

TARAVANA
by E.R. Cross

There was a quiet before dawn beauty to the village of Tupapati on the western shore of Hikueru lagoon in the Central Tuamotus. Pareu-clad native women moved about in the light of brightly burning fried coconut husks as they prepared breakfast for their men. While they ate their simple meal the sky to the east paled with approaching dawn. In the dim light along the shore, long, square-sterned outrigger canoes were readied for the coming day's work. Woven baskets tied to long ropes, heavy lead weights on the end of smaller ropes, bamboo tankards filled with drinking water, and meager lunches wrapped in green leaves were placed in the canoes. The sun was up but still low behind the coconut palms on the eastern islands and the only sound was the muted rumble of the surf on the bleached coral reef. Suddenly thunder without lightning rolled across the lagoon as a thousand outboard engines on the sterns of as many outriggers roared into life. The first day of the pearling season had begun for the pearl divers in Hikueru, the richest and deadliest pearl lagoon in the South Pacific.

The pearl divers of the Tuamotus are skin divers. They use no breathing apparatus and no air supply for their underwater work. Consequently they have no fear of the bends, of air embolism, or of oxygen poisoning. The dread disease of the skin diving pearl divers is "taravana." It is the same disease that killed or crippled sponge divers of ancient Greece, pearl divers of old Mexico, and the early Rhodian salvage divers. A disease unknown to the medical profession of the modern world yet familiar to every man, woman, and child of the remote Tuamotu Archipelago.

Translated from Paumotan, the language of the Tuamotus, taravana means to fall (tara) crazily (vana). Many of the divers who fall crazily back into the lagoon as they emerge from a dive are rescued from the water by the tete or helper only to die later in the village. Those who survive may be paralyzed or mentally incompetent days, weeks, and sometimes for the rest of their lives. The symptoms of taravana--vertigo, paralysis, unconsciousness and insanity--provide a temptation to liken this disease or accident to the classical bends of the helmet and lung divers. There is not true similarity and the disease of the skin diver is completely different from the diseases of the divers supplied with air under pressure.

My search for taravana began in 1947 when I heard of a strange disease occurring only in skin diving. Diving was at that time, practiced by only a few hardy individualists. Four years of correspondence with diving authorities from all parts of the world produced more rumors but no specific information.

Reports indicated the divers of Mexico suffered the highest incidence of accidents of any group of underwater workers in the world. But the majority of these men of the sea were not skin divers. They used helmet equipment and scuba.

While at Acapulco I learned that a diver from the South Pacific had been taken to Honolulu for treatment of a strange diving disease. Hoping this would be my lead to the disease of skin divers the *Four Winds* was immediately made ready for sea. Twenty-three days later, after having sailed across 3,500 miles of stormy seas, we arrived at Honolulu. But too late. The patient, a French research doctor and well known diver from Tahiti, had died after having spent nineteen agonizing days in iron lungs and recompression

chambers. But he lived long enough to prepare a brief report on taravana, the disease of the pearl divers of the Tuamotus.

An hour had passed since the divers had left the shore and headed their canoes to various parts of the seven-mile long lagoon. A small canoe left the beach and was paddled toward the *Four Winds* by an old man who sat proud and erect in the stern. He was Tahauri Hutihuti from the Island of Takapota, a pearl producing atoll northwest of Hikueru Tahauri, and the rest of the able-bodied divers of his clan, came each year to Hikueru during the pearling season.

“Ioarana,” he shouted as he deftly brought the canoe alongside. “We go now?”

I replied with the English equivalent to his Paumotan good morning and dropped lightly into the bow of their small outrigger. With a nod of his craggy head and a grin spread over his broad face Tahauri handed me a paddle and turned the bow of the canoe toward the narrow boat pass leading into the lagoon.

