

Transcription of a tape made at the 25th reunion of people who participated in Midpac (1950) and Capricorn (1952) expeditions by Scripps Institution of Oceanography. The reunion was some time in 1975. The idea of the reunion came from Edward S. Barr of San Diego, who had been on Midpac as a high-school student.

Opening remarks on the tape are by Nelson Fuller, then head of SIO's Public Affairs Office, who read letters and telegrams from participants who were unable to attend the event.

The following is only the reminiscences of that evening by Roger Revelle. (Transcribed by Betty Shor, 29 December 1997, from tape provided by Edward Barr)

Revelle:

Starting with Midpac: You remember there were two ships: the *Horizon* and a ship called the EPCER something or other. The primary characteristic of the EPCER whatever it was, was that it broke down. This was not, so far as I could see, quite an act of God. It had something to do with the crew. Jim Faughn and I on the *Horizon* had all the oil. We managed to get the EPCER so far from San Diego they couldn't get back without refueling. Jim was very careful to measure the amount of fuel we gave them every other day; it was not enough to get to San Diego. We got them all the way to the equator and all the way back to Hawaii on a short

leash. We gave them two or three days of fuel each day — remember, Jim? You were very careful about measuring every drop. When we at least got them to Hawaii, they sent a cable to their wives saying, “We are going to spend the rest of the summer in Pearl Harbor, please join us.” I went to the Commandant of the Navy yard, who was an Admiral, and I told him it was a very important National Science Foundation expedition and it couldn’t be delayed for any reason whatever. Would he please get this EPCER out of the Navy yard as soon as he possibly could? He gave them, instead of the bottom priority, he gave them the top priority. We went on in the *Horizon* to the Mid-Pacific Mountains. Before anyone could believe it, there was the EPCER. They stayed all the rest of the way; I don’t know what happened to their wives. Remember, Ned, we had a group of you camping on the beach, a tropical paradise while the rest of us lived on the ship. This was the kind of a thing you hadn’t expected, to camp on the beach.

That’s about all I remember about Midpac except that in the Mid-Pacific Mountains Ed Hamilton was finding wonderful fossils. Really we felt we were revolutionizing the world because of what we were finding out about the basic mountain range which extended from the Hawaiian Islands west all the way to Wake Island.

On Capricorn — getting back to Midpac for a minute: After we had all been at Bikini for a while, the ship of course had to get home again and

Jeff Frautschy led the expedition home. And that was the first time that anybody realized the nature of the great fracture zones in the Pacific Ocean — the huge cliffs that extended for a thousand miles or so along along the Mendocino escarpment. I remember also on Midpac that Russ Raitt first made his famous aphorism: That day is lost to low-descending sun; please no seismic run.

Coming now to Capricorn, my memories flood back a lot about Capricorn. One of them I remember was on Falcon Island. Falcon Island is and was a disappearing island west of the Tonga Islands. It's an active volcano, and every now and then it explodes and piles up a huge pile of cinders several hundred feet above sea level. Then the waves come and wash it away. Most of the time it's about 20 or 30 feet below sea level. We decided for reasons that I don't remember now that we would investigate Falcon Island, more or less over the dead body of our captain. We went right to the top of this shoal, this island with a shallow bank. As I remember, when we came in to Falcon Island we were rather scared that the depth was too shallow and prepared to back up. Art Maxwell came rushing up to the bridge and said, "We're aground!" What had happened was that the wake of the ship had created an echo which was shallower than the ship itself. Actually the top of the bank was about 20 feet down. But for a moment we thought it would be the end of the expedition right there. Walter [Munk] and several other people dived on Falcon Island; I

remember Walter's mission in life was to measure the temperature of this submerged volcano. He stuck a thermometer into a rock and he happened to look around and there was a shark looking over his shoulder, reading the thermometer along with him. There was nothing really to do but go on reading the temperature. Eventually the shark lost interest and went away, and Walter is still here.

