Oral History of

Elizabeth Louise Venrick

Interview conducted by Laura Harkewicz

15 December 2005

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ABSTRACT:

Elizabeth Louise "Pooh" Venrick was interviewed in her office on December 15, 2005. Venrick was born in Chicago, Illinois on May 21, 1941. She received a bachelor of arts degree from Pomona College in Claremont, California in 1962. She received her Ph.D. from Scripps Institution of Oceanography, University of California, San Diego (SIO) in 1969. Her dissertation topic was *The Distribution and Ecology of Oceanic Diatoms in the North Pacific*. Her graduate advisor was Dr. Edward W. Fager. In 1964 she went on her first scientific cruise, the Ursa Major, conducting research she used in her dissertation. From 1962–1965 she was Sverdrup Postdoctoral Fellow in the Department of Oceanography at the University of California, San Diego. She was the first Ph.D., the first woman, and the first expert in marine science to be appointed by Governor Edward. G. "Jerry" Brown to serve on the California Fish and Game Commission (from 1976–1982). She also served on the Scientific Statistical Committee for the Pacific Fisheries Management Council and the California Condor Advisory Committee. She is currently the co-director of Scripps Institution's Integrative Oceanography Division (IOD). She is also the Scripps director of the CalCOFI (California Cooperative Oceanic Fisheries Investigations) program. The interview stressed Venrick's experiences as an individual who has spent her entire professional career at SIO. We discussed her experiences on board research cruises, as an SIO administrator, and her perspective as a woman scientist, among other topics. We also discussed her views as a biological oceanographer at an institution that has often stressed the importance of physical oceanography. Venrick stressed the importance of data collection over time, systematic evaluation, and the interrelationships between organisms and their environment in her work.

INTERVIEW HISTORY: The interview took place in Venrick's office in Ritter Hall at Scripps Institution of Oceanography in La Jolla, California on December 15, 2005. Her office was cluttered but cozy. We talked for a little over two hours. The recording was only paused to turn the tape over or to switch tapes.

Laura Harkewicz
Oral Historian, SIO/UCSD
March 14, 2006

Elizabeth “Pooh” Venrick working at the bench (no date available).
Scripps Institution of Oceanography Archives, UCSD.

INTERVIEW WITH ELIZABETH VENRICK: 15 DECEMBER 2005

HARKEWICZ: ##[1]Okay. It's December 15, 2005. I'm in Dr. Elizabeth Venrick's office, at 227 Ritter Hall, in La Jolla, California. Good afternoon Dr. Venrick.

VENRICK: Good afternoon.

HARKEWICZ: All right. My first question is: what made you choose a career in oceanography?

VENRICK: *[Laugh*] I knew that was coming. Well, it certainly wasn't anything rational. And, to some extent I didn't choose it, it chose me. In college, I majored in plant ecology and took very little zoology because it was all premed and I was interested in field work. I was very good in math and I had quite a few advanced math courses in college. Somehow I never intended to be a professional. I certainly was not thinking in terms of a university academic position, but I had a feeling that I wanted to do research. I wanted to continue to do research, and maybe if I got a master's degree it would allow me to do a little bit better research, more independent. Logically, I would have gone on in plant ecology and I did apply to Duke, which was a very good school. But one summer I went to University of Michigan Biological Station and took invertebrate zoology. One of the last lectures, which really impressed me, had to do with marine biology and oceanography. One of the things I was impressed with was the fact that it was such a young field and there was a lot of interdisciplinary work: the zoology and the botany hadn't gone off their different ways, the way they seemed to have done in terrestrial systems. They were still studies as part of the same system. The professor highlighted some of the marine institutions around the country, one of which was Scripps. And interestingly enough, my boyfriend at the time was from La Jolla. *[Laugh]* So, I thought, "Well, why not?" I applied to Scripps. I applied to the Marine Biology Department for a master's degree but I stated quite clearly I was interested in ecology. They accepted me. They gave me more money than Duke did, which also accepted me, and Scripps said, "By the way, because of your strong math background we have moved you over into the Division of Oceanography[2] and they don't offer a master's degree so we've entered you into their Ph.D. program." I subsequently broke up with the boyfriend and I'm still here.

HARKEWICZ: Well, that's good. I guess you liked it well enough to stay beyond it?

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[1] The symbol ## indicates that the tape or a section of the tape has begun or ended. For a guide to tapes see the final page of this transcript.

[2] Venrick later added, "which included the Marine Ecology Group."

VENRICK: Yeah. You know, I was quite young at the time. I was very much wrapped up in the adventure of oceanography, which it was. And I don't think I've ever really regretted it.

HARKEWICZ: Do you remember what year that was?

VENRICK: Let's see. That would have been the fall of 1962.

HARKEWICZ: And you didn't have some great passion about the ocean before that?

VENRICK: No. Born in Chicago? Come now.

HARKEWICZ: Well, there's the lake, you know. I mean, the Sea Grant covers the Great Lakes area, too.

VENRICK: But it didn't then.

HARKEWICZ: Yeah. I know.

VENRICK: Oceanography was really a brand new field then, and we'll probably get into that.

HARKEWICZ: Did you imagine what it would be like to be an oceanographer? At that time did you have any—

VENRICK: Not really. I just knew about the adventure of the high seas, you know, sort of.

HARKEWICZ: From books and things like that?

VENRICK: No. My own imagination, I guess.

HARKEWICZ: Your own imagination?

VENRICK: I hope nobody ever uses me as a role model.

HARKEWICZ: Well, I've found from the few interviews that I have done that it seems like people have sort of have fallen into it, so far. We'll see how things progress as I interview more people. So Scripps offered you more, you said, than Duke offered you?

VENRICK: Uhm-hmm.

HARKEWICZ: Was that what attracted you to them, then, strictly that kind of a—

VENRICK: It was sort of the justifiable reason to choose Scripps, which was somewhat illogical by all standards. I mean, I'd had no oceanography courses. None of the undergraduate schools taught oceanography at that time. And, it was very much a lark that I even applied. But as I recall—well, they offered me a Sverdrup Fellowship, which they had then, and it was the grand sum of—it included registration and, I believe, $250 a month, which was quite adequate in those days. *[Laugh]* That was the sort of thing I could tell my parents.

HARKEWICZ: That you got a fellowship?

VENRICK: Well, and it was a bigger fellowship than Duke had offered me[3].

HARKEWICZ: I understand, yeah. So, did you apply to any other schools outside of oceanography, then, when you were looking into it?

VENRICK: Just the Duke in plant ecology.

HARKEWICZ: Okay. And Duke wasn't oceanography then?

VENRICK: They may have had been. They have had a small marine station for quite a while. I don't know when it started, but that certainly was not the reason I applied to Duke. It was a very well known school in plant ecology.

HARKEWICZ: Where did you live when you first came to La Jolla?

VENRICK: We rented. There were three of us and we rented—well, the very first year I rented a little studio with another graduate student. She was a graduate student in chemistry. But then I moved into a little house on La Jolla Shores Drive. It was three bedrooms with a leaky roof. It was $105 a month rent. We split it three ways. It has since been upgraded considerably. It's now quite a fancy little house, but it was within walking distance of Scripps, and we'd walk along the beach to work, go home for lunch, go home for dinner and come back in the evening. It was a wonderful place to live.

HARKEWICZ: Did you spend most of your graduate career living there, then?

VENRICK: We lived there a couple years and then toward the end, my very last year—let's see, how did that work? Well, then I rented a house in Del Mar, again with three gals, and I don't remember why we left the first house. Graduate students are just sort of mercurial at that point. And, then at one point I got married briefly. That didn't work, and so my last year I lived in the last house on Sunset Cliffs Boulevard, out in Point Loma, and again

[3] Venrick later added, "I certainly didn't want to tell them it was because of a boyfriend."

with four gals, none of whom were at Scripps. And then at that point I rented for a while and then bought the house I'm in now.

HARKEWICZ: So, you still live around here then?

VENRICK: It's up in Cardiff-by-the-Sea.

HARKEWICZ: Did you feel like you had a community of type, or do you feel like there's a community at Scripps right now?

VENRICK: Well, there certainly was then. I felt it very much more then, because graduate students, I think, are always sort of a tightly knit group. Now, probably by my own choosing, I'm not as involved with the extracurricular activities of SIO. I mean, it's there, but I don't have a sense for how much Scripps people socialize together as opposed to having their other, outside friends. It's a little bit of both, I think[4].

HARKEWICZ: Okay. As far as research ideas, how did—. I guess with you it's a little difficult because you're still working, and so this might be rather awkward when I say, "Try to imagine what it was like when you first started and sort of how things changed over time," is sort of the way I want you to try to think about some of these questions. So when you first started how did you exchange ideas about research? What was the method for that? Was it like talking about different things or memos to each other?

VENRICK: Actually, I was more of a sponge than an exchanger. The year I came in was the first year that in our particular group, which was Marine Ecology, admitted any students straight from undergraduate school. There were two or three of us. But there were maybe four guys there at the time who had worked for several years before coming back to graduate school. One had been with IBM, I remember. One of them was very much involved with fisheries management problems. It was a whole different community than that in college and I just sort of listened I think I probably didn't open my mouth the whole first year I was here. But, I sure learned a lot. Everything from research to politics to real estate.

HARKEWICZ: Did you have like a colloquium or anything like that, or was it basically just, did you do a lot of conversing in the hallways?

VENRICK: There was the traditional coffee pot, and that definitely was a center of activity. There were some official and semi-official seminars that usually involved a lot of conversation. The younger graduate students, you know, first and second year, tended to work late at night, and there was a lot of

[4] Venrick later added, “Especially since so many academics have partners who work in other ‘worlds.’”

interaction. I don't know that it was all scientific. But, there was certainly a lot of communication that went on there.

HARKEWICZ: So, it was more informal type?

VENRICK: Yeah. Uh huh.

HARKEWICZ: Do you still do that kind of thing now with your colleagues?

VENRICK: Not as much. For one thing I don't work late at night anymore. I think our interchange now is a lot more structured, and a lot more goes on in more of a mentoring capacity or a formal seminar. I at least am less involved in the free-wheeling where everybody sits down in the middle of the hall and shoots the, you know, talks.

HARKEWICZ: Is that by choice or is it by status, sort of?

VENRICK: It's hard to say. It really is. And, I suspect the graduate students still do it the old way. You know it's funny, I get older, and older, and older and I don't feel any older. Students don't even seem to get younger to me, but the difference goes up, and up, and up. So I— *[inhales]*

HARKEWICZ: Yeah. I know what you mean. How did you learn, or how do you learn now even, about new changes and new developments in the field?

VENRICK: Well, obviously the literature is important, and I'm not as good as keeping up on that as I should be. There's just so much of it now. I think meetings are very important and the conversations that go on around the edges of the talks at meetings. Recently, the last couple of years, I've been lured into a rather different field for me. I'm an open ocean phytoplankton ecologist and I got talked into starting to do some work on coastal harmful algal blooms. And I got talked into it because I was at a meeting[5]—I suppose it was limnology and oceanography—and in the women's room I ran into two gals, both of whom who had also been students here at Scripps. We're all in phytoplankton research of some sort but none of us had ever collaborated. One is now a professor at the University of Santa Cruz. One's a professor at University of Santa Barbara.[6] And, me. About two weeks later one of them came back and said, "Hey. Let's collaborate. "And the thought of working with the two of them, again it was more of a an absurdity than a logical decision. But it turned out to be a rather profitable interaction. And as a consequence, although I'm trying to ooze

[5] American Society of Limnology and Oceanography (ASLO).
[6] Barbara Louise Berntsen Prezelin (1948 -), professor of biology, Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara. Mary Wilcox Silver (1941 -), professor, Ocean Sciences Department, University of California, Santa Cruz.

out of the harmful algal field, I've brought in a postdoc (now a specialist at SIO) who is going to continue with the work. I still work closely with her. I think I've learned about the harmful algal work more by osmosis and informal conversations than any other way.

