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Classic Ships of Islam

From Mesopotamia to the Indian Ocean

by

Dionisius A. Agius

BRILL

Classic Ships of Islam

Handbook of Oriental Studies

Section 1, The Near and Middle East

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On the cover: Arabesque floral carved decoration on a river boat from a copy of al-Ḥarīrī's *Maqāmāt*, Baghdad 635/1237. Bibliothèque Nationale, Ms 5847, fol. 119v.

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To my wife Anne

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PREFACE

During one of my field trips in the Gulf, in April 1992, I met a Qatari, Muhammed Saeed al-Balushi, who completely changed the way I looked at the maritime culture of the Western Indian Ocean. Muhammed was then head of research and documentation at the Arab Gulf States Folklore Centre in Doha and it was thanks to him that I began searching the history of sailing ships through early Arabic sources. One day, he introduced me to Yousef Al Majid, a master builder in Doha, who was building a replica of a 90-foot long *battīl*. In the days of sail the *battīl* was a trading and pearling vessel, but also a pirate and warship in the eighteenth and nineteenth centuries. She was a double-ended craft, with a fiddle-headed bow, a high sternpost and double forward-leaning masts. I was transfixed by the sheer beauty and craftsmanship of the vessel and resolved there and then to find out more about these relics of the distant past and how they might relate to the modern vessels I had previously observed. Yousef told me: "If you want to know all about the past, go to the coasts of Oman; there you shall see how our ancestors build our ships and sailed them". He was absolutely right, and furthermore, I found that traditional dhow-building, though in decline, still exists in places dotted around the coasts of the Indian Ocean.

Visiting these places, I have watched closely the different stages of building a craft and the progress of the sailing vessel herself. I watched carpenters from carving boats made out of the bark of a tree with a crude knife to others building vessels of intricate beauty. Observing how things are done and talking with people made me consider the reasons to build, equip and fit out watercraft over the centuries and the communities who existed around them. This is what this book is about: the *Classic Ships of Islam*, the story of river boats and ocean-going vessels.

I chose the word "Classic" to denote something which has stood the "test of time"; a "standard" form: in other words, these are the best examples of ship-types recorded by Muslim historians, geographers, travellers and storytellers. *Classic Ships of Islam* is about types of craft, their hull design, and equipment, but also about seamanship and technology in the context of the broader historical framework. The focal point is the Western Indian Ocean and the two corridors: the Arabian/Persian Gulf and the Red Sea. Within this context, I have

attempted to look at the past through the last remnants of traditional watercraft and it is they who have inspired the writing of the book. They have not changed since antiquity; the way they are built is the same as it was then; the building materials are the same and the tools are rudimentary. Man's first attempts at navigation may perhaps have been made upon rivers not on the sea: the vastness of the sea frightened him, but once those first journeys were attempted, technology advanced at different stages. Ships were built light enough to ride the waves; they had a single rudder on the starboard side or two rudders, one on each side of the stern; they were also propelled by sails, the square-type or lateen; and the stars guided them through the night. Following traditional practices, the mariners voyaged across the ocean with impunity, and if necessary, they relied on a primitive compass and pilot guides. Many of the seafarers' yarns tell a story of suffering, courage and the endurance of the sailors who survived in difficult circumstances. They are stories about deep piety and superstition, but mixed with myth and legend there are solid facts. One factor above all else remained constant: seafaring in the Western Indian Ocean followed the rhythmic seasonal monsoonal winds, so fundamental to the physical, human and spiritual unities of the various seafaring communities.

Dionisius A. Agius
Exeter 2007

ABBREVIATIONS

Archival

Aanw	Aanwinsten le Afdeling (Dutch General State Archives, The Hague)
AHU	Arquivo Historico de Ultramarino
ANTT	Arquivo Nacional da Torre do Tombo (Lisbon)
ARA	Algemeen Rijksarchief den Haag (Dutch General State Archives, The Hague)
BL	British Library, London
BL Or	British Library, Oriental Section, London
BLO	Bodleian Library, Oxford
BN	Bibliothèque Nationale, Paris
BNM	Biblioteca Nacional, Madrid
CDRAD	Centre for Documentation and Research in Abu Dhabi
FMB	Fondation Martin Bodmer, Bibliothèque et Musée, Genève
IOS	Institute of Oriental Studies, St. Petersburg
KLI	Khudābukhsh Library, India (Archives of the University of Alexandria, Faculty of Arts Library)
KSU	King Saud University Library, Riyadh
LAS	Library of the Academy of Sciences, St Petersburg
MMA	Metropolitan Museum of Art, New York
OED	Oxford English Dictionary
Port Arch	Portuguese Archives (CDRAD)
QaQ	Quseir al-Qadim paper fragments (Universities of Southampton & Leeds)
RHC	Recueils des historiens des croisades
RQAD	Quseir al-Qadim Arabic Documents AHRC Project, University of Leeds
SPKB	Staatsbibliothek Preussischer Kulturbesitz, Berlin
TS	The Taylor Schechter Collection (University of Cambridge)
TI	Topkapı Library, Istanbul
TIEM	Türk ve İslam Eserleri Müzesi, Istanbul
UAFAL	University of Alexandria, Faculty of Arts Library

ULC	University Library, Cambridge
ULC Or	University Library, Cambridge, Oriental Section
V&A	Victoria and Albert Museum, London
VOC	Verenigde Oost-Indische Compagnie

Classical and Medieval Authors and Literary Sources

AQ	Abū Qāsim al-Baghdādī
Ar	ʿArīb
B	Buzurg b. Shahriyār al-Rāmhurmuzī
G	Genizah
IA	Ibn al-Athīr
IB	Ibn Baṭṭūṭa
Id	al-Idrīsī
IH	Ibn Ḥawqal
IJ	Ibn Jubayr
IM	Ibn Mājid
IMa	Ibn Mammātī
IMu	Ibn al-Mujāwir
IS	Ibn Sīda
Ist	al-Iṣṭakhrī
J	al-Jazīrī
Ma	al-Madaynī
Maq	al-Maqrīzī
Mas	al-Masʿūdī (*Murūj*)
Mu	al-Muqaddasī
N	al-Nuwayrī l-Iskandarānī
PrIs	Pre-Islamic Poetry
Q	al-Qurʾān
T	al-Ṭabarī
Tan	al-Tanūkhī
Yaq	al-Yāqūt

Linguistic

Akk	Akkadian
Aram	Aramaic
Ben	Bengali
CA	Classical Arabic

Eng	English
Far	Fārsī (Persian)
GA	Arabian Gulf Arabic
Gr	Greek
Had	Ḥaḍramī
Heb	Hebrew
Hin	Hindi
Ind Eur	Indo-European
It	Italian
Lat	Latin
Mal	Maltese
Malay	Malayalam
Mald	Maldivian Divehi
Meh	Mehri
Mid Per	Middle Persian
Nab	Nabatean
Neo Per	Neo-Persian
Old Per	Old Persian
Per	Persian
Port	Portuguese
Skt	Sanskrit
Soq	Soqoṭrī
Syr	Syriac
Tam	Tamil
Ur	Urdu

Literary

a.	*annus* (year)
b.	born
BAH	before Islam
Bk	book
BCE	before Christian era
c	century/centuries
c.	*circa*
cc	corpo cronológico
cf.	*confer* (compare)
Ch	chapter
CE	Christian era
coll.	collective noun

Cx	Codex
d.	died
E	East
ed.	edited by/editor
eds.	editors
eg	*exempli gratia* (for example)
f.	feminine
ff.	*folio*s (pages); following
fig(s)	figure(s)
fl.	*floruit* (flourished)
fn.	footnote
fol.	*folio* (page)
ibid	*ibidem* (same source and place)
idem	same author
i.e.	*id est* (that is)
illus.	illustration(s)
l.	line
lit.	literally
liv.	*livro* (Ms)
m.	masculine
mg	*maghīb* (setting [for stars])
Ms	manuscript
mt	*maṭla'* (rising [for stars])
N	North
nd.	no year
ndd	unknown death date
NE	North East
no.	number(s)
NW	North West
p.	page
pl	plural
pl.	plate(s)
pp.	pages
r	*recto* (on the front of the page)
rev.	revised by
s	singular
S	South
SE	South East
SW	South West
seq.	*sequens* (the following)

spp.	species
s.v.	*subvoce* (under the word or heading)
trans.	translated by
v	*verso* (on the back of the page)
vs	verse(s)
W	West

Weights & Measures

bāʿ (pl *abwāʿ*)	c. 6ft/1.8m
cm(s)	centimetres(s)
ft	foot/feet
in(s)	inch(es)
kg(s)	kilogram(s)
km	kilometre(s)
lb(s)	pound(s)
m	metre(s)
mi	mile(s)
mann (pl *amnān*)	13.12ft/4m

Symbols

*	hypothetical
<	derived from
>	becoming
/	and; or
[ ]	filling gaps within a quote; the quote in transliteration; or information within round brackets
( )	additional information within a quote
[?]	doubt about the year
(?)	doubt about the origin of the word
{?}	doubt about the description of the ship's function

TRANSLITERATION SYSTEM

Consonants

ʾ	ء	s	س	l	ل
b	ب	sh	ش	m	م
t	ت	ṣ	ص	n	ن
th	ث	ḍ	ض	h	ه
j	ج	ṭ	ط	w	و
ḥ	ح	ẓ	ظ	y	ي
kh	خ	ʿ	ع		
d	د	gh	غ		
dh	ذ	f	ف		
r	ر	q	ق		
z	ز	k	ك		

Vowels

Long	ā	ا	Short	a	ـَ
	ū	و		u	ـُ
	ī	ي		i	ـِ
	ō			o	
	ē			e	
Doubled	iyy (final form = /ī/)			يِّ	
	uww (final form = /ū/)			وُّ	
Diphthongs	ay	ـَيْ			
	aw	ـَوْ			

NOTE

I have adopted the Library of Congress Arabic Transliteration System for names of Arab(ian)/Muslim rulers, dynasties, religious and political movements and technical terms. All bibliographical Arabic entries (i.e. names of authors, titles of works etc.) and citations in the text follow the Transliteration System. Pre-Islamic and Qurʾānic citations maintain full vocalization; other texts are transliterated in full or pausal form. Place-names of towns such as Aden, Aidhab, Basra, Jeddah, Quseir, Suakin or countries like Iraq, Oman and Yemen are better known to the reader in this form rather than using the Transliteration System, e.g. Aden for ʿAdan, Aidhab for ʿAydhāb, Basra for Baṣra, Goga for Qūqa, Hasa for Aḥsāʾ, Iraq for ʿIrāq, Jeddah for Judda, Mahfuza for Maḥfūẓa, Oman for ʿUmān, Quseir for Quṣayr, and Suakin for Sawākin. A transliterated form of the place-name is found in the Index and placed in brackets, eg Ras al-Khaimah (Raʾs al-Khayma), Sohar (Ṣuḥār) and Yanbo (Yanbūʿ). Also note that in the text *nisba*s or relative adjectives relating to a country or town of origin are used with no diacritics, eg Adeni for ʿAdanī, Dhofari for Ẓufārī, Sirafi for Sīrāfī. Christian dates are normally preceded by Islamic dates if the subject concerns the Islamic period; in other instances only the date of the Christian era is inserted. In the text and bibliographical references, the word Ibn (son) occurs at initial position with Classical and Medieval Muslim writers, eg Ibn Ḥawqal, but an abbreviated *b.* is employed in the middle of a name, eg Abū Bakr Muḥammad b. Ḥusayn. All Classical, Medieval and Modern Arabic (and Muslim) names starting with *al-* are listed in the bibliography under the first letter following *al-*, eg al-Maqrīzī under /m/, al-Quṭāmī under /q/, al-Rūdhrāwarī under /r/ and al-Samarqandī under /s/.

PART ONE

CHAPTER ONE

A JOURNEY INTO THE PAST

وهو الذي جعل لكم النجوم لتهتدوا بها في ظلمات البر والبحر...

It is He who maketh the stars for you, that ye may guide yourselves, with their help, through the dark spaces of land and sea... .[1]

Al-Qurʾān, Sūrat al-Anʿām, VI: 97

Nowadays, when maps, distance and speed have become integral to our life style, we have almost forgotten that world where man relied on camel, horse, donkey, or ship for transport. Whether travel was by land or sea, man perforce had to call upon the experience of generations gone before to ensure his safety, but sea transport was always perilous for many reasons, not least that navigational aids were not accurate.

The sea proved no barrier to human enterprise; trade and cultural interaction brought together the great civilizations of China, India and Islam. The caravan routes overland, as they had been in the past, were a vital source for trade; their connections with the main harbours led to an expansion of the sea-borne trade and, though there were times when it was affected by political instability and natural disasters, trade continued to prosper until the day the Europeans entered the Indian Ocean in 1487, as capitalist predators, disturbing the commercial and cultural system of peoples who had lived in relative harmony since antiquity.

This book is the third and final journey from the modern age back to the Classical and Medieval period of Islam. Two of my earlier works, *In the Wake of the Dhow: The Arabian Gulf and Oman* (2002) and *Seafaring in the Arabian Gulf and Oman: The People of the Dhow* (2005) focused on the cultural, material and commercial significance of the traditional ship (the *dhow*); her role in the life and interaction of coastal communities; the long tradition of seafaring in the Western Indian Ocean during

[1] *Wa-huwa lladhī jaʿala lakum al-nujūma li-tahtadū bihā fī zulumāti l-barri wa-l-baḥri*; trans. Ali 1946, I: 317.

the Portuguese (16th c), the Dutch (16th to 18th c) and the English presence (19th to late mid-20th c) until the decline in maritime activity in the Gulf with the advent of oil. The present study, *Classic Ships of Islam: From Mesopotamia to the Indian Ocean* charts the development of watercraft from antiquity to the Middle Medieval Islamic period. It utilizes mainly Classical and Medieval Arabic literary sources with iconographical evidence and archaeological finds. It is divided into six parts: Part One discusses the methodology and the main Arabic sources used in this book; Part Two looks at early maritime contacts and port towns of the Classical and Medieval Islamic period; Part Three examines watercraft technology during the Bronze Age and construction features of ships in Medieval Islam; Part Four is an inquiry into seamanship and the Indian Ocean ship whether engaged in trade or *ḥajj* (pilgrimage) or naval activities; Part Five analyzes types of boats and ships, and the book concludes with Part Six which is a discussion on language contact and language dominance, the use of technical terminology and cultural and technological exchange.

Two principal questions arise in this work: 1) What information can early and medieval literary and non-literary sources provide about water and seacraft of the Western Indian Ocean and maritime culture in general? 2) How reliable are their data and how far can they help us to understand construction features of vessels and technology?

The geographical area

The book is concerned with the coastal lands surrounding the Western Indian Ocean which comprises the Red Sea (the African-Arabian littorals), the Gulf (Arabian-Persian littorals) and the Arabian Sea i.e. from East Africa to West India. It also includes the Euphrates and Tigris rivers of Mesopotamia and the River Nile of Egypt.

To some Greek and Roman historians and geographers the Western Indian Ocean was known as the Erythraean Sea and that could sometimes include the Gulf (the area from Mesopotamia to the Straits of Hormuz) and/or the Red Sea.[2]

Over the centuries the naming of the Red Sea and the Persian Gulf was generally problematic, resulting in different names at different

[2] Strabo Bk 16.3.11; *Periplus* 1912: 50.

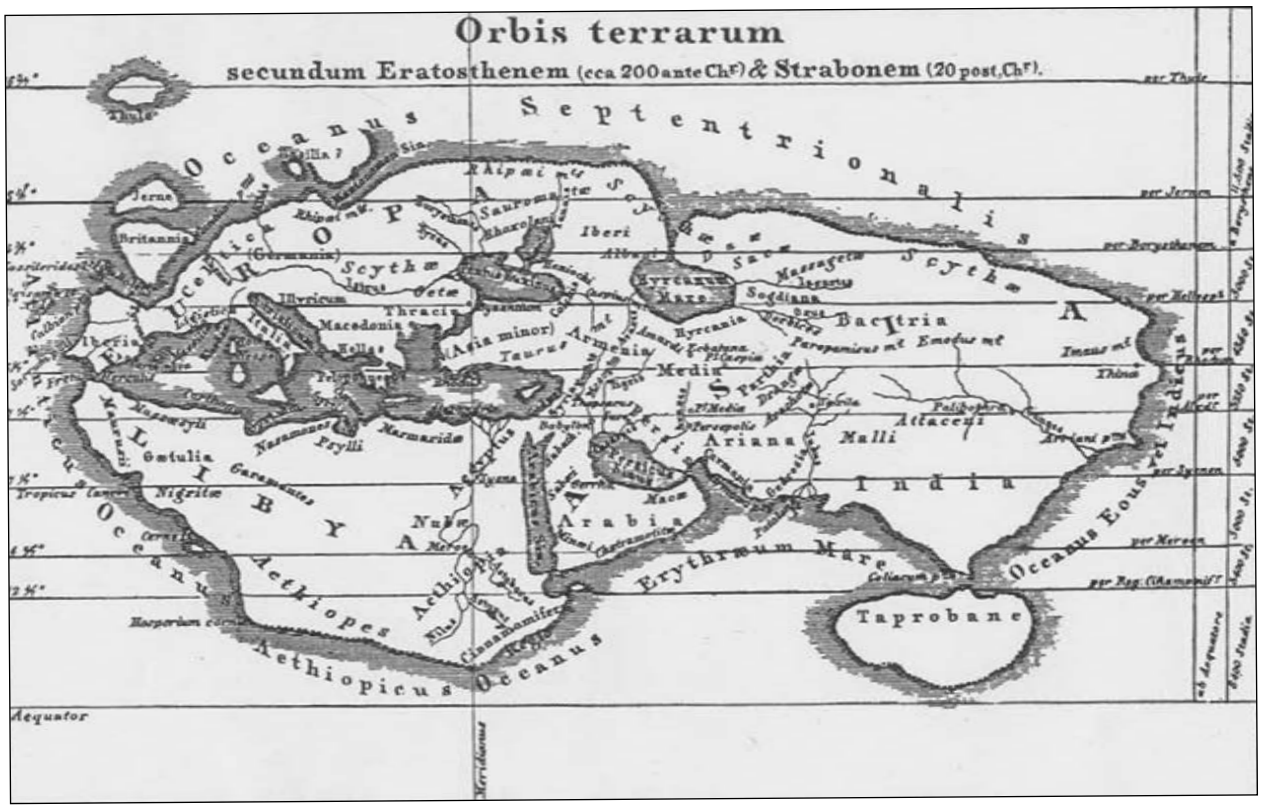
times. Consider Theophrastus (d. c. 287/6 BCE) and Herodotus (d. 425 or 420 BCE) who called the Red Sea the Arabian Gulf (Gr *Arabikos kolpos* and Lat *Arabicus sinus*).[3] The Red Sea is a European adaptation; it is understood to reflect the orangy-redness of the corals, hence its name. Its original name in Arabic, however, was Baḥr al-Qulzum (The Sea of Qulzum) but it was also known as Baḥr al-Ḥijāz (The Sea of Hijaz) and al-Khalīj al-ʿArabī (The Arabian Gulf). As for the Persian Gulf, Eratosthenes (d. c. 194 BCE) and Strabo (d. after 21 CE) apply the name *Persikos kolpos* (Persian Gulf), which later Roman historians rendered as *Persicus sinus*, a toponym that was translated into European languages and remained consistent until modern times (map 1).

As for the Gulf (the Arabian and Persian littorals), the name Sea of Fars (Baḥr Fārs, i.e. the Sea of the Province of Fars) first appears on Islamic maps in fourth/tenth-century geographical-historical works such as that of al-Muqaddasī (fl. second half of the 4th/10th c) and Ibn Ḥawqal (fl. c. 367/977–8) (map 2). Al-Masʿūdī (d. 345/956–7) calls it al-Baḥr al-Fārisī (the Sea of Fars) as well as Khalīj Fārs (the Gulf of Fars);[4] it is described by Ibn al-Balkhī (fl. 8th/14th c) as "the arm of the Great Sea" (i.e. the Indian Ocean).[5]

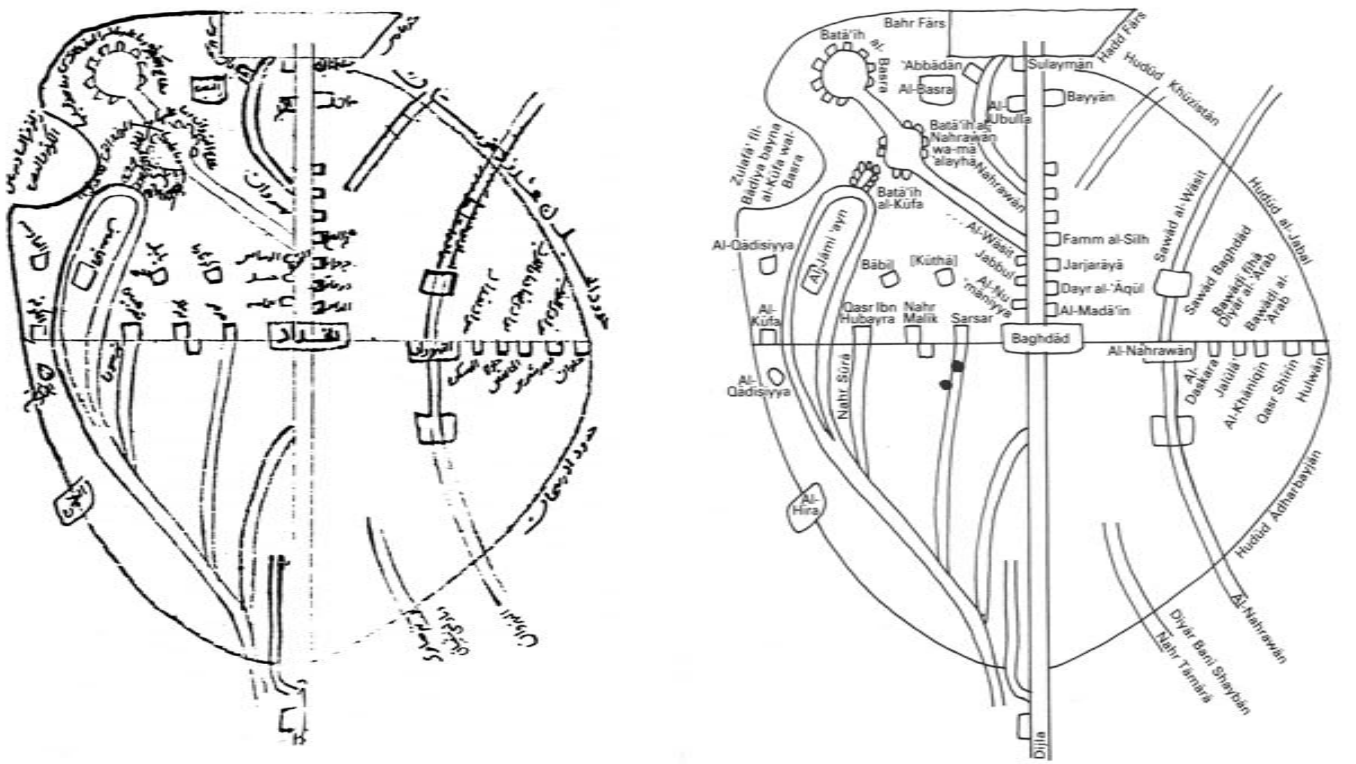
Other names for the Gulf followed in the sixteenth century: the Ottoman Pīrī Reʾīs (d. 962/1554) called it the Sea of Hormuz and the Gulf of the Indian Ocean.[6] The Ottomans, who captured Basra from the Portuguese in 1546, applied three names: the Gulf of Basra, the Gulf of Qatif or the Gulf of Arabia. They were used in subsequent charts, such as the 1548 map of the Italian cartographer Giacomo Castaldi, which had Golpho di Persia (the Gulf of Persia) and Ganson (1568) gave Mare Elacatif (The Sea of al-Qatif) while the map of Diego Ribero (1529) retained the old name, Sinus Persicus.

All these toponyms continued to be used in maps of the seventeenth and early eighteenth century until the name Persian Gulf was finally adopted by the English and French cartographers and remained so till the 1960s and 1970s,[7] when it became the Arabian Gulf. It is evident that the name Persian Gulf arose from the classical and medieval

[3] Herodotus Bk 2. 102, 158.
[4] Ibn Ḥawqal 1992: 209; a reference work on maps of the Gulf is in Al-Qasimi's 1999 and *The Arabian Peninsula* 2000.
[5] Ibn al-Balkhī 1912: 872.
[6] Pīrī Reʾīs 1988, I: 155–6.
[7] Al-Qasimi 1999: 4.



Map 1 World Map, according to Eratosthenes and Strabo showing the Erythraean Sea, the Red Sea (Arabicus Sinus) and the Persian Gulf (Persicus Sinus)



Map 2 Al-ʿIrāq according to al-Muqaddasī showing Baḥr Fārs in the north: (left) original map with Arabic toponyms and (right) a copy of the map with Arabic toponyms in transliteration (after al-Muqaddasī 2001: 96, 409)

usage of Baḥr Fārs, and I therefore opted for the use of Persian Gulf in this book.

The whole Indian Ocean was called by early Muslim geographers the Green Sea; this is because the sea is so often green or a light blue-green colour; other names were Sea of India or Sea of China. It was divided into seven seas, each possessing different features: i) Fars, the corridor from Southern Mesopotamia to Oman, ii) Lar, probably referring from East Africa to West India, iii) Harkand which lies in the Bay of Bengal, iv) Kalahbar which is around the west coast of the Malay Peninsula, v) Salahit in the region of Sumatra, vi) Kardanj, the sea between the Islands of Sumatra and Kalimantan, and vii) Sanji which is the South China Sea[8] (map 3).

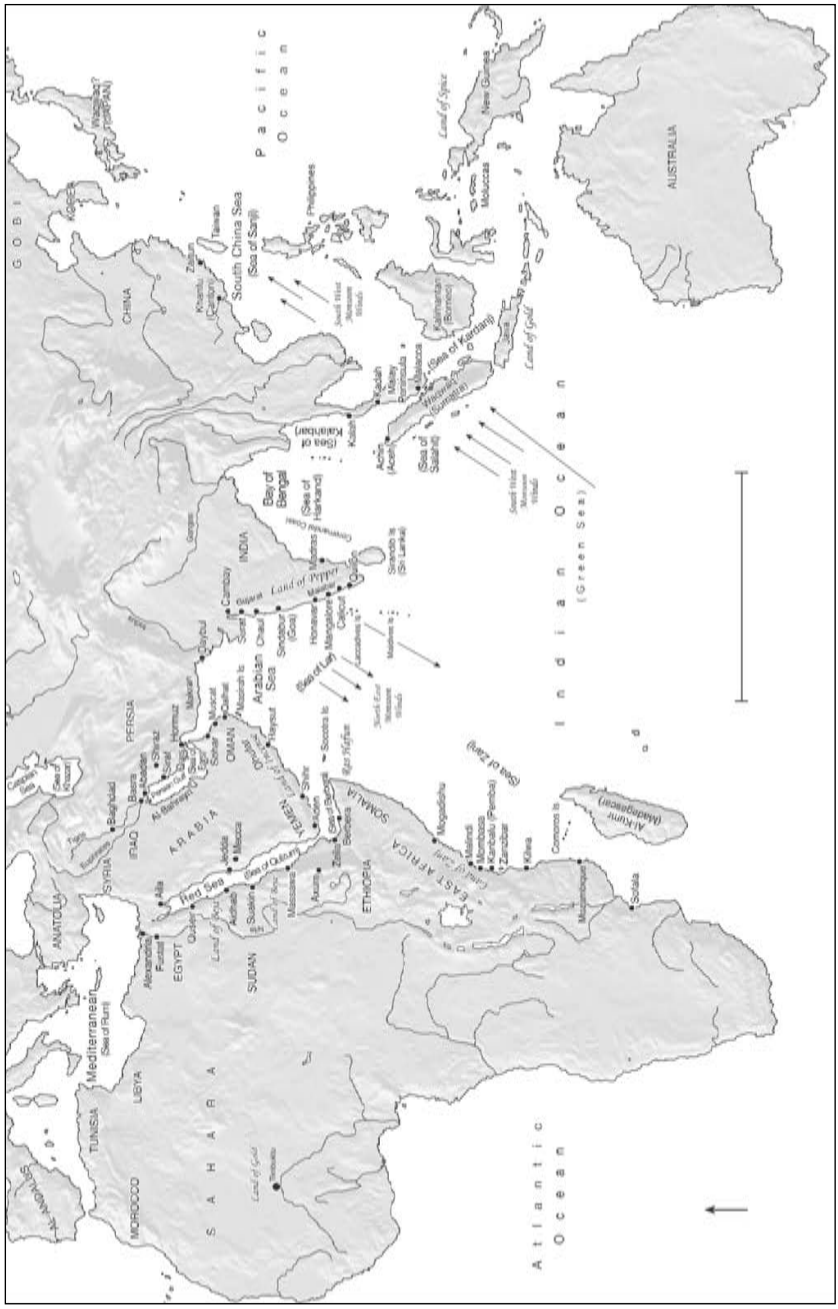
Cultural identity: name coinage

Arab(ian) and Muslim, Frank and Turk, Caffre and Moor are frequent coin-terms that come up in the primary and secondary Arabic and non-Arabic texts. Their meanings are more complex than they appear on the surface. Some clarification, therefore, is intended here to explain their usage in the context of the Indian Ocean.

The period of Islamic conquests can be regarded as a force for a political unity and strength and although Arabic became an important language of administration within a span of eighty years, it never entirely replaced the language of native speakers such as those of Persia, India and Egypt to mention a few examples; it was rather the assimilation into the Arab(ian)-Islamic culture which constituted one unified community, the *umma*. Sharing one belief it became difficult to distinguish between Arab(ian), Persian or Indian; these peoples shared the trade-business in the major port towns of the Indian Ocean but increasingly in the early centuries of Islam a great part of the commerce came into the hands of other Muslim subjects in South and Southeast Asia (see Chapter 3).

Islam was an Arabian religion: the language of the Holy Book, the Qurʾān, was Arabic and the language of administration was Arabic

[8] See al-Masʿūdī 1983, I: 167–78.



Map 3 The Indian Ocean: The Seven Seas of Classical and Medieval Islam

but those who spread Islam, at least the majority, were foreigners. The streets of Basra, for example, were thronged with Persians, Arabians, Indians, East Africans and Malay speakers from Indonesia. Along the Persian Gulf the broad distribution of the population during the ʿAbbāsid caliphate (132–656/749–1258) was, as it seems, predominantly Arabian and Persian but there were also minorities of East Africans, Indians and others. The Arabian element retained its language, though intermarriages with Persians, Indians, East Africans and also Southeast Asians were common so that the descendants of the Peninsular Arabians might have often retained their language and have changed their type. Non-Arabians, living on the peninsula, would have accultured to Islam and they might have adopted Arabic as a second language. This was probably the socio-cultural and political scenario. The common factor was the Islamic community, the *umma*, to which every Muslim belonged. Therefore, the concept of Muslim within the *umma* was a true identity which meant equality irrespective of language, race and religion. At least this was the principle.

So far I have used the word Arab(ian) which stands for Arab and Arabian. Why have I done this? Firstly, the word Arab is a loose and broad term; it implies, though not always, someone speaking Arabic, a Muslim, Christian, or Jew; someone living in an Arabic-speaking country from Morocco to Mesopotamia. An Arabian, on the other hand, is an inhabitant of the Arabian Peninsula (from the Red Sea to the Persian Gulf), one who speaks Arabic and/or one or more Semitic languages, particularly those of Southern Arabia. Consider that before and after the coming of Islam many Arabians were not Muslims but Christians, Jews and pagans. Alongside those living on the coasts of the Arabian Peninsula there was a large immigrant population from Persia, India and East Africa who had settled in the main port towns (see Chapters 2 and 3). These are the Arabians and non-Arabians with whom this book is concerned; hence my usage of Arabian throughout the book. Secondly, the word Muslim was applied to all those who embraced Islam but did not necessarily speak Arabic or acculturate to an Arabian identity. Persians are a good example of this.

If we look at Chinese records we come across the use of Po-sseu (c. 455–461) meaning Persian and Ta-chi or To-che (c. 674–675) for Arabian,[9] two coin-terms which were discussed first by Ferrand in

[9] *Chau Ju-Kua* 1911: 7–8.

1924.[10] I shall add two or three points to what we already know. Posseu seems to be associated with the region of Pars (Gr Perses; Lat Parthia; CA Fārs). We are told that the products of Sarandib (today Sri Lanka), India and Arabia were known to be the "products of Posseu", so what did the Chinese record mean by "products of Po-sseu"? Are they products from the Persian (Sāsānian) Empire (224–651 CE), ports of which included regions of Mesopotamia, Arabia and India? If this is true then the term Po-sseu is justified; or, is the term referring to Persian goods transhipped at ports in West India and Arabia? It is difficult to say. The use of Ta-chi is interesting; it is probably the name for the Arabian tribe of Tayy from the region of Hira; it is perhaps a reference to the Aramaic-speaking Nestorian merchants of the Tayy tribe who reached China in the seventh century. There is a black stone stele erected in 781 in Xi'an in Central Asia with an inscription in Syriac listing 70 Nestorian missionaries (Chapter 2). That Persian and Arabian merchants were active in China around the time is confirmed by the Tang annals (618–907) which record 2,000 of them.

The distinction as shown is important, it raises the question of ethnic identity: Persian versus Arabian. Arabic sources talk specifically about Peninsular Arabians if they are discussing desert tribes that settled in newly established towns but, in general, the tendency was to label as Muslim those foreigners who converted to Islam irrespective of their ethnic background. In religious and administrative terms the coin-word Muslim is correct but we are in the dark as far as the ethnic background is concerned. Persians had converted in masses, though, it needs to be said that many Persians, who were most probably Zoroastrians prior to Islam, were affiliated to Arabian tribes, some were monolingual, others bilingual. So *Muslim* too is a loose term, as was *Arab* for anyone who speaks Arabic and neither say much about the ethnic background let alone that of the Persian-Arabian mix (see Chapter 13). When authors wrote of Muslim ships sailing in Southwest Asia we are not sure what they meant: Are they talking about Muslim ships manned by Arabic-speaking Persians or Persian-speaking Arabians? It is often impossible to tell. Some authors, however, are specific: al-Masʿūdī (d. 345/956–7), the historian and geographer, states that the Sirafis and Omanis were the leading seafarers of his time who braved the monsoons as far as

[10] Ferrand 1924: 241–2.

China;[11] Ibn Jubayr (d. 614/1217) and Ibn Baṭṭūṭa (d. 770/1368–9 or 779/1377), both travellers, applied the name Muslim sparingly, though correctly, in a religious context to distinguish one community from another which was not Islamic, such as the Christian, Jew, Hindu and Zoroastrian.

The word Muslim generally was a collective usage; it was difficult to discern the identity of one community from another. With the sixteenth-century Ḥaḍramī chronicles on Portuguese activities (904–984/1498–1577) we notice that although the word Muslim applied to the North African, East African, Indian, Persian and Yemenite, when it came to the Ottoman Turks, they did not refer to them as Muslims but preferred that they were called Atrāk (s Turk). The Portuguese, according to the Ḥaḍramī chronicles, were the Franks, a coin-term remnant of the Latin chronicles of the Crusades. Almost with no exception, Muslim chronicles of the Crusades called Christians, Franks, for whom the Arabic term was *ifranj* (s *ifranjī*), ultimately meaning a foreigner, the underlying meaning being that they are outside Islam.

For the sixteenth-century Portuguese and thereafter, the indigenous were classified into Caffres and Moors, both generic terms to indicate pagans and Muslims respectively. In simple terms East Africa was the land of Caffres and Arabia the land of Moors. For the Portuguese the use of the term Caffre (CA *kāfir*) simply meant a Black person, a word borrowed from the Arabs of the Atlantic coast and those of the Mediterranean but with a different connotation, for they called the heathen Christians and Jews *kuffār* (plural of *kāfir*) "unbelievers".[12] In the case of the Indian Ocean, *kuffār*, was a coin-term used by Arabians for pagans referring to non-Muslim Blacks while the Portuguese Christians (and Jews) or other Europeans were known as Franks; but *kuffār* was also applied as a derogatory term addressed to Europeans.

The Portuguese called the Muslim a Moor,[13] a name which belonged

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[11] Al-Masʿūdī 1983, I: 122–3, 132–3.

[12] See Sūrat al-Kāfirūn (The Unbelievers) CIX: 1–43. On the historical development of the term the reader is referred to the article by W. Björkman, "Kāfir", *Encyclopaedia of Islam*, Volumes I–XII (Leiden: E. J. Brill, 1960–2004), IV: 407–9.

[13] It was first used by the geographer Strabo (d. after 21 CE) (Bk 17. 3.1) in the context of the dark-skinned Ethiopians. We find the coin-term applied by an anonymous chronicler of 754, to distinguish the identity of Arabs (Levantine) and Arabians (from the Peninsula) as opposed to inhabitants of North Africa who could either be Arabs and/or Berbers or possibly Blacks from Africa, see Tailhan 1885: 23. The nomenclature was adopted by Christian writers of the Iberian Peninsula *circa* 8th century and the popular practice among the varied linguistic communities (including Portugal) was to

to a Mediterranean/Atlantic coinage; this was a convenient name the Portuguese used which encompassed any Indian Ocean native who was Muslim irrespective of his/her ethnic background and therefore it could be an Arabian, East African, Indian, Persian, Javanese, Sumatran etc., but in fact, we know from the chronicler Diogo do Couto (d. 1616), that many from Kerala (India), for example, were Christians.[14] Because of its extensive use in Portuguese chronicles the word Moor became a fashionable term among both the populace and European writers, evidenced by its occurrence later in the Dutch and English documents.[15]

Scope of study

The historian Ibn Khaldūn (d. 808/1406–7) reports that in the early years of Islam, the military commander of Egypt, ʿAmr b. al-ʿĀṣ (d. c. 42/663), advised the caliph ʿUmar b. al-Khaṭṭāb (13–23/634–644), not to use the sea for combat, just the land; he wrote:

> The sea is a great creature upon which weak creatures ride—like worms upon a piece of wood.
>
> [*inna l-baḥr khalq ʿazīm yarkubuhu khalq ḍaʿīf dūd ʿalā ʿūd*].[16]

The purpose of this quote by Ibn Khaldūn was to point out that the early Muslim conquerors were not ready to take to the sea, not that they judged the benefits inconsiderable, but the reason was clear: they were unprepared to face the enemy by sea. It was only when Byzantine, Persian and Coptic craftsmen were invited by the Muslim administrators to offer their services that things started to change. Among those hired were the shipbuilders and navigators whose experience went back generations; thus, from this homogeny of nations, came the best

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call a Muslim, Moor (Maurus, pl Mauri). But it was the epic *Cantar del mio Cid* which played the decisive role among the popular audience to employ the term Moor to refer to anyone who was a Muslim whatever his/her ethnic background.

[14] Subrahmanyam 1997: 119–120.

[15] In a personal communication, Lisbeth Van Til Schaefer (17 June 2000) informed me that the label "Moor" (noun or adjective) appears in at least 30 Dutch (CDRAD) ARA-VOC documents and the so-called Generale Missieven-material of the Governor General and the Council of Directors in the Netherlands alone has hundreds of references to "Moor".

[16] Ibn Khaldūn 1970: 209; nd: 225.

of seacraft, that were eminently able to fulfil the maritime needs of the Muslim government and so began a long *tradition* of the finest of shipwrights and seafarers.

Tradition forms an important part of culture. The word "culture" itself is difficult to define. I define it here as a system of relationships that exist among a community of people, their daily activities, as dictated by the politics of the region, and their religious belief. Of these relationships, I consider the interaction between man and material culture to be one of the most important and significant elements in a community. Material culture comprises the objects that the individuals of a community manufacture, subject to climate, environment and the materials available; it is also about the relationship between the individual and the object, in terms of both manufacture and use. Thus, maritime material culture is the relationship between man and all that pertains to the sea: the carpenter and his water/seacraft; the community and their materials; the types of boats and ships; the crew; navigational aids; winds and currents; the merchants and their voyage; trade and *ḥajj* (pilgrimage); the harbour and the people.

When talking of shipbuilding techniques and hull design, *tradition* is the handing down of ideas and practices from one generation to another. While this suggests that things remained the same, adaptations must have occurred over time; overall, however, the shipwright would have adhered to the tried and tested practices of the past, within the context of the socio-economic conditions, the availability of material, technological resources and the environment. Contacts among coastal communities from different parts of the Indian Ocean have undoubtedly contributed towards technological exchanges but as much as shipbuilding traditions were borrowed from foreign technology, it would also be right to think that technologies could have developed in parallel.[17]

The traditions of seafaring and shipbuilding have long been a means of cultural as well as commercial exchange among the diverse linguistic and ethnic communities of the Mediterranean, Mesopotamia, the Indian Ocean and its two corridors—the Persian Gulf and the Red Sea. The Indian Ocean seafaring tradition developed quite separately

[17] Recent research in maritime archaeology and ethnographic field work by Tom Vosmer (1996, idem, 1997 and 2005) have produced new findings regarding the characteristics of Indian Ocean watercraft, their design and building methodology from the early period (BCE) to most recent times, see also Hornell 1920; idem 1933, 1938, 1942 and 1946; Landström 1961; Prins 1965; idem, 1982; Severin 1982; Heyerdahl 1982; idem, 1986; Shihāb 1987; al-Ḥijjī 1988; Greenhill 1995; Prados 1997; Al-Hijji 2001; Agius 2002; idem, 2005a.

from the Mediterranean tradition, though contact with Egypt and the Levant via the Red Sea was inevitable. Seasonal trade was dictated by the monsoonal winds, a long-term reality; they were fundamental to the physical and human unities of the Indian Ocean, while religion (Hinduism, Buddhism, Judaism, Christianity and Islam), no doubt, was a great driving force, which strengthened trade and cultural ties.

One of the problems that I encountered in the present research was textual material on maritime culture. Many were only passing references but patchy though they were, they shed some light on the history of the development of types of ships, their function in trade, pilrimage and naval warfare.

Arabic is enriched with a vast vocabulary coming both from within its own tribal dialects and, in the east, from neighbouring languages such as Aramaic, Persian, Greek and Indian languages. With the spread of Islam, a flood of foreign material-cultural vocabulary crept into the language, as converts continued to speak their source language, while adopting Arabic as their second language. Arabic being the language of the Qurʾān, medieval philologists safeguarded it by promoting Arabic in its purest form. When it came to vocabulary lists it was the purist view to exclude foreign words as they were regarded as unimportant and obscure or they contaminated the language of the sacred Qurʾān. Given this state of affairs, a number of maritime cultural terms would not have featured in dictionaries. If, on the other hand, the researcher does encounter such terms, it is unlikely that the medieval lexicographer would give a definition (see Chapter 13). The question arises: given that lexica are not our best tools for the search of material cultural terms, then in what sort of other written sources do they occur? The answer lies in the works of history, geography, travel and, in a few cases, literary texts; they are our true source of information, the aims of which are to provide factual data though not necessarily with an explanation. The challenge, therefore, has been to interpret these data, leading to the present study. A difficult task but one which has, nevertheless, yielded some interesting results.

Conceptual framework

The purpose of this book is a study of ships and seafaring in the classical and medieval periods of Islam in the Western Indian Ocean, but it also looks at the way ships were built, their design, building materials and techniques. A synchronic-diachronic approach will help us to

understand the development of maritime technology over the centuries, from the third millennium BCE to the second millennium CE.

Although information on maritime culture is generally scanty, descriptions of port towns and maritime activity are often forthcoming. On collecting data for this book, I inquired about the method Classical and Medieval Muslim authors (geographers, historians, lexicographers, literateurs and travellers) used for verifying their facts, events or terminology. In doing so I was able to sift the sources into two categories, those that are reliable and those that are less so. The criteria these writers adopted for their information were based on the following fundamentals (*uṣūl*): a) *isnād*, the need to state the authority of where the information was taken from through a chain of reliable scholars; b) *muṭāla'a*, reading or consultation; c) *mu'āyana*, viewing or eye-witnessing; d) *muḥādatha*, interviewing or discussing of material; e) *taqyīd*, travel notes; and f) *ta'āruf*, judging how commonly the term is used (figure 1). Muslim writers may not have addressed all the criteria all the time but, in general, these principles, whether in whole or in part, were for those who travelled around, the basis of the concept, "In Search of Knowledge" (*fī ṭalab al-'ilm*).

These criteria were my inspiration, and, therefore, the foundation of the framework of my study. Like the scientist, I would say that there is no general theory that covers all aspects; however, the more facets of the past we investigate, the more likely we are to arrive closer to the truth.

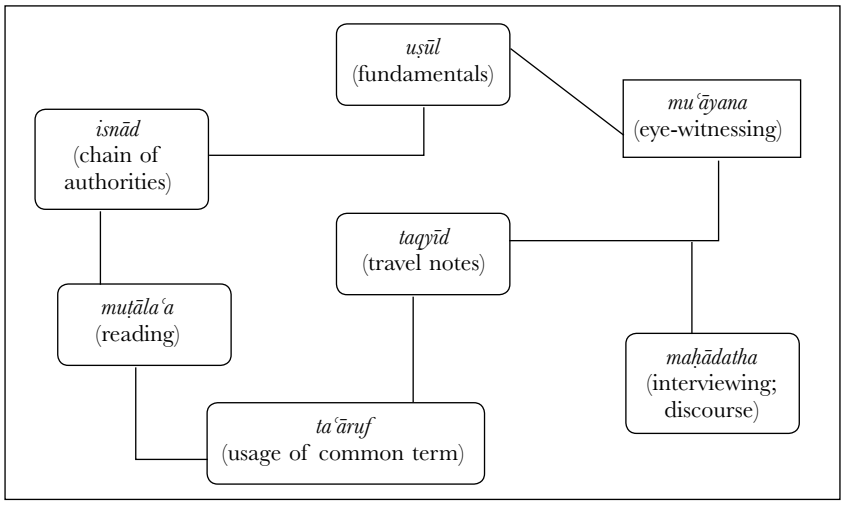


Figure 1 The *uṣūl* method

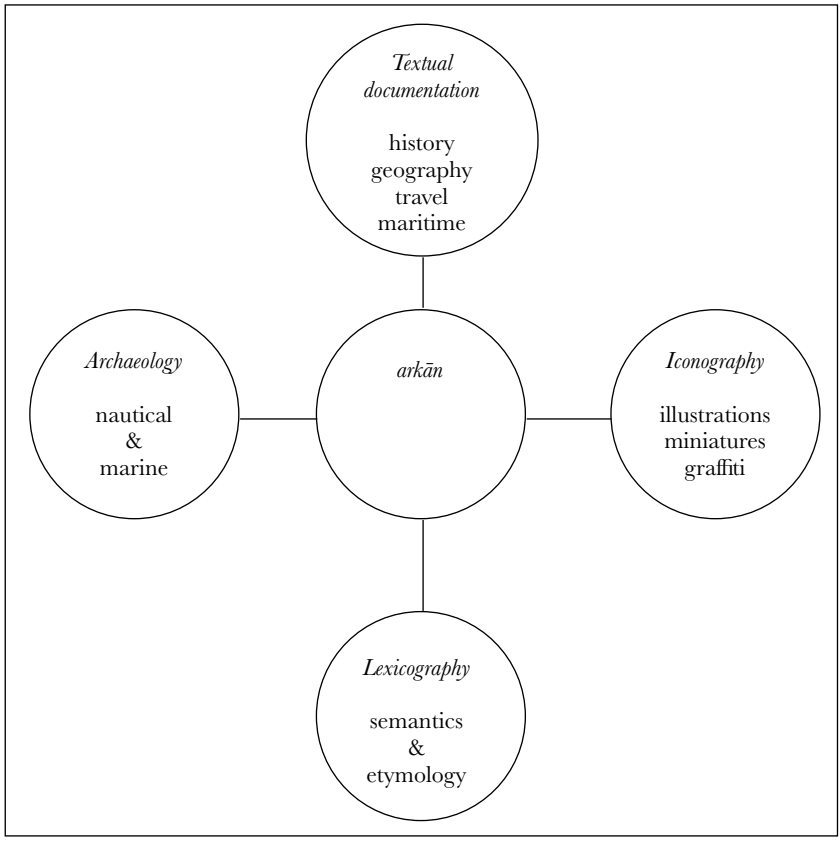


Figure 2 The *arkān* framework

My *point du départ* is based on an inquiry into: a) textual material (historical, geographical, travel and maritime Arabic works); b) lexicography (semantics and etymology); c) archaeology (nautical and marine); and d) iconography (illustrations, miniatures and graffiti) (figure 2).

These constitute the *arkān* (corners), the demarcation of my book, and within these four parameters I shall demonstrate the relationship of maritime material culture to the wider picture of the ethnic, religious and linguistic mix, as well as the technological and economic developments of trade and commerce in the Western Indian Ocean. This framework is an attempt to bring four disciplines together, to strengthen evidence where there is doubt, to fill gaps where there are holes, and to offer interpretations of the sources available and make inferences from them.

Textual: Documentary sources

Among the textual sources that were useful for the present study, are the collections of Arabic paper fragments and coins uncovered by the University of Chicago (1978–1980)[18] and the University of Southampton archaeological teams (1999–2003)[19] at the Egyptian Red Sea site of Quseir al-Qadim, which shed light on the activities and operations of shipping business on the Red Sea and the maritime history of Egypt during the Ayyūbid and Mamlūk periods (6th–8th/12th–14th c). The Chicago and Southampton archaeologists also unearthed numerous artefacts: textiles, a diverse range of wares, glass, coir, leather, ostrich eggshells and seeds; they excavated wall foundations of buildings, some occupation deposits of the Islamic harbour and a caravanserai, which provided rest and storage facilities in the Mamlūk period for merchants and pilgrims.[20]

Other Arabic documents, comparable to the Quseiri corpus, are the Genizah collection (354–663/965–1265), which were unearthed in 1890 in Old Cairo (Fustat). The documents (a mixture of court statements and agreements, deeds, private and commercial letters, notes and accounts), are written in Hebrew but the content is in Middle Arabic (a mixture of Classical Arabic with dialectal influence); the point here is that the people who wrote them were Jewish merchants or agents who spoke a number of Arabic dialects such as Egyptian, Adeni and the North African varieties (including Andalusi Arabic and Siculo Arabic). These papers are a window on the socio-economic history of the Jewish communities and their trade networks with Egypt, the Mediterranean and the Indian Ocean. My main interest in this collection is that many letters cover information on harbour management and shipping transactions.[21]

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[18] The study of the fragments has been undertaken by Li Guo 2004.

[19] The Arabic documents recovered by the Southampton group are being studied by a University of Leeds team, sponsored by the Arts and Humanities Research Council (RQAD); for the corpus of paper fragments see Anne Regourd 2004 and forthcoming work; for coins see Cecile Bresc (forthcoming) and for Arabic writing on ostrich eggs see Agius 2005d.

[20] On the surveys of the excavations at the site consult Whitcomb & Johnson 1979; idem, 1982; Peacock & Blue 2006.

[21] Goitein's perceptive work (1967–1993) on these documents is a seminal study, a contribution to our understanding of the private and communal life of the Jewish community in Early Medieval Islam. Other significant studies on the Genizah documents used in my book are: Khalilieh 1995; Margariti 2002 and 2007.

Like the Genizah documents, the Quseiri paper fragments promise great potential in terms of the economic, social and cultural history of Medieval Islam. It is true that the impact of the Quseiri documents is perhaps not as rich and wide-ranging as the Genizah corpus. However, the Quseiri collection takes us a step further, because the written evidence is corroborated by the excavations and the material culture recovered from the site, which is lacking in the Genizah discovery.

Apart from studying the Arabic paper fragments of Quseir al-Qadim (RQAD) and the Genizah letters (TS), I have consulted documentary sources and manuscripts at the British Library (BL), the Bodleian Library (BLO), and the pictorial archive of the Bibliothèque Nationale in Paris (BN), Fondation Martin Bodmer at Genève (FMB), Metropolitan Museum of Art in New York (MMA), Türk ve İslam Eserleri Müzesi in Istanbul (TIEM) and the Searlight Collection at the Victoria and Albert Museum in London (V&A). For the post-medieval period, though not the main focus of this book, I looked at letters, diaries and reports, and examined old maps archived in London, The Hague, Paris, Lisbon and Mumbai, copies of which are found at the Centre for Documentation and Research at Abu Dhabi (CDRAD).

Arabic literary sources

My search for textual data on maritime culture came from a number of mainly Islamic literary genres: a) classical literature, b) lexicography, c) geography, d) history, e) travel, and f) maritime literature.[22]

Two facts underpin the inquiry into the literary material: i) authors are constrained by conventions of language, genre, cultural and social contextual considerations, ii) what counts as a fact or event or explanation of an historical phenomenon is relative to time, place, environmental and cultural conditions. It is not an easy task, given that some writers provided maritime information or technical facts in passing references, or narrated events in a poor and sometimes ambiguous style

[22] Previously, I have studied types of medieval ships recorded by al-Muqaddasī (fl. second half of the 4th/10th c) geographer, Ibn Sīda (d. 458/1066) lexicographer, Ibn Baṭṭūṭa (d. 770/1368–9 or 779/1377) traveller, and al-Maqrīzī (d. 846/1442) historian, material which has been published in a number of articles; see Agius 1997 and 2005c (for al-Muqaddasī); 1998 and 2001 (for al-Maqrīzī); 2001 (for Ibn Baṭṭūṭa); 2005b (for Ibn Sīda). Some of the information contained in these articles has since been revised and included in the present work.

of language; others tended to exaggerate in their accounts, while some used a language that was symbolic or flowery, though with its elegance and style, sometimes expressed factual subjects with great refinement and precison. With such an extensive range of literary source material used in this study, it became necessary to limit my discussion to those works which are the most significant and frequently used.

A) Classical Literature: From the poetic lore of pre-Islam we have the classical ode (*qaṣīda*). It is one of the richest sources of information on early water and seacraft. In these odes, the desert and the camel are frequently compared with the vastness of the sea and the ship. H. A. R. Gibb succinctly described the *qaṣīda* as containing a series of themes which are "elaborated with unsurpassed vigour, vividness of imagination, and precision of imagery, in an infinitely rich and highly articulated language".[23] Their description of the richness of life in the desert is a source of knowledge about pre-Islamic socio-economic life and tribal history. There seems little doubt that the desert poets were familiar with the maritime world, as much of the nautical vocabulary found in these poems is recorded with great vitality and precision.

The Qurʾān has a number of references to the ship; its occurrence, however, is symbolic. Muḥammad, the Prophet of Islam, grew up in an environment where the Arabians were familiar with religious symbols that were innate in Near Eastern beliefs. One of these was the "ship", which was mostly symbolical of man, life and death, and resurrection, echoes of which are found in Ancient Egypt as well as Christianity. There is evidence of the symbol of the ship in the representation of death and resurrection preserved in the verses of Zuhayr b. Abī Salāma (d. after 627 CE), ʿAbīd b. al-Abraṣ (d. c. 554 CE), al-Nābigha l-Dhubyānī (d. before 600 CE), and Maymūn b. Qays al-Aʿshā (fl. 6th century CE) (see Chapter 10).[24] The comparison of death with the ship is a recurrent theme in various beliefs: Tales from Ancient Egypt show death, symbolized by the passage of a boat or ship sailing through rough seas, followed by calm weather as the mariners are saved from drowning;[25] a theme also known in Indian and Buddhist votive depictions,[26] Orthodox icons depicting Saint Nicholas saving a ship from wreckage

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[23] Gibb 1963: 13.

[24] Zuhayr 19 vs 15; ʿAbīd b. al-ʿAbraṣ 8 vs 5ff.; al-Nābigha 5 vs 44ff.; al-Aʿshā 4 vs 36ff., 5 vs 56ff., 13 vs 55ff., 58ff., see Lichtenstädter 1976: 18–19.

[25] Lichtenstädter 1976: 19.

[26] Tripati 2006: 88.

or people from drowning, and, in more recent times, the votive paintings of the Roman Catholic faith bearing images of the Virgin Mary, the protectress of the sea.[27]

B) Lexicography: Philological interest lay behind the impulse that led Muslim scholars to collect early poems and prose. They needed the grammatical information and lexical data contained in these writings to assist them with the interpretation and commentary on the Qurʾān and Ḥadīth (the sayings and deeds of the prophet Muḥammad). Lexicographers relied on this textual material; they looked for pieces of evidence (*shawāhid*) to prove the existence of a lexical item. In doing so, several maritime cultural terms entered their lexica. In an early work, *Arabic Literary Works as a Source of Documentation for Technical Terms of the Material Culture*, I argued that there are no classical-medieval historical dictionaries;[28] the traditional approach of Arabic lexica was purely descriptive, their purpose being to deal with diction, quotations from the Qurʾān, Ḥadīth and pre-Islamic poetry. They are without doubt monumental, yet incomplete, works. The tools needed, therefore, for a synchronic investigation of technical terms of material culture in Arabic are generally not satisfactory. However, attempts to include some nautical terminology and nomenclature of ship-types are found in three major lexica: The first is Ibn Sīda's (d. 458/1066) *al-Mukhaṣṣaṣ fī l-lugha* (The Specialist Work on Philology), compiled by subject-matter under broad headings; a unique approach in classifying vocabulary. Of importance is his general nautical vocabulary with synonyms, some of which are terms still used among contemporary mariners. His list of 24 names of ship-types represent a broad range of classical and medieval vessels up to his time (see Appendix A). The *Mukhaṣṣaṣ* is an authority in its own right which later lexicographers used as one of their main sources of reference. The second is Ibn Manẓūr (d. 711/1311–2), whose lexicon, *Lisān al-ʿArab* (The Language of Arabs) is considered one of the best and most authoritative dictionaries, though some gaps do exist in that he misunderstands his sources. The third, and the most important and authoritative lexicon for this present research, is the *Tāj al-ʿarūs min jawāhir al-qāmūs* (The Crown of the Bride from the Precious Stones of the Ocean) compiled by al-Zabīdī (d. 1205/1790–1). Although a very much later lexicon than the scope of this present volume, its value lies

[27] Pucciarelli 2000: 62–80.
[28] Agius 1984: 75.

in that al-Zabīdī registers the complete vocabulary materials derived from Classical and Medieval Arabic dictionaries and literary sources. In this sense it is the lexicon that a medievalist should consult and is without doubt a seminal work for the present research.

What about words of non-Arabic origin? Little has been done in this field; dictionaries like *Kītāb jamharat al-lugha* (The Book of a Multitude in Language) of Ibn Durayd (d. 321/933) and *Kītāb al-muʿarrab min al-kalām al-aʿjamī ʿalā ḥurūf al-muʿjam* (The Book of Arabicized Words of Foreign Origin according the Letters of the Alphabet) of al-Jawālīqī (d. 539/1144) are practically our chief sources for etymology, though their intention was to compile dictionaries to preserve the "pure and eloquent" (*faṣīḥ*) language. There are serious gaps of knowledge here, but considering the time when these lexica were compiled, they are still worth consulting. Technical loan-words of maritime culture, however, are few.

All these early works mentioned above, together with dictionaries of Arabic compiled by a number of orientalists such as E. W. Lane (d. 1876), R. Dozy (d. 1883), G. P. Badger (d. 1888), and H. Wehr (d. 1981) for Arabic, W. Gesenius (d. 1842) and W. Von Soden for Semitic languages, and J. Th. Zenker (d. 1884) and F. J. Steingass (d. 1903) for Persian, constituted the basis for an attempt to reconstruct maritime cultural terms. More work is needed to incorporate Sanskrit and other related Indian languages.

C) Geography: Geographical works formed a central part of my inquiry; they were the basis for my study on maritime life. The early literature was purely administrative as the central government needed information on taxation, and social conditions of the population of each province. So a genre of geographical treatises were composed with the aim of surveying the main routes of the Early Islamic Empire. The relevance of this literature is in the abundant information Muslim geographers offer on socio-economic events, customs and practices of people, trade and commerce, harbours and coasts of the Indian Ocean and a wealth of material-cultural terminology, though, as mentioned earlier, a disappointing record of seamanship and shipbuilding. Evidently, this was the birth of physical and human geography. Such works as those of al-Yaʿqūbī (d. c. 278/891–2), *Kītāb al-buldān* (The Book of Countries), Ibn Khurradādhbih (d. c. 300/911), *Kītāb al-masālik wa-l-mamālik* (The Book of Routes and Provinces), Ibn Rusta (d. after 290/893–4), *Kītāb al-aʿlāq al-nafīsa* (The Book of the Precious Trinkets), Ibn Faqīh al-Hamadānī (fl. end of 3rd/9th c), *Kītāb al-buldān* (The Book of Countries), al-Iṣṭakhrī (fl. c. 340/951–2), *Kītāb al-masālik*

wa-l-mamālik (The Book of Routes and Provinces) and Ibn Ḥawqal (fl. 367/977–8), *Kitāb ṣūrat al-arḍ* (The Book of the Configuration of the Earth) are fundamental and significant in the development of empirical study among early geographers.

Ibn Khurradādhbih placed Iraq at the centre of the world, followed by the province of Fars. Iraq was called the Sawād (black) because most of the land was thronged with trees (mostly date-palm trees) and so appeared to the traveller to be "black". Al-Yaʿqūbī also put Iraq as the centre of the earth but, unlike his contemporary, he did not describe territories beyond the realm of Islam (the Dār al-Islām). Compared to these two, Ibn Rusta was not a great traveller but credit should be given to him for his detailed physical description of the places he did visit, in particular those of many lost sites. Al-Iṣṭakhrī's book was based on a lost work, *Ṣuwar al-aqālīm* (The Configuration of the Climes) of Abū Ziyād al-Balkhī (d. c. 322/933–4), a pioneering work with a set of 20 maps; however, al-Iṣṭakhrī, for some reason, does not mention his name. Al-Iṣṭakhrī's work in turn was revized by Ibn Ḥawqal. Their merit lies in the way in which the coverage of the material is presented in an artistic and lively narration. Al-Iṣṭakhrī is known for his details on Fars, the rich and prosperous province of Persia, but did not travel, while Ibn Ḥawqal travelled extensively and when revizing al-Iṣṭakhri's work, added much newer material on economic matters.

The most original concerning personal observations is al-Muqaddasī (fl. second half of the 4th/10th c); his details on the various customs, manners, and characteristics of the places he visited are invaluable to the socio-economic historian. In the course of his journeys he took up various jobs and was involved in some commercial activities. His *Aḥsan al-taqāsīm fī maʿrifat al-aqālīm* (The Best Divisions for Knowledge of the Regions) is credited for his methodical presentation of information. His list of material-cultural terms is exhaustive; for ship-types he listed 36 vessels used in his time (see Appendix A). Disappointingly, however, he leaves the reader in suspense because he does not discuss the terminology as he proposed to do in his introductory section. Al-Muqaddasī is critical of other geographers such as Ibn Faqīh al-Hamadānī, of whom he states that his geographical information is incorrect.

An important source for both the ethnographical and trade relations of the sixth/twelfth century is the *Nuzhat al-mushtāq fī ikhtirāq al-āfāq* (The Stroll of One Who Desires to Cross the Horizons), a comprehensive geographical work of al-Idrīsī (d. 548/1154). It consists of data obtained partly from his travel experiences and partly from other travellers and

earlier sources. Also, I include Yāqūt al-Rūmī (d. 626/1228–9), a slave of Greek origin who was given an Islamic education by a merchant. His travel experiences and his own observations instigated the writing of his *Muʿjam al-buldān* (A Lexicon of Countries), a world gazetteer; while it does not venture beyond the world of Islam, it is unquestionably a reliable source, and its data on socio-economic matters is of particular interst to our area of study.

An important writer from a time when little geographical material has come down to us, is Ibn al-Mujāwir (d. 690/1291). His *Tārīkh al-mustabṣir* (A Chronicle for Someone who Seeks to Understand) covered the toponymy of the Arabian Peninsula and provided us with details on the ethnography of the country. Its aim was to instruct government officials but also to entertain. Ibn al-Mujāwir wrote from personal observation, having travelled into Yemen via Tihama and visiting occasionally India and East Africa where he engaged in trade. He was interested in all aspects of trade and commerce, such as imports and exports, taxes, and weights and measures. His knowledge on these was interspersed with historical facts and the background of the people he wrote about. He had a keen eye for the material culture, giving details of food, clothes and agriculture, and a particular interest in the social customs of communities of the Arabian Peninsula, especially with regard to magic, sorcery, *jinn*s (genies) and the tales of the distant past.

Last but not least is Abū l-Fidāʾ (d. 732/1331–2), a Syrian prince, though a historian, who wrote a large geographical work, the *Taqwīm al-buldān* (The Survey of the Countries), based largely on earlier works but added facts from his personal experience of countries he visited.

Most of the geographical information after the sixth/twelfth century which has come down to us, consists of extracts and quotations from earlier sources. The reasons for this decline are the same ones which afflicted literary circles; by the seventh/ thirteenth century much of the style becomes decadent and not conforming to the early canons of *adab* (eloquent) taste. Works like Ibn al-Mujāwir's were a genre that interested a mixed audience; often they were not written in the best style. The Arabic of his *Tārīkh al-mustabṣir* is essentially Classical but with a mixture of colloquialisms, what is called Middle Arabic.

D) History: Historical works are of exceptional importance. There are different types of histories. Some are concerned with the chronological record of events as they happened, such as the monumental work of al-Ṭabarī (d. 310/922–3), author of *Kitāb taʾrīkh al-rusul wa-l-mulūk* (The Book of the History of the Prophets and Kings). Others,

like al-Balādhurī (d. 279/892–3), are concerned with the conquests of Islam, his *Kītāb futūḥ al-buldān* (The Book of the Conquests of the Countries) is about the settlement of the Muslims in a geographical arrangement. Others still are interested in the biographies of people like al-Khaṭīb al-Baghdādī (d. 463/1070–1) who compiled the *Taʾrīkh Baghdād* (History of Baghdad); it is a monograph of persons who were born in this city and the people who visited it. These are but a few examples of genres of historiography. The historical works consulted in this present volume are varied and the list is long. They have been cited because of their contribution to the history of the development of the ship and naval activities.

I mention here the main sources of historical narrative on various aspects of maritime culture; those that speak in some detail about types of ships, their function and sometimes the conditions in which they were used. They are also noteworthy for their approach of compiling and reporting facts as well as their method of investigation (see figure 1).

The first historian is al-Ṭabarī (mentioned above). His *Kītāb taʾrīkh al-rusul wa-l-mulūk* is a classical source, a universal history of Islam, that no other historical work can match. The uniqueness of this history is the method the author applied to trace back each single fact or event to an eye-witness or informant through an un-interrupted chain of authorities. I have listed 21 types of vessels, some of which he mentions during the Zanj (East African) uprising in Basra (247–269/861–882) (see Appendix A). Then comes al-Masʿūdī (d. 345/956–7), an extraordinary figure, known for his humanistic and universal approach; in the writing of his *Murūj al-dhahab wa-maʿādin al-jawāhir* (The Golden Meadows and Mines of Precious Stones), he combines different disciplines. Essentially, it is a work of history preceded by geographical information. Much of his data is valuable, not only because of his personal experience, but in that he extracts his information from earlier authorities whose works had, at the time of his writing, all but disappeared. He is an authority who inspired other historians with a versatile outlook, such as Ibn Khaldūn (d. 808/1406–7) mentioned earlier. He believed in personal experiences, wandering through different regions in thirty years of almost constant journeys. Al-Masʿūdī takes particular interest in the sea and mariners, their skills and their language. He sailed on ships owned by sailors from Siraf and Oman, and described the hazardous seas of East Africa. His voyages to China, however, have been the subject of debate, as evidence for them seems doubtful. In general, however, al-Masʿūdī displays an open-mindedness and a keenness to record the

minutest thing that he has heard and seen. Like al-Muqaddasī (see above), he consulted manuscripts and contacted people for true information (see figure 1); his data on maritime culture is the result of his intellectual curiosity and is largely based on the accounts of the sea captains, sailors and merchants.

For the social life, administration and military organization in Mesopotamia I have consulted the following: Ibn Saʿd's (d. 230/844–5) *Kītāb al-ṭabaqāt al-kabīr* (The Great Book of Classes), a monumental work on military events of wars and accounts of people and material culture; the *Kītāb al-diyārāt* (The Book of Monasteries) of al-Shābushtī (d. 388/988) which is one of the most important works for the cultural history of Mesopotamia; al-Tanūkhī's (d. 394/994–5), *Kītāb nishwār al-muḥāḍara wa-akhbār al-mudhākara bi-alfāz al-mukhālafa* (The Book of Table-talk and Information of Memorization by Means of Contrast), which gives personal characteristics of daily life in Mesopotamia; and the *Kītāb al-tajārib al-umam wa-taʿāqib al-himam* (The Book of Experiences of Nations and Results of [their] Endeavours) by Ibn Miskawayh (d. 421/1030), covering also the social and political life of ʿAbbāsid Iraq.

Other rich historical sources that are contributory to this inquiry into maritime material culture, though not directly related, come from Egyptian historians. Egypt lies at a crossroads between the Mediterranean, the Red Sea and the Indian Ocean. Of particular interest is their mention of Muslim and Christian war vessels of the Early and Middle Medieval periods in Egypt and the Red Sea; this information can be compared, albeit in a limited way, with references from other sources dealing with the Indian Ocean. The most important works I have consulted are: Ibn Mammātī's (d. 606/1209) *Kītāb al-qawānīn al-dawāwīn* (The Book on Law and Accounts of the Treasury), which lists all inhabited towns and villages of Egypt with details on agricultural and irrigation systems; it contains an inventory of vessels as well as shipbuilding for the Ayyūbid arsenal. Al-Nuwayrī l-Iskandarānī's (fl. 8th/14th c) *Kītāb al-ilmām fī mā jarat bihi l-aḥkām al-maqḍiyya fī wāqiʿat al-Iskandariyya* (The Book of Knowledge on the Administration of Provisions for the Battle at Alexandria) is about the history of Alexandria between 767/1365–6 and 775/1373–4 and the Frankish incursions on the city in 767/1365–6. His interest in the detail of, and the data he provides about, material culture, is of immense importance, particularly the information he gives on maritime matters; his description of types of vessels (see Appendix B) is invaluable. Another author of comparable fame is al-Maqrīzī (d. 846/1442), a prominent historian,

devoted, like his predecessor, to the regional history of Egypt. His first work, *al-Mawāʿiẓ wa-l-iʿtibār fī dhikr al-khiṭaṭ wa-l-āthār* (Admonitions and Parables on the Enumeration of the Districts and Remains), deals generally with the topography of Fustat, Cairo and Alexandria; the second, *al-Sulūk li maʿrifat al-mulūk* (The Path to the Knowledge about Kings) is exclusively on the history of the Ayyūbid and Mamlūk periods. In Appendix A, I have listed 28 ship-types which I came across in the course of my reading of al-Maqrīzī's works.

No historian of the medieval period can ignore the works of these Egyptian historians; they cover subjects and areas that are of great benefit, not only to the understanding of Egypt in terms of the political, cultural and social institutions but in a wider sense provide details of a global trade from the Mediterranean through the Red Sea and the Indian Ocean. These works are to be studied together with the textual material from the Genizah collection and the Quseir al-Qadim paper fragments mentioned earlier; it is now possible, through these documents, to reconstruct the old trade routes and networks, including information about shipping and cargo, merchants and agents and the harbour management of main coastal towns.

E) Travel: Travel accounts, otherwise known as *adab al-riḥla*, are a richly rewarding source of geography, ethnography and cultural history, though sometimes they may cross the boundary between fact and fiction. Ibn Jubayr's (d. 614/1217–8) *al-Riḥla* (The Travel) is a gem of travel literature because of its instructive contents, including some nautical details and information on maritime material culture. He sailed in Christian ships and his observations on storms and shipwrecks are arresting. The work of Ibn Baṭṭūṭa (d. 770/1368–9 or 779/1377), *Tuḥfat al-nuẓẓār fī gharāʾib al-amṣār wa-ʿajāʾib al-asfār* (The Gift of the Observers on the Curiosities of the Countries and the Wonders of the Travels) is an important and indispensable source of information on ethnography and cultural history, not to mention his rich details on maritime culture. He took two long voyages: the first down both shores of the Red Sea and Yemen, then from Aden to the trading posts on the coast of East Africa, and from there to the southern coast of Arabia and the Persian Gulf; the second adventurous journey took him down the Malabar coast to the Maldives and Sri Lanka, then to Southeast Asia and finally to China. In the course of these voyages he mentions 23 types of vessels (see Appendix A). His comparison of Mediterranean vessels with Perso-Arabian and Indian vessels is unusual. Much has been said, however, about the credibility of some of his so-called historical facts

and events, which are fancifully elaborated, leaving us lost between myth and reality. He also says that some of his notes were lost in a shipwreck and that he had to dictate them from memory to Ibn Juzayy (d. c. 756–8/1355–7), who wrote his text. It may be argued that Ibn Juzayy is perhaps responsible for any divergence from the truth, as his focus was more to produce a work of flowery style. That said, Ibn Baṭṭūṭa's work is a mine of information on material culture and the maritime world of the Indian Ocean.

F) Maritime literature: The maritime genre offers interesting data about Indian Ocean navigation, so important to our understanding of the semantic development of nautical and maritime terminology. One of the earliest travel accounts, the *Akhbār al-Ṣīn wa-l-Hind* (News on China and India) is known to be a part of a work entitled *Silsilat al-tawārīkh* (A Chain of Narratives). The authorship of this book remains a mystery, but one version is that the travellers' tales were collected by a certain merchant named Sulaymān al-Tājir (Sulaymān the Merchant) who had compiled it *circa* 237/851, though earlier material could have been collected before this date, perhaps in the second/eighth century. Sulaymān was probably a sea captain too, whose voyages took him to Inda and China. There are indications that he had available to him navigational treatises, then current in the Indian Ocean, following the traditions of the *Periplus of the Erythraean Sea*, which was written in the first century CE by a Greek living in Egypt; the author is unknown but there is enough evidence to show that he sailed the Red Sea down the Southern Arabian coast to Oman and the Indian Ocean.

Some references to the *Silsilat al-tawārīkh* are given by the geographers Ibn Khurradādhbih, Ibn Rusta and Ibn Faqīh al-Hamadānī mentioned above. It is said that a certain Abū Zayd Ḥasan b. Yazīd of Siraf (fl. 4th/10th c) re-edited the *Akhbār al-Ṣīn wa-l-Hind* about 304/916 and added information on India and China. It seems that he was not a traveller but simply made notes on navigation, collected statements from merchants concerning their voyages and reported them verbatim.[29]

Travel accounts vary, from a description of a voyage to tales of heroism like those of the *Kītāb 'ajā'ib al-Hind* (The Book of the Marvels of India), a collection of tales recounted by Buzurg b. Shahriyār al-

[29] Further reading on this fascinating work and the inquiry into its authorship and contents is found in *Relations des voyages* 1845: xi–xxxi; *Voyage du marchand arabe* 1922: 13–14 and Tibbetts 1979: 5–6, 8–9.

Rāmhurmuzī (d. 399/1009), a sea captain from Ramhrumuz. They are tales that belong to a literary genre called *ʿajāʾib* (marvels), often told with a touch of ironic humour, about life at sea, but which give a wealth of data on maritime culture: for instance, we have a great deal of information about Persian Gulf sea captains and merchants while others talk about the China trade and expeditions to the coasts of Sumatra and Java. A feature of this work is that countries were grouped according to the trade commodities they were known for: so the Southern Arabian coast was called the Land of Incense; India was known as the Land of Pepper; Sumatra and Java were the Land of Gold and the Moluccas were known as the Spice Islands[30] (see map 3). When al-Masʿūdī was writing his *Murūj al-dhahab* (The Golden Meadows), there is evidence to show that he relied on the *Akhbār al-Ṣīn wa-l-Hind* and the *Kitāb ʿajāʾib al-Hind* (see above); both works gave him a basis for his geographical information on Southeast Asia, though, they are less valuable as a source of historical data. One should add here that these are the earliest Arabic works of the classical period that shed light on the Indian and Far Eastern trade. Most interestingly, some of these maritime accounts appear to be similar to the "Seven Voyages of Sindbad the Sailor" of the *Alf layla wa-layla* (One Thousand and One Nights), otherwise known as the *Arabian Nights*, which parallel to some extent the narratives in their descriptions of experiences on the open sea. Although the origins of the *Arabian Nights* remain a mystery, it is possible that some of the tales go back to the Sāsānian Persians (224–651 CE) and could be an echo of earlier sea-tales like Homer's (fl. 8th century BCE) *Odyssey* in the Mediterranean.

Eye-witness accounts, such as the *Akhbār al-Ṣīn wa-l-Hind* and the *Silsilat al-tawārīkh* are written in a style which tends to be close to the spoken register of the mariners and merchants. The *ʿAjāʾib al-Hind* is another good example of this conversational style. Taking into account who the audience was and why they were written, the Arabic should be judged not as a weakness of language style, something that traditionalist linguists would like to argue, but a sign of authenticity. The Sindbād tales of the *Arabian Nights* demonstrate how stories were narrated and give us a true representation of Arabic of the time. Of course, for the "purists" of Arabic, the language and style of these stories fell below what was expected by the canons of an eloquent language (*al-fuṣḥā*)

[30] Al-Rāmhurmuzī 1863–1866: 7, 94, 130; idem, 1981: 5, 55, 76.

and good literary taste (*adab*). For the present study, however, it is the content and context of these tales that is important, we are not concerned with a stylized Arabic.

One important fact which emerges from these works, is that knowledge of the seas, particularly the Indian Ocean, was considerably advanced. Like geographers and travellers, navigators left significant details about the coastlines of the regions they visited and, importantly, they give enough evidence to show how active shipping and trade was from ports in East Africa to those of the China Seas. One navigational treatise by Ibn Mājid (d. after 906/1500) is of particular note. His *Kitāb al-fawā'id fī uṣūl al-baḥr wa-l-qawā'id* (The Book of Benefits in the Principles of Navigation) is a synthesis of earlier Persian manuals on navigation, written by members of his family. It throws light on the knowledge of nautical theory and practice that came down to the Arabians by way of Sanskrit and Persian. Ibn Mājid's treatise was followed by the *Kitāb al-'umda l-mahriyya fī ḍabṭ al-'ilm al-baḥriyya* (The Book of the Mahri Masterpiece on Exact Maritime Sciences) of Sulaymān al-Mahrī (d. 917/1511), providing information on compass bearings and latitude measurements; other works of his are the *'Umda* (Support), the *Tuḥfat al-fuḥūl* (The Luminary Gem) and the *Qilādat al-shumūs* (The Necklace of Suns). These were poems memorized by sea captains and pilots and they are valuable records of a time when the Indian Ocean saw the emergence of a European presence, the Portuguese.

Archaeological and iconographical sources

Recent studies on anchor types have enhanced our knowledge of the distribution and handling of these artefacts in the Persian Gulf and the West Indian coast.[31] As for shipwrecks, the remains of a ninth-century Perso-Arabian or Indian wreck recovered off the Indonesian Island of Belitung[32] and a thirteenth to fifteenth-century shipwreck found at Kadakkarappally on the Malabarian coast,[33] show construction features which indicate that they may have been built in the Western Indian Ocean. The Belitung wreck could turn out to be a significant find; it

[31] See Tripati & Gaur 1997; Vosmer 1999.
[32] Flecker 2000: 203–4.
[33] See Tomalin *et al.* 2004.

points, subject to some speculation, to direct evidence of long distance trade between China and the Western Indian Ocean.[34]

Consider other wrecks of ships constructed in the Eastern Indian Ocean: the tenth-century shipwreck known as the Intan wreck;[35] a thirteenth-century wreck in the Java Sea; an early fifteenth-century wreck with a cargo of Thai storage jars; and a sixteenth-century shipwreck in the Gulf of Thailand. Several wrecks of Chinese ships have been uncovered in Chinese waters and other sites; most were shallow-bottomed river boats, warships or cargo ships dating from the Song (960–1279), Yuan (1279–1368) and Ming (1368–1644) periods.[36] One ship, similar to Zheng He's (d. 1433 or 1435) vessels, was a deep-bottomed type.

Compared to medieval archaeology, the Bronze Age has yielded much information about Egyptian[37] and Persian Gulf ships and the evidence provided by numerous Mesopotamian models.[38] It must be said, however, that underwater archaeology can be "quite arbitrary":[39] How truly representative these craft are of what actually existed at the time is open to question.

Iconographic evidence of Indian Ocean ships in Medieval Islam is found in the *Maqāmāt* (The Assemblies) of al-Ḥarīrī (d. 516/1122), the *Kitāb ṣuwar al-kawākib al-thābita* (The Book of the Constellations of Fixed Stars) of al-Ṣūfī (d. 376/986) and the Persian miniatures of the *Shāhnāma* (The Book of Kings). The *Shāhnāma* is an epic poem composed by the poet Firdawsī (d. c. 411/1020) with various copies and illustrations dating from the eighth/fourteenth to eleventh/seventeenth centuries.[40] Although small in quantity, this pictorial material is not only a treasure trove of information, the miniatures themselves are of sublime beauty. The presence of Indian and Chinese ships in pictorial art is important; they give often contemporary information on the use of masts and sails and the development of sailing ships through the ages: the best representations of ancient Indian ships from the Sanskrit

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[34] Flecker 2001; 335–54.
[35] Idem, 2002.
[36] See Church 2005: 28 and fn. 91.
[37] See Ward 2000.
[38] De Graeve 1981; Quells 1981; Cleuziou & Tosi 1994; idem, 2000; Carter 2002; idem, 2002–2003.
[39] Church 2005: 28.
[40] My thanks are due to Robert Hillenbrand, University of Edinburgh and Charles Melville, University of Cambridge who have provided me with copies of illustrations.

Jataka fables are found in the caves of Ajanta (dating c. 200 BCE–650 CE), with magnificent frescoes and sculptures depicting scenes from the life of Buddha. Ancient Indian art traditions are not confined to India but are found as far as Southeast Asia.

For the boat architect, it is possible to establish a link with the past by looking at the chain of technological development, comparing the medieval ships and boats with the finds of Bronze Age archaeology and various iconographic materials and artefacts, such as petroglyphs, ship graffiti and boat models. Interestingly, these sources show that some construction features of the Bronze Age and Medieval Islam persist in the Omani *badan* [s.v.] and Kuwaiti *būm* [s.v.] of the modern age. It must be stressed that medieval pictorial evidence has to be taken with caution as there is much that we do not know about the background of the artists and their familarity with the nautical world.

Experiments in nautical archaeology, such as a stitched ship similar to the Medieval trading vessel, *Sohar*, that Tim Severin's team built in Oman in 1980, and which sailed a 6,000-mile (9,656 km) journey to Canton, China, may give clues to the many gaps in the history of the development of shipbuilding but do not necessarily lead us to any conclusions unless they are corroborated by concrete finds. Some conclusions have been leaps of imagination that are not as yet backed by hard evidence. The functionality of ship design depended on several practical considerations, for example, seaworthiness, weight, speed or naval strategies. Such information is almost absent in Islamic sources; accordingly, any scattered data is fundamental to the reconstruction of ship-types. That the present traditional seafaring vessels and boats are possible replicas of thousands of years ago is backed up by new evidence which I hope to bring to this study (see Chapter 4); however, some guess work is to be expected, particularly as there is a dearth of descriptive and pictorial evidence of Indian Ocean craft before the sixteenth century.

Reconstructing the past

Reconstructing the past is a difficult task because of the absence of tangible information; we have lists of names of types of ships but little discusssion on what they served for or where they sailed to; we have lists of exports or imports but there is hardly any assessment of

the importance of trade in terms of its role in the economic survival of the region.

History is defined here as the enquiry into the past of people, their skills and artefacts, as well as the study of communities and their written records. The history of the development of ships can only be studied with concrete examples of the past, such as the eye-witness accounts of historians, geographers and travellers. Inevitably, these people were influenced by the values and attitudes of the religion, culture and environment within which they lived. The question is: how familiar were these writers with the technology, materials and tools the coastal communities were equipped with and their techniques in shipbuilding and seafaring? My concern is to evaluate the information they provide and to see whether it can be corroborated with pictorial evidence. Certainly, using an integrated approach has yielded much greater results, in spite of the paucity of hard facts. At the very least, I hope it will open up possiblities for further research.

PART TWO

CHAPTER TWO

EARLY MARITIME CONTACTS

وان ادبرت قلت مشحونة
اطاع الريح قلعا جفولا

And if she is viewed from behind,
you would say, 'A laden (ship)
with a flowing wind, her
sails full, moving swiftly'.[1]

Bashāma b. ʿAmr (d. before 1st/7th c)

The Arabian Peninsula is surrounded by three seas—the Persian Gulf on the east, the Arabian Sea on the Southern Arabian coast and the Red Sea on the west. For centuries it has been an established centre for trade with the Mediterranean and the Indian Ocean. The fertile provinces of Yemen and Hadhramaut in the southwest, Oman in the southeast and Al-Bahrayn (the islands of Failaka and Bahrain, Qatif, Hasa, Tarut Island and Qatar) on the east coast of the Persian Gulf, were all important centres for the exchange of commodities and technological innovations.

Ships sailing the Persian Gulf in the third millennium BCE seem to have taken the route along the Arabian coast; the prevailing wind and current from the northwest to the southeast would have made sailing southbound possible.[2] The opposite direction, however, would have been difficult and only successful if there were a change in the prevailing wind. On their return journey to the Gulf, ships would have probably used the northeast monsoon wind and current along the coast of Makran (Pakistan) but our knowledge on the use of the Iranian and Pakistani coasts during the Bronze Age is lacking due to the paucity of archaeological surveys in the region. Navigation along these coasts was dangerous; reaching the Northern Gulf, the currents can be erratic and

[1] *Wa-in adbarat qulta mashḥūnatan/aṭāʿa lahā l-rīḥu qilʿan jafūlā*; translation taken from Montgomery 1997: 189.

[2] During Caspers 1971: 21.

the navigator would have to wait for a change of wind and current to sail northbound. It needs mentioning that an Early Bronze Age ship would not have been able to sail close to the wind with little leeway; in addition, one should consider the slow speed of these ships. The mariner of antiquity would have acquired knowledge of wind and current systems by observation and by trial and error.

The difficult waters of the Red Sea were mastered by the Egyptians who sailed to Punt[3] during the Fifth Dynasty (2544–2407 BCE) and the Eighteenth Dynasty (1570–1293 BCE) at the time of Queen Hatshepsut (1486–1468 BCE).[4] Textual and archaeological evidence point to the use of two routes during the Greek Ptolemaic and Roman periods (3rd century BCE to 3rd century CE): one was to avoid much of the northern prevailing wind by way of the Nile and then across the desert to the Red Sea coast; the other route meant hugging the Arabian/African coast. At this time Berenike and Myos Hormos were both active ports on these two routes.[5]

Although the main focus of this book is the Early and Middle Medieval Islamic period, it is necessary to show the development of maritime activities in the Western Indian Ocean leading up to that time. I cannot claim expert knowledge of pre-Islamic history, nor do I claim expertise in archaeology; what I present here are some important highlights of early maritime contacts from the Bronze Age to the emergence of Islam.

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[3] Where this is located has been the subject of discussion for many years: south of Egypt into Kush (north of Sudan) and at times the borders may have extended to Somalia; as K. A. Kitchen suggested that "the land of the Punt" could have been East Africa, "well south of Egypt, conveniently accessible from the Red Sea's western shores" (Kitchen 2004: 30).

[4] A naval expedition by Queen Hatshepsut was sent to "the land of Punt"; particulars of this voyage on the Red Sea were discovered on her temple Deir el Bahari near Luxor in Egypt. Only recently (December 2004), the first remains of Pharaonic ships ever to be unearthed have been found by a Boston University and Italian archaeological team in two caves at Wadi Gawasis on the Egyptian Red Sea coast. Apart from pottery fragments at the site, the team recovered pieces of timber and riggings; these included two cedar planks which seem to be part of steering oars. It is possible that the pottery finds could be from Yemen as at the time, Yemen traded with Punt, a place from which the Egyptians imported ebony, gold and incense but whether there is any link with Queen Hatshepsut's naval expedition it is too early to say, see www.newscientist.com/article (15 April 2005).

[5] See Peacock *et al.*, 1999; idem, 2000, 2001, 2002, 2003; Sidebotham 2004; Peacock & Blue 2006.

Sea trade in antiquity: Meluhha, Magan and Dilmun

The agriculture of Egypt and Mesopotamia in the Early Bronze Age (c. 5000 BCE) was much dependant on irrigation and annual inundations, while in the Arabian Peninsula the reliance was on pastoral life, hunting and gathering, and fishing. It seems that in Egypt, Mesopotamia and the Indus Valley (the region of present-day Pakistan), where, hitherto, they had been reliant on hunting and fishing, when agriculture was exploited, it stimulated the growth of urbanization, leading to an expanding trade and economy. For the Arabian Peninsula, however, the economy was based on marine resources and hunting. Excavations at the third millennium site of Ras al-Jins show that ninety-six per cent of the faunal remains are marine species.[6] During the summer monsoon, however, the coastal Arabians moved inland in search of work in agriculture, hunting and gathering.

Sea trade activity in the Persian Gulf is well attested to in archaeological findings. The ancient coastal population traded goods from Mesopotamia to India as evidenced by the Ubaid pottery of Iraq (c. 4000 BCE)[7] and painted pottery of the so-called Jamdat Nasr type (c. 3000 BCE), also of Iraq and found in a variety of locations (illustration 1). Literary evidence confirms an economic boom in trade from 2500 to 1750 BCE. During the reign of Ur-Nanshe, king of Lagash (south of Mesopotamia), in about 2520 BCE, we learn that ships came from Dilmun bringing timber from a foreign land (presumably India).[8]

Maritime trade seemed to be at its height around 2300 BCE, at the reign of Sargon of Akkad (2334–2279 BCE)[9] and it is through cuneiform inscriptions that we now know definitively of Akkad's trading partners:

> …the ships of Meluhha, Magan and Dilmun [moored] at the quay of Akkad.[10]

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[6] Cleuziou & Tosi 2000: 42.

[7] Oates, Kamilli & McKerrell 1977: 221; Potts 1992: 64; Kuhrt 1995: 22.

[8] Cooper 1982: 22–30 (1.2).

[9] Sargon, also known as Sharukkin, king of Akkad in Mesopotamia (c. 2340–c. 2305 BCE) conquered and established an empire covering the whole of Mesopotamia, Syria and Elam. The empire extended to lands as far as the west to the Mediterranean and north to the Black Sea.

[10] Akkad, the capital of the Akkadians (most probably located near Baghdad), see Frayne 1993: 28.

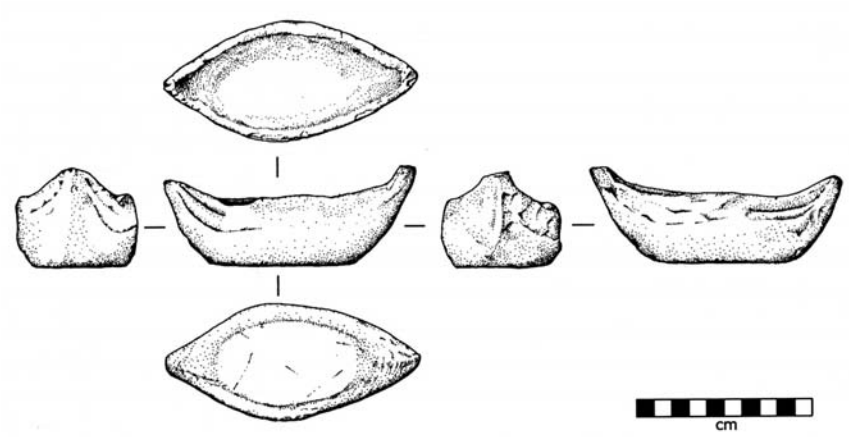


Illustration 1 An Ubaid ceramic boat model c. 5000 BCE at Al-Subiyah, Kuwait (after Carter 2002: 21, fig 8)

The location of these three trade centres, Meluhha, Magan and Dilmun, has been the subject of much discussion in the past (map 4). Meluhha is interpreted as the Indus Valley with great cities built at Harappa and Mohenjo-Daro, and ports such as Lothal and Dwarka.[11] Magan, it has been agreed, includes Oman and seemingly part of Baluchistan. As for Dilmun, there is abundant geological, archaeological, botanical and textual evidence to suggest that the land covers the whole area south of Mesopotamia and the confluence of its two rivers, the islands of Failaka and Bahrain, as well as Qatar with the addition of the nearby shores (such as Qatif and Tarut Island).[12]

One can trace a vigorous sea-trading network of the Dilmun period[13] through the numerous Sumerian tablets impressed with the reed marks of ancient cuneiform writing. From Ur and Eridu fine Ubaid pottery

[11] See Potts 1978: 36, 47–8. Al-Khalifa's and Rice's edited book (1986) provides an initial good reading about the history of Al-Bahrayn region in the pre-Islamic period through a number of papers delivered at the conference on archaeology in Bahrain. I refer the reader also to Daniel T. Potts's work *The Arabian Gulf in Antiquity*, volume I, *From Prehistory to the Fall of the Achaemenid Empire* and volume II, *From Alexander the Great to the Coming of Islam* (1990), both of which reveal the richness of the area's highly developed spiritual as well as commercial traditions. On the commercial significance of the Persian Gulf in antiquity highlighted in recent studies see Potts 1993: 423–40. Also, a recent work on the legacy of Alexander in Asia, see Ray & Potts (eds.) 2007.

[12] The position of Dilmun has been reconsidered in the light of recent archaeological discoveries and interpretation of historical sources, see Crawford 1998; Hoyland 2003.

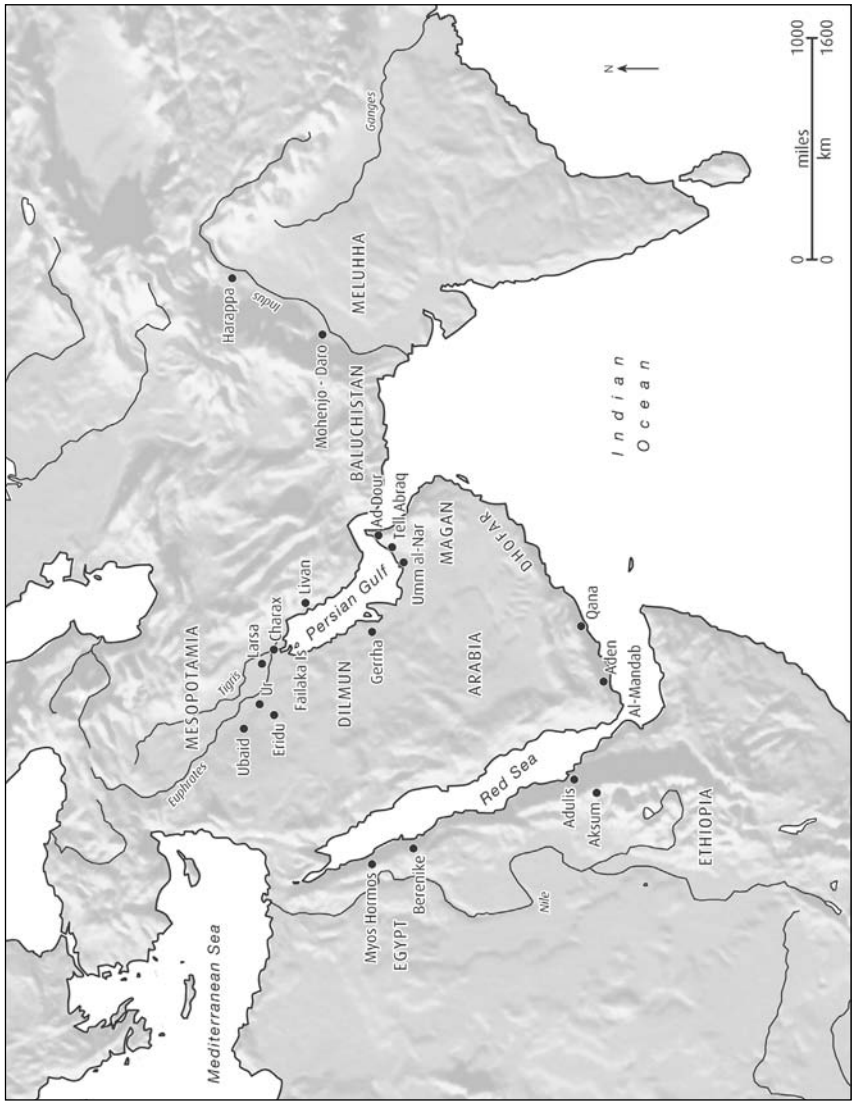
[13] During Caspers 1971: 21–55; Ratnagar 1981.

was shipped to port towns in the Gulf. Hundreds of potsherds dating from c. 4500–4000 BCE, both painted and plain, were found on the shores of Kuwait, Eastern Arabia, Bahrain, Qatar and the Emirates. Such contact brought about an exchange of goods and, it is believed, that pearls as exotic goods may have been sought by the Mesopotamians from Al-Bahrayn and the Emirates in particular. Unperforated pearls have been identified on archaeological sites in the Emirates dating back to the fifth and early fourth millennium. In addition, flint and other stones and shell jewellery may have been traded for the pottery from Mesopotamia. Exports from the Sumerian towns were largely grain (wheat and barley), wool, dates, sesame oil, skins and textiles. Their goods were marked by cylinder seals which were found on clay sealings and potsherds.

Mesopotamia lacked timber for building and stone[14] so from Meluhha (the Indus Valley) came Indian timber and mangrove poles as well as carnelian beads, lapis lazuli, ivory, and gold,[15] their goods marked with seals on which were engraved animals. Fragments (c. 2200 BCE) of imported black storage jars and small cubical stone weights found in Tell Abraq in the Emirates, are identical to those found in the agriculture-based city-states of the Indus Valley: Mohenjo-Daro, Chanhu-Daro and Harappa. Evidence of shipping and shipbuilding activities can be seen in representations at Mohenjo-Daro, Harappa, Lothal and Kachchh on a seal, a terracotta tablet, a graffito on a potsherd and a boat model.[16]

Trade in Mesopotamia flourished during Ur-Nammu's time, referred to as the Ur III period (2212–2004 BCE).[17] A class of seafaring merchants managed the trade successfully; they traded directly with Magan for copper in exchange for great quantities of wool and garments.[18] Magan was a land of copper, mines of which are being rediscovered in Oman and the Emirates. Jamdat Nasr vessels surfaced in excavated areas near Al-Ain and Jebel al-Emaleh in the Emirates probably in exchange for copper. The Dilmunites exchanged products such as milk and cereal

[14] Moorey 1994: 60.
[15] Bibby 1962: 47.
[16] See further details in Alok Tripathi, "Antiquity of sailing ships of Indian Ocean: evidence from ancient Indian art", a presentation at the conference on "Sails of History" in Zanzibar, 17–19 July 2006; see also Deloche 1996: 199–224.
[17] For the Middle Bronze Age the reader is referred to Hallo & Simpson 1971: 71–103.
[18] Oppenheim 1954: 13.



Map 4 Arabia and its Neighbours

products, silver, wool and fat from Mesopotamia for copper at Dilmun. Copper came from the Magan region (Oman) and the Dilmunites may have acted as agents for this much-sought product. From the cuneiform tablets we have references to the import of copper from Magan to cities in Mesopotamia. Copper then was the "most important exportable natural resource".[19]

It appears that many wares referred to in the written sources as "Magan goods" were in fact coming from Meluhha. Although Indus Valley goods were recovered in Mesopotamia, it is difficult to ascertain whether a regular trade existed because of the small number of objects found; nor can one comment on the Indus trading communities within Mesopotamia. There is evidence to suggest from the Ur III tablets that the Persian Gulf was no more an open sea and trade remained closed in the narrow corridor of the Gulf. For some political reason Meluhha was cut off and it seems Magan was playing trade games by exporting Meluhha products under its own name. As for Mesopotamian trade with Egypt during the mid-third millennium BCE, the most direct route was across the desert to either the Gulf of Aqaba or the Mediterranean coast but it was also possible to take the Red Sea route via Upper Egypt to Alexandria.

Ur seems to have declined in importance by the middle of the second millennium, during which time the Kassites (1415–1159 BCE)[20] from the Zagros Mountains assumed power. This decline could be attributed to the end of its role as the main maritime import and export centre, i.e. the end of the triangular trade with Dilmun, Magan and Meluhha.

When the Neo-Assyrians (c. 1000 to 612 BCE) came into power they concentrated their hold in Mesopotamia by military campaigns until the fall of Nineveh in 612 BCE.[21] They took the whole territory from

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[19] Potts 1998: 32. Ancient tombs and settlements from the third millennium on the island of Umm al-Nar, near Abu Dhabi show evidence of copper residues of castings and crucibles that are typical of Magan often recorded in the Sumerian cuneiform texts. Copper was, indeed, revolutionary. The operations of mining, smelting and casting would have needed an organised labour of a class of artisans and slaves while the rulers sought to explore new territories for raw materials. Umm al-Nar was strategically a good sea-trading port.

[20] The Kassites, known in Greek as Kossaeans, came, though not all, from the centre west of Iran to Babylon; settled after c. 1680 BCE in the northern region and gradually became absorbed in the Babylonian community, see Halo & Simpson 1971: 103, 105–9; Von Soden 1994: 26–7.

[21] The Neo-Assyrian period (c. 1000–612 BCE) includes the reigns of Ashurnasirpal II (c. 883–859 BCE), Shalmaneser III (858–824 BCE), Tiglath-pileser III (745–727

the Zagros to the Persian Gulf and westward to the Mediterranean. But their most significant advance was in the south of Mesopotamia, where the Chaldeans and Elamites controlled most of the trade. Many of the battle scenes are depicted on stone reliefs (illustration 2).

The Mediterranean invaders and traders

Darius I (521–486 BCE), king of Persia, one of the most able of the Achaemenids (550–330 BCE),[22] was keen to develop commerce within the empire; he was interested in opening sea trade routes. He brought skilled workers to work on agricultural land and probably encouraged the construction of underground water channels.[23]

In 331 BCE Babylon was conquered by Alexander the Great (356–323 BCE). He ordered admiral Nearchus (fl. 324 BCE), Cretan by birth, to sail with a fleet in the Persian Gulf reconnoitring the coast, its anchorages and water supplies;[24] nothing survives of this report but the activities recorded in it have been mentioned by later writers such as Theophrastus of Eresus (d. c. 287/6 BCE), Strabo (d. after 21 CE) and Juba of Mauritania (d. c. 23 CE). Lucius Flavius Arrianus (d. c. 180 CE), wrote of Alexander that he

> …had ideas of settling the seaboard of the Persian Gulf and the offshore islands; for he fancied it might become as prosperous a country as Phoenicia… . Arabia, too, was a large country, its coast (it was said) no less in extent than the coast of India; many islands lay off it, and there were harbours everywhere fit for his fleet to ride and to provide sites for new settlements likely to grow to great wealth and prosperity.[25]

Three days before his campaign, Alexander died of a fever. One legacy left by him was the founding of Charax on the Shatt al Arab (near

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BCE), Sargon II (722–705 BCE), Sennacherib (705–681 BCE) and Ashurbanipal (669–626 BCE).

[22] The Achaemenids were keen to develop a land empire, extending its trade routes from Egypt to India; consequently, navigation received a set-back whereby several dams and irrigation works were constructed near Ubulla obstructing ships trying to enter the Euphrates and the Tigris (Huzayyin 1942: 19–20). This may have been a deliberate policy because the rivers have a history of overflowing causing havoc to the land and economy; hence the land route would have been a securer alternative.

[23] Cook 2001: 344.

[24] Arrian Bk VII. 20.

[25] Ibid., 19–20.

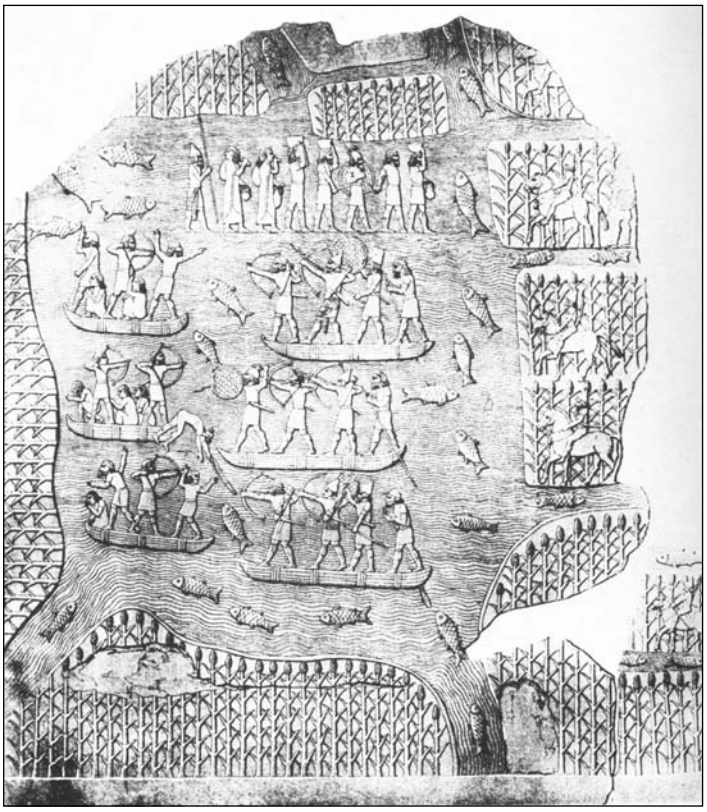


Illustration 2 Battle scene in the Marshes: the Assyrian soldiers (right) against the Marshes soldiers (left), Kuyunjik, SW palace (after De Graeve 1981; pl. XX, no. 52)

Basra).[26] It was an important event because for centuries this city became the focus of maritime trade from India and China as well as Yemen and East Africa: frankincense, copper, hard woods and silk were imported in exchange for products like gold and dates. Alexander's motives for founding Charax had little to do with trade, as Potts argues: first he wanted to establish a defensive outpost against any possible attacks from the Gulf and second he sought a base for his large navy.[27]

[26] The port town was subsequently destroyed by flood but rebuilt by Antiochus IV (175–164 BCE) gaining the name of Antiocheia, see *Periplus* 1989: 177–8.
[27] Potts 1990, II: 8.

The Persian Gulf was never strongly Hellenized[28] and it can be safely assumed that the material and intellectual culture was indigenous (Arabian and/or Persian)[29] with no doubt foreign influence from the Indian Ocean, the Red Sea and East Africa. Archaeological finds of coastal settlement from about 50 to 100 CE show the remains of private houses, both large and small and individual and collective graves, all built from *farūsh* (beach rock) such as the vast site of Ad-Dour in Umm al-Quwain. Other buildings excavated in this area are square or rectangular having corner towers, suggesting that such residences could have belonged to the elite or wealthy merchants. The port of Ad-Dour, recently excavated, is an ancient settlement of the Hellenistic period. It was clearly linked to a network of trading routes. In recent years broken Greek amphorae were unearthed from tower tombs of mixed brick in inland Mleiha (near Dhaid), then a flourishing town which was on the caravan route between the east coast and the southern Yemen. Burials excavated on Ras Abaruk peninsula, northwest of Qatar may be dated to the Selucid era (c. 312–226 BCE) during which time Selucia was the ancient city of Mesopotamia on the Tigris (below modern Baghdad).[30] If this is the case then the large number of (burial) cairns may suggest an active seafaring community.

Babylonia was supplied with Arabian aromatics and goods from India. The Gerrhaeans, according to Aristobulus (cited by Strabo),

> import[ed] most of their cargoes on rafts to Babylonia, and thence sail[ed] up the Euphrates with them, and then convey[ed] them by land to all parts of the country.[31]

The Gerrhaeans were, reports Strabo, "exiles from Babylon".[32] Gerrha, their city, was in Northeast Arabia but the exact location is not known;

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[28] Attempts were made to establish Greek settlements but no evidence of colonization in a scale claimed by some scholars, see Potts 1990, II: 15.

[29] Diodorus Siculus' (fl. 1st c BCE) judgement of the Arabian character is worth considering; he remarked that Arabians loved "freedom and under no circumstances submit to a foreign ruler", Bk II. 1.5.

[30] The name comes after Seleucus (c. 358 to 280 BCE), one of the Macedonian generals who after the death of Alexander was allotted the eastern empire (i.e. Syria, Iraq and Iran).

[31] Strabo Bk 16.3.3.

[32] Ibid. In fact he says that Gerrha was "inhabited by Chaldaeans"; hence, it came to mean that the city was founded by Chaldaeans. The Chaldaeans were Semitic, the ruling class of Babylon coming from Northeast Arabia or from the Kurdish uplands. They ruled Southern Babylonia c. 1000 BCE and their empire flourished under

it has been suggested that it could have been on the site of Qatif, Hofuf, Salwa, ʿUqayr, Thaj, or even possibly Jubayl.[33] We know that the Gerrhaeans traded incense and cargoes of aromatic products with the Mediterranean and their commercial contacts with the Nabateans are well noted.

Following the Selucid dynasty, the Parthians (c. 330 BCE to 240 CE) rose into power; their monarchy extended from the Euphrates to the Indus and from the Indian Ocean to the Hindu-Kush. Parthia (southeast of the Caspian Sea)[34] was the chief rival of Rome after the middle of the first century BCE, interfering with Graeco-Roman trade between the Mediterranean and India. As the Parthians controlled the silk route from the east to Syria and on to the coastal towns of the Mediterranean the Romans sought an alternative route via the Red Sea.[35] It needs to be mentioned that from Barbaricum, at the mouth of the Indus Valley, came silk-yarn while Barygaza and the Malabarian ports exported silk-cloth.[36] Now Barygaza, on the Gulf of Cambay, was linked by overland route to China. The Romans tried to bypass the Parthians, according to Procopius (d. after 558 CE), by buying the silk from the Ethiopians who acted as middlemen with the Indians. This never happened because the Parthian merchants were "at the very harbour where the Indian ships first put in",[37] thus making sure that the Ethiopians were blocked.

Nebuchadnezzar II (c. 605–562 BCE). Movers (cited by Potts too) argued that Nebuchadnezzar had "exiled the Chaldaean Gerrhaeans, as part of a policy to protect the country from menacing Arab tribes" (Potts 1990, II: 86) and Rawlinson (also cited by Potts) claimed that it was Sannacherib (705–681 BCE) who sent the Chaldaeans "to dwell in Gerrha" (ibid). It has now been established that the Chaldaeans were not the Gerrhaeans. Their connection with Gerrha, however, seems to have never been fully explored. Their decline came when Babylon fell to Cyrus the Great in 539 BCE.

[33] There is mention in Strabo's account of Gerrha that it is both a port "situated on a deep gulf", and a town "200 stadia (c. 32 km) distant from the sea" (Bk 16.3.3). For a discussion on Gerrha and its origin, see Potts 1990, II: 85–97. Walter Müller (cited by Potts) hypothesized that Gerrha may have derived from Aramaic *ḥagarā* (cf. CA *ḥajar* "stone" [Wehr 1966: 157]) and therefore, as H. von Wissmann (cited again by Potts) pointed out, this could be a reference to "a walled city with towers and bastions"; Potts thinks that Thaj or Jubayl could possibly be the town of Gerrha, ibid., II: 89–90.

[34] A mountainous region with fertile valleys, lying south of Khurasan, it was part of the Assyrian and Persian Empire, later the Macedonian Empire. Mentioned in the New Testament in *Acts* 2.9, the Parthians were able horsemen and archers (further details see M. A. R. Colledge, *The Parthians* (London: Thames & Hudson, 1967).

[35] Strabo Bk 2.5.12.

[36] *Periplus* 1912: 39, 49.

[37] Procopius Bk I.XX.9–12.

The Red Sea route: the discovery of the Indian monsoons

Trade with the spice lands via the Red Sea during the Ptolemaic and Roman periods is well attested in the classical works of Strabo (d. after 21 CE),[38] Pliny the Elder (d. 79 CE) and the *Periplus* (written in the 1st century CE).[39]

In the second century BCE, Mediterranean navigators had made some attempts to cross over the Indian Ocean from the Southern Arabian coast to West India. We know that Eudoxus of Cyzicus (fl. 2nd century BCE)[40] did it with the aid of the monsoon winds between 117 and 109 BCE. A discussion on these winds will follow in Chapter 6. He had sailed to the north of the Indus Valley round the Arabian and Makran (west of Pakistan) shores which means that he experienced the periodic change of the Indian monsoons. But according to the *Periplus*, Eudoxus was not the first; the first shipmaster who sailed across the open sea direct to West India was said to be the Greek pilot Hippalus sometime around 60 CE who, we are told, was blown out to sea in an open ship from Yemen to Southwest India and six months later managed to make his way back again.[41] In either case the Greeks and Romans from the second century BCE to the first century CE were familiar with the monsoon wind directions.

It is possible that prior to Eudoxus of Cyzicus and the account in the *Periplus*, the use of the south-west monsoons was only known to Arabian mariners who were not willing, so we are told, to share their knowledge with their rivals the Greeks, Romans and Egyptians.[42] But why would Arabian and Indian Ocean mariners keep this as a secret? It is odd that they would not share their knowledge with the Mediterranean mariners as trade was of great benefit to all. For the Greeks and Romans it is clear that the result of such a discovery was a breakthrough in the knowledge of the monsoonal winds and the route to India. Thus, a Graeco-Roman vessel could leave the port of Alexandria in July and arrive in India in September with a stop in Aden waiting for the south-west fair monsoon winds. The vessel could then wait in India for some two months and catch the north-east monsoonal winds

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[38] Strabo Bk 17.1.45.

[39] *Periplus* 1989: 51.

[40] He was a Greek navigator who under Ptolemy VII (145–116 BCE) was commissioned to explore the shores of the Western Indian Ocean.

[41] *Periplus* 1912: 45.

[42] On this subject see Rougé 1988: 59–74.

to sail back to Egypt. If indeed it was a Greek or Roman discovery, it would have been for the west a significant event, ranking with the circumnavigation of the Cape of Good Hope by the Portuguese in 1487, the key to the Indian Ocean.

The Red Sea and India: Graeco-Roman trade

By the time of Herodotus, writing in the fifth century BCE, India was already regarded as a rich country and it produced gold;[43] Strabo describes India as "the greatest of all nations and the happiest in lot".[44] Southern Arabia which produced myrrh and frankincense was called by the Greeks *Eudaimon Arabia* (Prosperous Arabia), while the Romans called it *Arabia Felix* (Happy Arabia). "Happy" is probably in the sense of fortunate, a reference to the sun, its light, the fragrant spices, exotic plants and animals.

