

Celestial Navigators and Navigation Stories

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Abstract

Fishermen of the Kerkennah Islands in Tunisia, Moce Islanders in Fiji, and navigation instructors at the United States Naval Academy are the focus of a contemporary study of modern day navigation by the stars. The differences between these communities are obvious, but one of the similarities is the focus of this paper: the stories they tell about navigation. This cultural astronomy project primarily used methods from anthropology, especially ethnography. The stories were collected during interviews in each community from 1998 through 2003. Representative examples of their stories are presented and analyzed. Analysis includes what can be learned and what can be inferred about the navigators, their marine environment, and their relationship to the sky. Though the structure of their stories have parallels, community dependent and reflects different relationships to the sky and to new navigation technologies are emphasised.

Introduction

One time my father went to Lakeba and, in the morning at one village, Waitabu, he went to the shore to look at the sun. When the sun was rising he saw the marking on the sun [of the clouds] and said that there was going to be bad weather in the midday. He came and told the people from Moce not to go but to stay. But the people did not want to stay and all went. When they left, the bad weather, very strong weather came and they turned around to go back to Lakeba. They did not use the sail, they took the sail down and went back to Lakeba. And all the people said that my father was the big captain.

Moce Interview 01/03

The stories navigators tell often describe mythical feats of daring or instances of quick thinking that lead to survival in the face of dramatic overwhelming odds. The tales can be very entertaining, yet also describe

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navigation techniques, characteristics of climate and weather, and an understanding of the limits of equipment including the limits of the boats themselves. Thus, they are a way of revealing important technical knowledge to listeners.

During 1997, I began a cultural astronomy project to study people today who continue to use the stars for navigation. By 1999, I had established three research sites: The United States Naval Academy in Annapolis, Maryland, USA; Moce Island in Fiji, in the South Pacific; and the Kerkennah Island off of the coast of Tunisia, in North Africa. At each of these sites were the following: 1) People who knew how to navigate at night using the stars. 2) Navigation took place on the ocean. 3) There had recently been a major change in their navigation techniques.

The goals of the project were to document their navigation knowledge, learn how they learned to navigate and what they were teaching to the next generation, and what role did new technologies play in their continued use of the stars for navigation. In the process of collecting data, I was told many stories about navigators and navigation. This paper is an analysis of those stories.

I found two types of stories particularly revealing of many aspects of navigation expectations and knowledge: what I call 'blind navigator' stories and 'competing navigation' stories. The blind navigator stories are about what navigators consider to be the worst situation in which to navigate and they provide clues to which skills the navigators valued most in each navigation community. The competing navigation stories are where two navigation techniques are pitted against each other. I collected the stories at all three research sites and added to these with stories I collected from other studies of navigation. The navigators and people in their community told me many stories about different events in their lives and their history. But these two types of stories proved to be the most revealing of the local navigation culture in terms of local ecological knowledge, navigation standards, and local power dynamics. The two types of stories provide a window into navigation culture at each site and into the skills of the navigators. They are good for teaching young navigators; however, these stories were told to me. I am not sure if they use these stories to teach young navigators, because I never witnessed such an exchange.

Blind Navigator Stories

Good navigators should have the capacity to navigate well even under the most extreme conditions. Being blind, temporarily not being able to see,

and being unable to see in the normal manner of seeing are extreme situations for a navigator but such situations do occur. Blindness for navigators in these stories is usually temporary and can be caused by a storm, fog, or the loss of a favored piece of equipment. However, some of the blind navigator stories are about old navigators who have suffered a permanent loss of sight. The blind navigator stories collected during this study reflect all these blindness possibilities and yet all end in a triumphant feat of successful navigation.

The Blind Fishermen of the Kerkennah Islands

Two blind navigator stories circulated among the fishermen of Kerkennah. The first story is mythical in that it lacks names, a date, and information that could place the events historically. The story: A group of fishermen was lost in a storm off the Kerkennah Islands. After the storm, each of the fishermen in the boat took a turn at trying to navigate back to Kerkennah, but none was successful. Finally, after everyone else had failed, the fishermen asked an old navigator in the boat who had gone blind many years before if he knew how to reach Kerkennah. The blind man took a long pole and felt along the sea floor. He pulled up the pole and tasted the water, then he instructed them as to which way to go and they all arrived home safely.

The other Blind Navigator story is about a real person who was also physically blind. The blind man was known to go out fishing in one of the natural bays of Kerkennah by himself in a small boat. He was able to set his nets and return several hours later to collect his catch. He used a rowboat and had a pole to help him navigate by the seafloor features. In 1999 I learned that he was living in the village of Mellita, Kerkennah. Though I never met this blind navigator, other people confirmed his existence.

