

Polynesian Migrations, Canoes, and Wayfinding

Polynesian Voyaging Society

Before the birth of Christ, voyagers from islands east of New Guinea began to explore and settle islands upwind, toward the rising sun. This migration into the central Pacific Ocean was one of the most remarkable achievements of human history. It took over a thousand years to complete and involved finding and fixing in mind the positions of dozens of islands (some just coral rings on which the highest landmarks are coconut trees) scattered over 10 million square miles of water. By the time European explorers entered the Pacific in the 15th century almost all of the habitable islands had been settled for hundreds of years and oral traditions told of explorations, migrations, and travels across this immense watery world.

The voyaging was all the more remarkable in that it was done in canoes carved with tools of stone, bone, and coral; lashed with hand-made fiber; and navigated without instruments by expert



Landfall, from Peter H. Buck's *Vikings of the Pacific*

seafarers who depended on their observations and knowledge of the ocean, sky, and birds for clues to the direction and location of islands.

The canoe hulls were carved from tree trunks with adzes or made from planks sewn together with fiber of coconut or other plants twisted into strands and braided for strength. Cracks and seams in the hull were caulked with plant fibers and sap from breadfruit and other trees. An outrigger was lashed to a single hull to increase handling and stability; or two hulls were joined to crossbeams with a deck added between the hulls to increase carrying capacity for long-distance voyaging. The sails were made of mats woven from pandanus leaves.

These vessels were seaworthy enough to make voyages of over 2,000 miles along the longest sea roads of Polynesia, like the one between Hawai'i and Tahiti. And though these double-hulled canoes had less carrying capacity than the broad-beamed ships of the European explorers, the Polynesian canoes were faster: one of Captain Cook's crew estimated a Tongan canoe could sail "three miles to our two." After a visit to Society Islands in 1774, Andia y Varela marvelled at the amount of sail the canoes carried and their speed and manoeuvrability: "These canoes are as fine

forward as the edge of a knife, so that they travel faster than the swiftest of our vessels; and they are marvellous, not only in this respect, but for their smartness in shifting from one tack to the other" (Corney 282).

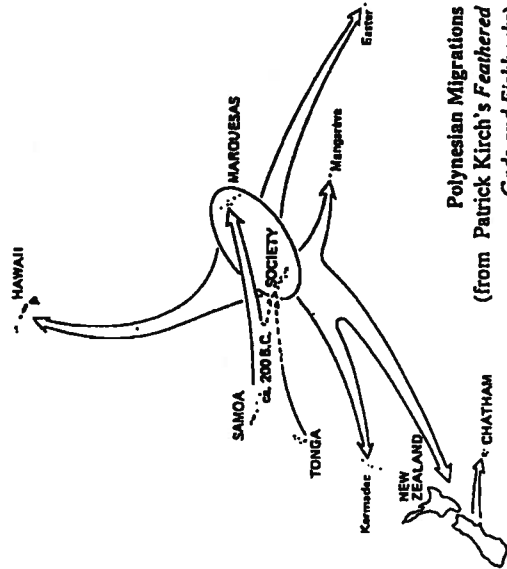
The dangers of voyaging were many. The canoes could swamp or capsize in heavy seas; sails could be ripped apart, and masts and booms could be snapped by strong winds; the hulls could break apart in heavy seas or be smashed against unseen rocks or reefs. And while there might be grass shelters on the decks of canoes, the voyagers were often exposed to the wind, rain, and sun, with only capes of leaves or bark-cloth wrappings for protection. During cold, stormy nights at sea, a person could die of exposure. If supplies ran out during a long voyage, starvation was a possibility.

The art of weather prediction without instruments or satellites was essential to voyaging, to anticipate the changing direction and strength of the wind, which seemed to blow through holes in the dome of heaven along the horizon, sometimes steady, a other times shifting clockwise or counterclockwise. A knowledge of seasonal patterns was the basis of prediction. Daily, the navigator watched the condition of the sea and the direction of the swells, the color of the sky and the shapes, colors, and movements of clouds overhead to anticipate approaching weather.

