

Oral History of
Richard Yukio Morita

Interview conducted by Laura Harkewicz

4 December 2006

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ABSTRACT:

Richard Yukio Morita was interviewed in his home on December 4, 2006. Morita was born in Pasadena, California on March 27, 1923. After being interned in the Japanese Relocation Camps during World War II, he served in the US Army (1944-1946) and earned his BS in bacteriology/chemistry from the University of Nebraska (1947). He received a MS in bacteriology from the University of Southern California in 1949. In 1954, he received a PhD in microbiology from Scripps Institution of Oceanography. His doctoral dissertation was titled *Occurrence and Significance of Bacteria in Marine Sediments*. While a graduate student at Scripps, Morita served as a microbiologist on several research cruises including: the MidPac Expedition (1950), the *Galathea* Deep Sea Expedition (1952), and the Transpac Expedition (1953). He worked as a research biologist at Scripps from 1954-1955. He was an assistant professor of biology at the University of Houston from 1955-1958 and an associate professor of microbiology at the University of Nebraska from 1958-1962. In 1962, he became a professor of microbiology and oceanography at Oregon State University (OSU) where he was named professor emeritus in 1989. Over the years he has held a variety of positions in national and international organizations including: program director for Biochemistry, Molecular Biology Section, BMS, National Science Foundation (NSF) (1968-1969); Advisory Committee on Carbon Dioxide (and Microbiology), National Oceanographic and Atmospheric Association (NOAA, 1976); visiting professor, Ocean Research Institute, University of Tokyo (1978); consultant, Battelle Pacific Northwest Laboratory (1979); consultant, Strategic Petroleum Reserve, Lawrence Livermore Laboratory (1979); and scientific advisor, Operation DeepStar, Japan Marine Science and Technology Center, Japan. In 1984, he was given the Milton Harris Award in Basic Research from Oregon State University, College of Science. The interview stressed Morita's experiences as the first Nisei (second generation Japanese, first generation born abroad) oceanographer and microbiologist to hold professional rank in microbiology. We focused on his graduate career as a student of Claude ZoBell at the Scripps Institution of Oceanography. We also discussed his experiences with discrimination, professionally and personally, and his experiences as a professor at Oregon State University.

INTERVIEW HISTORY: The interview took place on a chilly winter morning in the home of Dr. Richard Y. Morita on December 4, 2006. Morita lives in Corvallis, Oregon. We talked for approximately two hours without interruption.

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August 9, 2007



Richard Morita with puffer fish at Bikini Atoll, the Marshall Islands, during Midpac Expedition, 1950.
Scripps Institution of Oceanography Archives, UC San Diego Libraries

INTERVIEW WITH RICHARD Y. MORITA: 4 DECEMBER 2006

Harkewicz: This is Laura Harkewicz. It's December 4, 2006. I'm in Corvallis, Oregon with Dr. Richard Morita. Good morning, Dr. Morita.

Morita: Good morning, and please call me Dick, not Doctor.

Harkewicz: Okay. Thank you, Dick. So as I told you before we got started, we are focusing mostly on Scripps history but I wanted to start out with some questions about your childhood. I know you were born in Pasadena, and grew up there, but can you tell me a little bit about your childhood?

Morita: Oh, it was rough because my upbringing was during the Great Depression of the 1930s, and my father¹ had a business but he was a soft touch. So people would come to him asking for credit to buy groceries and he couldn't refuse. So he was caught in the middle of having to pay the wholesaler and taking the loss. But that was life, and we weren't the only ones having a rough time. Everybody else was. But right after he was just recovering came the evacuation of Japanese-Americans. So we were incarcerated, and around the first of May we went to the Tulare Assembly Center where we were the last to come in. The first people were from around Lompoc, Arroyo Grande, Pismo Beach, and they got stuck in the horse barns that still smelled. And after about three months there we were relocated to the Gila Relocation Center in what they call Rivers, Arizona, which doesn't exist now. But at that time it was the third largest city in Arizona.

Harkewicz: This was 1942, is that correct?

Morita: Forty-two.

Harkewicz: And your parents were first generation Japanese?

Morita: My father was first generation. My father was also a World War I veteran of the US Army.

Harkewicz: Really?

Morita: He was disappointed, but he always remained a patriot. He advocated a lot of things that were unpopular among a lot of people, but that's the way life is. For instance, they were making camouflage netting in the Relocation Center but nobody wanted to do anything. They couldn't get enough help, so he's the one that got the people to get together and got them to working on it. He was also the truant officer for the school system inside the camp.

¹ Dr. Morita's father Jiro Morita (1892-1975) entered the US in 1911 and attended the California Institute of Technology. He served in the US Army during World War I.

Harkewicz: Really?

Morita: He interacted with the second generation to the first generation, because he spoke English extremely well, and he was educated in the US. He actually went to Pasadena High School, and then started Caltech, which was, in those days, known as Throop College. And then he went into the service. And when he came out of the service all the enlisted personnel were supposed to go in for an interview and he was not called in so he asked why. And the reason they gave him was, "Well, no one will take orders from you, especially a white man." So I don't know if that was the main reason he decided to quit school or whether marriage to my mother caused it, or the combination of both. And then everything from there on was, you might say, my background growing up in Pasadena, which was a nice town to grow up in even though there was discrimination. It was very subtle. But the thing I remember most is you were only allowed to go swimming one day a week in the public pool, and that was on Mondays only, because Tuesdays they changed the water. *[Laugh]*

Harkewicz: Oh, gees. Was there a large population of Japanese-Americans in Pasadena?

Morita: Oh, I'd say about a hundred families. The population of Pasadena in those days was about eighty thousand.

Harkewicz: Okay. So, that's not very many.

Morita: Yes. But then, my brother² and I were lucky to find a school to be able to go to. So my brother and I and a fellow named Jay Shintani, and the other one was Roy Deguchi, the four of us left the camp in Rivers, Arizona to go to school. And three of us, except Jay, went to medical school in St. Louis, and the three of us went to school in Lincoln, Nebraska at the University of Nebraska.

Harkewicz: So they let you out of the camp to go to school?

Morita: School.

Harkewicz: How did that happen? I mean, that seems rather unusual.

Morita: Well, the Student Relocation Center helped us get out, but we had to be accepted by a university first. And the University of Nebraska was one of the few big schools that would accept us. It only accepted a hundred at the beginning. But I'm quite sure there was more than a hundred later on.

Harkewicz: I want to hear more about your college education, but I guess I just wondered if you could talk a little bit more briefly about the whole internment experience?

Morita: It wasn't pleasant.

² William Hideo Morita.

Harkewicz: Well, I can imagine it wasn't.

Morita: There was nothing to do. There was no privacy. There wasn't even partitions between the toilets. There were no washing machines so the women had to wash all the clothing by hand. And everybody ate in this big mess hall, depending on how many mess halls per block, and each block had so many barracks. They were military barracks covered with tar paper on the outside. Big holes in it. When the dust came up, it was dusty inside. The only furniture we got were cots.

Harkewicz: I think I read somewhere that your father and you were able to build some furniture, is that correct?

Morita: That's right. My father had the foresight to bring a saw, nails, and a hammer. So, we went scrounging for wood. We made some of the furniture. We made beds for my sisters and my parents, but not for my brother and I because we were pretty sure we were going to leave. And then a coffee table, stools, not big chairs because we didn't have the right lumber. After we got through everybody wanted to borrow the saw and hammer. [*Laugh*]

Harkewicz: I see. So how did that happen, you said you had the foresight to bring a saw? I mean, did they just come one day and say, "Get your stuff together"?

Morita: No. We had about two weeks, and then the only thing you could take was what you could carry.

Harkewicz: Gees.

Morita: So my brother, my father and I carried great big duffle bags while my sisters and my mother carried what they could.

Harkewicz: Hmm. So, let me—I have my little timeline here for you—so you and your brother went to Nebraska in—what was that year? You went into the Army, too, in '44, correct?

Morita: I went in the service. Before I went in the service they had what they called a "loyalty questionnaire." They went through all the camps and then also all those that were on the outside were also required to answer the question. Questions 27 and 28 had to do with loyalty and "Would you be willing to serve?"

Harkewicz: Japanese-Americans on the outside? How did some people get to stay on the outside while others were forced to move inside?

Morita: Well, you had to get permission to go outside.

Harkewicz: I see.

Morita: Otherwise, you were incarcerated. People say, “Well, they were pleasant.” But when I first went to Tulare, machine guns were pointed inward not outward. Everybody wanted to say, “They were protecting us.” I couldn’t see it.

Harkewicz: It’s hard to protect you if the guns pointed at you, right?

Morita: But anyway, they had our addresses. The reason they decided to take us back in the service was simply the fact that—when World War II broke out—there was a big battalion of Japanese-Americans in Hawaii. They went to Fort Snelling. Several times they went through basic. They finally went to Europe, because they needed troops. And so they made a good name for themselves in the battle for Monte Cassino, in the abbey. And so they formed the 442nd. The 442nd came from volunteers out of the assembly centers, or the relocation centers, and from Hawaii, and they did well so they decided they were all subject to draft. Our draft classification changed from enemy alien to draftable. And when that happened, after we signed our loyalty thing, my brother and I both got our induction notices and we went to Fort Leavenworth to be inducted.

Harkewicz: Monte Cassino, that was in Europe?

Morita: Europe. Italy.

Harkewicz: In Italy? Were you in the 442nd yourself?

Morita: Yes, I was in the 442nd, I Company, 2nd platoon and the 2nd squad. The 442nd were joined together. The 100th became the first, second, and third battalion. The turnover rate was over 320 percent.

Harkewicz: Because they were killed?

Morita: Well, they were wounded or killed. And in my company, it was the first to make contact with the lost battalion. That’s before I arrived, and only eight men came off the front line.

Harkewicz: Gees.

Morita: Out of a company of two hundred and something.

Harkewicz: Was that the only Japanese-American battalion?

Morita: No, it was the only Japanese-American regiment. But it has more Congressional Medals of Honor than many divisions had. And it was one-third the size of a division. When I was growing up, the person that gave me a job at the gas station where I heard about December 7th was killed in action. He was later awarded the

Congressional Medal of Honor. A BAR³ man in my platoon also received a Medal of Honor. My platoon sergeant was the most decorated person in the whole outfit. Not because he had high medals of honor but because he'd been wounded so many times, six times. He had the Silver Star and the Bronze Star. All the old timers in the unit were well decorated and even the corpsman had a Silver Star.

Harkewicz: So what was that like to have been locked up in sort of a concentration camp, effectively, and then go and fight for the people that had locked you up? How did you feel about that?

Morita: Well, when duty calls, duty calls, and you go.

Harkewicz: All right. What happened after—I know you went to school. What happened to your family after they were let out of the internment camps?

Morita: My father left approximately a little more than a year before the interment camps closed. The reason he was let out is because he had to help support my sister. One of my sisters, Elsie,⁴ was at Doane College in Nebraska. And then my youngest sister⁵ still had high school and he didn't want her to finish high school in an internment camp. So he took a job as a domestic in Omaha, but the people in Omaha, and my folks, and my youngest sister didn't get along so he found a job in Lincoln. So he came to move to Lincoln, and as soon as my younger sister finished high school there they came back to Pasadena.

