

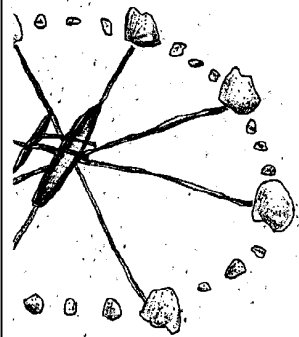
Meanwhile, In the Pacific...

Where Did the Polynesians Come From?

Part 2—Polynesian Navigation

Key Concepts

1. The ancestors of today's Polynesians embarked on a period of maritime colonization greater in scope and considerably earlier than any of the Western European voyages of discovery.
2. The migration of populations may be traced using a variety of forms of evidence.
3. Wind and ocean currents are logical starting places in the investigation of human migration patterns.
4. The presentation of information affects the degree to which it is believed. In a conflict of opinions, emotional appeal can overshadow compelling evidence.



Background

In an effort to learn Polynesian navigational techniques, Stephen D. Thomas studied with Piailug, the last Polynesian to be trained and initiated in the skills of the ancestors. “The Sons of Palalup: Navigating Without Instruments in Oceania” is a summary article describing what Thomas learned about the complex sailing techniques of the islanders, techniques that are very different from western European methods of navigating. The student pages include a short series of questions to guide student analysis of the article.

In another effort to recapture some of the lost lore associated with the colonization voyages, a group of Hawaiians, in the mid 1970’s, embarked on what became known as the *Hokule’a* Project. They built a replica of a 60-foot voyaging canoe, and sought to retrace the ancient voyaging routes of their ancestors. One man, Nainoa Thompson, learned how to navigate like the ancients, and guided the ship on its penultimate voyage in 1987.

The article “Nainoa Thompson and the Lost Art of Polynesian Navigation” is the story of Thompson and the *Hokule’a*. This article is accompanied by a Three-Level Guide in which students develop a literal understanding of the article, then interpret the material, and, finally, apply what they have read.

Three-Level Guides are based on the idea that comprehension takes place at different levels of cognition. Harold L. Herber names these levels 1) literal, 2) interpretive, and 3) applied. With the exception of the literal level, each level requires the product of the previous level in order to function.

The literal level of comprehension produces knowledge of what the author said. We all recognize that it is quite possible to identify and even repeat what an author said without having any understanding of what the author meant. The interpretive level of comprehension depends upon the reading performed at the literal level but carries the process a step further. At this level the reader derives meaning from interpreting the author's meaning ("reading between the lines"). The applied level of comprehension takes the product of the literal (what the author said) and the interpretive (what the author meant by what he or she said) and applies it in some practical or theoretical exercise. At this level, the reader is using his or her own past experience and knowledge to produce new ideas which extend beyond those immediately identifiable in the reading selection.

It must be kept in mind that the level at which a person reads does not reflect upon his or her intelligence, and that the level can change as the material changes. The most advanced engineers and scientists often read at the literal level if they cross into other disciplines. When we read material from an area in which we have little familiarity, our level of comprehension goes down. Our students are no exception to this observation. The three-level guide is a device intended to improve a person's comprehension by focusing on important concepts at each of the three levels.

The Three-Level Guide can be used with any material and is readily constructed. For information in this regard, see *Teaching Reading in the Content Areas*. 1970. Harold L. Herber, Prentice-Hall, Inc., Engelwood Cliffs, New Jersey. 296 pages.

Materials

For each student:

- One copy of "The Sons of Palalup: Navigating Without Instruments in Oceania"
- One copy of student questions and/or
- One copy of the article, "Nainoa Thompson and the Lost Art of Polynesian Navigation"
- One copy of the Three-Level Guide

Teaching Hints

If you use the second article and the Three-Level Guide, explain to students that the guide will take them through three levels of questioning, from a literal level, to inference, and then to analysis and synthesis. The idea is not to “get the answer right” per se, but more importantly, to use the questions as a guide to the major ideas in the article, and to try to incorporate those ideas into one’s own knowledge base. It is important to emphasize to the students that their reasoning is much more important than their answer. In fact, in levels two and three, there may be no “right” or “wrong” answer!

Traditionally, Three-Level Guides have been intended for individual work. Suggest that the students read the statements in the three-level guide before they read the article. (Some students may prefer to read the article first, then go back over it a second time with the three-level guide). The guide is intended to be a vehicle for helping students look for certain concepts in the article.

When students have finished, discuss the guide, referring to the article. You may wish to have students work in collaborative groups to compare their answers. The process of resolving differences of opinion can be very instructive.

