

Indian Ocean
Arab Navigation Studies
Towards a Global Perspective:
Annotated Bibliography and
Research Roadmap

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Abbreviations

ADU = Abu Dhabi University Library
 AKLL = Aga Khan Library, London
 BnF = Bibliothèque nationale de France
 CUL = Cambridge University Library
 HT = Hathi Trust (online catalog)
 OUL = Oxford University Library
 QNL = Qatar National Library

Introduction

The present work is both a historical overview and a report on the current state of affairs in the field of Arab navigation studies, with particular attention to Indian Ocean navigation. Having in view the earliest historical testimonies, and comprising both nautical technical and more general maritime literature, we focus on the late medieval and early modern periods. Although we are aware of the inextricable relation between the studies of different aspects of Indian Ocean Arab navigation, and though we are surveying and profiting from a wide range of sources, our particular research within the ERC RUTTER Project gives a certain angle to our perspective: we are primarily concerned with the seamanship treatises (in Portuguese, *livros de marinaria*) by Arab authors, and how they were shared with or made their way into other nautical traditions. In this regard, we are fortunate to benefit from the extraordinary pool of knowledge of our colleagues at the Centro Interuniversitário de História das Ciências e da Tecnologia, Lisbon, and we offer a contribution which while not leaving historical stones unturned, is fully apprised with the living reality and practice of nautical sciences.

In a collegial spirit, this technical note is also meant to be a contribution for other scholars in the field, a gathering of sources conducive to further research. In this aspect, it is by definition and even hopefully incomplete, offered like a stepping stone along the road, somewhat in response to Allen's clarion call for a "deeper, wider, better co-ordinated academic effort" on Indian Ocean studies (1980, 148). Closer to our own work, it is also meant to be an executive summary, acting as a preamble and a roadmap for impending in-depth research, all within the frame of the RUTTER Project.

Furthermore, in the wake of the ongoing shift of historical disciplines towards a concretely global perspective, we mean hereby to prepare the ground for and to engage in a decentralised and transnational approach to Arab Navigation studies. With very few exceptions which we shall mention below, the major earlier iterations within the field (most notably the pioneering works by Ferrand and Tibbetts) were still imbued with Western centre-periphery views, and therefore not exempt of a degree of Eurocentric bias. But the time is now ripe for a full integration of secondary sources in the light of new manuscript finds, including a wealth of new sources coming from the Middle East (particularly the works of Khoury and Shihab) and from India and Pakistan. As in many other historical fields, an amalgamation of scholarly traditions is long overdue, to bring non-Western publications into the picture and on an equal footing.

We use English quite deliberately as an instrument, as the *de facto* scholarly language of the day, but without any claim to particular suitability. The limitations on this attempt will naturally be those of the language skills shared by the work team: while we will be working with sources in most European languages and in Arabic, we are aware that there are still significant contributions in Persian, Swahili, Tamil, Turkish, Urdu, and other languages which remain out of our immediate scope (see Nadvi 1966, 149ff.).

CHRONOLOGY

We are convinced that the timeliness, or even urgency, of such a comprehensive survey as this one comes out from the broad strokes of a chronology of the discipline.

Leaving aside early medieval travel literature, some of which we will mention below, we focus on nautical literature from the appearance of the two most influential corpora in the fifteenth and sixteenth centuries, namely the works of Aḥmad Ibn Mājīd and Sulaymān al-Mahrī. The first question is: how were their writings transmitted and studied in these past five centuries? and how did we arrive at the current situation?

On one hand there seems to have been an uninterrupted, mostly oral, professional transmission of the writings just mentioned in the Arabian Sea, where ship captains were using some or other version of them until the advent and general adoption of modern nautical charts and navigation methods (Agius 2005, 175). Scholarly speaking, the first notable recognition and appropriation of the two authors took place in Turkey, when a famous 17th century Ottoman admiral, Sidi ‘Alī Çelebī, praised them in his major work and made use of their information.

After this, contemporary studies of Arab navigation begin in two phases, and the first one, in the mid-nineteenth century, consists of works by Joseph von Hammer and by James Prinsep largely dedicated to Çelebī; a second phase begins with the works of Gabriel Ferrand in the early twentieth century and continues uninterrupted to our days.¹

Almost simultaneously with von Hammer’s main work, the Omani general who conquered Mombasa in 1839, Shaykh Āl ibn ‘Alī, was giving orders for the “very useful” texts of Ibn Mājīd to be copied in the wake of his victory (al-Ghunaym 2006, 281). The destiny of those copies is yet to be discovered, but the contemporary publications by von Hammer did come to fruition and eventually inspired the second phase, kickstarted by the French scholar Gabriel Ferrand in the 1920s. Ferrand published facsimilar editions of two comprehensive manuscripts (details below), preceded and followed by several nautical essays by him and other related authors. In 1966, Allamah Sulayman Nadvi published in Lahore his *The Arab Navigation*, while in Britain Gerald Tibbetts was publishing a series of articles, culminating in his 1971 English translation of Ibn Mājīd’s *Fawā’id*. This translation was published in the same year that the first critical edition of the *Fawā’id* text was published by Ibrahim Khoury in Damascus, along with three other volumes of key works and lengthy articles comprising the verse works of Ibn Mājīd.

As of today, Khoury’s Arabic volumes and articles constitute the reference editions for the main works of Ibn Mājīd and al-Mahrī, but their impact seems to have been very limited, and

¹Agius (2005, 4–9) and Staples (2017, 224–228) have excellent overviews upon which we are gratefully expanding here. All authors and works mentioned will be treated in more detail below.

they have yet to elicit the amount of scholarship generated by Ferrand's earlier work in the 1920s. Similarly, in 1989 Khoury chaired a "Conference for the Revivification of Ibn Majid's Heritage" (*Al-Nadwah al-ilmīyah li-iḥyā' turāth Ibn Mājīd*), with proceedings published in two volumes in 1992, but its impact seems to have been very limited, probably because of its limited diffusion outside the Arabic-speaking world.

In line with such efforts, a significant amount of quality publications have been added to the literature, focusing not exclusively on the early modern texts but approaching the subject from a technical nautical aspect, as in the works of Grosset-Grange and Malhão Pereira, or historically focused on particular topics, like the works of Agius, or bringing valuable archaeological data to bear on navigation matters. More recently, the works of Ducène, though mainly with a cartographical interest, give testimony to an ongoing shift towards more inclusive Indian Ocean Studies, bringing nautical matters into an interdisciplinary approach to the field; this has been as it were ratified by the consolidation, from 2011, of the [Indian Ocean World Centre \(IOWC, McGill University\)](#), which started in the 1990s in South African academia, and now runs the biannual [Journal of Indian Ocean World Studies](#). A fruitful and remarkable practical initiative was the 2008–2010 experimental voyage in a replica of a medieval vessel, the *Jewel of Muscat*, from Oman to Singapore, undertaken by a multidisciplinary crew, documented by Eric Staples (2013) and followed by very interesting and concrete observations on traditional navigation techniques. A number of other similar projects are under way, like the Centre de Recherches sur les Sociétés de l'Océan Indien, based at the University of La Réunion, which bring to the field of studies all the benefits of local knowledge and connections, while working from a global historical perspective.² In general, both Indian Ocean Studies and Maritime Studies have been emerging and consolidating as independent disciplines over the past two decades, with new journals, research centres and museum initiatives appearing;³ they provide a rich and thriving context for the more specific Arabic dimensions on which we focus here.

In the following pages, we start by listing and discussing the known manuscripts of the main Arab nautical authors, giving, as far as possible, references and direct links to their locations in libraries worldwide. Section 2 singles out the most important authors, noting in some detail the contents of their works, thereby effectively providing an overview of the primary themes treated in the literature. A final and third section takes the form of an annotated bibliography, providing shorter or longer running commentaries, as needed, to weave a coherent narrative regarding the history, the current status, and the prospects of our field of studies.

As is customary in Arabic and Islamic studies, we give the dates in Hijri/Gregorian format for Islamic sources, and names are alphabetized ignoring the article *al-*. For the transliteration, we follow as closely as possible the [ALA-LC Romanization tables](#).

²Follow [this link](#) for a useful list published by the "Reimagining Indian Ocean Worlds" Mellon Research Initiative at U.C. Davis.

³See for instance the [Journal of the Indian Ocean Region](#).

1 Primary Sources

As mentioned above, the two canonical authors of Arab nautical literature are Aḥmad ibn Mājid and Sulaymān al-Mahrī. They come respectively from the Persian Gulf region and from Yemen, and their lives spanned the late fifteenth and early sixteenth centuries. Their works follow each other chronologically, and they are the avowed and self-conscious result of centuries of Indian Ocean and Red Sea sailing routes, and of an international precious cumulative body of experience and know-how. Part of what they convey comes from genres closely related to nautical literature, like itineraries and geography books (e.g. Sīrāfi and Mas‘ūdī). Their influence is clear in some later authors like ‘Alī Çelebī, who translated into Turkish passages from al-Mahrī, and less direct and still to be ascertained in a great number of other works, including Mediterranean sources and Western languages.

One of the important features of this early nautical literature is that it is written by experts and for experts, and it was regarded and valued as such by subsequent transmitters. This explains, for instance, that Ibn Mājid not only became a textual authority and a technical reference, as mentioned above, but even a sort of patron saint of Islamic sailors through the centuries, even down to the early twentieth century.

Before Ibn Mājid, that is, before the fifteenth century, and strictly within nautical literature, he himself gives a lineage of writers and pilots, whose names may be used to guide future archival searches:⁴

“In the time of the Abbasids, there were three famous men: Muḥammad ibn Shādhān, Sahl ibn Abbān, and Layth ibn Kahlān.” Ibn Mājid is supposed to have seen the handwriting of the latter’s son in a rutter (*rahmānaj*), with the *incipit* “Lo, we have made you victorious...” (*innā fataḥnā laka*). “There were famous pilots around the same time: ‘Abd al-‘Azīz ibn Aḥmad al-Maghribī (or al-Ma‘rūf; perhaps Moroccan?), Mūsā al-Qandarānī (or Qīdarānī), and Maymūn ibn Khalīl [Jewish perhaps?].“ *Before them* there were two other writers from which they had borrowed: “Aḥmad ibn Tabruwayh (or Tabrūyah or Bayruwayh) and Khawāshīr ibn Yūsuf ibn Ṣalāḥ al-Lāzkī (or al-Arikī or al-Azkī), who was travelling on AH 400” (ca. AD 1022, so now we have a span of approximately five hundred years under the gaze of Ibn Mājid’s narrative) “in the vessel of a certain Indian Dayūkāra” (or Diukār or Dabūkarah; a name which may help establish chronology). “The latter two were contemporaries of the famous captain Aḥmad ibn Muḥammad ibn ‘Abd al-Raḥmān ibn Abī al-Faḍl al-Maghribī” (another Moroccan perhaps, and quite remarkable as a connection with north-west African sailing tradition).

The term mentioned above for a rutter or simply a volume of nautical instructions, *rahmānaj*, is of obvious Persian origin. Apart from it, the Arabic *daftar* (notebook) is also used. At the moment, none of these notebooks nor any work from the above mentioned mariners

⁴Names are collated from Khoury’s *Fawā’id* edition and the earliest known Bodleian manuscript, see below.

has come to public attention. The connection with India goes back to the earliest times, and has been a constant element even to our days (Staples 2013, 237).

Before examining in some detail the main works and themes of this nautical literature, let us have a look at the main manuscript sources and the existing editions on which the literature has so far been based.

1.1 Manuscripts

In this section we make available the information on the main manuscript sources, providing specific archival hyperlinks when possible. In addition to those listed below, we are aware of the existence of certain relevant manuscripts, notably in Peshawar (Nadvi 1966, 148) and in Cairo (Mss. 308 and 309 contain works of al-Mahrī), which we have not been able to obtain. As Grosset-Grange (1996, 242) has pointed out, numerous sources are still “disperse in the archives of the nations which were part of the complex history of navigation in the Indian Ocean.” And on a wider scale, it is well known in Arabic-Islamic Studies that there is around the world an enormous wealth of manuscript material which eludes digital searches and requires direct access.⁵ While we may yet engage in research trips to partially fill the gaps, it is our present desideratum—and an invitation is hereby extended—to interact and collaborate from the distance with local scholars from the countries around the Indian Ocean basin. For historical reasons, it would be hardly surprising to find new manuscripts relevant to our work in the public libraries along the east coast of Africa and the west coast of India. Similarly, it has been pointed out (Allen 1980, 142–3; Agius 2005, 207) that private collections in the Gulf and elsewhere may still hold important and as yet unstudied works.

1.1.1 Bahrain

Ms. in private collection of ‘Alī Muḥammad al-Tājir

Dated 1091/1679, 238 folios (hereafter B1). Abbreviated by Khoury as ت, for *Tājirīyah*.

