

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

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**RUTTER Technical Notes** are research materials and studies resulting from the activities and investigation of members of the Project RUTTER Making the Earth Global. Although their primary intention is to assist in the various tasks of the RUTTER Team, they are made public in the spirit of academic collaboration and sharing. *RUTTER Technical Notes* are non-periodic and will cover topics as diverse as the ones that interest the international and multidisciplinary Project’s team. The main objective of the RUTTER Project is to write a narrative of the scaling up of a scientific description of the earth in the sixteenth and seventeenth centuries, and how it grew out of the lived experience of travelling and observing the earth in long-distance sea voyages. It aims at radically improving our present knowledge of the historical processes that led to the formation of global concepts about the earth. The RUTTER Project is the ERC-funded Project “RUTTER Making the Earth Global: Early Modern Rutters and the Construction of a Global Concept of the Earth” (ERC Advanced Grant 833438; IR: Henrique Leitão, Faculdade de Ciências, University of Lisbon).



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# Contents

Introduction . . . . .	5
1 Primary Sources . . . . .	8
1.1 Manuscripts . . . . .	9
1.1.1 Bahrain . . . . .	9
1.1.2 Cairo . . . . .	10
1.1.3 Damascus . . . . .	10
1.1.4 Doha . . . . .	11
1.1.5 Kuwait . . . . .	11
1.1.6 Leiden . . . . .	11
1.1.7 Lisbon . . . . .	11
1.1.8 London . . . . .	12
1.1.9 Mosul . . . . .	12
1.1.10 Muscat . . . . .	12
1.1.11 Oxford . . . . .	12
1.1.12 Paris . . . . .	13
1.1.13 Peshawar . . . . .	14
1.1.14 Rampur . . . . .	14
1.1.15 St Petersburg . . . . .	14
1.1.16 Tehran . . . . .	14
1.1.17 Vatican . . . . .	14
1.1.18 Washington D.C. . . . .	15
1.1.19 Yale . . . . .	15
1.1.20 Zanzibar . . . . .	15
2 Main Works and Authors . . . . .	16
2.1 <i>Kitāb al-Masālik wa-l-mamālik</i> (9th/10th century) . . . . .	16
2.2 <i>Akhbār al-Šīn wa-l-Hind</i> (9th/10th century) . . . . .	16
2.3 <i>Kitāb ‘Ajā’ib al-Hind</i> (10th century) . . . . .	17
2.4 <i>Aḥsan al-taqāsīm fī ma‘rifat al-aqālīm</i> (10th century) . . . . .	18
2.5 Aḥmad b. Mājid (mid-15th century) . . . . .	19
2.5.1 <i>Kitāb al-Fawā'id fī uṣūl ‘ilm al-baḥr wa-l-qawā'id</i> . . . . .	20
2.5.2 <i>Hāwiyat al-ikhtisār fī uṣūl ‘ilm al-biḥār</i> . . . . .	22
2.5.3 <i>al-Sufāliyya</i> . . . . .	23
2.5.4 Other works . . . . .	24
2.6 Sulaymān al-Mahrī (early 16th century) . . . . .	29
2.6.1 <i>al-‘Umda al-Mahriyya fī dabṭ al-‘ulūm al-baḥriyya</i> . . . . .	29
2.6.2 <i>al-Minhāj al-fākhir fī ‘ilm al-baḥr al-zākhir</i> . . . . .	30

2.6.3	Other Works . . . . .	30
2.7	Seydi Ali Çelebi (16th century) . . . . .	31
2.7.1	<i>el-Muḥiṭ fi İlm el-eflak ve'l-ebhur</i> (in Turkish) . . . . .	32
3	Secondary Sources . . . . .	34
4	Websites & Online Resources . . . . .	51
5	Audio / Videos . . . . .	52

**Abbreviations**

BnF = Bibliothèque nationale de France

BNP = Biblioteca Nacional de Portugal

QNL = Qatar National Library

UBIA = Khoury, Ibrahim, ed. 1970–72. *al-ʿUlūm al-baḥriyya ʿinda l-ʿarab: Taḥqīq wa-taḥlīl (Arab nautical sciences: Navigational texts and their analysis)*. 4 vols. Damascus: Majmaʿ al-Lughā al-ʿArabiyya.

**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 companion and a roadmap for ongoing 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 Shihāb) 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 15th and 16th centuries, namely the works of Aḥmad b. Mājid 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, Seydi Ali Çelebi, 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-19th century, consists of works by Joseph von Hammer and by James Prinsep largely dedicated to Çelebi; a second phase begins with the works of Gabriel Ferrand in the early 20th century and continues uninterrupted to our days.<sup>1</sup>

Almost simultaneously with von Hammer's main work, the Omani general who conquered Mombasa in 1839, Shaykh Āl b. 'Alī, was giving orders for the "very useful" texts of Ibn Mājid 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. This collection proved very successful, and although based almost exclusively on the facsimile of two Paris manuscripts, it was the foundation of decades of scholarship in the West.

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 Mājid's *Fawā'id*. This translation was published in the same year that the

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<sup>1</sup>Agius (2005, 4–9) and Staples (2017, 224–28) have excellent overviews upon which we are gratefully expanding here. All authors and works mentioned will be treated in more detail below.

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 Mājid.

As of today, Khoury's Arabic volumes and articles constitute the reference editions for the main works of Ibn Mājid and al-Mahrī, but their impact seems to have been very limited, and 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 Mājid's Heritage" (*al-Nadwa al-'ilmiyya li-iḥyā' turāth Ibn Mājid*), 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, bringing to the field of studies all the benefits of local knowledge and connections, while working from a global historical perspective.<sup>2</sup> 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;<sup>3</sup> 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.

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<sup>2</sup>See [Section 4](#) below for a commented list of dedicated websites.

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

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 rules for [Brill's Encyclopaedia of Islam THREE](#).

## 1 Primary Sources

As mentioned above, the two canonical authors of Arab nautical literature are Aḥmad b. Mājid and Sulaymān al-Mahrī. They come respectively from the Persian Gulf region and from Yemen, and their lives spanned the late 15th and early 16th 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. al-Sirāfī and al-Masʿūdī). Their influence is clear in some later authors like Seydi Ali Çelebi, 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 20th century.

Before Ibn Mājid, that is, before the 15th 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:<sup>4</sup>

“In the time of the Abbasids, there were three famous men: Muḥammad b. Shādhān, Sahl b. Abbān, and Layth b. Kahlān.”

Ibn Mājid is said to have seen the handwriting of the latter's son in a rutter (*rahmānāj*), with the *incipit*

“Lo, we have made you victorious... (*innā fataḥnā laka*).” “There were famous pilots around the same time: ‘Abd al-‘Azīz b. Aḥmad al-Maghribī (or al-Maʿrūf; perhaps Moroccan?), Mūsā al-Qandarānī (or Qīdarānī), and Maymūn b. Khalīl (Jewish perhaps?).”

Before them there were two other writers from which they had borrowed: “Aḥmad b. Tabruwayh (or Tabrūyah or Bayruwayh) and Khawāshīr b. Yūsuf b. 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 b. Muḥammad b. ‘Abd al-

<sup>4</sup>The following names are collated from Khoury's *Fawā'id* edition (pp. 14–16) and the earliest known manuscript, Oxford Selden Superius 46 (fols. 5r,10–6r,4), see below.

Raḥmān b. Abī l-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, *rah-mānaj*, is of obvious Persian origin. Apart from it, the Arabic *daftar* (notebook) is also used. At the moment, none of these early notebooks nor any work from the above mentioned mariners 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. 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.<sup>5</sup> 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 fols. (hereafter **B1**). Abbreviated by Khoury as ت, for *Tājiriyya*.

This MS includes several works by Ibn Mājid, including the *Kitāb al-Fawā'id* and the *Ḥāwiyat al-ikhtisār*. Khoury considered it the best and most reliable of the three MSS used for his 1971 critical edition,<sup>6</sup> 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. We have not been able to ascertain the current whereabouts of this manuscript.

<sup>5</sup>See the Introduction to Al-Furqān Foundation, *World Survey of Islamic Manuscripts*.

<sup>6</sup>See Khoury, 1970, 10–13, and al-Ghunaym, 2006, 284.

### 1.1.2 Cairo

#### **al-Maktaba al-Azhariyya, 34500.244**

Dated 904/1498–9, 14 fols. (hereafter **Az1**).

Contains Ibn Mājid, *Taṣnīf qiblat al-islām fī jāmi‘ al-dunyā*, also called *Tuḥfat al-quḍāt*.

#### **al-Maktaba al-Azhariyya, 86604**

No date, 114 fols. (hereafter **Az2**).

Contains al-Mahrī’s *Minhāj al-fākhir*.

#### **National Library of Egypt (Dār al-Kutub al-Miṣriyya), Jughrāfiyā 1055**

18th c., 48 fols. (hereafter **DK1**).

Contains al-Mahrī’s *Minhāj al-fākhir*.

#### **National Library of Egypt (Dār al-Kutub al-Miṣriyya), Taymūr 308**

48 fols.

Hereafter **DK2**. This is a copy of the previous MS (Jughrāfiyā 1055), even to the colophon.

#### **National Library of Egypt (Dār al-Kutub al-Miṣriyya), Miqāt 570**

Probably 19th c., 273 pp. (hereafter **DK3**).

A later nautical MS with lots of astronomical tables and illustrations, in the style of BNP Or.2 and latter manuals which include solar declination tables. This is an important late Arabic manuscript.

### 1.1.3 Damascus

#### **Al-Assad National Library (al-Maktaba al-Waṭaniyya), 3114**

Dated 1001/1592, and produced in Mecca, 174 fols. (hereafter **D1**). Abbreviated by Khoury as ٥, for *Zāhiriyya*.

The manuscript includes at least sixteen works by Ibn Mājid. Among these are the *Kitāb al-Fawā'id* and the *Hāwiya*. It was first found in the *Zāhiriyya* Library in Damascus, with the shelfmark 3114, and later moved to al-Assad National Library. In 1925, Najm al-Dīn al-Bey wrote a copy of it.

**1.1.4 Doha****Qatar National Library, Or 15643**

Dated 1153/1740, 5 fols. (hereafter **Q1**).

Small MS including Sulaymān al-Mahrī's *Tuḥfat al-fuḥūl*. [Link to Library](#).

**1.1.5 Kuwait****Ministry of Awqaf and Islamic Affairs, 195(3)**

No date, 71 fols. (hereafter **K1**).

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

**1.1.6 Leiden****Leiden University Library, Or. 8660**

Dated 1059/1649 (hereafter **Le1**), 85 fols. Abbreviated by Khoury as J.