It was very shortly after that that Helen Raitt joined the expedition at Tonga. She had been meeting us at the different ports, and by this time we managed to see that she really belonged to the expedition and us, so she joined us there and went home the rest of the way with us. This was in some way a great first: she was the first woman, so far as I know, that ever took part in a major oceanographic expedition. She wrote a book about it; it began her long love affair with the Tonga Islands, particularly the magical island of Vava'u. Actually I had asked Rachel Carson to come along on the expedition, to write a book about it, and she had planned to do so when at the last minute she couldn't do it. But Helen's book, Exploring the Deep Pacific, is, I think, a worthy surrogate for what Rachel Carson might have written. It centers around memories and nostalgia, wonderful enthusiasm, naivete, and sensibility that Helen's book has — I think still fills us all with good feelings.

It was on that expedition in the Fiji Islands that I realized the difference between the director and the captain. We were exploring a

narrow passage of the Fiji Islands. Larry Davis was the skipper of the ship. He was obviously quite nervous about this, but I insisted on keeping on soundings and really trying to find out what the shape of this narrow gulf was like. Pretty soon it came close to sunset, and I realized that we had gotten ourselves in a very tight spot, and it was only by Larry Davis's skillful navigation and calmness and thoughtfulness that we got out. I'm afraid that I was very much at fault for insisting on staying too long and trying to do too much, in the face of the safety of the ship.

It was on Capricorn that we explored the Tonga Trench, one of the most remarkable features of the earth. I remember very well one of the exciting parts of it was the discovery of Bob Fisher's mountain — a little mountain that rises, if you will, from 35,000 feet to about 1500 feet below the sea surface, so in some ways it is the highest mountain in the world, although Bob never claimed it; he claimed it was rising from the side of the trench so it was only about 26,000 feet.

Tonga Trench — all of you will remember it. We had a new winch and a new wire and a tapered cable. The ordinary cable which is the same diameter all the way down won't hold its own weight when you get beyond about 25,000 feet. The bottom of the Tonga Trench was 35,000 feet. We had a tapered cable, a cable that was big at the top and small at the bottom. We had a new winch that we didn't understand very well, and probably wasn't very well designed. The result was that every now and then the

wire would just snarl, like a fishing reel that would over-run, and the wire would come off the reel and kink and snarl. We had about 25,000 feet of wire out over the Tonga Trench when this happened. I think that was the worst 24 hours of my life. We had to take a [word unclear] to the part of the cable that was over the side, cut the cable, and remove all the snarled parts. [words unclear] It worked, and we didn't lose anybody or anything, but it was a very very bad 24 hours. I still have the shudders when I think about it.

On Capricorn as well as on Midpac we had two ships, and of course we had two watches on each ship. A characteristic thing about people is that they have a team spirit with their competitors. I well remember that on one watch the people on the other watch were always lazy and slow, they always arrived late, they always left early, they never cleaned up. Then somebody would get transferred to the other watch. Then of course it turned out that everybody on your watch arrived late, left early, never cleaned up. This was exacerbated on Capricorn by the fact that we had two ships: *Baird* and *Horizon*. Everybody on the *Baird* thought that everybody on the *Horizon* never did anything right. They had a series of wrong ideas, and of course the same thing was true on the *Horizon*. Those on the *Baird* were a bunch of arbitrary bastards who didn't understand the science or how a combination expedition worked. So finally we traded people from one ship to the other. Those on their previous ship were a bunch of bums

and the people on their new ship were full of virtue. This is one of the great things about a multi-ship, multi-watch expedition.

I remember also walking down the streets of Nufa Lofa, the capital of Tonga on Christmas Eve. There was Win Horton and John Isaacs and me and Gus Arrhenius, two or three other people who were all about 6 feet 2 inches tall — I think Bob Livingston was one of them. Tongans don't get over about 5 feet 6 inches. We were a very impressive, over-powering sight, walking all abreast down the streets of Nufa Lofa. The next morning we all went to church and the Tongans sang Christmas carols and Christmas hymns, and one of the interesting things about them was that they sung in Tongan. And as you might expect — in every other language the words are much longer than they are in English; the English version took up the whole four lines, or whatever the cadence is, and the Tongan versions were just exactly twice as long, in Tongan, as they were in English.