This Ms. includes several works by Ibn Mājid, including the *Kitāb al-fawā'id* and the *Ḥāwīyah al-ikhtisār*. Khoury considered it the best and most reliable of the three Mss. used for his 1971 critical edition,⁶ though Shihāb disagreed with this and considered the other two better. It seems to be the same Ms. that contains several works by al-Mahrī.

⁵See the Introduction to Al-Furqan Foundation *World Survey of Islamic Manuscripts*.

⁶See Khoury, 1970, 10–13, and al-Ghunaym, 2006, 284.

1.1.2 Damascus

Al-Assad National Library, Ms. 3114

Dated 1001/1592, and produced in Mecca, 173/174 folios (hereafter D1). Abbreviated by Khoury as ٤, for *Zāhirīyah*.

The Ms. includes at least sixteen works by Ibn Mājid. Among these are the *Kitāb al-fawā'id* and the *Hāwīyah*. It was first found in the Zahiriyah Library in Damascus, with the codex number 3114, and later moved to al-Assad National Library. In 1925, Najm al-Dīn al-Bey wrote a copy of it which is now in the Library of Congress. There seem to exist only three descriptions of this Ms. and they do not completely match. The first was written by Najm al-Dīn al-Bey in 1925, the second was written by Ibrahim Khoury in 1971, and the third by al-Ghunaim in 2006. Al-Bey's description was translated into English by Tolmacheva in 1994 and claims that the Ms. contains 173 folios with twenty three lines per page. Khoury describes the manuscript as containing 174 folios with twenty three lines per page. Furthermore, although Khoury and al-Ghunaim claim the Ms. includes the same nineteen works that are found in P1, the copy in the library of Congress includes only sixteen of those works.

1.1.3 Kuwait

Ministry of Awqaf and Islamic Affairs, 195(3)

No date, 71 folios (hereafter K1).

This Ms. was unknown to Khoury. It contains only the *Fawā'id*. A facsimilar edition was published by al-Ghunaim in 2004, who calls it the Abdullah Khalaf Ms., after the Kuwaiti scholar who used to own it.

1.1.4 Leiden

Leiden University Library, Or. 8660

Dated 1059/1649 (hereafter Le1). Abbreviated by Khoury as ٥.

The Ms. includes two works by Sulaimān al-Mahrī: *Al-Umdat al-mahrīyah* and *Minhāj al-fākhir*. [External Link](#).

1.1.5 Lisbon

Biblioteca Nacional de Portugal, Ms. Or.2

This recently discovered and previously unstudied manuscript has been photographed and is currently under study by the RUTTER team. It is 94 folios long and includes

several rutters with different dates, from 1243/1827 to 1265/1849). It is in general good shape, with some damage around the edges. It has interesting wind rose illustrations and it contains Indian Ocean bearings, latitude tables, and anchorages, dealing with routes to Aden and the East coast of Africa. Author yet unknown. Hereafter abbreviated Li 1.

1.1.6 Oman

Ministry of Cultural Heritage of Oman, 3561–1

Dated 1157/1744 (hereafter O1). It contains several nautical poems by Ibn Mājid, including the *Nūnīyah al-kubrā* as described in Shihāb (1993). [Link to Library](#).

Ministry of Cultural Heritage of Oman, 3910

Date uncertain. 18 folios (hereafter O2). Contains Al-Mahri's *Minhāj*. [Link to Library](#).

1.1.7 Oxford

Bodleian Library, MS. Selden superius 24

Oxford University. Dated 15th century, 31 folios (hereafter Oxon. 1).

This Ms. includes nine minor treatises by Ibn Mājid, including four unpublished: the *Qaṣīdah qad ṣadaḥa al-dīk* (“The Cock Has Crowed”); the *Urjūzah fī musāyarah al-ard min ‘adan ilā jiddah* (“Going by the Land from Aden to Jeddah”); the *Qaṣīdah al-shahīrah bi-misallat al-fūlādhi* (“Famous Poem on the Steel Needle”); and the *Qaṣīdah fī waṣf al-ṭarīq min al-bāb ilā jiddah fī musāyarah al-sāhil* (“On the Description of the Way from Bab-el-Mandeb to Jeddah Going by the Coast”). [External link](#).

This and the following two Oxford Mss. seem to come from the same hand, though only Oxon. 2 is dated, see below. It is remarkable that, being very early Mss., they have remained practically unstudied to date and have not formed part of any critical edition, as observed by al-Ghunaim (2004, 19).

Bodleian Library, MS. Selden superius 46

Dated 894/1489, 129 folios (hereafter Oxon. 2).

The Ms. contains the full text of *Kitāb al-fawā'id*. [External link](#).

Bodleian Library, MS. Selden superius 57

Dated 15th century, 35 folios (hereafter Oxon. 3)

The Ms. contains the *Hāwīyah al-ikhtiṣār*. [External link](#).

1.1.8 Paris**BnF, Arabe 2559**

Dated sixteenth century, 187 folios (hereafter P2). Abbreviated by Khoury as ب

The Ms. includes nine works: four by Ibn Mājid and five by Sulaymān al-Mahrī. Among Ibn Mājid's works there is a copy of the *Ḥāwīyah*. Among al-Mahrī's, there are the *al-ʿUmdah* and *al-Minhāj*. [External link](#).

BnF, Arabe 2292

Dated 983/1576, 183 folios (hereafter P1).

The Ms. includes nineteen works by Ibn Mājid. The first two are the *Kitāb al-fawā'id* and the *Ḥāwīyat al-ikhtisār*. The remaining seventeen are minor metrical treatises mostly on nautical matters. [External link](#).

1.1.9 Qatar**National Library, Or 15643**

Dated 1153/1740, 5 folios (hereafter Q1).

Small Ms. including Sulaymān al-Mahrī's *Tuḥfat al-fuḥūl*. [External link](#).

1.1.10 Russian Academy of Sciences**Russian Academy of Sciences, B.992**

Dated sixteenth century (hereafter PP992)

The Ms. includes several Arabic and Turkish texts, among which are Ibn Mājid's *Sufāliyah*, *Al-Ma'laqīyah*, *Al-Tā'īyah*. PDF files of the Catalogues available [here](#).

1.1.11 Washington D.C.**Library of Congress, VK551 .A46**

Dated 1344/1926, 174 folios (hereafter W1)

The Ms. includes sixteen works by Ibn Mājid, the first two being the *Kitāb al-fawā'id* and the *Ḥāwīyah*. In terms of contents, this Ms. is similar to P1, except for three poems absent in P1: the *Iddat al-shuhūr*, the *Fī ma'rifat al-manāzil* and the *Kitāb al-fuṣūl*. [External link](#).

1.1.12 Yale

Yale University Library, Landberg MSS 401. Dated ca. 976/1568,⁷ 156 folios (hereafter Y1). Abbreviated by Khoury as ٤.

The Ms. includes 4 works by Sulaymān al-Mahrī: *Al-Minhāj al-fākhir*; *Umdat al-mahrīyah*; *Tuḥfat al-fuḥūl*; and *Mir'āt al-salāk li-kurāt al-aflāk*. With the exception of the latter, all these are also found in P2. [External link](#).

2 Main Works and Authors

In this section we list chronologically from the earliest testimonies the works pertaining to Arabic navigation, with a more or less detailed overview of their themes and historical relevance. As can be seen below, the earliest works are not nautical treatises, but only give maritime information in passing; they are helpful nonetheless, for various reasons, not least because they help establish a chronology towards the extant nautical treatises of the fifteenth century and afterwards. Trying to retain our focus on properly nautical texts, we have had to draw a line and decided to leave out of this list some of those earliest works, like the travel narratives of Ibn Battuta or Ibn Mujawir, and the geographic work of al-Mas'ūdī.

2.1 *Kitāb al-masālik wa al-mamālik* (9th/10th century)

Book of Routes and Kingdoms, by Ibn Khurdādhbih (also transliterated Ibn Khurradādhbih and variously otherwise, d. between 272/885 and 300/912). One Ms. of this work is found at the Bodleian Library (MS. Huntington 433). [External Link](#).

Describing different routes from one specific location to another, Ibn Khurdādhbih's book has been seen as a “manual for the use of secretaries of the administration” (Pellat, 2020). Even though most routes are land routes, there is one –from Basra to “the Orient”– by sea which describes specific distances, locations and landmarks.

Editions and Studies:

de Meynard, Charles Casimir Barbier. 1865. *Le Livre des routes et des provinces*. Paris: Impr. impériale.

De Goeje, Michael Jan. 1889 (repr. 2013). *Kitāb al-Masālik wa l-Mamālik*. Leiden: Brill.

De Goeje, Michael Jan. 1907. *Selections from Arabic Geographical Literature*, 3-10. Leiden: Brill.

⁷The description from Yale University catalog conflicts with Khoury's and Tibbetts'. In his 1971 edition, Khoury dates the manuscript in 1097/1686. Tibbetts, in his article for the Enciclopedia of Islam, refers to the manuscript as “Yale Arab ms. 1480, 1535, 1536–7” and dates it 1091/1680. Neither of the authors mentions the *Mir'āt al-salāk li-kurāt al-aflāk*.

2.2 Akhbār al-ṣīn wa-al-hind (9th-10th century)

Narratives of China and India, by Abū Zayd al-Sīrāfī. It is found in a single Ms. at the BnF, Ms. Arabe 2281 (2a–23b). [External link](#).

Akhbār al-ṣīn wa-al-hind is actually the fusion of two different works: the first was written in 237/851–52 by an unknown author and the second—which aimed at developing and correcting the former’s contents—was composed somewhere between 271/884 and 332/943–44 by Abū Zayd al-Sīrāfī. Taken together, they form a work made by various journeys accounts which took place around the Indian Ocean. Such accounts were originally not from the authors themselves but gathered from informers who—for the most part—remain anonymous and often worked in commercial trade.

Even though it contains interesting passages regarding shipbuilding and the seas of the Indian Ocean, the second book has very little information regarding routes or navigation. In fact, sailors’ (*al-baḥriyūn*) accounts were even avoided by Abū Zayd, who deemed them unreliable (2014, 132–33). The same does not happen in the first book. Although it is also concerned with descriptions of far away peoples and their costumes, such descriptions are preceded, first, by chapter “On The Sea Route from Sīrāf to Khānū” (in China) (2014, 31), and then by another “On Tides and Usual Phenomena of the Seas” (2014, 35). It is only after this voyage, that the reader arrives to an account on “The Chinese and Some of their Customs” (2014, 37).

Edition and Studies:

Renaudot, Eusèbe. 1718. *Anciennes Relations Des Indes et de La Chine, de Deux Voyageurs Mahometans, Qui y Allèrent Dans Le Neuvième Siecle; Traduites d’arabe: Avec Des Remarques Sur Les Principaux Endroits de Ces Relations*. Paris: Jean-Baptiste Coignard.

Ferrand, Gabriel. 1922. *Voyage Du Marchand Arabe Sulaymân En Inde et En Chine, Redigé En 851, Suivi de Remarques*. Paris: Bossard.

Sauvaget, Jean. 1948. *Relation de la Chine et de l’Inde*. Paris: Les Belles Lettres.

al-Shārūnī, Yūsef, ed. 1999. *Akhbār al-ṣīn wa al-hind*. Al-Qāhira : al-Dār al-Miṣriyya al-Lubnāniyya.

Khoury, Ibrahim, ed. 1991. *Akhbār al-ṣīn wa al-hind*. Beirut: Dār al-Mawsim lil-I’lām.

Ibn Faḍlān, Aḥmad. 2014. *Two Arabic Travel Books. Accounts of China and India and Mission to the Volga*. Edited by Tim Mackintosh-Smith, and James E. James. Library of Arabic Literature 17. Abu Dhabi: NYU Press.

2.3 Kitāb ‘ajā’ib al-hind (10th century)

The Book of the Marvels of India, attributed to a Buzurg Ibn Shahriyār al-Rāmhormuzī. MS. Aya Sofya 3306 in the Süleymaniye Library, Istanbul.

The book is a collection of 134 mariners' tales gathered by a Buzurg ibn Shahriyār, a ship captain (*nākhudā*) of Persian origin. It describes the adventures of men who, sailing the Red Sea, the Persian Gulf and the Indian Ocean, came across different cultures, environments, wonders and perils. The book does not attempt to give precise descriptions of navigation routes or practices, but, rather, it is considered as part of a literary genre of marvels and wonders of nature, in which imagination and reality are often mixed. Nevertheless, the value of the *Kitāb 'Ajā'ib* as an early source on Arabic navigation should not be underestimated. These tenth century tales, originally told by captains, pilots and marines—while not describing them fully—do include specific sea routes, navigational terms and useful knowledge concerning stars, winds and landmarks that, centuries later, still feature in Ibn Mājid and al-Mahri's works. It is a popular book and we are aware of the existence of other Arabic editions we have not been able to track.

Edition and Studies:

Van der Lith, Pieter Antonie, and L. Marcel Devic, eds. 1883–6. *Kitāb 'Ajā'ib al-Hind ou Livre Des Merveilles de l'Inde*. Leiden: Brill.