The Kerkennah Islands are on the western edge of the Gulf of Gabes, a part of the Mediterranean Sea. Kerkennah fishermen fish the waters surrounding the Islands and throughout the Gulf of Gabes, off Tunisia. On the Kerkennah Islands, on clear days the mainland and the city of Sfax can be seen to the west. A map of the seafloor shows depths up to 26 meters in the area between the Islands and the mainland, with an average depth of about ten meters. The seafloor drops off to the southeast but remains shallow to the north. For several kilometers north of the Islands the seas are very shallow, there are few places deeper than four meters. There are no islands to the west in the Gulf of Gabes. The island of Gabes is several tens of kilometers to the south of Kerkennah.

The shallow seas surrounding Kerkennah make bathymetry, or navigating by the features of the seafloor using a long pole, fairly easy. The sea floor close to Kerkennah is shallow with deep channels that lead to the villages. Some of the seafloor is sandy, it is rocky in other places, and sea grasses cover it in yet other places. Blindness in these blind navigator stories is caused by the permanent loss of sight. It is not surprising that these blind navigator stories reflect the local ecological knowledge needed to employ this unique aspect of Kerkennah navigation.

Lost in the Storm

The Moce navigators told stories about being blinded by the high seas and the low visibilities found during the many storms in the South Pacific. Some tell stories of surviving the worst tropical storms - hurricanes, either in canoes or in small boats. These stories are not myths or hypothetical they are real stories involving blindness and survival. A middle-aged navigator told me a story that reflects important actions taken in heavy storm conditions.

The story: The navigator was traveling home to Moce Island alone when he was caught in a storm.¹ Visibility quickly decreased and the sea became very rough. The navigator's first priority was to slow down the canoe, which he did by cutting the sail and tying items to drag behind the canoe. Then he was able to maintain his course, after noting the wind and current direction, by keeping the canoe and sail oriented in his original travel direction. Luckily, the wind direction did not change during the time he was traveling. He arrived at Moce safely.

Extreme storm conditions are the cause of blindness in these stories. In practice, the Moce navigators avoid storms as shown by the quote opening this paper. If an island is nearby when a storm hits, they will take shelter on the island rather than continue. However, some storms are so sudden that they catch the navigators off guard. If the navigators find themselves in a situation where the wind and current directions are changing, they will do their best to stop the boat and drift while waiting out the storm. If they decide the wind and wave directions are steady, then they will set the angle of the sail and the angle of the hull such that they can keep their course.

¹ Holbrook, J.C., 'Celestial Navigation and Technological Change on Moce Island.' *The Max Planck Institute for the History of Science Preprint Series* 216 (2002), p. 27.

Today, the Moce Islanders primarily use motor boats. The ability to ‘read’ the wind and wave directions is particular to sailing with canoes and young navigators do not automatically learn how to do it when they only use motorboats. The old sailors of Moce believe that it is a skill that is useful under such blinding conditions. After listening to many storm stories, I agree with the old sailors. But no one has taken up the task of teaching these survival skills learned through sailing to the younger generation of motorboat users.

Captain Bligh, the Ultimate Navigator

At the United States Naval Academy, the officers told two blind navigator stories which both stress the importance of celestial navigation. The two stories referred to Captain Bligh, who is famous because of the Bounty mutiny. These two stories emerged when I asked the officers if they thought celestial navigation is an important part of the navigation curriculum.

Summarizing the historic events: In 1789, Captain William Bligh with crew that were loyal to him was set adrift in a lifeboat after the crew of the HMS Bounty staged a successful mutiny. Captain Bligh had a sextant and a chronometer in the lifeboat, and using celestial navigation he created new charts of South Pacific Islands as he navigated his way back to civilization, rescuing himself and his crew. They traveled 3600 nautical miles during which they mapped parts of the Pacific for the first time, including parts of Fiji. The waterways between the coast of Viti Levu, the largest island in Fiji, and the Yasawa archipelago and Vanua Levu are ‘the Bligh Waters’ in honor of his passage.

The second story is a hypothetical version of the lifeboat story. That is, like Captain Bligh, a navigator is set adrift in nothing more than a lifeboat. The batteries that power electronic navigation equipment will run down over time, and so celestial navigation is the only reliable method while adrift. The United States Naval Academy instructors had never personally experienced trying to survive in a lifeboat on the open ocean, but perhaps the numerous lifeboat drills that are part of ship life keep the possibility fresh in their minds. Captain Bligh had oars and a sail to use to propel his lifeboat. Most lifeboats today are not equipped for sailing or paddling long distances, they are just to provide safe shelter until rescue. Nonetheless, it might be comforting for the navigators to know where they are while awaiting rescue.