In the pass the breakers were only slightly less awesome than along the foaming reef. Tahauri rested on his paddle watching the pattern of the breakers for a few minutes. Suddenly he grunted something in Paumotan and began stroking powerfully. The small outrigger moved forward and we shot through the pass on the crest of a charging wave that didn't quite become a foaming breaker as all the others had. A sharp turn to the right around a small palm-tree covered islet and we were in the calm lagoon. Waiting for us was Turoa in a large pearling canoe equipped with an outboard engine. We anchored the small outrigger and transferred to the large canoe. With this we could cruise the lagoon watching the divers at work, or speed quickly to the scene of an accident.

Hundreds of pearling canoes could be seen scattered over the surface of the lagoon, some still plunging through the water at top speed. A large group of canoes was bunched together along the southern shore. From a distance they seemed to form a solid line in front of the palm trees. Turoa started our outboard and headed the canoe across the lagoon toward the larger group. When we were near the diving canoes I could see they were anchored several yards apart. Totes were lowering rope baskets into the water until the baskets were three feet from the bottom. The rope leading to the basket was tied to a cleat on the side of the canoe. The diver pulls himself back to the surface by this rope. Smaller ropes to which were tied 12-pound lead weights were carefully coiled in the bottom of the canoes.

“Today very bad,” Turoa remarked. “Good weather, much shell.” Tahauri explained this apparent contradiction. “Much nou nou parau. Many accidents.”

They didn't have to explain to me that nou nou parau means pearl shell insanity. That divers working in a rich lagoon under ideal conditions go crazy with greed and dive until the shell is gone or until taravana strikes.

As the divers undressed and prepared for diving they began a period of deep breathing. Their forceful exhalations were accompanied by harsh whistling and a monotonous and strident chant. Sharp and singing this chant filled the lagoon with a feeling of tense yet joyous life. The chant, a form of hyperventilation, was continued for several minutes. I watched a young diver in an outrigger off the bow of our canoe. As he chanted he put a strong white glove on his right hand then gravely slid over the side of the canoe into the water, fully aware of the dangers he must face. With one hand he held on to the iato, the principal crosspiece between the canoe and the outrigger. He adjusted the small goggles to his eyes. The tempo of his chanting accelerated and while he was

still chanting the *tete* placed the lead weight in the water near the diver who grasped the weight between his feet. quickly he came out of the water to his waist, inhaled deeply and dropped out of sight with hardly a ripple left on the surface of the lagoon. His rate of descent was controlled by the *tete* who payed out the small rope allowing the lead weight to carry the diver to the bottom, 120 feet below, in thirty seconds.

For the next four hours Turoa guided the outrigger back and forth across the lagoon. Wherever we went divers could be seen and heard as they surfaced, rested, chanted, and plunged again to the bottom. Some of the divers were working in water no deeper than 20 feet. Others made repeated dives to depths of 140 feet. Most of the pearlers remained underwater no longer than one minute and forty seconds. Occasionally a man would remain submerged for more than two minutes. A diver who found pearl shell would give a gleeful whistling exhalation when he surfaced. Then the *tete* would raise the basket and the lead weight. When no shell was found the diver exhaled with a snort audibly denoting his disgust. In either case he immediately began deep exhalations accompanied by the strident whistling chant.

On the eastern side of the lagoon great breakers driven by strong trade winds were rolling across the coral reef into the lagoon. One of the many divers working this area was Temoana Gatata. Temoana was also from Takapota. He had been diving pearl for more than fifteen years. Now at thirty-two he was in his prime as a diver, sometimes making 60 dives a day. Today he had found a rich pearl bed in 130 feet of water and had nearly filled his canoe with shell. He shot out of the water to his waist when he came up from the blue depths of the lagoon. Water poured from his thick black hair and ran down his broad back. The lagoon resounded to his powerful voice as he gave the joyous "whoeee" cry of victory over the depths and of a successful dive. His *tete*, responding to the enthusiasm of Temoana, rapidly hoisted the shell-filled basket into the canoe where it was quickly emptied then lowered to receive more of the rich harvest. The singing chant of the big diver continued for a few minutes as he rested from his great diving efforts. Then he plunged into the lagoon.