The MS includes two works by Sulaymān al-Mahrī: *al-Umda al-Mahriyya* (fols. 1r–53v) and *al-Minhāj al-fākhīr* (fols. 53v–85r). [Link to Library](#).

**1.1.7 Lisbon****Biblioteca Nacional de Portugal, MS Or.2**

This previously unstudied manuscript has been analysed by the RUTTER team. It is 94 folios long and includes several rutters with different dates, from 1243/1827 to 1265/1849). It has several illustrations and several sets of tables (astronomical and nautical), dealing with routes to Aden and the East coast of Africa. Its contents make it a middle link in the transmission between late medieval and 19th-century Indian Ocean nautical literature, in fact quite close in some respects to Gujarati sailing manuals (*malam-ni-pothis*). [Link to Library](#)

Two titles are given within the manuscript, both associated in some undetermined way to 'Abdallāh b. Aḥmad b. 'Abd al-Razzāq, an otherwise unknown figure mentioned by Āghā Bozorg Tehrānī in his *Dhayl kashf al-zunūn* (1967) as author of Islamic works living around 1838. The first title (fol. 1r) is *Salwat al-mahmūm wa-l-ṣiṭr al-mashmūm fī l-ilm al-mubārak al-maqsūm 'alā l-ʿalāmāt wa-l-majāri wa-l-nujūm* (*The Solace of the Distressed, and the Fragrant Perfume on the Blessed Science Treating of Landmarks, Routes and Stars*), and the second title (fol. 31r) is *Faraḥ al-nālīn wa-qiblat al-muṣallīn* (*The Joy of the Successful and the Qibla of Those Who Pray*). Some mispagination and interpolation are evident. For further details see J. Acevedo, 2021, in Bibliography below. Hereafter abbreviated **Li1**.

### 1.1.8 London

#### British Library, Or 2920

Dated 1260/1844. 124 fols. It includes at least two titles: *al-Dalīl al-baḥrī lil-muḥīt al-Hindī wa-khalīj Fāris wa-l-baḥr al-aḥmar*, and *Ikhtilāf al-ghāyāt wa-l-mabādi' wa-l-taqallubāt wa-l-thawābit wa-l-nawāzil*. More details and downloadable file available at [this QNL link](#). Hereafter **BL1**.

A “nautical almanac” in the family of the later *raḥmāniyyāt* found in Lisbon, Cairo, Oman and elsewhere (see respectively).

#### British Library, Or 8086

Dated 1287/1870. 105 fols. Not yet catalogued.<sup>7</sup> It includes at least three titles: *al-Dalīl al-baḥrī lil-baḥr al-‘Arabī*, *Naṣā’ih ‘ulamā’ al-baḥr*, and *Khuṭba ‘alā mabda’ al-ghāyāt*. Hereafter **BL2**.

### 1.1.9 Mosul

#### Maktabat al-Awqāf al-‘amma, Majmū‘ 9/59

Unfortunately, this manuscript supposed to contain an otherwise unknown work by Ibn Mājid, the *Kitāb al-Mīl* (Brockelmann Suppl. 2, 239), has been confirmed as disappeared from the Awqaf Library since the war of 2017.<sup>8</sup>

### 1.1.10 Muscat

#### Ministry of Cultural Heritage of Oman, 3561–1

Dated 1157/1744 (hereafter **O1**). Approx. 140 fols. It contains several nautical poems by Ibn Mājid, including *al-Nūniyya al-kubrā* as described in Shihāb (1993). [Link to Library](#).

#### Ministry of Cultural Heritage of Oman, 3910

Date uncertain. 18 fols. (hereafter **O2**). Contains Al-Mahrī’s *Minhāj*. [Link to Library](#).

### 1.1.11 Oxford

#### Bodleian Library, MS. Selden superius 24

15th c., 31 fols. (hereafter **Ox. 1**).

<sup>7</sup>We are grateful to Dr Bink Hallum (British Library) for calling our attention to and sharing information about this and the previous manuscript.

<sup>8</sup>We wish to thank Ammar Hatem Abbo Alaraj (Iraqi State Board of Antiquities and Heritage, Mosul) for providing this information.

This MS includes nine minor poems by Ibn Mājid, including four unpublished: *Qad ṣadaḥa l-dīk* (“The Cock Has Crowed”); *al-Urjūza fī musāyarat al-arḍ min ‘Adan ilā Jidda* (“Rajaz-poem on Going by the Land from Aden to Jeddah”); *al-Qaṣīda al-shahīra bi-Misallat al-fūlādhi* (“Poem Known as ‘The Steel Needle’”); and *al-Qaṣīda fī waṣf al-ṭarīq min al-Bāb ilā Jidda fī musāyarat al-sāḥil* (“Poem on the Description of the Way from Bab-el-Mandeb to Jeddah Going by the Coast”). [Link to Library.](#)

This and the following two Oxford MSS seem to come from the same hand, though only Ox. 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-Ghunaym (2004, 19).

### **Bodleian Library, MS. Selden superius 46**

Dated 894/1489, 129 fols. (hereafter **Ox. 2**).

The MS contains the full text of the *Kitāb al-Fawā'id*. [Link to Library.](#)

### **Bodleian Library, MS. Selden superius 57**

15th c., 35 fols. (hereafter **Ox. 3**)

The MS contains the *Ḥāwiyat al-ikhtiṣār*. [Link to Library.](#)

## **1.1.12 Paris**

### **Bibliothèque nationale de France, Arabe 2292**

Dated 983/1576, 183 fols. (hereafter **P1**).

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

### **Bibliothèque nationale de France, Arabe 2559**

16th c., 187 fols. (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 *Ḥāwīya*. Among al-Mahrī’s, there are *al-‘Umda* and *al-Minhāj*. [Link to Library.](#)

### **Bibliothèque nationale de France, Arabe 3264**

18th c., 52 fols. (hereafter **P3**).

This is a codex containing various small treatises on Islamic subjects. Ibn Mājid’s text, fol. 43v only, is devoted to finding the *qibla* (details below). [External link.](#)

**1.1.13 Peshawar****Islamia College Library, 1953**

The catalogue of the Library of Islamia College (I, 371) lists MS 1935 (hereafter **Pes.**) under the collective description *Majmū‘at rasā’il ‘ilm al-bahriyya*. It is dated 1007/1598-9 and described as having been copied by “an early hand”. The catalogue entry lists al-Mahrī’s *‘Umda, Tuḥfa, Minhāj*, and notably the only other instance of the *Qilādat al-shumūs* preserved to date. It also mentions a *Fawā’id ‘ilm al-bahriyya*, but we have not been able to obtain a copy or confirm the status of the manuscript.

**1.1.14 Rampur****Raza Library, 9022 M**

19th c., fols. 1r–57v (hereafter **Rm**).

Sulaymān al-Mahrī, *al-Minhāj al-fākhir*. This is a defective copy which contains a prologue, seven chapters, and a conclusion.<sup>9</sup>

**1.1.15 St Petersburg****Russian Academy of Sciences, B.992**

16th c. (hereafter **Pt1**).

The MS includes several Arabic and Turkish texts, among which are Ibn Mājid’s *al-Sufāliyya*, *al-Mal‘aqiyya*, and *al-Tā’iyya*. PDF files of the catalogues are available [here](#).

**1.1.16 Tehran****University Library, 2597/2**

Dated 1078/1667-8, pp. 23–30; hereafter **Te1**.

Short version (*muntakhab*) of Sulaymān al-Mahrī’s *al-‘Umda al-Mahriyya*, written in *nasta‘līq* script.<sup>10</sup>

**1.1.17 Vatican****Biblioteca Apostolica Vaticana, Vat.ar.1096**

Date uncertain. 92 fols. (hereafter **V1**). Folios 32r–59v contain an incomplete copy of al-Mahrī’s *Minhāj al-fākhir*, ending abruptly in the middle of section 7.3 (“On the hours”). The

<sup>9</sup>Cf. Imtiyāz ‘Alī ‘Arshī. 1977. *Catalogue of the Arabic Manuscripts in Raza Library Rampur*. Vol. VI: *History, Biography, Travels and Geography*. Rampur: Raza Library Trust, 266.

<sup>10</sup>Cf. Muṣṭafā Dirāyatī. 2012. *Fihristgān-i nuskahā-i khaṭṭī-i Īrān (Fankhā) / Union Catalogue of Iran Manuscripts*. Tehran: Sāzmān-i Asnād wa-Kitābkhāna-i Millī-i Jumhūrī-i Islāmī-i Īrān. Vol. 22, 983.

rest of the MS contains works by Shihāb al-Dīn Ibn al-Majdī on the design and use of astronomical instruments. [External link](#).

### 1.1.18 Washington D.C.

#### Library of Congress, VK551 .A46

Dated 1344/1926, 174 fols. (hereafter **W1**)

The MS includes sixteen works by Ibn Mājid, the first two being the *Kitāb al-Fawā'id* and the *Ḥāwiya*. In terms of contents, this MS is similar to P1, except for three poems absent in P1: *Iddat al-shuhūr*, *Fī ma'rifat al-manāzil*, and the *Kitāb al-Fuṣūl*. [Link to Library](#).

### 1.1.19 Yale

#### Yale University Library, Landberg MSS 401.

Dated ca. 976/1568,<sup>11</sup> 156 fols. (hereafter **Y1**). Abbreviated by Khoury as **ي**.

The MS includes five works by Sulaymān al-Mahrī: *al-Minhāj al-fākhir*; *al-'Umda al-mahriyya*; *Tuḥfat al-fuḥūl*; *Sharḥ Tuḥfat al-fuḥūl* and *Mir'āt al-sallāk li-kurāt al-aflāk*. With the exception of the latter, all these are also found in P2. [Link to Library](#).

### 1.1.20 Zanzibar

In his 2006 catalogue *The Arabic Manuscripts of the Zanzibar National Archives*, Declich mentions the following two MSS, most likely related to the Lisbon, London, and Cairo MSS on later Indian Ocean navigation.

#### Zanzibar National Archives, EAC-026

Declich, p. 23. Untitled. "Collection of tables used for navigation: latitudes and longitudes of many Indian Ocean's ports, calculation of position in relation with the movement of the stars. These last tables are useful for several years (1890-1920 ca.) Tables follow the solar calendar." Copied 1298/1880.

#### Zanzibar National Archives, ZA 2/19

Declich, p. 54. "Table about the position of ports and towns of the Middle East and the Indian Ocean, bringing the name of the place, longitude and latitude..." Dated ca. 1825-1830.

