Tangaroa

PACIFIC VOYAGE

Testing Heyerdahl's Theories about Kon-Tiki 60 Years Later

by Torgeir Sæverud Higraff

with Betty Blair

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Crew that sailed the Tangaroa raft from Peru to the Polynesian islands (April to August 2006). Left to right: Torgeir S. Higraff (expedition leader), Anders Berg (photographer), Olav Heyerdahl (carpenter, scuba diver and grandson of the famous Thor Heyerdahl who led a similar expedition in 1947), standing behind: Bjarne Krekvik (captain), Øyvin Lauten (executive officer) and Roberto Sala (Peruvian ex-navy sailor).

As far back as I can ever remember, Thor Heyerdahl (1914-2002). has always been my hero. Ever since childhood. I know I'm not alone. The ventures of this great explorer, anthropologist and archaeologist on the high seas have captured the imagination of millions of people around the world, making him the most famous Norwegian as well as one of the most well-known international figures of the 20th century. His fame is most closely associated with his first voyage across the Pacific Ocean on a primitive balsa raft named "Kon-Tiki", the Inca name for "Sun God".

Despite how risky that undertaking was, one must keep in mind that Heyerdahl always carried out exhaustive anthropological and historical research before ever embarking on any type of archaeological experiment—whether on land or sea. In anticipation of that bold venture floating on a primitive raft to the Polynesian islands, Heyerdahl had spent an enormous amount of time in the "field". In 1937 he took his newly-married wife Liv on a steamer to the island of Fatu-Hiva where for a year they tried to live as close to nature as possible.

Unlike most people who spend their careers in academia, Heyerdahl was willing to take risks to prove the merit of his ideas. He challenged others—perhaps, it's more accurate to say that he "provoked" others—to find evidence to counter his theories. In this way, despite the fact that some of his ideas turned out to be wrong, he still did the scientific world a great favor. In addition, one cannot underestimate his contribution to the general popular knowledge in making people aware of early navigation and migration patterns across the continents.

He prodded researchers to rethink the early migration patterns of man—not only in terms of the direction of immigration from West to East, but in the feasibility and likelihood that early man had had the capacity to cross vast expanses of water. Heyerdahl generated enormous interest in numerous fields—cultural history, anthropology, archaeology, botany, biology, early language and environment. He raised major questions, not only about our past, but about the future as well.

WOULD IT SAIL?

Despite how convinced Heyerdahl was that the Kon-Tiki experiment would work, he admitted to having doubts even up to the last moments before launching out to sea. A few days prior to the voyage, Heyerdahl had chanced upon a Norwegian ship with experienced Norwegian crewmembers aboard. He showed them the Kon-Tiki. Their prognosis was not good: such a blunt-bowed, clumsy craft with its small sail would never make it across the Pacific. For sure, it wouldn't be able to keep afloat even for two weeks; and even if it did, it would take the Kon-Tiki a year to reach the Polynesian islands. Besides the ropes tying the logs together would wear out from the continuous rubbing up and down as the craft rose and fell with the waves.

Heyerdahl noted in his book Kon-Tiki: "Even if only one of their arguments proved to be right, we didn't have a chance. I'm afraid that I asked myself many times if we knew what we were doing. I could not counter the warnings one by one myself because I was not a seaman. But I had in reserve one single trump in my hand, on which the whole voyage was founded. I knew all the time in my heart that a maritime pre-historic civilization used rafts like the Kon-Tiki to travel vast distances along the coast of South America, long before Europeans set foot on the continent. Could their ingenious boats have challenged the biggest ocean of all—the Pacific?"

Of course, Heyerdahl's popularity must also be understood in the context of World War II (1939-1945). Here was a handsome young man embarking into the unknown on a simple primitive craft across a vast, potentially turbulent and life-threatening ocean with just a small, handpicked crew, simply to prove something that they believed in. He dared by himself to challenge well-established institutions.

It was an enormously romantic idea—especially following on the heels of a brutal war, which had destroyed the lives of so many millions of people. Heyerdahl challenged the belief that one's fate was pre-determined. He was convinced that despite limitations, man could do much to shape his destiny.

Only once did I have the chance to meet my hero personally. It was back in 2000. In Oslo. But, of course, the concept for our project, which we would name "Tangaroa" (God of the Seas) was inspired by Kon-Tiki.

UNIVERSITY STUDIES

I must have been mulling over this idea for such an expedition for about 10 years. During my studies at the University of Oslo in the mid-1990s, I had read all of Thor Heyerdahl's books. I found them at second-hand bookstores; they weren't available at the university bookstore. Heyerdahl's book "American Indians in the Pacific: The Scientific Theory behind the Kon-Tiki

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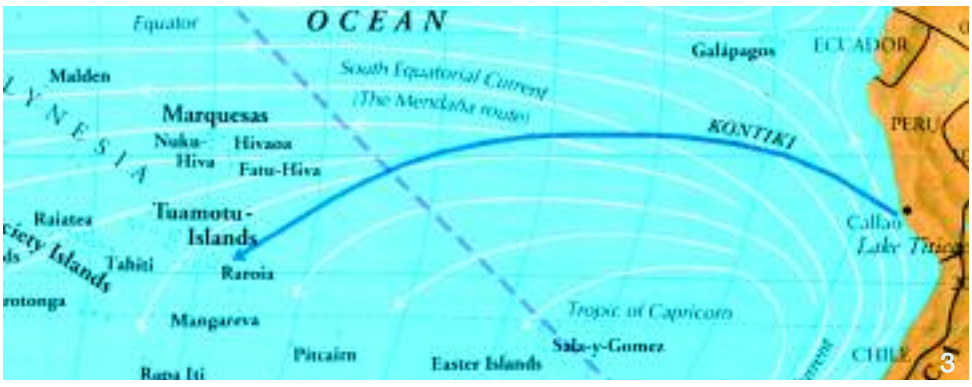

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Photos

2. The Tangaroa sailed from the Peruvian coast to the Polynesian islands, a distance of 4,620 miles (7,436 km) from late April to early August 2006. The idea behind the design of the raft was to improve upon Thor Heyerdahl's Kon-Tiki expedition (1947), from a technical point of view which had sailed 60 years earlier.

The Tangaroa was a larger vessel and had a sail that was three times as large. It arrived more quickly at its final destination because the crew had learned to use "guara" centerboards to steer the craft.

3. Map of Kon-Tiki voyage, which generally followed by the Tangaroa raft.


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Expedition" is an impressive volume of 800-plus pages with more than a thousand scholarly references. Few people know about it and those who do, rarely give Heyerdahl the credit he deserves for it. I also read his other books like "Early Man and the Ocean" which provides a good overview into the subject of early migrations.

I didn't read these books like any ordinary person in search of adventure. I studied and analyzed them, digging into the references, especially those written by scientists who opposed Heyerdahl's ideas such as Lothrop (1932), Hornell (1931) and Dixon (1932, 1933).

Arguably, with the exception of James Hornell, such scholars were not convinced that a balsa raft could carry people and goods from the Americas to the Polynesian islands. They thought such a crude boat wouldn't be buoyant and that shortly after it left the shore, it would become waterlogged and sink. It was in the midst of this heated debate that Heyerdahl decided to test his hypothesis to convince the scientific world that it was, indeed, possible for a raft to be carried along by ocean currents for 8,000 kilometers.

Of course, spending so much time buried in Heyerdahl's works didn't boost my grades in Latin American History. I managed to pass, but the professor blocked my pursuit to continue my Master's degree. In fact, when I challenged him about the agenda of the program, he literally kicked me out of the program.

I guess I should consider myself lucky to have even been given a grade for the course and allowed to graduate. The experience made me sensitive to some of the difficulties that Heyerdahl himself had dealt with throughout his career. The greatest opposition to his ideas came from academia. They stabbed him, wounded him, but in the end, they never managed to stop him.

PHOTOS

4-5 The Tangaroa took advantage of modern technology to facilitate communications and make the voyage by raft safer. The raft was equipped with telephone, radar system, solar panels, wind turbine, laptop computers and access to the Internet. Here Captain Bjarne Krekvik from Sweden is making contact with a captain of one of the four large container ships that the raft passed during the voyage. Communication was important in order to avoid any collision.

6. Though Anne Ely Thorenfeldt did not cross the Pacific with the crew on the Tangaroa, her presence was indispensable for the expedition. She was coordinator for the project back in Norway and worked tirelessly behind the scenes for the past several years, helping to sort through and administer myriad details.


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So, with my academic studies short-circuited, I decided to take a trip to Peru to study these early indigenous cultures that had spread throughout the region prior to the Spanish conquest. That was in 1996. I traveled 15,000 kilometers in a 1979 Corolla from Atlanta, Georgia, all the way down to Costa Rica and eventually ended up in Peru, where my passion grew for the coastal culture. Whenever I would visit a museum or archaeological site, I found myself jotting down notes about prehistoric seafaring and primitive vessels.

But I never told anyone of my dream. Well, not before 1999 when I met Mona—the woman who would become my future wife. I was afraid that if I mentioned that I wanted to build a raft and repeat Heyerdahl's Pacific expedition, it would have been like telling people that I was going to be an astronaut! People would have thought: "Yeah, sure! Dream on!" And they would have smiled and nodded: "How wonderful!" and then politely changed the subject to something more credible.

After Heyerdahl's death in April 2002, I told Mona that I really wanted to focus on making this voyage during the next few years. It meant that she would have to support me financially, which she did—for three years, though I did earn some money as a teacher. This experiment also meant that Mona would have to forget about the idea of having children until after I returned from Tahiti. And so, we came to an agreement and we began pursuing the idea of what became the Tangaroa with enormous passion. And it was Mona who became my greatest support and confidante.

Now that the expedition is over, maybe we'll be able to settle down to a more normal life. We laugh about those strange episodes at the beginning of our dreams for Tangaroa. It wouldn't have been easy for any wife. Our apartment was always a mess—books and papers all over the place.

Mona would tell friends and family: "He's planning a secret project" but that would only whet their appetite and make them probe further: "Was I studying at the university?" "Was I writing a book?" I guess they couldn't believe that someone would do research without having a course or without getting paid.

Despite the fact that we had no funding, we spent the summer of 2003—actually, it was our honeymoon—trying to track down balsa trees in Ecuador. The effort ended in failure. In the process, we had had to cope with a mountain of difficulties, many of which we would rather forget about. We began to realize that endurance alone was not enough to guarantee our success. Sick, dirty, worn out and disappointed, I told my wife: "It's time to go home. Forget about these piddly little efforts; we have to start thinking big!"