Harkewicz: What was it about Nebraska that seemed to be so willing to have . . .

Morita: They were one of the few big schools that would accept second generation Japanese.

Harkewicz: And that's how your parents ended up being there, too?

Morita: Well, they wanted to be close to us. And you have to realize, even in Lincoln there were two other universities, Nebraska Wesleyan and Union College, and they also accepted Japanese. And at Nebraska Wesleyan, my cousin, the only relative I have, she's probably second or third cousin, I don't know which, she went to Nebraska Wesleyan mainly because my brother and I were in Lincoln and her parents got her out of Jerome Relocation Camp. And nearby schools, small ones—also that's why my sister went to Doane College.

Harkewicz: Did they have to apply to get out of the camp, then?

³ Browning Automatic Rifle.

⁴ Elsie Shizuko Osajima.

⁵ Helen Fumiko Matsunaga.

Morita: Oh, yes. You had to apply. You had to have a destination. And you also had to be accepted. The people, later, got permits to go outside to work, and they tried to encourage people to relocate all across the country. But there were a lot of people that couldn't, that were too old or something like that. So my father had to start anew, brand new in terms of thinking about retirement and everything after he got out.

Harkewicz: He lost his business and everything, then?

Morita: Oh, yes.

Harkewicz: Well, I don't want us to get too caught up in the—it was just a fascinating piece of history that I believe we understand very little about and it's important to talk about. So, how did you get into oceanography and how did you come to Scripps?

Morita: Well, when I finished at the University of Nebraska, with my bachelor's degree, I was the only one in the graduating class in microbiology that didn't have a position, or didn't know what they were going to do. So, recognizing that, I decided, well, I'd go home and see what I could dig up. And my roommate was a fellow by the name of William Dye, but he finished his master's before I finished my bachelor's degree, and he was working at the LA County Hospital. I went to see him and he says, "Well, you know, viral techniques are just beginning," and they were working on the infantile paralysis virus. So I said, "Well, at least I can learn some techniques." So I went to see the head man, who was Dr. John Kessel.⁶ He was also chairman of what they used to call "bacteriology" instead of "microbiology" at USC. And he wouldn't let me work for nothing. He said, "I want three letters of recommendation," and I got those and he was impressed. So he put me under the auspices of Dr. Charles Pate, who was a physician who believed in phage therapy.

Harkewicz: Like bacteriophage?

Morita: That's right.

Harkewicz: All right.

Morita: Because if you read Sinclair Lewis's book,⁷ that physician practiced phage therapy. I was helping him and I also learned how to inoculate everything from mice all the way to monkeys intracerebrally. That is, to the brain. I learned a lot of other techniques. Fall semester was about ready to start at USC and I was

⁶ John Flenniken Kessel (1894-1981) was professor and chairman of medical microbiology at the University of Southern California (USC) School of Medicine from 1929 until 1951 and then served at University of California, Los Angeles (UCLA) in the Division of Parasitology and Tropical Medicine in the School of Medicine where he directed the Pacific Tropical Diseases Project.

⁷ Sinclair Lewis, *Arrowsmith* (Harcourt Brace & Co., 1925), a novel about a physician and his medical research. *Arrowsmith* was awarded the Pulitzer Prize in 1926, but Lewis declined it.

called into his office, and he said, “How about registering at USC and I’ll give you a teaching assistantship?” And I thought about it and I said, “But I don’t know anything about USC.” I said, “Well, I’ll visit the place.” And he said, “When would be the appropriate time to do so?” So I made an appointment with him to visit the campus, and I talked to some other students. They were all GIs, too. And the reason he needed help was because there were too many GIs that wanted to take microbiology and there weren’t enough teaching assistants. So, that’s how I got in.

Harkewicz: So, that’s about 1948 or ’47?

Morita: That was ’47.

Harkewicz: Okay.

Morita: I finished in ’49, and I was going to major in virology. The reason that I decided not to is when I took a course in virology I immediately recognized that all the profs were still probing. Nothing was definite in terms of factual information. So, I just got a degree in microbiology and decided I would go on for a PhD, because I had a job offer at Eastside Brewing Company. In those days, wages were low and it was \$275 a month, and I was still getting my GI Bill. So, I said, “Well, if I can get my GI Bill and another teaching assistantship, I’ll be better off in the long run.” So I decided, “Well, I’ll go to Berkeley and see what’s going on.” In those days, all graduate students figured, “Well, go to three different universities for your degrees so you get exposure to more professors.” I went up to Berkeley and one of my classmates at USC was already up there, and she said, “I wouldn’t come here.” And I asked her, “Why?” And she said, “There are seventeen PhD students. Ten have completed all their coursework. Seven have laboratory space, and three are just waiting for lab space to do their thesis. It’s going to take you too long.” So I went back to USC and I told my professors, Dr. Appleman,⁸ Dr. James Bartholomew,⁹ and Dr. Sydney Rittenberg.¹⁰ And Sid said to me, “Well, if that’s the case why don’t you go to Scripps?” Because Rittenberg was ZoBell’s first PhD student. He arranged everything for me to go down to Scripps. I also arranged for letters of recommendation from all three of them to precede me. And Dr. ZoBell¹¹ wrote back and said, “Well, come on down for an interview.” And then he set the time, so I drove down, and I had an interview with him. But I also found out what it was like, because Carl Oppenheimer¹² was

⁸ Milo Don Appleman (1909-), professor of bacteriology at University of Southern California.

⁹ James William Bartholomew (1916-), professor of bacteriology at University of Southern California.

¹⁰ Sydney Charles Rittenberg (1914-1995) got his PhD in microbiology at the University of California in 1941 working under Claude ZoBell at the Scripps Institution of Oceanography. He spent most of his career as a professor of bacteriology first at USC and then at UCLA.

¹¹ Claude Ephraim ZoBell (1904-1989) is called the father of marine microbiology and spent his entire career as a professor of at Scripps Institution of Oceanography from 1932 until his retirement in 1972.

¹² Carl Henry Oppenheimer (1921- 2007) got his PhD in microbiology at the University of California in 1951 working at the Scripps Institution of Oceanography and had an academic career as a professor of microbiology at the University of Texas and other institutions.

already there, and I knew Carl from USC. And Carl said, “This is a good place because we’ve got all kinds of room to work.” I decided I’d come if he’d accept me. And even before I left, he accepted me.

Harkewicz: So he never even interviewed you?

Morita: Oh, yes. But I saw Carl before I saw him.

Harkewicz: I see.

Morita: After the interview, he told me I could come down. I went down in the fall of ’49 and started. I will say one thing, research at Scripps was not very structured, purposely. And it was very hard to make the transition from the LA area to La Jolla, especially at Scripps. Because I caught myself looking out the window all the time. [*Laughter*] Enjoying it.

Harkewicz: Because of the ocean?

Morita: Enjoying the scene and the weather.

Harkewicz: Right.

Morita: Anyway, I decided, “Well, I’d better get down to brass tacks.” And during this time ZoBell says, “Here’s your desk and here’s a lab.” Nothing after that. And then just before Christmas vacation he called me into his office and there sat around the table was not only ZoBell, but also Dr. Denis Fox,¹³ and Dr. Martin Johnson.¹⁴ And all three of them were sitting there, and the first question was, “What have you done research-wise?” And then the second thing was, “Why?”

Harkewicz: Uh oh.

Morita: Well, I’ve always worked in a lab, as an undergraduate, and I had already started a research project, because I had nothing else to do, besides taking class. And I was doing what we called “geomicrobiological prospecting.” So I told them what I was doing and I finished, and they were satisfied, and I said, “By the way, what is my research problem for my PhD?” And no one gave me an answer. They said, “Well, you do what you need to do.” I wasn’t under what Dr. ZoBell called the API Grant, American Petroleum Institute Research Grant.

Harkewicz: You were or you were not?

Morita: I was not. I was one of the two in the southern section of the University of California that had a research assistantship. I don’t know how he got it for me, but he got it. So I was under no obligation to go into anything that dealt with

¹³ Denis Llewellyn Fox (1901-1983), professor of marine biology at Scripps Institution of Oceanography.

¹⁴ Martin Wiggo Johnson (1893-1984), professor of marine biology at Scripps Institution of Oceanography.

petroleum. I was free to do what I wanted to do, and so I started developing a few things, and started to do more reading into the background of everything. They were starting to plan the Mid-Pacific Expedition of 1950. And Dr. ZoBell volunteered me for that project. So I interacted with a lot of geologists during my time there, and that's when I started thinking about doing the microbiology of sediments in the deep sea. When they talk about the deep sea, there's been a lot of work on sediments in the near-shore environment. That is from the shoreline out to the 200-meter mark, before the continental slope goes down steeply. That portion had been looked at in the old literature. But you have to realize, in the old literature there's no methods and materials section. And they say, "Well, I found this. I found that." But how much faith could you put into it? And secondly, the Kullenberg Corer was just developed out of Sweden,¹⁵ which allowed you to take a long core. No one had ever gone real deep into the sediment, so I figured that was a good choice. So I developed a technique to work out at sea. But I will say one thing, it was more difficult on yours' truly working out at sea than with the rest of my colleagues, because there was no room set aside for microbiology. Everybody was running around. So after everybody went to sleep, I had to do the microbiology. [Laugh] Then when everybody got up, I got up, too.

Harkewicz: So you didn't sleep very much when you were out there?

Morita: No. I lost a lot of weight. And that's how I got started in deep sea microbiology.

Harkewicz: All right. I want to talk to you some more about the expeditions, but what I wanted to ask you about was just how it was working with Dr. ZoBell as your teacher and a mentor?

Morita: Oh, it was great, because he never bothered me as long as I put in my quarterly report. He kept up with me, that was the main thing. He figured, like many people at Scripps in those days, the least supervision is the best supervision. You wanted to bring out the best quality of the students from themselves. And as a result, many of my colleagues didn't make it.

Harkewicz: Because they weren't driven enough, somehow or other?

Morita: Well, they weren't inventive enough, and I don't think they read the literature enough. And secondly, they lacked the know-how to do things.

Harkewicz: So you had to be very self-directed?

Morita: Yes. For a master's that's fine. I had no direction for my master's degree, either. When I went to USC they told me about a problem and gave it to me, and the profs never saw what I did until I handed in my thesis. That's the way I've

¹⁵ The Kullenberg piston corer was invented in 1947 by Börje Kullenberg (1906-1991) to enable the Swedish Deep Sea Expedition to collect long samples of undisturbed sediment, up to 24 meters long, from beneath the sea floor. This tool became a staple in sea floor sampling.

always worked. And that's the way I always take care of my students, too, and all of them have done very well, except for one. But we used to be able to write research grants that way. But now they want the research grants structured so much that you follow this experiment, that experiment, the next experiment. It doesn't leave the students any room to use their own ability. NSF said—well, to me the reason they didn't like my proposals anymore was because I didn't write down exact experiments. And secondly, they said, "Well, nobody's interested in pressure anymore." And the third reason was, "You don't fall into the groove." I said, "Well, the best discoveries are not people that follow the crowd." So I gravitated to working in the Arctic. So we had a big Arctic program going on.