The *Periplus* records imports and exports, the conditions of the peoples that lived on the coasts of the Red Sea, East Africa and the Western Indian Ocean. Articles such as frankincense, gems, pearls, ebony and sandalwood, balms and spices are mentioned.[45] The details reflect in some way the volume of the traffic that had developed at those times. We have in the *Periplus* a description of the route to the Red Sea ports of Egypt and Somalia, the Southern Yemen coast and the west coast of India.[46] We learn, for example, that the seafaring community at Muza (probably Mocha, Southwest Yemen) sent thither "many large ships; using Arab[ian] captains and agents" to East Africa and along the Southern Arabian coast to India.[47] As for the Persian Gulf, it records Apologos (later called by the Arabians, Ubulla) in Southern Iraq,[48] and "Omana", the region assumed to be in Southeastern Arabia in the lower Gulf.[49] These market-towns were visited, so the *Periplus* informs

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[43] Herodotus Bk III. 98.
[44] Strabo Bk 2.5.32.
[45] *Periplus* 1989: 16–17, 37–8, 87, 89, 169–70, 219–23, 231–2.
[46] Ibid., 283.
[47] Idem, 1912: 28.
[48] The town Apologos in c. 8th and 7th centuries BCE, assumed the name Ubulla after an Aramean tribe called Ubulu who, as documented in the Assyrian records, settled in the area, see *Periplus* 1989: 177–8. Apologos was refounded by Khusraw Ardashīr (224 or 227–241 CE).
[49] Omana, Schoff believes, covers a large area including much of the lower Persian Gulf and the Southern Arabian coast as far as Ras Hasik (*Periplus* 1912: 140). Glaser & Warmington, quoted by Casson, too place it inside the Persian Gulf (idem, 1989:

us, by large vessels from Barygaza (modern port of Broach on the Gulf of Cambay in India), loaded with supplies of "copper, teakwood, and beams, saplings, and logs of sissoo and ebony".[50] Frankincense, which grows in Dhofar and the Hadhramaut was:

> brought into Kanê (modern Bir Ali in Hadhramaut), as if to a warehouse, by camel as well as by rafts of a local type made of leathern bags and by boats.[51]

Already during the Sabaean period[52] several early sources point to a profitable trade that existed between the Yemen and India,[53] and the Ptolemies (305 to 31 BCE)[54] too, had established sea trade with India though with much caution because of the economic threat they posed to the Sabaeans. Supplies of incense for the great temples of Egypt were crucial for the Ptolemies. They learnt to work with the powerful

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180–1); others, however, have suggested Chah Bahar (Southwest Iran), a prominent harbour at the north of a small bay, or Tiz apparently an active port town, at its bottom, or even perhaps more eastward, on Gwadar West Bay (see Casson's note in *Periplus* 1989: 180). The name Omana seems to have an Early Arabic root or one that can be traced to Southern Arabic: ʿUmān in the Yemeni dialect stands for "soft land" (see Lane 1984, II: 2160).

[50] *Periplus* 1989: 73.

[51] Ibid., 67.

[52] The Sabaeans are the inhabitants of what is present-day Yemen and the Hadhramaut. The region was called Saba or the biblical name Sheba whose inhabitants had migrated, it is believed, from Northwest Arabia. Some time in the 10th century BCE, Ethiopia was colonized by Saba. There is mention of Saba in Assyrian documents claiming that it was of social and political importance. The Sabaeans are also mentioned in a biblical reference to the visit of the Queen of Sheba to King Solomon (c. 970–931 BCE), see I Kings 10.1–10. Archaeological evidence reveals that Saba was at its height from the 6th to 5th century BCE: such as the Marib dam, buildings and monuments. Numerous inscriptions in Sabaic, some by the Himyarites, see Rabin 1951; for general historical facts about the Sabaeans and archaeological finds, see Von Wissmann 1982; also Hoyland 2003: 36–42, 46–9, 140–1, 164, 175, 178, 182, 197, 200–1, 203, 205.

[53] *Periplus* 1912: 3; Charlesworth 1924: 58; Hasan 1928: 46. We now know through the finds of survey expeditions (1996–2000) that a number of port towns had been established on the Southern Arabian coast, what is today Hadhramaut. Apart from the well-known port towns of Qani and Moscha or Khor Ruri others have been identified as settlements during the Iron Age: Shihr East, Musaynaʿa, Kidmat Yarub, Sharwayn and Khalfut. These ports were closely linked with the east, Dhofar, as a number of imported ceramics testify, see Rouguelle 2001: 205–11.

[54] The Ptolemies of Macedonian descent ruled Egypt; their first ruler Ptolemy 1 (d. 284 BCE), son of Lagus, acquired the land of Egypt after Alexander's death in 323 BCE. In spite of incessant warfare, he laid the foundation of a Ptolemaic administration in Egypt and promoted culture and art by founding the library there; for further reading seee E. R. Bevan, *A History of Egypt under the Ptolemaic Dynasty* (London: Methuean, 1927); Grant 1984: 201–7; Hoyland 2003: 21, 25, 72, 76.

Sabaeans without upsetting their political and economic power in the region. The very fertile country of the Sabaeans produced "myrrh and frankincense and cinnamon", writes the Greek geographer Strabo.[55] Much of their traffic in aromatics, he reports, was with Ethiopia across the Red Sea. They sailed across in "leathern boats",[56] but they also delivered their goods as far as Syria and Mesopotamia.

The traffic of myrrh and frankincense was during the third century CE in the hands of the Nabateans; they acted as middlemen to the Ptolemies. From Omana, probably the lower region of the Persian Gulf (i.e. Oman and Southwest Iran), were exported purple cloth and local clothing, wine, dates, gold, slaves,[57] and quantity of pearls.[58] Jewellers went to the Persian Gulf to obtain the finest specimens of pearls for, as the Roman naturalist, Pliny the Elder, wrote:

> [the pearls] round Arabia on the Persian Gulf are specially praised.[59]

Pearls in Roman times, according to Pliny, were the most precious of all valuables, fetching high prices from the Roman clientele.[60] It was believed that pearls had healing powers because of their natural beauty and they served as charms to ward off evil; it was also thought, as today, that the grains used in various potions could heal a wide range of illnesses. As a consequence of this, ships sailing to India from Arabia were often subject to piratical raids. Pliny tells us that the whole region was "greatly infested by pirates"; a fleet crossing these seas would have sailed "with companies of archers on board".[61]

Greek trade with the peoples of the Red Sea coast and India started under the Ptolemies; it expanded under Ptolemy II (285–246 BCE). From East Africa came elephants which were shipped to Egypt; elephants were important for warfare and their ivory tusks were much sought by Mediterranean traders. On the Southern Egyptian Red Sea coast, we find Berenike (162 mi/260 km east of Aswan), an important harbour town (from 3rd century BCE to 6th century CE), a lively entrepôt which linked the Mediterranean and the Indian Ocean.

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[55] Strabo Bk 16. 4. 19.
[56] Ibid.
[57] *Periplus* 1989: 178.
[58] Much of the pearls came from Qatar-Dubai area, Casson notes (quoting the USA Defence Mapping Agency [1983]), see *Periplus* 1989: 178; Agius 2005a: 52–3, 58, 145, 147, 156.
[59] Pliny the Elder Bk IX. LIV. 106.
[60] Ibid., Bk IX. LIV–LVII. 106–120; Bk XII. XIX. 84.
[61] Ibid., Bk VI. XXVI. 101.

Excavations have revealed "rich and diverse ethnic and socio-economic backgrounds of the people who made Berenike their home".[62] In addition to the plethora of artefacts unearthed at Berenike there is a rich corpus of ostraca exhibiting twelve different scripts which represent Pharaonic Egyptian (Hieroglyphs and Demotic), Greek, Latin, Palmyrene, Hebrew, Aramaic, Coptic, Tamil-Brahmi, Prakrit-Sanskrit and two unknown languages.[63]

Goods were also shipped to Myos Hormos (Mussel Harbour), during the Ptolemaic period. Myos Hormos is 5 miles (8 km) north of the modern port of Quseir. The desert route carried the cargo from the Red Sea ports and India to Coptos (modern Qift c. 62 miles [100 km] NW), a strategic trade town on the Nile, just north of the gold mines of Wadi Allaqi. The cargo was transported up the river to Alexandria for further shipment across the Mediterranean. A piece of papyrus recovered at Quseir al-Qadim on the Egyptian Red Sea coast by the University of Southampton archaeological team shows the name of the site as Myos Hormos; in addition, an important archive of ostraca was unearthed detailing activities of sea trade in the Red Sea region.[64] Extensive excavation at the site provided very rich and well-preserved remains of textiles, pottery, leather, basketry and matting as well as a large number of ostraca (mentioned above) written in Greek and a few containing unknown scripts.

Further south on the African coast of the Red Sea near present-day Massawa there was the kingdom of the Greek-speaking ruler Zoskales; copper alloy, iron, glassware and wine were imported from Egypt; in addition the kingdom exchanged ivory, tortoiseshell and rhinoceros horn for Arsinoë robes. Adulis, south of Massawa, was an active port during the Ptolemaic period (from 4th to 1st century BCE); it served Aksum the Ethiopian Christian kingdom from which gems, spices, cassia, incense and gold were exported to Byzantium, India, Sri Lanka and Persia.[65] From *circa* the first century CE the Aksumites had developed an active trade network linking Roman-Byzantine Egypt with India.[66]

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[62] Sidebotham 2004: 105; also 106–13.

[63] Ibid., 105.

[64] Peacock *et al.* 2000: 11, 51–2; Peacock & Blue 2006: 4–6. Whitcomb & Johnson (1979: 4) argues that the suggested site was not Myos Hormos but the rather minor Roman harbour of Leukos Limēn based on Ptolemy I's (d. 284 BCE) reading and an ostracon bearing the name Leuk. The Southampton team, however, has recovered a number of material which points to Myos as the chief port, Peacock & Blue 2006: 4.

[65] *Periplus* 1989: 53, 61, 101–3, 106–10; see also Manzo 2005.

[66] Munro-Hay 1991: 52–60.

Many goods from Egypt, East Africa and India came by sea. Myos Hormos was visited by some 120 ships a year.[67] Some maritime Roman artefacts were found at the site and are available for study by the Southampton team; these include: cordage, wood, textiles and metal which help to explain "the components required by ships, for rigging, hull sheathing and construction".[68] It is difficult to ascertain from the finds what ships were in use at the time. Local sewn ships may have been used to carry Greek and Roman trade.[69]

The development of the Mediterranean-Red Sea trade network with India is apparent from Greek and Roman sources as well as the numerous ostraca found in Berenike and Quseir al-Qadim. Also to be mentioned is the numismatic evidence found in the Persian Gulf and India itself. Indian sources speak of this foreign trade too. Sanskrit and Pali works: the *Mahābhārata, Pancha-Siddhāntika* and the *Virihat-Saṁhitā*, all speak of the Roman trade.

Native rulers and sea trade

One of the maritime routes was connected with an overland track which crossed the great caravan city of Palmyra in the Syrian desert, the latter being reached from the Mediterranean by way of the northern road: from Antioch down to Hama, the east-west route from Homs and the inland road from Damascus to the northeast at Qaryatein. Near modern Hit on the Euphrates in Iraq, caravans stopped and goods were handled on river barges plying the Euphrates as far as Apologos (Ubulla near Basra today) and from there the vessels sailed to India and China.[70]

Much of this trade was known principally from inscriptions found at Palmyra. Some Palmyrene texts dating between 19 and 269 CE reveal the role the kingdom of Charax played in the wake of the Parthian conquest of Southern Mesopotamia acting as a middleman between the overland and maritime routes. Charax, perhaps previously Apologos,

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[67] Strabo Bk 2.5.12.

[68] Thomas & Whitewright 2001: 37–41; also Thomas, Whitewright & Blue 2002: 81–3.

[69] Procopius I. XIX. 23–4.

[70] Al-Ṭabarī 1965, V (i): 2384; al-Masʿūdī 1861–1877, I: 231, 234. The period the Muslim historians are writing about is definitely before the Christian era but the century they are referring to is vague.

was now both a city and a city-state. Its contact with the Persian Gulf has started to reveal some interesting finds as more fragmentary vessels of Roman glass, pillar-mounded bowls, almond bossed beakers and pear-shaped flasks have been excavated in Ad-Dour.[71] It is evident that Ad-Dour was a trading emporium whose contacts with the Roman world were greater than has so far been understood. Of interest also is the periodic fairs and markets that were held in the sixth and seventh century CE, mentioned in Ibn Ḥabīb's (d. 246/860) *Kītāb al-muḥabbar* (Book of Refinement). They were found all over the Arabian Peninsula and were visited by Persian merchants who routinely travelled from one to another, exhibiting and trading wares.[72] Places noted are: Dumat al-Gandal at the head of the Wadi Sirhan (Northwest Arabia); Dibba at the foot of the Ruus al-Jibal of the Musandam Peninsula; Sohar on the Al-Batinah coast of Oman and Shihr on the Yemeni coast. Dibba, in particular, was one of the two main ports of importance, Sohar being the second, reports Ibn Ḥabīb.[73] He notes that merchants came to Dibba from Sind, India and China. The Chinese were at this time using a sea route as an alternative to the silk route overland. It needs to be noted that at the time the eastern coast of Arabia was under Persian rule and the Persians more or less controlled the commercial trade. They appointed agents to these fairs and levied heavy taxes on goods brought by merchants. But when the Persians started to lose their grip on Arabia in the early seventh century, their agents on the Eastern Arabian coast were powerless. Because of this the Arabians of Al-Bahrayn and the territories of Oman gained greater prominence and controlled the trade to Mecca through Yamama[74] (illustration 3). There is also evidence in the Chinese annals of the Hou Han Shu (fl. 6th century CE) that part of the trade from China went through the ports of Persian Gulf and Lower Mesopotamia through Arabian merchants.[75]

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[71] For further details see Potts 1988: 136–67 and 1997b: 89–107.

[72] Ibn Ḥabīb 1942: 265; al-Yaʿqūbī 1883, I: 313–14; see also Hoyland 2003: 109–10.

[73] Ibn Ḥabīb 1942: 256.

[74] In fact, the Bahrain-Yamama was one of the three trade routes Mecca was connected with during the 6th century, the first being with East Africa and the second with Yemen, see Kawar 1957: 184–92; Shoufani 1973: 69.

[75] Hirth 1885: 157–8; 184–5.



Illustration 3 Rock drawing of ships on the Southern Arabian coast, Dhofar, Oman (courtesy of Ali Ahmed al-Shahri, 1996)

The development of sea trade under the Sāsānian Persians

Commercial activity suffered a set-back in Mesopotamia and the Persian Gulf with the overthrow of the Parthians and the establishment of the Sāsānians in 225 or 226 CE in the province of Fars. The Sāsānians (c. 224–651 CE), coming from the southwest region of Persia had better contacts with the maritime world. Ardashīr Pāpakān (226 [?]–240 CE) was known for his re-building of the towns of Ubulla, Rishahr and Hormuz. He re-conquered the eastern territories and established Zoroastrianism as the state religion. Ubulla was, as in the early years, an important centre for the caravan-routes that came from the north of Mesopotamia and east of Persia and the Mediterranean. Rishahr, further south, close to present Bushehr, was an important sea port and still further south lay Hormuz which was a port of call for ocean-going ships to Sri Lanka. The Sāsānians built a strong navy, bringing an end to piracy and by doing so strengthened pearl-fishing and trade.[76]

[76] Reinaud 1861: 74.

Their chief aim was to control the Gulf trade. Shāpūr II (309–379 CE) tightened his hold on the Arabian littoral,[77] where Arabians took sheltered areas and exploited the trade by both land and sea.[78] In the fourth century CE the Latin historian Ammianus Marcellinus (d. c. 395 CE) reports that

> all along the coast [of the Persian Gulf] is a throng of cities and villages, and many ships sail to and fro.[79]

It is an important piece of information which explains in a nutshell the vitality of the Sāsānian sea trade at the time which by the beginning of the Sāsānian monarchy had reached China. The Province of Fars, reported the Muslim sources, was known for its wood, cotton, linen and perfume and particularly brocades and carpets.[80] Williamson identified the Bushehr Peninsula with Rev Ardashir as the main centre for Sāsānian maritime trade in the Persian Gulf. An account of the strategic importance of Rev Ardashir is supported by historical evidence;[81] Bushehr is rich in archaeological finds[82] which suggest that it was an important port linking inland to Kazerun and Shiraz.[83]

Sāsānian Persia invaded Yemen (after 542 CE) which at the time was ruled by Ethiopia; many Ethiopians were killed at the port of Aden and consequently trade connections with Adulis and Aksum came to an end. It may have been a deliberate policy by the Persians to keep the Red Sea corridor closed to Indian and East African shipping while the Persian Gulf, under their control, experienced a revival in commerce. Direct maritime contact between the Sāsānian Empire and China prospered and continued to do so at the beginning of Islam. The Chinese had, from about the Sung dynasty (420–478 CE), called on Hormuz, Siraf and Ubulla.[84]

The Sāsānian Persians seem to have controlled the monopoly of oriental imports to the Western Indian Ocean, mainly that of silk from China, a merchandise, as mentioned earlier, which had previ-

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[77] Al-Balādhurī 1866: 431–2; al-Ṭabarī 1965, II (i): 839; V (i): 2546–8.
[78] Al-Ṭabarī 1965, I (ii): 820, 836, 838–9.
[79] Ammianus Marcellinus Bk 23.6.11.
[80] *Ḥudūd al-ʿālam* 1937: 130; al-Iṣṭakhrī 1870: 133; al-Muqaddasī 1906: 629–30.
[81] Piacentini 1985: 57–77.
[82] Whitehouse & Williamson 1973: 29–49.
[83] Boucharlat & Salles 1981: 66.
[84] *Chau Ju-Kua* 1911: introduction, 4.

ously, attracted the attention of the Romans in the first century BCE.[85] The caravan Silk Route from China to the Mediterranean via Iraq flourished as it did previously under the Parthian period but with the Perso-Roman wars (502–506, 527–561 and 602–629) the Silk Route trade became limited and was the reason why the Romans resorted to the Red Sea route to reach the West Indian coast.[86]

The Persian element in the ports of Al-Bahrayn, Oman and the remaining Arabian coast was, as Muslim historians reported, very strong.[87] Persians mixed with Arabians, an assimilation which was strengthened during the second century CE by major population migrations from the Azdites, a group of the Azd ʿUmān (from the east of the Arabian Peninsula) and the ʿAdnānī extended tribe of Northern Arabia and Syria. No matter what name the new settlers took in the centuries to come or on which side of the Gulf littoral they were, they carried with them a long existing tribal feud that split the northern and southern Arabians, both politically and culturally. Some tribal members of the Azd ʿUmān, such as the Salima b. Mālik b. Fahm had crossed over to the Persian coast and settled in Kirman, others on the islands of the Persian Gulf. Fishing was the staple part of their economy; as seafarers and merchants, some exploited further terrain but were envied by other Arabians.[88] These new Arabian settlements and their mix with the Persians brought a revival to the Sāsānian economy. Perhaps this thriving economy was partly due to the Roman long-distance trade between the Mediterranean and India but whatever the case, the Sāsānians saw this as an opportunity to take and foster their suzerainty over Byzantium in the west.

Evidence of Sāsānian contact is found in Umm al-Maʾ; we have green-glazed pots manufactured in Iraq and Sāsānian material at Salihiyah in Ras al-Khaimah.[89] The excavations at Ad-Dour near Umm al-Quwain have brought to light several objects of Persian-like pottery as well as Roman finds such as glass, bronze, coins, stone anchors and fishing net weights. Ad-Dour must have been a port for a whole settlement; impressive houses made of seastone show the remains of

[85] Rougeulle 1996: 159.
[86] Jones 1970: 4.
[87] Al-Balādhurī 1866: 78 and al-Ṭabarī 1965, IV (i): 2021–23.
[88] Rabin 1951: 14, 54 seq.; Strenziok 1960: 812.
[89] De Cardi 1974: 199.

round towers; there is a temple with four stone incense altars outside and some incense burners and there are stone-lined tombs with intact corbelled roofs. The funerary objects found inside the tombs include glass flasks, glazed pottery and fine bronze drinking cups, all Mediterranean in style as well as coins from local areas.

Christianity and trade under the Sāsānians

In the few centuries before the advent of Islam the chief religion in Babylonia and Mesopotamia was Mazdaism[90] but there were also pockets of pagans, Jews and Christians. The Christians were the Nestorians, who came from the Byzantine territory after having fallen out on a dogmatic issue with their fellow Greek and Melkite Christians in the west.[91] Under the Persian kings, Shāpūr III (383–388), Bahrām IV (388–398) and Yazdagird I (399–420), the Christian Nestorians lived a life of relative tolerance. They were active proselytizers but conversion to the Nestorian Church did not come from Mazdaism, though a few exceptions are noted, rather from the Aramaic and Arabic-speaking pagan cults in Babylonia and Mesopotamia. We have information from Islamic sources that most of Southern Iraq belonged at the time to the Nestorian faith.[92] These converts constituted an important element in the ethnic mix of Eastern Arabia. The Nestorian Christians were Aramaeans (Nabaṭ) and although they spoke Aramaic, the language of their liturgy was Syriac. Their church was never a Persian Church as the Byzantines claimed; its followers spoke no Persian and in many respects their culture was characteristically different from that of the Persians.[93] Christianity at the time was complex: the fifth and sixth cen-

[90] A religion that evolved c. 5th century BCE following Zoroastrianism in Eastern Iran under the prophet Zoroaster (Zarathustra) c. 1000 BCE; he elevated the status of the heaven god Ahura Mazda, incorporating the concept of the dualism of life, good and evil, that are always in conflict. The Parsees today concentrated in the Maharashtra and Gujarat states especially in Mumbai, practise Mazdaism; they originally came from Iran escaping Muslim persecution in 2nd/8th century, see Ferm 1981: 477, 842–3. Their role as seafarers and merchants in the development of sea trade during the medieval Islamic period is noted in Chapter 3.

[91] The Nestorian Church accepted the canon (ecclesiatical law) of the Council of Nicea (325 CE) but rejected those of the Councils of Ephesus (431 CE) and Chalcedon (451 CE). The essence of the controversy was based on the principle that there was one divine nature in Christ rather than the two natures (divine and human), see Ferm 1981: 136, 252, 504.

[92] Trimingham 1990: 162–3.

[93] Ibid., 162.

turies witnessed a division among Syrian Christians: the Melkites, who remained faithful to the Byzantine Justin I (528–537), the Monophysites of West Syria and the Nestorians of East Syria who were subject to persecution by the Orthodox Church. Monophysitism spread also to the east;[94] their followers gained a hold on Takrit, north of the Tigris, then the Lakhmid centre of Hira in 524 which was the home of many Arabian leading families, many of whom converted to this belief.[95] The Nestorians, on the other hand, gained a strong hold in Southern Iraq, which, as mentioned earlier, was under the Sāsānian rule; their influence spread all along the Arabian coast of the Gulf; they and the Monophysites translated philosophical and scientific works into Syriac.

The Nestorians turned to trade; missionaries followed the overland Silk Route from Persia to Central Asia; they also took the sea trade route to West India and as far as China (illustration 4). Much of their activity is well attested to in the correspondence between the Catholicos (patriarchs) and the Arab bishops.[96] Recent discoveries on the Islands of Sir Bani Yas and Marawah (Abu Dhabi Emirate) show that Nestorian Christianity was active from the late pre-Islamic to the early Islamic era (c. 500 to 800) and even as late as the ninth century in Al-Bahrayn (i.e. Qatif and Hasa).[97] Such sites include churches and monasteries and a number of stone artefacts. Christian sties are also found on the islands of Failaka, off Kuwait,[98] at Jubayl (Saudi Arabian coast) and inland at Jebel Berri.[99] It is still too early to evaluate the importance of these sites in terms of their community activity and the relationship of the church/monastery with the inland settlements and nomadic tribes. Other questions as to the islanders' main occupation of fishing, seafaring and trade remain unanswered until further excavations are undertaken.

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[94] Its followers believed that God became man but kept the divine nature. Their dogma was propagated by the clergy, monks and nomads in the Syrian desert. The bishops were externally Hellenistic but culturally they were Arab.

[95] For further reading on the subject of Christianity and the Arabs/Arabians in the east, see Hefele 1894; Labourt 1904; Cheikho 1912–1919; Trimmingham 1990.

[96] Catholicos Ḥazqiyāl (c. 576), Yashūʿyāb I (582–595) and Īshōʿyaw III (c. 650) in *Synodicon Orientale* 1902: 273, 275, 424–51, 480–90.

[97] Elders 2001: 47–57.

[98] Bernard, Callot & Salles 1991: 145–81.

[99] Potts 1994: 61–5.

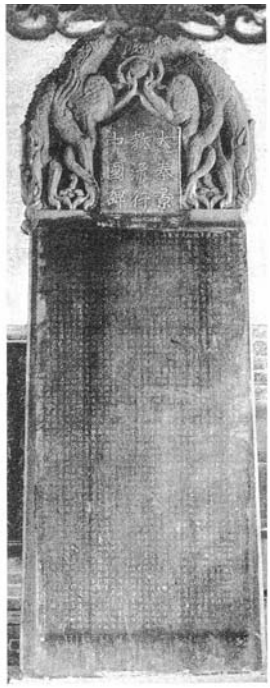


Illustration 4 A stele showing an inscription in Syriac listing 70 Nestorian missionaries in Xi'an, Central Asia

Conclusion

The peak of Sāsānian power and prosperity was reached by the middle of the sixth century when its king Khosrau I Anohshirvan (531–579) invaded Syria. The blow came, however, when his son, Khosrau II Parviz (590–628) over-reached himself by invading Byzantium and was forced to retreat. Peace came too late for both empires; economically, the empires of Persia and Byzantium were drained by long years of war. The new Arabian armies, enthusiastically and religiously motivated as they were in the name of Islam, moved to conquer Arabia and Syria (then under Byzantium). By 23/643 Persia was overrun, followed by the conquest of Herat and Balkh in 31/651 and the fall of Kabul in 44/664 which opened the way to India by 94/712.

Like their ancestors, the Persians of the Sāsānian Empire had developed maritime relations with the neighbouring regions of the Western Indian Ocean and the Far East. It is not known when they

first established trade relations in the east, but the call of Islam in the first/seventh century fired the desire to explore land for trade as in the words of the Qurʾān:

> But let there be amongst you traffic and trade by mutual good-will. . . .
> [*illā an takūna tijāratan ʿan tarāḍin minkum* . . .].[100]

Chinese chronicles from the fourth to the beginning of the seventh century CE, as noted in Chapter 1, record that goods from Persia or Persian goods came from India, Arabia and East Africa.[101] It is almost certain that Persians acted as middlemen carrying to China "coral, amber, cornelians, pearls, glass, both transparent and opaque, rock-crystal, diamonds, steel, cinnabar, quicksilver, frankincense, turmeric, storax, putchuk, damasks, brocaded muslins, black pepper, long peppers, dates, aconite, gall nuts, and galangal".[102]

The language of trade may still have been conducted in Persian but Arabians and West Indians were to join the mercantile Persian communities as Arabic became the official language of administration and a vehicle for the spread of Islam, a subject which will be taken up in Chapter 13; but now I shall look at the rise of trade and port towns in Classical and Medieval Islam.

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[100] Sūrat al-Nisāʾ, 4: 29.
[101] *Chau Ju-Kua* 1911: 7–8.
[102] Hasan 1928: 82–3.

CHAPTER THREE

TRADE AND PORT TOWNS OF THE CLASSICAL AND MEDIEVAL ISLAMIC PERIOD

وينتهي هؤلاء في بحر الزنج الى جزيرة قنبلو –
والى بلاد سفالة و الواقواق من اقاصي ارض الزنج –
ويقطع هذا البحر السيرافيون وقد ركبت انا
هذا البحر من مدينة سنجار من بلاد عمان مع جماعة
من نواخذة السيرافيين.

> They sail to the island of Qanbalū… then to Sufāla and Wāqwāq at the extremity of the Land of the Zanj… the Sīrāfīs cross this ocean. I, too, sailed across from the city of Sanjār in Oman in company of Sīrāfī shipmasters.[1]
>
> Al-Masʿūdī (d. 345/956–7)

Al-Bahrayn, Oman, Hadhramaut and the coastal towns of Eastern Arabia were under Persian Sāsānian rule when Islam emerged as a dominant force. Although historical documentation on trade and port towns before the advent of Islam (1st/7th c) and its early period is generally lacking, there is, however, evidence to suggest that from Sāsānian times, trade from the Western Indian Ocean was handled through the Mesopotamian-Persian Gulf route. It was here and in the region of Oman that an annual trade fair was held before and after the coming of Islam, attracting merchants and traders who came across to Awal (modern Bahrain), Sohar and Dabba, then the capital of Oman.[2] A fair took place from the beginning of Jumādā I to the end of the month. Ibn Ḥabīb (d. 245/860), reporting on this event, relates that

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[1] *Wa-yantahī haʾulāʾ fī Baḥr al-Zanj ilā Jazīrat Qanbalū… wa-ilā bilād Sufāla wa-l-Wāqwāq min aqāṣī arḍ al-Zanj… wa-yaqṭaʿū hādhā l-baḥr al-Sīrāfiyyūn wa-qad rakibtu anā hādhā l-baḥr min madīnat Sanjār min bilād ʿUmān maʿa jamāʿa min nawākhida l-Sīrāfiyyīn*, al-Masʿūdī 1983, I: 123. Note Sanjār was the metropolis of Oman at the time al-Masʿūdī wrote the *Murūj al-dhahab* (4th/10th c), see the editor's note by Yūsuf Asʿad Dāghir, ibid.

[2] Ibn Ḥabīb 1942: 265.

> Persians used to cross the sea and come to it [i.e. the fair] with their merchandise…
>
> [*fa-tawāfā bihā Fāris yaqṭaʿūna al-baḥr ilayhā bi-biyāʿātihim*…].[3]

Other people came to these fairs: Ibn Ḥabīb says that at Dabba, one of the two ancient Arabian ports,

> merchants from Sind, India, China, people of the East and the West came to it…
>
> [*yaʾtīhā tujjār al-Sind wa-l-Hind wa-l-Ṣīn wa-ahl al-Mashriq wa-l-Maghrib*…].[4]

Sāsānian Persian and Byzantine administration for many years controlled this trade, imposing heavy duties on all merchants and traders. Local chiefs were appointed as agents to exact customs dues. As tax on sea traffic increased, it was natural then that shipmasters, merchants and traders began to look for a different route to the Persian Gulf. The Red Sea was a good alternative and trade must have then passed into the hands of those, such as the Meccans, who found ways to control the Spice Route.[5]

Prophetic traditions offer up some evidence as to regular sea traffic between Arabia and Abyssinia (modern Eritrea): the first, reports that a ship owned by a Byzantine trader was wrecked at the port of Jeddah and local builders used her timber to cover the roof of the Kaʿaba at Mecca; the second one relates that the first Muslim converts sailed on merchant ships to Abyssinia;[6] the third states that the ruler of Abyssinia sent a party of 60 persons on board a ship in 6/627 which never reached the coast of Arabia; and the fourth reports that in 7/628 Ḥabība, the Prophet's wife, was among a number of Quraysh emigrants who sailed from Abyssinia to Jar on the Arabian littoral.[7] None of these traditions suggests that trade was taking place with the kingdom of Aksum in Eritrea. Aksum was the capital of the empire that lasted up to two centuries after the coming of Islam. Adulis was then "the most important port town" of the Aksumite kingdom.[8]

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[3] Ibid., translation in Shoufani 1973: 155.
[4] Ibn Ḥabīb 1942: 265–6; translation in Shoufani 1973: 156.
[5] See Kawar 1957: 184–92; Shoufani 1973: 69.
[6] On the number of Muslim immigrants that sailed to Abyssinia on boats, see Adel Salahi's study, 2005: 124, 127, 132, 141.
[7] Al-Ṭabarī 1965, I (ii): 1135, 1181–2; I (iii): 1570–1.
[8] Raunig 2004: 87.

Sea-borne trade and trade through the desert routes was the wealth, strength and glory of Islam; the rapid expansion of Islam in the first centuries strengthened links between the towns of the mainland and the coastal towns; the *ḥajj* (pilgrimage), the fifth pillar of Islam, accelerated sea trade as thousands of pilgrims and merchant-pilgrims made their way to Mecca and Medina by sea, stopping at coastal towns where they often traded goods (see Chapter 7).

Muslim shipping dominated the Mediterranean and the Indian Ocean during the third/ninth and fourth/tenth centuries linking al-Andalus with China; by the fifteenth century the Venetian convoys had synchronized their shipping, timing it toward the end of August in order to coincide with the availablility of the Indian Ocean ships that would by then have reached Aden and Jeddah. The commercial states of Europe were driven in search of silver and gold. By the fifteenth century China had saturated the global market with silver but, for Europe and the Muslim world, gold held a significantly more important monetary value. The Bilad al-Sudan (The Land of the Blacks), the sub-Sahara, was the chief supplier of gold and it is recorded that the Mandingo ruler of Mali, Mansa Mūsā (712–738/1312–1337), arrived in 1324 in Cairo on his way to Mecca with 100 camel-loads of gold. Southeast Africa near Sofala was also a gold-bearing region and it was this gold that brought the Portuguese to the Indian Ocean in the late fifteenth century (illustration 5).)

This chapter looks at general features of trade and some of the most important Islamic harbour towns in the Early and Middle Medieval periods of Islam. What I present here is an historical overview which sets up the maritime scene. Information is patchy but it is the intention to present as comprehensive picture as possible based on original Arabic sources and archaeological evidence.

Iraq's strategic frontier

Mesopotamia's geographic and strategic position made it a crossroads on the overland and sea trade routes, playing an important role in two world routes—the Silk Route and the Spice Route. The northern region, known as Lower Iraq (al-ʿIrāq al-ʿArabī), is the land where the two great rivers, the Euphrates and the Tigris, run parallel for some 250 miles (402 km) down to the Persian Gulf. It was a land sought by the Arabians for its ancient channels of irrigation and its commercial links with

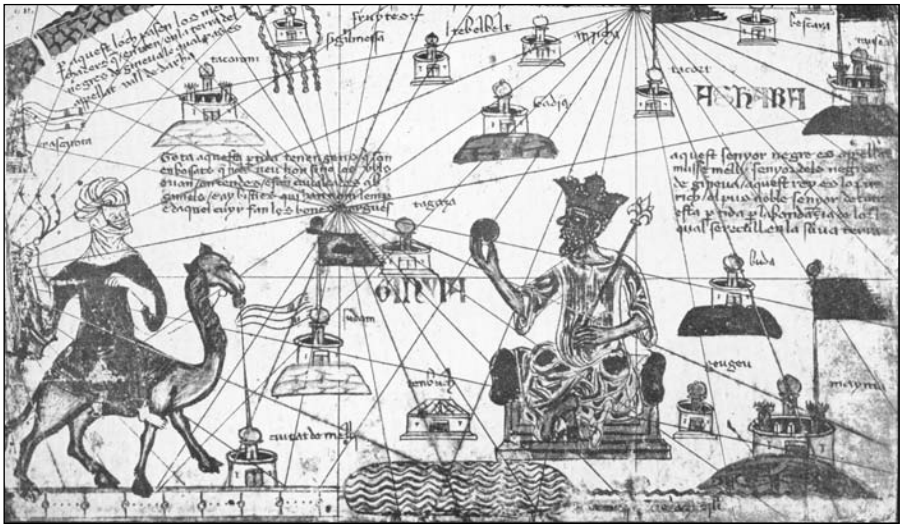


Illustration 5 Mansa Musa, Lord of Mali from a Catalan Map 1375 (after Bovill 1958 facing the title page)

the Indian Ocean. The plain of Iraq was sufficient for their wants and by 16/637 they had secured their hold on Mesopotamia down to the Shatt al-Arab. ʿUmar al-Khaṭṭāb, the second caliph (13–24/634–644), was then keen to occupy the head of the Gulf, the harbour town of Ubulla. He wrote to Saʿd b. Abī Waqqās, an Arab general (d. 50/670 or 55/674–5), who was at the time the commander of the Muslim forces in al-Kadisiya (North Iraq):

> Send someone you trust to [al-Ubulla(h), known as] 'the opening for India'. He will stay in front of it and protect you from any [danger] that may emerge from there.
>
> [*ibʿath ilā farj al-Hind rajulan tarḍāh yakūn bi-ḥiyālih wa-yakūn rid'an laka min shay' in atāk min tilka l-tukhūm*].[9]

Ubulla, lying on the estuary joining the Persian Gulf, was one of the oldest ports. As mentioned in the previous chapter, it was the chief port of Mesopotamia in Sāsānian times and remained the main anchorage in the Medieval Islamic period. References to ships sailing as far as China are found in the *Arabian Nights*: Sindbād the Sailor recounts

[9] Al-Ṭabarī 1965, IV (i): 2223; translation by Y. Friedmann, see al-Ṭabarī 1992a, XII: 15.

his seventh voyage adventure which led to China.[10] Al-Masʿūdī claims that "ships from China and India" [*…sufun al-Ṣīn wa-l-Hind*] came as far as Ubulla.[11] His use of the words, "ships from China", is ambiguous: it could be interpreted either as Chinese ships or ships laden with Chinese goods. If he meant Chinese ships he might have been writing about smaller types of *junk*s, such as the *kakam* or *zaw*, described by Ibn Baṭṭūṭa (d. 770/1368–9 or 779/1377) on his visit to the Malabar coast (see Chapter 7).[12] It would have been difficult for a very large *junk* to lay anchor at Ubulla; the danger of a low water level and, in some areas, coral reef in the Shatt al-Arab waterway, meant it could only be reached by smaller vessels: "scarcely a ship comes [hither] unscathed in rough seas" [*lā takādu tusallam minhu, safīna ʿinda hījān al-baḥr*], reported al-Iṣṭakhrī (d. 340/951–2).[13] Our reliance on the navigability of this region rests on texts; so far no excavation has been attempted.

In the early centuries of Islam the Ubulla river was connected to Basra (NE), the latter becoming the military camp capital of the conquering Arabs.[14] Basra was founded by ʿUtba b. Ghazwān in 17/638 under the instruction of the caliph ʿUmar b. al-Khaṭṭāb; its importance at the head of the Gulf was obvious and vital for the protection of the military camps guarding the Tigris against possible naval raids from Oman or Persia.[15] In 83/702 Wasit, lying equidistant from Kufa, Basra and Ahwaz in Khuzistan, assumed an important place as a military and commercial centre; it conveniently occupied both banks of the Tigris, midway between Basra and Baghdad.[16] Baghdad, became the seat of the Islamic caliphate in 132/749; trade flourished in the following century and a half at the same time as demand increased for goods from both east and west. Al-Yaʿqūbī (d. c. 278/891–2) calls Baghdad "the waterfront for the world",[17] hence al-Ṭabarī's (d. 310/922–3) statement:

> There is no obstacle between us and China, everything can come to us by sea.
>
> [*Laysa baynanā wa-bayn al-Ṣīn shayʾ yaʾtīnā fīhā kull mā fī l-baḥr*].[18]

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[10] *Alf layla wa-layla* nd., III: 147.
[11] Al-Masʿūdī 1983, I: 118.
[12] Ibn Baṭṭūṭa 1968, IV: 91.
[13] Al-Iṣṭakhrī 1927: 32.
[14] Al-Muqaddasī 1906: 117; idem, 2001: 98.
[15] Ibid.
[16] See Muir 1924: 339; on the building of the city by the governor al-Ḥajjāj b. Yūsuf (d. 95/714), see Bosworth 2004: 72–4.
[17] Al-Yaʿqūbī 1892: 237, 250.
[18] Al-Ṭabarī 1965, X (iii): 272.

Meanwhile, gaining importance and stability, Basra was claimed to be "the metropolis and emporium of merchandise of the world" [*kānat madīnat al-dunyā wa-maʿdin tijāratihā*].[19] Ibn Rusta (d. after 290/893–4) remarked that "the ships coming from India entered the Tigris of Baṣra and went up the river to al-Madain (south of Baghdad)" [*fa-kānat sufun al-baḥr tajrī min bilād al-Hind fa-tadkhul Dijlat al-Baṣra ḥattā taʾtī l-Madāʾin*].[20] By the fourth/tenth century it was a well-established trading centre side by side with Ubulla. Al-Muqaddasī (fl. second half of 4th/10th c) remarks that Basra produced a considerable number of articles of commerce; he asks: "Have you not heard of silks and linens of al-Baṣra…"? and speaking of Ubulla, he continues, "linen cloths of exquisite fineness are made, embroidered".[21] Muslim geographers (3rd/9th and 4th/10th c) describe it as having a large population, with trees, date palms, cereals and fisheries in the river. It was also a shipbuilding site. Wasit was a place famous for its textiles; merchants went there for its curtains, kilims, trouser cords and dyed wool.[22] From antiquity dates had been exported from Basra to ports in the Indian Ocean, to towns across Iraq overland and "to places far away".[23] Palm trees were fertilized by guano: in the Northern Persian Gulf somewhere between Julfar (on the present Emirati coast) and Al-Bahrayn, there are a number of islands where birds land and leave their droppings; these droppings, known as guano, were loaded on to small ships and transported to Basra and other places and sold there for a high price.[24]

But the route from Basra to Baghdad was not free from difficulties. The inundations of the rivers led to changing their courses, thus rendering navigation on both rivers dangerous.[25] Moreover, the silting up of the mouth of the rivers was a huge obstacle to shipping and trade. To extract the silt that had accumulated at the mouth of the rivers and therefore make the canals navigable, the caliphal administrators needed a large force of labourers. They brought thousands of slaves from East Africa but floods and broken embankments made the work harder,

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[19] Al-Yaʿqūbī 1892: 323.
[20] Ibn Rusta 1892: 59.
[21] Al-Muqaddasī 1906: 128; idem, 2001: 107.
[22] See al-Yaʿqūbī 1892: 322; Ibn Rusta 1892: 94–5; Ibn Ḥawqal 1964: 231–2; al-Muqaddasī 1906: 118–9; see also Le Strange 1966: 39–40.
[23] Al-Muqaddasī 1906: 128; idem, 2001: 107.
[24] Al-Idrīsī 1994, I: 163.
[25] Al-Masʿūdī 1861–1877, I: 224–6.

rendering navigation in the area almost totally impossible.[26] To make matters worse, the Negro slaves revolted against the caliphal army and caused great repercussions for the economy of Mesopotamia.[27] They were repressed and sometime after 270/883 the Basra-Baghdad route was re-opened by the ʿAbbāsid caliphate and strengthened. Then Basra was taken by the Qarmaṭians (286–294/899–907) who established a tollhouse at its entrance,[28] thus controlling the sea route to India and China. Ibn Ḥawqal noted in 358/969 that Basra totalled an annual revenue of six million dirhams.[29]

The Basra-Baghdad route had a crucial role because of the overland commercial caravans from east and west while the Baghdad-Kufa-Mecca route and the Basra-Mecca route were particularly important during the *ḥajj* (pilgrimage) season, an opportune time for merchants to transport their merchandise with pilgrim caravans (see map 5 for locations).

Al-Bahrayn: The Northern Gulf

The name Al-Bahrayn (lit. the Two Seas) stood collectively for a number of places: Hasa, Qatif, the islands of Bahrain, Qatar, sometimes extending to Oman and, according to al-Masʿūdī, it also covered the Southern Arabian coast up to Yemen.[30] Some 300 to 360 villages are said to have existed on the island of Awal (modern Bahrain).[31] The number is obviously exaggerated, Kunitszsch argued; it mistakenly represented the Island of Awal to be the whole region of Al-Bahrayn.[32]

Al-Bahrayn enjoyed a diversified economy based on the farming of dates, fruit, cotton, the manufacture of textiles, ambergris and pearl fishing. Pearl production gave rise to a large trade network. Around the Awal, Hasa and Qatif region there were the best pearl beds. Ibn Baṭṭūṭa comments (8th/14th c) that "large number of boats…with

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[26] Ibid.

[27] The political and economical upheaval had a devastating effect on the trade in Mesopotamia and its trading partners, India, China and East Africa, see further details Popovic 1965: 175–87; idem, 1976 and see also my article, Agius 1983: 3–18.

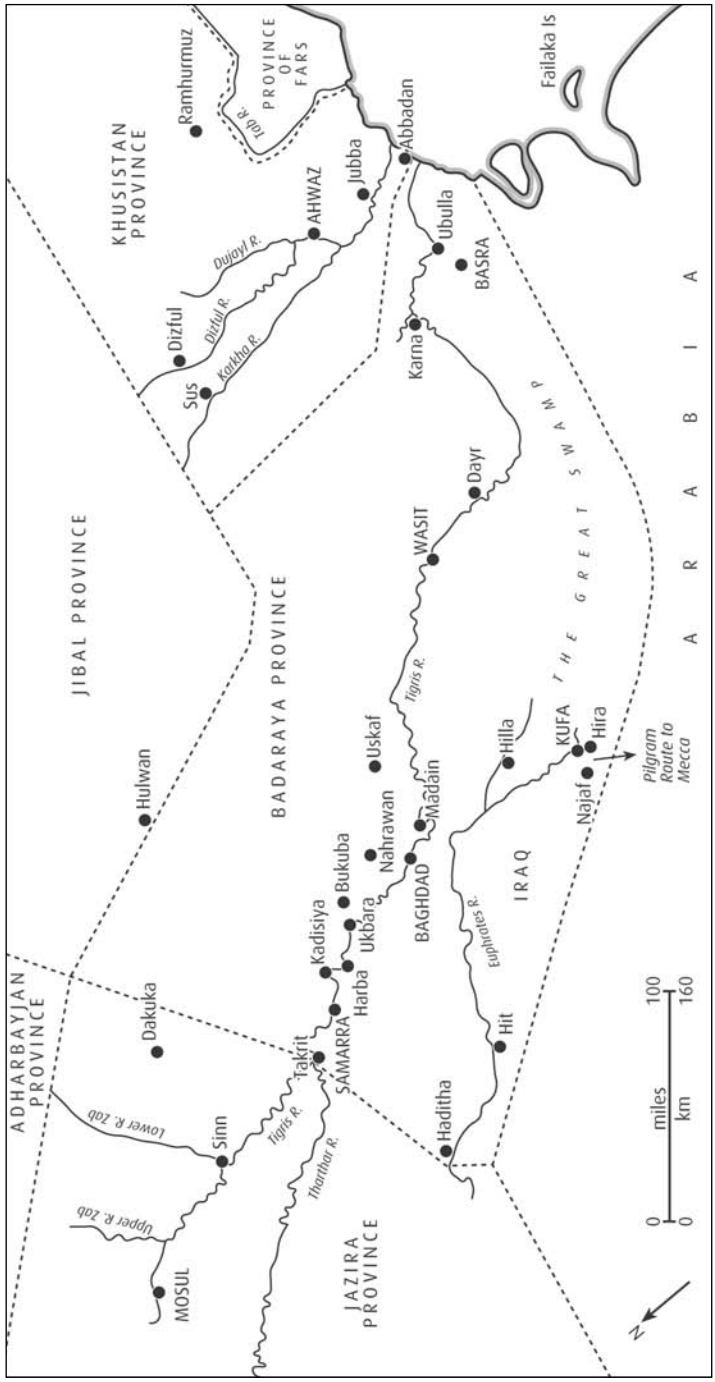
[28] Al-Muqaddasī 1906: 133; idem, 2001: 112.

[29] Ibn Ḥawqal 1992: 214.

[30] Al-Masʿūdī 1983, I: 126.

[31] Abū l-Fidāʾ 1840: 370; Ibn al-Mujāwir 1951–1954, II: 301; Ibn Mājid 1971: 300–2.

[32] Kunitszsch 1993: 388.



Map 5 Provinces of Badaraya, Iraq, parts of Fars, Jazira and Khusistan

divers and merchants" etc. came here for pearl fishing,[33] and, according to Aḥmad b. Mājid (d. after 906/1500), the number of pearling boats reached a thousand.[34] If we are to believe Ibn Mājid it was a large undertaking. Al-Masʿūdī (d. 345/956–7) devotes a whole section of his *Murūj al-dhahab* (Golden Meadows) to pearl fishing, describing the season, the location of oyster beds and other regions and how diving for pearls was done.[35] His comparison of the oyster in the shell to the mother and child is captivating:

> [it] fears for the pearl the approach of the divers, as a mother would fear for her child.
>
> [*yafzaʿ ʿalā mā fīh min al-luʾluʾ wa-l-durr khawfan min al-ghāṣa ka-khawf al-marʾa ʿalā waladihā*].[36]

Pearldivers and their catch are beautifully captured in the ode of al-Musayyab b. ʿAlas (uncle of the pre-Islamic poet al-Aʿshā [fl. 6th century CE]); he speaks of the moment the pearldiver picks his prize:

> He touched the bed, spitting oil from his mouth, and groped,
> athirst, his heart ablaze with the fire of want;
> …
> Then won he his longed-for prize, and upward he bore
> the pearl in its shell, that shone like a burning coal.
>
> [*ashfā yamujju l-zayta multamisun*
> *ẓamʾānu multahibun min al-faqri*
> …
> *fa-aṣāba munyatahu fa-jāʾa bihā*
> *ṣadafiyyatan ka-muḍīʾati l-jamri*].[37]

Not only was Al-Bahrayn famous for the seasonal pearl fishing but ships also came here because of its water. Water was in abundance, an important commodity, which was exported to places where it was not so readily available and was transported on ships for the benefit of the crew and passengers on long-distance voyages (illustration 6).

The sea route brought prosperity as heavy taxes were collected from passing ships from what seems to have been the island of Bahrain (i.e.

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[33] Ibn Baṭṭūṭa 1958–2000, II: 126, 408.

[34] Ibn Mājid 1971: 300. When Pīrī Reʾīs (d. 962/1554) spoke about pearling boats setting off from Bahrain he meant the island of Bahrain because by the tenth/sixteenth century it had already assumed the name known today, see Reʾīs 1988, I: 161, 163.

[35] Al-Masʿūdī 1983, I: 168–9.

[36] Ibid., 169.

[37] Verses cited in Jones 1996, II: 125–6.



Illustration 6 Fishing for pearls (after *Travels of Marco Polo* 1982: 291)

Awal).[38] During the Qarmaṭian period (4th/10th c) mentioned earlier, exorbitant customs duties were imposed on shipmasters as well as taxes on the pilgrims and on the colonies and territories.[39] The taxes extracted were then shared among the Qarmaṭian community. Their piratical activities and high taxes on passing ships must have deterred merchants and captains from coming here and consequently, trade might have shifted to the Persian coast and Sohar in Oman; archaeological evidence, on the other hand, points to imports still reaching the Arabian coast (Hasa, Qatif, Dhahran, Bahrain and Qatar) from the third/ninth to fifth/eleventh century.[40]

The Island of Bahrain had assumed a strong position under the protectorate of Hormuz in the ninth/fifteenth century and remained

[38] Ibn Ḥawqal 1992: 33.
[39] Ibid.
[40] Rougeulle 1996: 164.

its tributary[41] until the Portuguese took the island in 1521 and Qatif in 1545. Under the Portuguese, merchants continued to come from far and wide to trade dates, the island's principal asset, while pearls, the best in the world, were exported to India.[42]

Julfar: a pearl fishing town

One medieval town which archaeological finds have corroborated as an important port was Julfar on today's Emirati coast. During the caliphate of ʿAbd al-Malik (65–86/685–705) it was a strategic harbour, a key to the control of Oman through the desert. Julfar was known for fishing and was a trading centre which served the tribal families in the desert and mountains. A dependancy of Sohar, according to al-Muqaddasī (fl. second half of the 4th/10th c),[43] it was a place of rich pasturage, famous for cheese and clarified butter,[44] but also, according to al-Idrīsī (d. c. 560/1165), it was a pearl fishing place.[45] The port town was a dependant of Hormuz during the reign of Sayf al-Dīn (821–840/1418–1436–7) just before the arrival of the Portuguese. Duarte Barbosa (d. 1521) who visited Julfar in 1517 wrote that it is a place

> where dwell persons of worth, great navigators and wholesale dealers. Here is a very great fishery as well of seed-pearls as of large pearls, and the Moors of [H]ormus come hither to buy them and carry them to India and many other lands. The trade of this place brings in a great revenue to the King of Ormuz… .[46]

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[41] The island of Bahrain paid tribute to the sultan of Hurmuz in the ninth/fifteenth century. We are told by Ibn Mājid (d. after 906/1500) and other Muslim authors that Ajwad b. Zāmil b. Ḥusayn al-ʿĀmirī (b. 821/1418) of the Banū Jabr tribe was the ruler of Bahrain around 1490. His dominion extended at the time to include Qatif, see Kunitzsch 1993: 389, fn. 23.

[42] See De Barros (1973, III: 6–5; IV: 3–13) who claims that the island of Bahrain alone yielded good revenue.

[43] Al-Muqaddasī 1906: 53, 71.

[44] See Yāqūt nd., II: 179; Julfār spelt Jullafār (ibid.).

[45] Al-Idrīsī 1994, I: 150, 157–8, 162.

[46] *Book of Duarte Barbosa* 1918–1921, I: 73–4. The Portuguese, who in 1622 were expelled from Hormuz by the Ṣafavid Shāh ʿAbbās (996–1038/1588–1629), used Julfar as their base in order to launch an attack on Hormuz and retake it. Their plan was never executed because the Omani Imām Nāṣir b. Murshid (1034–1059/1624–1649) attacked Julfar and the Portuguese abandoned the town in 1633. Some notes about Hormuz and Julfar are found in Ibn Razīk 1871: 66–7.

Julfar was then a vibrant place where Arabians and Persians mixed and pearl fishing brought significant wealth to the city. From archaeological surveys conducted in the past thirty years, there have emerged a number of sites on the coast line north and south of Ras al-Khaimah (identified with Julfar) which reveal evidence of settlement dating to between the fifth and the twentieth century.[47] Of particular interest are: Jazirat al-Hamra, Ras al-Khaimah, al-Mataf Rams and Jazirat al-Hulaylah.[48] Other sites inland have produced some fourth/tenth-century pottery at Kush and Hulaylah, and other finds, including palm-frond huts, shell middens and hearths. The most interesting finds, however, came from al-Mataf in the eighth/fourteenth-century, a period which has been described as "an economic boom". From a small fishermen's anchorage, al-Mataf developed into a trading centre on the coast in less than a century.[49] Its wealth has been attributed to pearls but also possibly by exporting horses and providing food and water to Hormuz, as these latter two have been mentioned by medieval sources.[50]

The archaeological excavations on the northern outskirts of Ras al-Khaimah also testify to an active sea trade, while Julfar must have been a major harbour: several artefacts from China, India, East Africa, Yemen, Persia and Iraq have been unearthed from the sites in the area.[51] Excavations show that Julfar was a prosperous settlement over about 300 to 400 years with several houses and mosques. A number of imported Chinese celadon and blue and white porcelain wares come, however, from a later period (14th and 16th c).[52] A surprising find is the discovery of coffee beans as early as the sixth/twelfth century on these sites.

Another site Jumayra, near Dubai, was probably a trading centre too. It is believed to have flourished in the ʿAbbāsid period (132–656/749–1258), foundations of which date back to the Umayyad times (41–132/661–750). The excavations show a tradition of Sāsānian

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[47] Excavations started from 1977, see Hansman 1985; and recently 1989 and 1990, see Hardy-Guilbert 1991: 161–203.

[48] Derek Kennet has recently examined the historical documentation and archaeological evidence of these and other sites; an update of surveys and studies is provided in Kennet 2002: 151–64.

[49] Ibid., 160–1.

[50] Ibn Baṭṭūṭa and Duarte Barbosa, see Kennet 2002: 161.

[51] Hardy-Guilbert 1991: 183–96.

[52] See G. Bibby, "Julfar. Medieval Islamic port-city", *Arts and the Islamic World*, 23 (nd): 23, 46–8, 62; see also Hardy-Guilbert 1991: 196–7.

decorative style on arches and a good hearth system to warm water for both cooking and a lavatory. An interpretation of the function of this site awaits further excavation.[53]

The port of Siraf: An emporium of the Persian Gulf

The land route through Central Asia was still active in the first centuries of Islam, though it is evident from Arabic and Chinese accounts that the sea route was much preferred and continued to be so for some time. Bushehr was a thriving port during the Sāsānian period as evidenced in archaeological finds but dramatically declined some time before or after the emergence of Islam (1st/7th c). Most of its maritime trade was gradually transferred to Siraf. It has been thought that Siraf became the main harbour in the Persian Gulf during the third/ninth century and its success was understandable because of its natural harbour.[54] Seth Priestman, however, recently reconsidered the transition period between when Bushehr fell into decline and the rise of Siraf. He argued, on archaeological evidence, for a transition that occurred in the first/seventh century as a result of the Muslim conquest. He thinks that this coincided as a result of "the need for greater security".[55]

Two contemporary geographers, al-Iṣṭakhrī and al-Muqaddasī, visited this city in the second half of the fourth/tenth century, both impressed by its beauty and the affluent population. Merchants found in Siraf a thriving market with rich financial rewards, claims al-Iṣṭakhrī,[56] despite the fact that it was short of water for part of the year. Al-Muqaddasī could not help but comment on the charm of this city; he further wrote:

> I have not seen in the realm of Islam more remarkable buildings [than those of Siraf].
>
> [*ma raʾaytu fī l-Islām aʿjab min dūrihā*].[57]

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[53] Information collected from Hussein Suleiman Qandil, archaeologist at the Department of Archaeology and Museums in Dubai (interviewed 13 April 1996).

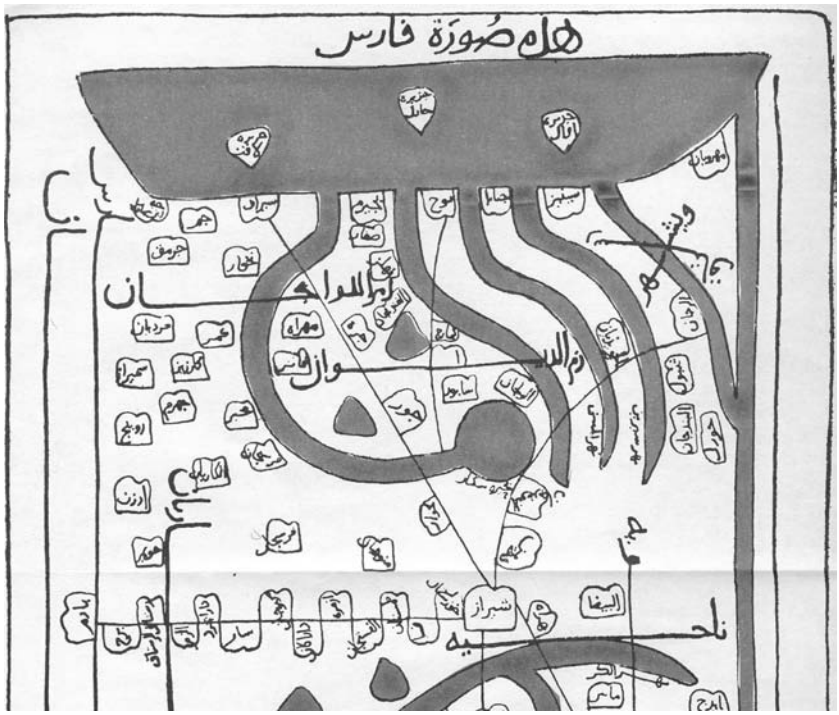
[54] *Relations des voyages* 1845: 51.

[55] Written communication from Seth Priestman (21 November 2006); a discussion on the transition from Bushehr to Siraf will appear in a forthcoming article.

[56] Al-Iṣṭakhrī 1870: 131–2, 170.

[57] Al-Muqaddasī 1906: 426; idem, 2001: 347.

They were "several storeys high [built] overlooking the sea" [*wa-abniyatuhum ṭabaqāt wa-hiya ʿalā shafīr al-baḥr*];[58] they were built of teakwood and baked brick.[59] For their roofing, mangrove wood was imported probably from Manda Island (off present-day Kenya), which was, as it seems, a colony of Siraf (see below). In terms of wealth, Siraf was the rival of Basra.[60] Its size and splendour, al-Iṣṭakhrī maintains, "nearly equalled Shīrāz" [*wa-hiya tuqārib Shīrāz*],[61] northeast inland. It was linked from the harbour to Firuzabad and Shiraz[62] (map 6). Among the imports, he lists a number of rare and precious Indian goods, which are called



Map 6 A section of Ibn Ḥawqal's map of Fars: at the top is the Persian Gulf showing the three Islands of Awal (Bahrain), Harik (Kharik) and Laft; on the left lies the coastal town, Siraf, connected diagonally with mainland Shiraz (after Ibn Ḥawqal 1992: 48)

[58] Al-Iṣṭakhrī 1870: 127.
[59] Al-Muqaddasī 1906: 426; idem, 2001: 347.
[60] Ibid.
[61] Al-Iṣṭakhrī 1870: 127.
[62] Boucharlat & Salles 1981: 68.

barbahār, such as aloes-woods, amber, camphor, precious gems, ivory, perfumes, drugs, condiments and paper. The produce of the city itself was linen veils and pearls.

As for Islamic and Chinese ships sailing to and from China, we have a number of sources to consider: Sulaymān al-Tājir in 237/851 is the first ever to record Chinese ships trading with Siraf,[63] later al-Masʿūdī (d. 345/956–7) writes about mariners and merchants of Siraf as well as Basra and Oman crossing the Sea of China[64] and Buzurg b. Shahriyār (d. 399/1009) tells stories of Sirafi seamen sailing as far as China.[65]

The route to China is described by the geographer Ibn Khurradādhbih (d. c. 300/911);[66] a number of agencies were set up on the route and merchants and traders from Malaya and the Indonesian archipelago acted as intermediaries between the Persian Gulf and China. Kalah, and later Malacca, were established as trading posts. For the Chinese sources, the Chinese Tang annals (c. 620–650) give accounts of journeys taken by Chinese merchants from Canton to Siraf, via Malacca and India. The dominance of Chinese ships in the Western Indian Ocean during the Northern Song (960–1127), Southern Song (1127–1279) and Yuan (1279–1368) dynasties is well attested. Nonetheless, the Chinese sources, as Williamson (cited by Tampoe) argued, are vague and ambiguous about sailing to the Persian Gulf, suggesting that they may not have done so.[67] He says that in all their references there is no mention of Chinese sailors or merchants in the Persian Gulf ports. On the other hand, Arabic sources report that Chinese ships put in at the port of Siraf while ships from Basra and Sohar and also Yemen came to Siraf to load their cargo onto Chinese ships.[68] For example, Abū Zayd Ḥasan al-Sīrāfī in the third/ninth century maintains that "most of the Chinese vessels [took in] their cargo" to Siraf[69] and al-Masʿūdī,

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[63] *Relation des voyages* 1845, I: 12; II: 14; *Voyage du marchand arabe* 1922: 18–9.

[64] Al-Masʿūdī 1983, I: 176.

[65] Al-Rāmhurmuzī 1883–1886: 2, 5, 12, 14, 17, 19, 36, 62, 86–8, 98, 105, 137, 141–2, 148, 152, 161, 165, 168; see also *Chau-Ju-Kua* 1911: 33.

[66] Ibn Khurradādhbih 1889: 68–71, 153–5,

[67] The sources mentioned are: the Annals of the Liu-Sung dynasty (c. 500 CE), account of the Battle of Talas in 751 CE by Da'Honan and an itinerary of Jia Dan's chronicle describing the sea route from Canton to the Arab world (c. 785–805 CE). These are discussed in Williamson's uncompleted thesis entitled "The maritime cities of the Persian Gulf and their commercial role from the fourth century A.D. to 1507" (Oxford University, nd); information taken from Tampoe 1989: 120.

[68] *Voyage du marchand arabe* 1922: 39.

[69] *Ancient Accounts of India and China* 1733: 8. Both Ibn Rusta (1892: 94) and al-Ṭabarī (1965, IV [i]: 2023) comment on the activity of Chinese vessels in the Persian Gulf.

circa a century later, claims that Sirafi ships carried the Chinese exports and distributed them to all major ports of Southern Arabia and East Africa.[70] The last report about Chinese ships seen in the Arabian Sea comes from Abū l-Maḥāsin (cited by Kindermann): he writes in 1432 that some Chinese ships sailed as far as Aden trading porcelain, silk, musk etc.[71]

Finds of fragments of Chinese porcelain and ceramic are scattered and found in a number of port towns in Southern Arabia and East Africa as well as parts of the Red Sea. They all point to an active shipping of Chinese exports in the whole Western Indian Ocean, particularly during the Song and Yuan dynasties.[72] The significant change, however, was that pottery (porcelain and stoneware) gave way to silk by the second/eighth century which was produced in quantity.[73] An increase in sea traffic signalled a prosperous economy during the Early Medieval period, an important part of which was the importing of Chinese and Indian goods such as iron, weapons, musk, aloes, porcelain, pepper, camphor and tin. Over the years, Siraf had several trading partners: Sohar in the Persian Gulf, Mantai (northwestern tip of Sri Lanka), Athar (south of the Red Sea), and in the Lamu archipelago in East Africa (Manda, Shanga, Pate). 30 sites were identified (3rd–5th/9th–11th c) where ceramic imports from the Gulf region such as egg-shell ware and blue/white glazed pieces of the Sāsānian-Islamic period were recovered. Style III glazed pottery was common in Siraf together with the occurrence of Chinese porcelain.[74] Also, Chinese sherds representing Hunan stoneware and white porcelain as well as Indian ceramics and quantities of Near Eastern glass have been unearthed.[75] In addition to architectural, numismatic and ceramic material collected by surface survey and excavation, there is evidence

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[70] Al-Masʿūdī 1983, I: 123, 125.

[71] Kindermann 1934: 21.

[72] See Kamoika & Yajima 1979: 170–1; Rougeulle 1996: 170–1.

[73] There is a significant number of Chinese imports to the Muslim world from the second/eighth to fourth/tenth century (eg Ras al-Hadd, Sohar, Siraf, Minab, Shiraz, Kish, Kufa, Samarra etc.); see Rougeulle 1996: 160 and Figure 1 showing Chinese imports to the Muslim world (2nd–4th/8th–10th c). Rougeulle argues that as hardly any Chinese porcelain and stoneware were unearthed at this period may explain the fact that they were produced in very small quantities.

[74] Further details on Style III glazed pottery is found in Whitehouse 1983: 330–1.

[75] Chittick 1967: 37–67; idem, 1984: 66, 71–9, 101–5, 159–79, 225–7; see also Piacentini 1992: 117; Rougeulle 1996: 165–6.

of an organised system of water-supply provided to the city by way of wells, cisterns and aqueducts.[76]

The heyday of Siraf was during the early decades of the Būyid dynasty (320–454/932–1062) that governed the province of Fars.[77] Yet, al-Muqaddasī reports that the population started to diminish during the time that the Būyids were in power;[78] a number of Sirafi merchants, who controlled the financial life of Fars, shipowners and navigators, seem to have left the port town to set up their trade in Sohar.[79] It is safe to assume, that this diaspora from Siraf helped the growth of ports like Jeddah and Aden and contributed to the development of Mogadishu, Kilwa and Malindi in East Africa (see below). We know, for example, that one very rich merchant of Siraf, by the name Rāmshit, settled in Aden and died there in 535/1140.[80]

According to al-Muqaddasī, it seems, that Siraf was almost destroyed by an earthquake in 367/977, which "shook it violently for seven days" [*fa-qalqalathā wa-ḥarrakathā sabʿat ayyām*],[81] and with the subsequent fall of the Būyids at the beginning of the fifth/eleventh century, Siraf rapidly declined. Ibn al-Balkhī,[82] writing around 504/1110, gives the following reasons for the decline but does not mention any earthquake: He explains that when the amir of the Island of Qais (or as known to the Persians, Kish, south of Siraf) came to power (giving no year) he took over a lot of the revenue that at the time came to Siraf. However, the governor of Fars, Rukn al-Dawla Khumartagin decided to build war vessels to attack the Island of Qais and its dependences but because of bribes and gifts sent to him by the ruler of Qais he was cleverly dissuaded from executing his plan. A further attempt against the ruler of Qais was made by Abū l-Qāsim, one of the khans (governors) of the province of Fars. When he took over Siraf he sent every year or so an army against the Island of Qais but at the end accomplished

[76] Tampoe 1989: 103; Piacentini 1992: 117.

[77] The Būyids were the most powerful of the new formed governments outside the central administration of ʿAbbāsid Baghdad. But this did not last for a long time, for over a century of their rule political unrest broke out weakening the Būyid dynasty.

[78] Al-Muqaddasī 1906: 426.

[79] See Wilson 1959: 94; Aubin 1959: 297; Williamson 1973: 22.

[80] Stern 1967: 10–14; for more details see Margariti 2007: 144–6, 148–51.

[81] Al-Muqaddasī 2001: 347; idem, 1906: 426.

[82] Ibn al-Balkhī was commissioned by Sultan Ghiyāth al-Dīn Muḥammad (498–511/1104–1117) to write the *Fārs Nāmah* which contains a description of the province of Fars in Persia.

nothing. As a result of this warlike activity in Siraf, the merchants no longer felt safe in the port, and were persuaded to abandon it and to anchor at Sohar or Qais.[83]

The collapse of Siraf may have been precipitated by natural disaster but if we are to believe Ibn al-Balkhī, there were political and economic reasons. Whatever the case, it seems that Siraf was already losing its trade in the late fourth/tenth century and some of that trade by the beginning of the fifth/eleventh century was to be diverted from the Persian Gulf to the Red Sea.[84] As David Whitehouse has pointed out, the excavations of the 1970s reveal "a catastrophic, but protracted decline" lasting until about the end of the sixth/twelfth century.[85]

The rise of minor towns on the Persian coast

With the fall of the Būyids in 454/1062, trading routes in the Persian Gulf were disrupted. As we saw earlier a number of wealthy Sirafi merchants went to Qais.[86] The Island of Qais was visited by a Rabbi Benjamin ben Jonah (d. after 1173) of Tudela from Spain, sometime between 1164 and 1173; "rabbi" is used as a title of respect, he was in fact a merchant. His itinerary offers valuable information as to trading activities in the Persian Gulf and India; he also tells us about the size of each city he visited and comments on the Jewish population; thus he reports of Qais, that 500 Jews lived on the island, information that no Muslim geographer or traveller seemingly ever gave. The market at Qais was considerable, to which

> the traders of Mesopotamia, Yemen and Persia import all sort of silk and purple cloths, flax; cotton; hemp; mash; wheat; barley; millet; rye and all other sorts… those from India import great quantities of spices—.[87]

As a Jewish merchant, his journey to Qais was not unusual for there are reports in the Genizah documents that Jews had reached India and the Persian Gulf a century later.

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[83] Ibn al-Balkhī 1912: 322.
[84] Aubin 1959: 295–301.
[85] Whitehouse 1983: 330–1, fig 2.
[86] Al-Qazwīnī 1848, II: 161; Ibn al-Balkhī (1912: 330) reports that there were three islands belonging to the Ardashir Khura district: Lar, Afzuna and Qais, the latter being the principal of all.
[87] *Itinerary of Rabbi Benjamin of Tudela* 1840–1841, I: 137; II: 177–8.

We know from al-Yāqūt (d. 626/1228) that the ruler of Qais was held in respect by the governors of India on account of the numerous ships he had.[88] These vessels were a threat to Indian and Muslim ships busy trading with Yemen and Egypt and, in fact, according to Ibn al-Mujāwir (d. 690/1291), he owned large galleys and warships[89] (see Chapter 12). In spite of this, the island was conquered by the ruler of Hormuz in 626/1229. During the time of the Il-Khanid governor of Fars, Jamāl al-Dīn Ibrāhīm al-Tībī, the island was enriched with many wells and palm groves[90] and pearl fisheries were an important source of revenue. Qais was also shipping horses to West India, news of which reached China at the time.[91] As for the houses, Ibn al-Mujāwir has this to report:

> The people build in stone and gypsum and their houses are very tall, one producing a building seven storeys high. Each house is like a fortress
>
> [*wa-bināʾ al-qawm bil-ḥajar wa-l-jiṣṣ wa-dūruhum dhāt ʿuluww wa-rifʿa yajʿalu aḥaduhum fi l-bināʾ sabʿ ṭabaqāt wa-kull dār minhā shibhu ḥiṣn*].[92]

His ethnographic details about the people of Qais are as important to the historian as the personal observations noted in the diaries of Ibn Baṭṭūṭa and Duarte Barbosa. Of their good nature and manners, Ibn al-Mujāwir says that: "They are a people who have great esteem for strangers and take great care of them" [*wa-hum qawm yuʿizzūna l-ghurabāʾ wa-lahum bihim ʿināya ʿaẓīma*].[93] He has also some comments to make about their dress which comes from North Africa though he says that women dressed in black.

Quṭb al-Dīn Tahamtan II, the king of Hormuz (1319–1347) recaptured the island in 1330 but, it seems, it never recovered since then.[94] That the island was once prosperous is corroborated by recent excavations where several large buildings, walls, cisterns and *qānāt*s (water canals) were uncovered. In addition to Style III sherds of pottery found all over the place, late Islamic wares with underglaze ornament were unearthed[95] and a number of ceramic sherds, both Islamic and Chinese (12th and 14th c), were recovered on the island.[96]

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[88] Al-Yāqūt nd., IV: 479.
[89] Ibn al-Mujāwir 1951–1954, II: 296.
[90] Reports Abū l-Fidāʾ (quoting Yāqūt) 1840: 373.
[91] *Chou Ju-Kua* 1911: 133–4.
[92] Ibn al-Mujāwir 1951–1954, II: 296; the English translation is taken from Rex Smith's forthcoming book.
[93] Ibid.
[94] Piacentini 1975: 84–5.
[95] Whitehouse1983: 331.
[96] Tampoe 1989: 114.

Further north lies the Island of Kharik, off the mouth of the Shapur river. Famous for the best pearl fisheries in the neighbouring sea, Kharik seems to have been as commercially important as Qais.[97] Another important port in the fourth/tenth century was Mahruban, close to the western border of Fars. Ships bound for India also stopped here after Basra. Shipping was a chief source of income for this town which in itself was famous for linen and dates. South of Mahruban was Shiriz, a strongly fortified post, where locally grown flax and oil for lamps were exported.[98] By the end of the century the importance of these ports was in decline, to be replaced by (Old) Hurmuz which was to become then the seaport of the provinces of Kirman and Sijistan.

Hormuz: "No equal on the face of the earth"[99]

Old Hormuz had captured most of the trade of the Indian Ocean,[100] controlling sea ports on the Arabian littoral of the Northern Gulf: Ras al-Khaimah, Julfar and Al-Bahrayn (Hasa, Qatif, and the Island of Bahrain), as well as the Omani coast: Khor Fakkan, Sohar and Qalhat.[101] It was probably around the eighth/fourteenth century that Old Hormuz moved its harbour to the Island of Jarun, opposite the old town, thus cutting itself off from the politics of Persia.[102] By doing so it could control the trade routes to mainland Persia: Kirman, Yazd, Shiraz, Kashan and Tabriz (map 7).

A great number of vessels from India and Yemen sailed and anchored at New Hormuz. Among the commodities known to have arrived in the harbour there were

> all sorts of spices and precious stones and pearls and cloths of silk and of gold and elephants' tusks and many other wares.[103]

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[97] Yāqūt 1866–1873, I: 395, 503.

[98] Al-Iṣṭakhrī 1870: 34, 128; al-Muqaddasī 1877: 426; Yāqūt 1866–1873, I: 502; III: 221.

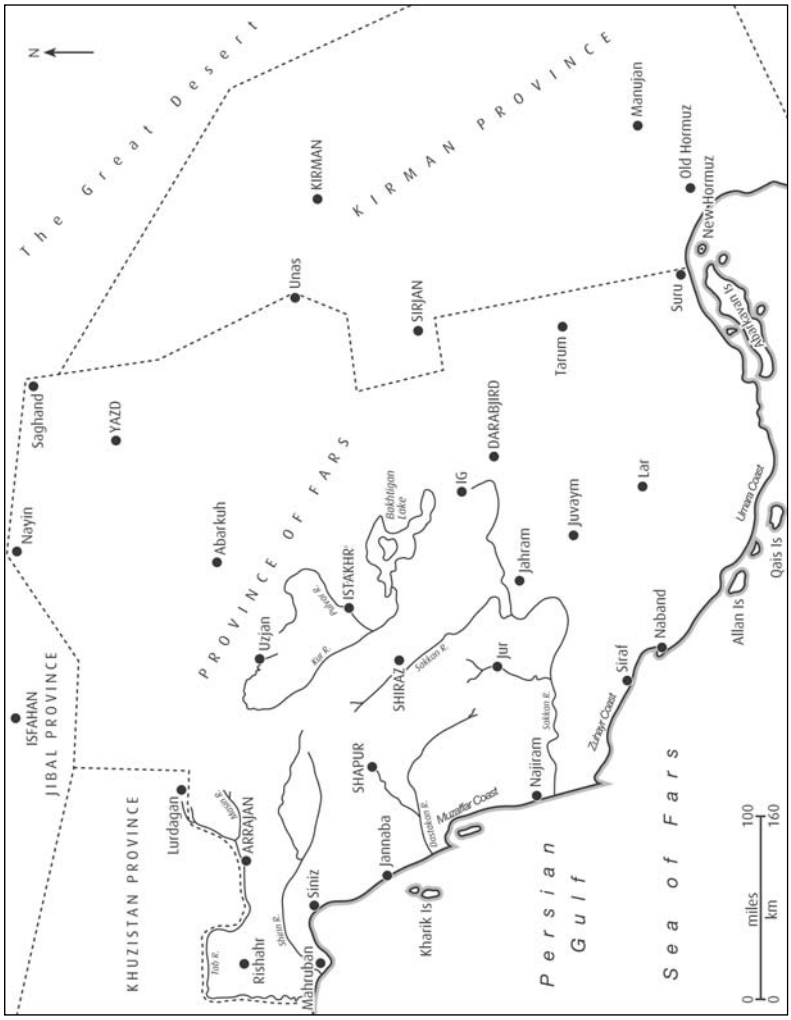
[99] Al-Samarqandī 1949, II: 766, cited by Piacentini 2000: 177.

[100] Several roads in Fars that led down to the coast and the ports of Siraf, Qais Island and Hormuz Island were described in some detail by Ibn Khurradādhbih 1889: 52–3, al-Iṣṭakhrī 1870: 131–2, 170 and al-Muqaddasī 1877: 154–5.

[101] Williamson 1973: 57.

[102] Piacentini 1992: 172–3.

[103] *Travels of Marco Polo* 1982: 52.



Map 7 Province of Fars

By the start of the ninth/fifteenth century Hormuz was not only the commercial outlet of Fars and Kirman but an international trading centre reaching out to Europe.[104] Here is what the Persian historian al-Samarqandī wrote about the harbour island *circa* 844/1440:

> Thither coast-dwellers from the confines of China… the coasts of Arabia as far as ʿAdan, Judda and Yanbūʿ bring rare and precious things to which the sun and the moon and the fertilizing virtue of the clouds have given lustre and beauty… .[105]

He stresses the cosmopolitan character of the city and claims that it was given the name of Dār al-Amān (The Land of Security).[106] At the time of his visit, the sultan of Hormuz, Fakhr al-Dīn Tūrānshāh II (840–875/1436–1470–1) owned both coasts of the Persian Gulf: Qishm, Qais, Qatif and Kharik, all had good ports.

Chinese annals describe Hormuz as a rich city which sent embassies to China.[107] Ma-Huan (15th c) recounts how

> from every place and foreign merchants travelling by land all come to this country (i.e. Hormuz) to attend the market and trade; hence the people of the country are all rich.[108]

The seaborne empire of Hormuz, by the time of the Portuguese conquest in the early decades of the sixteenth century, dominated the coasts of the Persian Gulf; even though it was conquered by De Albuquerque's fleet in 1514, it continued to prosper for another century.[109] After the conquest, Duarte Barbosa's ship put in to the harbour; there he noticed

> all sorts of goods are handled, which come from many lands, and which they barter with many parts of India. They bring there all sorts of spices, pepper, cloves, ginger, cardomons, aloes wood, sandalwood, brazilwood, myrobalms, tamarinds, saffron, indigo, wax, iron, sugar, a great quantity of rice, coconuts, many precious stones, porcelain, benzoin, from all of which they make a great deal of money.[110]

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[104] Piacentini 2000: 181–2.
[105] Al-Samarqandī 1949, II: 766, cited by Piacentini 2000: 177.
[106] Ibid.
[107] Huzayyin 1982: 182.
[108] Ma-Huan 1970: 92–3.
[109] The reader is referred to Jean Aubin's articles on the kingdom of Hormuz, a study of its political and economic history (7th–10th/13th–16th c), 1971: 99–124; idem, 1973: 77–179.
[110] *Book of Duarte Barbosa* 1918–1921: I: 91–2.

An impressive list of commodities! Barbosa was actually a Portuguese official but was also a much-travelled merchant[111] who was able to give quite detailed accounts of the imports and exports of each country he visited. Hormuz probably equalled if not surpassed Aden and the ports in the Red Sea. It remained, under the Portuguese, the chief emporium of trade for the Mediterranean and Europe.

Sohar: the gateway to China

Before the advent of Islam, Sohar had a large Persian community who refused to accept Islam and were consequently expelled by the Omani tribes.[112] Zealous in their new faith, the Omanis then crossed over to the Persian coast and with the help of a number of militant Muslims pushed deep inland. When the conquest was over, many Omanis settled on the Persian coast while others returned home.

Sohar was to become the capital of Oman. The harbour was ideally located for it was sheltered from the monsoon winds and, therefore, a natural stopping-place for vessels approaching the Persian Gulf. It supplied the vessels of her trading partners Siraf and Basra with African goods on their voyage to India and China. Al-Muqaddasī (fl. second half of the 4th/10th c) claims that

> there is not on the Sea of China today a more important town than it [i.e. Sohar]…It is the gateway to China, the storehouse of the East and of al-ʿIrāq, and the (succour for) al-Yaman.
>
> [*laysa ʿalā baḥr al-Ṣīn al-yawm balad ajall minhu… dihlīz al-Ṣīn khizānat al-Sharq wa-l-ʿIrāq wa-maghūthat al-Yaman*].[113]

Among the commodities exported to Oman in the fourth/tenth century there were perfumery, pharmaceutical goods, brazilwood, teakwood and sandalwood. Others listed were: sapphire, ivory, ebony, pearls, camphor, sandarax, aloe, iron, lead, silk brocade, glass and pepper.[114] Water was in abundance and gardens and orchards were watered by the *falaj*-

[111] It is not known in what capacity Duarte Barbosa went to India; he may have accompanied his uncle Gonçalo Gil Barbosa as an agent and remained in Cochin. Barbosa was poisoned by the king of Sebu in the Philippines in 1521 (written communication from David Frier, 17 February 2006).

[112] Al-Rawas 2000: 40.

[113] Al-Muqaddasī 1906: 92; idem, 2001: 79.

[114] Ibid., 1906: 97; 2001: 83.

system.[115] Al-Iṣṭakhrī (fl. c. 340/951–2) described Sohar as the most populous and wealthy town and "in all the realm of Islam" [*bi-jamīʿ bilād al-Islām*], he says, "you will hardly ever find…a town more rich in buildings than Ṣuḥār" [*wa-lā takādu tuʿraf…madīnatun akthar ʿimāratan wa-mālan min Ṣuḥār*].[116] According to Ibn al-Mujāwir (d. 690/1291) there were 12,000 houses built of "bricks, mortar and teakwood"; some 192 weighing balances were constructed in order to weigh merchandise for vendors and purchasers.[117] Archaeological evidence shows marks of copper-working and glass-making in Sohar and several remains of glazed ceramics (Islamic and Chinese 3rd–8th/9th–14th c) are reported.[118] By the time Ibn al-Mujāwir wrote his *Tārīkh* the town had decayed to an agrarian and fishing village. In fact al-Idrīsī (d. c. 560/1165) tells us that in the first half of the sixth/twelfth century, the town had suffered from the depredations of the ruler of the Island of Qais to the extent that Chinese vessels stopped using the port of Sohar; the ruler despoiled their property and rendered Sohar so weak that "the commerce was diverted from Oman to Aden".[119]

The West Indian coast: Indian merchants taking the lead in sea trade

The southern coast of India stood at important crossroads between the Western Indian Ocean and Southeast Asia. Here, merchants from different regions met and traded products of all sorts. Mangalore and Cambay were the chief ports where ships put in to trade dates for other commodities and timber; building materials, teak planking and jungle wood were all available from the Malabar coastal hinterland whose timber trade goes back into antiquity.

Managalore was a large busy harbour at the time when Ibn Baṭṭūṭa visited it in 743/1342; there were, he reports, about 4,000 Muslims "living in a suburb alongside the town".[120] The town attracted Jewish merchants because of the economic opportunities it could offer; one Genizah letter, addressed to Abraham Ben Yiju and written in *circa*

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[115] On water exploitation and agriculture in Oman, see Wilkinson 1977.
[116] Al-Iṣṭakhrī 1927: 25.
[117] Ibn al-Mujāwir 1951–1954, II: 284–5.
[118] Williamson 1974: 78–96.
[119] Al-Idrīsī 1836–1840, I: 152–3; idem, 1994, I: 156–7.
[120] Ibn Baṭṭūṭa 1958–2000, IV: 808.

1148, bears testimony to the trade at the time between the Red Sea and Mangalore.[121] The whole region around Mangalore was known for its spices and was consequently one of the richest territories in the medieval world.

South of Mangalore lies Calicut, a much larger port; in fact Ibn Baṭṭūṭa calls it "one of the largest in the world". To it came merchants from China, Sumatra, Sri Lanka, the Maldives, Persia and Yemen. Duarte Barbosa (d. 1521) too commented on the cosmopolitan nature of the port;[122] there were Arabians, Persians, Gujaratis and Khurasanis, collectively known as *paradesi*s or foreigners, many of whom were expatriates who had for a long time settled in Calicut. Timber trade activity was centred around Calicut and along the southern coast numerous workshops were found for shipbuilding and repair.

Arabian and Persian merchants carried numerous products of India. According to Ibn Khurradādhbih (d. c. 300/911), there was a demand for: aloeswood and its different varieties, musk, ambergris, bamboo, camphor, cardamom, clove, pepper, spices, rice, betel leaves, willow, gold, ivory, iron, jute, jewels, precious stones, cloth of different varieties and cotton.[123] Sindabur (Goa) was an important trade centre where horses, perfumes and Chinese pottery were brought. Apparently horses were in great demand by the Indian rulers because of frequent warfare between rulers. The growing textile industry in Gujarat, in the north, supplied the main ports of Hormuz and Aden with a significant quantity of textiles in exchange for spice products in the markets of Southeast Asia. Such an exchange came at a time when there was an increasing demand for spice commodities in the Mediterranean.[124]

This exchange of trade brought other opportunities: mercantile communities were instrumental in carrying out Islamic missionary work; they converted hundreds of people on the east coast of Sumatra and north coast of Java. It was to become easier then for Perso-Arabian and Indian ships to sail beyond the Island of Sarandib (today Sri Lanka) as far as China, bringing back products that were to be distributed to Europe. Sri Lanka stood at an intersection of the pearl trade. Between the island and the south coast of mainland India, more than 8,000 boats, reported the Dominican Friar and missionary Jordanus (d. c.

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[121] See Goitein 1973: 187–92.
[122] *Book of Duarte Barbosa* 1856: 202.
[123] Ibn Khurradādhbih 1889: 70–1.
[124] Harrison 1972: 44.

1330), were engaged in pearl fishing for three months. Moreover, the best precious stones in the whole world were found in this island, he tells us.[125]

The Gujaratis came to play an important role in the north of the Western Indian coast; many of them had settled in Cambay (south of Sind) as it was the most frequented harbour in the medieval period. By the seventh/thirteenth century it had become one of the richest port towns. During his stay there in 742/1341, Ibn Baṭṭūṭa remarked that the population consisted mostly of

> foreign merchants, who are always building there fine mansions and magnificent mosques and vie with one another in doing so.
>
> [*anna akthar sukkānihā al-tujjār al-ghurabāʾ fa-hum abadan yabnūn bihā al-diyār al-ḥasana wa-l-masājid al-ʿajība wa-yatānafasūn fī dhālik*].[126]

It was a cosmopolitan town but clearly Islamic. Within the monopolistic framework of the Islamic Indian Ocean economy, the Gujaratis, like their fellow Muslim traders in the west, would have ventured to places as far as Indonesia in increasing numbers, establishing mercantile colonies and expanding their trading links as far as China.[127] In addition there were the Tamil and Telugu Chettis, the St Thomas Christians, the Jewish, the Chinese and other small minorities.[128] There was also regular commerce between Hindu merchants of Gujarat and their agents in old Hormuz.[129] Much of the Indian trade was organized into guilds based on caste and religion.[130] Gujarati merchants are reported to be everywhere: on the Malabar coast, the Persian Gulf, the Red Sea and East Africa. They were called *bāniyān* (< Hin *vaniya*s; < Skt *vanij* "merchant"), a term also used in modern times to refer to Hindu and Jain mercantile groups in the north and west of India, though it is not certain whether the nomenclature had a wider application to any Indian merchant group in West India.[131]

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[125] Jordanus 1863: 28.
[126] Ibn Baṭṭūṭa 1968, IV: 53; idem, 1958–2000, IV: 797.
[127] Meilink-Roelofsz 1970: 144–5.
[128] Subrahmanyam 1997: 96.
[129] Digby 1982, I: 100.
[130] Goitein 1968: 360. On the legacy of the indigenous maritime enterprise in Malabar, see Arasaratnam 1994.
[131] Subrahmanyam 1977: 106; Löfgren 1936–1950, glossary; see also Serjeant 1974: 32–4, 37, 70.

Other merchant groups known in the seventh/thirteenth century were the Parsees of Cambay, mentioned by Sadīd al-Dīn al-ʿAwfī,[132] and the Khojas and Bohras, the latter of the Ismaʿīlī sect, being divided in two sub-groups, the Sulaymānis and the Daʾūdīs. The Daʾūdīs were from Yemen and had settled in Gujarat at the beginning of the sixteenth century around the time that the Portuguese reached the west coast of India. Merchants and craftsmen of the Parsee community settled on the West Indian coast, from Gujarat to Sind.

Then there were the Tamil-speaking group known as the Marakkayars found along the Tamil coast; Malayalam-speaking Mappilas, who by intermarriage had become Indian by blood, had settled on the Malabar coast;[133] the Arabians from Hadhramaut and Oman, and Persians from Bushehr and Hormuz who for centuries migrated and established their home in Malabar; and finally South Indian Muslim merchant communities in Sri Lanka.[134] The Jewish merchants took up residence on the Malabarian coast from the fifth/eleventh century and thereafter; their business documents from the Cairo Genizah sources show the number of Jewish merchants in Aden and Mangalore who had commercial contacts between the Mediterranean and India. Rabbi Benjamin of Tudela (d. after 1173) wrote that a number of Jews who lived on the Malabarian coast were "of black colour",[135] referring to converts of the local population to Judaism or, perhaps, an ethnic mix with the Jewish community.

All this, points to a global trade which was for the most part Islamic and cosmopolitan in nature. Although Arabian and Persian merchants had for many centuries taken root on the West Indian coast, it became evident by the seventh/thirteenth century that Indian merchants were taking the lead in the sea trade. The Gujaratis were running much of the trade to Burma and Malaya, Bengal, Hormuz, Aden and the coast of East Africa[136] until the coming of the Portuguese (16th c) when that monopoly was broken.

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[132] Siddiqui 1992: 24–6.
[133] Curtin 1984: 146.
[134] McPherson 1995: 143.
[135] *Itinerary of Rabbi Benjamin of Tudela* 1840–1841, I: 140–1; II: 183–4.
[136] Lewis 1974: 243; Chaudhuri 1985: 100.

The ports of the Arabian Sea

Several ports, some of only minor importance, are found on the coastal plain of the Arabian Sea which stretches from Muscat to Yemen. In the fourth/tenth century Muscat appears to have been a port at which Yemenite ships put in before proceeding to India and beyond.[137] Chinese ships, maintains Ibn Faqīh al-Hamadānī (fl. end of 3rd/9th c), paid a harbour tax of 100 dirhams for small vessels but 10 to 20 dinars for larger vessels.[138] At the time of the arrival of the Portuguese, Muscat appears to have been the principal port of the kingdom of Hormuz.[139] It posed a threat to the Portuguese control of the Persian Gulf so they set the harbour on fire which contained, it is said, many fishing boats and an arsenal "full of every requisite for shipbuilding".[140] The town remained under the Portuguese until 1650 when it was taken by the Imāms of Oman.

Further south of Muscat we find Qalhat, north of present Sur, a strategic harbour that superseded Sohar. The town was from the sixth/twelfth to the eighth/fourteenth century the hub of the "monsoon" trade; many merchant ships from India came here. Marco Polo (d. 1323) called it "a great and noble city";[141] he described it as having an excellent port where many vessels from India carried spices and other goods which fetched the best prices, and many "fine horses", he continued, which were shipped from Qalhat to India.[142] That the Qalhatis were traders and made their livelihood from what came to them on the Indian Ocean was noted by Ibn Baṭṭūṭa (d. 770/1368–9 or 779/1377).[143] Qalhat was an important administrative and political centre that controlled the mouth of the Gulf (illustrations 7 & 8).

It was a beautiful and prosperous town until its sacking by the Portuguese commander Alfonso de Albuquerque (d. 1515) in 1508,[144] after which it was eclipsed by the rise of Muscat. The number of artefacts, including pottery sherds, beads, glassware and coins, recovered in a surface excavation at Qalhat explains the town's active sea trade. An

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[137] Ibn Faqīh al-Hamadānī 1885: 11–12; al-Muqaddasī 1906: 93.
[138] Ibn Faqīh al-Hamadānī 1885: 11.
[139] *Commentaries* 1875–1884, I: 83.
[140] Ibid., 82.
[141] *Travels of Marco Polo* 1982: 272.
[142] Ibid.
[143] Ibn Baṭṭūṭa 1968, II: 225; idem, 1958–2000, II: 396.
[144] *Commentaries* 1875–1884, I: 221




Illustrations 7 & 8 The ruins of the mausoleum of Bibi Maryam (8th/14th c), Qalhat 1998 (photos author)

interesting find was the *ḥammām* (bath) structure with rooms, basins and pipes which is one of the few water systems uncovered on the Arabian Peninsula.[145] Stone anchors found at some 65 feet (20 m) distance from the coast line of Qalhat harbour confirm the importance of the harbour and also suggest that a mooring ridge was in use for ships to anchor.[146]

The Southern Arabian Dhofar coast had well-sheltered anchorages; the whole region was part of the frankincense trade which had existed from antiquity (illustration 9). Horses were exported from here to India at a great profit.[147] A study (1996–2000) between Mukalla and the Omani border shows that a number of harbours were established during the pre-Islamic and the early Islamic periods: Shihr East, Musaynaa, Kidmat Yarub, Sharwayn and Khalfut;[148] some were busy during the early period of Islam but things changed when the trade was controlled by Egyptian merchants between the sixth and ninth/twelfth and fifteenth centuries. Shihr, Sharma and Aden became the chief ports.

Shihr, east of Aden and Mukalla, was the capital of Mahra. Ibn Ḥawqal (fl. c. 367/977–8) gives the following description:

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[145] Vosmer 2004: 396.

[146] A study on anchors and the harbour of Qalhat was conducted by an underwater expedition directed by Tom Vosmer (March-April 1998), see Agius 1999: 174–77, 189–94 and Vosmer *et al.* 2000; see also recent results of the first mission of excavations at Qalhat, Vosmer 2004: 400–1.

[147] *Travels of Marco Polo* 1982: 272.

[148] Rougeulle 2001: 203–11.



Illustration 9 Frankincense tree on the Dhofar coast, Raysut 1996 (photo author)

> This is a wild country. The language [of the inhabitants] is not Arabic; it can hardly be understood. There are no palm trees, nor is there any cultivation. Their wealth is based of camels and goats. Camels and animals feed on little fish named *warq*. They and their animals do not know or eat bread. Their food is meat, preparations of milk and dates. They possess pure-bred camels. It produces frankincense [*lubān*] used in the whole world: the houses are full of it. Their country consists of large valleys.
>
> [*wa-hiya bilād qafra alsinatuhum mustaʿjima jiddan lā yakād yūqaf ʿalā kalāmihim wa-laysa bihā nakhl wa-lā zarʿ wa-innamā amwāluhum al-ibl wa-l-maʿaz wa-l-ibl wa-l-dawābb taʿlif al-samak al-ṣighār al-maʿrūf bil-warq wa-hum wa-sāʾir ḥayawānihim lā yaʿrifūn al-khubz wa-lā yaʾkulūnah wa-akluhum al-sumūk wa-l-albān wa-l-tumūr wa-lahum nujub min al-ibl tufaḍḍal fī l-sayr wa-ḥusn al-riyāḍa ʿalā jamīʿ al-nujub wa-lubān alladhī yustaʿmal bil-āfāq min hunāk wa-diyāruhum muftarisha bihi wa-bilāduhum bi-wādin nāʾiya* . . .].[149]

The passage contains rich ethnographic detail on the economic life of the inhabitants of Mahra. Of the other texts (al-Masʿūdī and al-Muqaddasī), this is the only one that mentions Shihr as the capital. In

[149] Ibn Ḥawqal 1964: 38; idem 1992: 44; see Hardy-Guilbert 2001: 69, 78, fn. 4, and her English translation with my amendments.

essence, Ibn Ḥawqal is telling us that the country is rainless and the people live on a diet of no bread or vegetables. They breed camels but they make a living from fish. On the question of fish, al-Muqaddasī (fl. second half of the 4th/10th c) reports that

> Al-Shiḥr…is an important centre for enormous fishes, which are exported to ʿUmān and ʿAdan, thence to al-Baṣra, and to the towns of al-Yaman.
>
> [*wa-l-Shiḥr…maʿdin al-samak al-ʿaẓīm yuḥmal ilā ʿUmān wa-ʿAdan thumma ilā l-Baṣra wa-aṭrāf al-Yaman*].[150]

Fish was in great abundance, notably tunnies; it was fed to animals, because the whole country had no grass. In fact Marco Polo (d. 1323) reiterates the fact that this region is "the driest place in the world".[151]

According to al-Masʿūdī (d. 345/956–7), the place-name stood for the whole region (*bilād al-Shiḥr* or *sāḥil al-Shiḥr*) but also for the town (*madīna ʿalā l-shāṭiʾ*).[152] But how important was Shihr? After the fourth/tenth century no source mentions it, only Marco Polo reports in the fourteenth century that Shihr was still a thriving port:

> …for I assure you that many merchant-ships come here well loaded with goods from India, and from here they export goods to India….[153]

He also claims that the Shihr region produced quantities of excellent incense and that it prospered with the number of horses that were exported from which "merchants make a handsome profit".[154] He tells us that it formed part of Aden and that its ruler, probably Ibn Iqbāl under the Rasūlids (626–85/1229–1454), was just.

From surveys carried out on the coast of Hadhramaut (as far as Sayut), the ancient site of Shihr was discovered in the Qaryah quarter, 197 feet (60 m) from the beach. The settlement dates back to the early Islamic period (from the 2nd/8th c). Several ʿAbbāsid pieces of pottery (2nd–3rd/8th–9th c) from Wadi Samun and Qaryah were recovered. Also found were a number of Sāsānian-ʿAbbāsid fragments of jars possessing an alkaline blue-green glaze and other jugs and bowls which implies trade being carried out with other port towns: Basra, Siraf,

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[150] Al-Muqaddasī 1906: 87; idem, 2001: 78.
[151] *Travels of Marco Polo* 1982: 271.
[152] Al-Masʿūdī 1983, I: 126, 170, 209, 450; II: 210.
[153] *Travels of Marco Polo* 1982: 271.
[154] Ibid.

Julfar and from as far as China.[155] Other finds from one building site included two ovens and a glass workshop, probably dating from the eighth/fourteenth century.[156]

Further east of Shihr was Sharma, one of the most active harbours of the Indian Ocean trade; it was dependent on Zabid in the Tihama on the Red Sea coast.[157] It is mentioned by al-Idrīsī (d. c. 560/1165) together with Lasa (the old name for Shihr).[158] Both Sharma and Shihr are noted by the geographer al-Dimashqī (d. 727/1327) for their importance.[159] We are also informed by al-Idrīsī, a geographer interested in gems, pearls, fossils and stones, that the caliph Hārūn al-Rashīd (170–193/786–809) sent an expeditionary team to Yemen to enquire from the people of Aden, Sharma and Hasik about amber.[160] This is probably because Hārūn al-Rashīd, as in Greek and Roman times, believed in amber's magical charms, hence the wearing of beads or amulets, particularly as a preventive against disease.[161] From the yellow-brown fossil, vast quantities of beads, amulets, and other small ornamental objects were manufactured.

Ras Sharma, located east of Shihr, was settled in the Neolithic period and an amount of flint material has been recovered. Several pre-Islamic sherds from a surface survey were also found, which come from Oman, Iran and India.[162] But the foundation of a main settlement comes from the fourth/tenth century, the founders of which are from the Persian Gulf, which produced large amounts of glazed ceramics exported to Sharma among other ports.[163] Rougeulle's conclusions about this settlement, which was abandoned by the first half of the sixth/twelfth century, are that Sharma was possibly not a harbour but a "warehouse" and as the excavations show, it was dominated by a huge fortified store-house.[164] This concept of a warehouse is one which may be compared to Quseir al-Qadim on the Egyptian Red Sea coast, where textual evidence indicates that the buildings that were excavated belonged to one or more merchants.[165] In this compound there were government officials as well

[155] Hardy-Guilbert 2001: 72, 73, 75–6.
[156] Ibid., 71.
[157] Al-Muqaddasī 1906: 53, 70; idem, 2001: 50, 66.
[158] Al-Idrīsī 1994, I: 55, 56; see also Rougeulle 2003: 287.
[159] Al-Dimashqī 1874: 301.
[160] Al-Idrīsī 1994: 66.
[161] Harris & Levey 1975: 80
[162] Rougeulle 2003: 287.
[163] Ibid., 296.
[164] Ibid.
[165] Guo 2004: 9–16.

as craftsmen and it seems likely that a number of soldiers would have been stationed in a fortress though no foundations of such a building were ever discovered at Quseir in spite of the place-name which in Arabic represents "little fort". Another point mentioned by Rougeulle is the lack of luxury items and the debris of breakable merchandise, a pattern that occurs in Quseir al-Qadim too.

The homogeneous archaeological material found at Sharma can be dated from the end of the fourth/tenth to the beginning of the sixth/twelfth century: no coins were recovered but there were large quantities of varied types and uses of resins; micro-beads; numerous imported ceramics and glass vessels. Great quantities of Chinese porcelain and stonewares were unearthed, "the richest corpus of Chinese imports ever found on an Islamic site of this period"; glazed wares and unglazed pieces (90.7% of the recovered ceramic material).[166]

The Red Sea corridor

Aden was one of the most celebrated and ancient ports on the Southern Arabian coast and was considered "the base of the shipping industry".[167] By the sixth/twelfth century, many Egyptian, Persian and Indian merchants had settled in Aden, occupying a good part of the cosmopolitan town; all foreign merchants were responsible to the *wakīl al-tujjār* (the representative of merchants)[168] while all (foreign and local) merchants were answerable to "the head of the merchants" (*raʾīs al-tujjār*).[169] Ships came to Aden from all the major ports of the Indian Ocean as well as China. Imports included ambergris, fine linens (*shurūb*), shields, tiger skins as well as Abyssinian slaves and eunuchs.[170] Spices and drugs, cotton cloths and other wares came from Cambaya, food-stuffs from Zeila. Aden also exported glass; in a Genizah letter of 1139, a number of glass items: sixty-eight goblets, ten bowls, five cups and five green bottles were exported to India and yellow-glazed pottery shipped to East Africa[171] (illustration 10).

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[166] Rougeulle 2003: 295–6.
[167] Margariti 2002: 234.
[168] Goitein 1968: 345–6.
[169] Serjeant 1988: 66; see also QaQ PA 0343, l. 11.
[170] Al-Muqaddasī 1906: 97; idem, 2001: 83.
[171] Meyer 1992: 120.

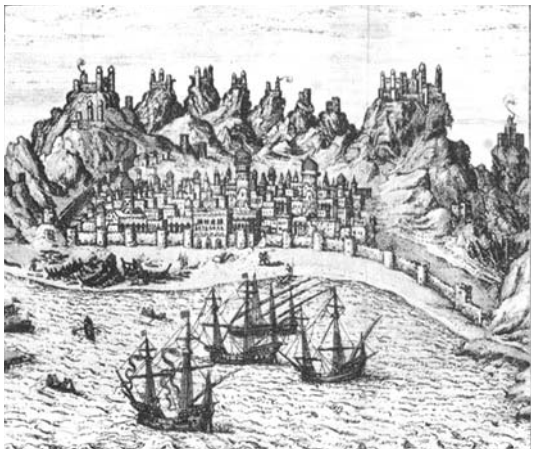


Illustration 10 Aden: the most celebrated medieval port town which controlled the Red Sea corridor (after *Civitates orbis terrarum* 1572–1617, I: 53)

Strategically, Aden controlled the Red Sea corridor: Qulzum in the north, according to al-Yaʿqūbī (d. c. 278/891–2), was an important port:

> Here merchants supply provisions to the Hijaz and Yemen; it has a harbour for ships; here are people of different races and the merchants are wealthy. . .
>
> [*fīhā l-tujjār alladhīna yujahhizūn al-mīra min Miṣr ilā l-Ḥijāz wa-ilā l-Yaman wa-bihā marsā l-marākib wa-ahluhā akhlāṭ min al-nās tujjāruhā ahl yasār*. . .].[172]

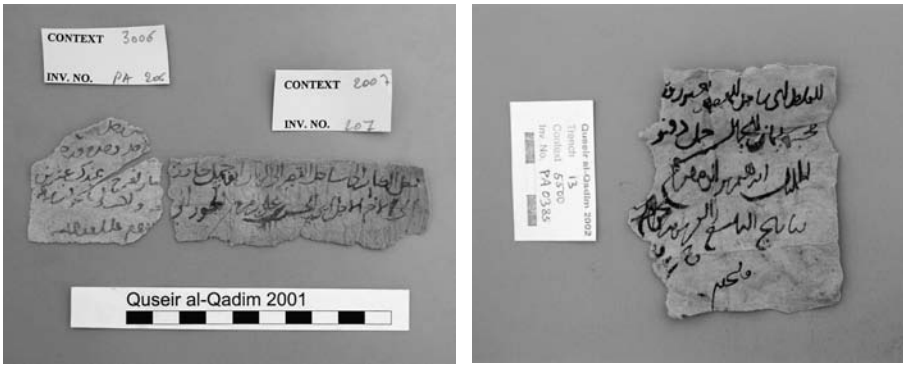
Further to the east of the Sinai Peninsula lay Ayla (modern Aqaba) which was a bustling port, with a good mix of population; it was the meeting place for pilgrims from Syria but also, according to al-Yaʿqūbī, for North Africans and Egyptians. The safest way for them was to sail to Jar and then to Jeddah rather than the Qulzum-Jar route, for the treacherous prevailing winds from the north made the voyage often very difficult.[173] Jar (probably near modern Yanbo) on the Arabian littoral was a well-established pre-Islamic port. It was frequented by ships from Egypt and Yemen and a colony of merchants had settled there.[174] The Red Sea ports: Jeddah, Aidhab, Suakin and Quseir al-Qadim were commercially linked with India and East Africa. Texts and archaeological

[172] Al-Yaʿqūbī 1892: 340.
[173] Al-Muqaddasī 1906: 11–12.
[174] Yāqūt nd., II: 107.

finds show that Aidhab (5th–7th/11th–13th c) and Quseir al-Qadim (7th–9th/13th–15th c) both played key roles in the long-distance trade from India to Yemen and from the Red Sea to the Mediterranean via the River Nile (illustrations 11 & 12). Perhaps of all the Red Sea ports, Athar on the southern Tihama coast, is considered to have benefited most from the commerce of the Persian Gulf.

Both corridors of the Indian Ocean were in competition: the Persian Gulf route was under the influence of the Eastern ʿAbbāsid caliphate while the Red Sea route was controlled by the Fāṭimid caliphate of Fustat (4th–6th/10th–12th c). Egyptian merchants traded with India and as the Genizah letters inform us, they had agents in Red Sea ports, Yemen and India. By exerting economic and political pressures, the Fāṭimids apparently managed to divert the trade from the Persian Gulf to the Red Sea. Did they engineer this? Could Fustat manage a maritime network on such a grand scale, from the Indian Ocean to the Mediteranean? It is diffcult to say. On the other hand, "it may be no coincidence", argues Whitehouse, "that trade through the Red Sea flowered at precisely the moment at which trade in the Mediterranean entered a period of rapid expansion".[175]

Excavations at Athar have disclosed the remains of a settlement, abundant finds of glazed ceramics and evidence of an industrial glass-



Illustrations 11 & 12 Two paper fragments showing the name of Quseir (RQAD–QaQ PA 206, l. 1 and PA 0385, l. 1, courtesy of Universities of Leeds and Southampton)

[175] Whitehouse 1983: 333–4.

producing site. The Islamic glazed wares are of the Samarra type (3rd–4th/9th–10th c), Persian Gulf types and the ceramics of the Fāṭimid South Arabian provenance. Other artefacts of Chinese ceramic assemblage range from different dynasties, namely ninth to twelfth centuries.[176]

Jeddah was the pilgrim port for Mecca and the emporium of Yemen and Egypt; it grew into an important seaport where ships with spices and drugs from India put in every year. When the Chinese Treasure Ships on their seventh expedition came as far as Aden in 1421, seven mariners were sent to Mecca by a local ("foreign" in Chinese terms) ship;[177] apart from the fact that these seven were Muslims it is possible that the Chinese vessels were too large to enter the Red Sea. I shall discuss the size of these ships in Chapter 7. Around 1503, Ludovico di Varthema, stopped at Jeddah and reported to have seen at the harbour "one hundred ships"[178] laden with spices. From Jeddah they were trans-shipped onto small boats and then to Tur on the Suez canal. Tur had replaced Quseir al-Qadim by the ninth/fifteenth century; it was the commercial centre for goods to be distributed to agents in Cairo and Alexandria or Damascus and Beirut. From Jeddah and Aden ships returned to Calicut laden with copper, quicksilver and verdegris.[179] This vibrant trade is captured in the verses of the poet Luís Vaz de Camões (d. 1580) who extols Jeddah as the principal mart of the Red Sea:

> Jeddah the port is called where all the trade
> Of the Red Sea the most did flourish;…
> Of mightly vessels by the Indian sea,
> Coming each year in search of spicery… .[180]

The East African ports

Commerce between the Persian Gulf and Southern Arabia with East Africa was well established by the fourth/tenth century.[181] Muslim set-

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[176] See Tampoe 1989: 110.
[177] See Church 2005: 12, fn. 37.
[178] *Travels of Ludovico di Varthema* 1863: 52, 54.
[179] *Book of Duarte Barbosa* 1918–1921, I: 46–7.
[180] "Gidá se chama o porto, aonde o trato/ De todo o Roxo Mar mais florecia,…/ De grandes náos pelo Indico Oceano/ Especiaria vem buscar cada anno…" (Canto IX, Stanzas 3 and 4).
[181] East Africa was called the Bilād al-Sūdān (The Land of the Blacks), see al-Masʿūdī 1983, I: 123.

tlers were found in several East African towns; they were called Shirazis, a general term for the Perso-Arabian Muslims inhabiting East Africa.[182] The Shirazis are said to have traded slaves, ivory and ambergris. The main ports of call were Mogadishu, Merca, Barawa, Manda, Ungwana, Malindi, Gedi, Mombasa, Pemba, Zanzibar, Mafia and Kilwa; towards the end of the ninth/fifteenth century there were thirty towns listed, from Somalia to Sofala. Apparently, each town had its independent status, administered by merchants. The chief export in the third/ninth century was slaves. Thousands of slaves, called the Zanj, were brought from East Africa to Basra to revive dead lands in the estates of Basra.[183] Their number was estimated to be 50,000.[184]

The Islamization of the East African coast can be better understood with the finds of early excavations, namely at Mogadishu, Merca, Barawa, Kelepwa, Ungwana, Gedi and Kilwa,[185] which indicate a general trading link with Aidhab and Quseir al-Qadim in particular. Mamlūk glass is one example; the glass consisted of bottles, vials, beakers, bowls, lamps and bracelets.[186] Chinese wares were common and they may have come from Siraf, Sohar or Aden.

Mogadishu was founded by the Gulf Arabians (of the al-Ḥasā tribe)[187] around the fourth/tenth century but Persians had also settled there by the seventh/thirteenth century; exports included: sandalwood, ebony, amber and ivory.[188] Ibn Baṭṭūṭa (d. 770/1368–9 or 779/1377) described Mogadishu as a large town,

> its inhabitants are merchants possessed of vast resources…In this place are manufactured the woven fabrics called after it, which are unequalled and exported from it to Egypt and elsewhere.

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[182] Trimingham 1975: 124–5; 128–9.

[183] Al-Iṣṭakhrī 1927: 82.

[184] For the events following 255/869 to 270/883 see al-Ṭabarī 1965, XII (iii): 1742–87, 1834–1920; XIII (iv): 1921–2103. Never in the history of Islam there were so many slaves concentrated in one region toiling for years under appalling conditions. The lives of these miserable slaves ended in a tragedy. Under the instigation of their leader ʿAlī b. Muḥammad they rose against the Caliphal army but were defeated in 270/883 and consequently the Zanj movement collapsed. The Zanj movement, ironically, was never against the Caliphate; it fought against those who owned land. In reality, the Zanj organization had no particular ideology, no aim, for example, to abolish slavery. The Blacks only hoped that their life would get better despite the social and economic environment, see Agius 1983: 13.

[185] Kirkman 1954, 1966; Garlake 1966; Chittick 1974.

[186] Meyer 1992: 75–96.

[187] See H. A. R. Gibb's note in Ibn Baṭṭūṭa 1958–2000, II: 374, fn. 47.

[188] Yāqūt nd., V: 201.

[*wa-ahluhā tujjār aqwiyāʾ wa-bihā tuṣnaʿ al-thiyāb al-mansūba ilayhā llatī lā naẓīr lahā wa-minhā tuḥmal ilā diyār miṣr wa-ghayrihā*].[189]

It became a very important Islamic centre minting its own coins[190] and a number of thirteenth to fifteenth-century Chinese and Arabic coins have been unearthed here.

Further south is the town of Merca, established by the Sirafis in the fourth/tenth century and the next town, Barawa which was populated by the Gulf Arabians as early as the fourth/tenth century.[191] From Yemen and the Northern Arabian coast of the Red Sea, Arabians settled in Manda in the Lamu archipelago, where numerous Islamic pottery finds of Sirafi provenance, dating from third to fourth/ninth to tenth century were excavated.[192] Other towns that should be mentioned were Ungwana, Malindi, Gedi and Mombasa, all south of Manda. It is said that the founders of Malindi came from Kufa, Iraq. We are told by al-Idrīsī (d. c. 560/1165) that Malindi was a big port town and many fishermen were engaged in catching whales which they first salted and then traded. He also says that iron was mined in both Malindi and Mombasa.[193] Then comes Qanbalu, a considerable Islamic settlement by the fourth/tenth century. An extraordinary hoard of 12 gold and 2,060 silver coins was recovered at Mtambwe Mkuu; the gold coins were minted in Tunisia, Cairo, Tyre and Damascus while the silver collection is of East African origin.[194]

The island of Zanzibar was well known from the sixth to the eighth/twelfth to fourteenth centuries. *Chau Ju-Kua* comments on the Perso-Arabian direct trading between Malabar and Zanzibar; commodities were white and red cotton cloth, porcelains and copper.[195]

The Persian Gulf trade to the East African coast is evidenced by excavations dating from about 750 CE in the Lamu archipelago at Manda, Sharga and Pate; several imported Islamic and Chinese ceramics at these sites have been found: white-glazed wares (c. 800 CE) and lustre pottery (c. 900 CE). Timber for building-construction was sought from the Lamu archipelago; mangrove poles from sites such as

[189] Ibn Baṭṭūṭa 1958–2000, II: 374; idem, 1968, II: 181.
[190] Chittick & Rotberg 1975: 13–14.
[191] Grottanelli 1975: 73–4.
[192] Chittick & Rotberg 1975: 11.
[193] Al-Idrīsī 1994, I: 59.
[194] Horton, Brown & Oddy 1986: 115–23.
[195] Lane & Serjeant 1948: 116.