HARKEWICZ: So, you said something about things being on the edge of these seminars, or the edge of the meetings?

VENRICK: Well you know, in between sessions you meet people, and you talk, and "What are you doing?" and so on, and so forth. I think you probably learn more that way than you do just listening to the talks. I mean it's just the bringing together of people informally.

HARKEWICZ: Maybe there's too much pressure during that, for the talks that you have to prove something, as opposed to—

VENRICK: Well, you know, you're listening to a talk and you have a—. I usually think of the questions I'd like to ask later. And so then later I can either ask the person who talked or I can ask somebody else. You know, "I heard such and such. Did this strike you also?" That's kind of communication I'm describing.

HARKEWICZ: So, it's more of multiple exchanges—

VENRICK: Yeah. Uh huh.

HARKEWICZ: —or something. Okay. Well, that's interesting. Can you recall any major conflicts about—interpretations about—research in the past, or currently?

VENRICK: Hmm. I don't know exactly what you mean by "major conflicts." There's a rip-roaring disagreement going on now. I think it's friendly—it's just two groups of people championing their own particular viewpoint. This disagreement gets into the subject of climate shifts. You are familiar with El Niño, which recurs fairly frequently. They have not long ago discovered a longer frequency-lower frequency-longer period type of variability which we call interdecadal climate shift[7]. There was a big one that everybody agrees on in the late seventies, and then something odd happened in the early nineties and a lot of people think that it may have been a return to the conditions that existed before the shift in the seventies. Other people say, "Nah." And, it's interesting. I mean, you know, it's much

[7] Venrick described "interdecadal" as "one dominant scale of climate change. This seems to recur with a frequency of about 20 years. A more familiar scale is the El Niño scale (every three to seven years). These are not regular events but simply dominant scales of spectrum of climate variability. (Maybe more familiar is the season scale in which temperature has a sort of regular cycle of ups and downs, but some years—like El Niño years—are warmer than others)."

too soon for anybody to really know what happened, but the evidence comes in and one group is happier while the other group isn't happy. It's a disagreement of fairly large scale.

HARKEWICZ: And how does that discussion go on?

VENRICK: Well, at all levels. The CalCOFI Program, of which I'm director of the Scripps component, just had a big conference and the controversy came out in several of the talks and in different guises. There were a lot of conversations after the talks, as I was saying, at the dinners and the lunches and things, about, you know, "I think you're all wet. Look at this." But, it's all, I think, a quite adult disagreement. Although the exchanges get heated, I don't think anybody really takes it personally. Is that the sort of disagreement you mean?

HARKEWICZ: I guess. I know, if you'll excuse the word, "controversies," but in other scientific controversies a lot of times people are afraid to go against the status quo. You know, there's a certain idea of what is happening and people who have alternate ideas may not necessarily want to go against what's been accepted for years. Do you feel like that's the—I mean, you're saying people are talking like around the edges, are they?

VENRICK: No.

HARKEWICZ: Is the evidence just not there for them to come out and argue for—

VENRICK: Oh no. There are plenty publications out on either side. I just don't think that the data is there to make a decision one way or the other at this point. No, I would say at Scripps that is not, in general, a problem. If anything, we have people who tend to be too outspoken and too opinionated, and too iconoclastic. You know, it could very well be that some of the graduate students feel that way.

HARKEWICZ: I see.

VENRICK: I can't really answer that from my own perspective.

HARKEWICZ: And the situation doesn't involve publication or anything? I mean, you can go ahead and publish whatever you want? There's not a problem with—

VENRICK: I've certainly never run into anything like that.[8]

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[8] As Venrick later commented, "One may occasionally encounter a reviewer (of a manuscript or a proposal) who does not agree with the premise of a paper or thinks the proposed work is a waste of time. This is unavoidable. But the system is set up with multiple reviewers and an editor and it *tries* to keep a balanced perspective between accepted knowledge and new ideas."

HARKEWICZ: Okay.

VENRICK: And, I'm not aware that anybody has. It may well happen but I'm just not aware of it.

HARKEWICZ: Okay. You got your Ph.D. in 1969—

VENRICK: Uhm-hmm.

HARKEWICZ: Is that correct? And the 1960s have been described in various locations as the "golden age of oceanography." Now, I know you were just coming out of that time period, but did you get that sense from your experience that it was a golden age?

VENRICK: Well, certainly looking back at the students who came in my class and the year behind me, we picked where we wanted to go after SIO. Right now the graduating students can't get jobs. There are fewer jobs and more students and competition's really tough. But when I was a student, oceanography was a brand new field. It was just starting up in many of the major institutions and everybody was hiring. There was a lot of money available. And now the problem is, of course, we're all the same age and so all the institutions sort of topped out with their quota of oceanographers. We're just now starting to retire and to make room for new people to come in. So yes, it was a great time—especially the resources that were available, particularly money (which translated into opportunities).

HARKEWICZ: So, you think that there were just not enough oceanographers at that time? I mean, you said things were growing, it was new, a new field—

VENRICK: Brand new.

HARKEWICZ: —there was more money?

VENRICK: Yeah. All of the above.

HARKEWICZ: All those things affected it?

VENRICK: Yes. As they would say in biology, we arrived “very low on the growth curve," and it's always a good time when the field is growing rapidly and ideas are being generated. And you're not restricted in how you investigate things by resource limitation.

HARKEWICZ: Okay, you mentioned the whole idea that there's too many oceanographers of the same age group and they haven't retired enough?

VENRICK: Yeah.

HARKEWICZ: Are the resources still there or they're just too many people, you think, now, or too many oceanographers at this point? Or—

VENRICK: *[Sigh]* The resources have not grown to keep up with the demand. In fact, they're talking about next year tying up some of the big ships part of the year, which is just disastrous for a lot of scientific programs, simply because they don't have the resources to keep them all running all year round. And of course there's the perennial problem now of finding jobs for graduate students. Scripps is growing but certainly not as fast as we used to. And our growing pains are painful. It's sort of a forced growth *[laugh]* rather than just a natural growth.

HARKEWICZ: How do you mean by "forced growth"?

VENRICK: Well, space is limiting. And the more people we bring in the more cramped everybody gets. We build new buildings but hire too many new people and there's still not enough space. Not enough startup funds for the people we bring in. So, it's just mainly a problem of resource limitation because I think we're at our population maximum right now. Not just Scripps, but everybody.

HARKEWICZ: So, when you say "resource," I suppose you probably mean a lot of different things, but as far as office space and stuff like that, is that a big, as you said, that's a big problem right there?

VENRICK: Big problem. Big problem. I'm a co-director of one of the divisions and I'd always heard that space was a problem. Trust me, space is a big problem. I probably get more complaints about space, people needing space, "There's not any space. I've got this space but it's too noisy. I want another space." Yes. Space is a problem.

HARKEWICZ: Okay. Well, what was it like when you first came here? I mean, what kind of space did you work in when you were a graduate student?

VENRICK: Well, that's funny because I was totally unaware of any—there may have been horrible space constraints then because there were really only a few buildings. But I was totally unaware of it. In my first year here I actually sat in the coffee room, (it was in the wing that they just tore down) which was probably less than half the size of this room, and it had the coffee pot. We didn't have Xerox machines then. But it served as a place where everybody hung their wetsuits.

HARKEWICZ: And, that's where you worked?

VENRICK: That's where my desk was the first year because they didn't have any student office space available. It was fine. I've always been able to work in the middle of anything. And it was good because that's where everybody gathered to discuss, and so I was right there. I didn't have to—

HARKEWICZ: That's where you sponged all that stuff in.

VENRICK: I was shy. I didn't have to intrude on these discussions. They just came to me. And then I moved into offices with other graduate students, and it was about, as it is now, I think, in terms of a lot of space and sharing. The offices were a little bit bigger than they are in newer buildings, but there were three students to an office, instead of two.

HARKEWICZ: Well, that's not too bad, I guess.

VENRICK: Uhm-hmm.

HARKEWICZ: What do you think is the most important change, like scope or direction in research at Scripps in your time here?

VENRICK: Ooh, there have been a lot of them. Probably in my own field, which is pelagic ecology, it has been the recognition of the importance of things of very small size. This includes bacteria and virus. Some of the very, very early work was just going on when I arrived at SIO. You know, are there bacteria in the ocean and what is their vertical distribution? And, it turns out that the early techniques just were not able to detect adequately what's out there. In my own subfield, in phytoplankton ecology, when I started some of the most important taxonomic groups hadn't even been "invented" then. It took the development of special pigment and other techniques to recognize and quantify what they now call picoplankton. These are organisms five microns down to maybe one micron and less. And, in some areas they're very, very important., We just had no idea that they were out there, and it's revolutionized the way we think about the whole system. Now that's an important change in my field. Another very important advancement that has impacted many disciplines has been the whole appreciation of climate change and the impact on the ocean. Most people agree that that the oceanographic part of the climate change field had its roots in 1958, at a meeting here at Scripps—just before I came in.[9] And

[9] One of the activities of the International Geophysical Year (IGY), which ran from July 1957 to December 1958, was to attempt to accurately measure the carbon dioxide in the atmosphere. Scripps director Roger Revelle (1909 – 1991), who had studied the chemical interaction of seawater and carbon dioxide in the atmosphere in his earlier oceanographic career, and Hans Eduard Suess (1909 – 1993), SIO chemist and developer of the La Jolla Radiocarbon Laboratory (later professor of chemistry at UCSD), hired geochemist Charles David Keeling (1928 – 2005) to take the measurements. The question was: "Are carbon dioxide levels in the atmosphere increasing?" By 1960, Keeling, using a recording spectrophotometer that earlier scientists had deemed too sensitive and too

the program I'm involved with (CalCOFI) has been instrumental in a lot of the data collection and analyses. This is the same field that's recently generated this interdecadal climate shift debate. And, the more we look at that the more we realize that while we used to think the ocean was similar year, after year, after year, in fact it's hugely variable. So that's another very important change in perception that's occurred. And I don't know which is more important. Those are probably the two in my field that I think of first.[10]

HARKEWICZ: Do you think those changes were due to—. Especially with your field, from the way you described it, it sounds more like a technological type advancement?

VENRICK: In the case of what I'll call the small thing, yes. As much as anything, it was technology that improved and increased our awareness. In the case of the climate change it was just getting enough data to document the change and then looking at these data with a fresh perspective. CalCOFI[11] started collecting data in the late forties, and we had a huge El Niño in '57-'58; we realized that something had happened but it wasn't until the early eighties that we had enough data to really understand El Niño was a periodic event. And by then, of course, we'd had an interdecadal climate shift and we didn't even know it. It was another twenty years before we had enough data to detect the interdecadal scale. So, it takes a huge amount of data to really describe these big scales of variability, and now we need to understand them because of global warming—to understand what is global warming, what is anthropogenic, and what is another scale of natural variability that we didn't recognize.

HARKEWICZ: So, that's almost just time?

VENRICK: That's time. Yes.

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expensive for the job, was able to demonstrate a rising level of carbon dioxide in the atmosphere. As historian of science Spencer Weart writes, "Keeling's curve [showing carbon dioxide concentration vs. month and year], climbing ominously higher each year, soon became well-known as an icon of the 'greenhouse effect.'" (Spencer Weart, "The Discovery of the Risk of Global Warming." *Physics Today* (January 1997): 34–40, 39.

