον αὐτῶν εἰς τὸν δρόμωνα· εἶτα ἵνα ἐπέλθῃ ἄλλος δρόμων κατὰ τῆς πλευρᾶς τοῦ πολεμικοῦ τῆς οὔσης εἰς τὴν πρύμναν καὶ ἵνα συγκρούσῃ καὶ πρώσῃ ἰσχυρὰ τὸ τοιοῦτον πολεμικόν· καὶ ὁ μὲν πρῶτος δρόμων ὁ δήσας τὸ πολεμικὸν ἵνα δυνηθῇ ἀπολύσειν αὐτὸν ἐκ τοῦ δεσμοῦ καὶ ὑποχωρῆσαι ὀλίγον πρὸς [τὸ][32] μὴ ἔχειν εἰς αὐτὸ ἀκούμβισμα τὸ πολεμικόν· ὁ δὲ ἄλλος δρόμων ἵνα βαρήσῃ ὅσον δύναται καὶ ἂν γένηται οὕτως, ἵνα περιεγείρῃ τὸ[33] πολεμικὸν μετὰ τῶν ὄντων ἀνδρῶν εἰς αὐτό. Πρέπει δὲ ἵνα μὴ δήσῃς ὅλον τὸ πολεμικόν, ἀλλ᾽ ὀλίγον τι, ἵνα ἀφήσῃς πλευρὰ γυμνὰ εἰς τὴν πρύμναν τοῦ πολεμικοῦ, εἰς ἃ ἵνα συγκρούσῃ ὁ δρόμων πρὸς τὸ περιεγεῖραι τὸ πολεμικὸν μετὰ τῶν πολεμίων.

63 Ἀναγκαῖον δὲ φαίνεται μοι καὶ ὅπερ ἐπενοήσαμεν ἡμεῖς ἵνα ἀπὸ τῆς κάτω ἐλασίας τοῦ δρόμωνος διὰ τῶν τρυπημάτων τῶν κωπίων ἐκβαίνοντα τὰ μέναυλα σφάζωσι τοὺς πολεμίους.

64 Ἔστι δὲ καὶ ἄλλο ἀναγκαίοτερον ἂν εὕρῃ χεῖρας ἐπιδεξίους, τὸ ἐκβάλλειν ἀπὸ τῶν εἰρημένων τρυπημάτων τῶν κωπίων τῆς κάτω ἐλασίας μέναυλα καὶ τρυπῆσαι τὸ πολεμικὸν ὥστε εἰσελθεῖν ὕδωρ καὶ γεμίσαι αὐτό. Ἐπενόησαν δὲ καὶ ἄλλα τινὰ ἐπιτηδεύματα οἱ ἀρχαῖοι εἰς τὸν πόλεμον τῆς θαλάσσης. Εἰσὶ δὲ καὶ ἄλλα δυνάμενα ἐπινοηθῆναι, ἀλλ᾽ ἐθέλοντες τὴν συντομίαν οὐχ ἰσχύομεν γράφειν αὐτά· εἰσὶ γάρ τινα ἐξ αὐτῶν ἀσύμφορα πρὸς τὸ γράφεσθαι ἵνα μὴ γίνωνται φανερὰ εἰς τοὺς πολεμίοις, ἵνα μὴ μᾶλλον ἐκεῖνοι ποιῶσιν αὐτὰ καθ᾽ ἡμῶν. Τὰ γὰρ στρατηγήματα ἂν ἅπαξ κατανοήσωσιν οἱ πολέμιοι, δύνανται ἀντιστρατηγεῖν καὶ ἐπιτηδεύειν αὐτά· διὰ τοῦτο πρέπει ἕκαστον ὅπερ ἂν ἐπινοήσῃ ἔχειν αὐτὸ ἐν μυστηρίῳ, ἕως ἂν ποιήσῃ αὐτό.

65 Εἰς δὲ τὸ βιβλίον τῶν ἀρχαίων τακτικῶν καὶ στρατηγημάτων ἐπευνῶν εὑρήσεις καὶ περισσότερα· οὐ γάρ ἐστιν, ὡς εἴρηται,[34] δυνατὸν γράφειν πρὸς πάντα τὰ μέλλοντα γίνεσθαι διὰ τὸ εἶναι ἄπειρα.

66 Πλήν, ἵνα εἴπω τὸ κυριώτερον, ἔστωσαν οἱ δρόμωνες ἐξωπλισμένοι τελείως ἀπὸ στρατιωτῶν ἀνδρείων καὶ δυναμένων ἀπὸ χειρὸς πολεμεῖν καὶ τολμηρῶν καὶ γεγυμνασμένων·

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[32] τὸ added by Dain. MSS N & l do not have this.
[33] τὸ, thus Dain: τὸν MSS N & l.
[34] εἴρηται, thus Dain and MS. l: εἴρη MS. N.

to that part which is against the dromon, as is their cusom, to engage in hand-to-hand fighting, hoping that their ship will lay against the dromon. Then another dromon should run at the enemy [ship]'s side at the stern and should strike and push the enemy [ship] severely. And the first dromon, the one coupled to the enemy [ship], should be able to free itself from the coupling and back off a little so that the enemy [ship] does not lay against it. The other dromon should weigh down as much as it can and if it does this, it should up end the enemy [ship] with the men in it. You should not couple the whole enemy [ship] but only a little, so that at the enemy's stern you leave the sides bare, where the dromon can strike in order to overturn the enemy [ship] with the enemy [crew].

63 **(= Leo VI, §69)** [A technique] which we have devised seems to me useful: when pikes, coming out through the *trypēmata** (oarports) for oars on the lower bank on a dromon, slaughter the enemy.

64 **(= Leo VI, §§70, 71)** There is something even more useful if experienced hands are available, [and that is] to thrust pikes out from the above-mentioned oar-ports of the lower oar-bank and make a breach in the enemy [ship] so that water enters and floods it. The ancients invented other devices for naval warfare and others can also be invented, but since I wish to give a summary, I cannot describe them. It is also inappropriate for some to be described, to prevent their becoming known to the enemy and indeed their using them against us. For if the enemy once get information about a stratagem, they can work out a counter-stratagem and put it into practice. And so every [scheme] that is invented [should be] kept secret until it can be carried out.

65 **(= Leo VI, §72)** You will find more [information] when you look in the book of ancient tactics and strategies. For it is impossible, as has been said, to write about everything that will happen since these are infinite.

66 **(= Leo VI, §73)** But, let me mention the more important [point]. The dromons should be completely armed with brave soldiers capable of fighting at close quarters, and bold and

ἐχέτωσαν δὲ ἅρματα καὶ ἐξόπλισιν οἵαν ὡρίσαμεν ἵνα ἔχῃ ὁ στρατιώτης ὁ ὢν εἰς τὴν ξηρὰν ὁ κατάφρακτος· καὶ οὕτως ἔστωσαν ἐξωπλισμένοι πάντες οἱ τῆς ἄνω ἐλασίας.

67 Πρὸς δὲ τὴν ποιότητα τῶν ἐχθρῶν καὶ πρὸς τὸ πλῆθος τῶν πλοίων αὐτῶν ποίησον καὶ σύ, στρατηγέ, δρόμωνας καὶ ἐξόπλισον αὐτοὺς πρὸς τὸ μὴ ἔχειν τὸν δρόμωνα ἡμῶν ὀλιγότερον στρατὸν παρὰ τὸ πολεμικὸν πλοῖον, ὅστις ἐξαιρέτως ἑτοιμάζεται δῆσαι μετὰ τοῦ πολεμικοῦ καὶ πολεμῆσαι· ἀλλ᾽ εἴ ἐστι δυνατὸν ἵνα ἔχῃ καὶ περισσότερον στρατὸν ὁ ἡμέτερος δρόμων· πολεμούντων γὰρ ἀνδρείως καὶ τῶν δύο οἱ περισσότεροι νικήσουσιν ἄν.

68 Εἰ δὲ συνορᾷς ὅτι ἔχουσιν οἱ πολέμιοι πλοῖα ἔχοντα περισσότερον στρατόν, βάλε καὶ σὺ πλῆθος περισσότερον εἰς τοὺς δρόμωνας καὶ οὐσίωσον αὐτούς. Πλὴν ἔκλεξαι ἀπὸ πάντων τοὺς κρείττονας ἄνδρας καὶ ἐξ αὐτῶν ἐξόπλισον τὴν ἀρκοῦσαν δύναμιν εἰς δρόμωνας τελείους καὶ ἰσχυροτάτους· καὶ ἢ τῶν δύο δρομώνων τὸν στρατὸν, ἂν τύχῃ, ἵνα βάλῃς εἰς τὸν ἕνα δρόμωνα, ἢ ἐκ πάντων ἵνα ἐπιλέξῃς τοὺς κρείττονας, ὡς εἴρηται, καὶ γένωνται ἄχρι διακοσίων στρατιωτῶν ἢ καὶ περισσότεροι καθ᾽ ἕνα[35] ἕκαστον δρόμωνα, ἵνα καὶ ἀπὸ τοῦ πλήθους καὶ ἀπὸ τοῦ μεγέθους τῶν δρομώνων καὶ ἀπὸ τῆς ἀνδρείας τῶν στρατιωτῶν νικήσῃς σὺν Θεῷ τὰ πολεμικὰ πλοῖα.

69 Ἵνα δέ ἐξοπλίσῃς καὶ μικροτέρους δρόμωνας καὶ ἐλαφροτέρους παρὰ τοὺς ἄλλους οὓς ἔχομεν συνηθείᾳ,[36] ἵνα καὶ ἐὰν διώκωσι τοὺς πολεμίους, φθάσωσιν αὐτά, καὶ ἐὰν διώκωνται παρὰ τῶν πολεμίων, μὴ φθάνωνται παρ᾽ αὐτῶν, καὶ τούτους ἵνα ἔχῃς εἰς καιρὸν χρείας πρὸς τὸ δύνασθαι αὐτοὺς ἢ ποιῆσαί τι κακὸν τοὺς ἐχθροὺς ἢ μὴ παθεῖν τι κακὸν παρ᾽ αὐτῶν.

70 Μικροὺς δὲ καὶ μεγάλους δρόμωνας ποιῆσον πρὸς τὴν ποιότητα τῶν πολεμούντων σοι ἐθνῶν. Οὐ γὰρ τὸν αὐτὸν ἔχουσι στόλον οἱ Σαρακηνοί. ἔχουσι δὲ καμπάρια[37] μεγαλώτερα καὶ ἀργότερα· οἱ δὲ Ῥῶσοι ἀκάτια μικρότερα καὶ ἐλαφρότερα καὶ γοργά· διαβαίνουσι γὰρ ποταμούς καὶ οὕτως ἐμβαίνουσιν εἰς τὸν Εὔξεινον Πόντον· καὶ διὰ τοῦτο οὐ δύνανται ἔχειν μεγαλώτερα πλοῖα.

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[35] καθ᾽ ἕνα, thus Dain: κατὰ ἕνα MSS N & l.

[36] συνηθείᾳ, thus Dain, following Desrousseaux: συνήθειαν MSS N & l.

[37] καμπάρια MS. N, καμπάδια MS. l, καὶ μπάδια Dain. The κουμβάρια of Leo VI, *Naumachika Leontos Basileōs*, §77 became καμπάρια in MS. N, which was misread as καμπάδια by Antonios Eparchos in MS. l, and this was then guessed at as καὶ μπάδια by Dain. Something of an object lesson in manuscript transmission processes!

exercized. They should have weaponry and armament such as we have decreed the soldier who is on land, the *kataphraktos*, should have. All those in the upper oar-bank should be armed like this.

67 **(= Leo VI, §74)** You, *stratēgos*, should build dromons to match the quality of the enemy and the number of their ships and arm them so that our dromon has a *stratos* no fewer than the enemy ship, [and] one that is especially prepared to couple with the enemy ship and fight; but if it is possible our dromon should have a larger crew, for when two crews fight bravely, the larger will win.

68 **(= Leo VI, §75)** If you realize that the enemy has ships with a larger *stratos*, put a larger number into the dromons and *ousia**[38] them. However, choose the stronger men from the whole [force] and from these arm a sufficient force of effective and very strong dromons. Either, if this is [what] happens, put the crew from two dromons into one dromon, or choose the best from all, as has been said, and there should be up to two hundred soldiers or more on each dromon, so that through the number and size of the dromons and the bravery of the soldiers you may, with God, defeat the enemy ships.

69 **(= Leo VI, §76)** You should arm dromons [which are] smaller and lighter than those we usually have, so that if they pursue the enemy, they can catch up with them, and if they are pursued by the enemy, they are not caught up with by them. You should have these for a time of need, so that they can either inflict some damage on the enemy, or avoid damage from them.

70 **(= Leo VI, §77)** Build small and large dromons according to the quality of the peoples warring against you. For the Saracens do not have the same fleet; they have larger and slower *kamparia**. The Russians have smaller, lighter, and fast *akatia* for they cross rivers and thus come down into the Black Sea and so cannot use larger ships.

[38] See Appendix Two [a], §75 and n. 58.

71 Καὶ ταῦτα μὲν εἴπομεν περὶ τῶν παραταγῶν. Ὅταν δὲ θέλῃς χωρισθῆναι ἀπὸ τῆς μάχης, ποίησον ὡς σῖγμα τὴν παραταγὴν τῶν δρομώνων καὶ οὕτως ὑποχώρησον ἐξοπίσω, οἷον ἡ πρῴρα ἵνα βλέπῃ πρὸς τοὺς πολεμίους καὶ ἡ πρύμνα ἵνα ὑπάρχῃ ὀπίσω· ἀσφαλὲς γάρ ἐστι τοῦτο τὸ σχῆμα τῆς παραταγῆς καὶ ὅταν ὑπάγῃς πρὸς τοὺς πολεμίους καὶ ὅταν ὑποχωρῇς ἐξ αὐτῶν, ὡς μαρτυροῦσι τινες τῶν παλαιῶν ποιήσαντες αὐτοί. Καὶ γὰρ ὅταν ὑποχωρῇς ἐξ αὐτῶν οὐ φεύγεις, ἀλλὰ φυγομαχεῖς καὶ ἔχεις καὶ τοὺς δρόμωνας ἑτοίμους πρὸς τὸ ἐπελθεῖν πάλιν κατ᾽ αὐτῶν ἂν γένηται χρεία ἐκ τοῦ ἔχειν σε τὰς πρῴρας πρὸς αὐτούς· καὶ οἱ πολέμιοι πάλιν οὐ θαρροῦσιν ἐμβῆναι πολλὰ εἰς τὸ κύκλωμα τῆς παραταγῆς σου, ὑφορώμενοι ἵνα μὴ κυκλωθῶσιν.

72 Ἀφ᾽ οὗ δὲ λυθῇ ὁ πόλεμος, ἁρμόζει σέ, στρατηγέ, τὰ κρατηθέντα ἀπὸ τῶν πολεμίων διαμερίζειν ἐπίσης εἰς τοὺς στρατιώτας καὶ ποιεῖν τραπέζας καὶ καλεῖν καὶ φιλοφρονεῖσθαι· καὶ οἱ μὲν ἀνδραγαθήσαντες ἵνα λάβωσι καὶ δωρεὰς καὶ τιμάς, οἱ δὲ ποιήσαντές τι ἀνάξιον στρατιώτου ἵνα ἐπιτιμηθῶσι ἁρμοζόντως.

73 Γίνωσκε δέ, στρατηγέ, ἂν ἔχῃς πλῆθος δρομώνων καὶ ἔπειτα ἔχῃς καὶ ἀνάνδρους στρατιώτας, [ὅτι][39] οὐδὲν ἰσχύει οὐδ᾽ ἂν ἔχῃς[40] πόλεμον πρὸς ὀλίγους ἐχθροὺς καὶ ὦσιν ἐκεῖνοι ἀνδρεῖοι καὶ τολμηροί· οὐδὲ γὰρ πολλοὶ ἄνδρες ἰσχύουσί τι κατὰ ὀλίγων ἀνδρῶν, εἰ οὔκ εἰσι καὶ ἀπὸ τῆς πρθυμίας καὶ ἀπὸ τῆς ἐξοπλίσεως στρατιῶται ἀληθεῖς. Τί γὰρ κακὸν οὐ μὴ ποιήσουσι καὶ ὀλίγοι λύκοι πολλὰς χιλιάδας προβάτων;

74 Διὸ πρέπει ἵνα βλέπῃς μετ᾽ ἀκριβείας πολλῆς πάντα τὰ τῶν ἐχθρῶν ὅπως εἰσὶ καὶ οὕτως ἵνα ποιήσῃς καὶ τῶν δρομώνων τὴν κατασκευὴν καὶ τὸ πλῆθος αὐτῶν καὶ τὸ μέγεθος καὶ τὴν ἐξόπλισιν τῶν στρατιωτῶν καὶ τὰ ἄλλα ἐπιτηδεύματα ἁρμοδίως καὶ κατὰ τῶν ἐχθρῶν. Ἔχε δὲ καὶ μικροὺς καὶ ταχείας δρόμωνας, οὐ πρὸς πόλεμον ἐξωπλισμένους, ἀλλὰ πρὸς τὰς βίγλας καὶ τὰ μανδάτα καὶ τὰς ἄλλας τὰς ἀπαιτούσας ὁμοίως χρείας. Ἔχε δὲ καὶ τά μονήρια[41] καὶ τὰς γαλέας καὶ αὐτα ἐξωπλισμένα μετὰ ἁρμάτων διὰ τὰ πολλάκις συμβαίνοντα.

75 Σὺ δὲ ὀφείλεις εἰς πάντα εἶναι σπουδαῖος καὶ ἀνδρεῖος καὶ ἀτάραχος καὶ ταχὺς εἰς τὰς ἀναγκαίας ἐξαιρέτως τῶν πραγμάτων ἐγχειρήσεις καὶ πράξεις ἵνα καὶ τῷ Θεῷ ἀρέσῃς καὶ

[39] Thus Dain. MSS N & l do not have this.
[40] ἔχῃς, thus Dain, following Desrousseaux: ἔχη MSS N & l.
[41] μονήρια, thus Dain: μονέρια MSS N & l.

71 **(= Leo VI, §78)** That is enough about formations. When you wish to withdraw from a battle, make the formation of the dromons into a [capital letter] sigma (i.e., "C" shaped), and thus withdraw backwards so that the prow faces the enemy and the stern remains to the rear.[42] This type of formation is safe both when you approach the enemy and when you withdraw from them, as some of the ancients have indicated, having done [that].[43] For when you withdraw from them you are not in flight but are avoiding battle, and you keep the dromons ready to attack again, if need arises, by your having the prows towards them. And the enemy in turn do not have the courage to enter your curved formation for fear of encirclement.[44]

72 **(= Leo VI, §79)** When the engagement has ended, it is appropriate, *stratēgos*, for you to divide then amongst the soldiers what has been captured from the enemy, and to hold banquets and invite [the men] and make much of them. Those who have acted bravely should receive rewards and honours and those whose behaviour has been unbecoming to a soldier should be penalized accordingly.

73 **(= Leo VI, §80)** You should realize, *stratēgos*, that if you have a number of dromons but then you have cowardly soldiers, that it is no use even if you are fighting against a few enemies but ones who are brave and bold. For not even many men can achieve anything against a few unless they are true soldiers both in energy and arms. For will not a few wolves do terrible things to many hundreds of thousands of sheep?

74 **(= Leo VI, §81)** Therefore you should look with great accuracy at the whole [situation] of the enemy, and then organize the equipment of the dromons, and their number and size, and the armament of the soldiers and other needs in a manner appropriate to the enemy**.** Have small fast dromons which are not armed for battle but as scouts, for messages and other similar necessary purposes. You should also have *monēria* (monoremes) and *galeai*, both armed with weaponry against many eventualities.

75 **(= Leo VI, §82)** You must be keen, brave, calm, and vigilant through everything, especially in the inevitable conflicts and periods of action, so that you may both please God and appear a

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[42] Cf. Appendix Two [b], §2.
[43] The following sentences were added by Nikēphoros Ouranos to Leo VI's text.
[44] Cf. Appendix Two [b], §2.