Manda were shipped to the Persian Gulf region (2nd–3rd/8th–9th c). Siraf was probably one of the importers.[196] Mangrove poles were used particularly for roofs of buildings and they were being exported to the Gulf until fairly recent times.[197]

Sailing south is Kilwa, which was a large city at the time of Ibn Baṭṭūṭa. He describes it as

> one of the finest and most substantially built towns; all the buildings are of wood, and the houses are roofed with *dīs* reeds.
>
> [*…min aḥsan al-mudun wa-atqanihā ʿimāratan wa-kulluhā bil-khashab wa-saqf buyūtihā l-dīs*].[198]

Excavations disclose evidence of glass vessels and thousands of varied beads, the majority coming from India.[199] Both Kilwa and Mombasa were important trading cities; the Portuguese later sought them out for trade in gold, iron, ivory and tortoise-shell (illustration 13). Thereafter, the ships of Oman and Siraf reached Sofala; much of the Indian gold trade depended on this coastal town.[200] It was the southernmost trading post[201] and beyond Sofala, explains Yāqūt (d. 626/1228–9), no seaman dared to venture because of the perils that ships could encounter[202] (illustration 14). Ships, however, sailed to the east of Sofala; they sailed to the Island of Madagascar, their ships laden with cloth of gold and various silken fabrics, trading for ivory and ambergris.[203] But they did not go beyond the south of the island because of the strong currents, Marco Polo (d. 1323) maintains, which meant "[ships] would have little chance of returning".[204] Thus, the Indian Ocean mariner was dissuaded from exploring the "Sea of Darkness" (the Atlantic). So no Indian Ocean ship seems to have ever rounded the Cape of Good Hope even though al-Bīrūni (d. 440/1048), who had given correct values of latitudes and longitudes of various places, hinted at the possibility of circumnavigating the Cape; if the Chinese *junk*s succeeded the evidence is simply not there.

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[196] Whitehouse 1969: 51–2.
[197] Agius 2005a: 125–6.
[198] Ibn Baṭṭūṭa 1958–2000, II: 380; idem, 1968, II: 193.
[199] Chittick 1974: 460, 468–70, 479, 482.
[200] Yule & Burnell 1994: 850.
[201] Al-Masʿūdī 1983, I: 123.
[202] Yāqūt 1866–1873, I: 87.
[203] Ibid.
[204] *Travels of Marco Polo* 1982: 263.

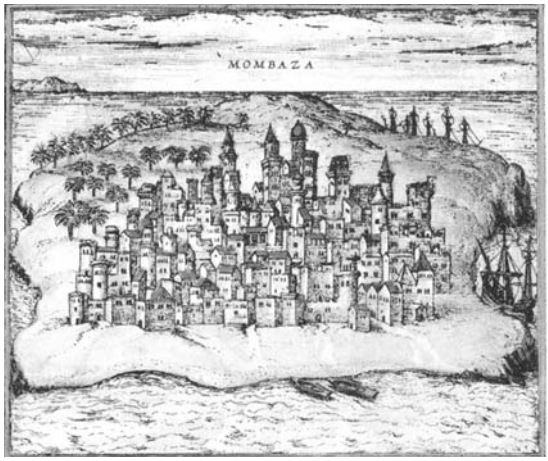


Illustration 13 Mombasa, known for gold, iron and tortoise-shell (after *Civitates orbis terrarum* 1572–1617, I: 53)



Illustration 14 Sofala: no Indian Ocean mariner dared to sail beyond this town (after *Civitates orbis terrarum* 1572–1617, I: 53)

People of southeastern origin settled in Madagascar and the Comoro Islands in the second half of the first millennium CE; the language of Madagascar today is Malagasy of an Austronesian family with strong ties to Ma'anyan and the Borito languages of Borneo. How they reached Madagascar is interesting and something which has intrigued a number of scholars. One voyage, undertaken by Bob Hobman and his crew on 6 August 1985, proved that Neolithic navigators could have crossed over from Indonesia to Madagascar on an outrigger canoe, the *sari-manok*, a hollowed-out trunk of a huge ghio tree with sails woven from plant fibres. The voyage lasted 63 days. Philip Beale and his team set out to build a large (62.1 ft/19 m) outrigger vessel based on five reliefs found at the eighth-century Borobudur temple in Central Java, Indonesia. The hypothesis is that in the first millennium Indo-Malay people reached Madagascar and West Africa on large outriggers. The performance characteristics of the replica launched in May 2003 proved its capability for crossing the ocean to East Africa and finally reaching Ghana on 23rd February 2004.[205] Both Bob Hobman and Philip Beale have demonstrated that it was possible to sail on primitive boats and that Madagascar and the Comoros Islands could well have been settled by Indo-Malay people.

There are some hints in Islamic sources to suggest maritime activity among Indo-Malay mariners and merchants who sailed to Madagascar, perhaps sometime in the early centuries of Islam (2nd–4th/8th–10th c).[206] The most striking of the narratives is told by Buzurg b. Shahriyār (d. 399/1009), he recounts:

> …In 334/945 they [the people of the east, Waqwāq] came with a thousand boats and violently attacked the town of Qanbalu (probably situated in the archipelago of the Comoros)…They said it was because the land had trade goods useful in their country and for China, such as ivory, tortoise-shell, panther-skins and ambergris, and because they wanted to obtain Zanj (i.e. slaves), for they were strong and easily endured slavery. They said their voyage had lasted a year…
>
> […*annahum wāfūhum fī sanat arbaʿ wa-thalāthīn wa-thalāth māʾa fī naḥwa alf qārib fa-hārabūhum ḥarban shadīdan (tujāh Qanbalu)…innamā jāʾūhum li-anna*

[205] Philip Beale gave a presentation "Borobudur Ship Expedition 2003/4" to the conference on "Sails of History", Zanzibar, 17–19 July 2006; a report on this expedition by Nick Burningham and Philip Beale was submitted to the Royal Geographical Society in March 2006.

[206] See G. Ferrand-P. Vérin, "Madagascar", in *Encyclopaedia of Islam*, volumes I–XII (Leiden: E. J. Brill, 1960–2004), V: 939–45.

ʿindahum min al-amtiʿa mā yaṣluḥu li-bilādihim wa-l-Ṣin mithla l-ʿāj wa-l-dhabl wa-l-numūr wa-l-ʿanbar wa-li-annahum yurīdūna l-Zanj li-ṣabrihim ʿalā l-khidma wa-jildihim wa-annahum jāʾūhum min masīratin sana…].[207]

The location of the Waqwaq Islands is a controversial issue which I shall not discuss here.[208] Although there is myth surrounding Buzurg b. Shahriyār's tales, there may also be facts that should not be discarded. In his anecdote of a Waqwaq expedition to Qanbalu, Buzurg concludes:

> If these men spoke the truth and their report is correct, when they say they had come from a year's sail away, this would confirm what Ibn Lākīs (the story-teller) said of the Waqwāq Islands—that they lie opposite China. God knows best.
>
> [*fa-idhā kāna qawl haʾulāʾi wa-ḫikāyatuhum ṣaḥīḥa annahum jāʾū min masīratin sana fa-hādhā yadullu ʿalā ṣiḥḥat mā dhakarahu Ibn Lākīs min amr jazāʾir l-Waqwāq wa-annahā qubālata l-Ṣīn wa-llāhu aʿlam*].[209]

His conclusion has a message questioning the truth of the story. Historically, there may be important information here in terms of the year it was reported and details of the voyage and the commodities.

The second important Islamic source comes from al-Idrīsī who states that:

> The inhabitants of the Islands of Rānj (i.e. Sumatra) voyage to [the Land of] the Zanj in *zawraq*s and small ships, carrying their merchandise, and [they came here] because they understand one another's langauge…
>
> [*wa-ahl jazāʾir al-Rānj yusāfirūna ilā l-Zanj fī zawāriq wa-marākib ṣighār fa-yajlubūna minhā amtiʿatahum li-annahum yafhamu baʿḍuhum kalām baʿḍ*…].[210]

The "[Land of] the Zanj" is a reference to the East African coast but could equally be pointing to the Islands of Madagascar and Comoros. By the time al-Idrīsī wrote his geographical work in the sixth/twelfth century, the Malagasy people had long settled on the islands and the passage does suggest that the east-west trading contacts were maintained through a common language. The linguistic, ethnic and cultural connection with the ancestral speakers of Malagasy looks obvious; there

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[207] Al-Rāmhurmuzī 1981: 103; idem, 1883–1886: 175.

[208] Al-Idrīsī (d. 560/1165) believed that Sofala was called the Sofala of the Waqwaq on the basis that the indigenous speech resembled a whistling sound of a bird, see al-Idrīsī 1836–1840, I: 79.

[209] Al-Rāmhurmuzī 1981: 103; idem, 1883–1886: 175.

[210] Al-Idrīsī 1994, I: 61.

are gaps in our knowledge and more research is needed in order to establish exactly why and how the "people of the east" voyaged and settled in Madagascar.[211]

Conclusion

The current belief is that the political breakdown of the ʿAbbāsid caliphate accelerated a shift of trade and channelled it to the Red Sea at the rise of Fāṭimid power in 358/964. Consequently, Sauvaget claims, the Gulf trade became restricted to "a few isolated ventures".[212] Although there is some historical truth and archaeological evidence to substantiate this claim, this is not the whole picture and the Gulf trade was not in total decline. We have seen the recession of commercial centres like Basra, Ubulla, Al-Bahrayn, Siraf and Qais which played important roles in the sea route to China during the second-third/eighth-ninth centuries; the volume of Chinese goods reaching the Persian Gulf ports certainly suffered a loss during the third/ninth century: some reasons may have been, the danger of reefs and typhoons which Chinese ships were exposed to in Southern China, piracy, and outbreak of fires at Khanfu.[213] However, against this decline, as was shown in this chapter, is the resurgence of ports in the following two centuries, such as Hormuz and Sohar which are well documented by Muslim and non-Muslim authors and corroborated by archaeological finds.

By the fifth/eleventh century, however, the Red Sea does become an important venue for maritime commerce; goods are transported to Aden and Aidhab. Ibn Jubayr (d. 614/1217) describes the latter as

> one of the most frequented ports of the world, because of the ships of India and the Yemen that sail to and from it, as well as the pilgrim ships that come and go.
>
> [*wa-hiya min aḥfal marāsī l-dunyā bi-sabab anna marākib al-Hind wa-l-Yaman taḥuṭṭ fīhā taqlaʿ minhā zāʾidan ilā marākib al-ḥujjāj al-ṣādira wa-l-wārida*].[214]

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[211] LeBaron Bowen Jr. 1953a: 85. The reader is referred to Roger Blench's new data and interpretation in a forthcoming study on the Austronesian settlement in Madagascar and the East African coast.

[212] Sauvaget 1948: 19–20.

[213] Hourani 1963: 72.

[214] Ibn Jubayr 1952: 63; idem, nd: 63.

The Genizah documentation and the information provided by Ibn al-Mujāwir (d. 690/1291) on some ports in the Red Sea are our best sources. With the rise of the Fāṭimids, Egypt became preoccupied by commerce and the trade route with India and China; thus, Egyptian merchants began to control the commercial networks and the expansion of these connections by way of agents in Yemen and India.[215] Letters from the Genizah corpus testify to this change of routes from the Persian Gulf to the Red Sea. Perhaps it also needs to be said that the fifth/eleventh century was the time when trading centres in East Africa were established, enjoying a long period of prosperity.

The Indian presence in East Africa may have posed a threat. Knowing the value of gold, one may ask whether Persian and Arabian merchants tolerated the presence of Indian traders in East Africa and reserved for themselves the commerce within the Red Sea and the Arabian Sea? Material recovered in Sharma (up to the 6th/12th c), and to a lesser extent Quseir al-Qadim (7th–9th /13th–15th c), show an obvious connection with East Africa, India and China.

It was at the end of the ninth/fifteenth century that things started to change in the Indian Ocean. The seven Ming diplomatic expeditions (1405 to 1433), under the commandership of Zheng He or Cheng Ho (d. 1435), admiral and diplomat, Grand Eunuch, commissioned by the emperor Yung-Lo or Zhu Di (d. 1424) of the Ming dynasty (1368–1644),[216] is a unique event in the history of Indian Ocean trade: large fleets of *junk*s of different sizes, over 28 years, covered many thousands of sea miles on the high seas from China to East Africa and the Red Sea; they sailed their vessels as far as the east coast of Mozambique but, maintains Needham, because of "a change of policy had withdrawn the treasure fleets for good".[217] A very unusual thing to happen; the decision to end the voyages in 1433 forbade also further private overseas trading. What was the reason for the withdrawal of their ships? It remains a mystery. These voyages had multiple objectives, the chief being to explore and expand trade and diplomatic relations. Choosing Zheng He, a Muslim, son of a *ḥājj* (pilgrim), to establish good trade links

[215] Naji 1993: 440.

[216] Information about these Ming expeditions came down to us through Ma Huan, a Muslim writer from Kuei-Chi in Chekiang, whose accounts were written between 1416 and 1435 in a work entitled *Yingyai shenglan* (The Overall Survey of the Ocean's Shores); see also Needham 2000, IV, iii: 487–92. On Zheng He (or Cheng Ho) see Levathes 1996.

[217] Needham 2000, IV, iii: 503.

with the west of the Indian Ocean, was an important and significant move; much of the trade at the time was in the hands of Muslim communities. The grandeur of these expeditions, the diplomatic mission, the ships, the gifts showered on the rulers were a way to exhibit the greatness of the Ming dynasty; it is reported that the coastal communities acknowledged China's superiority. If they had not, what would have happened? No doubt the Chinese were prepared for the worst: the use of force, for which they were well equipped; the ships carried hundreds of armed men in case they were attacked, but no incident was reported, they were peaceful expeditions. As Needham remarked, there is nothing new about the Chinese in the Western Indian Ocean, they were there much earlier, but what was special about the Ming expeditionary voyages was "the appearance of organized naval forces with *junk*s of great size" not witnessed ever before[218] (see Chapter 7). These expeditions were impressive and the impact on the rulers and the communities was great. It could not have lasted any longer because to maintain and man the fleet would have been too much of a strain on the Ming economy. Further, Sally Church understands that the country was also under economic strain due to the military campaigns, in the north against the Mongols, and Annam in the south. She thinks that the moving of the capital from Nanjing to Beijing in 1421 and the building of canals for the shipping of grain from the south to the capital in the north, would have entailed an immense expense on the state.[219]

The Portuguese in the sixteenth century had restrained the Muslim monopoly on the Indian Ocean trade; they instituted a trading licence, the *cartaz*, which enabled them to monitor the overall trading networks; Asian merchants, fearing the repercussions if they did not cargo their goods with Portuguese ships, switched from local to Portuguese ships, the latter increasingly crewed by Arabians, Indians and South Asians.[220]

Three towns in the sixteenth century served as the marts for all the trade and merchantable wares in the Indian Ocean: a) Malacca, the entry to the Straits of Singapore, b) Hormuz, the opening to the Persian Gulf, and c) Aden, the gate to the Red Sea.[221] De Alboquerque

[218] Ibid., 492.

[219] Written communication from Sally Church (22 November 2006).

[220] CDRAD/ Port Arch, ANTT, cc 1–14–75 (Almeirim, 2 March 1514): In a letter to Alfonso de Albuquerque, Don Manuel I, King of Portugal, says that he had ordered Antonio Real "to instruct all the Christians and Pagans of the necessity of travelling in Portuguese vessels to stop the Moors navigating in the Indian Ocean".

[221] *Commentaries* 1875–1884, IV: 185.

(d. 1515) failed to take Aden in 1513; the author of the *Commentaries* laments the event and argues:

> …if the King of Portugal had made himself master of Aden, with a good fortress, such as those of [H]ormuz and Malac[c]a…he might well have been called the lord of all the world—as did Alexander when he penetrated to the Ganges… .

The Ottoman efforts in the mid-sixteenth century to keep the Portuguese at bay in the Arabian Sea had some effect with varying degrees (see Chapter 8). In the subsequent decades the Portuguese stopped all native trade to Aden and Jeddah and diverted their trade via the Cape of Good Hope.[222] The pilgrimage traffic to Mecca suffered a setback with the Portuguese threat and menace in the Indian Ocean. One may argue that by re-routing the Spice Route to Lisbon, the Portuguese suppressed the long-established native trade via the Persian Gulf and the Red Sea and brought some catastrophic consequences to the indigenous seafaring communities. By conquering the main port towns of the East African coast, the Persian Gulf and the West Indian shores, the Portuguese had affected the whole pattern of world trade. Their discovery of the Cape of Good Hope route changed the history of trade in the Indian Ocean.

[222] See *Book of Duarte Barbosa* 1918–1921, I: 43–4: "(The Portuguese) took the ships of the Moors so that they should not pass from India to the Red Sea…".

PART THREE

CHAPTER FOUR

PRIMITIVE BOATS AND BRONZE AGE CONSTRUCTION FEATURES: MESOPOTAMIA AND THE PERSIAN GULF

يمر الموج تحت مشجرات
يلين الماء بالخشب الصحاح

(As) the waves passed under wooden (ships)
lying low on the water, their timbers
soundly fitted… .[1]

Bishr b. Abī Khāzim al-Asadī (d. c. 535 CE)

Boat designs depend on a number of factors such as economic demands (crew, cargo, distances), the environment (weather conditions, seasonal change) and the topography (anchorages, harbours, shoals and reefs) as well as social, cultural, and religious influences. It goes without saying that seaworthiness is an important factor in the design of a craft and that seaworthiness and the suitability of a design rely on the hull forms, displacement of water, the surface below the waterline, the height of the gunwales above the waterline, buoyancy, speed and stability. An outline of design features of some primitive boats will serve as a base to the understanding of early craft of the Bronze Age which form the subject of this chapter. Using earlier research as a foundation,[2] this chapter will discuss, in general, construction features of watercraft, looking at evidence from textual, archaeological and iconographical material.

The first type of craft that must have existed would be a hollowed-out tree trunk, a raft or a boat made from bundles of reeds. Turtle shells also made excellent floats; they are bowl-shaped and, as the Greek historian and geographer, Agatharchides of Cnidus (c. 200–131 BCE)

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[1] *Yamurru l-mawju taḥta mushajjarātin/ yalīna l-mā'a bil-khushubi l-ṣiḥāḥi*…, translation from Montgomery 1997: 170–1.

[2] Boyle 1940; Hornell 1938; idem, 1942, 1946c; Landström 1961; Hourani 1963; Casson 1971; Hawkins 1977; De Graeve 1981; Qualls 1981; Heyerdahl 1982; Shihāb 1987; al-Ḥijjī 1988; Greenhill 1995; Vosmer 1996; idem, 1997, 2001; Agius 2002; McGrail 2004; Agius 2005a and Vosmer's unpublished thesis 2005.

reported, they could be made to sail.[3] Pliny claims that the Indian Ocean turtles were huge; the inhabitants of the Red Sea islands used them not only as boats but also as huts.[4] A bowl would have been a perfect object on which to sit and beat the water with one's feet like oars. Early craft were made from the materials most ready to hand which were accessible, economical and practical. If timber was scarce, waterskins, twigs, reeds and rope from palm-tree fibre were available. From wooded areas, timber and logs would provide the basic frame of a watercraft. Today, along the coast of the Western Indian Ocean, the Persian Gulf and the Red Sea, one can still find the construction of primitive watercraft. Some look much the same as the early craft of the Bronze Age, raising the question as to whether there has been a continuity in methods of construction going back thousands of years.

Technology and material

The early watercraft, such as rafts and dugouts would not have required more than a stone knife, a chisel and rope. To build boats, particularly ocean-going craft, required concentrated thought and skill; experience above all was quintessential. In the fourth millennium BCE, copper saws were used in Egypt and Mesopotamia but planks were split rather than sawn.[5] Copper tools were being replaced with new metal technology in the Late Bronze Age: a bronze chisel with a cutting edge at the end of the blade could shape timber.[6]

As I pointed out earlier, construction of river and sea craft depended on the technology and materials readily available such as reeds (*Typha* spp., *Phragmites australis* and *Phragmites communis*) which were easy to harvest. Rope could have been made from split reeds, the leaf of the date palm (*Phoenix dactylifera*) or the coconut palm. The use of reeds for boatbuilding is well known from textual[7] and archaeological finds. Their use was also known for the making of sails, fish traps and huts. Other material employed to make fishing nets and sails was from linen (*Linum usitatissimum*); in Mesopotamia, flax was also used for oil.[8]

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[3] Agatharchides of Cnidus 1989: 86.
[4] Pliny the Elder Bk IX.X.35.
[5] For Egypt see Landström 1970: 23.
[6] See McGrail 2004: 23, 43–5, 57, 59, 65, 67, 70.
[7] See Exodus 2.3; Strabo Bk 16.1.15.
[8] Potts 1997a: 119.

Different species of timber were used for shipbuilding. Egyptian shipwrights in the mid-third millennium BCE utilised cedar wood, imported from the mountains of Lebanon;[9] local wood such as acacia which was the most widely used, tamarisk (*Tamarix* spp.), sycamore (*Platanus orientalis*), and *sidir* (*Ziziphus spina-christi*).[10] For the Mesopotamian region, both Strabo (d. after 21 CE) and Arrianus (d. c. 160 CE) noted the scarcity of timber;[11] however, some local trees were used in construction: from the Zagros mountains came oak (*Quercus* spp.), cypress (*Cypressus* spp.) and juniper (*Juniperus* spp.) which were substantial enough for building temples and palaces but also for shipbuilding. Oak was used for most keels, strong enough for the mariners to haul the craft onto the beach where the crew camped for the night;[12] but also because oak is durable and was not vulnerable to the attack of the ship worm (teredo) as other inferior timber.

Supplies of certain species must have come from outside the area. The only readily available tree was the palm tree and, of course, there were abundant supplies of reeds.[13] From excavated sites in Mesopotamia, Moorey mentions the following timbers used for boatbuilding: ash (*Fraxinus* spp.), cedar (*Cedrus* spp.), cypress (*Cypressus* spp.), elm (*Ulmus* spp.), oak (*Quercus* spp.), pine (*Pinus* spp.), tamarisk (*Tamarix* spp.), teak (*Tectona grandis*), mulberry (*Moraceae* spp.) and willow (*Salix* spp.).[14] Interestingly, from the whole list, the palm tree is not included.

Bitumen, an important substance in boatbuilding, was used in ancient Mesopotamia for caulking, sealing and waterproofing; we have it recorded in the Epic of Gilgamesh (c. 2750–2500 BCE)[15] and the Biblical story of the Flood.[16] Archaeological finds of the Bronze Age Ras al-Jins boat, point clearly to the application of bitumen.[17] Fish oil may have been an important component in the coating of bitumen on reed-built and wooden vessels in antiquity. It served as a preservative for wood, reeds, and rope. Anti-fouling composed of fish oil with animal fat and lime may have been used though it is not clear when it was first developed.

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[9] Landström 1970: 28; Meiggs 1998: 63–8.
[10] Kadry 1986: 123; Meiggs 1998: 59–60.
[11] Strabo Bk 16.1.11; Arrian Bk VII.19.4.
[12] Theophrastus: information from Meiggs 1998: 118.
[13] See De Graeve 1981: 94–6; Powell 1992: 115–6; Meiggs 1998: 62.
[14] Moorey 1994: 360.
[15] Pedersen 2004: 231.
[16] Genesis 6.14.
[17] Cleuziou & Tosi 1994: 745–62.

Navigating on the river and the sea

Mesopotamia, situated as it is between two rivers, the Euphrates and Tigris, like Egypt with its Nile, is dependent entirely upon irrigation. The flow of water is regulated by a network of canals, which irrigate the soil and form waterways for boats to carry passengers and freight. Navigating on the rivers could be difficult as there were several limiting factors the river craft were exposed to: the northern region tends to be rocky with areas of shallow waters and the northern prevailing wind blows in the same direction as the current flows. In contrast the navigator on the Nile does not share the same experience because, although the prevailing wind comes from the north, it blows against the current;[18] navigation, therefore, was comparatively easy either way, whereas in the Tigris and Euphrates, sailing upstream was difficult; sometimes vessels had to be towed along the bank by animals or men.

All along the Arabian shores, the shallow waters and sandbanks could have been reached by the most primitive craft. Sailing down the Northern Persian Gulf probably meant hugging the coast, primarily because of sweet-water sources and sheltered harbour facilities, such as Failaka Island (off Kuwait),[19] Tarut Island (off Qatif) abundant in date gardens,[20] Bahrain Island famous for its fresh water, pearl industry and dates[21] and Umm al-Nar the best anchorage for vessels southbound.[22] Southwards, therefore, was completely straightforward. But the return journey, facing the prevailing winds from the north and north-west, must have been difficult. Sailing close to the coast was slow and arduous for a boat not able to bear to windward. This remains speculative because very little is known about the early period. It is possible that oars were used, though with much difficulty, against the wind.[23] I mentioned in Chapter 2 that a cuneiform text of Sargon (3rd millennium

[18] Casson 1994: 13.
[19] Bibby 1984: 215.
[20] Ibid., 330.
[21] Kramer 1963: 381.
[22] During Caspers 1970: 207.
[23] Written evidence from classical sources fails to offer any information on the subject of sailing in the Persian Gulf. Arrian (Lucius Flavius Arrianus) reports that Alexander the Great (356–323 BCE) sent Archias on a thirty-oar galley to reconnoitre the coast of the Persian Gulf; we are told that he did not venture beyond Tylos (i.e. Bahrain), while Androsthenes got further south of the Arabian Peninsula. There is no mention that they got back. A third galley which was supposed to circumnavigate the whole of the Arabian Peninsula also failed half way through but this one, we are informed, turned back, Arrian Bk VII. 20–1.

BCE), reports of ships from Dilmun, Magan and Meluhha docking at the quay of Akkad (probably near modern Baghdad).[24] It also tells of two Akkadian kings, Manishtusu (2269–2255 BCE) and Naram-Sin (2254–2218 BCE), who conquered Magan and had their ships loaded with black stone and brought to Akkad.[25] These texts suggest navigation northward was possible, which raises the question of how they did it. One possible explanation could be if the monsoon extended as far as the north in Arabia, then an Early Bronze Age ship would be able to navigate northwards easily because of a south-easterly prevailing wind, rather than the north-westerly one finds today.

Pictorial representations show that boats were often propelled by punting poles, which seamen used by moving from bow to stern. Punting poles were made of *qaṣab* (*Phragmites communis*) which grow in abundance today in the reed beds of the marshes of Mesopotamia as they would have in antiquity.[26] Paddles operated canoes and oars were widely used too. From figures seen on bas-relief, De Graeve remarked that there were two categories of rowers: "fac[ing] the stern and pull[ing] with [one's] legs and back" and "stand[ing] upright, facing the prow and letting [one's] weight fall forward over the oars".[27] Large boats, as I shall show later, were sometimes rigged and had a great oar at the stern.

Primitive watercraft

As I discussed at the beginning of this chapter, the possibility of continuity in the design of primitive craft and their modern day counterparts is intriguing. In order to show such a link we need to look in more detail at the construction features of contemporary primitive boats and compare them with those of antiquity as depicted in artistic representations, boat models and the finds of recent excavations.

What did the earliest vessels look like and how did people handle them? The answer to both questions may be found in some of the craft

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[24] Frayne 1993: 28.

[25] Ibid., 75–6, 97, 100, 117.

[26] The Greek geographer Strabo in the 1st century CE reports on the many reed-beds supplying reeds "from which all kinds of reed-vessels are woven", Strabo Bk 16.1.9.

[27] De Graeve 1981: 158–9. The method of rowing standing up is found today in several countries; Ibn Baṭṭuṭa (d. 770/1368–9 or 779/1377) noted this practice in Ubulla (1958–2000, II: 281); an illustration in al-Ḥarīrī's *Maqāmāt* (The Assemblies) we find a gondola-shaped boat with three sailors rowing standing up, see al-Rāmhurmuzī 1883–1886: 166–7.

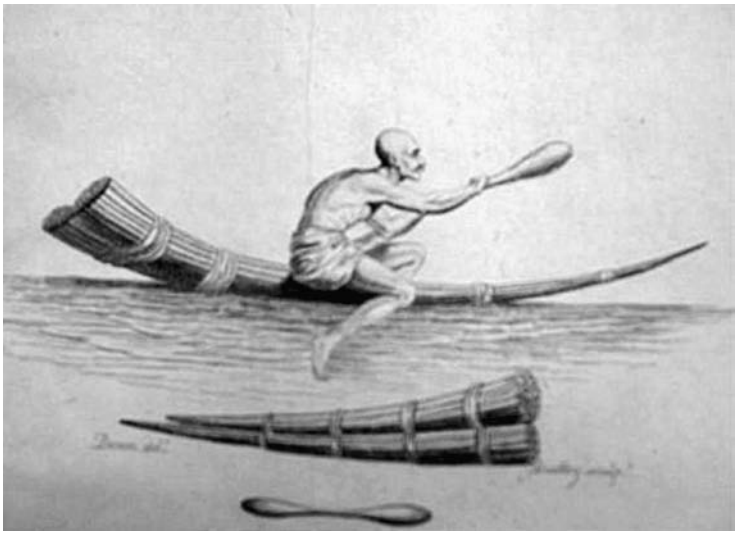


Illustration 15 Crossing the River Nile on two bundles of reeds (after Denon 1825: 124, pl. XCIII)

used in contemporary times. At first it might have been a waterskin or a single log which one could pilot across the stream, then two logs or two bundles of reeds tied together to cross from one spot to another (illustration 15). It would not have taken long for man to realise that a raft composed of several logs or bundles of reeds tied together could carry a number of people, animals and cargo. Dugouts made from the trunk of a tree and coracles and canoes made of reeds are a step forward in the advance of the technology of boatbuilding.

Waterskins

Until fairly recent times, inflated waterskins (s *qirba*, pl *qirab* or *qirbāt*) were used by Omani fishermen on the Southern Arabian coast, Bahrain and Iraq.[28] The skins were prepared and tanned, then tied with an osier string or some other form. Similar craft to these with a man

[28] Ritter (1919: 136, pl. 43) photographed an Iraqi on a waterskin crossing the Euphrates in 1917.

lying on his chest, paddling with the feet, is clearly represented on the Assyrian palace reliefs from the reign of king Ashurnasirpal II (c. 883–858 BCE) to Ashurbanipal (669–633 BCE).[29] One can see soldiers on the bas-reliefs, on animal skins, swimming across rivers (illustration 16). Occasionally, fishermen tied two or more waterskins to a piece of wood on which they sat; this ancient technique was used off the coast opposite the Kuria Maria islands on the southern coast of Oman way into the 1950s.[30] Jannaba fishermen swam on inflated sheepskins, LeBaron Bowen Jr. noted, to fish for sharks, the fins and tails being sold to Muscat.[31] It was because of their poverty that these fishermen used inflated skins. Haines, however, thinks that they have lasted for such a long time because they are actually safer than any other type of craft, particularly with heavy surf.[32]

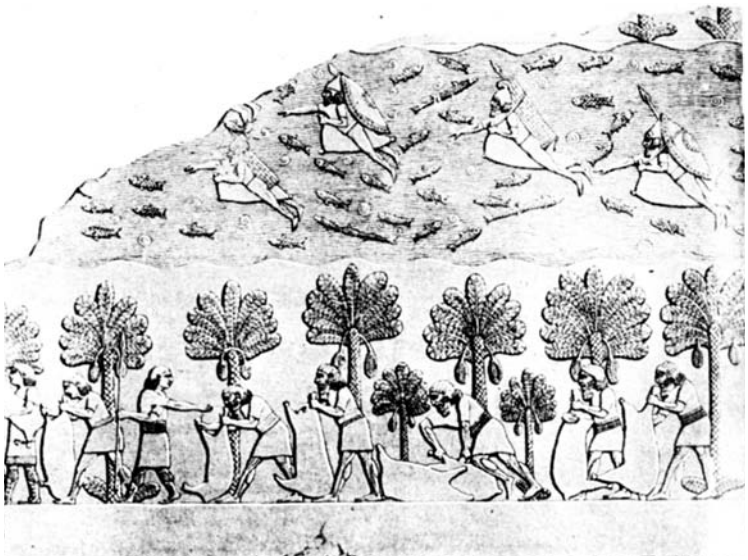


Illustration 16 Relief from the reign of Ashurbanipal: inflating skins (bottom) and Assyrians crossing the river (top), Kuyunjik, SW palace (after De Graeve 1981: pl. XXVI, no. 59)

[29] De Graeve 1981: 80–1.
[30] *Oman: A Seafaring Nation* 1979: 153.
[31] LeBaron Bowen Jr. 1952: 188.
[32] Haines 1847: 141.

Rafts

The concept of floating on a boat-like raft of branches or logs is one of the earliest form of invention and still used in several parts of the world. Mesopotamians came up with the idea of devising buoyed rafts supported by inflated animal skins, ideal for rivers with rapids. However, navigating on buoyed rafts was hazardous because of the strong currents and the several rapids in the upper and middle part of the Tigris and the Euphrates, which meant that the rafts had to be let to float downstream with the current. It did not matter if a few of the skins were punctured by sharp rocks as navigators were still able to make their way down the stream relatively smoothly on the buoyed rafts. The Assyrians used this method[33] as illustrated in bas-reliefs.

There is a type of raft called a *ṭawf* (pl *aṭwāf*), recorded by the lexicographer Ibn Manẓūr (d. 711/1311–2), which was used to carry food supplies and ferry people across the river.[34] Citing al-Azharī (d. 370/981), he explains that it was constructed of

> canes and pieces of wood bound together, one upon another; then bound with ropes of palm-tree fibre in order to ensure from falling apart.[35]
>
> [*…min al-qaṣab wa-l-ʿīdān yushadd baʿḍuhā fawq baʿḍ thumma tuqammaṭ bil-qumuṭ ḥattā yuʾman inḥilāluhā*].[36]

Camels were transported on this craft; how many depended on "its strength and its thickness".[37] We find the use of the *ṭawf* in Iraq in the early twentieth century: al-Dujaylī describes a large type made of "rough logs bound together with no skins, 10 metres [32.8 ft] wide, 15 metres [49.21 ft] long…";[38] it made regular trips from Baghdad to Basra, carrying earthenware jars, small jugs of clay or tin and grain. The word is traced by the lexicographer al-Jawālīqī (d. 539/1144) to Persian;[39] though western philologists think it is more likely to have a Semitic origin (Arabic, Aramaic or Judeo-Aramaic).[40] Another medieval

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[33] Xenophon Bk 1.15.10.
[34] Ibn Manẓūr nd., IV: 2723; see also Ibn Sīda 1893–1903, X: 29 on the authority of Ibn Durayd, 1987, II: 921.
[35] Lane 1984, II: 1893 with my amendments.
[36] Ibn Manẓūr nd., IV: 2723.
[37] Lane 1984, II: 1893.
[38] Al-Dujaylī 1912b: 152.
[39] Al-Jawālīqī 1867: 95.
[40] Steingass 1977: 822; Fraenkel 1962: 220.

raft called *ʿimāma* (pl *ʿamāʾim*) was constructed of logs and used both on sea and river;[41] a smaller version of this, the *ʿāma* (pl *ʿām, ʿāmāt* or *ʿūm*), was made "of twigs from trees";[42] either nomenclature looks genuinely Arabic but Fraenkel claims it has an Aramaic or Judeo-Aramaic origin.[43]

Other types are the *kelek* and *ramath*, which are historically important to the understanding of the use of rafts in the river and sea. The *kelek* (pl *aklāk* or *kelekāt*) is made from bundles of bulrushes with the forward end turned up to form the prow;[44] it is light to sail easily on the water; the larger type is made of strong reeds that grow in the marshes or wood. *Kelek*-builders used inflated goatskins or sheepskins to support the reeds and to offer buoyancy. An ordinary *kelek*, reports Chesney in 1850, was from 16 to 18 feet (4.8 to 5.4 m) long and 14 to 16 feet (4.2 to 4.8 m) wide, but there were larger ones 30 to 40 feet (9.1 to 12.1 m) long, supported by 50 skins and some would require 300 skins. A cargo-*kelek* would carry its goods from Mosul to Baghdad.[45] The *kelek*-men propelled it by a pole down the river with the current until it reached the south; there, they unloaded their cargo, dismantled the raft and sold its parts. As the boatman experienced difficulties upstream, the return journey was by land so the sailor then became a camel driver, leading his caravan to the port of origin. Therefore, the process of building another *kelek* and sailing down the river started all over again.[46]

The method of constructing a *kelek* was to lay the frame, which consisted of planks of (poplar) placed lengthwise and crosswise with bundles of reeds laid in between; then the *kelek*-men inflated animal skins and firmly secured the openings by a string made of osier or other twigs; finally, they were placed and fixed with ropes to the framework.[47] Some 200 to 300 waterskins were needed as support for an average raft for commercial purposes and 700 to 1,000 skins for an exceptionally large one, if passengers were to be ferried (illustration 17). On these *kelek*s

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[41] Ibn Sīda on the authority of Khalīl b. Aḥmad, 1898–1903, X: 29; al-Fīrūzābādī 1995: 1029.

[42] Ibn Sīda also on the authority of Khālid b. Aḥmad, 1898–1903, X: 29; Ibn Manẓūr nd., IV: 2842.

[43] Fraenkel 1962: 220.

[44] Thesiger 1967: 127–8, see also pl. 46–9.

[45] Chesney 1850, II: 635.

[46] Contenau 1964: 46.

[47] See Place 1867–1870, II: 134–42; Ritter 1919: 141–3, pl. 36–42; Dozy 1967, II: 485; De Graeve 1981: 83.



Illustration 17 A *kelek* down the Tigris River (pencil and watercolour by Frederick C. Cooper [d. after 1868], Searlight Collection courtesy of the Victoria & Albert Museum)

very often a hut or two was erected.[48] Voyaging on a *kelek* could have been difficult in times of dreadful weather and a skilful seaman would be needed to sail the craft at a steady pace through the rapids and currents. The coastal South Arabian tribes also adopted such inflated rafts, which had been in use in Mesopotamia from antiquity and until fairly recent times in Iraq.[49]

There is no record of a *kelek* in the Classical Arabic lexica despite its usage in the medieval period. It is known in Persian as *kālak* "a raft made of reeds"[50] though the word has a long history. It is traced to Aramaic,[51] and Akkadian *kalakku* or *kalakee*,[52] and the earliest record goes back to the Sargonic period (3rd millennium BCE),[53] loaned from Sumerian *ka-lá* (< *ki-lá*).

The *ramath* (pl *armāth* or *rimāth*) is a raft-type still in use today. Historically, the word occurs in a pre-Islamic ode (*qaṣīda*) of Abū Ṣakhr

[48] See Ritter 1919: pl. 38; Budge 1920, II: 86.
[49] Hartmann 1909, II: 469, fn. 2; *Periplus* 1912: 27.
[50] Shīr 1980: 137.
[51] Fraenkel 1962: 220; Shīr 1980: 137,
[52] Von Soden 1959–1981, I: 423.
[53] De Graeve 1981: 82–3.

al-Hudhalī (ndd); the poet longs for his love and wishes they are together out at sea:

> . . . in my love for ʿUlayya, I wished that
> we were on board a raft on the sea, without wealth
>
> [. . . *tamannaytu min ḥubbī ʿUlayyata annanā*
> *ʿalā ramathin fī l-baḥri laysa lanā wafru*].[54]

Then I found its mention in a Ḥadīth (sayings and deeds of the Prophet) where it is reported that a man came to the Prophet asking him:

> [If] we embark on our rafts and we have no water, do we make ablutions with sea-water?
>
> [*innā narkab armāthan lanā fī l-baḥr wa-lā māʾ maʿanā ʾa fa-natawaḍḍaʾ bi-māʾ al-baḥr*?] [55]

to which the answer was that not only can one make ablutions with sea-water before prayer but that you may eat of the fish therein. Ibn Sīda (d. 458/1066) in his lexicon simply defines a *ramath* as "pieces of wood put together upon which one embarks on the sea".[56] There is no mention of it anywhere until the nineteenth century; the Swiss traveler Johann Ludwig Burckhardt (d. 1817), writes that he sailed in Nubia on "a small raft of reeds" called *rāmūs*:[57] He said it was constructed of "[four] trunks of date-trees, tied loosely together".[58]

In the early part of the twentieth century, Samuel Barrett Miles writes that he saw Socotrans sailing to Muscat on this fishing craft made of "three logs about six feet [1.82 m] long, the central one being the longest propelled by a double paddle".[59] The sea voyage of Socotran fishermen, from the island to Muscat, took some ten to twelve days, less perhaps in favourable winds. It proves that such voyages along the coast were possible as Arabians were familiar with the monsoonal winds.[60] The *ramath* survived in Socotra until the 1960s. Alan Moore too, in 1925, saw at Massawa on the Eritrean coast, a three to four log-raft with

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[54] Montgomery 1997: 195.
[55] Al-Zabīdī 1969, V: 265.
[56] Ibn Sīda on the authority of Abū ʿUbayd, 1898–1903, X: 29.
[57] Burckhardt 1922: 314.
[58] Ibid., 47.
[59] Miles 1994: 414.
[60] The story of a daring voyage on board the *Kon-Tiki* built by Thor Heyerdahl and his party has proven that a primitive raft could cross long distances, such as in his case, from South America to the Polynesian Islands, see Heyerdahl 1950.

double-round bladed paddles,[61] sturdy enough to carry people, animals and cargo. Its survival in Socotra does indicate an unbroken link with antiquity. LeBaron Bowen's view is that the Arabian raft could be of Indian origin;[62] a claim based on the similarity that exists with the South Indian *kattumaram* (Malabarian and Sri Lankan). Physical evidence of a long tradition of building *kattumaram*s is not conclusive proof that such craft were imported to the Southern Arabia coast and the Red Sea because primitive craft may have developed independently of any similar type.[63] Even so, the name is traced back to Demotic */r.m.s./*, a "barque or raft"[64] and it occurs in Hieratic writing. It is also a cognate of Ethiopic; it appears in Kebra-Nagast[65] and in Somalia it is known as *rámsi, ramás, ramásh* and *ramísh* which stands for "a fishing raft-boat".[66] All this suggests that the raft journeyed from Ethiopia and Somalia to Yemen and the Southern Arabian coast.

Finally, the raft-type, the *madarata*, recorded in the *Periplus*, which is said to have been employed by Arabian mariners:[67] It has often been argued that the name is Greek μαδαράτε, "a kind of boat".[68] However, the word seems to be of Semitic origin, from the root */ʿ.b.r./* "to cross". The clue for this is the Babylonian *mabbara* (< *maʿbara* i.e. "crossing boat"),[69] and its Arabic cognate *miʿbar* (pl *maʿābir*) meaning "raft" or "ferryboat", a term which occurs in the ode of the pre-Islamic poet al-Nābigha (fl. 6th century CE).[70] There may be a phonological connection with the Greek counterpart *madara(ta)*: firstly, the term is preceded by */m(a)/*, a prefix that applies in Arabic to an object describing a function (e.g. *markab* "a ship" < *rakiba* "to board [a ship]"); secondly, the Babylonian /b/ became Greek /d/, and finally, /r/ is common in both. Whatever the case, the Babylonian and Greek terms do not provide us with any clue as to what the raft was made of.

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[61] Moore 1925: 138.

[62] LeBaron Bowen Jr. 1952: 192–3.

[63] On primitive craft (in particular the *ramath*) in Arabia see Moore 1925: 138; for Massawa see Eric Kentley's and Stone's observations for Tihama, 1985: 126–7 and fn. 112; see also my discussion in Agius 2002: 130.

[64] Kindermann 1934: 33.

[65] Ibid., 32.

[66] Ibid.; also known in the Shuwa dialect of Borum, Nigeria as *ramūs* and *rāmūs* (ibid.).

[67] *Periplus* 1989: 73 [36].

[68] See Liddell & Scott 1953: 1071.

[69] Patai 1998: 45.

[70] De Goeje 1879: 295. Ibn Sīda and Ibn Manẓūr define *miʿbar* as a ferryboat, see Ibn Sīda on the authority of Abū ʿUbayd, 1898–1903, X: 26; Ibn Manẓūr nd., IV: 2782.

Dugout canoes

The dugouts in the Indian Ocean are still in use today. When people in antiquity used logs to cross from one place to another, the next obvious step would have been to take the trunk of a tree and hollow it out. The trunk of a heavy tree was carved out with a crude stone knife or axe: the men would then plug up both ends of the hollow trunk with some form of boarding. Today, two well-known types, the *hūrī* (pl *hawārī*) and *balam* (pl *ablām*), are used for local fishing and to transport people in ports and anchorages; also seafarers use dugout canoes to ferry them to and from the dhows anchored at the port. They are sturdy and seaworthy.

The best known *hūrī* is from the Malabar coast, made from mango-wood (*Mangifera indica*). In Southeast Oman the hollowed-out type, called *hūrī ḥafar* (lit. open-hulled *hūrī*), is as long as 40 feet (about 12 m).[71] As *hūrī*s can easily capsize, Omanis use stone or gravel as ballast for stability. Paddles are used instead of oars. If the dugout *hūrī* serves as a fishing boat, ribs are added to the hull and the prow and gunwale are strengthened; this is called the *hūri manshūr* (lit. built *hūrī*) (illustrations 18 & 19). The hull is smeared with fish oil. It is clear that such extensions, as Landström explains, are the result of early man's concept of an advanced technique in boatbuilding.[72] A short mast carrying a small lateen-settee sail is fixed and a rudder is hung to the curved stern by gudgeon and pintle. When not in use, it is hauled out of the water on to the beach. The passenger or fishing *hūrī* can carry 3 to 4 men. As to the origin of the name *hūrī*, it comes from Hindi *hōṛī* and ultimately from Sanskrit *hoḍa*.[73]

The *balam* (pl *ablām*) is another dugout type, round bottomed, which has been around for centuries in the Indian Ocean. It comes from Mumbai and the Malabar coast where it is also made from mango tree trunks though sometimes from other more durable trees.[74] Like the *hūrī*s, the *balam*s are punted or sailed. The punting pole is made of bamboo and its length can vary from 4 to 5 feet (1.2 to 1.5 m). In addition to the Arabic usage of the term, we have the Persian *belem*. It

[71] Hornell 1920: 148.

[72] Landström 1961: 11.

[73] Glidden 1942: 72; note Ur *hōdzī* (Badger 1889: 824); Soq *hóri* (Vollers 1896: 651); also note the plural for Meh *hōwárit* and Had *hawáriye* (Jahn 1902: 272).

[74] For example the *Calophyllum inophyllum, Astocarpus lakoocha, Adina caordifolia* and *Terminalia*, see Hornell 1942: 31.




Illustrations 18 & 19 Dugout *hūrīs* in Raisut, Southern Arabian coast, Oman 1996 (photos author)

is possible that the origin of the name lies in the Indian nomenclature (Hin **valam*), according to al-Dujaylī,[75] perhaps related to the Tamil Nadu *vallam* or Dravidian.[76] The Greek historians Herodotus (d. c. 425 or 420 BCE) and Thucydides (d. c. 400 BCE) record a ship-term called πλοϊον (*ploion*) "floating vessel"[77] but whether there is any link with the Mesopotamian and Indian usage is difficult to say, even though it can be argued that the initial and final sounds of the Indian and Greek terms are similar: pairs of contrastive sounds of a common linguistic family (Indian and Greek being Indo-European) may become interchangeable; thus the initial /v/ of Indian **valam* becomes the initial /p/ of Greek πλοϊον and the final Indian /m/ is rendered in Greek /n/.

Reed canoes

The reed canoes of the Marshes of Southern Iraq are a link with the past in terms of their continuity of use, environment and the method

[75] Al-Dujaylī 1912a: 97.
[76] Hornell 1942: 33–4.
[77] Liddell & Scott 1953: 1422.

applied to build them. An example is the simple form of a reed boat of the Sumerian type found relatively recently in Lower Iraq, called the *chalabiyya* (pl *chalabiyyāt*), 8 to 10 feet (2.43 to 3.04 m) long, "tied together at the ends so that it looks like a cigar".[78] The palm-tree fibre beach canoe, *wārịyya* (pl *wāriyyāt*) of Iraq, Kuwait and Bahrain is but another version of the reed boat of the Sumerian ancestor which could be found until relatively recent times in the 1980s.[79] It was some 10 feet (3.04 m) long and made from bundles of palm-leaf stems, which are an alternative to reeds as these were not available. For example, in Iraq the *wāriyya* is made of reed bundles and fitted out with wooden thwarts. The bottom of the Gulf *wārịyya* is usually packed with the bulbous end of palm stalks called *karab* to offer buoyancy while the Iraqi craft has no *karab* and therefore could not maintain the buoyancy required to keep it afloat; thus, unlike the Gulf type, it was sinkable. These craft have survived for many centuries because they were practical, flexible and easy to build.

Regarding their nomenclature, there are two names that occur in classical (early medieval) sources which seem to be phonologically identical to their contemporary counterparts: one is listed by al-Muqaddasī, *walajïyya*[80] and the other, *w.r.ḥiyya* by Abū l-Qāsim al-Baghdādī, both of the 4th/10th century.[81] In the Failaki dialect the use of the name *warjïyya*[82] is close to al-Muqaddasī's *walajïyya* (the sounds /r/ and /l/ are liquids and they are interchangeable) and the second modern Failaki usage is *wahriyya*, almost identical to Abū l-Qāsim's *w.r.ḥiyya* (the switching of the letter /r/ with /ḥ/ a metathesis feature, could be a copyist error). Hypothetically, this is correct but whether the classical names can be proven to be the prototype and ancestor of the present Failaki and Bahraini beach canoe is a different story.

A beach canoe with a similar design, is called by the Omanis, *shāsha* (pl *shāshāt* or *shūsh*). They are still being built in the Al Batinah region (Northeast Oman) and are used by fishermen. Like the sister-*wāriyya*, the *shāsha* is made from date palm-leaf spines and bound together with coir; the longest can measure about 10 feet (3.04 m) long. I have

[78] LeBaron Bowen Jr. 1952: 196, see fig 3; see also Thesiger 1954: 272–81.
[79] Other names attached to this craft are: *wahriyya, warjïyya, hūriyya* and *huwayriyya*, see Agius 2002: 126–7.
[80] Al-Muqaddasī 1906: 32.
[81] De Goeje 1879: 231.
[82] Agius 2002: 128.

spoken to a number of *shāsha*-builders and I report here some of its construction features:[83] The palm stems (*jarīd*) are stripped off, soaked in sea water for from four to thirty days depending on the seasonal weather; then the soft and pliable palm fronds are sewn together and curved by a knife ready for use; holes are then bored in each frond and stitched by a palm-fibre thread thus tightening the palm fronds. One technique was the use of palm-fibre pins (*shjāyech*; s *shācheh*) which the beach canoe-men pierced through the stalks and then tied together with string.[84] The first bundle forms the keel and then the sides to build the gunwale; pieces of *sidir*-wood strengthen the hull on either side, and are extended to form a bow and stern. At the end, palm-stem butts (or polystyrene) are placed at the bottom to ensure stability; a layer of palm fronds are stitched together to form the deck. The *shāsha*s cope well with surfing and with rough weather because of the flexibility of their construction. One beach canoe carries up to two people and is propelled by one or two oars, having angular, cricket-bat or rectangular shaped-blades. The *shāsha*s require no waterproofing, although fish oil is sometimes applied, probably as a preservative. They are left to dry on the beach as frequently as possible because the palm fronds get waterlogged. *Shāsha*s, like their sister beach canoes, the *wāriyya*s, have a short lifetime, maybe one or two years if they are solidly built, so why then did the concept of a *shāsha* last for so many centuries? The answer lies in its simplicity: to construct one is straightforward and it takes roughly one day; it is light and easy to launch. It is very economical; it costs practically nothing and it is made from one tree; all locally available resources (illustrations 20 & 21).

Wooden canoes

Once the concept of adding planks to the dugout was conceived, we see the development of a wooden ship; examples of this technological advancement can be seen in Mesopotamian Bronze Age types.[85]

My search for this link with the past takes me to the Marshes of Southern Iraq, lying astride the Tigris, from Qurna in the south to Kut al-Amara in the north; there one still finds different types of canoes used

[83] Ibid., 121–5.
[84] Ibid., 125–6.
[85] De Graeve 1981: 99.





Illustrations 20 & 21 *Shāsha*s made from date palm-leaf spines bound together at Harat al-Sheikh and Umm Al Jariz, Northeast Oman 1996 (photos author)

for fishing and hunting, generally called *mashḥūf* (pl *mashāḥīf*),[86] though in the past decade their numbers have drastically dwindled because of the drainage schemes of the Marshlands since the 1970s[87] (illustration 22). Each type varies according to the region; these canoes are swift and so light that sometimes they can overturn with the lightest movement. The smallest type called *matawr* (pl *matāwir*) is made of reeds or wood but the larger type, the *ṭarrāda* (pl *ṭarrādāt*) is always made of wood; all the planks are coverd with bitumen.[88] Their builders use the simplest tools: a saw, an adze and a bow drill. The *ṭarrāda* is carvel-built from Iraqi mulberry wood and imported wood from Malaysia and Indonesia;[89] it is slim and flat-bottomed, some 35 feet (10.66 m) long and 3.5 feet (1.06 m) wide;[90] its high curved slender prow and stern rises 5 feet (1.52 m) above the water. Gavin Maxwell, who accompanied

[86] Thesiger 1967: 37; see also Ritter 1919: 138; Carter 1973: 22.

[87] A statement (14 August 2001) released by Klaus Topfer of the United Nations Environment Programme reports that a massive drainage of water took place in the early 1990s, after the Gulf war with Kuwait. Consequently, 40,000 Marsh Arabs were then living in refugee camps. Klaus Topfer concludes: "a 5,000-year old culture, heir to the ancient Sumerians and Babylonians, is in serious jeopardy of coming to an abrupt end".

[88] Heyerdahl 1982: 21, 26; Young 1989: 26–7. Layard calls them the "black boats", because they are covered with bitumen, see Hornell 1946c: 578.

[89] Young 1989: 26.

[90] Fāliḥ bin Mājid built one *ṭarrāda* for Thesiger in 1951 which was 36 feet (10.9 m) long.



Illustration 22 The *mashḥūf*: a general boat-type used for fishing and hunting (after Haji Rikkian 1927: 94)

the explorer Wilfred Thesiger (d. 2003) to the marshlands, remarks how these prows enabled the *ṭarrāda*s to "force their way through the reed beds",[91] a very important feature, as other canoes get stuck when advancing through this type of passage. Like his predecessors, Gavin Young, another traveller, observed, how the lifestyle of the Marsh Arabs (the Maʿdan) had remained virtually unchanged from their ancestors, the Ancient Sumerians.[92] Some of the fine-shaped *ṭarrāda*s were described by him as the "war canoes of the sheikhs" (illustration 23). He does not say why he called them so, but it reminded me of the description of war canoes that were used in the same region by the black slaves against the ʿAbbāsid caliphal army in the third/ninth century (see Chapter 12). These could perhaps have been the proto-type of the present *ṭarrāda* or *mashḥūf*.

The answer to my quest for ancient models can possibly be found inside the Sumerian graves. One can see similarities which are quite apparent, between the present *mashḥūf* and Old Babylonian vessels represented on terra-cotta plaques; the latter shows small, open-ended boats with upturned ends. These Sumerian vessels could have been constructed of light wood but because they are coated with bitumen, it is

[91] Maxwell 1986: 27.
[92] Young 1989: 26.



Illustration 23 The fine-shaped *ṭarrāda* (after Protheroe nd.: 8)

difficult to know for certain whether they are reed or wood-planked. The paddler is often shown sitting but sometimes standing up and punting, probably due to shallow water;[93] similar postures to those used today on *ṭarrāda*s. A good example of these positions is found in a Jamdat Nasr seal representing a hunting scene in the Marshes.[94]

The coracle

Another ancient type of boat is the coracle. Two types have been known in Iraq till modern times: the rectangular *zaʿīma* and the circular *quffa*. The *zaʿīma* (pl *zaʿāyim*), c. 10 feet (3.04 m) long and 2 feet (0.60 m) wide, is made of reeds (*qaṣab*) and the outside is finished with a layer of bitumen. Wilfred Thesiger gave some account of its construction: the *zaʿīma*-man ties bundles of five to six reeds to form the keel; the

[93] De Graeve 1981: 107 pl. 1–4, 108.
[94] Ibid., pl. 123.

ends are bent upwards; he then bends five long reeds into the shape of a U which he fastens to the middle of the keel itself and continues to do so until he builds the sides and ends of the hull; slender (willow) sticks form the ribs and a number of reeds are fastened to cover the ribs; stiff sticks are finally wedged across as thwarts. When the *zaʿīma* is ready, a coat of bitumen covers the outside. The *zaʿīma* would not last more than a year as the bitumen could not be replaced.[95]

The Iraqi *quffa* or *guffa* (pl *quffāt* or *guffāt*) is another example of a long-standing technique of making circular coracles which goes back to antiquity. It is strikingly similar to the boats of a circular shape found on Assyrian reliefs in the reigns of Ashurnasirpal (c. 883–859 BCE), Sannacherib (705–681 BCE) and Ashurbanipal (669–626 BCE) (illustration 24). The name is traced to Akkadian *quppu* meaning "basket".[96] It is a typical craft of the Tigris and the Lower Euphrates, particularly in the neighbourhood of Baghdad; one could see them around till the 1970s.[97] It is a basket-boat which does not sail well against the current as it spins around in the water, but is quite safe. It consists of a spiral of reeds bundled and woven together in a techique called "coiled basketry".[98] The reeds are woven together with a palm fibre rope and the basket is reinforced by an inner structure.[99] Normally, two *quffa*-builders are needed, one for the inside and the other for the outside, as one passes the cord through the wall of the basket while the other tightens the cord and so on. When completed, the *quffa*-builders smear the vessel with bitumen.[100] Bitumen is brought from Hit on the Euphrates, a well-known place for this mineral since early times. Larger *quffa*s are coated on the outside with a mixture of hard and liquid bitumen, which makes the craft "stronger and safer to use".[101] A number of cowries and blue beads are stuck into the bitumen on the side of the gunwale to ward off the evil eye[102] (illustration 25).

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[95] Thesiger 1967: 128; pl. 45.
[96] Von Soden 1959–1981, II: 928.
[97] Personal communication (22 April 2002) from Hussein Abdul-Raof.
[98] De Graeve 1981: 85.
[99] Not all *quffa*s were made of reeds, some were constructed of "pomegranate branches laced together with ropes"; from the diaries of Louisa Jebb, *By Desert Ways to Baghdad* (London: Thomas Nelson and Sons, nd.), p. 278.
[100] Hornell (1938: 153–9) describes in detail the method of constructing a modern *quffa*.
[101] De Graeve 1981: 86.
[102] Hornell 1938: 155.

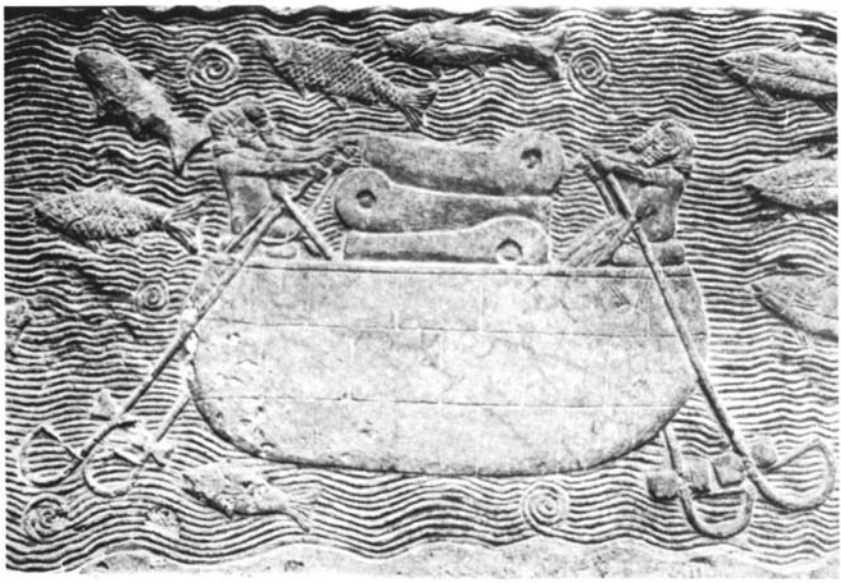


Illustration 24 A *quffa* on an Assyrian relief, Kuyunjik (after De Graeve 1981: pl. XLVII, no. 110)



Illustration 25 Two Iraqis in a *quffa* (pencil and watercolour by Arthur Trevor Haddon [1864–1941] Searlight Collection, courtesy of the Victoria & Albert Museum)

Some of the *quffa*s are from 10 to 15 feet (3.04 to 4.57 m) in diameter (from gunwale to gunwale) and some are even larger, 8 feet (5.5 m) with a depth of 3 to 4 feet (0.91 to 1.21 m), carrying cargo from 3 to 7 tons. One or two men propelled the coracle by oar, standing up. Normally, it could carry 4 to 5 persons but up to 20 passengers or more if it were larger, including at times a camel.[103] F. R. Chesney on his visit to Iraq in 1850 noted, though rare at the time, that sometimes the *quffa* was covered with leather which was used to keep the water out.[104] Leather is said to have been used in the fifth century BCE. Herodotus (d. c. 425 or 420 BCE), who visited Babylon, writes that these coracles were made of hide:

> …they cut ribs of osiers to make the frames and then stretch watertight skins taut on the under side for the body of the craft… .[105]

There is certainly a resemblance of the boats on the Assyrian reliefs to the modern Iraqi craft and De Graeve asks whether the Assyrian coracles are the prototypes of the *quffa*?[106] As I have shown with other craft, these primitive boats have survived because they could be made from locally sourced materials, so were cheap to build and, crucially, they worked; it is more than likely, therefore, that the *quffa* is a true relic of the past. Interestingly, coracle boats crop up in other parts of the world (such as China and India, and even Britain) with the same basic construction,[107] so they are not unique to Mesopotamia.

Bundled-reed wooden vessels

The sailboat could already have been around in ancient Sumer c. 4000 BCE.[108] How successful these early ocean-going ships were with the open

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[103] Personal communication (22 April 2002) from Hussein Abdul-Raof.
[104] Chesney 1850, II: 639.
[105] Herodotus Bk I.194.
[106] De Graeve 1981: 87.
[107] Hornell 1933: 158–9; Needham 2000, IV, iii: 384–6.
[108] Recent excavations show that by 3000 BCE a Sumer (non-Semitic) civilization flourished in the southern part of ancient Mesopotamia. Excavated artefacts which include pottery, jewelry and weapons point to sophisticated skills for using tools. With the recovery of numerous cuneiform (wedge-shaped) clay tablets it was possible to reconstruct the administrative, religious and work networks of the Sumerians. They describe a well-organized communal life, mainly agricultural; they built canals and developed effective systems of irrigation, see Kramer 1963; Crawford 1991. Other sources of information come from a corpus of clay tablets in Southern Mesopotamia

sea is not known but when in 1977, Thor Heyerdahl (d. 2002) built the bundled-reed ship *Tigris*,[109] his ambition was to prove that such a craft could have sailed beyond the Mesopotamian rivers. Heyerdahl sailed with his reed-ship down the Shatt al Arab to the Gulf of Oman, across the Indian Ocean to Karachi, from where he crossed westbound to Djibouti in Somalia, a journey of 4,200 miles (6,759 km). The voyage was made using primitive methods of navigation. The construction of these large bundled-reed vessels like Thor Heyerdahl's *Tigris*, confirms that such craft were viable but would not exclude, rightly argues Bendt Alster, that wooden ships already existed in the third and second millennia BCE and had sailed the Persian Gulf.[110] Early Bronze Age textual and iconographic representations show that bundled-reed and wooden vessels were in use simultaneously.[111] Probably, some boats were a hybrid of materials used.

Chesney in an expedition to the Euphrates in 1835 observed how the whole framework of reed boats is reinforced with "strong poles or stems of small trees as tie beams or thwarts".[112] From the way reed-built homes (*muḍīf*) of the Southern Marsh Arabs (Maʿdan) of Iraq were constructed, it is possible that bundled-reed boats were also strengthened with wooden beams and that perhaps frames and stringers were added for the same reason.[113]

Boat models recovered in a number of places offer a base for understanding different types of river craft and ocean-going vessels.[114] Other evidence comes from the Failaka and Bahrain circular stamp seals (dating from the end of the 3rd and 2nd millennium BCE) which show three different types: sickle, angular and pot shapes.[115] The most common

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under the Sargonid dynasty (Sargon II [722–705 BCE], Sennacherib [705–681 BCE], Esarhaddon [681–669 BCE], and Ashurbanipal [669–626 BCE]).

[109] Heyerdahl gave a dramatic account of his crossing of the Arabian/Persian Gulf and the Indian Ocean in *The Tigris Expedition* (1982), but his trip was only possible after the second attempt with the boat beating to windward.

[110] Alster 1983: 50.

[111] Landström 1961: 14.

[112] Chesney 1868: 78.

[113] Tom Vosmer, personal communication (4 July 2002).

[114] De Graeve (1981) catalogued and studied 108 representations and boat models from Mesopotamia (the Old Babylonian period c. 2000–1600 BCE; the Kassite and Middle Assyrian periods c. 1600–1000 BCE; the Neo-Assyrian period c. 1000–612 BCE; the Neo-Babylonian period c. 612–539 BCE) and Qualls (1981) listed and described 403 representations that appear in seals, models and graffiti of the Bronze Age period.

[115] A detailed study on the Dilmun seals is found in Al-Sindi 1999 (in particular pp. 15–54); interviewed the author on 23–24 April 1991; see also Kjaerum 1980: 45–53; Johnson 1980: 10; Crawford 1998: 15–16.

form for a reed boat in the Mesopotamian and Egyptian representations is the sickle-shape. A transition in shape is noted when shipwrights began to apply timber in the construction of vessels: from the seals it is evident that the sickle-shape gave way to an angular-form.[116] The angular-form has survived for millennia: one can see it represented in medieval iconography and in some craft of modern times too. Reed craft would have developed because reeds in Mesopotamia and papyrus in Egypt were in such abundance. One could also say that the lack of shipbuilding timber in these regions was a contributory factor to reed-boat construction. However, how would one explain the preference for reed-built craft during the Indus Valley civilization where there was a plentiful supply of timber? Perhaps the process of constructing a reed boat was a much simpler and easier option.

Thor Heyerdahl's theory of the preponderance of reed boats cannot be proven absolutely, for wooden boats also sailed the Persian Gulf in the third and second millennium BCE. There is a long tradition of Mesopotamian boats built of wood.[117] From the clay tablets we know that Dilmun shipwrights imported wood for their ships; the merchants stamped the seals recording such transactions.[118] It can be shown from these Dilmun seals that angular and wooden boats were used (illustrations 26 & 27) and it is possible that they had keels, as the boat model from Lothal seems to support this concept.[119]

Archaeology: Reed boat construction and the use of bitumen

Until the Ras al-Jins (Southeast Oman) discoveries,[120] we had no direct information on reed boat structure; iconographical representations and boat models proved unhelpful. However, the reconstruction of a 42.6-

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[116] Kjaerum 1980: 45–53; idem, 1991: 137–47; Al-Sindi 1999: 15–54.

[117] Alster 1983: 50; see Barnett 1958: 220–30; Johnstone 1980: 10–11.

[118] Leemans 1960: 116; Pettinato 1972: 55. These seals were small and button-shaped with a picture incised on the smooth surface while on the back you find circles with a dot in the middle. The seals were found in Ur, Lothal (in the south of the Indus Valley), Teppe Yahya (Southeast Iran), Failaka, Qatar, the Emirates, Southern Arabia and Bahrain. The Sumerians marked their merchandise with cylindrical seals impressed in clay. The Indus Valley seals were rectangular.

[119] Rao 1973: 124.

[120] A joint Italian-French archaeological mission was headed by Maurizio Tosi (Università di Bologna) and Serge Cleuziou (Centre National de la Recherche Scientifique, Nanterre) between 1985 and 1994, see Cleuziou & Tosi 1994: 750; Vosmer 1996: 223–42.





Illustrations 26 & 27 Dilmun wooden ships *circa* 2000–1600 BCE (after Al-Sindi 1999: 52)

foot (13 m) proto-reedcraft based on the Ras al-Jins bitumen impressions, provided valuable information into construction methodologies: there were about 300 fragments of bitumen imprinted with reed, rope and mat impressions on one side and barnacles (*Balanus amphitrite*) on the other, dating from between 2300 and 2100 BCE.[121] The intention in building the prototype was to provide knowledge on the skills needed in its construction, using materials such as reeds (*Phragmites australis*), rope and bitumen.[122] All materials were sought from Oman. The building process needed the skills to cut reeds, make ropes, put together bundles of reeds (lashing and binding) (illustration 28), prepare timber and finally in the mixing of lime and bitumen. Other skills were required to make sails (woollen or mats of reeds or date palm leaf). The conclusion drawn from this, Tom Vosmer comments, was that Bronze Age shipbuilding required "a highly organized social and manufacturing infrastructure", and it would be expected that the crew had similar skills for repairing the ship when it sailed across the ocean.[123] The boat finally sailed in February 2002. One question remains unanswered: whether the reed was local or imported from the Meluhha (Indus Valley) region.

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[121] Along with the fragments, there were a number of objects unearthed: an Indus Valley ivory comb and copper trading seal, various Indian carnelian beads and dozens of pieces of ancient Indian pottery.

[122] Vosmer 1996: 223–42; see also De Graeve 1981: 105–6.

[123] Vosmer 1996: 239.

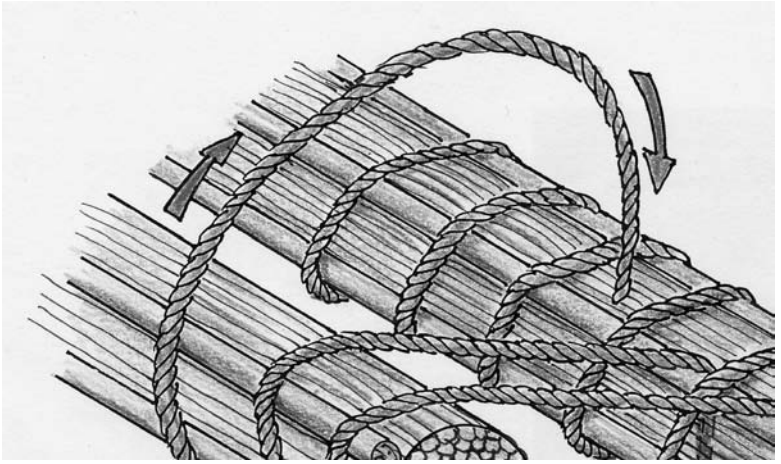


Illustration 28 Tying reed-bundles together (courtesy of Tom Vosmer)

Further experimentation was conducted by Tom Vosmer, in coordination with a research team in Ravenna, Italy, by constructing a bundled-reed vessel named "Magan boat".[124] The team was inspired by the method used by the Marsh Arabs to build their reed houses (*muḍīf*), as mentioned earlier, i.e. proceeding upside down; that is the keel, like the roof of the house, is first made with a number of tight bundles of reeds (*qaṣab—Phragmites communis*)[125] lashed together to form the hull shell and then long reeds are shaped in a U form which are passed from the middle of the keel to the floor (illustrations 29 & 30). Based on the evidence of the bitumen fragments, the team decided to put mats on the bundles to protect them from heat and the bitumen from melting. It is interesting to note that with Egyptian reed boats it was the custom to use clay on the inside rather than applying another coat of bitumen. Heat keeps clay dry while bitumen melts and becomes sticky.[126]

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[124] Under the auspices of the Centro Etnografico della Civiltà Palustre in Ravenna affiliated with the Department of Archaeology, University of Bologna, the project was sponsored by the Fondazione Cassa di Risparmio (Bologna) and the Fondazione Flaminia Ravenna. The Magan boat was a 1:20 double-ended model, 42.6–49.2 ft (13–15 m) long with a height of 13.12 ft (4 m); a discussion on the building of the bundled-reed vessel is found in Vosmer's unpublished thesis 2005: 110–32.

[125] A reed that grows in the Marshes as high as 25 feet (7.40 m), see Thesiger 1967: 205–7.

[126] Patai 1998: 7.





Illustrations 29 & 30 (Left) Building the arches for the *muḍīf* (after Thesiger 1967: fig. 88); (right) building the keel of the bundled-reed "Magan boat" at Ravenna, 2002 (photo author)

Textual evidence points to the existence of bitumen-covered reed-bundle vessels in the Bronze Age (c. 3000–2000 BCE): an Ur III text from Girsu mentions, among other things, the use of vast quantities of reeds and bitumen;[127] another Ur III text states that 900 kg of bitumen was scraped off a boat.[128]

Coating of reed-boats with bitumen is well-known. The Tell Mashnaqa (Northeast Syria) models show what seems to be bitumen coating.[129] Two large models (from 1–1.5 ft/30.4–38.1 cm to 6 ft/121.9 cm in length) found in Ur were made with bitumen and such models seem to appear throughout the Sumerian period. The recent recovery of 22 bitumen fragments of ocean-going vessels belonging to the Ubaid period at Al-Subiyah (Northeast Kuwait)[130] is a significant find. They point to a maritime trade as early as the sixth millennium BCE. Among these fragments one finds bitumen pieces with reed impressions on one side

[127] Cleuziou & Tosi 1994: 746, 754.

[128] Ibid. From the Ur III cuneiform texts we note that boats had from 10 to 60 *gur* of cargo capacity (c. 2.5 to 15 tonnes), others up to 300 gur (c. 75 tonnes), see Potts 1997: 128.

[129] Theusen 2000: 76.

[130] The British Arachaeological Expedition to Kuwait (1998–2003) was directed by Harriet Crawford and Robert Carter both of the Institute of Archaeology, University College London, see Carter 2002: 13–20.

and barnacles on the other.[131] Other finds include a small boat model made of fired clay.[132] Interestingly, in Mesopotamia ceramic model boats of the Ubaid period were found coated with bitumen.[133] It is possible to speculate from the discoveries at Al-Subiyah that the bundled-reed vessels were secured with rope or cord and coated with bitumen and that the site was used for repair work and maintenance and possibly boat-building.[134]

From the experimentation conducted by the Ravenna team, Tom Vosmer observed that: a) the impressions left on the bitumen fragments could possibly be caulking remains, b) barnacles grown on the outside of the fragments could suggest that the bundled-reed boats were ocean-going vessels, and c) from the internal side of the fragments one could see that the reed bundles were lashed with rope and covered with woven mats.[135] The finds, primarily the bitumen fragments, indicate that both wooden and reed boats were constructed, or single boats with a hybrid structure of reed and single-plank technology.[136]

Sewing techniques of a vessel (c. 2000 BCE): the link with the past

Written, archaeological and ethnographic evidence reveal some common features which are unique to sewn method construction, such as the Southern Indian stitched vessels of today,[137] the ninth-century shipwreck of a sewn ship at Belitung Island, Indonesia[138] and remnants of stitched planks found in Oman[139] (see Chapter 5). The first question is where did the sewn technique originate from? The second is how was a sewn-planked ship built? Early records of watercraft of the Ur III period and the seals from the Dilmun period are void of construction technique. However, one Akkadian text, the *Epic of Gilgamesh*, gives some interesting detail about the building of a sewn ship.[140] The

[131] Carter 2002: 22.
[132] Idem 2002/2003: 46.
[133] Qualls 1981: 12–3.
[134] Carter 2002/2003: 46; also personal communication (6 July 2002).
[135] Personal communication (Tom Vosmer 6 July 2002).
[136] Vosmer 2001: 235.
[137] Pedersen 2004: 231.
[138] Flecker 1999: 199–217; idem, 2001: 335–54.
[139] Vosmer 1997: 217–235; Agius 2002: 98–9, 111–2.
[140] Pedersen 2004: 231.

eleventh tablet of the Gilgamesh epic (c. 2000 BCE) a parallel with the biblical tradition, which tells the story of the deluge,[141] illustrates some features of the process of constructing a sewn ship and, as Pedersen claims, "reinforces the connection between the vulnerable dhow and the watercraft of the world's first civilizations".[142] In the Gilgamesh epic we find the same progression of the shell-first construction practised in the Arabian/Persian Gulf up to recent times, which consists of stitching the planks together and then lashing them internally. The second stage is plugging stitched holes with wooden pegs or pieces of (coconut) fibre as a prevention against leakage.[143] Then comes the process of oiling the cordage inside the hull. Sealing the cordage inside the hull is crucial in order to prevent the rope from rotting; fish oil was generally applied. Finally, the waterproofing of the outer hull is important as a protection of the wood, particularly the harm caused by the teredo, or shipworm. A mixture of lime and oil is smeared by hand on the outside, below the waterline, a process often seen on modern Arabian dhows: it serves both as a deterrent against the teredo and a sealant. The information gathered in the Gilgamesh epic is remarkable in terms of its content but also, as Pedersen observed, "the correct order followed by shipwrights". Historically, this is an important document which advances our knowledge of the stitching process from the second to the third millennium BCE, as well as consolidating our understanding of traditional shipbuilding practice from antiquity to present times.

To sum up, primitive craft, like the *kelek*, *ramath*, *shāsha* and *quffa* are an unbroken link with our ancestors and it is imperative that they are thoroughly documented before they pass from human memory altogether. Water and sea craft develop in different ways: they are influenced by the land formation, local waters and climate; for their construction they depend on availability of materials; the tradition and culture of the

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[141] In the Gilgamesh epic we have Utnapishtim who is asked by the gods to build a huge vessel (Gilgamesh XI.56–76) while in the Old Testament it was Noah who had the ark built (see Genesis 7:12–9: 17); there are some variations but in both instances the mission was to save life from destruction.

[142] Pedersen 2004: 236.

[143] Using a wooden plug to block a leakage of a boat is a very primitive method; see also Caspar Balbi's description in his travels to Arabia in the sixteenth century, in which he describes how the ship's crew dive into the sea to block holes by a plug with horse hairs being sucked in: see CDRAD/Dutch Archives "Travels by Caspar Balby 1579–1588", fol. 40; see also Agius 2005a: 139.

craftsmanship and the shipbuilders; and, of course, the environment in which different boats and ships evolve. One important factor is the purpose for which a boat or ship is built: traditional shipbuilding is time consuming, the skills needed to use the tools with precision, patience and perseverance.

The marshy region with its reed beds provided the material to build not only houses and domestic utilities (i.e. mats, baskets, curtains) but also many boats which were made of bundles of reeds, tied together with several lashings. These reed boats were largely limited by the material and structure while the wooden vessels had the potential for development. I also looked at contemporary primitive boats and the information they provide as to the early stages of development, which involved reshaping them with a number of additions the end-result being a shape similar to a constructed wooden boat. Two techniques were applied to buiding a boat from scratch: the skeleton and the shell method. In the skeleton technique it is required to lay the keel first, then the frames are set up, to which the planks are fixed, while the shell technique also has the keel first, followed by planks to shape the shell of the vessel and then the frames are inserted. The latter method was widely applied in antiquity and it is still prevalent in many regions of the Indian Ocean. One of the reasons why the shell method lasted for such a long time could be explained by the sewing techniques that give shape to the ship (see Chapter 5). The Gilgamesh ship, one of the earliest records we have, is remarkable because similar features still prevail in sewn vessels built in Southern India and also Arabian dhows with nail-planking. With these facts in mind, we are now in a position to look at some general construction features of the Classical and Medieval period of Islam and, where possible, to show by comparison, design features that are common with the early vessels of the Bronze Age.

CHAPTER FIVE

CONSTRUCTION FEATURES OF PERSO-ARABIAN AND WEST INDIAN SHIPS IN MEDIEVAL ISLAM

انماهي مخيطة بامراس من القنبار

[The *jalbas*] are sewn with cord made from *qinbār*[1]

Ibn Jubayr (d. 614/1217)

The bundled-reed boats of Bronze Age Mesopotamia, the Indus Valley and Egypt present similar technological features (i.e. lashed or sewn construction) to the Western Indian Ocean craft of the medieval period. A number of design features (prior to 16th century CE) are characteristic of Indian Ocean ships; for example, if we compare the Failaka seals (2nd millennium BCE) with the *Maqāmāt* (The Assemblies) illustrations (13th century CE) of al-Ḥarīrī (d. 516/1122), one finds striking parallels, particularly the straight stem and sternpost and the rake of the ends. Other design features are the double-ended shape, the false sternpost or stern fin known as the *fashīn*, the rope-controlled system, the framing patterns, the square rig, fore and aft decks and construction methodologies such as the shell-first construction or hybrid shell-skeleton construction, sewn planks versus iron-nailed framing and the use of fish oil and anti-fouling.

There is no treatise that deals with ship construction in the Classical and Medieval Islamic literature; the occasional references we have in works of history, geography and travel are, if any, of little substance in such things as the type of timber the medieval shipwright used, hull-design etc. Moreover, iconographic representation is very sparse and what we are left with is scraps of data which can be more frustrasting than no information. This chapter is an attempt to present general shipbuilding features of the Medieval Islamic period through literary sources and pictorial representation; by reconstructing the past I will look at some present construction features in the Western Indian Ocean.

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[1] *Innamā hiya mukhayyaṭa bi-amrās min al-qinbār*; Ibn Jubayr nd.: 64–5; trans. by R. J. C. Broadhurst, see 1952: 65.

Shipbuilding sites

We do not have the wealth of information about shipbuilding sites in the Western Indian Ocean as we do for the Mediterranean Classical and Medieval Islamic period. There seem to be fewer sites, nothing compared to the many Mediterranean shipyards which were used to build war vessels because of the constant warfare between Islam and Christendom.

In the early centuries of Islam, Ubulla and Siraf had two main dockyards, while Aden was an important boat-building centre during most of the Middle Medieval Islamic period. On the southwest coast of India, south of Calicut, the Beypore shipyards were well-known as they were located at a crossroads between the Western Indian Ocean and the Far East; their importance grew in terms of the varied types of timber the region could supply and in the number of shipbuilders with workshops dotted all along the coast. In addition, the Southwest Indian coast was the right spot for ships to stop over because of the monsoonal winds and/or to repair their ships. Raw materials such as teak planks, coir and *nūra* (lime and fat substance) were exported from here.

Margariti's recent research on the maritime trade in Aden provides a valuable observation on the organization of shipbuilding in the Indian Ocean: her comments come from the Genizah documents which throw new light on this industry.[2] It is possible, she thinks, that as much as shipbuilding was active in Aden in the Middle Medieval period, one should not ignore the fact that ships could have been bought and constructed overseas and then shipped to Aden. In fact the West Indian coast was the perfect location for ship construction as all the building materials were available, from types of timber to the materials for fastening the planks; which makes it possible, that shipwrights from other shipbuilding sites in the Persian Gulf, commisioned their ships from Indian shipwrights for the same economic reasons. However, this may not have always been the case: Duarte Barbosa, in the early sixteenth century, claims to have seen Red Sea ships moored at Calicut harbour carrying a number of shipbuilders.[3] It is not clear who these shipbuilders were. Is it possible that Calicut shipbuilders were hiring Red Sea workers to build Indian ships or could it be the case that these

[2] Margariti 2002: 256 *seq.*; idem, 2007: 56–60, 154, 158–60.
[3] *Book of Duarte Barbosa* 1918–1921, II: 77.

ships were carrying Red Sea carpenters to construct their own ships in Calicut and sail them back to the owners who had commisioned them? Although Barbosa's statement is open to different interpretations it has to be said that Yemenites were renowned for their shipbuilding skills (see Chapter 3).

What about Portuguese ships? Carpenters would have accompanied the crew on their voyage and repairs were done as needed but would they have built ships during their stay in India? One undated document refers to the prohibition on constructing ships in India.[4] This might be interpreted, however, as a temporary measure; an intriguing reference, for Indian timber, nails and craftsmanship were readily available (illustration 31).

For smaller vessels, it was a question of finding places suitable for use as shipyards that were convenient with materials to hand; timber for planking was imported from India but local wood would have sufficed for ribbing and joints. One should also mention that old timber was recycled; it was collected from shipwrecks and salvaged boats, and re-used to build new boats or for re-fitting old ones.[5] Sindbād the Sailor in his sixth voyage recounts how, marooned on an island, he built a raft from the remains of shipwrecks:

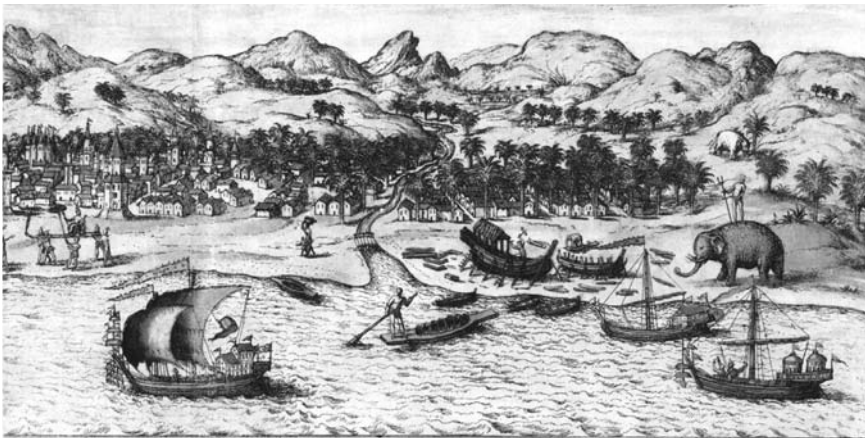


Illustration 31 A shipyard in the city of Calicut *circa* sixteenth century (from an old print; Danvers 1894, I: 182)

[4] CDRAD—Portuguese Archives, ANTT Tragmentos, Cx. 4—Documentos da India M⁰1, no. 31.

[5] Sālim & ʿAbbādī 1969: 261–2.

> Then I arose and went and collected pieces of wood… and bound them upon the shore of the sea with some ropes of the ships that had been wrecked; and I brought some straight planks, of the planks of the ships, and placed them upon those pieces of wood… .
>
> [*thumma innī qumtu wasiʿtu akhshāban… wa-shadadtuhā ʿalā jānib al-baḥr bi-ḥibāl min ḥibāl al-marākib allatī kusirat wa-jiʾtu bi-alwāḥ musāwiya bi-alwāḥ al-marākib wa-waḍaʿtuhā fī dhālika l-khashab*…].[6]

So, after measuring the width of the river, Sindbād made the raft, fixed two pieces of wood as oars, loaded all the treasures from the shipwrecks and his belongings and sailed down the river to the sea shore.

Technology and material

Tools

Shipbuilding tools, from the limited information given by our sources, seem to have been very much similar to the rudimentary tools used in some of the shipyards of modern times.[7] These are the bow and string drill, the auger, adze, mallet, saw and chisel. Not much is known about the size of nails used and where the iron was brought from. Where iron was lacking, treenails were used; they do not rot with dampness nor do they create rust; such wood fastenings were more frequent with small vessels.[8]

There is no archaeological record of instruments being used for measuring systems; carpenters, therefore, would have applied measurement related to parts of the body: span of a hand (s *shibr*, pl *ashbār*) roughly 9 inches (22.86 cm.), the forearm (s *dhirāʿ*, pl *adhruʿ*) c. 18 inches (45.72 cm.), foot (s *qadam*, pl *aqdām*) c. 12 inches (30.48 cm.), and the open-arm's length (s *bāʿ*, pl *abwāʿ*) c. 6 feet (1.8 m.).

Anchors

Types of anchor depended on the nature of seabed: sandy, muddy bottoms or rock. The earliest types were large stones. Until recent times stone anchors were used by mariners in Oman and the Southern

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[6] *The Thousand and One Nights* 1979–1981, III: 64; *Alf layla wa-layla* nd., III: 142.
[7] Agius 2002: 139–41.
[8] McGrail 2004: 72, 201, 236, 273.

Arabian coast: these were circular, oblong or triangular in shape and weighed from 10 to 12 *mann*s (88.18 lb/40 kg to 110.23 lb/50 kg).[9] A piece of timber with sharp ends was fitted to the hole of the stone anchor; these timbers enabled the stone anchor to obtain a firm hold on both muddy and sandy seabeds. Common features of the Indo-Arabian type are the two rectangular or square holes at the bottom end to secure flukes and at the top end a circular hole for a hawser. There are stone anchor finds in a few locations in the Western Indian Ocean: Indo-Arabian stone shanks were found at Qalhat (Southeast Oman), and two stone anchors retrieved off the Grande Island, Goa, though dating them is problematic;[10] however, two fragmentary examples of Indo-Arabian anchors at Siraf were datable (8th–11th c), and one other Indo-Arabian stone anchor found at Kannur, Kerala was dated c. fifteenth century.[11]

One type of anchor, reported by the lexicographer Ibn Sīda (d. 458/1066), was made of wood and lead; the process of making one was described as follows:

> You take pieces of varied sized timber; you tie them together from the middle in one position; then by pouring melted lead the wood becomes as solid as a rock; the ends of the wood are tied to a piece of rope and the anchor is lowered to [the bottom of] the sea.
>
> [*wa-huwa an tuʾkhadh khashabāt fa-yukhālif baynahā wa-bayn ruʾūsihā wa-tushadd awsāṭuhā fī mawḍiʿ wāḥid thumma yufragh baynahā raṣāṣ mudhāb fa-taṣīr ka-annahā ṣakhra wa-ruʾūs al-khashab nāʾisha tushadd bihā l-ḥibāl tursal fī l-māʾ*].[12]

A fair amount of detail which is unique to a lexicographer. Ibn Sida's approach to compiling his lexicon was by subject matter and though description for some entries is lacking, others such as the above are substantial (see Chapter 1). In fact I found no description of making anchors in any of the early and medieval Arabic sources. The oldest literary Arabic term for anchor is *marsā* (pl *marāsī*), a pre-Islamic word; consider the following verse of al-Musayyab b. ʿAlas (before 1st/7th c):

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[9] Information based on interviews with Omanis, Agius 2005a: 181–2. Tom Vosmer told me that a 40 kg stone is significantly smaller than the anchors found in Qalhat (communication 26 April 2006). Other details are found in LeBaron Bowen Jr. 1957a: 288–93.

[10] Vosmer 1999: 248–63; Vosmer *et al.* 2000: 11–14; Tripati *et al.* 2003: 99.

[11] Tripati *et al.* 2005: 133.

[12] Ibn Sīda 1893–1903, X: 27.

He cast the anchors right o'er a perilous deep—
The anchors held, and the craft lay still in the flood.

[*alqā marāsiyahu bi-tahlikatin*
thabatat marāsīhā fa-mā tajrī].[13]

As this verse says nothing about the anchor type, we have to rely on Ibn Sīda's description which might not be true of the early period. One further comment the lexicographer makes is that the *marsā* was known to be heavier than the *anjar* (pl *anājir* < Per *lanjar*),[14] but we do not know what the composition of the anchor was, i.e. stone, lead, wood or iron. The Arabic technical term applied to one or the other in classical and medieval times remains obsucre. Consider Buzurg b. Shahriyār's (fl. 4th/10th c) use of the term *anjar*, "to let go the anchor/s" [*ramā bil-anjar* or *ṭaraḥa l-anājir*];[15] he could be referring to either a stone or iron anchor or both.

I would like to recall what two European authors wrote about anchors in the sixteenth century. Gaspar Correia says that Indian Ocean ships carried anchors of hard wood with stones tied to the shanks in order to go to the bottom of the sea;[16] he also informs us that they carried "anchors of iron and stone".[17] Ludovico di Varthema, his contemporary, says that the Indian ships he saw at Calicut carried anchors made of marble.[18] All this information is helpful in understanding the types of anchors used at the time but no clue as to what the anchors they saw were called in the source language. Iconographic evidence shows that iron anchors were already in place by the twelfth or thirteenth century: a representation of a small four-pronged grapnel anchor hanging from a bowsprit is seen in two *Maqāmāt* (The Assemblies) images[19] (illustration 32), while in India, its usage seems to have appeared after the sixteenth and seventeenth century probably with the coming of the Portuguese.[20]

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[13] The verse is cited in Jones 1996, II: 125–6.
[14] Note Skt *nangara* (iron anchor) and *nangarasila* (stone anchor).
[15] Al-Rāmhurmuzī 1883–1886: 51.
[16] *Three Voyages of Vasco da Gama* 1869: 241.
[17] Ibid.
[18] *Travels of Ludovico di Varthema* 1863: 153.
[19] LAS (St. Petersburg) Ms S23; BN (Paris) Ms Arabe 5847, fol. 121 (illustration by Yaḥyā b. Maḥmūd al-Wāsiṭī most probaby in Syria).
[20] Tripati *et al.* 2003: 104.



Illustration 32 The four-pronged grapnel in one of the *Maqāmāt* of al-Ḥarīrī (d. 516/1122) (after al-Rāmhurmuzī 1883–1886: opposite title page)

Timber

India supplied wood to practically all shipyards in the Western Indian Ocean. To build ships, the Arabian carpenter needed wood like teak (*Tectona grandis*, CA *sāj*) for planking. It can be bent and joined to the frames, following the curves of the ship's sides. It is well established that India, from antiquity, provided teak to the Persian Gulf; when Theophrastus, in the third century BCE, claimed that the timber of the ships of Bahrain lasted two hundred years,[21] he was possibly referring to teak, as it is well-known to be long-lasting. One of the earliest Islamic poets, Farazdaq (d. 110/728 or 112/730) speaks of "(ships of) teak".[22] Over

[21] Theophrastus Bk V. IV. 7.
[22] See Montgomery 1997: 195.

the centuries, teak has proved to be the ideal timber because it is hard but durable and pliable once it has been seasoned.[23] Other timber that came from India included: aini (*Artocarpus hirsuta*), jackfruit (*Artocarpus heterophyllus*), karam (*Adina cordifolia*), mango wood (*Mangifera indica*), poon (*Calophyllum* spp.) and venteak (*Lagerstroemia lanceolata*). But wherever it was possible shipbuilders reverted to local wood; the advantages were obvious compared to the expense of buying the timber from abroad, not to mention the costs of employing the crew and labourers or slaves, transporting it and the dangers of the sea.

With smaller craft, local wood was used for ribbing and joints, *nārajīl*, coconut timber (*Cocus nucifera*) was used exclusively for building hulls; it was imported from the Maldives and Laccadive Islands but also from Yemen.[24] Its trunk supplied the carpenters with masts and yards, as the Jesuit missionary Jerónimo Lobo (d. 1678) reports;[25] also oars and wooden anchors were manufactured from this coconut timber.[26] Other timbers that carpenters used were: *qaraṭ* (*Acacia nilotica* and *Acacia indica*), *ghāf* (*Prosopis cineraria*), *ʿilb* or *sidir* (*Zizyphus spina-christi*);[27] these are trees that grow in abundance in several wadis of the Arabian Peninsula. Also, it needs to be said, that the timber of the palm tree was good for boatbuilding and its leaves served for making sails and producing sacks for merchandise (illustrations 33 & 34, 35 & 36).

Rope, caulking and preservation of the ship's planks

Date palm fibre (*Phoenix dactylifera*) was used for rope in Arabia and the Northern Gulf in the absence of coir (made from the husks of the coconut). Remarkably strong, the date palm fibre would not, however, last long in seawater, while coir fibre, exclusively supplied from Sri Lanka, the Maldives and Lakshadweep Islands, has proved capable of enduring seawater for much longer. The Arabic term for coir is *qinbār*

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[23] *Periplus* 1912: 152; see also al-Masʿūdī 1861–1877, I: 365.
[24] Ibn Jubayr 1952: 65.
[25] *Itinerário of Jerónimo Lobo* 1984: 108.
[26] Ma Huan (1970: 143), writing about coconut plantations in Malaysia, lists 10 different uses derived from the coconut tree: building houses and roofing; food stuffs such as syrup, wine, oil, and sugar; from the fibre, ropes for shipbuilding; from the shell, bowls and ash.
[27] For example the Omani stitched double-ended *sanbūq* and the *badan*, Agius 2002: 80, 103–4.




Illustrations 33 & 34 *Qaraṭ* (left) and *sidir* (right) trees grow in many parts of the Arabian Peninsula, Sikkat al-Souq, Musandam 1996 (photos author)




Illustrations 35 & 36 *Qaraṭ* timber (left) is good for framing and *sidir* wood (right) is for the ribs, Suakin 2004 (photos author)

(also *qanbār* or *qunbār*).[28] It was available in quantities and was exported to China and India as well as Yemen.[29] This resilient material served not only to stitch the planks of a ship but also as rope for rigging and cables.[30] Omanis valued the fibre highly; Abū Zayd Ḥasan of Siraf (fl. 4th/10th c) reports:

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[28] Qinbār is also used for "cannabis or hemp", from which ropes and the like are made, al-Zabīdī 1968, IV: 81. Dhofaris in Oman called their sewn boats (the *sanbūq*-type) *kambārī*, a nomenclature which represents the term *qinbār*.

[29] "The quality of which was better than hemp": Ibn Baṭṭūṭa 1968, IV: 121; idem, 1958–2000, IV: 827.

[30] Ibn Jubayr 1952: 65; Ibn Baṭṭūṭa 1968, II: 204; idem, 1958–2000, II: 387. Abū l-Qāsim al-Baghdādī (fl. 5th/11th c) reports that the *ja'fariyyāt* [s.v.] were stitched with coir rope [*al-ja'fariyyāt mukhayyaṭa bi-amrās min al-qanbār*], De Goeje 1879: 231; see also *Itinerário of Jerónimo Lobo* 1984: 107–8.

> [They] cross over to the island(s) where coconut trees grow; they carry with them carpenters' tools and such like tools; then they fell trees as many as they need. When the wood dries, they cut planks and with the bark of the tree they spin a yarn, wherewith they sew the planks together to build a ship… .
>
> […*yaqṣidu ilā hādhihi l-jazīra llatī fīhā l-nārjīl wa-maʿahum ālāt najjār wa-ghayruhā fa-yaqtaʿūna min khashab al-nārjīl mā arādū fa-idhā jaffa quṭiʿa alwāḥan wa-yaftalūna min līf al-nārjīl mā yakhrizūna bihi dhālika l-khashab wa-yastaʿmilūna minhu markaban*…].[31]

As for the making of the cord, Ibn Baṭṭūṭa (d. 770/1368–9 or 779/1377) describes the process as follows:

> …the hairy integument of the coconut, which they tan in pits on the shore, and afterwards beat out with bars; the women then spin it and it is made into cords.
>
> [*wa-huwa līf al-nārajīl wa-hum yadbaghūnahu fī ḥufar ʿalā l-sāḥil thumma yaḍribūnahu bil-marāzib thumma yaghziluhu l-nisāʾ wa-tuṣnaʿ minhu l-ḥibāl*].[32]

To render the seams of a ship's planks impervious to water, caulking (*qalfaṭ*)[33] was needed. Wood tends to swell in the sea, so the narrow gap between the planks is caulked. The operation consists of driving rope or oakum (tarred hemp [*Cannabis sativa*]),[34] mixed with fish oil, or coconut oil or resin with fish oil, into the seams of the ship's planks.

Going back to as early as the seventh century, Egyptian papyri mention this operation of driving rope into the seams.[35] Early Arabians knew about caulking ships by pitch and fish oil: we can rely on the knowledge of pre-Islamic poets such as al-Muthaqqib al-ʿAbdī (ndd) of a ship being "greased" […*dahīn*],[36] al-Akhṭal (d. 92/710–1), "beating the tar and the firm timber" [*yaṣukku l-qāra wa-l-khashaba l-ṣilābā*] and

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[31] *Relations des voyages* 1845: 136 [Arabic text 130–1].

[32] Ibn Baṭṭūṭa 1968, IV: 121; idem, 1958–2000, IV: 827. Also Ibn Jubayr has this to say: "The [boat]makers", in Aidhab, "thrash [the *qanbar*] until it takes the form of thread, which then they twist into a cord…" (1952: 65).

[33] Also *qalfat*, "to repair, refit"; cf. Gr καλαφατ, see Agius 1996: 380; see also Makrypoulias 2002: 183. The verb is *qallafa* "to caulk (a ship)" (Wehr 1966: 787); CA *qalf* "securing the ship's timbers…" (al-Zabīdī 1987, XXIV: 283).

[34] Oliveira (d. after 1585), in his work on shipbuilding, states: "Oakum is so efficient…that neither wool, nor cotton, nor any type of fluffy material can serve as well for the purpose: for none will stop the water like oakum does. It is soft and can be compacted, and swells when it is wet: and it accepts pitch or grease, or any other sealant well", 1991: 151.

[35] Makrypoulias 2002: 183.

[36] See Sulaymān 1993: 95.

finally Labīd b. Rabīʿa (d. 40/660–1) "like the ship of the Hindī who has repaired its leaks with broad timbers and oil" [*ka-safīnati l-Hindiyyi ṭābaqa darʾahā bi-saqāʾifin mashbūḥatin wa-dihāni*].[37] It is well documented that fish oil was used for caulking: Ibn Jubayr (d. 614/1217–8) says that shark oil was the best in terms of rendering the wood soft and supple,[38] and the Egyptian historian al-Maqrīzī (d. 846/1442) reports that shipwrights in his time applied castor oil, *kharwaʿ* (*Ricinus communis*).[39] Sometimes whale oil was used; Siraf carpenters (3rd/9th c) would cut whale blubber, extract the oil from it and mix it with other substances then rub it into the joints of the ships' planking.[40] Shark liver-oil is still being applied today on the wooden hulls of the dhows in the Gulf and Oman.[41]

Another method for preservation of stitched planks was to smear them with grease and tar (*qār*),[42] or pitch (*ḥumar*) was also applied to preserve caulking. The practice of the use of bitumen on boats is quite visible in the seventh/thirteenth-century *Maqāmāt* illustrations and Persian miniatures of later centuries which show ships with black hulls (illustration 37). Al-Nuwayrī l-Iskandarānī (fl. 8th/14th c) tells us that the war-*ghurāb* [s.v.] pitched with tar looked all black.[43] Melinde shipbuilders, according to Gaspar Correia (fl. 16th c), were not pitching ships but coating the seams with bitumen[44] and then applying fish oil to both the inside and outside, thus making the planks watertight.[45]

To preserve the bottom and sides of a ship below the waterline, antifouling was applied. This was a coating of fish oil with animal fat (CA *shaḥm*) and burnt lime (CA *nūra*) called *chunam* to deter barnacles (*Lepas anatifera*) and also to inhibit the attack of the teredo (Lat *teredo navalis*

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[37] Montgomery 1997: 190; personal communication (James Montgomery 20 December 1996), see further details, ibid., 179, 184.

[38] Ibn Jubayr 1952: 65.

[39] Al-Maqrīzī 2002, I: 551.

[40] *Relations des voyages* 1845, I: 146.

[41] Agius 2002: 171–2, 174–5.

[42] Al-Masʿūdī 1861–1877, I: 365; see also what Marco Polo has to say about Hormuzi vessels in *Travels of Marco Polo* 1982: 52.

[43] Al-Nuwayrī l-Iskandarānī 1968–1976, II: 230.

[44] Tom Vosmer, in a written communication (31 July 2006), told me that there is not much difference between pitch and bitumen. Pitch (a natural product of pine trees) is better as a wood or rope preservative than bitumen (natural petroleum seeps). He added that "the Melinde builders might have been laying in a coating of bitumen between the seams, probably with a layer of fabric". In his *Sohar* experience they used "gauze impregnated with resin". On the building of the *Sohar* see Severin 1982.

[45] *Three Voyages of Vasco da Gama* 1869: 241–2.

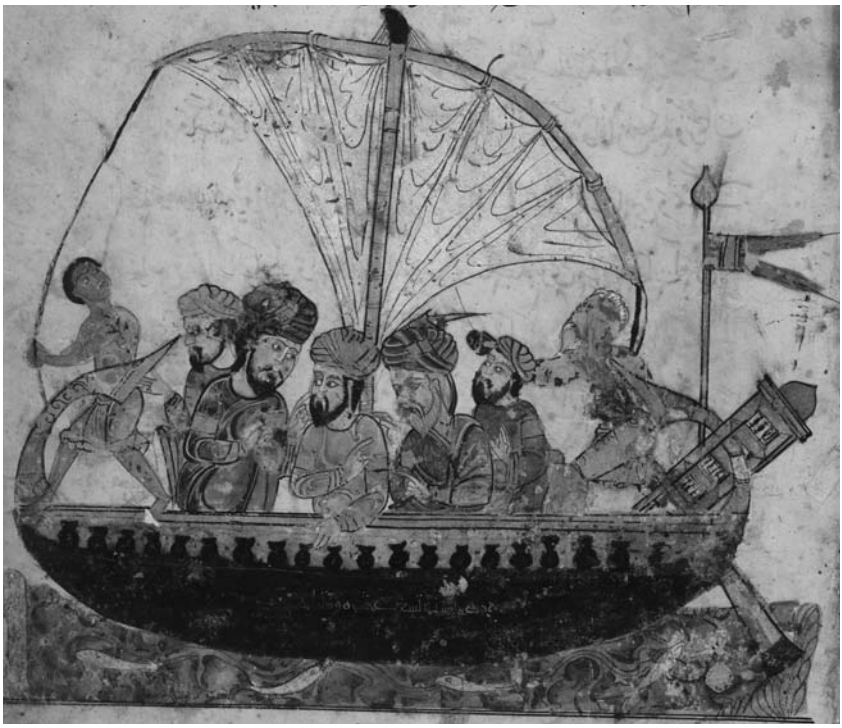


Illustration 37 A *Maqāmāt* ship with a black hull (618/1221) (courtesy of Bibliothèque Nationale, Ms Arabe 6094, fol. 68)

< Gr *terēdōn*), the ship worm, which damaged thousands of wooden ships.[46] Severin's experience on the *Sohar*, a replica of a medieval Arabian stitched trading vessel built in 1980, has proved that as soon as anti-fouling flakes off, the stitched planks become exposed to the attack of the teredo to the point of disintegration.[47] Interestingly, when the ship is brought out of the water for several days, this kills the teredo.

Careening took place more often with sewn ships which also needed treating internally with vegetable oil to preserve the rope fastenings. Scraping off the old layer of anti-fouling was necessary before reap-

[46] "Now woods which decay in sea-water are eaten by the *teredon*… It is a creature small in size, but has a large head and teeth;…the harm that these do is easy to remedy; for, if the wood is smeared with pitch, it does not let in water when it is dragged down into the sea; but the harm done by the *teredon* cannot be undone", Theophrastus Bk V. IV. 4–6.

[47] Severin 1982: 127–8, 132.

plying a fresh coat. In the hot climates of the Gulf and Indian Ocean, once the anti-fouling application is applied on the outside of a nailed hull, the ship is often pulled into the sea to prevent the coat from flaking off immediately. Sooner or later, however, it cracks with the movement of the ship in water; at this point she is exposed to attack from the teredo.

Shipbuilding features

General remarks: Hull shape

We do not know very much about hull design in Islamic ships of the Mediterranean and even less about those of the Western Indian Ocean. Commercial ships are often called rounders in both seas because of their belly shaped hulls. It is possible to hypothesize on the shape of the hull by deducing the meaning of the word through its root. I take here a few examples from the nomenclature of ship-types which I will discuss in detail later in this book (see Chapters 10 to 12): *burma* [s.v.], literally means "a pot"[48] which lends to a typical round-hull ship; *fulk* [s.v.] is an "orbit; circuit", i.e. something round, which may be interpreted as "a round ship" from the root-verb *falaka* "to be round";[49] *qurqūra* [s.v.] is described as a "full-bellied [vessel]",[50] one of the root's meanings is a "wheel" used for the punishment of criminals.[51] It may be that the seventh/thirteenth-century illustration of the ship in the *Maqāmāt* (The Assemblies) represents the belly-shaped hull. But what about Islamic warships? It is possible that some had a round-shaped hull, though nothing like the long and narrow Byzantine warships.[52] The medieval Islamic war-*ṭarīda* [s.v.] was, according to M. M. Ziyāda, a small round vessel ("a ship in the shape of a barrel" [*safīna fī shikl al-barmīl*])[53] but Unger thinks she was a hybrid of the galley and the round-ship.[54]

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[48] For the use of the term see al-Muqaddasī 1906: 32; Ibn al-Mujāwir 1951–1954, II: 296.
[49] Fraenkel 1962: 212.
[50] Al-Jawālīqī 1867: 123; see al-Zabīdī 1974, XIII: 401.
[51] Steingass 1977: 965.
[52] Makrypoulias 2002: 186–7.
[53] See his editorial note in al-Maqrīzī 1957–1973, I: 56, fn. 4.
[54] Unger 1980: 125–6.

Islamic vessels in the Mediterranean, at least the war galleys, were, in the early period of Islam, larger and heavier than the Greek type of vessel and were slower but by the sixth/twelfth century they showed very similar features.[55] The miniatures produced in the illustrated *Chronicle* of Ioannes Skylitzes (fl. c. 1081) show similar construction features of Islamic and Byzantine ships,[56] which seem to corroborate written evidence. What is striking about these miniatures is that had it not been for the caption-information given on top of each image we would not have known the difference between them.[57] There are far fewer pictorial representations of Indian Ocean ships and hardly any Western Indian Ocean shipwrecks, though, as researchers on Mediterranean and South Asian wrecks have found, evidence from these can be inconclusive.

From the information above we can only speculate on construction features by looking at contemporary shipbuilding traditions in the Indian Ocean. The build of ships all along the Western Indian Ocean coasts may have varied, though not much, each adapted to a particular need. With the triangular trade around the coasts, there seems to have been a cross-fertilisation of designs that took place over many centuries since antiquity. It appears that Indian and Persian designs were dominant along the northwest coast of India where the Parsee communities mainly settled and influenced ship construction. Though the original design may have disappeared, some modifications were introduced due to Portuguese influence after 1487. No Arabic sources seem to imply that this was the case but it is interesting to mention, nonetheless, that the sixteenth-century Gaspar Correia reports about an Arabian merchant in Gujarat who ordered the construction of a galleon on the lines of the European vessel.[58]

Shell-first and skeleton-first methods

The most common practice in construction methodology in the Western Indian Ocean, as in the Classical Mediterranean, was the shell-first process; it involved building the hull first (i.e. the shell) by fitting the planks to the sides of the ship then laying the frames or ribs, a method which determined the shape of the hull. This is a technique (still in place today

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[55] Babuin 2002: 33.
[56] Located in the Biblioteca Nacional in Madrid, see Tselikas 2000.
[57] Babuin 2002: 34.
[58] *Three Voyages of Vasco da Gama* 1869: 750.

among Arabian Gulf and Red Sea shipwrights) (illustration 38) that goes back to antiquity but was not applied exclusively on bundled-reed boats in Mesopotamia (Chapter 4). Sources from the first three thousand years BCE imply features of a skeleton-first method (i.e. laying the ribs first) used on the Tigris and Euphrates, a process probably borrowed from house-building techniques, i.e. laying the frames first. In the Mediterranean the ancient shell-first method was in place for a long time; we find information in the *Chronographia* of Theophanes (dating 8th to early 9th CE) and the Greek papyri from Islamic Egypt which seem to suggest that shipbuilding among the Mediterranean Arabs followed the Graeco-Roman practice of shell technique;[59] whereas, the eleventh-century Serçe Limani Byzantine wreck points to a skeleton-first technique (i.e. fixing the frames first followed by planking).[60] So which method came first, the skeleton (frame)-first method or the shell-construction technique? It is difficult to say, Casson rightly argued, in both instances,



Illustration 38 The shell technique method, fitting first the planks to the sides followed by laying the frames, applied in Suakin 2004 (photo author)

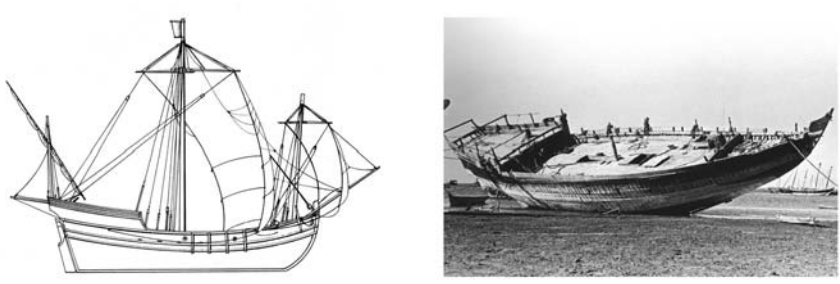
[59] Makrypoulias 2002: 183.
[60] Steffy 1982: 13–34.

whichever method was first applied, the construction of the keel first followed by the erection of the stem and sternposts is common to both techniques.[61] However, with sewn plank construction it is mandatory to use shell-first technique because, as Vosmer maintains, it is virtually impossible to assemble sewn planks when the frames have been fitted in first.[62] In the case of the Serçe Limani planks, they were nailed, so a skeleton (frame)-first method could be applied.

Double-ended and square-sterned vessels

Most ships were double-ended; the reason being that as they were sewn-planked, it would have been much easier to stitch the hood ends of planks. It was only when iron-fastened construction was introduced that a shift to a transom stern took place. The modern Perso-Arabian *sanbūq* [s.v.] has maintained the two hull forms; until recent times one could see the chief design element of the Portuguese *caravel* [s.v.] on a *sanbūq*, with the high poop and transom stern[63] (illustrations 39 & 40).

Bronze Age ships were double-ended but often square-sterned: seventeen transom-sterned boat models were found in the Saqqara tombs (2600–2300 BCE) in Egypt;[64] a graffito on a potsherd and four terracotta boat model fragments located in Lothal, south of the Indus



Illustrations 39 & 40 (Left) The Portuguese sixteenth-century *caravel* (after Landström 1961: 107, pl. 275); (right) the square-sterned *sanbūq* with a high poop (after Villiers 2006: 47)

[61] Casson 1971: 208–9.

[62] Personal communication 5 July 2002; Vosmer in his unpublished thesis discusses a number of characteristic features of Indian Ocean watercraft both in design and construction method (2005: Chapter 2).

[63] Agius 2002: 77–82.

[64] Landström 1970: 40, 48–50, 60–1; Greenhill 1976: 109.

Valley, depict square-sterned vessels with a sharp bow;[65] and a steatite pendant (c. 1300–300 BCE) found in Tell Abraq is a Magan representation of a square-sterned vessel with a sharp bow.

It is generally believed that the Portuguese introduced the transom to the Indian Ocean shipwrights; although it must be said that Chinese vessels were transom-shaped centuries earlier. An interesting feature arises in the depiction of Islamic ships found in the Portuguese Lopo Homem-Reinéis' *Atlas de 1519* which shows double-ended ships with stern castles atop[66] (illustration 41).

The transom stern on Western Indian Ocean ships is non-existent in any of the iconography dating prior to the coming of the Portuguese, despite any possible Chinese influence.[67] Transoms do not seem to have been established prior to 1680.[68]

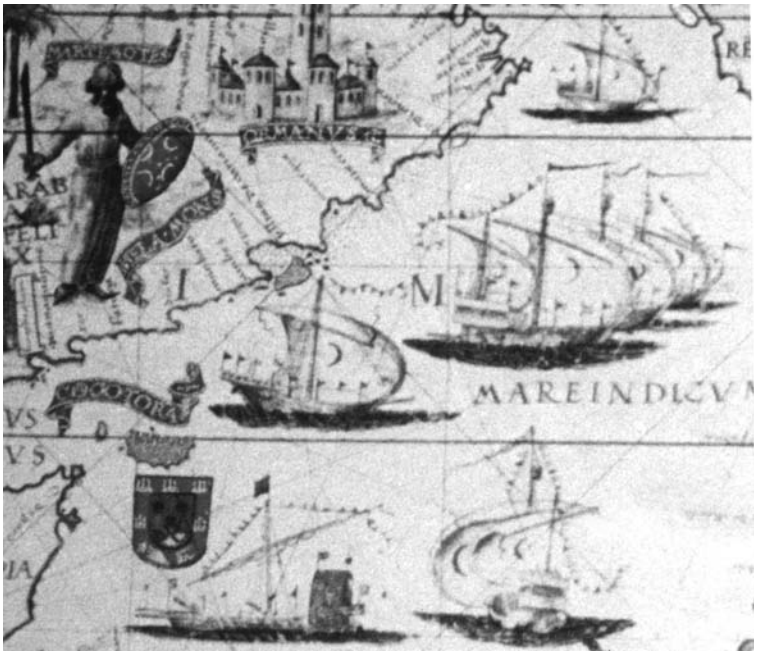


Illustration 41 Double-ended Muslim ships in Lopo Homem-Reinéis' *Atlas de 1519* (after Cortesão & Da Mota 1960, I: pl. 19)

[65] Alster 1983: 49–51.
[66] Cortesão & Da Mota 1960, I: pl. 19.
[67] Garlake & Garlake 1964; Nicolle 1989; Sidebotham 1990; Deloche 1996.
[68] Personal communication from Norbert Weismann (7 April 2001).