Again he came to the surface, but this time with no cry of victory. Instead there was a dazed look on his face as he reached feebly for the side of the outrigger. He missed and his limp body fell silently back into the lagoon and disappeared beneath the surface of the water.

Taravana had struck!

With a sharp cry for help and with a scramble of legs and arms the *tete* went over the side of the outrigger. Almost immediately he was back on the surface near the side of our canoe. The unconscious Temoana was pulled aboard and the outboard engine on our outrigger roared at full speed as we headed toward the village followed closely by the canoe of Temoana. But our haste was in vain. Temoana died during the wild ride across the lagoon.

When a pearling canoe returns to the village the family of the diver rushes to greet their man. As we approached, Tupapati men and women could be seen hurrying toward the landing place. There was anxiety in the faces of Turoa's family when they met the canoe. Relief was mixed with sadness when they learned it was their friend Temoana who had died. The family of Temoana accepted his death in the traditional way of the Paumotan. Sadly but stoically the men of the family, aided by Turoa, took the body from

the canoe. The women began the wailing chant of the dead as the body was carried across the island to the thatched hut that was their home.

Tahauri and I waited for Turoa to return. A few yards off-shore several canoes were at anchor. Divers and tetes were waiting in the canoes. Our canoe, rushing madly in from the lagoon and on to the beach, had created little interest among these men. We were one of twenty canoes pulled up on the sand near the village.

“Why are all these canoes back so early?” I asked Tahauri.

He made a sweeping gesture with his arms to include all the canoes and said, “Much taravana.”

“I want to meet all divers who have had taravana. Can you arrange this?”

The old man nodded. “When Turoa returns we will see the Chief of the village. If he says ‘yes’ then the divers must talk to you.”

Later I talked to the Chief through Turoa who acted as my interpreter. “In the United States there are three million divers who dive as the Paumotan pearl divers do,” I told him. “But they do not know of taravana. Some die or are crippled.” I couldn’t keep the urgency from my voice. I had to talk with the taravana victims.

“Our divers know of taravana,” the old chief replied. “Yet they are sick and some die. Our divers also know the men of Mangareva never have taravana.” Then he added, “It is the nou nou parau that makes our divers have taravana.”

“How many divers have taravana today?”

“Now only twenty-one. More by night. Much nou nou parau.”

The Chief, talking to Turoa, ordered all divers to answer my questions. I thanked the Chief and left his house, wondering how the Mangareva techniques of diving differed from that of the Paumotan divers.

divers working the pearl beds of the Tuamotus are of pure Polynesian ancestry. Their entire life is spent in contact with the sea. They seldom are as tall and the Polynesians of the mountainous islands of Tahiti and the Australs. But they are heavily built and show remarkable muscular development. Like most Polynesians they have a tendency to become fat, some at an early age.

There has always been great imagination and considerable exaggeration about the depths reached by the pearl divers and about the length of time they can remain submerged. At the beginning of the pearling season the divers work in water no deeper than 50 feet. Then as the season progresses they work deeper and deeper until the great divers are working in depths of 25 fathoms; a full 150 feet.

The divers spend five to six hours a day in productive diving. They dive at a rate of 6 to 14 times per hour and each day must withstand from 30 to 50 compressions and decompressions of four to six times normal. Most divers remain submerged no longer than one minute and fifty seconds. An average dive for the divers working Hikueru was one minute and thirty-five seconds, the duration of the dive having no relation to the depth. Their time underwater reaches an astonishing average of one hour and fifteen minutes per day. The adaptability of these men to the rigorous conditions of diving is amazing. Unfortunately the capacity is not unlimited and neglect of the most elementary precautions leads to many symptoms of taravana.