Harkewicz: At Oregon State?

Morita: Oregon State.

Harkewicz: Do you think that's because—I know that a lot of the interviewees that I've talked to have talked about how competitive oceanography is, or just science in general has become. Do you think that that's why they seem to want results before you even get started with NSF? Is it because the funds just aren't there anymore?

Morita: Well, I don't know what's changed at NSF. I used to be there. But the way they review grants and the people they get to review them are probably of the new school, where once everything's so orderly, cut and dry. But I just don't operate that way. I've been able to successfully do things without following the crowd. One of my colleagues at OSU used to tell me, he said, "Dick, the trouble with you is you're ahead of everybody." [*Laugh*]

Harkewicz: You're a visionary. Well, back to your time at Scripps and with Dr. ZoBell. I was wondering—you said it was difficult to be in La Jolla, then looking out the window all the time. And I wondered if there was much socializing with Dr. ZoBell or with other . . .

Morita: No, there wasn't much socializing at Scripps at the time. There was more than one reason. When I went there, most of the students were married. Secondly, many of the students were still in the service. And on top of all that, the funds just weren't there. People were barely making it. So there was very little social life among the bachelor's. And when I first went to Scripps there was only twenty-eight of us students. A little later it got larger, the following year. But there wasn't much social life in town, unless you were well to do and could hit the real expensive hotels. So one of the things that you would see most of the students do is come back at night and work. And also on weekends.

Harkewicz: I read somewhere that you had parties with Nat Buchwald,¹⁶ at the house you shared with him?

¹⁶ Nathaniel Avrom Buchwald (1924-). Buchwald enrolled at Scripps in 1950; he completed his PhD in neuroanatomy at the University of Minnesota in 1953.

Morita: There was no place for us to gather, and Nat Buchwald and I were renting a house together. Not a big one. But, nobody had space in their house—and a lot of the people were living in the GI housing on top of the hill. So once a year they would get together and hold a big party. And the fellows that were still in the services would go to their PXs and buy the beer and the hard drinks, and they would have a nice big party once a year. And it was a party. I'm a teetotaler. I was watching it all. I shouldn't say this, but I have to laugh at the antics of some people, [*laugh*] when they had too much. But the local gendarmes didn't bother us. All they did was have a patrol car out in front just to make sure everybody stayed in line. That's how small La Jolla was.

Harkewicz: I see. I see.

Morita: That's why we had the party once a year.

Harkewicz: So you were just observing everything from the outside? That must have been interesting. I've heard that Dr. ZoBell was rather secretive with his work. Did you find that in your interactions with him?

Morita: He didn't share his data because he and Jean¹⁷ would work in the lab by themselves.

Harkewicz: His wife Jean?

Morita: Yes. Jean.

Harkewicz: I see.

Morita: And I knew what they were working on, but the biggest project was dealing with Athabasca tar sands. You know what they are?

Harkewicz: No, not really.

Morita: They are the tar sands that are in Canada, Alberta, in which they're trying to get the oil out. And also in Colorado and Wyoming. Dr. ZoBell discovered what we call thigmotactic bacteria, which have the ability to adhere. Now thigmotactic bacteria are much in the news with pathogenic forms, but he's the one that discovered the ability of microbes to crowd surfaces.

Harkewicz: I see.

Morita: He was trying to get the microbes to crowd the oil off the sand particles.

¹⁷ Jean Switzer ZoBell (1919-) married Claude Ephraim ZoBell in 1945 and worked and traveled with him throughout his career.

- Harkewicz:** In order to extract it?
- Morita:** Yes, and, unfortunately he was never successful. But we never did see that actual data.
- Harkewicz:** Was that unusual?
- Morita:** Actually, I never saw the data of any of the other profs that I worked with.
- Harkewicz:** I see.
- Morita:** Because, the students were doing all the work, and they were supervising and teaching—most of the research done by major professors is really done by their students, or their technicians, or their postdocs. As a prof, I always found myself so busy I didn't have time to go in the lab. Too much reading proposals for various agencies, and too much sightseeing for various agencies, and all the other committee duties that you get nationally as well as internationally, and locally. And so you really didn't have time.
- Harkewicz:** So students doing the work is not unusual anywhere you go, then?
- Morita:** No.
- Harkewicz:** Okay.
- Morita:** At least not in microbiology.
- Harkewicz:** I understand. I know that Dr. ZoBell wasn't very happy about Roger Revelle¹⁸ becoming director of Scripps. Did that affect your relationship between the two men at all?
- Morita:** No. It didn't impact the students. I got to know Roger Revelle quite well, and he's originally from Pasadena, too, I think.
- Harkewicz:** I think you're right.
- Morita:** And if my memory serves me correctly, I used to go on a few trips with him. He used to drive me here and there. I got along well with Roger.
- Harkewicz:** And, that never affected your relationship with Dr. ZoBell?
- Morita:** I think they kept that rather among the faculty themselves.
- Harkewicz:** I see.

¹⁸ Roger Randall Dougan Revelle (1909-1991) was trained as a geologist and oceanographer. He served as director of Scripps Institution of Oceanography from 1950-1964.

Morita: Because I never heard about it.

Harkewicz: You never saw it yourself?

Morita: I never saw it and never heard about it when I was a student. I knew it was going on but none of the students talked about it.

Harkewicz: Okay.

Morita: At least not in ZoBell's lab.

Harkewicz: Okay. What kind of interactions did you have with Roger Revelle, besides him driving you around certain places?

Morita: Oh, he was the expedition leader for Expedition MidPac. So I had a lot of interaction with him that way.

Harkewicz: Wasn't there some beer story or something about MidPac with Roger Revelle?

Morita: Beer story?¹⁹

Harkewicz: Yes, the beer incident—you were keeping the yeast for the beer in the refrigerator?

Morita: Oh, not with him. Most of the students didn't have very much funds, especially to buy beer, some of the students and technicians started brewing their own. But they had no one to take care of the yeast cells. So I got a hold of the yeast cells from a brewery in San Diego and I kept it going. And when they wanted to brew a batch of beer they would let me know a week in advance and then I would culture the yeast cells so they'd have a sufficient active culture to inoculate their "wort" as they called it. You have to realize that they had really no place to brew the beer except their bathtubs. So when one person would brew it in their bathtub they'd used the other guy's facilities to take a bath. [Laughter]

Harkewicz: So you were the yeast grower then?

Morita: Yes. I was the yeast grower.

¹⁹ Dr. Morita reviewed the transcript in August 2008 and wrote, "I also remember what the 'beer incident' was about. It occurred on the R/V *Horizon* during MidPac Expedition. Scripps vessels in those days were kept at the Naval Electronics Lab. However, when we docked in Honolulu, we were in a civilian port and beer could be brought aboard. My microbiological samples were taken out of the refrigerator and replaced by beer. Roger told me that the beer was more important than my samples. He was the boss so I kept quiet. However, I should have told him that there would be no beer without the microbes."

Harkewicz: All right. Were there other people from Scripps that you think you could say had an impact on your career?

Morita: I would say probably others not so much. Of all those that are there it would probably be, the closest would probably be Ed Goldberg.²⁰ Ed Goldberg was a postdoc with Dr. Rakestraw²¹ before he became faculty. And I knew him and his wife before he became faculty, but nevertheless he was on my committee. I would say from him I probably learned curiosity more than anything else.

Harkewicz: I see.

Morita: But straight marine biology, like Dr. Johnson, really didn't interest me. And so I, since I had enough biochemistry before I went to Scripps, I interacted with some of the people at the Scripps Clinic. I started to bring physiology and biochemistry to marine microbiology. And let me say this, it didn't go over easy. Because a few editors just told me, after I really got started, they didn't want to see any of my manuscripts anymore because it didn't belong to the marine environment in terms of biology. They couldn't see far enough ahead. But now it's practically all there. Now we're in genomics.

Harkewicz: So they just didn't see the connection?

Morita: Oh, they didn't see the connection. They weren't broad enough in order to see the light.

Harkewicz: I see.

Morita: I started doing some of that when I was at Scripps, when I was finishing up, and I used to do work on pressure affects and previous pressure affects on microbial cells and then analyze the biochemical reactions.

Harkewicz: You were talking about some of your experiences on expeditions, and I was wondering if there were any specific memories you had that you would want to share with us?

Morita: Well, Transpac—well, let's go back to MidPac²² first. MidPac was a lot of work and everybody worked, and I lost a lot of weight, I have to admit, but I wasn't the only one. But the thing that used to get me more than anything else was that towards the end of every leg, before we hit port, the meals would get pretty bad

²⁰ Edward Davidow Goldberg (1921-2008) got his doctorate in chemistry at the University of Chicago in 1949 and then joined the faculty of the Scripps Institution of Oceanography teaching marine chemistry and geochemistry.

²¹ Norris Watson Rakestraw (1895-1982) joined Scripps Institution of Oceanography as professor of marine chemistry in 1947 and headed the graduate department at Scripps.

²² The joint Scripps Institution of Oceanography-US Navy Electronics Laboratory MidPacific expedition on R/V *Horizon* and the Navy ship *EPC(ER) 857* was a three month expedition to the Eastern Tropical Pacific in 1950-1951.

because there wasn't anything left, for the chef to cook with. But it was an experience and I got to learn quite a bit about geology.

Harkewicz: You mentioned that the geologists were always running around. Did you have opportunities to interact with them directly, then?

Morita: As a matter of fact, I interacted with geologists all the time I was at Scripps, including Jeff Frautschy.²³ I would say I got to know some of the geologists, like Ken Emery²⁴ out at USC. Bob Dietz.²⁵ I picked up a little geology at that time. So working with sediments didn't bother me one way or the other.

Harkewicz: Do you think that directly impacted your career or how your research went?

Morita: Yes, when I was at Scripps. But I left what we called "geomicrobiology" when I came to Oregon State University. Because I went strictly into biochemistry and physiology as it is affected by low temperatures and high pressures. I don't know if I mentioned it in my whatchamacallit,²⁶ but I also discovered what we call "psychrophiles," cold-loving bacteria. It was a major find, but no one would believe me.

Harkewicz: I want to talk about that too, but . . .

Morita: But that was here. But at Scripps, the *Galathea* Expedition,²⁷ I don't know why I was selected eventually to go. Because Carl, I thought, was supposed to go originally, but he didn't make it.

Harkewicz: Carl Oppenheimer?

Morita: Yes. And Dr. ZoBell sent me, of which I am glad because I made acquaintance with a lot of Danish people. But I only hit one trench, and I did the work on that trench. But the thing that amazed me is how much life there was down there, macroforms, especially sea cucumbers. And some of those organisms that they recovered I wanted to really dissect apart and look at the intestinal tracts, and so forth, but that was sacrilegious with them. So all I did was keep working on sediments that were dredged up. That trip was mainly one of leisure because after we worked the Kermadec-Tonga Trench it was just sailing back from New Zealand, all the way back to San Diego. So I enjoyed myself, and everybody else

²³ Jeffery Dean Frautschy (1919-1983) was a marine geologist and assistant director of Scripps Institution of Oceanography.

²⁴ Kenneth Orris Emery (1914-1998), professor of oceanography at USC and later at Woods Hole Oceanographic Institution.