Other construction features

Typical of early Mediterranean Arab vessels is the pronounced curve of prow and stern with "decorated sides" as the Damascus mosaic shows.[69] Such features can be further illustrated by a figure found in a copy of al-Ṣūfī's (d. 376/986) *Kītāb ṣuwar al-kawākib al-thābita* (The Book of the Constellations of Fixed Stars),[70] dated 870/1465 (illustration 42). Very rarely do Islamic sources provide any information on ship design; one little detail by the historian al-Ṭabarī (d. 310/922–3) about the *zanbariyya*s [s.v.] found on the Mesopotamian rivers is interesting, he says that they were long ships with a projected bow [*zanbariyyāt al-ṭiwāl al-quʿs*],[71] a feature that occurs in some medieval images. The widely discussed illustration of the ship in the *Maqāmāt* (The Assemblies) shows clearly a similar hull design to the Kuwaiti double-ended *būm* [s.v.], even though the latter is a modern design of the early twentieth century. Arabian, Persian and Indian shipwrights would not have made radical changes; thus, traditional features in the construction of the modern dhow show signs of continuity with the past.

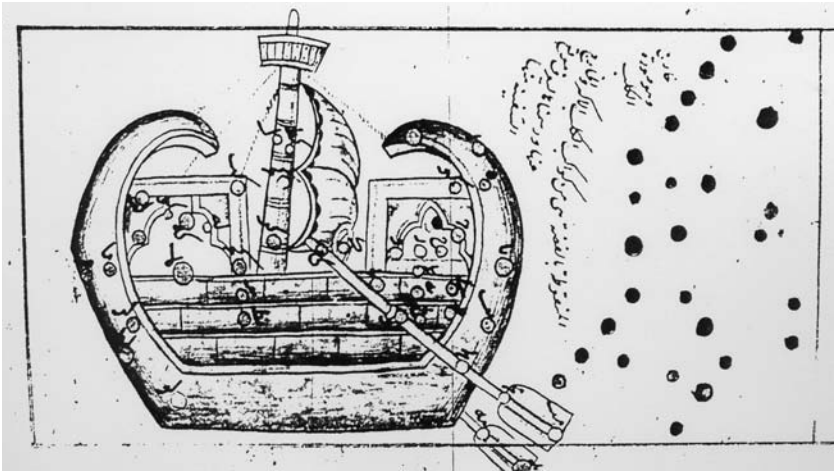


Illustration 42 Curved prow and stern in al-Ṣūfī's *Kītāb ṣuwar al-kawākib al-thābita* dated 870/1465 (courtesy of King Saud University Library, Riyadh, Ms 3730 unpaginated)

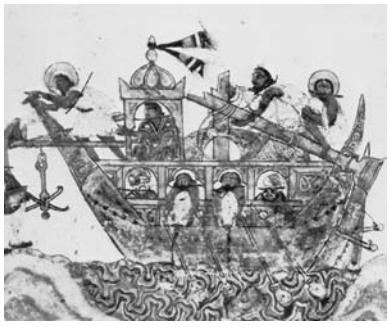
[69] Babuin & Palioura 1998: 80.

[70] KSU Library Ms 3730 (unpaginated), copyist ʿAlī b. Ḥasan b. Muḥammad Sulaymān.

[71] Al-Ṭabarī 1965, VIII (ii): 724.

Similarities of the *Maqāmāt* ship with the *būm* are quite visible: a straight stem, a curved stern (illustrations 43 & 44). One can see in the illustration below the anchor of the medieval ship hanging from a divided bowsprit: until a few decades ago one could still see a dual bowsprit on the Kuwaiti *būm*. It may be that the similarities are accidental but it must be said that the *būm* was an adaptaion of an ancestral Indian-built vessel, the *dhangi* [s.v.], the design of which may go back to pre-Portuguese times;[72] for example, the Lopo Homem-Reinéis' *Atlas de 1519* shows 10 ships resembling the *būm* type[73] (illustration 45).

There are obvious signs of post-medieval European technology influencing Western Indian Ocean shipbuilding, such as the designs of the now extinct Kuwaiti *baghla* [s.v.] and Omani *ghanja* [s.v.], and the more recent Indian *kūtiyya* [s.v.]. Traditional designs prevail until today. One other example is the illustration of a war vessel of Egyptian or Syrian provenance; it is attributed to Ḥasan al-Ramma (7th–8th/13th–14th c) and found in the *Kitāb al-furūsiyya wa-l-manāṣib al-ḥarbiyya* (The Book of Horsemanship and the Engagements of War),[74] which shows a straight keel, a straight stem and sternpost and a hull design very similar to the *būm*. The planks of the ship reached up as high as to where the cargo was stored.





Illustrations 43 & 44 Similar stem and sternpost features: (left) the *Maqāmāt* of al-Ḥarīrī (d. 516/ 1122) (Library of the Academy of Sciences, St Petersburg, Ms S23); (right) a *būm* in Khor Deira, Dubai 1996 (photo author)

[72] See my discussion on this subject in Agius 2002: 70.
[73] Cortesão & Da Mota 1960, I: fol. 2v.
[74] BN-Ms Arabe 1825, fol. 100r.

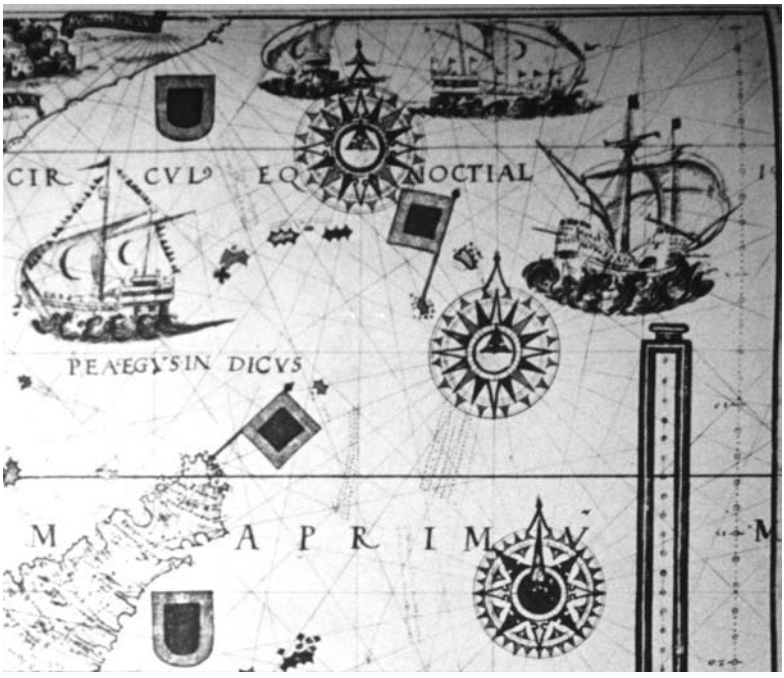


Illustration 45 Detail of a Muslim ship (left) similar to the *būm* type in Lopo Homem-Reinéis' *Atlas de 1519* (after Cortesão & Da Mota 1960, I: fol. 2v)

Most of the Indian Ocean ships were undecked, apart from a fore and aft deck,[75] but some had full decks;[76] the seventh/thirteenth century *Maqāmāt* illustration depicts probably more than one deck.[77] Cargo ships seem to have had no decks and crew and passengers slept on top of the cargo. The absence of decking on such vessels was an advantage for it gave greater accessibility to the cargo and the facility to resew planks in an emergency. Of course, decks on warships were essential for fighting men to use as a platform and for the carrying of war machines.

[75] See *Voyage of François Pyrard* 1887–1890, I: 258; *Journal of John Jourdain* 1905: 78; *Travels of Ludovico di Varthema* 1863: 152–4; *Three Voyages of Vasco da Gama* 1869: 240; *Book of Duarte Barbosa* 1918–1921, II: 76.

[76] *Three Voyages of Vasco da Gama* 1869: 239.

[77] BN-Ms Arabe 5847.

Sewn construction

Sewn construction of medieval and contemporary Indian Ocean ships has been the subject of modern scholarship for many years and it is not my intention to repeat that information here. However, some mention of the most important references to sewn ships by early medieval authors is necessary. The earliest reference is found in a Qurʾānic verse from Sūrat Qamar (The Moon):

> But we bore him on an (ark) made of broad planks and cord of palm-fibre.[78]
>
> [*wa-ḥamalnāhu ʿalā dhāti alwāḥin wa-dusurin*].[79]

The term *dusur* (pl/coll. of *disār*) is understood to be "the cord of the fibres of the palm tree (*līf*)",[80] though "iron nails" has also been suggested, the explanation being that the iron-fastened ark of Noah to which the Qurʾānic verse is alluding, miraculously held fast to the surface of the sea and was not dragged down to the bottom of the sea by magnetic rocks (*al-ḥijārat al-maghnāṭīs*). It was widely believed in antiquity that the bottom of the sea magnetically attracted iron-fastened planks, though the Byzantine historian Procopius (d. [?] 565) rejected such a belief, arguing that Graeco-Roman nail-planked ships in the Red Sea did not sink.[81] This belief in the destruction of nailed ships by magnetic rocks persisted among the Islamic communities from Early to Late Medieval periods.[82] In *The Thousand and One Nights*, one of the tales recounts how a mountain with magnetic properties attracted a ship with iron-fastened planks.

> We drew near to the mountain which is composed of black stone called 'magnet-stone'; the current carried us towards it with violence, and when the ships were almost close to it, they fell asunder, and all the nails, got stuck to it. . . .
>
> [*naṣil ilā jabal min ḥajar aswad yusammā ḥajar al-maghnāṭīs wa-tajurrunā l-miyāh ghaṣban ilā jihatih fa-tumazziq al-markab wa-yarūḥ kull mismār fī l-markab ilā l-jabal wa-yaltaṣiq bih . . .*].[83]

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[78] Ali 1946, II: 1456, with my amendments.
[79] Al-Qurʾān, Sūrat Qamar 54: 13.
[80] Lane 1984, I: 879.
[81] Procopius Bk I. XIX. 23–4. The legend of magnetic rocks exists in many cultures, one as such is found in an eleventh-century Indian treatise called *Yuktikalpataru* written by Bhoja, see Mookerji 1912: 14.
[82] Al-Nuwayrī l-Iskandarānī 1968–1976, II: 232.
[83] *The Thousand and One Nights* 1979–1981, I: 161 with my amendments; *Alf layla wa-layla* nd., I: 60.

Al-Masʿūdī (d. 345/956–7) says that, "the sea water melts the iron nails, consequently they are softened and become weak" [*…māʾ al-baḥr yudhīb al-ḥadīd fa-taruqq al-masāmīr fī l-baḥr wa-taḍʿuf*];[84] hence the reason why sewn planks were preferred.

Going back to the Qurʾānic term *dusur*, whose root-verb *dasar* implies "to push, thrust, drive, propel etc."; in addition to what has been discussed, the word is interpreted by the lexicographer, al-Zabīdī (d. 1205/1790–1), to be "(wooden) nails"[85] and, some translators of the Qurʾān, according to the commentator Yusuf Ali, preferred the latter meaning.[86] Both are possible. In fact, the verb *dasar* also means "to nail anything" in the sense "to fasten or repair a ship with a nail or with cord of fibres of the palm-tree".[87] In the opinion of some Classical Arabic lexicographers such as Ibn Sīda (d. 458/1066), al-Jawharī (d. 393/1002–3) and al-Fīrūzābādī (d. 816/1415), "(wooden) nails" were used to secure the ship's sides and the bottom to her timbers.[88] By this they probably meant treenails which are wooden pins driven into holes bored with an auger into the planks; a reference to these treenails is found as early as the sixth century in the pre-Islamic ode of Bishr b. Abī Khāzim al-Asadī (d. c. 535 CE) "caulked, tied with oakum and pegs" [*muʿabbadati bi-saqāʾifi dhāti dusurin*].[89] Treenails normally swell in the hole when moistened which tightens the fit.

In all our medieval accounts, Muslim and non-Muslim, stitching was almost the only mode of constructing ships in the Persian Gulf, the Red Sea and the Indian Ocean. It is clear in a Ḥadīth (prophetic tradition) that planks were stitched by thread:

> He erected her and supported her with no props, he put [the planks] together by fastening [them] with no nail [i.e by cord].
>
> [*rafaʿahā bi-ghayr ʿamadin yadʿamuhā wa-lā disār yantazimuhā*].[90]

Sewn ships in the third/ninth century sailed from Ubulla to China, reports the geographer al-Yaʿqūbī (d. c. 278/891–2).[91] He also tells us

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[84] Al-Masʿūdī 1983, I: 185.
[85] Al-Zabīdī 1972, XI: 291; see also Lane 1984, I: 879.
[86] See Ali 1946, II: 1456, fn. 5138.
[87] Lane 1984, I: 879.
[88] Ibid.
[89] See Montgomery 1997: 170–1.
[90] Al-Zabīdī 1972, XI: 290.
[91] Al-Yaʿqūbī 1892: 360.

that one finds sewn craft on the Atlantic coast at a naval base in Massa;[92] the point he is making here is that sewn ships were made both in the east and the west. Others have stressed the difference between Indian Ocean sewn ships as opposed to Mediterranean nail-planked ships: consider Ibn Rusta (d. after 290/893–4) reporting about nails in Mediterranean planking; al-Masʿūdī (d. 345/956–7) who writes that the Abyssinian ships had their planks stitched;[93] Abū Zayd Ḥasan (fl. 4th/10th c) who compared the Sirafi sewn ships with nailed-planked ships on the coasts of Syria;[94] and al-Nuwayrī l-Iskandarānī (fl. 8th/14th c) who comments about the use of nailed planks (*masmūra*) in the Mediterranean and the stitched planks (*mukhayyaṭa*) in the Yemen and India.[95]

In the thirteenth century, Christian missionaries made similar observations on the sewn construction features in Indian Ocean vessels: Friar John of Montecorvino of the Order of Minor Friars (d. c. 1328), described the ships of the Arabian Sea "sewn like clothes with twine";[96] the Franciscan Friar Odoric (d. 1331), on his trip to Hormuz some time after 1321, saw a kind of vessel called *jase* (he probably meant *jahāz* [s.v.]), fastened with cord on which he embarked and sailed for 28 days to Tana (Mumbai);[97] and the Dominican Friar Jordanus (d. c. 1330), writing from Malabar, said, "the vessels of these Indies [are] of a marvellous kind".[98] Muslim travellers from the Mediterranean comment on this construction feature too: the Moroccan traveller, Ibn Baṭṭūṭa (d. 770/1368–9 or 779/1377) says that the planks of Yemenite ships were sewn together[99] and a century earlier, the Andalusian traveller, Ibn Jubayr (d. 614/1217) notices *jalba*s [s.v.] sewn with cotton rope.[100]

Reports on sewn ships continued in the centuries to follow. Portuguese explorers and travellers of the early sixteenth century, such as Vasco da Gama, (d. 1524) commented on the stitching of planks at Melinde which "endures all the strain of sailing",[101] an interesting observation,

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[92] Ibid., 390.
[93] Al-Masʿūdī 1861–1877, I: 365; Ibn Rusta 1892: 195–6.
[94] *Relations des voyages* 1845, II: 87; *Voyage du marchand arabe* 1922: 93.
[95] Al-Nuwayrī l-Iskandarānī 1968–1976, II: 232.
[96] *Cathay and the Way Thither* 1866, I: 218.
[97] Ibid., 57.
[98] Ibid., 31.
[99] Ibn Baṭṭūṭa 1968, IV: 121; idem, 1958–2000, IV: 827.
[100] Ibn Jubayr 1952: 65.
[101] *Three Voyages of Vasco da Gama* 1869: 23, 26, and 239–40; see also *Collecção de noticias* 1812–1856, II: 114; *Book of Duarte Barbosa* 1918–1921, II: 76.

which illustrates the sturdiness by which the coir fastenings remain, in the words of the writer, "as secure as if they are nailed".[102] One source states that Gujarati 100-ton ships were well stitched,[103] and Duarte Barbosa remarked that Indians in Calicut built their deckless keeled ships with "the whole of the sheathing [...] sewn with thread".[104]

The use of thread, it can be argued, has many advantages: if treated properly it lasts longer and salt water does not spoil it. Sewn boats are flexible in surf and the cord gives the planks more pliability.[105] Ibn Baṭṭūṭa (d. 770/1368–9 or 779/1377), who seems to have had an interest in maritime matters, highlights the advantage of using cord over iron nails by saying, "if [a ship] is sewn together with cord, it is given a certain resilience and does not fall into pieces" [...*wa-idhā kāna mukhayyaṭan bil-ḥibāl u'ṭiyā l-riṭūba fa-lam yankasir*].[106] Marco Polo (d. 1323) noticed that the shipwrights in Hormuz used treenails to secure the stiched planks[107] and Jerónimo Lobo (d. 1678) adds that carpenters hammered several additional wooden pegs wherever it was necessary.[108] In view of this, one would have expected to find treenails in the plank edges of the third/ninth-century Belitung (Indonesian) wreck recovered in the Java Sea,[109] but none were found.

How were planks sewn together? Evidence from Egyptian and Mesopotamian iconography suggests that planks were held together by individual lashings. During the Medieval Islamic period, the planks of Indian Ocean boats were assembled by continuous sewing along longitudinal seams. The keel was laid first, followed by the stem and sternposts; the planks were fastened to them and to each other by continuous sewing. To lock the planks together, the shipwright drove dowels obliquely through the sides of one plank into the next; this was followed by sewing the plank seams.[110] One can still find the technique of locking planks in dhows of Oman: the late *badan* (pl *badana* or *bdāna*) and *baqqāra* (pl *baqāqīr*) and the current Musandam *battīl* (pl *batātīl*) and

[102] *Three Voyages of Vasco da Gama* 1869: 239–40.
[103] *Collecção de noticias* 1812–1856, II: 114.
[104] *Book of Duarte Barbosa* 1918–1921, II: 49.
[105] Moreland 1939: 66; see particularly McGrail 2004: 145–8.
[106] Ibn Baṭṭūṭa 1968, IV: 121; idem, 1958–2000, IV: 827.
[107] *Travels of Marco Polo* 1982: 53.
[108] *Itinerário of Jerónimo Lobo* 1984: 107.
[109] Flecker 2000: 203–4.
[110] McGrail 2004: 147–8.
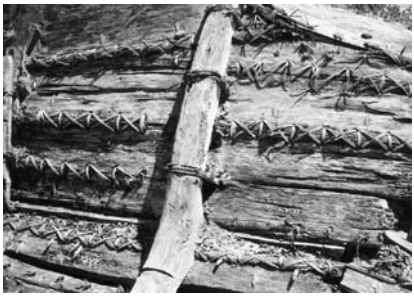
zārūka (pl *zawārīk*) [s.v.].[111] Once the planking shell was finished, the builder lashed the floors, frames and thwarts to holes drilled through the planks.

The procedure involved in sewn planking can be seen on the *kambārī* (a name after the term *qinbār* "coir") in the Dhofar region of Southern Oman.[112] I found this fishing boat abandoned in a cemetery at Taqa in Dhofar. The stitching was done in a zigzag pattern working through the holes on the inside and outside of the plank seam (illustrations 46 & 47).

Stitching of entire boats has ended in the Arabian Gulf and Oman region, though the tradition of using stitches prevails on the West Indian shores, such as Kerala.[113] In modern times, however, Omani dhowbuilders still stitch the stem and sternpost to the ends of the planks of a *badan* and *battīl* [s.v.], while the rest of the planking of the craft is nailed.[114] Apparently, the stem and sternpost are easily damaged by pushing or pulling the boats on the shore, so they can easily be replaced if they are stiched.

Iron-fastened planks

With the coming of the Portuguese in the sixteenth century, nail factories were introduced on the West Indian coast: the chronicler Fernão Lopes de Castanheda (d. 1559) reports of storehouses in Goa with





Illustrations 46 & 47 Stitching the planks of a *sanbūq* in Taqa, Dhofar on the Southern Arabian coast 1996 (photos author)

[111] Agius 2002: 98–103.
[112] Ibid., 81; pl. 19b.
[113] Pedersen 2004: 231.
[114] See Agius 2002: 100, 111–2.

large quantities of nails as well as cordage;[115] Gaspar Correia observed that thin nails with broad heads were used on ships at Melinde[116] and Ludovico di Varthema (fl. 16th c) writes about the large number of nails applied on planks at a shipyard in Calicut.[117] Yet we cannot take the sixteenth-century accounts as conclusive evidence that nails were introduced at the coming of the Portuguese. A tale from *The Thousand and One Nights*, compiled probably before the sixth/twelfth century, seems to suggest that shipwrights in Mesopotamia and the Persian Gulf were in fact using iron nails for shipbuilding.[118] Although the setting of most of these tales is Baghdad and Basra, we do not know where the narrator/s came from; he/they could be narrating about customs and practices that were not eastern at all but rather referring to Mediterranean iron-fastened planks.

It needs to be reiterated that the use of cord remained because it was such a tried and tested method and was used until quite recently. The debate as to when iron fastening was introduced was recently re-opened when a shipwreck was recovered at Kadakkarappally on the Malabarian coast: excavations in 2002 and 2003 unearthed a flat-bottomed iron-fastened boat[119] which could date from between the thirteenth and fifteenth centuries. This is tentative dating until further tests are made. It is claimed to be a "unique discovery" in terms of the method of construction, the condition of the timber and the use of iron-fastened planks[120] and it also predates any record we have on the use of iron in the Western Indian Ocean.

It is possible that the method of iron-fastening planks was copied from Chinese and Javanese *junk*s which for centuries, prior to the Portuguese arrival, moored along the Malabarian shore. Trade contacts between Malabar and China, as we have seen in Chapter 3, existed during the Sāsānian empire (c. 224–651 CE) and throughout the Early Medieval Islamic period. It seems that not only Chinese and Javanese *junk*s plied the waters of the Malabar coast but there were *junk*s such as those described by John of Marignola at Malabar in the fourteenth

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[115] De Castanheda 1833: 30.
[116] *Three Voyages of Vasco da Gama* 1869: 239.
[117] *Travels of Ludovico di Varthema* 1863: 152.
[118] *Alf layla wa-layla* nd., I: 60.
[119] See Tomalin *et al.* 2004: 253.
[120] Measuring 61.35 ft/18.7m by 13.28 ft/4.05 m, the ship has two masts, a double-planked hull, a pointed bow and possibly a transom stern, see Tomalin *et al.* 2004: 254.

century,[121] implying they were Indian *junk*s built in Malabar or that they could simply be vessels that resembled Chinese and Javanese *junk*s. The features of the Kadakkarappally wreck suggest Chinese influence, as well as the fact that iron fastenings were applied to the planks. Finally, I should mention that Gaspar Correia, the chronicler of Vasco da Gama's voyages, in his sixteenth-century text, reports having seen at Cannanore, north of Malabar, vessels with iron-fastened planks. He made the following observation saying that these vessels were flat-bottomed (like the Kadakkarappally ship) and that the other ships he saw were sewn with coir and had keels.[122] What is interesting to note here is the distinction he makes between a flat-bottomed type of vessel and a keeled ship, one is nail-planked and the other uses sewn planks.

In conclusion

On constructing a sailing vessel, the medieval carpenter made sure that she floated upright and that the hull had adequate space for the crew, equipment and, of course, cargo. Passengers fitted according to the availability of space after the vessel had been cargoed. The vessel had to be strong enough for the expected weather and resist sideways and foreward movements. The speed and stability of any sailing vessel depended on the full-load of a hull; with larger craft, the more carrying capacity, the greater the stability. Other factors are the shape of the hull, its surface below the waterline and finally the powering of the craft with the sails.[123] By making sure that all these features worked in harmony, the medieval carpenter managed to construct vessels that were eminently seaworthy.

The stitching of planks with coir was the construction feature that obviously intrigued Mediterranean Arab and Western travellers. One may speculate, therefore, that such a technique was not in use at the time in the Mediterranean, as, if it were, none of the Arab and non-Arab travellers would have commented on it. It may be argued that the tradition of sewn ships evolved from the raft, the binding of a number of logs together, and of stitching of hides. Whatever its origins, this long tradition of sewing planks lasted for centuries and, as I

[121] *Cathay and the Way Thither* 1913–1916, III: 230.
[122] *Three Voyages of Vasco da Gama* 1869: 240–1.
[123] Garrett 1987: 126–8; Greenhill (with Morrison) 1995: 74–90, 118–30; McGrail 2004: 71–7, 192, 286–7, 297, 322; see also Vosmer 2005: Chapter 2.1.

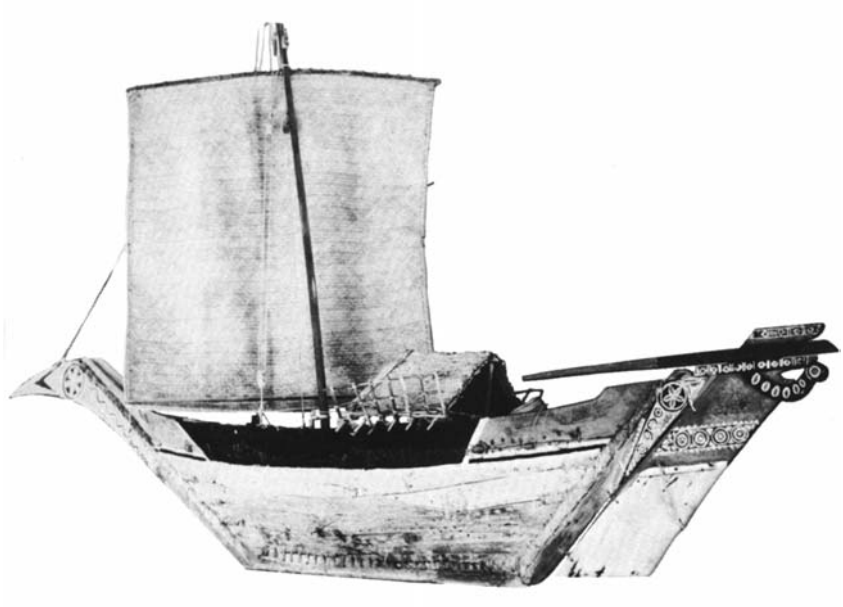


Illustration 48 Sewn East African *mtepe*: a link with the past (after Hawkins 1977: 21)

have shown, proved very effective, and even though nailed construction became common, the preference for sewn construction continued into the twentieth century.

Still to be seen only a few decades ago, another link with the past was the now extinct East African double-ended *mtepe* (pl *mitepe*)[124] (illustration 48); her construction and design, the sewn planks, the raking straight stem and the athwartship timber that extends through the sides of the hull are similar overall to the third/ninth-century Belitung shipwreck.

As we have seen, there is a long tradition of stitching planks in Indian Ocean ships. There may be several reasons why certain features in ship construction are adopted and though functional advantage such as seaworthiness may be one answer, there may well be other reasons.

The next chapter is about seamanship, the crew, steering and sailing; it will discuss other construction features, such as the introduction of the axial rudder and the development of the lateen-settee sail during the Medieval Islamic period.

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[124] Two types of *mtepe* are known: the *mtepe* and the *dau la mtepe*, Hawkins 1977: 20; Prins 1982: 85–100. An illustration of this 15th-century craft seems to point to a *mtepe*-type, see Garlake & Garlake 1964: 198–200.

PART FOUR

CHAPTER SIX

SEAMANSHIP

وما رائح روحته الجنوب
يروي الزروع ويعلو الديارا
يكب السفين لاذقانه
ويصرع بالعبر اثلا وزارا

No (river) at night, tossed by the south wind,
flooding fields and dwellings,
Flinging the ships on their prows and toppling
the *athl* and *zār* trees on its bank(s).[1]

Maymūn b. Qays al-Aʿshā (d. after 625 CE)

Ancient seafarers would usually make their way as much as possible along the coast, not by choice but out of necessity in order to make progress against the prevailing winds. Ordinary seamen had specialist skills in varying degrees; they could steer the ship with or without navigational aids. Knowledge of land and sea breezes was essential to follow the coastline; in addition mariners observed sea currents, wind patterns, the colour of the sea, bird life as well as fish life; and they took samples of the seabed; they carried birds on board to determine the ship's distance from land. Stars were their guide; their risings and settings determined the latitude in order to find their destination. The introduction of instruments may have facilitated seafaring but knowledge of basic skills and experience were the best facilitators to trans-oceanic navigation.

In this chapter the word seamanship is used in its wider sense to mean anything from the crew to the daily management of the ship, including aspects of its day-to-day working, such as the monsoon wind systems, planning the route, steering, rigging, sails, and the watch at sea. It is not intended to be comprehensive; readers who wish for greater detail

[1] *Wa-mā rāʾiḥun rawwaḥathu l-janūbu/ yurawwī l-zurūʿa wa-yaʿlū l-diyārā/ yakubbu l-safīna li-adhqānihi/ wa-yaṣraʿu bil-ʿibri athlan wa-zārā*; trans. Montgomery 1997: 193.

are referred to my previous work, *Seafaring in the Arabian Gulf and Oman: The People of the Dhow* (2005a). What I present here are some essential features of seamanship in the Western Indian Ocean during the Early and Middle Medieval Islamic period.

Maritime terminology

Before discussing seamanship, it is necessary to look at Arabic maritime terms: The root */m.l.ḥ./* offers a number of words within the concept of "sea, transport and travel", thus, the Arabic term *milāḥa*, in its general sense, means "seafaring", but specifically it implies the art of navigating; in this connection *milāḥ* (without the final /a/) means "the wind that blows [the sails of] the ship".[2] From the same root we get *milḥ* "salt" and in fact "the main body of the sea" is called *malḥa*[3] (figure 3). Consider, the sea is called *al-baḥr al-milḥ* (lit. salt sea) as opposed to *al-baḥr al-ʿadhb* (lit. sweet sea), referring to river,[4] though, *baḥr* on its own stands for both "sea" and "river".[5] Attached to the root */m.l.ḥ./* is: *mallāḥ*, the mariner or shipman, whose duty is "to sail ships on salt water".[6] The *mallāḥ* is the helmsman in pre-Islamic poetry, who conducts a vessel from one place to another safely, thus writes the poet al-Nābigha l-Dhubyānī (d. c. 604 CE):

> Out of fear, the helmsman constantly grips
> his rudder, after exhaustion and exertion.
>
> [*yazallu min khawfihi l-mallāḥu muʿtaṣiman*
> *bil-khayzurānati baʿda l-ʿayni wa-l-najadi*].[7]

As a cognate to the Arabic term *mallāḥ*, there is Aramaic and Hebrew *malāḥ*,[8] which ultimately come from Akkadian *malāḫu* "seaman or boatman".[9] Also from the Arabic root there is *milāḥiyya* or *mallāhiyya* "the

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[2] Al-Zabīdī 1970, VII: 144.
[3] Ibid.
[4] Al-Minhājī 1374/1955, I: 194–6.
[5] Lane 1984, I: 156; other terms for sea are: *qāmūs/ qamīs* "the deepest part", *qawmas* "the main body (of the sea)", *khiḍrim* "a great sea", *muḥīṭ* "ocean", ibid., I: 757; II: 2563.
[6] Al-Zabīdī 1970, VII: 143; another term being *baḥḥār, baḥrī* etc., see section on "Crew" in this chapter.
[7] See Mongomery 1997: 191.
[8] Gesenius 1906: 572.
[9] Von Soden 1959–1981, II: 593.

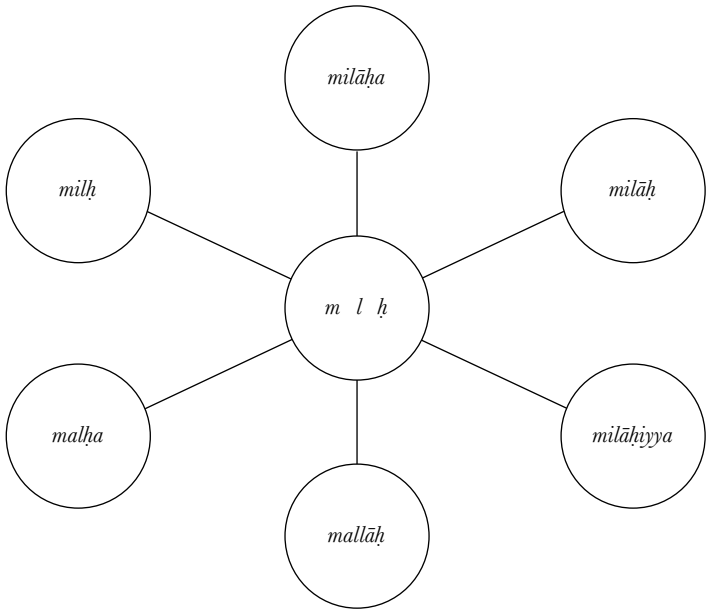


Figure 3 The root-word */m.l.ḥ./* and its derivations

mariner's workmanship",[10] a rare word, which is superseded by *sifāna*, a term which encompasses "the craft or occupation of constructing and of navigating ships or boats".[11]

The root */s.f.n./* produces the verb *safana* "to strip off, scrape off etc.", a word for careening. Nouns: *safan* or *misfan* denotes the carpenter's tool, the adze or axe with which the palm trunks are pared; *saffān* means a shipbuilder, navigator or shipmaster;[12] *safīna* [s.v.] is the classical generic term for ship or boat, so called we are told, because she "skim[s] the surface of the water"[13] and elsewhere, it is said that "[she] pares the sands [by running aground] when the water is little [in depth]…";[14] and finally, the same word, *safīna* is an astrological term for the bright southern star (Canopus) which guides navigators on the sea and camel drivers in the desert (figure 4).

[10] Ibn Sīda 1898–1903, X: 28; al-Zabīdī 1970, VII: 143.
[11] Lane 1984, I: 1375.
[12] Ibn Sīda 1898–1903, X: 23; see also Lane 1984, I: 1375.
[13] Ibn Manẓūr nd., III: 2031.
[14] Lane 1984, I: 1375.

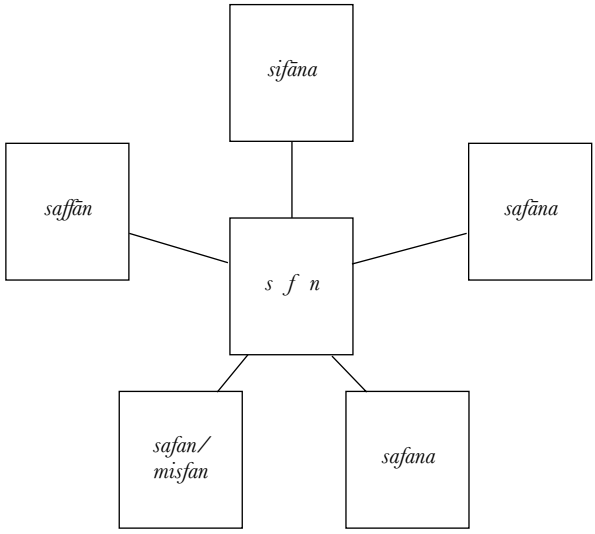


Figure 4 The root-word /*s.f.n.*/ and its derivations

Terminology for port or harbour varies from *bandar* (pl *banādir*) "a port town; port" (< Per < Skt *bhandara* "storehouse; treasury"); *daryābār* "a sea port"; *furḍa* (pl *furaḍ*) "small port town"; *iskila* (pl *asākil* < Lat) "seaport; commerical centre"; *kallāʾ* "harbour"; *marfaʾ* or *murfaʾ* (pl *marāfiʾ*) "a station of ships" from *rafaʾa* "to bring [the ship] near the bank of a river"; *marsā* (pl *marāsi*) "anchorage", the verb being *arsā* "to become stationary"; *mīnāʾ* or *mīna* (pl *mawāni* or *miyan*) "port, harbour, anchorage".

For coastal features, there are the following terms: *bār* (< Skt) "coast"; *khalīj* (pl *kuljān* or *khuluj*) "a canal (from a large river)"; *sharm* (pl *shurūm*) "an inlet; small bay" synonymous with *khawr* (pl *khuʾūr*); and *raʾs* (pl *ruʾūs*) "a promontory, cape". Seashore terminology, we have: *judda* (also *jidda* or *jidd* or *judd* < Nab), hence the place-name Jeddah; *shāṭiʾ* (pl *shawāṭiʾ* or *shuṭʾān*); *sāḥil* (pl *sawāḥil*) synonymous with *judda* and *sīf* (pl *asyāf*) while for riverbanks there is *ḍiffa* or *ḍaffa* (pl *ḍifāf*) and *shaṭṭ* (pl *shuṭūṭ* or *shuṭṭān*). Other sea features are *ghubba* (pl *ghubbān*) for "shallow (area)" and *lujj* or *lujja* (pl *lujaj* or *lijāj*) "depth of the sea; fathomless sea".[15]

[15] Ibn Sīda 1898–1903, X: 27; Lane 1984, I: 259, 386, 783, 821, 1086–7, 1117–8, 1321; II: 1548–9, 1795, 1937–8, 2222, 2650; Steingass 1977: 517; Wehr 1966: 17, 317, 664, 858, 936.

Principles of navigation

In his *Kitāb al-fawā'id fī uṣūl wa-l-qawā'id* (Book of Benefits in the Principles of Navigation), Aḥmad b. Mājid (d. after 906/1500) lists twelve Principles of Navigation that constitute the art of seamanship in the classic sense.[16] They are as follows: i) lunar mansions (s *manzil*, pl *manāzil*), ii) rhumbs of the compass (s *khann*, pl *akhnān*), iii) routes (s *dīra*, pl *diyar* or *diyarāt*), iv) distances between ports due east and west (s *masāfa*, pl *masāfāt*), v) methods of taking latitude measurements from the altitude of the Pole star (s *bāshī*, pl *bāshiyyāt*), vi) calculation of latitude by measurement of star altitude (s *qiyās*, pl *qiyāsāt*), vii) knowledge of one's position in relation to localised winds, tides, currents, coasts, and their landfalls, islands, mud and sea weed, fish and birds (s *ishāra*, pl *ishārāt*),[17] viii) revolutions of the sun and the moon (*ḥulūl al-shams wa-l-qamar*), ix) winds and seasons (*al-aryāḥ wa-l-mawāsim*), x) seasons of the sea when it is navigable (*mawāsim al-baḥr*), xi) instruments of the ship (*alāt al-safīna*), and xii) relations with the crew and passengers (*siyāsāt*) (figure 5).

The crew

The crew is a company of men whose duty is to man a ship or a boat; this involves the upkeep of the craft and her instruments. The only Islamic source which deals comprehensively with crew members on board the ship is a Persian work titled *Ā'īn-i Akbarī* (The Rules of [Jalāl al-Dīn] Akbar);[18] it is the third part of a monumental work called *Akbar Nāma* (The Book of [Jalāl al-Dīn] Akbar) compiled by Shaykh Abū l-Faḍl ʿAllāmī (d. 1002/1593). Although this is a late source, it gives us a picture of the division of labour among the crew of a Muslim ship in the Indian Ocean which could hardly have changed from the classical period. The terminology used is Persian (Fārsī), Hindi or Arabic (the latter relatively few): such a mixture represents the language of Indian Ocean seamen at the time and in many respects has remained so till today.[19]

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[16] A full translation of this work by G. R. Tibbetts, entitled *Arab Navigation in the Indian Ocean before the Coming of the Portuguese* (1981) contains an introduction on the history of Arabian navigation, notes on the navigational techniques, topography of the Indian Ocean and a glossary of nautical terms.

[17] See also Mookerji 1912: 52; al-Quṭāmī 1964: 103, 114–5.

[18] ʿAllāmī 1872–1877, II: 26; see also 1873, I: 280–1.

[19] See my work on seafaring in the Arabian Gulf and Oman 2005a: 127–54.

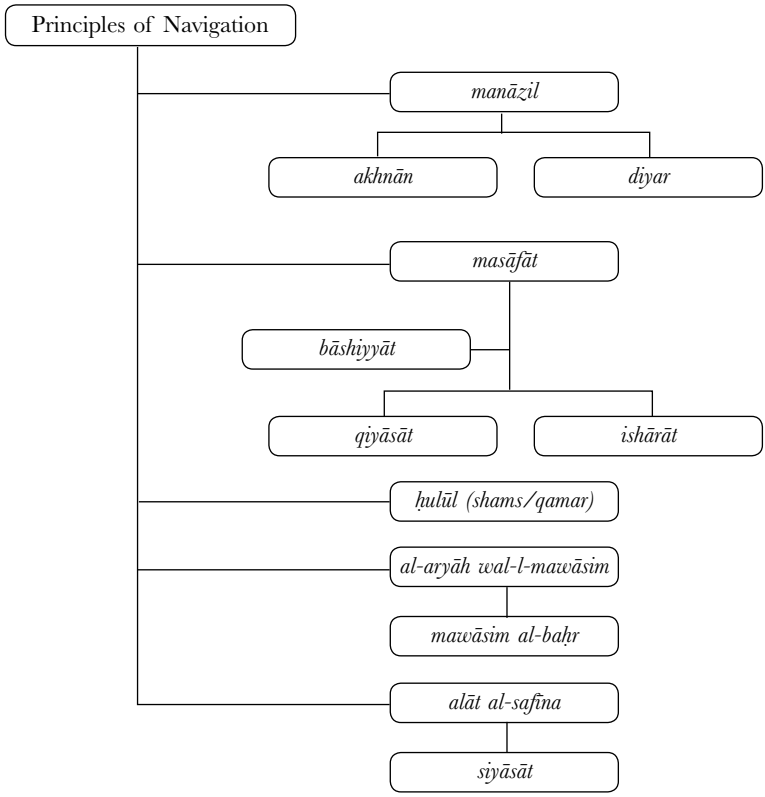


Figure 5: The twelve Principles of Navigation

From the *Maqāmāt* (The Assemblies) dated 635/1237, a beautiful picture shows crew members at work on an Indian Ocean ship. The Baghdadi scribe and artist, Yaḥyā b. Maḥmūd al-Wāsiṭī (fl. 7th/13th c), has produced a striking illustration[20] (illustration 49). All crew members are dark-skinned; they appear to differ ethnically from the pale-skinned passengers seen looking out of the portholes, but this may just reflect a life spent in the sun. At the stern, on a high platform, the sea captain (or the helmsman) holds two ropes of the sail; he is assisted by the chief sailor responsible for the sails, the latter is instructing his fellow mariners with rigging; a sailor positioned

[20] BN-Ms 5847, fol. 119v.



Illustration 49 The crew at work on a Perso-Arabian or Indian vessel from the *Maqāmāt* of al-Ḥarīrī (d. 516/1122) (after al-Rāmhurmuzī 1883–1886: 90)

at the foredeck keeps an eye out for shoals, coral reefs and other dangers; the look-out man sits in the crow's nest while two men of Negroid appearance bail water from pitchers through portholes; finally, the turbaned passengers, who could be merchantmen, are peeping through the portholes, all facing to the right in the direction of the prow. It is not clear from the illustration what the captain's headgear was; in other sources, like the *Arabian Nights*, the sea captain wore a turban[21] which could be interpreted as a sign of authority, as opposed to the sailors who

[21] *Book of the Thousand Nights* 2001, II: 219.

wore felt caps.[22] His posture is sitting and he is shown as a large figure compared to the rest of the crew, probably an indication of the high status that he enjoyed. One finds other sixth/twelfth-century illustrations showing the sea captain sitting on a platform;[23] a similar posture is seen on Bronze Age seals such as that of Mohenjo-Daro.[24]

The number of crew depended on the vessel's size. In general, according to Buzurg b. Shahriyār (d. 399/1009), the officers were called *rubbāniyya* and the seamen, *bānāniyya*.[25] The *nākhudhā* was the highest in the hierarchy. Etymologically, the term is Persian: *nāw* "boat, ship" and *khudā* "master", giving the meaning "captain or master of a vessel or boat".[26] It was a common term though its meaning varied over the centuries from one region to another.[27] Al-Masʿūdī (d. 345/956–7) replaces the Persian term for one in Arabic, *rabb al-markab* (pl *arbāb al-marākib*), "master of the ship".[28] The term *nākhudhā* is still in use to this very day among coastal communities in the Gulf and Oman.

The *nākhudhā* (pl *nawākhidha*) was the general supervisor in charge of the ship and trade, and his responsibility was the safe delivery of goods and the passengers; this was the twelfth principle of navigation, the *siyāsāt* (see figure 5), a very important part of his relationship with the crew and passengers as well as the management of the ship with implications for her safety and final destination (*siyāsāt al-baḥr wa-mudārāt al-markab*).[29] Buzurg b. Shahriyār narrates a story told to him by Muḥammad b. Bābishād in which he comments on the captain's moral duty towards the safety of the crew and the merchants (s *tājir*, pl *tujjār*).[30] He recounts that one day while Captain ʿAllāma was crossing from India to China he noticed by looking at the sea that a gale was on its way. He told the crew to first lower the sails, which they did, then, "in the voice of a man full of fear", he said:

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[22] See for example al-Ṭabarī 1987, XXXVII: 23, "I extracted 40 arrows from the felt cap I had on, and from the rest of the sailors' felt caps" [*nazaʿtu min lubbāda kānat ʿalayya arbaʿīn nassāba wa-min labābīd sāʾir al-mallāḥīn*] 1965, XIII (iv): 1960.

[23] Nicolle 1989: 175.

[24] Johnstone 1980: 176–7.

[25] See al-Rāmhurmuzī 1883–1886: 166.

[26] Ibid., 7, 12, 14, 19, 29, 48–9, 62, 65, 129, 165, 174.

[27] See for example its occurrence in the post-medieval Ḥaḍramī chronicles, Serjeant 1974: 22, 34, 40, 57–8, 64, 177.

[28] Al-Masʿūdī 1983, I: 122–3, 126; II: 255.

[29] Tibbetts 1981: 387.

[30] Al-Rāmhurmuzī 1883–1886: 44–7; idem, 1981: 27–8.

> Merchants! Which do you prefer? Your goods that you can replace a thousand times over, or your lives, that you cannot replace?
>
> [*yā tujjār ayy shayʾ ʿindakum aḥabbu lakum amwālukum allatī minhā alf ʿiwaḍ aw nufusukum allatī lā ʿiwaḍa lahā*].[31]

The merchants were surprised because the sea was so calm and they were reluctant to jettison their goods. Only after he and his crew boarded the lifeboat, filled it with jars of water and food and were about to sail away, did the merchants realize what the captain meant, and they called them back. They agreed to throw everything into the sea. As it happened, the gale struck the ship although she was not lost, so the captain's wisdom and experience had proved correct. The crew and the merchants reached an island and there they found not only their jettisoned goods but merchandise from other ships that were wrecked. Central to this story is the willingness to serve and follow instructions on the part of the crew for, as Ibn Mājid (d. after 906/1500) cautioned, if the captain could not rely on the crew the safety of the ship would be in peril.[32]

Nākhudhā was a title also given to the shipowner;[33] he would often be a merchant to trade goods for himself and/or others. Several examples of this exist in the Genizah letters;[34] some carried both roles of shipowners and sea captains, so the distinction between the roles was often blurred.

Muslim geographers provide some interesting information, albeit passing references, on skilled captains and the way people judged them. A number of them left their native place, Persia, during the third/ninth and fourth/tenth century and settled in towns on the coast of Yemen, the Red Sea and East Africa.[35] Among the most knowledgeable and experienced captains were the Persians, the Sirafis in particular. Buzurg b. Shahriyār informs us that large vessels were

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[31] Ibid., 1883–1886: 44; 1981: 27.

[32] Ibn Mājid 1971: 241.

[33] See for example al-Rāmhurmuzī (Aḥmad b. ʿAlī b. Munīr, "…one of the best shipowners to have sailed the seas…[1883–1886: 12; idem, 1981: 8]); (Muḥammad b. Bābishād, "…his distinction as a shipowner and his well-known name at sea…" [1883–1886: 98; idem, 1981: 57]). In all instances Freeman-Grenville renders *nākhudhā* correctly as "shipowner".

[34] Margariti 2002: 220.

[35] Al-Masʿūdī 1983, I: 123. Shipowners/sea captains, navigators and merchants from Persia, a great number of them settled in these regions. Persian shipbuilders and mariners by far exceeded that of any other region, reports al-Muqaddasī (1906: 18).

commanded by "sea captains [that] were well-known and respected" [*wa-nawākhidhatuhā mashhūrūna lahum qadr wa-manzila fī l-baḥr*].[36] In one story he tells us of a shipmaster, Abū ʿAbdallāh b. Bābishād b. Ḥarām b. Ḥammawayh, who sailed to the Land of Gold, i.e. Sumatra and Java;[37] he was considered

> one of the best informed God's creatures in nautical matters, and one of the best and most respected sailors…
>
> […*wa-aʿrafu khalq Allāh bi-amr al-baḥr wa-min jullat al-baḥriyyīn*…].[38]

One Sirafi sea captain, the same author recounts, was Abū l-Zahr al-Barkhatī, a Magian (i.e. Zoroastrian), who was regarded as a "man of integrity" and one to whom the mariners listened and merchants "entrusted [their] goods and children" […*wa-yastawdiʿūnahu amwālahum wa-awlādahum*].[39] The port of Siraf, as we have seen in Chapter 3, was an impressive place; it was the meeting place of mariners and merchants from all over the Indian Ocean. Sirafi mariners are described by al-Iṣṭakhrī (fl. 340/951–2) as men who passed their whole life on a ship; he reports: "they did not leave the ships for some 40 years" [*lam yakhruj min al-safīna naḥwa arbaʿīn sana*].[40] Al-Masʿūdī met many Sirafi skippers on his voyages to West India, East Africa and China; he lists a few: Muḥammad b. al-Raydūm al-Sīrāfī, Jawhar b. Aḥmad, Aḥmad al-Ṣamad and ʿAbd al-Raḥīm b. Jaʿfar al-Sīrāfī.[41] Although he does not comment on their lives or achievement it is understood that they were skippers of some fame otherwise he would not mention them. Furthermore, Omanis and Yemenites were also known for their good skills and boldness in crossing the Indian Ocean.[42]

Sailing as far as China[43] and returning to Siraf was an accomplishment considering the many difficulties and mishaps the seamen encountered; thus reports Buzurg b. Shahriyār about one remarkable sea captain, ʿAbhara:

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[36] Al-Rāmhurmuzī 1883–1886: 165.
[37] Ibid., 7.
[38] Ibid., 5; idem, 1981: 4.
[39] Ibid., 1883–1886: 19; 1981: 13.
[40] Al-Iṣṭakhrī 1870: 138.
[41] Al-Masʿūdī 1983, I: 123.
[42] See al-Rāmhurmuzi 1883–1886: 150; al-Masʿūdī 1983, I: 114, 122–3.
[43] Al-Rāmhurmuzī 1981: 5, 13–14, 27, 49–52, 54, 58, 62–4, 99, 103, 111.

> No one has done it without an accident. If a man reached China without dying on the way, it was already a miracle. Returning safe and sound was unheard of. I have never heard tell of anyone, except him [ʿAbhara], who had made the two voyages there and back without mishap.
>
> [*wa-lam yakun salak qabluhu ilā l-Ṣīn illā man gharrar wa-lam yasmaʿ anna ahadan salakahu wa-salim wa-ʿāda qaṭṭ fa-in salim fī l-muḍiyy fa-huwa ʿajab fa-lā yakād yaslam fī l-ʿawda wa-mā samiʿtu anna aḥadan salim fī l-dhahāb wa-l-majīʾ sawāh*].[44]

Considering the monsoonal winds and the risks taken to sail to China, it must have demanded good nautical skills as well as experience and foresight.

The ocean-going navigator, *muʿallim* (pl *muʿallimūn* or *maʿālima*) occupied the second chief post among the crew.[45] In order to carry out his job effectively he had to master the twelve principles described earlier (figure 5). His job started while the ship was still at anchor; he set up the compass (when that was available) and made sure that both the captain and the crew would adhere to his warnings.[46] He had a number of duties but inspection of the gear and the ship's loading were perhaps the most important; the latter, of course, was to do with keeping the ship at a balance and the cargo properly secured when rough weather struck the ship. The navigator liaised with the captain at all times and his relationship to his crew and passengers, the upkeep of the vessel and the instruments carried on board formed part of the nautical etiquette, the *siyāsāt* (or twelfth principle of navigation).[47] The *muʿallim* maintained order and punished any insubordination even to death. His deputy was called *sarhang* and occasionally he took charge of the ship, but his main job was to supervise the docking and landing of the ship.

Although sea captains and navigators followed the code of conduct, there were inevitably those among them who were not of good moral standing: Buzurg b. Shahriyār relates of a certain sea captain called Marzabān who treated merchants badly on board the ship; he comments, "no sea-captain was more dishonest than [him]" [*lam yakun fi*

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[44] Ibid., 1883–1886: 85; 1981: 50.
[45] On *muʿallim*, see Ferrand 1923–1928, III: 180–3.
[46] Al-Rāmhurmuzī, 1981: 49.
[47] For further details on this so-called branch of navigational science see Tibbetts 1981: 387–91.

rubāniyyat al-baḥr azlam min al-Marzabān hādhā].[48] We also have reports of pilots who were not up to their job; Ibn Baṭṭūṭa (d. 770/1368–9 or 779/1377) says that one pilot he observed was not competent enough to navigate the ship to Malabar and were it not for God's grace, he comments, the ship would have ran aground.[49] On the other hand, we have an example of the good shipmaster, Abū l-Zahr al-Barkhatī, mentioned earlier. In one of his voyages to China, his ship was sailing in the Malay Sea near the borders of China when a gale arose. The passengers, trembling with fear, lost all hope of rescue but Abū Zahr reassured them that

> All of us captains are bound by oaths. We are sworn not to expose a ship to a loss.
>
> [*naḥnu maʿshar al-rubbāniyya ʿalaynā al-ʿuhūd wa-l-mawāthīq an lā naʿruḍ safīnatan ilā l-ʿaṭab*].[50]

The deep-sea navigators would have been well equipped to sail across the ocean. It was the service of these skilled seamen that Vasco da Gama (d. 1524) was able to obtain for his crossing from Malindi to Calicut.[51] By the time the Portuguese arrived on the East African coast in the late fifteenth and early sixteenth century, a large number of skilled Indian captains, together with merchants and agents (s *wakīl*, pl *wukalāʾ*) had settled there; their fame became increasingly important from the thirteenth century. Not only did they man vessels, some were also owners and others even financed large vessels. It would not, therefore, be an exaggeration to say that Indians were, at the time of the coming of the Portuguese, masters of the Indian Ocean triangle trade not only as pilots but also as merchants.[52]

A sea captain or pilot was also called *rubbān* (pl *rubbāna, rubbānūn* or *rubbāniyya*); this name was also used for the coastal pilots, indeed it remains so today.[53] The word comes from Old Semitic which can be traced as far as the Akkadian **ribbānu* and later Aramaic *ribbōn*.[54] It is

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[48] Al-Rāmhurmuzī 1883–1886: 95; idem, 1981: 55.
[49] Ibn Baṭṭūṭa 1968, IV: 186–7; idem, 1958–2000, IV: 856–7.
[50] Al-Rāmhurmuzī 1981: 14; idem, 1883–1886: 22.
[51] *Three Voyages of Vasco da Gama* 1869: 82.
[52] As an example see the Yemenite fiscal survey dated 815/1412, *Mulakhkhaṣ al-fitan* of al-Ḥasan b. ʿAlī l-Ḥusaynī in Serjeant 1974: 10, 25 *seq*., and Rex Smith's translation of this treatise with annotations (2006).
[53] Agius 2005a: 131–2.
[54] Glidden 1942: 71. The Arabic term *rubbān* is common on the shore of the Arabian Sea up to modern times (eg Soq *rébehon* and Had *rabbān*).

clear from Ibn Baṭṭūṭa's description of the native use of the term in the Red Sea and the Southern Arabian coast, that it was equivalent to "sea captain". He says that the crew on board his ship, which was heading from Suakin to Yemen, were calling the man in charge, *rubbān*,[55] and at Zafar (Salalah today) too, the people at the port were addressing their captain in the same manner.[56] His duties were as important as that of a *nākhudhā* and *muʿallim* combined.

Navigating the ship in the Red Sea or Persian Gulf required good skills, most importantly the ability to steer her away from coral reefs and shoals. Some of these coral reefs were elusive: for example, a great reef in the Arabian littoral of the Persian Gulf was noted by al-Idrīsī (d. 560/1165) who warned of the danger ships would encounter if they steered in this direction: "from time to time the reef shows and then is hidden beneath the waters" [*...yaẓhar minhu al-qalīl fī baʿḍ al-amākin wa-yaghīb fī ghayrihā*].[57] To monitor these obstacles, the *rubbān* stood on the foredeck of the vessel, or took a position in the crow's nest, "to warn the steersman of rocks" [*yunabbih ṣāḥib al-sukkān ʿalā l-ahjār*].[58] There is no better way to describe a *rubbān* in the Red Sea than Ibn Jubayr (d. 614/1217) who compares him to

> a cavalier [who] manages a horse that is light on the bridle and tractable. [*taṣrīf al-fāris lil-jawād al-raṭb al-ʿinān al-salis al-qiyād*].[59]

A ship had a secretary or an accountant, *karrānī*,[60] a term that occurs in early and modern Arabic sources. He kept a record of the names of sailors and passengers, the type of cargo and the volume of its weight, as we learn from Ibn al-Mujāwir's (d. 690/1291) description at the arrival of the ship in the port of Aden.[61]

The sailors were called *khalāṣī* and their chief *tandīl*; other sources give *baḥrī*, *baḥḥār* (pl *baḥḥāra* or *baḥḥārūn* or *baḥriyyūn*), *baḥara* and *baḥriyya*

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[55] Ibn Baṭṭūṭa 1968, II: 163; idem, 1958–2000, II: 364.

[56] Ibid., 1968, II: 198; 1958–2000, II: 383. Ibn Baṭṭūṭa, however, applied the term *raʾīs* for captain, a word known to him in Morocco and the Mediterranean, still used including the Red Sea region; see also al-Muqaddasī 1906: 31.

[57] Al-Idrīsī 1994, I: 162.

[58] Ibn Baṭṭūṭa 1968, II: 163; idem, 1958–2000, II: 364; see also al-Muqaddasī 1906: 12; idem, 2001: 11.

[59] Ibn Jubayr 1907: 67; idem, 1952: 69.

[60] Al-Rāmhurmuzī 1883–1886: 202, also *kārīn* (ibid., 61) and *kīrānī*; see Ibn Baṭṭūṭa 1958–2000, II: 383.

[61] Ibn al-Mujāwir 1951–1954, I: 138–9. The *karrānī*'s role can be compared to the scribe in the records of Genoese shipping, see Byrne 1930: 59.

(coll.); also *bānāniyya* (s *bānānī*), *ghādūf* or *ghādif, mallāḥ* (pl *mallāḥūn*), *nūtī* (pl *nawātī*), *ṣārī* (pl *ṣarariyyūn* or *ṣurrā'*).[62]

The helmsman, *sukkān-gīr*, had an important job: he managed the rudder. Arabic sources list him as *ṣāḥib al-sukkān*, i.e. "master of the rudder"[63] or *al-musakkin*.[64] His position was at the stern of the vessel, sitting atop a platform. He had to sit high enough in order to have a full view of the ship, the sea, and to follow the sea captain's instructions.

The sailor in charge of the sail was called *dārī* or *khārwah*. Often the sewn vessel would leak; a sailor called *gunmaṭī* would plug leaks and fix other damage. We are told, for example, it was customary on board the Red Sea *jalba* [s.v.] to have four divers whose job, apart from greasing the hull with fish oil, was to dive while the ship was sailing to repair the leaks. When they dived they blocked their nose with wax. As soon as they heard the water murmuring through the leaks they sealed the hole with wax or palm leaf; in one day they would fix 20 to 30 holes.[65] A carpenter, *najjār* (pl *najjārūn*), sometimes assisted by other sailors, attended to the major repairs or damage that a vessel required during a voyage or at anchorage. Pulling the ships onto the shore and pushing them to the sea would have caused damage; as most of the planks of medieval Indian Ocean ships at the time were sewn, replacement of, for example, the ship's ends, was practical and economical (see Chapter 5).

The bailer, *bandūlī*, bailed water collected at the bilges;[66] one can see in the *Maqāmāt* (illustration 49), two bailers with amphora containers working from the bottom of the ship. Sewn ships were renowned for the quantity of water that seeped through the planks; as Friar Jordanus (d. c. 1330) observed, the bailers on Indian sewn vessels, "always, or almost always, [had] to stand to bale out the water".[67]

The look-out man, *fanjarī* or *dīdabān*,[68] had an important function: to warn the pilot against rocks, corals, pirates, and, of course, to inform all on board of the sight of land. This was the job of an expert seaman. However, the pilot, as noted earlier, would also sometimes fulfil this function by sitting on top of the ship's mast to observe the winds and the flowing movements of the sea.

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[62] Al-Rāmhurmuzī 1883–1886: 94, 142, 165; Ibn Sīda 1898–1903, X: 25–9; see also Serjeant 1974: 87.
[63] Al-Muqaddasī 1906: 12; idem, 2001: 11; al-Rāmhrmuzī 1883–1886: 96.
[64] Ibn Mājid 1971: 202, 242.
[65] UAFAL (Berlin) Ms 667, fol. 127r–v.
[66] Al-Rāmhurmuzī 1883–1886: 90.
[67] *Cathay and the Way Thither* 1866, I: 53.
[68] See for example al-Rāmhurmuzī 1883–1886: 91.

Provisions for the ship and the crew were cared for by the *bhandārī*. Food was prepared by a cook, *khabbāz*, who made unleavened bread called *khubz*. Fish was the staple food. Fried fish was considered to be lighter on the stomach or it could be made into a soup. A movable wooden box was used to cook food; it had a hatch at the top to let the smoke escape. The water for crew members and passengers was, according to a European report,[69] carried in wooden cisterns placed on each side of the main mast, as is the custom on dhows.[70] Some Indian ships, however, used barrel-shaped jars called *mátabán*.[71] Pyrard (d. 1621) observed that the cisterns held more water than the jars as they had holes to draw water. But, he argued, such a cistern could lose all its water if it was hit by a cannon-shot, or the water could become easily contaminated and go bad. No mention of these jars or cisterns is found in the Arabic sources.

Slaves were not used on board cargo-passenger vessels, but if the information about Sindbād the merchant-sailor in the *Arabian Nights* is true, slaves may have taken supervisory roles on board. Sindbād, reports:

> I hired [for a ship I bought in Baṣra] a master and sailors, over whom I set my black slaves and my pages as superintendents, and I embarked in it my bales.
>
> [*wa-(i)ktaraytu lahā rayyisan wa-baḥriyya naẓarat ʿalayhā ʿabīdī wa-ghulmānī wa-anzaltu fīhā ḥumūlī*].[72]

The tales of the "Seven Voyages of Sindbād" revolving around Baghdad and Basra are obviously mythical but the setting and background, the harbour activity, the ship and her crew, the navigating and shipwrecks described in them may well be based on reality.

Physical nature of the Western Indian Ocean

Muslim geographical works, as noted in Chapter 1, generally describe the Western Indian Ocean as made up of three different seas: the Red Sea, Persian Gulf and the Arabian Sea, all three seas encircle the Arabian Peninsula. Consider al-Muqaddasī (fl. second half of the 4th/10th c)

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[69] *Voyage of François Pyrard* 1887–1890, I: 258.
[70] Such as the *fiṭās* on the *būm* in Kuwait, see Agius 2002: 173.
[71] *Voyage of François Pyrard* 1887–1890, I: 258–9.
[72] *Thousand and One Nights* 1979–1981, III: 50–1; *Alf layla wa-layla* nd., III: 134.

who sailed around the three seas and the details he gives about the physical nature of the coast, the winds, currents, tides, reefs, islands as well as the dangers encountered:

> I, myself, have travelled over it a distance of about two thousand *farsakh*s, and have gone around the entire Peninsula from al-Qulzum to ʿAbbādān. . .
>
> [*wa-ammā anā fa-sirtu fīh naḥwa alfay farsakh wa-durtu ʿalā l-Ǯazīra kullihā min al-Qulzūm ilā ʿAbbādān . . .*].[73]

Farsakh is the word used to denote the distance covered on foot in one hour or "marching mile".[74] At one time it was calculated to be three "Arab" miles, each measuring one thousand *bāʿ*, equivalent in modern times to 3.7 miles (6 km).

The Red Sea was difficult to navigate because of the shallowness of the water and the coral reefs[75] and the frequent changes in the direction of the wind. In winter the winds are north-east across the Arabian region, while in summer the winds blow from the north or north-west in the northern region of the Red Sea, and west or south-west over the southern coasts.

The winds in the Persian Gulf are for most of the year north-westerly. The Iranian littoral has reefs and the banks are of sand, mud and rock but with a deeper clearage. Unlike the Iranian coast which is mountainous, the Arabian coast is generally low, with reefs and shoals. In the Gulf of Oman winds vary according to the south-west monsoon in the northern part of the Arabian Sea: in winter the winds are northerly while in summer they change to southerly.

The Arabian Sea lies between Arabia and India to the north while to the southeast of Socotra Island is the sea's southern boundary, stretching from the coast of East Africa to the west coast of India. Sailing in the Arabian Sea depended on the predictability of the monsoon winds.

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[73] Al-Muqaddasī 2001: 9; idem, 1906: 10.

[74] Per *farsang* (Steingass 1977: 918) is a unit of distance based on the march of an infantry about 2.48 mi/4 km and cavalry is about 3.7 mi/6 km, < Mid Per *frasang* < Old Per **parāthanga*; found in Herodotus and Xenophon, Gr παρασάγγης (Liddell & Scott 1953: 1323); Syr *parseḫā*, see Payne Smith 1903: 463; W. Hinz, "Farsakh", in *Encyclopaedia of Islam*, volumes I–XII (Leiden: E. J. Brill, 1960–2004; second edition), II: 812–3; see for example al-Muqaddasī 1906: 2, 61, 68–69; idem, 2001: 2, 58–9, 65–6.

[75] Coral reefs include "fringing and barrier reefs, simple island reefs and atolls", *Western Arabia* 1946: 66.

The chief harbours such as Basra, Cambay, Mangalore and Aden offered good shelter for the ocean-going vessels. Mooring conditions dictated the design of the ship, and since many medieval ports, like Siraf, Sohar, Calicut and Quilon were exposed anchorages;[76] they were used by coastal vessels of shallow draft, designed to manoeuvre the land and sea breezes.

Monsoon wind systems

Sailing close to the coast has its dangers. These consist mainly of being driven on to a lee-shore, hit by hidden rock and sand-bank, caught by strong tides or sucked into whirlpools. However, the mariners were in tune with the natural rhythms of the lunar tides and the currents attributed to the principal winds; the *shamāl* (north), *janūb* (south), *dabūr* (west) and *qabūl* (east).[77] They worked in harmony with these, adapting their sailing to their vagaries.

The maritime calendar was divided into two halves: the south-west monsoon, from April to end of August was called the *mawsim al-kaws* and the north-east monsoon, *rīḥ al-saba* (or *rīḥ al-azyab*) from October to March. These sailing seasons were referred to as *mawāsim al-asfār* or *mawāsim al-riyāḥ* (i.e. the seasons of winds).[78] Therefore, the term *mawsim* meant "season", a period of time in which ships could sail safely from x to y. Eastbound, cargo ships from Yemen would depart for India with the south-west monsoonal winds which enabled them to sail to China in one season. However, archaeological and textual evidence from Southwest India (i.e. the Maldives and Sri Lanka), shows that during the monsoon period, ships sailing eastbound had to make a stop, usually in South India, before proceeding to the Far East.[79] Going westbound, ships had to cover their voyage in two seasons: from China up to India with the north-westerly winds was the first stage, with one stop waiting for the south-west winds in mid-October in order to complete their voyage to Yemen or the Persian Gulf.

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[76] Tibbetts 1981: 145, 152.

[77] Al-Masʿūdī 1983, II: 221; other winds and the theory of them, see Tibbetts 1981: 142–4, 270–1, 382–7.

[78] Refer to my discussion on the monsoon winds and terminology in Agius 2005a: 193–7.

[79] Carswell 1993: 156.

There are three different periods in the year: one is for sailing, the second one marks the time the trading fleet returns to the port and finally, there is the period when the port is closed for shipping; the latter is called *al-ghalq* or *banādir al-ghalq*. The opening of the season for sailing is called *futūḥ mawāsim*. For sailing, the navigator used a system for dating according to the solar year; he could not use the Islamic lunar year as there is no correlation between the months and the seasons. The maritime calendar was based on a system of numbering consecutively from 1 to 365 days, using no months. The first day of the maritime year was called *nayrūz* (< Per *naw-roz* "new day") according to the Persian calendar (also called the calendar of Yazdagird). The Sāsānian monarch Yazdagird III (632–651) ordered the standard official date to be on 16 June 632. Like the Persian calendar, the 365-day maritime year had a discrepancy of a quarter of a day that occurred at the time of the equinox every year in a cycle of four years; this eventually was rectified by intercalating one day every four years in order to adjust the shortfall of a quarter of a day every year. The navigator memorized the table, so that, for instance, on a journey from Malabar to Sind (round the Laccadives), a ship departing Day 100 arrived Day 150 or Day 160, corresponding from 2 March to end of April.[80]

Routes

There were two main routes in the Indian Ocean; they were described in *Chou-ku-fei* (written 1178), by Ibn Mājid (written 1489–90) and Duarte Barbosa (written 1501–7). One route was used by small ships all along the northern coasts and the other by the larger ships across the high seas. Sri Lanka was the meeting point for ships coming from the Persian Gulf, the Red Sea and East Africa and it was described as such by the Egyptian Nestorian, Cosmas Indicopleustes *circa* sixth century CE:

> From all India, Persia and Ethiopia many ships came to this island, and it likewise sends out many of its own, occupying as it does, a kind of central position… .[81]

[80] Tibbetts 1981: 365–6, see "Table of Monsoon Dates".
[81] Cosmas 1897: 337.

The duration of the voyage from the Persian Gulf to China (Muscat—Quilon—Kalah—Canton) was about three months. This was, of course, in relatively fair winds, but under rough weather, the Chinese traveller I-Tsing (d. 713 CE) reports that a voyage from Sri Lanka to Java alone could take 3 months, allowing time for stopping at anchorage for repair and leakage.[82] The return trip was divided as follows: setting out in November from Canton to Aceh (Sumatra) lasted 40 days and in January, from Aceh to Dhofar or Aden was about 60 days. Buzurg b. Shahriyār reports having heard in 317/929 that it took a sea captain, Ismaʿīlawayh exactly 48 days to sail from Kalah, on the west coast of Malaysia, to Sohar.[83] If we take, for example, the distance between Muscat and Quilon, about 1,562 miles (2,513 km), with a reasonably favourable wind, the journey would take some 28 to 30 days, thus covering about 50 miles (80 km) a day. With a north-easterly wind, Ibn Baṭṭūṭa's ship sailed from Calicut to Zafar on the Southern Arabian coast in 28 days.[84] Both Marco Polo and Ibn Baṭṭūṭa give us a rough idea of how long their voyage lasted from one port to another. From Maabar (Coromandel Coast) to Zanzibar, reports Marco Polo, was 20 days, and Vasco da Gama was informed that the journey from Malindi (on the East African coast) to India would take 30 days;[85] however, Marco Polo claims that with the "continual southward set of the current", the journey might take 90 days.[86]

During the months from June to August, strong winds blow and all ports on the west coast of India are closed. For ships sailing in a westerly direction, they catch the north-easterly light winds from October to March. Persian, Arabian, Indian and Chinese merchants had to trade when the western shores of India and the Southern Arabian coast were open, while during the summer months, seamen did repair work and careened their ships when the coasts were closed for sailing. Wooden ships were regularly repaired every three years and replaced every ten years. The annual trading fleet headed southwards, down the East African coast, starting from mid-October to mid-November with

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[82] Radhakamal Mukerjee, *A History of Indian Civilization* (nd) cited by Tripati & Raut 2006: 865.
[83] Al-Rāmhurmuzī 1883–1886: 133.
[84] Ibn Baṭṭūṭa 1968, II: 196; idem, 1958–2000, II: 382.
[85] *Three Voyages of Vasco da Gama* 1869: 82.
[86] *Travels of Marco Polo* 1982: 263.

favourable winds. Ships came from the Red Sea, or the Persian Gulf, calling first at Aden. Indian ships would have also crossed directly from the West Indian coast to the shores of East Africa.

Maps and portulan charts

One day, on the shore of Aden, al-Muqaddasī (fl. second half of the 4th/10th c) met Shaykh Abū ʿAlī b. Ḥāzim, a most knowledgeable merchant, whose ships sailed to the furthest parts of the Indian Ocean, and said,

> God support the Shaykh! My mind is preplexed concerning this sea, so great is the number of conflicting accounts of it.
>
> [*ayyada Allāh al-shaykh qad ḥāra ʿaqlī fī hādhā l-baḥr li-kathrat al-ikhtilāf fīh*].[87]

The shaykh squatted, and with a finger, drew the Indian Ocean from East Africa to China. Al-Muqaddasī realised that, helpful as the official maps could be, they were no match for the hard-won practical knowledge of men such as the shaykh, "chief of the merchants", who had sailed the seas for many years and knew every inch of the coastline. I wonder if early Arab(ian) or Persian navigators ever had access to world maps; the charting of the Indian Ocean, drawing the coast lines in the forms of tongues and birds is what the Classic and Early Medieval geographers (eg al-Muqaddasī and Ibn Ḥawqal) had produced. It was the geographer al-Idrīsī (d. c. 560/1165) who first drew a world map in 549/1154 following the Greek and Roman models. A more detailed and accurate map was drawn by the geographer Ḥamd Allāh Mustawfī l-Qazwīnī (d. after 740/1339–40), based on the work of Ptolemy's (fl. 2nd century CE) *Geographia* (Geographike Hyphegesis), which was, until then, not known to Europeans.[88] Ptolemy's work was in fact revolutionary to the medieval world for it maintained that the earth was not flat but a sphere; the book included a list of topographical features with their latitudes and, interestingly, set out the principles

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[87] Al-Muqaddasī 1906: 11; idem, 2001: 9.

[88] Al-Idrīsī's map shows the earth round while a Carta Catalana of 1375 presents it as flat. Some progress was made with the 1474 Genoese world map by Paolo Toscanelli, a Florentine physician and geographer; it shows a large Asia, the northern section of the African continent looks proportionately correct but not East Africa, Arabia and the rest of the Indian Ocean.

by which one could find the longitude. The latter was not understood until centuries later when the Europeans, by trial and error, discovered the way to determine longitudinally one's own position. The Chinese might have perfected this before the Portuguese entered the Indian Ocean in 1487.

When western portulan charts were made in the thirteenth century, they were illustrated with wind-roses to mark rhumb directions for prevailing winds; the manuals had important information such as distances and coastal bearings, markings as to where rocks, shoals and reefs were found, depths and anchorage, and, importantly, when tides occurred. Such portulans could have existed among Persians, Arabians and Indians for when Marco Polo (d. 1323) sailed the Indian Ocean, he reports having seen pilots with good charts.[89] But there is no evidence of these charts nor did Aḥmad b. Mājid (d. after 906/1500) and Sulaymān al-Mahrī (d. 917/1511) in their text point to any definitive nautical charts except for a reference to a mapping of some islands.[90] But again information about charts in the east comes from the west. Between 1503 and 1508, the Italian traveller Ludovico di Varthema (fl. 16th c) met Arabian navigators on his voyage from the Red Sea to the Indian Ocean who had compasses and charts [*E con nostri Piloti delle sue bussole e carte al corso del mare necessarie grandi obseruatori*…].[91] It is an intriguing passage because firstly, as Badger remarked, the information is contemporary to the arrival of the Portuguese, and secondly, it confirms that the navigators were in possession of such nautical instruments. I shall discuss the use of compass below. If Di Varthema's claim that he saw charts in the hands of pilots is to be taken as a fact, then the Portuguese story about the Moor from Gujarat (the celebrated Malemo Cana or Canaqua)[92] showing Vasco da Gama (d. 1524) a sea-chart, according to João de Barrros (fl. 16th c), is on firmer ground.[93]

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[89] *Travels of Marco Polo* 1982: 225, 266. Tibbetts (1981: 4) claims that the pilots were Arabians but this is purely a guess.

[90] See Ferrand 1924: 210; idem 1923–1928, III: 237; Da Mota 1964: 72.

[91] *Travels of Ludovico di Varthema* 1863: 31–2.

[92] Malemo Cana or Canaqua, the latter is the Indian *kanaka* for "astrologer", see Tibbetts 1981: 9.

[93] It was at Malindi, in modern day Kenya where Vasco da Gama seemingly picked up the pilot of Gujarat who then piloted his ship to Calicut. The actual name was not given and the common Arabian theory is that the Moor of Gujarat was Ibn Mājid. The event is sanctioned by al-Nahrawālī (d. c. 990/1582) in his *al-Barq al-Yamānī fil-fatḥ al-ʿUthmānī* (The Lustrous [Chronicle] of the Yemen on the Ottoman [Conquest]) in which he refers to "…a skilful navigator named Aḥmad b. Mājid", an Arabian of

Another story, about how Alfonso de Albuquerque (d. 1515) acquired a map from a Moor, is not to be taken as an alternative to De Barrros' account of Vasco da Gama being given a sea chart, but rather to consolidate what we know of Indian Ocean pilots having sea-charts that included Arabia and India: it is reported that De Albuquerque, on leaving the city of Qalhat, north of Sur, told the Moorish pilots that he had in his possession a chart made by a certain ʿUmar[94] who had accompanied Vicente Sodré in 1503.[95] The chart contained all the harbours, towns and places of the coasts of the Persian Gulf.[96] We are told that this chart was of great value because not only could the Portuguese ships obtain access to the ports along the Omani coast, but that the captain-major and officers could check on whether the Moorish pilots were guiding their ships correctly or not.[97]

Maritime manuals

There is no direct evidence of Indian Ocean pilots being equipped with manuals, but there is an intriguing reference to their use by al-Muqaddasī who claims to have met captains, who had

> in their possession navigation instructions which they studied carefully together and on which they rely completely proceeding according to what is in them… .
>
> [*wa-raʾaytu maʿahum dafātir fī dhālika yatadārasūnahā wa-yuʿawwilūna bi-mā fīhā*…].[98]

Najdī descent, who discussed with the "Franks" (i.e. the Portuguese) the sea route from Malindi to Calicut, see Hopkins 1990: 326. However, there is no consensus about the truth of this event among the Portuguese sources, nor is it mentioned explicitly by Ibn Mājid himself. He would have heard of the Portuguese whom he referred to as *Burtuqāliyyūn*, but apparently never encountered them. If he had, it seems strange that he does not mention this historical event.

[94] In the fortress of Socotra which was taken by the Portuguese in 1506, there was one Moor by the name of ʿUmar who was taken prisoner; this, I suppose, could be the ʿUmar that De Albuquerque obtained the map from, see *Commentaries* 1875–1884, I: 52.

[95] Sodré's vessel was wrecked and drowned off the Curia Muria Islands in July or August 1503. The sixteenth-century chronicler Gaspar Correia reports that his brother's (Bras Sodré) vessel was also wrecked at anchor but he and his crew escaped to land, see *Three Voyages of Vasco da Gama* 1869: 376, fn. 1.

[96] *Commentaries* 1875–1884, I: 67.

[97] Ibid., I: 52, 67; II: xlii; also *Three Voyages of Vasco da Gama* 1869: 376.

[98] Al-Muqaddasī 1906: 10–11; idem, 2001: 9.

We have no clue as to what these nautical "instructions" were about. His silence about the content of these manuals raises our suspicions as to what langauge they were written in. It seems they were in Persian, a language that al-Muqaddasī was not familiar with. What is also interesting is his reference to a sea chart[99] but there he stops. He gives no detail. Nonetheless, his account is a unique source of information in terms of the nautical knowledge at the time. He remarks that these people were aware of the winds, anchorages and the sea, he writes: "I questioned [their knowledge], about the conditions on it, and about its limits…" [*fa-saʾaltuhum ʿanhu wa-ʿan asbābih wa-ḥudūdih*],[100] even though he refrains from providing us with any of their answers.

We have no record to show how the ancient navigator, with neither compass nor chart, set and kept course for his destination, but we can assume that before the magnetic needle was discovered, the sun and the stars served the sea captain or helmsman well[101] and that his long experience and visual memory replaced the chart. In one of Buzurg b. Shahriyār's (d. 399/1009) stories we are informed that an experienced sea captain would have spent a whole night

> studying the stars, and recognising the position of the constellations, so as to fix in his memory how to go and come back.
>
> [*yūqifuhum ʿalā l-nujūm wa-yuthabbituhum ʿalā manāzil al-kawākib wa-jihāt al-āfāq wa-ṭarīq al-iqlāʿ fī l-majīʾ wa-l-ʿawda*].[102]

Mention of pilot manuals does not occur specifically in earlier Arabic sources, except for one reference to a Persian guide in 587/1191.[103] Whether Arabians in general used the Persian version is not known. These guides were drafted after the Persian (*rahnāma*)[104] or Indian model and they contained information about coastlines, currents etc., and it is almost certain that the Arabic navigational treatise written by Aḥmad b. Mājid (d. after 906/1500) was based on these models.

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[99] Ibid.
[100] Ibid., 1906: 10–11.
[101] See for example Ibn Jubayr 1952: 67.
[102] Al-Rāmhurmuzī 1883–1886: 32; idem, 1981: 19.
[103] *Iskandar-nāma* (Romance of Alexander), a poem written by Niẓāmī of Ganja, see Hasan 1928: 129–30.
[104] The Persian term *rahnāma* (see Steingass 1977: 565, 1380) developed into Arabic *rahmānī* or *rahmānaj*, thus the /m/ was switched with /n/, a common phonetic feature called metathesis and the final Persian /-a/ or /-aj/ became Arabic final /-i/.

Maritime manuals consisted of star positions, latitudes, bearings and physical descriptions of land, islands etc., a framework comparable to the Chinese sailing instructions that survived in the fifteenth-century *Wu bei zhi* (Treatise on Military Preparedness).[105] Undoubtedly, Indian Ocean mariners, irrespective of their language and culture, were aware of each other's knowledge of sailing directions. The Indian tradition in navigation was well known to both Persians and Arabians. There are indications that Sulaymān al-Tājir, when composing the *Akhbār al-Ṣīn wa-l-Hind* (News on China and India) around 237/851, had available Indian navigational works.

Ibn Mājid, the author of *Kitāb al-fawā'id fī uṣūl wa-l-qawā'id* (Book of Benefits in the Principles of Navigation) composed in 895/1489–90, wrote that he had seen a Persian copy of a *rahnāma*, dated as early as 580/1184–5, transcribed by the grandson of Layth b. Kahlān. This Layth, on compiling data from a Persian *rahnāma* (manual of sailing instructions), collaborated with Muḥammad b. Shādhān and Sahl b. Ābān.[106] So this is the connection with Ibn Mājid and thanks to him we have a nautical treatise written in Arabic, information from which was based on the Persian *rahnāma* now lost.

There is mention of a Persian treatise by the geographer and historian Ibn al-Mujāwir (d. 690/1291) in his *Tārīkh al-mustabṣir* (A Chronicle for Someone who Seeks to Understand) composed around 630/1232, which suggests that the nautical treatise was well known to Arabian and Persian mariners with whom he came in contact. Also, we need to bear in mind that Ibn al-Mujāwir was Persian-speaking. I would postulate that this treatise of the seventh/thirteenth century was still available in Persian at the time of Aḥmad b. Mājid. Many mariners were Persian anyhow. It must be added, as I explained above, that earlier navigational literature also existed in Sanskrit and Tamil, though no mention of this has been made by Ibn Mājid nor did his contemporary, Sulaymān al-Mahrī (d. 917/1511), say anything about this.

Towards the end of the ninth/fifteenth century Ibn Mājid would have realized the urgent need to put all the nautical instructions into Arabic when sea captains and navigators were becoming increasingly Arabic-speaking and the number of monolingual Persian or bilingual

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[105] It is a multi-volume compendium compiled by Mao Yuanji (d. 1641), containing numerous texts on military matters; it also includes information on ships and seafaring (written communication from Sally Church 16 & 19 March 2007).

[106] Ferrand 1924: 196.

Persian and Arabic speakers was decreasing. One may argue, therefore, that Aḥmad b. Mājid did not in fact produce an original work, but adapted or translated one of the Persian *rahnāma*s into Arabic, but this is speculation and cannot be said with any certainty.

Sailing traditions formed part of the oral tradition which have come down to us in poetic verse, as we find in Ibn Mājid's and Sulaymān al-Mahrī's works.[107] Sailors memorized these poems and recited them as route directions during their voyages and it is in this tradition that navigational works were composed. It is important to mention that pilot-poems were used until fairly recent times among Indian Ocean navigators.[108]

Being familiar with coastal features, with channels and shoals and knowing the depth and nature of the seabed were all factors in safe navigation. Coastal sailing was practised in the absence of navigational aids. A pre-Islamic verse from the *dīwān* (collection of poems) of Ṣakhr al-Ghayy (ndd) marks this sailing tradition of the time:

> As if what followed it on the desert were
> the ships of a foreigner hugging the coast
>
> [*ka-anna tawāliyahu bil-malā*
> *safā'in aʿjama māyaḥna rīfā*].[109]

"Hugging the coast" meant being able to utilise information regarding landmarks, tides, winds, birds and fish, which were termed *ishārāt* (the seventh principle of navigation).[110]

Basic nautical parameters in aid of navigation include: depth, time, distance and direction, all "notional concepts".[111] The unit of measurement is the *bāʿ* (pl *abwāʿ*), equivalent to the fathom, "the outstretched arms of a man, which is approximately 6 feet (1.82 m) in a man of

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[107] Ibn Mājid's earlier work, *Ḥāwiyat al-ikhtiṣār fī ʿilm al-biḥār* (A Short Compendium of Navigational Science) is a poem dated 866/1462. Al-Mahrī's works in poetic verses are: one dated 917/1511, *Kītāb al-ʿumda l-mahriyya fī ḍabṭ ʿilm al-baḥriyya* (Book of the Mahri Masterpiece on Exact Maritime Sciences) and the second undated, *Kītāb al-minhaj al-fākhir fī ʿilm al-baḥr al-zākhir* (Book of the Perfect Method in Navigational Sciences), see Ibn Mājid 1981: 17–46. On navigational methods, see Ferrand's three volumes, *Instructions nautiques* 1923–1928; Grosset-Grange 1970: 227–46; idem, 1972: 240–54; Agius 2005a: 155–73.

[108] Serjeant 1982: 109–27.

[109] Montgomery 1997: 189.

[110] Al-Quṭāmī 1964: 103, 114–5; Tibbetts 1981: 77–8.

[111] Arunachalam 1996: 263.

average size".[112] Undoubtedly, the pilot could interpret depths by the lead and line; he would have been familiar with the feel and character of the winds which influenced his direction. Time was estimated by plotting the position of the sun throughout the day and that of the moon at night; star positions in relation to the lunar month were observed, to estimate time. The ability to locate the North Pole was fundamental, so knowledge of the stars was essential. With these aids, the sun, moon and stars, the Indian Ocean navigator was able to plot his route.

Plotting the route

The introduction of a magnetic compass by the Chinese was an important discovery. A description of it comes in a Chinese encyclopaedia of 1135 which says that it consisted of a wooden fish with a magnet that was floated in a bowl. In the Islamic world, we have for the first time mention of a magnetic compass by al-ʿAwfī (d. 630/1232) in his Persian work, *Jāmiʿ l-ḥikāyāt* (A Comprehensive Book of Stories) and in a 1282 Arabic text it is seen on a voyage between Syria and Alexandria.[113] Early mariners called it *quṭb numā* and the Arabians referred to it as the *dāʾira* (circle) or *bayt al-ibra* (the abode of the needle) or simply *ḥuqqa* (the case [containing the needle]).

A combination of the star altitude measurements and compass bearings were the essentials with which the navigator established the route. With the development of the magnetic compass, the Indian Ocean pilot was able in principle to locate the magnetic North Pole and it became possible to set a course with accuracy by day or night, though it must be said that the earliest forms of compass were difficult to use at sea and sometimes not reliable.[114] The compass developed into a circular card with rhumbs (s *khann*, pl *akhnān*) drawn on it and attached to a magnetized needle (*ibra*) which, pointing to magnetic north, gave the calculations of the ship's course (*majrā*). The thirty-two rhumbs were named after eighteen prominent stars, sixteen of which rise (*maṭlaʿ*

[112] Kemp 1992: 297.

[113] Tibbetts 1981: 290; see also my discussion on the magnetic compass in Agius 2005a: 158–60.

[114] The compass played tricks—"navigational hazards" (defects) (*khalāl al-ḥuqqa* or *fasād al-ibra*), see Tibbetts 1981: 292–3.

[= mt]) in the east, and set (*maghīb* [= mg]) in the west.[115] They are: *jāh* (Polaris "North")—, *farqadayn* (βγ Ursae Minoris "Guards"—[mt] N by E [mg] N by W), *naʿsh* (αβγδεζη Ursae Majoris "Plough"—[mt] NNE [mg] NNW), *nāqa* (stars in Cassiopeia and Andromeda "She Camel"—[mt] NE by N [mg] NW by N), *ʿayyūq* (Capella—[mt] NE [mg] NW), *wāqiʿ* (Vega—[mt] NE by E [mg] NW by W), *simāk* (Arcturus "Fisherman"—[mt] ENE [mg] WNW), *thurayyā* (Pleiades "Candelabra"—[mt] E by N [mg] W by N), *ṭāʾir* (Altair—[mt] W [mg] E), *jawzāʾ* (Orion's belt—[mt] E by S [mg] W by S), *tīr* (Sirius—[mt] ESE [mg] WSW), *iklīl* (βδπ Scorpioni—[mt] SE by E [mg] SW by W), *ʿaqrab* (Scorpius "Scorpion"—[mt] SE [mg] SW), *ḥimārayn* (αβ Centauri "Two Donkeymen"—[mt] SE by S [mg] SW by S), *sulbār* (α Eridani—[mt] S by E [mg] S by W), *suhayl* (Canopus).[116] Arunachalam shows how the stars used in star compasses of the Arabian, Persian and Indian tradition are virtually identical though some differences are noted.[117]

There is one important thing to mention here: for the Indian Ocean pilot, unlike the Mediterranean pilot, the needle was not the only instrument he used; star sighting was equally important. Perhaps his reliance on the position of stars was because of the frequent clear skies one experiences in the southern hemisphere. Western writers (Marco Polo c. 1292, Odoric of Pordenone c. 1301, Niccolò de' Conti c. 1440 and Fra Mauro c. 1460), wrote about this celestial navigation to a point that they give the quite erroneous impression that Indian Ocean pilots never used the needle at all.[118]

To measure stellar altitudes, Ibn Mājid says that a *lōḥ* (or *khashaba*) was used.[119] This consisted of several plates or boards, each of which had a different width corresponding to "different angular altitudes on the horizon".[120] Both Ibn Mājid and Sulaymān al-Mahrī called this method of measuring, *qiyās* (sixth principle of navigation [see figure 5]).[121] Some

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[115] Details on the points of the star compass are discussed in Ferrand 1923–1928, III: 92–124; Dimmock 1944: 158–9; Tibbetts 1981: 112–7; Agius 2005a: 156–8.

[116] Other details are in Dimmock 1944: 154–61; Tibbetts 1981: 546–52; Agius 2005a: 155–8; personal communication Harriet Nash (8 August 2007).

[117] Arunachalam 1996: 263.

[118] *Mirabilia descriptio* 1863: 34; *Cathay and the Way Thither* 1913–1916, II: 146; Taylor 1971: 127; Needham 2000, IV, iii: 572.

[119] On *lōḥ*, see Ferrand 1923–1928, III: 15–16.

[120] Tibbetts 1981: 316.

[121] See Ibn Mājid 1971: 236, 378.

centuries later (i.e. post–15th c), the *lōḥ* device developed into a single rectangular plaque (*circa* 1.96 in/5 cm by 1 in/2.54 cm), the so-called *kamāl*;[122] to this tablet was attached a cord "which was calibrated by knots along its length".[123] Each knot determined the latitude of a certain port. The navigator, stretching the *kamāl* at eye level and holding one of the knots of the cord in his teeth, aligned the *kamāl* with the horizon; he was then able to determine the latitude as the upper edge intersected the Pole Star[124] (illustrations 50 & 51).

To calculate the latitude of the ship, the pilot measured a number of finger breadths (each one called *iṣbaʿ* [pl *aṣābiʿ*]) and each finger unit (*iṣbaʿ*) being equal to 0.75 inches/1.9 cms (= I^0 36' 25")[125] and 4 *iṣbaʿ*s ("a complete hand of four fingers held at arm's length") would make a *dhubbān*.[126] He then looked at each knot, from which he could calculate the point of the distance the ship was sailing to (east and west).[127] Distance was measured by time. Each corresponding *iṣbaʿ* was divided into eight divisions which were called *zām* (pl *azwām*).[128] The *zām* was equivalent to three hours (c. 12 nautical miles) and eight *zām*s formed twenty-four hours. It is interesting to note that the Indian Ocean pilot practised the finger units, whether he was calculating the "star altitudes, azimuths [or] interstellar great arc lengths".[129]

The Chinese altitude measurements in *chih* and *chio* (graduation in finger breadths) were practically identical to those used by the Ara-

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[122] See Ferrand 1923–1928, III: 15–16; Tibbetts 1981: 312–54; Fatimi 1996: 283–93; Sheriff 2002: 209–26.

[123] Personal communication (Paul Lunde 16 December 2002).

[124] Da Mota 1964: 53 *seq*.

[125] Arunachalam 1996: 264, fn. 6.

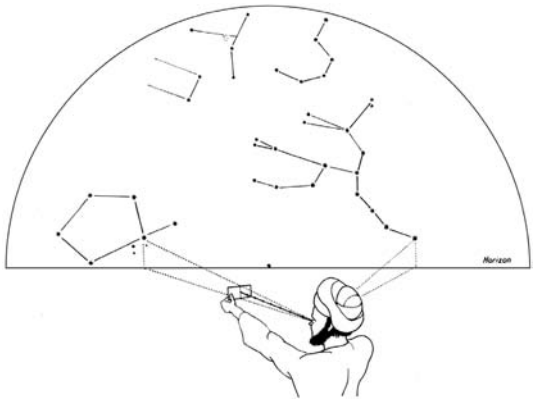
[126] The star *dhubbān al-ʿayyūq* took its name from this measurement, see Tibbetts 1981: 316, fn. 205; on *iṣbaʿ* see Ferrand 1923–1928, III: 162. The */-ān/* ending raises the question whether it is of Arabic origin (see Chapter 13).

[127] Taylor 1971: 129; Tolmacheva 1981: 183.

[128] Note Skt *zama*, Tam *yamam* and Mald *dama*, see Arunachalam 1996: 263, fn. 3.

[129] Arunachalam 1996: 264. In the chart that the pilot of Gujarat carried, we are told by João de Barros, there was the entire coast of India including the meridians and the parallels drawn on it "in the manners of the Moors", but showing no bearings of the compass, see *Three Voyages of Vasco da Gama* 1869: 138, fn. 2. He adds that as the squares of those meridians and parallels were very small, the coast represented by these two lines of north and south and east and west was defined "with great certainty" (ibid). Teixeira da Mota understands the parallels to be the altitudes of the stars traced on a scale of 1/4 by 1/4 of an *iṣbaʿ* (I^0 36' 25"), and the meridians could be lines of equal distance, in the east-west direction, with perhaps an interval of 8 *zām*s (i.e. 24 hours), see Da Mota 1964: 69–70 and Maqbul 1990: 1083. De Barros correctly noted the unity of distance which was, in his words, calculated by the *jomo*, corresponding to three hour's navigation (i.e. the *zām*), see Da Mota 1964: 57, fn. 9.





Illustrations 50 & 51 (Left) A model of a mariner using the *kamāl* (courtesy of The Mariners' Museum, Newport News, Virginia); (right) an Indian Ocean navigator measures with the *kamāl*, Capella (*ʿayyūq*) and η Ursae Majoris (*naʿsh*) (after Brice 1981: 3)

bian and Persian pilots expressed in *iṣbaʿ*, in *viral* by the Coromandel, Malabar and Lakshadweep seamen, and *anguli* by the Gujarati and Kutch sailors;[130] the Arabic application was first recorded by Aḥmad b. Mājid around 1475. It is known that this tradition of altitude measurement was applied at the time of Zheng He's (d. 1433 or 1435) voyages.[131] So the question is: which of the navigators were first, and subsequently influenced the other? It is a question not easily answered. Firstly, I have mentioned in Chapter 3 that Chinese ships anchored at various ports of the Western Indian Ocean and that Perso-Arabian and Indian ships sailed as far as China; the contacts and exchange of ideas must have existed from antiquity (see Chapter 2). Secondly, taking star altitudes among Persians, Arabians and Indians is well known but the nature of instruments employed by the Chinese pilots during the Yuan (1279–1368) and Ming (1368–1644) dynasties is not clear. Chinese stellar diagrams studied by Tibbetts show in each a framed three-masted ship, and around it star formations, with the names and altitudes in "finger breadths" (*chih* and *chio*); this information might predate Arabic

[130] Arunachalam 1996: 264.

[131] It is important to add that early European maps of the Indian Ocean located the position of ports in *pulgadas* "fingers".

texts, though Tibbetts argued that the Chinese did not seem to take positions at different intervals throughout the night as the Arabians did (presumably Persians and Indians performed the same exercise); also, the diagrams did not mention the date and year of the sighting, while the Arabians either recorded the hour, day and date of the position of the heavens, or named the correct position of the lunar mansion; in all this, however, the Arabians failed to produce diagrams but rather described their calculations in text[132] (illustration 52).

The Portuguese adopted the *kamāl* from contact with Muslim mariners; they called it *tavoleta*, or the *balistinha do Mouro*,[133] a nautical term which Arabians coined later as *al-balistī*. Needham remarked that the Chinese were employing the cross-staff in about the eleventh century; it is mentioned by Li Hsii (d. 1592). It was a long wooden staff (3 ft/0.91 m) with a cross-piece set at right angles to the staff: the navigator placed it on the cheek-bone and the edges of the cross pieces (transoms) were aligned with the horizon and the body being observed and a reading of the altitude was taken, the point where the transom cuts the scale.[134] A version of the *kamāl* was also used by Chinese pilots. It is true that Li Hsii's report comes in the sixteenth century, but textual evidence suggests that the Chinese pilots were using this method much earlier.[135]

The *kamāl* system, it may be argued, was ingenious but not accurate; when applied it produced different readings. The problem was that the instrument gave more or less accurate latitudes but the method used did not help the pilot with measuring east-west distances (i.e. the longitude). An attempt was made by the medieval pilot to use the distance travelled by a ship on a fixed bearing, called *tirfa* (pl *tirfāt*), by raising the latitude by one *iṣba'*,[136] a system whereby the navigator could make oblique measurements and calculate the distance between the east and west by applying the *zām*. In practice this turned out to be complicated on approaching the ports, east and west; the Portuguese were not able to determine the longitude with any success,[137] nor did the Chinese perfect a method.

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[132] Tibbetts 1973: 97–8.
[133] Da Mota 1964: 68 and other details on navigational methods, 53–68.
[134] *Travels of Pietro della Valle* 1892: 13.
[135] Needham 2000, IV, iii: 332, 574–5.
[136] Tibbetts 1981: 299; the *tirfa* corresponds to the European calculation of "raising the Pole", see Taylor 1971: 163.
[137] Scammell 1981: 59.

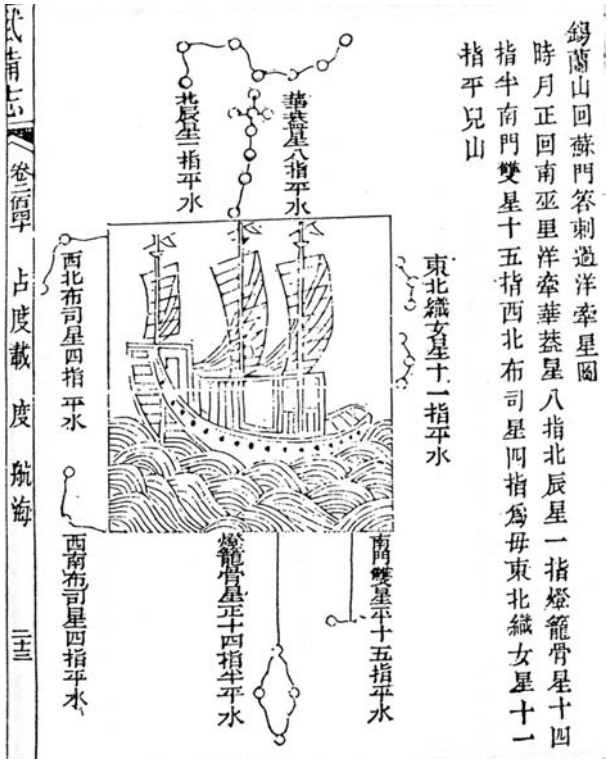


Illustration 52 Chinese stellar diagram preserved by Mao Kun (d. 1601) (after Tibbetts 1973; 101)

Finally, what bearing would the mariner take when facing the prevailing wind which would, for instance, be north in the Red Sea? The solution to this was to apply *takkiyya* (a verbal noun coming from *wakā* which means "to tack" against the wind); it represented a change of bearing caused by the strength of the wind and which varies in season. Both Ibn Mājid and Sulaymān al-Mahrī gave details about the setting of *takkiyya* positions at ¼ *iṣbaʿ* intervals. So by steering his ship into the wind, the sea captain would determine its strength; the variances of this wind were listed in tables but these were only a guide because the winds in the Red Sea are unpredictable in all seasons; such tables were there to help the mariner, on meeting the prevailing wind, to manoeuvre and steer for the islands.[138]

[138] See Tibbetts' section on *takkiyya* (1981: 310–2).

To sum up, there seems to be no written evidence of the use of the mariner's compass prior to the Chinese discovery in the twelfth century. It cannot be argued that the absence of textual evidence indicates that Western Indian Ocean navigators did not employ this device. We know that astronomical studies among Muslims were well advanced from the day of al-Bīrūnī (d. 440/1048), Ibn Khalaf (fl. 5th/11th c) to Abū Isḥāq al-Zarqālī, known in Europe as Arzachel (d. 480/1087). A great deal is also known about Greek knowledge being passed on to Arabic, and similar transmissions from Sanskrit to Arabic are found from astronomical and mathematical works. Planisphere astrolabes were developed and perfected by the Perso-Arabian-Indian astronomers during the first/seventh century; these were designed for time-measuring by solar observations during the day and star(s) by night, while the seaman's astrolabe was devised to measure the altitude of the sun and star. Direct contacts between scientists and navigators obviously stimulated ideas and it is difficult to say who would have inspired whom. We can say that "the first European treatises on the astrolabe were of Arab(ic) inspiration", as Donald Hill remarked[139] but the prime contributor to the development of navigational instruments remains a mystery.[140] One can compare similarities in devices and techniques in navigating, sailing, shipbuilding etc. among the Indian Ocean communities, but in terms of exchange of technology, as McPherson argued, it is difficult to ascertain whether the pull of the tide was one way or the other.[141] Can we say that similarities are a product of technology that came with the Chinese to the Arabians, Persians and Indians or the other way around? Direct contacts brought about exchange of ideas and technology and, of course, there existed a mutual influence, though it should not be ruled out that the development and application of astronomical ideas and navigational techniques could have been, as McPherson concluded, "the result of independent inspiration…".[142]

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[139] Hill 1994: 42.

[140] Needham's discussion in his chapter, "Nautical Technology", summed up from a number of sources is rich and raises interesting questions with some possible answers, see Needham 2000, IV, iii: 554–84, in particular 570–6; see also Tibbetts (1973: 97–208) on comparison between Arab and Chinese navigational techniques.

[141] McPherson 1995: 33.

[142] Ibid.

Steering

Before the rudder was introduced, a mariner sailed his boat by depending on the wind and current. He developed "a strong sense for the feel, character and behaviour of the wind":[143] he used a steering oar, projecting over the quarter, i.e. the starboard side, of the boat. It was the means of directing the course of a ship. With larger vessels one or two, even three, oars were used. We find in Egypt by the twelfth century BCE, steering oars being used projecting from both quarters.[144] A verse in Labīd b. Rabīʿa's (d. c. 40/660–1) poem suggests the use of two steering oars:

> Thus was its ancient underbody repaired—,
> But her twin followers (i.e. the side-rudders) could not keep straight her crooked (course).
>
> [*fa-(i)ltaʾma ṭāʾiquhā l-qadīm*
> *fa-aṣbaḥat mā in yuqawwimu daraʾahā ridfāni*].[145]

The word for steering oar is generally known to be *mijdāf* (pl *majādīf*); the root-verb *jadaf* is defined as the bird that spreads its wings; hence the noun *mijdāf* is conceptually the motion of the oar like the wing of the bird.[146] It is an imagery that crops up in a sixth/twelfth-century text of Abū Shāma (d. 665/1266–7); he speaks of a warship, called *ghurāb* [s.v.] spreading "[her] wings like those of a dove" [*wa-tanshuru min ḍulūʿihā ajniḥat al-ḥamām*].[147] It seems to me that these "wings" (sticking out like those of a dove), imply two large bladed-oars, one on either side of the stern. Another use of the word "wings" [*ajniḥa*] occurs in the *Tārīkh al-mustabṣir* (The Chronicle for Someone who Seeks to Understand) of Ibn al-Mujāwir (written a century later),[148] he writes:

> These ships have wings necessary because of the narrowness and rockiness of these seas and the small quantity of water.
>
> [*wa-li-marākibihim ajniḥa li-ḍayqi biḥārihim wa-waʿrihā wa-qillati l-māʾ bihā*].[149]

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[143] Arunachalam 1996: 264.

[144] See Casson (1994: 86, 88, 133–40) for further details on the use of steering oars in European rivers and streams, the Mediterranean and the river Nile.

[145] Montgomery 1997: 190.

[146] Ibn Sīda 1898–1903, X: 28; Lane 1984, I: 390–1; also *jadhaf* and *mijdhāf*; terminology of oar varies in Arabic dialects but mostly derived from the root */j.d (dh).f./* (cf. Aram and Syr *gādūpā*) see Glidden 1942: 72; Agius 2002: 123, fn. 18.

[147] *Recueils des historiens des croisades* 1967, IV: 210.

[148] Rex Smith drew my attention to this reference (communication 3 August 2000).

[149] Ibn al-Mujāwir 1951–1954, I: 117.

The waters were shallow and rocky, so the ships required more manoeuvrability than that afforded by sailing, hence the use of what appear to be oars.[150] But, are they really steering oars? Needham has the answer; he explains that such wings were devices to assist the ship not to be driven sideways or overturn under pressure of the wind or rising waves. In support of this he refers us to a Chinese war vessel which had "floating boards" (leeboards) attached to the sides of the ship which, we are told, looked "like the wings of the bird (a hawk or grebe)".[151] In view of this, the Arabic texts were applying the correct term to convey the message that the "wings" (*ajniḥa*) were in fact "floating boards". Needham further tells us that such devices were not introduced into Europe before *circa* 1570; his assumption is based on an illustration of a European ship in Amsterdam harbour. It is difficult to say whether the Islamic use of "wings" was a concept borrowed from the Chinese, but both the similarities and the metaphoric use of the term "wings" are striking.

There are in the *Maqāmāt* (The Assemblies) two depictions of a single steering oar in a double-ended vessel, dated 619/1222 and 700/1300.[152] One would expect to find a ship with two steering oars, for it seems advantageous to control a vessel with two rather than one steering oar, thus providing greater manoeuvrability. However, according to James Hornell (cited by Johnstone and Muir), one steering oar mounted to the sternpost was much easier to manoeuvre in a double-ended ship.[153] Iconographic examples of double-ended Indian Ocean vessels with twin quarter rudders or steering oars are many; such a practice was also prevalent in the Mediterranean.

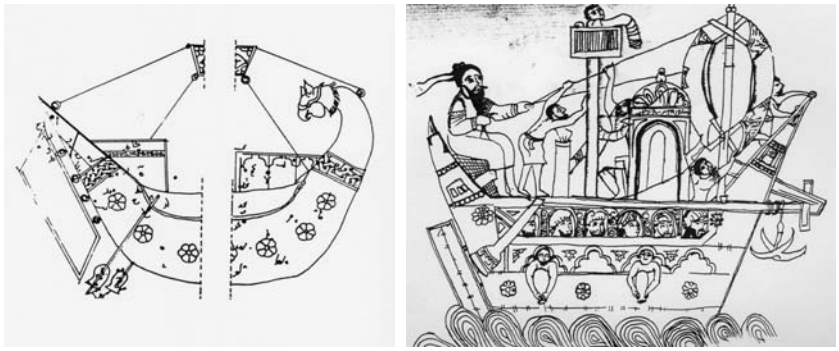
The mechanism of a steering oar led to the logical development of a rudder, *sukkān* (pl *sukkānāt* < Aram < Akk), for the rudder helped the seaman in tacking and turning, though not free of the wind.[154] The axial rudder was traced to China; it replaced the long steering oar which was not safe or manoeuvrable in bad weather. Needham is of the opinion that the transmission of the technique appears to have passed from Chinese to Perso-Arabian and Indian maritime culture *circa* 1000: "the

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[150] Written communication from Tom Vosmer (15 August 2000).
[151] Needham 2000, IV, iii: 618.
[152] BN-Ms 6094; BL-Add. Ms 22114, fol. 132r.
[153] Johnstone & Muir 1962: 62.
[154] On the development of the Indian Ocean rudder, see Johnstone & Muir 1962: 58–63; Hourani 1963: 98–9; LeBaron Bowen Jr. 1963: 303–4; idem, 1966: 172; Mott 1996: 120–5; Vosmer 2005: Chapter 4.4.

stern-post rudder, no less than the mariner's compass, was an essential pre-requisite for the oceanic navigation of large ships".[155] Two illustrations of the earliest known stern rudder are found in the *Kitāb ṣuwar al-kawākib al-thābita* (The Book of the Constellations of Fixed Stars) of al-Ṣūfī (d. 376/986), one possibly from Egypt, dating 525/1130–1,[156] and the other from Mardin in Iraq 529/1134–5.[157] This predates the discovery of stern rudders which are engraved on the thirteenth-century seals of the Hanseatic League ports,[158] previously thought to be the earliest examples of their use. The stern rudder caught the eye of Friar John Montecorvino (d. c. 1328) during his voyage in the Indian Ocean, and he described the Malabar ships as having "a frail and flimsy rudder".[159]

An interesting feature found in the manuscript of *Kitāb ṣuwar al-kawākib al-thābita* (dating 525/1130–1), mentioned above, is that here the ship, in addition to the stern rudder, is carrying twin-quarter rudders.[160] Also, the *Maqāmāt* from Baghdad (dating 635/1237) depicts an axial rudder and one steering oar (illustrations 53 & 54).



Illustrations 53 & 54 (Left) A ship with a stern rudder carrying twin-quarter rudders (*Kitāb ṣuwar al-kawākib al-thābita* [?] Egypt 525/1130–1); (right) a *Maqāmāt* ship with an axial rudder and a steering oar (Baghdad 635/1237)

[155] Needham 2000, IV, iii: 652. The Chinese invented the primitive type of stern rudder but also developed other types. Christides (1999: 93–6) supports the theory of the Chinese passing on the mechanism of different types of rudders to the Arabians.
[156] TI-Ms Ahmad III, 3498, ff. 130v, 131v.
[157] TI-Ms Fatih, 3422, ff. 198r–v.
[158] Kemp 1992: 731.
[159] *Cathay and the Way Thither* 1866, I: 217.
[160] See Nicolle 1989: 174–5.

Therefore, the question is, why do we have two steering systems in one ship? Perhaps the rudder worked with deep water while the oars assisted to propel the vessel in shallow waters. The axial rudder, when it evolved in the Indian Ocean *circa* third/ninth century, was held by some system of lashing to the vessel, as the quarter rudder probably was in earlier centuries. Al-Muqaddasī (fl. second half of the 4th/10th c) gives us an idea about how this worked: he reports that the helmsman (*ṣāḥib al-sukkān*) held two ropes in his hand and on the instructions given by the sea captain, he pulled one to the right or to the left accordingly.[161]

The mechanism of a rudder with ropes (*sukkān bil-ḥibāl*) was still applied until modern times on traditional Omani craft: the *badan*, *baqqāra* and *zārūka* [s.v.]; on each side of the sternpost you would find two projecting pieces of wood to which the rudder is lashed and held in place, as it would have been in the *Maqāmāt* ship. I came across the following description of a pilgrim ship reported to have been seen in Jeddah in 1795, which explains precisely the mechanism of the steering gear: "Their manner of steering is very remarkable, being performed by tackles attached to the tiller, which projects from the *back* of the rudder; to aid this a strong beam traverses the ship abaft the mizen mast, whose two ends, extending beyond the ship's side, support the centers of two levers, which are placed in an upright position; the lower arms of these communicate by ropes with the tiller, their upper arms are attached to tackles which lead into the ship for the purpose of steering"[162] (illustrations 55 & 56). As late as the 1930s, the Kuwaiti *būm* [s.v.] and *baghla* [s.v.] had ropes or chains leading from their ends to the steering wheels.[163]

The introduction of the axial rudder in the Mediterranean came *circa* eleventh or twelfth century, probably through the Red Sea, and is credited to the Arabian shipwrights during or after the First Crusade.[164] Whatever the truth may be, representations of an axial rudder

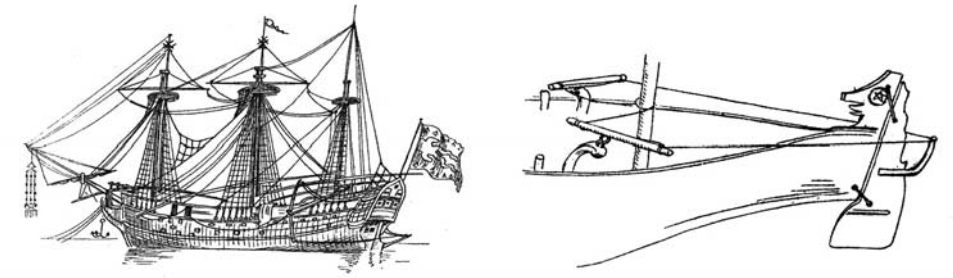
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[161] Al-Muqaddasī 1906: 12; idem, 2001: 11.

[162] Morton Nance 1914: 4–6, fig 1; idem, 1920: 36, fig 16. One may consult the following literature on the rope-steering system, Gaspar Correia in *Three Voyages* 1869: 241; Balbi (cited by Slot 1991: 91); Pâris 1841: pl. 5, figs 3–7; Moore 1925: 123; Hornell 1942: 29–30; Johnstone & Muir 1962: 62; LeBaron Bowen Jr. 1963: 30–4; Muir 1965: 358; LeBaron Bowen Jr. 1966: 35, 51, 111–2; Agius 2002: 101.