De Goeje, Michael Jan. 1907. *Selections from Arabic Geographical Literature*, 68-75. Leiden: Brill.

Freeman-Grenville, G.S.P. ed. 1981. *Book of the Wonders of India: Mainland, Sea and Islands*. UK: East-West Publications Ltd.

al-Ḥabashī, 'Abd Allāh Muḥammad, ed. 2000. *'Ajā'ib al-hind li-Buzurg ibn Shahriyār* UAE: Majma' al-Thaqāfi.

Shihāb, Ḥasan Ṣāliḥ. 2010. *'Ajā'ib al-hind li-Buzurg ibn Shahriyār bayn al-ḥaqīqah wa-al-ustūrah (The Marvels of India by Buzurg Ibn Shahriyār, Between Reality and Myth)*. Abu Dhabi: National Library Abu Dhabi Authority for Culture & Heritage.

Shafiq, Suhanna. 2013. "The Maritime Culture in the *Kitāb 'Aja'ib al-Hind* (The Book of the Marvels of India) by Buzurg Ibn Shahriyār (d. 399/1009)." Berlin, Boston: Klaus Schwarz Verlag.

Agius, Dionisius A. 2014. "Abhara's voyages." In *The World in the Viking Age*, edited by Søren M. Sindbæk, and Athena Trakadas, 40-45. Roskilde: The Viking Ship Museum.

2.4 Aḥsan al-taqāsīm fī ma'rifat al-aqālīm (10th century)

The Best Divisions for Knowledge of the Regions, by Muḥammad ibn Aḥmad al-Maqdisī (also al-Muqaddasī; d. ca. 390/1000). Manuscripts extant in Berlin and Istanbul. Berlin, Staatsbibliothek, Sprenger 5 ([external link](#)), and Süleymaniye Library, Aya Sofya 2971.

A geographical book which, while describing the rivers and seas, provides information regarding tenth century maritime culture. It is the last of five works produced by what has been called the Balkhī School of geographers. Before *Aḥsan al-taqāsīm* there were al-Balkhī's *Ṣuwar al-aqālīm* (*Shapes of the Climes*), al-Iṣṭākhri's *Kitāb al-masālik wa al-mamālik* and Ibn Ḥawqal's *Ṣurat al-ard* (*Image of the*

Land). All these aimed at representing the lands and seas of Islam both in texts and in maps.

Aḥsan al-taqāsīm is not particularly innovative in terms of contents. Like the geographers that preceded him, al-Maqdisī describes Islam as encompassing two seas: The Indian Ocean and the Mediterranean. In a continuity with the Greek and Roman tradition, the Red Sea and the Persian Gulf are perceived not as separated entities, but rather as two integrated parts of the Indian Ocean, differentiated by specific currents, winds, islands and coasts.

By contrast, the method applied for collecting and organizing information seems to be particular to this work. Unlike the precedent members of the Balkhī School, al-Maqdisī often mentions his sources in order to argue for the reliability of his descriptions. His chapter “On the Seas and Rivers,” begins by explaining that the information presented was collected by consulting the highest authorities in such matters: men who frequently sailed the seas.

“And I kept company with elders born and bred around this sea, from among the captains, officers, navigators, agents and tradesmen, and I found them to be the keenest of men about it, about its anchorages, winds and islands, and I asked them about its matters and limits, and I saw they have notebooks (dafātir) regarding all this from which they learn, and upon which they rely and act” (2003, 17).

By consulting seamen, al-Maqdisī extends the scope of his work. Apart from the geographical descriptions, it includes useful accounts that specify how certain conditions affect navigational practices. That way, along with details on what sailors carried, the chapter points to the perils sea travellers are exposed to and how they should proceed to avoid them. As André Miquel put it, al-Maqdisī intended “to create a useful science, notably to merchants and the cultivated man” (2012).

Editions and Studies:

De Goeje, Michael Jan. 1906. *Descriptio Imperii Moslemici*. Bibliotheca Geographorum Arabicorum III, vii. Leiden: Brill.

De Goeje, Michael Jan. 1907. *Selections from Arabic Geographical Literature*, 62-68. Leiden: Brill.

Miquel, André. 1963. *Aḥsan at-taqāsīm fī maʿrifat al-aqālīm; La Meilleure répartition pour la connaissance des provinces*. Damascus; Beirut: Imprimerie catholique.

Collins, Basil Anthony. 1994. *The Best Divisions for Knowledge of the Regions: A Translation of Aḥsan al-Taqāsīm fī Maʿrifat al-Aqālīm*. Reading, UK: Centre for Muslim Contribution to Civilisation.

al-Ḍannāwī, Muḥammad Amīn, ed. 2002. *Aḥsan al-taqāsīm fī maʿrifat al-aqālīm*. Beirut: Dār al-Kutub.

2.5 Aḥmad Ibn Mājid (mid 15th century)

Shihāb al-Dīn Aḥmad ibn Mājid (d.ca. 1500) has a proverbial and uncontested place as the Arab authority on navigation. Beyond the ken of Arab navigation strictly, he has added historical importance because, born ca. 1420, he was in his prime during the middle of the 15th century, and his works are known to have been already circulating by the time of the Portuguese arrival in the Indian Ocean. For almost a century it became commonplace in navigation literature that he had been the one who guided Vasco da Gama from Malindi to India. This claim has been proved repeatedly and in detail to be fanciful, especially by Ibrahim Khoury, who devoted decades to editing critically and publishing Ibn Mājid from all the manuscripts he could muster (see in particular Khoury 2001, 213 ff.). It can undoubtedly be affirmed, nevertheless, that Ibn Mājid did help Da Gama, but only through the presence of his writings. In fact, Khoury himself speaks (2001, 104, 114) of a nautical text by Ibn Mājid which was appropriated by Da Gama and made its way to Lisbon, to be eventually incorporated into the earliest northern European nautical treatises—this merits detailed verification through comparative work, which is currently under way by the RUTTER team.

We list below the forty-one works currently attributed to Ibn Mājid, considering three major and the rest of minor importance, sometimes only because of their extent. There has been some variation in this tally among authors and over the years, but everyone agrees on the primacy of the three works we list first here below.

2.5.1 *Al-Fawā'id fi uṣūl 'ilm al-baḥr wa-al-qawā'id*

*Addenda on the Principles and Foundations of Maritime Science*⁸

This work, a collection of twelve chapters on various topics of Indian Ocean navigation, has long been considered Ibn Mājid's most important text. There are two critical editions apart from the facsimilar French edition made by Ferrand in 1920. The twelve divisions of the text are called *fawā'id*, “useful texts”, or “addenda”, because they are thought as appendages, practically footnotes, to a long tradition of nautical treatises, and most likely also, in line with the authors' claims, because they are accessory to the practical expertise, not to be considered self-sufficient, but only a support for expert mariners. Here is a list of contents of the *Fawā'id*:

I – History of navigation from Noah to Ibn Mājid's time; II – The qualities of the pilot (*mu'allim*); III – The lunar mansions; IV – The compass rhumbs; V – Classical astronomers and geographers; months of the Roman year; VI – Maritime routes: coastal and high sea routes; VII – Measurement of stellar altitudes (*qiyās*); VIII – Landmarks (*ishārāt*); policies (*siyāsāt*) of the navigator; IX – Description of the world's coasts; three types of pilots; X – The world's ten biggest islands; XI – Monsoons; XII – The Red Sea.

Editions and Studies:

Ferrand, Gabriel, ed. 1921. *Instructions nautiques et routiers Arabes et Portugais des XVe et XVIe siècle: reproduits, traduits et annotés*. 3 vols. Paris: Geuthner. External Links: [Volume 1](#);

⁸Found in B1, K1, Oxon.2, P2, W1.

Volume 2; Volume 3.

A three-volume edition of Ibn Mājid's and Sulayman al-Mahrī's works found in P1 and P2. The first two volumes were published in 1921 and are facsimiles of the manuscripts. The third volume was published in 1928 and became only part of what was originally proposed. Beginning with a reedition of articles by Prinsep, Concreve and Saussure on navigation and nautical science, the volume continues with Ferrand's chapter on the three known authors: Ibn Mājid, Sulaymān al-Mahrī and Sīdī 'Alī Çelebi. At the end, there is a small glossary with a few technical terms.

Khoury, Ibrahim, and 'Izzat Ḥasan, eds. 1971. *Shihāb al-Dīn Aḥmad Ibn Mājid: Kitāb al-fawā'id fī uṣūl 'ilm al-baḥr wa-al-qawā'id*. Maritime Sciences Among the Arabs 2. Damascus: Arab Academy of Damascus. [External link](#).

With several indices, well annotated, comparing three Mss., this is still, in spite of some criticism by Ḥ.Ş. Shihāb, the best critical edition of the *Fawā'id*. It relies on B1 for most readings.

Tibbetts, Gerald Randall. (1971) 1981. *Arab Navigation in the Indian Ocean before the Coming of the Portuguese*. London: The Royal Asiatic Society of Great Britain and Ireland.

An extensive analysis of the *Kitāb al-fawā'id*, including both an English edition of the text and a study on Arabic navigation. Based on a comparison between P1 and D1, Tibbetts' translation is the first and so far only English translation of the book. It has certain discrepancies with the readings in Khoury's and Shihāb's editions. Regarding navigation, the book begins with an introduction to Arabic authors and works until the end of the sixteenth century, and continues in another chapter on navigation techniques. Additionally, there is also a detailed topographical study of the Indian Ocean and the Red Sea which –along with the glossary on nautical terms– is of great utility to the lay reader.

Shumovsky, Teodor Adamovich, ed. 1985. Книгу польз об основах и правилах морской науки: Арабская морская энциклопедия XV века” Ахмада ибн Маджида (*The Book of Benefits on the Basics and Rules of Marine Science*). 2 vols. Arabskaia Morskaia Entsiklopediia 15. Moscow: Izdatel'stvo «Nauka».

This is an edition of the *Fawā'id* from the facsimile edition of Ferrand, accompanied by a Russian translation (Tolmacheva 1994, 123).

Shihāb, Ḥasan Ṣāliḥ, ed. 1989. *Taḥqīq kitāb al-fawā'id fī uṣūl 'ilm al-baḥr wa-al-qawā'id li-Ibn Mājid*. Kuwait: al-Jamī'at al-Jughrāfiyah lil-Kuwaytiyah.

al-Ghunaim, Abdullah Yousef, ed. 2004. *al-Fawā'id fī uṣūl 'ilm al-baḥr wa-'l-qawā'id*. Kuwait: Markaz al-Buḥūth wa-'l-Dirāsāt al-Kuwaytiyah.

This is a facsimilar edition of K₁, with a little useful introduction, locating it in the editorial history of the book. The author expresses his desire, still unfulfilled, for a new critical edition of the *Fawā'id* to be produced incorporating K₁ and Oxon 2.

Shihāb, Ḥasan Ṣāliḥ, ed. 2013. *Al-Fawā'id fī uṣūl 'ilm al-baḥr wa al-qawā'id*. Abu Dhabi: Abu Dhabi Tourism & Culture Authority, Dār al-Kutub al-Waṭāniyah.

This is the second edition of the same title by Shihāb, and the most recent edition of the *Kitāb al-fawā'id*, based on collation of all the known manuscripts with the exception of Oxon. 2. Some mistakes seem to have crept into the final text, and it should be consulted judiciously.

2.5.2 *Al-Ḥawīyat al-ikhtiṣār fī uṣūl 'ilm al-biḥār*

*The Comprehensive Summary on the Principles of the Knowledge of the Seas*⁹

Written in 866/1462 with 1082 verses, this is Ibn Mājid's most extensive poem. Here he presents for the first time the majority of the themes discussed later in the *Fawā'id*. How do these works resemble and differ from one another? Probably the most thorough comparison between the two works was produced by Khoury (2001), whose conclusion is worth briefly noting here. Considering the complexity of the *Ḥawīyah* in terms of content and form, Khoury argued that this must have been the work Ibn Mājid regarded as his best. Written in a language quite distant from the marine jargon used at the time—in a language which would require “un effort considérable de toutes les facultés mentales d'un maître bien formé” (1985, 3)—it seemed unlikely that it would have been meant to assist pilots at sea. On the contrary, Khoury believed that the reason for writing such a complex poem was—first and foremost—Ibn Mājid's ambition of being eternally celebrated. This argument, however, flies in the face of a centuries-long tradition of using verse to convey highly technical knowledge, from Ancient Greek through Latin, and with not few examples in Arabic literature (Dunsch 2012, 6).