[10] Venrick later added, "In geology and geophysics, it might be plate tectonics; in another area it might be the development of remote sensing."

[11] CalCOFI, California Cooperative Oceanic Fisheries Investigation, was established in 1949 in order to research the causes of the failure of the Pacific sardine fishery off California and Mexico. The CalCOFI consortium is composed of the California Department of Fish and Game, the Coastal Fisheries Resources Division (now known as the Fisheries Resources Division) of the Southwest Fisheries Science Center (National Marine Fisheries Service) and the Marine Life Research Group of SIO. Since its founding, the central theme of CalCOFI has been to conduct cooperative biological oceanographic surveys measuring the biological, physical and chemical characteristics of the California Current area. The CalCOFI measurements are the longest and most complete time series of oceanographic and ichthyoplankton data in the world. In May 1997, the CalCOFI data base was recognized as a national science treasure by a peer review panel of distinguished scientists.

HARKEWICZ: Okay.

VENRICK: Time and technology. I don't think we're getting any smarter. So, I think those are probably the two driving things in a lot of—

HARKEWICZ: But it really wasn't, I guess from the way you describe it, it wasn't some huge changes in the science itself?

VENRICK: Well, in the case of the picoplankton, yeah. That was a change that was technologically started, but then it turned our focus to something that we didn't realize was important—and that drove more technology because we realized that we needed to be able to do this or be able to do that. And so, that's kind of a snowballing effect. The change in the direction of the science was both the difference in perceptions, and the difference in the technology.

HARKEWICZ: Okay. I want to talk a little bit more about the climate change a little bit later, but why don't we go backwards a little bit.

VENRICK: Okay.

HARKEWICZ: So, we were talking about changes within science, or changes at Scripps, but what about changes in societies, things like the Civil Rights Movement, and the Women's Movement, and things like that? How do you think that affected work at Scripps or oceanography in general?

VENRICK: Certainly women in science *[laugh]* I think I can speak to.

HARKEWICZ: I think you can do that.

VENRICK: Civil rights I would have a little more trouble because I suspect that we have not felt the changes here that have been felt in society at large simply because we don't get many black applicants, and that's a problem. There are very, very few people in the field of oceanography that are black. I can't honestly say that they would not have had the opportunity to enter oceanography before the Civil Rights Movement, but it has been a change that's much different locally than the broader civilization. The situation with women I've seen change a lot. When I first came in, I was the first woman admitted to biological oceanography. And I learned later that my major professor, Dr. Fager[12], who was one of the fairest people I had ever met, was concerned enough about admitting a woman that he asked the guys did they think it would be okay. And, I gathered that this started off the usual bit about, "Well, what's she look like?" that sort of thing. And

[12] Edward William Fager (1917 – 1976), SIO marine ecologist.

one of them started a rumor that I was six foot two, and they all believed it until the day I walked in the door.

HARKEWICZ: Did they seem disappointed when they saw you?

VENRICK: I didn't hear about this until years later. Somebody told me about this. I'm sure there were a lot of things that happened then that now would not—would be interpreted as sexism. I was just totally oblivious. I've heard plenty of other stories from colleagues of mine who had more pointed experiences. A good friend of mine told the story that when she was, I think, applying for admissions, one of the male professors said, "Well, do you realize you're going to be taking food out of some family's mouth," reflecting the current dogma of Man-as-the-Breadwinner. Going to sea, it turned out I was also the first woman to go to sea alone. I believe this is true. There had been a few women who had gone to sea in groups or in pairs, or with husbands, but my very first cruise, I was slated to be the only woman. John Isaacs[13], who was director of CalCOFI and a very influential person at the time, did not think this was right. Until the very last minute he was going to send his high school daughter out to sort of balance things off. I was personally incensed because I was going to be chaperoned by a high school girl? And here I was a graduate student. And, I knew the guys. I mean, these were my graduate school friends and so I had no problem with being the only woman. And then she didn't go and I never did quite figure out what happened there.

HARKEWICZ: That was when you went on the Ursa Major?

VENRICK: That was Ursa Major.[14]

HARKEWICZ: And that's in '64, I think it was?

VENRICK: Sixty-four. And, I've since met Carolyn Isaacs, who was the high school girl in question, and she's a lovely person. I would love to sail with her sometime. In more recent years, I've seen women join the crew. I've seen women be chief scientists. But back in the mid-sixties women at sea were viewed with skepticism. I remember once I was on the first leg of a cruise (San Diego to Kodiak, Alaska) and I wanted to continue on the cruise across the subarctic. This was in January-February. It was a pretty rough cruise. The chief scientist at that time said, "No. It's too rough for a woman." I had plenty to do. I didn't need that particular adventure. I know

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[13] John Dove Isaacs (1913 – 1980), Scripps biological oceanographer.

[14] The Ursa Major Expedition was leg #1 of a scientific cruise aboard the SIO ship R/V *Alexander Agassiz.* The Ursa Major leg was from San Diego, California to Kodiak, Alaska and took place from August 4 to August 20, 1964. Leg #2 was from Kodiak, Alaska to Honolulu, Hawaii and took place from August 25 to August 31, 1964. The expedition sampled zooplankton biomass (displacement volume) on board ship. For more information on Venrick's work during expedition see, E. L. Venrick, "Recurrent Groups of Diatom Species in the North Pacific." *Ecology* 52.4 (July 1971): 614 – 625.

another gal who was on a cruise and the chief scientist said, "Don't wear a bathing suit." These were experiences that accompanied the early acceptance of women at sea. Now I think our graduate student incoming class is slightly more than half women. And, people don't think anything of both sexes at sea. I've been on cruises where I've bunked with a guy, because the distribution of bunks didn't match the distribution of sexes. You know, you try to avoid the situation but if it happens, it just happens. That's been a big change, just the way we're treated.

HARKEWICZ: Did you feel like it was harder for you, at all, being a woman?

VENRICK: No. It might have been, but I never felt it. In some ways, being a woman was an advantage. I've talked to people who went through graduate school at the same time and they often have very different perceptions. I think that so much is just your own particular outlook, or whatever you want to call it. But I simply was not looking for discrimination and I never found it.

HARKEWICZ: Well, that's good. How soon after you were accepted in the program, were other women?

VENRICK: The next year.

HARKEWICZ: Did you feel any less pressure or anything? Or maybe even feel pressure to begin with?

VENRICK: No. I was almost sorry. I liked having all the guys to myself. One of the gals who came in, and I believe it was a year or maybe two years after me, is one of the women who talked me into the harmful algal program I was just referring to.[15] One thing that I do remember of those early days is that so few of the women actually went on to work in the field. Most of them either got married as soon as they got their Ph.D., and started raising families, or they got married during their career and quit research. To that extent, the concern about women in the field was being justified, by women. And now, of course, women do both. I don't know how they do it. Nobody thinks anything of it.

HARKEWICZ: All right, let me ask you this, though. You may not be able to answer it, but do you think that may have been because they did have a different experience and they just didn't feel comfortable enough to stay in the field so that they looked, sort of, for an out, so to speak?

VENRICK: I don't know. For some people that might have been true. But, I can think of a couple cases where it seemed like their career was going fine. One in

[15] Mary Silver at UCSC. See note 6.

particular just quit right in the middle of graduate school and had twelve, ten or twelve kids.

HARKEWICZ: Not all at once of course?

VENRICK: No. But, that's what she had always wanted to do and I think in this case she was pressured into going into graduate school by her parents. Some of them may have simply not been able to find a job. I mean, that's another aspect that I don't really know too much about. I was lucky in that respect. But that could very well be another reason. So, it's all part of it, you know, it's just again the chicken and the egg situation.

HARKEWICZ: Exactly. I'll just ask you one more question about this whole thing. You didn't feel a necessity to bond with the other women students or the other women oceanographers as—

VENRICK: No.

HARKEWICZ: Any special connection with them that you didn't have with the men, or anything like that?

VENRICK: Not really. Hmm. For one thing, there were so few of them. I became good friends with Mary, and I still am. But, there were so few women around that there were very few of my particular temperament.

HARKEWICZ: I see.

VENRICK: I think I probably—it was probably many, many years before I developed good women friends, who were also in oceanography.

HARKEWICZ: Okay. And that was Mary?

VENRICK: Mary Silver. She's at Santa Cruz.

HARKEWICZ: Okay. Well, let's talk about another movement of the sixties, or started in that time period. I tend to think of the environmental movement as social movement, or that affects public policy. But, I was reading in CalCOFI references about the change in the way research was done around the late sixties and how it sort of moved to a more ecosystem-based, more interdisciplinary research mode. And, I was wondering if you thought that science was influenced by the public desire or if science sort of preceded public interest in the environment?

VENRICK: Well, I think over time science has become more and more responsive to society. I can remember, in the 1970s, quite apart from CalCOFI, that

doing practical research was sort of selling your soul to the devil type of thing. Applied research was inferior science.

HARKEWICZ: Right. Okay.

VENRICK: "Let somebody else do applied research. We are scientists." That view is certainly gone, and I don't know exactly when or why it left. CalCOFI is a kind of an interesting situation, though, because it was started by a situation that's not all that uncommon today. There was a huge fishing industry—I don't know how much of this you know—that went broke when the sardine population crashed. Some people, such as the California Department of Fish and Game, wanted to shut down the fishery because they thought sardines were being overfished. The federal agency at the time said, "No, it was just climate, it was climate change. It was the ocean change." In retrospect, they didn't really know what they were saying. The fishermen objected, saying, "You can't shut us down. The fish are out there. They've just moved." The state was preparing to enact state regulations against landings, which would have curtailed the fishery. So the fishermen—and they still do this—they said, "Wait. Wait. Wait. We don't know enough. Let us fund a study." This was a delaying tactic on the part of the fishermen, there's no doubt about that. But that started CalCOFI. Two of the partners were the state fisheries agency and the federal fisheries agency, who had very different opinions as to what had happened to the sardines. Each had evidence on their side, good evidence, or as good as we could get in those days. I often thought Scripps was stuck in there just to keep the peace. On paper we were included to provide the oceanography perspective. But looking back, it is amazing how much foresight the people who actually designed that program had, because we had no idea what was going to come out of this program. The fact that they actually combined the oceanography with the fisheries science was unique at that time. I think the program itself—although the motivation behind it was driven by society—I think the program itself was extremely well designed and driven at least in part by the scientific interests of the parties.

HARKEWICZ: And who designed it then? Was it the state or some sort of—

VENRICK: It was this committee. Scripps, the feds, which was then the Bureau of Commercial Fisheries (now it's NMFS[16]), and the State Department of Fish and Game. Although I knew many of the key persons back then, I don't know who were actually the designers. It's fascinating history to read. But then CalCOFI started, and the more the data came in the more

[16] National Marine Fisheries Service (NMFS) is part of NOAA (National Oceanographic and Atmospheric Association). NMFS is a federal agency, a division of the Department of Commerce. Its mission is the stewardship of the nation's living marine resources through science-based conservation and management and the promotion of healthy ecosystems.

fascinating it became. It was only, what, ten or fifteen years ago when we recognized interdecadal climate shifts that we realized that it probably was largely a climatic oceanographic change that had affected the sardines. That's one of the big fascinating problems now. There is a clear interdecadal pattern in the sardines, but it's the same pattern on both sides of the North Pacific, and also down off South America. All these sardine populations show the same fluctuations even though they're in very, very different environments. And the climate shift affects their environments very differently. Yet all the sardine species go up and go down in synchrony with ours. But some environmental conditions are 180 degrees out of synchrony. It's one of the real interesting problems.