τῇ ἐξ αὐτοῦ βασιλείᾳ ἡμῶν δόκιμος φανῇς στρατηγὸς καὶ ἐξ ἀμφοτέρων κερδήσῃς ἀξίας ἀμοιβάς, ἀπὸ Θεοῦ μὲν μισθοὺς ἀθανάτους ὡς ἀγωνιζόμενος ὑπὲρ τῆς κληρονομίας αὐτοῦ, ἐξ ἡμῶν δὲ τιμάς τε καὶ δωρεὰς τὰς πρεπούσας, οὐ ψευδόμενος τὸ ὄνομα τοῦ στρατηγοῦ, ἀλλὰ στατηγὸς τῇ ἀληθείᾳ καὶ ὢν καὶ λεγόμενος. Τοσαῦτα περὶ θαλασσομαχίας ἐν συντόμῳ εἰρήκαμεν.

notable *stratēgos* in the service of my Majesty under God and receive worthy recompense from both: an eternal reward from God for your struggles on behalf of his dominion, and honours and gifts from myself since you have not fallen short of the name of *stratēgos* but are a *stratēgos* in truth both in word and deed. We have said enough in brief about warfare at sea.

APPENDIX SIX

GREEK FIRE

This Appendix is not an attempt to solve the vexed problems of either the composition of the raw material of Greek Fire or of the delivery systems for it. We do not pretend to have considered *in toto* the scholarship on Greek Fire, the literature on which is voluminous and has a long history.[1] Here we have merely collected those observations on Greek Fire which we have made in the course of our research into the Byzantine navy and which may be useful to others or which inform our discussion elsewhere. The entire debate about Greek Fire has been bedevilled by the fact that the term became used widely in both Arabic and Latin for almost any combustible, irrespective of the delivery system. Pots full of combustibles known as Greek Fire, hurled by catapults, were utilized by both Muslims and Latins, as well as by Byzantines. However, here we are concerned only with that type of combustible which was either shot by *siphōnes* or which the Byzantine sources suggest was the same material, even if hurled or poured.

Although the relevant section of his chronicle is confused chronologically, Theophanēs the Confessor, followed by Constantine VII in the *De administrando imperio*, ascribed the invention of Greek Fire and the projection of it through flame-throwers, *siphōnes* or *siphōnia*, to an artificer from *Heliopolis* of Syria by the name of Kallinikos during the first Muslim siege of Constantinople. He first wrote that in A.M. 6164 (September 671-August 672) the emperor Constantine IV stationed "large biremes carrying fire-cauldrons and dromons carrying *siphōnes*" in the small harbour of Caesarius on the south side of Constantinople in preparation to defend it against the Muslim fleets en route to assault the city. According to Theophanēs, the Muslim fleets did not arrive until A.M. 6165 (spring-summer of 673). He then described the siege of the city from April to September

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[1] See in particular Partington, *Greek Fire and gunpowder*; Ellis Davidson, "Secret weapon"; Haldon and Byrne, "Greek Fire"; Haldon, "'Greek Fire' revisited"; Christides, "New light"; Korres, «Ὑγρὸν πῦρ»; Pasch, "Fuoco greco"; Russo, "Fuoco marino".

We are extremely grateful to John Haldon for his many discussions with, and communications to, us concerning Greek Fire and his practical experiments to build a *siphōn* weapon, and for a copy of his "'Greek Fire' revisited" before its publication.

673, the withdrawal of the Muslim fleet to *Kyzikos* to winter over 673-4 and its return in the following spring of 674, the siege lasting in this way for seven years according to him. Only at the end of his entry for A.M. 6165, in a passage identified as being derived from a lost Syriac chronicle, did Theophanēs write that: "At that time Kallinikos, an artificer from *Heliopolis* of Syria, having taken refuge with the Romans [and] having prepared sea fire, ignited the ships of the Arabs and burned them with their crews. In this way the Romans came back in victory and acquired the sea fire."[2] The later part of the entry for A.M. 6165 is in fact chronologically generic and the fact that Theophanēs wrote that the Byzantines had dromons carrying *siphōnes* in A.M. 6164 does not negate his own ascription of the development of Greek Fire to Kallinikos. He referred to it as "sea fire", πῦρ θαλάσσιον (*pyr thalassion*), or "wet fire", πῦρ ὕγρον (*pyr hygron*), and said that Kallinikos had "prepared" or "processed", κατασκευάσας (*kataskevasas*), it.

Writing around the middle of the twelfth century George Kedrēnos uniquely reported that Kallinikos was from *Heliopolis* of Egypt rather than Syria and that from him were descended the family of "Lampros", "Brilliance", who still manufactured the fuel in his own day.[3] "Brilliant" was one of the adjectival terms commonly used for the fire. However, there is no corroborating evidence for Kedrēnos's story and the idea that the secret of the fuel had remained confined to the members of one private and obscure family and had been handed down within it from generation to generation for six centuries is not credible.

Theophanēs also wrote that in 713, when preparing against the coming Muslim assault on Constantinople, Anastasios II built fire-carrying *diēreis*, amongst other ships. And, during the actual assault, Leo III had fire-carrying *siphōnes* made and mounted on dromons and *diēreis* which he sent against the Muslim fleets. In 726 the fleets of Hellas and the Cyclades revolted against Leo III because of his persecution of iconophiles but were defeated by the imperial fleet using "artificial" fire. In 743 the usurping emperor Artabasdos, sent out "fire-carrying *diēreis*" against the fleet of the *Kibyrrhaiōtai*

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[2] Theophanēs, *Chronographia*, A.M. 6164-5 (vol. 1, pp. 353-4), esp. A.M. 6165 (vol. 1, p. 354): "τότε Καλλίνικος ἀρχιτέκτων ἀπὸ Ἡλιουπόλεως Συρίας προσφυγὼν τοῖς Ῥωμαίοις πῦρ θαλάσσιον κατασκευάσας τὰ τῶν Ἀράβων σκάφη ἐνέπρησε καὶ σύμψυχα κατέκαυσεν. Καὶ οὕτως οἱ Ῥωμαῖοι μετὰ νίκης ὑπέστρεψαν καὶ τὸ θαλάσσιον πῦρ εὗρον.". Cf. Constantine VII, *De administrando imperio*, §48 (p. 226).

[3] George Kedrēnos, *Synopsis historiōn*, vol. 1, p. 765.

supporting Constantine V approaching Constantinople but the *Kibyrrhaiōtai* repulsed them, suggesting that they also had Greek Fire. Finally, In 812 the Bulgar Khan, Krum, captured the town and fortress of *Develtos* on the Black Sea coast and found in it 36 bronze, χαλκοῦς (*chalkous*), *siphōnes* and a quantity of the fuel. However, there is no evidence that the Bulgarians ever used the Greek Fire themselves and, apparently, obtaining possession of the fuel and the delivery mechanism did not in itself reveal the secret of the weapon system.[4]

In the tenth century the *De administrando imperio* repeated Theophanēs' account, referring to the fuel as "wet" fire, as did the *Vita Basilii* of the *Theophanēs continuatus*. Genesios called it fire "for war", πολεμικὸν πῦρ (*polemikon pyr*).[5] Leo VI referred to it as "processed" fire, πῦρ ἐσκευασμένον (*pyr eskevasmenon*), and Nikēphoros Ouranos followed him; although, he also called it "brilliant" fire, πῦρ λαμπρόν (*pyr lampron*). Both said that as well as being projected through *siphōnes*, it could be hurled in pots, κύτραι (*kytrai*) or τζυκάλια (*tzykalia*), or poured from what may have been cauldrons operated by *mangana*, or have tow wrapped around caltrops, τρίβολοι (*triboloi*), soaked in it.[6] The treatise known as the *Syllogē taktikōn*, which has been dated to the early tenth century, also referred to it as "wet fire" or "brilliant" fire and described the projection devices as swivels, στρεπτὰ (*strepta*): "Useful are what are known as *strepta* which send by a device the wet fire, which is also known as brilliant [fire] by many." The *Syllogē taktikōn* once had a chapter 70 entitled, "How the fire that is called wet can be put out and how, when it is thrown at wood or walls, it does not affect them"; however, this chapter has been lost.[7]

The Muslims also acquired possession of Byzantine fire-ships and the question arises as to whether they did in fact acquire the secret of the *siphonēs* and their fuel. Ibn al-Athīr, writing of a naval expedition

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[4] Theophanēs, *Chronographia*, A.M. 6209, 6218, 6235, 6305 (vol. 1, pp. 397, 405, 419, 499).

[5] Constantine VII, *De administrando imperio*, §48, ll. 28-30 (p. 226): " Ἰστέον, ὅτι ἐπὶ Κωνσταντίνου, υἱοῦ Κωνσταντίνου, τοῦ καὶ Πωγωνάτου καλουμένου, Καλλίνικός τις ἀπὸ Ἡλιουπόλεως Ῥωμαίοις προσφυγών, τὸ διὰ τῶν σιφώνων ἐκφερόμενον πῦρ ὑγρὸν κατεσκεύασεν, ..."; *Theophanēs continuatus*, V.59 (p. 298): "... τοῦ πνεύματος τῷ ὑγρῷ πυρὶ κατενέπρησαν."; Genesios, *Basileiai*, B.2, B.5, Δ.34 (pp. 24, 27, 85).

[6] Appendix Two [a], §§6, 59, 63 (*kytrai*), 64, 67 (*manganon*); Appendix Five, §§5, 56, 60 (*tzykalia*), 61 (*manganon*). On the *mangana* see above pp. 378-9.

[7] *Syllogē taktikōn*, 53.8 (pp. 102-3): "... λυσιτελεῖ τὰ στρεπτὰ καλούμενα τὰ διὰ μηχανῆς τὸ ὑγρὸν πέμποντα δηλαδὴ πῦρ, ὃ δὴ καὶ λαμπρὸν παρὰ τοῖς πολλοῖς ὀνομάζεται, καὶ τὰ λεγόμενα χειροσίφωνα, ἅπερ νῦν ἡ βασιλεία ἡμῶν ἐπενόησε ...". See also the rubric for ch. 70 at p. 15.

commanded by the Aghlabid emir Abū 'l-Aghlab Ibrāhīm ibn 'Abd Allāh against Pantelleria in 827, wrote that the Muslims captured a Byzantine fire ship of the *ḥarrāqa* type.[8] Other Arabic authors called ships or weapons for launching fire *ḥarrāqāt* or *naffāṭāt* and specialists in fire-launching *ḥarrāqūn* or *naffāṭūn*.[9]

The Latin treatise attributed to Marcus Graecus entitled *Liber ignium ad comburendos hostes* survives in several manuscripts, the oldest of which is apparently the late thirteenth- or early fourteenth-century Paris, Bibliothèque Nationale, MS. Lat. 7156. It contains much information about what it calls Greek Fire. Who Marcus Graecus was is unknown, although Muslim alchemical writers and their Latin translators knew a text or texts attributed to a certain Marcouh or Marcouneh, entitled King of Egypt. The title was only an honorific but the treatise attributed to this author by Muslim alchemists was associated with a Greek tradition. The translation into Latin was made in the late twelfth or thirteenth centuries. This treatise was concerned with combustibles of many types which supposedly could not be extinguished by water, rather than with the Byzantine weapon *per se*. It represents a much wider alchemical tradition on combustibles and is of little use. There is no mention of *siphōnes* in it.[10]

The otherwise unknown Muslim author Murḍā ibn 'Alī ibn Murḍā al-Ṭartūsī, who wrote a treatise on armaments for Ṣalāḥ al-Dīn, described the composition of a naphtha-based fire fuel which would float on water:

> Manufacture of a naphtha which runs on water and is good for burning ships. Pitch, one part; mineral sulphur, that is to say naphtha, one part; resin, the same; sandarak, the same; pure and clear dolphin's fat, the same; grease of kidneys of goat, the same; yellow sulphur, the same. Grind that which should be ground. Put the pitch on the fire in the cauldron for a while and, when the pitch boils, the sandarak should be added and beaten until it is mixed. That finished, mineral sulphur should be added, which has been covered in old oil, and take off [the fire]. When you need it, take it and boil it until you know that it has reached the point to ignite as fire, and send it on the water towards the desired ships. It will cause a great

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[8] Ibn al-Athīr, *Al-Kāmil* (Fagnan), p. 192.

[9] See Canard, "Textes".

[10] The treatise was edited by Berthelot from the oldest manuscript, Paris, Bibliothèque Nationale, MS. Lat. 7156, with reference to three other manuscripts also. See Marcus Graecus, *Liber ignium*, pp. 89-94 and 108.

conflagration and it runs on water and cannot be extinguished.[11]

It is extremely improbable that the Byzantine Greek Fire fuel had anything in common with such a mixture, or indeed with any of the many other similar such mixtures to be found in Muslim sources.

A dromon's primary *siphōn* was undoubtedly the one at the prow, above which, according to Leo VI and Nikēphoros Ouranos, there was a fortified foredeck.[12] In the anonymous Arabic translation of sections of the *Naumachika Leontos Basileōs* inserted by Ibn Mankalī into his *Al-adilla* and *Al-aḥkām*, Leo's §6 was translated as: "At the bow of each ship there should be tubes (*anābīb*) from which they throw fire. They [the tubes] are called in the old Greek (*Rūmī*) tongue *sifuna*, and above the aforementioned tubes should be covered planks, the latter in turn protected from above by other planks". The translator apparently envisaged more than one such *sifōn* at the prow. The translator also preserved the reference to the fortified foredeck above the *sifuna*. The text of §51 of the *Naumachika Leontos Basileōs*, was also reproduced quite closely: "On other occasions, the arranging of your ships should be in a straight line, so that if time allows, you can ram your enemy's ships with the bow of your ships, and shoot fire at them". Where Leo VI said that the *siphōn* was bound in copper, the Arabic translator omitted this. However, interestingly, in the *Al-adilla*, the *siphōnator* was said to have had his own "elite squad" of men, as, no doubt, he would have had.[13] The translator used the Arabic *anābīb*, "tubes" for the flame-thrower. He knew Greek well but had no idea about the Byzantine weapon because σίφων did, of course, have the primary sense of a tube or pipe, as well as of a force-pump. He simply equated it to the types of combustibles known to Muslims and translated the Greek literally.

There is no doubt that the Muslims possessed combustibles for use in war both at sea and on land. They could certainly hurl such combustibles in pottery "grenades" by hand or with catapults.[14] The only question is whether they also possessed the secret of the *siphōnes* and could project fire in the manner of a flame-thrower. The fact that the translator of Leo VI could translate the Greek σίφων accurately by

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[11] Al-Ṭartūsī, "Traité", pp. 123 [Arabic] and 146 [French translation]; here translated from the Arabic by Ahmad Shboul.

[12] Appendix Two [a], §6; Appendix Five, §5.

[13] Appendix Eight [a], pp. 241-2, 243, 247; [b], pp. 21, 123 The texts vary slightly.

[14] See Christides, *Conquest of Crete*, pp. 63-6; *idem*, "Transmission", pp. 91-5; *idem*, "Parallel naval guides", pp. 62-4; *idem*, "New light", pp. 4-25; Haldane, "Fire-ship of al-Sālih".

the Arabic *unbūb* for a tube does not really prove anything more than that he knew Greek well. In fact, among all the Arabic references to "Greek Fire" combustibles collected by De Goeje and Canard, there is only one description of fire-throwing devices, *ḥarrāqāt al-naft'*, by a poet included in the *Nishwār* of Abū 'Alī al-Muḥassin ibn 'Alī, al-Tanūkhī (Syria and Iraq, 941-94 C.E.) which does suggest that Muslims may have had such a device: "And lo [there is] something yellow (of brass or bronze) in whose mouth is mucus of the same colour which whenever she [the yellow object] vomits forth, then it [the mucus] plays with the wind and floats like a mirage. ... She spits out lightning flashes, between two nights, from entrails up through the mouth of a snake where you can see no teeth. She plunges into the tumult naked, to make it more frightening, and if she were asked she would not recognise fear or safety".[15]

According to John Kaminiatēs, the Muslims under Leo of Tripoli assaulting Thessalonikē in 904 used fire emitted from *siphōnes* in the hands of men stationed on bridges running from the mastheads of the ships,[16] and it is probable that Muslims did in fact acquire the secret of the weapon system, although hard evidence is extremely elusive.[17] It is clear from Joinville's description that the Greek Fire used by the Egyptians against the Crusaders at Damietta in 1249 was in earthenware pots hurled by catapult.[18]

Was the secret acquired by the Latin West? Geoffrey Malaterra, reported that in 1081 the Norman fleet off *Dyrrachion* was confronted and defeated by the Venetians, who "... skilfully blowing the fire, which they call Greek and is not extinguished by water, from hidden passages of tubes beneath the waves, cunningly burned between those same waves of the sparkling sea-top a certain ship of ours [of the Normans] which they call a *cattus*".[19] Malaterra clearly did not

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[15] Canard, "Textes"; De Goeje, "Observations". Canard's work built upon De Goeje's. Our translation is suggested by Michael Carter from Al-Tanūkhī, *Nishwār*, vol. 2, p. 303. It varies considerably from those of Margoliouth and Canard.

[16] John Kaminiatēs, *De expugnatione Thessalonicae*, 34.7 (p. 32): "..., πῦρ τε διὰ τῶν σιφώνων τῷ ἀέρι φυσήσαντες, ...".

[17] Examination of the sources cited by those who claim the Muslims did have the secret of the weapon system, Canard, Christides, Eickhoff, Haldane, Vasiliev, and others, reveals a lack of hard evidence for the *siphōn* system. There is plenty of evidence for fireships, combustibles, earthenware grenades, and fire-arrows, but not for the *siphōn* system.

[18] Joinville, *Vie de saint Louis*, §206 (pp. 100-101).

[19] Geoffrey Malaterra, *De rebus gestis*, III.26 (p. 73): "Sed illi artificiose ignem, quem *graecum* appellant, qui nec acqua extinguitur, occultis fistularum meatibus sub undis perflantes, quandem navem de nostris, quam *cattum* nominant, dolose inter ipsas liquidi aequoris undas comburunt.".

understand how the Greek Fire weapon worked, but he did believe that the Venetians had access to it. This is the only mention known to us in Western sources of a weapon resembling the *siphōnes* of tenth-century dromons being used by anyone other than Byzantines. Similarly, no depiction of any weapon resembling a *siphōn* is known to us from illustrated Western manuscripts, with the exception of the single illustration in the Sicilian manuscript of the *Synopsis historiōn* of John Skylitzēs. Although drawn in Sicily, this illustration was probably based on an earlier Byzantine one in the original manuscript from which it was copied.[20]



Figure 57
Dromon using Greek Fire in the *Synopsis historiōn* of John Skylitzēs
(Madrid, Biblioteca Nacional, vitr. 26-2, fol. 34v), ca 1160.

However, we draw attention to a hitherto almost unnoticed mention of what may have been *siphōnes* of the Byzantine type used in the fleets of the Angevin Kingdom of Sicily in the 1270s. Angevin galleys used *ampule*, bottles or jars, filled with *ignis*, "fire", variously described as *sulphureus* (sulphurous), *silvestris* (lustrous, silvery), or *Grecus* (Greek).[21] These were presumably hurled by hand or by catapults. The correlation between the Latin *silvestris* and the Greek *lampron* used in Byzantine sources is striking and it is difficult to avoid the conclusion

[20] See Appendix Seven; here esp. Table 9, Byzantine Four; Table 10, no. 10.
[21] Filangieri, *Registri*, vol. 12, p. 223; vol. 13, pp. 104-5; vol. 17, pp. 147-8; vol. 23, p. 289.

that the fuel was the same. Moreover, one order of 1275 from the royal chancery specified that galleys should be armed with "*roccette ad ignem proiciendum XXV*"; that is, with "25 'rockets' for throwing fire".[22] These sound so much like the *siphōnes* of the Byzantines that it is difficult to believe that the reference was to anything else. However, we know of no collateral evidence for the use of anything like a *siphōn* or *roccetta* for projecting fire actually being used by Angevin fleets. The chronicle record of the operations of Angevin fleets has no mention of the use of such devices.