Back to *al-Ḥawīyat*, the work is divided into eleven chapters:

I – Landmarks (*ishārāt*). Knowledge and preparations of the pilots; II – The lunar mansions and the rhumbs; III and IV – Elevations of the stars, the *bāshī* (distance of the pole star to the actual pole), and the rules for the observation of specific stars; V – Maritime routes in the Arabian Peninsula's coast; VI – Maritime routes in Africa's oriental coast; VII – Maritime routes in Asia's south and southeast coasts; VIII – The maritime distances between the Arabian Peninsula's coast and different points in South Asia, especially in India; IX – The altitude of the pole star, the two guardians, and the Ursa Minor for the main points in the Indian Ocean; X – Useful practices for the pilot at sea; XI – A thorough review of the distances in high sea (*zām*), of the zodiac signs, the hours, the binary star, the precursor signs of big storms, and, finally, a conclusion where Ibn Mājid puts the specific date and the number of verses in each chapter.

⁹Found in B₁ (1082 vv.); D₁ (1067 vv.); P₁ (1073 vv.); P₂ (904 vv.); W₁ (1067 vv.).

Editions and Studies:

This text has been published four times (al-Ghunaym 2006, 268) in the following order.

Ferrand, Gabriel, ed. 1921–23. *Instructions nautiques et routiers Arabes et Portugais des XVe et XVIe siècle : reproduits, traduits et annotés*, Vol.1, *Ibn Mājid*, fols. 88v–117r. Paris: Geuthner.

Khoury, Ibrahim, ed. 1971. “La Hawiya: Abregé versifié des principes de nautique.” *Bulletin d’études orientales* 24: 249–386.

An extensive study and transcription of the *Ḥawīyah*. The article begins with an introduction to Ibn Mājid, his life and works, and continues with an analysis of the poem, describing the manuscripts where it is found, its sources and contents. In a third part, it includes three different Arabic-French glossaries: on navigational terms, on places and on stars—and a topographic study in the form of six maps, representing the geographical areas mentioned in the poem. The rest of the article is devoted to the edition of the *Ḥawīyah*, based on a collation of P1, D1 and B1.

Shihāb, Ḥasan Ṣāliḥ, ed. 1993. *Al-Nūnīyah al-kubrā ma‘a sitta qaṣā’id ukhrā (The Great Rhyme in Nūn, with Six Other Poems)*. Muscat: National Ministry of Heritage and Culture: 74–232.

This edition by Shihāb was based on a newly found Omani manuscript which contained two previously unknown works. It is remarkable that it was produced two years before the following edition by Khoury, who could have profited from the new Ms.

Khoury, Ibrahim, ed. (1995) 2001. *Ḥawīyah al-ikhtīṣār*. Silsilat kitāb al-abḥāth 2. Ra’s al-Khaymah: Markaz al-Dirāsāt wa-al-Wathā’iq.

Khoury published this new edition basing himself on the three Mss. used for his edition of the *Fawā’id*. It has been reprinted, and it includes an English translation of the poem (al-Ghunaim 2004, 268).

2.5.3 Al-Sufāliyah

“The Poem of Sofala”¹⁰

As per the section on manuscripts above, this poem is found in a single manuscript, namely Pt1. Written in 807 verses, this copy is mostly dedicated to navigation in the Oriental coast of Africa—from Cape Guardafui to the South of Sofala. Additionally, it includes a few passages concerning the presence of the Portuguese in the Indian Ocean. Reading the poem in its entirety, Shumovsky was led to the same argument that Ferrand had proposed years earlier, namely that Ibn Mājid had been the Arabic pilot who took Vasco da Gama to India. After the publication of the Russian edition in 1957, Shumovsky’s reading remained unchallenged until

¹⁰Found in Pt1 with 803 verses.

1983, when Khoury translated the poem to English. According to Khoury, the copy in Pt1 included several interpolated passages that were later additions made by the copyist. Once these are removed, the result is a well-structured poem with 701 verses, divided in five parts:

I – Routes from India to the African coast; II – The route from al-Sif al-Ṭawīl to al-Sawāḥil (Kenia, Tanzania); III – Navigation along Mozambique’s north coast; IV – Navigation in Sofala; V – Navigation in the islands in front of al-Zanj, al-’Ahwār and Sofala.

Editions

Shumovsky, Teodor Adamovich, ed. 1957. Три неизвестные лоции Ахмада ибн Маджида (*Three Unknown Poems by Aḥmad ibn Mājīd*). Moscow: USSR Academy of Sciences.

An edition of the three poems found in Pt1: *al-Sufālīyah*, *al-Ma’laqīyah* and *al-Tā’īyah*. The book includes an introduction, photographs of the Petersburger manuscript, and a translation from Arabic to Russian. According to Khoury, Shumovsky has the merit of being the first western scholar to dare translate the nautical poems, which are the core of the Arabic nautical tradition (Khoury 2001, 203). The Russian text was eventually translated into Portuguese by Myron Malkiel-Jirmounsky in 1960 (see next entry), and the edition of the text spawned the following Arabic publication.

Ibn Mājīd, Aḥmad, and Teodor Adamovich Shumovsky. 1960. *Três roteiros desconhecidos de Ahmad Ibn-Madjid, o piloto árabe de Vasco da Gama*. Translated by Myron Malkiel-Jirmounsky Chumovsky. Lisbon: Comissão Executiva das Comemorações do v Centenário da morte do Infante D. Henrique.

Shumovsky, Teodor Adamovich and Muḥammad Munīr Mursī, eds. 1969. *Thalāth azhār fī ma’rifat al-biḥār (Three Flowers on the Knowledge of the Seas)*. Cairo: ‘Ālim al-Kutub.

Khoury, Ibrahim, ed. 1983. *As-Sufaliyya: «The Poem of Sofala» by Aḥmad Ibn Mājīd*. Vol. XXXVII. Separata do «Boletim da Biblioteca da Universidade de Coimbra» CXLIII. Coimbra: Junta de Investigações Científicas do Ultramar.

Considering that Shumovsky’s translation had interpretation mistakes, ambiguities and—most importantly—that it could not account for the alien verses inserted by the copyist, Khoury’s article includes a critical analysis and an English translation of *al-Sufālīyah*.

———. 1987/88. “Les poèmes nautiques d’Ahmad Ibn Magid, 3eme partie. Les poèmes à rime variable: *al-’Arāḡīz*. Texte arabe établi avec introduction et analyse en français”. *Bulletin d’études orientales* 39–40: 373–420 (Ar.3–50).

In an edition of the known *urjūza* poems by Ibn Mājīd, Khoury began with an analysis and edition of *Al-Sufālīyah*. This article thus offered, for the first time, a critical Arabic text of the poem.

2.5.4 Minor Metrical Treatises

Several *arājīz* (pl. of *urjūza*) on specific topics of maritime sciences.

Al-Balīghah fī qiyās al-suhayl wa-al-rāmiḥ “The Eloquent Poem on the Measure of Canopus and Arcturus“. 69 verses. Found in P₁, W₁ and Oxon.1. Verses 19–24 are missing in P₁ and W₁.

Edition:

Khoury, Ibrahim. 1985/86. “Les poèmes nautiques d’Ahmad Ibn Magid, 2eme partie. Les poèmes à rime unique: *Al-Qaṣā’id*. Texte arabe établi avec introduction et analyse en français”. *Bulletin d’études orientales* 37–38: 226–230 (Ar. 47–51).

Barr al-‘arab fī khalīj fāris “Poem of the Arabic Coasts on the Persian Gulf“. 100 verses. Found in P₁; W₁. A description of the sea route from Basra to the strait of Hormuz.

Edition:

Khoury 1987–88, 263–269 (Ar. 154–160).

Ḍarībat al-ḍarā’ib “The Assembly of the Analogues“, on the stars that are useful for navigation. 192 verses. Found in P₁ and W₁. Verses 97 and 98 are missing in P₁.

Edition:

Khoury 1985–86, 245–257 (Ar. 20–32).

al-Dhahabīyah “The Golden Poem“. 193 verses. Found in P₁, W₁; Oxon. 1. Verses 5–45 are missing in Oxon.1.

On astronomical navigation. The poem begins with an explanation on the longitudes, the rhumbs, *zāms* and the *tirfah*, then mentioning specific stars and their altitudes. It ends quoting *al-Fawā’id* and listing sixteen of Ibn Mājid’s poems, five of which are lost.

Edition:

Khoury 1985–86, 262–273 (Ar. 4–15).

Al-Fā’iqah fī qiyās al-ḍafda‘ al-awwal wa-qayduhu suhayl “The Eminent Poem on the Measure of Fomalhaut When Canopus is Fixed“. 59 verses. Found in P₁; W₁; Oxon.1. Verses 19 and 20 in Oxon. 1 are missing in P₁ and W₁.

Edition:

Khoury 1985–86, 208–212 (Ar. 66–69).

Hādīyat al-ma‘ālimah “The Guide of the Pilots”. 155 verses. Found in P2. It describes the sea route from Oman to Gujarat and Konkan.

Edition:

Khoury 1987–88, 270–280 (Ar. 143–153); Shihāb 1993, 256–68.

‘Iddat al-shuhūr al-rūmīyah wa-kullu shahr kam huwa “The Number of The Byzantine Months and the Days in Each Month”. 13 verses. Found in P1. The Julian months: their names, number of days and distribution in four seasons.

Edition:

Khoury 1985–86, 207–208 (Ar. 69–70).

Kanz al-ma‘ālimah wa-dhakhīratuhum fī ‘ilm al-majhūlāt fī al-baḥr wa-al-nujūm wa al-burūj wa-asmāihā wa-aqtābihā “Treasure and Provision of the Pilots on the Unknowns at Sea, on the Stars and the Constellations, Their Names and Their Poles”. 72 verses. Found in O1, P1, W1 and Oxon 1. The first verse in P1 is written in prose in W1. According to al-Ghunaim, the second hemistich of the verses 29 and 30 and the first hemistich of verse 31 are missing in Oxon 1.

Edition:

Khoury 1985–86, 217–222 (Ar. 55–60); Shihāb 1993, 233–244.

Kitāb al-fuṣūl “Book of the Divisions”. Found in P1. Some prose lines on several topics at the end of the manuscript. Unpublished to date.

Al-Makkīyah “The Mecca Poem”. 172 verses. Found in P1 and W1. The second hemistich of verse 59 and the first hemistich of verse 60 are missing due to a copist mistake. A description of the sea route from Jeddah to cape Fartak, and from there on to several different ports.

Edition:

Khoury 1985–86, 233–244 (Ar. 33–44).

Al-Ma‘laqīyah “The Poem of Malacca”. 273 verses. Found in Pt1.

Edition:

Shumovsky 1957; Khoury 1987–88, 321–336 (Ar. 87–102).

Manāzil al-qamar “The Lunar Mansions”. This poem is found both in D1 and P1. In the Paris Ms. it has the full title *Fī ma‘rifat al-manāzil wa-ḥaqīqatihā fī al-samā’ wa-ashkālīhā wa-‘adadihā* (“On Knowledge of the Mansions, their Ascertainment on the Sky, their Shapes and Number”), and it is attributed to ‘Alī ibn Abī Ṭālib.

Edition:

Khoury 1987–88, 258–262 (Ar. 161–165).

Mawāsim al-safar “The Seasons for Travelling”. Found in B₁.

Edition:

Khoury 1985–86, 205–207 (Ar. 70–72).

Mīmīyat al-abdāl tuqās ‘alá sittat awjuhīn “The *Mīm* Rhyme of the Interchangeable Stars that Are Measured in Six Ways”. 64 verses. Found in P₁ and W₁.

Edition:

Khoury 1985–86, 217–213 (Ar. 60–64).

Al-Mu‘arribah “The Elucidator”. 178 verses. Found in P₁ and W₁. A summary of navigation in the Gulf of Berbera (Gulf of Aden).

Edition:

Khoury 1987–88, 281–292 (Ar. 131–142); Shihāb 1993, 48–73.

Al-Mukhammasat al-istiwāyāt “Quintets on the Moderations”. 17 strophes. Found in P₁ and W₁. About the stars which indicate the position of Polaris. As indicated by the titles, this poem has an interesting fivefold structure, with every four hemistichs ending with a fifth one as a refrain for the pilots: “Ponder and ask for advice, and wake the night and be resolute.”

Edition:

Khoury 1985–86, 201–204 (Ar. 73–76);

Fī musāyarat al-arḍ min ‘adan ilā jiddah “Going by Land from Aden to Jeddah”. 119 verses. Found in Oxon. 1, fols. 12v.–16r. Unpublished to date.

Nādirat al-abdāl fī al-wāqi‘ wa-dhubbān al-‘ayyūq “The Extraordinary Poem of the Permutable Stars over Vega and β Aur”. 57 verses. Found in P₁ and W₁. The copy in P₁ misses the second hemistich of v. 52. A Poem on the altitudes of the stars Vega and β Aur.

Edition:

Khoury 1985–86, 230–233 (Ar. 44–47).

Fī al-natakhāt li-barr al-hind wa-barr al-‘arabī “The Landing Ports on the Indian and Arabian Coasts”. 255 verses. Found in P₁ and W₁.

Edition:

Khoury 1987–88, 305–320 (Ar. 103–118).

Nūnīyah al-kubrā “The Great Rhyme in Nūn”. Found in O₁ and K₁.