Torgeir Higraff (33) Expedition Leader of Tangaroa. It was his brainchild to repeat the oceanic voyage by balsa raft that Thor Heyerdahl (1914-2002) made across the Pacific in 1947. Torgeir has a background in teaching and journalism and is passionate about nature, history, and the study of both past and present civilizations. He likes to engage in conversation about philosophy and politics over a glass of red wine, but he also spend much time exploring wilderness and historical places. Presently, he is writing a book about the expedition, which is scheduled to come out in four Scandinavian languages—Norwegian, Swedish, Danish and Finnish. He is married and lives in Oslo, Norway.

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Bjarne Krekvik (53) joined the team in December 2004. He served as captain and was a key person for the success of the Tangaroa because of his expedition experience and sailing background from replicas of Viking ships.

Bjarne has a degree in agronomy and in navigation. He served as head of security onboard. Bjarne spends his free time on his little farm. He likes being outdoors and listening to music. He has worked as First Officer aboard a freighter and has taken part in several expeditions sailing Viking ships. He is married and has two sons.

Anders Berg (42) has been involved with the Tangaroa project since Spring 2004. He was the first crewmember to join Torgeir. Anders served as the photographer for the expedition and was responsible for all filming onboard the raft. Anders likes to spend time outdoors, especially doing alpine skiing. And he loves music. He is married with two sons. He lives in Torsby, Sweden, and was the only Scandinavian who was not Norwegian. Thor Heyerdahl also took one Swede along on the Kon-Tiki crew 60 years ago!

Øyvin Lauten (55) teaches building construction at Thor Heyerdahl High School in Larvik, in southern Norway, which is the hometown where Heyerdahl grew up. Øyvin served as "XO", Executive Officer for the Tangaroa. He served as the captain aboard the veteran ship Frithjof II for many years. During leisure time on the Tangaroa, Øyvin liked to sing. On land, he sings in theatrical performances. He is married, with two daughters and a granddaughter. Home for Øyvin is Stavern, Norway.

Roberto Sala (45) came from Lima, Peru. He was the only non-Scandinavian crewmember. He had a long career in the Peruvian navy and was selected by them to represent South American seamanship. On board the raft, he was responsible for astro-navigation.

Roberto turned out to be the only person on the raft who had no conflicts with anyone during the 85 days duration at sea. Though teambuilding is critical to such an expedition, Roberto proved that native politeness was even more effective. He is married and has a daughter.

Olav Heyerdahl (29) is the grandson of Thor Heyerdahl who made the original expedition by balsa raft from Peru to the Polynesian islands in 1947. As a carpenter and engineer, he was responsible for construction and maintenance onboard. He likes to travel and finished the second half of his engineering studies in Cape Town, South Africa.

Olav is an enthusiastic scuba diver, which enabled him to marvel at the unique life under the sea. In some places it was so clear that he could see 30 meters depth. Olav is single and lives in Oslo, Norway.

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RE-READING KON-TIKI

On the return flight home to Norway, I started re-reading Heyerdahl's book, Kon-Tiki. This time I didn't read for the plot. I wanted to learn directly from the pioneer himself: "How had he been able to organize such an undertaking?"

I read with new eyes. This time I focused on the process and the gigantic effort it took to plan the expedition. From the beginning, Heyerdahl had had the astuteness to present the experiment as an official undertaking—not

PHOTOS

7. Preparing the balsa logs for the Kon-Tiki raft (1947). According to Thor Heyerdahl the Expedition Leader, 12 enormous balsa trees were chopped down in the jungle in the foothills of the Andes mountains in Ecuador. They were floated down the river where the raft was constructed in Peru. According to Heyerdahl, each tree was christened and given the name of a god before it was felled, in accord with Polynesian custom.

8. Kon-Tiki used nine sizeable balsa logs as the base for the raft; Tangaroa was larger with 11 logs. In both vessels, hemp rope was used to tie all the pieces together. Not a single nail, bolt or wire was used.

9. Calm seas for the Kon-Tiki (1947). Photos from a rubber dinghy. Heyerdahl noted that "when the balsa logs disappeared behind the waves, the raft looked like a crooked hayloft floating on the sea."

10. A Kon-Tiki crew member (1947) struggling to steady the steering oar in rough seas. Because Heyerdahl didn't know how to use guara centerboards that ancient seaman had used with such craft, keeping the course became even more difficult for the Kon-Tiki.

"The Kon-Tiki expedition opened my eyes to what the ocean really is. It is a conveyor and not an isolator. The ocean has been man's highway from the days he built the first buoyant ships, long before he tamed the horse, invented wheels, and cut roads through the virgin jungles."

—Thor Heyerdahl
Foreword to the 35th Anniversary Edition of his book Kon-Tiki,
(Washington Square Press, 1984)

something amateurish. For example, on his trip to Ecuador and Peru, he had carried letters of reference and support from governments and VIPs ("very important persons").

I knew I had to concentrate more in this direction. It would be critical to the project to meet the right people who could facilitate my efforts, and it would be important to meet them in the right sequence. I would need to gain the support of A, who could help me to meet B, and so on. Considering the scope of the project, I soon realized that I would probably need the assistance of an entire alphabet!

It didn't take long to see that this project would be more time consuming for us than it had been for Heyerdahl. Being knowledgeable and courageous simply wasn't sufficient enough to carry out an expedition of this magnitude.

CHOOSING THE CREW

It was then that I met Anders Berg, 42. I happened to be in Sweden viewing footage at the largest film archive that exists on Heyerdahl. Anders had worked directly with the explorer over a period of several years. He was a professional cameraman with Sebrafilm. Some weeks later, Anders emailed me, asking to be the Swede to accompany us on the raft. "After all," he argued, "there had been a Swede on the Kon-Tiki—the prototype for the voyage. Besides, wouldn't I need a cameraman?"

Two years would pass before we finally were able to launch Tangaroa, yet Anders never tired of the project, and he was committed to making a film about the voyage. The Kon-Tiki footage had been in black and white and awarded an Oscar in 1951 for Best Documentary. The Tangaroa footage would be made in color with sound.

"Talk to Olav Heyerdahl!" the director at the Kon-Tiki Museum in Oslo had advised. Olav, then 27, just happened to be the grandson of Thor Heyerdahl. And as if that wasn't enough to qualify him for the expedition, he also was a carpenter and civil engineer. At the time when I first broached the subject with him via email, he was scuba diving off the coast of South Africa.

After a few meetings, I decided to go ahead and invite Olav to join the expedition. Naturally, he needed some time—the summer of 2004—to think about it. Fortunately, he agreed. As a true handyman aboard the raft, he became indispensable to the expedition, not only when we were cutting down the balsa trees and floating the logs downriver, or constructing the raft itself, but Olav was immensely helpful onboard as well when we desperately needed to make repairs.

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Also he was responsible for scuba diving, which enabled us to get a glimpse of the marvels under the sea. Anders had an additional camera that he would attach to a pole and submerge in the water to capture the underwater life that Olav found. Olav scuba dived; the rest of us only snorkeled.

Bjarne Krekvik, 53, joined us as captain of the Tangaroa. One of the most experienced Viking ship sailors in Norway, Bjarne was chosen because he could apply his vast knowledge in addition to helping us with the rigging and navigation of the raft.

Bjarne had been the captain of a replica of the Gokstad, a 9th century Viking ship called Saga Siglar, which had sailed around the world in the 1980s. He had later sailed it as the skipper when it went down in violent winds and 14-meter waves in the Mediterranean in the 1990s. He and his crew sailed that open Viking ship for hours in a life-threatening hurricane before managing to get to safety in lifeboats. That's what I call "real seamanship". Bjarne was considered a hero back then. Now we had chosen him to organize our expedition across the Pacific. I was proud to be among his crew.

PHOTOS

11. Torgeir at the balsa plantation in Quevedo, Ecuador.

12. The Tangaroa crew ordered the balsa trees in November 2004. The trees were selected and marked in February 2005. The idea was to identify trees, which would be the most buoyant. Since female trees are lighter than male trees, native specialists would knock against the trunk to detect by sound which were the more porous trees. Then in January 2006, a cut was made around the circumference of the trunk to prevent the sap from rising.

Two weeks later the trees were cut down and left with their branches and leaves attached to dry out. Finally, as shown above, Torgeir and workmen stripped the trunk of its bark and prepared the logs to be transported to Peru where the raft would be constructed.

13. Organizing logs for transportation to Peru where the raft would be built. The raft was made of 11 balsa logs, the longest one in the middle of the vessel measured 17 meters (about 56 feet) long, while the others were 14 meters (46 feet). Despite the fact that balsa produces one of the lightest weight woods, the logs all together weighed more than 20 tons.