For the navigator, the voyage was a mental challenge. To navigate hundreds of miles without



Canoe Builders from Peter H. Buck's *Vikings of the Pacific*



instruments required an extensive, detailed knowledge of the ocean and sky. And without charts and plotting devices, the navigator had to memorize his course, sometimes over a period of weeks. Some scholars have expressed disbelief that such navigation could be done with any accuracy, especially on long voyages of over several hundred miles. However, modern voyages by Micronesians who still practice a form of traditional navigation and by Hawaiians and other Polynesians who have recovered this lost ancestral art have shown that navigation relying on natural signs for direction and on memorization of one's course was accurate enough to guide canoes to the farthest reaches of Polynesia. (See Finney, Gladwin, Kyselka, and Lewis.)

In the 18th century, Andia y Varela recorded how Tahitian navigators held their courses by using the winds and swells, and the sun and stars, which seemed to rise from fixed pits along the eastern horizon, pass overhead across the dome of heaven, then set into fixed pits along the western horizon:

[The Tahitians] have no mariner's compass, but divide the horizon into sixteen parts, taking for the cardinal points those at which the sun rises and sets...

When setting out from port, the helmsman reckons with the horizon, counting from the point where the sun

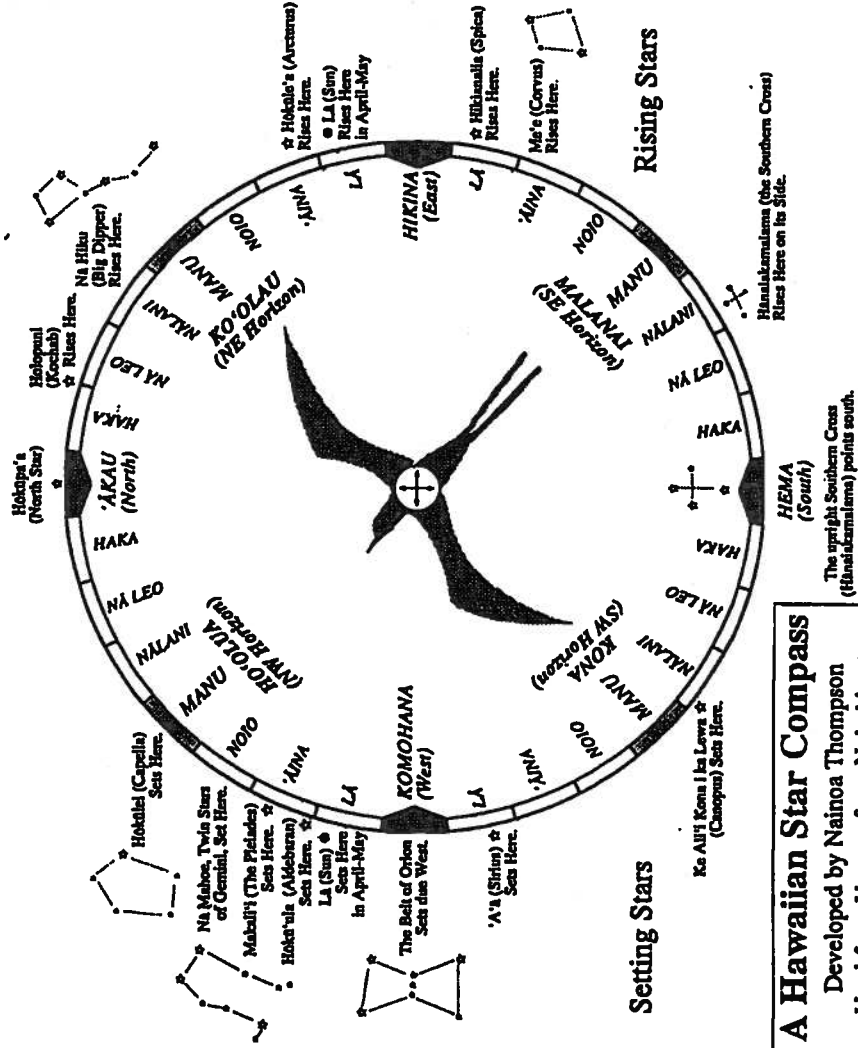
rises; he knows the direction in which his destination bears: he sees, also, whether he has the wind aft, or on one or the other beam, or on the quarter, or is close-hauled: he knows, further, whether there is a following sea, a head sea, a beam sea, or if it is on the bow or the quarter. He proceeds out of port with a knowledge of these conditions, heads his vessel according to his calculation, and aided by the signs the sea and wind afford him, does his best to keep steadily on his course.