HARKEWICZ: That's something that hasn't been explained?

VENRICK: There are some interesting theories. One of them that was given at this last CalCOFI Conference by a little Japanese fellow who fortunately had very good visuals, because it was difficult to understand his English. But he thinks that in fact the populations have genetically diversified to the extent that they respond to different environmental cues. I don't remember all of his reasoning now. Another theory is that one thing that is in common, let's say to Japan and California, is that currents speed up on both sides of the North Pacific and so the eddy fields change. The population increases and declines may be a factor of eddy retention of eggs and larvae, even though California warms as Japan cools,

HARKEWICZ: So it's not a simple temperature change?

VENRICK: Well not, not on the surface. Because as this climate flip-flops the temperatures of two halves of the North Pacific respond in opposite ways. California gets warm and Japan gets cold, and vice versa.[17]

HARKEWICZ: So, you're saying—okay, am I understanding this right? You're saying the changes are opposite and yet the . .

VENRICK: The sardines increase at the same time, even though they're experiencing opposite temperature changes.

HARKEWICZ: Wow. I can see why that would be difficult.

VENRICK: In terms of temperature. Now, there may be some other factors that, like the eddy fields, respond in synchrony.

HARKEWICZ: Right.

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[17] Venrick later explained, "The alternation of temperature regimes off California has been postulated to explain the change between sardine dominance and anchovy dominance."

VENRICK: So, there's a lot to be learned there. But it's truly amazing.

HARKEWICZ: Okay. Well, let's go back to what you said about you think science has become more responsive to society.

VENRICK: Uhm-hmm.

HARKEWICZ: Do you think that's out of necessity because—

VENRICK: Partly, I think it's probably self-serving because as resources get tighter and tighter we're looking more and more for other sources of funding. But, I also think that scientists, per se, are now more aware of the scientific challenges that some of these societal problems present. And realize that there really is good science to be done in answering what's basically a societal problem.

HARKEWICZ: A practical issue?

VENRICK: Uhm-hmm.

HARKEWICZ: What about the whole funding issue? When you came to Scripps did they still have military funding at all?

VENRICK: Uhm-hmm. Uhm-hmm.

HARKEWICZ: Do you think that that has—. Again, you said out of necessity, as the military funding went down and other funding sources went up, do you think that that affected the relationship between society and science? Or—

VENRICK: Well, I was in a program that had ONR[18] funding for many years. They had a good pot of money that went to pure science. I know there was a lot of science of a more applied sort that was funded by the Navy, but my own experience with the Navy has been pretty positive. Actually that program ended before the Navy money became tight. So, I really don't have a first-hand feeling for how the ultimate restrictions on military funding affected most sciences.

HARKEWICZ: Well, when you talk about the whole idea of pure versus applied science that's a big, big discussion in Science Studies.

VENRICK: Uhm-hmm.

HARKEWICZ: So, what do you personally feel about the whole thing? Do you have issues with one way or the other? Do you have, you know, think that

[18] Office of Naval Research.

applied science is dirty or something, in some respect or anything like that?

VENRICK: No. Both "pure" science and applied science have good work and poor work. I do a little bit of both.[19] Two colleagues of mine, Paul Dayton and Clint Winant[20], were involved in a project in which one of the big companies[21] proposed to establish a big salt works in a lagoon in Mexico—a lagoon that was adjacent to a lagoon where the gray whales breed. This project caused a huge uproar, and they actually were funded by—[22] ##

HARKEWICZ: ## You were talking about funding a study by a salt company?

VENRICK: [23]—to look at the environmental and ecological damage that would be done by putting this salt work there. I heard Dayton and Winant present their findings a couple different times and their conclusion, which was quite well documented scientifically, was that oceanographically the salt works' impact would be minimal and would not affect the whales. They both said as an aside that they were more concerned with the loss of the pristine nature of the terrestrial environment and the growth of the support communities. They thought that was going to be a much worse problem. When that study came out, Dayton and Winant were absolutely crucified by the environmental movement, which had recruited some surprisingly respectable scientists, who had never read the study. The opposition just automatically assumed that the scientists had been bought by the salt company. My colleagues said they would "never ever touch that kind of money again," and I don't know if they've changed their minds in the subsequent years. This was what, five or ten years ago? It left a bad taste in everybody's mouth. So, what am I trying to say here? I think that the more traditional scientific funding agencies or funding mechanisms are being set up to address societal problems but the general acceptance of such studies still needs improvement.

HARKEWICZ: Like the National Science Foundation and things like that?

VENRICK: Within the National Science Foundation. NOAA, of course, has always had a practical focus. Again, except for CalCOFI, which is a rather unique program, the practical problem I am most familiar with is the harmful

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[19] Venrick later added, "…pure and applied—hopefully all 'good.'"
[20] Paul Kuykendall Dayton (1941 -), professor of oceanography; Clinton D. Winant (1944 -), professor of oceanography.
[21] Venrick later proposed that the company may have been Mitsubishi.
[22] Venrick later added that this situation created a huge uproar "in the environmental community, that feared harm to the whales. The funds for the research to provide background information for the environmental impact report, although originating with the salt industry, were managed by NSF, and the research had the same rigorous outside review as any unsolicited research project."
[23] Venrick later added, "NSF, not the company, managed the study which was…"

algal blooms. And most of the major funding agencies have a HAB component that looks directly at harmful algal bloom,[24] not only their ecology but their impact on society—fishing and human health and tourism, etc. That is an uncontroversial mechanism for funding HAB research. But there's still a lot of wariness about individual scientists contracting directly with industry for some of these consulting jobs, where the funding source has got an obvious bias toward the result. I've heard a lot of mechanisms suggested for buffering the two entities. Some of them sound like they would work. I just don't know how many of them have been put into place.

HARKEWICZ: Is there some sort of filtering group or something that you have to go through when you fund something? You know, you said, "mechanism." I mean, do individual scientists sort of choose their funding sources? You know, you said these people that did this study for the salt company "don't ever want to get involved with that kind of thing again." Is there some sort of upper level person you have to go through for funding approval, so to speak, for anything that would—

VENRICK: Not in that sense, if I understand you correctly. We are pretty much free to get money wherever we can, as long as we don't commit ourselves to more than a hundred percent of our time. And, as long as we deliver the research. Especially with the more applied projects, the consequences of not delivering are serious for the institution as a whole, and there's more and more scrutiny at the level of the institution if a scientist is not delivering a promised product on a contract. I've seen this scrutiny applied to some of the city and county contracts. But in terms of the institution saying, "No. You can't take that money," no.[25]

HARKEWICZ: Okay. So you're saying, if I'm understanding you right, that anything that would maybe have a certain practical societal application with—. Application sort of implies that it's applied science then, from the way you look at it? Is that right? It's just not theoretical?

VENRICK: I don't think you can make that distinction anymore. That distinction used to be made, but I think more and more people are realizing that you can't just pull theoretical and applied apart. There's a whole spectrum. There are some projects which are clearly applied with very little product of what I would call scientific interest, at least directly. But, you never know

[24] Venrick noted that her research into harmful algal blooms (HAB) "investigated the coherency of toxic algae along the Central and Southern California coastline."

[25] Venrick noted, "Since this interview I have encountered a rather odd situation in which the University refused to allow a PI to form a contract with a state agency to do some research. This however, was a legal problem, not a problem with the proposed work. The situation has not yet been resolved."

when generated data is going to become fascinating to somebody in some context.[26]

HARKEWICZ: Since we're talking about funding, maybe I should go to my funding questions. I was just wondering if you could tell me about writing your first grant proposal and what that was like? Maybe who you had to write it for?

VENRICK: We didn't get funded. That's what I remember.

HARKEWICZ: Well then, I wonder, was it a good experience or a bad experience?

VENRICK: Well, it was certainly educational. I had just gotten my Ph.D. and a professor down the hall, John McGowan[27], who may be on your talk-to list, got a number of us together to get funding to work out in the Central Pacific. That was my very first proposal, and I thought I worked very hard on it. I probably didn't. Ultimately, we managed to keep the study going for several years even without funding, just by piecing together little bits and pieces. Largely that was John's doing.[28] It was a very valuable program, and it should have been funded.[29] That was the first proposal that I helped to write. And then for a long time, because I'm in CalCOFI, and my research is not terribly expensive, I've been kind of buffered from the necessity of writing proposals. I mean, I've been involved in a lot of them but they haven't been critical to my work viability.

HARKEWICZ: Your work hasn't depended on the grants or anything?

VENRICK: Right.

HARKEWICZ: So, where do you get your funding from, then?

VENRICK: My salary comes from through the state and was originally tied to CalCOFI. And, my funding expenses are minimal, unless I want to go to sea and actually direct a cruise. Some formalin and some sample bottles. I have been, as I say, I have been involved in programs that sought funding, sometimes successfully and sometimes not. This harmful algal bloom was the most recent one. That was funded through the UC Office of the President. We also have a proposal into the ECOHAB[30] Program which I

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[26] Venrick added, "Routine monitoring used to be considered mindless. Now such data are the primary means for understanding global change."

[27] John Arthur McGowan (1924 -), professor of biological oceanography, SIO.

[28] Venrick later noted, "This was easier to do in those days when resources were more plentiful."

[29] Venrick later quipped, "No bias there?"

[30] ECOHAB (Ecology and Oceanography of Harmful Algal Blooms) is a national, coordinated scientific research program to study the trophic impacts and population dynamics of harmful algal blooms. Among the topics that the program studies are: How HAB species respond to and/or alter the environment; how the distribution and abundance of HAB species may be regulated by the environment; and how HAB species are affected by, or effect,

think is a combination of funding agencies, administered by NOAA. But the bottom line is that I have not had the funding battle that a lot of people have had. So, I'm probably not the right person to ask about funding.

HARKEWICZ: But, if you were to go on a cruise, where would you look for the money for that?

VENRICK: Well, it would depend upon what the problem was. Almost always, anymore, if you go to sea it 's with a group of people. You have a whole program that will utilize the ship. This involves large, multidisciplinary/multi-institutional funding proposals. The alternative to that is to be a tag-along program on somebody else's cruise and then all you need really is your travel expense and your supplies. But, in either case, probably NSF is the primary agency for the kind of work I do. CalCOFI receives its funding through NOAA. For some of the near-shore stuff, Sea Grant is sometimes helpful. I inherited a Sea Grant Program once when the PI took a job in Chile. But that's the only Sea Grant funding I've had so far.

HARKEWICZ: When did you get involved with CalCOFI?

VENRICK: Well, in a way I've been involved from the very beginning because I've always had a CalCOFI billet. But, back in the golden years when resources were not a problem, CalCOFI was defined as the study of the California Current and “all its tributaries”. And so a lot of this work that we did out in the Central Pacific was paid for by the CalCOFI Program which at that point had quite a bit of money. And then they, like everybody else’s, their budget's gotten tighter, and tighter, and tighter.

HARKEWICZ: So, again, even at the beginning you weren't dependent on writing grants for the most part?

VENRICK: No.

HARKEWICZ: Okay.

VENRICK: I've been a participant but not—

HARKEWICZ: Okay. So, backing up to what Scripps meant to you, were, or are, there aspects of your job that you'd like to change?

VENRICK: Yes. I don't like being an administrator. *[Laugh]*

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food web and community relationships. ECOHAB is administered through NOAA (National Oceanographic and Atmospheric Administration) and jointly sponsored by NOAA, NSF (National Science Foundation), EPA (Environmental Protection Administration), NASA (National Aeronautic and Space Administration), and ONR (Office of Naval Research).