[163] See Hornell 1942: 23; details about the Omani and Kuwaiti craft see Agius 2002: 49, 66–7, 98–110.

[164] Mott 1997: 124–6.



Illustrations 55 & 56 (Left) The steering gear of a three-masted pilgrim ship, sketched in Jeddah 1795 and (right) detail of the rope-steering system (Morton Nance 1914: fig 1 & 1920: fig 16)

in the Mediterranean, nonethless, appear by the seventh/thirteenth century.[165] The large ships of the Portuguese, which sailed in the Indian Ocean from the late fifteenth century, could not have carried quarter rudders as they were too heavy. Instead, they fitted the rudder to the sternpost by pintles and gudgeons which allowed later movement from side to side. This technology quite possibly originated in the Indian Ocean and such rudders are still found in present-day dhows. The lack of a tiller (*kāna*) in the medieval stern rudder is significant. It was a later development in the Indian Ocean for the Perso-Arabic term *kāna* is a derivation from Portuguese *cana* from which, one understands, that the idea of its mechanism was borrowed from the Portuguese in the sixteenth century when they settled on the coast of West India and the Persian Gulf.[166]

In order to enhance windward sailing capabilities, the Arabian, or most probably the Persian, shipwright came up with a design innovation to the axial rudder by placing it well aft of the vessel; this is the *fashīn*, the stern fin. *Fashīn*-like structures on the stern are shown on two *Maqāmāt* images of the thirteenth century; how important this is of its use at the time is difficult to say, though one image shows clearly a rope steering system. Tom Vosmer explains that the *fashīn* served several functions; it supported the rudder together with a steering system of ropes and wooden levers which acted as a tiller; it set the position at which the rudder was raked; and finally, by positioning the rudder

[165] Ibid., 125–6.
[166] See Johnstone & Muir 1962: 62.

further aft it allowed the whole system to work in smoother water;[167] thus the *fashīn* became a useful part of a sailing vessel. Though dhows are no longer sailed, the *battīl baḥwī* [s.v.] of the Musandam Peninsula and the now defunct *badan* [s.v.] retained the *fashīn*, often referred to as the false sternpost; but more for decorative rather than functional purposes.[168]

Sailing

Navigating from the ocean up the Mesopotamian rivers was, as noted in Chapter 4, difficult. Not every pilot was capable enough to navigate his ship from sea to river. An ocean navigator possessed different skills from his river counterpart though some may have had both skills for sea-to-river navigation. Written evidence about commercial craft and warships sailing on the River Nile is plentiful and has been the subject of discussion by several scholars.[169] Sea-to-river craft required both sails and oars to manouevre in difficult areas and the structural design of the vessels had to be adapted to the conditions of the rivers. When a ship trying to enter the river could not proceed, this was because of shallow water or strong streams at the mouth of the river or, indeed, robbers. Arguments between the parties as to the contract, such as leasing (*ijāra*) issues pertaining to navigation were dealt with in *fatāwā*s (formal legal opinions). Much of this is relevant to the Mediterranean.[170] In the context of the Indian Ocean, thanks to Ibn Mājid, we know that there was a code of behaviour, the so-called *siyāsāt* (policy and crew management), to which captain and crew were bound to adhere. It covered all aspects of the voyage, the preparation for departure, arrival at the harbour, and any issues concerning ballasting, overloading etc.[171] But these were etiquette and management issues rather than formal legal matters.

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[167] See further details in Tom Vosmer's "The *fashin*: a cultural and technical marker in Indian Ocean boat construction", a presentation to the conference on "Sails of History", Zanzibar, 17–19 July 2006.

[168] Agius 2002: 112.

[169] Udovitch 1978: 521–2; ʿAbbādī & Sālim 1981: 229–42; Khalilieh 1995: 23–6; Goitein 1999, I: 319.

[170] See Ṭāhir 1983: 5–54; Ibn Rushd 1984, IX: 63–5; Khalilieh 1995: 13–16.

[171] Tibbetts 1981: 387–91.

Sailing ships would have had oars for entering and leaving ports and moorings. Other modes of propulsion used in rivers were punting and towing from banks. Iconographic evidence from the *Maqāmāt* (The Assemblies) points to the use of a single mast (s *diql*, *daql* or *daqal*, pl *adqāl*),[172] and one illustration originating from Baghdad and dated 635/1237 has two masts.[173] Another depiction of a ship with two masts, is a war vessel of Egyptian or Syrian provenance found in the *Kitāb al-furūsiyya wa-l-manāṣib al-ḥarbiyya* (The Book of Horsemanship and Engagement of War) and attributed to Ḥasan al-Ramma (13th or 14th c).[174] As for written sources, there are two reports on the use of one mast: the Italian traveller, Marco Polo, in the fourteenth century, observed Perso-Arabian ships moored at Hormuz, which had one mast[175] and Ibn Mājid, writing in the fifteenth century, suggests that ships had no more than one mast.[176] Compare this information with other Indian Ocean ships: in the Ajanta cave (No 2) one illustration shows a ship with three masts and another (No 7) represents a ship with two masts, the latter can be dated to the seventh century.[177] Chinese *junk*s had up to six masts; I shall discuss their number in relation to the size of medieval ships in Chapter 7.

There is a lacuna of information on masts and sails in Arabic texts and one can only assume that larger vessels carried two masts using two or three sails. Sails made of bamboo cane matting were used in the Indian Ocean: some were made from strips of date leaves, matted or pleated together; others were woven from the *muql* leaves [*min khūṣ shajar al-muql*].[178] According to al-Nuwayrī l-Iskandarānī (8th/14th c), Indian Ocean *jalba*s had sails manufactured from flax and coconut mats [*kattān wa-ḥuṣur al-nārajīl*] and sewn with coconut thread.[179] Only recently, the square sail made from *nkoma* palm (*Raphia farinifera*) was noticeable on the East African *dau la mtepe* [s.v.] (illustration 57). Woollen sails were

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[172] Lane 1984, I: 898.
[173] BN-Ms Arabe 5847.
[174] BN-Ms Arabe 1825, fol. 100r.
[175] *Travels of Marco Polo* 1982: 52.
[176] Tibbetts 1981: 176.
[177] See Alok Tripathi, "Antiquity of sailing ships of Indian Ocean: evidence from ancient Indian art", presentation to the conference on "Sails of History", Zanzibar, 17–19 July 2006.
[178] Ibn Jubayr 1952: 65; idem, nd: 65; Broadhurst explains that the *muql* tree is the "Theban palm or Bdellium, a kind of gum-tree", Ibn Jubayr 1952: 65.
[179] UAFAL-Berlin, Ms 667, fol. 127v; see also al-Nuwayrī l-Iskandarānī 1968–1976, II: 249.



Illustration 57 A square sail made of matting on the *dau la mtepe*, Mombasa 1900 (after Hawkins 1977: 21)

used in Mesopotamia; cotton sails are never mentioned, but from this one should not assume that they were not used. Cotton was processed from very early on in the Indus civilization so was readily available in any area of the Western Indian Ocean.

The classical term for sail is *qilʿ* (pl *qulūʿ*), though occasionally *shirāʿ* (pl *ashriʿa*) is used, examples of which are found in classical poetry. For rigging, the common term was *ʿudda* or *ḥibāl*. The square sail was universally employed; its shape was rectangular or perhaps trapezoidal.[180] Sails that were square-rigged were called *muṣallaba* or *ṣalībiyya* (lit. "cross-like") and *murabbaʿat al-qilāʿ* (square-sailed) (9th/15th c).[181] Ibn

[180] BLO-Ms Marsh 144, ff. 365–8; LAS-Ms S23; see also Nicolle 1989: 17.

[181] Al-Nuwayrī l-Iskandarānī 1968–1976, II: 249; al-Maqrīzī 1957–1973, IV (ii): 722.

Jubayr writing in Shaʿbān 580/8 November 1184, says that the Rūm (i.e. Europeans) deem this

> to be the best method of sailing, since they cannot but catch the wind which comes aft of the ship on its course.
>
> [*…wa-huwa ʿindahum aʿdalu jarī li-annahu lā yakūnu illā bil-rīḥ allatī tatalaqqā muʾakhkhara l-markab fī majrāh*].[182]

The square sail provided a better use of following winds; it helped a boat to function windward and, on large ships, it provided stability in heavy seas. Manoeuvring the square sails was an art and having the right crew to change sails in contrary winds and rain was crucial. Ibn Jubayr recounts a storm on a voyage to Jeddah in the summer of 579/1183 and the difficulties the crew encountered in handling the sails. In addition to the wind, the sailing gear was faulty,

> which time and again became entangled and broke when sails were raised or lowered… .
>
> [*wa-(i)khtilāluhā wa-(i)qtiṣāmuhā al-marra baʿda l-marra ʿinda rafʿ al-shirāʿ aw ḥaṭṭih…*].[183]

The traditional view is that it was during the early Byzantine period (or even earlier) that triangular sails may have developed,[184] enabling them to sail close to the wind. It seems that the Greeks at some point, set the fore part of the sail to a point, thus forming a triangular sail, the lateen.[185] For the mariner, it then became apparent that if the forward corner of the lateen sail was cut off, a short luff is formed, thus looking like a quadrilateral sail. This was the settee. The settee's advantage was that it could work more closely to windward (fore- and -aft sail), providing greater manoeuvrability and ability to tack on rivers and narrow waters. Windward sailing was not easy: consider the huge size of the sails and their control; the navigator sailing closer to the wind is able to tack—"when the wind is brought round the bow", and to wear—"bringing the wind around the stern".[186]

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[182] Ibn Jubayr 1952: 313, 332; idem, nd.: 208, 220.
[183] Ibid., 69–70; idem, nd.: 67.
[184] Casson 1971: 244–5.
[185] For further details see Paris 1948: 69–96; LeBaron Bowen Jr. 1949: 87–96; Casson 1971: 244–5, 277; other details on the transition of the square sail to a lateen are found in Medas 2000: 205–28.
[186] Kemp 1992: 929.

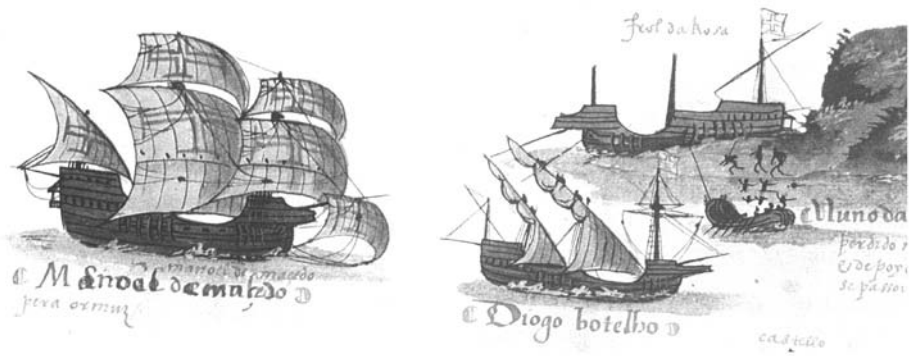
The traditional view, that one type of sail followed the other, has recently been questioned by Julian Whitewright. He said that it is a very complicated question and "this view is becoming more and more untenable in the face of modern theory and the evidence".[187] He further commented that he would be surprised "if the two sails were not in contemporaneous use alongside one another".[188] Iconographic evidence in the Mediterranean has shown that the settee was already in place by the mid-fifth century and the lateen by 632 CE. It is possible, he said, that the lateen/settee configuration depicted on Alexandrian rigged vessels might be as early as second century BCE, though their interpretation is disputed.

So the Mediterranean ship set sail for many centuries using both square and lateen/settee sails. The sixteenth-century Portuguese *caravel* was originally lateen-rigged on two masts, but this turned out to be inconvenient on longer ocean voyages, hence the development of three masts: the two forward masts were square-rigged and the mizzen was lateen-rigged (illustrations 58 & 59). Such a distribution gave a better balance of sail power.[189] The *caravel* was more seaworthy than lateen-rigged dhows designed to sail with the monsoon.

No Arabic source seems to mention the use of the lateen sail in the Western Indian Ocean; nor do we seem to find any reference to the use of the settee sail, whose origin and provenance are obscure. However, one ship-term *muthallatha*, recorded by al-Muqaddasī[190] may suggest the use of a lateen sail in Mesopotamia (or the Indian Ocean) as early as the fourth/tenth century. Literally, *muthallath*(*a*) means "a triangle"[191] so the term could be referring to a lateen-rigged ship; if this assumption is correct then we could have the employment of such a configuration in the Indian Ocean at a much earlier date than presently known.

Perhaps the concept of using the fore- and -aft sail, the lateen-settee, in the Western Indian Ocean may have had its origins, not from the Mediterranean, but from Southeast Asia during the time when the Islamic trade reached China in the third/ninth century, as discussed in Chapter 3. Persian, Arabian and Indian *nākhudhā*s may have borrowed

[187] Written communication 13 December 2006.
[188] Ibid.
[189] See Kemp 1992: 139.
[190] Al-Muqaddasī 1906: 31.
[191] Wehr 1966: 105.



Illustrations 58 & 59 Two Portuguese *caravels*: (left) the *Manuel de Macedo* with square sails and a lateen sail and (right) the *Diogo Botelho* lateen-rigged (*Memória das armadas* c. 1566)

ideas for sailing to improve and more effectively work the land and sea breeze variations. Stone relief sculptures on the temple of Borobudur (8th c) in Central Java, Indonesia, reveal ocean-going vessels rigged with rectangular sails but with an oblique edge.[192] One Ajanta cave depiction (No. 2 undated) shows a ship with rectangular or oblong sails.[193]

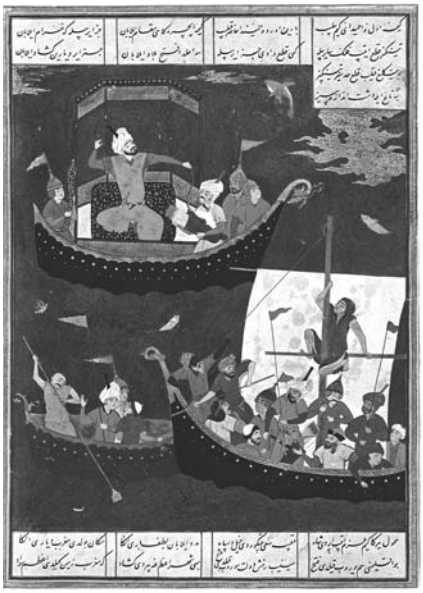
There is no sign of a settee sail in the Early and Middle Islamic iconography; moreover, the evidence on Indian and Persian miniatures from the sixteenth to the eighteenth century is predominantly of square sails (illustrations 60 & 61). Western Indian Ocean graffiti also depict square sails, though one sixteenth-century graffito at Gedi, Kenya, presents a settee sail.[194] It seems that by the sixteenth century, some ships were experimenting with the settee sail; no doubt the product of a transition from square/lateen to settee developed through experimentation and refinement. A description given by Correia in the *Three Voyages of Vasco da Gama* might be interpreted as the use of a sail that resembles a settee; he writes:

> The sail is longer abaft than forward by one-third… [the navigator] brings the sail very far forward, so that they steer very close to the wind… .[195]

Nonetheless, iconographic evidence persistently depicts a square rig among Muslim ships, whether they are illustrations from the *Kītāb ṣuwar*

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[192] Behera 1999, pl. 34.
[193] Griffiths 1983: 17, pl. 34.
[194] Garlake & Garlake 1964: 201, 203.
[195] *Three Voyages of Vasco da Gama* 1869: 239–41.




Illustrations 60 & 61 Square sails in Persian miniatures: (left) *Iskandarnāma*, Nava'i, Tabriz 1526 (courtesy of Bibliothèque Nationale, Ms Sup. Turc 316, fol. 447v); (right) *Shāhnāma*, Firdawsī 855/1451 (courtesy of Türk ve İslam Eserleri Müzesi, Istanbul, Ms 1945, fol. 245v)

al-kawākib al-thābita (The Book of the Constellations of Fixed Stars) by al-Ṣūfī (d. 376/ 986), the *Maqāmāt* (The Assemblies) of al-Ḥarīrī (d. 516/1122) or the Lopo Homem-Reinéis' *Atlas de 1519*.[196] It seems that the introduction of the settee rig came much later. To reiterate: the presence of the fore- and aft- sail in the Mediterranean and Southeast Asia is evidenced in the first millennium CE, whereas in the Western Indian Ocean it appears after 1500.

Sailing directions were primitive. The Indian Ocean mariners continued to follow traditional practices for a long time; they voyaged across the ocean with impunity, relying on star observation and where necessary on instruments such as a primitive compass. Courage and tenacity were the hallmarks of these seamen. It was a remarkable achievement to cross the ocean many times, very often in difficult conditions, in search of trade or ferrying pilgrims to Jeddah. This is the subject of the next chapter "The Ship at Sea".

[196] Cortesão & Da Mota 1960, I: pl. 18.

CHAPTER SEVEN

THE SHIP AT SEA: TRADE AND *ḤAJJ*

والمركب يجري في موج كالجبال كالبرق الخاطف

The ship, driven by a smart breeze, travelled like lightning over waves like mountains.[1]

Buzurg b. Shahriyār (d. 399/1009)

Differences of temperature and salinity cause the surface of the ocean to be disturbed in a variety of ways: the wind causes waves to rise and to travel fast and at great distances. As the long and slow waves of the deep sea approach the shallow waters, they become steeper and higher. Such waves or currents pose a potential threat to the ocean-going vessel as they could produce instability and lead her to destruction;[2] wave and periodic motion could send her rolling or pitching. The seaworthiness of a ship, therefore, apart from her design and construction, relied on a crew who had good judgement, navigation skills and the experience to deal with such hazards (see Chapter 6).

There were many anxieties surrounding a voyage, from the day of departure, to the arrival of the ship laden with merchandise and passengers in the port. Apart from the problems of customs, inspectors and taxes, the shipowner and/or sea captain worried that their ship would not reach the port because of storms and other mishaps causing them to jettison their precious merchandise. God was their only insurance and if He willed it then the journey ended in a great loss: ship, cargo and lives of people. There must have been moments of satisfaction and even joy when things worked well and the ship sailed with favourable winds but often that pleasure turned to fear and despair, when the only recourse was to offer propitiation in the form of pious acts.

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[1] *Wa-l-markab yajrī fī mawj ka-l-jibāl ka-l-barq al-khāṭif*, al-Rāmhurmuzī 1883–1886: 33; trans. Freeman-Grenville 1981: 20.

[2] On the question of the navigator's knowledge of winds, the reader is referred to Ferrand 1924: 230–4, 249–50; Grosset-Grange 1972: 47–8; Tibbetts 1981: 44, 360–3.

Sea transportation

Travel by land had its dangers and misfortunes too: the desert had highway robbers while the sea had pirates and one is no less an evil than the other, but transportation by sea had the advantage that it was faster, even though the distance covered from one port to another varied greatly, depending on the monsoon winds and stops for repair, the resulting trade generated a high percentage of profit.[3] The incentive of being able to buy goods at a low price and then sell them where the demand was strong and, therefore, achieve a high price, drove the merchants to accept the risks,[4] but while in all probability it was safer and faster in some regions of the Western Indian Ocean, sea transportation was much riskier when sailing as far as China. This is largely because of the length of the journey, much of which depended on good winds or the monsoon weather, but also because ships could be driven off course, which added to the time taken to complete the route. In addition, as I explained earlier (Chapter 6), there was the period when ships were compelled to wait when the port was closed because of the monsoon weather. There must have been considerable trepidation on the part of those embarking on the pilgrim ships if the *ḥajj* fell during the time of the high monsoonal winds.

For some merchants and pilgrims, land transportation proved more reliable, albeit the risk of highway robbery. Taxes were imposed by the Bedouins on most, if not all, travellers and if they refused, these Bedouins believed they had the right to attack pilgrim and merchant caravans to compensate for the loss of tax revenue.[5] The overland route was profitable once there was a guarantee of safety and security and the availability of water. For a sum of money, Bedouins would guide the travellers through the desert and they also supplied them with food and water and pack animals when needed. Often some pilgrimage routes were protected by military officers who would have had to negotiate a

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[3] I refer to Muhsin Yusuf's stimulating article on sea and land transportation whose ideas have inspired me to write this section, see Yusuf 1996: 232–58. His coverage of the Mediterranean, Red Sea and the Indian Ocean presents very important points of comparison in terms of the reasons why land and sea transportation were used or abandoned by medieval travellers.

[4] Yusuf 1996: 242–4.

[5] See Ibn Taghrībardī 1929–1972, III: 454; V: 24, 34–6, 41–2, 45, 51, 138; Ibn al-ʿAdīm 1951–1968, II: 429; al-Muqaddasī 1906: 252; idem, 2001: 211; Ibn al-Qalānisī 1908: 120; see also Yusuf 1996: 247 and fn. 51.

sum of money with the Bedouins in order to ensure a smooth journey through the desert. All in all, it may be said, that travel by land, compared to sea transportation, had several advantages: firstly, it did not depend upon the monsoon season; secondly, the medieval traveller could plan his journey; thirdly, the stopping time for a caravan was shorter; and fourthly, the setting off was predictable. But sea transportation had its benefits too: as stated earlier, it could be faster; if the journey was timed with the seasonal monsoon winds, merchants and pilgrims could reach ports in a much shorter time than they would by land. They also felt protected from piracy or naval activity as cargo ships were generally convoyed.

Any potential enemy was watched for day and night from a number of small forts or towers, such as in Aden *circa* seventh/thirteenth century, which had watch towers on hills around the town; guards were stationed in them to spot ships approaching the harbour. The look-out man had a piece of wood which he aligned with the level of the object he saw on the sea; after several checks, if the image came straight along the stick and he was sure that it was a ship, he would signal to another look-out man and so on until the watchman down at the harbour sent news about the arrival of the ship to the governor of the town.[6] If it were an enemy ship it was dealt with accordingly from land and sea, though it must be said that sea incursions in the Indian Ocean were, until the coming of the Portuguese, not common (see Chapter 8).

Lighthouses, on the other hand, were set up in the sea in order to assist the navigators. On approaching the coast near Basra, wooden posts (*khashabāt*) driven into the seabed served as lighthouses, reports al-Masʿūdī (d. 345/956–7).[7] He informs us that at Jarara on the side of Ubulla and Abadan, one could see such posts with

> fires [burning] by night…to caution the vessels from ʿUmān, Sīrāf, and other ports, lest they run against Jarāra or other ports and get wrecked and lost.
>
> [*…yūqidūna l-nār bil-layl….khawfan ʿalā l-marākibi l-wārida min ʿUmān, wa-Sīrāf wa-ghayrihā mimmā taqaʿu fī tilka l-Jarāra wa-ghayrihā fa-taʿṭab fa-lā yakūnu lahā khalāṣ*].[8]

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[6] Ibn al-Mujāwir 1951–1954, I: 138.
[7] Al-Masʿūdī 1983, I: 169.
[8] Ibid., 121.

No doubt, they provided the guidance the mariner needed. The Persian traveller Nāṣir-i Khusraw (d. c. 481/1088), in his *Safarnāma* (Book of Travels), also refers to similar structures on which lanterns were lit with lights enclosed in glass.[9] He remarks that an observation post on top of the upright posts served "to mark the entrance to the Tigris" [*li…yuʿlamu bihi l-madkhalu ilā Dijla*].[10] They were also used by sailors to tie up their boats lest they drifted with the tide and ran aground.[11]

Size of cargo ships

When speaking of trading vessels, size is never specifically quantified; it is generally expressed in terms of how "big" or "small" Islamic ships are. An example below is a report by al-Muqaddasī (fl. second half of the 4th/10th c) during his visit to the bustling port of Old Cairo:

> I was one day walking on the bank of the river, and marvelling at the great numbers of ships, both those riding at anchor, and those coming and going, when a man from the locality accosted me, saying: "Where do you hail from?" Said I, "From the Holy City". Said he, "It is a large city. But I tell you, good sir—may God hold you dear to Him—that of the vessels along this shore, and of those that set sail from here to the towns and the villages—if all these ships were to go to your native city they could carry away its people, with everything that appertains to it, and the stones thereof and the timber thereof, so that it would be said: "At one time here stood a city".[12]
>
> [*wa-kuntu yawman amshī ʿalā l-sāḥil wa-ataʿajjabu min kathrat al-marākib al-rāsiya wa-l-sāʾira fa-qāla lī rajul minhum min ayna ant qultu min Bayt al-Maqdis qāla balad kabīr aʿlamuka yā sayyidī aʿazzaka Allāhu anna ʿalā hādhā l-sāḥil wa-mā qad aqlaʿa minhu ilā l-buldān wa-l-qurā min al-marākib mā law dhahabat ilā baladika la-ḥamalat ahlahā wa-alātahā wa-ḥijāratahā wa-khashabahā ḥattā yuqālu kāna hāhunā madīna*].

A lively dialogue which makes two important points: one is about the port and the other on the size of the ships. The impression is clearly of a harbour with a large number of ships, perhaps greater than any other Islamic harbour known at the time. But not only was the number of ships impressive, the text seems to say that they were large enough to

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[9] Khusraw 1986: 96.
[10] Ibid.
[11] Abū l-Fidāʾ 1840: 309.
[12] Al-Muqaddasī 2001: 167; idem, 1906: 198.

carry a whole city with its people. Apart from this hyperbolic reference to size, al-Muqaddasī omits any real detail as to the cargo capacity and the number of crew and passengers.

It is important to note that cargo vessels were not used exclusively for carrying merchandise; they served as passenger ships too. Niccolò de' Conti (d. 1469), a Venetian nobleman, noted *circa* 1420, that some of the Indian ships were larger than European vessels[13] and François Pyrard (d. 1621) tells us that in the Indies they build vessels larger than "anywhere else in the world".[14] An interesting comment, but we are not told whether they were Indian, Javanese or perhaps Chinese. That they were Indian is possible, because as we have seen elswhere, Arabic sources inform us that a large number of Far Eastern shipwrights, mariners and merchants settled on the Malabarian coast before the 1500s. One could speculate that some *junk*s were built here or similar large vessels that towered over the Portuguese ships.

The Portuguese *caravel* in the fifteenth and early sixteenth century was between 60 to 100 *tons*[15] (illustration 62) and from Portuguese sources of the time we learn that Gujarati sewn ships had a 100-ton capacity;[16] one document mentions a 200-ton cargo local ship loading horses and sacks of dates at Qalhat in 1507.[17] Other ships were larger, possibly up to 500-ton capacity.[18] Ocean-going vessels transporting pilgrims to Jeddah during the *ḥajj* season may also have had a capacity of *circa* 200 tons. Much of the pilgrim traffic was on Gujarati ships; they were cargo vessels as most pilgrims were also merchants carrying goods to Jeddah or other stops on their inbound and outbound journey. Trans-shipment of goods also took place at Aden and Aidhab on the African Red Sea coast; there they were transferred to smaller vessels and then transported to minor Red Sea ports. These vessels had a

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[13] *India in the Fifteenth Century* 1857, 2.27.

[14] *Voyage of François Pyrard* 1887–1890, I: 258.

[15] The *caravel* with its storm jib-sails typified the Portuguese vessel for voyages of exploration as well as for trade; originally, she was designed to carry a lateen-rig on two masts known as the *caravela latina* but later because of the incompatibility of this rig for long voyages like those to India, the Portuguese developed the *caravela rotunda*, a compromise of the north-European three masts: a square rig on the two fore masts and the Mediterranean rigged mizzen (see Chapter 6). Batholomew Diaz in 1487 and Ferdiand Magellan in 1519–1522 voyaged on board the *caravela rotunda*, see Landström 1961: 102–3, 106–7.

[16] *Collecção de noticias* 1812–1856, II: 114.

[17] *Commentaries* 1875–1880, I: 66.

[18] *Book of Duarte Barbosa* 1918–1921, II: 76.



Illustration 62 The *caravel, Vasco Gomes de Abreu* of 60 to 100 *tons* sailed along the East African coast in 1507 (*Memória das armadas* c. 1566)

weight capacity of *circa* 50 tons. Ibn Jubayr (d. 614/1217) mentions the *jalba*-ferry in 579/1183 which was probably of this size, making trips with pilgrims from Aidhab to Jeddah.[19] These Red Sea ships were most likely designed with a shallower draft which was better capable of manoeuvring in places where coral reefs were in abundance and small islands were submerged in the sea close to the surface. But in the eyes of both western and non-western medieval authors, no ship seems to have matched the size of a Chinese *junk* (CA pl *junūk*).[20] How true is this?

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[19] Ibn Jubayr 1952: 65.

[20] The name *junk* is interesting and one which was not unfamiliar to Arabians, Persians and Indians. An early record of the nomenclature appears in 1310. It is quite possible that the English version of "junk" may have come from Portuguese "junco". Other references to *junk*s are found in *Cathay and the Way Thither* 1866, I: 73; *Journal of John Jourdain* 1905: 62, 123, 212 fn., 216 fn., 237, 245, 316, 323, 340. See also Ibn Baṭṭūṭa 1968, IV: 92; Marco Polo 1982: 210; Jun-yan 1980: 98–9 and Xin Yuan'ou (cited in Church 2005: 3 *seq*.).

Descriptions of Chinese ships as being large vessels come from different sources: Marco Polo (d. 1323) and Ibn Baṭṭūṭa (d. 770/1368–9 or 779/1377) were both impressed by their size.[21] They seem to be the only travellers from the Christian and Muslim west who bothered to give details of Chinese *junk*s. Because of the lack of information on Arabian, Persian or Indian vessels, the description of Chinese vessels is particularly valuable as they can throw some light on their Islamic counterparts. Even the Portuguese *caravel*s were not described by Muslim authors, presumably because they were a familiar sight to the Indian Ocean seafaring communities. The lack of such detail is no surprise. It is not only the *caravel* and the *junk* that they failed to describe, the silence on Indian Ocean ships in general is striking.

As for Chinese sources, they too emphasize the great size of their ships: Ma Huan in his *Yingyai shenglan* (The Overall Survey of the Ocean's Shores) refers to them as "whale-like" ships,[22] and in a report of a diplomatic voyage to Korea in 1123, Xu Jing (cited by Sally Church) says that 85-foot Chinese ships "had the majestic quality of great mountains".[23] However, the length of these ships is actually quite small, for according to several Chinese sources, Zheng He's ships (pre-15th c) were 447 feet (138.4 m) by 183 feet (56 m).[24] If we compare these measurements with contemporary Genoese ships, 84.5 feet (25.75 m) in length with a depth (railing to keel) of 21.5 feet (6.55 m),[25] we can easily discern that the Chinese figures relating to the Zheng He's ships are grossly inflated.

The size of a ship can be judged by the number of masts and our Islamic sources, as pointed out in Chapter 6, mention Indian Ocean ships as not having more than two masts, so compared to most Chinese ships, they must have been of small or medium size. Marco Polo comments that Chinese *junk*s had four masts and "often they add another two masts, which are hoisted and lowered at pleasure"[26] while Ibn Baṭṭūṭa describes the size of these vessels by the number of sails: he says that

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[21] Ibn Baṭṭūṭa identified three types: *junk* (large), *kakam* (medium) and *zaw* (small). For *kakam*, Beckingham identified it as the Chinese *hoa-ch'uan* "trading vessel", the type Ibn Baṭṭūṭa sailed on beyond the Indian coast to China, see Ibn Baṭṭūṭa 1968, IV: 95; idem, 1958–2000, IV: 813, fn. 43, 815; he called the smaller types: *nisfī, thulthī*, and *rubʿī* and tells us that they were built in Zaitun and Canton; see Kindermann 1934: 94.

[22] Church 2005: 11–2.

[23] Ibid., 13.

[24] Ibid.

[25] Landström 1961: 83.

[26] *Travels of Marco Polo* 1982: 210.

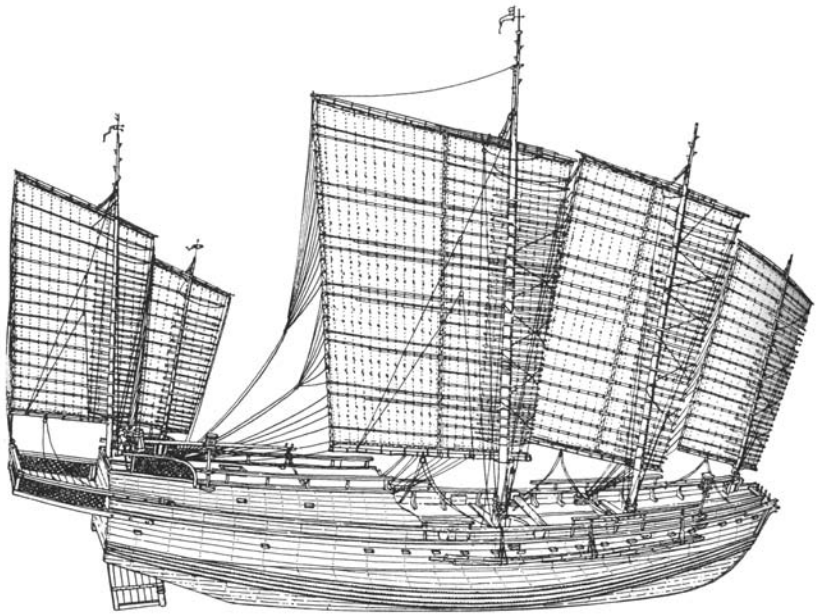


Illustration 63 A cargo *junk* with multiple masts that may have similar features to Zheng He's (d. 1433 or 1435) Treasure Ships (picture drawn by Landström 1961: 219, pl. 538)

in 743/1342 he saw in the port of Calicut Chinese ships that had from three to twelve sails.[27] This figure matches that of Niccolò de' Conti, *circa* 1420, who, like his predecessors sailed on a *junk*; he informs us that she carried ten to twelve sails,[28] whereas al-Nuwayrī l-Iskandarānī (fl. 8th/14th c) claims that Indian ships had seven sails.[29]

Chinese sources differ on the number of masts but the largest number recorded is nine.[30] This seems unlikely as a ship with nine masts would be unsafe; Xin Yuan'ou argues that a ship with such a structure would be "unable to resist the combined strength and force of such huge sails"; she would not be able to cope with strong wind and would break.[31]

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[27] Ibn Baṭṭūṭa 1968, IV: 91.
[28] Cited in Hall 1996: 124.
[29] Al-Nuwayrī l-Iskandarānī 1968–1976, II: 249.
[30] Personal communication (Sally Church 26 June 2006).
[31] From an article by Xin Yuan'ou originally published in *Chuanshi yanjiu* (History of Ships), 17 (2002): 1–20. I have seen a draft translation by Sally Church entitled "A technical analysis of the dimensions of Zheng He's treasure ships" and the quote comes from p. 24 (written communication 26 June 2006).

A smaller number of masts seems to be about right: in a recently discovered illustration of Zheng He's (d. 1433 or 1435) fleet found in a religious text, *Taishang shuo Tianfei jiu kuling ying jing* (The Supreme Venerable Sovereign's Scripture Relating to the Celestial Spouse's Rescue of the Suffering Souls)[32] (1420) (illustration 63), it is clear that the largest Chinese ships could carry six masts "with two small collapsible masts in the stern for turning and control", the latter, interestingly, are similar to Marco Polo's description above, and to the Song dynasty shipwreck, recovered at Quanzhou Bay in 1974.[33]

Another factor to consider is the tonnage: we are told that Zheng He's ocean-going ships were between 15,000 to 20,000 tons with a 7,000 tons displacement; these figures have been the discussion of several maritime historians and ship architects.[34] Xin Yuan'ou asserts that with fifteenth-century technology, the building of large ships of 15,000 to 20,000 tons would have been difficult: consider the watertight compartments, a technical innovation known at the time, which would have made Chinese ships "transversely strong but longitudinally weak";[35] thus, the keel of a ship which was 447 feet (139.4 m) in length, such as that of Zheng He's Treasure Ships, would have needed several tree trunks to construct it. For a ship of this size, the mast would have required multiple timbers, and China in the fifteenth century, argues Xin Yuan'ou, did not have joining materials in order to support tall masts; furthermore, high rigging would have made the Chinese ship weak.

From the comments of modern scholars on Medieval Chinese accounts and reports, it is apparent that a ship had a natural limit to her size, going beyond, would have made her structurally unsafe as well as causing a considerable loss of manoeuvrability, something the Spanish Armada ships famously experienced.[36]

Measuring the dimensions of a ship, one normally takes the length at deck level or at the waterline. No medieval Arabic or Islamic sources provide us with such information. In order to calculate the size of a ship it is possible to look at the number of crew and passengers on board ship. Ibn Baṭṭūṭa tells us that on a large *junk* he estimated 1,000 crew

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[32] Translation title was provided by Sally Church (written communication 1 August 2006).

[33] See Xin Yuan'ou (see note 31; draft translation p. 35).

[34] See Church 2005: 2–4.

[35] Ibid., 3 (communication Sally Church 24 January 2007).

[36] Howarth 1981: 209–10; he asserts that the Spanish ships were "over-masted for Atlantic weather and had rigging which was too light" (ibid., 209).

members: 600 sailors and 400 men-at-arms (archers, shield-men and naphtha throwers),[37] the latter were important in order to defend the ship, cargo and passengers against pirates and unforeseen sea incursions (see Chapter 8). Unfortunately, Ibn Baṭṭūṭa does not give the number of passengers. Compared with these figures, we have Ibn Jubayr's report on a Genoese ship he took in 580/1184 from Acre to al-Andalus: he states that there were 2,000 Christian pilgrims and "many" Muslims;[38] unlike Ibn Baṭṭūṭa he does not mention the number of crew members. This suggests a very large ship such as the Sindi and Gujarati types described by François Pyrard (d. 1621), each of which, he says, could carry "as many as 2,000 persons on board".[39] The question is: are these figures correct?

One might come close to reliable figures if we consider the following reports: from an inventory of ships described by Gong Zhen (c. 1500), he says that on Zheng He's ships, some 200 to 300 sailors were needed on deck to handle mat and cloth sails, anchors and the rudder;[40] while in 1331, Friar Odoric witnessed 700 passengers on a *junk*, and that included sailors and merchants.[41] So, given all this information, is it possible to calculate the size of a ship from the number of sailors and passengers on board? One might consider adopting the western medieval rule of calculating the size of the ship by the formula of one man per ton of displacement: thus, if we take Gong Zhen's data, we would have 200 to 300 tons; Ibn Baṭṭūṭa's 1,000 crew would come to 1,000 tons and Friar Odoric's 700 men brings the total to 700 tons. But these calculations are simply not accurate because passengers and crew often shared their space with cargo as one finds on modern dhows.[42] In this case the numbers calculated above would roughly have to be doubled: Ibn Baṭṭūṭa's ship would have been 2,000 tons and the Genoese ship at least 4,000 tons. Were medieval ships as large as that? The answer is negative, so, the addition of cargo into the equation means that the man-ton ratio cannot work.

Another method applied by Song Li (d. c. 1422) was to divide the number of crew and passengers by the total number of ships at sea, the

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[37] Ibn Baṭṭūṭa 1958–2000, IV: 183.
[38] Ibn Jubayr 1952: 325.
[39] *Voyage of François Pyrard* 1887–1890, I: 258.
[40] Church 2005: 13.
[41] *Cathay and the Way Thither* 1866, I: 73.
[42] See Agius 2005a: 141–4.

result of which is multiplied by 2.5 tons. By using this formula, we can arrive at the following results: Buzurg b. Shahriyār (d. 399/1009) reported that in one voyage there were three ships with a total of 1,200 men which set sail from Siraf to Saymour (West India);[43] therefore 1,200 ÷ 3 ships = 400 men × 2.5 tons which comes to a 1,000 ton capacity. If we take the data from a Chinese source, a Changle inscription from the Zheng He era, there were 100 Treasure Ships. We are informed through several sources that the total of men on board was 27,000 to 28,000. By Song Li's formula: 27,000 – 28,000 men ÷100 ships = 270–280 men × 2.5 tons, we obtain an average of 675–700 tons.[44] One type comparable to Zheng He's ships was found at Quanzhou, measuring c. 98 feet (30 m) long with a displacement of 494 tons.[45] Buzurg b. Shahriyār's figure above looks too high but the Chinese one is plausible. Consider a report by the historian al-Ṭabarī (d. 310/922–3), who says that there were 100 *shalandī*s [s.v.] in Damietta each carrying 50 to 100 men[46] with a 125 to 250 ton capacity; that sounds about right; also consider the *Mary Rose* (1512), a *carrack*, which was 700 tons with some 400 men, carrying 100 guns.[47] It is interesting to note that in my fieldwork data collection in the Arabian/Persian Gulf, I was told that a nineteenth-century Kuwaiti *baghla* or an Omani *ghanja* rarely exceeded 600 tons.[48] My conclusion from the above is that the largest Chinese *junk*'s average length was about 200 to 250 feet with a maximum weight of 700 tons, and my estimate for Arabian, Persian and Indian sewn ships, the most prevalent in the medieval period (pre-1500), that they were not larger than 100 feet in length with a maximum weight of 300 tons.

How seaworthy were Arabian, Persian and Indian ships compared to Chinese or Javanese *junk*s? It is difficult to say, but one Chinese source reports that when it came to sailing beyond Sri Lanka (Ceylon then), Persian and Arabian merchants boarded Chinese *junk*s.[49] Both al-Masʿūdī (d. 345/956–7) and Ibn Baṭṭūṭa (d. 770/1368–9 or 779/1377)

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[43] Al-Rāmhurmuzī 1883–1886: 165.
[44] Church 2005: 16.
[45] Ibid., 28. Xin Yuan'ou's formula for displacement (personal communication Sally Church [26 June 2006]) is to multiply the length, beam and draught of the ship and then multiplying by 0.5 coefficient, see Church 2005: 8, fn. 20.
[46] Al-Ṭabarī 1965, XII (iii): 1417–8.
[47] Gardiner & Allen 2005, IV: 12.
[48] Agius 2002: 44–75; idem, 2005a: 15–19.
[49] Jun-yan 1980: 92–3.

set off for China on a *junk*. This could be interpreted as meaning that Perso-Arabian and Indian ships were believed to be less seaworthy than their Chinese counterparts. Chinese vessels were known to have a large draught and a good floating capacity.

As noted earlier, the lack of information on the size of medieval Perso-Arabian and Indian ships is puzzling. It seems that Chinese vessels were indeed larger and more seaworthy than the rest of the Indian Ocean and European ships. Having said that, *caravel*s, although much smaller than the Chinese *junk*s, were much more agile and manoeuvrable. Only after the sixteenth century did Indian shipwrights start to construct vessels larger than Portuguese *caravel*s and even then usually not as large as Chinese or perhaps Javanese *junk*s.

Comfort on board ship

Travellers on smaller ships would not, in general, have had the comfort found on larger vessels. On the other hand, as one can tell from the port holes depicted in the *Maqāmāt* illustrations, some had cabins for the rich merchants (see illustration 49), as did Chinese vessels; Ibn Baṭṭūṭa, reporting about large *junk*s, says that they had several rooms for their wives, children, concubines and slaves.[50] On Muslim ships, richer merchants paid for the use of such cabins or, if the ship's cabins were taken up, shared space with the sea captain on the aft deck while ordinary passengers would have slept by, or even on, their merchandise, as the cargo was often covered with layers of bamboo, reed mats, felt and sackcloth;[51] these absorbed water but were also comfortable for passengers to sleep on. Gaspar Correia, the sixteenth-century Portuguese chronicler, reports that the merchandise on Indian ships was covered with "leaves of the palm tree dried and well woven together". Not only that, he asserts, the palm leaves served as a "shelving roof" for water to run on each side of the ship.[52] As for animals, they shared the same space with travellers. Ibn Baṭṭūṭa has an anecdote about sharing his trip with camels on board a *jalba* [s.v.] from Jeddah. As it happened he did not embark on the ship because he was afraid of

[50] Ibn Baṭṭūṭa 1968, IV: 92; idem, 1958–2000, IV: 814.
[51] See for example *Alf layla wa-layla* nd., III: 146.
[52] *Three Voyages of Vasco da Gama* 1869: 243.

the camels.[53] Sharing space with animals and merchandise was usual. On my field trip to Doha (Qatar) in 1992, I saw passengers travelling to Iran sleeping by their belongings on board the *būm* [s.v.] and *sanbūq* [s.v.] alongside camels and Toyota open trucks.[54] How much worse it must have been for our medieval travellers, who risked their lives in bad weather conditions, while the lack of water and sanitary facilities, the smell of vomit and the rats running in the cramped space of the vessel's hull and deck (if there was one) were enough to make the life of the passengers miserable. Passengers must have provided their own food, water and cooking utensils; only the rich merchants were invited by the *nākhudhā* to share his food prepared specially by the ship's cook (Chapter 6).

Customs and port duties

When a ship arrived at a major harbour the port officials would board the vessel and make preliminary enquires about the origin of the ship, its merchandise and the passengers. They would check the list of names, country of origin and items to declare. In terms of documentation, passengers would have travelled freely without any passports. At Alexandria, reports Ibn Jubayr in 578/1183, the officials interrogated each passenger as to what money he possessed in order to pay the *zakāt* (a portion of one's property).[55] After the inspectors had finished their inquiries, they would order the removal of the masts, sails, rudder and anchors, which would be carried by the officials' helpers to the shore and locked until the vessel's departure. They did this, as Ludovico di Varthema (fl. 16th c) explains, "to ensure that the crew did not sail off without paying their customs".[56] The port officials investigated the commercial goods which would have then probably been unloaded to the shore. They counted and weighed the bales and packages in order to assess the customs dues. The taxable merchandise was taken to the customs house or storehouse located on the waterfront. After payment, the goods were released and porters were hired to carry the

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[53] Ibn Baṭṭūṭa 1968, II: 158; idem, 1958–2000, II: 361.
[54] Agius 2005a: 56.
[55] Ibn Jubayr 1952: 31–2; on customs officials see Ibn Baṭṭūṭa 1968, II: 183.
[56] *Travels of Ludovico di Varthema* 1863: 60. On Aden's customs duties and procedures at the time of Ibn al-Mujāwir (d. 690/1291), see Margariti 2002: 142–7; idem, 2007: 113–4, 122–6.

merchandise on donkeys or carts to the caravan site or to smaller boats for trans-shipping to minor ports. This was roughly the procedure but some practices may have varied from one place to another. Other things to consider were that merchants incurred additional expenses for the hiring of porters, sailors, or a pilot and, of course, a shipowner and/or sea captain. Sometimes the ship made multiple stops in a number of harbours, thus adding more to the expense.

Profiting from their strategic position, ports could impose duties and tolls on merchandise in transit. There was always the danger of ships being plundered or having to buy themselves off by paying a heavy toll. Goods from the port of Basra, or by the Meccan caravan route to Bahrain, were taxed heavily at Bahrain. When Ibn Baṭṭūṭa arrived in Malabar in 743/1342, the Sultan of Bacanor demanded a tax on each passing ship; he recounts that if by chance the ship skipped the port, a party of harbour officials sailed out to the ship and brought her in by force. The sea captain would be charged double the tax and prevented from "proceeding on his journey for as long as they wish".[57] Customs and port duties could be extortionate and ships may have made attempts to avoid stopping unnecessarily at a harbour. According to Buzurg b. Shahriyār (d. 399/1009), the Sultan of Oman in 317/929 levied a tax of a tenth of the goods of a passing ship belonging to Ismaʿīlawayh b. Ibrāhīm b. Mirdās, a shipowner; he had been taxed 600,000 *dīnār*s, not counting the cargo that escaped the customs' notice.[58] This must have been a significant amount, because in all the stories Buzurg mentioned, he does not give any information on port taxes except for this one. In the third/ninth century, goods coming from certain countries paid heavier taxes; a special tithe was paid on China Sea trade, reports al-Yaʿqūbī (d. c. 278/891–2).[59]

Damage or loss of cargo was common and theft of cargo during trans-shipment could be other added costs. Some of these damages are well recorded in the Genizah letters; a few mishaps were attributable to human causes but the majority of them mention damage caused by storms,[60] water leaking into the ship, cargo getting wet by the waves

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[57] Ibn Baṭṭūṭa 1958–2000, IV: 808.
[58] Al-Rāmhurmuzī 1883–1886: 130; idem, 1981: 76.
[59] Al-Yaʿqūbī 1883, II: 590.
[60] The Genizah letters record several disasters: ships were wrecked and never arrived at their destination, Goitein 1968: 335, 348; idem, 1973: 315–9, fn. 71; idem, 1999, I: 320–5; see also TS 10 J11, fol. 17; TS 24.6; TS 20.69; ULC Or 1080 J22.

etc.[61] To lighten the ship in case of a storm, some of the cargo was jettisoned. Financial loss could also be due to the ship being caught in a storm thus delaying her arrival at the destination and missing the season of navigation dictated by the monsoon. Gales and storms could delay the departure from ports. A story told by Buzurg b. Shahriyār recounts how a sea captain, Muḥammad b. Bābishād, was concerned about the anxiety of the passengers and crew waiting in Basra until the gale was over:

> Ships stayed in port, and every man was agog for news of the sea and delay to shipping. For on board were a great number of people, passengers and others, and a cargo of great value.
>
> [*fa-(i)nqaṭaʿat al-marākib wa-taʿallaqat al-qulūb bi-akhbār al-baḥr wa-ta'akhkhara l-marākib wa-kāna fī dhālika l-marākib khalq min al-rukkāb wa-ghayrihim wa-amtiʿa lahā qadr*].[62]

In spite of the port taxes, the levying of heavy taxes on runaways, and damages or loss of cargo, merchants, in general, made considerable profit. A merchant from Basra who set sail with his two brothers anchored at a certain port where, he reports, "we sold our goods at a profit of ten dīnārs for one [dīnār]" [*wa-biʿnā baḍāʾiʿanā fa-rabiḥnā fī l-dīnār ʿasharata danānīr*].[63] We only have to look at what al-Muqaddasī had to say on this matter to realize that commerce in his time (4th/10th c) could be highly profitable but came at a price. Merchants took a chance for no voyage was safe. Al-Muqaddasī encountered a certain merchant, Abū ʿAlī l-Marwazī, on board ship, who informed him that one could set off from Aden with a thousand *dirham*s and return with a thousand *dīnār*s. Al-Muqaddasī was tempted to try his luck and was planning to set out to East Africa where gold was struck in quantities, but the loss of his trading partner shook him and made him change his mind,

> And indeed, what boots prosperity, with death in its wake, and the accumulation of wealth which one inescapably must leave behind?
>
> [*wa-mā yaṣnaʿu bi-niʿmatin al-mawtu min warāʾihā wa-jamʿu amwāl lā budda min tarkihā*].[64]

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[61] TS 10, J19, fol. 19; TS 12.241; TS 13, J29, fol. 7; see Goitein 1999, I: 321, 323, 329.

[62] Al-Rāmhurmuzī 1883–1886: 17; idem, 1981: 11.

[63] *Alf layla wa-layla* nd., I: 12; *Book of the Thousand Nights and One Night* 1972, I: 16.

[64] Al-Muqaddasī 1906: 98; idem, 2001: 83.

Of course, the intention of this anecdote is to serve as a moral. There are other stories of merchants in the *Arabian Nights*, where the joys and pleasures of commerce are expressed in the words of Sindbād the Sailor, a merchant of Baghdad, who "equipped [himself] with merchandise of price…". He recalls:

> We sailed from place to place and from city to city, buying and selling and rejoicing in the new sights which met our gaze.
>
> [*wa-lam nazal musāfirīna min makān ilā makān wa-min madīna ilā madīna wa-naḥnu nabīʿ wa-nashtarī wa-natafarraj ʿalā bilād al-nās*].[65]

But this feeling of safety was soon spoiled by a tragedy that befell the ship: Sindbad's vessel was broken into pieces against a rock; many perished but some survived, amongst whom was the narrator of the story. Sindbād had struck lucky this time as he recounts that the beaches where they were washed to by the waves were covered with a "multitude of bales from which rich merchandise and costly ornaments had escaped".[66] The loss of one place is the gain of another.

The terrors of the sea

The terrors of the sea were many: what passengers feared most was the loss of their lives through gales and storms or that their ships were wrecked on rocks. Gale winds blow at a speed of between 34 and 47 knots; anything above 47 knots would be a storm, whose average speed is between 48 and 63 knots.[67] Cargo jettisoning was the practice when disaster struck.[68] Ibn Baṭṭūṭa (d. 770/1368–9 or 779/1377) relates the story of a gale which sprang up at the southernmost part of Sri Lanka. The ship he was on narrowly escaped being wrecked and the only way to save the passengers and crew was to jettison the cargo and the mast. There was almost no hope:

> We were face to face with death, and people jettisoned all that they had, and bade farewell to one another. We cut down the mast and threw it overboard.

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[65] *Alf layla wa-layla* nd., III: 140; *Book of the Thousand Nights and One Night* 1972, II: 219.
[66] Ibid., 1972, II: 219.
[67] Kemp 1992: 334, 837.
[68] See for example al-Rāmhurmuzī 1883–1886: 46, 93, 190; idem, 1981: 28, 54, 111.

[*wa-raʾaynā l-mawt ʿiyānan wa-ramā l-nās bi-mā maʿahum wa-tawādaʿū wa-qaṭaʿnā ṣāriya l-markab wa-ramaynā bih*].[69]

Sacrificing slaves for the sake of others could also have taken place, though it must be said that human jettison was opposed by all Islamic jurists.[70]

Gales and storms are a recurrent topic: a storm captured in a pre-Islamic verse by Zuhayr b. Abī Salmā (d. after 627 CE) reads as follows:

When you come to him, you come to the depths of a sea
on the humped waves of which the ships are tossed about

[*matā taʾtīhi taʾtī lujja baḥrin*
taqādhafu fī ghawāribihi l-safīnu].[71]

A lively description, it is as if the poet had himself experienced the terror of steering his ship in a storm. Medieval authors have often recorded such scenes. Buzurg b. Shahriyār (d. 399/1009) tells of a disaster that befell a magnificent new cargo-*jalba* [s.v.] sailing from Oman to Jeddah in 325/936 when she was "swallowed up" by a gale and no person was saved.[72] On the journey from Siraf to Oman, al-Masʿūdī (d. 345/956–7) writes how

the waves, crashing one against the other, the passengers panic[ed] at them as [the waves] towered over them.

[*…wa-amwāj mutalāṭima tajzaʿu minhā l-nufūs idhā ashrafat ʿalayhā…*].[73]

Between Basra and Jannaba in the Persian Gulf, reports Ibn Ḥawqal (fl. c. 367/977–8),

it was notoriously dangerous and a ship hardly ever sails safely in this rough sea.

[*wa-huwa makān makhūf lā yakād taslam safīna fī hījān al-baḥr*].[74]

Pilot guides often included information on the condition of seas, their dangers etc.; one of the perilous passages in the Red Sea is described by al-Muqaddasī (fl. second half of the 4th/10th c):

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[69] Ibn Baṭṭūṭa 1968, IV: 186; idem, 1958–2000, IV: 857.
[70] Khalilieh 1995: 97–8; idem, 2002: 139–41.
[71] Montgomery 1997: 191.
[72] Al-Rāmhurmuzī 1883–1886: 93.
[73] Al-Masʿūdī 1983, I: 126 and 167.
[74] Ibn Ḥawqal 1992: 52.

> Fārān (near Jeddah), a place where the winds blow from the direction of Egypt and of Syria to form an overpowering whirl, so there is utter destruction of ships there… .
>
> [*thumma Fārān wa-huwa mawḍiʿ tahubbu fīh al-riyāḥ min Miṣr wa-l-Shām fa-tataḥādhayān wa-fīh halāk al-marākib*].[75]

He is referring here to the northerly prevailing winds which are frequent and often unpredictable. The Arabian Sea is a vast deep ocean and often there are seen "waves like towering and immovable mountains".[76] It is safe for outbound vessels but hazardous for inbound. Further, the Sea of Berbera, the gate to the Land of Zanj (i.e. the East African coast), was described as "one of the most dangerous seas" [*min aʿẓam al-biḥār khaṭaran*] while the Gulf of Sarandib (Sri Lanka today) was

> among the most difficult of all seas, from which men rarely return safe and sound.
>
> [*wa-min al-biḥār al-khabītha l-ṣaʿba l-shadīda llatī yaqillu l-salām fīhā*].[77]

It is interesting that Muslim geographers rarely mention winds that blow seasonally i.e. the SW monsoon (April to August) and NE monsoon (October to March) (see Chapter 6). Certainly, climatic conditions and seas are their chief concern but such descriptions are vague, though for the medieval traveller they are informative enough to give him a general picture. It is only when we come to gales and storms that some details start to appear; descriptions are believable so that one can imagine the scene; Ibn Jubayr (d. 614/1217) and Ibn Baṭṭūṭa (d. 770/1368–9 or 779/1377) are good examples: their experiences as travellers are every bit as lively as the stories of sea captains in the *ʿAjāʾib al-Hind* (Marvels of India) and Sindbād the Sailor in the *Arabian Nights*.

Ibn Jubayr, who almost drowned three times, tells us of a storm that raged on the morning of 4 Rabīʿ al-Ākhir 579/ 26 July 1183; it prevented their ship entering the harbour of Jeddah because of the many reefs. He says that they abandoned hope but luckily arrived at the anchorage where they beseeched Allāh that "[their] return should not be by this accursed sea [i.e. the Red Sea]" [*al-lā yakūn inṣirāfunā ʿalā hādhā l-baḥr al-malʿūn*].[78] On another occasion, in a ship that carried

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[75] Al-Muqaddasī 1906: 11; idem, 2001: 11.

[76] Ibid., 12 [12]. The description is found in the Qurʾān, Sūrat Hūd (The Prophet Hūd), XI: 42 [*wa-hiya tajrī bihim fī mawjin ka-l-jibāli*].

[77] Al-Rāmhurmuzī 1883–1886: 113–4; idem, 1981: 66.

[78] Ibn Jubayr 1952: 70; idem, nd.: 68.

many merchants from Siraf, Buzurg b. Shahriyār narrates a story about a storm that blew the ship off the coast of the borders of China in the Malay seas. There was no hope of rescue,

> in a sea that boiled, beaten about by frightening waves, on a ship that leapt and plunged. . .
>
> [*wa-l-biḥār al-zākhira wa-l-amwāj al-hāyila wa-markabuhum yanuṭṭ wa-ya'inn*. . .].[79]

The winds were intense and the crew could not understand the orders of the captain because of the noise of the crashing waves against each other and the howling of the wind.[80] The ship would have foundered were it not for the captain's skill in managing the ship and keeping calm among the crew and passengers. At the end, he remarked that it was not the gale that would have broken the ship but "the crew's negligence and the state of the rigging" [. . . *ʿuṭlat al-rijāl wa-ʿuddat al-markab*].[81] However, in a different story told by Ibn Jubayr, he says that in a storm between Aidhab and Jeddah, the crew struggled to lower and raise the sails but, he comments, in spite of their good efforts, the gear was not strong enough and often broke.[82] The narrator is making a point here in that sailors were chosen for their nautical skills which were much needed in bad weather and a ship could be lost if they failed to demonstrate competently their skills.

Gales struck at random. A Hijazi merchant, Abū l-ʿAbbās, who owned many ships in the sixth/twelfth century, had eleven out of twelve ships wrecked in one day.[83] A merchant ship set off in 306/918 in the company of two other ships from Siraf to Saymur. The day before their arrival a gale rose and "the sails could not be reefed" [*fa-lam naḍbaṭ al-sharʿ*], so the ship lost control and was carried away with the waves. Some of the men boarded the ship's boat and left it to their fate. They became so hungry and desperate that they were beginning to think of eating one of themselves, when luck struck them and, lo and behold, they saw land. Of the three ships, no lives were saved, except for those who embarked on the ship's boat.[84]

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[79] Al-Rāmhurmuzī 1883–1886: 21; idem, 1981: 13.
[80] Ibid., 1883–1886: 23; 1981: 14.
[81] Ibid.
[82] Ibn Jubayr 1952: 70.
[83] Labib 1970: 68.
[84] Al-Rāmhurmuzī 1883–1886: 165–7; idem, 1981: 97–8.

Sindbād the Sailor, in his sixth voyage, recalls when his ship, filled with merchants and notables, left Basra peacefully for a long voyage until one day a strong wind arose from nowhere and the captain warned everyone on board that they would perish unless Allāh saved them. Thus, Sindbād describes the scene:

> So all the passengers wept for themselves: they bade one another farewell, because of the expiration of their lives, and their hope was cut off. The vessel drove upon that mountain and went to pieces… .
>
> [*fa-bakā jamīʿu l-rukkāb ʿalā anfusihim wa-waddaʿa baʿḍuhum baʿḍan li-farāgh aʿmārihim wa-(i)nqaṭaʿa rajāʾuhum wa-mālat al-markab ʿalā dhālika l-jabal fa-(i)nkasarat wa-tafarraqat alwāḥuhā…*].[85]

Many lost their lives, but some, among them Sindbād, saved themselves "by clinging to the lower crags" of a mountain.[86]

If it were not gales or storms it was something else: crocodiles[87] and big fish (probably whales or sharks), some 100 to 200 fathoms long,[88] abounded everywhere in the Indian Ocean from East Africa to China. They followed a vessel for food and, of course, a wreck would be a great prey. But some fish, we are told,

> …strike the ship again and again, until they have capsized [her] and swallowed all they find. God have mercy on us!
>
> [*fa-taḥmilu ʿalayh ḥamlāt ḥattā taqlibuhu fa-taltaqiṭ mā fīh li-ʿāda wa-(i)stimrār nasʾalu Allāh al-ʿāfiya*].[89]

Al-Masʿūdī (d. 345/956–7) sailed in almost every corner of the Indian Ocean: "In these seas", he says, "horrors beyond count befell me" [*wa-aṣābanī fīhā min al-ahwāl mā lā aḥṣīh kathratan*]. Writing about the Sea of Zanj (i.e. East Africa) he says there were whales measuring four hundred "arms in length"; the crew and passengers were scared of them but sailors would fend them off "with bells and rattles in order to flee away…" [*bil-dabādib wa-l-khashab li-yanfir min dhālik…*].[90] Ringing of bells was a common tactic,[91] as was the striking of pieces of wood against

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[85] *Alf layla wa-layla* nd., III: 141; *Thousand and One Nights* 1979–1981, III: 62; *Book of the Thousand Nights and One Night* 1972, II: 219.
[86] Ibid.
[87] Al-Rāmhurmuzī 1883–1886: 115; idem, 1981: 66.
[88] Ibn Khurradādhbih 1889: 61.
[89] Al-Rāmhurmuzī 1883–1886: 19; idem, 1981: 12.
[90] Al-Masʿūdī 1983, I: 124.
[91] *Relations des voyages* 1845: 3.

another and the beating of drums.[92] Whether or not it was true that they were capable of attack, all sorts of noises were used to deter big fish or whales from following the ships.

Piratical raids: Convoys of vessels

Islamic shipping in the Western Indian Ocean often depended on Indian, Javanese and Chinese shipping and vice-versa. This might have been the result of the harmonious co-existence of Muslims and non-Muslims at a time when in the third/ninth and early fourth/tenth centuries trade with China had reached its highest peak.[93] The occasional sea incursion or piratical raid would have no doubt tipped that balance and cargo ships would have had to sail in a convoy of warships. Conversely, in the Mediterranean it was one-sided: the Islamic merchant shipping required almost constant naval assistance; Goitein gives details of some 150 Muslim ships owned by merchants in the fifth/eleventh century which needed military protection because of the fear of being attacked by the Christian enemy.[94]

From East Africa to China the major hazard was pirates. Shipowners and sea captains were naturally concerned about the safety of the cargo and passengers: some pirates and corsairs were out for booty alone; others for slaves. Armed men challenged the pirates and inflicted damage or set fire to the ship:

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[92] Al-Rāmhurmuzī 1883–1886: 14; idem, 1981: 10.

[93] See Soucek 1993: 49.

[94] Goitein 1999, I: 309–11. There is mention of Mediterranean *qurqūr(a)*s [s.v.], essentially war vessels, which often offered protection to cargo and pilgrim vessels; they ferried pilgrims from the North African coast to Alexandria, see Ibn al-Khaṭīb 1956: 327. ʿImād al-Dīn al-Iṣfahānī (d. 597/1201) tells us that Christian merchants travelled on their ships accompanied by a *ḥarrāqa* [s.v.], a fire warship (see Chapter 12) and Muslims seem to have targeted her as a great prize; thus, in the year 586/1190 "[the Muslims] fell upon a big *ḥarrāqa* and *barkūs*es which transported Christian merchants who owned property and wealth…", see ʿImād al-Dīn 1965: 460. The *barkūs* was a small Christian warship of the time, Ibn Shaddād 1964: 154; Abū Shāma 1287–1288 AH, II: 187; also mentioned together with Christian war vessels but sometimes operating as merchant ships are the large *baṭsa* or *buṭsa*, see RHC 1967, II: 43; III: 183, 190, 206, 220; IV: 235; al-Maqrīzī 1957–1973, I: 101, 103, 229; Kindermann 1934: 7–8; and other Christian vessels, the *bayūnī* and *jalāsa*, see al-Maqrīzī 1911–1924, IV: 54; idem, 1957–1973, IV (i): 294; IV (iii): 1227.

> Every ship (passing through [the Arabian Sea]) needs to carry armed men, and personnel to throw Greek Fire.
>
> [*wa-lā budda fī kull markab min muqātala wa-naffāṭīn*].[95]

The fighting men on board ship were "the guarantors of safety".[96] In South Thailand and Cambodia piratical activity was rife, and numerous pirates were harboured in the port towns of Dwarka and Somnath.[97] Marco Polo (d. 1323) gives us some interesting details on the dangers travellers encountered when approaching the coasts of Malabar and Gujarat: "More than 100 ships cruise every year as corsairs, seizing other ships and robbing the merchants".[98] He says that these pirates were accompanied by wives and children.[99] Their tactics were to cruise in line, about five miles (8 km) apart; thus in an area of one hundred miles (160.9 km), there would be twenty ships and "as soon as they catch sight of a merchant ship, one signals to another by means of beacons".[100]

Piracy in the Indian Ocean was on a big scale; there is no Islamic source that does not mention the dangers and risks of sailing this sea infested by pirates. One story in the *ʿAjāʾib al-Hind* (Marvels of India) tells us that Ismaʿīlawayh, a shipowner (see above), was sailing from Kalah to Oman in 317/929, when 63 pirate vessels attacked his ship. A combat followed for three days and several of the pirate ships were burnt and many attackers were killed. He escaped, but there is no word about the crew and the rest of the passengers.[101] In another story we are told that pirates in the Gulf of Sarandib (Sri Lanka)

> attack ships, and eat those they capture. These are the worst of men. There are none like them anywhere.
>
> [*idhā zafarū bi-markab akalū ahlah wa-hum asharr qawm wa-laysa fī sāyir al-amākin man yaqṭaʿ al-baḥr mithlahum*].[102]

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[95] Al-Muqaddasī 1906: 12; idem, 2001: 11.
[96] Ibn Baṭṭūṭa 1968, IV: 59; idem, 1958–2000, IV: 800.
[97] G. E. Gerini as cited by Hādī Ḥasan 1928: 112.
[98] *Travels of Marco Polo* 1982: 254. They are described by the Russian traveller, Athanasius Nikitin as "Kofars" (pagans), presumably he meant Hindus, see *India in the Fifteenth Century* 1857, 3.11.
[99] *Travels of Marco Polo* 1982: 254.
[100] *India in the Fifteenth Century* 1857, 3.11.
[101] Al-Rāmhurmuzī 1883–1886: 129–30; idem, 1981: 76.
[102] Ibid., 1883–1886: 114; 1981: 66.

A gruesome picture; other stories in the *ʿAjāʾib* speak about cannabilistic activities of this sort.

One way to deter the pirates was to create a device to block pirate ships from entering the harbour. At the Straits of Malacca, according to a Chinese chronicle, an iron chain was installed between two ends of the harbour; after port officials made all the necessary checks, the iron chain was raised and any attempt by the enemy to reach the cargo ships was curtailed.[103] A good solution for a port surrounded by land on both sides; the open sea, however, offered no alternative but to face the pirates. Considering this permanent danger, which route was then the safest?

Cooperation between shipowners of different ships facilitated the delivery of the merchandise safely; no doubt their concern was also the protection and safety of merchants and pilgrims. A cargo-passenger ship would have departed in company with several others in case they were attacked by pirates or overtaken by a gale. They would have sought each other's assistance in case a ship ran into difficulties. But things could sometimes go wrong. A sea captain, ʿImrān al-ʿAraj, sailed in 325/936 from Oman to Jeddah on his own ship along side several vessels from Aden, Ghalafiqa and Athar; he recounts that one ship capsized, no one was saved and the cargo perished.[104] Convoys were indispensable, and in case the cargo was gold and other precious merchandise, shipowners and merchants would have asked and paid for the assistance of warships, as one Genizah letter reveals.[105]

The Egyptian Kārimi merchants were protected by the Fāṭimid war fleet, the historian al-Qalqashandī (d. 821/1418) informs us;[106] their trade from Egypt to India brought in great revenues to the caliphate. Apparently the squadron was up to five warships. Although Yaacov Lev questioned the practicality of this in terms of war equipment, operation and crew,[107] it must be said that in general, convoys boosted trade with the east and opened up markets and sources of supply. This

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[103] *Chau Ju-Kua* 1911: 62. Iron chains were also used to protect naval arsenals: the shipyard in Tunis built under the governorship of Ifriqiyya Ḥassān b. al-Nuʿmān in 89/708–9 was located inland and access to it was through a channel; iron chains were lifted to block the passage and protect the arsenal from the enemy, see Fahmy 1966: 114, fn. 3, and 118; see Sālim & ʿAbbādī 1969: 25–34.

[104] Al-Rāmhurmuzī 1883–1886: 93; idem, 1981: 54.

[105] Goitein 1973: 311–2.

[106] Al-Qalqashandī 1913–1919, III: 520.

[107] Lev 1999: 171.

protection strengthened the Mediterranean-Egypt-India commercial links. Cambay became the Muslim-ruled entrepôt during the Mamlūk period (7th/13th c), playing an important economic and political role; Quseiri archaeological finds and a number of Arabic paper fragments, as discussed elsewhere, testify to this long-distance trade.[108]

Superstition and rituals for safe journey

The size and height of sea waves frightened people. They were only too well aware that while a ship at sea usually rides with the waves, if she loses her stability masses of water could break her to pieces.

Rituals were performed for a safe journey, and at the time of stormy weather they prayed for calm sea.[109] Charms were worn by sailors to sail with a good wind and protect them against pirates.[110] Up to modern times, an amulet the *bayraq* (pl *bayāriq*), an emblem of the Southern Arabian holy men, was worn by sailors as a lucky charm; they believe it gives "good fortune" (*baraka*) at sea.[111] Ibn Baṭṭūṭa narrates a story of sailors who visited a shaikh, Abū Isḥāq Ibrāhīm b. Shahriyār at Kazerun (55 mi/88.5 km west of Shiraz), who was venerated by many Indians and Chinese sailors. They presented him with a petition to protect them from attacks of pirates and storms, and made a pledge that they would donate a certain amount of money when they had completed their voyage safely.[112]

Most of our Muslim geographers have commented on the effects of nature and rough seas on people. Al-Masʿūdī tells us how the seas of the Gulf of Aden between Berbera and Ras Hafun caused terror to those that crossed it: he says Omani and Sirafi mariners were tossed high and low on the waves; he evokes the scene of Omani sailors reciting the following verses:

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[108] Guo 2004: 25, 27, 43, 48, 55, 58–9, 62–6, 85, 90–1, 96–7, 179–80, 182, 210; Regourd 2004: 277–9 and her forthcoming book; for a survey of the excavations at Quseir al-Qadim see Peacock & Blue 2006.

[109] See for example al-Rāmhurmuzī 1883–1886: 25.

[110] Ibn Baṭṭūṭa 1968, II: 89–92.

[111] Serjeant 1974: 137.

[112] Ibn Baṭṭūṭa 1968, II: 89–92; idem, 1958–2000, II: 319–21.

> Barbara and Jafuna, your waves that frighten us
> Jafuna and Barbara, their surge of the sea as you see.
>
> [*Barbarā wa-Ǯafūnī wa-mawjuka l-majnūnī*
> *Ǯafūnī wa-Barbarā wa-mawjuhā kamā tarā*].[113]

The sea was full of surprises; but by prayer and ritual, crew members hoped to ward off any evil that could befall the ship. Crossing the sea from Aidhab to Jeddah, Abū l-Ḥasan al-Shādhilī (d. 656/1258), a Ṣūfī, used to recite the Litany of the Sea (*ḥizb al-baḥr*) on board ship:[114]

> …Guide us, and deliver us from the hand of the evildoers, and grant us a fair wind according to Thy knowledge… .
>
> […*wa-(i)hdinā wa-najjinā min al-qawmi l-ẓālimīna wa-hab lanā rīḥan ṭayyibatan kamā hiya fī ʿilmika*…].[115]

The Litany of the Sea was a well-known devotional exercise recited at the time by his disciples every day. Rituals for a smooth journey were performed on small islands or at an anchorage before setting off on a voyage: the crew prayed and threw rice in the sea, then cried out: "This is your guest, oh mountain!" [*hādhihi ḍiyāfatuka ayyuhā l-jabal*].[116] Rocky hills and mountains were their guide; they were the landmarks the pilot needed; thus, prayer and ritual secured his guidance and luck. In the Red Sea region, when the cargo-*jalba* [s.v.] approached the coast close to Aidhab, sailors greeted the mountains saying:

> O mountain, the captain of this ship sails from here and there your favour is with him
>
> [*ayyuhā l-jabal hādhā markab al-nākhūdā sāfara min balad al-fulānī yurīdu l-balad al-fulānī khāṭiruka maʿah*].[117]

Other information on votive offerings come from Sanskrit and Pali literature: mariners made a donation to their gods if they were saved. Tara, the Buddhist goddess, the protectress, appears in a number of images such as a man sinking in the sea and invoking Tara's help.[118]

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[113] Al-Masʿūdī 1983, I: 123.
[114] Of Moroccan origin al-Shādhilī was founder of a religious brotherhood; for political reasons he settled in Alexandria and from there went on pilgrimage to Mecca every year, see Ibn Baṭṭūṭa 1958–2000, I: 24, fn. 62 and fn. 65.
[115] Ibn Baṭṭūṭa 1968, I: 42; idem, 1958–2000, I: 26.
[116] Al-Nuwayrī l-Iskandarānī 1968–1973, II: 247.
[117] Ibid.; see also Gildemeister 1882: 443.
[118] Tripati 2006: 88.

One finds similar themes in Christianity, such as in Orthodoxy, St. Nicholas, and in the Catholic tradition, the Blessed Virgin Mary, saving the crew members or passengers from sinking.[119]

But the most frightful of all were the genies (CA, coll. *jinn*), who inhabited the mountains and desert; they could be mischivious and attract winds and stormy sea; so rice or food gathered by the merchants was often thrown in the sea as an offering, thus warding off evil. When the winds dropped and the sea was calm, a black hen or a black he-goat was slaughtered and its blood put at the mast step. After that sailors burnt aromatic wood and waited for good winds.[120] The wind was associated with spiritual power, so using swords to cut the wind, as al-Nuwayrī (fl. 8th/14th c) informs us was the custom, is another sign of magic ritual.[121] If calmness persisted, crew members made a model boat from a jar (*qulla*) stuffed with salt, ash and cooked rice. A candle was placed in the middle to represent the mast and went around the deck for seven times. Then the candle was lit and the jar (or boat model) was set afloat on the water, with the cry: "This is an offering to the sea". The jar remained afloat until the wind picked up and a wave blew the candle light off and swallowed it away.[122]

There were several dangerous spots for sailing: Ras Jumjuma at the Musandam Peninsula, Ras Fartak and Ras al Kalb at the southern end of Southern Arabia and the straits between Ras Hafun and the Island of Socotra. Genies were believed to live here at the bottom of the sea so that an offering to the heavenly spirits was essential. Ibn al-Mujāwir (d. 690/1291) records the following practice: when a ship approached the Island of Socotra, sailors attached a sail and tiller to a pot, then stuffed it with salt, ash and coconut and threw it in the stormy sea.[123] All the ships crossing the Indian Ocean on their way to Aden anchored near Sira Island, a holy place, where it was believed a guardian spirit lodged; at the island mariners prayed for a safe return.

"Angels of the ship" protected the mariners and their vessel in both rough and calm weather. A certain Abū l-Zahr al-Barkhatī, a sea captain, was sailing in the Sea of Malay, when a frightening storm

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[119] Pucciarelli 2000: 62–80; Prins 1989: pl. 1, 3–5, 7–44.
[120] Al-Nuwayrī l-Iskandarānī 1968–1973, II:247.
[121] Kamioka & Yajima 1979: 61 (Atsuko Saisho translated for me sections of this book April 2000).
[122] Al-Nuwayrī l-Iskandarānī 1968–1973, II: 248.
[123] Ibn al-Mujāwir 1951–1954, I: 114.

broke on the first night of the voyage and the ship was on the point of foundering. Seeing this, the captain asked the crew and passengers to calm down and pluck courage but they still despaired and turned to prayer. One sailor, we are told, placed rice with animal fats and a bucket of water to give to the angels in order to be delivered from their misery. However, an old man who was hiding on board ship consumed the food and water. When he gave himself up, the crew and merchants were stupefied, for they thought he must be the angel and were not expecting that he would appear to them. The old man told them who he was and not to fear for everyone on board would be saved.[124] The purpose of the story was to remind listeners, who would be sailors, to put their faith in Allāh, but it does demonstrate how widespread these practices were, something that seems to be common to all regions where people travel by sea.

Inter-cultural beliefs: the spirit of the sailing ship

The *'Aja'ib al-Hind* is full of stories about merchants who had a superstitious fear of the sea, not surprising when one considers that the medieval pilot's only aids were the stars and his primitive instruments; other than that, he relied on experience, but it did not take much for a sailing ship to be driven out of sight of land. When the merchants and pilgrims set out on a sea voyage, they would have thought of the land to which they were going but equally they longed for what they had left. The vastness of the sea frightened them and so they reverted to prayer and ritual to ensure that Allāh would deliver them from disasters and loss of life.

Ships carried symbols which were considered to have special powers; they consisted of motifs which bore expressions of cultural beliefs belonging to the Indian Ocean people. Such motifs or decorative themes presented symbolism that went back to ancient history; zoomorphic themes, for example, persist from antiquity to present times. Several medieval Persian miniatures show ships or boats with animal head stems. In more recent times, the East African *mtepe* [s.v.] had a stemhead shaped like a head of a bird; also the Kuwaiti *baghla* [s.v.]

[124] Al-Rāmhurmuzī 1883–1886: 26; idem, 1981: 16.





Illustrations 64 & 65 (Left) The animal headstem is a recurring feature in Persian miniatures, from the *Haft Aurang* of Jami, Meshhed 1556–1565, 1946.12, fol. 147 (courtesy of the Smithsonian Institution, Freer Gallery of Art, Washington D.C.); (right) the parrot-shaped stemhead on a Kuwaiti cargo *baghla* 1999 (photo author)

had a parrot-shaped stemhead facing inward[125] (illustrations 64 & 65). What would be the significance of such motifs?

They are represented in both the Bronze Age culture and pre-Islamic times; LeBaron Bowen thinks that they could be echoes of human or animal sacrifice, when the severed head was fixed to the prow;[126] the ritual changed slightly then by placing the goatskin from the goat sacrificed at the launch of the boat on the stemhead as one finds today on the Musandam *battīl*s [s.v.] and elsewhere[127] (illustration 66). Decorations such as goatskins and pendulous decorations convey messages, and, presumably, are thought to impart protection, but we cannot now be sure of their significance. Other motifs such as the oculus, the stylized

[125] See Agius 2002: 49–50.
[126] LeBaron Bown Jr. 1955: 32.
[127] Agius 2002: 111.



Illustration 66 Goatskin on the *battīl kārib*'s stemhead in Kumzar, Musandam Peninsula, Oman 1996 (photo author)

eye, are connected with nature.[128] Interestingly, there seems to be no iconographic examples of the oculus on medieval Islamic ships though it exists in stylised forms such as a simple circle. Would the absence of the oculus be explained by the Islamic prohibition on representative imagery? It would seem unlikely, given that the arabesque floral design may be found on medieval Islamic ships and more recent dhows, a motif which seems to have replaced the oculus.

This floral design is ubiquitous and there is evidence that it goes back to antiquity. As to what it represents, we can only now speculate, though interestingly, its presence is often associated with Persian influence[129] (illustration 67).

Travel by sea was inherently perilous, with danger coming from both man and nature. In times of greatest danger—when loss of life seems

[128] On the subject of oculi see LeBaron Bowen Jr. 1955: 5–48; idem, 1957b: 262–91; Prins 1970: 327–39.

[129] For further details see my article 2007: 101–11.



Illustration 67 Arabesque floral carved decoration on a river boat from a copy of al-Ḥarīrī's *Maqāmāt*, Baghdad 635/1237 (courtesy of Bibliothèque Nationale, Ms 5847, fol. 119v)

imminent, travellers instinctively return to the superstition of their ancestors. The symbolic meanings of all these motifs may be lost, but their occurrence embodies some spirit or belief which has persisted throughout the history of decorative motifs in maritime culture. In its diverse representations, the oculus may be interpreted as symbolically keeping watch over the sea as well as looking inward to protect the ship, the crew and passengers from danger. However, the meaning of other motifs is by no means clear.

CHAPTER EIGHT

THE SHIP AT SEA: NAVAL INCURSIONS

> Sweet trumpets filled the air with sound
> animating men's happy spirits;
> the boats of the Muslims crowded the sea,
> their awnings trailing in the water;
> the gunners fired their dreadful cannon,
> blotting out the sun with smoke:
> blast followed on blast, becoming so fierce,
> the Muslims clapped their hands across their ears.[1]
>
> Luís Vaz de Camões (d. 1580)

References to the subject of the *baḥriyya* (navy) made by Arab, Byzantine and Western sources in the early centuries of Islam, give substantial information about military-naval activities in the Mediterranean:[2] Until the fifth/eleventh century as far as our documents can tell, Muslim and Byzantine warships were manned by skilled fighting men who possessed naval war manuals and were trained in the best naval tactics.[3] On the

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[1] Camões 1997, Canto Two, vs 100.

[2] On this subject Ayalon's article (1960, I: 945–7) provides a rich bibliography of Arabic primary sources; see also Fahmy 1966: 80–148. For the early naval history (up to 648/1250) the reader is referred to Ehrenkreutz's short article (1982: 119–21) and for more details see Khānkī 1948; Māhir 1967; Christides 1987: 87–99; Makrypoulias 2002; Pryor 2006, IV: 1101–2. On the main works for the Mediterranean Byzantine-Islamic sources, see Fahmy 1966; Ahrweiler 1966; Santoro 1978; Reddé 1986; Pryor 1992; Delgado 1990; Christides 1995: 111–22; idem, 2002: 87–106. Early raids in Muslim naval history were against Cyprus in 28/655; the navy was victorious over a Byzantine fleet in the Battle of the Masts (Dhāt al-Ṣawārī) as it is called. Constantinople suffered two sieges under the Arabs in the years between 54 to 69/673–688 and 98 to 99/716–717, see Fahmy 1966: 80–113. The naval base at Tunis was successful in a number of raids on Sicily until its capture in 291/902 by the Aghlabid naval forces. Their naval traditions were taken by the Fāṭimids who undertook to expand the Muslim fleet in the Levant and the mid-Mediterranean, capturing Sardinia, Corsica, the Balearic Islands, Malta and other islands which were significant gains both politically and economically. They raided also the southern coast of France, Genoa and the south of Italy, Calabria. Their conquest of Egypt in 358/969 was a decisive step in expanding their realm from North Africa to Syria.

[3] For further details on the Fāṭimid navy, its composition and tactics see Lev 1999: 183–4; see also Ibn al-Manqalī 1988: 249–54; Christides 1984a: 137–48; idem, 2002: 87–106.

subject of military-naval activities in the Indian Ocean, however, the sources have not much to say. What could be the reason for this? One explanation is that for centuries, until the coming of the Portuguese in the early sixteenth century, the Western Indian Ocean enjoyed a "purely commercial nature" of seafaring, and for this reason, it may be argued, there was not much of a military-naval tradition.[4] Only a small number of war-like encounters at sea between Muslims and non-Muslims are mentioned in the Early Medieval period and few in the Middle Medieval Islamic period. However, there is evidence of naval warfare on the west and east coasts of India as noted on Indian inscriptions of various dynasties, namely the Chalukyas (mid 6th to 8th c), Rashtrakutas (mid 8th to 10th c), Cholas (9th to 13th c), and Kadambas (10th to 13th c).[5] The Indian navy was called upon to assist rulers in supressing local rebellions and insurrections (some Muslim) as well as for offensive purposes. From my understanding of the sources, there seem to have been no naval activities that refer to war with the Arabians and Persians. A good example is the Kadambas dynasty, a great maritime power that sustained good trade relations with Muslims in East Africa. All this suggests that Muslim merchants came to the coasts of India on peaceful terms as their primary interest was trade.

The baḥriyya *in the east in the early centuries of Islam*

From Muslim sources, it may be discerned that the *baḥriyya* in the east was not so structured as it was in the Mediterranean. There was no naval policy and strategy dictated by the Caliphate and the naval requirements of the Caliphate were not, as in the west, necessitated by the defence of Muslim territories against a stubborn enemy, namely the Byzantines (8th–11th c) and the Crusaders (11th–12th c). Hence, naval activities in the Mediterranean were a much more complicated affair than those of Mesopotamia, the Persian Gulf, the Red Sea and West India. As we discussed earlier and as Hourani correctly noted, "the Indian Ocean was a sea of peace",[6] while the west was "rigid" and dominated by "separation" (Islam against Byzantium and the Cru-

[4] Soucek 1993: 49.
[5] Tripati 2006: 88–90.
[6] Hourani 1963: 61.

sader states); the east, however, witnessed "integration" of communities in trade[7] and exchange of ideas and, very often, tolerance of beliefs. Admittedly, piracy in the Indian Ocean, as I showed in Chapter 7, was endemic, and was a menace from before the pre-Islamic era, continuing right up to fairly recent times.[8]

The absence of adequate sea defences in the Early Medieval period raises the question of whether the Arab/Arabian conquest of the Iranian plateau was conducted solely on land. The available literature suggests that the caliphal armies in the east used the sea only occasionally and those maritime campaigns that did take place seem to have been "unofficial expeditions": examples of these are the Muslim raid in the middle of the first/seventh century which took place against the coast of Ethiopia;[9] the raid organized by al-Mughīra b. Abī l-Āṣ (ndd) to the port of Daybul (in Pakistan), that by Ḥakam b. Abī l- Āṣ to Persis,[10] or the campaign involving a fleet of vessels which are said to have left Julfar (north of present-day Ras al Khaimah) to Fars against the Sāsānians in about 16/637.[11] Most of these were piratical raids, engaged in pillaging and looting.[12]

The caliphs, at least until the early decades of the second/eighth century, were against attacks by sea.[13] Utba b. Ghazwān (fl. 1st/7th c) wrote to the caliph ʿUmar b. al-Khaṭṭāb (13–23/634–644) from Bahrain telling him that Ubulla is a strategic place and that it is the harbour for Oman, India and China [*furḍat… ʿUmān wa-l-Hind wa-l-Ṣīn*].[14] The message was clear; Ubulla should be taken and an attack by sea would be better than by land. We do not know what, if anything, the response to his plea was, but he did set off with ships from Bahrain to occupy Ubulla in 14/635–6, where he found resistance from the Persians at the eastern bank of the river.

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[7] Soucek 1993: 49.

[8] For modern times, see Agius 2002: 13–19, 21–2, 34–5, 50–1, 58–63, 66, 119; idem, 2005a: 9, 15, 59, 200–1.

[9] Further details are provided by Christides 1994: 2–42.

[10] Piacentini 2002: 165.

[11] Al-Ṭabarī 1965, V (i): 2545–6.

[12] Al-Balādhurī 1866: 431.

[13] References to an early caliphal policy not to use the sea as a strategy for military incursions is found in al-Ṭabarī (1965, V (i): 282–3) but absent in the *futūḥ* (conquests) chronicles.

[14] Al-Balādhurī 1991: 337. Al-Ṭabarī (1965, I [iv]: 2016, 2012) described Ubulla as the *farj al-Hind*—"the frontier to India".

It was only during the time of the governor of Iraq, al-Ḥajjāj b. Yūsuf al-Thaqafī (d. 96/714) and his son-in-law, Muḥammad b. al-Qāsim al-Thaqafī, that we start to see references to an Arabian war fleet collaborating with land forces to capture the port of Daybul. We are told that under the Caliphate of Abū Jaʿfar al-Manṣūr (136–158/754–775), the governor, Tasnīm al-Ḥawwārī, used Julfar from which to dispatch an expedition to India. Another source reports that an ʿAbbāsid fleet with 1,000 horsemen and 5,000 infantry anchored at the port of Julfar and crushed an oppostion coming from Oman.[15]

There were naval raids (15–17/636–638) launched from Oman against Iran and India as far as Tana near present day Mumbai; from antiquity, both countries had maritime and commercial links with Mesopotamia and the Persian Gulf. In their advance on India in 107/725, the Muslims fortified Mahfuza and Mansura, bordering on the Indus, from which military and naval raids were sent forth. From Bahrain, the Arabians crossed over to Persia and reached Persepolis. Al-ʿAlā b. al-Ḥaḍramī, then governor of Bahrain, had his ships destroyed and made his way to Basra, close to Ubulla in 17/638.

It should be noted that these operations were executed against the wish of the caliph ʿUmar b. al-Khaṭṭāb. He was not in favour of naval activities and only once did he allow a raid against Adulis (present Eritrea).[16] But what of the Persian fleet? Islamic sources seem to hint at a fierce Sāsānian resistance against the caliphal army with supplies provided by the Persian fleet to its garrison port towns on both littorals of the Gulf.[17] The Persians had to protect their sea route and major harbours: Rishahr, Lingeh, Suru, Hormuz on the Iranian shore and Jask with Tiz and Armabil on the Arabian side. But it seems that the advance on the enemy by land was much preferred, although it is debatable whether we are to believe al-Ṭabarī's allusion to this being "out of fear of the sea". The conquest of Khurasan and Kirman were certainly achieved by land.

If on the other hand there were any organised maritime expeditions to support the Islamic invasions by land, hard evidence is lacking. Some scraps of information, however, are forthcoming: there is an account

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[15] Al-Rawas 2000: 146–7.

[16] Al-Balādhurī 1866: 431–2; al-Ṭabarī 1965, V (i): 2545–8, 2595.

[17] Al-Balādhurī 1866: 315, 386–8, 391, 432–4; al-Dīnawarī 1912: 140–1; al-Ṭabarī 1965, V (i): 894, 1958, 1960, 2016; see also Piacentini 2002: 167, 171, fn. 7.

of the expeditions of al-Mughīra and al-Ḥaḍramī against Bahrain, of Ḥakam b. Abī l-Āṣ against Fars and finally the Persian attack in Kirman from Hormuz.[18] In all this the most frustrating aspect for the historian, and for this study in particular, is that our sources have little information, if any, on warships or their formation in sea battle. That said, on the subject of river warfare in the third/ninth century, al-Ṭabarī (d. 310/922–3) provides information on the caliphal military-naval tactics, the enemy, their movements, transport and ammunition, with much detail.

River warfare: the Zanj uprising

The ʿAbbāsid Caliphate, from the death of the caliph al-Wāthiq (227–232/842–847), seemed to fall into anarchy. Right from the earliest years of its establishment it was politically unstable, the hastily conquered provinces proving a source of disunity, while closer to home, a significant change occurred with the introduction of thousands of Turkish soldiers, brought by the preceding caliph al-Mustaʿṣim (218–227/833–842) from Central Asia.[19] Although they had been brought in as royal guards, they soon gained power and were the source of much political intrigue and even military uprisings which threatened the rule of the caliphs. Al-Dūrī observed that during the nine years from 247 to 256/861 to 870, four caliphs succeeded one after another, but all were helpless in the hands of the Turkish guards who controlled the court and the capital.[20]

While the central government in Baghdad was suffering a dramatic loss of power, the governors of the provinces were busy establishing dynasties in Persia, Northern Mesopotamia, Syria, Egypt and North Africa which posed an implicit threat, and by the time of the assassination of the caliph al-Mutawakkil (232–247/847–861), civil strife and wars were ever increasing. This prolonged internal political and economic crisis was further exacerbated by the Zanj (East African) uprising of 247–269/861–882.[21] The Zanj were Blacks from East Africa, brought as agricultural slaves to Southern Iraq to revive dead lands in

[18] For bibliographical details, see Piacentini 2002: 166–71.
[19] Al-Dūrī 1945: 60.
[20] Ibid., 59–73.
[21] Waines 1977: 339–48.

the *ḍayʿa*s (estate/s) of Basra.[22] The misery and wretchedness of their conditions are well documented.[23]

This exploitation of the black slaves led to a social and political upheaval that slowly formed the roots of an uprising. The slaves rallied after ʿAlī b. Muḥammad (d. 270/883), their leader. Successful military campaigns against the rich land-owners in different parts of Southeast Iraq followed, as one gang after another of probably runaway slaves from towns and villages joined the insurgents.[24] Later on, the black soldiers of the caliphal armies deserted to the Zanj movement, thus supplying them with arms and trained manpower. The Zanj leader and his army were finally crushed by the army but the revolt had grave consequences, for besides showing the weaknesses in a Caliphate that was unable for fourteen years to subdue the insurrection, it made worse the difficulties for the armies in controlling future separatist movements.

Al-Ṭabarī's account, detailing this eventful war between the caliphal army and the Zanj is remarkable and unique "for the quality and quantity of information", as Popovic remarked.[25] His version of events is constructed on reports by witnesses and participators. The naval organisation was mostly left in the hands of commanders appointed by the caliph, whose task was the construction and equipping of warships and war canoes, and the hiring of competent personnel and intelligence. Procuring raw material for the building of warships was an economic strain on the local governors and only by raising taxes could they enable the construction and fitting of the war vessels. Nine types of war vessels, the *ḥadīdī, ṣalgha, sallūra, shabbāra, shadhā, sumayriyya, ṭayyār, zabzab* and *zawraq* (see Chapter 12), were used during the revolt which took place in the Marshes of Southern Iraq. In the ensuing years and at the time of the Qarmaṭian invasion in 293/906, we see similar river craft being employed.

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[22] Al-Iṣṭakhrī 1927: 82; see also al-ʿUlabī 1961: 70.

[23] They had to dig away the nitrous surface soil, in order to lay bare the ground underneath and at the same time to extract the salt that had accumulated in the upper stratum. The agricultural land of Mesopotamia was one of the most important sources of revenue for the caliphate, see al-ʿUlabī 1961: 69–70; al-Kharbuṭlī 1968: 174. Many *iqṭāʿ*-holders employed local farmers to work the land. Floods and broken embankments had by that time converted much arable land into marshes, see Nöldeke 1892: 148; see also my article (1983: 3–18), some information of which has been included here.

[24] Nöldeke 1892: 154.

[25] Popovic 1976: 83.

The alternative route to the Persian Gulf

The political instability during the Zanj war on the Mesopotamian rivers and the Qarmaṭian threat to tax passing ships in the Northern Gulf started to take its toll on the safety of the Persian Gulf.

The Qarmaṭians (4th–5th/10th–11th c) had succeeded in building up a vital, economically prosperous and lasting state in Al-Bahrayn. They made attempts to reassert their hold over Southern Iraq but the Barīdīs (315–349/927–960) who were distinguished military leaders in Basra and Ubulla kept them at bay. Meanwhile, Oman, a rival of the Qarmaṭians and trying to escape taxes from them on her ships, sought to occupy Basra. The historian and man of letters, al-Ṣūlī (d. 335–6/946), reports this event in 331/942: he recounts that Yūsuf b. Wajīh, ruler of Oman arrived in Basra-Ubulla with a large fleet fit to launch an attack on the Barīdīs. As they entered Ubulla they were met by the Barīdīs on small warships; they surrounded their fleet throwing at them "fire bottles" [*nār…juʿilat fī zujāj*].[26] However, when the Omanis landed and occupied Ubulla, the Barīdīs and their supporters rowed their ships and blocked the Omani fleet from going upstream to Basra, thus making an end to the expedition.[27] After that experience the Omanis never came back. But Basra-Ubulla were not left alone. A new threat to occupy these twin harbours came from the Ḥamdānids (293–394/905–1004). From Baghdad and the town of Wasit, they organised an army against the Barīdīs; the towns were captured and the Barīdīs fled to the Qarmaṭians in the Al-Bahrayn region. By 459/1067 the Qarmaṭians had lost control of the island of Awal (modern Bahrain) after the inhabitants rose against them and their fleet was defeated. The Qarmaṭian reign was finally crushed in Hasa on the Arabian coast by the chief of the Banū Murra b. Āmir.

The Island of Qais and the attack on the port of Aden

With the political and economical upheaval in the Northern Persian Gulf in the fifth/eleventh and sixth/twelfth century, many merchants and traders had settled in the Island of Qais on the Persian littoral and

[26] Ibn Miskawayh 1332–1333/1914–1915, II: 46; al-Ṣūlī 1935: 203, 251, 263.
[27] Al-Masʿūdī 1861–1877, VIII: 345.

Sohar on the Omani coast. Qais practically controlled the sea traffic up and down the Gulf, but for years the ruler's attempts to deflect the trade from Fāṭimid Egypt (297–567/909–1171) via Aden and re-route it through the Persian Gulf had failed. It is reported that the ruler of the Island of Qais had terrorized shipowners and merchants into not using Sohar by despoiling their property; so he fortified the island and fitted it with a fleet (*usṭūl* [s.v.]). The fleet ravaged the west coast of India but the people of India resisted him with the aid of dugout canoes called *mashʿiyya* (pl *mashʿiyyāt*), each one was capable of carrying up to 200 men.[28] The ruler of Qais had 50 of them. Al-Idrīsī (d. c. 560/1165) adds that these sturdy canoes (*muḥkamat al-ṣanʿa*) were dug out in the Island of Qamar, Southwest India; each one was 60 *dhirāʿ* (88.5 ft/27 m) carrying 150 rowers.[29] If this is so they must have been extraordinarily large canoes.[30]

The ruler's threats to undermine the merchants and traders in Qais and Sohar proved futile. Many left and chose Aden and Jeddah as their new homes. It was, therefore, the Qais ruler's ambition to include under his power the port of Aden, the gate to the Red Sea and the Mediterranean which he planned to besiege.

The blockade of Aden was a tragic event for the port town and the cause of great disruption of trade links between the Mediterranean and the Indian Ocean. This event was witnessed by a shipbuilder-merchant Maḍmūn b. Japheth, an Adeni Jew, his first cousin Khalaf b. Isaac, and the Muslim historian Ibn al-Mujāwir (d. 690/1291).[31] In a letter to his business associate in Egypt, Khalaf b. Isaac reports,

> …to explain all this would take too much space, and even if I filled ten leaves to describe only a part of what befell us, it would not suffice.[32]

The Qais besiegers arrived at the harbour of Aden with a fleet consisting of 15 war vessels, namely the *burma, jāshujiyya, shaffāra* and *dūnij*. It is not clear which ones functioned as warships and/or transport vessels

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[28] Al-Idrīsī 1994, I: 72. The nomencalture is almost identical to the *machwa*, a fishing and/or cargo craft found on the Northwest Indian coast. But this is not a dugout canoe; she is planked-built with a transom stern, see Hornell 1946b: 202–3. Also known in Arabic as *māshuwwa* in the Northern Gulf, which was a lifeboat, an open-ended craft (24 × 9 ft/7.3 × 2.7 m), see Agius 2002: 116–7.

[29] Al-Idrīsī 1994, I: 72.

[30] *Oman: A Seafaring Nation* 1979: 108.

[31] Ibn al-Mujāwir 1951–1954, I: 124; Goitein 1999, V: 67; see also Margariti (2007: 76–83) for an examination of this naval blockade.

[32] Goitein 1999, V: 67.

(see Chapter 12). The siege, reports Khalaf b. Isaac, lasted two months: all the population had fled to the castles on the hills[33] and there were no ships to fight the enemy. For two months there was no life in the port. Finally, on the horizon there appeared 2 ships which belonged to a certain Rāmshit, a rich Jewish merchant from Siraf, who came in time to rescue the besieged town. The Qais war vessels tried to seize Rāmshit's ships, but "the wind was good, so that they were dispersed on the sea left and right".[34]

What is significant about this blockade is not the surprise attack by the enemy, but the absence of ships in the port of Aden during the two months of the siege. It is almost certain that the Qais ruler planned this siege at a time when the commercial ships and the galleys were away from port. But what about the Indian ships which would have put into the port of Aden in the month of October? It is safe to assume, thanks to his intelligence, that the Qais leader managed to keep the Indian ships away from Aden. He obviously had good links with the Indian rulers whose interest in shipping their goods via the Persian Gulf and the Red Sea cannot be disputed. It is possible, however, that, as Margariti argues, the news of the siege might have reached the Indian shipowners in time to stay clear of Aden.[35] An unusual event, where no ships suffered casualties but damage to the buidings of the harbour must have occurred, even though the sources do not make any comment on this.

The galleys in the port of Aden

Aden continued to play a strategic role during the Ayyūbid period (569–626/1174–1229); Egypt's decision to secure its port at Aden was a wise move. A number of galley-*shīnī*s [s.v.] were sent from the Mediterranean to the port of Aden to protect the harbour and town against any naval incursions. As it happened, for many years there was no war activity in the port or in the region, so the galleys sat idly in the harbour until the reign of Sayf al-Islām Ṭughtakīn b. Ayyūb (577–593/1181–1197). He was advised that they could serve a better

[33] Ibid.
[34] Ibid., 68.
[35] Margariti 2007: 79–80.

purpose rather than "rotting in the sun" [...*taqraʿuhā l-shumūs*].[36] He was told, therefore, to employ them usefully, safeguarding cargo shipping at sea.[37] Hence, Ṭughtakīn dispatched the *shīnī*s to India with instructions to search for strategic places to protect their ships. A galley tax (known as *ʿashūr al-shawānī*) was introduced, which merchants paid for this service.[38] But how far away did this protection reach? Was it to include Muslim and non-Muslim ships? And for how long did it last? Difficult questions to answer, but we do know from the Genizah letters that shipowners provided their own protection and covered the costs by charging extra for the cargo they carried, a service which was not dissimilar to the Aden maritime protection.[39]

Accounts of a traveller on Indian war vessels

The Mamlūks (648–922/1250–1517), who succeeded the Ayyūbids, continued to guard the Red Sea corridor and protect its long distance trade as the thirteenth-century Quseir paper fragments and coins testify.[40] Muslim sources also inform us that the towns of Qalhat and Hormuz prospered under the Hormuz princes in the eighth/fourteenth and ninth/fifteenth centuries. Numerous fortresses to protect the harbours are mentioned on the islands of the Persian Gulf,[41] out of fear of possible raids from the west coast of India. Our Arabic sources are not particularly specific about this; we know from Ibn Baṭṭūṭa (d. 770/1358–9 or 779/1377) that some naval raids on the Indian coast took place as a result of rivalries between Indian sultans but there is no mention of any involvement ouside their territories. However, Ibn Baṭṭūṭa's mention of types of Indian war vessels in the region does offer some interesting snippets of information.

We are told that Ibn Baṭṭūṭa was in Honavar in 743/1342 visiting Sultan Jamāl al-Dīn, during which time the sultan was engaged in an expedition to conquer Goa. Ibn Baṭṭūṭa, for reasons we do not know, accompanied the sultan on this expedition. Fifty-two vessels were fitted.

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[36] Ibn al-Mujāwir 1951–1954, I: 142; see also Smith 1995: 134.
[37] Ibn al-Mujāwir 1951–1954, I: 142.
[38] Ibn al-Mujāwir 1951–1954, I: 141–2; see also information on the galley tax in Smith 1995: 132–3 and 136–7; also Margariti 2007: 138.
[39] Margariti 2007: 137.
[40] Guo 2004; Regourd 2004.
[41] Al-Samarqandī 1949, II: 695; see also Piacentini 2000: 178.

When they advanced to attack, the inhabitants threw stones, forcing the passengers and fighters to jump into the water, "shields and swords in hand". Ibn Baṭṭūta also jumped in the sea while the sultan took refuge in an armed *ʿukayrī* [s.v.], a sixty-oared vessel with a roof to protect the rowers.[42] Together with these war vessels, there were transport *ahawra*s [s.v.] for horses equipped with oars and sails, a type associated with Sind (Northwest).[43] Ibn Baṭṭūṭa also narrates seeing on the Malabar coast in 745/1344, eight *ajfān ghazawiyya* (war-*jafn*s) [s.v.], which were under the protection of the sultan of Ceylon (modern Sri Lanka). The sultan, we are told, was a powerful tyrant and owned pirate ships.[44]

Ibn Baṭṭūta's report on Indian war vessels is anecdotal, and while of interest to the maritime historian, it does not add much to the history of naval activity in the region. Apart from a few types that look genuinely Indian, I question the nomenclature he uses for one or two Indian vessels which are obviously Mediterranean (see Chapter 12).

Early encounters of the Portuguese with the coastal people

On the arrival of the Portuguese in the Indian Ocean in the early years of the sixteenth century, they found little resistance from the coast dwellers; one Muslim harbour town fell after the other. The situation in the Red Sea was different; they encountered difficulties due to the presence of Mamlūk, and later, Ottoman, fleets.[45]

Naval incursions recorded between the Mamlūk-Ottoman fleet and the Portuguese are few and of little impact compared to the encounter between the Christian and the Ottoman forces in 1571 at the Bay of Lepanto in the Mediterranean: 30,000 men lost their lives. It was a victory for Christendom, the memory of which lasted for many years. What we have in the Indian Ocean is a different story. From the outset, the Portuguese presence in 1498, near the East African coast, posed a threat to the Mamlūk and Venetian trade in the Red Sea and the Indian Ocean. They entered the Indian Ocean with *caravel*s and *carrack*s and within a few years had laid siege to the area, setting fire to towns and vessels in harbours up and down the coasts of East Africa,

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[42] Ibn Baṭṭūṭa 1968, IV: 59, 107.
[43] Ibid., III: 109–10.
[44] Ibid., IV: 166–7.
[45] See Aubin 1953: 77–138; idem, 1973: 77–179; see also Agius 1999: 176–7.

the Persian Gulf and the West Indian coast; they spared no man if they encountered resistance. Their ships, equipped with fire power, carried cannons with a great range which made them far superior to their opponents, but the Mamlūk-Ottoman fleet was able, on one or two occasions, to withstand these Portuguese cannon.

Unlike the Portuguese sources which give detailed accounts of their conquests and occupations, Islamic sources such as the Ḥaḍramī chronicles on Portuguese activities (904–984/1498–1577) are lacking in content: many phases and aspects of the political and economic changes in the region remain patchy and often obscure.[46] On the other hand, the information they hold on types of Muslim and Portuguese (or Frankish) war vessels is helpful and their data is useful if added to other sources that provide this sort of information. Some of the warships mentioned are: *barsha* "galliot", *ghalyūn* "galleon", *ghurāb, qilyāṭa*, both "galleys", and *ṭarrāda* "an open skiff"[47] (see Chapter 12).

After the conquest of the Byzantine capital of Constantinople in 1453 and their mastery of the East Mediterranean, the Ottoman Turks' naval ambition had been to gain control of the whole of the Mediterranean and the Red Sea. What attracted the Portuguese in the east was chiefly economic gain, as it had been in their discovery and exploration of America, but their intention to convert the Muslim population should not be downplayed; religious zeal was just as alive there as it was across the Atlantic. The fiery preaching of the Jesuit father, Francis Xavier (d. 1552), had succeeded in converting thousands of Hindus, some on the western coast but many on the eastern coast of India. He was unsuccessful with converting Muslims, however, something which is also true of other Christian missionaries before and after him.

Fear of the Portuguese occupying the Red Sea corridor accelerated the Mamlūk-Ottoman advance to protect the Red Sea. By the early sixteenth century, the Portuguese ships had already captured several Indian Ocean ports, whether by force or treaty. They attacked the harbour towns, leaving death and destruction in their wake: for example, in 1508, at Qalhat, a thriving port, De Albuquerque (d. 1515) destroyed all the vessels there, and when he reached Hormuz he sank many ships, taking and burning others.[48] Devastated by plunder and slaughter, the

[46] Serjeant 1974: 1.
[47] Ibid., 44, 51, 57, 61–2, 66–7, 105, 111, 114, 119, 134, 178–9, 181.
[48] *Book of Duarte Barbosa* 1918–1921, I: 69, 101.

towns were crippled, for the Portuguese aim was to destroy the Muslim monopoly of the spice trade which came from the Far East into the Western Indian Ocean.

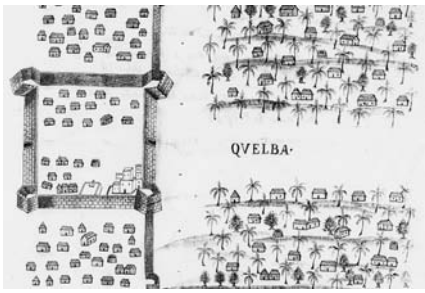
Several Mamlūk merchants complained about the capture of their cargo ships;[49] meanwhile, the Mamlūk alliance with the Gujaratis to counter the Portuguese threat in 1504 was of no use. Wherever the Portuguese settled they built fortresses and towers of which maps were produced with details such as the position of houses and even palm-frond *barasti* huts (illustrations 68 & 69). Their policy was to build several fortresses in key locations in order to monitor the Indian Ocean shipping and prevent their access to the Red Sea.

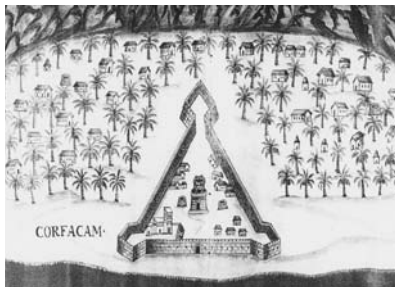
A surprise attack on the Portuguese

At the time of the Portuguese arrival, Jeddah and Aden, the two chief ports of the Red Sea, were subject to the Mamlūk Sultan of Egypt, Al-Ashraf Qānṣawh al-Ghawri (906–922/1501–1517). Under his command a fleet of 12 ships were built at Suez in 1507. It was a joint effort by the Venetians and the Ottomans. The Venetians were concerned at what the Portuguese might have succeeded in achieving had they mastered the Red Sea; they therefore provided the Mamlūks with carpenters to build the ships while the Ottomans supplied them with timber and copper.[50] Moreover, the Venetians also gave arms and men and al-Ghawri brought North African (Maghribī) navigators to man the galleys, as he knew that they could outperform the Mamlūks. With this new collaboration the fleet crossed the ocean to Diu in 912/1507 under the command of the Mamlūk Ḥusayn al-Kūrdī and the Ottoman Salmān Raʾīs. With the help of local ships supplied by Malik Ayaz, they launched a successful surprise attack on the Portuguese at Chaul in 1508. News reached Cairo of this Muslim victory and Ibn Iyās (d. c. 930/1524) reports that there were great celebrations which lasted three days.[51] Muslim morale was high but not for long: a counter-attack by Almeida, whose son was killed by the Muslim contingent, defeated the Mamlūks off the port of Diu, on the northwest coast of India.

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[49] Brummet 1994: 112.
[50] Ibid., 114–5.
[51] Ibn Iyās 1982, IV: 142.





Illustrations 68 & 69 Sixteenth-century Portuguese maps of forts at Kalba (left) and Khor Fakkan (right) (after Bocarro 1992, I: figs X and XI)

De Albuquerque's failure to capture Aden

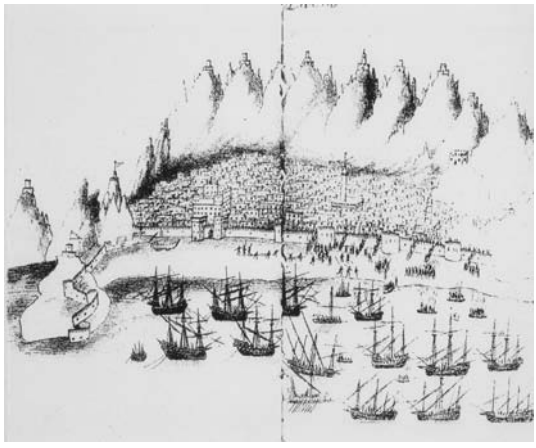
It was now impossible for the Mamlūks to guarantee the security of Muslim maritime trade in the Indian Ocean and the Red Sea. Nothing could stop the Portuguese, nor did the Indian threat not to collaborate with them alter their policy. Their hold on the West Indian coast and the Persian Gulf looked secure and the trade safely routed via the Cape of Good Hope. Commercially, if not strategically, they would have wanted to control the Red Sea corridor but their advance was a failure. When Ludovico di Varthema, visited Jeddah in 1503, he reported having seen about 100 ships in the port.[52] The city at the time was not properly fortified, but being aware of this weakness, in 1508 the Sultan Qānṣawh al-Ghawri wisely fortified both Jeddah, and Suakin further north on the African littoral, against any possible Portuguese attack. Aden, on the other hand, was better situated, being at the foot of a very lofty mountain range with castles and towers, well fortified and with high walls. It was also clear that it posed a serious commercial threat to the Portuguese.

Consequently, Alfonso de Albuquerque laid siege to Aden in 1513 but despite repeated attempts, he failed to capture it (illustrations 70 & 71). Efforts to intercept large ships from India and East Africa were evident in his concerted naval strategy to burn and destroy cargo ships in the harbour.[53] Further action was intended to shatter the Muslim monopoly and stop merchandise proceeding through the Persian Gulf, Iraq, Syria and the Mediterranean.

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[52] *Travels of Ludovico di Varthema* 1863: 52.
[53] *Commentaries* 1875–1884, IV: 185.





Illustrations 70 & 71 A portrait of Alfonso de Albuquerque (d. 1515) and a view of Aden harbour as it appeared to Gaspar Correia (fl. 16th c) in his *Lendas da Índia* (after *Commentaries of the Great Alfonso Dalboquerque*, I: facing title page & IV: 16–17)

Intelligence reached the Portuguese in 1514 that the Mamlūks were preparing a second fleet at Suez. In fact the Mamlūks and Ottomans were jointly building a huge fleet of galleys with 2,000 Ottoman armed men. Their plan was to sail for India in 1515 under the command of Captain Salmān but they never made it to India. Instead they concentrated their efforts on the Red Sea; their fleet managed to prevent the Portuguese from occupying Jeddah in April 1517.[54] An attempt by the Portuguese to attack Shihr on the Southern Arabian coast in 1528 failed too: a fleet of 20 ships under the command of Antonio de Miranda de Azevedo left Goa for Socotra and a number of them were to besiege the port of Shihr[55] but nothing came of this plan. On a second attempt in the same year, the Portuguese entered the harbour of Shihr with fourteen *ghurāb*s [s.v.] and two *galliot*s but abandoned the idea of landing there and reached some agreement with the sultan.[56] No further attempt by the Portuguese was made after that to take the port.

