

SPECIAL PUBLICATION

DEDICATED TO

Dr.N.K.PANIKKAR

MARINE
BIOLOGICAL
ASSOCIATION
OF INDIA



The Investigator

MAY 1973

HISTORY OF ARAB NAVIGATION IN THE INDIAN OCEAN

ANWAR A. ALEEM

Oceanography Department, University of Alexandria, Egypt

ABSTRACT

The paper describes a brief history of the Arab navigation based on the original Arabic sources from the 9th century onwards. The old literature indicates that the Arabs had a good knowledge of the wind-directions, currents and tides. They also knew the most favourable seasons for sailing from the different ports. The Arabs described the reversing currents in the North Indian Ocean and made several interesting observations on bioluminescence, discoloration of sea water, etc. They also made references on the light houses at the entrance of Persian Gulf and on the eddies, ascending currents and cyclonic winds.

Arab navigation in the Indian Ocean had deep connections with the Indian and Persian nautical traditions. These probably dates back to the first century when the Sanskrit "Jataka Mala" (maritime code) was written. The highly cultivated knowledge of the Arabs on nautical matters could be attributed to their knowledge of the stars, their eagerness to undertake extensive voyages and their desire to translate the relevant works in other languages into Arabic. The impact of nautical traditions of the Arabs on the Portuguese and Turkish navigations has been of considerable value.

INTRODUCTION

In ancient history, the Indian Ocean was known to the Egyptians, Greeks and Romans. Thus in 1478 B.C. Queen Hatchepsut (18th Dynasty) of Egypt sent an expedition to explore the East Coast of Africa. Chronicles of this expedition are recorded on the walls of her temple in Deir el Bahari, upper Egypt. The vivid relief scenes depict Egyptian ships being loaded with myrrh-resin, ebony, ivory, gold, incense woods, apes, dogs, panther skins and the like, from the coast of Somalia; while exotic Indian Ocean fishes feature in nets under-water. This marks the first known maritime expedition in history.

The "Indian Ocean" also features in the geography books such as "Almagest" of Ptolemy and the "Seven Climates" written by Ancient Greek and Hellenistic scholars of Alexandria in the 3rd and 4th centuries A.D.

Roman ships also circumnavigated this Ocean, but written accounts available on such expeditions, apart from being scarce, are devoid of useful navigational information.

Connections between the Arabs of Yaman, Hadramut and Oman with Persia and India on the one hand, and with the East Africa on the other, via maritime routes, preceded the spread of Islam by several centuries. However, the first written account on the seasonally reversing currents in the North Indian Ocean appeared only in the 9th century A.D. (Aleem, 1967a).

Preislamic Arabs had a good knowledge of the stars, the moon and winds, which they utilized for agriculture and for travel by land and sea. Such a knowledge is found scattered in preislamic Arabic poetry and in books of *Noa* (winds) and are summarized in the 9th and 10th centuries by Al Jahiz, Al Dinawari, and Al Sufi. The latter enumerates in his book "Images of Planets" about 250 stars in their chaste Arabic names. Al Biruni (c. 1000) also comments on preislamic astronomy in his "Chronology of Ancient Nations".

Islam spread quickly from Arabia into the surrounding countries in the 7th century A.D. and in less than two centuries the Moslem Empire extended from the Atlantic Coast of Iberia and North Africa to Transoxania (middle Asia). Thus it became necessary to describe land and sea routes, customs and economy of the various countries and adjust the positions of the towns more accurately. Hence knowledge on regional, mathematical and astronomical geography flourished during the 9th and 10th centuries. It is in such books written by the Arabs during this period that a history of navigation in the Indian Ocean can be traced. Already the legacy of Ancient Greece, India and Persia had been translated into Arabic in a special *Diwan*, under the direct supervision of the *Khalifs* of Baghdad like Al Mansur (762) and Al Mamun (813). Soon afterwards, the Arab contributions in arithmetic, algebra and astronomy, among others, flourished and the Greek instruments such as the *Astrolabe* and "Quadrant", used also in navigation, were modified or perfected.

Arab scholars were more pragmatic than their Greek predecessors; they relied in their description of seas and oceans on direct observation and experience. Their challenge to the Greek philosophers and theoreticians with regard to the description of the Indian Ocean, in particular, appears in accounts written by Al Mukaddasi (985) and others as we shall see later.

Although references to nautical books and "maps" of routiers as used by the Arab pilots in the Indian Ocean have been made by, the Ibn al Fakih (902), Al Massoudi (947) and Al Mukaddasi (985), original works from this period remained inaccessible to us. This gave the impression that such works were either lost or were never written at all. It was not until Ferrand (1921-23) discovered the nautical instructions of the Arab pilot Ahmad Ibn Magid and of

his contemporary Sulayman Al Mahri that our knowledge of the Arab navigation in the Indian Ocean in Medieval times began to flourish once again (see Aleem, 1968a).