<sup>11</sup>The description from Yale University catalogue conflicts with Khoury's and Tibbetts'. In his 1971 edition, Khoury dates the manuscript in 1097/1686. Tibbetts, in his article for the *Encyclopaedia 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-sallāk li-kurāt al-aflāk*.

## 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 15th 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 Baṭṭūṭa or Ibn Mujaʿwir, and the geographic work of al-Masʿūdī.

### 2.1 *Kitāb al-Masālik wa-l-mamālik* (9th/10th century)

“The 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). [Link to Library](#).

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:**

Barbier de Meynard, Charles Casimir. 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.

### 2.2 *Akhbār al-Šīn wa-l-Hind* (9th/10th century)

“Narratives of China and India,” by Abū Zayd al-Sīrāfī. It is found in a single manuscript at the BnF (Arabe 2281, fols. 2r–23v). [Link to Library](#).

*Akhbār al-Šīn wa-l-Hind* is actually the fusion of two different works: the first was written in 237/851-2 by an unknown author and the second—which aimed at developing and correcting the former’s contents—was composed somewhere between 271/884 and 332/943-4 by Abū Zayd al-Sīrāfī. Taken together, they form a work made by the accounts of various journeys 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-bahriyyūn*) 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 a 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, Rédigé En 851, Suivi de Remarques*. Paris: Bossard.
- Sauvaget, Jean. 1948. *Relation de la Chine et de l'Inde*. Paris: Les Belles Lettres.
- al-Shārūnī, Yūsuf, ed. 1999. *Akḥbār al-Ṣīn wa-l-Hind*. Cairo: al-Dār al-Miṣriyya al-Lubnāniyya.
- Khoury, Ibrahim, ed. 1991. *Akḥbār al-Ṣīn wa-l-Hind*. Beirut: Dār al-Mawsim lil-ʿIlām.
- 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 b. Shahriyār al-Rāmhurmuzī. MS Aya Sofya 3306 in the Süleymaniye Library, Istanbul.

The book is a collection of 134 mariners' tales gathered by a Buzurg b. 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 10th-century tales, originally told by captains, pilots and mariners—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*. Leiden: Brill, 68–75.
- Freeman-Grenville, G. S. P. ed. 1981. *Book of the Wonders of India: Mainland, Sea and Islands*. London: East-West Publications Ltd.
- al-Ḥabashī, ‘Abdallāh Muḥammad, ed. 2000. *‘Ajā’ib al-Hind li-Buzurg ibn Shahriyār*. Abu Dhabi: al-Majma‘ al-Thaqāfi.
- Shihāb, Ḥasan Ṣāliḥ. 2010. *‘Ajā’ib al-Hind li-Buzurg ibn Shahriyār bayn al-ḥaqīqa wa-l-uṣṭūra* [“The Marvels of India by Buzurg b. Shahriyār, Between Reality and Myth”]. Abu Dhabi: Dār al-Kutub al-Waṭaniyya, Hay’at Abū Zābī lil-Thaqāfa wa-l-Turāth.
- Shafiq, Suhanna. 2013. *Seafarers of the Seven Seas: The Maritime Culture in the Kitāb ‘Ajā’ib al-Hind by Buzūrg ibn Shahriyār*. Berlin: 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 b. Aḥmad al-Maqdisī (also al-Muqaddasī; d. ca. 390/1000). Manuscripts extant in Berlin and Istanbul: Staatsbibliothek, Sprenger 5 ([Link to Library](#)), and Süleymaniye Library, Aya Sofya 2971.

A geographical book which, while describing the rivers and seas, provides information regarding 10th-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* (“The Shapes of the Climes”), al-Iṣṭākhrī’s *Kitāb al-Masālik wa-l-mamālik* and Ibn Ḥawqal’s *Ṣurat al-arḍ* (“The Image of the Earth”). 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 the Islamicate world 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”* (2002, 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.

———. 1907. *Selections from Arabic Geographical Literature*. Leiden: Brill, 62–68.

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 Civilization.

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

## **2.5 Aḥmad b. Mājid (mid-15th century)**

Shihāb al-Dīn Aḥmad b. Mājid al-Najdī (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 sounds unlikely and we have not yet been able to verify it through our comparative work at the RUTTER team.

In pages 18–22 of his *Arab Navigation in the Indian Ocean*, Tibbetts gives a detailed list of forty works by Ibn Mājid, including the titles of some works mentioned by the author himself, and for which we may only have that mention or loose verses. We have used at least two manuscripts that were unknown to Tibbetts and Ferrand, including the Bodleian manuscripts (see above) which include some of the earliest preserved witnesses, and we have thus managed to identify some of the texts mentioned by Tibbetts with others already known, thus reducing the count. We list below the thirty-two works for which we have textual evidence at the moment, knowing full well that there remain indeed a number of titles mentioned by Ibn Mājid which are currently not documented. In the list below we consider four major works and the rest of minor importance, sometimes only because of their extent. Regardless of variations in this tally among authors and over the years, there is a rather general agreement on the primacy of the first three works we list below.

### 2.5.1 *Kitāb al-Fawā'id fī uṣūl 'ilm al-baḥr wa-l-qawā'id*

“Commentaries on the Principles and Foundations of Maritime Science.”<sup>12</sup> 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 conceived as appendages, practically footnotes, to a long tradition of nautical treatises, and most likely also, in line with the author’s 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 siècles: reproduits, traduits et annotés*. 3 vols. Paris: Geuthner. External Links: [Volume 1](#); [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,

<sup>12</sup>Found in B1, K1, Ox.2, P2, W1.

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 Seydi Ali Çelebi. At the end, there is a small glossary with a few technical terms.

Khoury, Ibrahim, ed. 1971. *Shihāb al-Dīn Aḥmad b. Mājid: Kitāb al-Fawā'id fī uṣūl 'ilm al-baḥr wa-l-qawā'id. al-'Ulūm al-baḥriyya 'inda al-'Arab* (Arab nautical sciences: Navigational texts and their analysis) [hereafter *UBLA*] 2. Damascus: Majma' al-Luḡha al-'Arabiyya. [External link](#).

With several indices, well annotated, and based on the collation of three MSS, this is still, in spite of some criticism by Ḥ. Ṣ. 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 16th 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 Morskaiia 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-l-qawā'id li-bn Mājid*. Kuwait: al-Jam'iyya al-Juḡhrāfiyya al-Kuwaytiyya.

al-Ghunaym, 'Abdallāh Yūsuf, ed. 2004. *al-Fawā'id fī uṣūl 'ilm al-baḥr wa-l-qawā'id*. Kuwait: Markaz al-Buḥūth wa-l-Dirāsāt al-Kuwaytiyya.

This is a facsimilar edition of K1, with a brief 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-l-qawā'id*. Abu Dhabi: Abu Dhabi Tourism & Culture Authority, Dār al-Kutub al-Waṭaniyya.

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 Ox. 2. Some mistakes seem to have crept into the final text, and it should be consulted judiciously.

### 2.5.2 *Hāwiyat al-ikhtiṣār fī uṣūl ‘ilm al-bihār*

“The Comprehensive Summary on the Principles of the Knowledge of the Seas.”<sup>13</sup> 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 *Hāwiya* 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-Hāwiya*, 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 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 gives the specific number of verses in each chapter and the date of composition.

#### **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 siècles: 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 *Hāwiya*. The article begins with an

<sup>13</sup>Found in B1 (1082 vv.); D1 (1067 vv.); P1 (1073 vv.); P2 (904 vv.); W1 (1067 vv.).

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 *Hāwiya*, based on a collation of P<sub>1</sub>, D<sub>1</sub> and B<sub>1</sub>.

Shihāb, Ḥasan Ṣāliḥ, ed. 1993. *al-Nūniyya al-kubrā ma‘a sitta qaṣā'id ukhrā* [“The Great Poem Rhyming in *Nūn*, with Six Other Poems”]. Muscat: National Ministry of Heritage and Culture, 74–232.

This edition by Shihāb is 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 manuscript.

Khoury, Ibrahim, ed. (1995) 2001. *Hāwiyat al-ikhtisār*. Silsilat Kitāb al-Abḥāth 2. Ra's al-Khayma: Markaz al-Dirāsāt wa-l-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-Ghunaym 2004, 268).

### 2.5.3 *al-Sufāliyya*

“The Poem of Sofala.”<sup>14</sup> As per the section on manuscripts above, this poem is found in a single manuscript, namely Pt<sub>1</sub>. 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 1983, when Khoury translated the poem to English. According to Khoury, the copy in Pt<sub>1</sub> 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-Sawāḥīl (Kenya, 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 b. Mājid”]. Moscow: USSR Academy of Sciences.

An edition of the three poems found in Pt<sub>1</sub>: *al-Sufāliyya*, *al-Mal‘aqiyya* and *al-Tā'iyya*. The book includes an introduction, photographs of the St Petersburg

<sup>14</sup>Found in Pt<sub>1</sub> with 803 verses.

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 Mājid, 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 maʿrifat al-biḥār* [“Three Flowers on the Knowledge of the Seas”]. Cairo: ʿĀlam al-Kutub.

Khoury, Ibrahim, ed. 1983. *As-Sufaliyya: «The Poem of Sofala», Arabic Navigation along the East African Coast in the 15th Century, by Aḥmad Ibn Māḡid*. Vol. XXXVII. Separata of *Boletim da Biblioteca da Universidade de Coimbra* 143. 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-Sufāliyya*.

———. 1987/88. “Les poèmes nautiques d’Ahmad Ibn Magid, 3ème 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 his edition of the known *rajaz* poems by Ibn Mājid, Khoury began with an analysis and edition of *al-Sufāliyya*. This article thus offered, for the first time, a critical Arabic text of the poem.

Jouannès, Claude. 2001. “La Sufāliya: un poème du maître-pilote Shihab al-Dīn Aḥmad bin Mājid. Essai de traduction, notes et commentaires. D’après le manuscrit W992 du fonds de répartition des manuscrits de l’Institut des Études Orientales de l’Académie des Sciences de Russie à St. Petersburg. Feuilles 83r à 96r.” *Études Océan Indien* 31: 35–114.

#### 2.5.4 Other works

These include mostly minor metrical works.

***al-Balīgha fī qiyās al-Suḡayl wa-l-Rāmiḡ*** “The Eloquent Poem on the Measure of Canopus and Arcturus.” 69 verses. Found in P1, W1 and Ox. 1. Verses 19–24 are missing in P1 and W1. Incipit: *Sahartu wa-ghayrī khāliyyu l-bāli ḡāji*.<sup>15</sup>

<sup>15</sup>The incipits follow Khoury’s published text whenever possible.