The Portuguese defeat at Jeddah and the subsequent loss of Aden was the end of them in both the Red Sea and the Arabian Sea. Aden was the gate to the Red Sea and it kept the Portuguese in check, thus

[54] Ibn Iyās 1982, IV: 362–5, 446–7; V: 85, 172.
[55] De Barros 1973, IV. i. 10; see also Serjeant 1974: 54.
[56] Serjeant 1974: 65–6.

allowing South Asian shipping, laden with spices from Aceh, to reach Jeddah safely. While the Portuguese in the early sixteenth century realized that they had to abandon the Red Sea passage, they held control of the Persian Gulf trade but it was not until after 1515 that they secured a permanent position at Hormuz. Several encounters between the Ottomans and the Portuguese took place over the control of Muscat. The Ottoman fleet twice took Muscat but were driven away by the Portuguese in 1554 (illustration 72). In subsequent years the Portuguese strengthened their foothold in Muscat by the building of forts at Jalali in 1587 and Mirani in 1588. Other forts were erected throughout the coastline of the Arabian/Persian Gulf and, in general, the Western Indian Ocean, many of which are visible to this very day.

Final thoughts

From what has been said earlier, the evidence seems clear that until the early sixteenth century, the harbours and communities of the Indian Ocean had for centuries enjoyed a relatively much more peaceful commercial co-existence than those in the Mediterranean. In the Early and Middle Medieval period, the Mediterranean was the scene of Arab-Byzantine and later Arab-Crusade military-naval incursions with serious repercussions on trade. Further encounters of war continued between the Christian West and Mamlūk Egypt and Syria (13th–14th c) followed by the escalation of periodic naval battles and piratical raids between the Christians and the Ottomans (16th–18th c).

From the Fāṭimid to the Mamlūk period, the Red Sea was a major artery of commerce linking the Mediterranean with Arabia, East Africa, India, and the East Indies. The Franks, in 1116, established full control of Ayla, the head of the Gulf of Aqaba and seized the Isle de Graye, Jazirat Firawn, with the aim of controlling the road used by merchants and pilgrims that went from Fustat through Sinai to the Hijaz. It is reported that in 1182, Frankish ships sailed as far as Aidhab, sacked the harbour, destroyed 16 Muslim cargo ships and then proceeded to the Arabian littoral. The Red Sea sustained no naval forces and panic struck among the Muslims in Egypt and Syria as they feared further attacks on major harbours in the Red Sea and the holy cities of Mecca and Medina. In 1183 Ṣalāḥ al-Dīn's brother ʿĀdil had a number of warships transported overland from Egypt which proved to be a saviour for the Muslims. The Franks were defeated after a pursuit of five days, and

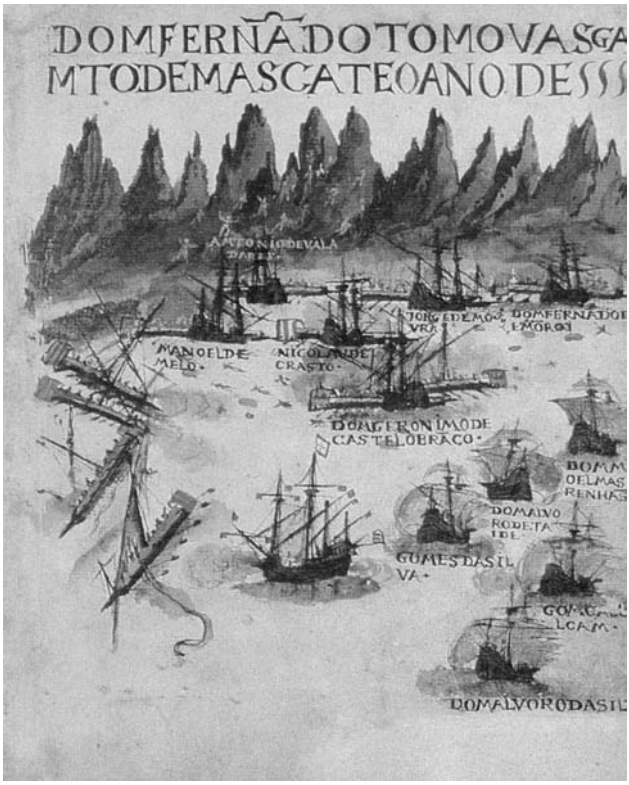


Illustration 72 Fernando de Menezes' fleet attacks the Ottoman galleys at Muscat in 1554 (after Cortesão & Da Mota 1960, I: pl. 87, from Anónimo, *Livro de Lizuarte de Abreu* c. 1564)

thereafter Christians had no access to the Red Sea.[57] Commercial ties between Egypt and India strenghtened the port of Aidhab, and later, Quseir; thus, Muslim shipping flourished in the Red Sea as merchants, traders and sea captains from the Persian Gulf sought Aden, and the ports of East Africa and West India as their home (see Chapter 3).

The few naval encounters in the Western Indian Ocean, mentioned above, did not disturb the long distance trade. The Ming diplomatic expeditions under the Muslim Zheng He or Cheng Ho (d. 1433 or 1435) were extraordinarily peaceful in spite of the hundreds of armed men on board the *junk*s, a naval force that had not been witnessed before

[57] Other details see Facey 2005: 87–98.

by the coastal communities of the Western Indian Ocean. None of these events were able to disturb the Muslims and Indians as much as the appearance of the Portuguese threat at the beginning of the sixteenth century.

What do these incidents tell us about the Muslim naval presence at the time of the Portuguese attacks? Fuess argued that in the Mediterranean there was no regular Mamlūk fleet and that warships were built according to need; consider the events of 1507 and 1514 in the Red Sea, discussed above. Years passed with no use for this Mamlūk fleet and they were left to rot in the Indian Ocean and the Red Sea.[58] As the Portuguese encounters became intense, the Ottomans, the new lords, in order to protect the Red Sea ports and Yemen, began to apply similar naval tactics to those they used in the Mediterranean, but their Portuguese enemy was more experienced and better equipped with ammunition. That said, most of the Mediterranean operations were carried out over shorter distances and involved sailing in less difficult conditions than the Red Sea and the Indian Ocean; in both cases, to use Fuess's words, they were "built on an *ad hoc* basis for specific expeditions".[59]

[58] Fuess 2001: 60.
[59] Ibid.

PART FIVE

CHAPTER NINE

GENERAL BOAT AND SHIP-TERMS

وعلت بهم سججاء حاذمة
تهوي بهم في لجة البحر

They sped on a bark well-balanced fleet as the wind,
that bore them swiftly into the ocean's trough. [1]

Al-Muayyab b. ʿAlas (ndd)

References to various types of craft are many in the primary Arabic sources. In this chapter and the following Chapters, 10, 11 and 12, my attention is on the nomenclature of the different types of Classical and Medieval Islamic vessels. I shall discuss these types and make an attempt to look at their function in the context of the given data and their etymology. This attempt at discussion is by no means exhaustive; my intention is merely to sample some of the medieval Islamic vessels in order to understand their role in the wider picture of the Western Indian Ocean, and will, therefore, include some craft of Mediterranean provenance, to be discussed in the context of the environment and the period.

On the subject of medieval Muslim ships, Arabic literary sources provide richer information on types of war vessels than any other craft, which can be misleading. I am aware that classifying ships and boats into types is not an ideal model; such an exercise can lead to misinterpretation. Nevertheless, an attempt is made here to divide medieval craft into types according to their function.

For the ship typologist, the maritime historian and the linguist, it will forever remain a mystery why some ships carry the nomenclature they were given, whereas the reasons behind other names may be conjectured through the root-verb or the morphological structure of the term concerned; such conjecture can lead us to understand the function represented. The discrepancies are many, whether they are to do with name, coinage, function or size, but in the end, albeit with

[1] *Wa-ʿalat bihim sajḥāʾu ḥādhimatun/ tahwī bihim fī lujjati l-baḥri*, translation taken from Jones 1996, II: 125.

some difficulty, it is possible from the patchy infomation in the written texts and the sporadic iconographic evidence, to form a picture of the intended classical and medieval boat or ship.

The varied Islamic boat and ship-terms are the product of a highly developed society. Boats and ships may have carried the same nomenclature over the centuries but their function varied and what was true of one period could have been different in another. Our Islamic sources, like modern times, sometimes do not speak of specific types but use generic terms; some types, however, could have a dual function. To establish a method by which to classify Classic ships of Islam in the Western Indian Ocean under certain categories was difficult, and at times the lack of data in general made it almost impossible. In this chapter I shall focus on the application of generic boat and ship-terms.

General nomenclature

I shall first consider four terms: *qishr*, *ʿūd*, *lawḥ* and *khashab*, semantically related to a piece of "wood". *Qishr* or *qashr* (pl *qushūr*) is said to be a "shell, hull or husk"[2] and, therefore, anything that floats on water or sea. Of all the medieval lexicographers, only Ibn Sīda (d. 458/1066) defines this word as a ship; he adds a *qishr* "scrapes off the water as though it shaves it off" [*... tasfinu l-māʾ ka-annahā taqshiruhu*].[3] The word *ʿūd* (pl *ʿūdān*) literally means "a piece of wood of any tree"[4] which, by extension, came to mean a water or sea craft; thus Ibn Khaldūn (d. 808/1406–7) uses this term to refer generally to a ship,[5] though no Classical Arabic lexicon would list it as a boat or ship-term. As for *lawḥ*, it means "any broad or wide, and thin ... plank"; its plural, *alwāḥ* is normally used for a boat or ship. For example, its collective usage in the Qurʾān applies to Noah's Ark:

> But We bore him on an (Ark) made of broad planks caulked with palm-fibre
>
> [*wa-ḥamalnāhu ʿalā dhāti alwāḥin wa-dusurin*].[6]

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[2] Al-Zabīdī 1974, XIII: 415; see also Wehr 1966: 764; Lane 1984, II: 2525.
[3] Ibn Sīda 1893–1903, X: 23.
[4] Lane 1984, II: 2190.
[5] Ibn Khaldūn nd.: 225.
[6] Sūrat al-Qamar (The Moon) LIV: 13, for the translation see Ali 1946, II: 1456.

Perhaps the best example of the use of *alwāḥ* is found in Ibn Jubayr's (d. 614/1217) *Riḥla* (The Travel): he recounts that during the *ḥajj* (pilgrimage season) the shipowners of Aidhab cram their ferry-boats with pilgrims like a chicken coop. He continues saying that these shipowners were indifferent and insensitive to people's safety; all that mattered was that they made money from the pilgrims. To this purpose he quotes a saying by the people of Aidhab:

> Ours to produce the ships [*alwāḥ*]; the pilgrims' to protect their lives [*arwāḥ*].
>
> [*ʿalaynā bil-alwāḥ wa-ʿalā l-ḥujjāj bil-arwāḥ*].[7]

The rhyming of *alwāḥ* "ships" with *arwāḥ* "lives" (lit. souls) is very effective and the message is clear. Both terms are actively used by Southern Arabians: in an inscription I found on the stern of an old *sanbūq* [s.v.] in Sadh (South Oman) it read as follows:

> O You who preserve life (sailing) on a ship/ O You who rescue ships from the depths of the sea/ Save and guard our *sanbūq*/ O Allāh, provider and saviour!
>
> [*yā ḥāfiz al-arwāḥ fī l-alwāḥ/ yā munajjī l-alwāḥ fī lujaj al-baḥr/ taḥaffaz lanā hādhā l-sanbūq/ yā Allāh, yā razzāq, yā Allāh yā ḥāfiz*].[8]

It is an invocatory prayer that Allāh may protect the "planks" (*alwāḥ*), i.e. the ship, and the "lives" *arwāḥ* of the fishermen from peril and destruction and to provide them with a good catch; two terms that for centuries the coastal communities retained in their maritime repertoire.

Khashab (pl *khashabāt* or *akhshāb*) is "a piece of wood, plank, board etc.";[9] like the last two terms discussed above, it is not found in classical and medieval dictionaries,[10] yet its usage, according to Ibn Mājid (d. after 906/1500), was prevalent on the Tihama coast.[11] Other sources indicate that the term was applied to both a cargo ship and a fighting vessel (10th/16th c).[12] In modern times *khashaba* is used by Southern Arabian fishermen to refer to any large ship that sailed to India, the

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[7] Ibn Jubayr nd.: 65; idem 1952: 65.
[8] See Agius 2002: 31, 35.
[9] Lane 1984, I: 741.
[10] Mention of it comes in a nineteenth century bilingual English-Arabic lexicon compiled by Badger (1889: 960) as a collective term.
[11] Tibbetts 1981: 110–11, 251.
[12] Ibn al-Dayba' 1983: 263; see Serjeant 1974: 48, 51, 74.

Red Sea and East Africa or a trading vessel laden with frankincense and myrrh.[13]

The khayṭiyya *and* mismāriyya

The meaning of these two collective terms is self-explanatory.[14] *Khayṭiyya* (pl *khayāṭī* or *khayṭiyyāt*) implies something which is made of "thread, cord, fibre (*khayṭ*)",[15] hence a " sewn-planked ship". For example, the sewn Red Sea *jalba* was called *khayṭiyya* by al-Nuwayrī (fl. 8th/14th c). The boat which al-Tanūkhī (d. 384/994–5) boarded on a journey to Ubulla was a sewn cargo boat. We do not know what type the craft was but obviously *khayṭiyya* was a commonly known term whether it was of generic or specific use. He narrates:

> …I prepared my luggage to go to Ubulla by night. I kept on looking for a sailor but could not find one. At the end, I came across one who was sailing on a light *khayṭiyya* which was not cargoed and asked him if he could take me. So he did at some reasonable fare… .
>
> […*wa-(i)staʿdadtu ʿalā l-safar masāʾan ilā l-Ubulla fa-mā ziltu aṭlub mallāḥan falam ajid ilā anna raʾaytu mallāḥan mujtāzan fī khayṭiyya khafīfa fārigha fa-saʾaltuhu an yaḥmalanī fa-sahhala ʿalayya l-ujra*…].[16]

From the context it is clear that al-Tanūkhī was talking about a river or coastal boat. Larger sewn craft, reports the geographer al-Yaʿqūbī (d. 277/891–2), were built in Ubulla and could sail as far as China.[17] The planks of these ships were threaded with the coir made from coconut husks called *qinbar* (*qanbar* or *qunbār* or *kunbār*), hence a sewn boat on the Nile as reported in the Genizah letters,[18] and until very recently it was known among the coastal people of Dhofar as a *kambārī*.

Conversely, the word *mismāriyya* (pl *mismāriyyāt*) means something constructed by the use of "nails" (s *mismār*, pl *masāmīr*),[19] and, therefore, "a nail-planked ship". Works of literature are not usually our best sources

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[13] Al-Quṭāmī 1964: 99, 105, 118; Agius 2002: 35–6.

[14] See for example al-Yaʿqūbī 1892: 390; al-Muqaddasī 1906: 32 and Quṭb al-Dīn al-Makkī in Kindermann 1934: 100.

[15] Wehr 1966: 267.

[16] Al-Tanūkhī 1375/1955, II: 338.

[17] Al-Yaʿqūbī 1892: 390.

[18] TS 12.556; TS 13, J17, fol. 7; TS 13, J19, fol. 29; BL Or 5563 C, fol. 19; ULC Or 1080, J170.

[19] Wehr 1966: 429.

on maritime matters, but the bellettrist al-Jāḥiẓ (d. 255/ 868–9) claims that the Umayyad governor of Iraq al-Ḥajjāj b. Yūsuf (d. 95/714), had ships built with nailed planks.[20] This is one of the earliest references to nailed planks in Arabic sources; the Umayyads, whose caliphal administration was in Damascus (41–132/661–750), would have employed Greeks and Syrians familiar with nail-planking. In the Indian Ocean, on the other hand, the general practice seems to have been for many centuries to sew planks with cord.

*Mismāriyya*s were generically known as "cargo and/or transport ships".[21] The Ḥaḍramī chronicles list them as such:[22] it is recorded that the Portuguese arrived in Shihr in 938/1531–2 with *mismāriyya*s (transport or cargo vessels) and *galliot*s (small war galleys). Their intention was to sieze the vessels anchored in the harbour but after some resistance, the local ruler agreed to a settlement, thus avoiding further casualties.[23] The point here is that the Portuguese entered the harbour with *mismāryya*s which they had seized from the Ottomans and which the ruler of Shihr thought he would recapture. Another mention in the same documents is that the Ottomans in 976/1568–9 arrived in Jeddah with an army of 3,000 men and with a fleet consisting of 17 ships, three of which were *mismāriyya*s (cargo vessels).[24]

Classical ship-terms

The most common classical and general ship-terms that occur in the Arabic sources are *safīna, qārib* and *markab*.

The safīna

The frequent occurrence of the ship-term *safina* (pl *sufun, safā'in, safīn*)[25] in pre-Islamic and early Islamic poetry suggests that it has long been known among the Arabians, particularly in Mesopotamia, as the verses from the *dīwān*s (collected poems) of ʿAmr b. Kulthūm (d. c. 600 CE)

[20] Al-Jāḥiẓ 1938–1945, I: 82–3.
[21] Tibbetts 1981: 138; see also Serjeant 1974: 64, 174.
[22] Serjeant 1974: 64.
[23] Ibid., 174.
[24] Kindermann 1934: 100.
[25] Of the plural variables, *safā'in* is the least commonly used, see Lane 1984, I: 1375.

and Maymūn b. Qays al-Aʿshā (d. after 625 CE) show. Their allusion to the she-camel as "the ship of the desert" (*safīnat al-barr*) is a well-known metaphor in world literature; the slow movement of the animal on the sand compared with the ship sailing on the waves is a simple but vivid picture.

In addition to the early poetry, *safīna* appears in the Qurʾān three times: in Sūrat al-Kahf (The Cave) twice[26] and Sūrat al-ʿAnkabūt (The Spider) once,[27] the latter alluding to Noah's Ark. The tale of Noah and the Ark represents an important event in the three monotheistic religions: the *safīna* becomes the archetype of all ships that reach their destination safely and only, in the Qurʾānic context, because God is beneficient.[28] The symbolism of the ship is likened to man who struggles with the vagaries of life and Noah's Ark shows that destiny lies in God's divine will.

A *safīna* is generally known as a large ocean-going ship operated by sail.[29] The word is compounded to explain different functions: *safīna baḥriyya* "deep-sea vessel",[30] *safīna ḥarbiyya* "warship",[31] and *safīna safariyya* "cargo vessel".[32]

Historically, this ship-term is known to be an old Semitic form, its common root being */s.f(p).n./* "to cover in". The Arabic *safīna* probably originates from Biblical Hebrew *sʾfinah*,[33] or, as Fraenkel first identified it, from Aramaic,[34] *sʾfinaʾ* and *sʾfintaʾ*.[35] Further research has shown that the Semitic term goes back to as far as Late Babylonian *çâphan* (saw-fan)[36] and can ultimately be traced back to Akhadian, *sapīn(a)tu*.[37]

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[26] Sūrat al-Kahf XVIII: 71, 79.
[27] Sūrat al-ʿAnkabūt XXIX: 15.
[28] See Montgomery's (1997: 199) discussion on this subject.
[29] Al-Minhājī 1374/1955, I: 96; see also al-Asyūṭī 1996, I: 79.
[30] Al-Ṭabarī 1965, XII (iii): 1582.
[31] Al-Iṣṭakhrī 1870: 71.
[32] Al-Idrīsī 1866: 181, 193.
[33] Patai 1998: 41.
[34] Fraenkel 1962: 216; see also Jeffery 1938: 171–2.
[35] Patai 1998: 41.
[36] Strong 1982: 83–4.
[37] Agius 1984: 118, 147.

The universal qārib *and* markab

The qārib

Qārib (pl *qawārib*), a common term with a very wide usage, is still present in today's maritime repertoire, perhaps more applicable to the Mediterranean than the Western Indian Ocean context.[38] In the first/seventh century, the *qārib*s were known to be typical cargo ships that plied in the waters from the Maghrib to al-Andalus and between Seville and Alexandria as mentioned in the Genizah letters.[39]

Well documented in medieval times, her usage was noted as a transport vessel for soldiers and pilgrims and as a cargo boat carrying cereals, food and water.[40] During Ibn Ṭulūn's time (254–270/868–884) the *qārib*s were called "service boats" (*qawārib al-khidma*) because of a number of functions they performed, namely cargoing commodities but also transporting soldiers and equipment.[41] The *qārib* was the ship's boat, used by seamen to help them carry out their duties off shore, to load cargo, or as the emergency boat in time of danger.[42] In addition, the *qārib* was used as a fishing and pearling boat;[43] in the pearl season (April and May), Ibn Baṭṭūṭa (d. 770/1368–9 or 779/1377) recalls seeing numerous *qārib*s between Siraf and Bahrain.[44] There must have been different types but, for Ibn Baṭṭūṭa, they were all lumped together as *qārib*s "small boats". The locals probably had different names for each type but Ibn Baṭṭūṭa used the general nomenclature as known to him in the Mediterranean. He also mentions that *qārib*s functioned as pontoons in Tustar, Southern Iran, comparing them with others in Baghdad and Hilla.[45] Using boats as a bridge is a common practice around the world.

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[38] Al-Rāmhurmuzī 1883–1886: 12, 167–8, 175; al-Muqaddasī 1906: 32; see De Goeje 1879: 231.

[39] Goitein 1999, I: 21, 42, 211–3, 305–6.

[40] Al-Nuwayrī l-Iskandarānī, KLI (No 738) Ms 2335, ff. 260r, 262r and 262v; Ibn Miskawayh 1332–1333/1914–1915, II: 176–8; Ibn Bassām 1967: 186; see also Picard 1997: 253, 293, 314, 371.

[41] Oman 1978: 783.

[42] Ibn Sīda on the authority of Khalīl b. Aḥmad, 1898–1903, X: 26; al-Minhājī 1374/1955, I: 94–5; Ibn Baṭṭūṭa 1958–2000, II: 374; idem, 1968, II: 18; al-Zabīdī 1968, IV: 18; al-Jawharī 1984, I: 1999; Lane 1984, II: 2508; al-Makhzūmī 1986: 20, 25; but see also Hourani 1963: 99; al-Nukhaylī 1974: 22; Goitein 1999, I: 306.

[43] Ibn Baṭṭūṭa 1958–2000, II: 408; idem, 1968, II: 244–5.

[44] Ibid., 1958–2000, II: 410; 1968, II: 245–6.

[45] Ibid., 1958–2000, II: 284; 1968, II: 24.

As to the origin of the name *qārib*, there is every indication that it is Arabic: consider, its tri-consonantal root */q.r.b/*, its root-verb "to come near", the substantive usage *qirāb* "container" and *qārib* is said to mean "seeking to attain [or journeying to] water".[46] Historically, the Andalusi Arabic use of *qārib* or *qārab*,[47] which pre-dates the Spanish and Portuguese *caraba* and *caravo* (13th c),[48] may be traced back to Byzantine Greek, κάραβος (kárabos) "a light ship".[49] One final observation: it is possible that the Byzantines, through the eastern commercial links with Mesopotamia, borrowed their nomenclature from an earlier Semitic source.

The markab

One of the most common generic ship-terms in the Classical and Medieval period is the *markab* (pl *marākib*) which is said to be an ocean-going vessel propelled by both sail and oar and comes in different sizes. In the narratives of Captain Buzurg b. Shahriyār (d. 399/1009), it crops up in almost every tale, where it is clearly used as a generic term.[50]

It has its roots in the verb *rakiba*, "to mount, ride" and by extension "to embark on the ship; go on board the ship".[51] A long-established word in the Semitic tongues, *markab* can be traced to an Ugaritic-Canaanite origin, *markabtu*.[52] Apart from the classical meaning of a vessel, ship or boat, it is also understood to mean "any kind of vehicle borne by a camel or other beast".[53] It needs to be said that *markab*, is grammatically marked masculine but sometimes used as feminine,[54] subconsciously treating the word as *safīna*, a feminine noun.

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[46] Lane 1984, II: 2508.

[47] Corriente 1989: 241; idem, 1991: 140. It is one of the six seacraft mentioned by al-Jazīrī, see A. Ferreras Sánchez, "*El Maqṣad al-maḥmūd fī talkhīṣ al-ʿuqūd* de Abūl-Ḥasan al-Jazīrī (m. 585/1189)", PhD Thesis (Universidad Complutense de Madrid, 1991), p. 289, fol. 53v.

[48] It became established in the Romance languages (Fraenkel 1962: 218) medieval Latin *carabus*, and through the Levantine trade reached Egypt, Syria (Antoniadis-Bibicou 1966: 166) and Mesopotamia; see Kindermann 1934: 76; Pellegrini 1978, II: 817–8.

[49] Liddell & Scott 1953: 877.

[50] Al-Rāmhurmuzī 1883–1886: 8–12, 12–20, 25, 28, 33, 71, 103, 165–8, 177.

[51] Lane 1984, I: 1142.

[52] Von Soden 1958–1981, II: 612.

[53] Ibn Manẓūr nd., III: 1714; al-Zabīdī 1966, II: 524.

[54] See for example, *Alf layla wa-layla* nd., I: 65; al-Rāmhurmuzī 1883–1886: 177.

The plural, *marākib*, is often compounded: *marākib ʿammāliyyāt* for Mesopotamian river vessels (5th/11th c),[55] *marākib baḥriyya* (or *safariyya* or *musāfira*) "ocean-going vessels", *marākib ḥammāla* "cargo ships",[56] *marākib ḥarbiyya* (or *ghazwāniyya*) "warships",[57] *marākib muqātila* "fighting ships",[58] *marākib muʿtadda* "equipment ships",[59] *marākib al-tujjār* "merchant ships". Two compound terms mentioned above, *ʿammāla* (< CA *ʿamil* "to do service") and *ḥammāla* (< CA *ḥamal* "to carry") are independent names for transport and cargo vessels.[60] Therefore, *markab* was an all-purpose ship: authors would attribute words to the noun *markab* to describe whether the ship was a "light ship" *markab khafīf*, "cargo vessel" *markab shaḥūn*, "laden ship", *markab thaqīl* or *markab wazīn*.[61]

General nomenclature for war vessels

The commonest generic term for fleet is *usṭūl* (pl *asāṭīl*, cf. Gr. στόλος), sometimes *ufrūṭa* (< (?) It *flotta*)[62] though also known as an individual warship.[63] In almost all accounts (history, geography and travel) of the early centuries of Islam, *safīna* and *qārib* appear to be the most common term in Mediterranean Byzantine-Islamic warfare.[64] There is evidence to suggest that the early Arab *qārib*-type was modelled after the Byzantine war vessel. *Markab* in the context of naval warfare was applied in a compound term to describe enemy ships as *marākib shalandī* (ships of the galley type),[65] and *marākib al-Rūm* (war vessels of the Byzantines).[66] Other general terms were *ḥarbī* (pl *ḥarbiyyāt*), *nāshī* (pl *nawāshī*) for ships engaged in skirmishes[67] and *shīnī* (pl *shawāni*) [s.v.],

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[55] De Goeje 1879: 231.
[56] Al-Idrīsī 1866: 112; see also Amari 1857: 333.
[57] Al-Maqrīzī 1957–1973, III (i): 113; IV (ii): 567; IV (iii): 1205; Ibn Ḥawqal 1992: 180; see also al-Nuwayrī l-Iskandarānī 1968–1976, II: 230.
[58] Al-Nuwayrī l-Iskandarānī 1968–1976, I: 165.
[59] Tibbetts 1981: 48.
[60] Al-Maqrīzī 1911–1924, II: 193; Ibn Mammātī 1943: 24; see also al-Masʿūdī 1861–1877, I: 283.
[61] Tibbetts 1981: 48.
[62] Al-Nuwayrī l-Iskandarānī 1968–1976, I: 112; III: 89.
[63] Goitein 1999, I: 307–8.
[64] Fahmy 1966: 103–6.
[65] Al-Ṭabarī 1965, XII (iii): 1417–8.
[66] Al-Nuwayrī l-Iskandarānī 1968–1976, II: 232–3.
[67] Al-Idrīsī 1994, I: 286.

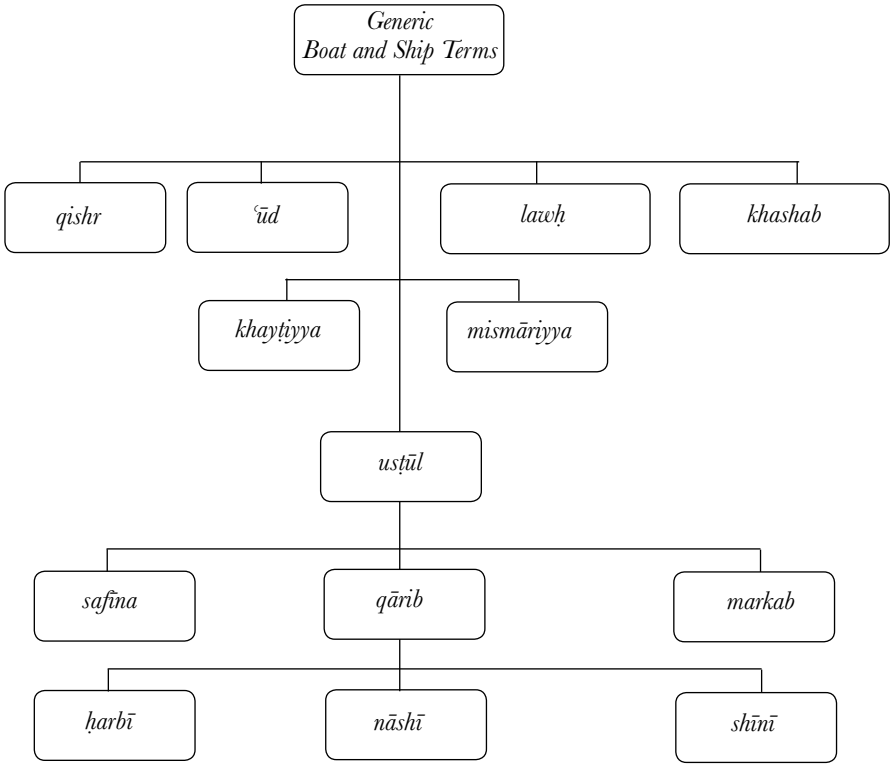


Figure 6 Generic boat and ship-terms of Classical and Medieval Islam

typically stood for any galley[68] though sometimes it could refer to a specific type.

Conclusion

Words like *ʿūd*, *lawḥ* and *khashab* essentially mean a piece of wood that floats. Often reference to boats and ships in geographical and historical works is marked by general terms such as *safīna*, *markab* and *qārib*, which are the most commonly used of all names (figure 6). They have lasted for centuries and are still in use in modern parlance. Such terms are

[68] Al-Maqrīzī 1911–1924, IV: 53; idem, 1957–1973, IV (ii): 617, 695, 722, 919; IV (iii): 1205, 1227.

all inclusive: medieval Muslim authors used them irrespective of the craft's size and hull design; other ship-types have specific names.

The history of the nomenclature of boat and ship-types can be examined linguistically and culturally which will be the subject of the ensuing chapters (10, 11 and 12). An attempt is made to group them under size and function and, wherever possible, the discussion will include information on hull design, though it must be said that Classical Arabic sources are vague about such detail and, as we shall see, if they do provide information, they are not necessarily helpful.

CHAPTER TEN

CLASSIC SHIPS

الله الذي سخر لكم البحر لتجري الفلك فيه
بامره ولتبتغوا من فضله ولعلكم تشكرون

> It is God who has subjected the sea to you, that ships may sail through it by His command, that ye may seek of His Bounty, and that ye may be grateful.[1]
>
> Al-Qurʾān, Sūrat al-Jāthiya, XLV: 12.

There are intriguing references to ships and seafaring in early Islamic poetry and the Qurʾān, and although set in a poetic context, they are obviously coming from contemporary experience and therefore are synchronically of value to this study.

The ship-camel parallel

In the early centuries before the emergence of Islam, Najd was the centre where East and West Arabians came together for fairs and pilgrimages; here, the poets from many tribes met at the courts of Hira on the Euphrates and Ghassan in Syria[2] to recite their *qaṣīda*s (odes) on a number of themes, expressing them with vigour and vividness of imagination, articulated in a beautiful and rich language. Throughout the early period, the language and imagery was that of the Bedouin, and poetry was associated with nomadic life. One of the themes was animal life: addressing his fellow tribesmen, the poet drew on images from both the desert and the sea, thus he compared the sand and the sea or the camel and the ship. It is clear that desert poets were familiar with the sea, the ship and her voyage and Barthold was wrong to state that pre-Islamic poetry was generally void of descriptions of the sea.[3]

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[1] *Allāhu lladhī sakhkhara lakum al-baḥra li-tajrī l-fulku fīhi/ bi-amrihi wa-li-tabtaghū min faḍlihi wa-laʿallakum taskhurūna*; trans. Ali 1946, II: 1357.

[2] Rabin 1951: 3; Trimingham 1990: 6–7, 122–4, 166–7, 178–88.

[3] Barthold 1929: 37.

Alan Jones concurs that the desert and the sea "are part of the basic poetic repertoire in Early Arabic".[4]

For the desert poets, the camel journey (*takhallus*), one of the three sections of the ode, was to illustrate metaphorical re-enactment: the desert/sea symbolising vastness—endless time while the camel/ship's movement is depicting symmetry and coordination. Consider the imagery of the camel driver pleasantly mounted for a long journey and the dromedary's swaying pace, compared with the mariner on the ship sailing with a favourable wind as she rocks forward, backward and sideways in the ocean.

The ode is also a reflection of the nomadic love for the journey (*raḥīl*). Ṭarafa b. al-ʿAbd (d. c. 569 CE), one of the pre-Islamic court poets, is well known for his long and detailed descriptions of the she-camel on her journey; the comparisons he made were striking and show the unique bond between man and the animal in an environment where life itself could depend on its strength; moreover, the scenery is considered one of the finest examples of the depiction of landscape in the pre-Islamic odes. More to our purposes here, however, we learn from his ode that Arabians had well-developed nautical skills.[5]

The ship-camel comparison, metaphorically or literally, is a classical theme. One shares the poet's experience poetically and emotionally. There are several examples, but a general portrayal of such an identification is lively in the poem of Zuhayr b. Abī Sulmā (d. after 627 CE); he compares caravan guides riding their camels in the vast desert with mariners sailing their vessels across the ocean:

> The camel-drivers took them into the soft parts on the expanses of sand in the same way that
> fishermen cause their ships to go deep into the waves of the open sea.
>
> [*yaghshā l-ḥudātu bihim waʿtha l-kathībi ka-mā yughshī l-safāʾina mawja l-lujjati l-ʿaraku*].[6]

Zuhayr's simile is extraordinarily precise; he strives to describe the sand and sea "with an equally sensitive choice of words", Arberry

[4] Jones 1996, II: 125.
[5] Arberry: 1957: 83–4; Jones 1996, II: 124.
[6] Ahlwardt 1870: 86; Jones 1996, II: 124.

commented.[7] The vocabulary is large and rich in synonyms.[8] Typical of the camel-ship parallel is comparing the howdahs (litters) with sails, such as in the ode by Bishr b. Abī Khāzim al-Asadī (d. c. 535 CE):

> Their camel-borne litters, on the morning they departed,
> resembled
> ships tossed about on a watercourse with humped waves
>
> [*fa-ka-anna zuʿnahumu ghadāta taḥammalū*
> *sufunun takaffaʾu fī khalījin mughrabi*].[9]

For ʿAbīd b. al-Abraṣ (d. c. 554 CE), the ship that sails on "humped waves" is compared to the camel driven by the wind on the desert dunes:

> As ships float on the humped waves of a deep main,
> tossed by a wind on the water of the Tigris
>
> [*ka-ʿawmī l-safīni fī ghawāribi lujjatin*
> *tukaffiʾuhā fī māʾi Dijlata rīḥun*].[10]

The "ship of the desert" is a powerful concept: the poet's inspiration to compare the ship and the camel is simple and striking.[11] It would be logical to assume that the desert poets based their descriptions upon personal observation and that their poetry was recited to an audience acquainted with both the pastoral life and voyaging by boat on the river or by ship on the open sea.

My concern here, however, is the types of ships: how familar were the poets with the watercraft they mention? What can early Islamic sources tell us of their size and function? Our sources, Early Islamic poetry and the Qurʾān, both testify to the existence of craft at the time they

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[7] Arberry 1957: 249.
[8] Ibid., 250.
[9] Montgomery 1997: 186.
[10] Ibid., 184.
[11] Consider, the Andalusian poets (5th–6th/11th–12th c) who described the ship in human, bird and object terms: the ship is the bride (*ʿarūsa*), daughter of the sea (*bint al-māʾ*), son of the sea (*ibn al-māʾ*); the ship is the bird, as the crow (*ghurāb*), eagle (*nasr*), falcon (*shāhīn*), pigeon (*ḥamāma*) and dove (*warqāʾ*), and finally, the ship is an inanimate object as house (*manzil*) and mountain (*jabal*). Several Andalusian sea poems are vivid with comparisons between ship and bird/beast: swiftness as the eagle (*fatkhāʾ*), the oars are like the speckled snake (*arqam*) or scorpion (*ʿaqrab*) and the sail compared to the wing of the bird; though the riding camel (*maṭiyya*) and the horse (*khayl*) are by far the most common metaphors, see Jalal Abd Alghani's forthcoming article in *Al-Masāq, Islam and the Medieval Mediterranean.*

were recorded but it is also possible to speculate that they had been around centuries earlier.

The classic ships: khaliyya, qādis *and* būṣī

The *khaliyya* (pl *khalāyā*) of pre-Islamic poetry is likened to "a freely roaming milking camel".[12] Muraqqish al-Akbar (d. c. 552 CE) describes them in one of his verses carrying litters and tall as the palm trees, he asks:

> To whom belong the litters floating in the morning,
> in appearance *dawm* palms or huge, dromedarian ships?
>
> [*li-mani l-ẓuʿnu bil-ḍuḥā ṭāfiyātin*
> *shibhuhā l-dawmu aw khalāyā safīni?*][13]

The metonymical representation of "milking camel" is interesting, and particularly that it is a "freely roaming" one, a beautiful imagery compared to a ship in the sea. Consider the imagery of huge litters, here compared with the *khaliyya* in the verse of Ṭarafa b. al-ʿAbd (d. c. 569 CE):

> (It was) as though the litters of the Mālikī camels (at) morning
> were hulks of ships in the wide-spaces of (the Wādī of) Dad
>
> [*ka-anna ḥudūja l-mālikiyyati ghudwatan*
> *khalāyā safīnin bil-nawāṣifi min dadi*].[14]

He likens the movement of the litters, swaying right and left, with the rocking motion of the *khaliyya*s. Ṭarafa is deeply involved and the scenery evokes poetical emotion, beauty and alertness.

Khaliyya is of the root-verb *khalā* "to be free"[15] from which derives the noun *khaliyya*, which could be interpreted as a "ship that sails freely".[16] If we take the following two verses by Maymūn b. Qays al-Aʿshā (fl. 6th century CE) it becomes clear that *khaliyya* is a ship "in full sail":

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[12] Ibn Sīda 1893–1903, X: 26; al-Jawharī 1984: VI: 2330–1.
[13] Lyall 1918–1924, II: Poem 49.1; trans. Montgomery 1997: 185.
[14] Ibn Manẓūr nd., II: 1257; see also Ahlwardt 1870: 54–5; trans. Bateson 1970: 143.
[15] Al-Jawharī 1984, VI: 2331.
[16] Written communication from Barbara Jockers (8 December 2005).

No foaming watercourse in the Euphrates,
black, its breakers crashing together,
Flinging the huge ship, in full sail,
with its prow almost shattered. . . .

[*wa-ma muzbidun min khalīji l-furā*
-ti jawnun ghawāribuhu taltaṭim
yakubbu l-khaliyyata dhāta l-qilāʿ
-i qad kāda juʾjuʾuhā yanḥaṭim. . .].[17]

These are tantalizing glimpses but still the *khaliyya* remains a mystery on which our main source, pre-Islamic poetry, cannot throw much light. The lexicographer al-Azharī (d. 370/981) states that she was a fighting ship,[18] a claim that is unfounded and any idea that the word *khaliyya* gave rise to the Old Spanish name for *galea* (galley) should, as Kindermann rightly noted, be dismissed.[19] What we can deduce from the sources, is that the *khaliyya* was a large ship with full sails but beyond that there is nothing.

The second ship-type we come across is the *qādis* (pl *qawādis*). In the following verse by Umayya b. Abī l-ʿĀʾidh (ndd) she is mentioned in the context of the sails' movement and is compared with the she-camel's neck on her journey in the desert:

She rushes with her neck which moves side to side,
just as the sails drive along the big ship.

[*wa-tahfū bi-hādin lahā maylaʿin*
ka-mā (i)ṭṭarada l-qādisa l-ardamūna].[20]

Away from the ship-camel allegory, Mulayḥ (ndd) compares the ship's sails with the tents on an encampment:

Just as on the sea the tent-pegs of a big ship rise,
which has a good, following south wind is speeding along

[*ka-mā nashaṣat fī l-baḥri awtādu qādisin*
marīsiyyatun ṭābat lahu fa-hwa jāfilu].[21]

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[17] Ibn Manẓūr nd., II: 1257; trans. Montgomery 1997: 192 with one amendment—I translated *khaliyya* as "ship" not "dromedarian (ship)".
[18] Ibn Manẓūr nd., I: 244, fn. 2; al-Zabīdī 1969, V: 417.
[19] Kindermann 1934: 25.
[20] Montgomery 1997: 190. Ibn Manẓūr's (nd., V: 3550) interpretation of *ardamūna* is a "sailor" (see also al-Zabīdī 1976, XVI: 356). I have opted for Montgomery's translation, "sails" which seems to fit very well in the context of the verse. According to Ibn Jubayr (1952: 384), *ardamūna* is a mizzen or aft-mast.
[21] Montgomery 1997: 190.

Perhaps this verse is indicating that the sails were square. Whatever the case we have no real idea what a *qādis* was.[22] It is an unusual name and it is unique to the Hudhalī poets (fl. before Islam).[23] The lexicographer, al-Azharī (d. 370/981) claims that she was a war vessel but gives no further information.[24] Dozy lists *qādis* as a large vessel with one or two masts[25] and this seems to be based on the poets' reference to a large ship. That the nomenclature might stem from Aramaic is possible but that it could have come from the Greek κάδος (kádos) should not be ruled out.[26]

The last type of craft noted in this section is the river boat *būṣī* (pl *bawāṣī*). In the following verse by Ṭarafa b. al-ʿAbd (d. c. 569 CE) a simile is drawn comparing the camel's "long neck" to the rudder of the *būṣī*:

> Her long neck is very erect while she lifts it up
> calling to mind the rudder of a Tigris-bound vessel
>
> [*wa-atlaʿu nahhāḍun idhā ṣaʿadat bihi*
> *ka-sukkāni būṣī bi-dijlata muṣʿidī*].[27]

As we have seen in Chapter 5, the rudder was the steering oar by which the early boatswain controlled the direction the boat took; likewise the camel-driver, by tapping on the camel's long neck with a cane, got her to move in the direction he wanted. Here is another description of this craft on the Euphrates in a verse by al-Aʿshā:

> Like the Euphrates wherever it flows,
> it flings the small vessel and the skilled mariner.
>
> [*mithla l-Furāti idhā mā ṭamā*
> *yaqdhifu bil-būṣī wa-l-māhiri*].[28]

A lively picture of a *būṣī* being tossed on the waves but managed by a "skilled mariner". Note that she is described as a "small vessel". The

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[22] See Fraenkel's comments (1962: 219).

[23] The Hudhalī (Northern Arabian) tribe was known for its tribal and beautiful poetry, see Rentz, 1971: 540–1. They also had a reputation for speaking correct Arabic, Rabin 1951: 79.

[24] Ibn Sīda 1898–1903, X: 26, on the authority of Khalīl b. Aḥmad; see also Ibn Manẓūr nd., I: 244, fn. 2.

[25] Dozy 1967, II: 314.

[26] On the Greek connection, see Fraenkel 1962: 219.

[27] Ahlwardt 1870: 56; Arberry 1957: 84; see also al-Zabīdī 1977, XVII: 500.

[28] Al-Zabīdī 1977, XVII: 500; al-Jawharī 1984, III: 1031.

next time we hear about the name of this craft is in the medieval period;[29] the Persian traveller Nāṣir-i Khusraw (d. c. 481/1088) reports to have boarded the *būṣī*, presumably a ferry-type, at Shati ʿUthman opposite the port town of Ubulla.[30]

In addition to these usages, Dozy defines *būṣī* as a large vessel with three masts. There is nothing to suggest that this was the case; nor is there any evidence, as he understands it, to suppose the word derives from the Latin *bussa* or *buza*.[31] We have in Andalusi Arabic *būs* or *būṣ* which seems most likely to have come from Latin and not from the Mesopotamian *būṣī*. On the other hand, the Romance terminology could be an earlier form of a Semitic term; if there was such a connection it would have come down from Aramaic or Chaldean via the Levantine trade.[32] One should note that there was a Babylonian type of boat called *butzith* (*buṣith*) or *bitzith* (*biṣith*) (1595–1158 BCE) which was used on the River Meshan, described as a small Marsh boat made of reeds, "elongated, narrow on the bottom but widening upward".[33] Could this Babylonian craft be the proto-type of *būṣī*? One further point is that a Persian origin, as al-Jawālīqī (d. 539/1144) claims, is also possible.[34] Early Persian and Semitic ship-terms often crossed each other's paths. Interestingly, we encounter the term *būṣī* in the nineteenth century, described as "a small boat that travels ahead of large vessels"; it is said that when the large vessel could not proceed, the passengers transferred their belongings into a *būṣī* in order to reach their destination.[35]

Two obscure classic ships: the ghassāniyya *and the* qawrāʾ

The origins of the *ghassāniyya* (pl *ghassāniyyāt*) are uncertain; it is recorded by Ḍābiʿ b. Ḥārith al-Barjamī (ndd) in the following verse:

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[29] Ibn Sīda 1898–1903, X: 26.
[30] Khusraw 1986: 96.
[31] Dozy 1967, I: 128. The Latin term developed later in Italian dialects, *buzzo, bucio, bucia* (a. 1158), *buccio* (a. 13th c) "a large vessel" or in the Calabrian dialect *vuzzu, guzzu*, "a small ship", see Pellegrini 1978, II: 820–1. Note the Maltese *luzzu*, a double-ended fishing boat deriving from perhaps Calabrian, see Aquilina 1987–1990, I: 764.
[32] For these possible origins see Shīr 1980: 31.
[33] See Patai (1998: 44) for a detailed description of the boat and her usage.
[34] Al-Jawālīqī 1867: 23.
[35] Fraenkel 1962: 217–8.

A *ghassāniyya* sailed across the deep ocean
when the wind started to blow [its sails] leisurely

[*tudāfiʿu ghassāniyyatun wasṭa luǰǰatin*
idhā hiya hammat yawma rīḥin la-tarassalā].[36]

The reference to a sea-going craft is clear; as for the name, it may, though unlikely, be associated with a person called, Ghassān, the owner or shipbuilder.[37]

Also unknown is the *qawrāʾ*, which occurs in pre-Islamic poetry and the *Mufaḍḍaliyyāt*, an anthology of early Islamic poems, some dating back to the beginning of the sixth century.[38] Here is what al-Muthaqqib al-ʿAbdī (ndd) had to say about the ship:

As if the saddle and its straps were [placed] on a caulked, high humped [ship], sailing the sea,
The prow of which cleaves the water as she climbs over the humped waves of every [watercourse] with its full dunes.

[*ka-annā l-kūra wa-l-ansāʿa minhā*
ʿalā qawrāʾa māhiratin dahīni
yashuqqu l-māʾa juʾjuʾuhā wa-taʿlū
ghawāriba kulli dhī ḥadabin baṭīni].[39]

The key-word here is *qarwāʾ*,[40] which seems to be used metonymically and understood in the context of a she-camel as being long-backed and "high-humped"[41] likened to the cargoed ship. *Qarwāʾ* is another example of an epithet usage, also found in the term *khaliyya* (discussed earlier) comparing "a roaming milk camel" to a sea-going vessel. In the following verse Bishr b. Abī Khāzim al-Asadī (d. c. 535 CE) relates *qarwāʾ* directly to a ship:

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[36] From the *Aṣmaʿiyyāt*; there were some 72 fragments of pre-Islamic or early Islamic poetry collected by al-Aṣmaʿī, a philologist who died in 213/828.

[37] Sulaymān 1993: 95.

[38] A title given to a collection of Early Arabic poems, most of which are pre-Islamic, put together by al-Mufaḍḍal b. Muḥammad b. Yaʿla l-Ḍabbī (d. 164/780 or 170/786), see Renate Jacobi, "Al-Mufaḍḍaliyyāt", in *Encyclopaedia of Islam*, volumes I–XII (Leiden: E. J. Brill, 1960–2004), VII: 306–8.

[39] Montgomery 1997: 190; see also Sulaymān 1993: 95.

[40] In a written communication with Barbara Jockers (30 November 2005), she pointed out from a German source (Fischer) that *aqrā* and *qarā* are associated with a "decked" ship; I have not come across any of the Classical and Medieval Arabic lexica listing this meaning.

[41] Ibn Manẓūr nd., V: 3616; al-Jawharī 1984, VI: 2461; al-Fīrūzābādī 1995: 1191; see also Lane 1984, II: 2088.

. . . and I have found myself
on a high-humped [ship] prostrating herself before the winds.

[. . . *wa-laqad arānī*
ʿalā qarwāʾa tasjudu lil-riyāḥi].[42]

Other verses of Bishr b. Abī Khāzim's poem show glimpses of his familarity with seafaring in the ancient world. These verses we have seen are our only source for the *qarwāʾ* so it is difficult to establish whether she ever existed; the term is obscure and any attempt to interpret it must remain hypothetical. That said, there is a connection to the root-word, *qariyya*, a nautical term for "the yard of a ship or a squared piece of wood upon the head of the mast of a ship".[43]

The Qurʾānic fulk *and* jāriya

The ancient fulk

The *fulk*, which appears in a few poetic verses and in a number of Qurʾānic *sūra*s (chapters), is the classical type mentioned by several Muslim historians and geographers and is listed by practically all medieval lexicographers. Her provenance might be the Red Sea, the Persian Gulf or the Western Indian Ocean; certainly it must have been a well-known vessel among the Arabians to appear in the Qurʾān twenty-three times. In grammatical terms, *fulk* (pl *fulūk*) is masculine and feminine but it can also be used collectively.[44]

In one of the pre-Islamic poems recited by the Hudhalī poets (fl. before Islam), these *fulk*s are featured in a captivating verse in which Ibn Barrāq (fl. 5th or 6th CE) describes an anchorage activity:

The wind that smites the clouds in a mirage as the
sea-going vessels continue to load (their merchandise) near the shore.

[*jawāfilu fī l-sarābi ka-mā (i)staqallat*
fulūku l-baḥri zāla bihā l-shirīru].[45]

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[42] Montgomery 1997: 170–1.
[43] Lane 1984, II: 2988.
[44] Al-Zabīdī 1993, XXVII: 305.
[45] Ibn Sīda 1898–1903, X: 24.

The appearance of the *fulk* in the Qurʾān is significant for the following reasons: Firstly, of primary importance is the metaphoric usage of the ship-term and the religious message that it conveys, an example being where the *fulk* is represented as Noah's Ark, the deliverance of mankind;[46] she is the symbol of trade and abundance but mainly of life and none of this is possible if it were not for God's grace and infinite bounty.[47] Secondly, and it is this which concerns me here, is the nautical information that we can infer. Here the *fulk* must have been a large vessel as she is used to refer to both Noah's Ark and a cargo (-passenger) ship; the latter is said to plough the waves in favourable winds and braving gales and storms.[48]

The Arabian *fulk* existed in pre-Islamic times, at least as early as the fifth century CE, and could have been around when the Greek ἐφόλκιον (efólkion) was recorded,[49] a cargo ship of the Red Sea. Her occurrence in Islamic sources of the later period is rare:[50] in the third and sixth voyages of Sindbād the Sailor in the *Arabian Nights*, there is a reference to a *fulk* which, judging from the context, can only be a life boat or possibly, as Lane rendered it, a raft.[51] From all of this one can conclude that *fulk* was a known term with a multi-purpose function.

One interesting verse from Nāṣir al-Dīn b. Nāhid (ndd), quoted by Ibn Baṭṭūṭa, compares

> …vessels like celestial spheres
> some upwards and some downwards, sail
>
> [*wa-l-fulku ka-l-aflāki bayna ḥadirin wa-musʿadin*].[52]

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[46] Sūrat Yūnus (Jonah) X: 73; Sūrat Hūd ([The Prophet] Hūd) XI: 37–8; Sūrat al-Muʾminīn (The Believers) XXIII: 27–8; Sūrat al-Shuʿarāʾ (The Poets) XXVI: 119; Sūrat Yā Sīn ([The Letters] Yā Sīn) XXXVI: 41.

[47] Sūrat al-Baqara (The Heifer) II: 164; Sūrat Yūnus (Jonah) X: 22; Sūrat Ibrāhīm (Abraham) XIV: 32; Sūrat al-Naḥl (The Bee) XVI: 14.

[48] Sūrat al-Ḥajj (The Pilgrimage) XX: 65; Sūrat ʿAnkabūt (The Spider) XXIX: 65; Sūrat al-Rūm (The Roman Empire) XXX: 46; Sūrat Luqmān (The Wise) XXXI: 31; Sūrat Fāṭir (The Originator of Creation) XXXV: 12; Sūrat al-Ṣāffāt (Those Ranged in Ranks) XXXVII: 140; Sūrat al-Muʾmin (The Believer) XL: 80.

[49] De Landberg 1920–1942, III: 2436; Kindermann 1934: 72; Liddell & Scott 1953: 746.

[50] See for example al-Masʿūdī 1861–1877, I: 292.

[51] *Alf layla wa-layla* nd., III: 120–1, 142–3; *The Thousand and One Nights* 1979–1981, III: 27, 64–6, 92, fn. 40.

[52] Ibn Baṭṭūṭa 1968, I: 69; idem, 1958–2000, I: 42.

It is a play on words, *fulk* (collective use for ships) and *aflāk* (celestial spheres), both stemming from a common root /*f.l.k.*/; poetically, he gives the *fulk* an almost magical grandeur as well as a hint, through its root-verb *falaka*, to her possible shape "being rounded".[53] Cargo ships are often said to have round-shaped hulls (see Chapter 5).

It remains, finally, to explore the possibility of finding some historical link between the classical *fulk* and the modern *fulūka* of the Nile and the Red Sea;[54] the nomenclature is an ancestor to several Islamic and European Mediterranean variants.[55] According to the lexicographer al-Zabīdī (d. 1205/1790–1), the use of the contemporary Egyptian *fulūka* is a dialectal derived form of *fulayka*, a diminutive of *fulk*,[56] It is possible, but both Dozy and Engelmann think that there is no connection.[57] Also to be considered is the Iraqi nomenclature *filka* (pl *filak* or *filkāt*), a type found on the Tigris in Baghdad; al-Dujaylī, writing around the beginning of the twentieth century, describes her as a ferry or pleasure rowing boat, 26 feet (c. 8 m) long, and fitted for six or eight oarsmen.[58] The common ground for this philological inquiry is that all these boat and ship terms stem from one common root /*f.l.k.*/ but whether historically there is any connection with the ancient *fulk* one cannot tell. It is possible to speculate, however, an Arabic and Greek link, given the fact that both ships described above have existed around about the same time and in the Nile and the Red Sea; thus at some point the Arabic name could have been borrowed from Greek or the other way round.

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[53] Fraenkel 1962: 212. One of the forms of *falak* means "circle" or "orbit; celestial sphere", Wehr 1966: 727. Note Hebrew *pēlekh* and an Assyrian cognate *pilakku* "whirl of spindle", Gesenius 1906: 813.

[54] Recorded in Yemen (*falūka* or *fullūka*) for "small ship", see De Landberg 1920–1942, III: 2436.

[55] First recorded in 1628, other documents dated 1655 and 1662, see OED, I: 982; mainly: *feluke, feluque, felucca, filucca, falucca, phalucco, felouca, felouk*; note Italian *felu(c)a*, French *felouque*, Spanish *faluca*, Portuguese *falua*. For example, Moroccan *flûka* (pl *flâik*), "barque ordinaire servant au transport des voyageurs seulement", Brunot 1920: 249; see Pellegrini for the European entries, 1978, II: 825.

[56] Al-Zabīdī 1993, XXVII: 307.

[57] Dozy & Engelmann 1869: 264–6.

[58] Al-Dujaylī 1912a: 153; Ritter 1919: 137.

The large jāriya

The *jāriya* (pl *jāriyāt* or *jawārā* or *jawār*) is popularly defined by its root-verb *jarā* "to run" and therefore by extension, "a ship, because [she *runs*] upon the sea".[59] We can only surmise from the Qurʾān that the *jāriya* was a large vessel as, like the *fulk*, she is associated with Noah's Ark:

> We, when the water (of Noah's flood) overflowed beyond its limits, carried you (mankind) in the floating (Ark).
>
> [*inna lammā ṭaghā l-māʾu ḥamalnāhum fī l-jāriyati*].[60]

The *jāriya*s are pictured as deep-sea vessels sailing majestically in the ocean; two Qurʾānic verses describe them as tall, ploughing their course through the ocean:

> And among His signs are the ships, smooth-running through the ocean, (tall) as mountains.
>
> [*wa-min ayātihi l-jawāri fī l-baḥri ka-l-aʿlāmi*].[61]

In another verse

> And His are the ships sailing smoothly through the seas, lofty as mountains
>
> [*wa-lahu l-jawārī l-manshuʾātu fī l-baḥrī ka-l-aʿlāmi*].[62]

The spiritual symbolism in these verses is clear; the ship cannot move without the wind, just as man is helpless without His Creator.[63] In both verses the word *aʿlām* (s *ʿalam*), translated here as "mountains",[64] presents a picture of a broad and elevated ship with sails that spread wide and high "as mountains" (*ka-l-aʿlām*). Classical Qurʾānic interpreters generally seem to agree in glossing *aʿlām* as *jibāl* (mountains), but some translators of the Qurʾān into English have interpreted this

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[59] Ibn Sīda, on the authority of al-Fārisī, 1898–1903, X: 26; Ibn Manẓūr nd., I: 610; see also Kindermann 1934: 15; Lane 1984, I: 416.

[60] Sūrat al-Ḥāqqa (The Intrinsic Reality) LXIX: 11; translated by Yusuf Ali 1946, II: 1597.

[61] Sūrat al-Shūrā (The Consultants) XLII: 32; translated by Yusuf Ali 1946, II: 1315.

[62] Sūrat al-Raḥmān (The Most Gracious) LV: 24; translated by Yusuf Ali 1946, II: 1475.

[63] Ali 1946, II: 1315, fn. 4572.

[64] On the use of "mountains" see translations by George Sale, *The Korân* (London: Frederick Warne and Co., nd.), pp. 471, 514 and N. J. Dawood, *The Koran* (London: Allen Lane, 1978; first published 1956), pp. 19, 157.

word differently: Beeston argues that the comparison between ships and mountains in terms of size should be discarded because such hyperbole is "wholly uncharacteristic of the Quran".[65] He thinks that Bell's and Arberry's translations of "landmarks" rather than "mountains" is more appropriate.[66] In support of his argument Beeston cites from ancient poetry a verse which clearly indicates that the term was used to suggest "waymark", hence "when we journey past one *ʿalam* [waymark] another shows up" [*idhā qaṭaʿnā ʿalaman badā ʿalamun*].[67] An *ʿalam* for the Bedouin was a cairn of stones which guided travellers in the desert; so the simile is one that compares the ships with these cairns of stones as landmarks. But these cairns were not high or lofty as the Qurʾānic image seems to be saying, and I do not think that "landmarks" fits the picture here, rather the traditional gloss of *jibāl* (mountains) captures correctly the image of the sails at sea billowing so that they look huge like mountains. The translators of verse LV: 24 (note 62), quoted above, also interpret *aʿlām* as "landmarks". Again I do not think this is correct. Here the simile *ka-l-aʿlām* is preceded by a participal phrase, *jawārī manshuʾāt*, though the term *manshuʾāt*, according to Qurʾān scholars, is open to different interpretations: "raising a bow-wave in motion" or "with hoisted sails/hoisting their sails" or "well built".[68] All these are possible. The poetic image of *jāriya*s at sea with sails that rise high as mountains seems more fitting to me while the simile of the ships that appear on the horizon like cairns of stones in a desert horizon does not apply. The conclusion then is that we have a type, the *jāriya*, which like the *fulk*, was mentioned in the Qurʾān as being not only an example of a ship that "sails smoothly through the seas", but was obviously of considerable size.

The mysterious qurqūr

The earliest mention of the *qurqūr* (pl *qarāqīr*)[69] is in a poem of al-Nābigha l-Dhubyānī (d. c. 604 CE):

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[65] Beeston 1973: 94.
[66] Ibid.
[67] Ibid., 95.
[68] Ibid., 96.
[69] Lane 1984, II: 2501.

Damaging the fortresses and driving the vessels of the Nabateans
Away from them (pushing them) to the sloping hills

[*muḍirrun bil-quṣūri yadhūdu ʿanhā*
qarāqīra l-nabīṭī ilā l-tilāli].[70]

This is the only early instance recorded by an Islamic source. The reference to the Nabateans is intriguing. Who are they in this context? There are two possible explanations:

The first could be that it is a reference to the Nabateans who, as far as we know, moved around the area of Petra in South Jordan in the fourth century BCE, their roots being nomadic, according to the Roman historian, Diodorus Siculus (d. after 20 BCE).[71] A century later, the Greek geographer and historian, Strabo (d. after 21 CE), reports that the Nabateans were sedentary and practised agriculture but still maintained some nomadic characteristics.[72] They were famous for their trade in luxury goods, particularly frankincense, throughout Southern Arabia and finally achieved a trade alliance with Rome.[73] They also had good trade relations with the Ptolemies in Egypt and the Selucids in Asia Minor from the fourth to the first century BCE. Not much is heard about their maritime adventures in the Red Sea, but the pre-Islamic verse quoted above by al-Nābigha obviously refers to Nabatean sea activity and the poet identifies the *qurqūr*s as Nabatean vessels. We are told by Strabo, that the Nabateans generally lived a "peaceful life".[74] A lot of the luxury goods trade from Arabia and India to the Mediterranean passed through Nabatean hands but with the coming of the Romans in Palestine and Arabia, trade patterns changed. One alternative route was the Egyptian Red Sea coast; Strabo reports that "loads of aromatics" were transported from Leuke Kome and later from Myos Hormos (near modern Quseir).[75] Though a peaceful people in general, the Nabateans turned to piracy; Strabo reports that by sailing on rafts they intercepted vessels reaching the Egyptian ports.[76] Using rafts was advantageous because they could surprise a vessel sailing to

[70] Montgomery 1997: 192; Lyall 1981: 97–8.
[71] Diodorus Siculus Bk 11.47.48.
[72] Strabo Bk 16.4.21, 26.
[73] Cassius Dio Bk 68.14.5.
[74] Strabo Bk 16.4.18.
[75] Ibid., Bk 16.4.24.
[76] Ibid., Bk 16.4.18.

or from Egypt in the darkness of night and climb on board to plunder her of cargo.

The second possibility is that the poet was using the word *nabīṭ* (< CA *nabaṭa* "to stream forth [water]"[77]) with a reference to the Mesopotamian agriculturalists, a term pejoratively applied by their Arab/Arabian conquerors.[78] The Nabateans, in fact, lived in the Sawad of Iraq which constituted the cultivated land of Lower Iraq and the Marshes between Basra and Kufa.[79] It is known that they had vessels to transport their food products and ferry passengers across the rivers. This possibility would fit with al-Akhṭal's (d. before 92/710–1) mention of the *qurqūr* on Mesopotamian rivers, suggesting that she belonged to these agriculturalists[80] rather than the Petra people mentioned above.

> But we have the land and rivers of ʿIrāq
> where you see the *qurqūra* sailing on a river
>
> [*wa-lākin lanā barru l-ʿIrāqi wa-baḥruhu*
> *wa-ḥaythu tarā l-qurqūra fī l-māʾi yasbaḥu*].[81]

So what were these *qurqūr*s? To go back to the Nabateans: Strabo's information about Nabatean rafts is interesting; a *qurqūr* could have been a raft, though, intriguingly, it is possible that the nomenclature may phonetically be linked to the more recent Persian Gulf term *gargūr* (pl *garāgīr*), a type of large round basket made until some fifty years ago of palm wicker-work. It is used for trapping fish by being placed upside down in the sea. So historically, could the classical *qurqūr* be referring to a round coracle like the Iraqi *quffa* (discussed in Chapter 4)? It is interesting that in both instances the craft would have developed from basket to boat in the same region. Mulayḥ's (ndd) verse may suggest that the *qurqūr* was a type of coracle; if it were so, then his verse would read as follows:

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[77] Wehr 1966: 939.
[78] See al-Zabīdī 1983, XX: 131; Lane 1984, I: 2759.
[79] See Fahd 1993: 836.
[80] See Fraenkel 1962: 217; see also Kindermann 1934: 79–81; al-Nukhaylī 1974: 120–5.
[81] Zayyāt 1949: 357.

Lank, red-brown (camels) abandoned them, like
coracles winding their way round the swells of the sea.

[*wa-zālat bihim ṣuhbun sibāṭun ka-annahā*
qarāqīru fī dhī luǰǰatin tataʿammaju].[82]

Moreover, the lexicographer al-Jawālīqī (d. 539/1144) (quoting Ibn Durayd [d. 321/933], the latter citing the poet al-ʿAjāj), defines *qurqūr* as being "a full-bellied [vessel]".[83] Might this be a reference to a round coracle? The hypothesis that the *qurqūr* was a coracle is further strengthened if we look at the possibility that the word perhaps comes from the Akkadian *qurqurru* "a type of basket".[84] Al-Jawālīqī argues that as *qurqūr* is not triliterally root-based it could not be Arabic,[85] while Ibn Durayd disagreed on this and considered it to be Arabic. Whichever language the lexicographers wished to argue for, it was a common term known in Mesopotamia. Another type of *qurqūr* which functioned as a fighting ship appears in the middle medieval period (see Chapter 12).

The ʿadawlī *of the African Red Sea coast*

One of the most contested words in ship typology is the *ʿadawlī* (pl *ʿadawliyyāt*). An early reference to this craft comes from a verse of Kuthayyir ʿAzza (d. 105/723–4) who writes:

Just as the *ʿadawlī* laden with goods
left early morning for Dahnā and Dahālik to unload its merchandise

[*ka-anna ʿadawliyyan zuhāʾu ḥumūlihā*
ghadatan tartamī l-Dahnā bihā wa-l-Dahālik].[86]

The context is clearly a cargo vessel. As for the ship-term itself there are three possiblities:

One is tracing it from the wood of a long tree called *ʿadawlī*;[87] however, I could not find any evidence for this. There are no other examples

[82] I owe thanks to an anonymous reader of one of the drafts of the present work who provided the translation; for the Arabic see Farrāj & Shākir 1965–1966, vs 13.
[83] Al-Jawālīqī 1867: 123.
[84] Von Soden 1959–1981, II: 929.
[85] See al-Jawālīqī 1867: 123.
[86] Yāqūt 1866–1873, IV: 797.
[87] See Ibn Manẓūr nd., IV: 2360.

of a ship-type called after the name of a tree except for the modern fishing *shūʿī* [s.v.] found in the Arabian/Persian Gulf which is said to have originated from a tree named *shūʿ*, a ben tree, of a kind that is tall and straight with soft wood, though this remains mere speculation.[88]

The second possibility, the one that was most current among Classical Arabic writers, is that *ʿadawlī* or *ʿadawliyya* alludes to a town in the Island of Bahrain.[89] To support this, they cite the following verse from Ṭarafa b. al-ʿAbd (d. c. 569 CE); we read:

> Of *ʿAdawliyya*, or of the ships of Ibn Yāmin
> which the helmsman now (wears), taking them
> off course, now steers straight.
>
> [*ʿAdawlyyatun aw min safīni (i)bni Yāminin*
> *yajūru bihā l-mallāḥu ṭawran wa-yahtadī*].[90]

Ibn Yāmin could be a well-known shipowner,[91] perhaps a sea captain, who is thought to have come from Bahrain but there is no hard evidence to substantiate this claim. It can be said, however, that the verse does provide information about sailing techniques, presumably in deep sea.

The third possibility, and the most likely one, is that the word *ʿadawliyya* applies to a type of ship whose name derives from the harbour town ʿAdawl (Greek ’άδουλις [Adoulis]) on the Eritrean coast.[92] Adulis was a flourishing port in the Ptolemaic period (from 4th to 1st century BCE)[93] and is probably located on what is today Annesley Bay, south of Massawa. East of the bay lies the Dahlak Archipelago, south of which is Dahlak Island, one of the islands which gave anchorage to ships like the cargo-*ʿadawliyya*. So *ʿadawliyya* is not the port of Adulis as Montgomery understands it;[94] the *ʿadawlī* is clearly a ship, as shown in the following verse of al-Nābigha l-Dhubyānī (d. c. 604 CE):

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[88] Agius 2002: 91–2.

[89] Ibn Sīda 1898–1903, X: 26; Ibn Manẓūr nd., IV: 2842; see also Lane 1984, II: 1975.

[90] Translated by Montgomery 1997: 185 with one modification, I have maintained the Arabic name *ʿadawliyya*.

[91] See Ibn Manẓūr nd., IV: 2842 and Lane 1984, II: 1975.

[92] Fraenkel 1962: 214.

[93] *Periplus* 1912: 60.

[94] Montgomery 1997: 185.

He has a sea which tosses about the *ʿadawlī*
and the small heavily laden *khuluj*.

[*lahu baḥrun yuqammiṣu bil-ʿadawliyyi*
wa-bil-khulujī l-muḥammalati l-thiqāli].[95]

She is represented here as a large cargo ship compared to the smaller type known as *khuluj* about which we know nothing.

Conclusion

The ship and the sea appear in pre-Islamic and early Islamic poetry in a set of striking images: camel-ship similes: litter-bearing camels and sails; palm-trees and ships; waves and sand dunes and the movement of ships on the sea. The ship-camel comparison is a recurring theme: the slow stately progress of the camel through the undulating sand dunes, its long neck swaying, compared to the ship, her prow jutting out ahead, sails unfurled, riding on the waves is entirely evocative of the desert and sea surrounding the Arabian Peninsula (figure 7).

These pre-Islamic descriptions are not only haunting and evocative poetry; they also give us an understanding of nautical activities at the time. Assuming that they come from personal observation, they offer an insight into types, the ships' mechanical parts and navigational techniques. For some, such as Lichtenstädter, many of these nautical references should be seen as purely mythological, serving only to express religious symbolism.[96] I cannot concur; it seems to me obvious that they were written for an audience of nomadic and/or coastal (seafaring) people who would have a knowledge of nautical terminology and for whom the maritime references would have to make sense. It seems, therefore, reasonable to assume that these poems offer genuine, if brief and tantalising, glimpses of a seafaring past.

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[95] Ibid., 192 with my amendments. On *khalīj* (pl *khuluj*) see Ibn Sīda 1898–1903, X: 26; Ibn Manẓūr nd., II: 1224; al-Zabīdī 1969, V: 533; al-Jawharī 1984, I: 311.

[96] In this respect Lichtenstädter's (1956: 75, 77) stance on the religious symbolism used by the poets is an interesting claim but difficult to prove.

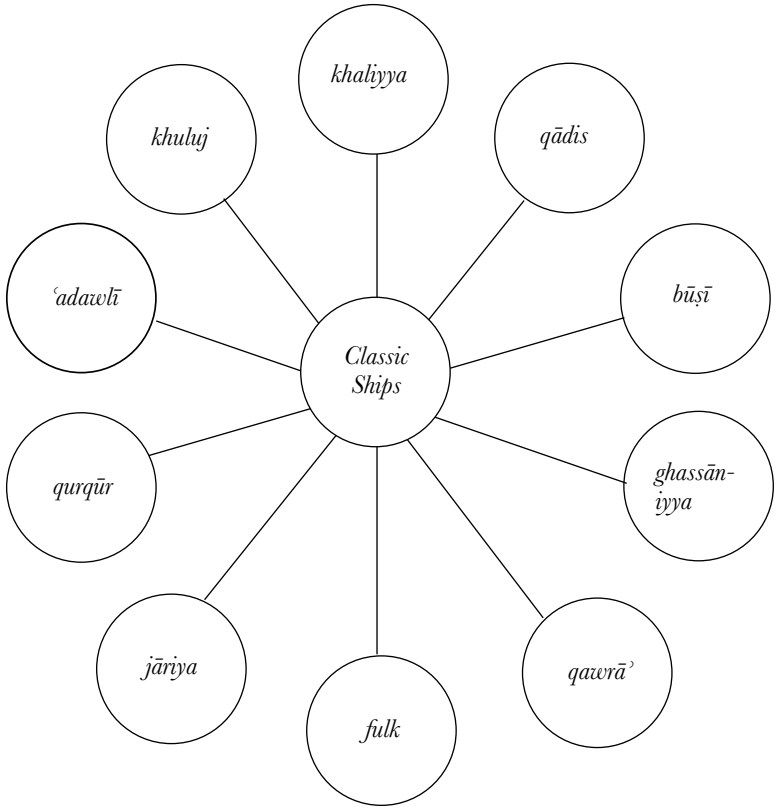


Figure 7 Classic ships.

CHAPTER ELEVEN

RIVER BOATS AND DEEP-SEA VESSELS: TYPES AND FUNCTIONS

وتوجهت الى مدينة البصرة ومشيت
على جانب الساحل فرايت مركبا كبيرة
عالية مليحة فاعجبتني فاشتريتها

> Walking along the bank of the river, I saw a great, handsome, lofty vessel, and it pleased me; wherefore I purchased it.[1]

Alf layla wa-layla (*The Arabian Nights*)

Introduction

Cargo vessels fall into three categories: a) the river type which carried goods on inland waters, b) coastal boats that sailed on river and along the sea and, c) the sea-going vessels which anchored at harbours or at some distance from the port, in which case their merchandise and passengers had to be ferried on small boats.

When attempting the classification of ships, it is preferable to identify which ones were seafaring, river-faring or able to navigate both. In principle an ocean-going vessel did not proceed to the river[2] and a river boat would not venture into the sea,[3] though some vessels must have been built to cope with both sea and river navigation. It may be the case that sea-to-river navigation was restricted to specially designed craft such as barges and canoes.[4] We know from the Mediterranean experience

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[1] *Wa-tawajjahtu ilā madīnat al-Baṣra wa-mashaytu ʿalā jānib al-sāhil fa-raʾaytu markaban kabīratan ʿāliyatan malīḥatan fa-aʿjabatnī fa-(i)shtaraytuhā; Alf layla wa-layla* nd., III: 134; trans. E. W. Lane, *Thousand and One Nights* 1979–1981, III: 50.

[2] Ibn Jubayr nd., 213; Ibn Baṭṭūṭa 1968, II: 183; IV: 119; al-Maqrīzī 1967, II: 143, 189; al-Nuwayrī l-Iskandarānī 1968–1976, II: 249–50.

[3] Al-Nuwayrī l-Iskandarānī 1968–1976, I: 171; II: 98, 233–5; III: 235; V: 84, 250, 375.

[4] Ibn Mammātī 1943: 339–40; al-Idrīsī 1994, I: 286; see also Diyāb 1977: 73–7; Udovitch 1978, II: 521–2; ʿAbbādī & Sālim 1981: 145–7; Khalilieh 1995: 23; Goitein 1999, I: 296.

that Crusader vessels, in spite of their skilled navigators, were not able to sail the Nile and that several attempts to capture Fustat failed because their ships were not fit to navigate in the Nile waters.[5]

I have shown in Chapters 4 and 6 how river and coastal boats were influenced by the local waters and climate as well as the tradition and culture to which their builders had been exposed over the centuries. I have explained how difficult it is to navigate in the Mesopotamian rivers, particularly that the northern prevailing wind blows in the same direction as the current flows. In the fifth voyage of Sindbād the Sailor in the *Arabian Nights*, it is inferred that from Basra to Baghdad he proceeded not by river but by caravan over land.[6] The Nile was a much better experience as navigation either way was possible, even though the northern prevailing wind blows against the current. No doubt the large river boats must have been flat-bottomed vessels; they would have been fitted with leeboards in place of a keel which helped them to operate in shallow water. It is safe to assume then that when ocean-going cargo vessels anchored at Basra or Ubulla, their merchandise was either transshipped to barges or loaded on camel back to reach the northern towns.

Although most of the trading vessels were passenger and/or pilgrim vessels, knowledge about them as to which sailed the rivers and seas in the Early and Middle Medieval Islamic period is scanty; a better picture can be formed of war vessels as more information is available in the primary Arabic sources (see Chapter 12). This chapter and the following are not intended to cover all the watercraft that were used in the classical and medieval periods but, as mentioned earlier, to provide a sample in which I will look into their historical context and highlight the origins of their nomenclature.

Royal and pleasure river boats

The zaww

River boats mentioned during the ʿAbbāsid period were multi-purpose craft; a number of them belonged typically to royal circles,[7] some, as will be shown in Chapter 12, functioned as fighting boats.

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[5] ʿAbbādī & Sālim 1981: 229–42.
[6] *Alf layla wa-layla* nd., III: 139.
[7] See for example al-Tanūkhī 1391–1392/1971–1972, IV: 49–51.

An early type of river boat, the *zaww*, is mentioned in a third/ninth-century poem by al-Buḥturī (d. 284/897)[8] and recorded around the same period by al-Ṭabarī (d. 310/922–3).[9] According to the geographer al-Yāqūt (d. 626/1228–9), we know that she was a large vessel, probably a ceremonial state barge used in a procession on festive occasions. I came to this conclusion because we are told that the caliph al-Mutawakkil (232–247/847–861) had one built with a "lofty castle" constructed on her deck [*wa-banā fī wāḥida minhā qaṣran mīfan*],[10] which I take to mean an elaborated royal cabin. We have no information about her provenance; the context suggests that such barges in the ʿAbbāsid period belonged to the Tigris or the Euphrates. The name is perhaps related to Persian *zawd* "swift".[11]

The ḥarrāqa *and* shabbāra

The *ḥarrāqa* (pl *ḥarrāqāt* or *ḥarārīq*) was employed in such a variety of ways that, as Kindermann rightly observed, "it is difficult to determine its development over a period of time".[12] She was known to be a pleasure boat for higher functionaries, a ferry-boat along the river banks and a light carrier; the latter, it is reported, was for the transport of food and raw materials from Baghdad to Raqqa on the Euphrates river,[13] but she was also used as a small cargo boat on the River Nile and the sea.[14]

We know from Medieval Islamic sources that she was used primarily in royal circles on the Tigris and Euphrates during ʿAbbāsid Iraq[15] and on the Nile in Fāṭimid and Mamlūk Egypt.[16] The *Arabian Nights* reports that the caliph Hārūn al-Rashīd (170–193/786–809) used to board a *ḥarrāqa* every night on the River Tigris disguising himself in a merchant's

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[8] See Lane 1984, I: 1266.
[9] Al-Ṭabarī 1965, XI (iii): 682, 1168.
[10] Yāqūt 1866–1873, II (ii): 960.
[11] See Kindermann 1934: 36.
[12] Ibid., 22.
[13] Al-Masʿūdī 1861–1877, VI: 351; Ibn Saʿd 1904–1921, V: 319.
[14] Al-Asyūṭī 1996, I: 78.
[15] For example at the harbour of Raqqa on the Euphrates (written communication from Stefan Heidemann 18 May 2004 and 6 December 2005); see also Heidemann & Becker 2003: 29, fn. 232.
[16] Al-Tanūkhī 1375/1955, I: 158; al-Ṣābī 1958: 24; al-Shābushtī 1386/1966: 45; al-Nuwayrī l-Iskandarānī 1968–1976, II: 249.

garb in order to observe the doings of common people.[17] Al-Ṭabarī reports on four occasions during events between 198–264/813–877 that dignitaries employed the *ḥarrāqa* on the Tigris to carry out their business.[18] There is an interesting anecdote about the use of a *ḥarrāqa* by the Iraqi judge, al-Tanūkhī (d. 384/994–5): he recounts that a certain vizier, Ḥāmid b. ʿAbbās, embarked on a *ḥarrāqa* on which women were on board waiting to be ferried from a bank of the River Dujayl in Khusistan. He reports, the vessel "was covered and curtained all over"; when asked why this was so, the story-teller responded, "it was improper for the crew of such a vessel to be virile".[19] Why would al-Tanūkhī bother to relate such an incident? Perhaps, he wanted to make the point that sectioning a ferry-boat was not common, at least not among ordinary people, the *ʿāmma*.

Another use of the *ḥarrāqa* was to launch fireworks: we are told that during the tenth/sixteenth century, the people of Cairo gathered on a feast day on the banks of the River Nile to watch fireworks lit from these *ḥarrāqa*s, producing a spectacular scene.[20] Semantically, the word *ḥarrāq* means "burning aflame", appropriately enough for the boat from which fire could be launched. I shall discuss her use as a fire-launcher against the enemy ship in Chapter 12.

Ibn Baṭṭūṭa (d. 770/1368–9 or 779/1377) reports that the Tigris *ḥarrāqa* was called by Iraqis *shabbāra* (pl *shabbārāt*). He might be inferring that there were two types of *ḥarrāqa*s, similar but with a different nomenclature. In addition to this he tells us that a *ḥarrāqa* was identical to another river boat called *sallūra* (pl *salālīr*).[21] No details of any of them are provided but then why should he take the trouble to describe river boats that were well known to all at the time? This is a recurent problem: common knowledge about vessels meant that Classical and Medieval Muslim authors did not feel the need to describe them. I shall come back to this point in Chapter 13.

According to al-Qazwīnī (d. 682/1283–4), the caliph al-Maʾmūn (198–201/813–817) owned some 4,000 large and small *shabbāra*s.[22] A considerable number; obviously some were meant to be used in royal

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[17] *Alf layla wa-layla* 1957, III: 128; *Thousand and One Nights.* 1979–1981, II: 338–9.
[18] Al-Ṭabarī 1965, XI (iii): 917; XII (iii): 1385, 1539; XIII (iv): 1927.
[19] Al-Tanūkhī 1391–1392/1971–1972, III: 43.
[20] Moritz 1915: 439.
[21] Ibn Baṭṭūṭa 1968, II: 116–7; idem, 1958–2000, II: 336–7.
[22] Al-Qazwīnī 1848, II: 233.

processions and feast days. There are a number of references to their exclusive use by the royal family and their entourage: Ibn Wāṣil (d. 697/1297–8) writes that he was in Baghdad when Nūr al-Dīn Arslan Shāh (589–607/1193–1210–1) fell critically ill at a place of convalescence near Mosul; he was fetched on board a *shabbāra*-gondola on which he died.[23] When Ibn Baṭṭūṭa arrived in Baghdad in 727/1327 during the reign of the last of the Mongol Khāns of Persia, Abū Saʿīd Bahādur Khān (716–736/1316–1335), he saw the Khān and his vizier in a *shabbāra* on the Tigris and ahead of them two *shabbāra*s "carrying musicians and dancers" for their entertainment and for the onlookers on the river shore.[24]

Both the *ḥarrāqa* and the *shabbāra* were a gondola-type, splendidly furnished with an elevated cabin.[25] One can imagine how beautifully decorated these gondolas were on festive occasions; they floated in a large *defilé* carrying the caliph with his royal court, civil servants, the military and music entertainers. Perhaps some of the boats depicted in the *Shāhnāma* miniatures could be representations of these river craft? (illustration 73) The nomenclature *shabbāra* has been identified with the Persian *shāhī-bār* "royal-carrier".[26] An attempt to derive it from Arabic *mashbar* meaning "a river"[27] is possible but the Persian connection is more convincing.

The domed-cabin gondola: the ʿushārī

Another type of royal boat similar to the *ḥarrāqa* and *shabbāra* was the Nile *ʿushārī* (pl *ʿushāriyyāt* or *ʿushāriyyūn*).[28] We learn from Ibn Khallikān (d. 681/1282–3) that she was larger and much longer than the *shabbāra*.[29] ʿAbd al-Laṭīf al-Baghdādī (d. 629/1231), a historian, gave a short but interesting description of this *ʿushārī* during his visit to Egypt. Comparing her to the *shabbāra* he says that she looked more elegant;[30] both were decked with a domed-cabin. He adds:

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[23] Ibn Wāṣil 1953–1960, III: 202–3; see also Abū l-Fidāʾ 1840: 242; Ibn al-Athīr 1965, III: 193.
[24] Ibn Baṭṭūṭa 1968, II: 116–7; idem, 1958–2000, II: 336–7.
[25] Ibn al-Athīr 1965, III: 193.
[26] See Yule & Burnell 1994: 827.
[27] Lane 1984, II: 1496.
[28] Also *ʿushshārī*, *ʿushāriyya* or *ʿushrāwī*.
[29] Ibn Khallikān 1842–1871, I: 299.
[30] Al-Baghdādī nd., 54.

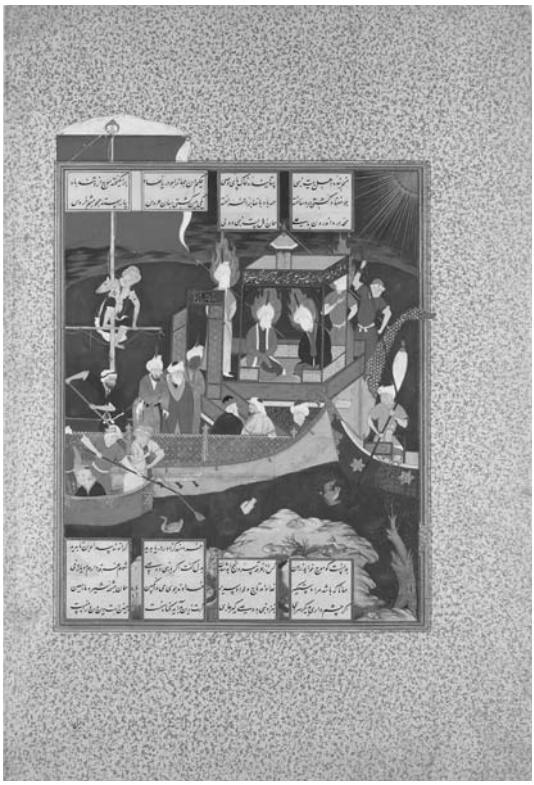


Illustration 73 A river boat furnished with an elevated cabin
(courtesy of Metropolitan Museum of Art, New York, Ms 1970, 301.1, fol. 18v)

> These types [of boats] are made for the use of the kings and nobles. The lord who embarks on one of these, reclines on his cushion and has around him people of his social circle… .
>
> [*wa-hādhā yuttakhadhu lil-mulūk wa-l-ruʾasāʾ bi-ḥaythu yakūnu l-raʾīs jālisan fī wisādatihi wa-khawāṣṣuhu ḥawlahu*…].[31]

Other details are that the wooden cabin had small windows and a door overlooking the river; it was decorated with lively colours and inside the cabin there was a water closet.[32] Gildemeister assumes that they were small flat-bottomed craft with a sharp pointed bow and stern and

[31] Ibid.
[32] Ibid.

a very low freeboard.[33] There existed different types of this beautifully furnished gondola during the Fāṭimid dynasty (297–567/909–1171): al-Maqrīzī (d. 846/1442) provides us with information on their size, weight and function as well as costs;[34] these included names such as *daymās* and *dukāsa*; larger ones were given names according to the colour they were painted such as *aḥmar* (red), *asfar* (yellow), *dhahabī* (golden), *fiḍḍī* (silver), and *lāzwardī* (sky-blue).[35]

The ṭayyār

The *ṭayyār* or *ṭayyāra* (pl *ṭayyārāt*), recorded by Abū l-Qāsim al-Baghdādī (fl. 3rd/9th c) and al-Muqaddasī (fl. second half of the 4th/10th c),[36] functioned as a pleasure and funeral boat for the royal court but also served as a ferry and transport boat on both the Mesopotamian rivers.[37] The name *ṭayyār* comes from Arabic *ṭār* "to fly",[38] perhaps an indication that she was light and swift.

Ibn Miskawayh (d. 421/1030) reports that when Abū ʿAbd Allāh al-Barīdī and his entourage entered Baghdad in 329/940, he was met by the vizier and his court officials on *ṭayyār*s and other river boats.[39] Other sources record her as a leisure boat for diplomats, or for feast days, or just for the use of the common people of Baghdad, who cruised down the river on Fridays.[40] During the Caliphate of Muʿtaḍid bi-llāh (279–289/892–902), we are told by al-Ṣābī, that a number of boatmen made a good living from ferrying passengers on the *ṭayyār*.[41] We also learn from ʿArīb b. Saʿd al-Qurṭubī, that the vizier Ibn Khāqān in 299/911–2 used to travel to his residence at the Shamāsiyya Gate in

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[33] Gildemeister 1882: 438.

[34] Al-Maqrīzī 1911–1924, I: 469, 471–4, 475–9, 482–3; II: 154–5; see also Gildemeister 1882: 436; Kindermann 1934: 22; al-Nukhaylī 1974: 96–7.

[35] Al-Maqrīzī 1911–1924, I: 469, 478–9; see also al-Nukhaylī 1974: 69–70.

[36] Al-Muqaddasī 1906: 31; De Goeje 1879: 231.

[37] See al-Tanūkhī 1391–1392/1971–1972, I: 26; II: 83; IV: 184 but also al-Nukhaylī 1974: 93, fn. 43.

[38] Lane 1984, II: 1903.

[39] Ibn Miskawayh 1332–1333/1914–1915, II: 14–15.

[40] Ibn al-Athīr 1301/1883, VII: 173, 176; VIII: 43, 55, 94–5; IX: 150; X: 38; Ibn Miskawayh 1332–1333/1914–1915, I: 24, 74, 92, 97, 219, 235, 264, 371–2, 412–3; II: 14–15, 112, 144, 245; al-Masʿūdī 1346/1927, II: 530, 541; al-Ṣūlī 1935: 122–3, 139, 280; al-Tanūkhī 1375/1955: 407–8; al-Ṣābī 1958: 46–7, 60–1, 215, 302, 393–4; al-Shābushtī 1386/1966: 272; see also Kindermann 1934: 60–1; al-Nukhaylī 1974: 93, fn. 43.

[41] Al-Ṣābī 1958: 24.

this skiff.[42] There is one reference to the Nile *ṭayyār*,[43] otherwise it has always been understood to be a Mesopotamian type.[44]

The sumayriyya *and* zabzab

Two other royal river boats were the *sumayriyya* and the *zabzab*. For the funeral of Ibn Muʾayyid al-Dawla in 375/985, the caliph Tāʾiʿ (363–381/974–991) went on board a boat, followed by court officials and Qurʾān readers on boats called *zabzab* (pl *zabāzib* or *zabzabiyyāt*) [s.v.].[45] On the 3rd October of each year, so the historian al-Shābushtī (d. 388/998) informs us, the people of Baghdad gathered to celebrate St. Ashmūn's day. They went to the feast by boats, crossing the Tigris in *sumayriyya*s, *ṭayyār*s and *zabzab*s, where they enjoyed themselves playing music and games and in eating and dinking.[46] The *sumayriyya* (pl *sumayriyyāt*) served as a ferry on this occasion,[47] but is more usually known as a pleasure boat probably manned by two rowers, mentioned often in connection with royal circles.[48]

The *zabzab* was used by the caliph and his courtiers as well as high functionaries.[49] In 379/989, the funeral cortège carrying the body of the late Būyid Sharaf al-Dawla Shīrzīl (376–379/987–989) was attended by the Baghdadi population; the new caliph Bahāʾ al-Dawla Fīrūz (379–403/989–1012) formed the head of the procession on board a *ṭayyār* followed by the Turkish and non-Turkish chamberlains on *zabzab*s, dressed in black and carrying swords and girdles.[50] Some of these *zabzab*s may have had cabins for the royal and court officials; Muʿizz al-Dawla Aḥmad (334–356/945–967) entered Baghdad in 345/956 through the Shamāsiyya Gate in an uncovered *zabzab* so that the people on the shore could see him.[51] The name *zabzab* is unusual; it might be related to the River Zab near Mosul.

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[42] ʿArīb 1897: 37.
[43] Ibn Saʿīd 1953, I: 8
[44] See on this subject al-Azdī 1902: 107.
[45] Al-Rūdhrāwarī 1920–1921, III: 123–4.
[46] Al-Shābushtī 1386/1966: 46.
[47] Al-Ṣābī 1958: 24; al-Shābushtī 1386/1966: 44, and 46; see also Ibn Miskawayh 1332–1333/1914–1915, II: 352–3.
[48] Al-Shābushtī 1966: 46–7; al-Tanūkhī 1391–1392/1971–1972, I: 350.
[49] Ibn al-Athīr 1301/1883, IX: 150; X: 4; al-Rūdhrāwarī 1920–1921, III: 85, 106, 123–4, 130–1, 148, 152, 168, 240, 274; see also al-Nukhaylī 1974: 56.
[50] Al-Rūdhrāwarī 1920–1921, III: 152.
[51] Ibn Miskawayh 1332–1333/1914–1915, II: 165.

The Fāṭimid qurqūr(a)

Lastly, the *qurqūr(a)* (pl *qarāqīr*); it is clear from al-Maqrīzī's report that one of her functions was leisure and entertainment. He tells us that the traditional festival of the "Day of the Nile Inundation" (*wafāʾ al-Nīl*) celebrated by the Fāṭimid caliphs was an unforgettable event; the banks of the River Nile in the Fustat area was full of people who embarked on some one thousand *qurqūr*s.[52] There is no information to suggest whether this type of vessel is one and the same as that which I discussed in Chapter 10.

The trading river vessel

Many of the river types mentioned by medieval writers were mostly barges with oars, although some may have been propelled by sails. The *zanbariyya* (pl *zanbariyyāt*) employed on the Mesopotamian rivers is said to have been "a large and heavy vessel";[53] she is defined by the lexicographer al-Jawharī (d. 393/1002–3) as a "bellied vessel",[54] an indication that she had lots of space for cargo. Another construction feature was her projecting stempost; in the following proverb al-Ṭabarī in 67/724 records the people of Basra saying:

Al-Muṣʿab conditioned us to pulling hawsers
and the *zanbariyya*s with a protruding bow

[*ʿawwadnā l-Muṣʿab jarra l-qalsi*
wa-l-zanbariyyāti l-ṭiwāli l-quʿsi].[55]

From this saying it is possible to infer that the vessels were big as it required labour imposed by the governor Muṣʿab b. al-Zubayr (1st/7th c) to tow them. Due to their flat-bottomed structure, they were used as pontoons, according to al-Tawḥīdī (d. after 399/1008–9), who writes:

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[52] Al-Maqrīzī 1957–1973, I: 476–7.
[53] Ibn Sīda 1893–1903, X: 26; al-Zabīdī 1972, XI: 454; see also Lane 1984, I: 1256.
[54] Al-Jawharī 1984, II: 667; see al-Zabīdī 1967, III: 1869; see also Gildemeister 1882: 439.
[55] Al-Ṭabarī 1965, VIII (ii): 724.

> I was standing on a bridge of *zanbariyya*s on the east side (the Tigris [?]) and the pilgrims entering with their camels blocking the width of the bridge… .
>
> [*kuntu qā'iman ʿalā zanbariyyat al-jisr fī l-jānib al-sharqī wa-l-ḥujjāj yadkhulūna wa-jimāluhum saddat ʿarḍ al-jisr*…].[56]

Iraq stood at a crossroads for pilgrims coming from the north and east of the province and these boats were placed on both rivers. They were also known as "the bridge of ships of Baghdad, which people and animals used to cross from one shore to the other".[57]

Coastal boats and lifeboats

The falū, kundura, ṣandal, talawwā, ṭarrāda *and* zawraq

Several small boat-types emerge in geography and travel Arabic literature such as: a) the *falū*, a ship's boat used in the context of India, the name may be related to *pulwah* or *pulwār*, a boat of the Bengali rivers;[58] (b) the *kundura* (pl *kanādir*) noted by Ibn Baṭṭūṭa (d. 770/1368–9 or 779/1377): approaching one of the Maldive Islands, the crew and the merchants of the ship he boarded on were picked up in a *kundura* as they laid anchor near the coast;[59] c) the *ṣandal* (pl *ṣanādil*), known in Persian and Turkish languages[60] and defined as "a small boat in the service of a large ship…",[61] the popular etymology being that her appearance was similar to a kind of foot-wear,[62] a *sandal* (Lat. *sandalum* < Gr. σάνδαλον); and d) *talawwā*[63] is said to come from the verb *talā*, *yatlū* "to follow" so by extension a boat "follow[ing] larger ships".[64] This is possible but sort of etymology has its pitfalls because the

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[56] See Zayyāt 1949: 336–7; see also Kindermann 1934: 36.
[57] UAFAL (Berlin) Ms 667, fol. 127v, see also Gildemeister 1882: 439; Kindermann 1934: 36 and al-Nukhaylī 1974: 58.
[58] Al-Rāmhurmuzī 1883–1886: 27; see also Yule & Burnell 1994: 737.
[59] Ibn Baṭṭūṭa 1968, IV: 119; idem, 1958–2000, IV: 826.
[60] See Steingass 1977: 701; Zenker 1979: 574.
[61] Al-Zabīdī 1997, XXIX: 233. Vullers (cited by Kindermann, probably on the authority of al-Zabīdī), lists it as "an auxiliary boat/supply ship" [*navigium minus cuius ope aqua, alimenta aliaeque res necessariae maiori advehuntur*], see Kindermann 1934: 55.
[62] Al-Zabīdī 1997, XXIX: 233.
[63] Ibn Sīda 1898–1903, X: 25–6; see also al-Muqaddasī 1906: 32.
[64] Ibn Manẓūr nd., I: 444.

term in question does not necessarily represent what it appears to be, a derivation from a root-verb or noun could be misleading. I shall discuss such semantic issues of ship terminology in Chapter 13.

*Ṭarrāda*s (pl *ṭarā'id* or *ṭarārīd*) served as shore boats. Portuguese accounts and the Ḥaḍramī chronicles of the sixteenth and seventeenth centuries are our main source for the Indian Ocean *ṭarrāda* (Port *terada*). They apply this craft-term to any coastal boat or rowing boat:[65] some were stitched with coir;[66] others had nailed planks. Duarte Barbosa (d. 1521) reports that "sweet water [wa]s conveyed to Ormus [the island]" in these small craft.[67] The Ḥaḍramī chronicles too designate the name to an open skiff used by the Ottoman Turks in the ports of Aden and Shihr between the years 938–948/1531–1541–2.[68] Other Portuguese sources mention *tarrāda*s in the context of war boats, equipped with guns carrying archers[69] (see Chapter 12).

The classical type is the *zawraq* (pl *zawāriq* or *zawārīq*), which often occurs as a skiff, well known in the Islamic world, whose name and function is still alive in the Arab world today. They were indespensible boats, used on the Mesopotamian rivers and canals as well as coastal boats; al-Iṣṭakhrī (fl. c. 340/951–2) and Ibn Ḥawqal (fl. c. 367/977–8) report having seen countless *zawraq*s near Basra[70] and al-Ṭabarī (d. 310/922–3) frequently mentions them in this region.[71] Al-Idrīsī (d. c. 560/1165) tells us that at the mouth of the River Tigris there were a number of posts at which sea wardens kept watch and that they ferried back and forth passengers from the ship to the shore on *zawraq*s; he also tells us that mariners voyaged from Sumatra (Ranj Islands) on *zawraq*s and small ships.[72] In the fifth voyage of Sindbād the Sailor the people of the City of the Apes embarked in *zawraq*s and ships and passed the night upon the open sea as they were frightened of the apes who inhabited the mountains.[73]

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[65] CDRAD—Portuguese Archives, AHU, Conselho Ultramarino, COD 501, ff. 96v–98, 169–170v [1646]; see also Agius 1999: 184–5.

[66] CDRAD—Portuguese Archives, Fragmentos, Cx, 4-Documentos da India Mº1, no. 68 [1532].

[67] *Book of Duarte Barbosa* 1918–1921, I: 75–6.

[68] Serjeant 1974: 57, 61, 66, 105.

[69] *Commentaries* 1875–1880, I: 105; see also IV: 53, 115, 192–3.

[70] Al-Iṣṭakhrī 1870: 80; Ibn Ḥawqal 1873: 159.

[71] Al-Ṭabarī 1965, XI (iii): 1168; XIII (iv): 2074.

[72] Al-Idrīsī 1994, I: 61, 385.

[73] *Alf layla wa-layla* nd., III: 137–8.

An early Mediterranean type had a particular use in warfare activites (see Chapter 12). The name *zawraq* has been traced to Persian.[74] Although the nomenclature bears a resemblance to the modern Musandam name *zawraka*, it is not possible to say if the medieval type had any similarity to the hull design of the modern vessel, a double-ender with a pointed stemhead and a long upright sternpost.[75]

The pearl-diving dūnij

A coastal vessel and lifeboat known to early Medieval Islamic authors is the *dūnij* (pl *dawānīj*), the earliest record coming from the story-teller Buzurg b. Shahriyār (d. 399/1009) in connection with sea adventures in India, Sri Lanka and East Africa.[76]

During the pearl-fishing season *dūnije*s served as diving vessels in the Bahrain region; al-Idrīsī reports:

> Each merchant hired a number of pearldivers and the whole flotilla, numbering more than 200 *dūnij*, leaves the port.
>
> [*wa-akrā kull wāḥid min al-tujjār ṣāḥibahu min al-ghawwāṣīn kharajū min al-madīna fī azīd min mā'atay dūnij*].[77]

These *dūnije*s must have been of a medium size, propelled by oars and sails. It is difficult from the above to guess how many divers each *dūnij* could carry for their size varied, but an estimate of 10 to 20 persons is possible for, according to al-Idrīsī, the *dūnij* was designed with 5 to 6 cabins; each cabin was for a merchant and his divers.[78] The origin of the boat-term is probably Persian, *dūnī* "a long swift vessel";[79] perhaps the most recent term, *dūmeh*, used in Bahrain for a small boat and *dūmī shirā'* at Masirah Island for a sail-powered vessel[80] could be traced to *dūnij*. Or is *dūnij* connected with Hindi *ḍēṅgā/ḍoṅgā* "small boat" (cf. Ur *ḍoṅga/ḍoṅgi* "a very small boat"; > Eng *dinghy*)?[81]

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[74] Al-Jawālīqī 1969: 173.
[75] See other details about this boat in Agius 2002: 107–9; 136, 176, 183–4.
[76] Al-Rāmhurmuzī 1883–1886: 37, 43–4, 51–3, 61, 86, 147, 167, 191 and 196 (note); see also al-Muqaddasī 1906: 32.
[77] Al-Idrīsī 1994, I: 388.
[78] Ibid.
[79] Steingass 1977: 547.
[80] Agius 2002: 43.
[81] Qureshi c. 1970: 329; see also Agius 1984: 135.

The versatile ʿushārī

The *ʿushārī*, which was mentioned earlier, also functioned as a coastal boat, picking up passengers or merchandise from the ship laid at anchor near the coast or carrying people across from the bank or shore. Very often the *ʿushārī* served as a supply boat, sloop or a lifeboat for larger ships. They had a shallow draught. We are told by al-Nuwayrī l-Iskandarānī (fl. 8th/14th c.) that an *ʿushārī* in the context of the Mediterranean was equipped with 10 oars and that some were propelled by 20 oars.[82] Apart from functioning as ferry-boats they were used to transport barrels of oil.[83]

Ibn Baṭṭūṭa (d. 770/1368–9 or 779/1377), narrating a story about a shipwreck, writes that in 732/1331–2 he intended to board a ship that was bound for Quseir on the northern Egyptian Red Sea coast but after having inspected her, he decided not to board the ship. His suspicions proved correct for as it happened, he tells us, the ship foundered; some merchants and her captain escaped in the *ʿushārī*, but many including seventy pilgrims, lost their lives.[84] One other incident recounted by him presents an entertaining picture. At Goga in Southwest India he went on an *ʿushārī* which got stuck in the mud during the low tide; he relates:

> when we sank into the mud I was leaning upon two of my companions, and the men of the place gave me to fear the turn of the tide before I should reach it, since I was not a good swimmer… .
>
> [*lammā nazalnā fī l-waḥl atawakkā ʿalā rajulayn min aṣḥābī wa-khawwafanī l-nās min wuṣūl al-madd qabla wuṣūlī ilayhā wa-anā lā aḥsunu l-sibāḥa*…].[85]

A very vivid image of Ibn Baṭṭūṭa whose fears about the sea and being on boats and ships are well noted throughout his diaries. However, my concern here is the application of the boat-term known to the Mediterranean traveller and transposing it with a type familiar to Indians most likely under a different name, a subject I shall discuss in Chapter 13.

The use of *ʿushārī*s as ferry-boats on the Nile and the Tigris is well documented during the Fāṭimid and Mamlūk periods in Egypt and

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[82] UAFAL (Berlin) Ms 667, fol. 124r; see al-Nukhaylī 1974: 95.
[83] Al-Nuwayrī l-Iskandarānī 1968–1976, II: 235.
[84] Ibn Baṭṭūṭa 1968, II: 251; idem, 1958–2000, II: 413.
[85] Ibn Baṭṭūṭa 1968, IV: 61; idem, 1958–2000, IV: 800.

ʿAbbāsid Iraq.[86] Most of the medieval sources, particularly the Genizah letters, indicate that the *ʿushārī* was a cargo vessel most prevalent on the Nile.[87] Some of the information also points out that the *ʿushārī* sailed on the open sea: reports include the shipping of flax, textiles and wax from Alexandria to Fustat (a. 1048, 1050, 1062);[88] other shipments of goods were sent from Tripoli to Fustat. How large this vessel was is not known though it seems, that the shipments were not of large quantity. In Siculo Arabic documents, she is described as "large ship" and a "tunny-fish boat".[89]

Tracing the origins of the name *ʿushārī* is difficult, though the nomenclature, perhaps not the type and function, is found in several western sources: *uscèri, uscerio, uscerius, usseria, scieri* and *uxerium* (a. 1286, 1294).[90] The root of the word /ʿ. *sh. r.*/ is connected with "ten"; it might refer to the general size of the vessel which carried 10 rowers though, as mentioned above, al-Nuwayrī l-Iskandarānī, speaks of one with 20 rowers.

The ṣunbūq: a versatile craft

The *ṣunbūq* (pl *ṣanābīq*) is a well known vessel of the Indian Ocean; a versatile craft, performing different functions and which came in all sizes. The Persian lexicographer Tabrīzī described her as a small ship constructed in the shape of a horseshoe,[91] which may be interpreted as a ship with a round-shape stern. According to the lexicographer al-Jawālīqī (d. 539/1144) she had a "curved bow",[92] a feature that seems to have been perpetuated in modern *sanbūq*s which until recent times were characterized by a low, curved, scimitar-shaped stempiece[93] (illustrations 74 & 75).

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[86] See for example al-Balawī 1358/1939: 291; al-Tanūkhī 1375/1955, I: 158; al-Ṣābī 1958: 24; al-Shābushtī 1386/1966: 45.

[87] Goitein 1999, I: 295, 305, 309, 320, 322, 345.

[88] TS 8, J20, fol. 2; TS 10, J15, fol. 15; TS 13, J16, fol. 19; TS 13, J17, fol. 1; see Gottheil & Worrel 1927: 22; Goitein 1999, I: 295, 305, 322.

[89] Agius 1996: 291, 336.

[90] See Ahrweiler 1966: 414–5; Fahmy 1966: 150; Christides 1984b: 46; Agius 1996: 291, 336.

[91] Tabrīzī 1982, II: 1170; see also Shīr 1980: 95.

[92] Al-Jawālīqī 1361/1942: 177.

[93] For details on the modern *sanbūq* family, see Agius 2002: 77–83.

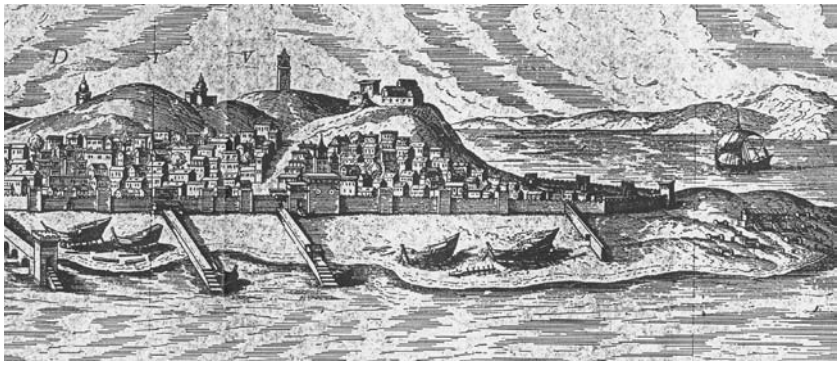


Illustration 74 Indigenous ships at the port of Diu: all ships show a curved stempost, a typical feature of the *ṣunbūq* as described by al-Jawālīqī (d. 539/1144) (after Danvers 1894, II: 400)



Illustration 75 The curved stem above the waterline of a recent Red Sea *sanbūq* (after Howarth 1977: 53)

The historian al-Maqrīzī (d. 845/1441–2) claims that during the third/ninth century the Ṭulūnid war fleet employed *ṣunbūq*s.[94] In what capacity they were used we are not told, but his report seems to imply that Red Sea *ṣunbūq*s which are known to have existed in his time and some, until recently, sailed to the West Indian coast. Al-Khafājī (d. 1069/1658–9) attributed them to the people of Hijaz.[95] As early as the fourth/tenth century, the *ṣunbūq* was known to have plied the waters of the Indian Ocean and sailed as far as China, reports Buzurg b. Shahriyār (d. 399/1009).[96] If this is so then she would have been a large vessel with perhaps 200 to 300-ton weight capacity.

One general use of *ṣunbūq* as a coastal boat was noted by Ibn Baṭṭūṭa. In a journey from Zeila on the Somali coast to Mogadishu, he recounts:

> it is a custom of the people of the town that, when a vessel reaches the anchorage, the *ṣunbūq*s, which are small boats come out to it.
>
> [*wa-min ʿāda ahl hādhihi l-madīna annahu matā waṣal markab ilā l-marsā taṣʿad l-ṣanābīq wa-hiya l-qawārib al-ṣighār ilayhi*].[97]

Customs officers also came out in *ṣunbūq*s to collect port taxes while inspectors made inquiries about the ship, her owner, her cargo etc.[98] In another voyage to Zafar (Salalah today) Ibn Baṭṭūṭa narrates that when a ship from India or elsewhere put in at the port,

> the sultan's slaves go down to the shore, and come out to the ship in a (*ṣunbūq*), carrying with them a complete set of robes ... for the *rubbān* [s.v.], ... the *kirānī* [s.v.] ... .
>
> [*kharaja ʿabīdu l-sulṭān ilā l-sāḥil wa-ṣaʿidū fī ṣunbūq ilā l-markab wa-maʿahum al-kiswa l-kāmila ... lil-rubbān. ... wa-lil-kirānī ...*].[99]

The captain and crew were then taken to the shore and a horse was provided for each of them; so they mounted the horse and in procession proceeded to the sultan's residence with the sound of drums and trumpets.[100]

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[94] Al-Maqrīzī 1270/1853, II: 180.

[95] Al-Khafājī 1282/1865: 118; and the 12th/18th century lexicographer al-Zabīdī (1989, XXV: 177–9), citing an earlier source, claims that she was a Yemenite vessel built locally.

[96] Al-Rāmhurmuzī 1883–1886: 190.

[97] Ibn Baṭṭūṭa 1968, II: 181; idem, 1958–2000, II: 374.

[98] Ibid., 1968, II: 183; 1958–2000, II: 375.

[99] Ibid., 1968, II: 198; 1958–2000, II: 383.

[100] Ibid., 1968, II: 198; 1958–2000, II: 383–4.



Illustration 76 The city of Calicut with Portuguese *caravel*s and *sambucho*s (CA *ṣunbūq*) in the harbour (after Danvers 1894, I: 182)

In Basra, Ibn Baṭṭūṭa informs us that the sailors of a *ṣunbūq* "row standing up".[101] To report such an experience suggests that elsewhere the normal practice was the sitting position otherwise Ibn Baṭṭūṭa would have not bothered to comment on it. It must be said, however, that rowing standing up was and is still a well-known practice in many places around the world.[102]

Other mention of *ṣunbūq* comes from the Ḥaḍramī and the Portuguese sources.[103] When close to the East African coast, Vasco da Gama (d. 1524) and his crew, sighted one of these craft laden with pigeon's dung; it is said that "[the locals] were transporting it as it was

[101] Ibid., 1968, II: 17; 1958–2000, II: 281.

[102] See for example the *Maqāmāt* illustration showing three rowers in a standing position, BN-Ms 5847, fol. 119v.

[103] For the Ḥaḍramī chronicles see Serjeant 1974: 58, 69; for the Portuguese sources see CDRAD/Portuguese Archives, ANTT, Mucleo Antigo, 592, ff. 2–5v [1522]; *Commentaries* 1875–1884, I: 62, 93, 252–3; *Book of Duarte Barbosa* 1918–1921, I: 7, 9.

merchandise with which they dyed stuffs".[104] It is also said that the *ṣunbūq*s at Mozambique carried sails of matting.[105] The ship-term the Portuguese used was *sambucho* or *zambuco*. As for crossing the sea in safety, the author of the *Commentaries* reports that their *caravel*s "were guided by small or large *ṣunbūq*s",[106] which were described as undecked and having no nails,[107] the latter a feature, recurring in the writings of medieval Europeans and Arabs (see Chapter 5). Only Ludovico di Varthema (fl. 16th c) describes the Red Sea *ṣunbūq* as a "flat-bottomed vessel".[108] Considering the expeditionary role that the fifteenth or sixteenth-century Portuguese *caravel* played in the Western Indian Ocean it is not known why Muslim authors failed to mention or describe this craft. Images of contemporary Portuguese ships are evidence of their ubiquity in Indian Ocean harbours (illustration 76). The *caravel*'s construction features such as the plain transom stern, the lofty poop broadened by a quarter gallery found their way into the building of the Arabian *baghla* [s.v.] and *ghanja* [s.v.] and the Indian *kotia* [s.v.] of the nineteenth and twentieth century[109] (illustrations 77 & 78).

Several attempts have been made to derive the name *ṣunbūq* from the Greek name, σαμβύκε (*sambúke*)[110] or the Latin *sambuka*, but more convincing is the argument that it comes from Persian through Middle Persian **sambūk* (> Neo Per *sunbuk*).[111] It is possible that the Greek ship-term σαμβύκη developed through contacts with the Red Sea and Indian Ocean thus adapting the Persian *sunbuk*,[112] the source of which may be traced to Sanskrit *çambuka*,[113] or Malay *sampan*.[114] We find cognates of her name in Mehri, Hadrami and Amharic (*sambūq*), and Tigré (*sembuk*).[115] I can, therefore, conclude that the name of this craft is a universal type used in the Red Sea, the Persian Gulf and across the Indian Ocean from East Africa to as far as China.

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[104] *Three Voyages of Vasco da Gama* 1869: 75–6, 79, 80, 109.
[105] Ibid., 80.
[106] *Commentaries* 1875–1884, IV: 206.
[107] [*As naos, ou zambucos, em que navegavão este Mouros, nem tinhão cuberta, nem pregadura*], ibid., I: 29.
[108] *Travels* of *Ludovico di Varthema* 1863: 154.
[109] Agius 2002: 134.
[110] Anāstās al-Kirmilī 1900: 68.
[111] See al-Jawālīqī 1969: 177–9; Tabrīzī 1982, II: 1170; see also Glidden 1942: 71.
[112] Shīr 1980: 95.
[113] De Landberg 1920–1942, III: 1986–7, fn. 1.
[114] Kindermann 1934: 43.
[115] De Landberg 1920–1942, III: 1985–6, fn. 1; Glidden 1942: 71; Serjeant places the ship-term with a Southern Arabian origin; see also Stone 1985: 125, fn. 106.