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QUICK FACTS

Comparing the Two Rafts: Kon-Tiki and Tangaroa

Name	Kon-Tiki. "Sun God" in the Incan language.	Tangaroa. "God of the Seas" in the Maori language.
Expedition Leader	Thor Heyerdahl (1914-2002), 32 years old	Torgeir Sæverud Higraff (born1973), 33 years old
Launch Date	April 28, 1947	April 28, 2006
Goal	To show that early man could have traveled from East to West (not just West to East as had been surmised earlier) and that South American natives could have populated Polynesia.	To improve on the design of the balsa raft and, thereby, better understand the capability of the early sailors. Also, to monitor pollution in the sea, especially "hidden pollution," such as antibiotic and hormone spilloff that is affecting reproduction.
Crew	6 crew: 5 Norwegians and 1 Swede	6 crew: 4 Norwegians, 1 Swede and 1 Peruvian
Location Balsa Trees Cut	Quevedo, Ecuador	Quevedo, Ecuador
Raft Launching Point	Callao, Peru	Callao, Peru
Final Destination	Polynesian Islands: Raroia atoll, Tuamotu Archipelago	Polynesian Islands: Raroia atoll, Tuamotu Archipelago and Raiatea, then towed to Tahiti, crew visited Moorea.
Days at Sea	101 days to Raroia	70 days to Raroia and then 13 more days to Raiatea.
Arrival date	August 7, 1947	Raroia on July 7, 2006. Raiatea on July 24, Tahiti on July 29, Moorea on August 7.
Length of Journey	Approximately 4,300 nautical miles (4948 miles or 7,964 km)	4,015 nautical miles (4,620 miles or 7,436 kilometers) in 1680 hours (70 days)
Average Speed	1.5 knots	2.4 knots
Unique Equipment / Electronics	Sextant to determine position. A simple short-wave radio by which they connected to numerous amateur short-wave operators throughout the world and sent regular reports to the U.S. Weather Bureau. As an emergency backup: a British Secret Service Mark II transceiver originally produced by the SOE (Special Operations Executive) in 1942.	Sextant to determine position plus GPS (Global Positioning System) navigation system, 42kg heavy F-77 satellite antenna from Nera, Jotron AIS (Automatic Identification System) with 6 solar panels to generate electricity, wind generators, desalination equipment, telephone, equipment to connect to Internet daily and update Web site (TANGAROA.no), 3 MAC Ibook computers, DVD player, Ipod.
Raft Dimensions	14m x 7.5m (46 ft x 25 ft) 9 balsa logs, 9 cross beams.	16 m x 8 m (52.5 x 26 ft.) 11 balsa logs, 8 cross beams.
Mast	9m high (30 ft.)	13m (42.7 ft) high
Sail	27 sq m	90 sq m, which was more than triple the size of the sail of Kon-Tiki.
Center Boards (Quara)	4 boards in fixed position. Each 2m long, made of pine.	9 boards, which could be raised and lowered to regulate the size of the keel forward and aft. 4 m x 50 cm boards made of moral fiña.
Cabin	Located behind the mast and made of plaited bamboo. Size: 4.25m x 2.4m (14 ft x 8 ft).	Located behind the mast, made of bamboo and totora reeds from Lake Titicaca (Size: 5m x 3.5m (49.2 ft x 11.48 ft).
Food Supply	200 coconuts, sweet potatoes, and military tin rations. Supplements by fishing, particularly "flying fish", "dolphin" and yellowfin tuna and shark.	420 military rations, home-baked bread every day, dried reindeer meat, canned food and soups, fresh fish almost every day for 87 days. Tuna and shark which Heyerdahl often saw have since disappeared from these waters.
Water Supply	1041 liters, (275 gallons) from crystal-clear spring waters from the mountains in 56 small water cans, made fast between the cross beams so that the sea could splash around them.	1700 liters (450 gallons) in 20-liter plastic bottles. And still they had to mix some of the water with sea water to stretch it.
Raft Returned to Norway	From Tahiti to Norway, via San Francisco	The Tangaroa was towed from the island of Raiatea back to Tahiti and then shipped to Bremerhaven, Germany (40,000 km) via the carrier Talisman (Wallenius Wilhelmsen). Then to Norway on board the MV Bremer Roland.
Book	"Kon-Tiki", a best seller, published in 66 languages	A book contract has been signed by Torgeir Higraff to be published in four Scandinavian languages—Norwegian, Swedish, Danish and Finnish.
Film	"Kon-Tiki" which won the Oscar for "Best Documentary" in 1951. Also a biographical documentary featuring the life of Thor Heyerdahl is in the process of being made.	A film is currently in the works to be released in 2007 to coincide with the 60th Anniversary of the launching of Kon-Tiki. Made by VIDEOMAKER.no.
Final Destination Norway	Kon-Tiki Museum in Oslo, which opened in 1950.	Thor Heyerdahl Museum which is being built in Larvik, Heyerdahl hometown.

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14. Planks made of mora fina timber. Unlike balsa logs, mora fina is very heavy. These boards were used for "guara" centerboards as part of the steering system on the Tangaroa raft. Guara centerboards were an ingenious invention by early sailors, enabling them to control the direction of the vessel despite strong currents or headwinds.

More than 300 applicants from all over the world had sought this position. Everybody wanted to be in Bjarne's shoes. On board the raft, it didn't take long for the crew to realize that Bjarne was irreplaceable. He became the key person behind the success of our expedition. In addition, he was also responsible for any medical situation that might arise.

Øyvin Lauten, 55, served as the "XO" (Executive Officer), which made him second in command. He is an experienced sailor, as well as a carpenter. He had also worked at the Geological Institute at Oslo University. For that reason, he was responsible for collecting the ocean water samples for scientific study during the voyage. Such analysis is of international interest by organizations such as the United Nations, World Wildlife Fund, the Norwegian Council of Research, and various universities which are analysing the samples now. .

The last member to join our crew was Roberto Sala, 45. Actually, it was the Peruvian Navy that chose him to represent South American seamanship. Roberto turned out to be the only person on the raft who never had any conflicts with anyone else during the entire voyage—those three months at sea. Teambuilding is invaluable under such cramped and perilous conditions, but Roberto proved that inborn politeness is even more effective in such circumstances.

Also, there's another person—back on land—half a world away who was indispensable for the project— Anne Thorenfeldt. I would never have managed to keep track of all the details throughout the planning and execution of the expedition without her enormous assistance. She became our coordinator back in Norway and worked behind the scenes, and has worked almost on a daily basis for the past two years. She's another person who never seems to get tired of what we were doing with the Tangaroa.


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TSUNAMI DELAYS TRIP

Eventually, we felt convinced that we could launch from Peru in April 2005. Everything was targeted for that date but then disaster struck when a deadly tsunami in the Indian Ocean came onshore on December 26, 2004, killing approximately 300,000 Indonesians, Thais and Malaysians. It was the deadliest tsunami in recorded history. Several of our donors backed off, and directed their funds to help out in this tragedy. We supported their decision, but it meant our plans for launching the Tangaroa would have to be postponed for another year until 2006.

Later, fortunately, we were able to gain back some of those donors. The extra year gave us some time to meet other potential donors and a chance to make more specific plans about the film that we wanted to make. The community in Larvik, the town in Norway where Heyerdahl had grown up, became more and more interested in the project. Businessman Thore Liverød made the decision to purchase our raft even before we had built it. He wanted to bring it back to Larvik so it could be the main attraction in a museum that would be dedicated to the legacy of Thor Heyerdahl. He wanted to make Larvik a world center in memory of its most famous citizen.

Frankly speaking, I didn't look forward to having to spend another year in planning, but I was convinced we could still carry out the expedition if we could only stick together and not give up on the idea.

In short, the major obstacles that we faced those first two years were in keeping the team together and generating sufficient funds for the project. I had to borrow money from my wife and from my family. At the same time, I kept saying "no" to practically every invitation that came from friends—"no" to joining them on national holidays when people normally take a break


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PHOTOS

15. Eleven large balsa logs were used to construct the base of the Tangaroa raft. The diameters of the logs were between 80-100 cm (32-39 inches) and their length was 14-17 m (45 to 51 feet). Their combined weight was 20 tons.

16. The Tangaroa crew found a family of four expert Peruvian carpenters to prepare the 13m (nearly 43 ft.) mast from pine wood. The tools that had been shipped from Norway, however, got stuck in customs at Callao, resulting in serious delays as the carpenters had to use their own very simple tools to tackle this very big job.

17. Planks used for the nine "guara" centerboards, which could be raised and lowered to steer the raft. The guara centerboards were 4m x 50cm (13 ft x 20 inches) and made of mora fiña.

and have fun. Instead, there I was hunkered down creating PowerPoint presentations on my laptop, collecting invoices and keeping track of all the financial accounts for this dream.

Whenever I felt a bit depressed about all the effort and time it took, I had only to take a turn on the television to see how many people were out there suffering who would have loved to have been in my shoes. And when hundreds of men and women wrote us from all over the world applying as crewmembers, I was reminded that our expedition was, indeed, a rare privilege.

We learned so much throughout the process of preparations. I'll have to admit that when we first started planning for the Tangaroa, I underestimated how much labor it would take to construct the raft.

If someone, not familiar with boat building, had looked at our raft, and compared it with another raft, maybe they wouldn't have seen any differences; that is, unless they studied the details carefully. It's hard to describe what an effort it takes to construct a good solid raft like the one we sailed to Polynesia. We needed a strong, reliable vessel for the high seas but it also had to be versatile enough to steer through the narrow passages of coral reefs against strong currents and tidal waters in the lagoons.

PHOTO

18. Jacob Sæverud Minde, 7, who lives in Bryne, Norway, attended the Tangaroa launching ceremony in Callao, Peru, on April 26, 2006. There he presented the Norwegian flag to his Uncle Torgeir who had organized the Tangaroa Expedition.

The Norwegian flag was affixed to the top of the raft's mast along with flags from Peru, Ecuador, Sweden, French Polynesia, the United Nations and the Larvik community in Norway. Larvik is the hometown of Thor Heyerdahl where the raft has been returned to become the main exhibition in a future museum to Heyerdahl's legacy.

Like most boys, Jacob loves the Kon-Tiki story. Here he helps the crew by cleaning up the sawdust between the logs and the bamboo deck. It was in this compartment that the crew stowed their huge supply of bottled water. According to Torgeir, this space was sufficient enough to have transported 10 tons of goods.

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IDENTIFYING TASKS

Actually, the Tangaroa really did perform quite well at sea, but it has been a difficult task to convince people that a successful archaeological experiment doesn't just happen by mere chance or coincidence!

From the beginning, we had to divide the project into hundreds of smaller tasks. First, we had to fund the project properly. After that, we could start looking for the right trees to be cut down in the right season so they would be sufficiently buoyant. Another task was to make the sail. Another, to construct the mast, and then to affix it to the log platform.

Tangaroa consisted of thousands of hours of labor. And the project involved hundreds of experts in as many different tasks. Each one of them was vital to the success of the voyage.

One of my photos is captioned: "Old experts prepare the mast". We were able to locate a family team of four carpenters who worked for weeks just to prepare the masts. Who would have guessed that the process was so involved?

"Logs finally arrived" is another of Anders' photos. Look at those logs! Imagine that you had only one month to transform those logs into a perfect ocean-going vessel. That's why this project was so difficult and one of the reasons why the outcome is something to be proud of. The honor belongs to the hundreds of dedicated people who were involved with the process and who identify themselves with Tangaroa.

The Tangaroa expedition had two objectives: (1) to demonstrate the versatility of the navigation system with "guaras" (centerboards) and (2) to analyze the contamination in the Pacific Ocean on a molecular level.

GUARA BOARDS

We also were able to carry out some very interesting experiments with the use of the guara boards, testing the speed and steering limitations of the ancient balsa raft. Our experience at sea convinced us that the craftsmen who made such rafts probably could have gone very far in such vessels, without ever being concerned about the possibility of sinking.

To maintain control of the raft, you need large sails, along with the knowledge of how to handle them. We used sails that were three times larger than those on Kon-Tiki. The idealized sketches [illustrating this article] show how the Tangaroa was equipped with several keels. In Peru they call these keels "guaras".

