Nainoa Thompson *and the lost art of Polynesian navigation*

Article by Robert J. Hutchinson

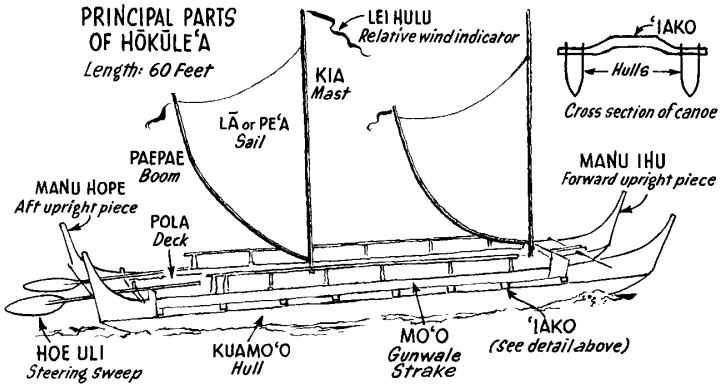
Nainoa Thompson was nervous. It was the night of May 21, 1987 - a clear, bright night with little wind - and he stood on the open deck of *Hokule'a*, intently watching the stars. As navigator of this 60-foot replica of an ancient, double-hull Polynesian voyaging canoe, he was afraid that currents might have caused her to drift off course.

Thompson knew that *Hokule'a* was somewhere near Hawaii and the end of a 2,500-mile journey north from Tahiti. This was the final leg of a 12,000-mile, two-year Voyage of Rediscovery, from Honolulu around the South Pacific and back - the culmination of over 20 years of research into ancient techniques of noninstrument navigation. Since its maiden voyage to Tahiti in 1976, *Hokule'a* had been used by the Polynesian Voyaging Society, which had designed and built the vessel as an experimental tool for discovering how the ancient Polynesians may have navigated across immense stretches of open ocean.

The triumphant return of *Hokule'a* to Hawaii was to be one of the crowning events of the "Year of the Hawaiian", an historic celebration of Hawaiian pride and culture proclaimed by the state's first part-Hawaiian governor, John Waihee. There would be welcome-home ceremonies, television specials, and speeches by the governor and other dignitaries. All of these plans, however, depended on Thompson's ability to cross thousands of miles of open ocean without navigational instruments of any kind - without charts, compass, sextant, chronometer, or even pencil and paper.

Through a decade of study and experimentation, the 35-year-old Thompson had developed his own system of noninstrument navigation: an innovative blend of

traditional wayfinding arts (such as the ability to plot a course by the ocean swells when the sun, moon, and stars are obscured by clouds) and a more scientific knowledge of the night sky, as it changes through different latitudes and seasons. Now his work was finally being tested.



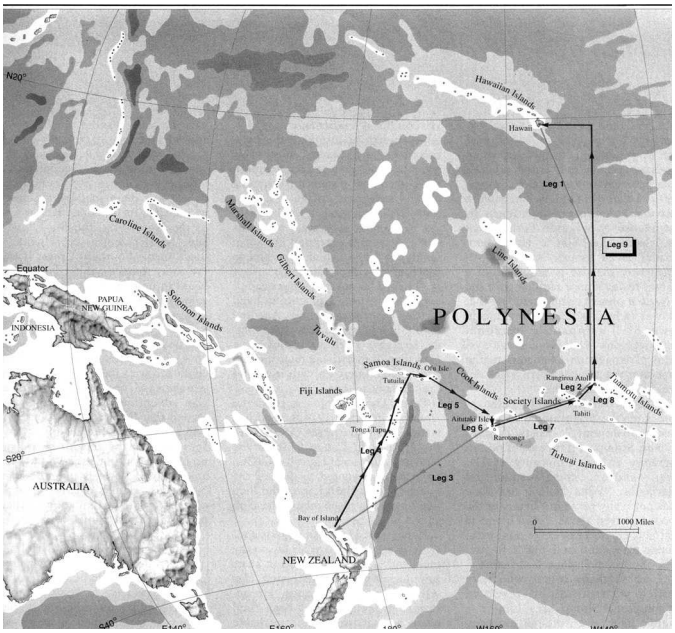
This diagram of Hokule'a *was taken from* An Ocean in Mind, *by Will Kyselka, published by the University of Hawaii Press (© 1987; reprinted with permission).*