Ibn Magid witnessed the arrival of the Portuguese in the Indian Ocean towards the end of the 15th and in the beginning of the 16th century, and both Ferrand (1922a) and Soviet orientalist such as schomovsky (1957) admit that he was the pilot of Vasco de Gama to India. However, we have arrived at a different conclusion as we shall see in the following page. The impact of Arab navigation on the Portuguese also deserves a comment.

Immediately after the Portuguese expeditions, the Indian Ocean became an area of great enterprise by the Turks, British and Dutch. Thus the age-long sea-faring tradition in the Indian Ocean is difficult to understand without reference to the Arabs. However, a history of the Arab navigation in the Indian Ocean could not be adequately covered earlier. Certain important omissions are obviously on the record. These are : the history of the mariners compass "*boussole*", details of astro-navigation and instruments employed, kinds of ships employed and classes of the different sailors on the ships. Finally the origin of technical nautical terms employed by the Arabs, which certainly had Greek, Persian, Indian, Turkish and Byzantine influences, apart from the Arabic impression left on such languages, have not been properly investigated. The identification of names of ports, islands and coasts with contemporary names also deserves more investigation.

SEA ROUTES TO CHINA AND AFRICA

Descriptions of these routes are mentioned in the books on sea tales and these should be considered while describing the early sources of Arab navigation in the Indian Ocean. This type of literature arose in Moslem Siraf and Basra—the two important ports in the Persian Gulf, where Arab and foreign pilots and traders met, narrated their adventures of high seas and described the new exotic lands, islands and peoples. Such stories have been given a romantic touch, and these have perserved in the well known tales of Sindbad the Sailor in the Arabian Nights. These, according to de Goeje (1890-93), formed the origin of legends such as that of San Brandan in the Medieval Europe. Nevertheless, these books reflect some authentic material on navigation, besides the vivid description of such remote places as Java, Sumatra and China.

The oldest written sea voyage in Arabic is known as the "Voyage of Sulayman the Merchant" which dates back to 851 and is ascribed to Ibn Wahab, who apparently took refuge in China during the "Revolution of Zing" in Baghdad. Some more additions in the book were made later on by Al Sirafi (916) and this book is considered an important source on the ethnology of India and China (Ferrand, 1922b). It also contains a description of the maritime route from

Siraf to Canton which the ships used to cover in "cycles" during a period of 4 months. These were summarized as follows : from Siraf to Mascot, then to Kalam (on the Malabar Coast) and to the ports of Ceylon (Sarandib), then across the Bay of Bengal (Sea of Harkand) to the Isle of Lingbalus (Nicobar), from there to Kalabar (Malacca) and from Malacca round Siam and then to the Isle of Haynan and from there to mainland China to the Port of Khanfu (Canton); some ships used to sail farther north to Korea and probably also to Japan. This route was commonly taken by the Arab and Persian pilots between the 7th and 9th centuries and already in the 8th century there was a strong Moslem community in Canton which controlled most of the external trade to China (Kammerer, 1935). Arab pilots felt at home in India and Ceylon and Ibn al Fahih (902) adds that the Indians on the Malabar Coast charged the Arab ships only between 10-20 *Dinars* for fresh water, while a Chinese ship would pay 1000 *Dinars* for the same. Arab ships also travelled from Nicobar to Java and Sumatra, where several Arab families settled and from there sailed to the Philippine Islands later on; these were mostly of *Hadramuti* origin.

Moreover, the *Yamani* tribes of *Azds* sailed more often to the east and settled along the coast of Africa in Zanzibar, Madagascar and further south to Sofala and Mozambique. The Sultans of Zanzibar ruled over this island until recently.

Another interesting book of sea tales is "Wonders of India". It is a collection of sea tales written by a pilot known as Buzruk Ibn Shahryar between 900-905. Apart from the breath-taking sea adventures, the book also includes some very interesting observations on winds and currents in the southern seas.

Ibn al Fakih (902) describes the difficulties of navigation in the Sea of Barbar (Abyssinian Sea) and notes that the Arab pilots travelled in this sea "with the cord and not with the arc". The same author while describing the "lighthouses" erected on a small island at the entrance of the Persian Gulf, comments on eddy currents. Similarly, Al Biruni (c. 1000) gives an intelligent observation that the currents were ascending from the sea bottom as judged from the "displacement of nets".

TREATISES ON ASTRONOMICAL AND REGIONAL GEOGRAPHY

Apart from the knowledge taken from the Greeks which has been translated into Arabic, the early Moslems also readily assimilated the Persian and the Hindu knowledge, before they made their great contributions in science. Thus in 770 Al Fazari presented at the court of Al Mansur a learned Hindu named Manka who introduced "*Siddhanta*" a treatise on astronomy according to Hindu methods, which was immediately translated. Al Fazari is also noted as the first Moslem to have constructed an *Astrolabe*. This instrument was perfected by

the Arabs, and Al Zarkali (1050) who is the author of "Toledo Tables", is credited for the integral *Astrolabe*.*

Arithmetic and algebra also flourished along with astronomy and the celebrated works of Al Khwarizmi (835-844) on astronomy, and on the Indian methods of calculation (*De Numero Indico*) and on algebra were translated into Latin by Adelard of Bath and Gerard of Cremona.

