



# OCEAN VOYAGING

## Dangerous atolls

*Landfall on a low-lying South Pacific island tests a couple's navigational skills*

by Clyde L. Lovett

**I**t was night. *Renaissance*, our Southern Cross 31, surged through the dark, shadowy seas and brought us ever closer to the insidious reefs of the Tuamotus. Splashed across a 700-mile-long area from Gambier to Tahiti, these South Pa-

who first came upon the Tuamotus called them the "Low and Dangerous Archipelago," a name that warns us of the challenges we must face when sailing to this ocean paradise.

My wife, Sophie, and I took turns of two to three hours apiece on deck

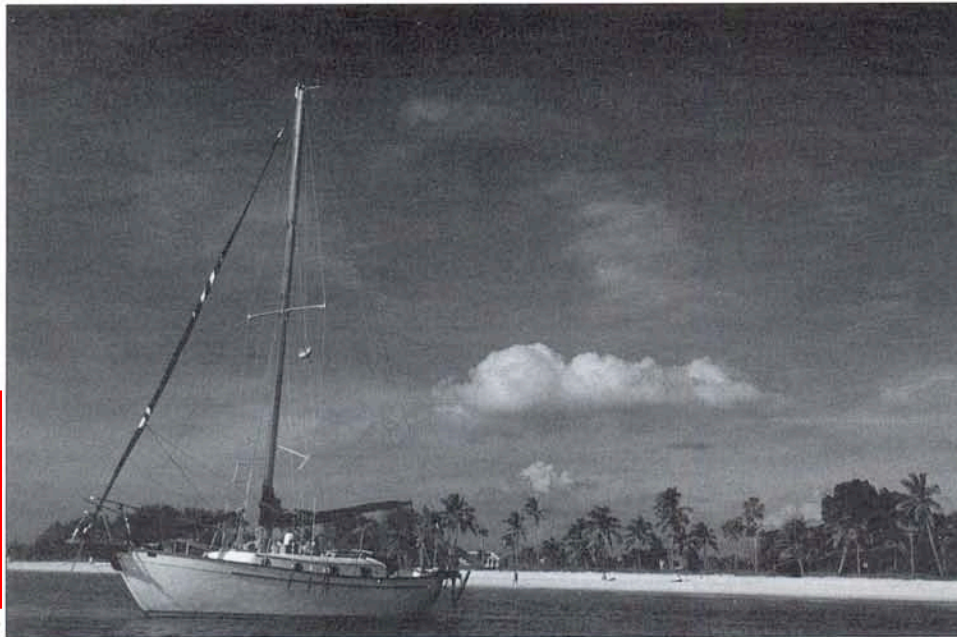
breakers on the reef. If our estimations of the current and leeway were correct, we should be 20 miles from our destination: the atoll named Kauehi. However, if the current had taken a whimsical turn, as we had been warned it might, what we find may be more than shadows in the dark.

In spite of a pleasant 20-knot breeze on our quarter, we took in the jib and sailed by main alone to keep our speed low and avoid arriving in darkness. My sailing mentor, a captain respected for his prudence and diligence, ran onto a reef one night—the reef of the same atoll for which we were now steering.

Since our last port, Ua Pou in the Marquesas, we had been under sail for nearly four days on a 480-mile passage. Because the sun, like the stars, had been hidden in the clouds for most of the time, celestial navigation was impossible. We were forced to rely upon DR and our satnav. As if to test our faith in this gadget, we didn't

receive a fix for more than 12 hours—so we decided to go slowly, watching and waiting.

Usually when approaching land after an ocean passage, we're cautious, but also secure and excited. In the places we've been—the Bahamas, the Caribbean Sea, the Galapagos and the Marquesas—local cur-



The author and his wife Sophie sailed from San Francisco to Australia via the Marquesas and the Tuamotus. Above is their Southern Cross 31 Renaissance at anchor.

cific atolls, the largest group of atolls in the world (the indigenous Polynesian name means "many islands"), are renowned for what many people use as criteria for paradise: white sand beaches shaded with coconut palms and warm, clear water protected from the ocean swells. In spite of the islands' beauty, however, the sailors

watching for any hints of land or reef. The watches were cold and lonely. We sailed without moonlight, beneath a sky whose stars hid in a blanket of clouds. As we searched the horizon, the waves would take the shape of coconut palms; the playful rumble of the sea passing alongside the boat would sound menacing, like

The voyage was from Boston to Australia

rents are predictable and can be figured into our navigational plot. In the Tuamotus, though, the unique undersea shape of the atolls and their tight proximity to each other produces erratic local currents.