Illustrations 77 & 78 (Left) The Kuwaiti *baghla* 1950s (courtesy of the Semitics Photo Archives at Leeds University) and (right) a wall painting of an Omani *ghanja*, Sur 1996 (photo author), both distinguished by a square galleon-shape stern and a high poop, features of the sixteenth-century European ships

One other type similar to the *ṣunbūq* is the *jahāzī* (also known as *jahāz*), a cargo vessel,[116] mentioned by al-Idrīsī (d. 548/1154). The missionary Friar Odoric in 1321 reports having boarded one of these vessels heading for Tana (today Mumbai),[117] whose planks were sewn together. She was also noted by Ibn Mājid (d. after 906/1500),[118] but I seem to lose track of her after his time. In modern times we have an East African dhow by the name of *jahāzī*. It is difficult to say whether the name and type are related to the medieval vessel though Prins suggested that a prototype had slightly different bows and a somewhat curved cutwater.[119] A modern *jahāzī* serves as a cargo ship and shares common characteristics with the Yemenite and Hadrami curved stemed-*sanbūq*.[120] *Jahāzī*s were reported to have sailed from East Africa to Oman and as far as Khasab, the old commercial harbour of the Musandam Peninsula, which until fairly recently was the centre of the frankincense and myrrh trade in the Northern Gulf.[121] East African *jahāzī*s still transport mangrove poles to Arabia.

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[116] See Dozy 1967, I: 228.
[117] *Cathay and the Way Thither* 1866, II: 113.
[118] Ibn Mājid 1981: 261, fn. 89.
[119] Prins 1965: 75.
[120] Hawkins 1977: 79.
[121] See Agius 2002: 97; for further details on the East African *jahāzī* see 96–98; also Agius 2005a: 72–6.

Although the word may be related to the Arabic root */j.h.z./* there is no historical-linguistic evidence to suggest that this is so. No classical or modern Arabic dictionaries list this name. An attempt to derive the nomenclature from *jahāz*, meaning "equipment or fittings" or "tackle/rigging" could only be accidental.[122] It seems clear to me that the nomenclature stems from the Persian *jahāz*, a word for "ship".[123]

The cargo and pilgrim-jalba

The *jalba* (pl *jilāb* or *jalbāt*) was a well-known Red Sea cargo and pilgrim vessel. Al-Nuwayrī l-Iskandarānī (fl. 8th/14th c) claims that she belongs to the Indian waters too.[124] I could not place the name in any classical and medieval lexica; I traced it through the word *jalab* which means "a thing…driven or brought, from one country or town to another…for the purpose of traffic",[125] which possibly meant the transport of animals (camels, sheep or goats), captives or slaves and merchandise from one coastal town to another; hence the ship that carried them was called *jalba*.

The earliest mention of a *jalba* comes from Buzurg b. Shahriyār (d. 399/1009) who retells a story narrated to him by a sea captain ʿImrān al-Aʿraj: In 325/936 ʿImrān set sail from Oman to Jeddah in company of ships from Aden, Ghalafiqa and Athar. A fierce gale broke and a newly constructed *jalba* from Ghalafiqa "[was] driven by the wind and waves on to a reef, and capsize[d]" [*wa-qad ṭaraḥatha l-rīḥ wa-l-amwāj ʿalā jabal fī l-baḥr wa-nazalat al-amwāj ʿanhā wa-(i)nqalabat*].[126] ʿImrān continues that he saw the passengers thrown into the sea and the ship swallowed up. The point he was making about the story was that the *jalba* was a "magnificent new vessel" [*jalba jadīda ḥasana*] and that "no one was saved" [*fa-mā salima minhā aḥad*].[127] Of all the vessels Buzurg mentions in his stories the *jalba* figures only once.

Cargo-*jalba*s trading goods in the Red Sea are recorded in the Genizah letters, one such is from a certain merchant Samuel ben

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[122] See Kindermann 1934: 21.
[123] Steingass 1977: 380; see also Māhir 1967: 338.
[124] Al-Nuwayrī l-Iskandarānī 1968–1976, II: 247.
[125] Lane 1984, I: 440.
[126] Al-Rāmhurmuzī 1883–1886: 93–4; idem, 1981: 54.
[127] Ibid.

Abraham ben al-Majjānī stationed in Aden, who in a letter to his business colleague, Abū Zikrī in Cairo, informs him of an incident that happened to him at Dahlak Island. His *jalba* was sailing on to Aden when she was intercepted by a number of *jalba*s under the order of the ruler of Dahlak.[128] The *jalba* was carrying a merchandise of cloth for which the interceptors, knowing that the cargo could fetch a good price, made "unreasonable demands" of the crew and merchants. So after a struggle they plundered the ship and took the goods away; they let the crew and passengers go but the Muslims accompanying the Jewish traders on board were injured.

During the *ḥajj* season Ibn Jubayr (d. 614/1217) reports that pilgrim-*jalba*s crossed the Red Sea from Aidhab to Jeddah, back and forth. Aidhab was considered to be "one of the most frequented ports of the world, because of the ships of India and Yemen that sail to and from it", so we are told.[129] It was the closest point of crossing so many pilgrims every year poured into this port coming from mainland Africa, Egypt and Sudan. Ibn Jubayr is perhaps the only traveller who had so much to tell us about the *jalba*. Apart from his interest in the construction features of this boat where he noticed that her planks were sewn with cotton rope (see Chapter 5), his attention was turned to the bad treatment pilgrims received from *jalba* owners. He arrived in Aidhab from Egypt in 579/1183 and like many other pilgrims he waited at the harbour to catch the ferry. He could not believe what he saw. He writes:

> [Shipowners] load the *jilab* with [pilgrims] until they sit one on top of the other so that they are like chickens crammed in a coop.
>
> [*…yashḥanūna bihim al-jilāb ḥattā yajlis baʿḍuhum ʿalā baʿḍ…ka-annahā aqfāṣ al-dajāj al-mamlūʾa*].[130]

No doubt these conditions increased the danger of losing one's life in the frequent storms which the Red Sea is prone to because of the northerly prevailing winds. As the Egyptian historian al-Maqrīzī (d. 846/1442) remarked, there were more of those who perished in the sea of Aidhab than any other anchoring-places in the Red Sea.[131] He adds the cynical

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[128] See Margariti 2007: 166–7.
[129] Ibn Jubayr 1952: 63.
[130] Ibn Jubayr nd., 65; idem, 1952: 65.
[131] Al-Maqrīzī 2002, I: 551.



Illustration 79 Pilgrim boats at Jeddah 1930 (afer Van Der Meulen 1957: 118)

comment that the only objective of the shipowners was "deriv[ing] incalculable benefits from the pilgrims"[132] (illustration 79).

I can only guess at the size of these cargo *jalba*s through the notes of the Jesuit Jerónimo Lobo (d. 1678).[133] In terms of size he compares her with the Alfama lateen-rigged *caravel* (*latina*). We also learn from his diary that the *jalba* did not "venture in the open sea";[134] she had one or two masts, light and manoeuvrable in places where there were dangerous shoals.[135] Some *jalba*s were large enough to carry a number of camels from Jeddah to Yemen.[136]

Smaller *jalba*s noted by the Portuguese sources were employed to scout around the shores of the Red Sea. In one of his expeditions on the

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[132] Ibid.
[133] *Itinerário of Jerónimo Lobo* 1984: 107.
[134] Ibid., 109.
[135] Ibid., 107.
[136] Ibn Baṭṭūṭa 1968, I: 158; idem, 1958–2000, II: 361; see also Dozy 1967, I: 204.

African coast, De Albuquerque (d. 1515) instructed his seamen to capture a *jalba* in order to reconnoitre the land; in a letter to King Manuel (1469–1521) on 4 December 1513 he gives the following report:

> Returning to Kamaran for the second time, and having decided to make ready to sail in August, I determined to send the *caravel* out to sea to try to get a *jelba* [*jalba*], in order to obtain some news of the land, for throughout the whole year the strait is navigated by these small rowing or sailing *jelba*s. I ordered her to try to reach the island of Dalaca [Dahlak] and Meçuá [Masawa], and I gave her a pilot from the same land. And with this I did not mean more than to send João Gomes in the *caravel* to spend some days discovering land throughout this strait wherever he could. He managed so well that he reached the island of Dahlak and some islands near it, where there are pearl fisheries… .[137]

An interesting piece of information which gives an idea of the way the Portuguese were operating in this region and their intention to occupy strategic ports. De Albuquerque adds that the locals had known for some days of the Portuguese entry through the strait of Bab el-Mandeb. The people of the coast, reports De Albuquerque, did not come out to greet them, there was an eerie silence "nor did birds light on the sea, so stupefied was the Red Sea with [their] arrival".[138] It is to be borne in mind that the letter, being addressed to the king, had to demonstrate the heroism of the Portuguese expedition to the Red Sea in order to justify his military and financial support.

It was not the first time that De Albuquerque sent officials to gather intelligence; Ruy Galvão and João Gomes were dispatched to Zeila on the Somali coast to observe "the nature of the place, and of its people and its trade".[139] The *caravel* that scouted in the strait of Bab el-Mandeb in June–July 1513 was commanded by João Gomes. On this occasion it was clear that the Portuguese wanted to reconnoitre the land in a *jalba* rather than conspicuously using one of their skiffs. Two important things mentioned in the letter quoted above were that the boat was light and swift and operated by oar and/or sail, and from the context, it is possible to deduce that these craft were in service during the pearl-fishing season. The Portuguese must have found the *jalba* practical to use in their expeditions: when De Albuquerque and his aides arrived in Qalhat from Hormuz in 1507, they came with their

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[137] *Cartas* 1884–1935, I: 220–1; *Suma Oriental* 1944, I: lxxxv.
[138] *Cartas* 1884–1935, I: 220–1.
[139] *Commentaries* 1875–1884, IV: 55.

*caravel*s and six *jalba*s; the latter they carried on board their ships and used them at the port.[140]

To conclude: the nomenclature of vessel-types I have discussed in this chapter tells us little about river and sea craft as such: their names are arbitrary and sometimes bear no relation to the size or shape of the hull. However, the names are historically important in terms of the sources and their relevance to the period in which they are reported. Some of the river boats were barges transporting stone, cargo, people and animals; others were built as ceremonial state vessels used in the royal court circles and for entertainment.

The *ḥajj* played an enormous role in sea-borne trade. Every year, the seasonal voyage brought cargo-passenger ships from the Red Sea, East Africa, the Persian Gulf, India and from the countries of the Eastern Indian Ocean. Many pilgrims were merchants, and for some long-distance pilgrims their voyage to Mecca was perhaps a once in a lifetime opportunity, not only to sell their goods and pay for their journey but also to establish agencies for future trade from their home town at the various stops on the way.

It is clear from our Arabic sources that the two most common cargo ships used in the Early and Middle Islamic periods were the *ṣunbūq* and the *jalba*: the *ṣunbūq* has been for centuries until present times the universal trading ocean-going vessel; the cargo-passenger *jalba*, on the other hand, was smaller but indispensable in the Red Sea due to her shallow draft.

Although information on ordinary river boats and sea-going vessels is generally lacking in Early and Medieval Islamic sources, historians took much more of an interest in listing and describing war vessels; albeit wanting in detail, their information is helpful for the maritime historian and boat/ship typologist. In the following chapter (Chapter 12) I shall look at war and transport vessels and discuss their background in the realm of Classical and Medieval Islam.

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[140] The purpose of their mission was supposedly to make peace with the Qalhatis but what happened after this is not clear for, as it appears, the Portuguese chronicles ignored the peace initiative proposed by the Qalhati vizier, see Aubin 1971, I: 116. Originally, when the Portuguese left Qalhat for Hormuz on 22 August 1507, they departed on good terms, but things must have changed for a year later, around 24 August 1508, they returned to Qalhat, sacked the town and burnt the ships in the harbour, CDRAD—Portuguese Archives, ANTT, cc. 1–7–56 (1508), letter from De Albuquerque to Francisco de Almeida. The letter also includes a description of the conquest of Qalhat, Quriyat, Muscat, Sohar and Khor Fakkan.

CHAPTER TWELVE

WARSHIPS AND TRANSPORT VESSELS

فسارت على سوار هي كنائن الا انها تمرق مروق السهام...
فلا اعجب منها تسمى غربانا وتنشر من ضلوعها اجنحة الحمام

> They sail by their masts (i.e. the sails); they (look like) quivers, but penetrate like arrows…It is no surprise that they are called *ghurāb*s because they spread their wings like those of a dove.[1]
>
> Abū Shāma (d. 665/1266–7)

The list of Classical and Medieval war and transport vessels in the Western Indian Ocean is, as to be expected, following my discussion on naval activities in the region (see Chapter 8), much smaller than that of the Mediterranean. There is a dearth of information on their hull shape and function and we can only guess their construction features from those of Mediterranean Muslim and Christian war craft. It would not be possible to write about warships of the Western Indian Ocean without discussing Mediterranean Muslim vessels, for as medieval sources infer, some of their warships sailed the waters of the Red Sea and into the Indian Ocean. Furthermore, it must be said that the lack of iconography of Muslim war vessels makes the study more difficult; once more our recourse is to search for pictorial evidence of craft from Byzantium and the Christian West. It is not the aim of this chapter to show comparative evidence; what is intended here, rather, is to look historically at various river and sea war craft and transport vessels in the Western Indian Ocean, their construction features, wherever that is possible, and trace the origin of their nomenclature.

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[1] *Fa-sārat ʿalā siwār hiya kanāʾin illā annahā tamruqu murūq al-sihām…fa-lā aʿjabu minhā tusammā ghirbānan wa-tanshuru min ḍulūʿihā ajniḥat al-ḥamām*; from *Kītāb al-rawḍatayn fī akhbār al-dawlatayn*, see *Recueils des historiens des croisades* 1967, IV: 210. I am grateful to an anonymous reader of one of my early drafts of this chapter (28 June 2005) who drew my attention to a mistranslation of the first line of this quote.

The river craft

The ḥadīdī, shabbāra, sallūra *and* zawraq

I will start with the *ḥadīdī* or *ḥadīdiyya* (pl *ḥadīdiyyāt*). The name suggests "something made with iron" and this is because early types of war vessels were built of iron i.e. their wooden hulls would have been protected by iron plates. No doubt this was a generic term but also a specific nomenclature for a war vessel of the type that al-Ṭabarī (d. 310/922–3) reports to have been used in 252/866 by the Turks on the Euphrates river.[2]

One of the earliest types, the *shabbāra* (pl *shabbārāt*), mentioned by al-Ṭabarī, was used by the caliphal army on the Tigris against the Turks on numerous occasions in 251/865.[3] The caliph al-Maʾmūn (198–201/813–817) is said to have owned some 4,000 large and small *shabbāras*; the caliph himself sailed on a *shabbāra*.[4] Apparently, the *shabbāra* was identical to the *sallūra* or *sullūra* (pl *salālīr*), which was used to assist the larger galleys equipped with archers.[5] Al-Nuwayrī l-Iskandarānī (fl. 8th/14th c) reports that each boat would carry 4 or 5 archers.[6] They shot arrows at the enemy vessels with the aim to set fire to parts of them and cause confusion. The *sallūra*s were not the only type of small boat to manoeuvre around the enemy galleys: the *shīṭī* [s.v.], *ʿushārī* [s.v.], *qārib* [s.v.] and *zawraq* [s.v.] were also used for this purpose; they were carried on the deck of the ship.[7] The *zawraq*s (pl *zawāriq* or *zawārīq*), al-Nuwayrī reports, were swift; if they were in danger they were quick enough to turn around and flee from the enemy.[8] Elsewhere the *sallūra* is described as a large Mediterranean war vessel with 16 to 24 oars; some were known to have 40 oars and to be carrying three sails.[9] We find this type on the Nile, as Ibn Wāṣil noted in 641/1243. Fleischer

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[2] Al-Nukhaylī 1974: 31.
[3] Al-Ṭabarī 1965, XII (iii): 1563, 1589–90, 1627.
[4] Al-Qazwīnī 1848, II: 233.
[5] UAFAL (Berlin) Ms 667, ff. 123v–124r; al-Maqrīzī 1957–1973, IV (ii): 671; see al-Nukhaylī 1974: 66.
[6] UAFAL (Berlin) Ms 667, ff. 124r–124v.
[7] Ibn Miskawayh 1332–1333/1914–1915, I: 271.
[8] UAFAL (Berlin) Ms 667, ff. 123r–124v; KLI (India) Ms 738, fol. 260r; see al-Nukhaylī 1974: 60.
[9] Khānkī 1948: 126; Dozy 1967, I: 673; Māhir 1967: 347.

(cited by Kindermann) places the name with Greek σελλάριον, a small sailing vessel.[10]

The sumayriyya, ṭayyār *and* zabzab

One of the warships used on the Mesopotamian rivers, the *sumayriyya* (pl *sumayriyyāt*),[11] was recorded by several classical historians, al-Ṭabarī being the most frequent.[12] At the time of the Qarmaṭian invasion in 293/906, hundreds of *sumayriyya*s were employed by the Qarmaṭians in their advance against the army:[13] Ibn Miskawayh (d. 421/1030) tells us that in 315/927 Abū l-Ṭāhir al-Qarmaṭī and his fellow fighting men marched to ʿAyn al-Tamar and hired 500 *sumayriyya*s and other river craft such as the *shadhā*s [s.v.] and the *ṭayyār*s [s.v.].[14] When the Qarmaṭians were threatening to invade Baghdad in the same year, the caliph's troops crossed the Euphrates in *sumayriyya*s and *ṭayyār*s.[15]

The origin of the name *sumayriyya* is not known, unless we believe al-Jawālīqī's (d. 539/1144) claim that she was so called after Sumayr, who lived in Basra.[16] It seems that there were both big and small types of *sumayriyya*,[17] performing different functions: the larger ones had 40 oars such as those mentioned by al-Ṭabarī; he relates that

> Sulaymān [b. Jāmiʿ] wrote to the leader of the Zanj, requesting the latter to reinforce him with *sumayriyya*s of forty oarsmen each.
>
> [*wa-kataba Sulaymān ilā ṣāḥib al-Zanj yasʾaluhu imdādahu bi-sumayriyyāt li-kull wāḥida minhunna arbaʿīn mijdhāfan*].[18]

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[10] Kindermann 1934: 41; see Fleischer 1836: 71.
[11] Ibn Manẓūr nd., III: 2091; al-Zabīdī 1972, XII: 84.
[12] Al-Ṭabarī 1965, XII (iii): 1759–61, 1784–5; XIII (iv): 1926, 1948–9, 1953–4, 1956–7, 1960, 1968, 2074.
[13] Ibn al-Athīr 1301/1883, IX: 75; idem, 1965, VIII: 125.
[14] Ibn Miskawayh 1332–1333/1914–1915, I: 175–6; see also Ibn al-Athīr 1301/1883, VIII: 63.
[15] Ibn Miskawayh 1332–1333/1914–1915, I: 133.
[16] Al-Jawālīqī 1355/1936: 191.
[17] Al-Masʿūdī 1346/1927, II: 53; see also al-Ṣūlī 1935: 207–8.
[18] Al-Ṭabarī 1965, XIII (iv): 1953; trans. Philip M. Fields (with a slight amendment by myself), see al-Ṭabarī 1987, XXXVII: 17.

The smaller ones had only 4 oars. The *sumayriyya* was also employed as a transport ship,[19] cargo vessel[20] and ferry,[21] as well as a pleasure boat.[22]

The *zabzab* (pl *zabāzib*)[23] seems to have been one of the largest of the river craft which belonged to the River Tigris, according al-Nuwayrī l-Iskandarānī;[24] one of her main functions was to transport equipment and soldiers.[25] She is mentioned in the context of the Barīdīs (315–349/927–960) during the Caliphate of Muttaqī Bi-llāh (329–333/940–944). As military leaders, the Barīdīs played important roles in Baghdad and in the south of the region of Iraq, Basra in particular (see Chapter 8). Al-Ṣūlī and al-Masʿūdī record the event of 331/942 when, we are told, an Omani fleet appeared in Basra with the intention of occupying it. Several of these *zabzab*s were used against the Omani fleet and the Barīdīs succeeded in blocking the Omanis at the entrance to Basra.[26] Apart from this incident there is no mention of the *zabzab* being used as a fighting ship; the craft was large and equipped with fire equipment.

The ṣalgha *and the* shadhā

The *ṣalgha* and *shadhā* occur frequently in the Classical Arabic accounts. The *ṣalgha* (pl *ṣilāgh*) is known to be a "large ship";[27] in the account of the Zanj war, reported by al-Ṭabarī, the name occurs in four places and from the context it is possible to conclude that the craft was similar to a *sumayriyya* but larger; she was used in the canals of Basra and the surrounding area to transport Zanj insurgents, horses and food supplies. We are informed that in 262/876, al-Jubbāʾi, in his encounter with

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[19] Mushrifa nd., 155; Mājid 1953–1955, I: 224.
[20] Al-Tanūkhī 1375/1955, II: 336, 390.
[21] Al-Ṣābī 1958: 24; al-Shābushtī 1386/1966: 44.
[22] Al-Shābushtī 1386/1966: 46–7.
[23] Ibn Manẓūr nd., III: 1802; Lane 1984, I: 1208.
[24] UAFAL (Berlin) Ms 667, fol. 127v.
[25] Ibn al-Athīr 1301/1883, IX: 224; idem, nd., 25; Ibn Miskawayh 1332–1333/1914–1915, II: 245 and several other references of this usage in Ibn Miskawayh; see al-Nukhaylī 1974: 555, fn. 12.
[26] Ibn Miskawayh 1332–1333/1914–1915, II: 46; al-Masʿūdī 1346/1927, II: 530; al-Ṣūlī 1935: 203, 251, 263.
[27] Ibn Sīda 1898–1903, X: 26; al-Zabīdī 1985, XXII: 529; al-Fīrūzābādī 1995: 706; see also Lane 1984, II: 1717.

Rumays, the Zanj leader, captured 24 *sumayriyya*s and over 30 *ṣalgha*s.[28] Al-Ṭabarī also tells us that the *ṣalgha* transported horses near Tahitha.[29] A *ṣalgha* carrying 10 Zanj soldiers and barley was sighted in 267/880–1, she was captured but the soldiers dived into the water and fled.[30] In the same year we learn that al-Khabīth equipped for war a large number of *ṣalghas, sumayriyya*s and *zawraq*s which carried Zanj on board under the command of Muḥammad b. Ibrāhīm.[31] The name *ṣalgha* is a word for she-camel [in her seventh year] and fat;[32] it is uncommon to call a ship by the name of an animal though bird names have been used (see Chapter 13).

The other type, *shadhā* (pl *shādhdh, shadhawāt, shadhāwāt* or *shadhā'āt*) is a galley. The first time the *shadhā* is mentioned by al-Ṭabarī we read that Manṣūr b. Jaʿfar in 257/870–1, when mustering his troops against the Zanj, had *shadhā*s which were made in the city of Jannaba[33] (located on the coast of Fars). Her identification as a war vessel is clear from nearly all the references about the Zanj.[34] On the 26 Shaʿbān 264/3 May 878 a certain Sulaymān was provided with 10 *shadhā*s by a man from Abadan called Ṣaqr b. Ḥusayn:[35] these *shadhā*s (barges) were fighting ships, five of which carried "the very finest of (Sulaymān's) commanders and troops".[36] Another event is mentioned in which Abū l-ʿAbbās in 267/880 moved his *shadhā*s into a narrow spot in the canal, thus engaging in a battle where he killed the enemy's infantry and injured many others by arrows.[37] When a count of sailors in Abū Aḥmad b. al-Mutawakkil's navy was made in 269/883, there were 10,000 paid sailors; this number included men from the *shadhā*s, *sumayriyya*s and *raqqiyya*s [s.v.], the latter transported the cavalry.[38] There is no information about how many fighting ships there were and the

[28] Al-Ṭabarī 1965, XII (iii): 1901.
[29] Ibid., XIII (iv): 1922.
[30] Ibid., 1955.
[31] Ibid., 1979.
[32] Lane 1984, II: 1717.
[33] Al-Ṭabarī 1965, XII (iii): 1844.
[34] Ibid., 1844, 1860; XIII (iv): 1923–6, 1948, 1960–1, 1966, 2074, 2282–3; Ibn Miskawayh (1332–1333/1914–1915, I: 372) for the events of 325/936; see also al-Ṭabarī 1985, XXXVIII: 189–90; idem, 1987, XXXVII: 13, 23–4, 28–9, 118–9; idem, 1992b, XXXVI: 137, 195–8.
[35] Al-Ṭabarī 1965, XIII (iv): 1923.
[36] Ibid., 1925; trans. by D. Waines, see al-Ṭabarī 1992b, XXXVI: 197.
[37] Idem, 1965, XIII (iv): 1966.
[38] Ibid., 2074.

number of men using them, nor is it clear how many were engaged in fighting on land or sea.

In the reign of al-Muʿtamid (256–279/870–892) Wasit was the base for military operations against the Zanj but the city was captured and sacked by the Zanj in 264/877–8; they held to the city for three years until a counter-attack was launched and the city was recovered and captives released.[39] Ibn al-Athīr (d. 630/1232–3) describes how the *shadhā*s were protected during the siege in 269/882:

> As a *shadhā* approached the castle arrows were shot at her and stones from ballistas and slings were thrown at her. Lead was liquified and poured over her… Then (al-Muwaffaq) ordered to provide the *shadhā* with a ceiling made of wood and covered with plaster, a coating which will prevent her from getting burnt… .
>
> [*fa-kānat al-shadhā idhā qarubat min qaṣrihi rumiyat min fawq al-qaṣr bil-sihām wa-l-ḥijāra min al-manjanīq wa-l-miqlāʿ wa-udhība l-riṣās wa-ufrigha ʿalayhim … fa-amara (l-Muwaffaq) an tusaqqaf al-shadhā bil-akhshāb wa-yuʿmal ʿalayhā jibs wa-yuṭlā bil-adwiya llatī tamnaʿ al-nār min iḥrāqihā*…].[40]

This they did and when the men in the *shadhā* drew closer to the castle of the Zanj they besieged the castle and burnt it. The seamen and the fighting men in the *shadhā* were safe. The covering of the *shadhā* with a roof and the use of plaster as a technique was perhaps not a common practice as Ibn al-Athīr thought it worthy of a special mention.

Both the *shadhā* and *sumayriyya* would have been capable of sailing before the wind, and depending on their length, would have had one or two masts. We have no means of knowing the number of oars they carried but we do know that when engaged in battle, as was the case with all types of classical and medieval warships, the sails were lowered and stowed away to give better manoeuvrability to the oars. It may be said that both the names, *shadhā* and *sumayriyya*, and the nature of these craft are indigenous to Basra and Southern Mesopotamia; they were better known in the context of the Zanj war, though one event is mentioned by al-Masʿūdī (d. 345/956–7) in connection with the Barīdīs:

> The Barīdīs were at their strongest in Basra, they blocked ships sailing through. Their army became big with many fighting men. They had

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[39] Ibid., 1921–7.

[40] Ibn al-Athīr 1301/1883, V: 151; we find other accounts related by Ibn Miskawayh and al-Ṣūlī on the use of fire by the enemy to burn *shadhā*s, see Ibn Miskawayh 1332–1333/1914–1915, II: 46 and al-Ṣūlī 1935: 244 for the year 331/942.

> two armies, one on the sea using *shadhā*s, *ṭayyār*s [s.v.], *sumāriyya*s [for *sumayriyya*s] and *zabzab*s [s.v.]. . . .
>
> [*wa-(i)shtadda amr al-Barīdiyyīn bil-Baṣra wa-manaʿū l-sufun an taṣʿad wa-ʿazuma jayshuhum wa-katharat rijālatuhum wa-ṣāra lahum jayshān jaysh fī l-māʾ fī l-shadhawāt wa-l-ṭayyārāt wa-l-sumāriyyāt wa-l-zabāzib*. . .].[41]

The name *shadhā*[42] in Arabic denotes "strength" but it also stands for "a type of tree",[43] the latter seems to be the closest; the question is whether timber from this tree was good enough to construct a *shadhā*? Like some classical Mesopotamian names *shadhā* may be traced to Judeo-Aramaic or even early Semitic as Akkadian; or could it be that this ship-term is related to the Greek *schediê* (σχεδίη)?[44]

Transport river vessels

Abū Aḥmad b. al-Mutawakkil sent his son Abū l-ʿAbbās to the town of Wasit to fight the Zanj and to this end 10,000 cavalry and infantry were "outfitted with the best equipment";[45] they were provided with a ferry called *miʿbar* (pl *maʿābir*),[46] from the root-verb, /ʿ.b.r./ "to cross"; she is always associated with transporting troops,[47] infantry,[48] cavalry and footsoldiers.[49] For horses, the *raqqiyya*-type [s.v.], was specially designed to carry them for battles.[50]

The *miʿbar* and *safīna* were mentioned exclusively by al-Ṭabarī and always in the context of the Zanj war. Both ship-terms are generic but were applied specifically to denote transport vessels. *Miʿbar*s are known to accompany *shadhā*s and *sumayriyya*s.[51] As for *safīna*s we come

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[41] Al-Masʿūdī 1861–1877, VIII: 345.
[42] Recorded by al-Azdī 1902: 107; al-Muqaddasī 1906: 32.
[43] Ibn Manẓūr nd., IV: 2221.
[44] This is the galley-type described by Homer when he refers to Odysseus building this craft and sailing home from Ogygia. Kurt (cited by Wallinga) states that the term is older than Homer's usage and it means "fast-built vessel", Wallinga 1993: 36.
[45] Al-Ṭabarī 1965, XIII (iv): 1948; trans. by P. M. Fields, see al-Ṭabarī 1987, XXXVII: 13.
[46] Also noted in the works of Hilāl al-Ṣābiʾ (d. 384/994–5) *zawārīq al-maʿābir* and Khaṭīb al-Baghdādī (d. 463/1070–1), *mibʿariyyāt*, see Zayyāt 1949: 349.
[47] Al-Ṭabarī 1965, XII (iii): 1871.
[48] Ibid., XIII (iv): 1948.
[49] Ibid., 2074.
[50] Ibid; see al-Muqaddasī 1906: 31.
[51] Al-Ṭabarī 1965, XIII (iv): 1961.

across her usage in several places in al-Ṭabarī's accounts: a) *sufun al-rijjāla* (transport ships for foot-soldiers),[52] b) *sufun bi-mā fīhā min al-rijjāla wa-l-silāḥ wa-l-alāt* (transport ships for foot-soldiers, weapons and [war] machines),[53] c) cargo vessels,[54] and d) *sufun al-jusūr* (pontoons).[55]

One other transport ship which seems to have been used exclusively for commanders and their crew was the *jarībiyya*.[56] The name occurs a few times in the history of al-Ṭabarī: all references are in connection to the Zanj uprising.[57]

The big warships

The bārija: *a pirate ship*

There were both large and small *bārija*s (pl *bawārij*).[58] During the Caliphate of al-Mustaʿīn (248–252/862–866), it is stated in the history of al-Ṭabarī that 10 *bārija*s came up from Basra in 251/865 and were engaged in a battle against the Turks; each warship, it is reported, carried 45 men:[59] the captain (s *ishtiyām*, pl *ashātima*), 3 naphtha throwers (s *naffāṭ*, pl *naffāṭūn*), 1 carpenter (s *najjār*, pl *najjārūn*), 1 baker (s *khabbāz*, pl *khabbāzūn*) and 39 oarsmen (s *jadhdhāf*, pl *jadhdhāfūn*) who doubled as warriors (s *muqātil*, pl *muqātila*).[60] It is an unusual account as Arabic sources rarely give details about the duties of crew members[61] (see Chapter 6). Seamen could have acted as fighters and were expected

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[52] Ibid., XIII (iv): 1965.
[53] Ibid., 1968.
[54] Ibid., XII (iii): 1550, 1844; XIII (iv): 2074.
[55] Ibid., XIII (iv): 1966–7.
[56] Ibid.
[57] Ibid., XII (iii): 1761, 1785–6, 1836; XIII (iv): 2074.
[58] The name is listed by Ibn Sīda on the authority of Khalīl b. Aḥmad, 1898–1903, X: 26.
[59] Al-Ṭabarī 1965, XII (iii): 1582.
[60] Ibid.; see also Fahmy 1966: 103–4; Christides 1993, VII: 42, 44.
[61] In the Mediterranean a naval officer was called both *muqaddam* and *mutawallī* though from the titles one cannot tell what the specific duties were. Experienced naval Egyptian and Syrian officers operated galleys in the Eastern Mediterranean and the Red Sea. Ḥusām al-Dīn Luʾluʾ commanded an Egyptian fleet on the Red Sea in 578/1182–3, whose crew were of North African origin though a ship captured off Tyre in 1187 had naval officers who were Moroccans and Persians. Islamic sources do not mention North Africans to have been part of an Indian Ocean crew. Other valuable information on crew members and their preparedness against the enemy the reader is referred to Ibn al-Manqalī 1988: 249–54.

when necessary to seize whatever they could find on board the ship and engage in hand-to-hand combat. Needless to say the operation of a war vessel required competent officers to man the ship and maintain discipline and team work, particularly among rowers, who would probably have a hierarchical system among them.

These *bārija*s were deep-sea vessels but used in riverfaring too. The name has often stood for "pirate ship",[62] the word originating from the people of Sind (Northwest India), who in the third/ninth century were the buccaneers of the sea. Under the Caliphate of al-Manṣūr (136–158/754–775), when Jeddah was attacked in 151/768, the appearance of these ships was feared so much that the name *bawārij* (pl of *bārija*) "pirate ships" became synonymous with the pirates themselves.[63] The threat of these pirate ships appearing on the horizon meant, in the words of al-Muqaddasī (fl. second half of the 4th/10th c), that the coastal people were always "in constant fear" (… *wa-lam tazal fī halaj*…).[64] That they were the terror of the Indian Ocean is recorded by Buzurg b. Shahriyār (d. 399/1009) in one of his sea accounts: he narrates how on one voyage from Kalah to Oman in 317/929, Captain Ismāʿīlwayh encountered 70 *bārija*s with whom he fought for three days, burning down many of the craft and killing a large number of the fighting sailors.[65]

Al-Muqaddasī records the name of this ship as *bīraja*;[66] De Goeje thinks that this nomenclature is a true phonetic representation of what al-Muqaddasī had recorded at the time and, therefore, could be a regional adaptation. Another form given to this ship-name is *bārūja* (Per lit. "flower pot"), which Suʿād Māhir interprets as a deep-hulled ship;[67] the root may also be connected to Hindi *bēṛā* and Urdu *pīrā* "a large boat".[68]

All the Islamic sources seem to point to the *bārija* being an Indian Ocean war vessel. Only al-Balādhurī (d. 279/892–3) describes her as the galley of the Mediterranean.[69] It is perhaps coincidental to associate

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[62] Al-Balādhurī 1866: 440; Yāqūt 1866–1873, I: 669; al-Masʿūdī 1894: 55.
[63] Al-Muqaddasī 1906: 14; idem, 2001: 13.
[64] Ibid.
[65] Al-Rāmhurmuzī 1883–1886: 130.
[66] Al-Muqaddasī 1906: 14, 32.
[67] Māhir 1967: 334.
[68] Kindermann 1934: 3.
[69] He calls her *shīnī* [s.v.], a generic term for warship, al-Balādhurī 1866: 435; see also al-Masʿūdī 1894: 55.

the Arabic name *bārija* with the Latin *barga* (a. c. 1180) or *barca*, from a proto name *bārica*.[70] But could there be any connection with the sixteenth-century European (Portuguese and Dutch) *barsha* and Turkish *barča* (or CA *bārsha*) known as the *galliot* (a "long covered ship")?[71] The Turkish name appears in the Ḥaḍramī chronicles:[72] Al-Ashraf Qānṣūh al-Ghawrī (906–922/1501–1517) was in command of three *barsha*s and three *ghurāb*s [s.v.] which he was to take to Diu on the West Indian coast; there, he fought the Portuguese in 912/1506–7, who were cutting the Muslim trade routes via the Red Sea.[73] From the map of Pīrī Reʾīs (d. 1554), it can be seen that the *barča* is a three-masted ship with a high foredeck and rounded stern; the middle forward leaning mast and the mast located at the stern carry square sails while the foremast has a lateen sail (illustration 80).

The war galleys

The Mediterranean war galley was developed from the vessels of Ancient Greece and Rome. Little is known about Muslim galleys and less so about those of the Western Indian Ocean pre-1500; the assumption is that their design was very similar to the Christian galleys; the long and narrow hull enabled quick movement through the waters.

From the Byzantine period right through the sixteenth century it is possible to identify varied types of galleys with hybrid features of oars and sails and the Muslim warships were no different. The oars provided the main power of the early galley; galley slaves sat on wooden benches, 4 to 6 men to an oar, their feet chained to benches where they rowed for hours. They could manoeuvre the vessel with rapid acceleration and speed and when in sight of the enemy, oars provided far better power than sails as the latter depended on wind conditions.[74] In secure waters a square sail would have powered the galley; depending on their length and in later periods two or three lateen sails were used. If sails were used when the galley was engaged in battle they would have been lowered before action. Oars enabled the vessel to approach the enemy

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[70] OED 1982, I: 168.
[71] Kindermann 1934: 4.
[72] Serjeant 1974: 44, 119, 181.
[73] Ibid., 44.
[74] Communication from Joseph Muscat 19 July 2006.



Illustration 80 An Ottoman *barča* (after Pīrī Reʾīs 1988, I: inside cover)

ship from any angle. The armoured projection from the bow of a war galley was designed to disable or sink an enemy ship by ramming her from the stern or the sides, thus fighting men boarded her from the raised forecastle platform. One other tactic was to approach the enemy ship or cargo ship by coming alongside to board her. What followed then was hand-to-hand fighting with swords and spears; sometimes the order was given to shoot arrows with fire.

A type commonly known in the medieval period, at least up to the fifteenth century, is a ship which had a markedly curved and rounded sternpost, known as the "round ship" (illustration 81); underwater archaeological evidence reveals that the Serçe Liman ship, possibly an Islamic vessel, and the Yassi Ada had a similar hull configuration.[75] Large round ships were built in the Christian West; by the twelfth century we know that they had two and sometimes even three decks, with two or three masts.[76] They all had curved stem and sternposts.

[75] Bass & Van Doorninck Jr. 1978: 131; Bass & Van Doorninck Jr. *et al.* 1982: 87–110; 311–9.

[76] Unger 1981: 237; Pryor 1984: 171–219, 275–92.

These round ships were powered by steering oars and carried lateen sails. The question is how much of these features were common to Islamic round-hulled sailing ships? Iconographic evidence is missing and the paucity of evidence for the hull-shape of Islamic warships and transport ships in texts is frustrating but there is no reason to believe that the Islamic round ships were any different.

The qurqūra

In Chapter 10, I spoke about the *qurqūr* (pl *qarāqir* or *qarāqīr*); one type in the Early and Middle Islamic period known also as *qurqūr(a)* was a war galley which functioned occasionally as a transport ship to supply the fleet with food, animals, ammunition and personnel;[77] like most of the galleys, the *qurqūr(a)* operated as a cargo vessel,[78] she could carry 10,000 barrels of oil, reported al-Nuwayrī (fl. 8th/14th c).[79]

Lexicographers included this ship-term, not because it was a common word, they were not interested in terms known to common people (*al-ʿāmma*), but rather because some ship-terms would be of some importance to government functionaries and administrators. Al-Zabīdī (d. 1205/1790–1), citing earlier sources, described her as a "long or large ship".[80] Ibn Durayd (d. 321/933) says that she was built of teak (mostly the hull planks) and was pitched[81] as was the common practice (see Chapter 5). Another piece of information comes from al-Jawālīqī (d. 539/1144), who citing Ibn Sīda, defines the *qurqūr(a)* as "fully-bellied"; this could be a reference to a round vessel or a transport vessel, heavy with war amunition, horses etc. Al-Nuwayrī l-Iskandarānī informs us that the *qurqūra* when approaching the coast anchored in deep-sea water otherwise the bottom would break into pieces due to her enormous weight [...*idhā nataḥat qāʿ al-barr inkasarat li-thaqlihā thaql wasqihā*].[82]

It is clear from the Arabic sources that *qurqūr(a)*s belonged to both Muslims and Christians; thus, we find several references to Christian

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[77] Al-Maqrīzī 1957–1973, III (i): 149, fn. 2; see also al-Ḥamawī 1945: 31; al-ʿAdawī nd., 154; Mushrifa nd., 154.
[78] TS 16.163 (1).
[79] Al-Nuwayrī l-Iskandarānī 1968–1976, II: 235.
[80] Al-Zabīdī 1974, XIII: 401.
[81] Ibn Durayd 1987, I: 199; II: 1195; see also Ibn Sīda 1983–1903, X: 26.
[82] Al-Nuwayrī l-Iskandarānī 1968–1976, II: 235.

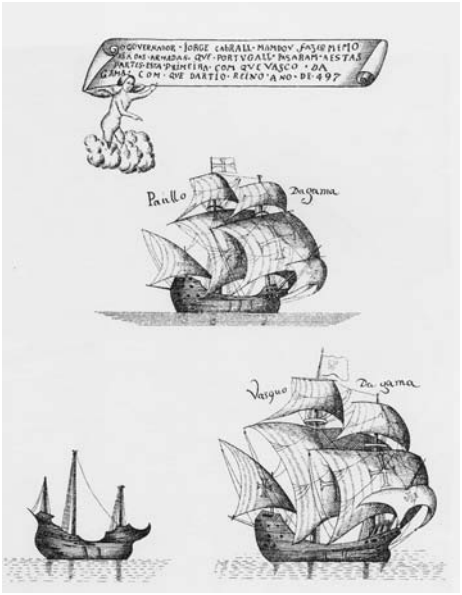


Illustration 81 Fifteenth-century Portuguese *nau*s with curved and rounded sternpost; painting Jorge Gabral, 1550 (courtesy of Science Museum, Science and Society Picture Library, London, no. 10319044)

war-*qurqūr(a)*s in the Mediterranean context.[83] Galleys did operate both as warships and merchant/passenger vessels[84] as will be seen later, with reference to the *shīnī*s [s.v.] and the *ghurāb*s [s.v.]. We are told by al-Nuwayrī l-Iskandarānī that "the *qurqūr(a)*s, because of their size and the weight of their cargo only travel[ed] under sail".[85] When in full sail they looked impressively large, reports al-Maqrīzī (d. 846/1442); he remarks that at one time there were 1,000 of them out at sea[86] and

[83] Al-Nuwayrī l-Iskandarānī gives an account of the Franks' attack on Tripoli (Syria) in 769/1367: they arrived with 55 *ghurāb*s [s.v.], 1 *ṭarīda* [s.v.] and 10 *qurqūra*s (UAFAL [Dār al-Kutub] Ms 737, fol. 20v). Ibn Ḥabīb (d. 779/1377) reports about Christian *qurqūra*s, though nothing is mentioned about their size. On his voyage to Constantinople, Ibn Baṭṭūṭa recounts that he saw in the harbour many large (Christian) *qurqūra*s "galleys". He boarded a Genoese *qurqūra* at Ladhaqiyya in 732/1331–2 in Syria, on the Mediterranean coast, north of Tripoli; he remarked how "the Christians treated us honourably and took no passage money from us", see Ibn Baṭṭūṭa 1968, II: 254; idem, 1958–2000, II: 415. This was a much larger *qurqūra* than the one he perhaps embarked from Alexandria, ibid., 1968, IV: 327; 1958–2000, IV: 921.

[84] Al-Maqrīzī (1911–1924, I: 476) notes that *qurqūra*s were employed during the Fāṭimid period as leisure boats for the caliphs and princes on the Nile.

[85] UAFAL (Berlin) Ms 667, fol. 124r.

[86] Al-Maqrīzī 1911–1942, II: 363. In a description of Christian galleys al-Maqrīzī

that the large *qurqūr(a)*s had three decks and the goods were loaded through side doors.[87] Al-Nuwayrī l-Iskandarānī states that "when the water comes near the lower door, after the lowest part of the ship has been fully loaded, it is closed, nailed, caulked and smeared with substances to keep the water out. Then the goods are brought to a door which is higher up on the second floor, and so on until the loading is completed…".[88]

As I have shown, the name *qurqūr(a)* was common among both the Islamic and Christian circles; the word could have derived from the Greek κερκουρος (*kerkūros*), "a light vessel boat especially among the Cyprians, used for Nile transport";[89] it is also found in Latin as *cercurus*.[90]

The galleys shīnī *and* shalandī

The *shīnī* was a general classificatory name for a galley though it is often referred to as a type on its own. Of obscure origin, the name appears in different forms: *shawna, shīniyya, shānī* and *shāniya* (pl *shawāni*), all these found in the context of the Mediterranean.[91] Her equivalent was the Byzantine *dromon*, and we find both terms are identical to the ninth-century Byzantine χελάνδιον[92] (see below). A *shīnī* carried a single mast with sails (originally two, then three)[93] (illustration 82).

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gives the following account: "It became visible to the lookout guard [in 767/1356] numerous sails on the horizon. Lo and behold, on the following day 8 [Christian] *ghurāb*s followed by [more Christian] *ghurāb*s and *qurqūra*s totalling to some 70 to 80 piece approached the port", see al-Maqrīzī 1957–1973, III (i): 105.

[87] Al-Maqrīzī 1957–1973, III (i): 149, fn. 2.

[88] UAFAL (Berlin) Ms 667, fol. 124r.

[89] Liddell & Scott 1953: 943.

[90] Lewis & Short, 1975: 318.

[91] Ibn al-ʿIdhārī 1848–1851, I: 130, 192, 318; al-Idrīsī 1866: 112; Ibn Ḥawqal 1873: 132; al-Muqaddasī 1906: 177; see also Lane 1984, II: 1635. Essentially, al-Maqrīzī (d. 846/1442) remarks that the *shīnī*-type falls under two classificatory names: *shawānī ḥarbiyya* specifically warships but not necessarily for long-distance voyages as opposed to the *shawānī baḥriyya* referring to ocean-going type of *shīnī*, see al-Maqrīzī 1911–1924, II: 45; idem, 1957–1973, II (i): 113, 129. The *shīnī* was particularly common in the Arabic sources dealing with the Crusades. We are told that the Crusades transported their armies, horses and cavalry on this craft. For name-types see, Kazimirski 1860, I: 1278; Dozy 1967, I: 793.

[92] Christides 2002: 101.

[93] Ibid., 91.

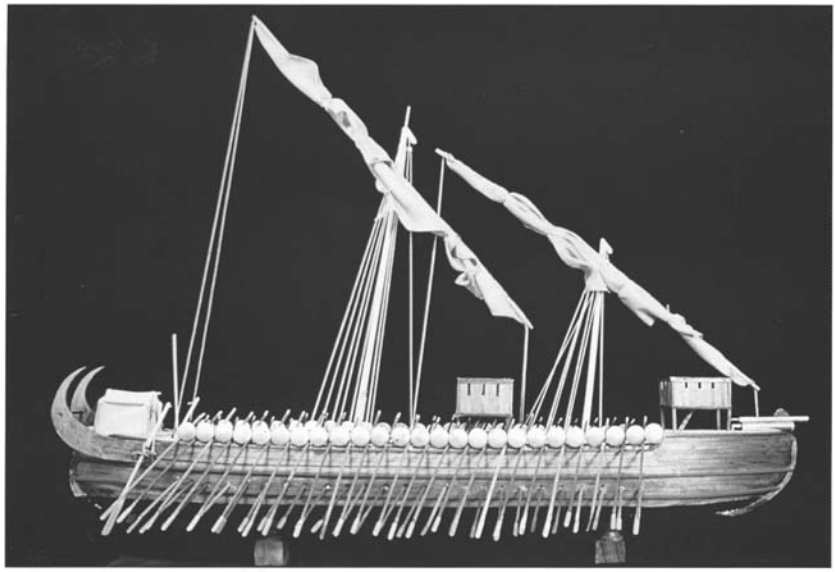


Illustration 82 A reconstruction of a *dromon-shīnī* by the Oinousses Project team (after Christides 2002: 101, pl. 6b)

The similarities of the *dromon* and *shīnī* in the middle first/seventh century were in their heavy weaponry amidships, the wood-castle located under the main mast and the ram above the waterline.[94] In terms of speed, the Muslim galley was outpaced by her rival (illustration 83).

Mediterranean galleys in the Indian Ocean region were unknown until the Ayyūbids (569–626/1174–1229) introduced *shīnī*s in the port of Aden to protect commercial shipping (see Chapters 7 & 8) and, therefore, their presence until the coming of the Portuguese in the early sixteenth century is significant. It may be argued that the *shīnī* hull-design and other construction features may have been copied by the Yemenite and Indian shipwrights living in Aden, hence introducing a newer technology in shipbuilding in the region (see Chapter 5).

It is possible to get some idea from the Islamic sources about the size of the *shīnī*.[95] At the beginning of the Fāṭimid dynasty, al-Maqrīzī (d. 846/1442) reports that 10 *shīnī*s could carry 10,000 soldiers with

[94] Ibid., 101.

[95] There seem to have been many *shīnī*s built in the Fāṭimid period: for example in 303/915, ʿUbayd Allāh al-Mahdī (297–322/909–934) founded the shipyards at Mahdiyya and had 900 *shīnī*s built there, see al-Maqrīzī 1911–1924, I: 351.

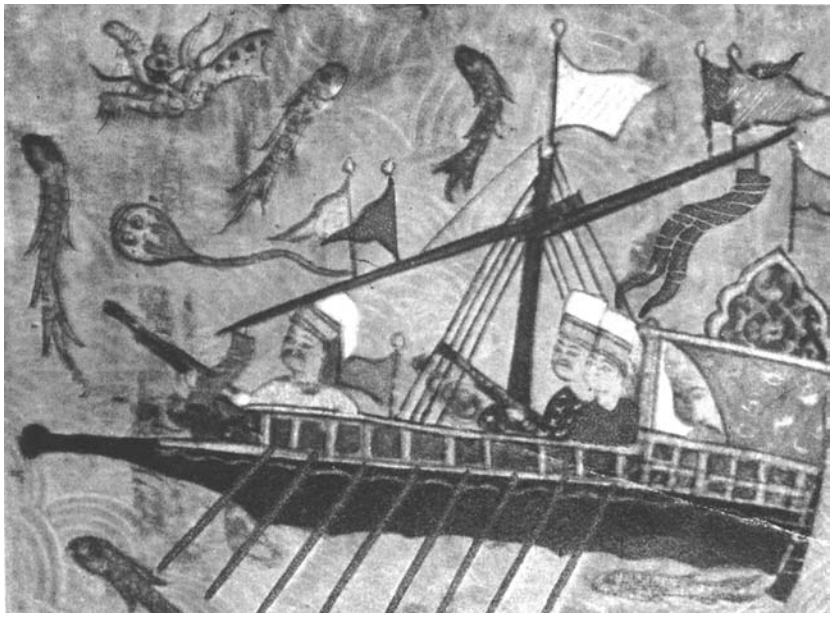


Illustration 83 An eighth/fourteenth-century Muslim war vessel with ram above the waterline (after Christides 2002: pl. 7)

about 1,000 in each.[96] This is an enormous size, which according to the calculations I discussed in Chapter 7, would give this type of *shīnī* a *circa* 2,000-ton capacity (i.e. 1 soldier = 1 ton × a ratio of 2 for ammunition and supplies); this would put an enormous strain on the keel, the masts and the rigging. Abū Shāma (d. 665/1266–7), on the other hand, writes that each *shīnī* had 150 infantry-men;[97] that sounds feasible and gives roughly a 300-ton capacity. Further credence to this amount is given by Ibn Mammātī (d. 606/1209) who records that one type of *shīnī* was equipped with 140 oars.[98]

The fourth/tenth-century *shīnī* was different from the Mamlūk type;[99] some *shīnī*s were, according to al-Asyūṭī (fl. 9th/15th c), rowing vessels, carrying no masts; the ninth/fifteenth century *shīnī* is described by him to be

[96] Ibid., 94.
[97] RHC 1967, IV: 165.
[98] Ibn Mammātī 1943: 340.
[99] Written communication from Vassilios Christides (5 June 2005).

> finely arched bottom; double-ended; no weight at the bottom; covered on the sides for the oarsmen; one anchor, covers and equipment. . . .
>
> [*daqīq musannam al-sufl hādd al-muqaddam wa-l-muʾakhkhar asfuluhu khāl min al-tathqīl mafrūsh bil-dufūf lil-muʿātala bi-maqādīf wa-mirsāt wa-satāʾir wa-ʿudad muʿallaqa bihi*. . .].[100]

One final note, there are sufficient records to indicate that while the size of ships began to increase amongst the Christian warships, whether Italian or Byzantine, there is no reason to think that *shīnī*s did likewise.[101]

The other warship, the *shalandī* (pl *shalandiyāt* or *shalanda*), is known to be a Byzantine type, mentioned in connection with transporting fighting men, war equipment, food and water.[102] *Shalandī*, the Arabic term, stands for the Greek χελάνδιον or χελάνδρα (Late Latin *chelendra*).[103] The Arabic adaptation cannot be traced in any of the Classical Arabic dictionaries. We find, as noted above, the *shalandī* in Greek and Arabic sources referred to as a Byzantine *dromon*;[104] this is because of the similarity between them, as was the case with the *shīnī* and the *dromon*; though, it must be said, that the *shīnī* was a galley distinct from other types and there is no evidence from the Arabic sources to suggest, as

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[100] Al-Asyūṭī 1996, I: 79.

[101] Unger 1980: 105, 122–3, 127–8.

[102] Al-ʿAdawī nd., 154; al-Ḥamawī 1945: 36–7. Described by al-Ṭabarī (d. 310/922–3) as a troop carrier at the siege of Damietta in 283/852–3, we are told that on board each of the 100 Byzantine *shalandī*s there were 50 to 100 men, totalling about 5,000 men, see al-Ṭabarī 1965, XII (iii): 1417–8.

[103] The name was frequently found in relation to Byzantine war vessels in the early centuries of Islam, see al-Ṭabarī 1965, XII (iii): 1417–8; Ibn al-Athīr 1965, VII: 4, 41–2, 258; XI: 159. Ibn al-Athīr (d. 630/1232) calls the Byzantines *aṣḥāb al-shalandiyya* (owners of *shalandī*). He speaks of Byzantine *shalandī* appearing on the Sicilian coasts during the Muslim campaigns of 233/847. The chronicler describes the scene of how ʿAbbās b. Faḍl (d. 247/861), the military commander, marched with the Muslim infantry to the city of Qasriyana and Syracuse in 244/858 while some of his fighters set out on their vessels and were met by 40 Byzantine *shalandī*s. They fought fiercely and the Muslims captured 10 of the vessels, see Ibn al-Athīr 1301/1883, VII: 24, see Kindermann 1934: 51; Dozy 1967, I: 783. At Kafar Sallam, one of the coastal villages of Caesarea (Syria), al-Muqaddasī (fl. second half of the 4th/10th c) describes how Byzantine *shalandī*s and *shīnī*s used to pull into the harbour "bringing with them captives taken from the Muslims, for ransom at the rate of three for one hundred *dīnār*s", see al-Muqaddasī 2001: 161; idem, 1906: 177. Other references are from Ibn Miskawayh (d. 421/1030) who, writing about incidents in 354/965, says the Byzantines conquered Tarsus, carrying the inhabitants on *shalandī*s, see Ibn Miskawayh 1332–1333/1914–1915, II: 211. The Latin and Greek forms were the base for late European, *schelanda* (Russian), *scialando* (Italian) and *chaland* (French), namely transport ships.

[104] Babuin 2002: 33.

Christides and Pryor have claimed, that she was virtually interchangeable with the *shalandī*.[105]

References as to where these craft were built in the Arab Mediterranean are given by al-Maqrīzī. He reports that when the Fāṭimid caliph al-Muʿizz li-Dīn Allāh (341–365/953–975) came into power he ordered the building of *shalandī*s in Egypt.[106] Various galleys, *shīnī*s and *shalandī*s, were constructed in the shipyard of al-Jazīra under the command of Maʾmūn b. Baṭāʾihi (517–519/1123–1125), the vizier of the Fāṭimid caliph al-Āmir bi-Aḥkām Allāh (495–524/1101–1130).[107] Ibn Mammātī describes the Muslim *shalandī* as

> a decked ship on which soldiers fought while rowers plied their oars beneath them.
>
> [*al-shalandī markab musaqqaf taqātal al-ghazāt ʿalā zahrihi wa-jaddafūn yajdafūna taḥtahum*].[108]

What is important to note here is the fact that she was decked. A galley furnished with a deck was called *musaṭṭaḥ* (pl *musaṭṭaḥāt*),[109] the Arabic root-verb being /*s.ṭ.ḥ.*/ "to level, even, make smooth", hence, "a deck (of ship)".[110] A deck was essential in navy expeditions; for example the *shalandī*'s deck, as Ibn Mammātī noted, was there to protect the oarsmen from the arrows and fire.[111]

The round jafn

The name *jafn* (pl *ajfān, jifān* or *jufūn*)[112] occurs frequently in Islamic sources and is often used indiscriminately for a war galley though references to it as a merchant vessel are also found.[113] Its plural form

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[105] Christides 1984a: 140; idem, 1984b: 43–4; Pryor 1992: 62.
[106] Al-Maqrīzī 1911–1924, II: 193.
[107] Idem, 1270/1853, I: 482; II: 197, 373.
[108] Ibn Mammātī 1943: 340.
[109] Ibn al-Athīr 1965, II: 80; see Amari 1863: 24–7, 32, 34, 39–41, 43.
[110] Wehr 1966: 409.
[111] Ibn Mammātī 1943: 339.
[112] Dozy 1967, I: 200–1.
[113] A Mediterranean-type, the *jafn* is perhaps restricted to the Maghrib and al-Andalus where it is known in Andalusi Arabic as *jafan* and in Maltese as *ġifen* (/*ġ*/ for /j/) both in the general sense of galley, see Corriente 1989: 68; Serracino-Inglott 1975–1989, III: 44; Aquilina 1987–1990, I: 403. She is mentioned as part of a large powerful fleet which played an important role in the history of maritime warfare during the reign

is used in compounds such as, *ajfān ghazawiyya* or *ajfān ḥarbiyya* "fighting galleys"[114] and *ajfān safariyya*, referring to "ocean-going ships" or "cargo ships". *Jafn* is a term which Muslim authors apply to describe a Christian galley, the reason being I suspect, that both the Muslim and Christian type of *jafn* looked similar.[115] The word *jafna* is defined by lexicographers as a "large bowl",[116] hence by extension the *jafn* is a reference to "a round ship" like the *burma* [s.v.], as I shall later explain. Interestingly, al-Nuwayrī l-Iskandarānī (fl. 8th/14th) described the *jafn* as a ship with "wings",[117] which, as I discussed in Chapter 6, probably are the leeboards (like dagger plates), long and narrow, that help the ship not to sail sideways or overturn.

The name also appears in the context of the Indian Ocean.[118] Ibn Baṭṭūṭa (d. 770/1368–9 or 779/1377) saw in Hormuz in 729/1329 ships "drawn up on the beach" beside the sultan's residence which were of the *jafn*-type.[119] We are not told whether these were war vessels. He also reports seeing *jafn*-type vessels on his way from Calicut to Honavar in 743/1342 and this time he does say that they were fighting ships

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of the Almohad Muḥammad al-Nāṣir (595–611/1199–1214). Al-Marrākushī (d. after 621/1224) lists a large number of warships that were engaged in a campaign to invade and occupy the Balearic Islands off the coast of Spain in 595/1199, see al-Marrākushī 1949: 314. These warships were built in Morocco on the northern coast of the Mediterranean and western coast of the Atlantic; in Salé near Rabat there was a shipbuilding site where *jafn*-galleys were contructed under the Marīnid sultan Abū Yūsuf b. Yaʿqūb (656–685/1258–1286), see al-Salāwī 1954, III: 89. Timber for shipbuilding may have come from a place on the mountains which Ibn Baṭṭūṭa (d. 770/1368–9 or 779/1377) noted was Janata, see Ibn Baṭṭūṭa 1968, IV: 351; idem, 1958–2000, IV: 932.

[114] See for example Ibn al-ʿIdhārī 1848–1851, I: 311.

[115] At Ghalata in 735/1334 Ibn Baṭṭūṭa saw in the harbour a hundred Christian *jafn*-vessels, see Ibn Baṭṭūṭa 1968, II: 433; idem, 1958–2000, II: 508–9. Ghalata was considered at the time one of the busiest ports where ships anchored from Genoa, Venice and other harbours in France and Spain. Also Christian *jafn*-galleys were recorded by Ibn Baṭṭūṭa in 750/1349 on the Andalusian coast off the town of Marbella, ibid., 1968, IV: 364–5; 1958–2000, IV: 939–40. Ibn Jubayr (d. 614/1217) too uses generically the term *jafn* to describe a fleet of warships which were moored in the harbour of Trapani on the west coast of the island of Sicily. He narrates that the people of Trapani did not know where this fleet was destined for, Ibn Jubayr nd., 233. For Ibn Jubayr, these Norman warships looked similar to Muslim ships; maybe they were ships which Normans captured from the Muslims during their naval campaigns against Damietta in 1169, Tinnīs twice between 1175 and 1178 and the Balearics in 1180 and 1181, see Ahmad 1975: 60.

[116] Lane 1984, I: 434.

[117] UAFAL (Berlin) Ms 667, fol. 124r.

[118] See Amari 1857: 34; Kindermann 1934: 18; al-Nukhaylī 1974: 23–6; Picard 1997: 162, 300–4, 398.

[119] Ibn Baṭṭūṭa 1968, II: 234–5; idem, 1958–2000, II: 402–3.

(*ajfān ghazawiyya*). He also adds that he was afraid of them "but after all they did us no harm".[120] As we have no indication as to what kind of vessel this possible Indian Ocean *jafn* was, there is no way we would know whether the nomenclature is correct; in Ibn Baṭṭūṭa's mind she must have been a galley identical to the Mediterranean-type; otherwise, he would have noted the dissimilarities. In fact, when he sailed in 745/1344 on the river from the port of Zaytun on the southern coast of China, he described the *jafn* there as "like the galleys in our country [i.e. Morocco]" [*yushbah ajfān bilādinā*].[121] The only difference, he continued, was that "the oarsmen row standing up in the middle of the ship",[122] a feature observed on the Ubulla canal. Also in the same year in Maabar (the Coromandel coast), he saw in the harbour 100 small and large vessels, 8 of which belonged to the sultan, Ayrī Shakarwatī. These 8 vessels, he reports, were *jafn*s which were to sail to Yemen. The sultan was a powerful man on the sea who owned pirate ships (*marākib taqṭaʿ fī l-baḥr*)[123] and who had ordered the *jafn*s to be equipped and his troops to guard them fearing a surprise attack. Was he intending to use them against cargo ships bound for Yemen? The point here is the Maabar-Yemen sea route and that the eight *jafn*s were probably not local but seized by the sultan; hence, they might well have been from the Red Sea or the Mediterranean and, therefore, Ibn Baṭṭūṭa might be right to identify them as *jafn*s.

The ṭarīda *and* ahawra: *transport vessels of horses*

The *ṭarīda* (pl *ṭarāyid, ṭarāʾid* or *ṭarādāt*) was above all a Mediterranean ship, often accompanying the *ghurāb* (see below).[124] Dozy defines the *ṭarīda* as one type of war vessel resembling a huge barrel,[125] in other words a round vessel[126] while Jal describes her as a "bâtiment que sa construction

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[120] Ibid., 1968, IV: 104–5; 1958–2000, IV: 819.
[121] Ibid., 1968, IV: 271; 1958–2000, IV: 895.
[122] Ibid.
[123] Ibid., 1968, IV: 165–7; 1958–2000, IV: 847–8.
[124] Al-Nukhaylī 1974: 89–91.
[125] Dozy 1967, II: 34.
[126] There was a Genoese and Venetian type of this craft, a round ship but of a smaller design, Unger 1980: 125.

rangeait dans la famille des galères ou vaisseaus longs".[127] The *ṭarīda* was equipped with sails and oars, which were large in proportion to the craft; the oars were an added feature, particularly important in times of war as the crew had to row the ship out of the port as swiftly as they could or to manoeuvre their vessel against the enemy ship.

The name can be traced to Arabic from the root-verb /*ṭ.r.d.*/, the Third Form *ṭārada* being "to charge upon, or assault" and the Fourth Form *aṭrada* "to be driven away".[128] Kindermann seems to suggest that the Byzantine ταρίτα is related to the Arabic name and ship-type *ṭarīda*; he also claims that the Low Latin term *tarida* or *tareta*, the Spanish *taride* (*per cavalls a portar*)[129] and later Italian *tartana*[130] and the French *tartane* are traced through Arabic.[131] A further insight into the the Arabic term *ṭarīda* is that the word means "a wild animal";[132] so far we have seen another animal name coined to a ship, *ṣalgha* i.e. "a she-camel", though bird names are much more common (see Chapter 13).

We know from the Muslim chroniclers of the Crusades that the Arab *ṭarīda* was designed to carry horses[133] but some *ṭarīda*s transported archers, including crossbow archers and fire-raisers; others were made to carry heavy cargoes and transport troops, weapons and food supplies (i.e. grains, cereals, corn and fruit).[134] It seems that the largest *ṭarīda* could carry 40 horses:[135] in his report of one of the Norman campaigns of Sicily against Alexandria in 569/1173, the historian Ibn Wāṣil (d. 697/1297–8) recounts that a total of 1,500 horsemen came out of 36 *ṭarīda*s,[136] i.e. about 40 horsemen for each ship; the cavalry and their horses entered by the middle of the stern of the ship.[137] For the Indian Ocean *ṭarīda*, Ibn Baṭṭūṭa also comments that

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[127] Kindermann 1934: 58.
[128] Lane 1984, II: 1838.
[129] Laures 1987: 25.
[130] The occurrence of this term in Italian dialects (tracing it from Arabic) is significant: *taride* in Genoese (c. a. 1241), *tarrida* in Venetian (a. 1275) and also in Catalan and Provençal from Italian *tarida, tarita* and *tareta*, see Pellegrini 1978: 815.
[131] Kindermann 1934: 58.
[132] Lane 1984, II: 1839.
[133] RHC 1967, I: 612; III: 214; IV: 164; al-Maqrīzī 1957–1973, III (i): 113, 129.
[134] Al-Maqrīzī 1957–1973, IV (ii): 686.
[135] Ibn Mammātī 1943: 339.
[136] Ibn Wāṣil 1953–1960, II: 12–13.
[137] Al-Nuwayrī l-Iskandarānī, UAFAL (Berlin) Ms 667, fol. 124r; see also Gildemeister 1882: 435.

> the horseman mounts his horse inside the vessel, puts on his armour and comes out at the point of the sword.
>
> [*…yarkabu l-fāris farasahu fī jawfihā wa-yatadarraʿu wa-yakhruj*].[138]

He reports that out of a fleet of 52 warships there were 2 *ṭarīda*s fitted for an expedition to attack Goa some time in 743/1342. Again, I am not sure how accurate Ibn Baṭṭūṭa is in recording the name for this ship-type in an Indian Ocean context. No doubt the *ṭarīda* he witnessed must have looked identical in structure to the Mediterranean one. One interesting piece of information is the use of musical instruments on *ṭarīda*s in a naval battle: he narrates that "when the drums, trumpets and bugles were sounded, the vessels moved in to the attack…" [*fa-…ḍuribat al-ṭubūl wa-l-anfār wa-l-abwāq wa-zaḥafat al-marākib…*].[139]

In his travels to Sind, Northwest India in 734/1334, Ibn Baṭṭūṭa gives an account of a war vessel called *ahawra* which he compared to the *ṭarīda*: he says that a certain jurist, ʿAlāʾ al-Mulk owned many vessels. One of these was an *ahawra*, which was "broader and shorter" than the *ṭarīda*[140] though he does not say whether she transported the cavalry. One feature of the *ahawra*, he noted, was a wooden cabin located in the centre of the deck with steps leading to a throne for the governor; the slaves sat on either side of the throne.[141]

The burma, jāshujiyya, shaffāra *and the small* dūnij

In Chapter 8, I wrote about the Qais ruler laying siege against Aden (4th/10th or 5th/11th c) with a fleet of 15 war vessels; these consisted of 2 *burma*s, 10 *jāshujiyya*s, and 3 *shaffāra*s.

The *burma* (pl *burmāt*) was probably a large round ship.[142] We know this because Ibn al-Mujāwir (d. 690/1291) gives us a clue as to the form and design of this craft; he writes that *burma*s looked like "the shape of oranges" [*shibh abrām al-naranjiyyāt*]. This must surely be interpreted as "ships with a roundish hull".[143] Also one should add that *burma* in Arabic

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[138] Ibn Baṭṭūṭa 1958–2000, IV: 820; idem, 1968, IV: 107.
[139] Ibid.
[140] Ibn Baṭṭūṭa 1958–2000, III: 601; idem, 1968, III: 109–10.
[141] Ibid.
[142] Ibn al-Mujāwir 1951–1954, I: 124; also listed by al-Muqaddasī (1906: 32) in the 4th/10th c.
[143] See Goitein 1954: 252.

means "a pot", which may explain the association of the name with the shape, traced back to Syriac, *būrmā/ burmtha* "a stone jar", Akkadian *burmāḫḫu* "container" and ultimately to the Sumerian *burmāḫḫu*.[144] Possibly, these *burma*s were equipped with war machines which would have made them heavy, so they did not sail as fast as other ships.[145]

The *jāshujiyya* (pl *jāshujiyyāt*) may have been a transport ship but this is a pure guess for we do not have information about her nor is it mentioned in any Islamic sources. It is possible the word derives from the Persian, *jāshū* "sailor".[146] As for *shaffāra* (pl *shaffārāt*) she was the typical galley-type, long and narrow, operated by sail and oar; these craft were light and they were shallow-drafted. It has been suggested by Goitein, based on a Genizah letter written by Maḍmūn b. Japheth, that such galleys were equipped with war materials and sailed in convoy to protect larger ships:[147] they themselves were large enough to carry 30 to 50 footsoldiers. Goitein correctly derives the name from the Arabic root-verb /*sh.f.r.*/ "to cut", hence, a galley that "cut[s] the waves", but it could also possibly be of Aramaic origin.[148]

Accompanying these warships, we are told by Yāqūt al-Ḥamawī (d. 626/1228–9), the ruler of Qais employed a number of *dūnij*es in the attack.[149] They are said to have been operated by oar and sail.[150] As these *dūnij*es were swift and manoeuvrable they were able to surprise the enemy ship: fighters climbed on board and set the ships on fire.

The ḥarrāqa: *fire launcher*

The earliest record of a war-*ḥarrāqa* (pl *ḥarrāqāt* or *ḥarārīq*) is known to come from Ibn al-Athīr (d. 630/1232–3) with reference to a campaign in Syracuse (Sicily) in 254/868.[151] He also reports that during the Zanj revolution, the caliphal fleet under the command of al-Muwaffaq

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[144] Von Soden 1959–1981, II: 140; see also Agius 1984: 135.
[145] See Goitein 1954: 253; idem, 1999, V: 523, fn. 97.
[146] Löfgren 1936–1950, I: 44. Steingass (1977) does not include this term.
[147] Goitein 1954: 253.
[148] The root in Aramaic gives words like *shippūra* "tube" and *shafīr* "placenta" (cf. Heb. *shefōfērēth* and *shafīr*), see Goitein 1954: 253.
[149] Ibn al-Mujāwir 1951–1954, I: 124; see Ibn Sīda 1898–1903, X: 25; al-Azdī 1902: 107; see also Shihāb 1987: 567.
[150] Hourani 1963: 99.
[151] Ibn al-Athīr 1301/1883, VII: 40; on the nomenclature see al-Jawharī 1984, IV: 1458; al-Zabīdī 1989, XXV: 154.

in 369/979, fought with *ḥarrāqa*s and other types of warships on the River Tigris.[152] How different or similar were Mediterranean and Mesopotamian *ḥarrāqa*s I do not know; Ibn al-Athīr does not tell us what his sources were. Elsewhere, it is reported that the *ḥarrāqa*s served to protect the galley-*shīnī*s [s.v.]:[153] we are told several of these craft were at Aidhab on the African Red Sea coast ready to be engaged in a battle against the Hijaz on the Arabian coast in 512/1118.[154] Such *ḥarrāqa*s mentioned by the Muslim chronicles of the Crusades[155] were used on the Red Sea and the Nile: We know from Ibn Mammātī (d. 606/1209), an administrator during the sultanates of both Ṣalāh al-Dīn (564–589/1169–1193) and al-ʿAzīz (589–595/1193–1198) that the Egyptian fleet had, among other war vessels, 100 *ḥarrāqa*s; he informs us that they were long and each one carried 100 oars.[156]

The Christian counterpart of the Muslim *ḥarrāqa*, as Arabic sources tell, accompanied not only the *shīnī*s but also other war vessels like the giant *maramma* (pl *marammāt*) which carried amunition as well as being used to transport foot soldiers and cavalry.[157]

As to her function in Muslim warfare, it is clear from a definition given by the lexicographer al-Jawharī (d. 393/1002–3) that the *ḥarrāqa* was equipped with engines for hurling fire and setting enemy ships on fire.[158] We know this from Ibn Faḍl Allāh al-ʿUmarī (d. 749/1349) who states that Mediterranean *ḥarrāqa*s transported hurlers; such warships were constructed at Almeria (Southeast Spain).[159] If we take the root-verb /*ḥ.r.q.*/ it means "to burn something; to hurt" and the Fourth Form, *aḥraqa* "to destroy by fire", the noun being "burning aflame" (*ḥarrāq*).[160]

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[152] Ibn al-Athīr 1301/1883, VII: 156.
[153] Al-Maqrīzī 1911–1924, I (ii): 212, 218.
[154] Al-Nukhaylī 1974: 33.
[155] RHC 1967, I: 143; II: 123; III: 178; IV: 342, 475; see Ibn Shaddād 1964: 135; al-Nuwayrī l-Iskandarānī, KLI (India) Ms 738, fol. 24v.
[156] Ibn Mammātī 1943: 24, 34.
[157] Ibn al-Athīr 1867–1871, XII: 215; al-Maqrīzī 1911–1924, I (ii): 218; RHC 1967, II: 114, 123 *seq*. The size of the *maramma* must have been huge for she is described by Ibn al-Athīr as "one of the largest ships" [*min aʿẓam al-marākib*]. In 647/1249 during Louis IX's (1226–1270) campaign, "there came to the Franks one of the largest ships called *maramma*, surrounded by a number of *ḥarrāqa*s to protect her…", see Ibn al-Athīr 1301/1883, XII: 151. Al-Maqrīzī calls her "one of the wonders of the world" [*min ʿajāʾib al-dunyā*], see al-Maqrīzī 1911–1924, I (ii): 218. She was iron-clad and therefore fire-proof, with a surface area of 500 *dhirāʿ*s and each nail weighed 25 *raṭl*s.
[158] Al-Jawharī 1984, IV: 1458; al-Zabīdī 1989, XXV: 154.
[159] Al-Nukhaylī 1974: 34.
[160] Ibn Manẓūr nd., II: 841.

On the basis of this definition, one needs to ask: was the *ḥarrāqa*, as it is claimed, a "fireship", by which she would have been set on fire and deliberately run into the enemy ship? Muslim sources do not mention this and it is safe to conclude, that a *ḥarrāqa* was used as a platform to hurl fire at the enemy ship and not as a "fireship".

The concept of flame throwing could have been borrowed from Greek technology: the Byzantines had "a type of ship armed with flame throwers and/or a machine for projecting earthenware pots stuffed with combustibles".[161] According to the *Gestes des Chiprois* (c. 1245), the Islamic *ḥarrāqa* ("Saracen *karaque*") carried inflammable material and explosives for throwing on the enemy ship.[162] It is possible that the Islamic *ḥarrāqa*, equipped with war machines such as *dabbāba*s (armoured [wooden] tanks) and *manjanīq*s (catapults), was launching Greek Fire,[163] knowledge of which could have been borrowed directly from Byzantine technology, though theirs was not the only one; there were different types of "fire". An earlier source of transmission could have come from the Chinese whose ships, carrying naphtha-throwers, were around the Western Indian Ocean as early as the third/ninth century. Their methods and tactics may have been used by the ʿAbbāsid army who used *ḥarrāqa*s in their war against the Zanj. It is possible that barrels containing certain types of the Greek Fire had been introduced by the Chinese and passed on to the Arabians and Persians.[164] Chinese naval war tactics continued for several centuries later. Ibn al-Manqalī (fl. 8th/14th c) and his contemporary, al-Nuwayrī l-Iskandarānī report the launching of fire arrows from small vessels;[165] and as I mentioned earlier, archers on *sallūra*s and *zabzab*s used fire arrows against the enemy on the Mesopotamian rivers. One such device was the propel rocket noted in the anonymous work, *Khizānat al-silāḥ* (Treasures of Weapons),[166] which could have been based on Chinese naphtha-throwing technology and then developed by Arabians and/or Persians. This does not come

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[161] Odetallah 2000, II: 63; see also Christides 1994: 19.

[162] Jal 1970–, volume letter "C": 220.

[163] The Greek Fire was a great offensive weapon against ships. It was a flaming torch aimed at masts and sails. The Arabs and others adopted the naval weapon for centuries but it fell into disuse after the introduction of gunpowder and cannons, see Hassan & Hill 1986: 106 *seq*.

[164] Christides 1987: 87–8. Also naphtha throwers hurled Greek Fire in the form of bombs called *qawārīr* (lit. long-necked bottles), see ʿImād al-Dīn 1888: 319; Ibn Shaddād 1964: 143.

[165] UAFAL (Berlin) Ms 667, ff. 124r–v.

[166] *Khizānat al-silāḥ* 1978: 70.

to us as a surprise, for direct knowledge of Chinese technology like the single rudder and the lateen sail had been passed on to the people of the Western Indian Ocean, particularly during the Fāṭimid period, when maritime trade between Egypt and the Indian Ocean flourished and relations between Arabians and Chinese reached their highest.[167] From the foregoing paragraphs it is safe to conclude that as far as the Islamic *ḥarrāqa*s are concerned there were two types: one a cargo ship and the other, a smaller ship, a fire launcher. The evolution of these *ḥarrāqa*s over the centuries produced different types in the same place or in different regions.

Finally, is there any connection between the European *carraca* (Eng *carrack*) and the Arab *ḥarrāqa*? When the early Muslim authors (6th–8th/12th–14th c) were writing about their Christian counterpart they employed the Arabic nomenclature *ḥarrāqa*. Are they talking of one and the same vessel? Assuming that the European and Islamic craft were identical in type and function, then is the European nomenclature a derivation of the Arabic term? If that is the case the attempt to derive *carraca* from the verb *carricare* "to lade, to charge", as has been suggested,[168] denies any Arabic origins. Or is it the other way round: the Arab *ḥarrāqa* comes from a Eurpean source? Difficult questions to answer; it remains to see, therefore, what was then a European *carraca*?

Western medieval sources describe her as a cargo ship as well as a fighting ship, though, as far as I know, with no mention of ever being a fire launcher.[169] Iconographic evidence of European *carraca*s (mid-15th c) shows them carrying three to five masts (illustration 84): the fore and mainmasts had a square sail and the mizzen masts (one or two) carried a lateen sail. The hull was large on her athwartships, with fore

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[167] Williamson 1972: 97–109; Huzzayin 1982: 151–6; Christides 1992: 38–45.

[168] Yule & Burnell 1994: 165. Dozy's (cited by Yule & Burnell) assertion that *carraca* is derived from the Islamic *qurqūra* (ibid.), a "long or large ship" (see al-Zabīdī 1974, XIII: 401) is an interesting proposition but is one based on phonetics, historically, though, it cannot be proven.

[169] One of the earliest known is a Genoese *car(r)aca*, recorded 1157; others are: a. 1338 Venetian-type; one *carraca* in a tempest mentioned by the Spaniard Clavijo in 1403; an Andalusi *carraca* (1418–1452); the Portuguese *carraca* or *caracca* that sailed to South America in the sixteenth century; the Order of St John *carraca*s and others that show that she was well in use to the end of the seventeenth century, see Pellegrini 1978, II: 815; Yule & Burnell 1994: 165–6; on the carracks of the Order of St John, see Muscat & Cuschieri 2002: 15–20.

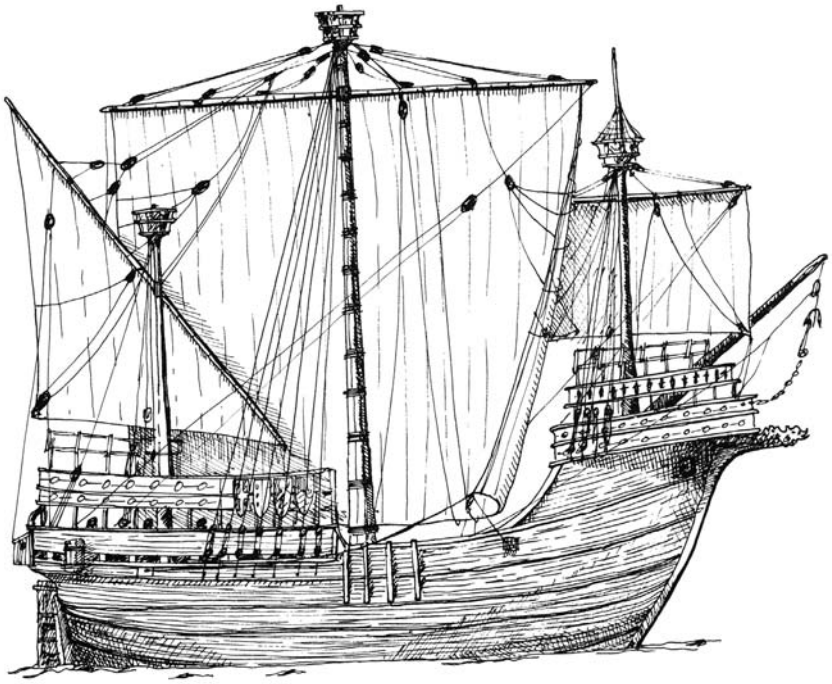


Illustration 84 A fifteenth-century three-masted *carraca* (after Blackburn 1978: 89)

and aft castles, carrying from 400 to more than 2,000 tons.[170] Other distinguishing features were the high freeboard and the number of guns she could carry.[171] One depiction of a craft on an Egyptian plate at the Museum of Islamic Art in Cairo might represent an Islamic cargo/naval *ḥarrāqa*, as Christides and Pryor have pointed out[172] or perhaps a European *carraca*, as the market for selling such plates came from abroad. But this is mere speculation. The fact was that Muslim and European goods and ships were often interchangeable due to the frequency with which they were captured, whether through warfare or corsairing, such was the renamed *Santa Maria*, a *carraca* of the Order of Saint John which was captured by the knights from the Ottoman

[170] Landström 1961: 92–5; on the hull evolution see Marshall 1989: 45; Muscat & Cuschieri 2002: 15.
[171] Muscat & Cuschieri 2002: 15.
[172] Christides 1984a: 148; Pryor 1992: 46–7.

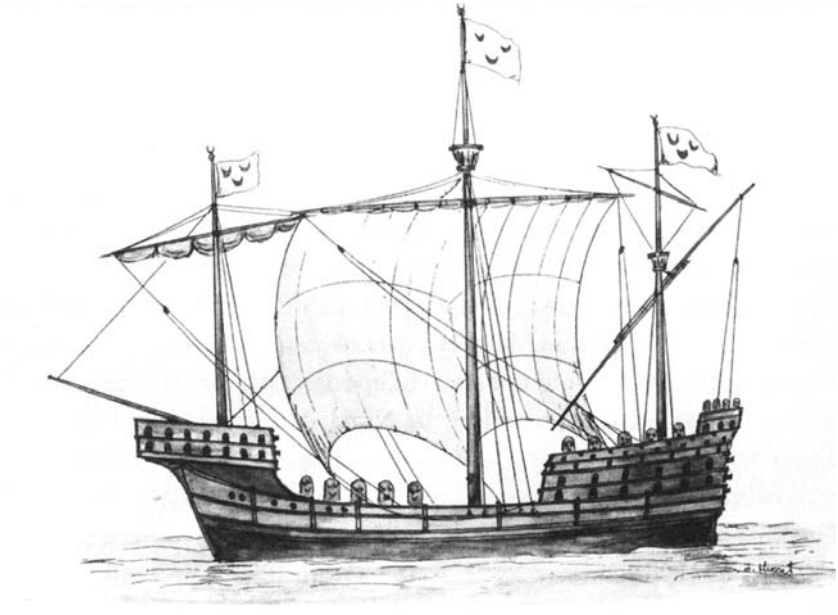


Illustration 85 A Muslim *ḥarrāqa*, the *Mogarbina* captured by the Knights of St John in 1507 (after Muscat & Cuschieri 2002: 16)

Turks in 1507; she was the largest *carraca* they ever captured from the Ottomans, originally called the *Mogarbina*, though little is known about where and when she was built[173] (illustration 85).

The galley ghurāb

The *ghurāb* (pl *ghirbān* or *aghriba*) is a typical war vessel which was operated by oars and sails mentioned frequently by the Egyptian historians al-Nuwayrī l-Iskandarānī (fl. 8th/14th c)[174] and al-Maqrīzī (d. 845/1441–2)[175] and like the *jafn* described earlier was known as both a Muslim and Christian galley because of their similarities.[176]

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[173] Muscat & Cuschieri 2002: 15–7.

[174] See the Index in al-Nuwayrī l-Iskandarānī 1968–1976, VII: 147.

[175] Referred to as *aghriba ghazāt* "military expeditionary galleys", see al-Maqrīzī 1957–1973, IV (ii): 700; see also Agius 1998: 185–97.

[176] Our earliest mention of this craft is in 577/1181 to denote a Muslim corsair ship: Having left Tripoli (Libya), the *ghurāb* encountered a merchant ship and after

Christides noted that the early tenth-century *ghurāb* was different to the Mamlūk one mentioned *circa* the fifteenth century by al-Maqrīzī and al-Nuwayrī l-Iskandarānī.[177] A few examples below will illustrate some of her features in the latter period. According to Ibn Abī Zarʿ (d. 726/1325–6), the *ghurāb* was the largest of the Muslim ships;[178] she was light with probably a few decks; she had one or two-masts and was square-rigged. The sails and masts of the *ghurāb* were tall and when the sails were fully spread the craft looked, in the author's poetic imagery, like "massive cities". More information about this type comes from Ibn Baṭṭūṭa d. 770/1368–9 or 779/1377). By way of comparing two Indian Ocean war vessels, the *ʿukayrī* with the *ghurāb*, he reports that an *ʿukayrī* in Qandahar had

> sixty oars and [wa]s covered with a roof during battle in order to protect the rowers from arrows and stones.
>
> [*fīhi sittūna mijdhāfan wa-yusaqqafu ḥīna l-qitāl ḥattā lā yunālu l-jadhdhāfīn shayʾ min al-sahm wa-lā l-ḥijāra*].[179]

In addition he compares the *ʿukayrī* to the *shillīr*,[180] thus there are three war vessels with a similar description. From this we may conclude that the *ghurāb* was undecked (unlike the early 10th-century type) and when engaged in battle the archers and rowers would have been exposed to the danger of their attackers. Ibn Baṭṭūṭa also states that the *ʿukayrī*'s hull was broader than that of the *ghurāb*. With regards, to the number of oars, Ibn Mammātī (d. 606/1209) says that the *ghurāb* was equipped with 140 oars,[181] and al-Nuwayrī l-Iskandarānī claims that the largest *ghurāb* had 180 oars;[182] in both cases more than double the figure (60 oars) given by Ibn Baṭṭūṭa for the Qandahari *ʿukayrī*. Although the *ghurāb* is known to be a warship we have references to her being a cargo vessel: from the Genizah letters cargo *ghurāb*s sailed from the Maghrib

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attacking the crew she seized the goods on board the vessel, see Amari 1863: 8 [269]. In 767/1365 Christian galleys approached the Egyptian coast and there were "24 Venetian *ghurāb*s, 2 Genoese *ghurāb*s, 10 Rhodian *ghurāb*s and 5 Frankish *ghurāb*s…", see al-Maqrīzī 1957–1973, III (i): 107; see other entries in al-Nuwayrī l-Iskandarānī 1968–1976, VII: 147.

[177] Written communication (5 June 2005).

[178] Ibn Abī Zarʿ 1843–1846: 225.

[179] Ibn Baṭṭūṭa 1958–2000, IV: 800; idem, 1968, IV: 59; see also Kindermann 1934: 52, 67, 70; al-Ḥamawī 1945: 43; Māhir 1967: 357–8; al-Nukhaylī 1974: 102.

[180] Ibn Baṭṭūṭa 1968, IV: 107; idem, 1958–2000, IV: 820.

[181] Ibn Mammātī 1943: 339–40.

[182] Al-Nuwayrī l-Iskandarānī 1968–1976, II: 234–5.

and Sicily as well as those operating on the Nile, carrying shipments of carob and flax.[183]

The *ghurāb* is frequently mentioned in connection with the Arabian Sea[184] and the west coast of India after the arrival of the Portuguese in the early sixteenth century and she continued to do so until the mid-eighteenth century.[185] The 1519 Portuguese map of Lopo Homem-Reinéis shows a number of Arabian galleys, a few of which could be Turkish *ghurāb*s. They look smaller than the Portuguese three-masted *caravel*s: two forward masts were square-rigged and the mizzen was lateen rigged (*caravela rotunda*)[186] (illustration 86).

I mentioned earlier that the name *ghurāb*, as in the early centuries, applied to both Muslim and Christian war vessels. Consider, Sidi Ali in 1552, writing about the Portuguese fleet in the Indian Ocean, reports that in addition to 4 *carrack*s they had 3 *ghurāb*s; the latter he described as "great (rowing) vessels"; he also says that there were 12 smaller *ghurāb*s, which are said to be "galliots with oars".[187]

The ship-nomenclature *ghurāb* is absent from Classical Arabic lexica. In the Mediterranean the Arabic name corresponded to a "galera", according to the 1505 *Vocabulista* of Pedro de Alcalá[188] and Amari (cited by Dozy) describes her as a "*galea* dans l'ancienne tradition latine":[189] both were equating her with the western type of galley, which in general terms is true. *Ghurāb* is Arabic, meaning "raven", and other names of ship-types in the medieval period seemingly had names of birds such as *ḥamāma* (dove) "a transport ship" and *ṭayra* (big bird) "a swift boat".[190] That the prow of the *ghurāb* may have looked like a raven's head is possible but there is no reference to this effect. However, she would have appeared to be black like a raven because she was coated with tar to protect her from water seeping through the planks [*sawāduhā*

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[183] TS 10, J29, fol. 10; TS 12.386; TS 14.13; TS 13, J25, fol. 9; see Goitein 1999, I: 476–7, fn. 12.

[184] Serjeant 1974: 44, 48, 50–1, 57–8, 62–7, 82, always referred to in the translation of the chronicles as "grab".

[185] Agius 2002: 61–3.

[186] Cortesão & Da Mota 1960, I: pl. 19; original map in Lopo Homem-Reinéis, *Atlas de 1519*.

[187] Cited by Yule & Burnell 1994: 363.

[188] Corriente 1989: 217.

[189] Dozy 1967, II: 204.

[190] See my article on al-Muqaddasī's ship-types, 1997: 324, 328; idem, 2005c: 387–8.

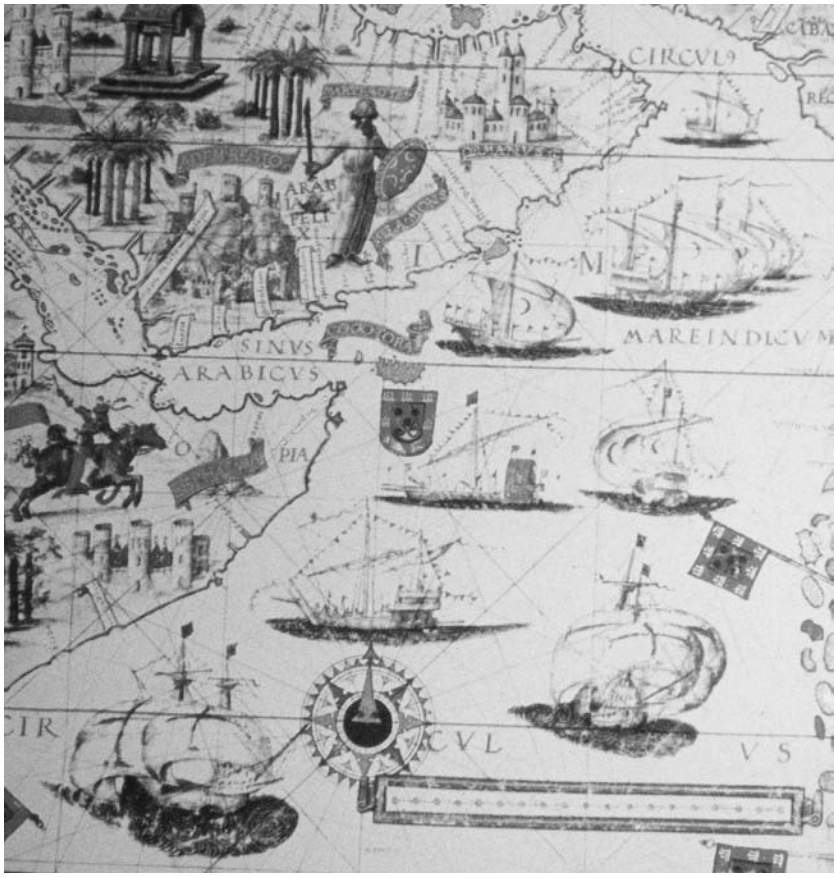


Illustration 86 Portuguese *caravel*s and Ottoman *ghurābs* in the *Atlas de 1519* of Lopo Homem-Reinéis (after Cortesão & Da Mota, 1960, I: pl. 19)

bil-aṭliyya l-māniʿa lil-māʾ ʿanhā ka-l-zift].[191] A mixture of tar (dark brown or black) and coarse resin was used to cover the oakum when caulking the seams of the planks (see Chapter 4). Vollers argues that the ship-term is from the Latin *carabus* and ultimately from Greek κάραβος "a light ship".[192] This is unclear because the Greek term may be connected with the Arabic *qārib*, a widely used type which was modelled after the Byzantine ship.[193]

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[191] Al-Nuwayrī l-Iskandarānī 1968–1976, II: 230.
[192] Kindermann 1934: 68; Liddell & Scott 1953: 877.
[193] See my discussion on the *ghurāb* in Agius 1998: 188.

The galley called qiṭʿa

The *qiṭʿa* (pl *qiṭaʿ*, *aqṭāʿ* or *qaṭāʾiʿ*) is generally associated with the Mediterranean war galley (*qiṭʿa ḥarbiyya*) and one which was common use too: In 557/1162, Ibn Abī Zarʿ (d. 726/1325–6) reports that ʿAbd al-Muʾmin had 400 armed *qiṭʿa*s ready for battle all along the Moroccan coast.[194] Other references are found in Islamic sources of the Crusades: "There sailed a fleet of 300 *qiṭʿa*s" [*wa-sāra l-uṣṭūl fī thalātha māʾa qiṭʿa*]; "Many *qiṭʿa*s were taken from the Egyptian fleet" [*wa-akhadha min uṣṭūl miṣr ʿiddat qiṭʿa*]; "He had 16 *qiṭʿa*s" [*wa kāna lahu fī l-baḥr sittat ʿashara qiṭʿa*].[195] They also served as transport vessels for troops, horses etc.[196] The *qiṭʿa* was mentioned in several Genizah letters.[197] Some particulars about this craft are provided by al-Asyūṭī (fl. 9th/15th c), he writes:

> She is very broad at both bottom and top; containing lower and upper decks; (ornamented with) potsherded *roshan*s cased with windows towering above the sea; she had water tanks, ovens and latrines; space for growing vegetables; sails and anchors; (but) no oars… .
>
> [*wa-sufluhā wa-ʿulūwuhā mutassiʿ jiddan wa-tashtamilu ʿalā ṭabaqāt fī l-sufl wa-ʿalā ṭibāq fī l-ʿulūw dhāt rawāshin mushaqqafa madhūna bi-ṭāqāt mushrifa wa-muṭilla ʿalā l-baḥr wa-ṣahārīj wa-afrān wa-murtafiqāt wa-arḍ mafrūsha bil-turāb li-zarʿ al-khaḍrāwāt wa-ṣawārī wa-qilāʿ wa-marāsī wa-laysa bihā maqādīf*].[198]

He adds that the sails are used if the ship is carrying a large number of passengers and crew.[199] Like other Arabic sources mention of number of masts is missing. The above report says that the *roshan*s (casement windows) were jutting out into the sea. The whole idea of a *roshan* existed "to catch the light rather than the breeze".[200] It is not clear from the text whether glass windows were used; if the *qiṭʿa* did she would predate the European ship which at the time did not use windows in the transom.[201]

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[194] Ibn Abī Zarʿ 1843–1846: 91, 224 *seq.*
[195] RHC 1967, I: 213, 354, 411, 667, II: 107.
[196] RHC 1967, I: 351 *seq.*; see also ʿImād al-Dīn 1888: 224; Ibn Shaddād 1964: 122–3.
[197] TS 8, J23, fol.13; TS 8, J24, fol. 21; TS 10, J19, fol. 5; TS 12.325; see Goitein 1973: 322–3; idem, 1999, I: 307–8.
[198] Al-Asyūṭī 1996, I: 79.
[199] Ibid.
[200] Greenlaw 1995: 21.
[201] Information from Ralph Morris, 5 June 2007.




Illustrations 87 & 88 West Indian *kotia*s descendants of the Arabian *qiṭʿa* ([left] after Hawkins 1977: 93; [right] courtesy of Caroline Sassoon)

The Indian Ocean connection coincides with the coming of the Portuguese in the sixteenth century. We are told in the chronicles of Bāfqīh al-Shaḥrī that the *qiṭʿa*s which were moored at west of Mukalla belonged to the Portuguese:[202] one report in 939/1532 says that the Franks (i.e. the Portuguese) passed by a place called Maifa with 14 *qiṭʿa*s and another states that in 945/1538–9 the Frankish fleet at Dabul consisted of 150 *qiṭʿa*s.[203] Only Aḥmad b. Mājid (d. after 906/1500) seems to record the Islamic counterpart but has no comments as to her provenance, her function and the design of the craft. If there were any Islamic *qiṭʿa*s in the Western Indian Ocean were they built locally or brought over from the Mediterranean?

The Arabic root /*q.ṭ.ʿ*./ means "to cross (a river or an ocean)",[204] hence the name for a ship appropriately called *qiṭʿa*. Moore and Serjeant believe that the modern Indian *cotia* or *kotia* is the descendant of the medieval *qiṭʿa*; her features, they argue, are a modified survival of a sixteenth-century European vessel[205] (illustrations 87 & 88). In modern

[202] Shihāb 1987: 54–5.
[203] Serjeant 1974: 65, 92.
[204] Wehr 1966: 774.
[205] Moore 1925: 76; Serjeant 1974: 65, 135.

times until fairly recent times the Arabian version named *kūtiyya* was built in Kuwait and Bahrain.[206]

The ṭarrāda

The *ṭarrād(a)* (pl *ṭarārīd*) was the most commonly used Indian Ocean war vessel in the sixteenth and seventeenth century. We often find her mentioned by the Portuguese authors (recorded as *terada* or *terrada*) and the Ḥaḍramī chronicles on Portuguese activites (1498–1577) which refer to her as *ṭarrād* (pl *ṭarārīd*). One Portuguese document reports that the craft was stitched with coir,[207] as other indigenous craft were at the time. We are told that hundreds of *ṭarrāda*s were burnt by the Portuguese in ports and anchorages between May 1623 and March 1628.[208] It seems that the Portuguese were informed that there was a larger *ṭarrāda*-type used in combats while a smaller version was a ship's working boat; in either case the verb-root *ṭarada* "to chase, hunt"[209] which gave the name *ṭarrāda* is quite appropriate to the context of war. In the *Commentaries* of Alfonso de Albuquerque (d. 1515), the author reports of a war-*tarrāda* equipped with "small guns and men wearing sword-proof dresses and armed head to foot, most of them being archers"; the text also includes a description on the *tarrāda*s decorated with flags and standards and coloured ensigns.[210] An illustration I found of two sixteenth-century warships seems to fit the description of the *tarrāda*s in the *Commentaries*. The artist depicts the two ships facing each other in a mirror-like effect; dark-coloured men are wearing loincloths; some are standing carrying fire arms or shooting arrows while others are seated rowing the boats. From this illustration we can gather that these *tarrāda*s, if my guess is correct, are one-masted and powered by lateen sails and oars (illustration 89).

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[206] Agius 2002: 55–7.

[207] CDRAD—Portuguese Archives, ANTT, Fragmentos, Cx, 4—Documentos da India M⁰1, no. 68.

[208] CDRAD—Portuguese Archives, AHU, Conselho Ultramarino, COD 501, ff. 169–170 [1646].

[209] Wehr 1966: 556; see other usages in Agius 2002: 44.

[210] *Commentaries* 1875–1884, I: 105. Other references to this craft used in combat is found in the seventeenth century, see CDRAD—Portuguese Archives, AHU, Conselho Ultramarino, COD 501, ff. 96–8, 110–1, 169–70v, 238–40 [1645–1646]; CDRAD—Portuguese Archives, ANTT, Livros das Mancões, liv. 51, fol. 235, no. 4 [Goa, 4 March 1643]; liv. 59, ff. 82–4v [1648].

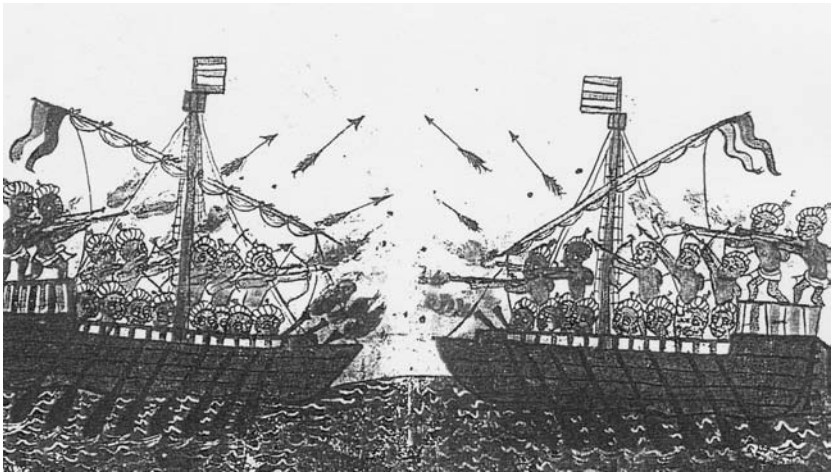


Illustration 89 Sixteenth-century war *tarrāda*s (after De Matos 1985: 69)

Concluding comments

The current hypothesis is that Muslim warships did not differ greatly from their non-Muslim counterparts. This assumption is based on what the Greek and Arabic sources (2nd–3rd/8th–9th c) report on shipping facilities at the Levantine port towns. With the facilities came the techniques of shipbuilding and the local experienced shipwrights who were Greeks, Copts and Persians from Western Mesopotamia.[211] For the later periods, the evidence shows that the Muslim Mediterranean did not lag behind the Christian West, as far as dockyards and technical skills were concerned, during the Ayyūbid and Mamlūk periods.[212] The claim that the Islamic world in the 8th/14th century "could not compete with such [western] craft or have its own ships" has no credence.[213] Information exists on building techniques such as the Ayyūbid arsenal mentioned by Ibn Mammātī (d. 606/1209)[214] and a fair amount of shipbuilding activity at Awra Island and Bulaq during the Mamlūk

[211] Among the Greek sources the most important is Theophanes the Confessor's (d. 818 CE) *Chronographia* which is a set of annals based on a number of materials collected by George Synkellos and other lost contemporary sources; for the Arabic sources al-Balādhurī's (d. 279/ 892) *Futūḥ al-buldān* is the most informative on naval ports, see Fahmy 1966: 27, 30–42; Santoro 1978: 1–9, 32–4, 122.

[212] Lewis & Runyan 1985: 57.

[213] Ibid.

[214] Ibn Mammātī 1943: 339–40.

period. We are told that the amir Yalbulghā Atābeg took an interest in the construction of galleys which were to be used against the Franks in 767/1365.[215] It was a huge enterprise which the vizier took charge of: 100 warships of the *ghurāb* and *ṭarīda*-type were built and the amir bestowed grants to all those who wanted to enrol themselves on the sea. *Ghurāb*s were built in Bulaq in 828/1424 and some of them were destined to strengthen the Red Sea and Indian Ocean Mamlūk navy, so ship planks were transported on camels to Suez where they were assembled together to sail in the Red Sea.[216] Raw material was not scarce in the fourth-fifth/tenth-eleventh centuries. The expertise was there; recruitment to construct warships came from among Egyptian natives but also Maghribīs (North Africans). Trade in timber, as the Genizah letters reveal, was active between the Italian towns of Amalfi, Genoa and Venice and Fāṭimid Egypt in the sixth/twelfth century.[217] In difficult times Fāṭimid Egypt turned to India.[218] We are told by al-Maqrīzī (d. 846/1442) that acacia grew in the woodland of Egypt during the Fāṭimid and Ayyūbid periods. Its wood was carried to the coast from the Nile to construct the *shīnī*.[219] Other timber like the sycamore was used to construct the *ghurāb*.[220]

That the Genizah documents refer to several Indian Ocean cargo vessels as warships (*ḥarbī*)[221] may suggest that both merchantmen and war vessels could function as both. Consider the Muslim *ṭarīda* [s.v.] which was principally used for transport for the infantry, but also in times of peace functioned as a cargo ship. In some respects, as Khalilieh argues, although with some exceptions, both commercial vessels and warships were not structurally dissimilar.[222] No doubt some war vessels which were only used for fighting must have been slight because speed was the main factor. Cargo/transport vessels were judged on their hull strength because of the long periods they had to sail and were heavier.

In terms of images of Muslim war vessels some pictorial evidence can be found in the Ioannes Skylitzes' *Chronicle* (12th c) which contains illuminations depicting naval activities of Byzantine war vessels as

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[215] Al-Maqrīzī 1957–1973, III (i): 113.
[216] Ibid., IV (ii): 686.
[217] Goitein1999, I: 46.
[218] Al-Maqrīzī 1957–1973, IV (ii): 688; Fahmy 1966: 143–7.
[219] Al-Maqrīzī 1911–1924, IV: 258.
[220] Idem, 1957–1973, IV (ii): 688.
[221] Udovitch 1978, II: 522–3.
[222] Khalilieh 1995: 26.

well as Muslim *shalandī*s, *ḥarrāqa*s and others. For the Western Indian Ocean we have images from the Lopo Homem-Reinéis' *Atlas de 1519* and other Portuguese material which offer some examples of fighting ships of which some seem to be *ghurāb*s. The question is how far different were Muslim ships from the enemy ships? Did captured vessels by Muslims maintain the original classified names or were they given different names?

The seizure of war vesssels on either side by the Muslims and non-Muslims brought about a cross-fertilization in naval architecture, which meant that at times they were on a par in technology. However, our knowledge of these war-type vessels, both in the Mediterranean and the Western Indian Ocean, is severely limited unless more concrete evidence such as shown by the wrecks of the seventh-century Yassi Ada at the southern coast of Turkey,[223] the ninth-century Belitung (Indonesian) wreck recovered in the Java Sea,[224] the eleventh-century Serçe Limani ship, south of Turkey opposite Rhodes,[225] the thirteenth-fifteenth-century shipwreck found at Kadakkarappally on the Malabarian coast,[226] and others can come forward. These are all cargo ships but we live in hope that one day a war vessel will be found.

Both iconography and underwater archaeology could in principle provide new documentation. Their scarcity is hindering us from reconstructing a historical coherence and an appreciation of what the early Muslim warships looked alike. In their absence, the primary Arabic, Greek and European, Indian and Chinese sources do give us some information and while some maritime historians may come up with theories as to the origins of such ships, their progress is slow or blocked because of the lack of data which makes any attempt at analysis systematically difficult. In the absence of concrete data, what alternatives are there? The next chapter will explore linguistic and cultural modalities for the further understanding of the history of the Classic Ships of Islam.

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[223] Van Doorninck 1972: 133–58.
[224] Flecker 2000: 203–4; idem, 2001: 335–54.
[225] Bass & Van Doorninck Jr. 1978: 119–32.
[226] See Tomalin *et al.* 2004.

PART SIX

CHAPTER THIRTEEN

LANGUAGE AND CULTURE CONTACT: TERMINOLOGY AND TECHNOLOGY

اهل هذا الاقليم لغتهم العربية الا بصحار فان نداهم
وكلامهم بالفارسية واكثر اهل عدن وجدة فرس
الا ان اللغة عربية.

> The language of the people of this region is Arabic, except in Ṣuḥār, where they call out to one another and speak in Persian. The majority of the people of ʿAdan and Judda are Persian, yet their language is Arabic.[1]

Al-Muqaddasī (fl. second half of the 4th/10th c)

The last stage of this book is an inquiry into language spread and language dominance in the Western Indian Ocean, in particular the mark that languages have left in nautical and maritime terminology. I will consider the relevance of linguistic moulds to to our understanding of the history and culture of watercraft. Finally, there is the question of cultural and technological exchange, how far did it go and what were its implications?

Trade language

Languages spread for different reasons: trade, military or religious. During the Sumerian period (before the third millennium BCE), we have in Mesopotamia a flourishing urban civilization which was predominantly agricultural with a well-organized communal life. The Sumerians built canals and developed effective systems of irrigation, a legacy which was passed on to the Akkadian period (third millennium BCE). From waterways to navigation was a natural transition. Trade

[1] *Ahl hādhā l-iqlīm lughatuhum al-ʿarabiyya illā bi-Ṣuḥār fa-inna nidāhum wa-kalāmahum bil-fārisiyya wa-aktharu ahl ʿAdan wa-Ǯudda Furs illā anna l-lugha ʿarabiyya*, al-Muqaddasī 1906: 96; idem 2001: 82.

spread from Mesopotamia to the Persian Gulf and the West Indian coast; Akkadian, written in cuneiform (c. 2,500 BCE), was the vehicle for a nautical terminology (of sea and river navigation) which was inherited by Aramaic and later Arabic speakers. Aramaic became the language of the masses throughout the Assyrian empire (c. first millennium BCE) and remained a *lingua franca* through several centuries of Islamic expansion, with pockets of it (Neo-Aramaic) still spoken today in Syria and Northern Iraq.

Sanskrit, throughout this time, was an important trade language. It reached the coasts of Southeast Asia and it was used for liturgical activities: Indian missionaries employed locals to guide them to new territories; they even hired the indigenous to accompany them as they spread their beliefs and extended their trade. Their influence was so great that Sanskrit left its mark on a number of Indian languages of the coastal communities, traces of which are still present today in the nomenclature of navigation, tides, winds and currents, sea-life and star recognition (see Chapter 6).[2] The contact of Mesopotamian with Indian mariners was one of trade but also technological exchange and adopting terminology. One has to ask, therefore, whether terms ending in /-*ān*/ or /-*ānī*/ are of Akkadian or Sanskrit origin; or whether Akkadian in the first place borrowed such terms from Sanskrit? Here are a few examples: *bānānī* "sailor"; *dāmān* "leeward"; *dhubbān* "a unit of measure consisting of 4 *iṣba'*s = 6^0 28"; *dīdabān* "onlooker"; *firmān* "the main yard"; *karrānī* "scribe" (< San *karana*); *rahmānī* "pilot guide"; *rubbān* "sea captain; navigator"; *shilmān* "the rib"; and *sukkān* "rudder".

Trade languages played a significant part in language spread. Muslim missionaries (merchants and mariners) followed the footsteps of Hindu religious leaders as well as Buddhist monks and saints in spreading their faith and trading with the indigenous in the Eastern Indian Ocean. As evidenced by the writings of Muslim geographers and historians, trade spread as far as China during the Sāsānian period (224 or 227 to 651 CE) and continued to do so in the Islamic period, right through the third/ninth century and probably later (see Chapter 3). The language of Islam was Arabic but the language that the merchants and mariners spoke and traded with was not necessarily Arabic; it seems more likely that Persian and later Indian were significantly dominant.

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[2] See Arunachalam (1996: 261–81), on his consultation of a number of early and more recent manuscripts; his corroboratory data on living practices and oral traditions; his extensive fieldwork along the Indian coast; and his interviews with elderly people.

Language dominance

The reasons for language dominance are more complicated than they look on the surface. Sumerian and Akkadian cuneiform literature produced a shared language technology in the middle of the second millennium BCE. They were then replaced by Aramaic, the latter was adapted by the nomads of the Northern Arabian Peninsula, who were culturally and linguistically absorbed in the Mesopotamian culture. Initially, Aramaic was a language for the rich Jewish community, but then it developed into the vernacular for the masses on a wider level. Technology flourished; writing was introduced using an alphabetic script and material-cultural technology was recorded, revealing the lives of communities from trade to religion, their crafts and their material culture, whether domestic or foreign.

Arabic, akin to Aramaic, took over the role of this once-established *lingua franca* and within a century, Arabic established itself as the language of Islam. Liturgically and administratively that was certainly the case, but Arabic did not become the vernacular among the communities who were not Arabic-speaking, and who had settled in increasing numbers on the seacoasts. The possibility is that seafaring communities on the Arabian/Persian littorals, from the Parthian (c. 330 BCE–240 CE) down to the Sāsānian period (224 or 227 to 651 CE) understood each other in a common language, probably Pahlavi (Middle Persian), but also that a creolized register of Pahlavi-Arabic was practised by the harbour people from a different linguistic background should not be ruled out. For the seafarers, the native tradition existed in a common literature and terminology: Sanskrit until the middle of the first millennium CE, and Persian up to the middle of the second millennium CE; both languages are of the Indo-European family.

Persian dominance

With the coming of Islam, trade, sanctioned by the Qur'ān,[3] strengthened the existing bonds between the Arabians, Persians and Indians but also the Javanese, Sumatrans and Chinese, thus reaching as far as the seas of China. As I pointed out above, Arabic had become the official administrative and liturgical language by then, but Persian had always

[3] Sūrat al-Nisā' (The Women) IV: 29.

been an important trading language; the question is: how much of its importance had it retained in Early and Middle Medieval Islam?

The presence of Arabians and Persians in the ports of Ubulla, Al-Bahrayn and Oman during the Sāsānian period is well attested by the historians al-Balādhurī (d. c. 279/892–3) and al-Ṭabarī (d. 310/922–3).[4] It is clear from Arabic sources that in the early centuries of Islam Persians were settled along both littorals of the Persian Gulf while the Arabians lived in the mountains and the desert.[5] One main source for the Persian dominance in the fourth/tenth century is al-Muqaddasī (fl. second half of the 4th/10th c): he clearly speaks of a mixed population that prospered on the Arabian and Persian coasts. In Sohar, he writes, there was a large Persian population who occupied much of the town [*qad ghalaba ʿalayhā l-Furs*].[6] From pre-Islamic times, this well-located port town always attracted many merchants from Persia.[7] Arabic was peripherally spoken, perhaps mainly by the Bedouins, for Persian was the main language of the inhabitants.[8] He also claims that Persians outnumbered the rest among the population of Aden and Jeddah [*wa-aktharu ahli ʿAdan wa-Ǧudda Furs*…].[9] His report comes in the heyday of the Daylamite rule of Persia when Aden and Jeddah were taken under their control (4th/10th c). During this transition, some wealthy Persians probably abandoned Siraf and established themselves in Aden and Jeddah (see Chapter 3). In all instances, the language was Arabic [*illā anna l-lugha ʿarabiyya*], al-Muqaddasī ascertains,[10] by which he meant that the written language for official matters was Classical Arabic.