HARKEWICZ: And why is that?

VENRICK: I've never thought of myself as an administrator. I don't really—well, this gets complicated. Professor Michael Mullin[31] previously had the job that I now hold It is a two-pronged job: co-director of a research division and the Scripps director of the CalCOFI Program, both of which are shared positions, but have evolved being very tied to one another. Mike died very suddenly in 2000. At that point he had been off campus for a while, and he had appointed me to stand in for him. Because the division was in the middle of administrative file action when he died, I agreed to stay on for five months. I'm still here. Parts of the job I rather like. I think I'd be a good chief of operations. I kind of like getting things done, but I'm not a visionary and the CalCOFI Program has recently gone through a huge financial crisis and hopefully, rejuvenation. It has really needed somebody with more of a, "Where do we want to be in twenty years," approach. But that's not the way I think. I take little pieces and put them together into a picture but I don't look beyond the boundaries of that picture. So, that part of the job has not been very satisfying to me, because I don't think I've done it as well as someone else might have done.

HARKEWICZ: Okay. The co-director: is this the Marine Life Research program?

VENRICK: It was Marine Life Research Group and one of the very first things that I was involved with as director was a merger with the Center for Coastal Studies. There were a number of reasons to merge. Mike Mullin had been talking to CCS about this anyway. We were two very small divisions. The merger was a natural in many ways, which I won't go into. Also there was a lot of pressure from the director's office to make fewer, larger divisions. And so we thought, and I think properly so, that it was better for us to be proactive and go the direction we wanted to go then to be forced in with another division along a disciplinary line. Because MLRG was very much interdisciplinary. And so, the division is now IOD, Integrative Oceanography Division, and I'm co-director with Bob Guza[32], who was a graduate student here when I was. Bob was previously the director of Center for Coastal Studies. And so, yeah, it used to be MLRG but now it's IOD.

HARKEWICZ: Okay. So, if I'm understanding you, you chose who you wanted to bond with as opposed to having the director tell you the new groupings?

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31 Michael Mahlon Mullin (1937 – 2000), research biologist, professor, and director of Marine Life Research Group (MLRG) ,1989 – 2000.

32 Robert Thomas Guza (1948 -), professor, researcher, and co-director of Integrative Oceanography Division (IOD).

VENRICK: And we had to work very hard to sell the idea of an interdisciplinary division, which is sort of contrary to classical thinking.

HARKEWICZ: Do you have any idea why they wanted to have bigger and larger groups?

VENRICK: It had to do with communications, I think. There were so many little divisions.[33] Don't get me into Scripps administration, please. But—

HARKEWICZ: Ah. I've hit a nerve.

VENRICK: You would hit a nerve with just about anybody you talked to. I think the director wanted to get representatives from the divisions who could have meaningful discussions and advise him. There used to be, what, twelve divisions, and he thought that was too many. And then they added all the curricular groups which was another dozen. So now we have two dozen people at his roundtable. And, he just felt that it would be easier to have fewer people in his advisory group, and there's some validity there. Now, he has accomplished that with a different structure and there's some question as to whether he's listening to the advice he gets. But anyway—turn the tape recorder off.

HARKEWICZ: Okay.

VENRICK: Erase that.

HARKEWICZ: All right. You'll have a chance to edit anything, you know. We can discuss it in the future. So, okay, you said you didn't like administration, administrative duties or whatever.

VENRICK: I don't like leading. I don't like being the leader and the visionary, and so on and so forth. I don't like space either.

HARKEWICZ: Dealing with people's space issues?

VENRICK: But I get satisfaction from getting the file actions through, for merits and promotions. It's a nuisance, but rewarding in its own way.

HARKEWICZ: Have you felt any tension between your personal intellectual interests and the goals of Scripps, or conflicts with duties like administrative, or anything to that effect?

VENRICK: I think there's a tendency in science, per se, and at Scripps, definitely, to move to high-tech, large program science. And, I'm a little concerned. I think some large program science is good but I'm concerned the scale of this move is sacrificing small program science. Certainly in biology and

[33] Venrick later noted, "I'm not sure that I think these are valid, by the way."

ecology, there's an awful lot of science that is not efficiently done in large programs. Even with some of the big biological programs that have been going on, it's questionable whether or not they are the most efficient way to conduct the research. But, Scripps seems to be emphasizing big programs, and little programs like taxonomy and systematics, which are vital to ecology, are overlooked or considered old fashioned. Scripps wants to jump into DNA research and catalog all the DNA in the ocean. But, if you don't have the traditional systematists we will never relate the DNA to our huge store of ecological and biological knowledge. This direction bothers me, although it doesn't affect me in my own research so much

HARKEWICZ: Do you think that's pressure, again, from society or funding sources?

VENRICK: It's very much, I think, funding driven. Because Scripps is in competition with all the other research institutions, Woods Hole particularly. I suspect a lot of it is getting the funding. Now why the funding agencies are going so strongly for large programs, I'm not sure. I can see in the case of the climate problem they simply have realized much too late that they need a lot of data. And, I think that is probably appropriately handled in the form of a large program. But, there are a lot of things that I believe are best researched on small scales—it's not certain, and I probably shouldn't even try to judge. Maybe in twenty years we'll look back and say, "Oh yes. That really was a much more efficient way to do it than we thought at the time."[34]

HARKEWICZ: But, you sort of feel that certain sciences have—every science can't be done in the same way as—

VENRICK: Absolutely not. And, taxonomy is in really sad shape. It's very hard to fund systematic work anymore because it's looked at as old-fashioned science.

HARKEWICZ: Well, that sort of leads into a question. You know, at one time Scripps had sort of switched from biological oceanography to more physical oceanography. And, do you think now, with all this interest in climate change, do you think they have gotten to the right balance between physical oceanography and biological oceanography?

VENRICK: I think the momentum is still on the side of physics and geophysics. I do think that SIO's stated goals of tackling problems of societal relevance

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[34] Venrick later mused, "Another quirk of funding agencies that I have never understood, is their reluctance to support retroactive analyses. As a consequence, most scientists run out of funds and must move to a new research topic long before all the information has been extracted. This is changing a little as the world begins to realize that often the only way to understand today is to have a sense of what happened yesterday—a perspective that is definitely a consequence of global change."

and getting involved in some of the big programs that are designed to do that is slowly bringing biology back to the mix. I think it'd be interesting if we had a biologist as a director. But, we have had physicist directors ever since I can remember. Well, since Revelle[35], I guess. Certainly Nierenberg and Frieman, and Kennel[36] are all nuclear physicists, and they see the world as more organized than it perhaps really is.

HARKEWICZ: That's sort of a tension between different sciences again, that every science can't be—

VENRICK: Yeah.

HARKEWICZ: —seen in the same way?

VENRICK: And, the other thing which is true, and I'm not sure if it's a flaw or not, is that physical oceanographers and geophysicists are generally more technologically advanced than biologists, and they seem to be able to get together and present a better unified voice in Washington. I think both of these are probably important in determining where the balance is right now. That doesn't mean I agree with it.

HARKEWICZ: Do you feel any restrictions because of that kind of an attitude, in your own work?

VENRICK: No.

HARKEWICZ: Or do you feel that it really doesn't affect you that much?

VENRICK: Only as it translates into resources, and lack of availability.

HARKEWICZ: Okay. Let's back up again, if we can, and talk a little bit about how Scripps was structured, especially when you first began here. You said something about starting in the marine biology program, is that right? The Marine Biology Department, I think?

VENRICK: I don't even know what they were called then. It was certainly it was one of the curricular groups. Scripps has got a weird structure.

HARKEWICZ: Well, tell me a little about that.

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[35] Roger Randall Dougan Revelle (1909 – 1991), SIO director 1951 – 1961.

[36] William Aaron Nierenberg (1919 - 2000), SIO director 1965 – 1986, Ph.D., physics, Columbia University, 1947; Edward Allan Frieman (1926 -), SIO director 1986 - 1998, Ph. D. plasma physics, Polytechnic Institute of Brooklyn, 1951; Charles Frederick Kennel (1939 -), SIO director 1998 – present, Ph. D. astrophysics, Princeton University, 1964.

VENRICK: Ever since I came here the educational structure has been more or less independent of the research structure and they're kind of superimposed upon each other. So, a faculty member has a curricular group, which is his educational role, and a division, which is his research division. Every director who comes in tries to simplify this and line them up, and I don't know, they all give up in frustration.

HARKEWICZ: So, when you say you were in the curricular group, what does that mean?

VENRICK: I applied to the Marine Biology Curricular Group and they put me into Oceanography Curricular Group.[37] That was my educational track. Now, my major professor was both a faculty member in biological oceanography, and he was—I don't even know what the division was. Maybe it was Oceanography Division back then. I was kind of unaware of all the different structural—

HARKEWICZ: It sounds like maybe you were better off being unaware.

VENRICK: Yeah.

HARKEWICZ: Sort of confusing the way it was.

VENRICK: I'd have to do some research, because I think maybe there was just an Oceanography Division then, which was the Research Division and then it began to proliferate and became physics and chemistry, and biological oceanography, and then geophysics, and climate.[38]

HARKEWICZ: What is it like now for you? What is your position?

VENRICK: I'm affiliated with the Biological Oceanography Curricular Group. I am a lecturer, and then I'm with the Integrative Oceanography Division.

HARKEWICZ: Do you spend a lot of time teaching, then?

VENRICK: Not since I became an administrator. I've done almost nothing with the Curricular Group, and in fact I think I just dropped my lectureship because I just have been too busy to teach. It's just a double whammy of both CalCOFI during this whole budget crisis, which almost sunk us and IOD which has had its own problems with the Scripps administration always trying to reorganize us along disciplinary lines. So, it's been really busy, probably busier than it would be if things were calmer. And I just gave up teaching. I've almost given up research. But there actually is a search out

[37] Venrick later added, "At that time, I think there were only two groups and they were called departments— now there are eight or ten or so".

[38] While editing this transcript, Venrick noted: "I looked this up. There were three research divisions: Marine Biology, Oceanography and Earth Sciences; Marine Life Research Group was a "lab," not a division, in those days."

now for a new director of the Scripps-CalCOFI, and at that point I will be able to at least spin-off that administrative hat and get back to research.

HARKEWICZ: Did you enjoy teaching when you did it?

VENRICK: I did. I didn't teach a lot. I taught a nonparametric statistic class every other year, but I was a lot more active with student committees and the seminars and things like that. So, I was interactive a lot more.

HARKEWICZ: Did you feel any pressure, as a woman, to teach more than a man might?

VENRICK: No.

HARKEWICZ: Okay. When you said you haven't—you've gotten away from research, do you feel like this administration, this string of duties, were thrust upon you against your will somehow or other?

VENRICK: Uhm . . .

HARKEWICZ: Due to the structure of Scripps or something?

VENRICK: No. I think it was just a combination of unfortunate events. Of course, starting with Mike's death. Then his second in command who sort of oversaw the CalCOFI program retired unexpectedly. Tom[39] was a good friend of mine, and he was on sabbatical at the time of Mike's death. Mike died in December and I think Tom returned the following May. And at that point I thought, "Okay, he will take over the CalCOFI Program," and he and his wife were here a month and they turned around and said, "Guess what? We're going to retire." They took an early retirement—both of them. When they had taken sabbatical they'd gone cruising up and down Baja in their little thirty-foot boat, and they suddenly realized that there was so much more that they wanted to do with their lives and they weren't getting any younger. And so, that's that. Bingo. I visited them this summer on the Chesapeake Bay, and they're just having a grand time. But, that sort of left me in the lurch with CalCOFI management, and then we had the budget crisis and nobody could hire anybody. You know, I could have screamed and yelled and said, "Get me out of here," but I was afraid of what would happen to CalCOFI if I did that. Also we had just merged, or were in the process of merging, MLRG with Center for Coastal Studies, and I wanted to keep IOD going. So, it was possible that I could have gotten out of administration, which is quite different than saying I enjoyed it. I'm getting very tired of it. So.