Keeping the canoe on a northerly course from Tahiti to Hawaii was difficult enough, even for *Hokule'a*'s by-now-quite-experienced crew. Yet the really hard part was knowing when to turn west. Thompson's navigational strategy called for the canoe to head northeast from the Rangiroa atoll near Tahiti, several hundred miles east of the meridian of Hawaii, until it reached the latitude of the Hawaiian chain, approximately 20° N. Once it reached that latitude, the idea was to head due west until it found one of the islands. This was one of the basic tricks of Polynesian navigation: instead of aiming for just a single island, aim for large island groups, such as the Tuamotus or the much smaller Hawaiian archipelago. Once you're in a large island chain, you can reorient yourself and find the smaller target. If Thompson turned west too soon, however, the canoe would pass under the Big Island - the most southern of the Hawaiian islands - heading for Asia. If he turned too late, north of the latitude of Kauai, *Hokule'a* would probably run into one of the hundreds of tiny islets that lie northwest of the main island group. But with the strong northern equatorial current, which runs east to west, there would be no way the canoe could make its way back in time to Oahu, where the voyage began. The entire experiment would end, if not completely in failure, then at least on a downbeat.

Thompson thought of all this as he scanned the night sky, checking and rechecking the stars he uses to pinpoint latitude. Standing aft and on the starboard side of the 40-foot deck, he could see the strange silhouette of *Hokule'a*'s two crab-claw shaped sails against the western horizon. Most of the other 14 crew members were asleep. Thompson could tell by the distance between the Southern Cross and the horizon that *Hokule'a* was definitely in the right latitude. Hawaii's zenith star, Arcturus -*Hokule'a*, or "star of joy" in Hawaiian - was directly overhead.

But Thompson wasn't sure of the longitude. It was entirely possible that his dead reckoning was off and the vessel had drifted imperceptibly west during its month-long voyage north from Tahiti. Since the ancient Hawaiians were a preliterate people and didn't use logbooks, all his navigational calculations - course corrections and

estimates of speed, direction, and leeward drift due to current - had to be done in his head from memory. It was a tremendous feat of concentration, requiring that he sleep very little during the long voyage, and the possibility that he had made an error was quite real. If he had made a serious mistake in his dead reckoning of the longitude or in estimating the latitude, it wouldn't matter a bit when he turned west: *Hokule'a* would have to be towed ignominiously back to Honolulu by the escort vessel, which was traveling with them to document scientifically the canoe's progress.



"We had had ideal visual conditions for days," Thompson recalls. "We knew we were in the right latitude, but as soon as we made the turn, the wind died. For four days, we just crawled west. For me, it was nerve-racking.

"We had this guy from Tonga with us (Sione Taupeamuhu), a longtime sailor. His eyes are not like normal people's eyes; he can see islands long before I can. We were hoisting him up the mast all the time to look for the islands. Mauna Kea and Mauna Loa [on the Big Island] are both almost 14,000 feet high. You can see them - at least in theory - from over a hundred miles away. So with this guy up the mast, with clear skies, he should have been able to see the island. But he didn't."

Nainoa Thompson is a muscular, darkly tanned man of medium build, friendly and articulate, and yet extremely private. His smile and eyes are bright and quick, but there is an intensity about him - a reflection of the fierce commitment and self-possession that would allow someone to traverse an entire ocean with just his own senses as his guide. Perhaps that is what makes him a natural-born leader, even though he insists vehemently that he is only part of a larger team. Those familiar with the *Hokule'a* project, while agreeing that it was indeed a team effort, are in awe of Thompson's personal achievement - he reinvented a system of navigation analogous to the one that the ancient Polynesians developed over centuries.

"I don't think anybody really appreciates the magnitude of Nainoa's accomplishment," insists Edward Dixon Stroup, a professor of oceanography at the University of Hawaii - and an expert seaman and navigator. "What Nainoa has done has not really come out in any of the books written about *Hokule'a* yet: to actually create a system of non-instrument navigation and put it to use. No one has ever done that before."

Like so many others who have sailed with the quiet, reserved Thompson, Stroup sees him in a heroic light, even though the navigator is 20 years his junior. "Nainoa is so much more than just a navigator," he says. "He is a leader without trying to be a

leader. He gives people tremendous confidence in his decisions; I've never seen him make a decision that turned out to be wrong. I guess people trust him because he's not the kind of man who talks about what he can do; he just does it."