Edition:

Shihāb 1993.

Qad šadaḥa al-dīk “The Cock Has Crowed”. 49 verses. Found in Oxon. 1. According to al-Ghunaim, this poem presents the altitude values of several stars. Unpublished to date.

Al-Qāfiyah fī ma‘rifat al-majhūlāt min al-nujūm al-lawāfi quyyidū bi-al-manāzil jayyidan “The Rhyme in *Qāf* on the Knowledge of the Stars Grouped With the Lunar Mansions and Unknown to the Sailors”. Found in B1.

Edition:

Khoury 1985–86, 222–225 (Ar. 52–55).

Fī qismat al-jumma ‘alā anjum banāt na‘sh “Division of the Surface of the Sea According to the Stars on the Ursa Major”. 221 verses. Found in P1 and W1.

Edition:

Khoury 1987–88, 293–304 (Ar. 119–130).

Al-Sab‘iyah “The Poem of the Seven Nautical Sciences”. 307 verses. Found in P2 and Oxon. 1. According to al-Ghunaim, verses 75 and 165 are missing in Oxon.1.

Edition:

Khoury 1987–88, 272–254 (Ar. 50–69), excludes the verses 227 and 228.

Al-qaṣīdah al-shahīrah bi-misallat al-fūlādhi “Famous Poem on the Steel Needle”. 34 verses. Found in Oxon. 1, fols. 24–25. Unpublished to date, this short poem deals with astronomical bearings.

Al-Tā’iyah “The Rhyme in *Tā*”. Found in Pt1. A description of the sea voyage from Jeddah to Aden.

Edition:

Shumovsky 1957; Khoury 1985–86, 262–268 (Ar. 15–19).

Taṣnīfu qiblat al-islām fī jāmi‘ al-dunyā “The Qibla of Islam in the Entire World”. 295 verses. Found in P1 and W1.

Edition:

Khoury 1987–88, 353–337 (Ar. 55–86); Shihāb 1991.

Fī waṣf al-ṭariq min al-bāb ilā jiddah fī musāyarat al-sāhil “On the Description of the Way from Bab-el-Mandeb to Jeddah Going by the Coast”. 123 verses. Found in Oxon. 1. Unpublished to date.

2.6 Sulaymān al-Mahrī (early 16th century)

Very little is known about the person of Sulaymān b. Aḥmad b. Sulaymān al-Mahrī, a native of Shiḥr, on the Yemeni coast, halfway between Aden and the Omani border. Some of his works were translated into Turkish by Çelebī, who tells us that al-Mahrī was no longer alive in 1554. Al-Mahrī is thematically a direct heir, and according to legend a direct pupil, of Ibn Mājid, whom he quotes in his work. Eventually they would be copied together in nautical collectanea like P₁, thus testifying to a clear complementarity.

2.6.1 *Minhāj al-fākhir fī ʿilm al-baḥr al-zākhir*

Precious Method on the Science of the Rising Sea. Found in: B₁; Le₁; O₂; P₂; Y₁; also in Peshawar. Khoury (1970) divides it in an introduction followed by seven chapters and a conclusion:

Introduction – Explanation of the *zām* and the *tirfah*; I – Bearings of known and populated lands, with some pages about high sea routes; II – Root latitude and other latitudes; III – A description of the islands with their latitudes; IV – Distance based on polar latitude and the Two Calves (β and γ Ursae minoris); V – On winds and perils; VI – On signs near the lands; VII – On the passage of the sun and the moon through the zodiac signs and the lunar mansions; Conclusion – Description of trips to Diu, Malacca, and other ports.

Editions and Studies:

Ferrand, Gabriel. 1925. *Instructions nautiques et routiers Arabes et Portugais des XVe et XVIe siècle: reproduits, traduits et annotés*. Vol. 2 Sulaymān al-Mahrī et Ibn Mājid. Paris: Geuthner, fols. 59v-92r.

Khoury, Ibrahim. 1970. *Sulaymān Ibn Aḥmad Ibn Sulaymān al-Mahrī*. Vol. 2, *Al-Minhāj al-fākhir fī ʿilm al-baḥr al-zākhir*. Maritime Sciences Among the Arabs 1. Damascus: The Arab Academy of Damascus.

2.6.2 *Al-ʿUmdat al-mahrīyah fī dībṭ al-ʿulūm al-baḥrīyah*

“The Reliable Mahrī Treatise on the Exactitude of Maritime Sciences”. Dated 1511. Found in Le₁; P₂; Y₁; also in Peshawar. It is divided in seven chapters:

I – Principles; II – Names of the stars and what is associated to them; III – Navigation “on the wind” and “under the wind”; IV – About the islands and their bearings; V – Latitudes of well-known lands; VI – Monsoons in the days of Nairuz; VII – Travelling various routes.

Editions and Studies:

Khoury, Ibrahim. 1970. *Sulaymān ibn Aḥmad ibn Sulaymān al-Mahrī*. Vol. 1, *Al-ʿUmdah al-mahrīyah fī dībṭ al-ʿulūm al-baḥrīyah*. Maritime Sciences Among the Arabs 1. Damascus: Arab Academy of Damascus.

2.6.3 Other Works:

Mirʿāt al-salāk li-kurāt al-aflāk

“Mirror of the travellers[?] on the Spheres of the Orbits”. Found in Y1. Unpublished to date.

Qilādat al-shumūs fī ‘ilm al-tawārikh

“Necklace of Suns on the Science of Chronology”. Found in P2.

Editions and Studies:

Khoury, Ibrahim. 1972. *Sulaiman Al-Mahrī’s Works*. Vol. 3, *Risālah qilādat al-shumūs wa is-takhrāj qawā‘id al-usūs; Tuḥfat al-fuḥūl fī tamhīd al-uṣūl fī uṣūl ‘ilm al-baḥr; Kitāb sharḥ tuḥfat al-fuḥūl fī tamhīd al-usūl fī Uṣūl ‘ilm al-baḥr*. Maritime Sciences Among the Arabs 1. Damascus: Arab Academy of Damascus, 3–11.

Tuḥfat al-fuḥūl fī tamhīd al-uṣūl

“The Worthy Men’s Classic on the Introduction to the Principles”. Found in P2; Q1; Y1. Only 6 folios. As some of the previous works, it includes a section on “two kinds of sailing at sea, i.e., following the coast line or crossing the high seas.”

Editions:

Khoury 1391/1972, 13–37.

Sharḥ tuḥfat al-fuḥūl fī tamhīd al-usūl

“A Commentary to the *Tuḥfat*”.

Found in P2.

Editions and Studies:

Khoury 1391/1972, 39–125.

2.7 Seydi ‘Alī Çelebī (16th century)

Seydi Ali Çelebi (1498–1563), also known as Seydi Ali Reis, Sidi Ali Ben Hossein, and Katib-i Rumi, was the Admiral of the Indian Ocean fleet. In contrast to the previous two authors, his life is relatively well documented by modern historians. Çelebi was born into a family of mariners and received his nautical education by sailing in the Mediterranean, under the chief Admiral of the Ottoman fleet. His nomination followed the death in 1553 of the Admiral Piri Reis, who had left fifteen galleys in Basra. That same year, he was sent by Suleiman I to bring the galleys back to Egypt, but was stopped by a Portuguese attack in the Persian Gulf. Çelebi was forced to take the Ottoman fleet to Gujarat in 1554, remained there for a year (Tibbetts 1971, 44), and returned to Istanbul by land.

A detailed account of his literary corpus can be found in Danişan 2019. Çelebi produced three main treatises: *Hülasatü'l-Hey'e (Epitome of Astronomy)*, which is a translation of al-Qushjī's *Al-Fathīyah* with additional sections on geography; *Al-Muḥīṭ (The Book of the Ocean)* in 1554, which is mainly a translation of al-Mahrī's *'Umdah*, as discussed below; and *Mir'atü'l-Memalik (The Mirror of the Countries)* in 1557, which is an introduction to several astronomical instruments. *Al-Muḥīṭ* was thus produced during Çelebi's stay in Gujarat, when he was already acquainted with astronomical matters and claimed to have in his possession ten Arabic works on navigation and geography (von Hammer 1834, 546). Yet, when commenting on *Al-Muḥīṭ*, Tibbetts noted that it contained several translation mistakes which could only lead "to the conclusion that Sidi Çelebi had no real knowledge of what his texts were dealing with" (1971, 45). How could this be? The answer may be related to Çelebi's education. Having been trained in the Mediterranean, he was unfamiliar with the problems and techniques related to Indian Ocean navigation. Çelebi realized this when, during his journey from India to Istanbul, he and the Ottoman fleet were lost in the Ocean (Danişan 2019, 3–4). Although it is not clear if such an experience is behind Çelebi's motivation to translate the Arabic works, it probably helps clarifying why he struggled to understand their content.

The important and immediate precedent of Piri Reis' *Kitab-ı Bahriye (Book of Navigation)*, whose contents overlap to a certain extent with the *Muḥīṭ*, should be the subject of a detailed collation.

2.7.1 *El-Muḥīṭ fi İlm el-eflak ve'l-ebhur (in Turkish)*

Book of the Ocean on the Science of the Spheres and the Seas. Mss. in Süleymaniye Library, Aya Sofya ms. 2591; and National Library of Austria, N.F. 184 ([external link](#)); allegedly also in Naples.

Composed in 1554, "this is the most recent work extant on the methods of navigation used in the Indian Ocean in the Ibn Mājid tradition." Following what has been described above, Çelebi claimed to have before him ten Arabic works on navigation and astronomy, six of which originally composed by Ibn Mājid and Sulaymān al-Mahrī. According to Tibbetts, *Al-Muḥīṭ* is mainly a Turkish translation of al-Mahrī's *'Umdah*, with additional passages from the other works and comments in specific sections. It is composed of ten chapters:

I– Names of the skies and stars, of the elements and what belongs to them; II– Foundation of the solar and lunar years; III– Divisions and subdivisions of the compass, the rhumbs and the *tirfā*; IV– Sea routes along the coast above and below the wind of Cape Comorin, the islands and America; V– Maritime calculations and technical terms; VI– Altitude of specific stars in order to determine the latitude of a place; VII– Distances between different ports. According to Tibbetts (1971, 45), it includes a collection of charts and maps which are not mentioned in any of Ibn Mājid's or al-Mahrī's works; VIII– Winds and monsoons; IX– Notice of certain islands and voyages, and the signs of vicinity of land; X– Accidents and dangers to look out for, and of hurricanes (von Hammer 1834, 516-17) (Ferrand 1925, 252-254).

Editions and Studies:

Von Hammer, Joseph, and James Prinsep. 1834. “Extracts from the Mohit, That is the Ocean, a Turkish Work on Navigation in the Indian Seas.” *Journal of the Asiatic Society of Bengal* 3, no. 35 (November): 545–56.

The first of four articles concerning *al-Muḥīṭ*. It is one of the earliest modern publications concerning texts on Arab navigation and mentioning Ibn Mājid, Sulaymān al-Mahrī—whose works Çelebī claims to have gathered and translated in *Al-Muḥīṭ*. Beginning with a small introduction, where the titles of the ten chapters are listed, the article then continues with von Hammer’s translation of Ch. 8: “Of the Winds and Moonsons.”

Von Hammer, Joseph, and James Prinsep. 1836. “Extracts from the Mohit (the Ocean), a Turkish Work on Navigation in the Indian Seas.” *The Journal of the Asiatic Society of Bengal* 5, no. 56 (August): 441–68.

The article is dedicated to the English translation of the ninth chapter of *Al-Muḥīṭ*: “Containing an explanation of some Islands and Voyages, and precautions, the knowledge of which is requisite for Navigators in the Indian Seas”. Being one of the earliest modern works on Arab navigation, the article begins by stating the major difficulties placed to the reader: along the text there are several terms and names with no modern correspondence. Thus, what von Hammer’s article proposes is a beginning: it begins to enquire about both the names of the places and the technical terms that are mentioned in the text—such as the *zām*, *iṣbā* and the *qiyās*. The chapter is divided into three sections: “Islands of the Arabian Coast”, “Islands of the Persian Coast”, and “Voyages and Indications of Nearby Coasts”—the last of these being a description of thirty sea voyages.

Von Hammer, Joseph, and James Prinsep. 1837. “Extracts from the Mohit (the Ocean), a Turkish Work on Navigation in the Indian Seas.” *The Journal of the Asiatic Society of Bengal* 6, no. 70 (October): 805–12.

A translation of *al-Muḥīṭ*’s tenth chapter: “Of certain truths founded on reason and experience; and of hurricanes.”

Von Hammer, Joseph. 1838. “Extracts of the Mohit (the Ocean), a Turkish Work on Navigation in the Indian Seas.” *The Journal of the Asiatic Society of Bengal* 7, no. 81 (September): 767–80.