In the Tuamotus pearl diving is usually considered man’s work. But at Hikueru seven women were diving for pearl, usually on shallow, brilliantly colored coral patches a few fathoms beneath the surface. There was one remarkable and locally famous,

exception. She was Mokouri Tuteina, a 35-year-old mother of four children, who spent each day working beneath 140 feet of water. Mokouri has never had taravana but her friend Tavita Bellais, who never worked in more than 35 feet of water, had taravana twice.

The youngest diver to whom I talked was nineteen-year-old Andre Aroiau. Andre had been diving for two years since his father died of taravana. He never worked deeper than 90 feet. Last year he suffered taravana while diving in 45 feet of water. The oldest diver was Tahaua Hutihuti who in his 71 years had spent 31 years diving. His greatest depth was 132 feet of water. He had never had taravana. Among the great divers none are less than twenty. The period of outstanding performance is between the ages of 25 and 35 years. This is also the age group having the greatest frequency of taravana.

By late afternoon a second diver had died of taravana. All divers had returned to Tupapati. Off-shore the canoes were anchored in a solid line, canoe to outrigger, for a half mile on either side of the village. In the canoes divers and tetes were busily cleaning the thousands of shells and searching for pearls. Normally this would be a gay time with shouting and laughing among the divers. Today solemn almost oppressive quiet existed. The tempestuous trade winds were now only light breezes and even the surf was less noisy as the breakers, no longer driven by strong winds, subsided into a gentle murmur. On shore the two dead divers had been carried to the cemetery. In rough boxes their bodies were lowered into shallow graves dug in a sandy knoll overlooking the lagoon. At the graveside women members of the family gouged deep gashes in their faces with sharp sticks as a token of affection for their husbands and brothers. Blood mixed with tears dampened the sandy earth thrown over the crude coffins.

The terrible taravana had taken a heavy toll. A total of forty-seven divers had been stricken. Thirty-four suffered vertigo, nausea, and dizziness. Eleven had come to the surface paralyzed or unconscious and were rescued by the tete. Six of these were partially or completely paralyzed, perhaps permanently; two were mentally affected and would join the group of "people of simple spirit" as they are called in the Tuamotus. And two young men had died. Many fine divers had paid a heavy tribute to nou nou parau, the insane greed for pearl shell.

Here in the Tuamotus most of the distressed divers are rescued. I had been able to talk to them, to ask them questions. By dusk, as Tuhauri and I paddled a small outrigger slowly, silently, through the pass toward the *Four Winds*, I knew the answer to many things.

Taravana is a name; a pleasant sounding name given by Paumotan divers to symptoms of a malady which affects them while diving. But taravana is also a terrible disease that may strike any skin diver in any part of the world.

The symptoms of taravana usually occur toward the end of a fine, warm, calm day in an area of the lagoon rich in pearl shell. Under these conditions nou nou parau grips the diver and he doubles the number of his dives, remaining on the surface only long enough for the tete to raise, empty, and lower the pearl shell basket. The onset of symptoms is severe, quick, and with only slight if any warning. The divers agreed they nearly always had blind spots in their vision that were surrounded by "shooting stars and luminous sparklings." They also agreed that usually these symptoms were too late to alert the diver and to permit him to avoid the sudden onset of other more serious symptoms. The defects of vision were followed rapidly by dizziness, vertigo, and nausea. These manifestations

were frequently so severe the diver could not regain the safety of the canoe without the assistance of the tete. Once in the canoe, the diver sometimes had the sensation the canoe was rapidly turning over and over. The diver was then obliged to lie down, eyes closed, while the canoe rushed him quickly to the village.