#### Volcanic remains

Each Tuamotian atoll is the remaining coral fringe of an ancient and long-since eroded volcanic island. From a bird's eye perspective, atolls look like huge, flat, coconut palm-studded rings with light blue centers of shallow water surrounded by dark blue sea. From the perspective of a fish, the atolls look like vertical coral walls, rising a quarter mile or more from the sea floor. They enclose an area which is typically 30 to 100 miles

crunch and abrupt halt of your vessel, your home; it means your boat being ruthlessly opened by the hard, unyielding coral.

The currents are only one component of the danger. When making a landfall in most places, the first feature to be seen is often a mountain, hill, lighthouse, or the loom of city lights. Kauehi, however, is typical of the Tuamotian atolls and has a maximum elevation of only 12 feet above sea level—barely above the cresting swells. With a population of less than 100, local knowledge substitutes for any buoys or lighthouses. As strangers, we were completely deprived.

The first light of day colored the shadows and added a third dimen-

#### Close to the reef

Our eyes followed the line of breakers which curve in a huge arc and fill in the gaps where the palms end and the submerged reef continues. We sailed nearer, continuing to check the positions of these clumps of trees and land against the chart. Then we found ourselves within a quarter mile; then 100 yards; then only a few crests of ocean swell were between us and the breakers that release the powerful energy of the ocean onto the partially submerged reef.

Our depth finder, rated to 1,000 feet, still hadn't registered a depth. I could throw a stone onto the reef, but because the underwater topography is nearly vertical, a slightly shorter

toss would sink a quarter mile before hitting bottom. In the days of exploration, this characteristic alone would lull mariners to their grave, as the reef would be upon them in the night before any bottom could be measured with a leadline.

To be so close to the large, thundering breakers was exciting. At times I would catch a mist of salt spray on my face. Our proximity also made navigation easier. We saw the breakers as they followed the curve of this 10-mile-diameter

rim, and thus we could distinguish this island from the other clump of trees we spotted earlier. We concluded that we had been seeing two separate atolls.

Although our destination, the village at Kauehi, was only a mile away on the other side of the reef, the only way in and out of the atoll is through a pass on its opposite side. We steered a course between what we believed to be Kauehi and Raraka. If this atoll truly was Kauehi, the appearance of the pass would be the final proof.

Like the atoll itself, no buoys mark the pass, no lighthouses, only a vague sentence from a guide book describing the pass as lying between two clumps of coconut palm-studded land,



Clyde Lovett photo

**Atolls are the eroded tops of submarine volcanoes that provide a location for coral growth. Because they're low-lying, these islands are almost invisible from any distance at sea. They often encompass large lagoons, like Aratika shown above.**

in circumference, or 10 to 30 miles in diameter—the larger ones could enclose Boston and its suburbs.

Because of the close proximity of these huge ocean pillars, the sea bends, twists and accelerates around them. Since these islands stretch in the same general direction as the southeast trade winds, slight changes in wind direction may be enough for the sea to choose a different path, create a new current flow, or a spiraling eddy—unseen and unknown factors which can push you miles off course and make a mockery of even the most careful navigation. In this case, a mockery means suddenly seeing breakers curling onto a submerged reef; it means a sickening

sion of depth to our vision. We estimated our position to be just ten miles from Kauehi. Standing high on the boom, I spotted something: the tops of coconut palms rising over the horizon like a strange, choppy fuzz. Kauehi! Or is it? Thirty degrees to port, another identical clump of trees appears. Is the open space between them an impassable bit of submerged reef between two parts of Kauehi, or is it the deep, navigable gap between Kauehi and its neighbor, Raraka? My heartbeat quickened as I compare lengths and juxtapositions of strips of palm trees and bits of land to those marked on the chart—a task not unlike trying to solve a jigsaw puzzle composed of all blank pieces.