The actual composition of the fuel is an unknown quantity. Understandably, Byzantine sources did not reveal the secrets of the fuel and its method of projection.[23] There is, however, a very curious description of what appears to be Greek Fire and *siphōnes* on folio 157r-v of a manuscript at Wolfenbüttel.[24] Most of this manuscript contains a text of the *De compendiosa doctrina* of the early fourth-century author Nonius Marcellus, a glossary of Latin terms profusely illustrated with quotations from late Republican Latin authors and with frequent sprinklings of Greek phrases. The folio in question here is in fact the last two pages of the manuscript and is written in a script of the ninth century. There are also some jottings in a fourteenth-century hand. These pages contain miscellaneous bits and pieces and the Greek Fire text is sandwiched between a Greek alphabet and list of diphthongs and vowels on the one hand and an excerpt from St Augustine on the other. It may have been intended to refer to how one might make a nice fire for a recitation of the canticle of the three boys in the fiery furnace (*Daniel*, III.52-88). It reads:

> The material of the fire of the three boys: naptha, tow, pitch, a fire arrow. Naptha [is] a species of balsam originating in Babilonia [Egypt] in humid places, which colloquially we call *marisci* [*recte*, *marismi*; i.e., maremmas], and it seems to swim there upon the water like fat. Also, there are two kinds of balsam. One originating from Mount Sinai, exuding from rock, whence "rock of oil" [i.e., petroleum]; the other [originating from] twigs which mixed together produce an inextinguishable fire. For when the Saracens proceed in war to a naval battle, having built a furnace

[22] Filangieri, *Registri*, vol. 13, p. 105. First noticed by Pryor in "Galleys of Charles I of Anjou", pp. 78-9 and Table One.

[23] Constantine VII, *De administrando imperio*, §13, ll. 73-103 (pp. 68-70).

[24] Wolfenbüttel, Herzog August Bibliothek, Cod. Guelf., 96 Gud. lat., fol. 157r-v. We are indebted to the Head of the Department of Manuscripts at Wolfenbüttel, Dr Helmar Härtel, and his staff, for their efforts in tracing this text from the inaccurate reference given in Forbes, *More studies*, p. 83, and for providing us with a photocopy of the manuscript. The text was transcribed in Bischoff "Anecdota Carolina", pp. 6-7.

right at the front of the ship, they [the Saracens?] set on it a copper vessel full of these things, having put fire underneath. And one of them, having made a bronze tube similar to that which the rustics call a *squitiatoria*, "squirt", with which boys play, they spray [it] at the enemy.[25]

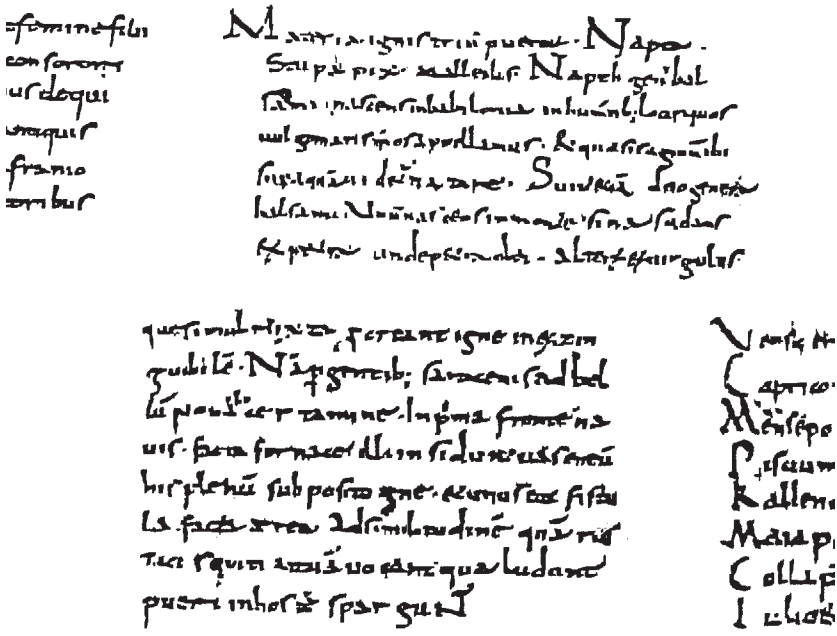


Figure 58
Wolfenbüttel, Herzog August Bibliothek, Cod. Guelf., 96 Gud. lat., fol. 157r-v.

This is an interesting text both because it is dated so early chronologically and also because it is the only text known which

[25] The Latin text reads as follows. The transcription and suggested emendations are Bischoff's with one addition by us from the manuscript given in square brackets: "Materia ignis trium puerorum. Napta. Stupa pix. malleolis. Napth genus balsami nascens in Babilonia in humentibus locis, quos vulgo mariscos (*korr. aus* marismos) appellamus, et quasi saginum ibi [super] aquam videtur natare. Sunt etiam duo genera balsami: unum nascens in monte Sina sudans ex petra, unde petra olei; alterum ex virgultis que simul mixta procreant ignem inextinguibilem. Nam pergentibus Saracenis ad bellum navali (nova *mit einkorr*. li *Hs*.) certamine, in prima fronte navis facta fornace illi insidunt vas eneum his plenum subposito igne, et unus eorum fistula facta aerea ad similitudinem quam rustici squitiatoriam vocant, qua ludunt pueri, in hostem spargunt.".

discusses the composition and method of projection of what appears to have been Greek Fire. Although it must be taken with many grains of salt, its identification of the fuel, naphtha, as a form of balsam being obviously incorrect, and the latter in itself being misunderstood, nevertheless its references to a furnace, a copper vessel, and a squirt are obviously important, as is its identification of the fuel as petroleum oil. It is difficult to believe anything other than that the author had seen Greek Fire weapons in action but how and why such a description of them ended up in such an odd Western manuscript in a recipe for the "fire of the three boys" must make the text very problematical.

In a passage of *Yngvars Saga Víðförla* which appears to be based on actual experience,[26] the hero Yngvarr and his companions coming down the Russian rivers encountered heathen "pirates" (*illgerðamenn*) who used fire weapons. Covering their ships with reeds to disguise them as islands, they attacked Yngvarr's ships. However, Yngvarr managed to defeat these heathen "pirates" and their fire weapons by shooting a flaming arrow lit from a tinder box into the mouth of "the tube jutting from the furnace".

> ... But when the Vikings found how tough the opposition was, then [the pirates] began blowing with smiths' bellows at a furnace in which there was fire and there came from it a great din. There stood there also a brass [or bronze] tube and from it flew much fire against one ship, and it burned up in a short time so that all of it became white ashes. ... But that arrow flew from a bow with the fire into the tube which came out of the furnace and the fire was turned on the heathens themselves and the island burned up in a short blink of an eye.[27]

There was obviously a good deal of fiction involved in this account;

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[26] Yngvarr Eymundsson was a historical personage, recorded as having died in 1041, who led a host to the East some time before that. Many runic inscriptions survive recording names of men who sailed with him. He was killed in the East in "Særkland". As it survives, the saga was probably written early in the thirteenth century and was based on a now-lost Latin work which may have amounted to a life of Ingvarr by the monk Oddr Snorrason, who belonged to the Benedictine monastery of Thingeyrar in Iceland. Oddr's work was based on both oral narrative and written sources.

[27] *Yngvars Saga*, §6 (p. 441): "En er víkingar fundu, at fast var fyrir, þá tóku þeir at blása smiðbelgjum at ofni þeim, sem eldr var í, ok varð af því mikill gnýr. Þar stóð ok ein eirtrumba, ok ór henni fló eldr mikill á eitt skipit, ok brann þat á lítilli stundu, svá at allt varð at fölska. ... En sú ör fló af boganum með eldinn í trumbuna, þá er stóð ór ofninum, ok snýst eldrinn á sjálfa heiðingja, ok brann á litlu augbragði eyin með öllu saman, mönnum ok skipum."

however, the mention of a furnace, the brass or bronze tube, the great din, and the emission of fire can leave little doubt that the origin of the story lay in someone's experience with Greek Fire.

One other property of Greek Fire deserves attention. The *Liber ignium ad comburendos hostes* attributed to Marcus Graecus repeated an ubiquitous specification that all "inextinguishable fire" could in fact be extinguished by strong vinegar, old urine, sand, or by felt soaked in vinegar three times and dried out after each soaking. Many different testimonies are clear that although it could not be put out with water, in fact it floated and burned on water, it could be extinguished with vinegar, presumably wine vinegar, Greek ὄξος (*oxos*), Latin *acetum*, or urine, as well as sand.[28] Hides soaked in vinegar were resistant to it. Sand would obviously smother the fire and extinguish it by depriving it of oxygen. However, why either vinegar or urine may have been effective, when water was not, is unknown. It could be dismissed as an old wives' tale were it not that these two chemicals alone were specified as being effective in so many different works. It could be that authors simply accepted what others wrote and so the specification was passed from hand to hand over the centuries; however, just possibly, there may have been some chemical reaction which produced carbon dioxide or nitrogen to smother the fire.

Leo VI wrote that there should be one *siphōn* at the prow below the fortified foredeck and that others which were to be used from behind iron shields, *skoutaria sidēra*, presumably along the sides when engaged broadside, were hand-held χειροσίφωνες (*cheirosiphōnes*), which he himself had invented. Nikēphoros Ouranos repeated Leo's reference to *cheirosiphōnes*, but it is very apparent that the Arabic translator of Leo included by Ibn Mankalī in his *Al-aḥkām* was completely bemused by the weapon.[29]

In what may possibly be the earliest reference to such *cheirosiphones* after Leo VI the author of the treatise on defence against sieges known as the *De obsidione toleranda* wrote that if the enemy built siege engines the defending commander should prepare pine torches, tow and pitch, and *cheirosiphōnes* to burn them.[30] This is a text which may possibly have pre-dated the encyclopaedic works associated with Constantine VII in the mid tenth century. It appears to

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[28] See Marcus Graecus, *Liber ignium*, p. 108.

[29] Appendix Two [a], §§6, 64; Appendix Five, §§5, 60; Appendix Eight [b], p. 124.

[30] *De obsidione toleranda*, §113 (pp. 188-9): "εἰ δὲ καὶ μηχανὰς οἱ ἐχθροὶ κατεσκεύασαν, προευτρεπίζειν δᾶιδας καὶ στυπεῖον καὶ πίσσαν καὶ χειροσίφωνα, και, …".

have been contemporary with the *Syllogē taktikōn*.

The Anonymous also wrote that there was one *siphōn* at the prow and another two which could be used along the sides when engaged broadside; although he did not say whether the latter were hand-held or mounted.[31] Liudprand of Cremona wrote that when fifteen derelict *chelandia* were armed to meet the *Rhōs* invasion of 941, they were armed with devices to throw the fire not only at the prow and on both sides but also at the stern.[32] Two inventories for the Cretan expedition of 949 also specified three *siphōnia* per dromon, without being any more specific than that, and 80 *siphōnia* for 40 *ousiaka* [ships].[33] These latter were probably *chelandia* and it would seem that they only carried two *siphōnia* each. It also specified 24 *siphōnia* for 50 *pamphyloi*, but this was almost certainly a copyist's error for the eight *pamphyloi*, said elsewhere to have sailed with the expedition, which would thus have been armed with three *siphōnia* each, just like the dromons.[34] The treatise known as the *Praecepta militaria*, dated to soon after 963, also referred to *cheirosiphōnes* and described the fire as "glutinous", πῦρ κολλυτικόν (*pyr kollytikon*), as well as "prepared".[35]

Hand-held weapons for Greek Fire, referred to by various terms, are mentioned in the context of land warfare in so many sources that whatever the fuel was, it must have been capable of being projected in this way as well. Leo VI recommended destroying an enemy's siege towers with fire-throwers, *pyrobola*, and stone-throwers. Nikēphoros Ouranos expanded the reference to *strepta* with fire, *siphōnes*, *cheirosiphōnes*, and *manganika*. In the *Syllogē taktikōn* the corresponding reference was to *strepta* "which shoot clearly by machine the liquid fire that is also called brilliant by the many, and the so called *cheirosiphōnes* which our majesty have now devised". Nikēphoros Phōkas also specified the use of *strepta* with brilliant

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[31] See Appendix Three, §2.14: "Ἐπὶ δὲ τῆς πρῴρας ὁ σίφων ὃς κατακόραξ λέγεται ἐνεργῶν ὅταν ὦσιν αἱ νῆες ἀντίπρῳροι· καὶ δύο δὲ πλάγιοι καὶ αὐτοὶ ἐνεργοῦντες ὅταν πλάγιως προσβάλλωσι.".

[32] Liudprand of Cremona, *Antapodosis*, V.15 (p. 138).

[33] Appendix Four [b], §§IV.1, V.27 [= Haldon, "Theory and practice", pp. 227, 229; Constantine VII, *De cerimoniis*, II.44 (vol. 1, pp. 672, 673)].

[34] See Appendix Four [b], §V.26 [= Haldon, "Theory and practice", p. 229; Constantine VII, *De cerimoniis*, II.44 (vol. 1, p. 673)].

[35] Nikēphoros Phōkas, *Praecepta militaria*, p. 5: "Δεῖ δὲ τὸν ἀρχηγὸν τοῦ στρατοῦ ἔχειν καὶ χειρομάγγανα μικρὰ, ἠλακάτια τρία καὶ στρεπτὸν μετὰ λαμπροῦ καὶ χειροσίφουνα, ἵνα, κἂν ἴσως καὶ οἱ ἐχθροὶ τῇ ὁμοίᾳ καὶ ἴσῃ παρατάξει χρήσωνται, διά τε τῶν χειρομαγγάνων διά τε τοῦ σκευαστοῦ καὶ κολλυτικοῦ πυρὸς ἐπικρατέστεροι γίνονται τῶν ὑπεναντίων καὶ παραλύσωσιν αὐτούς.".

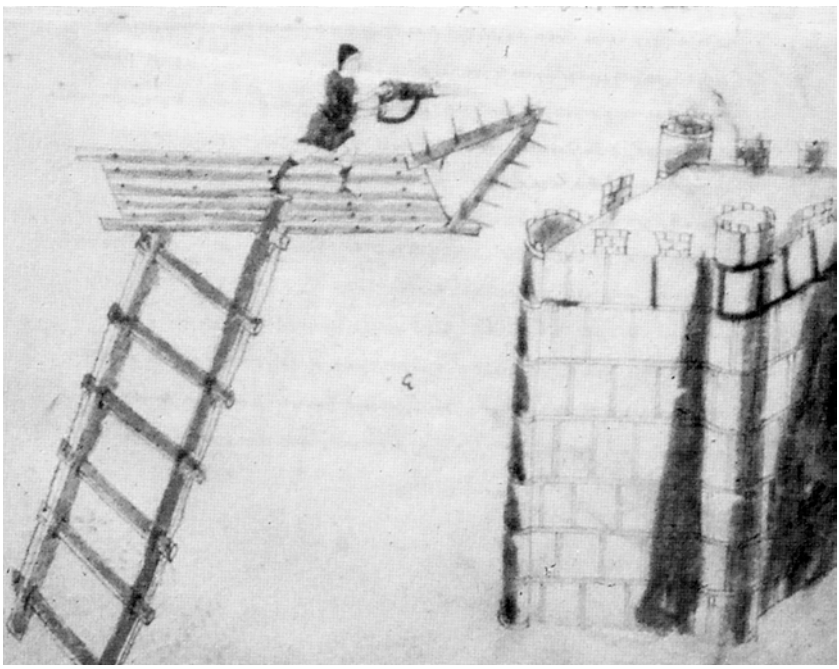


Figure 59
Soldier using a hand-held flame thrower in a treatise on poliorcetics attributed to Hērōn of Byzantium (Rome, Biblioteca Apostolica Vaticana, MS. Vat. Gr. 1605, fol. 36r), eleventh century.

[fire] and *cheirosiphōnes* by field armies.[36]

The *siphōnes* used by men stationed on flying bridges running from the mastheads of ships reported by Kaminiatēs must also have been

[36] Leo VI, *Taktika* (PG), XV.51 (coll. 899-900): "Προς δὲ τοὺς ἐπαγομένους πύργους πυροβόλα εἴδη καὶ πετροβόλοι, …"; Nikēphoros Ouranos, *Taktika*, coll. 1348-9: "Πρὸς δὲ τοὺς προσφερομένους πύργους εἰς τὸ τεῖχος, ἵνα ὦσι στρεπτὰ μετὰ λαμπροῦ καὶ συφώνια, καὶ χειροσύφωνα, καὶ μαγγανικά."; *Syllogē taktikōn*, 53.8 (pp. 102-3): "Πρὸς μέντοι τοὺς διὰ κυλίνδρων τοῖς τείχεσι προσαγομένος ξυλίνους πύργους, οὓς οἱ τακτικοὶ μόσυνας ὀνομάζουσι, λυσιτελεῖ τὰ στρεπτὰ καλούμενα τὰ διὰ μηχανῆς τὸ ὑγρὸν πέμποντα δηλαδὴ πῦρ, ὃ δὴ καὶ λαμπρὸν παρὰ τοῖς πολλοῖς ὀνομάζεται, καὶ τὰ λεγόμενα χειροσίφωνα, ἅπερ νῦν ἡ βασιλεία ἡμῶν ἐπενόησε, καὶ πύργοι πρὸς τούτοις οἱ κατέναντι αὐτῶν ὑψούμενοι λίθοις ἢ πλίνθοις ἢ ξύλοις, καὶ ὕλη παντοία ἐν τῷ μεταξὺ τόπῳ συμφορηθεῖσα καὶ μετὰ μικρὸν εξαφθεῖσα."; Nikēphoros Phōkas, *Praecepta militaria*, I.15 (p. 20): "δεῖ δὲ τὸν ἀρχηγὸν τοῦ στρατοῦ ἔχειν καὶ χειρομάγγανα μικρά, ἡλακάτια τρία καὶ στρεπτὸν μετὰ λαμπροῦ καὶ χειροσίφουνα, ἵνα, κἂν ἴσως καὶ οἱ ἐχθροὶ τῇ ὁμοίᾳ καὶ ἴσῃ παρατάξει χρήσονται, διά τε τῶν χειρομαγγάνων διά τε τοῦ σκευαστοῦ καὶ κυλλητικοῦ πυρὸς ἐπικατέστεροι γίνωνται ‹αἱ παρατάξεις ἡμῶν› τῶν ὑπεναντίων καὶ παραλύσωσιν αὐτούς.".

hand-held.[37] The words which he used, "τῷ ἀέρι" ("with air"), suggest that a blast of air of some kind may have been used to project the fire from the *siphōn*. That the Byzantines did possess the technology to project Greek Fire through *cheirosiphōnes* is proven by an illustration in the eleventh-century manuscript Rome, Biblioteca Apostolica Vaticana, MS. Vat. Gr. 1605 of the *Parangelmata poliorkētika* attributed to Hērōn of Byzantium. At folio 36r a soldier is depicted on a flying bridge attacking the top of the walls of a town with a hand-held flame thrower, described in the text as a "swivelling, fire-throwing, hand held [implement]".[38] It illustrates a passage taken from the *Syntaxis Mēchanikē* of Philōn of Byzantium, dated to the late third-century B.C.E., which referred to the use of "fire-throwing, hand-held [implements]". However, the treatise on poliorcetics attributed to Hērōn was first compiled in the reign of Constantine VII and some of its illustrations, even though based on antique models, may be assumed to represent the technology of that period.[39]

Whatever the various technologies for projecting Greek Fire may have been, and there appear to have been more than one, they were not confined to apparatus fixed on ships. When the fleet of *amīr* Yāzamān al-Khādim of Tarsos attacked *Euripos* sometime after 883, according to the *Theophanēs continuatus* the *stratēgos* of *Hellas*, Oiniatēs, destroyed the Muslim ships from the walls of the town with "wet fire".[40]

It is possible that the third figure from the left in the illustration of naval warfare in the Marciana manuscript of the *Kynēgetika* of Pseudo Oppian holds a *cheirosiphōn*. Whereas the flute or trumpet players at the sterns of the galleys are clearly blowing into their instruments, this other figure is not. He appears to be holding over his shoulder a tube of some sort bound with bands, which would accord with the presumed construction of such a weapon. [See Figure 26] It is quite similar in construction to the *siphōn* at the bow of the Byzantine galley in the Madrid manuscript of the *Synopsis historiōn* of John Skylitzēs.