An extremely bright if not particularly studious youth, the youngest of three children in a wealthy and prominent Hawaiian family, Thompson was raised in the Niu and Kuliouou valleys of east Honolulu. His childhood was in many ways idyllic. Although he attended the prestigious Punahou School, most of his youthful energy was channeled in two directions - toward the sea and a gradual rediscovery of his Hawaiian roots. He spent much of his time fishing and surfing with other members of his close-knit extended Hawaiian family, or *ohana*, which gave him so much of his cultural heritage.

"I fished for anything that swam," says Thompson. "I practically lived on the water growing up. And my family is a longtime kama'aina family, so I always felt a sense of being Hawaiian from both my mom and my dad's side. I grew up with it around me, an atmosphere."

When Thompson first heard of the *Hokule'a* project in 1974, he had just started racing outrigger canoes with the Huli Nalu Canoe Club in the Honolulu suburb of Hawaii Kai. One night he was invited to dine at the home of artist Herb Kane, who then lived near the place where the club stored its canoes.

Kane, part-Hawaiian and island-born, lived for much of his life on the mainland but has spent recent years popularizing and illustrating Hawaiian myths and legends. His romantic imagination had been fired when he met two other remarkable men: Ben Finney, a University of Hawaii anthropologist with a long-time interest in Polynesian navigation, and Tommy Holmes, a veteran canoe-paddler and student of Polynesian maritime culture. In the early 1970s, these three men formed the Polynesian Voyaging Society. Finney had already built a small double-hull canoe, Nalehia, whose ability to sail to windward had convinced Finney and others that two-way voyages between Tahiti and Hawaii, celebrated in Hawaiian legends, could have some basis in historical fact.

"Kane told me they needed paddlers to paddle Nalehia out of Maunalua Bay," Thompson recalls. "But what he really wanted to talk about, and what really sparked my imagination, was *Hokule'a*. He laid the whole idea out for us. He took us out into his yard and said how the navigation was done just by the stars, without any instruments. He showed us the North Star, the Big Dipper, and Hawaii's zenith star, *Hokule'a*, down to the Southern Cross. It was the most romantic thing I had ever heard in my life. In my mind, I was committed from that moment. *Hokule'a* wasn't even built yet."

Finney's thesis that the early Polynesians were capable of intentional voyages across vast stretches of ocean conflicted with the views of other researchers. Many-including Norwegian adventurer Thor Heyerdahl-argued that Polynesia had been settled through accidental "drift" voyages and that the ancient Hawaiians probably could not have undertaken any planned voyages of more than 300 miles because of adverse wind conditions and the limitations of their navigational technique.

Finney, Kane, and Holmes dreamed of creating a craft that would be, in effect, an exercise in "experimental archaeology", an authentic replica (albeit made with modern materials) of a voyaging canoe that they could test over long distances. From the

outset, however, the *Hokule'a* project was plagued by internal divisions between the researchers who designed, built, and funded the canoe, and a number of Hawaiian activists who joined the project as crewmen or builders but whose primary interest in the canoe was as a means to promote Hawaiian culture.

With the aid of Mau Piailug, from Satawal in the Caroline group (one of the few remaining Pacific Islanders trained in traditional techniques of non-instrument navigation), *Hokule'a* sailed successfully from Hawaii to Tahiti without instruments in 1976. But the experiment degenerated into racial bickering and even violence when some of the crew members insisted that only blood Hawaiians should be on the canoe.

Upon reaching Tahiti, the easygoing Mau left the project in disgust and flew back to his island home, vowing never again to participate. The mutinous crew members were put on a plane back to Hawaii and replaced by young Hawaiians like Thompson who believed in the goals of the project. It is largely due to the dedication of such Hawaiians as Thompson and others that these two aspects to the dream of *Hokule'a*, its role as both a research tool and a symbol of Hawaiian pride and culture, were harmoniously united.

Nainoa Thompson was a crew member on the return voyage from Tahiti. In Mau's absence the *Hokule'a* crew had to rely on modern navigational instruments to make the voyage back to Hawaii. But it was during this voyage that Thompson began to dream seriously of learning to navigate, like Mau, without instruments.

The 1976 voyage left a bitter taste in everyone's mouth. Finney, the principal founder and technical expert behind the project, resigned exhausted and disappointed, turning everything over to those who insisted that *Hokule'a* should be sailed only by and for Hawaiians.