They are boards, about 12-feet in length, a couple of inches thick, and about 20 inches wide. They're made of heavy and durable wood. These boards have holes drilled through them spaced several centimeters apart, starting from the top and extending about half way down, through which wooden pins can be inserted. The pins are about a foot long with a two-inch diameter. The boards serve as a sort of rudder to steer the raft. They are constructed so that they can slide into specific slots between the bamboo floor and the balsa hull logs. These boards provide a surface area, which offer some resistance in the water beneath the vessel.

The Kon-Tiki raft was equipped with four such centerboards but they were "fixed" and could not be raised or lowered. However, the whole point of this clever invention is to raise or lower the boards depending upon the winds and currents. When the wind is constant, the direction and course of the vessel can be changed if you move the boards to a higher or lower


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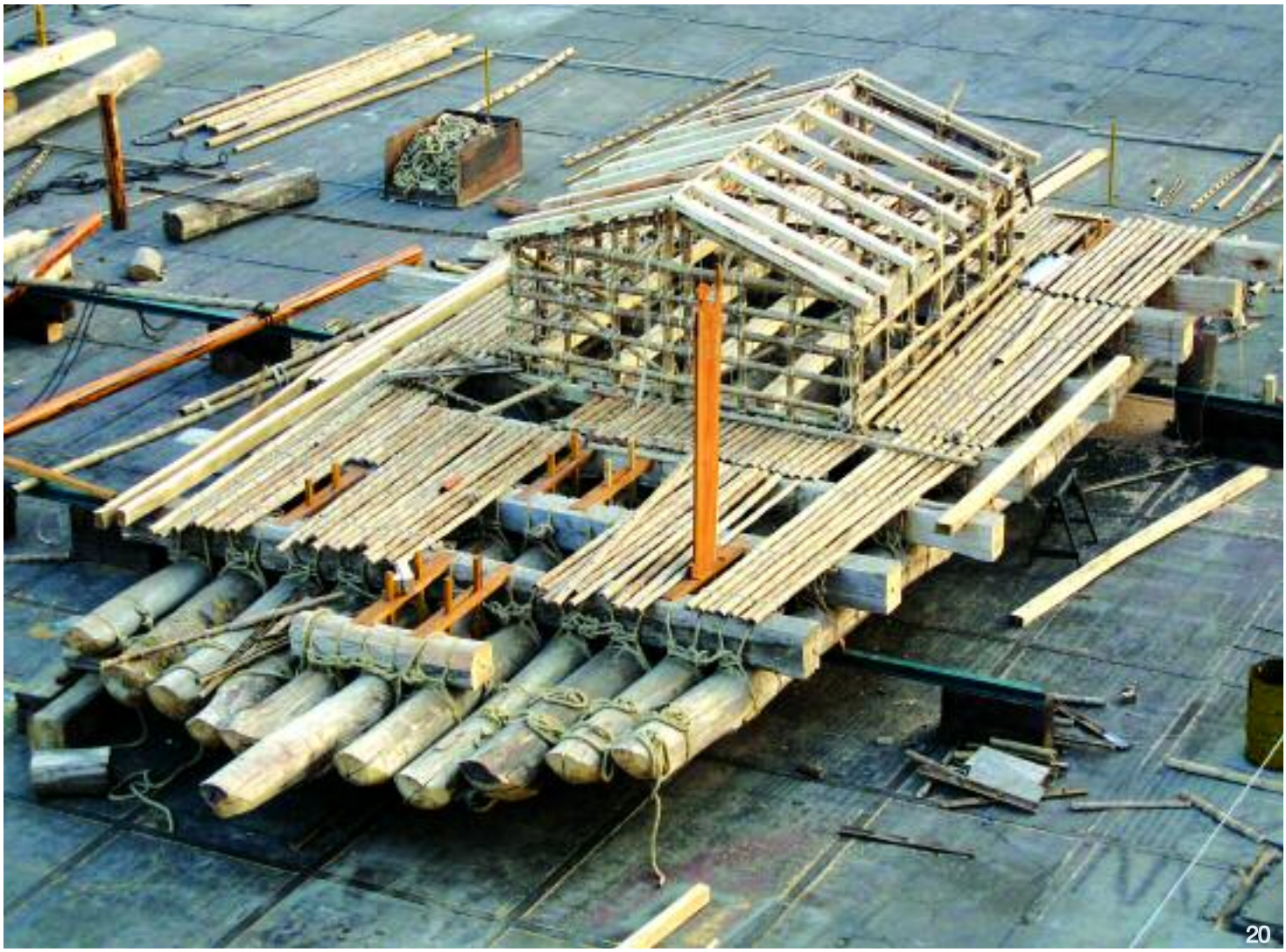
ANDERS BERG / TANGAROA

position. For example, if you raise one of them 20 centimeters, the course can change 20 degrees. So by lifting them up and down, we learned how to steer the raft the way ancient man did. We discovered that we could even steer directly into the wind.

Apparently, Heyerdahl had not seen sketches to understand that the crew had to raise these guara boards up and down. At least that's what he wrote in "American Indians". He mentions there that if he had known how to steer the raft with centerboards, he would never have smashed into the reef off the island of Raroia in the Tuamotu Islands when they reached their destination in August 1947.

Kon-Tiki also had a steering oar, but it wasn't very functional. Consequently, the Kon-Tiki was largely subject to the whim of wind and currents because they didn't know how to sail it directly into the wind.

Vital Alsar, who organized the expedition of La Balsa raft, used guara boards on his raft in 1970—the craft he used to sail between Peru all the way to Australia. By then it was understood how to use them.

Our use of the guara on the Tangaroa is based on Heyerdahl's observations that he made after completing his expedition of the Kon-Tiki. In 1953, he carried out an experiment in Ecuador with a small raft using the guara to understand how this mechanism worked. He wrote about the dexterity of the centerboards in several of his books, including "Early Man and the Ocean" (1978).

POLLUTION

Our second major task concerned pollution in the ocean. On board, we carried sophisticated scientific equipment in which to collect ocean samples. We were

PHOTOS

19. Mona Sæverud Higraff, wife of Expedition Leader Torgeir, christening the Tangaroa in Callao, Peru, on April 28, 2006, when it launched. The Norwegian couple had spent their honeymoon in Ecuador looking for balsa trees in 2003.

20. Construction in progress of the Tangaroa at the navy shipyard at Callao, Peru. The skeleton platform shows the balsa logs, cross beams, bamboo flooring, and cabin prior to laying down the "totora" reed on deck, which had been specially made by Indians living at Lake Titicaca. Sisal hemp was used to tie everything together.

Note the tall wooden guara (centerboard) in the lower right corner of the raft. Skillful use of the guaras—by raising and lowering these boards—enabled the crew to steer the raft against strong winds and currents.

The 30-foot mast for the sail is lying to the left of the raft. Photo: April 13, 2006—two weeks prior to launching the raft.


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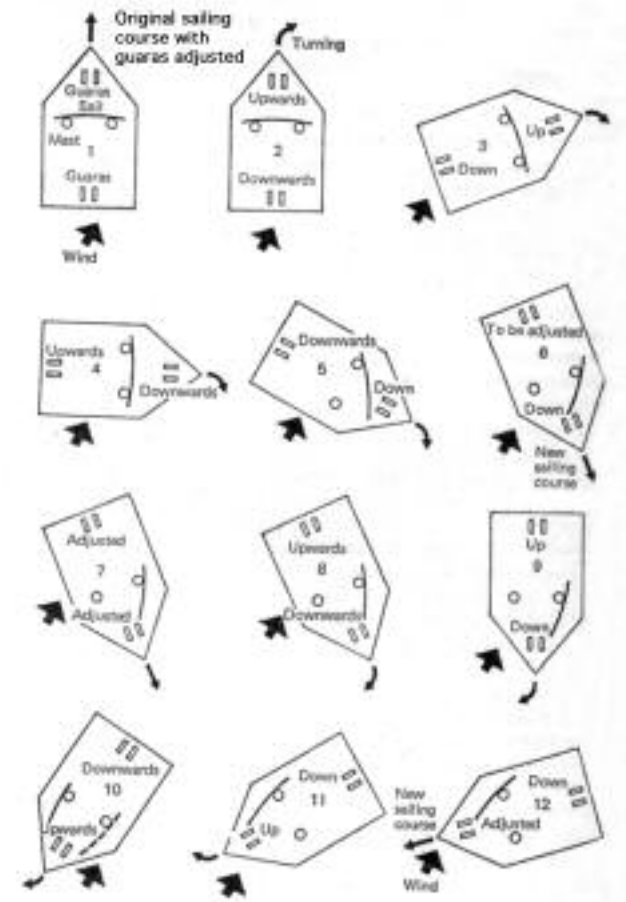
Principles of Guara Navigation



FROM: THOR HEYERDAHL THE EXPLORER BY SNORRE EVENSBERGET, 227.
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PHOTOS

21. Positioning one of the nine "guara" centerboards during construction of the Tangaroa. Each guara was about 4 m (13 ft) long.

22. "Guara" can be raised or lowered according to the currents and prevailing winds to keep the vessel on course. Note the pegs that are used in this process.

23. When Heyerdahl made his 1947 Kon-Tiki voyage, he did not understand the mechanism of "guara" in steering the raft. Kon-Tiki had four "guara" that were "fixed", and which could not be raised or lowered.

It meant that his crew was entirely at the mercy of the winds. Years later (1953), Heyerdahl learned how the "guara" should have been used. The diagrams here illustrate his understanding of how the boards should be raised or lowered under specific wind conditions to stay on the desired course. The Tangaroa (2006) had nine guara, and its crew learned to steer the craft quite effectively, which resulted in cutting down their stay at sea by a substantial number of days.

Illustration: "Early Man and the Ocean: A Search for the Beginnings of Navigation and Seaborne Civilizations," by Thor Heyerdahl, Vintage Books: New York, 1980, page 227.