It might be asked why the foredeck was constructed above the

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[37] See above, n. 16.

[38] Hērōn, *Parangelmata poliorkētika*, §49 (pp. 98-9) and fig. 22: "… στρεπτῶν ἐγχειριδίων πυροβόλων …". See also Schneider, "Byzantinische Feuerwaffe".

[39] See Dain, "Stratégistes", pp. 358 (where the manuscript is wrongly identified as Vaticanus Gr. 1614) and 388.

[40] *Theophanēs continuatus*, V.59 (p. 298). John Skylitzēs changed the report, making Oiniatēs dispel the Muslim fleet with his own *triēreis*. See John Skylitzēs, *Synopsis historiarum*, Βασίλειος ὁ Μακεδών.29 (p. 151).

siphōn, or alternatively why the *siphōn* was located below the foredeck rather than on it? The answer may have been that because the heat generated by the flame burning oxygen would tend to make the tongue of the flame curve upwards as it heated the air, it may have been necessary to locate the source of the flame as low to the water as possible in order for the tongue to make contact with an enemy ship, rather than passing right over it. Medieval galleys of all kinds always rode as low in the water as safety and other considerations allowed, in order to maximize the mechanical advantage of the oars. A tongue of flame whose end had curved upwards for more than three or so metres would pass right over a medieval galley, even if generated virtually at the waterline. However, Haldon's recent experiments suggest that this may not have been the case. In the machine which he constructed, because the fuel was incompletely vapourised as it left the nozzle, the jet of flame in fact curved downwards. [See Figure 61] This may help to explain how Anna Komnēnē, or her sources Landulf or Tatikios, describing the alleged defeat of a Pisan fleet during the First Crusade, wrote that the Pisans were terrified because they were not familiar with flames which instead of rising were directed wherever the *siphōnator* wanted, often downwards or sideways.[41]

Bearing in mind that the deck of a dromon at the prow cannot have been more than approximately 1.5 metres above the calm water line and that moderate breezes of *Beaufort Scale* Four, 11-16 knots, raise waves with crests up to around 0.8 metres above that, Liudprand of Cremona's comment that calm winds and seas were necessary if the *siphōnes* were not to become a danger to their own ships becomes comprehensible.[42] And, obviously, any wind would have to be astern. If an enemy fleet managed to gain the weather guage with the wind behind it, the *siphōnes* would have become useless. When Oiniatēs used Greek Fire against the fleet of Yāzamān al-Khādim at *Euripos*, the descriptions of both the *Theophanēs continuatus* and John Skylitzēs suggest that he did so only when the wind turned favourable.[43] It would also have been highly desirable, and probably

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[41] Anna Komnēnē, *Alexiade*, XI.x.4 (vol. 3, p. 44): "... (οὐδὲ γὰρ ἐθάδες ἦσαν τοιουύτων σκευῶν ἢ πυρὸς ἄνω μὲν φύσει τὴν φορὰν ἔχοντος, πεμπομένου δ' ἐφ' ἃ βούλεται ὁ πέμπων κατά τε τὸ πρανὲς πολλάκις καὶ ἐφ' ἑκάτερα), … ".

[42] Liudprand of Cremona, *Antapodosis*, V.15 (p. 138): "Denique miserator et misericors Dominus, qui se colentes, se adorantes, se deprecantes non solum protegere, sed et victoria voluit honorare, ventis tunc placidum reddidit mare; secus enim ob ignis emissionem Grecis esset incommodum.".

[43] *Theophanēs continuatus*, V.59 (p. 298); John Skylitzēs, *Synopsis historiōn*, Βασίλειος ὁ Μακεδῶν.29 (p. 151).

absolutely necessary, for the *siphōnes* to be able to be turned and aimed in various directions. Fixed weapons would have been almost unusable in the varying conditions encountered at sea. That is no doubt why the word *strepta*, "swivels" was used for the weapon, both by land and at sea. Liudprand of Cremona also wrote that in 941 the Byzantine fleet dispelling the *Rhōs* assault on Constantinople "threw the fire all around".[44]

What exactly *siphōnes* were made of is unclear. Theophanēs the Confessor wrote that the *siphōnes* that the Bulgarian Khan Krum captured at *Develtos* in 812 were made of bronze.[45] Both Leo VI and Nikēphoros Ouranos said that they were "bound" in bronze, and Anna Komnēnē or her sources said that those which Alexios I had made had mouths in the form of the heads of lions and other animals made of iron or bronze:

> ..., on the prow of each ship he [Alexios I] had fixed the heads of lions and other land animals in bronze or iron, with their mouths open, surrounding them with gold to make the mere appearance terrifying. He prepared the fire that was to be emitted against the enemy to come out through their mouths so that the lions and other animals appeared to be belching out fire.[46]

One of the inventories for the Cretan expedition of 949 said that 30 *nomismata* were spent on providing 200 *litrai* of tin to a metal worker named Michael for soldering, or brazing, together, various parts of the *siphōnia*.[47] This makes sense. A tin-based solder would almost certainly be used for fusing together sections of *siphōnes* if they were were made of bronze.

The word σίφων, and its Latin transliteration *sifo*/*sipho*, could mean a variety of things in classical Greek and Latin: tube, pipe, siphon for drawing liquids, water spout. However, the one which is relevant to

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[44] Liudprand of Cremona, *Antapodosis*, V.15 (p. 138): "... ignem circumcirca proiciunt.".

[45] Theophanēs, *Chronographia*, A.M. 6305 (vol. 1, p. 499): "... ἐν οἷς καὶ σίφωνας χαλκοὺς εὗρον λς΄, καὶ τοῦ δι᾽ αὐτῶν ἐκπεμπομένου ὑγροῦ πυρὸς οὐκ ὀλίγον, ...".

[46] Anna Komnēnē, *Alexiade*, XI.x.2 (vol. 3, p. 42): "... ἐν ἑκάστῃ πρώρᾳ τῶν πλοίων διὰ χαλκῶν καὶ σιδήρων λεόντων καὶ ἀλλοίων χερσαίων ζῴων κεφαλὰς μετὰ στομάτων ἀνεῳγμένων κατασκευάσας, χρυσῷ τε περιστείλας αὐτὰ ὡς ἐκ μόνης θέας φοβερὸν φαίνεσθαι, τὸ διὰ τῶν στρεπτῶν κατὰ τῶν πολεμίων μέλλον ἀφίεσθαι πῦρ διὰ τῶν στομάτων αὐτῶν παρεσκεύασε διϊέναι, ὥστε δοκεῖν τοὺς λέοντας καὶ τἆλλα τῶν τοιούτων ζῴων τοῦτο ἐξερεύγεσθαι.".

[47] See Appendix Four [b], §VI.22 [= Haldon, "Theory and practice", p. 231; Constantine VII, *De cerimoniis*, II.44 (vol. 1, pp. 675-6)]. On the construction of *siphōnes*, see now Haldon " 'Greek Fire' revisited".

discussion of Greek Fire is that of a force pump. The three most detailed classical discussions of force pumps were by Ktesibios of Alexandria (fl. ca 270 B.C.E.), Philōn of Byzantium (fl. ca 240 B.C.E.), and Hērōn of Alexandria (fl. ca 50 C.E.). Vitruvius attributed the invention of the force pump to Ktesibios.[48] A different version of one appears in a text related to the Arabic version of the *Pneumatika*, book five of his *Mechanikē syvntaxis*, of Philōn and Hērōn described in detail the construction of one used for a fire engine and called a *sifōn*.[49] Such force pumps were also mentioned by other classical authors and in all but two or three cases among seventeen catalogued literary references the word used for them was either *sifōn* or *sipo*/*sifo*/*sipho*.[50] Hērōn of Alexandria's pump consisted of two cylinders set into a sump with pistons operated in them in tandem via a pivoted connecting rod. Water was sucked into the cylinders through valves in their bases by the up stroke of the pistons and was then expelled into a horizontal connecting tube through other valves by the down stroke. The pistons forced the water out through the connecting tube into a mouth tube set into it, the latter being fitted with joints allowing the nozzle to be swivelled in any direction, both laterally and vertically. The whole machine was made of bronze. Surviving manuscripts of Philōn of Byzantium and Hērōn of Alexandria contain drawings of such force pumps.[51]

At least 21 actual examples survived in whole or in part into modern times. Nine of these, dating from the first to third centuries, were made of bronze, four of them having double cylinders and 5 having single cylinders, the latter all coming from the shipwrecks Dramont D and La Tradelière. These were most probably linked in tandem and were bilge pumps. However, other locations in which the pumps have been found, including mines, suggest that they served a variety of purposes. The most complete and spectacular still surviving example is the pump from the mine at Sotiel Coronada near Valverde, province of Huelva, Spain. Surviving pumps vary greatly in size from the smallest, which had an estimated discharge capacity of 0.236 litres, to the largest, which had a discharge capacity of 3.4 litres. The Sotiel Coronada pump has a cylinder bore diameter of 7.5 centimetres

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[48] Vitruvius, *De architectura*, X.vii.1-3 (p. 239).

[49] Philōn of Byzantium, *Mēchanikē syntaxis*, pp. 192-4; Hērōn of Alexandria, *Pneumatika*, 1.28 (pp. 130-37).

[50] See Oleson, *Water-lifting devices*, p. 20 for a list of references. All the texts are cited in Greek or Latin and translated. Force pumps are discussed at pp. 300-25.

[51] Schiøler, "Piston pumps", p. 19; Oleson, *Water-lifting devices*, figs 13, 14, 27, 28.

and height of 27 centimetres, with a cylinder displacement of 0.795 litres and a discharge capacity of 1.60 litres. The diameter of flow at the nozzle is narrowed to a mere 8 milimetres so that the velocity of flow is increased 25 times.[52] There appears to have been no attempt to estimate how far such a pump could eject its spurt of water; however, since Isidore of Seville wrote they were used to clean the ceilings of buildings, the water was obviously capable of being expelled with considerable force for quite a distance.[53]

Ktesibios's work is known only through Vitruvius. The *Pneumatika* of Philōn of Byzantium is known only through a ninth-century Arabic translation. The oldest surviving manuscript of the *Pneumatika* of Hērōn of Alexandria is the thirteenth-century manuscript Venice, Biblioteca Marciana, MS. Gr. 516. Whether the descriptions of force pumps by such authors were known in Byzantium is a moot point; however, Herōn of Byzantium certainly knew *siphōnes* as fire-engines in the tenth century.[54]

There are simply too many parallels between the names and physical attributes of these Greco-Roman force pumps and the Byzantine Greek-Fire *siphōnes* for it to be mere coincidence. Surely what Kallinikos did was to adapt the idea of the force pump to projection of some form of processed petroleum naphtha.

Immediately after mentioning the *siphōnia*, the inventory for the Cretan expedition of 949 said that there should be 40 extra γονάτια ἀκόντια (*gonatia akontia*), literally "hinged or jointed poles or pikes", for the βουκόλια (*boukolia*), often interpreted as bucklers or shields.[55] The context of this specification means that it must have had something to do with the *siphōnia*. *Gonatia akontia* must have had the sense of something jointed and pointed. Assuming that the only *siphōnia* requiring some kind of side protection were those at the bow, then the 40 *gonatia akontia* would correspond to two *boukolia* or guards either side of the 20 *siphōnia* for the 20 dromons. They may have been hinges by which the *boukolia* were swung into place when going into battle. The *boukolia* themselves may have been heat shields

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[52] Schiøler, "Piston pumps"; Rouanet, "Quatre pompes"; Oleson, *Water-lifting devices*, pp. 192-5, 198-9, 206-7, 219, 268-9, 313-16, 321.

[53] Isidore of Seville, *Etymologiae*, XX.vi.9: "Sifon vas appellatum quod aquas sufflando fundat; utuntur enim hos [in] oriente. Nam ubi senserint domum ardere, currunt cum sifonibus plenis aquis et extingunt incendia, sed et camaras expressis ad superiora aquis emundant.".

[54] Hērōn, *Parangelmata poliorkētika*, §39, ll. 24-8 (pp. 84-5).

[55] See Appendix Four [b], §IV.2 [= Haldon, "Theory and practice", p. 227; Constantine VII, *De cerimoniis*, II.44 (vol. 1, p. 672)]. See also Constantine VII, *De cerimoniis*, vol. 2, p. 794 and now Haldon, "'Greek Fire' revisited".

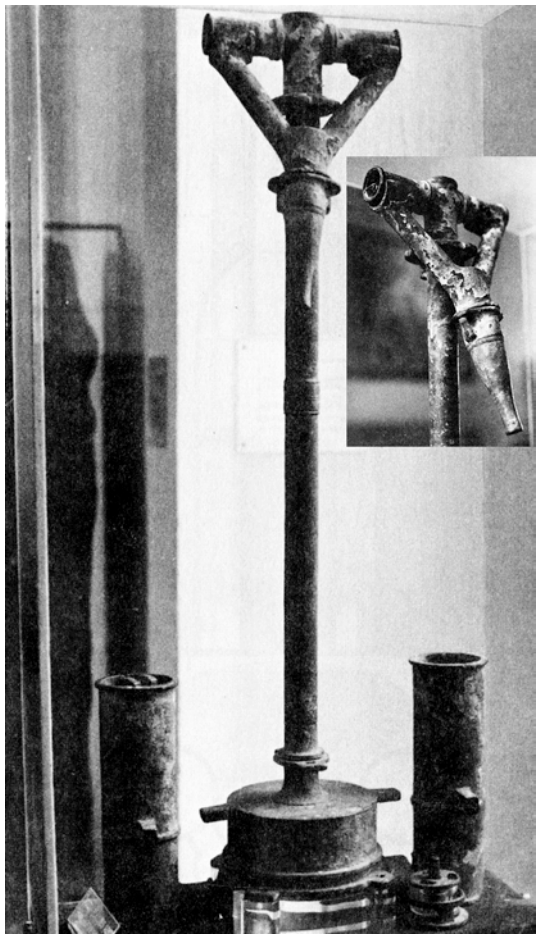


Figure 60

The Sotiel Coronada Roman force pump from Valverde, Huelva, Spain, probably dated to the first century C.E., Madrid, Museo Arqueologico Nacional.

In Haldon's experiment the heat generated by the device was so great that the *siphōnator* needed a shield between himself and the nozzle.[56] It is noticeable that the illustration of the Greek Fire *siphōn* on folio 34v of the Madrid Skylitzēs manuscript and also that on folio 23r of the Marciana manuscript of the *Kynēgetika* of Pseudo-Oppian, if the latter is indeed of a *siphōn*, both show the weapon as a flared tube. Force-pump nozzles must have been within such tubes, which would have operated as heat shields. It is certainly possible that such shields may have been for this purpose and it is to be noted that Leo VI and Nikēphoros Ouranos both wrote that the *cheirosiphōnes* were also

[56] See Haldon, " 'Greek Fire' revisited".

operated from behind iron shields.[57] Shields were not normally made of iron and it must have been the heat generated which made this necessary.

The inventory for the Cretan expedition of 949 also said that there should be 100 τετράκουλα (*tetrakoula*) for the *siphōnia*,[58] the meaning of which is unknown. Reiske suggested emendation of τετράκουλα to τετράκωλα, something four-legged, and that they were carriages for the *siphōnia* performing the same function as the gun-carriages of later times, which is a possibility. Haldon suggests four-legged grates or bases, perhaps for the hearth on which a brazier rested, again a possibility.[59]

Immediately after this item the inventory also specified that there should be 400 *linaria* (some things made of flax) for the "sponges", σφόγγοι (*sphongoi*).[60] This phrase appears to be corrupt. Reiske suggested emendation to "400 [pounds] of flax/linen for making sponges".[61] But what was the sense of "sponge" here? Obviously, if flax or linen was involved, the "sponges" had nothing to do with natural sponges. Perhaps they were flax or linen mops for cleaning the barrels of the *siphōnia*. In the inventories for the expedition of 911 to Crete, there was also a specification for 10,000 [units] of *linaria* for caulking and for the πρόπυρα (*propyra*), "fore-fires".[62] "Fore-fires" sounds suspiciously like something required to prepare the *siphōnia* for "firing", perhaps wicks of match. If the fuel was forced through the nozzle of a force pump in a fine spray, then a burning wick of match underneath the nozzle may have been what ignited it. The word πρόπυρον is otherwise almost unknown in Byzantine Greek except that Leo VI wrote of the processed fire that it was expelled from *siphōnes* with thunder and "forefire" smoke. This appears to make little sense and it is surely no accident that Nikēphoros Ouranos emended the emperor's syntax to convert the adjective πρόπυρος to the noun πρόπυρον, changing the syntax to mean expelled from

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[57] Appendix Two [a], §64; Appendix Five, §60.

[58] See Appendix Four [b], §V.23 [= Haldon, "Theory and practice", p. 229; Constantine VII, *De cerimoniis*, II.44 (vol. 1, p. 673)].

[59] See Haldon, "Theory and practice", p. 283; *idem*, "'Greek Fire' revisited"; Constantine VII, *De cerimoniis*, vol. 2, pp. 795-6.

[60] See Appendix Four [b], §V.24 [= Haldon, "Theory and practice", p. 229; Constantine VII, *De cerimoniis*, II.44 (vol. 1, p. 673)].

[61] See Constantine VII, *De cerimoniis*, II.45 (vol. 1, p. 673) [the Latin translation].

[62] See Haldon, "Theory and practice", p. 211· ῞... καὶ περὶ τοῦ ἑτοιμασθῆναι λινάριον λόγῳ τῶν προπύρων καὶ καλαφατήσεως χιλιάδας ι΄, ..."; Constantine VII, *De cerimoniis*, II.44 (vol. 1, p. 658); Appendix Two [a], §59.

siphōnes with thunder and smoke from the "forefires".[63] The Greek prefix πρό- could have the sense, amongst many others, of something in front of something else, either chronologically or spatially. What comes before fire chronologically is smoke. But Leo VI can hardly have meant "smoking smoke". The way in which Nikēphoros Ouranos changed his syntax suggests that the *magistros* knew that *propyra* were a physical part of the *siphōnes* but that the emperor did not. Haldon argues that the 10,000 units of flax must have been for flax fibre fires to heat the oil on the grounds that such large amounts would not have been needed for ignition wicks. That is certainly true, but it overlooks the other use specified for the flax, caulking. With a fleet the size of that of 911 a huge amount of caulking material would have been needed. Moreover, if one wanted a slow match-like source of heating which was safe at sea, why would one have used flax rather than charcoal, which was used universally for such purposes? Against that, however, charcoal would not have produced the large amounts of smoke apparently associated with the weapon and, certainly, Haldon has made a weapon work using a fire of flax fibre.[64] The question remains open, as does that of whether the fuel was actually heated aboard ship or not.