It is sometimes helpful to have students note the page number and paragraph where they found evidence to support their answer. You may require the students to provide sound, complete explanations for the answers they chose!

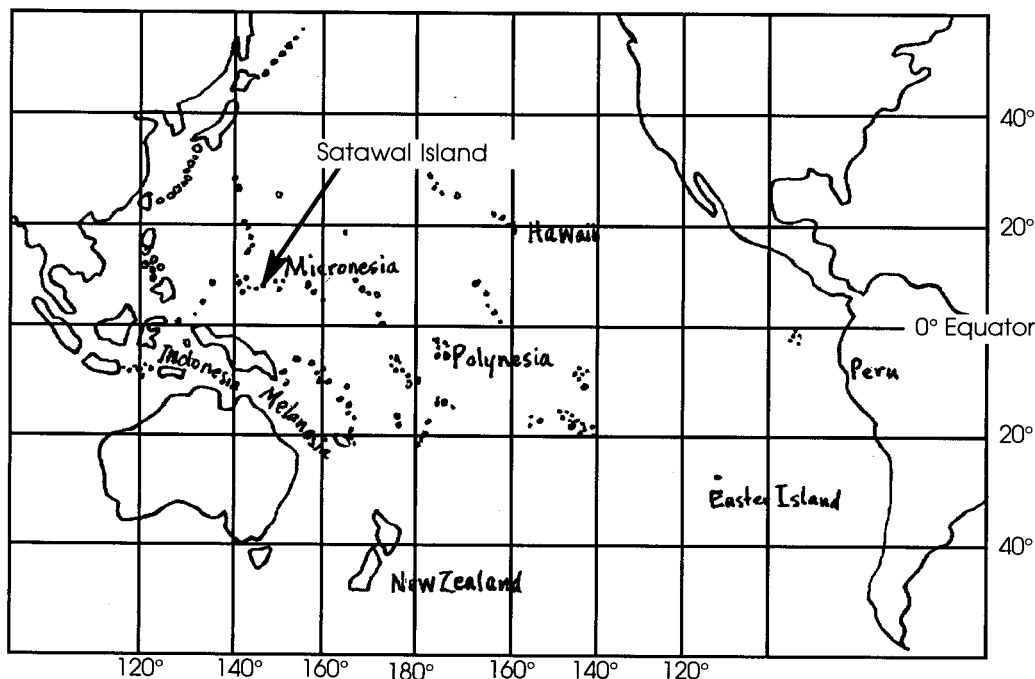
Extensions

1. Students can learn more about the Polynesian voyagers by reading the December 1974 issue of "National Geographic". There’s enough material in this one issue that several groups could attack parts of the articles and prepare presentations for other students. In addition, the October 1976 "National Geographic" has a fascinating article, “Hokule’a Follows the Stars to Tahiti,” by New Zealander David Lewis on the *Hokule’a* and the Polynesian art of navigation. Information on the cultural aspects of the *Hokule’a* project can be found in, “A Canoe Helps Hawaii Recapture Her Past,” by Herb Kawainui Kane in the April 1976 issue of "National Geographic".
2. Have students build models of a Pacific voyaging canoe.

Answer Key

“The Sons of Palalup: Navigating Without Instruments in Oceania”

- As depicted on the following map, Satawal is located at approximately 8°N 143°E in the Caroline Islands of Micronesia. Since Satawal Island is not shown on all maps, you may choose to have your students simply locate the Caroline Islands. Alternatively, you may wish to duplicate the map below for student use.



- The following definitions come from the glossary in Stephen D. Thomas' book, *The Last Navigator*. The terms are rich with meaning, however, and so your students may provide a wide variety of interpretations based on their reading.

palu- Navigator fully initiated in *pwo*, an initiation ceremony in which a navigational student becomes a full-fledged navigator.

Etak- A conceptual plotting system that enables the navigator to track his position at sea without charts, sextant, compass, or other modern aids to navigation. Also a unit of measurement.

tan- "Rising": prefix to indicate a star is rising.

wofanu- Navigational system delineating the star courses between the islands.

tuba- Palm sap, often fermented into an alcoholic beverage.

pookof- A navigational system which gives star courses and ranges to distinct and identifiable birds, fishes, whales, and reefs arrayed around each island.

- Responses will vary.
- Responses will vary.

“Nainoa Thompson and the Lost Art of Polynesian Navigation”

(NOTE: The answers students provide may vary from what is printed here. Sound reasoning for a differing answer should be encouraged. When evaluating student’s answers, comment on the reasoning, rather than checking right or wrong answers based on this key.)

