

## ARAB TRADITIONAL SEA NAVIGATION TECHNIQUES

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This paper highlights the historical importance of traditional Arab sea navigation. It emphasizes four different issues related to the traditional Arab sea navigation, drawing upon Arabic primary sources and other relevant literature. First, it investigates the reasons that made Arabs develop and employ various navigation techniques to guide their sea journeys. Some of these reasons mentioned in the paper due to the Arab peoples, who had originated as desert nomads in Arabia, became after the rise of Islam in the 7th century A.D. into merchants and pilgrims who travelled a network of land and sea routes between Eastern and Western cultures. As well as the ideas that were carried by Arab travelers along those transportation routes were advances in navigation techniques and tools of travel itself. An example of such techniques is Astronomical and Magnetic Position Finding technique which points out the enduring importance of the celestial bodies like sun and stars, and how these bodies were used by navigators for thousands of years to identify direction of travel and to orient themselves. Therefore, when no landmarks or other aids to navigation are visible, navigators can use the position of the sun or stars in the sky to fix their ship's position. The paper also presents an overview of the development of simple devices like the Qiyas (measurement of length). The early Arab navigators used the arm, hand and fingers to measure the positions of the sun and stars relative to the horizon; the Kamal which was another basic device and simple instrument used by the early Arab navigators and sailors of the Indian and eastern seas to find the altitude of the polar and circumpolar stars; and the sophisticated astrolabe which enabled navigators to set courses to unfamiliar places. The astrolabe was also used to determine latitude by measuring the angle between the horizon and the North Star. Another point that has been raised in this article is the landmarks and environmental cues such as the monsoon winds and others which used to be considered as a method to navigate their way. Early Arab mariners studied the directions of the monsoon and other winds to orient themselves at sea. Navigation of sailing ships in any sea depended on the seasonal winds and the direction of the winds. However, they usually sailed known routes to familiar ports during seasons dictated by the prevailing monsoon winds. as the early Arab sailors as well used many environmental cues and landmarks at sea, out of sight of land they derived clues about their location by observing types of birds, water snakes and fish, in addition to the depth, direction, and speed of current, tides and color of the water, and also the type of the sea bottom and its odor. By these they could tell if their location was near the coast or far away from it. Over the years ship captains had an enormous store of knowledge that was passed down through the generations both orally and in writing. Therefore, they augmented their memories by collecting written sailing directions (in books called Rahmani), although the use of poetry indicates the continuing oral tradition. The Rahmani texts mentioned environmental cues, routes, and also included sketches of landmarks to assist in piloting. Although written mentions of maps indicate that Arabs used sea charts, the lack of surviving copies leaves their nature in question.

Second, this paper reveals other factors in route selection such as the different sizes and types of boat, since different ship designs can play a role in sea navigation, whether by seaworthiness influencing the route the ship can take (coastal or open sea) or size determining the quantity of the cargo it can carry. Also, the type of sail and rigging and its design on the ship that was an important factor in sea navigation. In addition, travel season which included the importance of the monsoon winds in dividing navigation trips and sea routes played significant factor in sea navigation is also discussed.

Third, the paper states the classification of the Arab ship crew members, who were grouped into twelve classes: the Nokhda, Muallim, Khallasi, Nokhada- Khassab and so on; and the system that they followed in their particular duties and responsibilities.

Finally it ends with referring to the contribution of a well-known Arab navigator, Ahmed Ibn Majid, who came from a family of navigators; his father and grandfather were navigators. Furthermore, it points out his great invention of several navigation methods and instruments.

It concludes by showing how the Arabs and neighboring cultures were innovators in navigation, geography, and cartography and recognizing their significant historical contributions. The research raised a number of interesting questions and revealed other aspect of this research topic that merit further study.

**KEY WORDS:**

Sea navigation, mental maps, spatial thinking, historical data, map design.