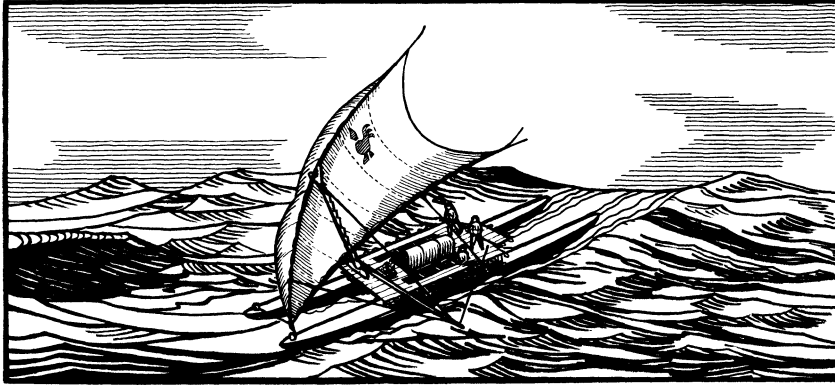


1

WITHOUT SHIPS OR COMPASS



A Sea So Vast

How the Polynesians, sailing in canoes hewn with stone adzes and setting their course by the stars, winds, and ocean swells, were able to explore and colonize their island realm has long been one of the most intriguing questions about the spread of humankind over our planet. To begin to understand why it has been so hard to answer that question, we first need to consider the immensity of Polynesia, a vast triangular region of the Pacific defined by the archipelago of Hawai'i north of the equator, by Rapa Nui, that tiny dot on the map across the equator far to the southeast that is known to the outside world as Easter Island, and on the southwestern side of the Pacific by Aotearoa, a pair of huge continental fragments and small offshore islands that now form the country of New Zealand (fig. 1).

Particularly in this age of transoceanic jet travel, the great dimensions of Polynesia cannot truly be appreciated without sailing from island to island throughout the region. Readers from outside the Pacific can get some feel for the size of this oceanic realm by using a globe to compare it with a part of the world more familiar to them. Hold one end of a string at Kaua'i, the

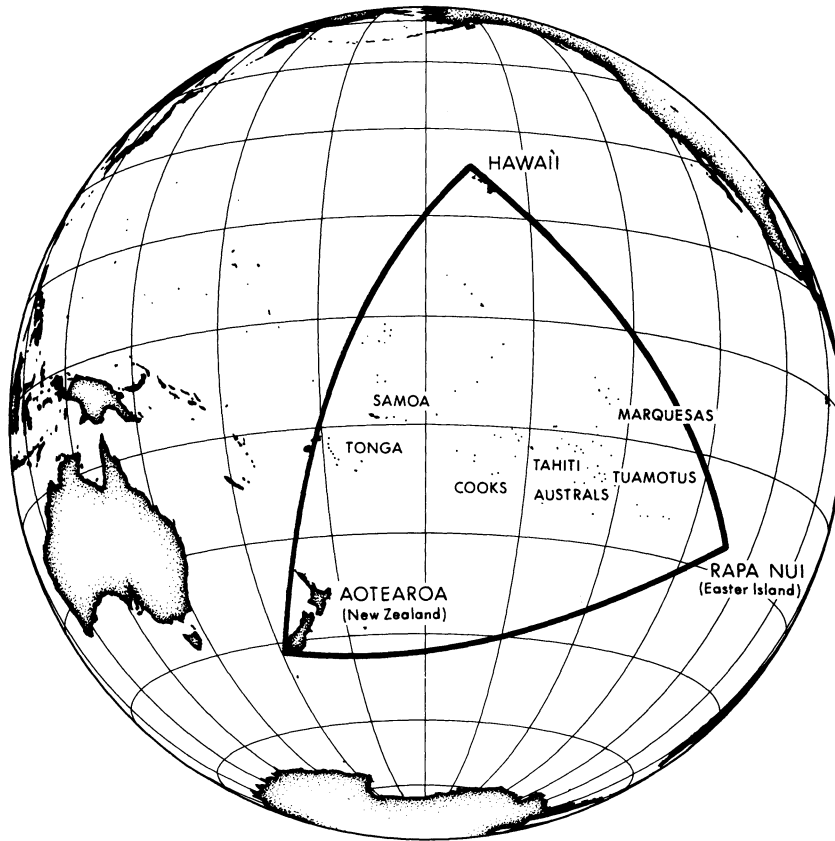


Figure 1. The Polynesian Triangle. A few small Polynesian settlements lie outside this triangle.