A translation of *al-Muḥīṭ*’s first chapter: “Names of the skies, and the stars; of the elements and what belongs to them.” The chapter is divided in nine sections, beginning with one “on the skies, stars and the elements” and increasingly dealing with astronomical navigation through the introduction of the *iṣba*’, the *khān* (the

rhumbs), and the “instruments of measurement”—all required for the calculation of the distance of the stars. The article ends with a note by James Prinsep, which is dedicated mostly to the names of stars mentioned in *al-Muḥīṭ*.

Seydî Ali Reis. 1897. “Die topographischen Capitel des indischen Seespiegels Moḥīṭ,” translated by Maximilian Bittner, with maps by Wilhelm Tomaschek. In *Festschrift zur Erinnerung and die Eröffnung des Seeweges nach Ostindien durch Vasco da Gama*, 329–419. Vienna: K.K. Geographischen Gesellschaft.

Bonelli, Luigi. 1894. *Del Muḥīṭ o ‘Descrizione dei mari delle Indie’ dell’ammiraglio turco Sîdî ‘Alî detto Kiâtib-i-Rûm* (Ch. 4 of *Al-Muḥīṭ*). *Rendiconti della Reale Accademia dei Lincei, Classe di scienze morali, storiche e filologiche*. Serie Quinta, Vol. 3: 751–77.

Bonelli, Luigi. 1895. *Ancora del Muḥīṭ o ‘Descrizione dei mari delle Indie’ dell’ammiraglio turco Sîdî ‘Alî detto Kiâtib-i-Rûm* (Ch. 6 and parts of ch. 7 of *Al-Muḥīṭ*). *Rendiconti della Reale Accademia dei Lincei, Classe di scienze morali, storiche e filologiche*. Serie Quinta, Vol. 4: 36–51.

These articles reproduce two chapters and some sections of the *Muḥīṭ*’s Turkish text, based on a collation of the Vienna and Naples Mss.

3 Secondary Sources

In recent years (approx. the last fifteen years), some important works have been published in Arabic and stayed off the radar of European scholarship, with a few exceptions like Agius, who is acquainted with the works by Shihāb and other sources. The following list aims at being thorough, but it does not claim to be fully comprehensive; interested readers are advised to consult in particular the bibliographies of ‘Abd al-‘Alīm, Malhão Pereira, Mathew, Nadvi, and Shihāb.

Authors names are ordered alphabetically, with their titles in chronological order. Authors in boldface are deemed to be of particular importance. The bibliographic entries for medieval authors are found above; see the individual names under [Main Works and Authors](#).

- ‘Abd al-‘Alīm, Anwar (also Aleem, Anwar A.). 1967. “Concepts of currents, tides and winds among medieval Arab geographers in the Indian Ocean.” *Deep Sea Research and Oceanographic Abstracts* 14, no. 4, (August): 459–463.
- . 1979. *Al-Milāḥa wa-‘ulūm al-biḥār ‘inda al-‘Arab*. [Navigation and Maritime Sciences Among the Arabs]. Kuwait: ‘Ālam al-Ma‘rifa.
- . 1980. “On the History of Arab navigation in the Indian Ocean.” In *Oceanography: The Past*, edited by Mary Sears and Daniel Merriman, 582–95. New York: Springer.
- Agius, Dionysius. 2005. *Seafaring in the Arabian Gulf and Oman*. New York and London: Routledge.

Prof. Agius has an extensive list of publications, some quite recent, mostly on the vessels and on Mediterranean and Red Sea matters, but also a lot of work on Gulf navigation. [Follow this link](#) for his list of publications at the University of Exeter. The following are the ones most relevant to our present topics.

- . 2013. “Ships that Sailed the Red Sea in Medieval and Early Modern Islam: Perception and Reception.” In *The Hajj: Collected Essays*, edited by Venetia Porter and Liana Saif, 84–95. London: The British Museum Press.
- . 2013. “Omani Seafaring Identity before the Early 1600s: Ethnic and Linguistic Diversity in Oman and Overseas.” In *The Ibadism of Oman. Its overseas Development and its perception overseas*, edited by Michaela Hoffmann-Ruf and Abdulrahman Al Salimi, 41–56.

The article looks for an identity among Oman seafaring communities. It begins with an historical account regarding the seascape, trade routes and port towns of Oman and ends with a discussion on “identity, ethnicity and linguistic diversity from early to late medieval Oman.” Of particular interest is the bibliographic information the author gives in the first part, regarding sources on early navigation in the Indian Ocean. The article discusses the Persian and, later, Arabic trading routes with China. The main sources mentioned are: Sulaymān al-Tājir (9th century); al-Mas‘ūdī (10th); Buzurg ibn Shahriyar (11th century); Ibn Khurradādhbih—*Kitāb al-masālik wa al-mamālik* (*The Book of Routes and Lands*)—(13th century).

- . 2017. “Sea zones: the Balkhi School’s conceptual mapping of the Indian Ocean.” In “Méditerranée et océan Indien, deux mondes en miroir,” supplement, *Topoi Orient-Occident*, no. 15: 225–243.
- Agius, Dionisius A., John Cooper, and Chiara Zazzaro. 2014. “The Maritime Heritage of Yemen: a focus on traditional wooden *dhows*.” In *Ships, Saints and Sealore: Cultural Heritage and Ethnography of the Mediterranean and the Red Sea*, edited by Dionisius A. Agius, Timmy Gambin, and Athena Trakadas, 143–157. Oxford: Archaeopress.
- Ahmad, S. Maqbul. “Khambāyat”. In *Encyclopaedia of Islam*, Second Edition. doi: http://dx.doi.org/10.1163/1573-3912_islam_SIM_4179.
- . “Ibn Mādjid”. In *Encyclopaedia of Islam*, Second Edition. doi: http://dx.doi.org/10.1163/1573-3912_islam_COM_0335.
- Al Salimi, Abdulrahman, and Eric Staples. 2019. *A Maritime Lexicon: Arabic Nautical Terminology in the Indian Ocean*. Hildesheim: Georg Olms Verlag.
- Aleem, Anwar A., see ‘Abd al-‘Alīm.
- Allen, J. de V. 1980. “A Proposal for Indian Ocean Studies.” In *Historical Relations Across the Indian Ocean*, 137–152. Ghent: UNESCO.

- al-Amin, Hasan. 1408/1987. “Shihāb al-Dīn Aḥmad bin Mājid al-mashhūr bi-Ibn Mājid” (“Shihāb al-Dīn Aḥmad bin Mājid, known as Ibn Mājid”). In *Mustadrakat a‘yān al-shī‘ah*, (Beirut: Dār al-Ta‘āruf), 4: 9–26.

This is an extensive article in an encyclopaedia of Shia personalities. A good part of it is devoted to the matter of Da Gama’s piloting to India, and especially the related comments of the renowned 16th century author al-Nahrawālī (cf. Khoury 1971, 16).

- Barradas, Lerenó. 1967. *O Sul de Moçambique No Roteiro de Sofala do Piloto Ahmad Ibn-Majid*. Vol. XXII. Separata da Revista da Universidade de Coimbra XX. Coimbra: Junta de Investigações do Ultramar.
- Beaujard, Philippe. 2017. “L’océan Indien, Un Espace Central du Système-Monde Afro-Eurasien Avant le XVIIe Siècle.” In “Méditerranée et océan Indien, deux mondes en miroir,” supplement, *Topoi Orient-Occident*, no. 15: 389–411.
- . 2019. “Introduction: The Geography of the Indian Ocean and Its Navigation.” In *The Worlds of the Indian Ocean*, Vol. 1: From the Fourth Millennium BCE to the Sixth Century, 9–18. Cambridge: Cambridge University Press.
- Becker, C.H., and Dunlop, D.M. “Baḥr Al-Zandj”. In *Encyclopaedia of Islam*, Second Edition. doi: http://dx.doi.org/10.1163/1573-3912_islam_SIM_1066.
- Bellec, François. 1988. “Early Pilots in the Muslim Waters.” In *Proceedings of the Indian Ocean Week*, Graeme Henderson, 5–10. Western Australian Maritime Museum.
- Burton, Antoinette, Madhavi Kale, Isabel Hofmeyr, Clare Anderson, Christopher J. Lee, and Nile Green. 2013. “Sea Tracks and Trails: Indian Ocean Worlds as Method.” *History Compass* 11, no. 7 (July): 497–502.
- Canavas, Constantin. “Compass”. In *Encyclopaedia of Islam*, THREE. doi: http://dx.doi.org/10.1163/1573-3912_ei3_COM_25561.
- Chaudhury, Anasua Basu Ray, and Rakhahari Chatterji. 2019. “Maritime order and connectivity in the Indian Ocean: the renewed significance of the Bay of Bengal,” *Journal of the Indian Ocean Region*, 15:3, 241–244. doi: <https://doi.org/10.1080/19480881.2019.1665823>
- Clark, Alfred. 1993. “Medieval Arab Navigation on the Indian Ocean: Latitude Determinations.” *Journal of the American Oriental Society* 113, no. 3 (July-September): 360–73.

This article compares the empirical methods of medieval Arab navigators on the Indian Ocean for determining latitudes with modern stellar methods.

- Clemesha, William Wesley. 1943. “The Early Arab Thalassocracy.” In *Journal of the Polynesian Society* 52, no. 3: 110–31.

The author gathers an interesting variety of data to prove the existence of an ancient (ca. 4000 BC) Arab Thalassocracy of southern Arabia and the Persian Gulf, “not quite like the Arab of the present day, but they must have been their lineal

forebears.” The argument is based on the following four topics: the development of the ship itself; weather-conditions of Eastern seas; the various goods carried as cargo; the evidence that now exists for such an Arab mercantile navy.

- Conermann, Stephan. 1998. “Muslimische Seefahrt auf dem Indischen Ozean vom 14. bis zum 16. Jahrhundert.” In *Der Indische Ozean in historischer Perspektive (Asien und Afrika)*. Beiträge des Zentrums für Asiatische und Afrikanische Studien der Christian-Albrechts-Universität zu Kiel 1, edited by Stephan Conermann, 143–180. Hamburg: E.B.-Verlag.
- Costa Brochado, Idalino Ferreira. 1959. *O Piloto Árabe de Vasco Da Gama*. Lisbon: Comissão Executiva das Comemorações do V Centenário da morte do Infante D. Henrique.
- Custódio de Morais, José. 1960. *Determinação das coordenadas geográficas no Oceano Índico pelos pilotos portugueses e árabes no princípio do século XVI*. Coimbra: Universidade de Coimbra 1960.
- Danişan, Gaye. 2019. “A Sixteenth-Century Ottoman Compendium of Astronomical Instruments; Seydi Ali’s Mir’at-ı Kâinat.” In *Scientific Instruments between East and West*, edited by Neil Brown, Silke Ackermann, Feza Günergun, 1–15. Leiden/Boston: Brill.

Dr. Danişan can read Ottoman Turkish and thus has access to an important number of little known premodern sources. Her tangential treatment of Seydi ‘Ali Reis (Çelebî in previous nautical literature) is a welcome updated take on the author of the *Muḥīt*.

———. 2017. “*Kamal*, an Instrument of Celestial Navigation in the Indian Ocean as described by Ottoman Mariners Piri Reis and Seydi ali Reis.” *Osmanli Bilimi Araştırmaları* 19, no. 1: 1–12.

Ducatez, Guy. 2003. “Aden et l’océan Indien au XIIIe siècle: navigation et commerce d’après Ibn-al-Muğāwir.” *Annales Islamologiques* 37: 137–156.

This work of Ducatez was inscribed in the activities of the [French MEDIAN project](#) (Les sociétés méditerranéennes antiques et les mondes de l’océan Indien), and particularly related to the [APIM \(Atlas des Ports et Itinéraires Maritimes de l’Islam Médiéval\)](#) database, two initiatives greatly relevant to this field of studies. Another closely related French initiative is the [Islam médiéval research unit](#), within the context of the larger research project [Orient & Méditerranée](#).

- Ducène, Jean-Charles. 2014. “The Knowledge of the Seas According to the Ottoman Translations and Adaptation of Arabic Works (15th-16th Century).” In *Uluslararası Piri Reis ve Türk Denizcilik Tarihi Sempozyumu*, 123–305. Ankara: Türk Tarih Kurumu Yayinlari.
- . 2015. “Une nouvelle source arabe sur l’océan Indien au Xe siècle: le *Şahīh min akhbār al-biḥar wa-‘aghā’ibihā* d’Abū ‘Imrān Mūsā ibn Rabāḥ al-Awsī al-Sīrafī.” *Afriques* 6.
- . 2016. “The Ports of the Western Coast of India According to Arabic Geographers (Eighth-Fifteenth Centuries AD): A Glimpse into the Geography.” In *Ports of the Ancient*

Indian Ocean, edited by Marie-Françoise Boussac, Jean-François Salles, Jean-Baptiste Yon, 165–78. Delhi: Primus Books.