The most celebrated work in the astronomy of the period is due to Al Battani (852-929) who wrote a large treatise and compiled astronomical tables which show an advance on the work of Al Khwarizmi. It shows a divergence from the Indian methods. These tables left an impression on the great maritime discoveries of the 15th and 16th centuries by the Spanish and Portuguese. Al Battani is also credited for laying the foundation of modern trigonometry. The divisions of a scale known as Al "Khwarizmi's Stick", which is used for measuring the altitude of stars is based on trigonometric functions. The stick was later replaced by a string knotted at intervals and adjusted to the centre of wooden tablets for measuring the altitude of stars above the horizon from the ships at night. The "sined quadrant" is also attributed to Al Khwarizmi.

Advances on regional geography were the outcome of the expansion of the Moslem Empire as stated previously and these flourished also in the 9th and 10th centuries. These books entail informations on lands, mountains, rivers, dimensions of seas and oceans, islands, economic resources and customs of people. Such informations were found useful for administrative purposes. These books also contain interesting informations on nautical matters, such as winds, currents, tides and cycles of maritime routes. They are known in their Arabic names as "Takween Al Buldan" (geography) and "Al Masalik wal Mamalik" (Books of Routes and Kingdoms).

Chief among these are : Ibn Khurdazbah written in 846, which contains the first account on the seasonally reversing currents in the North Indian Ocean, of Ibn Al Fakih (902) referred to earlier and that of Al Massoudi (947) known to Europeans in its Arabic name "Prairies of Gold". This book is considered as an encyclopedia of geography and history.

Other classical Arab geographers of the 10th century, such as Al Balkhi, Istakhari and Ibn Hawnal, illustrated their geographical books by maps which are known collectively as the "Atlas of Islam". These maps show an advance over the ancient Greek maps to such a degree that they include a round earth, devoid of pictures of animals and show more accurately the location of different regions. As already mentioned, Arab geographers of the 10th century already

*Arabs excelled in the determination of directions and positions of places relative to Mecca, the Qibla of Islam, used for determining the direction of prayer.

dissociated themselves from the ancient Greek theories on geography and relied upon their own experience. This is most evident from the work of Al Mukaddasi (985) and in particular from his account on the Indian Ocean which can be translated as follows :

"As for me I have sailed in this Sea for about 2000 *farsakh* (~ 6000 miles) and circumnavigated Arabia from Kulzum (Suez) to Abadan, apart from drifting on islands and in high seas. I befriended Sheikhs (pilots) born and raised in this Sea, shipowners, mathematicians, deputies and merchants. I found out that all these were among the most knowledgable on this Sea, of its ports, winds and islands. I asked them about it, its routes and boundaries and *have seen with them books on these matters* ; these they study, rely upon and act according to what they contain. This relieved me enormously after much thought and contemplation (of these problems)

Al Mukaddasi goes on to compare his practical knowledge with what had been written or drawn earlier in maps of this Ocean and mentions the discussions he had on the Coast of Aden with a shipowner whose vessels circumnavigated the Ocean to its extreme boundaries, and on matters of winds, bays, dangerous approaches, lighthouses, etc.

Al Massoudi (947) also acknowledged the experiences of *Omani* and *Sirafi* pilots in the Indian Sea, the Sea of China (South China Sea), the Sea of Zing, the Sea of Kolzum (Red Sea), etc., and he also concludes that the knowledge of these pilots was different from what had been stated previously by the Greek philosophers with regards to areas and dimensions of the oceans.

At a later date, Al Idrisi completed his geography book entitled "Nuzhat al Mushtak" in Palermo (Sicily) in 1154 and this book enjoyed a special reputation for centuries not only in the East, but also in Europe. This book combines descriptive and mathematical geography with a large number of maps and charts.

Reference should also be made to two other important geography books by Al Hamaoui (1250) and Abul Feda (1321). Apart from new additions on northern latitudes, including the Baltic Sea, the latter author refers to navigational instruments used by the Arabs.

COSMOGRAPHIA

Books on the wonders of sea and land, known also as *Mirabilia* enjoyed a wide popularity until recently. These books provide a mixture of legends with facts and are not altogether devoid of descriptions of oceanic phenomena such as the discoloration of sea water, mass mortality of fish, cyclones, poisonous

fish, bioluminescence, etc. (Aleem, 1968 *b*). Famous among these are the treatises of Al Garnati (1162), Al Kazwini (1280) and Al Dimishki (1325). Cyclonic winds known to these authors by *Al Tannin* (Dragon) have been explained by Al Kazwini as resulting from the impact of two winds blowing from opposite directions. Finally, travel books such as the "Voyage of Ibn Battuta" (1356) to India contains an interesting description of the islands in the Indian Ocean and the customs of people.

ARAB NAUTICAL INSTRUCTIONS

Technical works on Arab navigation written in the 9th and 10th centuries are not available as such, although references to them have been made successively by Ibn al Fahik (902), Al Massoudi (947) and Mukaddasi (958).