northernmost of the permanently inhabited islands of Hawai'i, and then extend the string to Rapa Nui. Cut the string there, and set it aside. Repeat this for the Rapa Nui to Aotearoa leg of the triangle, and then the Aotearoa to Hawai'i leg. Then reconstruct the triangle by placing these strings over a section of the globe you know better. If, for example, you start in London, you will probably be surprised to find that the first string will extend clear across Northern Europe and Siberia almost to the Pacific coast of the Russian Republic, the second from there down across China and Tibet to South India, and the third from there across Southwestern Asia and Southern Europe to London, thereby making a "Eurasian triangle" that encloses the better part of two continents.

Also basic to the problem of comprehending how the islands of the Polynesian triangle were first discovered and settled was the fundamental contrast between the oceanic view of the world held by the Polynesians, and the continental thinking of those first European visitors to Polynesia who were so surprised to learn that the islands they found in the vast stretches of the Pacific already had been discovered and settled. To the Polynesians, their ocean was a familiar, life-giving world that gave them food, provided seaways for exploration, and was strewn with fertile islands on which they could settle, plant their taro, bananas, and other crops, and raise their children. But, to those first European explorers, to sail into this largest of oceans the Pacific seemed a terrifyingly alien void. Even realization of its existence, then its great extent, was slow in coming. Columbus thought that in reaching the islands of the Caribbean he was on the threshold of Asia. Later, when in 1520 Magellan breached what geographers had finally surmised was a New World barrier to Asia by sailing through the straits at the tip of South America that now bear his name, he assumed the seas that stretched before him could be crossed in a matter of weeks. After an agonizing three months and twenty days, during which many of his starving crew died, Magellan reached the Philippines. So the outside world discovered, in the words of one of Magellan's chroniclers, "a sea so vast the human mind can scarcely grasp it."¹

Daring as were Magellan and the succession of European navigators who followed him into the Pacific over the next two and a half centuries, these men did not really attempt to explore this newfound sea. They belonged to Europe's first age of exploration during which the primary object of risking one's life on harrowing ocean voyages was to reach Asia and its riches. A few European navigators did sail into the Pacific to search for the fabled *Terra Australis*, the Southern Continent that cosmographers of that era thought must lie in the temperate latitudes of the South Pacific. Until the late eighteenth century, however, most of those who ventured into the Pacific did so to reach ports on the other side of this wide ocean, and as quickly as possible—haste often becoming a necessity as more and more of their crew fell victim to scurvy, or just plain starvation, on the slow, poorly provisioned ships of this age. These included the famous Manila Galleons that for more than two centuries sailed, laden with Mexican silver, through Polynesian waters on

the outbound leg from Mexico to the Philippines without anyone on board realizing that they were transiting one of the globe's major cultural regions. This meant that the European discovery of Polynesia and the Polynesians themselves took centuries, for there was no concerted attempt made to look for islands within this sea, much less for the people who might be living there.

People Without Skill or the Possibility of Sailing to Distant Parts

When early European explorers did happen across one of the Polynesian islands, the presence there of thriving communities of tall, handsome people puzzled these intruders from another ocean. As proud Atlantic seamen who had only recently developed the technology of ocean-spanning vessels and of ways of navigating far out of sight of land, they had trouble conceiving how these seemingly primitive islanders who were without ships or compass could have preceded them into this greatest of the world's oceans. Some refused even to consider the idea that the ancestors of these Stone Age islanders could have ever sailed great distances into the Pacific to discover and settle the islands there, and they sought to explain the presence of the voyagers' descendants in the middle of the ocean by other means.