Thompson was as disgusted as Mau with the petty racism that had plagued the project, but he was so fascinated by the idea of noninstrument navigation that he began to take astronomy courses during his intermittent stints at Willamette University in Oregon and at the University of Hawaii (from which he received a degree in ocean science in 1986). He spent entire nights out on the ocean off Oahu, lying on the bottom of his fishing skiff and staring up at the sky.

An exuberant fleet of Hawaiian vessels escorts homebound *Hokule'a* as she sails triumphantly into Kualoa Bay on May 23, 1987.

At the Pokai Bay navigational heiau (ancient Hawaiian temple) Thompson teaches 6th-9th graders about sea conditions.

And he read all he could about the techniques of Polynesian navigation.

Finally, in 1977 Thompson sought the assistance of astronomer Will Kyselka of the Bishop Museum Planetarium in Honolulu, and together they spent hundreds of hours studying the constellations, searching for patterns and relationships that could be useful for navigation. At the planetarium, Thompson was able to observe the changes in key star patterns, from latitude to latitude and season to season, collecting the kind of information that the ancient Polynesians must have assembled and handed down over many generations. One technique that Thompson developed involved discovering pairs of stars that rise simultaneously in a given latitude. At 21° N, for example, both Arcturus and Spica rise together, but as one travels south, Spica rises farther and farther ahead of Arcturus.

Similarly, Thompson found out how to use pairs of stars that lie north and south of each other and are fairly close together, such as Sirius and Canopus. When these selected star pairs appear to stand upright in the sky, the observer is facing the celestial meridian - true north or south. Thompson was able to identify a large number of these star pairs, using them to determine both latitude and direction.

Locating a number of wayfinding stars was important because the constellations useful for navigation change continuously as the night wears on, both because the stars move and because they are frequently obscured by clouds.

Even those who are nominal experts in Polynesian navigation, such as Stroup, Finney, and Kyselka, actually possess only a formal knowledge of the fundamental principles. Thompson alone has spent the years it takes to master the material details - to go out on the open ocean and learn, step-by-step, the precise relationships between various stars and star groups and how they shift as you travel across the globe.

By 1978, the new leaders of the *Hokule'a* project decided they were ready to try the trip to Tahiti again, this time without the assistance of either Finney or the navigator Mau. Thompson was to go along and attempt to guide the canoe when he could, using instrument navigation as a backup.

The canoe, overladen with supplies and carrying an inexperienced crew, left Honolulu on a stormy night. They were barely out to sea when the vessel swamped in the treacherous Molokai (Kaiwi) Channel. The expedition's leaders had not arranged for an escort vessel, so the 16 crew members were left clinging desperately to the capsized canoe, fearing the worst. The next day, one of the crewmen - a world

champion surfer named Eddie Aikau - set off on a surfboard to seek help. Later that day, the remaining crew members were rescued when the canoe was spotted by an airplane, but Aikau was never seen again.

"Basically, in 1978 we failed miserably," Thompson explains with characteristic frankness. "It is such a tragic story. The canoe wasn't ready, the crew wasn't ready, and . . . well, we went anyway. We weren't prepared, period.

"I don't think things happen as flukes. The more positive people involved in the project decided they couldn't let it end that way - with Eddie's death. They were dedicated to completing what we had started out to do."

The 1978 disaster was a turning point for both the *Hokule'a* project and Thompson. The Polynesian Voyaging Society, under the firm direction of veteran seaman and early *Hokule'a* supporter Gordon Pi'ianai'a (who had sailed on the original 1976 voyage but not on the 1978 excursion) committed itself to the kind of preparation and structure necessary for a successful voyage, to be undertaken in 1980. It was apparent that sheer guts and romantic fantasies of Old Hawaii were not enough to sail 5,000 miles over open ocean; the crew had to be carefully trained, and every detail planned.

Pi'ianai'a with Thompson on deck of *Hokule'a*

For Thompson, too, the project took on a new seriousness. No longer was he willing to go along just to experiment with navigational techniques; he wanted to navigate the canoe from start to finish. To do that, however, he needed more than an extensive knowledge of the night sky. After all, you can't navigate by the stars during the day or on cloudy nights. So with just nine months left before *Hokule'a*'s scheduled departure, Nainoa flew to Saipan in the Marianas Islands to try to convince Mau, who had recently sailed to the Marianas from Satawal, to accept him as a pupil.