This task becomes more difficult if the day be

cloudy, because of having no mark to count from for dividing out the horizon. Should the night be cloudy as well, they regulate their course by the same [sea and wind] signs; and, since the wind is apt to vary in direction more than the swell does, they have their pennants, made of feathers and palmetto bark, to watch its changes by and trim sail, always taking their cue for a knowledge of the course from the indication the sea affords them.

When the night is a clear one, they steer by the stars; and this is the easiest navigation for them because, there being many stars not only do they note by them the bearings on which the several islands lie, but also the harbors in them, so that they make straight for the entrance by following the rumb of the particular star that rises or sets over it; and they hit it off with as much precision as the most expert navigator of civilized nations could achieve. (Corney 284-7)

Finding islands before they could actually be seen was also part of the art of navigation. The name "Māui" seems to have been an honorific name given to numerous explorers who were capable of "fishing up" (i.e., discovering) islands. The first sign of an unseen island might be land-based birds like the white-tailed tern or



A Hawaiian Star Compass
Developed by Nainoa Thompson
Used for a Voyage from Nukuhiva to
Hawai'i, April-May 1995

noddy tern, or nesting seabirds, which fly out from an island to fish and return to feed their young. Swell patterns also provide clues to the directions of islands. Swells from the direction of an island are partially blocked by it and wrap around the island, creating a distinctive pattern. Swells in the direction of an island reflect off the island back toward the observer on a canoe. The navigator was able to feel these swell patterns in the pitch and roll of his canoe. If the island is upwind, human, animal, or plant smells and drifting land vegetation might reach the canoe. Other clues to landfall include special cloud shapes over islands; a green blush on the bottom of clouds above the islands in the daytime; or a glow above an island created by sunlight or moonlight reflecting up from the white sand and smooth water of a lagoon. Underwater lightning may also point the way to land (Lewis 153-215).

The Pacific Ocean mariners also use various seamarks to find their way. "As Europeans use landmarks, so the Gilbertese [navigators] use seamarks to check their daily position. These signposts in mid-ocean consist of swarms of fish, flocks of birds, groups of driftwood, or conditions of wave and sky...peculiar to certain zones of the sea. Hundreds of such traditional beta [seamarks]



Cloud Shapes
Indicating Land (from
David Lewis's *We the
Navigators*)

were stored up in the race memory as a result of cumulative experience of generations" (A. Grimble 48). These seamarks were found along routes between islands and indicated to the navigator that he was at a certain point along the way to his destination. For example, a seamark called "the swarming of beasts" consisted of an extraordinary number of sharks and might indicate the canoe was "a day's sail downwind of land." Other fauna marks included a region where flying fish leaped in pairs, a zone of innumerable jellyfish, an area of numerous terns, an area of sharks and red-tailed tropic birds, a place marked by a school of porpoises, a place where pairs of porpoises point their heads "in the direction of the passage into Tarawa lagoon" (A. Grimble 49-50).

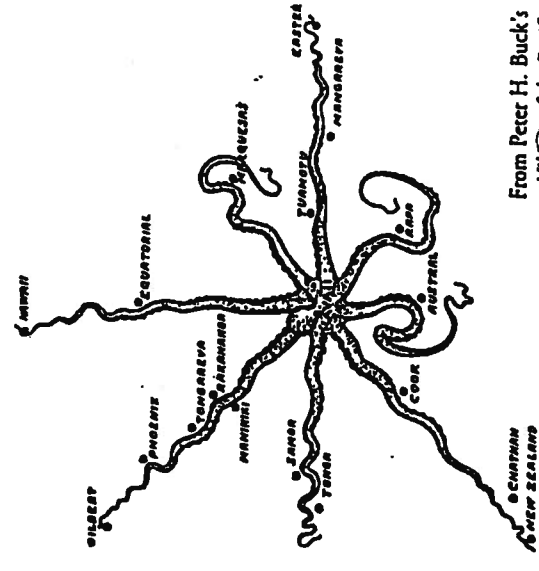
Before the 1992 voyage of the modern Hawaiian voyaging canoe *Hōkūleʻa* from Hawai'i to Tahiti, Sarawalese navigator Mau Piailug told Hawaiian navigator Shorty Bertelmann to look for a seamark he remembered from previous voyages along the route: a school of porpoises at the northern edge of the doldrums (around 9 degrees north latitude). Bertelmann sighted the porpoises in that area, confirming for him that he was on course and solidifying his faith in Mau's traditional navigation.