Consider, for example, the comments made in 1595 by Pedro Fernandez de Quiros, navigator of the Spanish expedition that chanced upon a collection of rugged volcanic islands some 4,000 miles west of Peru that the expedition's leader, Alvaro Mendaña, named Las Marquesas de Mendoza after his patron, the Viceroy of Peru. Although Quiros admired the physical beauty of the Marquesans, he was not at all impressed by their sailing canoes or their tales of overseas voyaging. Indeed, because they did not have large sailing vessels and navigational instruments, the navigator judged them to be a "people without skill or the possibility of sailing to distant parts." Thus, when they tried to tell Quiros how they sailed their canoes to islands lying to the south of their archipelago, Quiros refused to believe that these islands could be very far away. Although the Marquesans were probably referring to their raids on the Tuamotu atolls located several hundreds of miles south of the Marquesas, Quiros reckoned that because of the primitive state of their maritime technology these islands must lie just over the horizon. Quiros's rea-

soning was further shaped by his vision of a great Southern Continent. He theorized that these nearby isles must be part of a chain of closely spaced islands that led to the Southern Continent, and that this land mass and immediately offshore islands must have provided the ancestors of the Marquesans with an overland route and then island stepping stones that enabled them to move all the way from Asia into the Pacific without having to cross great stretches of open ocean.²

A century and a quarter later, the maverick Dutch navigator, Jacob Roggeveen, was even more perplexed as to how seemingly primitive people had come to be living on Rapa Nui—which he called Easter Island because he had chanced upon this minuscule island on Easter Sunday of 1722 while sailing across the Pacific in search of the Southern Continent or any other rich lands that he and his associates might exploit. Where the Marquesans at least had fairly good-sized double canoes, the Rapa Nui had only small, outrigger canoes that measured no longer than ten feet in length and were made by sewing a great many scraps of wood together. The islanders apparently could not make larger canoes for want of timber because generations of settlers had cleared the forests for agriculture and to obtain wood to construct houses and other structures, as well as to use for rollers, levers, and scaffolding in moving and erecting the stone images for which the island is so famous. Since the Rapa Nui had neither large oceangoing vessels, nor the compass or any other navigational devices, the Dutch navigator dismissed the idea that the ancestors of these people had settled their island by sailing there in canoes. After considering that the Spanish might have brought them, or that God might have specially created them on the island, Roggeveen gave up, declaring that “the ability of human understanding is powerless to comprehend by what means they could have been transported” to this isolated island so distant from any continental land mass.³

The common element in these and other attempts, during this early age of exploration, to explain the origins of the people European explorers kept finding on the oceanic islands they stumbled across, was the assumption that the slim canoes of these islanders, and whatever noninstrument methods they might have for navigating, were simply not up to the task of intentionally exploring the Pacific and colonizing the many islands there. It therefore seemed logical to the European mind of this era that

the solution to the puzzle of how these islands had originally been settled must lie elsewhere than in the islanders' seemingly rudimentary sailing technology and navigational abilities.

How Shall We Account for This Nation Spreading Itself So Far over This Vast Ocean?

Not until the coming of Europe's second, scientific age of exploration did a reasonable hypothesis begin to emerge as to where the Polynesians came from and how they managed to colonize their island world. Whereas Columbus, Magellan, and other early explorers were primarily searching for oceanic routes to the riches of Asia, their successors in this second age added a new quest to Europe's maritime expansion. In the words of the French historian Fernand Braudel, they sailed the seas "to obtain new information about geography, the natural world, and the mores of different peoples."⁴ To be sure, this quest for information about new places, their minerals, flora and fauna, and peoples was hardly divorced from the geopolitical designs of England, France, and the other countries that sent their ships to reconnoiter distant seas. But the approach was fundamentally different and did yield a wealth of knowledge. In the Pacific the leaders of this new approach to oceanic exploration—driven by the Enlightenment ideal of scientific investigation, and aided by better ships, more precise navigational methods, and more nutritious foods that allowed some respite from scurvy—criss-crossed the ocean, finding and charting island after island, cataloging the plants and animals found there, and investigating the islanders, their languages, and customs. Only then was the reality and extent of Polynesia realized and credence given to the idea that the ancestors of the people living there could have intentionally sailed into this great ocean to find and settle so many scattered islands.