- . (2016). Review of *Seafarers of the Seven Seas. The Maritime Culture in the Kitāb ‘Ajā’ib al-Hind by Buzurg Ibn Shahriyār (d. 399/1009)*, by Suhanna Shafiq. *Orientalistische Literaturzeitung*, Vol. 111, Issue 2. doi: <https://doi.org/10.1515/olzg-2016-0059>
- . 2017. “Savoirs Lettrés Arabes et Persans Sur l’océan Indien (IXe-Xve s.)” In *Méditerranée et Océan Indien, deux mondes en miroir*, supplement, *Topoi. Orient-Occident*, no. 15: 207–24.
- Dunsch, Boris. 2012. “Arte rates reguntur: Nautical handbooks in antiquity?” *Studies in History and Philosophy of Science* 43, Issue 2 (June): 270–283. doi:<https://doi.org/10.1016/j.shpsa.2011.12.024>

This article includes a tentative and summary comparison between one ancient author and Çelebi’s *Muḥīṭ*.

- Facey, William, and Anthony R. Constable. 2013. *The Principles of Arab Navigation*. London: Arabian Publishing Ltd.
- Al-Farā’, Ṭāhā ‘Uthmān. 1978. “*Ibn Mājid wa-ishāmātuḥu fī jughrāfiya al-baḥr*” [Ibn Majid and his Contribution to Maritime Geography]. *Majallat dirāsāt Jāmi‘ah Riyāḍ* 2, no. 2 (1978): 199–211.
- Fatimi, S. Qudratullah. 1978. “In Search of a Methodology for the History of Muslim Navigation in the Indian Ocean.” *Islamic Quarterly* 20, no. 1: 40.
- Ferrand, Gabriel. 1913–14. *Relations de voyages et textes géographiques arabes, persans et turks relatifs à l’Extrême-Orient du 8e au 18e siècles; traduits, revus et annotés*. 2 vols. Paris: E. Leroux.
- . 1922. “Le pilote arabe de Vasco de Gama et les instructions nautiques des arabes au XVe siècle”. *Annales de géographie* 31, no. 172 (July): 290–307.
- . 1923. “Les instructions nautiques de Sulayman al-Mahri (XVIe siècle)”. *Annales de géographie* 32, no. 178: 298–312.
- . 1938. *Introduction à l’astronomie nautique arabe*. Paris: Librairie Orientaliste Paul Geuthner.
- Fück, J.W. ‘Buzurg B. Shahriyār’. In *Encyclopaedia of Islam*, Second Edition. doi: http://dx.doi.org/10.1163/1573-3912_islam_SIM_1575.
- al-Ghunaym, ‘Abd Allāh Yūsuf. 2006. *Al-Makḥṭūṭāt al-jughrāfiyah al-‘arabīyah fī maktabah al-Būdliyān, jāmi‘at Ūksfūrd* [Arabic Geographic Manuscripts at the Bodleian Library, Oxford University]. Oxford: Oxford Centre for Islamic Studies.
- **Grosset-Grange, Henri**. 1971. “Les sciences nautiques des Arabes.” In *Shihāb al-Dīn Aḥmad Ibn Mājid: Kitāb al-fawā’id fī uṣūl ‘ilm al-baḥr wa-al-qawā’id*, edited by Ibrahim Khoury and ‘Izzat Ḥasan, 1–88 (Ar. 885–972). Damascus: Arab Academy of Damascus.

This important author is backed, like Malhão Pereira, by his nautical experience; his treatment of technical issues, added to his direct access to Arabic sources, is

very valuable. He decries the lack of sources prior to Ibn Mājid, and yet, being a sailor and thus sensitive to the practical continuity of the techniques, he affirms that “la fréquentation prolongée de ces livres amène insensiblement à oublier que leurs auteurs vivaient à la fin du Moyen-Âge” (1972, 252).

- . 1972. “Les traités arabes de navigation: De certaines difficultés particulières à leur étude.” *Arabica* 19, (October): 240–254.
- . 1977. “Les marins arabes du Moyen Âge: De certaines étoiles observées en Océan Indien.” *Arabica* 24, no.1 (February): 42–57.
- . 1979. “Les manuscrits nautiques anciens (Océan Indien): Considérations relatives à certains termes particuliers”. *Arabica* 26, (February): 90–99.
- . 1993. *Glossaire nautique arabe ancien et moderne de l’Océan indien*. Mémoires de la Section d’Histoire des Sciences et des Techniques, 5. Paris: Éditions du CTHS.
- Grosset-Grange, Henri, and Henri Rouquette. 1997. “Arab Nautical Science,” In *Histoire des sciences arabes*. Vol. 1, *Astronomie, théorique et appliquée*, edited by Roshdi Rashed and Régis Morelon, 203–243. Paris: Éditions du Seuil.

A very uneven and at times pointless article, devoid of citations, but still one or two useful references.

- Hadj-Sadok, M. ‘Ibn Khurradādhbih’. In *Encyclopaedia of Islam*, Second Edition. doi: http://dx.doi.org/10.1163/1573-3912_islam_SIM_3257.
- Ḥamawī, Muḥammad Yāsīn. 1947. *Al-mallāḥ al-‘arabī Aḥmad ibn Mājid: nāḥiyah majīdah min al-thaqāfah al-baḥrīyah al-‘arabīyah* (*The Arab Sailor Aḥmad ibn Mājid: the Glorious Standpoint of Arab Maritime Culture*). Damascus: Maktab al-Nashr al-‘Arabī.
- Hartmann, R. ‘Baḥr Al-Hind’. In *Encyclopaedia of Islam*, First Edition (1913–1936), edited by M. Th. Houtsma, T.W. Arnold, R. Basset, and R. Hartmann. doi: http://dx.doi.org/10.1163/2214-871X_ei1_SIM_1162.
- Al-Hosani, Naeema. 2005. *Arab Wayfinding on Land and at Sea: An Historical Comparison of Traditional Navigation Techniques*. Master’s diss., University of Kansas.
- Hourani, George F. 1947. “Direct Sailing Between the Persian Gulf and China in Pre-Islamic Times”. *The Journal of the Royal Asiatic Society of Great Britain and Ireland* 19, no.3–4 (December): 157–160.
- Hourani, George F., and John Carswell. 1995. *Arab Seafaring: In the Indian Ocean in Ancient and Early Medieval Times*. Princeton: Princeton University Press.

This little gem of a book continues to be the most comprehensive reference for Arab navigation from antiquity to early modern times. It is a treasure trove of sources from very diverse origins; some are rather outdated now, but its general guidelines are fundamental.

- al-Kamālī, Reem. 2019. *‘Ba‘da ikhtifā’ istamarra arba‘ah qurun: khamsah nusakh min Fawā’id Aḥmad ibn Mājid’* [After Disappearing He Endures Four Centuries: Five Texts of the *Fawā’id* of Aḥmad ibn Mājid], (May).

This brief article is based on Shihāb’s 2013 edition, and it seems to be the most recent published update on the *Fawā’id status questionis*.

- Kammerer, Albert. 1935. *La Mer Rouge, l’Abyssinie et l’Arabie depuis l’antiquité*. Vol 2, *Les Guerres du poivre. Les Portugais dans l’Océan Indien et la Mer Rouge au XVIe siècle. Histoire de la cartographie orientale*. Cairo: Société Royale de Géographie d’Égypte.
- Kennedy, Hugh. ‘The Star-Charts: Arabic Constellations - Star Names Used by the Arabs in the Indian Ocean’. In *Historical Atlas of Islam*, edited by Hugh Kennedy. doi: http://dx.doi.org/10.1163/1573-3912_hai_HAI_2_3.
- **Khoury, Ibrahim.**

In the early 1970s, K. produced a very important set of Arabic critical editions entitled collectively *Al-‘Ulūm al-baḥrīyah ‘inda al-‘Arab (Maritime Sciences Among the Arabs)*. Vols. 1 to 3 (counted as 1.1, 1.2, and 1.3) contain works of Al-Mahrī, and Vol. 4 (actually 2.1) is the edition of Ibn Mājid’s *Fawā’id*.

- . 1989. *The Stars of Arab Navigation in Ibn Magid Works*. Separatas da Revista da Universidade de Coimbra 35. Coimbra: Universidade de Coimbra.
- . (ed.) 1991. *Al-Nadwa al-‘ilmīyah li-ihyā’ turāth Ibn Mājid (Academic Conference on the Revivification of Ibn Mājid’s Heritage)*. 2 Vols. Latakia: Ittiḥād kitāb wa-adbā’ al-imārāt/Dār al-ḥiwār lil-nashr wa-al-tawzī’.

This conference took place in 1989. The proceedings were published in Arabic in two volumes and include the following articles. **Vol. 1:** Ibrahim Khoury, “Aḥmad ibn Mājid, the Witness of Navigation in the Indian Ocean (9th/15th century)”; Fāliḥ Ḥanzāl, “The Town of Julfār in History”; Aḥmad Ṭarbīn, “Theory and Experience in the Ways of the Pilot Aḥmad ibn Mājid, Forerunner of Astronomical Navigation in Modern Times”; Muḥammad Ḥasan al-‘Aydārūs, “Ibn Mājid, Astronomical Navigator”; Sālim Sa’dūn al-Mubādir, “Ibn Mājid, the First Pioneer in the Development of the Arabic Nautical Art”. **Vol. 2:** Igor Timofief, “Ibn Mājid in Sovietic Orientalist Works”; Ḥisām al-Khādim, “The Position of the Arab Coast on the European Maps Until the 19th Century”; Anwar Muḥammad ‘Abd al-‘Alīm, “Ibn Mājid and Portugal”; Ṭāriq Nāfi‘ al-Ḥamdānī, “Ibn Mājid and the Piloting of the Portuguese to India: A New Perspective”; Şabbāḥ Ibrāhīm al-Shaykhli, “Ibn Mājid and the East Coast of Africa”; Ḥasan Şāliḥ Shihāb, “The Adventurous Travels of Ibn Mājid Culminating in a New Season for the Trip to Jeddah”; Aḥmad Jalāl Tadmūrī, “Literary Style in the Works of the Arab Master Shihāb al-Dīn Aḥmad ibn Mājid”.

- . 2001. *Aḥmad ibn Mājid, ḥayātuh, mu'alafātuh, istiḥāla liqā'ihī bi-Fāskū dī Ghāmā* [Aḥmad ibn Mājid, his Life, his Writings, and the Impossibility of His Meeting with Vasco da Gama]. Ra's al-Khaimah, Markaz al-dirāsa wa-al-wathā'iq.
- King, David. 2019. "Finding the *Qibla* by the Sun and Stars – A Survey of the Sources for Islamic Sacred Geography (*Mash kutub dalā'il al-qiblah*)".

Prof. King has an extensive bibliography which for its breadth and depth can be considered a standard on Islamic astronomical themes.

- Kunitzsch, Paul. 1993. "Bahrain in a description by Aḥmad ibn Mājid, AD 1490." In *Bahrain Through the Ages: the History*. London: Kegan Paul International.

In a book dedicated to the history of Bahrain, Kunitzsch argued for the value of *Kitāb al-Fawā'id* as an historical source by translating a passage of the tenth *fā'idah*. Looking into Ibn Mājid's description of Bahrain, Kunitzsch concluded that, although the geographical informations seem to have been based on older works—the main ones being *Taqwīm al-buldān* by Abū'l-Fidā (d. 721/1321) and *Tārīkh al-mustabṣir* by Ibn Mujāwir (d. 690/1291)—the political descriptions seem to derive from Ibn Mājid's own experience. Kunitzsch's translation was based on Khoury's edition, and it draws attention to interpretation mistakes found in Tibbetts. Three manuscripts are mentioned: P1, D1, and B1.

- Laguardia Trías, Rolando. 1963. "Las más antiguas determinaciones de latitud en el Atlántico y el Índico". Madrid: Instituto Histórico de Marina.
- Lunde, Paul. 2005 "The Leek-Green Sea." *Saudi Aramco World* 56, no. 4 (July/August): 12–19.
- . 2013. "Sulaymān al-Mahrī: Maritime Routes in the 'Umda and Minhāj," in *The Principles of Arab Navigation*, edited by A. R. Constable and W. Facey. London: Arabian Publishing.
- **Malhão Pereira, José.** 2002. *East and West Encounter at Sea*. Lisboa: Academia de Marinha.

Malhão Pereira has accumulated over the years a large collection of articles on many historical and technical aspects of navigation, all backed up by decades of nautical experience. These works should be considered a primary reference, in that they combine rigorous historical acumen with a keen eye for technical subtleties which tend to escape the attention of lay authors. Most of his articles have been collected in three volumes of *Estudos* published by the Portuguese Navy. We cite here below only some of the most relevant titles.

- . 2003. *The Stellar Compass and the Kamal, An Interpretation of its Practical Use*. Lisboa: Academia da Marinha.
- . 2004. *As técnicas náuticas pregâmicas no Índico*. Lisboa: Academia de Marinha.
- . 2012. *Estudos da história da náutica e das navegações de alto-mar*. Vol. 1. Lisboa: Edições Culturais da Marinha.