*The author and his wife were sailing for the atoll of Kauehi in the Tuamotus. Because the currents there can be tricky, they wanted to positively identify the island before they attempted to enter the pass.*

one bit of land slightly larger than the other—some description! There are many cuts in the reef through which the sea flows, but at Kauehi, only one is of navigable depth. We knew that if we chose the wrong one we would ourselves become a landmark . . . “five hundred yards beyond the wreck of a 31-foot sailboat.”

### Calculating the tide

As Sophie steered our boat along the outer rim of the atoll, I went below to review the information I had on the pass. The chart shows that as we enter the pass, the depth rises quickly from more than 1,000 feet to 50 feet. Some Tuamotian atolls have passes up to a mile or more in width,

but the pass into Kauehi is only 40 yards wide, and most of the tidal water that flows in and out of the lagoon passes through this point. Because the large volume of water in the lagoon that forces its way out of this narrow gap, the maximum ebb can reach five knots or more—which happens to be the maximum motoring speed of *Renaissance*.

From equations passed on to us by other sailors over the SSB radio a few days before, I used the time of

moonrise to calculate the time of maximum and minimum ebb. There are rarely flood currents at Kauehi because the volume of water that is dumped over the reefs and into the lagoon by the breakers is usually enough to mask the inflowing tide. This accounts, in part, for the strong ebb currents: much of that water has to then flow out through the narrow pass. According to my calculations, our arrival at the pass would be at the time of maximum ebb.

I rejoined Sophie on deck and we climbed up to the spreaders to take a look. We scrutinized every gap and wondered if that opening was the pass for which we were searching. We also hoped that we had not already sailed past it. Then there was the fear that we were sailing around some other atoll similar in description to Kauehi. Finally, without question, we saw it.

From between two clumps of palms, a great river flowed and shot eddies of green water into our field of blue. The glare of the sun on the lagoon inside made the coral in the water hard to see, even with the help of our polarized sunglasses, but it was clear that the edges of the pass were fouled with coral. We looked at each other with apprehension. I took the helm and Sophie moved up to the bow. She would call the shots and describe the dangers. I, on the other hand, would try to keep the boat on the course she described. I started the engine and pushed the throttle down hard to build up speed. We made a large circle and then plunged into the pass.

### Caught by the current

We stopped—caught by the current. Sophie hung on tightly as the bow lifted high and then dove into the square, three- to four-foot standing waves created by the current overfalls. The wind blowing over the lagoon stirred up a chop which added even more turbulence.

Seconds passed like minutes. We were on the end of a string, swaying back and forth towards the edges of the pass. The mainsail tacked itself as we swung from side to side. I worked the tiller to keep us from getting too close. If we had turned broadside to the current we would be swept away in it. We had to maintain a cushion to provide enough of a turning radius to escape if we needed to.

On the edges of the pass, the current was less, but we couldn't afford to tarry there lest we be swept onto the shallow coral banks. Despite the small space, we decided to roll out the genoa with the hope that the added lift from the sail would help us overcome the current. We tacked . . . and tacked . . . and tacked. Sophie returned to the cockpit and joined me in the marathon duel against ruin. Seconds after she trimmed the sheet on one side, we approached the safe navigable limit of the pass and had to tack again. Racing boats have crews of six, ten or more—but we only had each other. Our muscles burned and seemed to lose their power as the exercise was repeated over and over again.

After what seemed like an hour, our efforts paid off: The palm trees began to move astern, the depth dropped to 150 feet and leveled off, and the lagoon opened before us like a pond within an ocean.

The boundaries of land that encircled us were thin lines on the horizon, but as we sailed closer we were reminded that there was more here than ocean, palms and coral sand. Across the iridescent blue of the shallow water, in the shade of the coconut palms, about two dozen tiny square buildings rested along the beach.

We watched the anchor sink through the clear water and set into the white sand 30 feet below. We inflated and launched our rubber dinghy. As we rowed ashore, the village children ran down to the pier to greet us. Not waiting for us to reach



*The author and his wife Sophie are seen here during the course of their Pacific trip on board their boat, Renaissance.*

shore, they jumped into the water and swam out to us. Smiling and playful, shouting exuberant cries of welcome, the children unwittingly soaked us with water. They grabbed onto the side of the dinghy and a half dozen

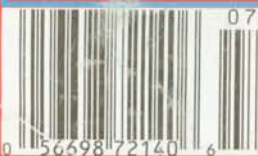
pair of kicking feet moved us to their village. ■

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# Ocean Navigator

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