**Edition:**

Khoury, Ibrahim. 1985/86. “Les poèmes nautiques d’Ahmad Ibn Magid, 2ème partie. Les poèmes à rime unique: *Al-Qaṣāʾid*. Texte arabe établi avec introduction et analyse en français.” *Bulletin d’études orientales* 37/38: 226–30 (Ar. 47–51).

***Urjūzat Barr al-‘Arab fī khalij Fāris*** “*Rajaz* Poem of the Arabic Coasts on the Persian Gulf.” 100 verses. Found in P<sub>1</sub> and W<sub>1</sub>. A description of the sea route from Basra to the strait of Hormuz. Incipit: *Yā ṭāliqan min ākhiri l-furāti*.

**Edition:**

Khoury 1987/88, 263–9 (Ar. 154–60).

***Ḍarībat al-ḍarāʾib*** “The Assembly of the Analogues.” 192 verses. Found in P<sub>1</sub> and W<sub>1</sub>. Verses 97 and 98 are missing in P<sub>1</sub>. On the stars that are useful for navigation. Incipit: *Shabābun bi-rāsī aʿjaba l-nāsa min amrī*.

**Edition:**

Khoury 1985/86, 245–57 (Ar. 20–32).

***al-Qaṣīda al-Dhahabiyya*** “The Golden Poem.” 193 verses. Found in P<sub>1</sub>, W<sub>1</sub>; Ox. 1. Verses 5–45 are missing in Ox. 1. Incipit: *Badaʿtu bi-smi llāhi rabbī wa-ṣāḥibī/khālīqī*.

On astronomical navigation. The poem begins with an explanation on the longitudes, the rhumbs, *zāms* and the *taraffā*,<sup>16</sup> then mentioning specific stars and their altitudes. It ends quoting *al-Fawāʾid* and listing sixteen of Ibn Mājid’s poems, five of which are lost.

**Edition:**

Khoury 1985/86, 262–73 (Ar. 4–15).

***al-Fāʾiqa fī qiyās al-Ḍifdaʿ al-awwal wa-qayduhū Suhayl*** “The Eminent Poem on the Measure of Fomalhaut When Canopus is Fixed.” 59 verses. Found in P<sub>1</sub>; W<sub>1</sub>; Ox. 1. Verses 19 and 20 in Ox. 1 are missing in P<sub>1</sub> and W<sub>1</sub>. Incipit: *Aqūlu wa-l-fulku tajrī bi-l-shirāʾayni*.

**Edition:**

Khoury 1985/86, 208–12 (Ar. 66–69).

***al-Fuṣūl*** “The Sections.” A minor prose work, the only one not in verse apart from the *Fawāʾid*. Found in P<sub>1</sub> (final folios, from 179v) and W<sub>1</sub> (172r). Taking about three pages in the manuscripts, it has not been published yet. Its contents include mostly astronomical bearings for particular routes around the Arabian Peninsula. Incipit: *Faṣl fī maʿrifat qiyās al-māriza*.

<sup>16</sup>This is the polar star calibration transliterated as *tirfa* in Tibbetts and other sources. We follow Shihāb (2010, 95) and Staples (2019, 382).

***Hādiyat al-ma‘ālima*** “The Guide of the Pilots.” 155 verses. Found in P<sub>2</sub> and partially in O<sub>1</sub> (p. 279, only the first 56 verses). It describes the sea route from Oman to Gujarat and Konkan. Incipit: *Al-ḥamdu lil-lāhi l-ḥasībi l-hādī*.

**Edition:**

Khoury 1987/88, 270–80 (Ar. 143–53); Shihāb 1993, 256–68.

***‘Iddat al-ashhur al-rūmiyya wa-kull shahr kam huwa*** “The Number of the Byzantine Months and of the Days in Each Month.” 13 verses. Found in P<sub>1</sub> and W<sub>1</sub> (153v). The Julian months: their names, number of days and distribution in four seasons. Incipit: *Khiyāru shuhūri l-rūmi yā khayra khillānī*.

**Edition:**

Khoury 1985/86, 207–8 (Ar. 69–70).

***Kanz al-ma‘ālima wa-dhakhīratuhum fī ‘ilm al-majhūlāt fī l-baḥr wa-l-nujūm wa-l-burūj wa-asmā’ihā wa-aqṭābihā*** “The Treasure and Provision of the Pilots on the Science of the Unknowns at Sea and on the Stars and Constellations, their Names and their Poles.” 72 verses. Found in O<sub>1</sub>, P<sub>1</sub>, W<sub>1</sub> and Ox. 1. The first verse of P<sub>1</sub> is written in prose in W<sub>1</sub>. According to al-Ghunaym, the second hemistich of the verses 29 and 30 and the first hemistich of verse 31 are missing in Ox. 1. Incipit: *Yā ayyuhā l-nāsu idhā shi’tumu qūlū*.

**Edition:**

Khoury 1985/86, 217–22 (Ar. 55–60); Shihāb 1993, 233–44.

***al-Qaṣīda al-Makkiyya*** “The Meccan Poem.” 172 verses. Found in P<sub>1</sub> and W<sub>1</sub>. The second hemistich of verse 59 and the first hemistich of verse 60 are missing due to a copyist’s mistake. A description of the sea route from Jeddah to Cape Fartak, and from there on to several different ports. Incipit: *Fū’ādī asīru l-ḥayyi min shi’bi ‘āmir*.

**Edition:**

Khoury 1985/86, 233–44 (Ar. 33–44).

***al-Mal‘aqiyya*** “The Poem of Malacca.” 273 verses. Found in Pt<sub>1</sub>. Incipit: *‘Azamtu wa-l-‘azmu ḥamīdun fī l-safar*.

**Edition:**

Shumovsky 1957; Khoury 1987/88, 321–36 (Ar. 87–102).

***Manāzil al-qamar*** “The Lunar Mansions.” 48 verses. This poem is found in D<sub>1</sub>, P<sub>1</sub> and W<sub>1</sub> (158r). In the Paris manuscript it has the full title *Urjūza fī Ma‘rifat al-manāzil wa-ḥaqīqatihā fī l-samā’ wa-ashkālīhā wa-‘adadihā* (“Rajaz Poem on the Knowledge of the Mansions, their Ascertainment on the Sky, their Shapes and Number”), and it is attributed to ‘Alī b. Abī Ṭālib. Incipit: *Al-sharaṭāni fa-hwa ra’su l-ḥamali*.

**Edition:**

Khoury 1987/88, 258–62 (Ar. 161–5).

***Mawāsīm al-safar*** “The Seasons for Travelling.” 19 verses. Found in B1. Incipit: *Idhā lāḥa bi-l-fajri l-ghurābu taqāsharat.*

**Edition:**

Khoury 1985/86, 205–7 (Ar. 70–72).

***Mīmiyyat al-abdāl tuqās ‘alā sitta awjuh*** “Poem Rhyming in *Mīm* on the Permutable Stars that Are Measured in Six Ways.” 64 verses. *Rajaz* poem found in P1 and W1. Incipit: *Suhādun ḥakat ‘aynī ‘uṣārata ‘andami.*

**Edition:**

Khoury 1985/86, 213–7 (Ar. 60–64).

***Min al-Bāb ilā Jidda fī musāyarat al-sāhil*** “From Bab-el-Mandeb to Jeddah Going by the Coast.” 123 verses. Found in Ox. 1. Unpublished to date. Incipit: *Ṭāba l-raḥīlu mina l-quṣāda l-saḥrā.*

***al-Qaṣīda al-shahīra bi-Misallat al-fūlādhi*** “The Poem which is Widely Known as The Steel Needle.” 34 verses. Found in Ox. 1, fols. 25r–v. Unpublished to date, this short poem deals with astronomical bearings. Incipit: *Hādhī l-jiyādu tuqādu fī arsānihā.*

***al-Mu‘arriba*** “The Elucidating Poem.” 178 verses. *Rajaz* poem found in P1, W1 and O1. A summary of navigation in the Gulf of Berbera (Gulf of Aden). Incipit: *Yā sā’ilī ‘an ṣifati l-majāri.*

**Edition:**

Khoury 1987/88, 281–92 (Ar. 131–42); Shihāb 1993, 48–73.

***al-Mukhammasa*** “The Pentastichic Poem.” 17 strophes. Found in P1, W1 and O1 (p. 274). About the stars which indicate the position of Polaris. As indicated by the title, this poem has a 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.” Incipit: *Ta’ammal wa-shāwir wa-shari l-layla wa-‘zimi.*

**Edition:**

Khoury 1985/86, 201–4 (Ar. 73–76).

***al-Urjūza fī Musāyarat al-arḍ min ‘Adan ilā Jidda*** “*Rajaz* Poem on Going by the Coast from Aden to Jeddah.” 119 verses. Found in Ox. 1, fols. 12v–16r. Unpublished to date. Incipit: *Al-ḥamdu lil-lāhi l-‘azīmi l-shānī (?).*

***Nādirat al-abdāl fī l-Wāqi‘ wa-Dhubbān al-‘ayyūq*** “The Extraordinary Poem of the Permutable Stars, on Vega and β Aurigae.” 57 verses. Found in P<sub>1</sub> and W<sub>1</sub>. The copy in P<sub>1</sub> misses the second hemistich of v. 52. A poem on the altitudes of the stars Vega and β Aur. Incipit: *Taraktu ishtighālī bi-l-mahā wa-l-jādhir.*

**Edition:**

Khoury 1985/86, 230–3 (Ar. 44–47).

***al-Natakhāt li-barr al-Hind wa-barr al-‘Arab*** “The Landing Ports on the Indian and Arabian Coasts.” 255 verses. Found in P<sub>1</sub> and W<sub>1</sub>. Incipit: *Yā ṭālība l-natakhati bi-l-ḥaqā’iqi.*

**Edition:**

Khoury 1987/88, 305–20 (Ar. 103–18).

***al-Nūniyya al-kubrā*** “The Great Poem Rhyming in *Nūn*.” 140 verses. Found in O<sub>1</sub> and K<sub>1</sub>. It was unknown to Tibbetts and Ferrand, hence that it is relatively unknown. No translation exists yet, and there is only Shihāb’s 1993 edition as per the details below.

The *Nūniyya* is divided in eleven chapters:

I – Signs of land; II – Lunar stations and stellar rhumbs; III – Pole Star calibrations (*bā-shiyyāt*) and nautical calendar (*al-taqwīm al-baḥrī*); IV – Pole Star calibrations; V – Routes of Arabia and East Africa; VI – Routes of Sind and India, and islands of East India and Persia; VII – Routes of the islands and their departure points; VIII – Nautical distance measures (*masāfāt*); IX – Altitude measures of well-known headlands in the Indian Ocean and the Red Sea; X – Tropical altitude measures, shipbuilding, currents; XI – Calendars, *zām* measures, signs of tempest at sea.