Haldon is surely correct to point to the fact that whatever the raw material of Greek Fire was, whether petroleum oil or something else, it was processed in some way before use. Leo VI and Nikēphoros Ouranos are very clear that it was the same processed fire fuel which was used for the *cheirosiphōnes* and that it could also be hurled in pots, or poured from what may have been cauldrons hung from cranes, or have tow-wrapped caltrops soaked in it. However, Haldon's reconstruction of a *siphōn* as a complex arrangement of an oil container, bellows and hearth to heat the oil, pump, and tube and nozzle, could have been applicable only to a heavy weapon fixed in place; such as a main *siphōn* at the bow of a dromon. He concludes that the *cheirosiphōnes* were different and that they merely squirted unignited raw material.[65] They undoubtedly were different in some ways since, at least as claimed, they were not developed until over two centuries after Kallinikos invented the original *siphōnes*. However, the illustration to folio 36r of Hērōn's *Parangelmata poliorkētika* [see Fig. 59] shows that they did throw the flame itself, not only unignited fuel. Moreover, Haldon's original arrangement of a tank of oil under

[63] Appendix Two [a], §59; Appendix Five, §56.
[64] See Haldon, "'Greek Fire' revisited"; Haldon and Byrne, "Greek Fire", p. 94.
[65] Haldon and Byrne, "Greek Fire", p. 97, n. 19; Haldon, "'Greek Fire' revisited".

pressure over a burning hearth would have been highly dangerous, yet there are no recorded instances of fire ships blowing up. In his second experiment he abandoned this approach for this reason and used a force pump between the tank of heated oil and the nozzle to put the fuel under pressure.[66]

We are convinced that the essential mechanism of *siphōnes* was an adaptation of a Greco-Roman force pump.[67] The fuel itself was undoubtedly processed from petroleum obtained at various times from wells in the regions of *Tmutorakan*, *Tziliapert*, Erzurum, and *Zichia* on the north coast of the Black Sea, in Georgia, in Eastern Turkey, and on the east coast of the Black Sea respectively. That much at least was revealed by the *De administrando imperio*. Even today, petroleum from these regions seeps to the surface through clay sediments and reaches the surface as very light crude.[68] What was then done to it to "process" it is a matter of debate. Haldon and Byrne considered the idea of distilling it but rejected this on the grounds that it would have been too dangerous. Since then Haldon has continued to use raw petroleum, although he has added around three kilogrammes of pine resin per 45 litres of fuel to make the fuel burn longer, be more adhesive, and burn at a higher temperature. By heating the fuel/resin mixture for his weapon, he has produced a very fluid liquid which burns very readily. When his weapon is used without heating the fuel/resin mixture, it does still ignite at the nozzle but only partially. Heating produces a longer range, up to 15 metres, and more fierce heat.[69]

Whether or not the fuel was indeed actually heated aboard ship is another issue. In fact, the only evidence that the fuel was heated in some sort of container on a hearth comes from two highly questionable Western sources, the obscure text of the Wolfenbüttel manuscript and *Yngvars Saga Víðförla*. There is nothing in the

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[66] Haldon, "Theory and Practice", pp. 278-80; Haldon, "'Greek Fire' revisited".

[67] Against all the evidence in the sources, logical argument, and experimentation, Korres has continued to maintain that force pumps could not possibly have been the main mechanism of *siphōnes* and has continued to insist that Greek Fire was projected by catapults only, his main argument being that force pumps could not possibly eject the fuel for a sufficient distance. See Korres, «*Ὑγρὸν πῦρ*»; *idem*, "Greek Fire". However, if the fuel was distilled to a consistency no more viscous than water, since we know that force pumps were used to clean the ceilings of ancient temples, there is absoltuely no reason why they could not have projected a tongue of flame for a sufficient distance. Whatever that may have been is arguable.

[68] Constantine VII, *De administrando imperio*, §53, ll. 493-511 (pp. 284-6). See also Haldon and Byrne, "Greek Fire", p. 92 & n. 4; Haldon, "'Greek Fire' revisited".

[69] Haldon and Byrne, "Greek Fire", p. 92; Haldon, "'Greek Fire' revisited". Additional information in a personal communication from John Haldon to John Pryor.

Byzantine or Arabic sources to suggest heating of the fuel aboard ship. If it were not for these two Western texts, would heating aboard ship be even considered?



Figure 61
"Greek" or liquid fire *siphōn* built by Colin Hewes and Andrew Lacey under the direction of John Haldon.
© John Haldon

The question of how the Byzantines may have "prepared" or "processed" the fuel is related to this. Virtually the one constant in the Byzantine sources is that the fuel was prepared or processed in some way. Refining petroleum, leaving aside the modern cracking process, is fundamentally a simple process of distilling the oil by heating it until various fractions are given off at various temperatures and then recondensed. The lighter the fraction, the lower the temperature necessary. The lightest liquid fraction, gasoline, will separate out at temperatures between 38˚ and 204˚ Celsius, temperatures which Byzantine technology was certainly capable of achieving. To make the point, the melting point of copper is 1083˚ Celsius and Romans and Byzantines could certainly cast copper. The temperatures necessary would not have posed any problem and distillation techniques were well known in the Greco-Roman world.[70] Dioskoridēs discussed the distillation of pine pitch and there is no reason why petroleum could

[70] See Forbes, *Art of distillation*, pp. 13-28.

not have been distilled either.[71] The light crude seeping to the surface in the regions enumerated in the *De administrando imperio* would have been relatively easy to distill if the potential dangers from volatile gasses could be overcome. Distillation of petroleum became widespread from the seventeenth to the nineteenth centuries,[72] and, although there is no evidence that they actually did so, there seems no reason *prima facie* as to why the Byzantines would not have been able to do so and to produce a light paraffin or kerosene which could have been used in a force pump without the need to heat the fuel. What Kallinikos may have achieved was to distill petroleum to produce a light paraffin or kerosene. This appeals as an appropriate understanding of what the process of "preparing" the fuel may have been.

After the tenth century, Greek fire and fire-bearing ships continued to be mentioned by various authors; for example, Michael Psellos, who described in classicizing language the remnants of the imperial fleet which scattered the last *Rhōs* attack on Constantinople in 1043 as being composed of *triēreis* and fire-carrying ships, πυρφόροι νῆες (*pyrphoroi nēes*), and who described their use of Greek Fire, with which the *Rhōs* ships were destroyed.[73] John Kinnamos and Nikētas Chōniatēs also referred to the continuing use of Greek Fire in the twelfth century. Kinnamos wrote that the Saljūqid sultān 'Izz al-Dīn Qi̊lı̊j Arslan II was treated to a demonstration of it when he visited Constantinople in 1162. Fire ships were prepared against the Normans of Sicily in 1147 and pursued a Venetian ship fleeing Constantinople at the time of the arrest of the Venetians in the Empire in 1171. Liquid fire was also used against the fleet of the rebel *stratēgos* Alexios Branas in 1187.[74] However, very interestingly, when Chōniatēs described the preparations of Alexios III Angelos to resist the imminent arrival of the Fourth Crusade, he made no mention of Greek Fire. He said that the emperor failed to construct warships, πολεμιστήριαι νῆες (*polemistēriai nēes*), and only at the last moment supposedly repaired what rotting little skiffs, σκαφίδια (*skaphidia*), he could find at Constantinople. Chōniatēs's account should be read with some skepticism since he was seeking to explain why civilization as

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[71] Dioskoridēs, *De materia medica* (Wellmann), I.72 (vol. 1, p. 71).
[72] See Forbes, *Studies*; idem, *More studies*, *passim*.
[73] Michael Psellos, *Chronographia*, XCIII (vol. 2, p. 10).
[74] John Kinnamos, *Historiae*, V.3, VI.10 (pp. 207, 283); Nikētas Chōniatēs, *Historia*, Βασίλεία Μανουὴλ τοῦ Κομνηνοῦ Β΄ (p. 77); Βασίλεία Μανουὴλ τοῦ Κομνηνοῦ Ε΄ (p.172); Βασίλεία Ἰσαακίου τοῦ Αγγελοῦ Α΄ (p. 381).

he knew it had been destroyed by the Crusaders. His pejorative language may well have exaggerated. Nevertheless, it is clear that by 1203 the negligent rule of the Angeloi emperors had allowed the great navy created by the first three Komnēnoi emperors to decay and that no effective opposition to the Venetian battle fleet could be mounted. According to Nikētas, the Venetians covered their galleys with ox hides as protection against fire, almost as though they expected to have to counter Greek Fire; however, neither he nor any Latin chronicler mentioned it actually being used against them. Some naval resistance was mounted in the Golden Horn by a few Byzantine "*triēreis*" but these were either destroyed or driven ashore and abandoned.[75] It is striking that whereas in 1043 the remnants of a similarly decayed Byzantine navy had been able to scatter the *Rhōs* attack on Constantinople with Greek Fire, it was apparently not used in 1203. The implication is clear. At Constantinople in 1203 the Byzantine galleys were not equipped with Greek Fire.

What happened to the *siphōnes* for Greek Fire? Why did they apparently fall out of use? Was it simply the case that the Byzantines lost access to the sources of their fuel?[76] The Erzerum region was certainly part of the Empire until the eleventh century but *Tmutorakan* was under Khazar and then *Rhōs* rule from the eighth to eleventh centuries and *Zichia* was probably never under Byzantine rule. It is true that the sources from which the fuel was obtained would all have been lost to the Empire by the end of the eleventh century. But, with the exception of those around Erzurum, they had not been within the frontiers of the Empire even in the age of Constantine VII. The Byzantines certainly had a presence and influence in the *Tmutorakan* and *Zichia* regions but would nevertheless have had to have obtained petroleum from them by trade or through relationships with client states. These regions were later conquered by the Mongols, who encouraged free trade, yet this does not appear to have enabled supplies to flow again.

[75] Nikētas Chōniatēs, *Historia*, pp. 540, 541, 544.
[76] See Haldon, " 'Greek Fire' revisited".

APPENDIX SEVEN

THE GALLEYS OF THE MANUSCRIPT, MADRID, BIBLIOTECA NATIONAL, VITR. 26-2, OF JOHN SKYLITZĒS' *SYNOPSIS HISTORIŌN* AND ITS DATING AND ART STYLES

The renowned Madrid manuscript of the *Synopsis historiōn* of John Skylitzēs (Biblioteca Nacional, Madrid, vitr. 26-2), which is the only surviving illustrated manuscript of any Byzantine historian, has been the object of much attention, particularly from art historians concerned with its 574 illustrations and from palaeographers concerned with its dating. Nigel Wilson dated the manuscript to the mid twelfth century, assigned to it a provenance in the Norman Kingdom of Sicily, probably the royal court at Palermo, and argued convincingly that the manuscript and its illustrations were, at least initially, copied from a *de luxe* illustrated Byzantine manuscript which may have come from imperial circles in Constantinople and have been brought back to Sicily by the embassy of Henricus Aristippus to Constantinople in 1158.[1] The complete series of its illustrations was published by Estopañan and the contributions of various artists to the miniature series were discussed at length by Grabar and Manoussacas. A facsimile of the entire manuscript was produced in 2000 and most recently Tsamakda has subjected the codex to palaeographical, historical, and art-historical analysis, including good quality reproductions of the complete corpus of illustrations. She has concluded that the manuscript was produced in the scriptorium of the Basilian Greek monastery of San Salvatore in Messina some time in the third quarter of the twelfth century.[2]

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[1] See Wilson, "Madrid Skylitzes".

[2] Estopañan, *Skyllitzes Matritensis*; Grabar and Manoussacas, *L'illustration*; Tsamakda, *Ioannes Skylitzes*. Grabar and Manoussacas reproduced only around half the illustrations. For further discussion of the scholarship on the codex see Tsamakda, *Ioannes Skylitzes*, pp. 1-21.

Tsamakda's reassignment of the manuscript to the monastery of San Salvatore raises more questions than it answers. From where would such a monastery have obtained the archetype to copy? Why would a Basilian monastery produce such a deluxe manuscript and why would it employ a miscellany of artists rather than its own monks. The artists painting in Western styles are very unlikely to have been Basilian monks. If it was produced by the monastery for either the royal court or for some Greek patrician, why did it remain in the monastery's library after completion?

Table 8: Artists of the manuscript Madrid, Biblioteca Nacional, Vitr. 26-2 of the *Synopsis historiōn* of John Skylitzēs according to (1) Grabar and Manoussacas and (2) Tsamakda

Quires	Folios	Artists		Notes
		Grabar and Manoussacas	Tsamakda	
1	9-16[3]	Aa		
	9r-16v		A1	
2	17-24	Ab		
	17r-24v		A2	
3	25-32	Aa		
	25r-32v		A1	
4	32-40	Aa		
	33r-40v		A1	
5	41-48	Bc		
	41r-48v		A1	
6	49-56	Bc		
	49r-56v		A1	
7	57-63	Ab?		
	57r-63v		A2	
8	64-71	Ab		
	64r-71v		A2	
9	72-79	Bc		
	72r-79v		A1	
10	80-87	Bc		
	80r(a)		B1	
	80r(b)-87v		A1	
11	88-95			No miniatures
12	96-102	Cd		
	96r-102v		B1	
13	103-110	Cd		
	103r-110v		B1	
14	111-118	Cd or Ce		Cd or perhaps a different artist Ce
	111r-118v		B1	
15	119-126	Ce or C?		Ce if Cd was the artist of quire 14. C? if Ce was the artist of quire 14
	119r-126v		B2	
16				quire missing
17	127-134	Cd		
	127r-134v		B1	
18	135-142	Cd		
	135r-142v		B1	
19	143	C??		Another artist responsible for all except folios 144-5, for which Cd was responsible.
	144-5	Cd		
	146-50	C??		
	143r-v		B3	
	144r-145r		B4	
	145v-150v		B3	
20	151-156	Cf		
	151r-156v		B3	

[3] The *Synopsis historiōn* begins on fol. 9r.

(Table 8 continued)

21	157-164	Dg		
	157r-164v		B5	
22	165-172	Dg		
	165r-172v		B5	
23	173-178	Dg		
	173r-178v		B5	
24	179-186	Dg		
	179r-186v		B5	
25	187-94			No miniatures
26	195-202	Cf		
	195r-v		B2	
	196r-200r		B5	
	200v-201r		B2	
	201v		B5	
	202r-v		B2	
27	203-210	Cd or Ce	B1	
	203r-210v			
28	211-218	Cd or Ce		
	211r-218v		B1	
29	219-226	Dg		
	219r-226v		B5	
30	227-234	Ab		
	227r-234v		A1	

An analysis of the styles of depiction of galleys in the manuscript has not previously been attempted; although, Babuin has made a selective study of some of the more important illustrations and has made some interesting observations. This is curious because the galley illustrations differ so markedly, and some can so clearly be assigned to different artists, that they are in fact extremely good evidence for the various arguments. Although Tsamakda devoted a long chapter to the iconography and its sources, discussing in particular combat and battle scenes, she paid no attention to the ships at all, with the single exception of the imperial galley using Greek Fire against Thomas the Slav on fol. 34v.[4]

The illustration series for the manuscript was executed by a series of artists working in different styles. On various grounds, Grabar and Manoussacas identified four different styles of art in the miniatures and at least seven different artists. For the most part, they deduced that an individual artist was responsible for the illustrations in any one

[4] See Babuin, "Illuminations"; Tsamakda, *Ioannes Skylitzes*, p. 314. Babuin misunderstands many of the illustrations she discusses.

Table 9: The galleys of the manuscript Madrid, Biblioteca Nacional, Vitr. 26-2 of the *Synopsis historiōn* of John Skylitzēs classified by artistic style.

Galley Group	Folios	Description
Byzantine One	14v, 15r, 26r, 31v, 32r, 33v, 35v, 38r, 38v, 39r 39v, 40v, 227r	These galleys are drawn in a rounded "banana boat" style, with only one bank of oars, with no spurs or ornaments at the prow, but with duplex stern ornaments. Two (14v, 15r) have single masts with beaked mastheads and obvious lateen sails. In these same two cases the stern ornaments have been applied mistakenly to the bow and in one other (38v) some oarsmen are mistakenly facing the bows. In a number of cases (14v, 31v, 33v, 35v, 38r, 38v, 39v), some of the oarsmen wear lamellar cuirasses. The galleys on fol. 38v clearly have two quarter rudders. The ship on fol. 15r appears to have an inscription on the upper strake at the stern. These galleys, and also those of groups Byzantine Two and Byzantine Three, bear many similarities to others found in Byzantine manuscripts from Mt Athos.[5] One, the well-known depiction of the arrival of Thomas the Slav at *Abydos* (fol. 31v) shows both a forecastle at the bow of his galley and also horses on one of the accompanying galleys. Why these galleys and those of Groups Two and Four do not include such fundamental characteristics of Byzantine galleys as spurs is difficult to comprehend.
Byzantine Two	20v, 21r	There are only two examples in this group. These galleys are very similar to those of Byzantine One except that they have a higher, more recurved prow and a triplex stern ornament, in one of them made out to be the bow. The colouring and style is so distinctive that it would be difficult to believe that anyone other than a unique artist drew these two galleys. The galley on fol. 21r appears to show both of the two helmsmen.
Byzantine Three	29v	There is only one illustration in this group. The galley is also drawn in a rounded "banana boat" style and with only one bank of oars, but has have duplex ornaments at both bow and stern. It has a pronounced spur. Here again the oarsmen have been mistakenly drawn facing the bow, probably because the object of the illustration, Thomas the Slav, is also depicted at the bow. This is also the first illustration in the manuscript to show a galley flying a standard, composed of a head and three streamers.
Byzantine Four	34v	This illustration is also unique. It is the famous illustration of an imperial galley attacking one in the fleet of the rebel Thomas the Slav in 821 with Greek Fire. The galleys are drawn in a rounded "banana boat" style and with only one bank of oars, but they have no spurs and no stern or bow ornaments. The imperial galley has a mast with a beaked masthead and a lateen sail and two shields hanging from the gunwale.

[5] See Pelekanides, *Οι Θησαυροί*, figs 55 (p. 61), 79 (p. 69), 299 and 300 (p. 175).

(Table 9 continued)

Byzantine Five	41r, 44r	There are only two illustrations in this group, both in quire 5. The galleys have extremely high, markedly recurving duplex stern ornaments but low bows devoid of ornamentation. There is a similarity in the low bows to those of the dromon in the manuscript of the Sermons of St Gregory of Nazianzos, Mount Athos, Panteleēmon, Cod. 6 [see Fig. 47] and in both cases spurs may have been intended. The galleys of fol. 41r both have two quarter rudders. The right-hand galley of fol. 44r mistakenly has the stern ornaments at the bow.
Western Six	110v, 111v	There are only two illustrations in this group, at the end of quire 13 and the beginning of quire 14. These galleys are depicted in a completely new style. They are very long and flat, show only one row of oar ports, have duplex stern ornaments, and have pronounced spurs but no stem posts. On fol. 111v the four galleys representing the fleet of Leo of Tripoli attacking Thessalonikē have lavishly decorated sterns, probably intended to suggest Muslim ships, and two quarter rudders. In one of these the galley has three oars at the stern rowed in a second file from above the gunwale in addition to the file rowing through oarports. In terms of the manuscript, this is the first depiction of the new Western bireme *galeae* of the late eleventh and early twelfth centuries. Two of the galleys on fol. 110v have recurved stemposts like those of Group Seven.
Western Seven	110v, 123v, 124r, 129v, 130r, 132v, 134v, 138v, 140r, 146v, 212r	This is a large group of illustrations. These galleys are very similar to those of group Six but in addition they have prominent recurved stem posts. Some (fol. 130r, 234v, 138v, 146v) have two quarter rudders. All have pronounced spurs. In two cases (130r, 132v) the oarsmen face forward. There is no doubt that this group also represents the new Western bireme *galea* of the late eleventh and early twelfth centuries.
Western Eight	145r	There is only the one unique illustration in this group on fol. 145r. The galleys in it are slightly curved in a "banana boat" style similar to those of Groups One, Two and Three, although much less markedly so. They have duplex stern ornaments, recurved stemposts, prominent spurs, and two files of oars, one rowed from above the gunwale and the other through oar ports below it. They are the best representations of Western bireme *galeae* before the Peter of Eboli illustration [see Figure 54].
Western Nine	146v	There is only the one illustration in this style on folio 146v. It is similar to galleys in the style of group Seven but two of the galleys have two files of oars using the same oarage system as in the one illustration on fol. 111v of Group Six and Group Eight.
Western Ten	146v, 147r, 147v (twice), 149v	One of the galleys on fol. 146v is of a different style also found on subsequent folios of quire 19. These are drawn in a heavy "banana boat" style devoid of either stern or bow ornaments but with recurved sternposts and

(Table 9 continued)

		stemposts. They seem to represent a reversion by an artist to a rather crude version of an earlier Byzantine style
Muslim Eleven	157r, 159r, 167v, 168v, 219v, 222r, 224r, 225v, 226r, 226v	These galleys are flat, with pronounced spurs and with identical fan-shaped ornaments at the bow and the stern. Their style is extremely distinctive and was probably Muslim inspired.[6] Many of the illustrations are extremely minimalist. Fol. 168v shows the only galley in the Western or Muslim styles to carry a mast and sail, clearly lateen. One of the galleys on fol. 226r clearly shows two quarter rudders and two helmsmen.

quire; although, some artists were responsible for the illustrations of several quires and a few quires seemed to them to have been illustrated by more than one artist. They concluded that the first two styles (A and B), found in the first ten quires of the manuscript, folios 9-87, were based on Byzantine styles of the eleventh or early twelfth centuries, whereas the second two (C and D), found in the remaining quires 12 to 29, folios 92-226, reflected Sicilian or South Italian styles of the twelfth or thirteenth centuries and some Muslim influences.