Level I

Students should agree with the following statements: 1, 2, 5, 7, 9,10, and 11. Students may feel that number 9 is a false statement. They may argue that even though the boat swamped, and a person was lost at sea, the first voyage made everyone aware of just how serious an endeavor they were undertaking.

3. Thompson knew his latitude, based on the Southern Cross and Arcturus. He wasn’t sure of his longitude, though, because there could be some error due to currents.
4. The Polynesian Voyaging Society was formed by three men: Kane, Finney, and Holmes.
6. *Hokule’a* was originally intended to be an archaeological experiment to see if the legends of Polynesians voyaging to Hawaii could be true.
8. One must learn many wayfinding stars in order to navigate, because clouds may obscure some, and the night sky is constantly changing, with some stars appearing and some dipping below the horizon.
12. Given the time it takes to learn ancient navigation techniques, Thompson feels that time may be better spent learning other things.

Level I

Directions: Read the statements carefully. Then, as you read the article, refer back to the statements and check those that you believe say or paraphrase what the author said. Be ready to support the statements you checked, and explain what is inaccurate about the statements you have not checked.

1. The ship *Hokule'a* was built to discover how ancient Polynesians may have covered vast stretches of open ocean to populate other islands.
2. It took Nainoa Thompson 10 years to learn how to navigate without instruments or charts.
3. When Thompson was near Hawaii, he knew exactly where he was, based on the distance between the Southern Cross and the horizon and based on the star Arcturus being directly overhead.
4. The Polynesian Voyaging Society was formed by four men: Herb Kane, Ben Finney, Tommy Holmes, and Nainoa Thomson.

5. Many people, including Thor Heyerdahl, argued that Polynesians could not have undertaken any planned voyages of more than 300 miles because of adverse wind conditions and limitations of their navigational technique.
6. From the beginning of the project, *Hokule'a* was intended to promote Hawaiian culture.
7. Thompson decided to learn navigation on *Hokulea's* first trip, returning from Tahiti.
8. To navigate using the stars, one must learn only a few wayfinding stars.
9. Thompson's first attempt to navigate *Hokule'a* was a failure.
10. Until Thompson studied under Mau, he could not navigate well during the day.
11. Nainoa Thompson sailed 20,000 miles on *Hokule'a*.
12. Thompson is leery about teaching others to navigate because he doesn't think others could learn fast enough.

Level II

1. Thompson developed his own system of navigating by the stars by studying constellations in a planetarium and noting certain combinations of stars he could use. He learned the ancient techniques of steering by the waves and other subjects from Mau Piailug who is one of the last to be trained in the ancient techniques.
2. *Hokule'a* proved that a canoe of ancient design, navigated with ancient techniques could make the journey from Tahiti to Hawaii. But this only says it was feasible for Polynesians to populate Hawaii; it does not prove they did!
3. Thompson made the decision to learn navigation on his first trip on *Hokule'a*. As a child, he was probably not interested in spending the time learning the skill, given the statement that he was bright but not particularly studious.
4. Thompson probably felt that being Hawaiian wasn't important, given that he was disgusted with the "petty racism" that occurred on the first voyage.
5. The most important thing Thompson learned was that staying on course in life, just like staying on course on the water, requires direction, dedication, study, confidence, and leadership.
6. Judging by the work Thompson does with school children, as illustrated in the article, he probably feels that it is important for all Hawaiians to be aware of their cultural roots.

LEVEL II

Directions: Read each statement. Then, using the article as reference, decide whether you agree or disagree with each statement. Check those statements which you feel can be supported by the article. Be ready to support your opinions.

1. Thompson navigated in exactly the same manner as the ancient Polynesians did.
2. The *Hokule'a* voyage proved that Polynesians populated Hawaii.
3. Thompson wanted to navigate like the ancient Polynesians from the time he was a small child.

4. Nainoa Thompson felt that anyone, not just Hawaiians, should be allowed to sail on *Hokule'a*.
5. The most important thing Thompson learned through studying navigation was to steer a boat in a straight line.
6. Thompson feels it is important for every Hawaiian to be aware of their cultural roots.

Level III

Answers to these questions will vary greatly.

Level III

Directions: Read each statement, relating the details and interpretations drawn from the article to ideas and experiences you've had in reference to the topic. Check the statements you agree with, and be ready to support your opinions.

1. *Hokule'a* is for Polynesia what the re-enactment of Columbus'adventure is to America.
2. Everyone could learn something about themselves by learning to navigate like the Polynesians.
3. Europeans didn't develop the navigational skills the Polynesians had because they weren't as advanced in understanding the stars and the oceans.