The above examples are but a few; the Persian presence was relatively strong in major ports of the Persian Gulf and the Southern Arabian coast way into the eighth/fourteenth century as in the case of Basra, Sohar, Qalhat and Aden. As Arabic was the administrative language for all legal and state correspondence, it is understood that Persian-

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[4] See for example, al-Balādhurī 1866: 78, 431–2; al-Ṭabarī 1965, IV (i): 2021–23; V (i): 2545–8, 2560–4 *seq*.; idem, 1989, XIII: 126–8, 140–5.

[5] Hoyland 2003: 28–9.

[6] Al-Muqaddasī 1906: 92; idem, 2001: 79.

[7] Al-Rawas 2000: 40.

[8] Al-Muqaddasī 1906: 96; idem, 2001: 82.

[9] Al-Muqaddasi's observations on the use of Arabic in these towns are worth noting: "The people of ʿAdan say *rijlaynah* for *rijlayh* (his two feet), they say *yadaynah* for *yadayh* (his two hands), and so forth", al-Muqaddasī 1906: 96; unlike other Arabic dialects and Classical Arabic, in this instance the /-n-/ of the dual is maintained with an attached pronoun.

[10] Al-Muqaddasī 1906: 96.

speakers spoke it at least in a formal capacity. But among themselves they would have conducted their business in Persian and still continued to follow instructions on maritime matters in Persian.

The most skilled seafarers and experienced shipbuilders were the Persians, the Sirafis in particular,[11] though, it must be said, Omanis and Yemenites are mentioned too.[12] But the Omani seafarers that al-Masʿūdī (d. 345/956–7) writes about are most probably Persian; Oman was colonized by Persians several centuries before Islam and intermittently after. Consider Persianized Oman in the last years of the Khwārazmian rule (c. 470–628/1077–1231): a certain Maḥmūd b. Aḥmad learnt of the strategic importance of Qalhat (north of present Sur, SE Oman); he usurped its throne after 611/1214 and brought the whole of the coast from Musandam in the north of Oman to Dhofar on the Southern Arabian coast under his command. Over the next two hundred years Qalhat became increasingly Persianized.[13] It was an important administrative and political centre, "a great and noble city", Marco Polo (d. 1323) called it,[14] that controlled the mouth of the Persian Gulf; importantly though, it was the gateway to India and China. Ibn Baṭṭūṭa (d. 770/1368–9 or 779/1377), who spoke Persian, could not help but comment on the Persian language which, he says, dominated the harbour town.[15] He also observes a dialect feature, peculiar to Qalhatis: for every sentence they utter they put a *lā* (i.e. "no") at the end, for example, "you eat, no; you walk, no; you do so-and-so, no".[16] Arabic, no doubt, would have been spoken in Qalhat but it was more of a language that nomads or settlers used in the mountains or the valleys nearby.

Ibn Baṭṭūṭa notes the presence of Persians in the West Indian ports and spoke Persian when Arabic was not understood. Niccolò de' Conti (d. 1469), when he landed in Calicut, remarked what "a very noble

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[11] Al-Rāmhurmuzī 1883–1886: 2, 4–5, 7, 12–14, 16–17, 19, 36, 62, 64, 98, 105, 137, 141–2, 148, 152, 161, 165; al-Iṣṭakhrī 1927: 138; al-Muqaddasī 1906: 18; al-Masʿūdī 1983, I: 123; see also *Chau-Ju-Kua* 1911: 33.

[12] Al-Masʿūdī 1983, I: 114, 122.

[13] I refer the reader particularly to Aubin's articles (1953; 1959; 1971 and 1973) which offer a detailed study on the political and economic history of the region (7th–10th/13th–16th c) based on primary Persian sources.

[14] *Cathay and the Way Thither* 1913–1916, II: 449–51.

[15] Ibn Baṭṭūṭa 1968, II: 224–6.

[16] Idem, 1958–2000, II: 396–7.

emporium of the Persians" it was. Poggio Bracciolini, who recounts the travels of De' Conti reports about him:

> Here [in Calicut], having remained for some time, he learned the Persian language, of which he afterwards made great use… .[17]

East Africa too, attracted Persian settlers during the Sāsānian years and, from the early centuries of Islam, merchants and shipbuilders known as Shirazis, are reported to have made the East African coast their home. Although they were called Shirazis they were not necessarily from Shiraz, explains Serjeant.[18] Many probably came from Siraf[19] and had migrated to East Africa in the diaspora of the fourth/tenth-century economic and political crisis of the Persian Gulf (see Chapter 3). As commercial links flourished with the Red Sea and India during the Fāṭimid and Mamlūk periods (4th/10th to 8th/14th c), the Persian community was very active in East Africa. But their dominance, it seems, started to diminish at the time of the coming of the Portuguese masters and Indians appear to take their place. Not only did Indians man the Indian Ocean vessels at the time, but some were owners and others financed large vessels.[20] Many of them, shipowners and merchants alike, established agencies on the East African coast, as well as on the Southern Arabian and the Red Sea coasts.

Arabic and the Portuguese

The level of civilization which the Portuguese encountered on the East African coast in 1487 must have greatly impressed them. They saw a trade-link, long established with Mombasa and Mogadishu and with Cambay on the West Indian coast. Sofala was an important trading centre where Muslims came from the northern port towns of Kilwa, Mombasa and Malindi in *ṣanbūq*s to trade in cotton cloth and beads for which the Sofalis paid in gold (see Chapter 3). When they anchored at the ports they found many settlers who spoke Arabic.

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[17] *India in the Fifteenth Century* 1857: 2.5.
[18] Serjeant 1974: 9.
[19] Trimingham 1975: 124–5; 128–9.
[20] See the Yemenite fiscal survey dated 815/1412, *Mulakhkhaṣ al-fitan* in Serjeant 1974: 10, 25 *seq*.; see also Smith's translation and commentary of the *Mulakhkhaṣ* (2006).

Duarte Barbosa (d. 1521) gives an insightful description of the immigrant population of Muslim and non-Muslim merchants from Arabia, Persia, and India into East Africa.[21] He offers information on the coastal communities, their trade and language; a unique account because, for the first time, a western writer provides ethnographical data which, since the time Ibn Baṭṭūṭa had set foot in the area, were almost forgotten. The influx of Arabians intermarrying with East Africans goes back to long before the advent of Islam. Consider the Hadhramis who played a key role in colonizing and civilizing East Africa; their presence is also noted on the west coast of India, often known as Shehiris, though it must not be interpreted that they all came from Shihr on the Southern Arabian coast, some perhaps did.

Arabic, for a number of centuries, had put down roots in a number of coastal towns outside the Arabian Peninsula. How deep and far were these roots spread we do not know. Arabian traders must have communicated in some sort of language which was a mixture of the indigenous with a simplified trading Arabic. One Portuguese source points to the use of a pidginized form of Arabic: Luís Vaz de Camões (d. 1580), a poet, captures this repertoire among the settlers of the East African coast,

> Some Arabic words were mingled
> with the language they were speaking;
>
> [*Palavra alguma Arabica se conhece*
> *entre a linguagem sua, que fallavão*].[22]

This is a level of Arabic which would have been dominant in trading areas and in the bazaars where Persian and Arabic were not the main languages. If we extrapolate this medieval linguistic scenario to modern times a visitor would notice in an Arabian Gulf *sūq* (market) a mixed language being spoken by the sellers and buyers; a kind of bazaar register, understood only by Afghans, Arabians, East Africans, Indians and Pakistanis.[23] They would use a mixture of Arabic with the Indian languages and Swahili, and the occasional English words and phrases

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[21] *Book of Duarte Barbosa* 1918–1921, I: 91–2.

[22] Camões, 1997 (*Canto* V, vs 76): 113; translated by Landeg White.

[23] See for example, the study by Hobrom (1992) on Pidgin Arabic among Indian labourers in Saudi Arabia. Also of interest is Hunter Smeaton's (1973) study on the borrowing from Persian, Urdu, Hindi and English into the Saudi Arabian Qatif and Hasa dialects through the mixture of Arabians with Indians, Pakistanis, Iranians and Americans at the ARAMCO (Arabian American Oil Company) base in the 1950s.

thrown in here and there. It would have been the same linguistic scenario in the Classical and Medieval period: it was quite common to find foreign merchants and mariners communicating in some pidginized form of Arabic or Persian, the result of different people speaking many tongues but no principal language.[24]

On board their *caravel*s, the Portuguese carried Arabic interpreters. Prior to their voyage to the Indian Ocean they must have known that knowledge of Arabic was necessary. Fernão Martins was one of these interpreters: he "spoke Arabic to some of the Negroes who understood it…".[25] Where the *Lusíadas* of Camões reports on Africans not being able to converse with the Portuguese, he writes of their frustration:

> But, since, in the end, my companions
> never managed to get a single word from them
> that would give some sign of what we were looking for,
> we unfurled our sails and raised our anchors.
>
> [*Mas, como nunca, enfim, meus companheiros*
> *palavra sua alguũ'a lhe alcançaram*
> *que desse algum sinal do que buscamos,*
> *as velas dando, as âncoras levámos*].[26]

The pilots that were invited on board the *S. Raphael* all spoke Arabic. Their ethnic background, however, is not known; they could have been Arabians from Yemen or Oman, Persians or Indians who spoke Arabic. Vasco da Gama (d. 1524) and his crew spoke to skilled navigators in Arabic in order to obtain their services to cross from Malindi to Calicut.[27]

Interpreters might have travelled all the way from Portugal or were picked up from port towns in the Indian Ocean wherever the *caravel*s put in: De Albuquerque (d. 1515), when at anchor off Aden, took on board a sea captain by the name of Gregorio da Quadra. This Gregorio

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[24] See for example *Book of Duarte Barbosa* 1918–1921, I: 15, 18, 31; see also Agius 1996: 105–6, 109, 122, 430–1.

[25] Cited by the historian João de Barros (d. 1570), see *Three Voyages of Vasco da Gama* 1869: 76, fn. 1.

[26] Camões *Canto* V, vs 64. A literal translation is provided by David Frier (written communication 17 August 2006). White's translation of the first two lines read: "for all our desire to converse with them/neither with words nor signs could we *prevail* (my italics)" (Camões 1997: 110); according to David Frier, the translation is misleading for he argues that "if this passage were being looked at in time of modern ideas about intercultural communication, then White's use of the word 'prevail' would suggest a Eurocentrism which is not borne out by the Portuguese original".

[27] *Three Voyages of Vasco da Gama* 1869: 82.

recounted to the Portuguese admiral his story of how he and his crew were captured and taken as captives to Aden and were thrown into a dry cistern. It is reported that during eight years in captivity,

> [Da Quadra] lost no time in learning the Arabic tongue, and could speak the language very well, so much that the people could not believe that he was not a Moor.[28]

When De Albuquerque (d. 1515) was ready with his fleet to set out from the harbour of Aden to the Red Sea he arranged to send ahead of him a ship which João Gomez had captured, along with 20 Portuguese and a Jew as interpreter who was familiar with the geographical conditions of the Red Sea. This Jew advised them to take a local pilot as he would have had great experience of all the shallows and harbours of these parts.[29] Gaspar Rodriguez was the chief interpreter of De Albuquerque's expedition and Pero Vaz Dorta, factor of the fleet, acted also as interpreter. It was Rodriguez who played an important role in the negotiations with the Muslims at Socotra, Qalhat and Hormuz.[30] The job may have had some rewarding moments but the differences of cultures and breaches of trust made diplomatic efforts difficult and sometimes ended disastrously.

It is clear from these few examples that the Portuguese authors were cognizant of the fact that Arabic was an important *lingua franca* in the Indian Ocean. The point to make here is that thanks to their intelligence back home the Portuguese were well equipped with Arabic interpreters, but no Persian experts were ever mentioned in their chronicles. If Arabic was the language of trade as the Portuguese sources lead us to believe the question arises: was Arabic also the language for nautical and maritime terminology?

The coastal towns of the Western Indian Ocean were the home of merchants, traders, mariners and craftsmen, many of whom were non-Arabians. Apart from the East African linguistic varieties and language minorities on the African Red Sea coast, Persian was, it seems, the most common foreign language which was well known to mariners and merchants in the Indian Ocean; the nautical terminology they used and the maritime manuals they followed are proof, no doubt, of the Persian foreign dominance (see Chapter 6), but Indian (and its varieties) must

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[28] *Commentaries* 1875–1884, IV: 49–50.
[29] Ibid., IV: 126.
[30] Ibid., I: 46–51, 63, 106, 124.

have also played an important role; a language which the Portuguese were in contact with for over a century, both introducing a vocabulary of material-cultural terms and one relating to ship-parts terminology.

Borrowing of nautical and maritime terminology

No language barrier would have alienated those who wished to communicate their ideas by word or drawing. When a technique is borrowed, the borrower would absorb the term of the source language. Many nautical and maritime terms still exist in the modern repertoire of the Arabian/Persian Gulf which demonstrates this exchange over the centuries.[31]

Several of the nomenclatures of crew members are of Indian and Persian origin: *dārī* "sail master" (< Hin); *fanjarī* "look-out man" (< Per *panjarī*; cf. *panjar* "a window; a cage, coop");[32] *khalāṣī* "sailor" (< Hin);[33] *nākhudhā* "ship master" (< Hin *nāo* "ship" + < Per *khudā* "lord"); *nūtī* "sailor" (< Hin; cf. Gr ναύης);[34] and *tandil* "chief sailor" (< Malay).[35]

Many boat and ship-terms are of Persian or Indian origin: *ahawra* "war vessel" (< Hin); *balam* "dugout canoe" (< Per *belem* < (?) Skt *vallam*); *bīraja* "launch" (< Hin *bēṛā* "large boat"); *dāw* "trading vessel" (< Per *dawh*); *dūnij* "coastal boat" (< Per *dūnī* "a long swift vessel" < Hin *ḍēṅgā/ḍoṅgā* "a small boat"); *falū* "a ship's boat" (Ben *pulwah/pulwār* "a boat of the Bengali rivers"); *hūrī* "dugout canoe" (< Hin *hōṛi* < Skt *hoḍa*); *jāshujÿya* "transport ship" (cf. Per *jāshū* "sailor"); *kundura* "small boat" (cf. Per *kandara* "a small water bird"); *shabbāra* "a river boat" (< Per *shāhī* + *bār* "a royal boat"); *ṣunbūq* "trading vessel" (< Per *sambūk* < Skt *çambūka*); *zanbariyya* "a large vessel" (< Per *zanbarī*); *zawraq* "a skiff" (< (?) Per); and *zaww* "a river boat" (cf. Per *zawd* "swift").[36]

Ship parts have names borrowed from Persian or Hindi but several came from Portuguese in the sixteenth century: *balanj* "ship's cabin" (< Hin *palang*); *barmēl* "outer stem" (< Per *bar* "over" + *mēl* "stem"); *bīs* "keel" (< Hin); *durmēt* "shelf" (< Port *dormente*); *firman* "the yard (a

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[31] See my two works on the Arabian Gulf and Oman, 2002 and 2005a.
[32] Steingass 1977: 256.
[33] See Yule & Burnell 1994: 223.
[34] Lane 1984, II: 2863.
[35] Al-Rāmhurmuzī 1981: 127–8, 138, 139, fn. 49.
[36] Vollers 1896: 651; Kindermann 1934: 3, 36; Steingass 1977: 546, 623, 1954; Yule & Burnell 1994: 737, 827; see Agius 1984: 135; idem 2002: 45, 53, 85, 118–9, 121, 204.

large wooden spar crossing the masts)" (< Hin *paravān* < Skt *parmāṇa*); *furma* "template" (< Port *forma*); *jarkh* "wheel" (< Per *charkh*); *kabirt* "template" (< Port *coberta*); *kalfāṭ* "caulking" (Port *calafêto*; cf. Ind-Eur, Ur *kalpatti*);[37] *kawra* "knee" (< Port *curva*); *lingūtī* "rivet" (< (?) Port *linguete*); *nīm* "poopdeck" (< Per); *narr* "pintle" (< Per *nar*); *shilmān* "rib" (< Hin < (?) Skt "brace, rib"); *zibadra* "gunwale" (< Per *sabdarā*).[38]

India was always a chief exporter of timber and, therefore, it is to be expected that some terminology is Indian, e.g. *bājī* "vakawood"; *fanaṣ* "jackwood"; *fann* "punnai"; *jangalī* "Indian laurel"; *manṭīj* "benteak"; and *sāj* "teak" (< Hin *sagawan*).[39]

There is evidence to suggest, as I have shown in Chapter 6, that nautical instructions were for many centuries in Persian: information included star positions, latitudes, bearings and physical description of land etc. No example of such manuals has ever surfaced, though Ibn Mājid (d. after 906/1500) mentions the Persian model, known as *rahnāma*, in his *Kitāb al-fawā'id fī uṣūl al-baḥr wa-l-qawā'id* (The Book of Benefits in the Principles of Navigation). Sailing directions formed part of the oral tradition which came down to us in poetic verses. Sailors memorized these poems and recited them as daily directions, a tradition that continued until recent times. The Arabic version of the *rahnāma* by Ibn Mājid introduced a new era of nautical and maritime terminology which coincided with the coming of the Portuguese in the Indian Ocean in the end of the fifteenth and beginning of the sixteenth century. The instructions were in Arabic but much of the terminology was Persian and remained so among Arabic-speaking Indian Ocean mariners until fairly recent times. Here are some examples of nautical terms of Persian origin, a few are traced back to Sanskrit: *anjar* "anchor" (< Per *langar* < Skt *nangara*); *bandar* "port" (< Per < Skt *bhandara*); *bār* "coast" (< Skt); *dāmānī* or *dīmānī* "the second navigation season (SW)" (< Per); *handāza* "quadrant" (< Per *āndāz*); *jāh* "North star" (< Per *gāh*); *kamāl* "a small parallelogram of wood having a string with knots to obtain the latitude" (< Per *kamān*); *khann* "rhumb" (< Per *khāna*); *rahmānī* "pilot guide" (< Per *rahnāma* [*rāh* "road" + *nāma* "book"]); *samka* "defect (of the compass)" (< Per < Skt *čumbaka*; cf. Tam *samukkā*; Mal *samka*); *tīr*

[37] An old term, apparently firstly used in Egyptian (Byzantine) Greek of the sixth century καλαφάτης and καλαφατίσε, see Kahane *et al.* 1958.

[38] Da Silva nd., 462, 568, 767, 976; Johnstone & Muir 1962: 61–2; Agius 2002: 34, 45, 53, 146, 156, 165, 169–70; idem, 2005a: 185.

[39] Agius 2005a: 30–1.

"star" (< Per); *tirfa* "a unit of measure" (< Per); and *zām* "three-hour watch" (< Skt *zama*).[40]

These examples suffice to demonstrate the function of language contact in a multi-ethnic Indian Ocean and the borrowing of the terminology that took place over the centuries. Much of the terminology was absorbed into Arabic adding to the richness of the language.

Arabic and the language of terminology

As I have argued in an early work, *Arabic Literary Works as a Source of Documentation for Technical Terms of the Material Culture*, there are very few works from the past that deal directly with the material culture. Those which do contain technical terms of the theoretical sciences such as agriculture, astronomy, engineering and medicine; there are also specialised vocabularies on topics like the camel, the desert, the house etc.[41] but hardly anything about the ship. Material for these works was collected from pre-Islamic and religious literature, or from tribal Arabians in the desert, and, on a smaller scale, from urbanized and coastal communities. The non-scientific terminology was at first recorded by philologists, whose primary interest was to collect materials of a sociocultural nature and classify them according to the subject they chose to write on; for example, al-Aṣmaʿī (d. 216/831–2) wrote the *Kitāb al-khayl* (The Book about the Horse) and al-Warrāq (fl. 4th/10th c) composed the *Kitāb al-ṭabīkh wa-iṣlāḥ al-aghdiya wa-l-maʾkūlāt* (The Book about Cooked Food and Improvement of Foodstuffs). Such specialized vocabularies were of interest to the educated elite; their authors were often not Arab/Arabian but they wrote in Arabic. Unusually, for the time, they also had an interest in non-Arabic terminology, particularly Persian.

I said above that "hardly anything about the ship" was written. As I pointed out throughout this book, with the exception of passing references, Classical and Medieval Arabic sources are deficient in knowledge about seamanship let alone listing a specialized vocabulary on nautical matters or watercraft. Even though such references are sometimes useful,

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[40] Ferrand 1924: 244–5; Steingass 1977: 108, 202, 565, 716, 1380; Tibbetts 1981: 121, 142, 150, 292; Arunachalam 1996: 263, fn. 3; Agius 2005a: 162, 181, 195.

[41] Agius 1984: 23–7.

they generally lack clarity. One lexicon that I mention in this respect is Ibn Sīda's (d. 458/1066) *al-Mukhaṣṣaṣ fī l-lugha* (The Specialist Work in Philology) in which he proposes to classify entries not in the traditional aphabetical listing but according to some logical arrangement; thus, he sections his lexicon into subject matters, one of which is about "The Ship" (*al-Safīna*) and another "That which resembles the ship" (*mā yushbihu l-safīna*) containing some 85 terms.[42] The lexicon appears to be promising in terms of the number of nautical words he lists. However, on a closer inspection, the researcher finds that many of them are not defined and some are given equivalents but no description. To give some examples: general maritime terms that deal with the ship at sea, such as *ḥadara, jamaḥa, māha, rasā, sakhara, shajja, taqādhafa* etc., are listed with no meanings (see Glossary); other terms such as *qilāʿ* "a sail", he gives the equivalent *shirāʿ*; for "nail", he has *sakk* and *mismār* with the understanding that the medieval user or reader knows what the term stands for in terms of definition and usage; for "rope", he gives *jummal* and *qals* but offers no explanation. Occasionally, we get some useful detail, for instance *khaysafūj*, he defines as "the rope for sails", *saqāʾif* "the ship's planks" etc.

What is significant about Ibn Sīda's lexicon is that it is an authority in its own right in spite of the lack of some definitions; he was consulted by two well-known lexicographers, Ibn Manẓūr (d. 711/1311–2) and al-Zabīdī (d. 1205/1790–1) as one of their main sources of references. Both lexicographers give fuller definitions and sometimes provide what is lacking in earlier works; their works, however, like earlier lexica, miss out a number of nautical terms especially those that are non-Arabic. That said, they do provide some definitions on watercraft; the question is, how much of this is useful and why were Classical and Medieval Arabic lexicographers so reluctant to list and define technical terms of nautical and maritime material?

Boat and ship-terms: the search for meaning

The question of classification and designation of watercraft as I have discussed in the previous chapters, 9 to 12, is crucial to the study of maritime history and ship typology of the classical and medieval periods

[42] Ibn Sīda 1883–1903, X: 23–9.

of Islam. There are several questions as to the provenance of ship nomenclature, whether the name was local or borrowed or transitional (adapted for some time and then replaced); how representational was the boat/ship nomenclature of place-names, indivdual names or bird and animal names? Further, how much information do the primary Arabic sources give in order to enable us to determine the type and function of vessels? If they do provide such information, how can we recognize differences in hull-designs?

Word-collectors were not interested in compiling historical dictionaries. Recognising the term in question and identifying the type of ship is difficult but can sometimes be a rewarding exercise. From my experience, about 60% of the terms I looked up were not found; of the rest that have been listed, the exercise often turned out to be unproductive. Where the lexicographer has marked the entry as "known" (*maʿrūf*) or simply stated that the term is "a type of ship" (*ḍarb min al-safīna*), e.g. *burākiyya*[43] and *miṣbāb*, I was at a dead end. Nor would the following information help: "the *zawraq* is one [type] which is smaller than the *khalīj*(s)" [*al-zawraq min al-sufun dūna l-khuluj*].[44] One boat-term for another, with no definition as to what it is, is no good; it is a circular approach which yields no results.

There are, however, a few exceptions. When Ibn Sīda and Ibn Manẓūr listed the following raft-terms: *ramath*, *ṭawf* and *ʿāma* [s.v.],[45] they gave information as to what they were made of and whether they were seaworthy. But this is an unusual case; medieval word-collectors are more often short of any proper definition. Rarely would a lexicographer explain the origin of a ship-term and, if he does, the statement is simplistic: consider the term *talawwā* [s.v.], Ibn Manẓūr explains that it is from *talā* "to follow, ensue" and *talawwā*, he says, is "that which follows larger ships".[46] Such an explanation sheds no light on the origin of the term but it does reflect the lexicographer's deterministic philosophy that what sounds Arabic must have Arabic roots.

My next question is: Why would a compiler fail to give a definition for a boat/ship-term or, for that matter, a nautical term? One answer

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[43] Al-Jawharī 1984, IV: 1575.

[44] Ibn Sīda 1898–1903, X: 26.

[45] On the authority of Abū ʿUbayd and Khālid b. Aḥmad, see Ibn Sīda 1898–1903, X: 29; on the authority of Ibn Durayd, 1987, II: 921; Ibn Manẓūr nd., IV: 2723, 2842.

[46] Ibn Manẓūr, nd., I: 444.

is simple: there was no need for it as it was known to the people at the time and therefore it was felt unnecessary to describe or, sometimes, even to record it. Consider, the *ghurāb*-galley [s.v.], a familiar term and because of its popular usage lexicographers left it out of their dictionaries; also, the name *kelek* (a raft-boat) [s.v.] was not listed because it was a common term. The other answer is that Classical and Medieval Arabic word-collectors were often purists and, therefore, it is not surprising that such words were left out. They were more concerned with religious, philosophical, grammatical terms or terms related to the camel, the horse, the desert etc. It was an arbitrary decision not to include certain terminology of the material culture. A humble watercraft used by the common people (*al-ʿāmma*) was of no importance to them. So why include it? When we talk of an English Morris Minor in modern times we all understand that it is a car of popular use. We would look it up in a specialist encyclopaedia if we want to learn more about the historical development of its design and make, otherwise we would not bother, for we all have a mental picture of this common English car that was with us for over half a century. This is the truth about why classical and medieval authors deemed it not necessary to classify known terminology; people had a mental picture of the boat or ship and therefore, why define something which was common knowledge?

Where lexicographers failed to give information, historians, geographers and travellers filled the gap. Here are some examples: the *bārija* [s.v.], a pirate ship was, according to al-Muqaddasī (fl. second half of the 4th/10th c), historically connected with Indian pirates who were called *bawārij*, the plural of *bārija*;[47] the *dūnij* [s.v.], was a coastal and pearl-diving boat in the Northern Persian Gulf and we are told by Ibn al-Mujāwir (d. 890/1291) that she was also employed as a ship's boat in the naval blockade on Aden;[48] the *ḥarrāqa* [s.v.], information on which comes from a number of authors such as Ibn Saʿd (d. 230/844–5), al-Masʿūdī (d. 345/956–7) and al-Nuwayrī l-Iskandarānī (fl. 8th/14th c), was a gondola-type, generally found on the River Nile, however, another type was known to be a fire launcher, used in Muslim warfare in the Mediterranean and on the River Tigris;[49] the *jalba* [s.v.], a ferry

[47] Al-Muqaddasī 1906: 14; idem, 2001: 13.

[48] Ibn al-Mujāwir 1951–1954, I: 124; see Shihāb 1987: 567.

[49] Al-Masʿūdī 1861–1877, VI: 351; Ibn Saʿd 1904–1921, V: 319; al-Nuwayrī l-Iskandarānī, 1968–1976, I: 171; II: 249, 251; V: 250, 375; see also al-Jawharī 1984, IV: 1458; al-Zabīdī 1989, XXV: 154.

and a cargo boat, described at length by Ibn Jubayr (d. 614/1217), carried sails made from flax and coconut mats;[50] the *qiṭʿa* [s.v.] could function as a cargo or transport vessel as well as a warship;[51] the *sumayriyya* [s.v.] was a pleasure boat but also a war canoe manned by two rowers, mentioned frequently by al-Ṭabarī (d. 310/922–3);[52] the ubiquitous *ṣunbūq* [s.v.] was a versatile ship which, according to Ibn Baṭṭūṭa (d. 770/1369–9 or 779/1377), came in all sizes;[53] and finally, the *ʿushārī* [s.v.], one type was known to be a long river craft, it was decked, with a domed-cabin.[54]

As shown in Chapters 10, 11 and 12, the reliablitity of information was crucial to word-collectors. To support their entries some included *shawāhid* (examples from pre-Islamic poetry, the Qurʾān, and Ḥadīth). Sometimes, they gave an *isnād*, a chain of authorities from the most recent to the first author, in order to prove the existence of the term in question at the time it was first recorded. For the 24 ship-types listed in the *Mukhaṣṣaṣ fī l-lugha* (The Specialist Work on Philology) (see Appendix A), Ibn Sīda (d. 458/1066) cites Khalīl b. Aḥmad (d. 175/791), Abū ʿUbayd (d. 223/837), Ibn Durayd (d. 321/933) and al-Fārisī (d. 377/987), all authorities held in great esteem. Both the *shawāhid* and the *isnād* approach was for the compiler a guarantee of reliability but there was always the possibility that the authorities they cited might have not necessarily reported first-hand information from the people that were familiar with the term.

On the matter of reliability of information, literary sources too could be a problem. From Ibn Baṭṭūṭa's report, it is often not clear whether the boat or ship he describes is an Indian Ocean or Mediterranean type. He applies, for example, the name *jafn* almost indiscriminately for an Indian Ocean merchant vessel and war galley, a type which he knew back home in Tangier, Morocco. One other example is his use of the term, *maʿdiyya* (< the verb *ʿ.d.w.* meaning "to cross"),[55] a nomenclature for a raft-boat which occurs in three different accounts:[56] i) On his voy-

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[50] Ibn Jubayr 1952: 63–5; al-Nuwayrī l-Iskandarānī 1968–1976, II: 247, 249.

[51] Ibn Abī Zarʿ 1843–1846: 91, 224 *seq.*; RHC 1967, I: 351 *seq.*; see also ʿImād al-Dīn 1888: 224; Ibn Shaddād 1964: 122–3.

[52] Al-Ṭabarī 1965, XII (iii): 1759–61, 1784–5; XIII (iv): 1926, 1948–9, 1953–4, 1956–7, 1960, 1968, 2074.

[53] Ibn Baṭṭūṭa 1968, II: 17, 181, 183, 198.

[54] Al-Baghdādī nd., 54.

[55] Wehr 1966: 598.

[56] Ibn Baṭṭūṭa 1968, III: 359; IV: 169–70, 186; idem, 1958–2000, III: 728 ; IV: 849, 857.

age to Maʿbar in 745/1344, he writes that a gale rose and the pilot nearly wrecked the ship; the sailors cut down the mast into pieces of logs and tying ropes to them, made a wooden raft called *maʿdiyya*; ii) He recounts in another story that a certain amir Bakht, who fled with his associates to Sind from the sultan, built a raft (*maʿdiyya*) made of reeds to cross the river; iii) In Sri Lanka in the same year, he accompanied a number of the Hindu sultan's dignitaries who were making an annual pilgrimage to the Blessed Foot and to cross a river they boarded a raft, a *maʿdiyya* "made of bamboo canes". The ethnographical details in these accounts, if they are true, are undoubtedly interesting but we will never know what the true name of the raft-boat was in indigenous terms; certainly not *maʿdiyya* because it is a Mediterranean term. With examples like these one questions whether Ibn Baṭṭūṭa ever did take a voyage to some regions of the Indian Ocean? Having said that, one does encounter occasionally details about Indian Ocean craft, for which he gives the local name, comparing them with Mediterranean vessels. He tells us, for example, that the Indian Ocean *ahawra* [s.v.] is similar to the Mediterranean *ṭarīda* [s.v.], both are transport ships for horses and heavy cargo, they have the same hull design but the *ahawra* is "broader and shorter"[57] (see Chapter 12).

The linguistic model: understanding the history and culture of watercraft

Classical and Medieval Arabic lexica turn out to be a false hope for the student of material culture; their concern was with rare words rather than material culture used by commoners, and even less so for the terminology employed by mariners and seafaring communities, whose contact with non-Arabic speakers was believed to have contaminated the purity of Arabic, the language of the Qurʾān. They were prescriptivists like lexicographers of other languages and other times, such as Samuel Johnson (d. 1784); they had, in the words of David Nokes, "a strong, if largely unconscious, desire to have the [...] language firmly policed".[58]

A great part of the nautical and maritime terminology, which I discussed in this book, would have been imported into Arabic and if

[57] Ibid., 1968, III: 108–9; 1958–2000, III: 600.

[58] David Nokes, "Long the last word—even if not adroit", *The Times Higher Education Supplement* (April 21, 2006): 22.

words did not fit the lingusitic mould they would be labelled "foreign" (*ʿajamī*) as opposed to those that did and consequently were called "Arabic" (*ʿarabī*). What is the implication of this? Lexicographers and philologists policed loanwords uttered by non-Arabic speakers; they considered them to be linguistically corrupted. The purists looked down upon words uttered by the masses (*al-ʿāmma*) who spoke faulty (*laḥn*) and not correct Arabic (*faṣīḥ*).

Indeed, the listing of words with clear and succinct definitions and their common or uncommon usage, is a modern concept. The absence of a historical Arabic dictionary and the patchy information from literary sources, could turn any inquiry into a labyrinthine exercise. An interpretation of the nautical term or boat/ship-term remains "somewhat arbitrary", and as Jacob Lassner rightly pointed out, to search for the right equivalent of the Arabic terms can become a "hazardous" task.[59]

The role of the classical and medieval philologists was to show the relationship between the morphology of the term and its cognitive link, on the premise that meaning fits a linguistic pattern from which Arabic draws on a set of forms and templates based on a tri- (sometimes quadri-) consonantal structure. The question arises: Would fitting words into fixed templates provide a means to understand the history and culture of the watercraft? I give some examples to illustrate how they argued that the various functions of nouns and their morphological attachments (prefixes and suffixes), and certain concepts and patterns can help us to establish the semantics and sometimes the history behind the nomenclature of a boat or ship.

Following the theoretical mould of: (i) *faʿl* or *faʿla*, we have (a) *jafn* [s.v.] "a galley", a noun meaning "large bowl", the association being that the ship is round-designed from the verb *jaffana* "to make bowls", (b) *jalba* [s.v.] "a cargo and pilgrim vessel", the noun built on the verb *jalaba* "to transport animals, captives or slaves from one place to another", (c) *ṭawf* [s.v.] "a raft" from *ṭāfa* "to journey around";[60] (ii) on the pattern *faʿʿāla* or *faʿʿāl* we can apply (a) *ḥammāla* [s.v.] "a transport and cargo vessel" from *ḥamala* "to carry (upon one's back)", (b) *shaffāra* [s.v.] "a galley"

[59] See his comments on al-Ṭabarī's text in 1987, XXXVII: 13, fn. 31.
[60] Lane 1984, I: 434–5, 438; II: 1892–3.

from *shafara* "to cut", by extension a ship that breaks the waves, and (c) *ṭayyār(a)* [s.v.] "a small and fast ship" deriving from *ṭāra* "to fly".[61]

Other grammatical devices to help us understand the background of the meaning of a term is by looking at prefixes or suffixes attached to words. Nouns prefixed by /ma-/ or /mi-/ describe something expressed in the verb they derive from; they often indicate a function of something: (a) *markab* [s.v.] a generic term for a sea-going vessel derives from *rakiba* "to ride; board", (b) *miʿbar* [s.v.] "a ferry-boat" from *ʿabara* "to cross", and (c) *miṣbāb* [s.v.] "a ship", from *ṣabṣāb* "a journey to water".[62]

The relative adjective called *nisba* which is featured by the suffix /-ī(yy)/ (m) or /-iyya/ (f) denotes that a "person or thing belongs to or is connected therewith":[63] (i) a *nisba* describes a relation to a thing, (a) from *ḥarb* "war, battle, fight or conflict" we have *ḥarbī* [s.v.] "a war vessel", (b) *safar* "journey or travel" becomes *safarī* [s.v.] "a sea-going vessel", and (c) *shaṭṭ* "bank, or side of a river" has *shaṭṭī* [s.v.] "a coastal boat";[64] ii) a *nisba* defines a general function, (a) *khayṭiyya* [s.v.] from *khayṭ* "thread" implying a sewn-planked ship, (b) *mismāriyya* [s.v.] from *mismār* "nail" denoting a nailed-planked ship, and (c) *musabbaḥiyya* [s.v.] probably a "cargo ship", from the root-verb *sabaḥa* "to swim";[65] iii) a *nisba* implies a relation to something associated to a town or port town, (a) *raqqiyya* [s.v.] "a ferry and/or cargo boat" derives from Raqqa, the chief town on the banks of the Euphrates on the Syrian frontier,[66] and (b) *wāsṭiyya* [s.v.] is the river cargo boat which is called after the harbour town al-Wasit on the River Tigris, one of the important towns of Mesopotamia throughout the ʿAbbāsid Caliphate;[67] iv) a *nisba* is a reference to person or tribe or thing, (a) *ghassāniyya* [s.v.] "an ocean-going vessel" which may be associated with the Yemenite tribe Banū Ghassān, and (b) *jaʿfariyya* [s.v.] is "a river boat" from the word *jaʿfar* "small river".[68]

Categorizing nouns by their prefixes or suffixes or ordering nouns by the description of their function or still grouping words according to templates is an interesting linguistic approach but in the end it fails to

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[61] Ibid., I: 646; II: 1570, 1903.
[62] Ibid., I: 1142; II: 1640, 1938–9.
[63] Wright 1964–1967, I: 149.
[64] Lane 1984, I: 540, 1371; II: 1548.
[65] Wehr 1966: 393.
[66] Written communication from Stefan Heidemann (6 December 2005); see also Le Strange 1966: 101; Heidemann & Becker 2003: 29, fn. 237.
[67] Le Strange 1966: 40.
[68] Lane 1984, I: 430.

convince us. We are still left with big gaps as to the origin and provenance of the boat or ship term; the search for its origin can be elusive. Names develop and change over time, the user applies the same name for a different make or a different name for the same type. Consider, the *shīnī* [s.v.], generally known to be a galley but also a type of its own; our sources mention that the ninth/fifteenth-century type was different than the earlier though we are not told in what way. Another example is the Egyptian *ʿushārī* [s.v.], defined as the royal domed-cabin boat, but other types and sizes functioned as a coastal boat and a lifeboat; some still were ferry-boats on the Tigris and the Nile and others were cargo ships on the open sea (see Chapter 11).

Reconstructing the type of an Indian Ocean vessel is difficult to interpret in any systematic way. Any attempt to reconstruct a classical and medieval Islamic vessel and for that matter to discuss the origin of the name of a boat or ship-type remains hypothetical. We have not reached the point in etymology and semantics where we can analyse fully words of non-Arabic origin. I have argued that linguistic forms may, but not always, conceptually assist us in guessing the meaning and features of a craft. The early efforts of Medieval Muslim lexicographers at etymology were undoubtedly remarkable, given the state of word-collecting at the time; they provided a platform on which western lexicographers, such as W. Bedwell (d. 1632), J. Golius (d. 1667), F. Meninski (d. 1698), G. W. Freytag (d. 1861), E. W. Lane (d. 1876), R. Dozy (d. 1883), A. de Biberstein-Kazimirski (d. 1887) and H. Wehr (d. 1981) could build in their monumental works. But we must have no illusions; much will for ever remain in doubt.

A search for truth: beyond the complexities

In this book I have attempted to explore the evidence that Classical and Medieval Arabic texts can provide about the development of Muslim and non-Muslim vessels in the Western Indian Ocean and how far iconography and archaeological finds can help in understanding construction features, riggings and sails configuration. I have looked at terms of boat/ship-types to show how categories are defined and how distinctions are perceived and expressed. This could not be possible without looking closely at the content and context of the terms in Islamic sources.

The interdependence of the various trading activities which centred on the sea provided an underlying cohesion for the maritime peoples, while for many centuries the long distance trade produced a cross-fertilisation, not only of goods, but of ideas and culture, which still persists today (see Chapters 2, 3 and 7). What emerges from written documents and archaeological evidence is an historical pattern of cultural change in commercial relations within the Indian Ocean region and across its frontiers.

Watercraft designs depended on environment, topography and economic demands but they were influenced also by social, cultural and religious factors. Shipbuilding tradition is largely conservative; carpenters follow their own traditions with very little adaptation over time. Some construction features of contemporary primitive boats are our clue to boats of antiquity and it was possible to show common design features with the early vessels of the Bronze Age and with the water craft of the classical and medieval periods (Chapters 4 and 5): for example, archaeological finds have produced fragments of boat specimens in a few trading posts and fishing places in the Persian Gulf and Oman; through these fragments it is possible to find a continuity of boat constructing techniques (eg the *kelek*, *mashḥūf*, *quffa*, *shāsha*, *ṭawf* and *wāriyya*) from Sumerian and Akkadian times through the Islamic medieval period and even up to modern times (see Chapter 4).

Although information on the development of ships during the Medieval Islamic period is sparse there is sometimes substance in the little that Arabic texts have to say. Consider Ibn Sīda's (d. 458/1066) description of making a *marsā* (anchor) (see Chapter 5) and Ibn Jubayr (d. 614/1217) who tells us how the Red Sea *jalba* had her planks sewn with cotton rope; the information by Ibn Mammātī (d. 606/1209) on the war-*shīnī* and the number of oars being used and al-Maqrīzī (d. 846/1442) on the number of soldiers on board the *shīnī*. Consider also Ibn Baṭṭūṭa's (d. 770/1368–9 or 779/1377) comments on the horsemen and their armour which they put inside the war-*ṭarīda*; they then mount on their horses and gallop to meet their enemy (see Chapter 11). For the maritime historian these snippets of information are pure gold but too fragmented to form a whole picture. As I have pointed out in this book, our primary Arabic texts are incomplete; it is impossible to penetrate their silence on the subject of technology or, in general, maritime and nautical matters. We are told hardly anything about the materials ships were built with, the number of man-days

needed to construct and repair them, their hull-design, the size of craft or details of masts and sails, oars, rudders and anchors. In the absence of textual evidence we can, as my discussion has shown in Chapters 3 and 6, look at other sources and see whether they can fill that gap in our understanding of the development of Muslim ships in the Western Indian Ocean: archaeological finds such as the Belitung (Indonesian) wreck (9th c) recovered in the Java Sea and the Kadakkarappally shipwreck (13th to 15th c) found on the Malabarian coast, and iconographic representations in the *Kitāb ṣuwar al-kawākib al-thābita* (The Book of the Constellations of Fixed Stars) of al-Ṣūfī (d. 376/986), the *Maqāmāt* (The Assemblies) of al-Ḥarīrī (d. 516/1122), and the Persian miniatures of the *Shāhnāma* (Book of Kings) were often, though not always, helpful. But other non-Muslim sources were essential: Indian ships from the Sanskrit *Jataka* fables found in the caves of Ajanta (dated c. 200 BCE–650 CE); illustrations from the fifteenth-century *Wu bei zhi* (Treatise on Military Preparedness) and several wrecks of Chinese ships dating from the Song (960–1279), Yuan (1279–1368) and Ming (1368–1644) periods.

Technological exchange brought about adaptations and inventions. The axial stern rudder was probably developed by the Chinese *circa* 1000; it replaced the long steering oar which was not safe or manoeuvrable in bad weather. It was not until the thirteenth century that the Mediterranean mariners adopted this device, perhaps at the same time that the compass reached them. The Indians, Persians and Arabians had long been using the compass after obtaining it from the Chinese. Steering a completely accurate course depended on the calculation of the latitude and longitude and the Chinese had perfected this use by probably the 1420s. However, as much as one could argue for the transfer of technology from the Chinese, there is also the possibility that such innovations could have been indigenous and that they had developed independently. The lateen-settee in the Indian Ocean, I have argued, might have had an eastern origin, even though its existence can be traced in the Mediterranean as early as mid-fifth century CE, if not earlier. The Chinese, Javanese, and Sumatrans journeyed east and west of the Indian Ocean. Their contacts could have been the platform for the development of the fore- and -aft sail. So far no iconographic evidence of a lateen-settee has emerged in the Western Indian Ocean prior to the Middle Islamic period; its configuration comes much later, after the 1500s (see Chapter 6). It is evident from the above that technological transfer in the Indian Ocean has often moved from east to

west in spite of Eurocentric views to the contrary; for instance, the so called Greek Fire was most probably introduced to the region via the Chinese, who had developed several types of this technology.

Ferrand's claim that voyages made to the Far East were exclusively conducted by Persians[69] is an exaggeration. That the language of trade from pre-Islamic times was Persian, particularly during the Sāsānian period, is largely true, but not totally, and even though the nautical instructions known to Arabian mariners were written in Persian before the 1500s, and a number of nautical terms, as discussed above, are of Persian origin, it cannot be taken as conclusive proof that Persian navigation was superior to the Arabian. At the time, contemporary to the Persian tradition of navigational science, there was an active Sanskrit/Indian and Chinese tradition, which was even older, in the Indian Ocean. It is true that the advent of Aḥmad b. Mājid (d. after 906/1500) marks a turning point in the history and tradition of Persian and Arabian navigation in that for the first time we have a record of the art of navigation in Arabic. However, Arabic was only the vehicle; the tradition of Persian manuals existed long before Ibn Mājid's treatise but, in his words, they were lost. If these manuals were lost he could only have recourse to what his predecessors had passed on to him in the form of an oral tradition. His work has been cited by Arabs and non-Arabs over the centuries and, although much legend surrounds the encounter between Ibn Mājid and Vasco da Gama (d. 1524), one fact is indisputable: until 1487 the leading traders of the Indian Ocean were the Persians, Arabians and Indians, many a time under the identity of "Muslim", as attested by the works of historians, geographers and travellers. However, in terms of science and technology it is no exaggeration to conclude that China was, for many years, ahead of the Muslim world and Europe.

In order to get at truth we need to see beyond the complexities. History is, of course, about the specific: what happened and why in a given time and place; all this is important in order to understand the development of types of boats and ships, their nomenclature and provenance, why and how they were used (Chapters 10, 11 and 12).

In this study I have pursued a lateral approach: if textual material is lacking, then our only resource is to go to iconographical and archaeological finds; here too, sometimes, the lack of evidence is frustrating.

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[69] Ferrand 1913–1914, I: 1–3.

However, much can be learnt about Arabian, Persian and Indian craft through European, Indian and Chinese sources: building materials, types of timber, styles of construction, types of masts, sails rudders, anchors etc. Illustrations and figures can often be subjective of course, and, therefore, not a real representation of the period in question. Moreover, archaeological finds can be arbitrary; they might give us clues but no conclusive answers. However, by this integrated approach, combining information from different sources, I was able to form an holistic picture of the development of the ship in the region and across the frontiers. The findings in this book are far from offering definitive answers, but they could, I hope, help others to explore new ways of thinking.

APPENDIX A

Ship-types recorded by al-Ṭabarī (d. 310/922–3), al-Muqaddasī (fl. second half of the 4th/10th c), Ibn Sīda (d. 458/1066), Ibn Baṭṭūṭa (d. 770/1368–9 or 779/1377) and al-Maqrīzī (d. 846/1442).

Al-Ṭabarī (historian)				
Kitāb ta'rīkh al-rusul wa-l-mulūk, volumes I–XV (1965)				
No	Name	Type	Period	Volume & page number
1	*baḥriyya* (pl *baḥriyyāt*)	sea-going vessel; warship	251/865	XII (iii): 1590
2	*bārija* (pl *bawārij*)	warship	251/865	XII (iii): 1582
3	*ḥadīdī*	warship; transport ship	251/865	XII (iii): 1626
4	*ḥarrāqa* (pl *ḥarrāqāt*)	fire launcher; all-purpose craft	198/813	XI (iii): 917; XII (iii): 1385; XIII (iv): 1927
5	*jarībiyya* (pl *jarībiyyāt*)	transport vessel	255/869; 256/870; 269/822–3	XII (iii): 1761, 1785, 1836; XIII (iv): 2074
6	*markab* (pl *marākib*)	(sea-going) vessel	238/ 852	XII (iii): 1417
7	*mi'bar* (pl *ma'ābir*)	ferry	258/872; 267/880–1; 269/882–3	XII (iii): 1871; XIII (iv): 1948, 1961, 1968, 2001, 2074
8	*mujawniḥa* (pl *mujawniḥāt*)	reed boat	255/869	XII (iii): 1760–1
9	*qals*			VIII (1): 724
10	*raqqiyya* (pl *raqqiyyāt*)	cargo ship	269/882	XIII (iv): 2074
11	*safīna* (pl *sufun*)	transport ship	251/865; 257/871; 267/880–1	XI (iii): 1168; XII (iii): 1550, 1582, 1590, 1844; XIII (iv): 1923, 1965, 1968, 2074
12	*ṣalgha* (pl *ṣilāgh*)	transport ship	262/876; 267/880–1	XII (iii): 1900–1; XIII (iv): 1922, 1955, 1979

Appendix A (*cont.*)

No	Name	Type	Period	Volume & page number
13	*shabbāra* (pl *shabbārāt*)	river boat	251/865	XII (iii) 1563, 1589–90, 1627
14	*shadhā* (pl *shadhāwāt*)	barge	257/870–1; 267/880–1	XII (iii): 1844, 1860; XIII (iv): 1923, 1925–6, 1948, 1960, 1966, 2074, 2282–3
15	*shalandī* / *shalandiyya* (pl *shalandiyyāt*)	warship	238/852–3	XII (iii): 1417–8
16	*sumayrī* (pl *sumayriyyāt*)	war galley	267/880–1	XII (iii): 1760–1, 1784–5; XIII (iv): 1926, 1948–9, 1960, 1968, 2074
17	*ṭawf* (pl *aṭwāf*)	waterskin	225/839	XI (iii): 1305
18	*zanbarī* (pl *zanbariyyāt*)	long vessel	67/686–7	VIII (2): 724
19	*zawraq* (pl *zawāriq*/ *zawārīq*)	skiff		XI (iii): 1168; XII (iii): 1463, 1563, 1626; XIII (iv): 2074
20	*zaww*		220/835	XI (iii): 682, 1168
21	*zulāl*	light (swift) river boat	227/841	XI (iii): 1323

Al-Muqaddasī (geographer)			
Aḥsan al-taqāsīm fī maʿrifat al-aqālīm (1906): 31–32			
No	Name	Type	Period (Century)
1	*barʿānī*	{?}	4th/10th (Mu)
2	*barka*	small boat	342/936 (Ist)
3	*bīraja* (pl *bawārij*)	war vessel; pirate vessel	251/865 (T)
4	*burākiyya* (pl *burākiyyāt*)	{?} passenger vessel	4th/10th (Mu)
5	*burma* (pl *burmāt*)	warship	4th/10th (Mu)
6	*dūnij* (pl *dawānij*)	skiff; canoe; lifeboat	375/985 (B)
7	*ḥamāma* (pl *ḥamāʾim*)	transport ship	264/877 (Maq)
8	*ʿirdās*	{?} small boat	4th/10th (Mu)
9	*jabaliyya* (pl *jabaliyyāt*)	{?} ferry	4th/10th (Mu)
10	*jāsūs* (pl *jawāsīs*)	{?} reconnaissance ship	4th/10th (Mu)
11	*kārwāniyya* (pl *kārwāniyyāt*)	{?} cargo vessel	4th/10th (Mu)

Appendix A (*cont.*)

No.	Name	Type	Period (Century)
12	*khaytiyya* (pl *khayāṭī/ khaytiyyāt*)	sewn ship	384/994–5 (Tan)
13	*makkiyya* (pl *makkiyyāt*)	{?} ferry	4th/10th (Mu)
14	*malqūṭa*	{?} ferry; cargo boat	4th/10th (Mu)
15	*markab* (pl *marākib*)	cargo ship	238/852 (T)
16	*miʿbar* (pl *maʿābir*)	ferry	258–69/872–83 (T)
17	*musabbaḥiyya* (pl *musabbaḥiyyāt*)	war galley	4th/10th (Mu)
18	*muthallatha*	{?} ferry/cargo vessel	4th/10th (Mu)
19	*qārib* (pl *qawārib*)	all-purpose boat	53/673 (Maq)
20	*raqqiyya* (pl *raqqiyyāt*)	ferry/cargo boat	269/882 (T)
21	*safīna* (pl *sufun/ safāʾin/ safīn*)	ocean-going ship	600–625 CE; 251/ 865; 257–267/ 870–880 (T)
22	*shabūq*	{?} small boat	4th/10th (Mu)
23	*shadhā* (pl *shādhdh/ shadhawāt/ shadhāwāt/ shadhāʾāt*)	war vessel	198/813; 257/870–1 (T); 303/915–6 (Ar)
24	*shalandī* (pl *shalanda/ shalandiyāt*)	war galley; transport ship	238/852–3 (T); 244/858–9 (IA)
25	*shamūṭ*	{?} small boat	4th/10th (Mu)
26	*shankūliyya*	{?} ferry	4th/10th (Mu)
27	*shīnī* (pl *shawānī*)	war galley	4th/10th–5th/11th (Mu, IH, Id, IA)
28	*sūqiyya* (pl *sūqiyyāt*)	cargo vessel	4th/10th (Mu)
29	*talawwā*	lifeboat; coastal boat	4th/10th (Mu)
30	*ṭayra* (pl *ṭayrāt*)	{?} swift boat	4th/10th (Mu)
31	*ṭayyār* (pl *ṭayyārāt*)	warship; swift vessel	207–30/822–914 (Yaq); 315/ 911–2, 329/941, 333/945 (Ar)
32	*walajiyya* (pl *walajiyyāt*)	reed/palm fibre canoe	4th/10th (Mu)
33	*wāsṭiyya* (pl *wāsṭiyyāt*)	ferry/cargo boat	4th/10th (Mu)
34	*zabarbādhiyya*		4th/10th (Mu)
35	*zabzab*	warship	333/941–5 (Mas [Mur])
36	*zawraq* (pl *zawāriq*)	all-purpose boat	269/883 (T)

Ibn Sīda (lexicographer)			
Kitāb al-mukhaṣṣaṣ, volume X (1896–1903): 23–29			
No	Name	Type	Period (Century)
1	*ʿadawliyya/ ʿadawlī*	transport-cargo vessel	6th BAH to 2nd/8th
2	*ʿāma* (pl *ʿāmāt/ ʿūm/ ʿām*)	a small raft	2nd/8th
3	*bārija* (pl *bawārij*)	warship	2nd/8th to 4th/10th
4	*būṣī*	small transport-cargo vessel	6th BAH to 2nd/8th; 5th/11th
5	*fulk/ fulkī* (pl *fulūk/fuluk*)	sea-going cargo vessel	6th BAH to 2nd/8th; 6th/12th; 8th/14th
6	*hurhūr*		3rd/9th
7	*ʿimāma* (pl *ʿamāʾim/ ʿimām*)	wooden raft	2nd/8th
8	*jāriya* (pl *jāriyāt/ jawārā/ jawār*)	large sea-going vessel	6th BAH; 7th/13th
9	*khalīj* (pl *khulij/ khuljān*)	cargo vessel	
10	*khaliyya* (pl *khalāyā*)		6th BAH to 2nd/8th
11	*miʿbar(a)* (pl *maʿābir*)	ferry boat, pontoon	6th BAH; 3rd/9th to 5th/11th
12	*miṣbāb*		4th/10th
13	*qādis* (pl *qawādis*)	large war vessel	6th BAH to 2nd/8th
14	*qārib* (pl *qawārib*)	all-purpose boat	1st/7th; 3rd/9th; 6th/12th to 8th/14th
15	*qirba* (pl *qirab*)	water skin	2nd/8th
16	*qurqūr* (pl *qarāqir/ qarāqīr*)	large war vessel	6th BAH; 8th/14th
17	*ramath* (pl *armāth/ rimāth*)	wooden raft	6th BAH to 2nd/8th
18	*rikwa/rakwa/rukwa* (pl *rakawāt/rakāyā/rikāʾ/ rukī*)	small rowing boat	7th/13th
19	*safīna* (pl *sufun/safāʾin/ safīn*)	small (or large) vessel	6th BAH to 6th/12th
20	*ṣalgha* (pl *ṣilāgh*)	transport and cargo vessel	3rd/9th
21	*talawwā*		4th/10th
22	*ṭawf* (pl *aṭwāf*)	river raft	4th/10th to 6th/12th
23	*zanbariyya*	all-purpose boat	4th/10th; 7th/13th
24	*zawraq* (pl *zawāriq/ zawārīq*)	transport and cargo vessel	2nd/8th to 7th/13th

Ibn Baṭṭūṭa (traveller)				
Tuhfat al-nuzzār fī gharā'ib al-amṣār wa-'ajā'ib al-asfār *Voyages d'Ibn Battûta*, volumes I–IV (1968)				
No	Name	Type	Period (approximate years)	Volume & page number
1	*ahawra*	river boat	734/1334	III: 109–10
2	*ghurāb* (pl *aghriba/ghirbān*)	war galley	743/1342	IV: 59
3	*ḥarbī* (pl *ḥarbiyyāt/ḥarābī*)	warship	745/1344	IV: 206
4	*ḥarrāqa* (pl *ḥarrāqāt/ḥarārīq*)	launch	727/1327	II: 116–7
5	*jafn* (pl *ajfān/jifān*)	war galley	729/1329; 732/1331–2; 743/1342; 745/1344; 750/1349	II: 234–5, 311–2, 351, 355, 433; IV: 105, 165–7, 234–5, 271, 351, 365
6	*jalba* (pl *jalbāt/jilāb*)	coastal and sea-going vessel	729/1329	II: 158–9
7	*junk* (pl *junūk*)	large Chinese cargo vessel	743/1342	IV: 91, 94, 103, 264, 269
8	*kakam*	small Chinese cargo vessel	743/1342	IV: 91, 95–6, 98, 103–4, 109
9	*kundura* (pl *kanādir*)	small boat	744/1343	IV: 119, 135, 208
10	*ma'diyya* (pl *ma'ād*)	ferry; bamboo-cane raft	732/1331–2; 734/1334; 745/1344	II: 326; III: 359; IV: 170, 186–7
11	*markab* (pl *marākib*)	cargo ship; coastal and sea-going vessel	727/1327; 732/1331–2; 734/1334; 743–5/1342–4; 750/1349	II: 160, 181, 354; III: 109–10; IV: 107, 119, 121, 185, 187, 328
12	*qārib* (pl *qawārib*)	all-purpose boat	729/1329; 745/1344	II: 17, 24, 181, 226, 231, 244–5
13	*qurqūra* (pl *qarāqīr/qarāqir*)	galley; cargo vessel	732/1331–2; 750/1349	II: 254, 433; IV: 327
14	*safarī*	sea-going vessel	732/1331–2	II: 358
15	*sallūra* (pl *salālīr*)	launch	727/1327	II: 116
16	*shabbāra* (pl *shabbārāt*)	launch	727/1327	II: 116
17	*shaṭṭī* (pl *shaṭṭiyyāt*)	coastal vessel	750/1349	IV: 353
18	*shillīr*	lifeboat	743/1342	IV: 107

Appendix A (*cont.*)

No	Name	Type	Period (approximate years)	Volume & page number
19	*ṣunbūq* (pl *ṣanābiq*)	cargo vessel; coastal and sea-going vessel	729/1329; 732/1331; 748/1347–8	II: 17, 181, 183, 198, 251, 280
20	*ṭarīda* (pl *ṭarāyid/ ṭarāʾid/ ṭarādāt*)	warship	734/1334; 743/1342	III: 109–10; IV: 107
21	*ʿukayrī*	galley	743/1342	IV: 59, 107
22	*ʿushārī* (pl *ʿushāriyyūn/ ʿushāriyyāt*)	lifeboat; skiff	732/1331–2; 743/1342; 745/1344	II: 60, 251; IV: 274
23	*zaw*	medium-sized Chinese vessel	743/1342	IV: 91

Al-Maqrīzī (historian) *Al-Mawāʿiẓ wa-l-iʿtibār fī dhikr al-khiṭaṭ wa-l-āthār*, volumes I–IV (1911–1924) *Kitāb al-sulūk li-maʿrifat duwal al-mulūk*, volumes I–IV (1957–1973)		
	Type of vessel	Source *Khiṭaṭ* (Kh) *Sulūk* (S)
1	*ʿalābiyya*	Kh
2	*baghla*	Kh
3	*batsa/butsa*	Kh
4	*bayūnī*	S
5	*dakāsa/ dukāsa*	Kh
6	*falūwa*	Kh & S
7	*ghurāb—aghriba al-ghazāt; aghriba ḥarbiyya*	S
8	*ḥamāma*	Kh
9	*ḥammāla*	Kh
10	*ḥarrāqa*	Kh & S
11	*jalāsa*	Kh
12	*jalba/jalaba*	Kh & S
13	*jarm*	Kh
14	*khashba*	Kh
15	*maramma*	Kh
16	*markab—marākib al-baḥriyya/ḥarbiyya/al-safariyya/ al- tujjār/al-shawānī*	Kh & S

Appendix A (*cont.*)

	Type of vessel	Source *Khiṭaṭ* (Kh) *Sulūk* (S)
17	*musaṭṭaḥ*	Kh
18	*qārib*	Kh & S
19	*qiṭʿa*	Kh & S
20	*qurqūra*	S
21	*shakhtūr*	S
22	*shalandī*	Kh
23	*salltūra*	S
24	*sanbūk*	Kh
25	*shīnī—shawānī baḥriyya/ḥarbiyya*	Kh & S
26	*ṭarīda*	S
27	*ṭarrāda*	S
28	*ʿushārī/ ʿushāriyya*	Kh

APPENDIX B

Frequency List of Boat and Ship-types: General Overview from a Selection of Early and Medieval Arabic Sources

Authors & Sources → Frequency → Boat & Ship-types ↓	AQ	B	G	IB	IJ	IM	IMa	IMu	IS	J	Ma	Maq	Mu	N	PrIs	Q	T
ʿadawliyya/ʿadawlī									x						x		
ahawra				x													
ʿalābiyya												x					
ʿāma									x								
ʿammāliyya	x																
ʿaykar						x											
aʿzārī							x										
baghla												x					
bahriyya																	x
bālūʿ	x																
barʿānī													x				
bārija/bīraja		x							x				x				x
barka													x				
batsa/butsa												x					
bayūnī												x					
burākiyya													x				
burma	x		x					x					x				
būṣī									x						x		
dakāsa/dukāsa												x					
darmūna														x			
dugayyaṣ										x							
dūnij/dūnīj		x						x					x				
falū/falūwa		x										x					
fulk/fulkā									x							x	

Appendix B (*cont.*)

Authors & Sources → Frequency → Boat & Ship-types ↓	AQ	B	G	IB	IJ	IM	IMa	IMu	IS	J	Ma	Maq	Mu	N	PrIs	Q	T
ghassāniyya															x		
ghurāb			x	x			x					x		x			
ḥadīdī																	x
ḥajm			x														
ḥamāma			x								x	x	x				
ḥammāla							x					x					
ḥarbī			x	x													
ḥarrāq(a)/ kharrāq	x			x	x		x			x		x		x			x
hurhūr									x								
ʿimāma									x								
ʿirdās													x				
jabaliyya													x				
j.d.y	x																
jaʿfariyya	x																
jafn				x	x									x			
jahāz						x											
jalāsa												x					
jalba/jalaba/ jalāb		x		x	x	x						x		x			
jarībiyya																	x
jāriya									x							x	
jarm			x									x					
jāshujiyya			x														
jāsūs	x												x				
junk				x													
kakam				x													
kārwāniyya													x				
khalīj									x								
khaliyya									x						x		
khashba/ khashab						x						x					
khayṭiyya/ khīṭiyya	x		x										x				

Appendix B (*cont.*)

Authors & Sources → Frequency → Boat & Ship-types ↓	AQ	B	G	IB	IJ	IM	IMa	IMu	IS	J	Ma	Maq	Mu	N	PrIs	Q	T
khinzīra			x														
khīṭī/khayṭī			x														
k.m.n.d.riyya	x																
kumba			x														
kunbār/qunbār		x	x														
kundura				x													
maʿdiya/ maʿdiyya			x	x													
māl.s.t/mālshat	x													x			
makkiyya													x				
malqūṭa													x				
maramma												x					
markab	x	x	x	x	x	x	x	x			x	x	x				x
markūsh							x										
miʿbar(a)									x				x				x
miṣbāb									x								
mismāriyya						x											
miṭyāl		x															
mujawniḥa																	x
musabbaḥiyya													x				
musaṭṭaḥ							x					x					
muthallatha													x				
nūbiyya/nūba								x									
nuhbūgh								x									
qādis									x						x		
qals																	x
qārib/ qirāb/ qirāba	x	x	x	x				x	x	x	x	x	x	x			
qarrāba			x														
qarwāʾ															x		
qirba		x							x								
qiṭʿa			x			x						x					
qirillī										x							

Appendix B (*cont.*)

Authors & Sources → Frequency → Boat & Ship-types ↓	AQ	B	G	IB	IJ	IM	IMa	IMu	IS	J	Ma	Maq	Mu	N	PrIs	Q	T
qurqūr(a)/ qarqūra			x	x					x			x		x			
ramath									x						x		
raqqiyya													x				x
rikwa/rakwa/ rukwa									x					x			
rubā'iyya														x			
sadā	x																
safarī				x													
safīna		x							x				x	x	x	x	x
ṣalgha									x								x
salūra/sallūra				x								x		x			
s.nbūq/sanbūk/ ṣunbūq		x		x				x				x		x			
ṣandal											x						
shabbāra				x										x			x
shabūq													x				
shadhā	x												x				x
shaffāra			x														
shāka/shākka			x														
shakhtūr(a)			x									x		x			
shalandī/ shalandiyya							x					x	x				x
sh.l.mlī	x																
shamūṭ													x				
shankūliyya													x				
shaṭṭī				x													
shillīr				x													
shīnī/shānī			x				x			x		x	x	x			
shītī														x			
sumayrī/ sumayriyya	x		x														x
sūqiyya													x				
ṣūr						x											

Appendix B (*cont.*)

Authors & Sources → Frequency → Boat & Ship-types ↓	AQ	B	G	IB	IJ	IM	IMa	IMu	IS	J	Ma	Maq	Mu	N	PrIs	Q	T
ṭabṭāb	x																
talawwā									x				x				
ṭarrād/ṭarrāda						x						x					
ṭarīda				x	x		x					x		x			
ṭawf									x								x
ṭayra													x				
ṭayyār/ṭayyāra	x												x				
ʿukayrī				x													
ʿulaybiyya											x						
ʿushārī/ ʿushshārī/ ʿushrāwī/ ʿushāriyya			x	x	x						x	x		x			
usṭūl			x											x			
walajiyya													x				
w.r.ḥiyya	x																
wāsṭiyya													x				
zabarbādhiyya													x				
zabzab/ zabzabiyya	x												x	x			
zanbarī/ zanbariyya									x								x
zaw/zaww				x													x
zawraq					x				x	x			x	x			x
zulāl	x																x
zūm														x			

GLOSSARY AND INDEX OF

GENERAL AND MARITIME TERMS

ʿabara	379	to cross (see *miʿbar*)
adab	24, 30	a style conforming to eloquent taste; a genre of good literary taste
adab al-riḥla	27	a literary genre of travel accounts
ʿadawlī or *ʿadawliyya* (pl *ʿadawliyyāt*)	292, 293, 294	Eritrean cargo vessel; a kind of long tree
aflāk (s *fulk*)	287	celestial spheres
ahawra	255, 340, 342, 370, 377	decked broad war vessel with a domed cabin, some features identical to the *ṭarīda* [s.v.]
aḥraqa	344	to destroy by fire
ʿajāʾib (s *ʿajība*)	29	tales belonging to a literary genre of marvels
ʿajamī	378	foreign
ajfān ghazawiyya (also *ajfān ḥarbiyya*)	255, 339, 340	war *galley*s [s.v.] (see *jafn*)
ajfān safariyya	339	deep-sea cargo vessel (see *jafn*)
ʿalam (pl *aʿlām*)	288	waymark; cairn
alāt al-safīna	175	the ship instruments
ʿāma (pl *ʿām* or *ʿāmāt* or *ʿūm*)	119, 374	Mesopotamian river raft; smaller version of the *ʿimāma* [s.v.] (see *kelek*, *ramath* and *ṭawf*)
(al-)ʿāmma	300, 332, 375, 378	the common people
ʿammāla (pl *ʿammālāt*)	273	a cargo vessel (see *ḥammāla*)
anguli	199	Gujarati and Kutch term for graduation in finger breadths (see *chih* and *chio*, *iṣbaʿ* and *viral*)
anjar (pl *anājir*)	146, 371	anchor
ʿaqrab	197, 279	Scorpius (southern constellation)
ʿarabī	378	Arabic
arkān (s *rukn*)	17	pillars or corners

arsā	174	to anchor (see *marsā*)
al-aryāḥ wa-l-mawāsim	175	winds and seasons
ʿashūr al-shawānī	254	*galley*-tax
ʿayyūq	197, 199	Capella (star)
bāʿ (pl *abwāʿ*)	144, 186, 195	open-arm's length (a unit of measure)
badan (pl *badana* or *bdāna*)	32, 148, 164, 165, 206, 208	an Omani coastal trading and fishing vessel, double-ended and double-keeled, characterized by her long slim hull with a sharp needle-nose and high unswept sternpost, one mast
baghla (pl *bghāla*)	159, 206, 225, 241, 242, 314, 315	a deep-sea Kuwaiti vessel characterized by her low bow and high unswept quarter deck, square *galleon*-type stern with rear windows and quarter galleries, rigged with two or three masts (see *ghanja* and *kūtiyya*)
baḥara (coll.)	183	sailors (see *baḥrī*)
baḥḥār		see *baḥrī*
baḥr	162, 340	sea; river
al-baḥr al-ʿadhb	172	river
al-baḥr al-milḥ	172	sea
baḥrī or *baḥḥār* (pl *baḥḥāra* or *baḥḥārūn* or *baḥriyyūn*)	172, 183	sailor (see *bānānī, ghādūf, khalāṣī, mallāḥ nūtī* and *ṣārī*)
baḥriyya (coll.)	183, 195, 245, 246, 334	sailors (see *baḥrī*); navy
bājī	371	vakawood
balam (pl *ablām*)	123, 370	a dugout canoe (see *hūrī*)
balanj	370	ship's cabin
(al-)balistī	200	an Arabic term for the Portuguese *balistinha* [s.v.]
balistinha do Moro	200	the Portuguese version of the *kamāl* [s.v.] (see *al-balistī* and *tavoleta*)
banādir al-ghalq (also *[al-]ghalq*)	188	port(s) closed for shipping (see *futūḥ mawāsim*)
bānānī (pl *bānāniyya*)	178, 183, 184, 362	sailor (see *baḥrī, ghādūf, khalāṣī, mallāḥ nūtī* and *ṣārī*)

bandar (pl *banādir*)	174, 371	port town; port
bāniyān	88	a term collectively referring to Indian merchants
baqqāra (pl *baqāqīr*)	164, 206	Emirati and Omani double-ended fishing and pearling vessel with some hybrid features of the *badan* [s.v.] but with a sharp pointed bow
bār	174, 329, 370, 371	coast
baraka	238	blessing; good fortune
barastī	257	a hut built of timber or palm fronds
barbahār	77	rare and precious Indian goods
barča	330, 331	an Ottoman three-masted *galliot* [s.v.] (see *barsha*)
barga or *barca*	330	Latin term for bark; small sea-going ship
bārija (pl *bawārij*)	328, 329, 375	Mesopotamian river war-barge; an Indian Ocean deep-sea vessel; pirate ship
barmēl	370	outer stem
bārsha	330	Arabic term for *galliot* [s.v.] (see *barča* and *barsha*)
barsha (pl *barshāt*)	256, 330	a sixteenth-century *galliot* [s.v.] (see *barča*)
bārūja	329	Persian term for flower pot
bāshī (pl *bāshiyyāt*)	175	methods of taking latitude measurements of the Pole star altitude
battīl (pl *batātīl*)	164, 165, 242	Emirati and Qatari double-ended coastal trading, pearling and pirate vessel, with a fiddle-headed bow, a high sternpost and double forward leaning masts; also Musandam (Oman) double-ended fishing vessel characterized by her low pointed prow, high stern post and projections
battīl baḥwī	208	a medium size Musandam (Oman) *battīl* [s.v.]
battīl kārib/qārib	243	a large size Musandam *battīl* [s.v.]
bayraq (pl *bayāriq*)	238	amulet
bayt al-ibra		see *dā'ira*
belem	123, 370	Persian term for *balam* [s.v.]

bēṛā (also *pīrā*)	329, 370	Hindi term for a large boat
bhandara	174, 371	Sanskrit term for storeage; treasury
bhandārī	185	sailor responsible for the ship and crew provisions
bīraja		see *bārija*
bīs	370	keel
bitzith or *biṣith*		see *butzith*
būm (pl *abwām*)	32, 158, 159, 160, 185, 206, 227	Kuwaiti cargo vessel, double-ended, distinguished by her straight, sharp-pointed stemhead, ordinarily painted black and white, with a curved stern
burākiyya (pl *burākiyyāt*)	374	a ship-type
burma (pl *burmāt*)	153, 252, 339, 342	a (round-hull) warship (see *jafn*); also jar
būrmā or *burmtha*	343	Syriac term for stone jar
burmāḫu	343	Akkadian term for container
burmaḫḫu	343	Sumerian term for a large receptacle
būs or *būṣ*	280, 283	Andalusi Arabic term for a ship-type (see *bussa* and *būṣī*)
būṣī (pl *bawāṣī*)	282, 283	large ship; ferry river boat (see *bussa*)
bussa or *buza*	283	Latin term for a large ship (see *būṣī*)
butzith or *būṣith*	283	Babylonian term for a boat-type (see (*būṣī*)
caffre	8, 12	Portuguese term for a Black person (see *kāfir*)
çambuka	314	Sanskrit term for a type of vessel (see σαμβύκε, *sambuka* and *ṣunbūq*)
cana	207	a Portuguese term for tiller (see *kāna*)
çâphan	270	Late Babylonian term for ship (see *safīna*)
caraba or *caravo*	272	a ship-type (see κάραβος)
carabus		see κάραβος
caravel	156, 212–213, 219–221, 255, 314, 319, 351, 368	sixteenth-century Portuguese and Spanish trading vessel, originally lateen-rigged, two masts; developed later into three masts, two forward masts square-rigged and the mizzen lateen rigged (see *carraca*)
caravel latina	318	lateen-rigged Portugese vessel
carraca (also *carrack*)	225,	fourteenth to seventeenth-century large

	346–8	trading vessel with square and lateen rigging, similar features to the three-masted development of the *caravel* [s.v.] but larger and sturdier with a high fore and aft castle
cartaz	107	Portuguese trading license
cercurus	334	Latin term for a light vessel (see *κερκουρος*)
chalabiyya (pl *chalabiyyāt*)	125	Southern Iraqi Marshes reed boat tied together at the ends
chelendra	337	Late Latin term for the Greek χελάνδρα
chih and *chio*	198	Chinese term for graduation in finger breadths (see *anguli*, *iṣbaʿ* and *viral*)
chunam	151	burnt lime (see *nūra*)
cotia		see *kotia*
dabbāba (pl *dabbābāt*)	345	an armoured (wooden) tank
dabūr	187	west
ḍaffa		see *ḍiffa*
dāʾira (also *bayt al-ibra* or *ḥuqqa* or *quṭb numā*)	196	magnetic compass
dāmān	362, 371	leeward
dāmānī or *dīmānī*	371	the second navigation season
daqal or *daql* or *dawqal*		see *diql*
ḍarb min al-safīna	374	ship-type
dārī (also *khārwah*)	184, 370	sailor in charge of sails
daryābār	174	sea port
dau la mtepe	168, 209, 210	a sewn-hulled East African boat
dāw	370	trading vessel
dawqal		see *diql*
ḍayʿa (pl *ḍiyāʿ*)	250	estate
daymās	303	an Egyptian river *gondola*-type [s.v.] boat (see *dukāsa* and *ʿushārī*)
ḍēṅgā or *ḍoṅgā*	308, 370	Hindi term for small boat
dhangī	159	Indo-Pakistani trading vessel
dhirāʿ (pl *adhruʿ*)	144, 252	the forearm (a unit of measure)
dhow	3, 123,	a collective term used by English

	139, 140, 151, 158, 165, 185, 207, 208, 212, 224, 243, 315	speakers to represent any Perso-Arabian or Indian or East African traditional (sailing) vessel
dhubbān	198, 362	a unit of measure consisting of four *iṣba'*s [s.v.]
dīdabān	184, 362	lookout man (see *fanjarī*)
ḍiffa or *ḍaffa* (pl *ḍifāf*)	174	riverbank (see *shaṭṭ*)
dīmānī		see *dāmānī*
dīnār (pl *danānīr*)	229, 337	monetary unit
dinghy	308	an English term for a rubber life raft
diql or *daql* or *daqal* or *dawqal* (pl *adqāl*)	209	mast
dīra (pl *diyar* or *diyarāt*)	175	route
dirham (pl *darāhim*)	69, 90, 229	monetary unit
disār (pl & coll. *dusur*)	161, 162	palm-fibre cord; also wooden pin(s) or iron nail(s)
dīwān (pl *dawāwīn*)	195, 269	a collection of poems
ḍoṅgā		see *ḍēṅgā*
dromon	334–337	a seventh-century Byzantine *galley* [s.v.] with a wood-castle and ram above the waterline (see *shalandī* and *shīnī*)
dukāsa	303	an Egyptian river *gondola*-type boat [s.v.] (see *daymās* and *'ushārī*)
dūmeh	308	a Bahraini term for small boat
dūmī shirā'	308	sail-powered vessel of Masirah Island, Oman
dūnī	308, 370	Persian term for a long swift vessel
dūnij (pl *dawānīj*)	252, 308, 342, 343, 370, 375	Western Indian Ocean coastal vessel; lifeboat; pearling vessel
Ἐφόλκιον	286	a cargo ship of the Red Sea (see *fulk*)
falaj (pl *aflāj*)	85	water canal
falū	306, 370	an Indian ship's boat
fanaṣ	371	jackwood

fanjarī	184, 370	lookout man (see *dīdabān*)
fann	371	punnai
farqadayn	196	βγ Ursae Minoris (constellation)
farsakh	186	a term for distance covered on foot in one hour or "marching mile"
farūsh	46	beach rock
fashīn	141, 207	the stern fin or the false sternpost
faṣīḥ	22, 378	pure and eloquent language as opposed to *laḥn* [s.v.]
fatwa (pl *fatāwā* or *fatāwi*)	208	formal legal opinion
fī ṭalab al-ʿilm	16	in search of knowledge
filka (pl *filak* or *filkāt*)	287	an Iraqi river ferry and pleasure boat (see *fulk* and *fulūka*)
firman (pl *farāmin*)	362	the main yard (see *qariyya*)
fulk (pl *fulūk*)	153, 285–289	the Qurʾānic term for Noah's Ark (see *jāriya*); large (round-hull) vessel (see *filka* and *fulūka*)
fulūka	287	an Egyptian river boat and a Red Sea coastal vessel (see *filka* and *fulk*)
furḍa (pl *furaḍ*)	174	small port town
furma (pl *furmāt*)	371	template
fuṣḥā	29	canons of an eloquent language
futūḥ mawāsim	188	opening of the season for sailing (see *banādir al-ghalq*)
galea		see *galley*
galleon	154, 256, 315	a development of the *carrack* [s.v.]; originally a warship then a trading vessel
galley	81, 153, 253, 281, 325–327, 329, 330–337, 338, 340, 343, 344, 348, 350, 352–354, 356, 375, 376, 378, 380	fighting ship equipped with the ram, one or two masts

galliot	256, 269, 330	small *galley* [s.v.] with oars and a single mast; long covered warship
gargūr (pl *garāgīr*)	291	a type of large round basket made of palm wicker work (see *quffa*)
ghādif		see *ghādūf*
ghādūf or *ghādif*	184	sailor (lit. rower) (see *baḥrī, bānānī, khalāṣī, mallāḥ, nūtī* and *ṣārī*)
ghāf	148	*Prosopis cineraria*
(al-)ghalq		see *banādir al-ghalq*
ghalyūn (pl *ghalāyīn* or *ghalāwīn*)	256	*galleon* (a development of the *carrack* [s.v.])
ghanja (pl *ghanjāt*)	159, 225, 314, 315	an Omani deep-sea vessel distinguished by her curved stempost and a parrot's beak on the stemhead, square-shaped stern with a high poop (see *baghla* and *kūtiyya*)
ghassāniyya (pl *ghassāniyyāt*)	283, 284, 379	ocean-going vessel
ghazwāniyya (pl *ghazwāniyyāt*)	273	warship
ghubba (pl *ghubbān*)	174	shallow area
ghurāb (pl *ghirbān or aghriba*)	151, 203, 256, 279, 330, 333, 340, 348–351, 356, 357, 375	a Mediterranean decked or undecked war vessel of different sizes operated by oars and sails (see *shillīr* and *ʿukayrī*); sixteenth to eighteenth-century Western Indian Ocean war vessel, the *galliot* type [s.v.] with oars and one mast; also crow; raven
gondola	301, 303, 375	light pleasure boat with a curved stem and sternpost propelled by a single oar
gunmaṭī	184	sailor in charge of plugging leaks and fixing other damage
ḥadara	373	to lower a boat
ḥadīdī or *ḥadīdiyya* (pl *ḥadīdiyyāt*)	250, 322	war vessel with wooden hull protected by iron plates
ḥadīth (pl. *aḥādīth*)	21, 64, 121, 162, 376	Prophetic tradition (sayings and deeds of the Prophet and his Companions)
ḥajj	4, 14, 65, 69,	pilgrimage to Mecca, one of the five pillars of Islam

	216, 219, 267, 317, 320	
ḥājj (pl *ḥujjāj* or *ḥajīj*)	106	pilgrim
ḥamala	378	to carry (upon one's back) (see *ḥammāla*)
ḥamāma (pl *ḥamāmāt* or *ḥamā'im*)	279, 350	transport ship; dove
ḥammāla (pl *ḥammālāt*)	273, 378	cargo vessel (see *'ammāla*)
ḥammām (pl *ḥammāmāt*)	91	bath
handāza	371	quadrant
ḥarb	273, 379	war; battle; conflict (see *ḥarbī*)
ḥarbī (pl *ḥarbiyyāt*) (also *nāshī*)	273, 356, 379	generic term for warship
ḥarrāq	300	burning; aflame (see *ḥarrāqa*)
ḥarrāqa (pl *ḥarrāqāt* or *ḥarārīq*)	235, 299–301, 343–348, 357, 375	a Mesopotamian and Egyptian war vessel; fire launcher; royal (domed-cabin) river boat similar to *shabbāra* [s.v.] and *sallūra* [s.v.]; pleasure and ferry river boat; light carrier; Red Sea small cargo ship
ḥibāl (coll.) (also *'udda*)	206, 210	rigging
ḥimārayn	197	αβ Centauri (southern constellation)
ḥizb al-baḥr	239	litany of the sea
howdah	279	litter
ḥulūl al-shams wa-l-qamar	175	revolutions of the sun and moon
ḥumar	151	pitch
ḥuqqa		see *dā'ira*
hūrī (pl *hawārī*)	123, 370	an Indian Ocean dugout vessel, punted or sailed (see *balam*)
hūrī ḥafar	123	open-hulled *hūrī*
hūrī manshūr	123	built *hūrī*
ibra	196	magnetized needle (see *bayt al-ibra*)
ifranjī (pl *ifranj*)	12	a term used by the Muslim chroniclers of the Crusades in reference to the

		Franks, i.e. Europeans; foreigner (outside Islam)
ijāra	208	leasing
iklīl	197	βδπ Scorpioni (star)
ʿilb	148	*Zizyphus spina-christi* (see *sidir*)
ʿimāma (pl *ʿamāʾim*)	119	a Mesopotamian river raft constructed of logs; also an ocean raft (see *ʿāma*, *kelek*, *ramath* and *ṭawf*)
iṣbaʿ (pl *aṣābiʿ*)	198, 199, 200, 201, 362	unit of measure to calculate the latitude of a ship (see *anguli*, *chih* and *chio*, and *viral*)
ishāra (pl *ishārāt*)	175, 195	knowledge of one's position in relation to localised winds, tides, currents, coasts and their landfalls, islands, mud and sea weed, fish and birds
ishtiyām (pl *ashātima*)	328	captain of a warship
iskila (pl *asākil*)	174	seaport; commercial centre
isnād	16, 376	an authority through a chain of reliable scholars
jabal (pl *jibāl*)	279, 288	mountain
jadhdhāf (pl *jadhdhāfūn*)	328	oarsman
jaʿfariyya (pl *jaʿfariyyāt*)	149, 379	a Mesopotamian river boat
jaffana	378	to make bowls (see *jafn*)
jafn (pl *ajfān* or *jifān* or *jufūn*)	338–340, 348, 376, 378	a Mediterranean war (round) *galley*-type [s.v.]; merchant vessel (see *burma*)
jafna	339	large bowl
jāh	197, 371	Polaris (North star)
jahāz	316	equipment or fittings; rigging
jahāz or *jahāzī*	163, 315, 316	a stitched-planked vessel; cargo ship sharing characteristics with the Yemenite and Hadrami curve-stemed-*sanbūq* [s.v.]; East African cargo vessel
jalaba	378	to transport animals, captives or slaves from one place to another (see *jalba*)
jalba (pl *jilāb* or *jalbāt*)	184, 220, 226, 231,	a Red Sea light passenger and cargo vessel; pilgrim ferry boat; light and

	239, 268, 316–320, 375, 378, 381	swift scouting boat used by the Portuguese
jamaḥa	373	to be out of control (a ship)
janāḥ (pl *ajniḥa*)	203, 204	wing; oar; floating board
jangalī	371	Indian laurel
janūb	187	south
jarībiyya (pl *jarībiyyāt*)	328	a Mesopotamian transport river vessel
jarīd (coll.)	126	palm stems stripped of their leaves
jāriya (pl *jāriyāt* or *jawārā* or *jawār*)	285, 288, 289	a Qur'ānic term for Noah's Ark; medieval deep-sea vessel (see *fulk*)
jarkh	371	steering wheel
jase	163	a Persian term for a vessel-type (see *jahāz*)
jāshū	343, 370	Persian term for sailor
jāshujiyya (pl *jāshujiyyāt*)	252, 342, 343, 370	Western Indian Ocean transport ship
jawzā'	197	Orion's belt (constellation)
jidd or *jidda*	174	see *judd*
jinn (coll.)	24, 240	genie(s); invisible creature inhabiting the earth which may both harm or help people
judd or *judda* or *jidd* or *jidda*	174	seashore
jummal (also *qals*)	373	rope
junk (pl *junūk*)	67, 101, 106–107, 219–226, 261	a Chinese and Javanese vessel, flat-bottomed, high stern with square bows, two or three masts (see *kakam* and *zaw*)
kabirt	371	template
κάδος	282	a type of vessel
kāfir (pl *kuffār*)	12	non-believer; a coin-term used in the Western Indian Ocean by Arabians for Pagans, the non-Muslim Black; a derogatory term addressed to a European (see *caffre*)
kakam	67, 221	a small-sized *junk* [s.v.] (see *zaw*)
kālak	120	Persian term for reed-raft (see *kelek*)

kalakku or *kalakee*	120	an Akkadian term for raft
καλαφατ		see *kalfāt*
kalfāṭ or *qalfaṭ*	371	caulking
kallāʾ	174	harbour
kamāl	198, 199, 200, 371	the single rectangular plaque to which a cord with a number of knots are attached in order to obtain latitude, north and south distances; developed from the *lōḥ* [s.v.]
kambārī	149, 165, 268	a Dhofari sewn-planked vessel (Southern Arabian coast) (see *qinbār*)
**kār*		the place where food is stored in lower-decked boats
karab	125	bulbous end of palm stalks to offer buoyancy for the Kuwaiti and Bahraini *wāriyya* [s.v.]; the Iraqi type has no *karab* (see *shāsha*)
κάραβος (also *carabus*)	272, 351	a light ship
karrānī or *kirānī*	183, 362	ship's secretary; scribe
kattumaram	122	a South-Indian log-raft
kawra	371	knee
kawtal		see *sukkān*
kelek (pl *aklāk* or *kelekāt*)	119–120, 139, 375, 381	a Mesopotamian river raft made from bundles of bulrushes with the forward turned up; larger type made of reeds with goatskins to support the reeds (see *ʿāma*, *ʿimāma*, *ṭawf* and *ramath*)
κερκουρος (also *cercurus*)	334	light vessel used for Nile transport
khabbāz (pl *khabbāzūn*)	185, 328	cook
khalāṣī	183, 370	sailor(s) (see *baḥrī, bānānī; ghādūf, mallāḥ, nūtī* and *ṣārī*)
khalīj (pl *khuljān* or *khuluj*)	174, 294, 374	canal; a ship-type
khaliyya (pl *khalāyā*)	280, 281, 284	sailing ship
khann (pl *akhnān*)	175, 196, 371	rhumbs of the compass

khārwah	184	sailor in charge of the sails (see *dārī*)
khashab (pl *khashabāt* or *akhshāb*)	234, 266, 274	piece of wood, plank, board
khashaba (pl *khashabāt*)	197, 217, 267	wooden post; see *lōḥ*
khawr (pl *khuʾūr*)	174	inlet; small bay (see *sharm*)
khaysafūj	373	the rope for sails
khayṭ	268, 379	thread (see *khayṭiyya*)
khayṭiyya (pl *khāyāṭī* or *khayṭiyyāt*)	268, 379	a sewn-planked ship (see *mismāriyya*)
khubz	185	unleavened bread
kirānī		see *karrānī*
kotia (also *cotia*)	314, 353	an Indian type of cargo vessel (see *kūtiyya*)
kundura (pl *kanādir*)	306, 370	a West Indian ship's boat
kūtiyya (pl *kawātī* or *kūtiyyāt*)	159, 354	a Kuwaiti and Bahraini ocean-going vessel with similar features to the *baghla* [s.v.] and *ghanja* [s.v.] (see *kotia*)
laḥn	378	incorrect (faulty) Arabic as opposed to *faṣīḥ* [s.v.]
lawḥ (pl *alwāḥ*)	266–267, 274	any broad or wide and thin plank (see *saqīfa*)
līf (coll. and pl *alyāf*)	161	fibre(s)
lingūtī	371	rivet
lōḥ	197	the nautical instrument to measure stellar altitudes; also called *khashaba* [s.v.] (see *kamāl*)
lubān	92	frankincense
lujj or *lujja* (pl *lujaj* or *lijaj*)	174	sea depth
mabbara	122	a type of Babylonian vessel
machwa	252	a fishing and/or cargo craft found on the Northwest Indian coast
madarata (*μαδαράτε*)	122	a Red Sea or Arabian Sea raft-type recorded in the Roman period (1st c CE); a kind of vessel
maʿdiyya (pl *maʿādi*)	376, 377	a raft-boat made of logs, bamboo canes or reeds

maghīb	197	setting of the star in the west (see *maṭlaʿ*)
māha	373	to enter (water) through the cracks
majrā (pl *majārī*)	196	the ship's course set out by the compass
malāḥ	172	an Aramaic and Hebrew term for mariner (see *malāḫu* and *mallāḥ*)
malāḫu	172	an Akkadian term for mariner or boatman (see *malāḥ* and *mallāḥ*)
malḥa	172	the (main body of the) sea
mallāḥ (pl *mallāḥūn*)	172, 184	mariner or shipman; helmsman in pre-Islamic poetry (see *baḥrī, bānānī, ghādūf, khalāṣī, nūtī* and *ṣārī*)
mallāḥiyya or *milāḥiyya*	172	the mariner's workmanship
manjanīq (pl *manjanīqāt* or *majāniq*)	345	catalpult
mann (pl *amnān*)	145	unit of weight measure
manṭīj	371	benteak
manzil (pl *manāzil*)	175, 279	lunar mansions
marākib ʿammāliyyāt	273	Mesopotamian river vessels
marākib baḥriyya (also *marākib safariyya* or *musāfira*)	273	ocean-going vessels
marākib ḥammāla	273	cargo ships
marākib ḥarbiyya (also *ghazwāniyya*)	273	warships
marākib muqātila	273	fighting ships
marākib muʿtadda	273	equipment ships
marākib al-Rūm	273	Byzantine war vessels
marākib shalandī	273	ships of the *galley*-type [s.v.]
marākib al-tujjār	273	merchant ships
maramma (pl *marammāt*)	344	a Mediterranean large transport vessel
marfaʾ or *murfaʾ* (pl *marāfiʾ*)	174	landing place; wharf; quay (see *marsā*)
markab (pl *marākib*)	122, 178, 269, 272–273, 274, 379	an ocean-going vessel

markab khafīf	273	a cargo vessel
markab shaḥīn	273	a laden ship
markab thaqīl (also *markab wazīn*)	273	a heavy-laden ship
markabtu	272	Ugaritic-Chanaanite term for ship
marsā (pl *marāsi*)	145, 146, 174, 381	anchor (see *anjar*); anchorage (see *marfaʾ*)
maʿrūf	374	known
masāfa (pl *masāfāt*)	175	distance between ports due east and west
mashbar	301	river
mashḥūf (pl *mashāḥīf*)	127, 128, 381	a generic term for a Marshes wooden canoe (see *matawr* and *ṭarrāda*)
mashʿiyya (pl *mashʿiyyāt*)	252	an Indian dugout canoe
māshuwwa (pl. *mawāshī*)	252	an open-ended lifeboat in the Northern Gulf
masmūr(a)	163	nailed planks as opposed to *mukhayyaṭ(a)* [s.v.]
mátabán	185	barrel-shaped jars
matawr (pl *matāwir*)	127	Marshes canoe made of reeds or wood; a smaller version of the *ṭarrāda* [s.v.]
maṭlaʿ	196	rising of the star in the east (see *maghīb*)
mawāsim al-asfār	187	sailing seasons (see *mawāsim al-riyāḥ*)
mawāsim al-baḥr	175	navigable seasons
mawāsim al-riyāḥ	187	sailing seasons (see *mawāsim al-asfār*)
mawsim (pl *mawāsim*)	175, 187	season; monsoon
mawsim al-kaws	187	south-west monsoon (see *rīḥ al-saba* and *rīh al-azyab*)
miʿbar (pl *maʿābir*)	122, 327, 379	a type of river or coastal boat; transport vessel; raft
mighdafa		see *mijdāf*
mijdāf (pl *majādif*)	203	(steering) oar
milāḥ	172	sailing
milāḥa	172	seafaring
milāḥiyya (also *mallāḥiyya*)	172	the mariner's workmanship

milḥ	172	salt (see *al-baḥr al-milḥ*)
mīna		see *mīnāʾ*
mīnāʾ or *mīna* (pl *mawāni* or *miyan*)	174	port; harbour; anchorage
miṣbāb	374, 379	a ship-type
misfan		see *safan*
mismār (pl *masāmīr*) (also *sakk*)	268, 373, 379	nail (see *mismāriyya*)
mismāriyya (pl *mismāriyyāt*)	268, 269, 379	nail-planked ship
mtepe (pl *mitepe*)	168, 241	an East-African double-ended sewn-planked vessel (now extinct)
muʿallim (pl *muʿallimūn* or *maʿālima*)	181, 183	ocean-going navigator; shipmaster (see *nākhudhā* and *rubbān*)
muʿāyana	16	eyewitnessing or viewing
mudārāt al-markab	178	ship management
muḍīf	133, 136, 137	a reed-built house of the Southern Marsh Iraqis
muḥādatha	16	interviewing or discussion
mukhayyaṭ(a)	163	stitched planks (see *masmūr[a]*)
muqātil (pl *muqātilūn*)	328	fighter
muql	209	the Theban palm (sails made from its leaves)
murabbaʿat al-qilāʿ	210	square-sailed
**murdī*		punting pole
murfaʾ		see *marfaʾ*
musabbaḥiyya (pl *musabaḥiyyāt*)	379	a cargo ship
musakkin	184	helmsman (see *ṣaḥib al-sukkān* and *sukkān-gīr*)
muṣallaba (also *ṣalībiyya*)	210	square-rigged
musaṭṭaḥ (pl *musaṭṭaḥāt*)	338	decked; a decked-galley
muṭālaʿa	16	reading or consultation
muthallatha (pl *muthallathāt*)	212	a type of vessel; probably a reference to a lateen-rigged ship

nabīṭ (coll.)	291	Nabateans; Mesopotamian agriculturalists; a pejorative term applied to the Arab/Arabian conquerors
naffāṭ (pl *naffāṭūn*)	328	naphtha thrower
najjār (pl *najjārūn*)	184, 328	carpenter
nākhudhā (pl *nawākhidha*)	178, 179, 183, 212, 227, 370	sea captain; shipmaster; shipowner (see *muʿallim, rabb al-markab* and *rubbān*)
nāqa	197	Cassiopeia and Andromeda (northern constellations)
nārajīl (coll.)	148, 209	coconut(s); coconut timber (*Cocus nucifera*)
narr	371	pintle
naʿsh	197, 199	αβγδεζη Ursae Majoris (northern constellation)
nāshī (pl *nawāshī*)		see *ḥarbī*
ναύης	370	sailor
nayrūz	188	first day of the maritime year
nīm	371	the poopdeck or half-deck
nisba	379	relative adjective
nkoma	209	a kind of palm tree (*Raphia farinifera*)
nūra	142, 151	lime and fat substance; burnt lime (see *chunam*)
nūtī (pl *nawātī*)	184, 370	sailor (see *baḥrī, bānānī, ghādūf, khalāṣī, mallāḥ* and *ṣārī*)
paradesis	87	foreigners
pīrā	329	an Urdu term for a large boat
πλοϊον	124	a vessel-type
pulwār	306, 370	a boat of the Bengali rivers
qabūl	187	east
qadam (pl *aqdām*)	144	foot (a unit of measure)
qādis (pl. *qawādis*)	280, 281, 282	large ship
qalfaṭ or *kalfāṭ*	150	caulking
qals		see *jummal*
qāna (pl *qānāt*)	81	water canal
qār	151	tar
qārab or *qārib*	272	Andalusi Arabic term for ship (see *κάραβος*)
qaraṭ	148	*Acacia nilotica*; also *Acacia indica*
qārib (pl *qawārib*)	269,	a Mediterranean cargo ship; transport

	271–272, 273, 274, 322, 351	vessel; generic term for a small coastal boat (see *κάραβος*); lifeboat
qariyya	285	the ship's yard; a wooden square piece on the ship's masthead (see *firman*)
qaṣab (coll.)	115, 129, 136	reed(s) (*Phragmites communis*)
qaṣīda (pl *qaṣā'id*)	20, 120, 277	Classical Arabic ode
qawārib al-khidma	271	service boats
qawrā'	283, 284	{?} a type of vessel
qil' or *qilā'* (pl *qulū'*) (also *juljūl* or *riwāq* or *shirā'*)	210, 373	sail
qilyāṭa	256	*galley*-type [s.v.]
qinbār or *qanbār* or *qunbār or kunbār* (coll.)	148, 149, 165, 268	coir made from coconut husks
qirba (pl *qirab* or *qirbāt*)	116	inflated waterskin
qishr or *qashr* (pl *qushūr*)	266	shell; husk; hull
qiṭ'a (pl *qiṭa'* or *aqṭā'* or *qaṭā'i'*)	352–354, 376	a Mediterranean warship; transport vessel
qiṭ'a ḥarbiyya	352	warship
qiyās (pl *qiyāsāt*)	175, 197	calculation of latitiude by measurement of star altitude
quffa (pl *quffāt*)	129, 130, 131, 132, 139, 291, 381	an Iraqi circular coracle made of a spiral of reeds bundled together in a technique called "coiled basketry", woven together with a palm fibre rope (see *za'īma*)
qulla (pl *qulal*)	240	jug; pitcher; jar
quppu	130	an Akkadian term for basket
qurqūr(a) (pl *qarāqir or qarāqīr*)	153, 235, 289–292, 305, 332–334, 346	a Nabatean vessel; round-hulled galley [s.v.], the large type with three decks; cargo and transport ship; Egyptian pleasure and ferry boat; also a coracle

qurqurru	292	an Akkadian term for a type of basket (see *quffa*)
quṭb numā	196	(see *dā'ira*)
rabb al-markab	178	shipmaster; sea captain (see *nākhudhā*)
rafa'a	174	to drag a vessel on shore; to bring [the ship] near the bank of a river
raḥīl	278	journey
rahmānī or *rahmānaj*	193, 362, 371	an Arabic term for the Persian *rahnāma* [s.v.], pilot guide
rahnāma	193, 194, 371	a manual of sailing instructions in Persian (see *rahmānī*)
ra'īs al-tujjār	95	head of merchants
rakiba	122, 272, 379	to mount; ride; board (a ship) (see *markab*)
ramás or *ramásh* or *rámsi* or *ramísh*	122	a Somali fishing raft-boat (see *ramath*)
ramásh		see *ramás*
ramath (pl *armāth* or *rimāth*)	119, 120, 121, 139, 374	an ocean log-raft (see *ʿāma, ʿimāma, kelek*, and *ṭawf*)
rámsi		see *ramás*
ramísh		see *ramás*
rāmūs	121	a small Nubian reed-raft
raqqiyya (pl *raqqiyyāt*)	325, 327, 379	Mesopotamian river cargo boat; transport ship
ra's (pl *ru'ūs*)	174	a promontory; cape
rasā	373	to anchor
ribbōn	182	an Aramaic term for pilot (see *rubbān*)
rīḥ al-azyab (also *rīḥ al-saba*)	187	north-east monsoon (see *mawsim al-kaws*)
rīḥ al-saba		see *rīḥ al-azyab*
riwāq		see *qilʿ*
roshan	352	casement window
rubbān (pl *rubbāna or rubbānūn* or *rubbāniyya*)	182, 183, 312, 362	coastal pilot; sea captain (see *nākhudhā and muʿallim*)
rubbāniyya	178, 182	crew members (officers)

sabaḥa	379	to swim (see *musabbaḥiyya*)
ṣabṣāb	379	a journey to water (see *miṣbāb*)
safan (or *misfan*)	173	carpenter's tool such as the adze or axe by which palm trees are pared
safana	173	to strip off; scrape off i.e. careening
safar	379	journey; travel (see *safarī*)
safarī	379	an ocean-going vessel
saffān	173	shipbuilder; shipmaster; navigator
safīna (pl *sufun* or *safā'in* or *safīn*)	67, 153, 173, 175, 269, 270, 272, 273, 274, 327, 328, 374	a generic term for ship or boat; astrological term for the bright southern star that guides navigators and camel drivers
safīna baḥriyya	270	a deep-sea vessel
safīna ḥarbiyya	270	warship
safīna safariyya	270	a deep-sea cargo vessel
safīnat al-barr	270	the ship of the desert
ṣāḥib al-sukkān	183, 184, 206	helmsman (see *musakkin* and *sukkān-gīr*)
sāḥil (pl *sawāḥil*)	93, 174	seashore
sāj	147, 371	teak (*Tectona grandis*)
sakhara	373	to follow the path
sakk (pl. *sukūk*) (also *mismār*)	373	*nail*
ṣalgha (pl *ṣilāgh*)	250, 324–325, 341	a Mesopotamian large river vessel similar to the *sumayriyya* [s.v.]; transport warship; she-camel
ṣalībiyya		see *muṣallaba*
sallūra or *sullūra* (pl *salālīr*)	250, 300, 322–323, 345	a river boat identical to the gondola-type *ḥarrāqa* [s.v.]; service boat for warships (see *shabbāra*); Mediterranean large war vessel with three sails
sambucho (also *zambuco*)	314	a Portuguese term for a small and large Western Indian Ocean craft (see *ṣunbūq*)
sambūk	314	a cognate term for *sanbūq* [s.v.] in Mehri, Hadrami and Amharic
sambuka	314	a Medieval Latin term for a type of vessel (see *σαμβύκε* and *ṣunbūq*)
σαμβύκε	314	a type of vessel (see *sambuka* and *ṣunbūq*)

samka	371	defect (of the compass)
sampan	314	Malay term for a small boat or skiff found on the Indian coast (as known to the Portuguese)
sanbūq (pl *sanābīq*)	148, 149, 156, 165, 227, 267, 310, 311, 315	Western Indian Ocean vessel with the high poop and transom stern; also open-ended (see *ṣunbūq*)
ṣandal (pl *ṣanādil*)	306	term for a ship's boat used in Persian and Turkish
sapīn(a)tu	270	an Akkadian term for ship (see *safīna*)
saqīfa (pl *saqā'if*)	373	ship's planks (see *lawḥ*)
ṣarānī		see *ṣārī*
sarhang	181	deputy to the shipmaster; ocean-going navigator (see *mu'allim*)
ṣārī or *ṣarānī* (pl *ṣarariyyūn* or *surrā'*)	184	sailor (see *baḥrī, bānānī, ghādūf, khalāṣī, mallāḥ*, and *nūtī*); mast
sarimanok	103	an Indonesian outrigger canoe
σχεδίη	327	a *galley*-type [s.v.] propelled by oars
scieri		see *uscèri*
σελλάριον	323	small sailing vessel
sembuk	314	a Tigré cognate term for *sanbūq* [s.v.]
s'fina' or *s'finta'*	270	an Aramaic term for ship (see *safīna*)
s'finah	270	a Biblical Hebrew term for ship (see *safīna*)
shabbāra (pl *shabbārāt*)	250, 299, 300–301, 322, 370	a Mesopotamian *gondola* (domed-cabin)-type [s.v.]; a river pleasure boat like the *ḥarrāqa* [s.v.]; a service boat used to manouevre around the enemy ship assisting larger galleys [s.v.] equipped with archers (identical to *sallūra* [s.v.])
shācheh (pl *shjāyech*)	126	palm-fibre pins
shadhā (pl *shādhdh* or *shadhawāt* or *shadāwāt* or *shadhā'āt*)	250, 323, 324, 325, 326	a Mesopotamian river barge; decked fighting ship
shadhā	327	a type of tree; strength; fragrance
shafara	379	to cut (see *shaffāra*)

shaffāra (pl *shaffārāt*)	252, 342, 343, 378	a Western Indian Ocean *galley*-type [s.v.]
shāhī-bār	301	a Medieval Persian term for a royal-carrier
shajja	373	to cut through the waves
shalandī (pl *shalandiyāt* or *shalanda*)	225, 273, 334, 337, 338, 357	a Medieval Arabic term which stands for the Byzantine χελάνδιον (or χελάνδρα); decked fighting ship with some features similar to the *shīnī* [s.v.] and the *dromon* [s.v.]; transport vessel
shamāl	187	north
sharm (pl *shurūm*)	174	inlet; small bay (see *khawr*)
shāsha (pl *shāshāt* or *shūsh*)	125, 139, 381	a North-Eastern Emirati and Eastern Omani beach canoe made of palm-leaf spines bound together with coir propelled by one or two oars (see *wāriyya*)
shāṭiʾ (pl *shawāṭiʾ* or *shuṭʾān*)	93, 174	seashore
shaṭṭ (pl *shuṭūṭ* or *shuṭṭān*) (also *ḍiffa*)	174	riverbank (see *shaṭṭī*)
shaṭṭī (pl *shaṭṭiyyāt*)	379	coastal boat
shawāhid	21, 376	examples from pre-Islamic poetry, the Qurʾān and Ḥadīth
shibr (pl *ashbār*)	144	span of hand (a unit of measure)
shillīr	349	a war vessel (see *ghurāb* and *ʿukayrī*)
shilmān (pl *shalāmīn*)	362, 371	the rib (frame)
shīnī or *shawna* or *shīniyya* or *shānī or shāniya* (pl *shawānī*)	253, 273–274, 329, 333, 334–337, 344, 356, 380, 381	a Mediterranean term for a seventh-century single-masted *galley* [s.v.], her equivalent being the Byzantine *dromon* [s.v.], both being identical to the ninth-century Byzantine χελάνδιον [s.v.]; tenth-century *galley* powered by oars (see *shalandī*)
shirāʿ (pl *ashriʿa*) (also *juljūl* or *qilʿ*)	210, 373	sail
shīṭī or *shīṭiyya* (pl *shayāṭī* or *shayṭiyyāt*)	322	a small and swift Mediterranean coastal boat; lifeboat
shūʿ	293	a type of tree

shūʿī (pl *shwāʿī*)	293	an Arabian Gulf and Omani fishing vessel almost identical to the square-sterned *sanbūq* [s.v.], characterized by her straight stem ending in a double curve and transom stern with projecting quarter strakes
shurūb	95	fine linens
sidir	113, 126, 148, 149	*Ziziphus spina-christi* (see *ʿilb*)
sīf (pl *asyāf*)	174	seashore
ṣifāna	173	shipbuilding; navigating
simāk	197	Arcturus (star)
siyāsāt (al-baḥr)	175, 178, 181, 208	the sea captain's or shipmaster's relations with the crew and passengers
στόλος	273	fleet
sufun al-jusūr	328	pontoons (see *safīna*)
sufun al-rijjāla	328	transport ships for foot-soldiers (see *safīna*)
suhayl	197	Canopus (South star)
sukkān (pl *sukkānāt*) (also *kawthal* or *khaysafūja* or *khayzurāna*)	204, 206, 362	rudder
sukkān bil-ḥibāl	206	rope-steering system
sukkān-gīr	184	helmsman (see *musakkin* and *ṣāḥib al-sukkān*)
sulbār	197	α Eridani (southern constellation)
sullūra		see *sallūra*
sumayriyya (pl *sumayriyyāt*)	250, 304, 323–324, 325, 326, 376	a Mesopotamian royal river boat; pleasure and ferry river boat; cargo river vessel and warship of different sizes (see *sumayriyya*)
sunbuk	314	Medieval Persian term for *ṣunbūq* [s.v.]
ṣunbūq (pl *ṣanābīq*)	310–315, 320, 370, 376	a Western Indian Ocean versatile vessel with a curved bow performing different functions and of all sizes; Red Sea type of coastal cargo vessel (see σαμβύκε, *sambucho* and *sanbūq*)
sūq (pl *aswāq*)	367	market

ta'āruf	16	judging the frequency of a term used
ṭāfa	378	to journey around (see *ṭawf*)
ṭā'ir	197	Altair (star)
tājir (pl *tujjār*)	178	merchant
takhalluṣ	278	camel journey
takkiyya	201	a unit of measure to determine the variances of the wind (see *wakā*)
talawwā	306, 374	a ship's boat
tandīl	183	chief of sailors
taqādhafa	373	to be tossed about (the ship) by the waves
taqyīd	16	taking travel notes
ṭāra	379	to fly (see *ṭayyār[a]*)
ṭarada	354	to chase, hunt
ṭārada	341	to charge upon or assault
tareta	341	see *tarida*
tarida	341	a Low Latin term for a transport ship of horses (see *ταρίτα* and *ṭarīda*)
ṭarīda (pl *ṭarāyid* or *ṭarā'id* or *ṭarādāt*)	153, 333, 340–342, 356, 377, 381	a Mediterranean round-shaped warship equipped with sails and oars; cargo and transport vessel, also designed to transport horses (see *ahawra*)
ṭarīda (pl *ṭarā'id*)	341	wild animal
taride	341	a Spanish term for Low Latin *tarida* [s.v.]
ταρίτα	341	a Byzantine ship-type (see *tarida*)
ṭarrād(a) (pl *ṭarā'id* or *ṭarārīd*)	307, 340, 354	a Western Indian Ocean coastal rowing (sewn- or nail-planked) boat of the sixteenth and seventeenth centuries; war vessel equipped with guns; a ship's boat (see *terada*)
ṭarrāda (pl *ṭarrādāt*)	127, 128, 256, 306, 307, 354	a fine-shaped Marshes canoe made of wood, carvel-built, slim and flat-bottomed with a high curved slender prow and stern, all planks covered with bitumen (see *matawr*)
tartana	341	Italian term for a type of vessel
tartane	341	French term for a type of vessel
tavoleta		see *balistinha do Moro*
ṭawf (pl *aṭwāf*)	118, 374, 378, 381	Mesopotamian river raft made of rough logs and reeds; no

		waterskins were used to support the raft (see *ʿāma, ʿimāma, kelek* and *ramath*)
ṭayra (pl *ṭuyūr* or *aṭyār*)	350	a swift boat; (big) bird
ṭayyār or *ṭayyāra* (pl *ṭayyārāt*)	250, 303–304, 323, 327, 379	a Mesopotamian royal boat; river ferry-boat
terada	307	Portuguese medieval term for an Indian Ocean coast rowing boat (see *ṭarrāda*)
thurayyā	197	Pleiades (star cluster)
tīr	197, 371	Cygnus (northern constellation)
tirfa (pl *tirfāt*)	200, 372	a unit of measure to calculate east-west variations
ʿūd (pl *ʿīdān*)	266, 274	a piece of wood of any tree
ʿudda (pl *ʿudad*)		see *ḥibāl*
ufrūṭa		see *usṭūl*
ʿukayrī	255, 349	a Western Indian Ocean decked war vessel similar to the *ghurāb* [s.v.] and *shillīr* [s.v.]
umma (pl *umam*)	8, 10	Muslim community
uscèri or *uscerio* or *uscerius* or *usseria* or *userium* (also *scieri*)	310	a Mediterranean type of large vessel; Siculo Arabic term for tunny-fish boat (see *ʿushārī*)
ʿushārī (pl *ʿushāriyyāt* or *ʿushāriyyūn*) (also *daymās* or *dukāsa*)	301–303, 309–310, 322, 376, 380	an Egyptian royal river boat similar to the *gondola* (domed-cabin)-type *ḥarrāqa* [s.v.] and the *shabbāra* [s.v.]; Red Sea coastal boat or lifeboat; supply boat; Mediterranean cargo vessel (see *uscèri*)
usṭūl (pl *asāṭīl*) (also *ufrūṭa*)	252, 273	fleet
uṣūl (s *aṣl*)	16	fundamentals
uxerium		see *uscèri*
vallam	124	a Tamil Nadu term for dugout canoe
viral	199	a Coromandel, Malabar and Lakshadweep term for graduation

		in finger breadths (see *anguli, chih* and *chio*, and *iṣbaʿ*)
wahriyya or *warjiyya*	125	a Failaki term for a beach canoe (see *wāriyya*)
wakā	201	to tack against the wind (see *takkiyya*)
wakīl al-tujjār	95	representative of merchants
walajiyya	125	a watercraft-type
wāqiʿ	197	Vega (star)
wāriyya (pl *wāriyyāt*)	125–126, 381	a Kuwaiti and Bahraini beach canoe made of bundles of palm-leaf stems; the Iraqi type is made of reeds and fitted with wooded thwarts (see *shāsha*)
warjiyya		see *wahriyya*
wāstiyya (pl *wāstiyyāt*)	379	a Mesopotamian river cargo vessel
χελάνδιον or *χελάνδρα* (also *chelendra*)		see *shalandī*
zabzab (pl *zabāzib* or *zabzabiyyāt*)	250, 304, 323, 324, 345	Mesopotamian royal river boat; large pleasure boat and ferry; transport river boat; fighting ship
zaʿīma (pl *zaʿāyim*)	129	Iraqi rectangular coracle made of reeds with bitumen on the outside (see *quffa*)
zakāt	227	a portion of one's property
zām (pl *azwām*)	198, 200, 372	unit of time equivalent to three hours
zambuco	314	see *sambucho*
zanbariyya (pl *zanbariyyāt*)	158, 305–306, 370	Mesopotamian river cargo boat with a projected bow; a barge
zārūka (pl *zawārīk*)	165, 206	Musandam (Oman) cargo or fishing double-ended vessel with a high stern piece like a dog's head
zaw	67, 221	a middle-sized *junk* [s.v.] (see *kakam*)
zawraq (pl *zawāriq* or *zawārīq*)	104, 250, 306, 307, 308, 322,	Mesopotamian swift river boat; Western Indian Ocean skiff; a lifeboat

	325, 327, 370, 374	
zaww	298–299, 370	a river boat; large vessel
zibadra	371	gunwale

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