Along with their extensive natural knowledge of ocean and sky, Polynesian voyagers depended on help from their gods and spirits. The gods were essential to canoe-building. The builders performed rituals and prayers to ask permission of the forest gods to cut down a tree, so as not to offend them; they called on the gods to guide the work. (In the tradition of Rata, the forest god To'a-hiti and his canoe carver Ta-va'a actually build Rata's canoe.) The builders also called on the forest gods to protect the canoe at sea. The naming of canoe and parts was important, for it was

part of the mana, or power, of the canoe: in the tradition of Te Erui Ariki, the canoe had to be renamed after it was almost destroyed in a hurricane. The two masts were renamed for the gods Tanaroa and Rongo.

The gods were also called upon for help at sea. Ru, who led a migration from Ra'iatea (Society Islands) to Aitutaki (Cook Islands), prayed to Tangaroa, the god of the ocean, to calm the stormy seas. Ancestral spirits accompanied Rata on his voyage to avenge his father's murder, guiding his canoe and helping him defeat various sea demons. Aku (bonito) and 'ōpelu (mackerel) came to rescue Pā'ao from storms sent by his angry brother Lonopele. The two fish were thereafter placed under a kapu (i.e., protected) during their spawning season by Pā'ao's priestly family.

The most celebrated center of Polynesian voyaging and navigation was the district of Opoa on the island of Ra'iatea, anciently called Havai'i, one day sail downwind from Tahiti in the direction of the setting summer sun. The island was apparently



From Peter H. Buck's
Voyage of the Pacific

named after a distance homeland, which some have suggested was the island of Java (Hawai'i = Java 'iti, or "Little Java"). This name was given to new islands discovered as exploration and settlement spread east across the Pacific: Savai'i is the name of the largest island of Sāmoa; and Hawai'i, the largest island in the Hawaiian chain. (In Maori, "Hawai'i" is pronounced "Hawaiki"; in Rarotongan, "Avaiiki.")

Peter Buck describes the development of central Polynesian culture in the fertile high islands of the Tahitian archipelago: "An exuberant new life opened up in central Polynesia and new adjustments and progress took place, not only in the arts and crafts but in social and religious matters. The senior families and the most intelligent priests seem to have settled down in the Opoa district of Hawai'i, which became the cultural centre of the group." (71-72). The main gods of the priests of Opoa were Ta'aroa (Kanaloa in Hawaiian, Tangaroa in Rarotongan), a god of fishing and the sea, represented by the octopus; and later his son 'Oro, a war god who required the first fruits of battle (human sacrifice) for his favor. From this district, and its sacred temple Taputapuātea, the chiefly culture and navigational knowledge spread to the central Pacific islands now called Polynesia.

The story of these voyagers from Hawai'i are told in the oral traditions of Polynesia. These oral traditions range from realistic accounts of migration voyages (Ru, Te Erui Ariki, and Ruatapu) to stories in which the human and the divine, the natural and supernatural intermingled.

The motivations of the voyagers varied. Some left to explore the world or to seek adventure. Others departed to find new land or new resources because of growing populations or prolonged droughts and other ecological disasters in their homelands. Within the sphere of known islands,

others sailed to wage war or seek vengeance, to escape political persecution or unhappy love affairs, to find a wife or visit relatives, or to obtain prized objects, like red feathers, basalt rock or pearl shells, not available at home.

Whatever the motivation for voyaging, the challenge was always the same—the huge, trackless expanses of sun-heated saltwater capable of generating fierce winds and battering waves. The challenge was met again and again by daring Pacific island voyagers, long before sailors in other parts of the world ventured beyond the coasts of continents or inland seas.

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