Impressed with the sincerity of Thompson's desire to learn, Mau agreed and returned with him to Hawaii, where they lived together and studied such arcane subjects as the 32-point Micronesian star compass, the *etak* dead reckoning system

(which Thompson admits he never learned well enough to use), and how to use the ocean swells to maintain a steady course.

"Mau taught me how to read the ocean," Thompson explains. "I was very strong on how to determine direction by the stars, but during the daylight I was a disaster. Mau also gave me the mental framework: Not only do you have to know how to hold your direction, but you also have to memorize and be able to process a tremendous amount of information for dead reckoning."

But Thompson needed to go one step farther. Mau's instruction, as essential as it was, turned out to be too general. "I had to expand virtually everything Mau taught me to make it more precise," Thompson says. "He gave me the basic concepts, and through modern techniques I was able to make his system much more precise. I needed that precision for my own confidence."

By the spring of 1980, Nainoa felt ready to try to cross the ocean to Tahiti without instruments, perhaps the first Hawaiian to navigate such a voyage in nearly a thousand years.

The voyage was a resounding success. With Mau along as a backup, Thompson, along with a dozen capable crew members, sailed the canoe from Hawaii to Tahiti and back again with remarkable precision - and without Mau's help. All of Thompson's navigational observations and decisions were carefully documented for later analysis, and the canoe's actual track was followed by means of the sophisticated satellite tracking system, ARGOS.

Building on the success of the 1980 voyage, the *Hokule'a* project team began planning for the Voyage of Rediscovery, a two-year expedition around Polynesia from Hawaii to Tahiti, the Cook Islands, New Zealand, Tonga, Samoa, and then back again to Hawaii. Each leg of this immense voyage was manned by a different crew, made up of representatives from the various island groups; Thompson was the only person to make the entire voyage, boosting the total number of miles he has sailed on *Hokule'a* to 20,000.

On that clear May night in 1987, Nainoa didn't know it but he was dead on target. The crew wasn't able to see the Big Island because of the recent eruptions of the Kilauea volcano, which had enveloped the horizon in a gray, sky-colored haze. At around 9:00 P.M., a longtime crewman named Abraham "Snake" Ah Hee saw a light that turned out to be the glow from Kilauea, off to the southwest. Some members of the crew wanted to turn *Hokule'a* toward the light, but Thompson, concerned that a more southerly course could take them south of the Big Island, ordered the ship to stay on its course due west. At around 2:00 A.M., the ecstatic crew members sighted the individual lights of the Big Island, and they knew they were home.

At dawn the next day, *Hokule'a* landed quietly without fanfare or much public notice in Hilo. They proceeded on to Molokai, where they prepared for the canoe's triumphant return to Kualoa Bay on Oahu's Windward Coast. It was from this bay, sacred to the Hawaiian people, that *Hokule'a* originally had been launched in 1975.

It is difficult for people on the mainland, where *Hokule'a* is virtually unknown, to appreciate how much the small double-hull canoe has come to be seen as a symbol of cultural pride for the people not just of Hawaii, but of the entire South Pacific. *Hokule'a*'s return to Oahu sparked banner headlines in Hawaii's newspapers; more than 12,000 Island residents gathered in early morning rain to greet the vessel and

crew. A voyage that had been a dream 14 years earlier was now a legend that will be retold, perhaps for generations, throughout Polynesia.

For Nainoa Thompson, who is now a legendary figure among Island school children, it is time to get on with his life. He is currently a private pilot, studying to acquire his instrument and commercial ratings. He has also recently married and is in the process of building his own house on an isolated beach on the Big Island.

Although he is constantly asked whether he will attempt to pass on what he knows to another generation, Thompson is not sure about the place for noninstrument navigation in a world of satellite tracking systems and radio beacons.

"Navigation for me is very personal; it's been the best part of my life," he says. But he's hesitant about creating too much of a mystique around *Hokule'a* and the wayfinding arts, largely because of the incredible commitment of time and energy required. "I'm leery about teaching other people navigation because maybe there are other things, much more important things, that young kids in Hawaii should be learning," he observes.

"Navigating is not a matter of simply pointing the canoe in the right direction. You learn how to stay on course, not just over the sea, but also in life. It's what navigation teaches you about life that is important." Those values - direction, dedication, study, plus confidence and leadership - are what Nainoa Thompson would like to pass on to future generations of Hawaiians.

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