Quires 11 and 25 were not illustrated. Spaces for illustrations were left in the text of the manuscript in these quires but were never filled in. Three artists worked in the two Byzantine styles A and B and Grabar and Manoussacas numbered them Aa, Ab, and Bc. At least four artists worked in the two Western and Muslim styles and they numbered them Cd, Ce, Cf, and Dg. Beyond this, Grabar and Manoussacas had difficulties with some quires and some folios where it appeared to them that various artists may have collaborated or where the identification of a particular artist was uncertain. Tsamakda has returned to the analysis of the artists and their art styles, reaching conclusions which are somewhat different to those of Grabar and Manoussacas but without providing any reasoning for her differing opinions.[7] Whereas Grabar and Manoussacas believed that they could distinguish three Byzantine-style artists and at least four Western-style artists, Tsamakda distinguishes only two Byzantine style artists but five Western-style ones, numbering the artists A1-2 and B1-5. Both of their conclusions are summarized in Table 8.

[6] They have similarities to depictions of Muslim galleys from Egypt and Iraq. See Christides, "Naval history", figs 6 and 9; *idem*, "Dhāt aṣ-Ṣawārī", fig. 2.

[7] Grabar and Manoussacas, *L'illustration*, pp. 169-95; Tsamakda, *Ioannes Skylitzes*, pp. 373-8.

Turning to the 48 illustrations of ships in the manuscript, almost all of them clearly depict galleys rather than sailing ships. There are only two which depict sailing ships. One represents the famous large sailing ship owned by his wife Theodōra, to which the emperor Theophilos took such objection, and the other is apparently a small boat.[8] They were drawn by Bc and either Cd or Ce (Grabar and Manoussacas) and A1 and B1 (Tsamakda). Although they have been included in Table 10 below, they have been excluded from the analysis of the various styles of galley depictions given here. As far as the illustrations of galleys are concerned, there is no evidence that any of the artists depicted anything other than what were either copies of illustrations of galleys as they found them in the original Byzantine manuscript or else depictions of contemporary galleys as they knew them. As Wilson has written:

> ... it must be said that the absence of an illustrated copy to work from would have forced the illuminators to apply their inventive energies in the styles to which they were accustomed. The alternative is to assume that the model was a book from Constantinople. In that case the assumption must be that it was illustrated in a more or less coherent, at any rate fully Byzantine style, but that some of the Sicilian illuminators could not or would not copy the model very closely. There is no harm in crediting them with a desire to show a degree of independence or originality.[9]

Medieval artists working under commission normally followed programmatic models as laid down by their employers.[10] Therefore, if the original Byzantine manuscript of Skylitzēs was illustrated but some of the artists of the extant manuscript apparently emulated the styles of illustration as found in the original manuscript whereas others did not do so and drew illustrations in other styles, there can be only one of two conclusions. Either the artists who did not follow the Byzantine styles were allowed to deviate from the original by their employers or else the illustrations of those parts of the manuscript that they illustrated had been lost by the time that they were working, or had never existed, and they and their employers had no style to emulate. The original manuscript from Constantinople may have been only partially illustrated.

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[8] See Table 10, nos 19, 40.

[9] Wilson, "Madrid Skylitzes", p. 216.

[10] Which in itself raises another question not considered by Tsamakda. If the manuscript was commissioned, why did the commissioner not require the execution of the miniatures in any one particular style?

Table 10: Comparison of styles of depictions of galleys in the manuscript Madrid, Biblioteca Nacional, Vitr. 26-2 of the *Synopsis historiōn* of John Skylitzēs with the general styles and artists as identified by (1) Grabar and Manoussacas and (2) Tsamakda

	Pryor and Jeffreys[11]		Grabar and Manoussacas		Tsamakda	
Folio	Number	Galley group	Figure (Plate)	Artist	Figure	Artist
14v	1	One	-	Aa	16	A1
15r	2	One	-	Aa	17	A1
20v	3	Two	-	Ab	33	A2
21r	4	Two	-	Ab	34	A2
26r	5	One	-	Aa	49	A1
29v	6	Three	15	Aa	57	A1
31v	7	One	20	Aa	61	A1
32r	8	One	-	Aa	63	A1
33v	9	One	-	Aa	67	A1
34v	10	Four	24 (pl. VI)	Aa	70	A1
35v	11	One	-	Aa	73	A1
38r	12	One	pl. VII	Aa	79	A1
38v	13	One	29 (pl. VIII)	Aa	81	A1
39r	14	One	-	Aa	82	A1
39v	15	One	-	Aa	83	A1
40v	16	One	-	Aa	86	A1
41r	17	Five	30	Bc	88	A1
44r	18	Five	-	Bc	98	A1
44r	19		Sailing ship - excluded			
110v	20	Six	129	Cd	251	B1
111v	21	Six	132	Ce	254	B1
123v	22	Seven	-	Ce	287	B2
124r	23	Seven	144 & 145	Ce	289	B2
129v	24	Seven	156	Cd	309	B1
130r	25	Seven	157 [pl. XXVIII]	Cd	310	B1
132v	26	Seven	161	Cd	317	B1
134v	27	Seven?	-	Cd	322	B1
138v	28	Seven	-	Cd	334	B1
140r	29	Seven	172	Cd	339	B1
145r	30	Eight	183	Cd	357	B4
146v	31	Nine & Ten	-	C?	363	B3
147r	32	Ten	-	C?	364	B3
147v	33	Ten	-	C?	366	B3
147v	34	Ten	-	C?	367	B3
149v	35	Ten & Seven	-	C?	375	B3
157r	36	Eleven	202	Dg	395	B5
159r	37	Eleven	207	Dg	401	B5
167v	38	Eleven	214	Dg	421	B5
168v	39	Eleven	215 [pl. XXXII]	Dg	423	B5
208v	40		small boat - excluded			
212r	41	Seven	249	Cd or Ce	501	B1
219v	42	Eleven	-	Dg	521	B5
222r	43	Eleven	-	Dg	526	B5

[11] Our references are to the manuscript and to the reproduction John Skylitzēs, *Σύνοψις ἱστοριῶν*.

(Table 10 continued)

224r	44	Eleven	266	Dg	530	B5
225v	45	Eleven	-	Dg	535	B5
226r	46	Eleven	-	Dg	536	B5
226v	47	Eleven	-	Dg	537	B5
227r	48	One	-	Ab	538	A1

It should be noted that there is one very long section of the manuscript between quire 5, folio 44r and quire 13, folio 110v which has no illustrations of ships at all. Another, somewhat shorter, section between quire 22, folio 168v and quire 27, folio 208v also has no depictions of ships. These lacunae may have been the result of nothing more than happenstance or there may have been something more to it. Certainly there are plenty of matters naval and maritime in the sections of the *Synopsis historiōn* in question which might have been illustrated.

Our analysis of the illustrations of galleys in the manuscript has led us to classify them in eleven groups as in Table 10. Comparison of the styles of galley depictions with the general analysis of the art styles and individual artists by Grabar and Manoussacas on the one hand and Tsamakda on the other has a number of instructive implications. Leaving aside consideration of all other aspects of the artistic styles, and accepting the obvious probabilities that individual artists may well either have been working to instructions, or may have been copying different styles from the original Byzantine manuscript, or may have drawn galleys in more than one style on their own volition, our correlations are as in Table 11.

Analysis of the styles of the depications of galleys suggests that some modifications to the conclusions of Grabar and Manoussacas [G-B] on the one hand and Tsamakda [T] on the other should be considered. The preliminary conclusions to be drawn are that in the Byzantine style the galleys in the style of Group One were drawn only by artist G-BAa/TA1 except possibly for the stray illustration at folio 227r, which Grabar and Manoussacas attribute to Ab but Tsamakda to Al. Almost certainly Tsamakda is correct. G-BAa/TA1 also drew the two unique galleys in the styles of groups Three and Four as well. This was Artist One. The two galley illustrations of Group Two are unique to artist G-BAb/TA2. This was Artist Two. G-BBc/TA1 also

Table 11: Galley Group artists correlated to (1) Grabar and Manoussacas and (2) Tsamakda

Galley Group	Quires	Folios	Artists according to Grabar and Manoussacas	Artists according to Tsamakda	Artists according to Pryor and Jeffreys
Byzantine One	1	14v, 15r	Aa	A1	One
	3	31v	Aa	A1	
	4	32r, 33v, 35v, 38r, 38v, 39r, 39v, 40v	Aa	A1	
	30	227r	Ab	A1	
Byzantine Two	2	20v, 21r	Ab	A2	Two
Byzantine Three	3	29v	Aa	A1	One
Byzantine Four	4	34v	Aa	A1	One
Byzantine Five	5	41r, 44r	Bc	A1	Three
Western Six	13	110v	Cd	B1	Four
	14	111v	Cd or Ce	B1	Four
Western Seven	13	110v	Cd	B1	Four
	15	123v, 124r	Ce or C	B2	Five
	17	129v, 130r, 132v, 134v	Cd	B1	Four
	18	138v, 140r	Cd	B1	Four
	19	146v	C??	B3	Six
	28	212r	Cd or Ce	B1	Four
Western Eight	19	145r	Cd	B4	Seven
Western Nine	19	146v	C??	B3	Six
Western Ten	19	146v, 147r, 147v (twice), 149v	C??	B3	Six
Muslim Eleven	21	157r, 159r	Dg	B5	Eight
	22	167v, 168v	Dg	B5	
	29	219v, 222r, 224r, 225v, 226r, 226v	Dg	B5	

supposedly drew the two galleys in the distinctive style of Group Five as well and here it is much more likely that Grabar and Manoussacas were correct and that this was a different artist rather than G-BAa/TA1. We have called him Artist Three.

Of the galleys drawn in Western and Muslim styles, G-BCd/TB1 definitely drew galleys in the styles of both groups Six and Seven because both are found in the illustration on fol. 110v. We have called him Artist Four. Grabar and Manoussacas were unsure whether the illustration on fol. 111v was by another artist but this appears unlikely.

Both Grabar and Manoussacas and also Tsamakda distinguish a separate artist G-BCe (or C)/TB2 for the two illustrations in the style of Group Seven on folios 123v and 124r of quire 15. From the style of the galleys alone there is no real reason to do so; however, there is a distinctive quality to the brushwork in this quire which suggests that it was the case. We have called him Artist Five. The stray illustration at folio 212r of galleys in the style of Group Seven attributed by Grabar and Manoussacas to G-BCd or G-BCe and by Tsamakda to TB1 could be attributed to either Four or Five on the style of the galleys alone; however, the brushwork suggests Four rather than Five.

Quire 19 is the most complex of the manuscript from an artistic point of view and both Grabar and Manoussacas and also Tsamakda distinguished two different artists. Although the style of three of the galleys in the illustration on folio 146v is the same as that of Group Seven, the drawing style is different to that of artists Four and Five and this illustration, which includes Group Nine, together with those of Group Ten, should be attributed to a different Artist Six.

The unique illustration in the style of Group Eight is attributed by Grabar and Manoussacas to G-BCd but they are almost certainly incorrect and Tsamakda correct in attributing it to a unique artist TB4. The illustration is so different in style to the others of Artist Four that it seems impossible that it could be by him. We have called this one Artist Seven.

The galleys in the Muslim style of Group Eleven were attributed to a new artist by both Grabar and Manoussacas (G-BDg) and by Tsamakda (TB5). Both are undoubtedly correct. We have called him Artist Eight.

We conclude that there were three artists working in the Byzantine style, four in the Western style, and one in the Muslim style. Artist One drew galleys in three distinctive styles, suggesting that he was faithfully copying illustrations which were already in different styles. If it were not for other evidence suggesting that the quires in question were illustrated by different artists, he might well be considered to have been capable of producing groups Two and Five as well; however, the other evidence is clear that they were produced by two other artists, Two and Three. Artists Four, Five, and Six all drew at least some of their galleys in very similar styles based on Group Seven, suggesting that they came from the same social milieu. Artists Seven and Eight appear to have come from different milieux.

We emphasize that these suggested modifications to the conclusions of Grabar and Manoussacas and also Tsamakda apply

explicitly to the illustrations of galleys only. Whether they have any implications for wider analysis of the art styles and artists of the rest of the illustrations of the manuscript is for others to decide.

The three important illustrations of bireme galleys discussed in Chapter Five, here numbers 21, 30, and 31, also confirm Wilson's and Tsamakda's dating of the manuscript to the second half of the twelfth century at the latest. First, they clearly show the same bireme oarage system as that of the illustration at folio 119r of the Berne manuscript of Peter of Eboli's *De rebus Siculis carmen*,[12] but in less detail. Since number 30 above is in the same artistic style as that of the Peter of Eboli illustration, it can reasonably be presumed to have come from the same atelier as the latter, but almost certainly predated it. Secondly, the styles of galley depictions of groups Six-Nine are extremely similar to those of the manuscript of the *Annales Ianuenses* of Genoa accompanying the entries for 1170, 1175, and 1191.[13] Although no files of oars are shown in the Genoese miniatures, it may be presumed that they also depicted the new bireme oarage system of the Skylitzēs manuscript in which both files of oars were rowed from above deck but only one through oar ports. Thus the evidence of the illustrations of galleys in the Skylitzēs manuscript confirms the dating of the manuscript to between ca 1160 and 1200.

[12] See above pp. 426-9 & Figs 51-4.
[13] See above pp. 424-6 & Fig. 50.

APPENDIX EIGHT

MUḤAMMAD IBN MANKALĪ[1]

[a]

AL-ADILLA AL-RASMIYYA FĪ 'L-TA'ĀBĪ AL-ḤARBIYYA

[b]

AL-AḤKĀM AL MULŪKIYYA WA 'L ḌAWĀBIṬ AL-NĀMŪSIYYA

TRANSLATION BY AHMAD SHBOUL

[1] Muḥammad ibn Mankalī was most probably the son of Mankalī Buġhā, a prominent Mamlūk *amīr* who was in charge of the royal correspondence in the Mamlūk chancery in Egypt for some years. He was born around 1300-1306 C.E. and died in 1382 C.E. In addition to works on warfare and military and naval tactics, he was also the author of a treatise on hunting. See Ibn Nāẓir al-Jaysh, *Tathqīf al-Ta'rīf*, p. 207.

[a]

Al-adilla al-rasmiyya fī l-ta'ābī' al-ḥarbiyya[2]

Official instructions for military mobilization

Remarks on sea warfare

الأدلّة الرسميّة في التعابي الحربيّة

نكت في قتال البحر

p. 241 He [the author's master, i.e., Najm al-Dīn Ḥasan al-Rammāḥ (the lancer)] said: **[= Leo VI, §5]** the ancients, in their sea warfare had ships (*marākib*), which had three levels /banks. In each ship there should be multiples of the supplies needed, such as oars, ropes, reels (*bakarāt*), sails, blocks (*qurī*) and all necessities for fighting at sea, also extra pieces of worked timber, such as cuttings (*qarā'id*), boards/ribs (*alwāḥ*) and thin planks (*mishāq*),[3] as well as pitch (*zift*), both liquid and dry.

In each ship there should be a carpenter [shipwright][4] with all his tools and implements, such as adze, saw and chisel. For him to have two of each tool would be the recommended thing. **[= Leo VI, §6]** At the bow of each ship there should be tubes (*anābīb*) from which they throw

قال إن القدماء كان قتالهم في البحر مراكب لها ثلاث طباق، ويكون في كل مركب من العِدد، أضعاف ما يحتاج إليه، مثل: المقادف و الحبال و البكرات و القلوع و القري، وجميع ما يُحتاج لقتال البحر، و كذلك فاضل من العود المنجور، مثل القرائض والالواح و المشاق و الزفت السائل و اليابس.

ولا بدّ أن يكون في مركبه نجّار بجميع عُدته وماعونه، كالقدوّم و المنشار و الازميل. و إن كان معه زوج من كلّ عِدّة، فهذا هو المختار. ويكون

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[2] Ibn Mankalī, Muḥammad, *Al-adilla al-rasmiyya fī 'l-ta'ābī' al-ḥarbiyya*, ed. M. S. Khaṭṭāb (Bagdhad, 1988), c. 21: "Nukat fī qitāl al-baḥr" ("Remarks on sea warfare"), pp. 241-51.

[3] Leo VI mentioned only two of these three items.

[4] The word نجّار misread in the printed text as بحّار.

في مقدّم كل مركب الأنابيب التي يرمون منها النّار وهي تُسمّى باللسان الرومي القديم: "سِفُنَهْ"، ويكون فوق الأنابيب المذكورة ألواح *مقنّعة[5] مسيّجة فوقها بألواح أُخرى. ويقف فوق تلك الألواح رجال مقاتلة، ليلقوا العدوّ الذي يأتيهم من المقدّم، ويكون معهم مايمكنهم مما يرمون به العدوّ. ويكون في كلّ مركب بُرج إلى جانب الصاري، ويُحاط البرج بألواح دائرة به، ليقف فوقها الرّجال المقاتلة، ويرموا إلى وسط مركب العدوّ، ويكون رميهم بحجارة كالأرحية أو الأعمدة، حادّة الأطراف لتقتل مَن تُصيب أو تخسف أينما وقعت. ويلقون على العدوّ ما يحرقونه به أو يحرّقون مراكبه، ويكون كل مركب منها متوسطاً في

p. 242 fire. They [the tubes] are called in the old Greek (*Rūmī qadīm*) tongue *sifuna* and above the aforementioned tubes should be covered planks, the latter in turn protected from above by other planks. And on top of these planks fighting men should stand so that they can face the enemy coming at them from the bow and they should have what they can to throw at the enemy. **[= Leo VI, §7]** In each ship there should be a tower beside the mast, the tower is surrounded by planks all around so that fighting men can stand on them and throw towards the middle of the enemy ship. They should throw stones the shape of [hand] mills or pointed shafts so that these can kill whoever they hit or break up [the ship] wherever they fall. They should also throw at the enemy what can burn them or set fire to their ships. Each ship should be of medium length with two levels. **[= Leo VI, §8]** The minimum number of thwarts (*zawāghir*) on each should be fifty, and the men should be above and below,

[5] The printed text has مقعّرة.

two men for each thwart, half of them to be oarsmen, and they are those of the lower level, the other half

طوله، وفيه طبقتان، وأقل مايكون فيها من الزواغير خمسون زغوراً، وهم من فوق ومن أسفل، على كل زُغّور رجلان، النصف منهم قَذّافَة، وهم أصحاب الطبقة السُّفلى، والنصف الآخر

p. 243 to be the fighters and they are those of the upper level.[6] Two men are in charge: one, together with an elite squad, for throwing fire, the other in charge of anchors and he should be supplied with his weapons. The captain (*ra'īs*) is to be in the front (*quddām*) seated on the bow of the ship. **[= Leo VI, §9]** Each ship should have two hundred men, fifty of these for throwing [fire] and the rest fighters. **[= Leo VI, §10]** Let there be other ships for speed and for day and night guards, **[= Leo VI, §11]** and among these ships there should be *ṭarā'id* specifically for horses and

مقاتلون، وهم اصحاب الطبقة العُليا، ورجلان مُدَبرّان: رجل و جماعة منتخبة لتزريق النار، وأخر برسم المراسي ويكون مُعداً بسلاحه، و الرئيس قدّام جالسا في مقدّم المركب. ويكون في كلّ مركب مئتا رجل، يكون منهم برسم القذف خمسون، والباقون مُقاتِلة. وليكن مراكب أُخَرُ برسم السرعة والحَرسَ و

[6] The Arabic text has, hardly surprisingly, failed to make sense of Leo VI here since Leo's syntax was obscure. Cf. above p. 255. The emperor meant that half of the oarsmen rowed from below deck and half from above it and that they could all double as soldiers or marines. The Greek has been read to mean that the oarsmen were all below deck and the soldiers or marines above deck, an understandable confusion.