Captain James Cook, the greatest of the explorers in this scientific phase of European global expansion, was the first to realize and document the cultural realm of Polynesia. Those earlier European navigators, such as Quiros and Roggeveen, who in traversing the Pacific had made landfall on Polynesian islands here and there in the triangle had utterly failed to recognize that they were sailing through a vast region occupied by people sharing a common cultural heritage. During his three expedi-

tions into the Pacific from 1768 to 1779, Cook crossed Polynesia from both east to west and west to east, as well as from south to north, and was the first to discover that all the people living on islands in this vast triangular region belonged to, as he called it, the "same Nation."

Key to this recognition that all the people living in this region were so much alike was the realization that the languages they spoke were all closely related. Linguistic discoveries made during Cook's first voyage established that people speaking related languages were spread 2,000 miles across the South Pacific from Tahiti to Aotearoa. After leaving Tahiti, where Cook and his astronomers and officers had been sent to observe the transit of Venus across the face of the sun, Cook was guided south from Tahiti to the island of Rurutu in the Austral Islands by a learned Tahitian named Tupaia who was accompanying the English back to England. There, the English found that the people spoke a language practically identical with Tahitian, just as Tupaia said they would. From Rurutu, Cook sailed his ship, the *Endeavour*, farther south into temperate latitudes and then west across the South Pacific until he made landfall on the east coast of the North Island of Aotearoa. Because the people they met ashore looked so much like the Tahitians, Cook tried hailing them in his rudimentary Tahitian, but with no effect other than to make them threaten the English with their spears and a challenging dance. When, however, Tupaia tried shouting to the people, Cook noted that "they immediately understood him." The obvious closeness of the two languages, plus further inquiries by Cook and his chief scientist, Joseph Banks, that revealed that the people of Aotearoa shared the same customs and basic cosmology as the Tahitians, led the English navigator to conclude that the two peoples "had one Origin or Source."⁵

After returning to England, Cook was again sent out to the South Pacific, this time to search in the high latitudes of the ocean in order to see if the hypothesized Southern Continent might be found there. After, however, probing as far south as latitude 71°10', an impenetrable wall of ice forced Cook back to the north. Instead of returning directly to England with news that no Southern Continent existed in these frigid latitudes, Cook decided to make another sweep across the tropical South Pacific to search out islands previously visited by European explorers but "imperfectly explored." This consummate navigator

wanted to fix the position of islands seen by earlier explorers but only roughly located on the map. Although his predecessors could measure their latitude by observing the height of the North Star or the noonday sun, they had no way of determining their longitude other than imprecisely estimating it by dead reckoning. Cook, however, could accurately determine longitude by using one of the first chronometers to be put into service to convert star sights into precise measurements of angular distance, and was also skilled in the difficult method of calculating longitude by observing "lunar distances."⁶

Cook started his sweep across the tropical Pacific on the eastern, South American side of the ocean by searching for the island Roggeveen had found on that Easter Sunday a half century previous. Cook first sailed his ship, the *Resolution*, north to the island's reported latitude, but well to the east of the longitude where the Dutch navigator's dead reckoning had placed it. Then he sailed her down that latitude until, to his great satisfaction, Rapa Nui finally appeared on the horizon. The English were not prepared, however, for their next discovery. Two men paddled out in a small canoe, and "immediately called out for a rope," naming it to everyone's surprise "by the same word as the Tahitians." Then, the first islander to climb aboard the *Resolution* gave further proof of a connection between the two languages. The man was so amazed by the great size of the ship that he proceeded to measure out her length by fathoming the gunnels from bow to stern with his outstretched arms, calling out as he did so the "Numbers by the same names as they do at Otaheite [Tahiti]." The realization of this linguistic tie between the Rapa Nui people and the Tahitians, as well as their obvious similarity in appearance and customs, led Cook to proclaim in his journal that "it is extraordinary that the same Nation should have spread themselves over all the isles in this Vast Ocean from New Zealand to this Island which is almost a fourth part of the circumference of the Globe."⁷

Cook continued westward across the ocean, touching on the Marquesas and Tongan archipelagos where the English immediately recognized that the islanders spoke languages akin to those spoken on Tahiti and the other islands touched upon in this part of the Pacific. Sailing further westward, however, took the *Resolution* out of Polynesian waters and into the island region extending from New Guinea to Fiji now called Melanesia.