That such books were known only to professional pilots may be inferred from the account of Al Massoudi that the Arab seafaring tradition was gained by long experience and passed from one generation to the other.

It is also possible that such a difficult subject might not have attracted as much popularity as the books on *Mirabilia*. Poetry was the form in which such a material could have been written in order to facilitate memorising it, i. e. "Mnemotechnique".

A few extracts of these on the difficulty of navigation in Barbara and Hafuni are mentioned by Ibn Al Fakih (*loc. cit.*) as stated previously.

However, the discovery of the nautical instruction of Ibn Magid (1433—1510 ?), the famous Arab pilot of the Indian Ocean, by Ferrand (1921-23) has thrown much light on the nautical matters given by his predecessors. Ibn Magid refers to Arab nautical instructions written 300 years before his time in the same form of poetry known as *Kasida* or *Urjuza* in which he wrote most of his works.

The works of Ibn Magid and his contemporary Sulayman Al Mahri are considered as the most complete document on Arab navigation in the Indian Ocean during the Medieval ages.

Commentary on this work and on the Arab astronavigation has been made by Ferrand (1928), De Saussure (1928) Schomovsky (1957) and Aleem (1967 *b*, *c*. and 1968 *a*.) Ibn Magid's contributions entail :

1. Sailing instructions based on astro-navigation and descriptions of routes from South Arabia to East Africa until Sofala, to Madagascar, to Sind, Malabar and the East Coast of India. Details of favourable times for sailing with regards to winds and currents are given for all ports and seasons of the year.

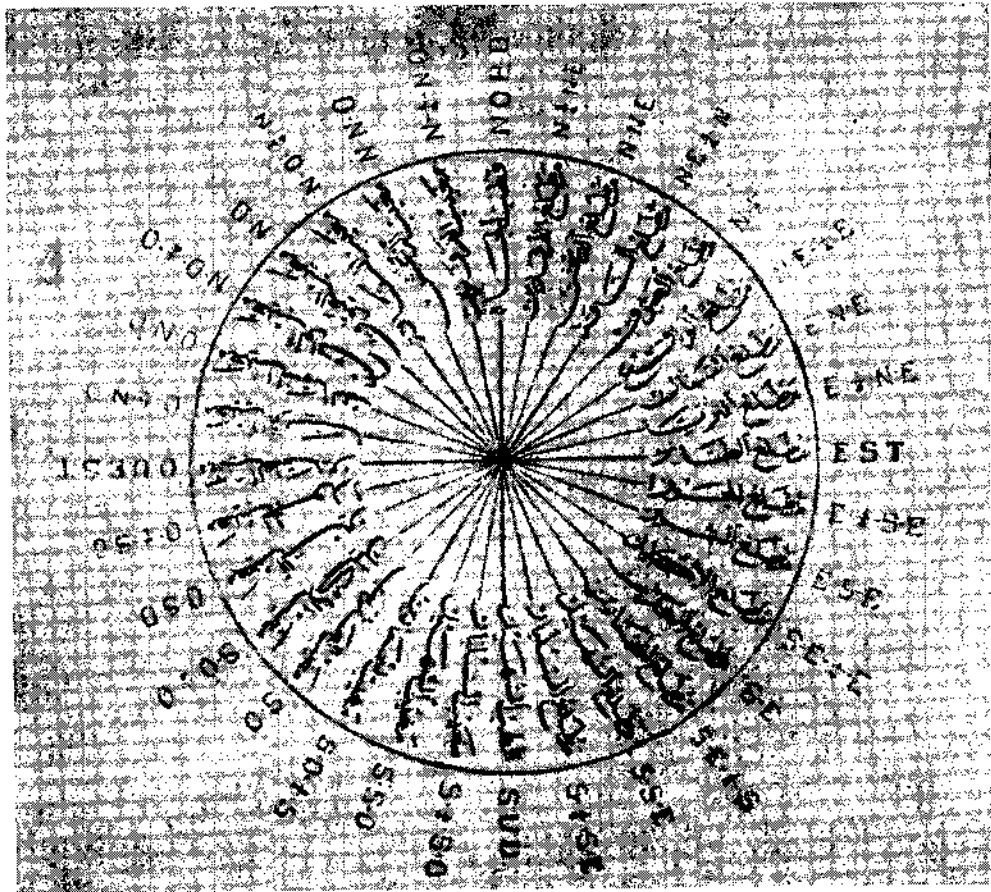


Fig. 1. Azimuthal wind rose of Ibn Magid.

2. Complete knowledge of stars and constellation, their altitudes and relative angles for determining the latitudes and adjusting the ships course. The relative movements of γ and β of the small bear (Alfarkads) in their 6 cases around *Polaris* were described by Ibn Magid and Al Mahri. This together with the mansions of the moon were utilized to determine the time at night. These phases of "Alfarkads" were not known to the Portuguese.
3. Ibn Magid was the first to adjust the magnetic needle of the compass on a pivot to enable it to move freely (Aleem, 1968a). His azimuthal wind-rose (Fig. 1) comprises 32 rhumbs or "Khuns" divided into 224 *isba*, so that 1 *isba* is equivalent to $1^{\circ} 37'$ or to 97 nautical miles. The unit of distance is the *Zam* (probably an Indian word), which is equivalent to 12 nautical miles.