HARKEWICZ: When you first started, who did you say your supervisor was?

[39] Tom Hayward (1951 -), research associate, Integrative Oceanography Division (IOD).

VENRICK: His name was Bill Fager.[40]

HARKEWICZ: Did you interact much with him? I mean, what kind of a supervisor was he?

VENRICK: He was not a warm fuzzy. He was aloof, very kind, very fair, but he was just naturally somewhat aloof. He probably was a little bit uncertain how to interact with me. And I just went charging on. But, as you probably know, a book came out for the Scripps' centennial that was a collection of mini-biographies about persons who influenced SIO history.[41] There was a chapter in there about Fager, primarily written by Jim Enright,[42] although I helped a bit—and there's a section describing the lab. I don't remember how Jim phrased it, but he described the person who was the "mother" of the lab, who provided the feeling of lab unity[43]. It was not Fager: it was his technician whose name is Thea Schultze[44]. And she was the polar opposite of Fager, who was always a little bit formal. Always, I think, he wore a tie. Maybe he was more of a European-style professor.[45] As I say he would spend as much of his time as a student wanted or needed, but he wasn't the sort to come in and sit down and prop his feet up and say, "Hey, what ya doing today?" you know. So, he would provide what you asked him for, and I probably didn't ask him for as much, in retrospect, I should have. But—

HARKEWICZ: Why do say that?

VENRICK: In, well, I don't know why I say that. Certainly he was very influential on the kind of research I do. That was extremely good. In terms of doing things like writing proposals, students now get a lot more training, even in the class forum. "The class assignment will be to write a mock proposal, and justify it." I didn't have any of that experience. And, whether or not it was just Fager or whether or not it was the times, I really can't say. One of

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[40] See note 12.

[41] Robert L. Fisher, Edward D. Goldberg, and Charles S. Cox, editors. *Coming of Age: Scripps Institution of Oceanography, A Centennial Volume, 1903 – 2003.* (La Jolla, CA: Scripps Institution of Oceanography, University of California, San Diego, 2003). Chapter on E. W. Fager written by J. T. Enright, pages 31 – 44.

[42] James T. Enright (1932 – 2004), professor of behavioral physiology at SIO.

[43] Enright wrote, "Thea not only helped with Fager's research in the laboratory, but also acted as a kind of 'den-mother' for his graduate students. A warm-hearted soul, she baked birthday cakes and offered advice and emotional support on everything from pre-exam jitters to broken hearts. Thea was Fager's technician throughout his entire career at Scripps and it is difficult to imagine someone better suited to complement his reserved personality" (*Centennial* 42).

[44] Thea Schultze (1924 -). Schultze started as a lab technician working with Dr. Ted Walker (1915 – 2003; animal behaviorist and SIO oceanographer 1948 – 1969) in 1956. In 1957, she moved to work identifying animals under the microscope in Fager's laboratory where she eventually obtained the title of staff research associate. She worked with Fager until her retirement in 1985. She is known for the "Flip Flop" dance, done in goggles and diving flippers, which she performed, upon special request, at Roger Revelle's 50th birthday party in 1959.

[45] Venrick later noted, "he had received one of two doctorates in at Oxford". Fager received his second doctorate, in ecology, from Oxford in 1955.

the other things that may have been important was that most of the students were so much older that they didn't need the kind of practical direction that students get now. And which I probably could have benefited from. I was pretty young. I don't know that it really ruined me.[46]

HARKEWICZ: But, you didn't feel that he treated you any differently than anybody else?

VENRICK: He might have been a little bit more careful of me, as the woman. I always got the feeling that I passed my departmental exam because people thought I was going to cry if they flunked me.

HARKEWICZ: Oh no. Oh no.

VENRICK: But, it worked. And, I did fly through my quals so I guess I made up for it.

HARKEWICZ: That's good. That's good. So, I guess you didn't socialize much with Bill Fager?

VENRICK: When we did, when he had a visitor in town, he would have a group over and it was always a little bit strained. The conversation was more intellectual and there wasn't a lot of guffawing. Compared to the lab parties that go on nowadays, it was more a more formal sort of event.

HARKEWICZ: What about your own graduate students or the people that you've supervised over—do you interact with them very much on a more social basis?

VENRICK: I really have never had a graduate student all of my own. I've been on a lot of committees. I socialize—let's see, how do I want to say this? I don't not socialize with them. In some ways, the context in which I get to know them best is going to sea.

HARKEWICZ: That makes sense.

VENRICK: And, that's definitely a social event, even though it's very scientifically oriented. But yeah, I think I socialize with them about the way I socialize with most of the people around here.

HARKEWICZ: I know that, it sounds like, at least, that there was a lot of people going to parties together and things like that.

VENRICK: Uhm-hmm.

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[46] Venrick later added, "Also, Fager was a benthic ecologist. I ended up in pelagic ecology and my primary mentor in plankton research was John McGowan. From Fager I learned statistics and sampling theory—two subjects that still interest me. Somehow, I sound negative about Fager. That is absolutely NOT the case. I have enormous respect for him. If I did not reap all the possible benefits, it was my own naivety."

HARKEWICZ: I mean, do you feel like there's—. Again, if I'm repeating myself I apologize—but do you feel like there's a Scripps community where people—

VENRICK: Well, Scripps is now so big. The Scripps community, I think, is kind of split up. What I remember is that the Scripps annual beach party, which still exists, was a group of us, including me, sitting around making a pot of cioppino and maybe fifty people went down the beach. And that was Scripps. And now, the Scripps beach party is huge and they still make the—somebody still makes a cioppino but, you know, they bring in tons of fish and I go down there and I don't know anybody. And, the TGIF started—I don't think it was here when I was a graduate student but not too long afterwards. And then you'd walk in and you'd know everybody. There'd be maybe thirty people there. And now you go and there's a hundred strangers. And the Scripps Christmas party is enormous, I don't know how many people are there but it's so big that you don't have the feeling of walking into a Scripps function and knowing everybody.

HARKEWICZ: Do you think that—

VENRICK: You'd be lucky if you know anybody.

HARKEWICZ: Yeah. I understand. Do you think that there a connection between the way Scripps had grown as far as a community and the whole idea of big science that you were talking about before?

VENRICK: I don't think that connection is so—or at least I don't understand the connection you're trying to make.

HARKEWICZ: I guess I'm just wondering if a smaller community would breed smaller scientific organizations, or something, as opposed to—. Or has just time, maybe it's just time?

VENRICK: Well, I suppose a smaller community that was as diverse as it is now would necessarily have to consist of smaller programs. So, I suppose there's a slight connection there. If you have very many big programs you're going to be big.

HARKEWICZ: I just wondered what the relationship between a community of scientists might be to the science structure, I guess.

VENRICK: I suspect it all goes back to the rapid growth of oceanography and that we just diversified so quickly and became big. I mean, when I came in it was rather unusual in most fields for the field to be so young and still very diversified; but there weren't very many of us. And, I think it was probably

the growth itself that kind of did both. We just grew so big that we lost our sense of a little tiny community. And we used to know what all the physicists were doing, for heaven's sake. I don't even know who all the physicists are anymore. And also, then it engendered the big science. It's evolution that's been very complicated.

HARKEWICZ: How do you think that's affected both your research and your experience working here?

VENRICK: The growth of Scripps?

HARKEWICZ: Yes.

VENRICK: I don't know. In some ways it's a lot easier and in some ways it's a lot harder. Certainly, there are a lot more facilities available now. I don't know how much of this is due to the size of Scripps or just the advent of the internet. We have more ships available, because we're bigger so we can attract funding for more ships. But then the competition to use them is tougher. The downside is you just don't know everybody and have no idea what's really going on in your own institution. We used to have institution-wide seminars every Monday afternoon. And one week there'd be a physical oceanographer speaking and then a chemical oceanographer, and within about a year or two you knew what all the major people were doing. But then the various disciplines became large enough to start up their own seminars. So, now you could spend your whole time going to little seminars, which are in many ways much more productive for the exchange of information than the big one, but the big department-, or Scripps-wide seminar just sort of went extinct because nobody had time to go to it anymore.

HARKEWICZ: Do you miss that at all?

VENRICK: Well, I was probably one of the first ones to stop going, just because there wasn't enough time. I'm a small-group seminar person. I think that's much more interesting and more profitable for me. But I recognize the down side of the loss of institution-wide seminars.

HARKEWICZ: *[Recording paused]* So, we were talking about some changes in research. And I know you talked about Fager being your original supervisor?

VENRICK: Fager, yeah.

HARKEWICZ: And, you said he influenced your research?

VENRICK: The way I did research.

HARKEWICZ: The way you did research?

VENRICK: More than the field that I chose.

HARKEWICZ: What was your first real research project?

VENRICK: That would have been my Ph.D. project.[47] That had to do with the distribution of a type of phytoplankton, called diatoms, out in the open ocean. Essentially, nobody knew anything about what happens in the open ocean at that point. I participated in two cruises, Ursa Major[48] and Zetes,[49] between Hawaii and Kodiak, Alaska. So that I had two transects, summer and winter. And, I did a lot of microscope work and a lot of counting.

HARKEWICZ: On board ship, or when you came back?

VENRICK: When I got back. Actually, it turned out to be a pretty good project. Today it would never happen because there are so many quicker and easier techniques, for collecting that amount of data. Counting with a microscope is a very slow way to collect data, although I still do it. It provides information that can not be obtained by other techniques. But it is very time consuming and I don't think I would ever be so bold as to tackle what I did when I was a student.

HARKEWICZ: Probably, a lot of people could say that about their youth. Well, let's talk about your trip during Ursa Major—

VENRICK: Uhm-hmm.

HARKEWICZ: —just a little bit. That was to the North Atlantic?

VENRICK: North Pacific.

HARKEWICZ: North Pacific, and you've also done a lot of other cruises over the years, correct?

VENRICK: Uhm-hmm.

HARKEWICZ: To the tropics, the South Pacific and stuff, at that point?

VENRICK: Uhm-hmm.

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[47] Elizabeth Louise Venrick, *The Distribution and Ecology of Oceanic Diatoms in the North Pac*ific (University of California, San Diego, 1969).
[48] See note 14.
[49] Zetes was a scientific cruise from South Kodiak Alaska to San Diego on the research vessel R/V *Argo*. The cruise took place from January 1966 to August 1966 and included stops at Tokyo and Hakodate, Japan and Honolulu, Hawaii.

HARKEWICZ: How does it compare working in the North Pacific to the South Pacific? Is there a difference in your experience by where you go? I'm not sure what time of year you actually went. You said the summer and the winter. So, what it would be like to work in the North Pacific in the winter versus the South Pacific in the summer?

VENRICK: The work that I have done in the South Pacific has been pretty low latitude, with the exception of one trip. One of the last, actually probably the last major expedition I made was to the Antarctic and I went just to go there. I took vacation and I signed on as a volunteer for the zooplankton team and was down there for a little over a month. And that was wonderful. I'm glad I did that. It had nothing to do with my own research. I was helping Ed Brinton[50], who I think is on your talk-to list. But other than that, my South Pacific work has been pretty much lower latitude where the weather is warm and often calm. The North Pacific is rough, can be quite rough. And sometimes it can be very rough. It also depends on the size of the ship. But Central Pacific can be extremely flat, like working on a mill pond, or it can be unpleasantly choppy, but it isn't really high latitude rough.