- Manguin, Pierre-Yves. 2012. “Asian Ship-Building Traditions in the Indian Ocean at the Dawn of European Expansion.” In *History of Science, Philosophy and Culture in Indian Civilization*. Vol. 3, part.7, *The Trading World of the Indian Ocean, 1500–1800* edited by Om Prakash. New Delhi: Pearson Education.
- Mathew, K.S, ed. 1983. *Portuguese Trade with India in the Sixteenth Century*. New Delhi: Manohar.

Mathew is a key reference for navigation and sea-trade matters related to the west coast of India and Sri Lanka in particular. He makes extensive use of archaeological findings, and he is critical of previous Eurocentric approaches in the discipline.

———. 1997. *Ship-building and navigation in the Indian Ocean Region, AD 1400–1800*. New Delhi: Munshiram Manoharlal Publishers.

———. 2018. *Shipbuilding, Navigation and the Portuguese in Premodern India*. London and New York: Routledge.

- Mauny, Raymond. 1960. *Les Navigations médiévales sur les côtes sahariennes antérieures à la découverte portugaise (1434)*. Lisboa: Centro de Estudos Históricos Ultramarinos.
- Miquel, A. “Al-Muḳaddasī”. In *Encyclopaedia of Islam*, Second Edition. doi: http://dx.doi.org/10.1163/1573-3912_islam_SIM_5451.
- Moura Braz, C. A. 1962. *O encontro de marinharias oriental e ocidental na era dos descobrimentos*. Lisboa: Sociedade de Geografia de Lisboa.
- Mukherjee, Rila. 2017. “Indian Ocean and the Mediterranean: One World, Two Seas, Multiple Routes.” In “Méditerranée et Océan Indien, deux mondes en miroir,” supplement, *Topoi. Orient-Occident*, no. 15: 317–33.
- Nadvi, Allama Syed Sulaiman. 1966. *The Arab Navigation*. Translated by Syed Ṣabāhuddīn ‘Abdur Raḥmān. Lahore: Kashmiri Bazar.

This book gives access to a wealth of precious references to Arabic, Persian, and Indian languages sources.

- Park, Hyunhee. 2008. “The delineation of a coastline: The growth of mutual geographic knowledge in China and the Islamic world from 750 to 1500.” Ph.D. diss., Yale University. [Permanent link](#).
- . 2012. *Mapping the Chinese and Islamic Worlds: Cross-cultural Exchange in Pre-modern Asia*. New York: Cambridge University Press.

Both titles by this author contain valuable firsthand information about Arab-Chinese maritime exchanges.

- Pellat, Ch. “Al-Masālik Wa ’l-Mamālik”. In *Encyclopaedia of Islam*, Second Edition. doi: http://dx.doi.org/10.1163/1573-3912_islam_SIM_4994.
- Pereira da Silva, Luciano A. 1924. “Kamal, Tâbuas da Índia e Tavoletas náuticas.” *Lusitania: Revista de Estudos Portugueses* 1, no. 3, (June): 363–371.

- Prabha Ray, Himanshu. 2016. *Bridging the Gulf. Maritime Cultural Heritage of the Western Indian Ocean*. New Delhi: India International Centre/Manohar Publishers. [External Link](#)

See in particular chapter 5: “Exploring the Essence of the Navigational manuals”; and ch. 6: “Navigation Wisdom of Arabs and Portuguese in Pre-modern Kachchhi”. Prabha Ray has here and elsewhere valuable work on the impact of Buddhism in the development of Indian and South Asian maritime trade during the Middle Ages.

- Ptak, Roderich. *Die maritime Seidenstrasse: Küstenräume, Seefahrt und Handel in vorkolonialer Zeit*. Munich: C. H. Beck, 2007,
- Risso, Patricia. “Indian Ocean, Early Modern”. In *Encyclopaedia of Islam*, THREE. doi: http://dx.doi.org/10.1163/1573-3912_ei3_COM_27846.
- Schmidl, Petra S. 1996/97. “Two Early Arabic Sources on the Magnetic Compass”. *Journal of Arabic and Islamic Studies* 1, 81–132.

The article presents and comments two early Arabic treatises on the magnetic compass: one written by al-Ashraf ‘Umar ibn Yūsuf (ca. 1290) and the other by Ibn Sim‘ūn (ca. 1300). Schmidl argues that, while earlier sources on the magnetic compass can be put in the context of navigation, these two works are the first to discuss their use in finding the *qiblah*.

The article begins with a survey of the early Arabic sources on the magnetic compass, and there are two works worth mentioning here. The first is the Persian anthology *Jāmi‘ al-ḥikāyāt (Compendium of Stories)*, by Sādī al-Dīn Muḥammad ibn Muḥammad Bukhārī (also known as Awfī). It describes the compass during a sea voyage in the Red Sea or the Persian Gulf in 1232/33. The second is the *Kitāb kanz al-tujjār fī ma‘rifat al-aḥjar (Treasure of Merchants about the Practical Knowledge of the Stones)*, (1282) by Baylak al-Qibjāqī, which mentions a voyage from Tripoli to Alexandria. According to Schmidl, the latter is “the first description of the use of the magnetic compass for nautical purposes in the Islamic world.”

- Sezgin, Fuat. 2000. *Geschichte des arabischen Schrifttums*. Vol. 11: *Mathematische Geographie und Kartographie im Islam und ihr Fortleben im Abendland. Historische Darstellung*, Part 2. Frankfurt a. M.: Institut für Geschichte der Arab.-Islamischen Wiss.
- . 2010. *Astronomy, Geography and Navigation in Islamic Civilization*. Istanbul: Boyut.
- **Shihāb, Ḥasan Ṣāliḥ**. 1982. *Fann al-milāḥah ‘inda al-‘arab (The Art of Navigation Among the Arabs)*. Beirut: Dār al-‘Awdah.

Shihāb is the most important recent author on the Arabic nautical tradition, particularly because of his editions of Ibn Mājid’s *Fawā’id* and his dictionary of technical terms.

- . 1986. *Qawā'id 'ilm al-baḥr: sharḥ wa taḥqīq al-makhtūṭayn fī fann al-milāḥah al-baḥrīyah* (*Foundations of Maritime Science: Commentary and Critical Edition of Two Manuscripts on Nautical Technique*). Kuwait: al-Jamī'at al-Jughrāfiyah lil-Kuwaytiyah.
- . 2001. *Aḥmad ibn Mājid wa-al-milāḥah fī al-muḥīṭ al-hindī* (*Aḥmad ibn Mājid and Navigation on the Indian Ocean*). Ras al-Khaimah: Markaz al-Dirāsāt wa-al-Wathā'iq.
- . 2004. *al-Qāmūs al-baḥrī: mu'jam lil-muṣṭalaḥāt al-baḥrīyah* (*The Maritime Dictionary: Compendium of Nautical Terms*). Abu Dhabi: al-Majma' al-Thaqāfi.
- Shylaja. 2016. “Navigation and Astronomy.” In *In History of Indian Astronomy: A Handbook*, edited by K. Ramasubramanian, A. Sule, M. Vahia., 500–514. Mumbai: Indian Institute of Technology; Tata Institute of Fundamental Research.
 - Sindbæk, Søren M., and Athena Trakadas, eds. 2014. *Abhara's World*. Part 2 of *The World in the Viking Age*. Roskilde: The Viking Ship Museum.

The work consists of three parts, the second of which is of interest here. It includes eight chapters on Arab navigation and is called “Abhara’s World”, after the name of the historical pilot described in *Kitāb 'ajā'ib*.

- Smith, G. Rex, ed. 2008. *A Traveller in Thirteenth-Century Arabia: Ibn al-Mujawir's Tarikh al-Mustabsir*. London: Ashgate for the Hakluyt Society.
- Soucek, S., Christides, V., Tibbetts, G.R., and G. Oman. “Milāḥa”. In *Encyclopaedia of Islam, Second Edition*. doi: http://dx.doi.org/10.1163/1573-3912_islam_COM_0737.
- **Staples, Eric**. 2013. “An Experiment in Arab Navigation: The Jewel of Muscat Passage,” in *The Principles of Arab Navigation*, edited by W. Facey and A. Constable (London: Arabian Publishing, 2013).
- . 2017. “Navigation in Islamic Sources.” In *Oman: A Maritime History*, edited by Abdulrahman Al Salimi and Eric Staples, 223–252. Hildesheim: Georg Olms Verlag.

This article is a most valuable and recent contribution to the literature, going over previously treated topics, in particular quite technical aspects of nautical astronomy, with the added experience of the 2008 *Jewel of Muscat* international project. Staples draws attention quite rightly to the highly interactive and ever culturally plural nature of western Indian Ocean navigation.

- Teixeira da Mota, Avelino. 1963. *Méthodes de navigation et cartographie nautique dans l'Océan Indien avant le XVIIe siècle*. Offprint of *Stvdia* 11. Lisbon: Junta de Investigações do Ultramar.
- **Tibbetts, Gerald Randall**. 1961. “Arab Navigation in the Red Sea.” *The Geographical Journal* 127, no. 3 (September): 322–334.

Tibbetts continues to be the primary English-language reference for a specialised study of the main Arabic navigation sources. In addition to the titles below, see his thoroughly annotated translation of the *Fawā'id* above.

- . 1969. *The navigational theory of the Arabs in the fifteenth and sixteenth centuries*. Separata da Revista da Universidade de Coimbra. Vol. XXIV. Lisboa: Junta de Investigações do Ultramar.
- . 1979. *A comparison of Medieval Arab Methods of Navigation with those of the Pacific Islands*. Separata of *Revista da Universidade de Coimbra* 27, 189–202. Lisboa: Junta de Investigações Científicas do Ultramar.
- . 1992. “The Balkhī School of Geographers.” In *The History of Cartography*, edited by J. B. Harley and David Woodward. Vol. 2, book 1, *Cartography in the Traditional Islamic and South Asian Societies*. Chicago: University of Chicago Press.
- . ‘Sulaymān Al-Mahrī’. In *Encyclopaedia of Islam, Second Edition*. doi: http://dx.doi.org/10.1163/1573-3912_islam_SIM_7165.
- Tolmacheva, Marina. 1980. “On the Arab System of Nautical Orientation”. *Arabica* 27, no. 2 (January): 180–192.
- . 1994. “An Unknown Manuscript of the *Kitāb al-Fawā'id*”. *Journal of the American Oriental Society*.
- . 2015. “The Indian Ocean in Arab Geography,” *Terra Brasilis* 6. doi: <https://doi.org/10.4000/terrabrasilis.1585>.
- . 2008. “Navigation in the Indian Ocean and the Red Sea.” In *Encyclopaedia of the History of Science, Technology, and Medicine in Non-Western Cultures*, edited by H. Selin. 2nd ed. Berlin: Springer.
- UNESCO. 1980. *Historical Relations Across the Indian Ocean*. Report and papers of the meeting of experts organized by UNESCO at Port Louis, Mauritius, from 15 to 19 July 1974. Ghent: UNESCO.

These multidisciplinary and truly international conference proceedings are divided in three parts. Part I: Historical, cultural and commercial contacts across the Indian Ocean; Part II: The settlement of Madagascar and neighbouring islands; Part III: Indian Ocean studies.

- **Varadarajan, Lotika**, ed. 2004. *The Rahmani of M. P. Kunhikunhi Malmi of Karavatti: A Sailing Manual of Lakshadweep*. New Delhi: Manohar.

This is a precious witness to the vitality of the Indian nautical tradition and of its inextricable relation to the Arabic literature. The *Rahmani* in question is the written collection of nautical instructions transmitted orally in Lakshadweep (formerly Laccadive Islands) for centuries. The edition includes a facsimilar reproduction of the original text, in a mixture of Arabi-Malayalam, Malayalam, and Arabic, and an annotated English translation. We are most grateful to Cmdr. Malhão Pereira for sharing with us this rare source.

- Vernet, Juan. 2006. *Lo que Europa debe al islam de España*. Acantilado.

A good section on “Náutica” in this work about Islam and Spain, with valuable references.

- Worrell, W. H. 1944. “The Terminology of Arabic Goniometrical Works.” *Journal of Near Eastern Studies* 3, no. 2 (April): 91–100.

4 Audio / Videos

- *Al-bu‘d al-jughrāfī lil-milāḥah al-‘arabīyah fī al-muḥīṭ al-hindī qabla al-qarn al-sādis ‘ashar* (“The Geographical Extension of Arab Navigation in the Indian Ocean Before the Sixteenth Century”). A lecture by Ḥasan Ṣāliḥ Shihāb. Kuwait, 2004.
- *The Jewel of Muscat*, two-part documentary on the archaeological reconstruction and sailing of a ninth-century type boat from Oman to Singapore. [Part 1](#) and [Part 2](#).
- “*Mémoire Maritime des Arabes / Maritime Memory of the Arabs*”, documentary directed by Khal Torabully, 2010.

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