The blindness in the Naval Academy stories is a ‘relative’ blindness. In contrast to the blind navigator stories from Kerkennah, these emphasize

an electronic blindness that makes the modern navigation aids relied upon by the Navy useless. This idea of electronic blindness is further supported by other stories told by the officers describing the experience of sudden electronic blackouts while on Navy ships. Apparently, Navy ships occasionally lose all power without explanation. It takes several hours to assess the situation and bring all the electric systems back online. In these situations, the officers say that they use celestial navigation until the other navigation aids are working.

Another Blind Navigator

Another blind navigator story is in *The Voyaging Stars* by David Lewis.² The tale takes place in the 1820s with a flotilla of double canoes returning from Samoa to Tonga and getting lost. After many attempts, the people in the boat asked Kaho Mo Vailahi, who was blind, to help. He put his hand in the sea, tasted the spray, and asked his son to tell him the positions of certain stars. He decided that the water was Fijian and that the waves were from the Lau group. He told them the direction to go and they arrived in Lau.

The similarities between this story and the blind navigator story of Kerkennah are remarkable. Lewis interprets the Tongan story as navigating first by the stars but also displaying knowledge about the various temperatures of the ocean in different locations. Tasting the water both in the Kerkennah and the Tongan story may point to a working knowledge of the salinity of the water in various regions. In Kerkennah, the fishermen often soften their hardtack in seawater before eating it, hard thick bread that looks and has the consistency of a big cracker. And they make fish soup using seawater, thus it is possible that they may have some local ecological knowledge about variations in salinity measured by taste.

Conclusions about Blind Navigators

Whether the blind navigator stories are truth or fiction, they provide insights into those critical navigation skills that needed to survive the most adverse condition – blindness. Blindness does not necessarily mean the permanent loss of sight, but reflects the temporary loss of sight such as in fog or a storm. As well as what navigators think of as blindness such as being without a preferred modern navigation aid or being without

2. Lewis, D., *The Voyaging Stars : Secrets of the Pacific Island Navigators*, 1st American ed. (New York: W. W. Norton, 1978).

electricity. Blindness provides the supreme test of navigation, and stories about navigating without sight showcase navigators with skills important for surviving in the local marine environment.

Competing Navigation Methods Stories

Another type of story involves two navigators using different techniques. These stories often, but not exclusively, highlight confrontations between traditional navigation techniques and new technology-driven methods. The outcomes of these stories vary, but the navigators always reach their destination safely.

Never Fish Alone

In Kerkennah the competing navigation stories focus on the choice between old and new technologies. A Kerkennah navigator, Magid Abdulmalik, told a story of how he was fishing one day when the fog rolled in. Before the fog descended, he had passed a young man fishing alone in a small boat. Magid thinks it is not a good idea to fish alone in general, just in case of accidents. He traveled on to encounter a larger commercial boat that it turns out the young man was working with. The larger boat had let the young man off to collect fish in that particular area. Once the fog descended, the larger boat could not find the young man. Magid returned effortlessly and picked him up. The young man was very relieved and grateful to Magid. Magid explained that the owners of the large boat used modern navigation equipment that is not superior to Kerkennah navigation. When asked about how he navigated in the fog, he replied that he knew the sea very well. He knew the seafloor and which sea grasses grew where, and where certain schools of fish are. He used his knowledge to return to the place where he had seen the lone fisherman.

The modern navigation aids did not prove to be better than the traditional skills of a Kerkennah fisherman. I do not know which modern aids the larger commercial vessel in this story had, but other commercial vessels working around Kerkennah have Global Positioning Systems (GPS), mariner's compass, and RADAR for navigation.

Wind and Clouds

On Moce one competing navigation story focuses on the choice between using wind or clouds. The story: One night a group of men was returning to Moce. The navigator saw a cloudbank to the south and pronounced that it lay over Moce. A passenger on the boat disagreed and said that he had

felt the characteristic change in wind direction that marked Moce as laying to the west. The navigator owned the boat and was in charge, so they headed south and landed on the island of Namaka, which is south of Moce, where they spent the night. The next morning they resumed their voyage home.

Navigators know that stationary cloudbanks amass over islands and use this while on the open ocean as a way of finding islands. And in this story, there was an island under the cloudbank, just the wrong one. However, using the change in wind direction might have been the most expeditious way to reach Moce that night.