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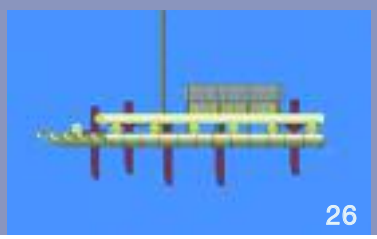
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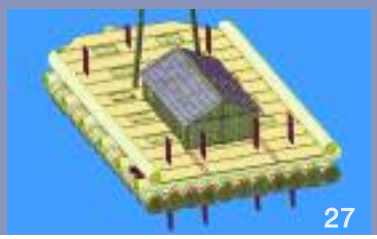
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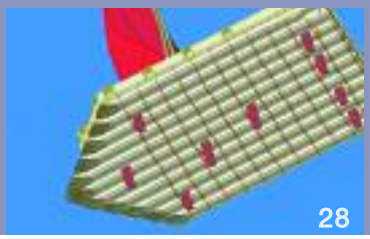
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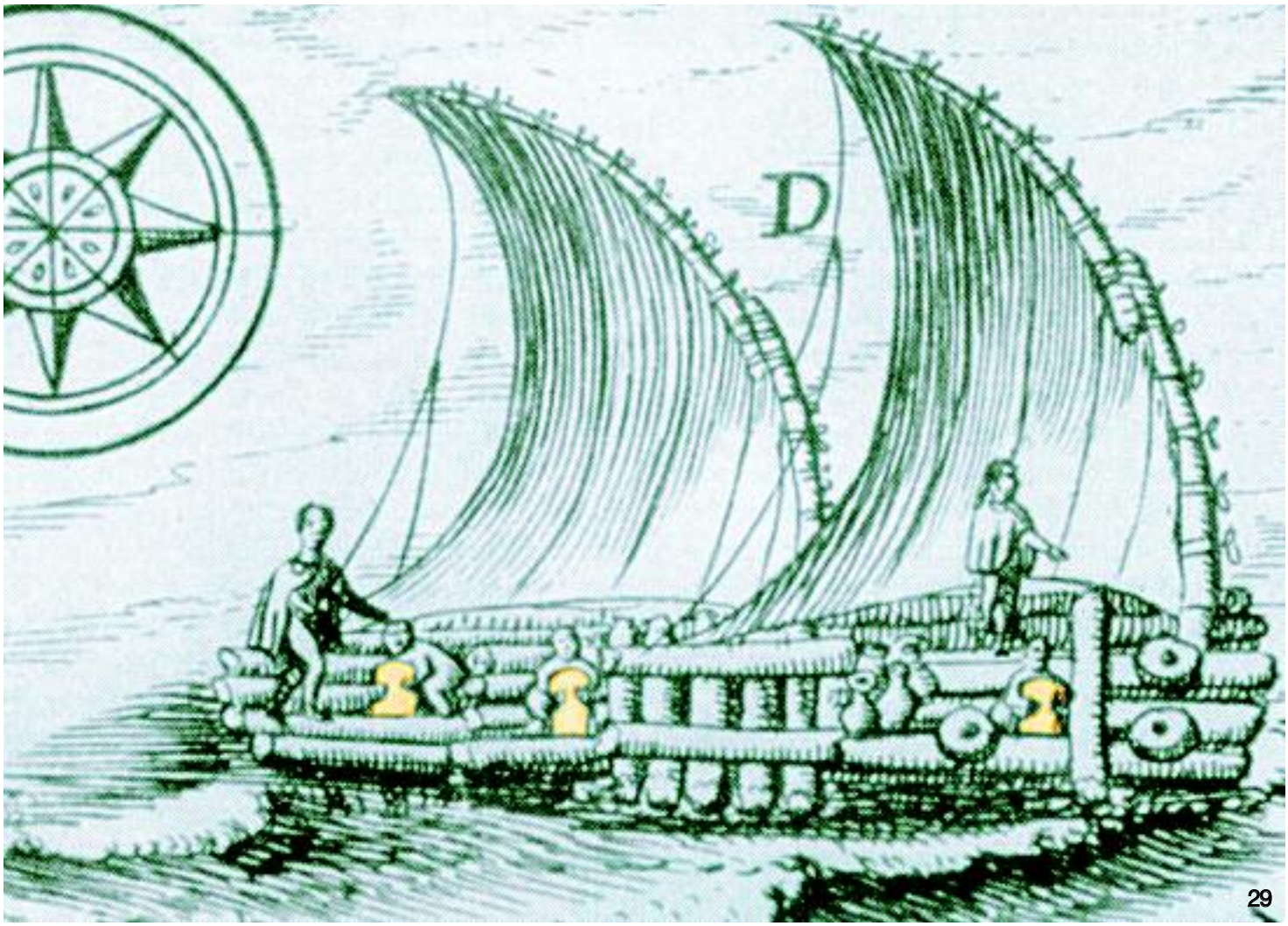

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FROM: THOR HEYERDAHL THE EXPLORER BY SNORRE EVENSBERGET, 119.

24. Ancient Incan navigators (Peru) used to be buried along with their "guara" centerboards, according to archaeological findings by the German scholar Gretzer. Obviously, this speaks to the importance and status of the "guara" in society. This "guara" was based on a design found in a grave.

25-28. Various sketches to show placement of the nine "guara" centerboards on the Tangaroa.

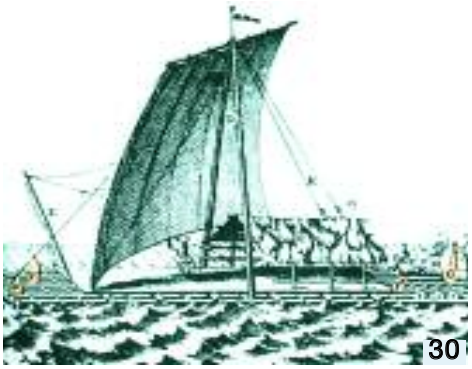
29. A 17th century drawing of a balsa raft under full sail off the coast of Peru. Note the placement of the "guaras" highlighted here in yellow (Photoshop).

30. A drawing dated 1748 by Juan and Ulloa showing a balsa raft from Guayaquil [Ecuador]. Note the "guara" centerboards, again highlighted in yellow here, and the tall guara at the back of the raft, which seems to also double as a rudder. Illustration: "Early Man and the Ocean," page 227.

particularly interested in trying to detect and measure what is often referred to as "hidden pollution". This refers not to oil slicks and such, but rather to the antibiotic and hormone runoff into the oceans, which is leading to aberrations and inability for species to reproduce. We wanted to examine water pollution to determine how it affects the ability of animals and plants to reproduce in the world's largest ocean.

According to Dag Oppen-Berntsen, Tangaroa's Science Officer on land, "Oil usually attracts a great deal of attention since oil slicks are so visible. It's easy to understand that oil spills are detrimental for the environment. But invisible contamination is worse. It can't be detected by the naked eye, yet it also has a serious negative impact on plant and animal life in the sea."

Xenobiotics (man-made molecules) can interfere with normal embryonic development and sexual reproduction in a wide range of invertebrates from fish to man.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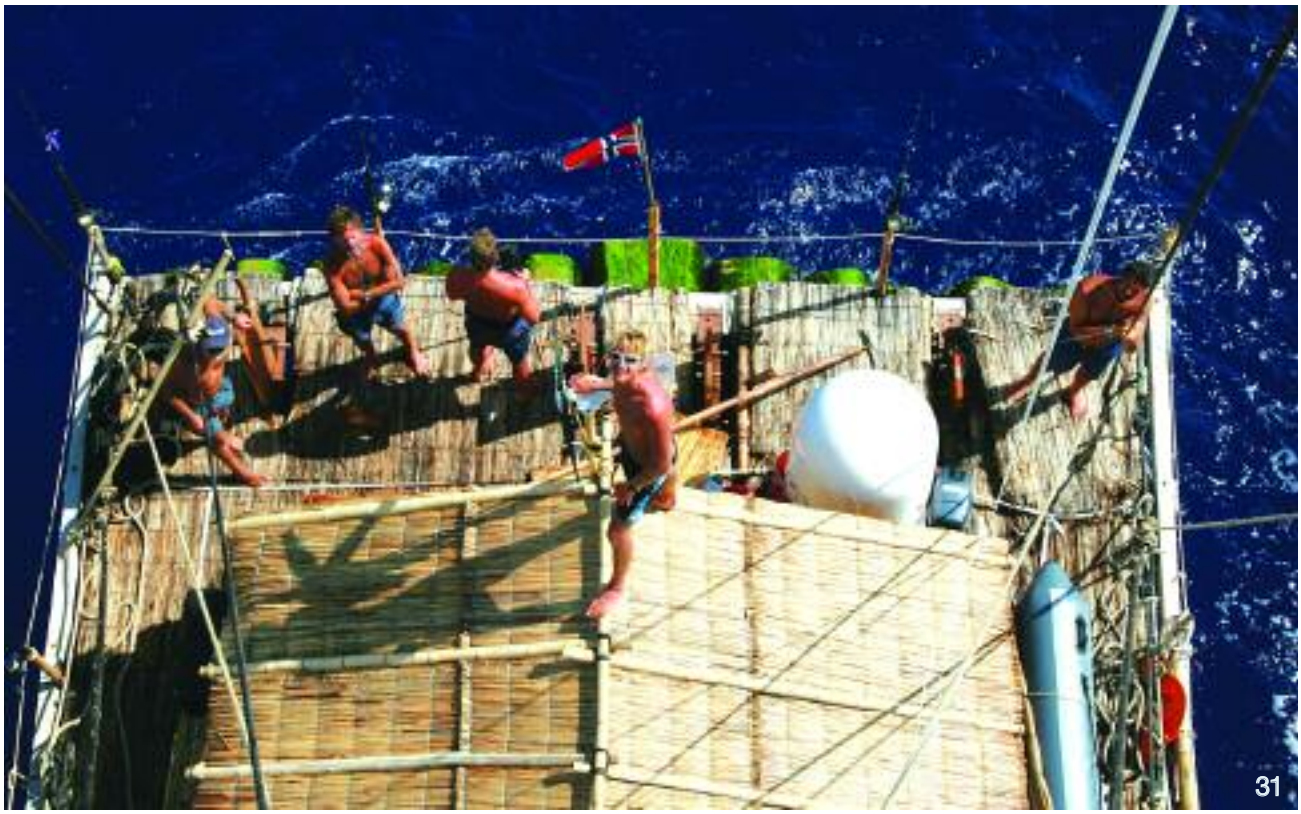
According to Oppen-Berntsen, the Tangaroa had some advantages in collecting data over other types of modern ocean-going research vessels. For example, the Tangaroa raft sailed so much closer to the surface of the water. This gave the crew a chance to sample surface film across the whole transect of the Pacific Ocean.



ANDERS BERG / TANGAROA

View of the Tangaroa at sea and its crew from atop the mast. Olav Heyerdahl, grandson of Thor Heyerdahl, looks up from the cabin roof.

"I don't believe in war as a solution to any kind of conflict, nor do I believe in heroism on the battlefield because I have never seen any. I was in uniform for four years, and I know that heroism doesn't occur from taking orders, but rather from people who through their own willpower and strength are willing to sacrifice their lives for an idea."