4. Ibn Magid is credited also for a treatise on useful signs used as navigational aids; these such as soundings, nature of the bottom, dangerous reefs, description of approaches, observations on birds, fish and seaweeds, on the colour of the water, as well as on winds and currents.
5. The same author is also credited for a "maritime code" incorporating a set of rules and regulations to be observed by pilots and crew for the "safety of the ship, passengers and cargo". This code seems more advanced and up-to-date than the Sanskrit code "Jataka Mala" (Sylvain Levy, 1918) or the code of the Kingdom of Malacca written by the Moslem pilot Mahmoud Sah in the Malayan language (Ferrand, 1928).

It is to be noted that although the Arabs perfected the *Astrolabe* and "Quadrant" at an early age, they scarcely used these instruments in navigation at sea, for the error resulting from the movement of the ship interferes with the correct readings. Instead, they used wooden tablets which depended on measuring the angle between the celestial body, the observer's eye and the horizon. The distance between the observer's eye and the adjusted tablet is graduated according to trigonometric functions as stated earlier. It is upon this principle that the instruments known as *Kamal*, *Balisti* and *Arablete* are graduated.

The *Astrolabe* was first known in Europe in 1054, after the Arabic sources (contractus de Vehrigen: *De Mansura Astrolabii*) while the first mention of the "Quadrant" in Europe dates back to 1276. This is also known after the Arabic sources were translated by Robert d'Angles in Montpellier.

Hentry, the Navigator was among the first to use an *Astrolabe* at sea in his voyage to West Africa in 1455, while Diego Gomez was among the first to use the quadrant in navigation carried out in 1462.

Arab cartographers also left an impression on the earlier Portuguese maps of the Indian Ocean. Thus De Barros (ed. 1777) mentions that the Persian Gulf in the "*Geographica Universalis*" is based upon Arabic and Persian sources, while Alfonso de Albuquerque sent to King Manoel of Portugal an Arabic chart captured with a pilot at the Island of Socotra in 1507 (Aleem, 1968a). Ferrand (1928) adds that certain Portuguese technical terms in navigation are transcriptions of Arabic terms. In this respect we refer also to Delgado (1919-21) for the etymology of such words as: *alfandega*, *algibeira*, *ceifa*, *aceifa*, *arratel* and *tariff*, *magazine*, *cheque*, *douane* and many others which have strict Arabic origin.

IDENTITY OF THE PILOT OF VASCO DE GAMA FROM MALINDI TO INDIA IN 1498.

Popular accounts of Vasco de Gama's first expedition to India written by Portuguese historiographers tell us that he sailed from Portugal on the 25th of

March 1497, crossed the Cape of Good Hope on 22nd November of the same year and arrived at "Natal" on the New Year's day. In January 1498 he lost one of his 3 ships in north of Natal but continued his voyage hugging the East Coast of Africa and reaching Malindi in March 1498. At Malindi, he anchored for some weeks seeking information on the route to India. Meanwhile, he befriended the Sultan of Malindi and requested the services of a pilot to guide him to India. After some hesitation, the Sultan introduced a pilot to the Portuguese Admiral who was impressed by his knowledge, instruments and charts. The Admiral took off from Malindi in the company of this new pilot two days after their consultation i.e. on 24th April 1498 and reached Calicut, a small port on the West Coast of India, after 22 days.

It is to be noted that Vasco de Gama did not write his own memoirs of the expedition and this was described later on by the Portuguese historiographers such as de Basros (1553), Castenheda (1554) and Goes (1566). Besides, much of the original materials and charts kept in the archives of the Place of India in Lisbon were destroyed during the earthquakes of 1755.

For this reason, accounts differ on the identity of the pilot who guided Vasco de Gama in his first voyage to India, whether he was an Arab, a Moor or an Indian from Gujarat. He was referred to in Portuguese accounts as Muallim, Muallimo, Cana or Canaqua. The first two words are the Arabic name for a master or pilot and these were the popular names for all able pilots in the Indian Ocean irrespective of their nationality, in the same way as the earlier Arabs adopted the Persian words "*Nokhada*" for "Pilot" and "*Rahmang*" for "book of the route". The words Cana and Canaqua of Sanskrit origin signify an astrologian or a man who has knowledge of the stars.

It is also known that the Portuguese sent three expeditions to India as follows in succession during their early campaigns.

- 1 — Under Vasco de Gama in 1497 — 1498
- 2 — Under Pedro Alvares Cabral 1500 — 1501
- 3 — Under Joao de Nova 1501 — 1502

All these expeditions encountered difficulties and lost ships and men in the Bay of Delgao and sought the help of foreign pilots from Africa to India. Cabral was accompanied by two pilots of Gujarati origin to show him the way to India.