Acknowledgments:

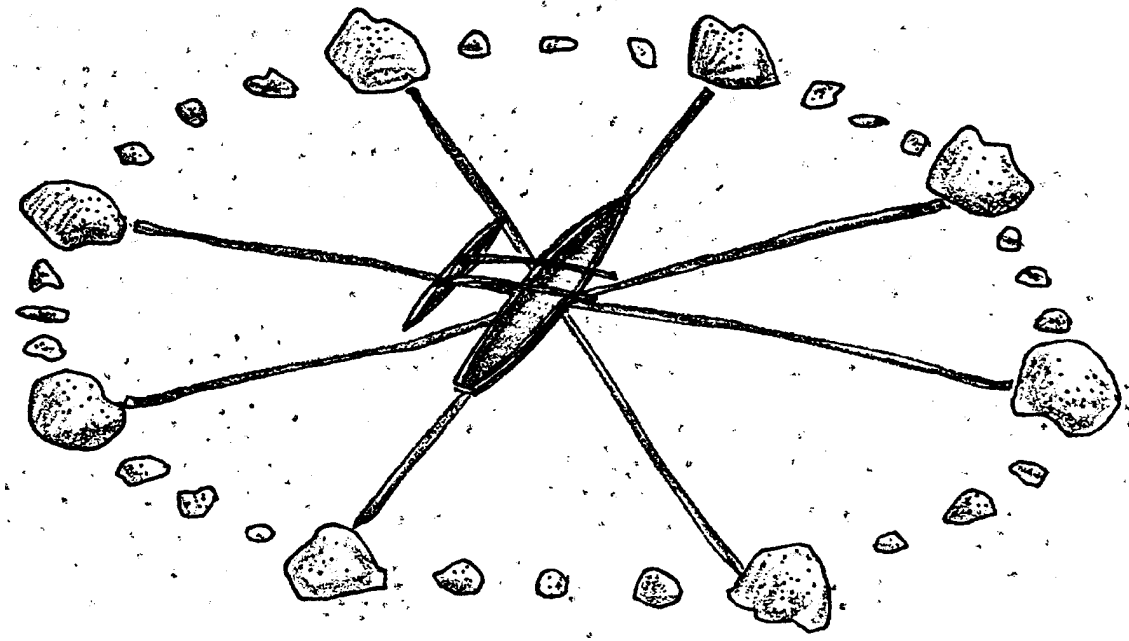
"The Sons of Palulap: Navigating Without Instruments in Oceania" is used with permission from *Oceanus* (Woods Hole Oceanographic Institution); Volume 28, Number 1, Spring 1985.

"Nainoa Thompson and the Lost Art of Navigation" is used with permission from *Oceans* (Oceans Magazine Co., Menlo Park, CA.); August 1988.

Meanwhile In the Pacific...

Where Did the Polynesians Come From?

Part 2—Polynesian Navigation



“The Sons of Palulap: Navigating Without Instruments in Oceania”

Peter Bellwood’s explanation of the colonization of the Pacific requires that the ancestors of today’s Polynesians must have been skilled navigators and sailors. Heyerdahl’s voyagers would have left their fate to natural forces, basically floating to their destinations. So, how did the Polynesians navigate through miles of open ocean, in strong currents, from one tiny piece of land to another?

Stephen D. Thomas wrote, in a book titled *The Last Navigator*, about his time spent learning the art of Micronesian navigation. He also wrote an article that summarizes what he learned.

Use the article, “The Sons of Palulap: Navigating Without Instruments in Oceania,” by Stephen D. Thomas, to learn more about how the ancestors of Polynesians navigated without instruments. Answer the following questions to guide your reading.

1. Locate Satawal on a map and record latitude and longitude.

2. Explain these Micronesian terms: palu, etak, tan, wofanu, tuba, pookof.

3. Does Thomas’ description of the navigation skills of these Pacific voyagers lend more credibility to the arguments of either Heyerdahl or Bellwood? Describe, in a paragraph, how your thinking on the two origin theories has been affected by reading Thomas.

4. Do you believe that it is necessary that ancient migrations must have moved downwind or with the local ocean currents? Explain.

Optional extension: Use existing pictures to serve as guides to help you build models of a Pacific voyaging canoe and of the Kon-Tiki raft.

NAINOA THOMPSON AND THE LOST ART OF POLYNESIAN NAVIGATION

A THREE-LEVEL GUIDE

Level I

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- _____ 6. Thompson feels it is important for every Hawaiian to be aware of their cultural roots.

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