²⁵ Robert Sinclair Dietz (1914-1995), geologist at Scripps Institution of Oceanography and at the Naval Electronics Laboratory in San Diego.

²⁶ Morita had sent the interviewer a short biography and CV to review prior to the interview. These materials are available at the Scripps archives in the Biographical Information Files for Richard Morita.

²⁷ The Danish Deep Sea Expedition of 1950-1952 is also called *Galathea* Expedition. Claude ZoBell and Richard Morita were on the expedition and wrote a chapter on deep sea bacteria in the official report of the expedition.

did, but I have to admit when I first got on the island of Tonga, I was amazed to see what was going on. Because health facilities weren't very good. And the native girls thought it was an honor to have a half-caste child. We lost a couple of crew members.

Harkewicz: Really?

Morita: They didn't return to the ship. It was the first time I ever saw a three-legged horse, an actual one, born that way. And it was the first time I saw my first case of elephantitis. We were on Tonga Island for a few days, which was enjoyable because I had a chance to talk with quite a few of the natives. I still have my tapa cloth from that area. Then, from Tonga we shipped out and we were heading for Honolulu, but we had a couple of stowaways on board.

Harkewicz: Native stowaways?

Morita: Yup. And so they let them off at the closest island they could come to, which is out of the path of many ships. And they finally got rid of them. I don't know if they ever made it back to their Tonga or not.

Harkewicz: Were they women or men?

Morita: They were men, young boys.

Harkewicz: Children?

Morita: Children, yes.

Harkewicz: And they just left them on an island somewhere?

Morita: Between Tonga and Hawaii we lost one crew member. He was probably sleeping on deck and rolled over. We spent a good day searching for him, but they never found him.

Harkewicz: Gees.

Morita: And then when we got into Hawaii they had a big reception for us and that's when I tried to pull an April Fool's joke on the kids back in the lab.

Harkewicz: I think I have that. I have the picture here. Tell us about this.

Morita: Yes. Well, a photographer took this.

Harkewicz: It's a picture of you with a Hawaiian woman, right?

- Morita:** A Hawaiian girl, and she put a lei on me. So I got the ship's captain to write a note to Dr. ZoBell telling him I'd got married to her. [*Laugh*] And sent him the picture. Did this come out of Dr. ZoBell's library?
- Harkewicz:** Yes. It came out of Dr. ZoBell's papers. Did anybody believe you?
- Morita:** Everybody said I didn't, everybody except Don Lear²⁸ said I did not, and Don Lear lost the bet.
- Harkewicz:** So they put bets on whether or not you had actually married this woman? I actually have a couple of other things that I wanted to ask you about. There are these caricatures that a zoologist from New Zealand had drawn of you? There's one with you with the—let's see, I have to describe it.
- Morita:** This is Vilstrup.²⁹
- Harkewicz:** There's one with you with the devil trying to tempt you to have a drink of Karlsberg beer?
- Morita:** That's right.
- Harkewicz:** And then there's this other one here which shows you smoking a cigar and playing cards, and thinking about a woman, and it's supposed to be the antithesis of what you're really like. Do you remember seeing these?
- Morita:** Oh, yes. This is Dr. Powell,³⁰ and he's at the Auckland Museum. But as I said I was a teetotaler.
- Harkewicz:** So what did you think about that? Them poking fun at you?
- Morita:** Oh, it didn't bother me. It didn't bother me one bit. Dr. Vilstrup was a heavy drinker. He was an ichthyologist. He was an expert on sharks, especially the shark's jaw. He was actually an M.D., but he also had a PhD. He and I got along real well, even though our philosophies differed.
- Harkewicz:** Dr. Vilstrup? And he was from where?
- Morita:** Denmark.
- Harkewicz:** Denmark? Okay.
- Morita:** Yeah. I went to see him on one of my trips to Europe.

²⁸ Donald Woodward Lear (1928-1996), M.S. 1957 in oceanography at Scripps Institution of Oceanography and PhD 1965 in microbiology from the University of Rhode Island.

²⁹ Dr. Thure Vilstrup, Danish ichthyologist.

³⁰ Arthur William Baden Powell (1901-1987), New Zealand conchologist and paleontologist.

Harkewicz: Was this kind of thing common? Did other people have caricatures drawn of themselves or was that unusual?

Morita: Well, no, Dr. Powell was doing this with everybody. But, I didn't even know Dr. ZoBell had these in his file. He collected everything.

Harkewicz: I guess so. Did that happen a lot on board these expeditions, this kind playing around with each other?

Morita: No, everybody was too busy.

Harkewicz: Oh, all right.

Morita: But Dr. Powell was a guest aboard the ship, so he didn't have much to do.

Harkewicz: I see. What about this photograph that you had with the Hawaiian woman, what prompted you to do that?

Morita: Because we landed on April Fool's Day.

Harkewicz: Oh, all right.

Morita: And that's where I met Dave Contois.³¹ Dave was finishing up his master's degree and looking for someplace else to go for a PhD. So I kept that in mind, and told Dr. ZoBell about him. And after all the paperwork was finished, he accepted Dave. Dave was another story in itself, and he went off on a different tangent than most microbiologists would do because ZoBell let him have free rein in terms of no structured research. He probably got his most influence from Carl Eckart. He developed a mathematical theory on what we call "a gross pattern" for microbes. And as I understand it, Ed Goldberg didn't quite follow it. So he sent the thesis to his close friend at the University of Chicago by the name of Dr. Novak,³² who was quite a well-known microbiologist. And Novak himself said, "It's wrong." But I don't think Novak really realized who was really behind the mathematics of it, and that was Carl Eckart. So Dave went to Chicago and proved Novak wrong right in his own lab. [*Laugh*]

Harkewicz: And do you know what Dr. Novak's first name is? Do you remember?

Morita: Oh, I forget. I think it might have been Aaron.

Harkewicz: Okay. I will see if I can find that out. So he was proved wrong in his own lab.

³¹ David Ely Contois (1928-1988) was professor of microbiology at the University of Hawaii from 1958-1988, and chair of the Department of Microbiology from 1962-1964.

³² Possibly Milan Vaclav Novak (1907-), microbiologist at the University of Illinois College of Medicine in Chicago.

Morita: Yes. And then from Honolulu we came to San Francisco, and there was a big welcoming party, including the US Navy. And I do remember one outstanding thing. They had a reception for everybody on the *Galathea* at the Treasure Island Naval Station. And that's the first time I ever met a high-ranking military officer, five stars. And it was Nimitz.³³

Harkewicz: Really?

Morita: I was introduced to him and I was quite taken back at being introduced to such a high ranking person. Because the only person I was ever introduced to in the high ranks was when I was in the hospital in Italy, and a two-star general came in and stopped by to talk to me. He was making the rounds of the hospital. Well anyway, we had the ship open for display, and since I'd been in San Francisco quite a number of times I told the scientific crew members that, "Why don't you all take off and I'll take care of the lab, showing people along." I was showing a group around and there was an elderly lady in this group. And when we finished she said, "Thank you. But you speak awfully good English for a Dane." [Laughter] And then from there we went to the Hopkins Marine Station, and that was the first time I met Mary Belle Allen³⁴ who was quite a well-known microbiologist. And, that's where Dr. Bolin³⁵ got off. And, I had hoped to visit with Dr. van Niel,³⁶ but he wasn't there.

Harkewicz: And where's the Hopkins Marine Center?

Morita: In Pacific Grove, California.

Harkewicz: All right.

Morita: And then from there we went to San Pedro. The reason I didn't learn any Danish was because on board everybody wanted to speak English. They said, "We're going to Hollywood, so we want to speak English." Well, they did go to Hollywood, but they only got to San Pedro. Most of the kids were invited to Hollywood to take a look around. And from there I went to see my relatives and got my car back, and drove down to La Jolla and the ship came down to La Jolla, and they had a reception there.

On my third trip out, on Transpac,³⁷ Warren Wooster³⁸ was still a student. And he was in charge and they had set aside a special room for me to do the microbiology only this time.

³³ Fleet Admiral Chester William Nimitz (1885-1966) lived in San Francisco and was special assistant to the Secretary of the Navy in the Western Sea Frontier at the time of the *Galathea* visit. He also served as a Regent of the University of California from 1948-1956.

³⁴ Mary Belle Allen (1922-), microbiologist at the University of California, Berkeley.

³⁵ Rolf Ling Bolin (1901-1973), ichthyologist at the Stanford University Hopkins Marine Station.

³⁶ Cornelis Bernardus van Niel (1897-1985), microbiologist at the Stanford University Hopkins Marine Station.

³⁷ Scripps Institution of Oceanography Transpac Expedition of 1953 on R/V *Spencer F. Baird*.

Harkewicz: Oh, that's good.

Morita: I decided to do the microbiology of the water column out in the open sea because that hadn't been done very much. But it was probably the worst trip I ever made, in terms of success. Because the first three days out it was so rough out of San Diego that everybody got sick, except one person.

Harkewicz: You?

Morita: No. Min Koide.³⁹ He was the only one that was chipper. Well, we got to Alaska all right, and then from Alaska we went north to the Pribilof Islands, and we got caught in a trough and the ship was in the wrong position. And it was swinging back and forth, and we did a sudden flip. All my glassware went up to the ceiling and broke. We had secured it for sideways but not for going straight up. And, we had a snap roll and all my glassware went up. So that brought my entire project to a halt.

Harkewicz: Oh, no.

Morita: So from there we went to Adak, Alaska, where the Naval base was. And aboard ship we had Noriyuki Nasu.⁴⁰ I don't know if you know the name or not?

Harkewicz: Yes, I recognize it.

Morita: Okay, Nori was from Japan and he got bitten by a dog. Everybody teased him about it and said, "Well, why didn't you run away or do something?" He said, "Well, he didn't realize what was going to happen because the dogs in Japan say, 'wun wun' and not 'bow wow.'" [*Laughter*]

Harkewicz: No bow wow, huh?

Morita: No bow wow. Nori came to Scripps about a year after I started and he was extremely formal, so I more or less took him in hand and got him started. Dr. ZoBell was able to get him the room under Dr. Hubb's place, on the hill, where it was occupied by Dick Vetter⁴¹ before. And before Dick Vetter was Han-Lee Mao.⁴² He was the only foreign student by the time I got there, but I did get to know him. He was from mainland China and he wasn't cleared for secret, so he didn't get a chance to intermingle with a lot of people.

³⁸ Warren Scriver Wooster (1921-), PhD in oceanography 1953 at Scripps Institution of Oceanography.

³⁹ Minoru Koide, research chemist at Scripps Institution of Oceanography.

⁴⁰ Noriyuki Nasu (1924-) is a Japanese biologist. He was a professor at the Ocean Research Institute at the University of Tokyo from 1962-1984, and director of the Institute from 1980-84.

⁴¹ Richard Cortright Vetter (1923-2007), M.S. 1951 in oceanography at Scripps Institution of Oceanography.

⁴² Han-Lee Mao (1919-1988), PhD in physical oceanography 1952 at Scripps Institution of Oceanography.

Harkewicz: Can you explain that? You said, he “wasn’t cleared for secret.”