It was due to Ferrand (1922 b) that Ibn Magid was identified as the incumbent pilot of Vasco de Gama. Ferrand, an outstanding orientalist and a keen research worker based his identification on an Arabic manuscript of a book by Kotb el Din Al Nahrawaly written in 1577 under the name "*Al Bark al Yamani fil Fath el Osmani*" (on the Ottoman conquests in Yaman, etc.). Another manuscript of this book is found in the National Library in Cairo to which

I have also referred. Al Nahrawaly's story goes to say that the Portuguese used to face losses in men and ships in their attempts to reach India and it was not until an able pilot in the name of Ahmad Ibn Magid has shown them the way, because the Portuguese Admiral had made him drunk (with liquor).

In our view, this story seems unfounded for the following reasons.

- 1 — Al Nahrawaly's manuscript was written 79 years after Vasco de Gama's Expedition. Had the story been true, the author of "Muhit", a serious treatise on navigation in the Indian Ocean written in 1557 by the Turkish Admiral Sidi Ali should have noted it. Sidi Ali was more acquainted with Ibn Magid and his works.
- 2 — Ibn Magid was a pilot of high integrity and calibre, with deep respect for his religion. This is manifested in all his writings which reflect clearly the way of life he chose (Aleem, 1967 b, c). Thus he writes "a pilot should be clean in body and thought". He always started his voyages with prayers and with submission to God. His saying may be noted "On board the ship you are a guest of Allah, never fail to remember and obey him". Besides at the time of this expedition Ibn Magid must have been over 60 years old, an age in which one is not easily tempted to drink.
- 3 — It is rather naive to think that a man like De Gama would trust a pilot to guide him while drunk.
- 4 — Al Nahrawaly's book lacks accuracy in other places, for example the conquest of Harmuz by Albuquerque in 1507 was made before building the Citadel at Goa and not after.
- 5 — The most important evidence, however, that Ibn Magid was not the pilot of Vasco de Gama or of any other Portuguese ships is derived from his own works. Thus in 1957 Schomovsky in Leningrad published three new Urjuza's of Ibn Magid. One of these (over 500 verses) is entitled "Urjuza of Sofala" describes the routes from Gujarat, Sind, Malabar to Sing Coast, Madagascar and Comore Island.

I have read thoroughly this Urjuza and in spite of the numerous difficulties encountered in deciphering this manuscript, photo-printed in Schomovsky's book, it appears beyond doubt that Ibn Magid was not the pilot of Vasco de Gama.

Ibn Magid at this time was certainly aware of the activities of the Portuguese in the Indian Ocean whom he refers to as the "Franks"* in several places of his Urjuza. He speaks of their infiltration into the Indian Ocean, their seeking of information from pilots arriving from India, their conquest of islands and leaving their men to rule over. He also condemns their conquest to India. Ibn

* "Franks" is a popular name in Arabic for nonbelievers, mostly from Europe. It was used extensively during the Crusades.

Magid was unaware of the coast south of Sofala and round South Africa, but he had certainly heard of the arrival of the Portuguese from this route.

Ibn Magid's account of the first arrival of the Portuguese to India goes to say that it took their ships about two years to cross and reach the East Coast of Africa (in 902 *higra* = 1497-8) and then they "undoubtedly diverted their course to India, but they hesitated to attempt the voyage to China". From India they returned to the Zing Coast. "Then again in the year 906 *Higra* (= 1501-2) they returned to India along the same route. "This time they bought houses, settled and the Zamorines, the people (of India) were bewildered of these *Francs*; have they come with the intention to rule over, or are they crazy robbers?"

As a man of the sea, Ibn Magid does not refrain from admiring the knowledge of the Portuguese. He admits in places in this *Urjuza* that "You shall learn more about these routes from the *Francs*" (he means the routes south of Sofala and to the west of Africa). He was certainly impressed by their arrival from the south and west, the routes which he himself had not followed, but had many illusions about these.

In no place of this *Urjuza* had Ibn Magid either directly or indirectly admitted that he ever guided a Portuguese ship to India. In an earlier *Urjuza* which he wrote in 906 *higra* (1501-2), Ibn Magid did not seem to have been aware of the presence of the Portuguese in the Indian Ocean, for not a single reference has been made about them. There is therefore no reason to dispute the Portuguese accounts that the incumbent pilot was a Moslem pilot from Gujarat. Ibn Magid was an Arab pilot from Oman.

SOURCES OF "MUHIT", A TURKISH TREATISE ON NAVIGATION IN THE INDIAN OCEAN

Prior to the Expedition of Vasco de Gama, the Portuguese were collecting information about the route to India from the traders, and special missions were sent for this purpose to the East.