—from "Thor Heyerdahl, The Explorer," by Snorre Evensberget. Oslo: J.M. Stenersens, 1994, p. 207

Because the raft moved rather slowly [about the pace of a brisk walk], the crew was able to affix devices under the raft to collect and concentrate lipophilic pesticides and hormone disruptors. This facilitated the replication of the way these organic environmental toxins are bio-accumulated in living aquatic organisms. Again, because of the slow pace of the raft, these samplings could be collected over a time span of weeks, rather than days of faster sea-going vessels.

Therefore, the expedition hopes to produce more knowledge about such "invisible" pollution that will enable scientists to understand more about the marine food chain and find out how this hidden pollution is affecting the life in the ocean. Universities will have to determine if the water samples that we collected contain dangerous molecules—pollution that makes you and me unable to reproduce. We'll have to wait for the results. Meantime, we can try to alert people to a problem that potentially may even be more troubling than Global Warming.

Xenobiotics is cutting-edge science and the Tangaroa is cooperating in this research with various scientific institutions, such as: Biosense (Norway), Veterinary Institute (Norway), University of Zurich (Switzerland), University of Bergen (Norway) and the Institute of Water Investigations (Sweden). Currently, we're waiting to hear from these scientific institutions to learn what their analyses show.

FOOD AND WATER

The Kon-Tiki carried 250 gallons of water. For food, they took 200 coconuts, sweet potatoes, bottle gourds and other assorted fruit and roots. The Quarter-Masters Department of the U.S. Army provided field rations, tinned food, and survival equipment. They also caught plentiful numbers of fish, particularly the species that is known as "flying fish" (Parexocoetus brachypterus), "dolphin" which often go by the name of "Dorado" but

which are also known as “Mahi Mahi” (Coryphaena hippurus), yellowfin tuna and shark.

We, too, ate a lot of “flying fish”. They would often land right on the deck and we would fry and eat them. They tasted like the small trout that one might catch in the icy mountain rivers in Norway.

In addition, they would have been able to carry many tons of water and food, like the dried potatoes from the Andes. Actually, we were able to test the viability of transporting potatoes during the three months we were at sea. Our experiment provides more data to the theories that relate to ancient voyaging and inter-continental contacts.

We carried along potatoes from the Andes, which had been dried by the Indians allegedly in the same way that the Incas had done it centuries ago. Amazingly, those potatoes were still good six months later. Primarily, Heyerdahl and his crew had relied upon field rations from U.S. Navy in 1947 and had supplemented their meals, as did we, with “dolphin” (Dorado) almost every day.

The Tangaroa carried 1700 liters (450 gallons) in 20-liter plastic bottles stashed away between the large balsa logs and the bamboo deck. There was plenty of space in that compartment. Actually, we could have stored about 10 tons there. Sometimes, we used some seawater in our dinner, or when making bread. But it turned out we weren’t really so thirsty and we had plenty of water left when we reached land.

And what did we do with all that plastic? Upon arrival in Tahiti, we met with the Ministry of Environment, and passed along those plastic bottles from our water supply and army rations. It’s amazing how much plastic is used to wrap military rations. The question is: “What does the U.S. Navy do with all their plastic? There must be thousands of tons of it.

CONFIRMATION OF EARLY TRAVEL

Though we didn’t set out on this voyage to prove any specific theory as Heyerdahl had, what we discovered is yet another argument against anyone who thinks the oceans were barriers for non-industrial people. Heyerdahl was convinced that oceans and seas served as communicators for early man. Clearly, he was right.

Also, those who say that people could not navigate the seas using such “primitive” rafts are wrong. Kon-Tiki was not really a good example because Heyerdahl did not use the guara boards the correct way. Tangaroa is a good example, but others can construct even better rafts. Such is the process of science. Little by little, knowledge and accurate information accumulate.

ANDERS BERG / TANGAROA

Torgeir Higraff holding a Snake Mackerel (Gempylus serpent). Sixty years earlier crewmembers on the Kon-Tiki had been startled from their sleep one morning to discover such a creature in one of their beds. The snake mackerel is found worldwide in temperate oceanic waters. It has an elongated, compressed body and grows to about three feet long. Its mouth is large with fang-like teeth. A solitary creature, it feeds on fishes, cephalopods and crustaceans.

In the beginning, Tangaroa was just a dream. But after I convinced myself that the project really was possible, I took it on as a self-assigned mission. I felt it was a duty, more than a dream. I’m convinced that's the reason we succeeded in carrying it out, especially after the year’s delay brought on by the tsunami disaster. I’d have to admit that along the way I discovered more than just the sea.

POTENTIAL PROBLEMS

The Tangaroa was so well prepared that upon looking back, it seems so easy because we had no major problems. We never had to carry out any spectacular emergency situations. We tried to anticipate every possible difficulty before launching into the Pacific—before, we were isolated and alone.

Bjarne was such an experienced sailor. He never allowed us to launch this expedition without being prepared for every imaginable emergency. And I’m sure we avoided numerous problems simply by following his advice. He had vast experience. Many evenings he would tell us: "Trim the sail tonight and we’ll avoid problems." And he was right.

We never took any chances. We tried to prepare for everything, for hundreds of situations that, fortunately, did not happen. Nevertheless, we prepared for them just the same. For example: a simple small infection 2,000 miles from land can turn into a major crisis. We carried medical supplies just like a field hospital in anticipation of such problems.

“Man overboard!” can be a frightening prospect. We equipped the raft with a rubber boat and engine. And we had a rope of 300 meters length hanging from back of the raft. A big yellow plastic buoy was tied to its end. Each night, everyone who had watch duty had to wear life jackets.

In addition, we had outfitted our raft with two lifeboats and six survival jackets from the Norwegian Navy. If we ever found ourselves in an emergency, abandoned and floating in the Pacific, a rescue team would have

ANDERS BERG / TANGAROA

33. Torgeir Higraff, sitting starboard of the cabin just before sunset, writing in his diary, which he kept for the duration of the three-month voyage. "Alone, at sea, surrounded by the voices of nature, the vast ocean became a familiar friend," he says, as the raft rolled over wave after wave.

immediately been alerted to identify our exact position in the water. These suits had been specially designed by the Navy and had special reflector lights sewn into the shoulders which would make a man swimming in the dark waters visible at night. Whenever we felt there was a storm approaching, we all put on these jackets.

"Breaking the Yard" (referring to the wooden beam attached at the top of the sail) can also be a major problem. We carried spare parts just in case we had to build a new one. The same held true for the sail and ropes. As well, our diving equipment, worth about $25,000, enabled us to repair anything that might break underneath the raft.

Suddenly finding a big ship at sea bearing down on us would have been a major problem. Our electronic equipment enabled us to be aware of any ship's presence long before it appeared on the horizon. We had to be concerned about any collision, especially since we were relatively small, moved slowly and weren't so easily visible to others.

At the same time, if we ran into a problem, we needed to have the capability of alerting ships that might be passing. There have been harrowing examples when rafts out in the ocean had no equipment onboard to make other ships aware of them. Ships would pass within a few miles distance while people were dying on deck as was the experience of Tahiti Nui, for example.

OTHER EXPEDITIONS

Tangaroa is not the only vessel that set sail following the illustrious example of Kon-Tiki in 1947. In fact, there have been at least 40 others (rafts, reed boats and canoes) according to Peter Capelotti who researched the topic in his book, "Sea Drift: Rafting Adventures in the Wake of Kon-Tiki". He describes several of these voyages in great detail. Most of these experiments ran into serious problems. Some were so badly conceived that you could even call them irresponsible. The most serious problems dealt with the crew, like when someone fell overboard, got sick, injured or was in danger of dying.

Then there were some crews that had so many bitter arguments among themselves that it jeopardized the voyage. For example, during the last experiment made by John Haslett, one person had been added to the crew whom the organizers really had not spent time getting to know. It turned out to be a very bad decision, despite how adventurous their story made for "exciting" reading.

Haslett also had problems with ship worms ("teredo navalis"). Within three weeks, the raft had been attacked and eaten by these worms that burrowed themselves into the logs.

In my opinion, Vital Alsar's voyage with the "La Balsa" in 1970 was the best one in terms of how the crew coped at sea. Alsar had constructed a

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34. And what did the crew do during their leisure at sea for three months? Captain Bjarne Kravik played the guitar whenever he was in the mood. Øyvin Lauten, the XO (Executive Officer), liked to sing. Anders Berg, the photographer, listened to music. Olav Heyerdahl and Bjarne, also, liked to create things out of wood and leather. Torgeir Higraff read from among the 47 books he had lugged along and he also compiled 300 pages of notes on his laptop. And Roberto Sala washed his clothes.

35. Map route of the Polynesian Islands and the zigzag route that the Tangaroa took between Raroia and Raiatea. The raft was then towed to Tahiti where it was shipped back to Norway.

rather small raft and sailed it between Ecuador and Australia. In comparison to the Tangaroa, La Balsa was a small and extremely light raft. This affected the way it rode the waves. Wind and water really beat down on them, while on our larger craft, we slept like angels. The four crew members on La Balsa were really tough guys. A gale blew up and badly battered their small raft, one of the crewmembers lost consciousness. Fortunately, they didn't lose anyone at sea. It was really admirable that they didn't give up.

Life on a rather large-sized raft can be quite relaxed and predictable, even amidst gales and storms. Size really does matter. I would never go out on a raft without plenty of food, water and safety equipment. It's too risky.

I tried to reach Alsar while making plans for the Tangaroa, but he's the kind of guy who has no phone, fax or email. After about a month of research, Nacho, a friend of mine from Spain, tracked down one of Alsar's friends, who, in turn, passed my letter to him. I had asked him what I thought were four critical questions. The reply came back: "Good luck!" That was all the advice he ever offered. Very informative! Perhaps, he was a busy man.

Another noble, but risky, experiment was the Tahiti Nui, led by 65-year-old Eric de Bisshop in 1959. At the end of that harrowing long voyage, the exhausted Bisshop collapsed and died. Such expeditions like either "Tahiti Nui" or "La Balsa" are much too risky if you're serious about presenting your project to future generations, not to mention if you love your wife and your family.

Hopefully, the Tangaroa experiment has hopefully set the standard for safety and communication for future experiments. But it was an expensive project, costing around $800,000, if one takes into account all the tools, equipment, volunteer service and cash that we spent.

Still I would encourage almost any attempt at such expeditions, even from those who can't afford the latest safety equipment or state-of-the art communications, just as long as they try to bring back valuable scientific information, and a good story.