It is also probable that whoever translated the Greek thought that it must have been so since in Egypt there was a strong distinction between oarsmen, who were not warriors, and soldiers or marines, who did the fighting. Men joining the navy in Egypt customarily served either as oarsmen or as soldiers, without usually being expected to perform in both capacities.

العَسَس، ومنها طرائد برسم الخيل، ومراكب لحمل الزّاد و علَف الخيل، وحملِ الأثقال. واستكثِرْ من الزّاد والعلَف ما استطعتَ أضعاف ما يُحتاج إليه، وكذلك من السلاح والنّشّاب والقِسيّ و ما يُحتاج إليه أضعاف ذلك، و كذلك الدّرَق المتقنة الصنّعة.

other ships for supplies of food [for the men] and fodder for the horses and for carrying baggage. You should have as much extra supplies of food and fodder as possible, as many times as needed, **[= Leo VI, §13]** similarly as regards weapons, arrows, bows and other requirements, several times what is needed, likewise for skilfully manufactured shields (*daraq*).

وليكن معهم المنْجنيقات و كذلك الحجارة الحادّة الأطراف بقدر ما تملأ الكفّ، فإنها تقوم مقام السلاح، لتأثيرها في الأعداء، وليكن رميها برفق و تأيُّد لئلا يُتعبوا أنفسهم، فيُقصرّوا ويطّلع العدوّ على كَلَلِهِمْ فيدخل عليهم.

p. 244 **[= Leo VI, §§13-14]** They should have catapults (*manjanīqāt*) with them as well as sharp edged stones of a size that can be hand-held which act as weapons because of their impact on the enemy. **[= Leo VI, §15]** These should be thrown carefully and deliberately so that they do not tire themselves or fall short of the target, leading the enemy to become aware of their weariness and thus overcome them.

ولا يُؤخذ من أحد الجند رشوةً، و اختيار المقاتِلة شرط في حق زعيم الجيش، كما تقدّم في صدر الكتاب.

[= Leo VI, §19] No bribe should be taken from any soldier; selecting warriors is a condition and prerogative of the commander (*za'īm*) of the army, as mentioned at the beginning of this book.

ومَن كان معكَ من الرجال

[= Leo VI, §20] Those among the men with you who

may not be courageous enough should be placed as a rule in the lower deck, and whoever is injured or hurt of those on the upper level you should transfer below and replace with men from the lower level according to necessity and as you see fit.

الذين هم غير شجعان ، فرسمهم في الطبقة السُفلى، ومَن جُرح من أهل الطّبقة العُليا أو تأذّى، فأنزِلهُ إلى أسفل، واجعل عوضه من الذين هم في الطبقة السُفلى، على حَسَب الضرورة و التدبير.

p. 245 Muḥammad ibn Mankalī said: Each ship should have four individuals trained specifically for looking after the injured, and to take off their weapons, and to give them drink and food. This is essential.[7] **[= Leo VI, §45]** Let those with you be accustomed in practice to hearing the sound of trumpets and shouts and the din of battle, so that they do not become fearful upon hearing such sounds without prior experience at the time of real fighting. **[= Leo VI, §§23, 25]** When they wish to weigh anchor or leave port let this be done in an orderly and organized manner. **[= Leo VI, §31]** Captains of the ships should be well-informed of the pattern of the wind according to certain indica-

قال محمد بن منكلي: ويكون في كلّ مركبٍ أربعة نَفَر ذوي رياضة برسم خدمة الجَرْحى، ولنزع سلاحهم و سقيهم و أكلُهم، و هذا ما لا بدّ منه. وليكن مَن معك متربّصين على سَماع البوقات و العياط، وسماع رُهوج الحرب، لئلا يسمعوا ذلك في غير عادة وقت قتال العدوّ فيعتريهم الخوف. و عندما يريدون أن يرسو في مَرْسَى، أو يخرجوا من البرّ، فليكن ذلك على

[7] Not in Leo VI's text.

tions. There should be no weighing anchor except when the weather is seen to be fine. **[= Leo VI, §33]** If you are close to the land of the enemy, or there is danger that the enemy might target you, you should have lookouts and night watchers on both land and sea and you should be careful and alert and keep vigil at night, ready for engagement. When it is time for fighting,

ترتيب و نظام. و يجب لرؤساء المراكب أن يكونوا عالمين بإتيان الرّياح بعلامات، ولا ينبغي الخروج من المَرسى إلا أن يرى الصحو. و إن كنت قريبا من أرض العدوّ، أو خطر العدوّ يأتي إليك، فلتكن لك نواظر وعسس في البر والبحر، و توثّق أمورك ، و تستيقظ. وتُطيل السهر، وتكون متأهّباً للمصافة. فإذا حضر وقت القتال،

p.246 and you are prepared as we have indicated, **[= Leo VI, §40]** line up your ships in formations that vary according to the place and the season.[8] Once you are certain and confident of all that, and you have resolved to face the enemy, do not fight them on your territory lest your soldiers rely on running away, and slacken because of this. For few are those who would consider dying honourably

وأنت على ما ذكرناه من تعبيتك، فصفّف مراكبك بأشكال مختلفة بقدر ما يتحمّل المكان ويمكّن الزمان*. و عندما تُحقّق ذلك كله و تعوّل عليه، و تريد مواجهة العدوّ، فلا تقاتله في أرضك لئلا تطمئن الجند للهروب،

[8] Here the edition reading is garbled, and the editor notes that the manuscript has the word الرمان which can easily be read as الزمان i.e. "time" or "weather" and thus corresponds to the Greek of Leo VI. We have opted for the reading above.

rather than running away meekly. **[= Leo VI, §41]** On the day prior to the day of the battle, you should assemble the leaders (*muqaddam*) of the ships and consult with them concerning what they should do; and once you agree on a decided plan, you should counsel them to be well prepared to implement it. **[= Leo VI, §44]** You should fix a specific signal so that upon hearing or seeing it they may commence to execute the plan. You should, O Commander, place in a prominent position in your ship a signal (*ʿalāma*), such as a flag (*band*) or *ṭarrāda*,[9] so that the other ships may see the signal and rely on it for whether they should fight or not, whether they should encircle the enemy or veer towards a particular direction to assist a section [of your fleet] that has become weakened, or whether they should stop throwing (*qadhf*) or not, whether they should intensify this or reduce it. **[= Leo VI, §46]** It should have been agreed in advance that if the signal were to incline to the right they would do such a thing, if to the left then something else, if it is

فيتراخوا لذلك، لأن القليل من الناس ممّن يرى أنّه يموت عزيزاً، ولا ينهزم ذليلاً.

وقبل يوم القتال بيوم واحد، تَجْمَعُ مُقدّمي المراكب، و تشاورهم فيما يصنعون، فإذا اتفّقتم على أمر ورأي، فلتوصِهم يكونوا متأهبين لفعل ذلك. و تجعل لهم علامةً إذا سمعوها أو رأوها ليبادروا لإنجاز الرأي، و تجعل في مكان ظاهرٍ في مركبك، أيّها المقدّم علامة مثل بَنْد أو طرّادة لتنظر المراكب الأخرى العلامة، فيُعوّلون عليه: هل يُقاتلون أم لا؟ أو يُحيطون بالعدوّ أو يميلون إلى جهة لمعونة جانب قد ضعف، أو يبطلون القذف أم لا؟ أم يجتهدون في ذلك، أو يُقَصرّون. ويكون قد قرر ذلك

[9] The word *ṭarrāda* here should normally refer to a type of ship. However, that is nonsense in the context. Either this is a scribe's error, or the Greek *flamoulon* has been misread in some way to give rise to what the Arabic has.

raised high another action is to be implemented, if it is shaken or moved this would indicate

في العلامة أنها إذا مالت إلى جهه اليمين، يكون لهم فعلٌ ما، أو إلى اليسار غير ذلك. وإذا رُفعت فيُعمل عَمل أخر، وإذا نزلت فغير ذلك، أو إذا نَفِضَتْ أو تحركت دلّ على

p. 247 yet another thing other than any of the above, and if it were moved or taken away or if the colours on the top of the indicator be changed, for example from red to blue or another colour, **[= Leo VI, §48]** these would indicate other things already agreed upon. **[=Leo VI, §47]** The best thing is to undertake the making of these signals with your own hands, O Commander, and to train your deputy commanders to familiarize themselves very well with these signals and to know exactly what they indicate, for what purpose, for how long, and how, so that they will learn their knowledge of these and not make any mistakes.

[= Leo VI, §§ 49, 58] I have not been able to specify for you here how to line up the numbers, for this should be according to your own judgement at the time, and depending on your experience of the enemy's action. **[= Leo**

سوى ذلك كلّه، أو إذا نُقِلت أو نُحّيت أو غُيّرت الألوان التي في رأس العلامة مثل أحمرفصار أزرق أو غير ذلك من الألوان، فإنّ ذلك علامات لأمور قد قُررت. وأجود ما يكون أن تُعاني عمل هذه العلامات المذكورة بيدك أيها المُقدّم، وتُريّض المقدّمين الذين تحت يدك على معرفة العلامات، ليعرفوها معرفةً جيدة، وعلى ما تدلّ، ولما هي، وإلى متى هي، وكيف هي، ويُحققون معرفة ذلك، حتى لا يغلطوا فيه.

ولم أقدر أن أحُدّ لك هاهنا كيف تَصاف الاعداد، لانه

VI, §50] The first thing I should tell you in this regard is that you should know when it is appropriate to surround your enemy in a half circle formation. Captains of ships should be enjoined to line up for you, as a right wing and a left wing, and the Commander should be in the heart, to enable you to manage the whole and see what needs to be done and to give appropriate orders as to what should be done. And whenever you see a section that has weakened and you are able to aid it, you should do so as far as possible. We have mentioned to you the half circle formation in surrounding the enemy, so that they find a way to enter the aforesaid form, and thus be completely encircled. **[= Leo VI, §51]** Alternatively, you should arrange your ships in a straight line, so that if time allows, you may ram your enemy's ships with the bow of your ships, and shoot fire at them.

بحسب ما تراه أنت في ذلك الوقت وعلى ما تُعانيه من فِعل العدو. فأوّل ما نعلمكَ به من ذلك،أنه يجب أن تعلم، متى يصلح أن تُحدق بأعدائك نصف دائرة. ويوصّون [sic] أصحاب المراكب، أن يُصففوا لك ميمنة و ميسرة، ويكون المقدّم في مكان القلب، لتدبّر الكُل وتَرتَئ فيهم و تأمر بما يجب فعله. وأين ما رأيت جانبا قد ضعف وأمكنك معونته، فلتُعنه بحَسب الاستطاعة. و ذكرنا لك شكل نصف دائرة في إحاطتك بالعدو، ليجدوا سبيلا إلى الدخول في الشكل المذكور، فيُطبق عليهم. ووقت أخر، يكون تصفيف مراكبك على الاستقامة، حتى إذا أمكنك الوقت تطخ مراكب أعدائك، بمقادم مراكبك، و تطلق عليهم النار.

p. 248 **[= Leo VI, §52]** At other times, you should divide the fighters into two or three fronts, according to the number of your ships. One section should penetrate the enemy lines, and while it is thus engaging them, another section should approach from the rear or side.

[= Leo VI, §54] On other occasions, you should approach them from a distance with light fast ships (*mash-shāya*), and then make these ships pretend to flee. Once the enemy ships disperse in pursuit of what they have seen, other ships of yours can attack them; and when the enemy's fighters are worn out you can send your rested companions against them. If possible avoid the enemy's large ships and target the weak ones. **[= Leo VI, §55]** If you have sufficiently numerous fighting men on board your ships, you should meet the enemy with some of them and let the others rest. Once the enemy is tired of fighting and your men are tired also, you replace them with rested ones. **[= Leo VI, §56]** If when you change your fighters you do not achieve your objective, pretend to flee and they will pursue you so that you can turn back on them when they are tired and you will attain

ووقت أخر، تَقسم المقاتلة لجهتين أو لثلاث جهات، بقدر عدد مراكبك، ويدخل الفريق الواحد على العدو، فعندما يشتغل معه، يأتيه الفريق الاخر من ورائه أو من جانبه. ووقت أخر تتراءى لهم بمراكب مشّايه خفيفة، ويُظهرون لهم الإنهزام، فإذا انتشروا طالبين لما رأوه، يضرب عليهم فُجاءة بمراكب أُخرى، فعندما يتعب أصحاب العدو في القذف، ترسل عليهم أصحابك مستريحين، وإن أمكن فتجانب ما كان قوياً من مراكب العدو، و تضرب على ما كان منهاضعيفاً. وإن كان أصحاب المراكب المقاتلة كثيرين، فتقابل عدوّك ببعضه وتريح الأخرين. فإذا تعب العدو من المقاتلة وتعب أصحابك، بدلت عليهم القتال بأخرين مستريحين. فعندما

what you set out to do. **[= Leo VI, §57]** Watch for the enemy's ships to ascertain when they are in trouble at sea because of storms and hurricanes so that you can attack them. **[= Leo VI, §59]** And let your throwing of *nafṭ* on your enemy be accompanied with thundering noise and smoke.

تبدل عليهم العسكر، ولم تنل غرضك، فأمض كأنك منهزم، فإنهم يتبعونك، فترجع إليهم وهم مُتعبون، فتبلغ فيهم ما تريد. وترصّد مراكب العدو متى أتت عليهم شدّة في البحر من العواصف و الزوابع، فتضرب عليهم، وليكن رميك النفط على أعدائك بإرعاد و دخان.

[b]

Al-aḥkām al-mulūkiyya wa 'l-ḍawābiṭ al-nāmūsiyya[10]

From Ibn Mankalī's Book of Rules

من كتاب الأحكام

p. 3 … Let it be known that fighting them (the Byzantines) at sea is quite difficult for those who have neither witnessed nor experienced fighting against them. For they have learned this and have become accustomed to it. It is in the book of Leo the Greek king. This king was a philosopher and conversant in engineering and stratagems.

… وليعلم أنّ قتالهم [يعني: الروم] في البحر عسر على من لا رآه منهم ولا له دربة في قتالهم … وذلك أنّ لهم دربة تعلّموها وألفوها في كيفية القتال في البحر هو[sic] من كتاب لاون الملك

[10] *Al-aḥkām al-mulūkiyya wa 'l-ḍawābiṭ al-nāmūsiyya*, ed. ʻAbd al-ʻAziz Maḥmūd ʻAbd al-Dā'im (Ph.D.; Cairo, 1974), pp. 3-4, 20-22, 122-5.

He is the author of a useful book which he called *The book of military organisation*, which he had written for the use of the Byzantines in their warfare against Muslims. I have come across this book and it contains great military benefits.

اليوناني. وكان هذا لاون الملك فيلسوفاً عالماً بالهندسة و مكايد الحروب ، وله كتاب مفيد سمّاه "مراتب الحروب" ، كان قد وضعه للروم لقتال المسلمين. وقد وقعتُ على هذا الكتاب وفيه فوائد جليلة حربية.

p. 4 I discuss in this abridged work of mine certain rules and practical tactics which the king of Constantinople has never heard of, nor has king Alfonso … nor have they occurred to the Genoese. […]

وأذكر في هذا المختصر بعض قوانين حربية، وضوابط سياسية ، لم يسمع بمثلها ملك قسطنطينية. ولا طرقت آذان ملك الفنش ... و لا وصلت اليها فكرة الجنويين ...

p. 20 On equipment for warships and the requirements of the fleet

في ذكر آلات المراكب وما يحتاج اليه الأسطول.

The first thing that should be known is the manner of building ships in their various types. King Leo the Greek said in his book which he called *Strategic tactics and the manner of combat on land and at sea,* that the reason why he wrote this book was to instruct his people in how to fight the Muslims. In it he mentions several unusual matters and remarkable tactics.

أول ما يجب علمه هيئة إنشاء السفن على طبقاتها. قال لاون الملك اليوناني في كتابه الذي سمّاه "مراتب الحروب وكيفية قتال البر والبحر" وكان سبب وضعه لهذا الكتاب تعليم أصحابه كيفية قتال المسلمين.

He enjoins the ship builder: **[= Leo VI, §6]** the specifications of your ships called *adromons* in Greek, which signifies fast moving (*mashshāya*), should have medium size planks, neither too thick which would slow down their movement, nor too thin, which would make them easily damaged from ramming and sea waves. **[= Leo VI, §5]** Each ship should have double the equipment and tools needed, such as oars, ropes,

وذكر فيه قضايا غريبة وضوابط عجيبة. فقال في وصيته لمنشئ السفن: "ينبغي أن يكون صفة مراكبك التي تُسمّى أدرومنس باليونانية ومدلولها المشّاية ، وتُجعل ألواحها متوسطة ، لا كثيرة الغلظ فتبطئ في سيرها ، ولا بالرقيقة فيضربها التناطح وأمواج البحر. ويكون في كل مركب من العِدَد التي يُحتاج اليها عِدد مضاعفة من المقاديف والحبال.

p. 21 reels (*bakarāt*), sails, blocks (*qurī*), masts, and extra pieces of worked timber and thin planks, also extra pieces of worked timber, such as cuttings (*qarā'id*), boards/ribs (*alwāḥ*) and thin planks (*mishāq*), as well as pitch (*zift*), both liquid and dry. No ship should be without one carpenter/shipwright, at least, with all of his implements and tools, such as adze, saw and chisel, and so on. **[= Leo VI, §6]** At the bow of each ship there should be tubes (*anābīb*)

والبكرات والقلوع والقري والصواري وفاضل من العود المنجور مثل القرايض والألواح والمشاق والزفت[11] السائل واليابس ولا يخل كل مركب من نجّار واحد على الأقل بجميع عدته وماعونه كالقدوم والمنشار والازميل وغير ذلك. ويكون في مقدم

[11] The Arabic edition reads: الزيت, instead of الزفت.

from which they throw fire. They [the tubes] are called *sifuna* in Greek, and above the aforementioned tubes should be covered planks, the latter in turn protected from above by other planks. And on top of these planks fighting men should stand so that they can face the enemy coming at them from the bow, and they should have what they can to throw at the enemy. **[= Leo VI, §7]** In each ship there should be a tower beside the mast, the tower being surrounded

كل مركب الأنابيب التي يزرق بها النار وهي تسمى باليونانية سفنة، ويكون فوق الأنابيب المذكورة الواح مشققة مسيحة فوقها بالواح أخرى ، ويقف فوق هذه الألواح رجال مقاتلة ليلقوا (مراكب) العدو التي تأتيهم من المقدم. ويكون معهم مايمكنهم مما يرمون به العدو، ويكون في كل مركب برج الى جانب الصاري ويحاط

p. 22 by planks all around so that fighting men can stand on them and throw towards the middle of the enemy ship. They should throw stones the shape of [hand] mills or pointed shafts so that these can kill whoever they hit or break up [the ship] wherever they fall. Each ship should be of medium length, with two levels, and there should be supervisors in charge, one man, two men.[12]

البرج بألواح دائراً به ليقف فوقها الرجال المقاتلة ويرموا الى وسط مراكب العدو. ويكون رميهم بحجارة أرحية أو أعمدة حادة الأطراف لتقتل من تصيب أو تخسف أينما وقعت، ويكون كل مركب منهم [sic] متوسطاً في طوله وفيه طبقتين وينبغي مدبرين

[12] The Arabic text is garbled here. See the text of *al-Adilla* above, p. 647, for the likely context.

الرجل رجلين.

p. 122 Chapter thirty six:
On the signals that should be on the bow of the ship.