Morita: Because all of us at Scripps were really cleared for secret. Everybody on board MidPac was cleared for secret.

Harkewicz: So, did you do classified work then when you were out there?

Morita: Well, certain of the data that was processed was kept secret, as I understand it. And, everybody was past it anyway, so I guess as a routine matter that was the procedure.

Harkewicz: Did that affect any of your ability to publish anything?

Morita: No.

Harkewicz: Or use it for your dissertation or anything like that?

Morita: No.

Harkewicz: Okay.

Morita: I think it had to do with the bathymetric charts and topography. Mainly topography. Because navigation wasn’t that good in those days. But Nori did quite well at Scripps.

Harkewicz: Now, was he a graduate student there?

Morita: Oh yes. Nori got his PhD at Scripps in 1955. I have to admit, I have on my CV that I graduated in ’54, but by legal rights, I guess, it should read January ’55. But I think I’m morally correct because I finished my dissertation the spring term of ’54 but I couldn’t get the people from UCLA to come down for the defense of my thesis. Then come summertime, they still wouldn’t come down. So my wife⁴³ wrote a letter. I don’t know what she wrote, but she’s a PhD from UCLA. She wrote them and then they decided to come down in between the summer session and the fall session for my final defense. And as soon as I finished my final defense ZoBell put me on as a postdoc. But I actually assumed that position long before I became a postdoc because after two years at Scripps, Dr. Fred Sisler⁴⁴ resigned and took a job with the federal government. Carl Oppenheimer, theoretically, was supposed to take it, but he took a Fulbright Fellowship to the University of Norway in Oslo where Dr. Somma⁴⁵ was. And so there was nobody else, so I took over the position of taking care of all the lab facilities.

⁴³ Richard Morita married Toshiko Nishihara on March 14, 1953. She had already completed her PhD in zoology at the time of their marriage.

⁴⁴ Frederick David Sisler (1916-1980), research associate in marine microbiology at Scripps Institution from 1948-1951.

⁴⁵ Maria Carmela Somma

Harkewicz: So, you were working as a postdoc when you really hadn't officially gotten your PhD?

Morita: Yes. But anyway, that's how that happened. Anyway, getting back to Nori, Nori lived in the place mainly because he had no transportation or anything, and he was rather new, and had to come back to work at night. And so I talked to Dr. ZoBell and he actually got Nori the place where Dick Vetter was. But social life in La Jolla wasn't much of anything. If you wanted to do anything you'd have to go all the way to San Diego. Actually, being a second-generation Japanese-American, the way was paved for me already at Scripps by someone that used to work there by the name of Hiomi Nakamura.⁴⁶ I think, Hiomi still lives in La Jolla. He's about ninety-three or four now, but he knew Revelle real well, and he knew all the others. He used to work around there all the time. He grew up in La Jolla and so the townspeople had no qualms about my being around. You know, when I was looking for a place to go during the evacuation I was accepted at Bowling Green University in Ohio. It used to be called a college then. But they wrote me a nice letter and said, "Yes, we'll accept you but the townspeople won't let you in."

Harkewicz: Well, that's sad.

Morita: Well anyway, getting back to at Scripps. I might also mention the fact that about Min Koide. Have you ever talked to him?

Harkewicz: No.

Morita: Well, Min and I, the two families knew each other because Min's family was originally from San Diego, but right after the war, they moved to Pasadena. And since my parents and his parents came from the same kin, that is province, in Japan, they got to know each other, and my youngest sister knew his sister quite well, and I interacted with Min a few times, and his younger brother Frank, and his older brother. Min finished his degree at UCLA in chemistry, but couldn't find a job, so he came back to San Diego to live with his parents. And I was visiting the parents one day and Min came up to me and he said, "You think you could find a job for me at Scripps?" And I said, "Well, I'll try." So I went to see Dr. Rakestraw, and Rakestraw said, "Yeah, we need chemical technicians aboard ship." So I got Min the job. He did very well as a marine technician. And Min finally came to me and he said, "Dick, you think I might be able to work on the campus and maybe work with Dr. Goldberg doing more theoretical chemistry?" So I went up to Ed and I said, "Hey Ed, how about trying him out?" I said, "You know, if he doesn't work out you can always ship him back to the marine science facilities," and Ed, on that condition, says, "Well, I'll try him out." And he's

⁴⁶ Hiomi Nakamura (1913-), research assistant in chemistry at Scripps Institution of Oceanography starting in 1935. His oral history is at <http://repositories.cdlib.org/sio/arch/oh/nakamura-2004/>.

worked out very well. Min doesn't have an advanced degree and yet he did some excellent geochemical work.

Well anyway, getting back to Transpac, after Adak we went into Hakodate. All the ships came out and fire hoses were up and everything. And we finally got into the marine facilities at the University of Hokkaido. It was separated from Sapporo, which is a different campus. And I met three marine microbiologists.⁴⁷ Two were faculty and one was a student. And the oldest faculty member couldn't speak English at all, so I had very little conversation with him except in my limited Japanese. And then from there I start talking to the second oldest, who is also a professor. And I met another one, the younger one, who was a student, who eventually became one of the best fish pathologists in Japan. And I've kept in touch with him until he passed away about five years ago, and he used to come to OSU to work with John Fryer.⁴⁸

Harkewicz: And, what was his name?

Morita: Kimura.

Harkewicz: Kimura? Okay.

Morita: Anyway, this other fellow spoke English extremely well and I got awfully curious and I asked him, finally, when nobody else was around, "How come you speak English so well?" And he says, "I'm a Nisei." He was born in Hawaii, and he went to school in Japan. When the war broke out he was already teaching. So he never had to go in the military, but none of his colleagues knew it.

Harkewicz: Really?

Morita: Not even his student. I had to inform him later that he was a Nisei and when he retired he went to the University of—a Catholic school in Hiroshima to teach, because there's a cutoff date for retirement in Japan, depending on what school you go to. The University of Tokyo is age sixty you have to quit. The University of Hokkaido and Kyoto University is sixty-three. All the other federal-run schools are sixty-five. But in private schools you can go on, and on, and on. Anyway, from there we went into Yokuska. Oh, I have to tell you a funny incident in Hakodate.

Harkewicz: Please do.

Morita: Since it was so cold and everything, and we never had that much fresh water aboard, and especially hot water, that we all decided to go to one of these Japanese hotels with a Japanese bath, where you first wash up and then jump in

⁴⁷ In his autobiography, Dr. Morita identifies these men as Dr. Sakai, a Nisei born in Hawaii who spoke English fluently, Dr. Kimura, and his mentor, Dr. Sakai.

⁴⁸ John L. Fryer (1929-2004), professor of microbiology at Oregon State University.

the water. And it's hot. I mean really hot. And so we were washing up and we ease ourselves in the water, and the assistant engineer of the boat said, "Oh boy!" and he jumped in. I never saw anybody get out of the water so fast. [*Laugh*] That was funny.

Harkewicz: He didn't realize it was so hot, then?

Morita: No. Anyway, we finally got into, from Yokuska we got into Tokyo Bay, and my grandfather was on the deck with another family friend, so they came to see me. And four people came aboard that I had never heard of before, and one was Dr. ZoBell's friend, that went to school with him at Utah State University. He came aboard with three others. I don't remember two others, but I remember just one of them—Dr. Kei Arima, who was Department of Bacteriology at University of Tokyo. And he at least spoke a little English and Dr. ZoBell's friend spoke a little English. We visited for about two hours on ship and then Dr. Arima asked me to come out to the University of Tokyo. So I went out there and looked around. They asked me what I was doing in terms of research, so I told them. And before I knew it, his department head, Dr. Sakaguchi and he had ganged up on me and said, "Would you please give us a lecture?" I said, "I don't speak Japanese too well." And he says, "It doesn't matter." So I gave my first lecture ever in front of a classroom, or students rather, at the University of Tokyo.

Harkewicz: In Japanese or in English?

Morita: No, in English. I spoke slowly. So I learned to speak slowly when I had a Japanese crowd, which I kept with me. I did the same when I was in Chile. I've been in Chile quite a few times. But anyway, I kept in touch with Arima for many years until he passed away. And then from Tokyo I went to see my relatives in the Peninsula of Izu. My grandfather took me over and I spent a day and a half with them. My father had made arrangements for a car to take me from Ito, which is a town, to his hometown. It was just dirt roads. Many years later I went back there and it was all paved roads, a big train and everything. Anyway, I got back and Dr. Rakestraw and I traveled to University of Nagoya, in which we participated in a roundtable discussion. And I understood Japanese well enough, and so in some cases where things got difficult I tried my Japanese on them, and they laughed at me. And I asked, "Why?" and I was told, "Well, you talk like a woman." I said, "Naturally, I learned my Japanese from my mother."

Harkewicz: What does that mean to "talk like a woman"?

Morita: You use different terms. Like, if you say, "I" a male uses the term "boku," "me." And female uses a polite term, "watakushi." Okay? There are certain things that a woman uses where a man does not. And vice versa. Well anyway, we got through that and I left, and Dr. ZoBell had made arrangements for me to see Dr.

Kadota.⁴⁹ And that was in Kyoto, so I traveled to Kyoto by myself and got into Kyoto and had no place to stay. No hotels or anything are available, mainly because it was tied up by the military. But I remembered the fact that when we traveled on expeditions we were naval technicians. So I went to the MPs office and said, "I'm a naval technician. I need a room for a couple days." And they fixed me up, and it was right next to the Imperial Palace. And since Dr. Kadota wasn't available right then, because he had to travel in from a city named Maizuru, I decided to go to the Imperial Palace to look around. But I was barred from going in. And, I thought, "Maybe I can get in anyway." So I went to the guard and spoke nothing but English, no Japanese whatsoever. Finally, the bigwig in the place that took care of everything, a civilian, came out to talk to me. He spoke English and I told him, "I'd like to see the place." He said, "Oh, okay. Fine." And he showed me around personally. I took pictures. And, when I had them developed and showed my mother, she was shocked, because no one ever got into the place.

Harkewicz: Really?

Morita: So after my visit there I gave a pretty good tip, especially in Japan. In those days, people were hard hit financially. Well then, he was very pleased. And then, I met Kadota at the hotel and we left and went to Maizuru. And, I met a lot of budding microbiologists there with Kadota. I didn't know it at the time, he was still a student himself, and yet he was corresponding with Dr. ZoBell. I spent three days there and when I got ready to leave I went to pay my hotel bill and they wouldn't accept my traveler's checks. So I went to the closest army post, which was about a mile out of town, and the first officer I saw I said, "I'd like someone to change a traveler's check into Japanese currency." He took it right out of his pocket.

Harkewicz: Really?

Morita: Well, from Kyoto I went to Osaka where the ship was, and then I returned from there.

Harkewicz: So you did a lot of traveling around in Japan. Was that more for personal pleasure or were you trying to make connections with Japanese microbiologists?

Morita: As much as I could. It was also Dr. ZoBell's purpose that I do so. And what was the rationale for that? I think he felt it was best for us to get to know as many people on the outside as possible. Even during the time I was a student, when people used to visit, he would always introduce Carl and I to the visitor. Selman Waksman⁵⁰ came down and visited, and ZoBell made sure we were introduced to

⁴⁹ Hajime Kadota (1920-2007) became an associate professor at Kyoto University in 1949 and completed his PhD at the university in 1956. He remained at Kyoto University as a professor until his retirement in 1984.