When Cook and his scientists encountered the dark-skinned inhabitants of the Melanesian islands that Cook named New Caledonia and the New Hebrides (now called Vanuatu), and did not recognize that any of their languages, save one, were related to those of the islands to the east, they concluded that they had left the region of the "same Nation." The one exception was a language, which they recognized to be close to Tongan, that was spoken by a fairer-skinned emigrant group in Vanuatu. This discovery led Cook to surmise, correctly as it turns out, that more such outliers of the nation he had found to the east were to be found in these western Pacific waters.⁸

The discovery that Polynesians had colonized islands across the equator in the North Pacific did not come until Cook's third voyage when he sailed north from Tahiti toward the northwest coast of North America to search for a waterway through or around that continent to the Atlantic, the long-hypothesized Northwest Passage. Cook had no reason to believe that in these North Pacific waters he might find people related to those south of the equator. The Tahitians had not told him about any islands that far north, and when he chanced upon an atoll just across the equator (which he named Christmas Island because the discovery was made the day before Christmas), Cook found it to be uninhabited. (In fact, archaeological remains since discovered there indicate that the island had previously been occupied by Polynesians.) When, after sailing another two and a half weeks to the north, Cook and his men spied first one and then another high, mountainous island, they therefore had no reason to believe that people of this "same Nation" had spread that far to the north. Indeed, Cook records in his journal that there was even "some doubt whether or no[t] the island was inhabited." Yet, when they approached the shore of Kaua'i, the second of the two islands to come into view, they saw people who looked like Tahitians coming out in canoes. Then, when the canoes came alongside, Lieutenant King records in his journal how they caught the "sound of Otaheite [Tahitian] words in their speech," and how upon asking them "for hogs, breadfruit, yams, in that Dialect, we found we were understood, & that these were in plenty on shore." To his agreeable surprise, Cook concluded that the "South Sea Islanders" had indeed spread across the equator into the Northern Hemisphere.⁹

Cook did not, however, name this region Polynesia, or call

the islanders Polynesians. Polynesia literally means “many islands.” In 1756 the provincial French magistrate and scholar Charles de Brosses had combined the Greek roots for “many” and “islands” to construct the term *Polynésie* to stand for all the islands of the Pacific. Three-quarters of a century later, after the explorations of Cook and other navigators had revealed the great multiplicity and diversity of islands and peoples in the Pacific, J. S. C. Dumont-d’Urville, then France’s leading Pacific explorer, delimited the term *Polynésie* so that it stood only for the islands inhabited by closely related peoples which lie mostly within the triangle formed by Hawai’i, Rapa Nui, and Aotearoa. This French construct, rendered in English as Polynesia, has since come to be regularly employed for this island world and has also been transliterated into various Polynesian languages, as, for example, *Polenekia* in Hawaiian and *Porinetia* in Tahitian.¹⁰

Cook’s discovery that the Polynesians extended north across the equator as well as for a considerable distance across the South Pacific caused the navigator to pen in his journal the question that has occupied explorers, scholars, and students ever since: “How shall we account for this Nation spreading itself so far over this Vast ocean?”¹¹ Cook himself never had the opportunity to answer that question fully. Before he could return to England and reflect at leisure upon Polynesian origins, the English navigator met his end on the shores of Kealahou Bay on the island of Hawai’i while trying to take the ruling chief of the island hostage to secure the return of a stolen boat. Nonetheless, the seeds for a theory of Polynesian settlement that takes into account both the nautical abilities of the islanders and the nature of the circulation of winds in the Pacific are to be found in earlier journal entries dating back to 1769.

That year, while on his first voyage into the Pacific, Cook stopped three months in Tahiti to prepare for, and then carry out, the observation of the transit of Venus across the face of the sun as part of an international effort to determine by trigonometric calculations the distance between the Earth and the sun. During his long stay in Tahiti Cook did something no previous European explorer to touch on a Polynesian island had ever done: he learned the basics of the local language, and then he used his rudimentary linguistic skills to inquire of the islanders how they sailed and navigated their canoes, what other

islands they knew about, and where they themselves had sailed. His primary guide in local nautical matters was Tupaia, the learned Tahitian who befriended the expedition, and who was to sail for England with Cook. On Tahiti, Tupaia had told Cook and the other curious Englishmen about how his countrymen sailed their canoes and navigated by reference to the sun, moon, and stars, and furnished them with sailing directions to a multitude of islands in the seas surrounding Tahiti. Cook was impressed enough with both the practical seamanship and navigational skills of the Tahitians, and their wide geographical knowledge, to accept that which had been unthinkable to Quiros, Roggeveen, and other early explorers: that the ancestors of these islanders must have sailed into the Pacific on their own.