Smart Ships

The formal interviews with the instructors at the United States Naval Academy begin the same way each time. I ask the instructors to give me background information about themselves and their education. When they finished telling me about their lives up to graduating from the Naval Academy, they begin a list of the names of the ships that they served on and their duties. On the surface, there is nothing unusual about Navy officers talking about ships, but just as with getting the assignment to teach at the United States Naval Academy is prestigious, being assigned to certain ships is also prestigious. The US Navy created a class of ships called 'smart ships'. Among the first smart ships were the USS Yorktown and the USS Ticonderoga, both were decommissioned in 2004. These two are Ticonderoga class guided missile cruisers, they can launch missiles and helicopters. The USS Rushmore is the first Whidbey Island Class Dock Landing Ship that is a smart ship, they transport land assault vehicles. I surmised from the interviews with the instructors that a smart ship assignment was one of the most prestigious. The competing navigation story involves one of the Navy's smart ships.

At the Naval Academy the competing navigation stories focus on the choice between high tech equipment and traditional techniques. The US Navy's smart ships have all the latest and experimental equipment for navigation as well as other ship systems. Like systems found on commercial airplanes, smart ships have an autopilot system for navigation. The smart ships have an integrated bridge that is a computer system connected to the ships propulsion and the navigation equipment including the ship's GPS, speedometer, rudder, RADAR, and inertial reference system (gyrocompass). The story: In a situation of dense fog, a US Navy smart ship and a US Coast Guard ship were trying to reach port. The smart ship switched to its automatic system and the system guided it

safely to the dock. The Coast Guard ship had to go back out to sea until the fog lifted.

In this competing navigation story the most modern system proved superior to whatever system was in use on the US Coast Guard ship. Whomever was in command of the Coast Guard ship realized that their navigation systems were not reliable under that heavy fog condition, and did not press forward into a risky situation. But, the USNA instructor that told the story showcased the superiority of the smart ship technology not the wisdom of the Coast Guard command. Also, it plays to the friendly but ever-present rivalry between the branches of the United States Military. I could have considered this a blind navigator story since the fog was blinding, but unlike blind navigator stories, the electronic equipment had the superior skills, not a person.

Another Competition Story

A paper by anthropologist Claudio Aporta includes a story about traveling with an older Inuit man in a small boat with an outboard motor.³ The fog rolled in before they reached their destination. The navigator asked the Inuit man which direction to go. The old man listened to the waves echo off nearby cliffs and watched the flight path of seabirds. Then he showed which direction to go. The young navigator had a Global Positioning System unit that pointed to another direction. He chose to follow the GPS direction and they arrived safely.

Aporta surmises that the direction the Inuit man suggested would have taken them to shore, but the GPS direction pointed to the shortest route to their destination. Given a situation with unlimited time and unlimited fuel, the Inuit man's directions were acceptable and accurate. But a shortage of fuel prompted the navigator to choose to follow the GPS direction instead.

Conclusions about Competing Navigation Stories

The stories that navigators tell are for entertainment, to emphasize preferred skills, to teach, and to punctuate their beliefs and understandings about how to navigate in their local marine environment successfully. The familiar 'One that Got Away' stories are perhaps told to add excitement to an otherwise uneventful fishing experience and the navigators did not tell me these type of stories during our discussions on

³ Aporta, C., *Resolving Spatial Problems in Navigation: Cultural Significance of Gps and Inuit Traditional Methods*, Unpublished), p. 22.

navigation. Both competing navigation and blind navigator stories are told to showcase the storyteller's preferred navigation technique. The competing navigation stories, unlike blind navigator stories, are lived experiences. The competing techniques do not all fall into traditional versus modern, nor do they end with modern being superior, but in many ways reflect the diversity of opinions on which is the best navigation technique to use in a particular situation. The competing navigation stories capture a historical moment when new techniques have been introduced and are in the process of being adopted or rejected by a navigation community. In contrast, the blind navigator stories teach about how to survive under the worst possible condition: blindness.

Navigators, Stories, and the Stars

The communities chosen for this study were chosen because of their ability to navigate by the stars. However, their stories cover the spectrum of navigation aids available to them. The blind navigator stories perhaps show what the most important navigation skill in each community is. With this in mind, the US Navy believes that the ability to navigate by the stars is important; the USNA continues to teach celestial navigation theory alongside all the electronic navigation aids. The Moce Islanders have only recently begun navigating by the stars but they have long been sailors.⁴ However, sailing is becoming obsolete, as are the skills of sailing. The Kerkennah Islanders are no longer teaching their children how to navigate by the stars, because their children now go to school and rarely go fishing at night. However, navigating by long pole continues to be used and taught. Thus, the Kerkennah Islanders and Moce Islanders currently are less concerned about navigating by the stars as opposed to the US Navy.

In order to tease out more of the relationship between each of these communities and the sky, I had to look beyond the stories to other information that I had gathered. However, the stories are a window into that relationship which is born out by the other data.

⁴ Holbrook, 'Celestial Navigation'.