HARKEWICZ: So, you didn't actually work in the South Pacific, as in the tropics?

VENRICK: Well, the two cruises I made in the South Pacific were both with Ed Brinton, and they were primarily equatorial. In one we went to Easter Island, which was fun. And then, I'm just trying to think how this worked, on ARIES[51] we worked the same kind of pattern, but instead of coming back to South America we went on to Tahiti and New Zealand. I guess the ship had to get to New Zealand and so some of us stayed on and sampled on the ship of opportunity. Except for Tahiti those are not really Rogers and Hammerstein *South Pacific* kinds of places. But it's pretty nice weather: warm, humid, flat.

HARKEWICZ: Did you like working in one location better than the other?

VENRICK: Oh, I suppose I would have to say that nice warm flat water is always more fun to work in. When you hit rough weather—you know, there's a certain challenge to working in rough weather, which I can appreciate. But after two or three days of rough weather when you can't sleep because you're hanging on, it really gets to you, and to everybody—the whole morale just goes down. It becomes a huge chore to get things done. So,

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[50] Edward Brinton (1924 -), research biologist, Integrative Oceanography Division, SIO.

[51] ARIES was a scientific cruise on RV *Thomas Washington*. ARIES started in San Diego on November 15, 1970 and returned to San Diego on October 14, 1971. It made several stops along its journey, including: Easter Island; Papeete, Tahiti; Wellington, New Zealand; Tokyo and Yokohama, Japan; and Honolulu, Hawaii.

one or two days of rough weather is kind of fun. But, beyond that, no thanks.

HARKEWICZ: Did you ever get seasick?

VENRICK: The only time I ever really got seasick was on a skiff off the end of Scripps pier. I think it was the gas fumes that got to me. I can get very, very sleepy, which I think is stage one of getting seasick. But somehow, somewhere along the line I just learned to ignore it. And, by in large, it doesn't bother me. I think there is a large mental component. When you wonder "Am I going to get seasick?" you predispose yourself.

HARKEWICZ: Predispose?

VENRICK: And after you go out enough you just realize that, "Wow, I guess I'm not going to get seasick." And, if you get busy right away and you still have a day or two of feeling very tired and lethargic. I do, anyway. But, it doesn't really bother me.

HARKEWICZ: Can you describe a typical workday at sea?

VENRICK: Well, our projects work round the clock. My favorite watch is, say, from four in the morning to noon. I like to get up early and watch the day grow. You tend to do different chores on different cruises, but we will generally take a hydrographic cast to obtain water from different depths and everybody draws water samples. There's a sample for salinity, a sample for oxygen, a sample for nutrients, etc.. We used to read thermometers for information on temperature and, ultimately, pressure (depth). Now that is done electronically. I usually take chlorophyll samples because that's often a job I get to do. I may take phytoplankton samples for myself. And then while the ship is underway, as often as not I am in charge of running the chlorophyll analysis, which is a laboratory analysis. Sometimes on a station I help more with the net tows, which involves launching and retrieving the nets, and monitoring them while they're underway, and watching the wire angle, and talking to the bridge and saying, "Hey, slow down," or " the wire is tending under the ship." Finally the job involves bringing the nets aboard and washing them down which can be cold and sloppy. *[Laugh]* And preserving the sample. I've done a lot of that. And you just do the same thing over, and over, and over again. Now that we have computers out there, there's a lot of data processing that happens after the analytical laboratory work. And so there's a lot of data entry and that sort of thing. ##

HARKEWICZ: ## The thing about being at sea?

VENRICK: Is you work in teams, watch teams. And so you're working with the same people, doing all the things that have to be done in a certain period of time, and there's a certain team spirit and camaraderie that's developed there. Each watch usually ends up having its own little traditions. Like some watches will immediately go watch a movie after they get off. Everybody just goes and watches a movie—make some popcorn and sit down and put your feet up. Other watches will have a coffee tradition, complete with an espresso machine and "hand brought" coffee. I've been on watches where, "who can make the most absurd sandwich after watch?" Or, in the olden days we used to just break out the booze, and sit down and have a drink. Sometimes people are musicians, so there will be live music. So each cruise is flavored by sort of the combinations of people that are on the watch and what traditions develop. That's really, I think, why I like going to sea. I like that sort of teamwork, camaraderie plus the feeling of getting something accomplished.

HARKEWICZ: And how many people did you say are on a watch, usually?

VENRICK: It depends on the size of the ship. But I would say six to eight. Eight would be a lot. Six is probably more normal, but on a big ship it could be more, although on the big ships you tend to have a lot of independent programs so you don't necessarily have the same few people doing everything. You tend to have a lot of other extra people. We took CalCOFI out on the *Revelle*[52] not long ago and the tradition turned out to be shrinking Styrofoam cups. This was all started by a request from Bob Knox[53] who is in charge of ship scheduling. Just before I left he said his daughter's friend was getting married and his daughter wanted to send out a couple of commemorative cups to shrink. Now, if you put a Styrofoam anything—it can be a head from a mannequin or a cup—in a mesh bag and send it down on the hydro wire to a thousand meters, the pressure will squash it into a perfect little tiny cup. I'm surprised I don't have one sitting around here to show you.

HARKEWICZ: It's just like a miniature?

VENRICK: Yeah. Styrofoam cups. You can take markers, waterproof markers and make designs on the original cups, and they shrink down into perfect tiny designs. So, Bob's daughter had made a couple that she wanted us to shrink for her friends. Well, most of the people on the cruise had never seen this before so at our first port call we had a personnel transport and I radioed back, "Bring Styrofoam cups." Somebody, I think it was Mark Ohman[54], came up with a bag of fifty Styrofoam cups. So we had big cup

[52] R/V *Roger Revelle,* built in 1996 with a crew of 22, a scientific berthing of 37, and displacement of 3,512 long tons.
[53] Robert Knox (1943 -), research oceanographer in physical oceanography in Scripps IOD.
[54] Mark Ohman (1951 -), professor of biological oceanography Scripps IOD.

shrinking parties, two or three different times. Even the crew got into it. Everyone would make marvelously decorated cups, and then we'd put bags of cups down, and everybody would stand around for the grand return. If you don't do it quite right then your cup can morph, but if you stuff things in it just right… Some of the cups were beautiful; some of the crew were really artistic. So you just never know what's going to happen on a cruise.

HARKEWICZ: It sounds like a great exhibit for the aquarium. *[Laughter]*

VENRICK: Well, actually it might. I wonder if we could fake that for kids? You'd have to get a big pressure tank somehow.

HARKEWICZ: That would be great.

VENRICK: Yeah.

HARKEWICZ: I've worked in museums so I think in those terms. Okay, so when you're doing these, are you talking about the different stations, and you said something about computers. Are there computers actually at the stations now? Is that what you were saying?

VENRICK: A station is just a spot in the ocean where you're taking data. The computers ride the ship from station to station. In the early seventies, we had the first big computer on board. That was an IBM 1100, I think, and it took a whole lab on the ship. It was the old punch card inputs and outputs, and crank, crank, crank, crank, but it really revolutionized a lot of what we could do out there. And now, of course, everybody has PCs. So on any one cruise every program probably has two or three PCs doing something. A lot of them are hooked to the electronic instruments and are recording data, and etcetera, etcetera. A lot of them are also used for data entry or for solitaire or video games. Now you walk into a lab on the ship and it just looks like a computer lab, with all of these little PCs sitting around. Mostly PCs, some Mac.

HARKEWICZ: So when you do the work at these stations for CalCOFI, is it any different than if you're doing it for Scripps?

VENRICK: The actual work you do and the depths you sample, and how frequently you sample, all depends upon the program.

HARKEWICZ: Okay.

VENRICK: So, yeah. It can—for biology there are really two basic kinds of sampling. There are net tows and there's water sampling. But, you can do that in a number of different ways. The nets can vary immensely from little tiny

vertical tows of fine mesh for fish eggs or phytoplankton to huge MOCNESS[55] systems that are—they're not exactly the size of this office but some of them are pretty darn big and they sample multiple depths and capture much larger organisms. There are also more and more electronic instruments being developed that replace net tows and, to some degree, the laboratory analyses of the water samples.

HARKEWICZ: You're trying to get organisms then, right?

VENRICK: Yeah.

HARKEWICZ: And then the other ones are for taking readings like you were talking about?

VENRICK: Well, the water samples are primarily for chemistry and biochemistry.[56]

HARKEWICZ: But the work itself is pretty much the same whether you're—

VENRICK: There are variations on it, but it's not that different. Yeah.

HARKEWICZ: Have you ever actually had to do the planning for one of these scientific cruises—

VENRICK: Oh yeah.

HARKEWICZ: —from beginning? Can you tell me a little bit about that?

VENRICK: Oh. *[Groan]* Well, first of all, it's not just one person. I mean, we just had a big meeting today for a cruise that's going out this summer. I'm not the PI, fortunately.

HARKEWICZ: Fortunately, you said?

VENRICK: Fortunately. First of all, you have a scientific objective. Now, CalCOFI, it's all prescribed. That's easy. And, well—

HARKEWICZ: How is that determined?

VENRICK: That's determined before you get the money. That's the way you justify your funding. Perhaps the wildest cruise I was ever PI on was a cruise not far from here. There's a bend in the southward flowing California Current

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[55]MOCNESS, or Multiple Opening/Closing Net and Environmental Sensing System, is a computer controlled net system which collects samples from specific depths.

[56] Venrick later added, "Sometimes direct analyses and sometimes involving some sort of experimental procedure (such as inoculation and incubation for rate processes)."

where it tends to bifurcate and one branch goes toward shore, and then goes north again. And the other branch goes offshore. This often happens at about the latitude of Ensenada and so we named it the Ensenada Front, “front” because it's a sharp juxtaposition of cold water against warm water. And there's a lot of weird stuff that happens along that frontal region. There was a consortium of physical oceanographers who wanted to study the convergence and divergence at the frontal boundary, and biologists who were interested in the biological transition. One of the problems is you've got all this high biomass water from the north and it just vanishes in this frontal region. There's one theory that it's subduction, which it may very well be. So we wanted to sample this area. Unfortunately, in spite of its name, the frontal position moves considerably. So, how do we find this area? Satellite images, of course, except if the weather is foggy. And in our case, the entire previous month was foggy. So months of planning were useless. Literally two days before we sailed, we scrapped the satellite-based plan and used the fact that the CalCOFI cruise had been out just before our cruise and they had located the core of the California Current to the north of the region. We went out with drifter buoys, and the general location of the California Current and the knowledge that eventually the California Current would enter the Ensenada Front. The Current has a particular hydrographic signature, so we kept taking vertical profiles until we had found the signature of the core. We launched three drifter buoys in this current, the theory being that we would follow the buoys down into the Ensenada Front.

HARKEWICZ: I see. Follow the buoys.

VENRICK: Well, of course, one went north, one went south and one just stopped there and went in circles. And so every couple of hours we'd get new buoy positions and we'd huddle in the lab with the biologists and the physical oceanographers and we'd say, "Well, which one do we follow, John, Jim or Peter?" By this time, we had named them. After a while they actually all came back to the main California current and did go into the Ensenada Front. But it was a matter of days and until then we were constantly, updating our plans as the information came in.

HARKEWICZ: This was back here, then?

VENRICK: No. We're on the ship.

HARKEWICZ: On the ship, okay.