Unfortunately, Cook never developed his thoughts about Polynesian migration beyond a few lines in his journal. These, nonetheless, are telling. While heading south from Borabora, an island just to the west-northwest of Tahiti, Cook penned the following passage that remarkably anticipates current thinking about how the islands of Polynesia were settled. Concerning Tahitian canoes (which he calls “proes” from the Malay *prahu*, or “Pahee’s” from the Tahitian *pahi*), Cook wrote:¹²

In these Proes or Pahee’s as they call them from all accounts we can learn, these people sail in those seas from Island to Island for several hundred Leagues, the Sun serving them for a compass by day and the Moon and Stars by night. When this comes to be prov’d we Shall be no longer at a loss to know how the Islands lying in those Seas came to be people’d, for if the inhabitants of Uleitea [Ra’iatea, a day and a half’s sail to the west-northwest of Tahiti] have been at islands laying 2 or 300 Leagues to the westward of them it cannot be doubted but that the inhabitants of those western Islands may have been at others as far to westward of them and so we may trace them from Island to Island quite to the East Indias.

The main elements for a theory of Polynesian settlement are in this passage: an acceptance that Tahitians’ canoes were seaworthy and capable of sailing at least “2 or 300 leagues” (around 600 to 900 miles), that they had a “compass” provided by the sun, moon, and stars that they used to orient themselves at sea, and that their ancestors employed this technology to move, from island to island, all the way from the “East Indias” (roughly

modern Indonesia, plus adjacent islands of Malaysia and the Philippines) to the eastern Pacific.

Cook's willingness to give the islanders credit for having intentionally explored and settled their island world was not solely a product of his times. This preeminent English seaman genuinely admired the canoes of the Tahitians and believed them when they said that they navigated without instruments. In contrast, consider how the remarks of one of Cook's contemporaries, the French navigator Julien Crozet, betray a total skepticism about Polynesian seamanship. In 1772 Crozet visited Aotearoa as an officer on the ill-fated Marion de Fresne expedition. He had with him a list of Tahitian words from the Bougainville expedition that had touched on Tahiti the year before Cook had stopped there to observe the transit of Venus. In his journal Crozet relates how surprised he was to find that when he read the words to the islanders they "understood me perfectly," and goes on to write: "I soon recognized that the language of this country was absolutely the same as that of Taïty [Tahiti] more than 600 leagues distant from New Zealand." But Crozet could not imagine that either these people or the Tahitians were capable of communicating over great distances by sea. Instead, he invoked a sunken continent to explain their linguistic relationship: "People so widely separated and without a means of navigation do not speak the same language unless they were once and the same people and inhabited perhaps the same continent, of which the volcanic shocks have left us only the mountains and their savage inhabitants . . ." ¹³

Cook chose the "East Indias" as the origin point for the Polynesian migration because the linguistic trail led from Tahiti to there. Sailing with Cook was Joseph Banks, a young botanist who had studied philology at Oxford and who later became president of the Royal Society. On board the ship was a collection of published accounts of previous voyages through the Pacific, in which were short vocabularies from a handful of islands scattered from Southeast Asia eastward into the Pacific as far as the western edge of Polynesia. By comparing the list of Tahitian words he had compiled with these vocabularies, Banks was able to show how Tahitian was directly related to languages spread across the Pacific to the "East Indias."