One such mission headed by Alfonso de Paiva and Pero de Covilham sailed from Portugal to Egypt, ten years before Vasco de Gama. Disguised as a Moslem, de Covilham boarded an Arab ship from Suez to Aden, while de Paiva remained in Egypt. From Aden, de Covilham took another Arab ship to India where he visited Calicut and Goa and sailed back to Sofala before he returned to Egypt. Shortly afterwards, he sailed back to India once more and this time with two other Portuguese, the name of one was Abraham de Pia and of the other Jusef Lamigo. At Hormuz in the Persian Gulf, they dispersed and de Covilham returned to Portugal via Abyssinid and through the Nile. It is said that he brought back with him Arab maps for navigation in the Indian Ocean (Kammerer, 1935).

Following the Expedition of Vasco de Gama, sea cruises by the Egyptian and Turkish fleets on one hand and the Portuguese on the other, went on for about 50 years in the Red Sea and Indian Ocean. In one such cruise, 20 ships sailed from the Suez under the Turkish Admiral Sidi Ali Hussein and these encountered 34 Portuguese ships in the Arabian Sea.

Storms often created havoc and both sides suffered heavy casualties. The Turkish Admiral took refuge in Diu and Sorat in Sind with only 9 ships of his fleet left. From there he entered the Persian Gulf and stayed in Basra for 5 months waiting for the monsoons. During this time Sidi Ali came across the nautical books of Ibn Magid and Al Mahri, from which he derived his nautical instructions known as "Mohit", which he wrote in Turkish.

This book received wide recognition only towards the end of the 19th century, when it was translated into German language by Maxmillian Bittner under the title "Die Topographischen Capitel der Indischen Seespiegels "Muhit" and, commented upon by Tomaschek (1897). Hammer (1834) and Bonelli (1894) had earlier translated parts of this book. Tomaschek adds that "Muhit" is a rare book which discusses all problems of navigation and compares favourably with the best of the Portuguese accounts of its kind.

However, Ferrand (1928) who discovered the manuscripts of Ibn Magid at a later date and compared these with "Muhit" gives no credit to the Turkish Admiral. His criticism of the latter goes to say that "tous les renseignements nautiques et astronomiques contenus dans le "Mohit" ne sont qu'une traduction turque, parfois mediocre, des textes arabes faisant l'objet de la presente publication".

This criticism seems unjustified, since Sidi Ali himself gives enough credit to the Arab pilots. In his introduction to "Mohit", Sidi Ali states that during his journey to Basra, he had ample opportunity to talk to these pilots on nautical matters. "I also collected books written by pilots as Ahmad Ibn Magid and Sulayman al Mahri such as *Kitab al Fawayed*, *Tuhfat*, *Minhag* and *Kilada*. I have gone through these books thoroughly and believe that navigation without them is quite difficult".

"I have found it necessary to translate them into Turkish, etc."

Sidi Ali Hussein also adds that "Ibn Magid was one of the best of pilots for the West Coast of India".

REFERENCES

A-ARABIC

- ABOUL-FEDA (Imaddin Ismail ibn Ali). 1321. *Takweem al Buldan* (Trans. by J. Reinaud, 1848).
 ALEEM (Anwar Abdel). 1967 b. *Kitab al Fawayed* by Shihab el Din Ahmad ibn Magid. *The Legacy of Humanity*, 4, 20 pp. Ministry of Culture, Cairo.

- ALEEM (Anwar Abdel). 1967 c. Ibn Magid, the Navigator. *Aalam al Arab*, Book No. 63, 172 pp. Ministry of Culture, Cairo.
- AL BATTANI (Albategius). 877-929. *Astronomical Tables* (translated by Nallino, 1903 and to Latin in 1140 by Plato of Tivoli).
- AL BIRUNI (Abu Rayhan). c. 1000. *Al Athar al Bakiyah* (published by C. E. Sachau, 1923 Leipzig).
- AL DIMISKRI (Shamsuddin). c 1325. *Nukhat ad Dahr* (published by Mehren, 1866 Petersburg).
- AL FAZARI (Yacub). c. 770. (*Astronomical Tables and on the use of armillary sphere*).
- AL GARNATI (Abu Hamid al Andalus). 1081-1170. *Tuhfat al Alab (Mirabilia)* (Published by Ferrand, 1925).
- AL HAMOUI (Yacut). 1250. *Al Moagam* (annotated lexicon of geographical terms and places in several volumes).
- AL IDRISI (Abu Abdullah Mohammed). 1154. *Nuzhat al Mustak* (Publ. by P. A. Jaubert 1836-40, Paris).
- AL KAZWINI (Zakaria). 1280. *Agayeb al Makhluqat (Mirabilia)*.
- AL KHUWARIZMI. 833-844. (*De Numero indico and Treatise on Astronomy*)
- AL MAHRI (Sulayman Ibn Ahmad). c. 1511 (cf. Ferrand, 1921-3).
- AL MASSOUDI (Abdul Hassan). 947. *Murug el Dehab*. (Publ. by Barbier de Meynard 1861-1877, Paris).
- AL MUKADDASI (Shamsuddin). 985. *Ahsam al Takaseem*. (Publ. by de Geoji 1906).
- AL NAHRAWALI (Kotb ed Din). 1577. *Al Bark al Yamani fil Fath el Osmani* (Ms. 2024 Cairo).
- AL SIRAFI (Abu Zayd Hussan). 916. (cf. Ferrand 1922a).
- AL SUFI (Abdul Rahman Abu Hussain) (10th Century) (*Images of Planets*).
- AL ZARKALI (Arzachel). 1029-1087. (*Tables of Toledo*).
- BUZRUK IBN SHAHRYAR. 900-905. *Agayeb al Hind*.
- IBN BATTOUTA. 1356 (*The Voyage*).
- IBN AL FAKIH (Ahmad al Hamadani). 902. *Kitabul-Buldan*. (Publ. by de Goeje, [1885]).
- IBN KHORDAZBEH (Abdul Qasim Obaidullah). 846. *Kitab-ul-Masalik Wal Mamalik*. (Publ. by de Goeje, 1889).