BALSA LOGS

The reed boats that Heyerdahl sailed in the 1970s, 25 years after his Kon-Tiki experiment, were long and narrow. But the balsa raft is a totally different type of vessel. It is heavier, wider and more stable. Tangaroa was made of 11 large balsa logs with diameters between 80-100 cm (32-39 inches). Eight smaller logs served as crossbeams to form a platform on top of them.

At the stern, the raft was 8 m (26 ft) wide, and at the bow, it was 6 m (20 ft) wide. The longest log in the middle measured 17 m (51 ft). Those on the sides were 14 m (45 ft). Together the logs weighed more than 20 tons.

Balsa has unique properties; it is exceptionally light. On my honeymoon with Mona in 2003, we had visited one of the balsa tree plantations in Ecuador. I discovered that alone, I could lift and carry a two-meter section of the log. So in comparison to timber such as pine, balsa is exceptionally light—about one third the density of ordinary timber.

If a conventional sailboat even gets a small puncture in its hull, it will sink. By contrast, a balsa wood raft can lose two thirds of its hull and still keep its crew and cargo afloat.

I'm not sure how much Heyerdahl knew about balsa trees before he chose them for his raft. For example, we don't know if Heyerdahl cut male trees or female trees. I think I've exhausted everything there is to read about balsa trees. Anyone wishing to undertake such a voyage should research the topic themselves.

However, we do know that Heyerdahl's trees were harvested at a time when they were full of sap. Since 1947, the seasons have dramatically shifted and are delayed. When Heyerdahl cut the trees in the beginning of February, the rain had poured for several months. When we cut ours in late January, the rainy season had not actually started.

Heyerdahl did not choose the right season to cut the trees and it turns out that he was wrong in thinking that sap would protect the logs from becoming water-soaked. In fact, they float much better when they're drier.

Research convinced me to cut a ring in the trees and pull back the bark a few inches before the rainy season started. This would prevent the sap from rising in the trees from the wet ground. It is actually good to drain the trees of sap as much as possible. We facilitated the drying process by allowing the felled trees to dry without stripping the branches and leaves from the trunk.

The sap in the balsa trunks runs through tiny, almost invisible channels between the larger pores of wood fiber. Thus, when these channels are full of sap, they act as a damper between the pores that produce the hollow sound when you knock on the trunk. Indians can detect the difference between trees simply through sound. The less sap there is, the more resonance! Female trees are lighter than males. You have to know the difference before you set sail and give yourself to the sea. We've lost this basic knowledge in making observations ourselves about nature but it was critical for survival for early man.

ANDERS BERG / TANGAROA

"Boundaries? I've never seen one,
but I hear that they exist in the minds of most people."

—Thor Heyerdahl, explorer, environmentalist, experimental archaeologist and expedition leader of the Kon-Tiki balsa raft (1947) and three other sea-going vessels made of reeds—all based on designs by early sea navigators.

Also, we used a special drill to take sample cores from the trees, which had the largest diameters. This enabled us to determine which trees were the driest and healthiest. As you can see, we used modern technology to assist as much as possible in both the construction and in sailing.

KON-TIKI'S LOGBOOK

Heyerdahl's logbook that he kept on the Kon-Tiki has never been published, but I was able to borrow it from the Kon-Tiki Museum in Oslo and study it. The facts about his trip became clearer, particularly in relationship to his observations about the weather and wildlife. Heyerdahl paid a lot of attention to details. For example, he used to document the number of flying fish they found on deck each morning, the kinds of birds and number of sharks they saw. He would note the size of the "dolphins" (a fish species known as "Dorado" or "Mahi Mahi") that they caught. He also made extensive notes describing how they had prepared for the journey, such as how much food and drinking water they stored on deck before leaving the Peruvian port of Callao.

Now after our expedition, I respect Heyerdahl even more for his ability to describe what he observed floating out there on the ocean. I sometimes found it hard to put into words the natural wonders that I saw, but Heyerdahl had a talent for this—both for observation and expression—like the way he described dolphins chasing after flying fish, or how fauna was growing on the logs beneath the raft, or how the raft was turning into a floating reef itself.

Heyerdahl must have had extraordinary leadership skills as well. Imagine, even though his reed boat the Ra sank (1969), the same team signed up with him to sail Ra II (1970) and also for the Tigris (1977) as well. Now that's impressive!!!

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ALL PHOTOS: ANDERS BERG / TANGAROA

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PHOTOS

36. So many flags were hoisted on the Tangaroa. They represented the nationalities of the crew (Norway, Sweden and Peru) as well as the countries participating in the expedition (Ecuador and French Polynesia). In addition, the community flag of Larvik, Norway, was raised as well.

Larvik is the hometown of Thor Heyerdahl where the raft has since been shipped back so that it will be a major show piece in a museum dedicated to Heyerdahl's legacy that is soon to be built. One more flag—that of the United Nations—also crossed the ocean atop the Tangaroa mast.

37. Islanders on Raiatea honor the Tangaroa crew with orchid leis and oars made by local experts. Here Øyvin Lauten (executive officer) on the Tangaroa honored after nearly three months at sea.

38. Welcome to Tahiti. Island residents wait for the crew to come onshore.

39. A jaunt to the local corner grocery shop at Raroia—first stop after 78 days at sea. The Tangaroa crew stayed on the island for a week, it necessitated some trips to the local grocery story. With clothes, shoes and groceries in hand—bread, butter, eggs and beer—Torgeir returns to the raft. July 10, 2006.

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If Heyerdahl were still with us, I would so much like to ask him about so many details of the Kon-Tiki voyage. For example, I wonder if they really experienced actual "storms" at sea. He called them "storms" in his book, but the logbook never mentioned "storms". Maybe they were "just" gales like we had. Also, I'd like to ask him about life onboard and about relations among the crew.

I think that he would have had questions for us, too. He may have wondered about our use of the guara boards and our larger sail since we arrived 31 days earlier than he did. And I think he would have been curious about the similarities that we had discovered between Viking ship technology and raft technology.

MODERN TECHNOLOGY

As you see, our expedition really wasn't about testing the ability of a sea-going vessel that was an identical replication of circumstances that sailors dealt with 2,000 years earlier. Philosophically, we had no qualms about using modern technology to assist and protect us. We felt that was the best way—to use every possible modern piece of equipment available to ensure our safety.

For example, Jotron Electronics outfitted us with a very expensive computer (radar) system, known as AIS (Automatic Identification System). This equipment made it possible for us to track and identify any ship at sea from several hundred nautical miles' distance. This also gave us access to all data related to any ship that we might pass. Even from a distance, we could determine their size, location, speed, destination and nationality of the registration. Likewise, other ships knew the same things about us. Meeting up with a ship out there in the vast ocean didn't happen very often but we were glad for this equipment. We considered it a valuable safety feature.

We also had GPS (Global Positioning System) and a big satellite dish that connected us to the world. However, such a connection turned out to be very expensive—something we didn't quite realize until we were half way through our journey. Imagine our shock when we received a $20,000 telephone bill! Obviously, we had to drastically limit the time we were spending on the Internet from one hour total each a day to a mere 10 minutes. Being connected to the Internet enabled us to transmit daily updates on our Web page—TANGAROA.no—throughout the voyage. We generated electricity from the six solar panels attached to the cabin roof. Curiously, calling someone on the phone cost only about a dollar a minute which, given the circumstances, was really quite reasonable.

We brought three Macintosh laptop computers onboard, which worked fine despite the salt and humidity. We were used to working with MACs for writing, photo work and video editing. When not in use, we stored the computers in watertight Pelicase cases, which are used for protecting cameras and other sensitive equipment. The manufacturer even boasts that they can protect equipment to depths of 30 feet under water.

In addition, we carried state-of-the art digital cameras, solar panels and wind generators. We also had desalination equipment in case we found ourselves in an emergency situation where we would need to make our own drinking water.

The laptops also had DVD players, and we brought Ipods to listen to music, but, mostly, we were fascinated with watching the waves, the ocean and sky. We never got bored—at least I never did.

The most sophisticated equipment that Heyerdahl had on Kon-Tiki was a short-wave radio that he had used in World War II. He also used a sextant to determine his position. So did we. But we could control the position with the GPS. Early man was so knowledgeable he could navigate by the stars.

In regard to being physically fit for the trip, actually, one's physical shape is not the most determining factor aboard such a raft. However, from my experience as both teacher and trainer, I'm convinced that one's physical shape says a lot about one's mental condition. Actually, all of us were in good physical shape. This was very useful when we had to raise the heavy sails, move the steering keels (guaras) or climb the mast. But life onboard was generally relaxed. Some days passed when we had nothing to do at all. It wasn't like those ocean races in schooners.

Whenever we sensed a storm approaching, we would put our life vests on. You could see the weather rolling in—heavy, dark clouds—usually from the south about half an hour before the storm would hit.

Yes, there were times when we were quite far from help if we would have needed it. At one point, we were 1,000 nautical miles (1,850 km / 1,150 miles) both from Easter Island and from Peru. Despite that, we never felt loneliness. No one ever mentioned to me that they felt lonely.

"To the innocent masses in all industrialized countries, we direct our appeal. We must wake up to the insane reality of our time.... We are all irresponsible, unless we demand from responsible decision makers that modern armaments must no longer be made available to people whose former battle axes and swords our ancestors condemned."

—Excerpt from the Open Letter that Thor Heyerdahl wrote to United Nations' Secretary General Waldheim on April 3, 1978, upon landing on the coast of the Republic of Djibouti, Africa. Heyerdahl and his crew had just survived a five-month oceanic voyage of 4,200-miles only to be denied a place to land because the entire region was engulfed in war. In the end, Heyerdahl decided to torch his reed boat—the Tigris—setting it ablaze as a bonfire for peace, protesting the wars that were raging, fueled by arms sales by the major Western powers and the Soviet Union.

MOONLIGHT

During the first weeks of the voyage, the nights were cloudy, and we had to use flashlights to move around on the deck at night. The lights attracted "flying fish" that sometimes would smack right into us. It would sting because of their speed.

Then during the last half of the journey the sky was clear at night. The stars were so bright and beautiful. It's so difficult to describe such an awesome sight. The planet Jupiter would shine so brilliantly that you could see its reflection in the ocean—like a small moon. And with star map in hand, we could name all of the major stars in the heavens. This made our three-hour watch fly by so quickly. Sometimes, we didn't even want to return to bed. We would just remain outside, gazing up at the stars, hypnotized by the beauty of the night sky. And on nights when there was a full moon, the light shone so brightly that we could read out there in the blackness of the night. The large sail served as a reflector of the moonlight.