**Edition:**

Shihāb, Ḥasan Ṣāliḥ. 1993. *al-Nūniyya al-kubrā ma‘a sitta qaṣā’id ukhrā*. Muscat: Wizārat al-Turāth al-Qawmī wa-l-Thaqāfa, 304 pp. With valuable appendices.

***Qad ṣadaḥa l-dīk*** “The Cock Has Crowed.” 49 verses. Found in Ox. 1. According to al-Ghunaym, this poem presents the altitude values of several stars. Unpublished to date. Incipit: *Qad ṣadaḥa l-dīku wa-nāḥa l-ghurābu.*

***al-Qāfiyya fī ma‘rifat al-majhūlāt min al-nujūm allawātī quyyidū bi-l-manāzil jayy-idan*** “Poem Rhyming in *Qāf* on the Knowledge of the Unknown Stars that are well Confined to the Lunar Mansions.” 33 verses. Found in P<sub>2</sub> and B<sub>1</sub>. Incipit: *Khalīlī hayyā wa-sma‘ā durra manṭiqī.*

**Edition:**

Khoury 1985/86, 222–5 (Ar. 52–55).

***Qismat al-jumma ‘alā anjum Banāt na‘sh*** “Division of the Surface of the Sea According to the Stars of Ursa Major.” 221 verses. Found in P<sub>1</sub> and W<sub>1</sub>. Incipit: *Yā qāsima l-arzāq lam yansa aḥad.*

**Edition:**

Khoury 1987/88, 293–304 (Ar. 119–30).

***al-Sab‘iyya*** “The Poem on the Seven Nautical Sciences.” 307 verses. Found in P<sub>2</sub> and Ox. 1. According to al-Ghunaim, verses 75 and 165 are missing in Ox. 1. Incipit: *Tabāraka l-rabbu lladhī hadānā.*

**Edition:**

Khoury 1987/88, 354–72 (Ar. 50–69), excludes the verses 227 and 228.

***al-Tā’iyya*** “The Poem Rhyming in *Tā’*” 54 verses. Found in Pt<sub>1</sub>. A description of the sea voyage from Jeddah to Aden. Incipit: *Sarat nasmatu l-firdawsī min arḍi Makkati.*

**Edition:**

Shumovsky 1957; Khoury 1985/86, 262–68 (Ar. 15–19).

***Taṣnīf qiblat al-islām fī jāmi‘ al-dunyā*** “Composition on the *Qibla* of Islam in the Entire World.” Also called *Tuḥfat al-quḍāt*. 295 verses. Found in Az<sub>1</sub>, P<sub>1</sub>, P<sub>3</sub> and W<sub>1</sub>. Incipit: *Bi-smi l-ilāhi l-musta‘āni abtadī.*

**Edition:**

Khoury 1987/88, 337–53 (Ar. 70–86); Shihāb 1991.

## 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 Çelebi, 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 P<sub>1</sub>, thus testifying to a clear complementarity.

### 2.6.1 *al-‘Umda al-Mahriyya fī ḍabṭ al-‘ulūm al-baḥriyya*

“Al-Mahrī’s Reliable Treatise on the Exactitude of Maritime Sciences.” Dated 1511. Found in Le<sub>1</sub>; P<sub>2</sub>; Y<sub>1</sub>; Pe<sub>s</sub>; and a short version in Te<sub>1</sub>. 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 b. Aḥmad b. Sulaymān al-Mahrī*. Vol. 1, *Al-ʿUmda al-Mahriyya fī ḍabṭ al-ʿulūm al-baḥriyya*. UBIA 1. Damascus: Majmaʿ al-Lugha al-ʿArabiyya.

Shumovsky, Teodor. 2011. Махрийская опора для точного определения [основ] морских наук. (*Mahrian Base in Precise Rendering of Navigational Sciences*) Moscow: Mardjani Publishing House.

This is the edition of previously unpublished work by Shumovsky. Dating from the 1970s it includes a translation and facsimile of the Paris text, and a 20-page English postface, which was published earlier in a collective volume as:

———. 2009. “Sulaymān Al-Mahrī and His Major Work on Navigation *al-ʿUmda al-Mahriyya fī Ḍabṭ al-ʿulūm al-Baḥriyya* (‘Mahrian Base in Precise Rendering of Navigational Sciences’).” In *East and West*, edited by Juan Pedro Monferrer-Sala, Vassilios Christides, and Theodoros Papadopoulos, 133–54. Piscataway, NJ: Gorgias Press.

In his introduction to the *ʿUmda*, Khoury mentions a first translation into Turkish by Çelebi and then a second translation into Sindhi, kept at the library of the University of Mumbai.

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

“The Precious Method on the Science of the Rising Sea.” Found in Az2; B1; DK1; DK2; Le1; O2; P2; Pes; Rm; Y1.

Khoury (1970) divides it in an introduction followed by seven chapters and a conclusion:

Introduction – Explanation of the *zām* and the *taraffā*; 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 ( $\beta$  and  $\gamma$  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 siècles: reproduits, traduits et annotés*. Vol. 2 Sulaymān al-Mahrī et Ibn Mājid. Paris: Geuthner, fols. 59v–92r.

Khoury, Ibrahim. 1970. *Sulaymān b. Aḥmad b. Sulaymān al-Mahrī*. Vol. 2, *al-Minhāj al-fākhir fī ʿilm al-baḥr al-zākhir*. UBIA 1. Damascus: Majmaʿ al-Lugha al-ʿArabiyya.

**2.6.3 Other Works*****Mirʿāt al-sallāk li-kurāt al-aflāk***

“The Traveller’s Mirror on the Spheres of the Orbs.” Found in Y1. Unpublished to date. See below in the Bibliography the reference to a recent article by Staples et al. on this text.

### ***Risālat Qilādat al-shumūs wa-istikhrāj qawā'id al-usūs***

“The Necklace of the Suns and the Extraction of the Rules of the Mathematical Basis.” A short work on the mathematical base (*uss*) of five different calendars: lunar, solar, Byzantine, Coptic, and Persian (Nayrūz). Found in P2 (fols. 1v–3v) and Pes.

#### **Editions and Studies:**

Khoury, Ibrahim. 1972. *Sulaymān b. Aḥmad b. Sulaymān al-Mahrī*. Vol. 3, *Risālat Qilādat al-shumūs wa-istikhrāj qawā'id al-usūs; Tuḥfat al-fuḥūl fī tamhīd al-uṣūl fī uṣūl 'ilm al-baḥr; Sharḥ Tuḥfat al-fuḥūl fī tamhīd al-usūl fī uṣūl 'ilm al-baḥr*. UBIA 1. Damascus: Majma' al-Lugha al-‘Arabiyya, 3–11.

### ***Tuḥfat al-fuḥūl fī tamhīd al-uṣūl***

“The Masters’ Classic on the Introduction to the Principles.” Found in P2; Q1; Y1; Pes. 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 1972, 13–37. [External link](#).

### ***Sharḥ Tuḥfat al-fuḥūl fī tamhīd al-usūl***

A Commentary to the *Tuḥfa*. Found in P2 and Y1. The Yale text was missing from the Beinecke Library’s catalogue for some time, but Khoury had already noted its existence (Khoury, UBIA 1–3, ج).

#### **Editions and Studies:**

Khoury 1972, 39–125. [External link](#).

## **2.7 Seydi Ali Çelebi (16th century)**

Seydi Ali Çelebi (1498–1563), also known as Seydi Ali Reis, Seydi Ali bin Hüseyin, and Katib-i Rumi, was an 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 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-Fatḥiyya* with additional sections on geography; *al-Muḥīṭ* (“The Ocean”) in 1554, which is mainly a translation of al-Mahrī’s *Umda*, 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 Seydi 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 Orbs and the Seas.” MSS in Süleymaniye Library, Aya Sofya, 2591; and National Library of Austria, N.F. 184 ([external link](#)); allegedly also in Naples.

Composed in 1554, this work may be considered the latest flourish among the “first wave” of early nautical works in the Ibn Mājid tradition. 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, *el-Muḥīṭ* is mainly a Turkish translation of al-Mahrī’s *Umda*, 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 *taraffā*; 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 *el-Muḥīṭ*. It is one of the earliest modern publications concerning texts on Arab navigation and mentioning Ibn Mājid, Su-

laymān al-Mahrī—whose works Çelebi claims to have gathered and translated in *el-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. VIII: “Of the Winds and Monsoons.”

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 *el-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 *el-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 *el-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 *el-Muḥīṭ*.

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

Bonelli, Luigi. 1894. *Del Muḥīṭ o ‘Descrizione dei mari delle Indie’ dell’ammiraglio turco Sidî ‘Alî detto Kiâtib-i-Rûm* (Ch. 4 of *el-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 Muḥîṭ o ‘Descrizione dei mari delle Indie’ dell’ammiraglio turco Sîdî ‘Alî detto Kiâtib-i-Rûm* (Ch. 6 and parts of ch. 7 of *el-Muḥîṭ*). *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 *Muḥîṭ*’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, Shihāb, and Staples.

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 and early modern 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): 459–63.
- . 1968. “Aḥmad Ibn Mājid, an Arab navigator of the XV century and his contributions to marine sciences.” *Proceedings of the First International Congress in the History of Oceanography, Bulletin de l’Institut océanographique de Monaco*, spéc. no. 2: 565–80.
- . 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.
- Acevedo, Juan. 2021. “A New Arabic Nautical Manuscript in Lisbon.” *Comparative Oriental Manuscript Studies Bulletin* 7: 9–36.
- Agius, Dionisius A. 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. Hildesheim: Georg Olms Verlag.

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 century); Buzurg b. Shahriyār (11th century); Ibn Khurradādhbih—*Kitāb al-Masālik wa-l-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. Topoi, Orient-Occident*, supplément no. 15: 225–43.
- Agius, Dionisius A., John Cooper, and Chiara Zazzaro. 2014. “The Maritime Heritage of Yemen: a focus on traditional wooden *dhow*s.” 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, 143–57. Oxford: Archaeopress.
  - Aḥmad, Muḥammad. 2011. *Ishāmāt al-‘Arab fi l-nahḍa al-ūrūbiyya al-ḥadītha ru’ya jadīda* [“Arab Contributions to the European Renaissance: A New Vision”]. Damascus: Jāmi‘at Dimashq, Kulliyyat al-Ādāb wa-l-‘Ulūm al-Insāniyya.