⁵⁰ Selman Abraham Waksman (1888-1973) was a microbiologist at Rutgers and the Woods Hole Oceanographic Institution. He won a Nobel Prize in Physiology and Medicine in 1952.

him. And we also met his colleague, Frank Johnson,⁵¹ from Princeton who did some of the original pressure work with ZoBell, because ZoBell took a sabbatical. I met him. Had a long talk with him. So ZoBell also made sure that we went to as many outside lectures around San Diego as possible. When there were lectures at San Diego State he always told us, told us about them so we'd go.

Harkewicz: So he was encouraging his graduate students to make these connections, then?

Morita: I got to know a lot of other oceanographers that came to Scripps, too. As a matter of fact, while I was at Scripps I used to have a small place, but I had two beds in the bedroom. And so people like Bob Dill,⁵² when they'd come down from USC, they'd need someplace to be put up, so he'd stay with me.

Harkewicz: Just because you had the extra bed n your bedroom?

Morita: Yes. I have to admit, we did get to meet a lot of people that came through Scripps. I got to meet Roger Stanier.⁵³ I got to meet Mike Doudoroff⁵⁴ from Berkeley. Oh, there were other visitors. One other nice thing, when I was at ZoBell's lab, was, number one, we had a lot of visiting profs. The first person that was there is Dr. Somma. She was from Norway. That's where Carl took his sabbatical. And then the second one was Dr. Wilhelm Schwartz, from Germany. And he stayed for about six months, maybe a little longer, and he really was a geologist at heart. So my wife and I used to take him around the back country, which he really enjoyed. And then, Ferguson Wood⁵⁵ from Australia came, and he brought his whole family and we got to know him. And the next person that came, that stayed a little while, was Dr. Victor Skirman from Australian, the University of Queensland, Brisbane. And, those people I kept in touch with, actually, after I left. So we got to meet a lot of people.

Harkewicz: So when did you get married? You said you and your wife showed him around.

Morita: Well, Schwartz came later, so the last part of his stay, it overlapped a little bit. So we used to take him into the Imperial Valley, and back into the canyons. And we'd sleep on the ground. And he'd be able to look around the country. But anyway, I also met on campus Cousteau.⁵⁶

Harkewicz: Oh, Jacques Cousteau?

Morita: Here's a funny thing about him. I was supposed to visit him on my first trip to Europe. I should say my second trip. The first one was military. Anyway, I got

⁵¹ Frank Harris Johnson (1908-1990) was emeritus professor of biology at Princeton at the time of his death.

⁵² Robert Floyd Dill (1927-2004), PhD in oceanography 1964 at Scripps Institution of Oceanography.

⁵³ Roger Yate Stanier (1916-1982) Canadian born microbiologist.

⁵⁴ Michael Doudoroff (1911-1975), professor of bacteriology and molecular biology at University of California, Berkeley.

⁵⁵ Edward James Ferguson Wood (1904-1972), Australian marine biologist.

⁵⁶ Jacques Yves Cousteau (1910-1997) French naval officer and ecologist, co-inventor of the aqua lung.

so sick I couldn't make it. I was a teetotaler and everybody was drinking wine, except those from Japan and I, you know, we had to at least brush our teeth. We all came down and I couldn't make it. So I didn't go to Monaco. Well, where was I? Getting back at . . .

Harkewicz: I wanted to ask, though, because you mentioned something about showing somebody around with your wife, and I wondered when you got married?

Morita: Nineteen fifty-three.

Harkewicz: Okay. So, it was while you were still a graduate student?

Morita: Yes. My wife already had her PhD.

Harkewicz: I see.

Morita: I got married, and one month after I got married we shipped out on Transpac.

Harkewicz: How did that affect your personal life, going out on the expeditions?

Morita: Oh, I thought it was fun. I thought it was a great experience.

Harkewicz: Yes, but what did your wife think about it?

Morita: Well, she didn't say anything. She knew about it before we got married. I should say, one thing that really impressed me was, you know, when we were in Tokyo on Transpac, we had an audience with the Emperor.⁵⁷

Harkewicz: Oh really?

Morita: And, Warren Wooster gave him some biological samples that we dredged up, and he was very pleased.

Harkewicz: This was Hirohito, right?

Morita: Yes.

Harkewicz: And he was an oceanographer originally, correct?

Morita: He was an amateur marine biologist.

Harkewicz: Okay.

Morita: As a matter of fact that doll on the right hand side, is a present from the City of Tokyo when we went in there.

⁵⁷ Emperor Hirohito (Emperor Shōwa, 1901-1989), emperor of Japan 1926-1989.

Harkewicz: Well, that must have been something.

Morita: Oh, yes. They really treated us royally when we got into Tokyo, I have to admit. But I have to say Scripps was an ideal place to do research, for me anyway. I know a lot of my colleagues that didn't make it. It probably wasn't for them because it was too unstructured. In those days, oceanographers had a hard time finding a job because there were no grant funds and they weren't too anxious to put out PhDs. The average time for a master's or a PhD at Scripps was five to seven years. How long do you think Dr. Revelle took to get his PhD?⁵⁸

Harkewicz: I don't know. Not five to seven years, probably.

Morita: I think it was fourteen years.

Harkewicz: Seriously?

Morita: The longest is Dr. James Kittredge, Dr. Fox's student.⁵⁹ I think he took seventeen years.

Harkewicz: That's a long time.

Morita: I don't know if Dr. Kittredge is still living or not. But in those days, you have to realize that they didn't like to give an advanced degree to—especially a PhD—to a woman. And one of the main reasons is, that they had no facilities aboard ship. There was only one head, because they were transformed military ships. One head, so there was no place for the girls to go. So Lela Jeffrey,⁶⁰ one of the smartest women I've ever met, got a master's and left and went to Texas A&M and became a prof there. But she went to England and got her PhD.

Harkewicz: Was she able to go out to sea in England?

Morita: Well, I don't know if she got her PhD in biochemistry or what, but not in oceanography. But nevertheless, she worked for the Texas A&M Oceanography Department, which is composed of a lot of SIO students.

Harkewicz: I've heard that from others.

⁵⁸ Roger Revelle enrolled as a graduate student at UC Berkeley in 1930 and completed his PhD in 1936.

⁵⁹ James Sargent Kittredge (1921-1998) earned a BS at San Diego State University in 1950. He enrolled at UCLA in 1950, and received his PhD from UC San Diego in 1965. This was not a record, however. Excluding Wendell Russell Gayman (1928-2000), whose PhD was awarded forty-four years after his enrollment, just before his death in 2000, the longest time to earn a PhD was held by John Rowen Lyman (1915-1978), who enrolled in 1936 and received his degree twenty-one years later in 1957. Another student took eighteen years, and several took fourteen to fifteen years to complete degrees.

⁶⁰ Lela Mae Jeffrey-Kirby (1925-2006), earned an M.S. in oceanography in 1951 from Scripps Institution of Oceanography and her PhD in oceanography from Texas A&M University in 1969.

Morita: ZoBell was offered the position of director of the place at one time.

Harkewicz: Oh, was he really?

Morita: Yes.

Harkewicz: But, he didn't want to leave Scripps?

Morita: No. I don't think so.

Harkewicz: I see. In the autobiographical notes that you sent to me, you talked a lot about discrimination, and I wondered if you could describe some of those experiences? I know you've talked about it a little bit already, but . . .

Morita: Well, in graduate school it was very subtle, because as far as Scripps was concerned I had no difficulty. At USC, slightly with the older faculty, because prejudice dies hard with the older ones. When I came back to the West Coast to OSU I could feel it in the older faculty, but my chairman was one of the nicest persons I ever met. And at that time the chairman of Oceanography was Wayne Burt.⁶¹ Wayne Burt was an SIO graduate. And so he and I got along very well. So as far as the people I had to work with immediately, I had no difficulty. It was higher above. I just didn't bother interacting with them. The reason is that lots of times, being a veteran allowed me to open doors a little bit. When I looked for a job from Scripps, I looked for a year, and nothing came forward. And all the schools that I wrote to either said they had no positions open or they didn't bother answering. So after trying the West Coast schools I put out letters all over and during the summer of '55, between I'd say about July or August, I got a nibble from the University of Houston, which was a private school. And so the chairman was originally from California, Highland Park, and she came to visit her parents. She came down to Scripps and she offered me a position after talking to me. And when it came around to salaries she said, "The salary is \$4200 a year." And I said, "Well, you know, I make \$1200 more a year than that here as a postdoc." And after thinking about it awhile, I decided I'd better get off on my own, because if I stayed at Scripps everybody would remember me as Dr. ZoBell's student. So I took off.

Harkewicz: Now, let me stop you here a minute, though, because you were talking about how difficult it was for women to be in oceanography and yet this woman from the University of Houston was the chairman of microbiology? Is that right?

Morita: No, she was chairman of biology.

Harkewicz: All right. Sorry.

⁶¹ Wayne Vincent Burt. (1917-1991), PhD in oceanography in 1952 at Scripps Institution of Oceanography.

Morita: So, I practically taught all the courses there. I had a colleague, whose name I won't mention, all he did was take classes at the MD Anderson hospital and also at Baylor to get his PhD. And I was publishing more than anybody else, by far, and during the beginning of the third year there, sometime in between that and the end of the term, I mean in the year, school year, he was going to be promoted to associate prof. And here, I was doing all the teaching. I recognized the symptoms immediately and started looking for another job.

Harkewicz: So you think it was because of your race, then?

Morita: Yes. I'm quite sure.

Harkewicz: Do you think the salary that they offered you was also due to that?

Morita: No, many years later I found out I was the lowest paid man in the department, by far. And also, I was the only newly-hired one with a year of postdoc work.

Harkewicz: But do you think because you were Japanese-American that they didn't pay you more?

Morita: I think she realized that I would have a hard time finding a job, so she wouldn't budge upward. But I will say one thing. When *Sputnik* went up in the air, that really did wonders for us.

Harkewicz: Because then they needed more scientists?

Morita: Yes. Another nice thing, when I was at Scripps I met Dr. Harve Carlson,⁶² who was with the Office of Naval Research at the time. And Harve moved to Washington with the Office of Naval Research. And then later on, he became the head of Biology and Medical Science at NSF. He always encouraged me. He's originally from Idaho. But he asked me to come aboard at NSF, but I put him off until finally I decided, "Well, I better go." So I spent a year at NSF.

Harkewicz: And, you were a project reviewer, right?

Morita: I think I was originally scheduled for something else, but he couldn't find anybody for biochemistry, so he put me in that slot.

Harkewicz: Earlier, you talked about people not being able to see far enough ahead with your work, that they weren't as visionary as you. But in your autobiographical notes you wrote that your work was seen as controversial and that people didn't believe it until somebody else substantiated it?

Morita: Yes.

⁶² Harve J. Carlson (1911-), bacteriologist for the Office of Naval Research and the National Science Foundation.

Harkewicz: Do you think that that was a form of discrimination, too?