On that expedition Bob Livingston wherever he went took recordings of the songs that the Fijians and the Tongans and the Marquesans and the Tahitians sang. Some of those you've heard tonight; they're still as fresh and wonderful as they were then. When we went through the Marquesas Islands, I remember something rather special. There was an old trader there who had been there for about 40 years, in [town name unclear], and he told a wonderful story. He said that when he

first went there — he sold shoes to the Polynesians, that's hard to believe, but he did — the average shoe size was size 12. By the time we got there, the average shoe size was size 8. What was the possible reason for this? I think the possible reason was a seminal immigration. There had been about five Chinese who lived in the Marquesas, and almost everybody who was then alive, almost the entire population, were the descendants one way or another of these five Chinese. They were seamen with the Micronesian population, and the result was that the Marquesans weren't surviving because of the [word unclear], and one of the other aspects of it was that their feet had gotten very much smaller.

I remember also that one of the places we went to was Palmerston Island. Palmerston Island was one of the most isolated places I can possibly think of. It's in the middle of the South Pacific; ships call there on the average of once every seven or eight years. It was first found by Captain Cook in one of his expeditions in the 1760s, and he surveyed the island. He concluded that there were very strong currents around the island, two-knot currents or more, and that statement by Captain Cook has been repeated in the pilot's book ever since. If you look carefully, you read there that a ship that called there in 1875 couldn't find any currents. There was another ship in the 1900s. We surveyed around the atoll and we found no currents. What had happened clearly was that Captain Cook in his surveys had depended on sextant sights on the atoll, and the only landmarks are



palm trees and it was very easy to mistake one palm tree from another as he went around the atoll. We had the great benefit of a recording echo sound with the result that we could actually make a closure, and there were no currents at all. This for me at least was an enormous satisfaction to be able to do better than Captain Cook, the greatest explorer, greatest navigator who ever lived.

I remember on Palmerston Atoll when we hove to offshore there were three little boats at sea, out of the passage into the open sea. They all came alongside. From the first boat a little brown man wearing a hat, no shirt, and thongs, came up on deck and said, "Hello, I'm Dan; I'm out of the first wife." A few minutes later the second little boat came alongside and another little brown man jumped out and said, "Hello, I'm Charlie, I'm out of the second wife." Pretty soon a third little brown man in a third boat said, "Hello, I'm Will. I'm a third wife." It turned out that Palmerston Atoll had been a completely deserted atoll when it was settled by a man named Ben Marston, an English sailor who brought along three Tahitian women and he had children by all three of them. There were now — there were in 1952, 400 descendants of them — God knows how many there are now. But in 1952 there were 400 descendants of Ben Marston; 75 of them were living on the atoll. Now this was my first experience with the population problem. I'd never really thought about it before. This was kind of a microcosm of the population problem. The limit of the number

that could live on the island was 75. That was the number that they limited their population to. Ben Marston had about 400 descendants, but they pushed everybody else off, to New Zealand, Tonga, Samoa, and to many other places; they were all over the South Pacific. Ordinarily the atoll could easily support four or five hundred people, but after a hurricane, when all the coconut trees were knocked down, and only fish were there for survival, that was the limit to the number they could have. And that was the number that they did have. This is the kind of rational calculation that human beings make if they have a chance to do so, and gives me some hope about the world's population problem.

We could go on for quite a long time, telling sea stories about this expedition. But I'd like to say one other thing. And that is that we were right in at the beginning of one of the great ages of exploration. It's quite obvious now that the 15 or 20 years from 1948 to 1965 were one of the great ages of discovery of the earth, and the things that we found and the things that our expeditions found later — Maurice Ewing and his group, and Teddy Bullard and his group, and some of the people at Woods Hole — between us we've raised the basis for a scientific revolution of the most profound kind that, in some ways perhaps not as important to human beings spiritually or psychologically as the Darwinian revolution, nevertheless intellectually and in terms of a complete change of understanding at least as profound a revolution as the Darwinian revolution

in its nature. We were lucky, of course. There is nothing in this world that could happen without luck. We were lucky to be at the right place at the right time. We were also lucky that we had so many people who were curious and able and interested and excited and willing to try to spend their lives in conditions that weren't often very pleasant, trying to find out what the world was all about.

Finally, let me just end up with one — not exactly a sea story — but to give some flavor of what happened. I remember very well Bill Menard saying after two or three expeditions, “One of the things that I find about these oceanographic expeditions is that every time I get back Giff becomes pregnant.”

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