Cook saw only one obstacle to accepting a Polynesian origin in island Southeast Asia: the proposed migration trail led

through tropical latitudes, and in the tropics trade winds blowing from east to west normally prevail. Whereas these would make it relatively easy for voyagers from South America to sail westward with the wind into the Pacific, steady trade winds seemingly would have presented a formidable obstacle for any voyagers originating at the western edge of the Pacific to sail eastward across the ocean. Yet, because he could see no resemblance between the islanders and the Native Americans he had seen in person and in drawings, Cook rejected the idea of an American origin to the Polynesians. To him, the trail of linguistic evidence indelibly marked the direction of migration, and he therefore sought to explain how canoe voyagers could have moved eastward into the Pacific against the direction of the trade winds.

Cook realized that Tahitian canoes sailed well with the wind and across the wind, but he had doubts that they could be forced to windward for the long distances required to move eastward across the Pacific. Tupaia supplied the intelligence needed to remove Cook's doubts. He told Cook that a series of islands extended far to the west of Tahiti, and that when his countrymen wanted to sail back to Tahiti from one of these western islands, they waited for spells of favorable westerly winds that frequently replace the trade winds during the summer:¹⁴

Tupia [Tupaia] tells us that during the Months of Nov^r Decemb^r & January Westerly winds with rain prevail & as the inhabitants of the Islands know very well how to make proper use of the winds there will no difficulty arise in Trading or sailing from Island to Island even tho' they lay in an East & West direction.

This crucial bit of information was all the English navigator needed to envisage how people sailing in canoes could have worked their way eastward from the Asian side of the Pacific by waiting for and then exploiting seasonal westerly wind reversals to move from island to island, farther and farther into the ocean.

A Developing Theory

Over the next century, Cook's sketchy proposal was developed into a general consensus about Polynesian origins and migration by a variety of explorers, scientists, and other writers.

Linguistic studies showed, for example, that Banks and Cook were on firm ground when they traced the languages of Polynesia back to island Southeast Asia. In fact, they were not the first to identify a linguistic relationship between these regions. Sixty years earlier a Dutch scholar, Adriaan Reeland, had published a dissertation in which he compared words from vocabularies gathered by early explorers from a few islands in Melanesia and along the western edge of Polynesia to word lists from Malaya and Java and found them to belong to the same family of languages. Upon publication of the vocabularies gathered by Cook and Banks, and later Pacific explorers and scientists, linguists expanded upon Reeland's discovery to establish definitively the existence of a great language family that they called the Malayo-Polynesian family, named from the distribution of its constituent languages from Malaya to Polynesia. Now, it is more commonly called the Austronesian ("Southern Islands") language family in recognition that islands where these related languages are spoken extend beyond Malaya across the Indian Ocean to the great island of Madagascar. This span of related languages from an island immediately offshore Africa across two oceans to the easternmost Polynesian outpost of Rapa Nui (which lies farther to the east than Utah's Salt Lake City) made Austronesian the most widespread language family on the globe—until European seafarers spread Indo-European tongues around the world.¹⁵

During his second expedition into the Pacific, Cook sailed west from tropical Polynesia into that part of the Pacific that Dumont-d'Urville was to label as *Melanésie*, or Melanesia, because of the dark skin of the people living on the islands stretching from New Guinea to Fiji. Within this region, the expedition visited New Caledonia, some small islands adjacent to it, and the archipelago to the north that Cook called the New Hebrides, but which is now known as Vanuatu. Although Cook and his scientists did find a Polynesian population on one island in Vanuatu, the bulk of the people they encountered in Melanesia seemed to them to be very different in appearance, language, and culture than the "nation" they had left to the east. To explain this difference in island populations, Johann Reinhold Forster, the naturalist on Cook's second expedition, focused on skin color and proposed that there had been two main

migrations into the Pacific: an early thrust of dark-skinned peoples followed by a later migration of brown-skinned voyagers. In terms of Dumont-d'Urville's geographical categories (which we still use today), Forster was referring to an initial migration of dark-skinned peoples into Melanesia, and a subsequent movement of brown-skinned peoples to Polynesia and to Micronesia, the island region north of Melanesia that Dumont-d'Urville had called *Micronésie* because of the small size of the islands there. Forster's formulation in turn led the eighteenth-century physical anthropologist Johann Blumenbach to add to the four races of mankind he had originally specified (Caucasian, Asiatic, American, and Ethiopian) a fifth, oceanic race that he called Malay.¹⁶

As for the means of migration, most writers agreed that Polynesians and their Micronesian cousins had migrated into the Pacific by canoe. In fact, when the distribution of oceangoing canoes and people speaking Austronesian languages was systematically considered, it was realized that canoe voyagers from Southeast Asia must have also expanded across the Indian Ocean to Madagascar where the national language, Malagasy, still bears witness to the Austronesian origins of the first people to occupy this great island (fig. 2).