Morita: I don't know. But I can tell you when I first published on psychrophiles, I sent it to *Science*. It came back rejected. And usually a person doesn't sign his name, but these two had their names signed to it, the reviewers. They were Dr. Stokes⁶³ and Dr. Roger Porter.⁶⁴ Stokes was supposed to be *the* man in cold-loving bacteria, or psychrophiles. But I got a nice letter from the editor of *Science* and he was Abelson,⁶⁵ and he said, "I believe it. Put it somewhere else." So I sent it to *Nature*. They wouldn't take it. I got the same kind of answer. Then I sent it to *Journal of Bacteriology*, and they said, "No." Finally I decided, "Well, maybe I'll try the *Journal of the Society of General Microbiology* in England," and they said "No." But I was fortunate in that Dr. Francis Richards,⁶⁶ the editor of *Limnology and Oceanography* was on campus, and he came to my lab to look around and I was telling him my woes, and I was showing about, showing him all the psychrophiles we had, and I, and he finally says to me, he said "Give me the manuscript. I'll publish it." And he published it without even putting it out to review.⁶⁷

Harkewicz: And this . . .

Morita: Two years!

Harkewicz: Two years it took you to have it published?

Morita: Yes.

Harkewicz: And where were you at the time, then?

Morita: Here at OSU.

Harkewicz: But you never knew whether or not it had anything to do with you being Japanese-American?

Morita: No. Not for the publications. When I was at University of Houston, Dr. Mary Sears⁶⁸ used to be the editor of *Deep Sea Research*. And she said, "I don't want to see any more manuscripts from you."

⁶³ Jacob Leo Stokes (1912-), professor of bacteriology and public health at Washington State University.

⁶⁴ John Roger Porter (1909-1979), professor of microbiology at the University of Iowa.

⁶⁵ Philip Hauge Abelson (1913-2004), physicist, director of the Geophysical Laboratory at the Carnegie Institution and editor of *Science* from 1962-1984.

⁶⁶ Francis Asbury Richards (1917-1984) of the University of Washington edited *Limnology and Oceanography* from 1963-1967.

⁶⁷ Richard Y. Morita and Roger D. Haight, "Temperature Effects on the Growth of an Obligate Psychrophilic Marine Bacterium." *Limnology and Oceanography* 9 (1): 103-106 (Jan. 1964). Roger Dean Haight (1936-) earned his PhD in marine microbiology from Oregon State University in 1965.

⁶⁸ Mary Sears (1905-1997), oceanographer at Woods Hole Oceanographic Institution and commander in the US Naval Reserve.

Harkewicz: And she never gave you any reason?

Morita: Mainly because they were too physiological and biochemically oriented. And then, Yvette Edmondson⁶⁹ was the editor of *Limnology and Oceanography* after Francis Richards quit. And after one of my publications she says, “I don’t want to see another manuscript from you.” Well, I saw her and her husband in Israel during the Warm Lakes Conference. The final conclusion of that conference was, “We just don’t know enough about the biochemistry of warm lakes to come to any good decision, or a good rational plan to investigate.” I thought she got the message. I shipped one more and she sent it right back. Oh well.

Harkewicz: So you have no way of knowing whether it was the work you were doing, or the person who was doing it?

Morita: I have no idea, but I think my work was too forward for them. Because one of the reviewers, who I knew quite well, was an extremely well-known microbiologist, and Canadian, Bob MacLeod.⁷⁰ He reviewed it. One of the comments he made was, “Yes, accept it, but most of the readers of *Limnology and Oceanography* won’t understand it.”

Harkewicz: Has that changed?

Morita: Oh, yes. I haven’t reviewed a paper for *Limnology and Oceanography* until last year. So a long drought of about thirty years, I guess. Anyway, the editor said I should see a paper, and so I said, “Well, you know, I’m not very, looked on very favorably by the editorialists.” And he said, “Well, it’s all changed now.” So I reviewed the paper and I found out, well, the common mistake done by young people. If it’s not in the computerized literature, it doesn’t exist.

Harkewicz: Oh, that’s pretty sad.

Morita: The work we did in the Antarctic wasn’t even mentioned. From our data you could predict what he was going to find. Oh well, that’s life.

Harkewicz: That’s unbelievable. If it isn’t on the computer, it’s not cited?

Morita: Well, you know, they flunked one of the oceanography students in the School of Oceanography here because he didn’t know the sources before the computerized literature.

Harkewicz: Really?

⁶⁹ Yvette Hardman Edmondson (1915-), editor of *Limnology and Oceanography*. She was married to zoologist W. Thomas Edmondson (1916-2000).

⁷⁰ Robert Angus MacLeod (1921-), microbiologist at McGill University.

- Morita:** That was during his prelims.
- Harkewicz:** So what is it that has changed in microbiology, or oceanography, or whatever the discipline you want to refer to, that has made the things that you were working on more acceptable now?
- Morita:** Because other people have done it also, repeated it, and published it.
- Harkewicz:** So you're saying that, in this particular form of science, the more people that repeat it, the more real, the more accepted it is?
- Morita:** Well, something close to that. It doesn't have to be the same thing, but something that adds to it based on what one has already done.
- Harkewicz:** Okay. So it has to add on to what is already known?
- Morita:** Yes.
- Harkewicz:** Ah, that's interesting.
- Morita:** If I go into the latest nobody wants to work on it, either. And I worked on subject matter that no one wanted to fund because it was not dynamic enough, and that was starvation survival. I wrote a book on it.
- Harkewicz:** Why wasn't it dynamic enough?
- Morita:** Well because things aren't growing rapidly. Everybody wants to see things growing rapidly, and here you're talking about dormancy in terms of ages. The last paper I wrote was a review on which I explained the reason why microbes could last such long times, eons of time, is because they had to have a mechanism to take care of depurination of the nucleotide, and racemization of the amino acids. And I said, "The reason why they can exist in granite and other things that have been there for geological time is because they have the ability to utilize hydrogen." And hydrogen is everywhere. You can't get away from it. Now, the question is, "What are the microbes using out in the middle of the ocean?" You know, they still keep working on it, but there's just not that much organic matter in the ocean, especially when you recognize that there are 10^6 microbes per milliliter. What are they doing? It's just that man lives too short of a time to . . . When I was a graduate student we always did make the comment, "Blessed are the microbes for they shall inherit the Earth." [*Laugh*]
- Harkewicz:** Do you think your experience working with geologists, who work under these longer time frames, do you think that affected your ideas of these longer time frames?
- Morita:** No.

Harkewicz: It just turned out that way?

Morita: I think it just turned out that way.

Harkewicz: This is ironic, that here Dr. ZoBell is training you to be creative and think for yourself, and then when you do creative and visionary work it's not recognized.

Morita: Because most people aren't brought up in the unstructured system that Scripps used to have.

Harkewicz: So do you think that made being at Scripps a disadvantage for you?

Morita: No, I think it was an advantage. Of course, a lot of kids didn't make it in ZoBell's lab. I have to admit that. Don Lear⁷¹ didn't make it. And Keith Budge⁷² didn't make it. There was one other person when I was there that didn't make it.

Harkewicz: So what happened to them? Did they go somewhere else?

Morita: Oh, they went somewhere else.

Harkewicz: And did they succeed there then, as far as you know?

Morita: As far as I know, no.

Harkewicz: So maybe it wasn't ZoBell at all, it was just the people, then?

Morita: Well, it could be the people. Keith Budge ended up teaching in the high schools in San Diego, mainly at the high school in La Jolla.

Harkewicz: Interesting. Well, I know that you were a graduate student at Scripps, and you've been a professor at Oregon State, but can you talk about the similarities or the differences between your positions? I mean, was your research totally different and did it have anything to do with the place, or was it more with where you were at in your career?

Morita: As far as research is concerned, no one ever told me what to do and what not to do.

Harkewicz: Anywhere?

Morita: At any of the professorial positions.

⁷¹ Donald Woodward Lear, Jr. (1928-1996), earned an MS in oceanography in 1957 from Scripps Institution of Oceanography and his PhD in microbiology in 1965 from the University of Rhode Island.

⁷² Keith McKay Budge (1916-1989), was enrolled at Scripps Institution of Oceanography from 1951-1955.

Harkewicz: Okay.

Morita: One advantage I had over a lot of my colleagues was that when I was in the eighth grade I took typing. This is years before the computer.

Harkewicz: So you had an advantage to taking typing?

Morita: In the early days, departments didn't have enough money for secretarial help. So when things came around I could type my own manuscripts. I got them published. When grant money came around—don't forget, when I first started, the only agency that gave money was ONR. Okay? So I could write an ONR grant. Then *Sputnik* went up, NSF was created, and the Department of Health grant system. So I could immediately write grant applications and get the manuscripts out. I left Houston and went to Nebraska and the department had only a half-time secretary for the whole department. So again, the typing came in extremely handy. So I was at an advantage to be able to do that.

Harkewicz: Interesting. Typing helped you.

Morita: Yes. I bought the first computer in the entire department when I was at OSU. And I told the students, "You better learn because this is the future." And one of them became an expert at it. He didn't know how to type when he started, but he was an undergrad and he has a PhD now, and is teaching at Western Washington State University in Bellingham. But I have to admit, Scripps turned out some good men.

Harkewicz: Many of the interviewees that I've talked to have complained about—I mean those who started in the ONR system, have complained about how restrictive funding has gotten over the years.

Morita: It has.

Harkewicz: And how you spend so much time writing grant proposals. Do you feel the same?

Morita: I think that's one reason NSF dropped me, because I would not, for the students' sake, would not say, "This experiment this time, and next, and next, and next." I wanted the students to think. I'd give them the problem and let them figure out how it should be solved. You can't do that now, not with our grant structure. And I think that's really terrible. And also, all these granting agencies want immediate results. They can show, "Oh we had so many papers for so many dollars." The trouble with education nowadays, I think it's going to pot to some degree. Terrible for me to say that.

Harkewicz: Well you're not involved exactly anymore.

Morita: No, I was involved until about three years ago, because I worked about seventeen years without a salary. I had my office still at the university and I finally decided to give it up.

Harkewicz: I wonder if you could explain, just a little bit more, about working at NSF, and about how NSF reviewing worked, in regards to experiments showing one thing after another?

Morita: They wanted the experimental procedures in the experiments that you do to solve the problem.

Harkewicz: And you're saying that you didn't want it to be that structured?

Morita: No, I didn't want my grants to be that structured. Mainly because the students would have to follow these things out and not be able to think for themselves.

Harkewicz: Right.

Morita: I used the same nonstructured system in my work with students. I'd call a student in, when he first came in and we'd sit down and I'd say, "Well, you're being funded on this project. This is the overall thing that you have. Our objective is such and such within this big frame. Now, you come back and tell me what you want to work on within this big frame. And if you don't do it in one semester then I'll assign you a problem." And the students came back with a definite idea of what they wanted to work on. And those that didn't, I'm afraid they didn't make it under my professorial system.

Harkewicz: Which is sort of what you were saying about the people at Scripps, in a sense?

Morita: Yes.

Harkewicz: What do you think have been the biggest changes in oceanography or microbiology in your years at Scripps and OSU?