IBN MAGID (Shihab uddin Ahmad). 1433-1510? (cf. Ferrand 1921-33, Aleem, 1967a, b & 1968 a).

IBN WAHAB, 851. (Voyage of Sulayman, the Merchant).

B-FOREIGN

ALEEM, A. A. 1967 a. Concepts of currents, tides and winds among Medieval Arab geographers in the Indian Ocean. *Deep Sea Research*, 14 : 459-463.

ALEEM, A. A. 1968 a. Ahmad Ibn Magid, Arab Navigator of the XVth Century and his contributions to marine sciences. *Bull. Inst. oceanogr. Monaco, No. Special 2* (Cong. int. Hist. Oceanog. 1. 565-580).

ALEEM, A. A. 1968 b. Concepts of Marine biology among Arab writers the Middle Ages - Ibid., 1 : 359-367, Monaco.

BARROS (Joao de). 1553. *Decada Primera da Asia, dos feitos que os Portuguezes fizeram no descobrimento e conquista dos Mares e Terras do Oriente* (Ditto ed. 1777). - Lisboa.

BITTNER, M. 1897. See Tomaschek.

BONELLI (Luigi). 1894. Del Muhit o descizione deimari delle Indie dell' ammiraglio turko Sidi Ali. *C. R. Accad. Lincei* : 751-777.

CASTANHEIRA (Fernaõ Lopez da). 1554. *Historia do descobrimento e conquista da India pelos Portuguezes*-Lisboa.

DELGADO, 1919-1921. *Glossario Luso-asiatico* (2 vol.) Coimbra.

FERRAND, G. 1921-1923. *Instructions nautiques et routiers arabes et Portugais des XV^e et XVI^e siècles. Tome 1 - Le pilote des mers de l'Indonesie par shihab ad Din Ahmed Ibn Majid dit "le lion de la mer". Texte Arabe, reproduction phototypique du ms 2292 de la Bibliothèque nationale de Paris (352 p. de texte arabe). Tome 2 - Reproduction phototypique des Instructions nautiques de Sulayman al-Mahri et Ibn Majid (Ms. 2559) (308 p. de texte arabe).*-Paris.

FERRAND, G. 1922 a. Le pilote arabe de Vasco de Gama et les instructions nautiques des Arabes au XV^e siècle. *Ann. Geogr.*, 31 (172) : 289-307.

FERRAND, G. 1922 b. *Voyage de Marchand Sulayman en Inde et en Chine.* Paris.

FERRAND, G. 1928. *Introduction à l'astronomie nautique arabe.* *Bibl. geogr. arab.*, 1. Paris.

DE GEOJE, M. 1890-1893. *La legende de St. Brandan* (I & II) Leiden.

GOES (Damiao de). 1566. *Chronica do felicissimo Rei Dom Manuel de Portugal*-Lisboa.

HAMMER-PURSTALL, J. 1834. Extracts from the Muhit, that is the Ocean, a Turkish work on navigation in the Indian Seas, translated by J. HAMMER-PURSTALL. *J. Asiat. Soc. Bengal.* : 805-812.

KAMMERER, A. 1935. La mer Rouge, l'Abyssinie et l'Arabie depuis l'Antiquité. Tome 2. Les Guerres du Poivre. *Soc. r. Geogr. Egypte*.

LEVI, Sylvain, 1918. Pour l'histoire du Ramayana. *J. Asiat Soc. Bengal.*, Jan. - Feb. 1918.

SAUSSURE (L. de) 1928. Commentaire des instructions nautiques de Ibn Magid et Sulayman al-Mahir, in : FERRAND, 1928.

SCHOMOVSKY (Theodor). 1957. Tri neizrestnye Potsi Akhmada ibn Majida, arabskogo lotsmana Vaski de Gamy, v venikalnoi rukopisi instituta vostokvedenia. - Moscow, Leningrad, Akad. Nauk, USSR.

SIDI ALI HUSSEIN. 1557. Muhit (cf. TOMASCHEK).

TOMASCHEK, W. 1897. Die topographischen Capital des indischen Seespiegels Mohit. Übersetzt von dr. M. BITTNER — mit einer Einleitung sowie mit 30 Tafeln versehen von der W. TOMASCHEK. - Wien.