A diver who had no more severe symptoms than these considered himself lucky. All too frequently paralysis, sometimes partial, sometimes complete, would strike the diver while he was still in the water, usually at the moment he was trying to hoist himself on the canoe. Then he would become aware one member of his body, or one entire side of his body, became inert and refused all movement. he would fall, limply, crazily, back into the lagoon and had to be rescued by the tete. Unconsciousness, complete and startling in its suddenness, occurred occasionally. Sometimes the tete saw the diver, far below the surface, cease all movement. To the tete it appeared his diver was suspended in space as he slowly floated with the current. it was then the tete must exercise his greatest swimming ability, because prompt rescue was imperative if the life of the diver was to be saved.

Of fifty old taravana victims questioned 42 had ordinary paralysis but recovered after periods ranging from one day to three months. Five suffered serious, permanently crippling paralysis. Two of this group had partial paralysis of the right side and lost the ability to speak. Three divers were affected mentally, apparently permanently. Today eleven more divers joined the ranks of the seriously affected. some would never recover.

Taravana strikes all age groups but is more prevalent in the age of greatest diving activity. In the early years of diving the diver has not developed the ability or stamina that permits diving to an extent that will cause taravana. The older divers appear to have developed a diving style which eliminates the greatest threat of the disease. Taravana occurs as frequently in divers working at shallow depths as in those performing deep diving. It occurs in divers who work only a few seconds more than one minute as often as in those who stay underwater for a full two minutes.

The most likely cause of taravana is lack of oxygen in the blood and tissues of the body. The simple phenomena of anoxia. The effect of this condition on the central nervous system and the brain could account for the many and varied symptoms the disease takes. it would also explain the difference in the duration of the symptoms which vary from several hours to permanent damage. And it might also explain the effect of the only "cure" the native divers have for the disease.

The primary reason for rushing the taravana victim to the village is to permit treatment. The traditional remedy is for the patient to drink as quickly as possible a minimum of one point of the best Tahitian rum. The majority of the old taravana victims praise this remedy. However, many divers feel that if one pint will cure, two or more pints should cure them quicker. And there are those who feign illness so they have an excuse to return to the village and their rum bottle.

The anoxic origin of taravana seems to be confirmed by the complete lack of this disease in the divers who practice the Mangareva technique of diving. The difference between the Tuamotu and the Mangareva technique is startling in its simplicity. The Mangareva divers space their dives about fifteen minutes apart instead of the 4 to 8 minutes practiced by the Paumotan diver. This is the only difference in their diving methods. For fifteen minutes, when diving to nearly the maximum of their breath-holding ability, the Mangareva diver continues his singing chant of hyperventilation in a less

forceful but longer and more efficient way. This simple precaution assures the diver of Mangareva perfect immunity to taravana. The old Paumotan divers knew indeed the rules of wisdom observed by the Mangareva divers, and applied them with profit to prevent the terrible taravana. But the following generations, touched by a compelling urge to “set a record” of pearl shell gathered in a day, neglect these wise precepts and thus deliver themselves unarmed to taravana.

It was dark when Tahauri brought the outrigger along-side the Four Winds lying at anchor off the quiet village of Tupapati. We climbed aboard and let the canoe drift astern on the end of a long rope.

“The island of the terrible taravana,” I mused as I watched the fires winking through the palm trees. This was the end of a two-year, eleven-thousand-mile search for the “unknown cause” of death and sickness to skin divers.

“Divers should never have taravana,” Tahauri started. “It is the nou nou parau.”

Pearl shell insanity! I couldn't help comparing the pearl divers' greed for shell to the diver in California frantically trying to spear a large grouper; and to the four divers who had entered a spearfishing competition meet in Europe, diving again and again until they failed to surface. Tahauri was right. Divers should never have taravana; nor any other diver's disease. But men who venture into the sun-speckled shallows, or who go deeper underwater, are subjected to physical and physiological effects of the fluid world into which they plunge. They must adapt to this unnatural environment and learn to work safely underwater. This is one of the challenges of man's future--to learn to work safely beneath the surface of the water; to explore, to harvest, to build, and to salvage. Then diving can continue to progress as a fascinating sport or as a profitable business.