Morita: Well, I think initially at Scripps the thing that Dr. ZoBell really started was the parameter of hydrostatic pressure. Now, I will be in disagreement with Yayanos,⁷³ because he renamed them. I reviewed the book in which he renamed them and I said, "You should have stuck with the old name." And, he said "Well, his prefix is Greek." But baro is also Greek—it means "weight". When you look at the environment, that pressure is created by weight, so why do you really want to change it? Because you want your own name attached—I shouldn't say this—to the definition of the organism. I wouldn't change "psychrophiles"—because I had a chance to—but everybody was used to using "psychrophiles." If one is using it all the time, one knows what you mean; even if you redefine it, everyone still knows what you mean

⁷³ A. Aristides Yayanos (1940-) professor of marine biology at Scripps Institution of Oceanography.

Harkewicz: So, you're saying that . . .

Morita: If possible, retain names.

Harkewicz: But the reason somebody would change the name is so that they can have their name attached to the organism?

Morita: Yes. That's right. It's a legal point

Harkewicz: That leads into another question I was going to ask you. I understand that you have a genus, *Moritella*, named after you?

Morita: Yes.

Harkewicz: Can you talk about that?

Morita: Yes. I discovered it when I first came to OSU. I brought three students with me from Nebraska to continue their graduate studies under me and I realized I needed something else besides pressure to work on. So I started doing a lot of reading about Antarctic microbiology and so forth, cold environments. And after reading about it, I recognized one thing all the investigators did not do, and that is to keep their samples cold. They brought them up to room temperature. Never realizing how sensitive some of these organisms are to increased temperature. So I walked in the lab one day when the kids were working. I asked them what they thought. And I said, "I'm going to go out and find some psychrophiles," and they all laughed at me. They said, "You're not going to find such a thing." In those days, we didn't have a regular ship down at the dock all the time. But we had the equipment, and I asked one of the technicians to do me a favor and collect me some water samples. I put a little yeast extract in the bottom of a bottle and had it sterilized and I told him to keep it in the refrigerator. "Now, when you bring up a sample from below the thermocline,"—you know what the thermocline is? Okay. "Take it first, keep it cold. As soon as it's filled halfway put the top on, rush it to the refrigerator, and leave it there. When you get back, call me." So after he got the sample, I went down with an ice chest with ice in it, and got the sample and I started isolating these. And when I isolated the first one, all the students wanted to drop their own projects. Well anyway, I sent it to Rita Colwell⁷⁴ here because I'm not a taxonomist, and she classified it first. And then many years later, one of her students, by the name of Sue Steven,⁷⁵ who happened to be my technician at one time, got a PhD under her, looking at the same bug and found that it was not *Vibrio*. It was different—and so she published her thesis and then it went to Japan

⁷⁴ Rita Rossi Colwell (1934-) an environmental microbiologist who got her PhD at the University of Washington; served as director of the National Science Foundation in 1998-2004.

⁷⁵ Sue Elizabeth Steven, *Molecular Systematics of Vibrio and Photobacterium*, (College Park: University of Maryland, 1990).

and they did further work on it, and in France they did further work on it, and they all came to the conclusion that it was a different genus. So that's why the genus was named after me.

Harkewicz: I see.

Morita: Sue Steven was on my research team in the Arctic.

Harkewicz: Did you go out on ship much once you came to OSU?

Morita: Not very often. I sent the kids out. They needed the experience.

Harkewicz: Okay. So it didn't have anything to do with OSU's ships—it was more that you wanted your students to have that experience?

Morita: The students needed the experience. Besides, I also had teaching experience. I did cancel classes once. In the early days, I used to teach general microbiology on Monday and Wednesdays. Friday was the same time, but open. And Dr. ZoBell wanted me to join him in an expedition to the Challenger Deep. It was at the end of December. It overlapped.

Harkewicz: Now, this was when you were working at OSU?

Morita: Yes. And so I asked all the kids if they'd come in Monday, Tuesday, and Wednesday so I could go. And, they did that, so I took off and came back and gave them the final exam.

Harkewicz: I think that's great that you asked the students if they would let you do that.

Morita: And I didn't get any objections. Well, they had that whole, the rest of the term off.

Harkewicz: That's really great.

Morita: Scripps was a very interesting place. I have to admit, I enjoyed being down there. But you have to recognize that in the early days, there was very little social life.

Harkewicz: Well, I just have a couple questions that I want to wrap us up with here, and these are questions that I ask everybody. So answer them as best you can. The first one is, what do you think made Scripps successful?

Morita: The personnel. That's number one. Number two, they were lucky in getting funded. But personnel first. That's what I would say. That's my judgment.

Harkewicz: All right. Then alternatively, what do you think may have threatened its success?

Morita: Wow. [*Laugh*] That's a hard question, because I can't think of anything. With good personnel, how are you going to threaten it? Because even though they had differences within the faculty, they kept it to themselves it didn't get into the rest of the SIO population.

Harkewicz: Okay.

Morita: But it has to do mainly with the personnel.

Harkewicz: All right. So you said even though personnel made it successful, there weren't any personal personnel differences that threatened it?

Morita: No, not when it came to the major objective; I think they all had their eyes on the major objective.

Harkewicz: Well, that's good. And then finally, the big question is what would you say Scripps meant to you?

Morita: Scripps meant to me? A wonderful experience, a decent graduate education. I would say the best graduate education one can get. And it gave us opportunities that we wouldn't have had anywhere else. Allowed you to do things that—you know, if we did an experiment and it didn't come out we didn't have to tell Dr. ZoBell it didn't come out. We just kept it to ourselves. Any idea we had, if we wanted to give it a try, we gave it a try. If it came out, fine. If it didn't, that's okay.

Harkewicz: So, you had a lot of freedom to experiment?

Morita: Yes.

Harkewicz: Experiment in anyway you want to look at it.

Morita: But one thing that ZoBell demanded of us is that we keep up with the literature. Every time he'd buy a new book for the library, and he knew when it went into the library, and he'd come and ask us, "Did you read it yet?" [*Laugh*] Another thing that he used to do, which kept us up on the literature, is that about once a semester, well three times a year roughly, when you came into the lab, sit at your desk first thing in the morning, maybe have a cup of coffee or something, there he'd be sitting at your desk and he'd give you an oral exam.

Harkewicz: Oh, my gosh.

Morita: Right then and there, out of the clear blue sky. [*Laugh*]

Harkewicz: So you had to be on your toes at all times?

- Morita:** Oh yes, you had to keep up on the literature. And also when you went on a field trip with him, he was always asking you questions, scientific questions. He never let up.
- Harkewicz:** Did you find yourself doing that kind of thing with your own students?
- Morita:** Not as much. Because I had a lot more students than he had.
- Harkewicz:** Well, let me ask you this, and you may not have an answer for it, and you may not want to answer, but would you say anything negative about your experiences with Dr. ZoBell?
- Morita:** No. I wouldn't say I had any negative experiences. I know he was a practical joker.
- Harkewicz:** He was?
- Morita:** Did you know that?
- Harkewicz:** No, I didn't know that.
- Morita:** You know, in Ritter Hall, the old Ritter Hall—they used to have one commode for the entire . . . As I understand it from Fred Sisler,⁷⁶ he put a pair of boots in the one stall, locked it from the inside, and crawled out. [*Laughter*]
- Harkewicz:** So nobody else could go in there? That's pretty good.
- Morita:** He and Fred used to play practical jokes on each other.
- Harkewicz:** I see.
- Morita:** I think that's one reason he recognized that I didn't get married to the Hawaiian woman in the photograph.
- Harkewicz:** He was an old pro so you couldn't pull a fast one on him, huh?
- Morita:** He may have been a Mormon, but he was a jack Mormon.
- Harkewicz:** What does that mean?
- Morita:** What does that mean? Well, it means that he didn't follow everything correctly. A true Mormon won't drink Coca Cola. Okay?
- Harkewicz:** All right.

⁷⁶ Frederick David Sisler (1916-1980) worked at Scripps from 1946-1951 completing his PhD in 1949. He spent the remainder of his career working as a microbiologist in federal government and in industry.

- Morita:** Dr. ZoBell would. A true Mormon wouldn't drink alcohol, but his doctor told him he better drink a little bit because of nerves, and they finally told him he ought to drink a little. So I've seen him drinking alcohol, especially when we went to national meetings. He used to take his entire group with him when we would have what we called the API meetings. The American Petroleum Institute would meet once in a great while in LA and we'd all go up. So he would expose us to that.
- Harkewicz:** You said that he had a colleague, a Japanese colleague that studied with him in Utah, is that what you said? Did you feel like he was more accepting of you being of Japanese descent than somebody else might have been?
- Morita:** No. I had no difficulty with him, because, but then I wasn't with him very much. But in Japan, you know . . .
- Harkewicz:** No, I'm sorry, I'm talking about Dr. ZoBell. You said you suffered a lot of discrimination in different places and I wondered if he was more accepting of you because of his experience with this other Japanese scientist?
- Morita:** I couldn't tell.
- Harkewicz:** I know that's a hard question to answer.
- Morita:** God, I can't remember his name.
- Harkewicz:** Well, if it comes to you let me know. We can go—we can add it to the transcript.
- Morita:** I had a picture of him, but I lost a lot of pictures. I had too many. The reason why I had so many pictures that I was the only one that had a camera. That's how things were in those days. The only reason I could afford a camera is I had one before I came to Scripps, because I bought it as a GI in Florence, Italy. I saw it in the window and I didn't have enough money for it, so I asked my brother-in-law, who was with Military Intelligence at that time at Fort Snelling, Minnesota, if he'd send me extra cartons of cigarettes. So I sold them on the black market and bought the camera. Of course, my salary when I was overseas was only \$26 a month, so I couldn't afford it. But I had a camera. And then when I went on Expedition MidPac I bought a hundred-foot roll, and had the cassettes, and rolled it myself, and that's why I had so many pictures. So when Roger Revelle used the pictures for his lectures here and there he took a lot of mine, which I never got back. He kept the best ones.
- Harkewicz:** You would have thought that they would have wanted somebody to bring a camera along.
- Morita:** No room.

Harkewicz: Really? It was that tight?

Morita: Oh, with the number of personnel we had for such a long trip there just wasn't very much room.

Harkewicz: Do you remember which ship you were on for MidPac?

Morita: Well, the first one was R/V *Horizon*.

Harkewicz: *Horizon*? That was pretty small.

Morita: And the second one was the *Spencer Baird*. By the way, *Galathea* is not "R/V," research vessel. It's "RDS," Royal Danish Navy. It was a naval ship that had facilities for research, and that was a unique crew because all the crew had college degrees, purposely selected for that purpose.

Harkewicz: That was unique to *Galathea* or was that unique to the Danish Navy?

Morita: No, the *Galathea*.

Harkewicz: All right. Well, I'll make sure I make a note of that too, then. Well, I have asked the questions that I had. Is there anything you wanted to add to our—we've been talking for quite a while now here, but is there anything that you wanted to add to your memoirs, so to speak?

Morita: You had an outline here. I just wonder if we covered it?

Harkewicz: I believe we have.

Morita: That's fine, then.

Harkewicz: Well, thank you for your time.

Morita: You're welcome.