Section 4 has some relevant paragraphs about the influence of Ibn Mājid. He draws from Juḥā (see below). Unfortunately, it rehashes the fallacious legend of Da Gama and Ibn Mājid meeting.

- Ahmad, S. Maqbul. 1977. “Khambāyat.” In *Encyclopaedia of Islam, Second Edition*, edited by P. Bearman, Th. Bianquis, C. E. Bosworth, E. van Donzel, W. P. Heinrichs. doi: [http://dx.doi.org/10.1163/1573-3912\\_islam\\_SIM\\_4179](http://dx.doi.org/10.1163/1573-3912_islam_SIM_4179).
- . 1968. “Ibn Mājid.” In *Encyclopaedia of Islam, Second Edition*, edited by P. Bearman, Th. Bianquis, C. E. Bosworth, E. van Donzel, W. P. Heinrichs. doi: [http://dx.doi.org/10.1163/1573-3912\\_islam\\_COM\\_0335](http://dx.doi.org/10.1163/1573-3912_islam_COM_0335).
- al-‘Araymī, Muḥammad b. Ḥamd. 2019. “*al-Raḥmāniyyāt tashhadu ‘alā barā‘at al-mallāḥīn al-‘umāniyyīn fa-mādhā ta‘rifu ‘anhā?*” [“Nautical guides testify to the excellence of Omani sailors: What do you know about them?”] *Atheer News*, Muscat.
- Albuquerque, Luís de. 1989. “Estudo Crítico, 13: Informações Sobre a Navegação Árabe No Índico.” In *O Livro de Marinharia de André Pires*, 127–37. Lisbon: Vega.
- Aleem, Anwar A., see ‘Abd al-‘Alīm.

- Alhosani, Naeema M. 2005. *Arab Wayfinding on Land and at Sea: An Historical Comparison of Traditional Navigation Techniques*. MA diss., University of Kansas.
- Allen, J. de V. 1980. "A Proposal for Indian Ocean Studies." In *Historical Relations Across the Indian Ocean*, 137–52. Ghent: UNESCO.
- Allibert, Claude. 2011. "Le *Kitāb-i bahriyye* de Pīrī Re'īs et l'océan Indien dans le contexte vohémarien: Analyse des versions de 1521 et 1526." *Études océan Indien* 46-7: 197–220.
- al-Amīn, Ḥasan. 1408/1987. "Shihāb al-Dīn Aḥmad bin Mājīd al-mashhūr bi-Ibn Mājīd." ["Shihāb al-Dīn Aḥmad b. Mājīd, known as Ibn Mājīd."] In *Mustadrakat a'yān al-shī'a* (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).

- Arunachalam, Balsubramiam. 2006. "The Chola Mode of Navigation in the Northern Indian Ocean." In *Indo-Portuguese Encounters: Journeys in Science, Technology and Culture*, edited by Lotika Varadarajan, 417–37. New Delhi: Indian National Science Academy.
- . 2008. "Technology of Indian Sea Navigation (c. 1200–c. 1800)." *The Medieval History Journal* 11, no. 2: 187–227.
- Barradas, Lerenó. 1967. *O Sul de Moçambique no Roteiro de Sofala do Piloto Ahmad Ibn-Majid*. Vol. XXII. Separata of *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 XVI<sup>e</sup> siècle." In *Méditerranée et océan Indien, deux mondes en miroir*. *Topoi, Orient-Occident*, supplément 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. 1960. "Baḥr al-Zandj". In *Encyclopaedia of Islam*, Second Edition, edited by P. Bearman, Th. Bianquis, C.E. Bosworth, E. van Donzel, W.P. Heinrichs. doi: [http://dx.doi.org/10.1163/1573-3912\\_islam\\_SIM\\_1066](http://dx.doi.org/10.1163/1573-3912_islam_SIM_1066).
- Bellec, François. 1998. "Early Pilots in the Muslim Waters." In *Proceedings of the Indian Ocean Week*, edited by Graeme Henderson, 5–10. Fremantle: Western Australian Maritime Museum.
- Benamar, Hamdadou. 2012. "*al-Milāḥa al-baḥriyya fī l-ḥadāra al-'arabiyya al-islāmiyya: Muqāraba tārikhiyya*" ["Maritime Navigation in Arabic Islamic Culture: A Historical Approach"]. *Mutūn* 5, no. 2: 281–95.
- Bénard, Inès, see Acevedo; Staples.
- Blussé, Leonard, and Zhuang Guotu. 1991. "Fuchienese Commercial Expansion into The Nanyang as Mirrored in the 'Tung Hsi Yang K'ao' 東西洋考." *Revista de Cultura* 1, no. 13/14: 140.

- Brauer, Ralph W. 1985. *The Contribution of Arabic Nautical Knowledge to the Development of Western European Navigational Techniques*. Wilmington, N.C.: Institute for Research on the Interrelation of Science and Culture.
- . 1992. “Geography in the Medieval Muslim World: Seeking a Basis for Comparison of the Development of the Natural Sciences in Different Cultures.” *Comparative Civilizations Review* 26, no. 26: 73–110.
- 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*, edited by Kate Fleet, Gudrun Krämer, Denis Matringe, John Nawas, Devin J. Stewart. doi: [http://dx.doi.org/10.1163/1573-3912\\_ei3\\_COM\\_25561](http://dx.doi.org/10.1163/1573-3912_ei3_COM_25561).
- Chakravarti, Ranabir. 2012. “Merchants, Merchandise and Merchantmen in the Western Sea-board of India (c. 500 BCE–1500 CE).” In *Trading World of the Indian Ocean, 1500–1800*, edited by Om Prakash, 53–116. Delhi: Pearson Education and Centre for Studies in Civilizations.
- 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, no. 3: 241–4.
- Christides, Vassilios. 2009. “Mamluk Ships and Seamanship: A Reappraisal.” In *East and West: Essays on Byzantine and Arab Worlds in the Middle Ages*, edited by Juan Pedro Monferrer-Sala, Vassilios Christides, and Theodoros Papadopoulos, 109–20. Piscataway, NJ: Gorgias Press.
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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, 143–80. Hamburg: E.B.-Verlag.

- Constable, Anthony R. 2012. “The Basic Ideas of Navigation in Relation to the Early History of Sailing in the Indian Ocean.” In *The Principles of Arab Navigation*, edited by Anthony R. Constable and William Facey, 1–20. London: Arabian Publishing.
- 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.
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- 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 reads Ottoman Turkish and thus has access to an important number of little known premodern sources. Her tangential treatment of Seydi Ali Reis (Çelebi in previous nautical literature) is a welcome updated take on the author of the *Muḥīṭ*.
- . 2017. “*Kamal*, an Instrument of Celestial Navigation in the Indian Ocean as described by Ottoman Mariners Piri Reis and Seydi Ali Reis.” *Osmanlı Bilimi Araştırmaları* 19, no. 1: 1–12.
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 Though this comprehensive PhD thesis is devoted to the instruments, there are several important references to Arab and Indian pre-modern developments in general. See especially Chapter 3.
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- 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.
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- . 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* 111, no. 2: 163–5
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This article includes a tentative and summary comparison between one ancient author and Çelebi’s *Muḥīt*.
  - El Hajji, Rawda. 2023. “Indian Ocean navigation based on *al-‘Umda al-mahriyya fī dabṭ al-‘ulūm al-baḥriyya* by Sulaymān al-Mahrī.” In *The 2nd International Prof. Dr. Fuat Sezgin Symposium on History of Science in Islam Proceedings Book*, edited by M. C. Kaya, N. Özdemir, G. Aksoy, 371–88. Istanbul: Istanbul University Press.
  - Facey, William. 1979. *Oman, a Seafaring Nation*. Muscat: Sultanate of Oman, Ministry of National Heritage and Culture.
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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 Mājīd, 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).

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A very uneven and at times pointless article, devoid of citations, but still containing some useful references.

- Guanqi, Sun, and Zhou Qiulin. 1995. “The Navigation Culture of the Arabian Muslims in the Middle Ages and its Historical Contribution.” *Journal of Arab Academy for Science &*

*Technology* 20: 39.

- Hadj-Sadok, M. 1968. "Ibn Khurradādhbih". In *Encyclopaedia of Islam*, Second Edition, edited by P. Bearman, Th. Bianquis, C.E. Bosworth, E. van Donzel, W.P. Heinrichs. doi: [http://dx.doi.org/10.1163/1573-3912\\_islam\\_SIM\\_3257](http://dx.doi.org/10.1163/1573-3912_islam_SIM_3257).
  - Ḥamawī, Muḥammad Yāsīn. 1947. *al-Mallāḥ al-ʿarabī Aḥmad b. Mājid: Nāḥiya majīda min al-thaqāfa al-baḥriyya al-ʿarabiyya* ["The Arab Sailor Aḥmad ibn Mājid: A Glorious Aspect of Arab Maritime Culture"]. Damascus: Maktab al-Nashr al-ʿArabī.
  - al-Ḥamdānī, Ṭāriq. 2002. *al-Milāḥa al-ʿarabiyya fī ʿuṣūr izdihārihā* ["Arab Navigation in its Golden Age"]. Abu Dhabi: al-Majmaʿ al-Thaqāfi.
  - 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](http://dx.doi.org/10.1163/2214-871X_ei1_SIM_1162)
  - al-Hijji, Yacoub Yusuf. 2012. "Arab Navigational Methods after 1850." In *The Principles of Arab Navigation*, edited by Anthony R. Constable and William Facey, 35–46. London: Arabian Publishing.
  - . 2012. "Alan Villiers and Arab Navigation." In *The Principles of Arab Navigation*, edited by Anthony R. Constable and William Facey, 83–90. London: Arabian Publishing.
  - . 2012. "Arab Navigation in the Mediterranean." In *The Principles of Arab Navigation*, edited by Anthony R. Constable and William Facey, 91–96. London: Arabian Publishing.
  - Hirth, Friedrich, and W. W. Rockhill. 1911. *Chau Ju-Kua: His Work on the Chinese and Arab Trade in the Twelfth and Thirteenth Centuries, Entitled Chu-Fan-Chi*. St Petersburg: Imperial Academy of Sciences.
  - Hoogervorst, Tom. 2018. "Sailors, Tailors, Cooks, and Crooks: On Loanwords and Neglected Lives in Indian Ocean Ports." *Itinerario* 42, no. 3: 516–48.
  - 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): 157–60.
  - 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.
- Ḥumayd, Sālīm. 2018. *Aḥmad b. Mājid, mallāḥ min Ḥulfār: al-Abʿād al-maʿrifiyya fī shiʿrihī, qirāʿa naqdiyya*. Dubai: Markaz al-Mizmāt lil-Dirāsāt wa-l-Buḥūth.
  - Juḥā, Farīd. 2002. *al-Mallāḥ wa-l-shāʿir wa-l-ʿālim al-ʿarabī Ibn Mājid, 838-907/1434-1501* ["The Arab Sailor, Poet, and Savant Ibn Mājid"]. Damascus: Wizārat al-Thaqāfa.
  - al-Kamālī, Rīm. 2019. "Baʿd ikhtifāʾ istamarra arbaʿa qurūn: khams nusakh min Fawāʾid Aḥmad b. Mājid" ["Forgotten for Four Centuries: Five Manuscripts of the *Fawāʾid* of Aḥmad b. Mājid"]. *al-Bayān* 05/05/2019 [online].