To the early European navigators, the sailing canoes they encountered in Polynesian waters looked so different from their own ships that at first they had difficulty appreciating the merits of these highly sophisticated craft. As was eventually realized, these oceanic canoes were anything but simple dugout vessels. A craft made from a narrow dugout log is not stable enough for deep-sea sailing; if rigged with a sail of any size, it will capsize when hit by a strong wind or rolled by heavy seas. Atlantic and Mediterranean seafarers had solved the problem of achieving stability under sail by building broad-beamed plank boats to make a wide enough base to raise a sail, and by weighting their vessels with heavy ballast to further counteract the overturning force of the wind. The people of Southeast Asia and the Pacific had hit upon an entirely different solution to this stability problem. Instead of making wide and ballasted monohull vessels, they kept the narrow, unballasted canoe hull, but incorporated it into composite craft designed to provide a wide enough stance to be able to carry sail without capsizing. They

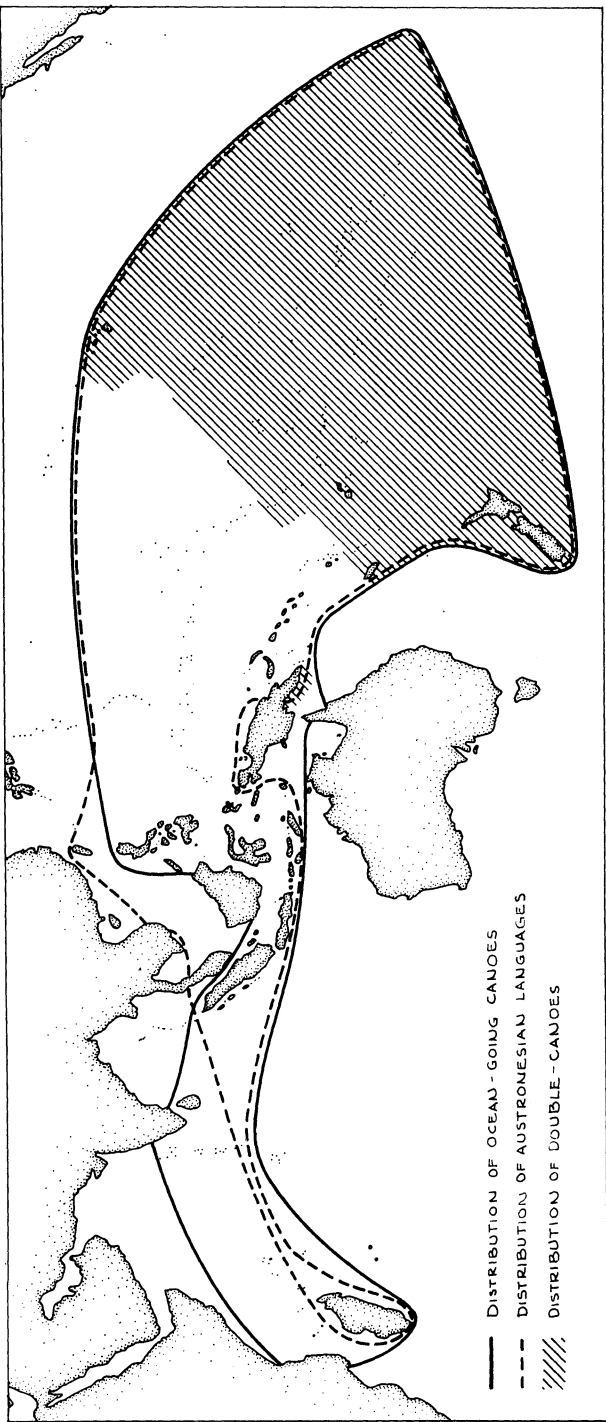


Figure 2. *The oceanic expansion of the Austronesians showing distribution of the language family and oceangoing canoes.*