الباب السادس والثلاثون
في ذكر العلامات التي تكون
مقدم المركب

Know, may God give you guidance, O Commander, that when you line up against the enemy's ships at sea, you should follow what Leo the Greek king said in his book *War tactics*, which is a useful book for anyone who is engaged in fighting the enemy on land or at sea. King Leo said: **[= Leo VI, §44]** you should, O Commander, have on the day of battle at sea a certain signal for your companions so that upon hearing or seeing it they would commence to execute the plan. **[= Leo VI, §42]** The ship which you command, which is called in Greek *adromon*, should be larger and faster than all other ships. You should select brave and resourceful men to be with you and the ship should lead all others. **[= Leo VI, §43]** All of your sub-commanders should have good light ships, and all ships should look towards the ship which you command, following your actions in what they do, **[= Leo VI, §44]** and you should have in a prominent position in your ship a signal (*ʿalāma*),

اعلم أرشدك الله أيها المقدم اذا صاففت مراكب العدو في البحر فلتعمد الى ما قاله لاون الملك اليوناني في كتابه "مراتب الحروب وهو كتاب مفيد لمن يعاني قتال العدو في البر والبحر. قال الملك لاون ينبغي لك أيها المقدم أن تجعل لأصحابك علامة في يوم الحرب في البحر إذا سمعوها أو رأوها يبادرون لنجاز الرأي. ويكون المركب الذي انت فيه المقدم أكبر من جميع المراكب وأسرعها مشياً وهي تسمى باليونانية أذرمن وتتخير الرجال الشجعان الأنجاد ويكون مركبا مرءوساً جميع المراكب وجميع المقدمين الذين تحت يدك تكون لهم

such as a flag (*band*) or *ṭarrāda*, so that the other ships can see the signal and do what has to be done: whether they should fight or encircle the enemy or veer towards a particular direction to assist a section [of your fleet] that has become weakened, or whether they should stop throwing (*qadhf*) or not, whether they should intensify this or reduce it. **[= Leo VI, §46]** It should have been agreed that if the signal were to incline to the right they would do a certain thing, if to the left then something else, if it be raised high another action, if it be lowered then another thing, if it be shaken or moved this would indicate yet another thing other than any of the above, and if it be moved or taken away or if the colours on the top of the indicator were to change, for example, red or blue, so that the red changes to blue or another colour, all these would be indicators for certain things already agreed upon. **[= Leo VI, §47]** The best thing is for you to undertake making these signs with your own hands, O Commander, **[= Leo VI, §48]** and you should train your deputy commanders to become familiar with these signals, so they would know quite well what such signs

مراكب حسنة خفاف و تكون جميع المراكب ناظرة الى المركب الذي أنت فيه مقتفين أثرك فيما يفعلون وتجعل في مكان ظاهرٍ في مركبك علامة مثل بَنْد أو طرّادة لتنظر المراكب الأخرى للعلامة، فيُعوّلون على ما يعول عليه: هل يُقاتلون أو يُحيطون بالعدوّ أو يميلون إلى جانب قد ضعف، أو يبطلون القذف أم لا أم يجتهدون في ذلك، أو يُقَصرّون. ويكون قد قرر معهم في العلامة أنها إذا مالت إلى جهه اليمين، يكون لهم فعلٌ ما، و إلى اليسار غير ذلك. وإذا رُفعت فيُعمل شئ أخر، وإذا أُنزلت فغير ذلك، و إذا أُنفِضَتْ أو تحركت دلّ على سوى ذلك كلّه، أو إذا نُقِلت أو نُحّيت أو غُيّرت الألوان التي في رأس العلامة مثل أحمرأو أزرق فصار

indicate, for what purpose, for how long, and how; and they may learn all this to avoid making any errors.

الأحمر أزرقاً أو غير ذلك من الألوان، فإنّ جميع ذلك علامات لأمور قد قُررت. وأجود ما يكون أن تُعاني هذه العلامات المذكورة بيدك أيها المُقدّم، وتُريّض المقدّمين الذين تحت يدك على معرفة العلامات، ليعرفوها معرفةً جيدة، وعلى ما تدلّ ولما هي وإلى متى هي وكيف هي، ويُحققون معرفة ذلك، حتى لا يغلطوا فيه.

123 [= Leo VI, §50] The first thing I should inform you of in this regard is that you should know when it is appropriate to surround your enemy in a half circle formation. And you should en-join the captains of the ships to line up for you, as a right wing and a left wing, and you should, O Commander be in the heart, to manage and organize and to give them orders as to what should be done, and whenever you see a section that has weakened and you are able to aid them, you should do so as far as possible. The reason for mentioning the half-circle for-

فأوّل ما نعلمكَ به من ذلك أنه يجب أن تعلم، متى يصلح أن تُحدق بأعدائك نصف دائرة.وتوصي أصحاب المراكب، أن يُصففوا لك ميمنة و ميسرة، وتكون أنت أيها المقدّم في مكان القلب، لتدبير الكُل وتَرتَيبهم وتأمر فيهم بما يجب فعله، وأين ما رأيت جانبا قد ضعف وأمكنك معونته، فلتُعنه بحَسب

mation in surrounding the enemy is so that they may find a way to enter the aforesaid formation, and thus you can encircle them.

[= Leo VI, §51] On other occasions, the arranging of your ships should be in a straight line, so that if time allows, you can ram your enemy's ships with the bow of your ships, and shoot fire at them. [= Leo VI, §52] At other times, you should divide your fleet (*usṭūl*) into two or three fronts, according to the number of your ships, making one section engage the enemy, and while they are thus occupied with it, another section should attack the enemy from the rear or the side. [= Leo VI, §54] At another time, you should approach them from a distance with light fast ships (*mashshāya*), and then these should pretend to flee. Once the enemy ships disperse to pursue what they have seen, you should attack them using your other ships, and when the enemy's fighters are worn out you can send your rested companions against them. If you can, you should avoid the enemy's large ships and target the weak ones. [Leo VI, §55] If your fleet is large you should meet the enemy with some of the ships and let the others rest. Once the enemy is

الاستطاعة. وسبب ذكرالنصف دائرة في إحاطتك بالعدو، ليجدوا سبيلا إلى الدخول في الشكل المذكور، فتُطبق عليهم.

ووقت أخر، يكون تصفيف مراكبك على الاستقامة، لكي إذا أمكنك الوقت تـــنطح مراكب أعدائك بمقادم مراكبك، و تطلق عليهم النار.

ووقت أخر، تَقسم اسطولك لجهتين أو لثلاث جهات، بقدر عدد مراكبك، وتدخل الفريق الواحد على العدو، فعندما يشتغل معه، يأتيه الفريق الاخر من ورائه أو من جانبه.

ووقت أخر يتراءى لهم بمراكب مشّايه خفاف، يُظهرون لهم الإنهزام، فإذا انتشروا طالبين لما رأوه، تضرب عليهم فجاءة بمراكب أُخرى، فعندما يتعب أصحاب العدو في القذف، ترسل عليهم

tired of fighting and your men are tired also, you can replace them with rested ones. [Leo VI, §56] If, however, you replace your fighters without achieving your objective, pretend to flee and they will pursue you, so that you can turn back on them when they have become tired and thus you may achieve your purpose. **[= Leo VI, §57]** Watch for the enemy's ships to ascertain when they are in trouble at sea due to storms and hurricanes so that you can attack them, or use stratagems against them

أصحابك مستريحين، وإن أمكنك فتجانب ما كان قوياً من مراكب العدو، و تضرب على ما كان منها ضعيفاً. وإن كان أسطولك كبيراً فتقاتل عدوّك ببعضه وتريح الأخرين. فإذا تعب العدو من المقاتلة وتعب أصحابك، بدلت عليهم القتال بأخرين مستريحين. فعندما تبدل عليهم العسكر، ولم تنل غرضك، فأمض كأنك منهزم، فهم لابد أن يتبعوك، فترجع إليهم وهم مُتعبون، فتبلغ فيهم ما تريد. وترصّد مراكب العدو متى أتت عليهم شدّة في البحر من العواصف و الزوابع، فتضرب عليهم.، أو تدور عليهم مكايد

124 as far as you can or according to the occasion, **[= Leo VI, §58]** for it is not possible for one to know all that could be considered in organising things. **[= Leo VI, §59]** And let your throwing of *naft* at your enemy be accompanied

بقدر مايمكنك أو يوجبه الزمان لأنه غير ممكن أن يعلم الإنسان كلما يتفكر في تدبيره. وليكن رميك النفط

by thundering noise and smoke. You should dispatch this against them from a machine called *sifuna* in Greek, which means pipes. It is also called throwers (*zarrāqāt*). There should be placed throwers at the bow and the stern, and also on the two sides. **[= Leo VI, §61]** You should have containers filled with lime to throw at your enemies, so that the fumes and smell of lime may injure their eyes. **[= Leo VI, §63]** You should hurl at your enemies jars of pottery filled with fire of the type prepared by the throwers […]. Leo the Greek king said: **[= LeoVI, §64]** You should use, O Commander, the machine which he [Leo] had invented and it is called *kirusifuna*,[13] to be carried by soldiers behind iron shields. This is filled with prepared fire which they throw into the faces of the enemy. **[= Leo VI, 68]** When a ship rams another ship, let it be at the side close to the stern, in order to cut loose

على أعدائك بإرعاد و دخان. وترسله عليهم من آلة يُقال لها باليونانية سيفونة وتفسير ذلك الأنابيب ويُقال لها الزرّاقات. ويكون في المقدم وفي الموخر رماة وكذلك في الجانبين. ويكون عندك أوعية مملوة بالجير ترمي بها أعداءك لتجبرهم الدخان، ورائحة الجير تضر بأبصارهم. وترمي أعداءك بقدور مملوة من نار مصنوع يعمله الزراقون وتكون تلك القدور من خزف.... قال لاون الملك اليوناني: وتعتمد أيها المقدم بالآلة التي استخرجها وسماها جرسعنة يحملونها الجند تحت الدرق التي من الحديد وشيئ مملوء بنار مصنوعة يضربون بها وجوه الأعداء ، و اذا نطح المركب، فليكن في

[13] This word is spelt in Arabic something like *Jirusi'ana*, which makes no sense here. It is clearly capable of being read as we have rendered it above, thus corresponding to the original Greek of Leo's text.

الجنب قريباً من الموخر فتقطع الكلاليب من مراكب العدو وتفرق مراكبك من مراكبهم فيهلكون بذلك.

قال لاون الملك اليوناني: وإذا وصل بكم الأمر الى الشدة فكن أيّها المقدم أول من تُظهر الصبر والتجلد واحفظ نفسك في وقت اللقاء من القتال بيدك إذا لم تدعوك الى ذلك ضرورة جدا بل تكن موقوفاً [على] الأمر والإرتياء.

125 the chains and hooks from the enemy's ships and thus disentangle your ships from those of the enemy, and they would perish.

Leo the Greek king said: if your situation becomes stressful, you, O Commander, should be the first to display perseverance and fortitude; and keep your person from actual combat when you meet the enemy in battle, unless it is absolutely necessary. Rather you should confine yourself to commanding and making decisions.

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Items which are included in the Gazeteer are asterisked (*) and those in the Glossary of Greek, Arabic and Latin terms are marked with an obelus (†).

Abbreviations

ʻAb.	ʻAbbāsid	Lat.	Latin (i.e., West European)
am.	*amīr/amīrate*†	*mag.*	*magistros*†
Byz.	Byzantine	*mag. mil.*	*magister militum*†
C.	Count/County	mts	mountains
Cal.	Caliph	P.	Prince/Principality
D.	Duke/Duchy	*pat.*	*patrikios*†
droung.	*droungarios*†	prov.	province
Emp.	Emperor	R.	Rome/Roman
Fāṭ.	Fāṭimid	*strat.*	*stratēgos*†
gov.	governor	*sulṭ.*	*sulṭān*†
Gr.	Greek	*th.*	*thema/themata*†
hist.	history/historian	Um.	Umayyad
im.	*imām*†	Ts.	Tsar
K.	King/Kingdom	W.	West/Western
Kh.	Khan		

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[b] Technical Index

In this Index, where ship types used by one culture are referred to by names used in another, they have been given in single quotation marks to indicate that it is a non-indigenous attribution.

A first construction of this section of the Index by alphabetical entry alone quickly became unusable because of the complex and multifarious nature of the book. Cross references became legion and many entries would have had no meaning to general readers. It became necessary to group many items under general headings and these have been indicated in **bold: arms/armaments, *chelandia*, crews, dromons, galleys, Greek Fire, horse transports, hulls, oars, ships**. These headings have sub-headings, and sub-sub headings.

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Figure 2 *Liburnae* on Trajan's column, ca 114 C.E.; by permission of Professor Sheppard Frere.

Figure 3 Galley on a mosaic from the baths at *Themetra*, near *Hadrumetum*, Tunisia, ca 200-220 C.E.

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Figure 5 Catalan galley on a painted beam from a church near Teruel (Barcelona, Museu Nacional d'Art de Catalunya, Ref. 15839); by permission of the Museu Nacional d'Art de Catalunya. ©MNAC - Museu Nacional d'Art de Catalunya, Barcelona, 2006. Photographers: Calveras/Mérida/Sagristà.

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Figure 8 Two-masted, lateen-rigged dromons in a manuscript of the *Sacra Parallela* attributed to St John of Damascus (Paris, Bibliothèque Nationale, MS. Gr. 923, fol. 207r); by permission of the Bibliothèque Nationale de France.

Figure 9 Dromons rolling over Russian ships with their spurs in the *Synopsis historiōn* of John Skylitzēs (Madrid, Biblioteca Nacional, vitr. 26-2, fol. 130r); by permission of the Biblioteca Nacional de España, Madrid.

Figure 10 The Athlit ram, third-second centuries B.C.E.; photograph courtesy of the photographer, Professor William M. Murray.

Figure 11 Caulkers at work extracting old pitch from the hull of a

ship in a manuscript of the *De materia medica* of Dioskoridēs (N.Y., Pierpont Morgan Library, Cod. 652, fol. 240r); by permission of the Morgan Library, New York.

Figure 12 Square sail on a galley in a manuscript of the Bible commissioned by abbot Vivian of St Martin of Tours (Paris, Bibliothèque Nationale, MS. Lat. 1, fol. 3v); by permission of the Bibliothèque Nationale de France.

Figure 13 Lateen sails on dromons in the *Ilias Ambrosiana* (Milan, Cod. Ambros. F. 205 Inf., min. XXVII), early sixth century; after A. Mai, *Homeri et Virgili picturae antiquae* (Rome, 1835).

Figure 14 Lateen? sails on dromons in the *Ilias Ambrosiana* (Milan, Cod. Ambros. F. 205 Inf., min. XXVII); by permission of the Biblioteca Ambrosiana, Milan.

Figure 15 Lateen-rigged ship in a manuscript of the Sermons of St Gregory of Nazianzos (Paris, Bibliothèque Nationale, MS. Gr. 510, fol. 367v); by permission of the Bibliothèque Nationale de France.

Figure 16 Lateen-rigged ship in a manuscript of the *Psalms*, the *Khludov Psalter* (Moscow, Historical Museum, MS. 129 D, fol. 88r).

Figure 17 Two-masted, lateen-rigged ship in a painting from *Kellia*, Egypt, from a drawing in L. Basch, "Navires et bateaux coptes: état des questions en 1991", *Graeco-Arabica*, 5 (1993), Fig. 25 (p. 53); by permission of Professor V. Christides, editor, *Graeco-Arabica*.

Figure 18 Galley on a lustre-ware bowl from *al-Fayyūm*, Egypt (Cairo, Museum of Islamic Art, Inv. No. 7900).

Figure 21 Through-hull rudder mounts on a galley representing the constellation Argo in a manuscript of the *Aratea* attributed to Germanicus Caesar (Boulogne-sur-Mer, Bibliothèque Municipale, MS. 188, fol. 78.); by permission of the Bibliothèque Municipale, Boulogne-sur-Mer.

Figure 22 *Chelandium* on a medal forged by Alvise Meneghetti (1691-1768) attributed to a Venetian Doge Pietro Candiano as published by Augustin Jal; after A. Jal, *Glossaire nautique: répertoire polyglotte de termes*

de marine anciens et modernes (Paris, 1848), p. 465.

Figure 23 Ship borne siege engines in a treatise on poliorcetics attributed to Hērōn of Byzantium (Rome, Biblioteca Apostolica Vaticana, MS. Vat. Gr. 1605, fol. 40r); by permission of the Biblioteca Apostolica Vaticana.

Figure 24 Mosaic of a galley with a lowered mast from a sepulchre at *Hadrumetum*, Tunisia, third century.

Figure 26 Dromons in the *Kynēgetika* of Pseudo-Oppian (Venice, Biblioteca Marciana, MS. Gr. 479 [coll. 881], fol. 23r); by permission of the Biblioteca Nazionale Marciana.

Figure 34 The fleet of Thomas the Slav advancing on Abydos and carrying horses aboard a galley in the *Synopsis historiōn* of John Skylitzēs (Madrid, Biblioteca Nacional, vitr. 26-2, fol. 31v); by permission of the Biblioteca Nacional de España.

Figure 36 Mosaic of a galley from Piazza Armerina, Sicily, early fourth century; photograph, John H. Pryor.

Figure 37 Horses unloaded from ports at the sterns of galleys in a manuscript of *Les livres des histoires du commencement du monde* (Paris, Bibliothèque National, Ms. Fr. 301, fol. 58v); by permission of the Bibliothèque Nationale de France.

Figure 43 The *cista Ficoronica*: Jason and the Argonauts watering at the spring of the Bebrycians; by permission of Dietrich Reimer Verlag, Gebr. Mann Verlag, Deutscher Verlag für Kunstwissenschaft.

Figure 46 The harbour of *Kastron Samos*, adapted from Great Britain, Admiralty, Hydrographic Office, Chart N° 1568 of 1967.

Figure 47 Dromon in a manuscript of the Sermons of St Gregory of Nazianzos (Mount Athos, Panteleēmon, Cod. 6; fol. 138r), twelfth century.

Figure 48 Graffito of a *katergon*? From the monastery of the Blatadōn at Thessalonikē; after O. Meinardus, "Medieval navigation according to akidographemata in Byzantine churches and monasteries", *Δελτίον τῆς Χριστιανικῆς Ἀρχαιολογικῆς Ἑταιρείας, περ. Δ΄*, 6 (1970-72), 29-52.

Figure 49 Graffito of a *katergon*? from Hagia Sophia, Trebizond; after A. Bryer, "Shipping in the empire of

Trebizond", *Mariner's Mirror*, 52 (1966), 3-12; fig. 6.

Figure 50 Galleys in the *Annales Ianuenses* of Genoa (Paris, Bibliothèque Nationale, MS. Suppl. Lat. 773); after L. T. Belgrano and C. Imperiale, eds, *Annali genovesi di Caffaro e de' suoi continuatori dal MXCIX al MCCXCIII*, 5 vols [FStI] (Rome and Genoa, 1890-1929).

Figures 51-3 Bireme galleys in the *Synopsis historiōn* of John Skylitzēs (Madrid, Biblioteca Nacional, vitr. 26-2, fols 111v, 145r, 146v); by permission of the Biblioteca Nacional de España, Madrid.

Figure 54 Sicilian galley in a manuscript of the *De rebus Siculis carmen* of Peter of Eboli (Bern, Burgerbibliothek, Cod. 120, fol. 119r); by permission of the Burgerbibliothek, Bern.

Figure 57 Dromon using Greek Fire in the *Synopsis historiōn* of John Skylitzēs (Madrid, Biblioteca Nacional, vitr. 26-2, fol. 34v); by permission of the Biblioteca Nacional de España, Madrid.

Figure 58 Wolfenbüttel, Herzog August Bibliothek, Cod. Guelf., 96 Gud. lat., fol. 157r-v; by permission of the Herzog August Bibliothek, Wolfenbüttel.

Figure 59 Soldier using a hand-held flame thrower in a treatise on poliorcetics attributed to Hērōn of Byzantium (Rome, Biblioteca Apostolica Vaticana, MS. Vat. Gr. 1605, fol. 36r); by permission of the Biblioteca Apostolica Vaticana.

Figure 60 The Sotiel Coronada Roman force pump from Valverde, Huelva, Spain, probably dated to the first century C.E. (Madrid, Museo Arqueologico Nacional); by permission of the Museo Arqueologico Nacional.

Figure 61 "Greek" or liquid fire *siphōn* built by Colin Hewes and Andrew Lacey under the direction of John Haldon; by permission of J. Haldon, C. Hewes, and A. Lacey.

THE

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