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. 2012. "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](http://dx.doi.org/10.1163/1573-3912_hai_HAI_2_3).
- al-Khaḍūrī, Nāṣir b. 'Alī b. Nāṣir. 1994. *Ma'dīn al-asrār fī 'ilm al-bihār* ["The Mine of Secrets on the Science of the Seas"]. Edited by Ḥasan Ṣāliḥ Shihāb. Muscat: Ministry of National Heritage and Culture.

This is Shihāb's edition of a late 19th- early 20th-century nautical guide extant in three manuscript copies in Muscat.

- Khalilieh, Hassan, and Areen Boulos. 2006. "A Glimpse on the Uses of Seaweeds in Islamic Science and Daily Life during the Classical Period." *Arabic Sciences and Philosophy* 16: 91–101.
- **Khoury, Ibrahim.**

In the early 1970s, Khoury produced a very important set of Arabic critical editions entitled collectively *al-'Ulūm al-baḥriyya 'inda l-'Arab: taḥqīq wa-taḥlīl* (*Arab nautical sciences: Navigational texts and their analysis*). Vols. 1 to 3 (counted as 1.1, 1.2, and 1.3) contain works by 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 Mājid Works*. Separatas of *Revista da Universidade de Coimbra* 35. Coimbra: Universidade de Coimbra.
- , ed. 1991. *al-Nadwa al-'ilmiyya li-ihyā' turāth Ibn Mājid* [Academic Conference on the Revivification of Ibn Mājid's Heritage]. 2 vols. Latakia: Ittiḥād Kuttāb wa-Udabā' al-Imārāt; Dār al-Ḥiwār lil-Nashr wa-l-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 Ḥanḏal, "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-Khādīm, "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"; Ṣabbāḥ Ibrāhīm al-Shaykhli, "Ibn Mājid and the East Coast of Africa"; Ḥasan Ṣāliḥ 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, ḥayātuhū, mu’allaḥātuhū, istiḥālat 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-Khayma: Markaz al-Dirāsa wa-l-Wathā’iq.
- King, David A. 1985. “Astronomy for Landlubbers and Navigators: The Case of the Islamic Middle Ages.” *Separatas Verdes* 164. Lisbon: Instituto de Investigação Científica Tropical.
  - . 2019. “Finding the *Qibla* by the Sun and Stars – A Survey of the Sources for Islamic Sacred Geography (*Mash kutub dalā’il al-qibla*).”

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*, edited by Shaikh Abdullah bin Khalid Al-Khalifa and Michael Rice, 385–92. London: Kegan Paul International.

In this 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’ida*. Looking into Ibn Mājid’s description of Bahrain, Kunitzsch concluded that, although the geographical information seems 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.

- Kuriyama, Yasuyuki. 2020. “Analysis of Historical Value of *Rūznāma*: Preliminary Research of Arab Nautical Activity.” *Toyo Kenkyu* 217: 69–100. [In Japanese].
- . 2021. “Arab Sailors and their On Board Activities in the Western Indian Ocean: From an Analysis of *Rūznāma* recorded by Kuwait’s *nāḥūdḥā*.” *Chuo Journal of Asian History* 45: 102–78. [In Japanese].

These two Japanese articles are reviewed in *Nouvelles Chroniques du manuscrit au Yémen* 14 (Jan. 2022): 21–22.

- Lafitte, Roland. 2014. “Le ciel austral des Arabes aux Portugais vers 1500.” Online article of the author’s talk at the “Symposium des planétariums,” Lucerne, May 2014.

There are a number of other relevant and well-informed articles by this author on the same website of the link above.

- Laguardia Trías, Rolando. 1963. *Las más antiguas determinaciones de latitud en el Atlántico y el Índico*. Madrid: Instituto Histórico de Marina.
- Lin, Hsiao-chien 林筱倩. 2015. *Fettering the Stars: Islamic Navigational Knowledge in Ming China*. MA thesis. Hsinchu: Tsing Hua University.

- Loureiro, Rui. 2013. “Ecos das Navegações Portuguesas no Kitab-i Bahriye de Piri Reis.” *Abriu* 2 (January): 11–37.
- Lunde, Paul. 2005 “The Leek-Green Sea.” *Saudi Aramco World* 56, no. 4 (July/August): 12–19.
- . 2012a. “Sulaymān al-Mahrī: Maritime Routes in the ‘*Umda* and *Manhāj*,” In *The Principles of Arab Navigation*, edited by A. R. Constable and W. Facey, 61–74. London: Arabian Publishing.
- . 2012b. “Sailing Times in Sulayman al-Mahrī”. In *The Principles of Arab Navigation*, edited by Anthony R. Constable and William Facey, 75–82. London: Arabian Publishing.
- al-Mājid, ‘Abdallāh ‘Alī. 1390/1970-1. “*al-Rubbān Sulaymān al-Mahrī wa-mu’allaḡātuh fī ‘ilmay al-milāḡa al-baḡriyya wa-l-falakiyya*” (“The Captain Sulaymān al-Mahrī, His Works on the Sciences of Navigation and Astronomy”). *al-‘Arab* 5: 37–54.
- **Malhão Pereira, José Manuel.** 2002. *East and West Encounter at Sea*. Lisbon: 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*. Lisbon: Academia de Marinha.
- . 2004. *As técnicas náuticas pregâmicas no Índico*. Lisbon: Academia de Marinha.
- . 2012. *Estudos da história da náutica e das navegações de alto-mar*. Vol. 1. Lisbon: 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, 597–629. New Delhi: Pearson Education.
- Markanday, Sucharit, and P. S. Srivastava. 1980. “Physical Oceanography in India: An Historical Sketch.” In *Oceanography: The Past*, edited by M. Sears and D. Merriman, 551–61. New York: Springer.
- Massignon, Louis. 1962. *Les Nuages de Magellan et leur découverte par les arabes*. Paris: Geuthner.
- 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)*. Lisbon: Centro de Estudos Históricos Ultramarinos.
  - Miquel, A. 1991. “al-Muḳaddasi.” In *Encyclopaedia of Islam, Second Edition*, edited by P. Bearman, Th. Bianquis, C. E. Bosworth, E. van Donzel, W. P. Heinrichs. doi: [http://dx.doi.org/10.1163/1573-3912\\_islam\\_SIM\\_5451](http://dx.doi.org/10.1163/1573-3912_islam_SIM_5451).
  - Mohebbi, Parvez. 1996. “A Persian Nautical Glossary from ca. 1900.” *Journal of the British Institute of Persian Studies* 34, no. 1: 129–33.
  - Morelon, Régis. 1987. “L’astronomie nautique arabo-islamique.” *Astronomie* 101: 191–4.
  - Moura Braz, C. A. 1962. *O encontro das marinhas oriental e ocidental na era dos Descobrimentos*. Lisbon: 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. Topoi, Orient-Occident*, supplément 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.

- Nieto, Michel. 1999. “Les Poèmes Nautiques de Sa‘īd Ibn Sālim Bātāyi’.” *Chroniques Yéménites* 6–7 (July).
  - 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.
- . 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.

- Pearson, Michael. 1998. *Port Cities and Intruders. The Swahili Coast, India, and Portugal in the Early Modern Era*. Baltimore: Johns Hopkins University Press.
- . 2003. *The Indian Ocean*. London and New York: Routledge.

The history of the Indian Ocean encompasses many facets naturally linked to one another. While navigation presupposes knowledge related to shipbuilding, instrument use and orientation at sea, the initial decision to navigate along specific routes is often related to trade, religion and politics. Pearson provides a narrative of such a history. Of particular interest for us are chapters 3 to 6, covering navigation down to the Early Modern period. Regarding Arabic, Indian and Chinese navigation, chapters 3 and 4 cite a variety of multicultural sources on travel liter-

ature, among which are the accounts by Ibn Jubayr, the 12th-century geographer, on Arab sailors and ships.

- Pellat, Charles. 1989. “al-Masālik wa ’l-Mamālik”. In *Encyclopaedia of Islam, Second Edition*, edited by P. Bearman, Th. Bianquis, C. E. Bosworth, E. van Donzel, W. P. Heinrichs. [http://dx.doi.org/10.1163/1573-3912\\_islam\\_SIM\\_4994](http://dx.doi.org/10.1163/1573-3912_islam_SIM_4994).
- Pereira da Silva, Luciano A. 1924. “Kamal, tábuas da Índia e tavoletas náuticas.” *Lusitania: Revista de Estudos Portugueses* 1, no. 3 (June): 363–71.
- Prabha Ray, Himanshu, ed. 2016. *Bridging the Gulf. Maritime Cultural Heritage of the Western Indian Ocean*. New Delhi: India International Centre/Manohar Publishers.  
See in particular chapter 5 by C. Goswami: “Exploring the Essence of the Navigational manuals”; and chapter 6 by A. Rajeshirke: “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.
- Proverbio, Edoardo. 1994. “Astronomical and Sailing Tables from the Second Half of the XVth Century to the Middle of the XVIth Century.” *Memorie della Società Astronomica Italiana* 65: 469–96.
- Puig Aguilar, Roser. 2007. “Un mar de arena, un mar de estrellas y un mar para navegar: árabes y navegación.” *Cuadernos del CEMYR* 15: 77–90.
- Ptak, Roderich. 2007. *Die maritime Seidenstrasse: Küstenräume, Seefahrt und Handel in vorkolonialer Zeit*. Munich: C. H. Beck.
- Rajeshirke, Ashok B., ed. 2014. *Pre-Modern Kutchi Navigation Techniques and Voyages*. New Delhi: National Museum.
- . 2016. “Navigation Wisdom of Arabs and Portuguese in Pre-Modern Kachchhi Navigation: An Observation.” In *Bridging the Gulf. Maritime Cultural Heritage of the Western Indian Ocean*, edited by Himanshu Prabha Ray, 161–80. New Delhi: India International Centre/Manohar Publishers.
- Raju, C. K. 2007. “Navigation: *Kamāl* or *Rāpalagai*. Precise measurement of angles and the two-scale principle.” In *Cultural Foundations of Mathematics: The Nature of Mathematical Proof and the Transmission of the Calculus from India to Europe in the 16th c. CE*, 239–63. Delhi: Pearson Education.
- Ricks, Thomas M. 1970. “Persian Gulf Seafaring and East Africa: Ninth-Twelfth Centuries.” *African Historical Studies* 3, no. 2: 339–57.
- Risso, Patricia. 2019. “Indian Ocean, Early Modern.” In *Encyclopaedia of Islam, THREE*, edited by Kate Fleet, Gudrun Krämer, Denis Matringe, John Nawas, Devin J. Stewart. doi: [http://dx.doi.org/10.1163/1573-3912\\_ei3\\_COM\\_27846](http://dx.doi.org/10.1163/1573-3912_ei3_COM_27846).
- Rivers, P. J. 2012. “New Lamps for Old: Modern Nautical Terms for Ancient Marine Practices and the Navigation of the Zheng He Voyages.” *Journal of the Malaysian Branch of the Royal Asiatic Society* 85, no. 1 (June): 85–98.