We always assigned two crewmembers to stand watch at night, along with one officer—either Bjarne or Øyvin. Another safety precaution. The officers would divide the day between themselves, and the rest of us would take turns assisting.

At night we had to watch out for a number of things. First of all, raising and lowering the guara boards. This would enable us to stay on course no matter which direction the wind blew. As well, we always kept an eye out for those who had to get up and relieve themselves in the middle of the night.

We would also watch for ships—both those that we could see coming over the horizon and also those which would appear on our "radar screen". Finally, it was always the responsibility of night watch to clean up the deck in anticipation of the new day, and to do some fishing and make breakfast.

Basically our working language on the raft was English. But when Roberto (a Peruvian) was not close by, we often lapsed into Norwegian, and Anders, the Swede, would reply in his mother tongue, which we all could understand.

STORMS

We did have to deal with several gales that suddenly whipped up in the middle of the ocean. The waves would swell six to seven meters. Fortunately, the raft


40


41

ALL PHOTOS: ANDERS BERG / TANGAROA

Photos
40-41. In the Polynesia islands, the Tangaroa was towed from the island of Raiatea back to Tahiti. From there, it was shipped to Bremerhaven, Germany (40,000 km) via the carrier Talisman (Wallenius Wilhelmsen).

TANGAROA / ANNE ELY THORENFELDT

The final leg of the journey from Bremerhaven to the southern Norwegian port of Larvik was completed on board the MV Bremer Roland, which belongs to Icelandic carrier Samskip. The Tangaroa arrived back in Norway on November 18, 2006. Plans are being made for the Tangaroa raft to be showcased in the new museum that is being planned for Larvik which is the town where Thor Heyerdahl grew up. The Museum is dedicated to the legacy of Heyerdahl.

"I built my first raft when I was seven years old. I want the seven-year-olds of today to do the same thing. Let them go out and take a good look at this big wondrous world around them. Let them probe deeply into nature—not just to find the right answers but more importantly, to learn to ask the right questions."

—Torgeir Higraff, Leader of Tangaroa Voyage
After completion of the 4,000 mile voyage on a primitive raft from the Peruvian coast to the Polynesian Islands

would always lift up ever so gently above them, and then we would surf down from the top of the wave, picking up speed, accelerating up to about five knots [about 9.25 km or 6 miles per hour] before the wave subsided. That was about twice the speed that our raft usually traveled. This rate would continue for hours and sometimes, even for days. North of Easter Island, we ran into some gale-like winds that lasted for nearly a week, pushing us more than 85 nautical miles per 24 hours [about 157.5 km / 98 miles]. The record speed on Kon-Tiki was 66 nautical miles [about 122 km / 76 miles].

BACK HOME

We're back home now with 10,000 photos in hand, 100 hours of film, and a million ideas. We've often been asked to tell our story in front of a live audience though sometimes they limit us to a 15-minute session to summarize what has actually taken about 10 years to plan for and accomplish.

When it comes to radio and television, we were lucky to get five minutes of coverage and it's very rare to be featured during prime time. And often, we have felt that some journalists are not concerned with the deeper issues that we were trying to convey. Rather, they seemed more interested in learning whether we missed chocolate or not while drifting three months across the Pacific.

Within 24 hours after I had arrived back home in Oslo, someone swore at me because I had a beard and a "laid-back" appearance. Perhaps, they saw me as a threat to others who regulate their lives according to timetables and schedules. I guess I'll have to get used to all this and get shaved and dressed "properly". Back here in civilization, I see too many people who are doing what I'm doing now—sitting in front of a computer, looking at a screen and typing. "Life has become so easy," some say, "all we need to do is to push buttons". There are way too many buttons to push. Instead of meeting people face to face, here I am, sitting in front of a machine which requires me to push buttons.

And where are the people? Always on their way to somewhere else. If they relax somewhere with someone, they prefer talking on a mobile phone with someone more distant.

"Come on!" I shout, "there's a huge world of nature out there—just a few miles outside your door!" Go immerse yourself in the awesomeness of nature. Instead, people are organized in gray cubes of cement, surrounded by the sound of cars, buses, beeps and electronic melodies. For me now, this all seems so depressing and unbearable.

I can't understand why we, members of the human race, want it to be like this. Why do people want to live in big cities? Why do we kill ourselves slowly waiting in queues of cars on bigger and bigger highways?

When someone happens to mention the word "ocean", I get the feeling that they are talking about a friend that I know. It used to be different for me. The ocean was a faceless, vast thing. The same with "currents" and "waves". These concepts are all like family members now.

As a person, I don't know how much I have changed because of the trip. I still have my sea legs, though I probably won't get to use them again for a while. Now I spend more time looking at the sky, at the clouds and stars. My visual awareness is more perceptive and more powerful. I can sense the slightest changes in the weather, whereas before, I couldn't have cared less.

Sometimes when I look back, I think I was so crazy to stand in front of all those people and announce that I wanted to undertake such a project, especially since I had absolutely no experience in tackling such things. To organize an expedition like this for someone like me, who had to start from zero, is impossible if you look at the scope of the whole thing.

It was only possible by breaking it down into many small tasks, and meeting each task head on, saying, "Yes, I will do it, I promise". I didn't allow myself the luxury of saying, "Sorry, no, I have too many problems!"

It was important to be positive with every encounter, meeting anybody who could extend any assistance. Then it was necessary to deliver, again and again and again, until people started to believe, and until they told others to do the same. The effect is synergetic. When many forces are working together towards the same goal, and everybody shares the same reward, you're proud to be a small cog in a big machine—to feel part of a team that is doing something important.

FUTURE

A small, but very talented production company known as Videomaker will be producing a 50-minute documentary film about our voyage. There are plans for both Norwegian and English versions. It should be out later this spring in time to celebrate the 60-year anniversary of Heyerdahl's Kon-Tiki voyage. Major television companies can then purchase the footage.

Like the Kon-Tiki, the Tangaroa raft will be put on display, surrounded by the story of the vision of the man who inspired us. On November 18, 2006, the raft arrived back in Larvik, Norway, the town where this great explorer and experimental archaeologist grew up, thanks to Wallenius-Wilhelmsen Lines. Together with the community, they will absorb the costs. Without a doubt, those 11 balsa logs and eight crossbeams are the most expensive logs in history. Thousands of people have been involved in the preparation process beginning with the choosing the trees in Quevedo, Ecuador, until the raft arrived back in the harbor of Larvik for the museum.

UPON REFLECTION

People always underestimate projects like Tangaroa. Some have told me: "This is not a scientific project," or "This is not a replica of the ancient rafts. You used cranes and machines to construct it."

"What?" I shoot back. "The greatest error among similar archaeological experiments was that the team organizing the project was too small and lacked sufficient resources—both in practical experience and in economical support." We are dealing with extinct knowledge and expertise, so we must compensate by spending more time and investing more labor.

Every single part of the vessel needed to be made by the very best craftsman or artisan that we could find. And every single part had to be made with all the love and care and attention that each person could possible bring to the task.

One of the first lessons we learn when we examine archaeology or history closely is that modern man can never be as brilliant as the original boat builder whose sailing vessel is now extinct. It would be impossible for us to construct a raft like they did. Simply, we really don't know how they did it. That means we have to draw upon every resource possible.

Tangaroa is also about communication. Our job would have been easy if we had made the trip just for the fun of it, without telling others about our experiences. But we want to share our insights as much as possible about how the ancient people were able to steer such a raft across the vast oceans. That's why we had a satellite antenna and a telephone onboard.

Now we want to contribute to the Thor Heyerdahl Center that is being built in Larvik. There we will use modern technology to tell people the story of our past, and to demonstrate what methods we used to explore these questions.

Already articles about the Tangaroa have appeared in about 20 languages. I think many newspapers picked up the news item about our successful arrival in the Polynesian Islands from Associated Press (AP). While en route, we sent a short film to one of the news agencies. Already, it has been shown in as many languages. Even some of our friends in Cyprus saw us on television. I've received letters from people living in mountain villages in Austria, the coastal towns of India and in New Zealand. We also have received letters from

TANGAROA / ANNE ELY THORENFELDT

Almost home. Tangaroa is lifted back on land at Larvik, Norway—seven months after it launched from the shores of Peru. The original raft that Thor Heyerdahl took to the Polynesian Islands in 1947 can be seen in the Kon-Tiki Museum in Osla. Hopefully, it won't be too long before the Tangaroa which took the same route 60 years later will be on display in Larvik.

every continent in the world, proving that we are, indeed, part of the heritage of Thor Heyerdahl—something that we, indeed, are very proud of.

I've now signed a contract for a book that will be published in four Scandinavian languages: Norwegian, Swedish, Danish and Finnish. There's talk about it being printed in English and Spanish editions as well. The first edition of the book is scheduled for October 2007.

Of all the expeditions that I'm aware of, with the exception, perhaps, of governmental projects in aerospace such as the Apollo, I'm convinced that the balsa raft expedition is the one that requires the broadest scope of research in order to accomplish it successfully. Maybe it's a bit arrogant on my part to say so, but consider that a mountaineer needs to know his mountain and his gear. A polar skier needs to understand the nature of ice and his sled.

But the person who dares to undertake a voyage by raft across a vast ocean needs to know the prehistory of continents, the archaeology of the region, modern history, biology and botany of forests, rivers, and oceans, the oceanography and geography of islands and atolls. In addition in this case, we had to persuade four national navies (two recently at war with each other—Ecuador and Peru) and a thousand helpers to join the team. That's why Tangaroa was four years in the making. Fortunately, despite all the burdens and hassles to accomplish this expedition, I can honestly say that I'm not tired of it. Tangaroa's voyage across the Pacific is finished, but I'm convinced our real journey has just begun.

When I was a seven-year-old child, I built my first raft. I'd like to encourage the seven-year-olds of today to do the same thing. Let them go out and take a good look at this big wondrous world around them. Let them probe deeply into nature—not just to find the right answers, but more importantly, to learn to ask the right questions. ■

Read More

About the Tangaroa

Tangaroa Blog in English
TANGAROA.nettblogg.no/english.html

Heyerdahl Institute
HEYERDAHL-INSTITUTE.no/pages/norsk/nyhet_tangaroa.html

Sailing.about.com
Search: Tangaroa
Then click "Tangaroa" in first sentence of their description. This takes you to English version of the main Web site for TANGAROA.no

The Kon-Tiki Museum
KON-TIKI.no