This article intends to shed light on some misnomers and misconceptions arising

from the encounter of Arab, Indian and Chinese maritime traditions.

- al-Salimi, Abdulrahman, and Eric Staples. 2019. *A Maritime Lexicon: Arabic Nautical Terminology in the Indian Ocean*. Hildesheim: Georg Olms Verlag.

This is the most important reference addition to the literature in recent times, being fully bilingual in Arabic and English, based directly on primary Arabic sources, taking into account all major and some rare secondary sources, and introducing several corrections and updates to previous works.

- Samsó, Julio. 2008. “Lunar Mansions and Timekeeping in Western Islam.” *Suḥayl* 8: 121–61.
- Schmidl, Petra S. 1996/97. “Two Early Arabic Sources on the Magnetic Compass.” *Journal of Arabic and Islamic Studies* 1, 81–132.
- . 2006. “On timekeeping by the lunar mansions in Medieval Egypt.” In *Proceedings of the Conference ‘Time and Astronomy in past Cultures,’ Toruń, March 30 – April 1, 2005*, edited by Arcadiusz Sołtysiak, 75–87. Warsaw: Institute of Archaeology, Warsaw University.

The article presents and comments upon two early Arabic treatises on the magnetic compass: one written by al-Ashraf ‘Umar b. 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 *qibla*.

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 b. 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-aḥjār* (“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.”

- Schottenhammer, Angela, ed. 2019. *Early Global Interconnectivity across the Indian Ocean World*. 2 vols. Palgrave Series in Indian Ocean World Studies. Cham: Springer.

VOLUME I: COMMERCIAL STRUCTURES AND EXCHANGES.

VOLUME II: EXCHANGE OF IDEAS, RELIGIONS, AND TECHNOLOGIES.

These two superbly produced volumes are the outcome of a 2012 conference and cover a great range of topics, both temporally and geographically. Schottenhammer is director of a thematically related project, the [Crossroads Research Centre](#), with a main focus on China, and more broadly on the interaction, communication and exchange relations in the macro-region of Eurasia, East Asia, the Asia-Pacific and Indian Ocean Worlds.

- . 2016. “China’s Gate to the Indian Ocean: Iranian and Arab Long-Distance Traders.” *Harvard Journal of Asiatic Studies* 76, no. 1: 135–79.
- Sears, Mary. 1966. “Medieval Arab references to the seasonally reversing currents of the North Indian Ocean.” *Deep-Sea Research* 13: 167–71.
  - 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 Arabisch-Islamischen Wissenschaften.
  - . 2010. *Astronomy, Geography and Navigation in Islamic Civilization*. Istanbul: Boyut.
  - Sheikh, Samira. 2009. “A Gujarati Map and Pilot Book of the Indian Ocean, c. 1750.” *Imago Mundi* 61, no. 1: 67–83.
  - Sheriff, Abdul. 2002. “Navigational Methods in the Indian Ocean.” In *Ships and the Development of Maritime Technology on the Indian Ocean*, edited by Ruth Barnes and David Parkin, 209–26. London: Routledge.
  - **Shihāb, Ḥasan Ṣāliḥ (1931–2012)**. 1982. *Fann al-milāḥa ‘inda al-‘arab* [“The Art of Navigation among the Arabs”]. Beirut: Dār al-‘Awda.
- 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-makhṭūṭayn fī fann al-milāḥa al-baḥriyya* [“Foundations of Maritime Science: Commentary and Critical Edition of Two Manuscripts on Nautical Technique”]. Kuwait: al-Jam‘iyya al-Jughrāfiyya al-Kuwaytiyya.
- . 2012. “Stellar Navigation of the Arabs.” In *The Principles of Arab Navigation*, edited by Anthony R. Constable and William Facey, 21–34. London: Arabian Publishing.
- . 2001. *Aḥmad b. Mājid wa-l-milāḥa fī l-muḥīṭ al-hindī* [“Aḥmad b. Mājid and Navigation on the Indian Ocean”]. Ra’s al-Khayma: Markaz al-Dirāsāt wa-l-Wathā’iq.
- . 2004. *al-Qāmūs al-baḥrī: mu‘jam lil-muṣṭalaḥāt al-baḥriyya* [“The Maritime Dictionary: Lexicon of Nautical Terms”]. Abu Dhabi: al-Majma‘ al-Thaqāfi.
- Shumovsky, Teodor, see above under individual translated titles by Ibn Mājid and al-Mahrī.
  - Shylaja, B. S. 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 al-Hind*.
- Smith, G. Rex, ed. 2008. *A Traveller in Thirteenth-Century Arabia: Ibn al-Mujāwir’s Tārīkh al-Mustabṣir*. London: Ashgate for the Hakluyt Society.
  - Smith, R. B. 1975. *Ra’is Salman and Amir Husain, being the Portuguese text of an unknown account of their expedition from Suez to Aden and the return to Jidda, in 1515 and 1516*,

found in the *Biblioteca Nacional de Lisboa*. Lisbon: Silvas.

- Soucek, S., Christides, V., Tibbetts, G. R., and G. Oman. 1991. "Milāḥa." In *Encyclopaedia of Islam, Second Edition*, edited by P. Bearman, Th. Bianquis, C. E. Bosworth, E. van Donzel, W. P. Heinrichs. doi: [http://dx.doi.org/10.1163/1573-3912\\_islam\\_COM\\_0737](http://dx.doi.org/10.1163/1573-3912_islam_COM_0737).
- **Staples, Eric**. 2012. "An Experiment in Arab Navigation: The Jewel of Muscat Passage." In *The Principles of Arab Navigation*, edited by W. Facey and A. Constable, 47–60. London: Arabian Publishing.
- . 2017. "Navigation in Islamic Sources." In *Oman: A Maritime History*, edited by Abdulrahman al-Salimi and Eric Staples, 223–52. 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.

———. See also under al-Salimi.

———, with Juan Acevedo and Inês Bénard. 2023. "Al-Mahri's Mir'āt al-salāk li-kurāt al-aflāk: A 16th-century Yemeni Navigator's Reflections on Astronomical Knowledge". *Nouvelles Chroniques du manuscrit au Yémen* 16 (35) (January): 96–120.

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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.

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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.

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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, as well as information on other valuable publications by Varadarajan.
- . n.d. “Of Eastern Sea Routes and Navigational Aids: Regional Versus Lusitanian.” *Revista de Cultura* 5, no. 13/14: 192–204.
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A good section on “Náutica” in this work about Islam and Spain, with valuable references.
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## 4 Websites & Online Resources

We are listing here only major sites and online publications which act as hubs for many related particular projects and institutions.

- [Crossroads Research Centre](#)

Focusing primarily on China, and more broadly on the interaction, communication and exchange relations in the macro-region of Eurasia, East Asia, the Asia-Pacific and Indian Ocean Worlds. They apply a parallel comparative analysis of both archaeological and textual evidence and a cross-cultural inter-disciplinary approach.

- [Études Océan Indien \(Indian Ocean Studies\)](#)

Journal published since 1982 under the auspices of the Centre de Recherche de l’Océan Indien Occidental (Western Indian Ocean Research Centre) at INALCO, now CROIMA (Western Indian Ocean and Austronesian World Research Center). Mostly ethnography and ethnology, first-quality research, especially good for Madagascar-related topics.

- [Indian Ocean in World History](#)

Sponsored by the Sultan Qaboos Cultural Center and intended for use by middle and high school teachers and students, the site provides a collection of primary sources on the Indian Ocean Basin.

- [Indian Ocean Research Group](#)

Based at the University of Adelaide, Curtin University, Australia, and South Asian University, India, with members from all over the world.

- [Indian Ocean World Centre \(IOWC, McGill University\)](#)

Based in Toronto, it is a research initiative and resource base established to promote the study of the history, economy, and cultures of the lands and peoples of the Indian Ocean world (IOW)—from China to Southeast and South Asia, the Middle East and Africa.

- [Leiden Centre for Indian Ocean Studies](#).

Netherlands-based, a global platform for scholars working on connections and comparisons across the Indian Ocean. Interested in scholarship that cuts across borders of places, periods and disciplines.

- [MEDIAN project—Les sociétés méditerranéennes antiques et les mondes de l’océan Indien](#)

Directed by Pierre Schneider, this project is based at Artois University since 2017.

## 5 Audio / Videos

- [al-Bu‘d al-jughrāfi lil-milāḥa al-‘arabiyya fi l-muḥīṭ al-hindī qabl al-qarn al-sādis ‘ashar](#) [“The Geographical Extension of Arab Navigation in the Indian Ocean Before the 16th Century”]. A lecture by Ḥasan Ṣāliḥ Shihāb. Kuwait, 2004.
- [The Jewel of Muscat](#), two-part documentary on the archaeological reconstruction and sailing of a 9th-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.
- [al-Ahammiyya al-tārikhiyya li-muṣannafāt al-milāḥa al-baḥriyya al-‘Umāniyya](#) [“The Historical Importance of Omani Maritime Navigation Works”]. A talk by Badr al-‘Araymī, 2020.
- [Melaka and the Middle East](#). A talk by Andrew Peacock, August 2019.

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Jesuit Trans-Oceanic Sailing Experiences*

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