VENRICK: On the ship. And, you know, you really don't know what's happening. You're just trying to interpret all of these different lines of evidence coming in Where is the ship? Where are we relative to where we want to be? So any cruise is really a group effort, and you may have a PI who is

responsible for, ultimately for the final decision, but mostly, it's a group effort.

HARKEWICZ: So when you're writing up this proposal, though, to get the funding to go on this, do you have to leave it sort of open-ended because you're, like you said, you weren't sure where this current was?

VENRICK: Well, I think we said we were going to use the satellite images, the previous month, plus the CalCOFI cruise to locate it. In retrospect, we were very naïve and nobody caught us on this: "Well, what are you going to do if you don't get satellite images?"[57]

HARKEWICZ: When you were talking about the watches before, is that a variety of people? Like, the principal investigators and graduate students, and I mean, who consists of a watch?

VENRICK: Certainly the scientific personnel are usually a variety of people. The title of principal investigator is usually applied to the lead scientist of the proposal. The scientist in charge on board ship is the "chief scientist" or just SIC. They may be the same person. The chief scientist often will not stand a watch, preferring to remain floating.[58] The watch standers usually contain a good component of trained technicians, marine technicians; a component of academic people; and certainly, a component of graduate students. There may be visiting scientists or even volunteers. It varies a lot from cruise to cruise. For instance, a cruise we're just planning, for a program closely affiliated with CalCOFI, will not have many of the CalCOFI technicians because they will have just come back from their own cruise. So, there's going to be a lot of academic people doing the technical work, which will be interesting.

HARKEWICZ: When you say "academic people," do you mean professors?

VENRICK: Yeah, faculty and researchers.

HARKEWICZ: So how does somebody get to be the chief scientist? I mean, are you out working on one project or are you are working on a bunch of different projects?

VENRICK: It can be both. It can be—it's a spectrum, but usually it's individual projects more or less knit into a whole so that somebody will be studying nitrogen fixation in the ocean and they will make a contribution to the entire project, whatever it is, but it's also part of their own program in a different way. So, it's an amalgamation. CalCOFI has a core of

[57] Venrick later added, "This sounds as though we had received external funding. In fact, although we received high reviewer marks, NSF declined funding. Ultimately, a scaled-down version of the study was funded by CalCOFI."
[58] Venrick later inserted the comment, "…and available for catastrophes."

observations that have to be made, but then we have lots of ancillary programs that come along with us with their own goals, which are more or less tied into what we're doing. Sometimes not much at all and sometimes quite closely tied in.

HARKEWICZ: But, would that be a separate cruise? Do Scripps scientists go on the CalCOFI cruises and do Scripps work?

VENRICK: They can.

HARKEWICZ: They can? So, it doesn't have to be separated?

VENRICK: No. No. In fact, a lot of them do. That would be an ancillary program.

HARKEWICZ: And you had said about, I think, you had said something about geophysicists doing some work in one area, and biologists doing something else on the same cruise? Are there normally dual-purpose cruises where there's biological and physical oceanography work going on at the same time?

VENRICK: I'm not sure that's the question you mean to ask. I'll also answer the question I think you mean to ask. And, the answer's “yes” to both. In the cruises that I'm most likely to be involved in, because they’re ecologically oriented, we need the physical oceanography, and so we have physical oceanographers and biologists working together very closely. There are other programs that because ship time is so expensive, the ship time is so precious, may share the same platform even though the research programs are independent. There may be a geophysical or geological cruise that goes to Timbuktu, and it's going to be doing coring. A core goes down and it may take three hours, four hours, five hours to get the core, and then it's on deck and there's another three or four hours of processing the core before they're ready to do anything else. That means the ship is sitting for three or four hours doing nothing. So, it's not uncommon for another program that's really not related to the geology to be on board just to use the ship in that period of time when the geological work is not using it. And so that's another kind of cruise where there are two different programs working together. There is really an entire spectrum from cases where programs are really intellectually intertwined to cases where it's just a ship of opportunity type of thing for one or more of the programs..

HARKEWICZ: Well, do you have two chief scientists at that point?

VENRICK: You would have one designated chief scientist. He is in charge of saying, together with the captain, "It's too rough to work," or, "We've lost a day of ship time, we're going to cut back thusly." But there may also be persons in charge of the ancillary programs. I can imagine a situation where two

independent programs teamed to obtain funding together and there would be more equal division of labor. In another case, a geologist got the funding to go to Timbuktu, then they looked around for somebody to share the ship and so the biologist sort of—I don't know why I put us in this order—the *biologist* got the funding to go to Timbuktu and had some time on the ship, so the geologist came along to use the "extra" ship time, and then they're definitely an ancillary program and they're working as ship time is available.[59]

HARKEWICZ: Right. Okay. Was ship time always so precious?

VENRICK: It's—no. Not. *[Sigh]* No. No. I mean we have always tried to use ship time efficiently, so these kinds of combinations have been around since the beginning of ships, but the pressure, the difficulty of getting on a ship and getting ship funds, has increased.

HARKEWICZ: Okay. Have you ever had any conflicts with the ship's crew at all, when you're trying to do some work?

VENRICK: I haven't. There have been. We had a technician with the CalCOFI program who was a crusty old salt. For some reason he did not get along with the captain. I don't know what happened there. We have so many days that we can be out on the ship. But, if things go well, we often don't use all the allotted time. Apparently, the captain was counting on getting back a day early because he had some important appointment. The rumor of what happened was that Walt,[60] the crusty old technician who was serving as chief scientist, was so mad at the captain that he stopped the ship and went fishing for our last day. That caused quite a repercussion to the point that Scripps then declared that CalCOFI cruises on the Scripps' ships had to have an academic as a chief scientist. So, marine techs couldn't serve as SIC anymore. After that, I actually went out as chief scientist several times. But, that event was just dumb. We've got good crew, and usually we get along just wonderfully. I think the differences that are likely to arise between the scientists and the crew would be issues of safety, where the captain was more conservative than the scientist, and the captain rules on issues of safety.

HARKEWICZ: The captain has the ultimate authority?

VENRICK: Uhm-hmm.

HARKEWICZ: Are there certain ship's captains or crew, or ships that you prefer to be on?

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[59] Venrick clarified by later adding, "The division of authority on the ship is usually related to the contribution to the overall cruise funding. But there is no formal procedure and there is *one* chief scientist."
[60] Venrick opted to use only the individual's first name.

VENRICK: It's more the ship I'm used to. Right now it's the *New Horizon*. It's an intermediate sized ship. I'm just familiar with it. I know where everything is. I find the big ships so big that if you're trying to find somebody you can spend hours. And so, I just don't enjoy the big ships as much, but on the other hand there are a lot of advantages to the big ships.

HARKEWICZ: You have written that "Life at sea is like eating liver. You either love it or you hate it."[61]

VENRICK: Oh, did I say that?

HARKEWICZ: Yes. You did.

VENRICK: How about that. Yeah, that's true.

HARKEWICZ: Do you love or hate life at sea?

VENRICK: Well, I hate liver, but I love going to sea.

HARKEWICZ: And why is that?

VENRICK: I think the reason, as I've explained, is that I like the personal interactions. You get to know people that you wouldn't otherwise get to know. You get to like people that you wouldn't otherwise like. It's amazing. And, you build up friendships, you know. They may not be lifelong friendships, but they're friendships that you wouldn't normally establish. And, I just like the feeling of being part of a team that's working efficiently. I also like putting my life on remote control for a while and just shedding the normal everyday chores. Unfortunately, it is less and less like that now, especially with e-mail. Now unfortunately anybody can reach you on the ship. But, there're a number of chores that you don't have to do— *[telephone rings]* you don't have to answer the phone, you don't have to cook. You don't have to do dishes. But the other side of this isolation is that people who are high achievers and who are used to accomplishing things must put their life on remote control, too, and a lot of the people can't happily do that. Those are the people who don't like being at sea. They feel restricted. So they are the people who don't like liver.

HARKEWICZ: Okay. But you like being at sea—

VENRICK: I do.

HARKEWICZ: —at least at this point?

VENRICK: Yeah.

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[61] Quoted in Andreas B. Rechnitzer, "Aquatic Occupations – Marine Careers," *CURRENT*. (Fall 1983): 5.

HARKEWICZ: Okay. So, we talked about your involvement in CalCOFI, and I know that you were a member of the California Fish and Game Commission.

VENRICK: Uhm-hmm.

HARKEWICZ: I believe you were the first Ph.D. and the first marine scientist, as well as the first woman? I couldn't find too many details about that, like how long you were on that. I think maybe it was—

VENRICK: Six years.

HARKEWICZ: And did that affect your career?

VENRICK: It probably didn't have a great affect on my scientific career, per se. It certainly gave me a much greater awareness of how the world works and why it works the way it does. But, that was all a part and parcel of the growing attempt to bring women into government. I think I came to the attention of Jerry Brown[62], or at least his secretary of appointments, because of my connections with CalCOFI. And because, through CalCOFI, I knew a lot of the Fish and Game people. Governor Brown wanted to put a woman, an oceanographer and a Ph.D. on the commission—all at once. There probably were not many women Ph.D.s in oceanography at that time.

HARKEWICZ: What year was that?

VENRICK: Seventy-five to '81, '76 to '82, something.

HARKEWICZ: Seventy-six to '82 is what I have down here, yes.

VENRICK: That experience, in turn, spawned a lot of other activities. I don't even know if I can remember them all. I was on the Scientific and Statistical Committee for the Pacific Fisheries Management Council.[63] I was on the California Condor Advisory Committee[64] for the department. I was on Marine Fisheries Advisory Council,[65] which advises the administrator of

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[62] Edmund G. Brown, Jr., "Jerry" Brown, was born in San Francisco in 1938. He served as the governor of California from 1975 – 1983. In 1998, he was elected mayor of Oakland, California—a position he still occupies at present.

[63] The Pacific Fishery Management Council is one of eight regional fishery management councils established by the Magnuson Fishery Conservation and Management Act of 1976. The purpose of the Magnuson Act is management of fisheries 3-200 miles offshore of the U. S. coastline. The Pacific Council is responsible for fisheries off the coasts of California, Oregon, and Washington.

[64] The California Condor Advisory Committee is an advisory group to the California Department of Fish and Game, California Fish and Game Commission on matters related to protection of the endangered California condor.

[65] The Marine Fisheries Advisory Committee (MAFAC) advises the Secretary of Commerce on living marine resource issues that fall under the responsibility of the Department of Commerce. They are mandated to evaluate

NOAA on fisheries matters. I was on a couple of committees I can't think of the name of anymore. So it seemed just this sort of one organization would pass me on to another one.

HARKEWICZ: I see.

VENRICK: But it, it was an interesting side aspect to my life. It didn't really ever have too much to do with my research. I would like to think I contributed my knowledge to whatever I was on. But it's—it's a different kind of life.

HARKEWICZ: Political life?

VENRICK: Yeah. Uh huh. And you—I enjoyed it. It was a lot of work. And to be perfectly honest, it's kind of like being in college. It's over with now and I don't miss it as much as I thought I would miss it.

HARKEWICZ: You're not looking for a political career when you retire?

VENRICK: No. I don't think so. I don't think so.

HARKEWICZ: I'm sorry, I forgot to ask you one of the questions I really wanted to ask in relation to the cruises: how you feel it impacted your personal life? Or if it did?

VENRICK: Well, it must have because just the depth of the people interactions there was something I probably wouldn't have experienced otherwise. But, you know, it's hard to say because it was just all part and part of parcel of maturing, so I don't know how I would be if I hadn't gone to sea. In terms of family life, I have never had kids so that's never been an issue. And my long-term companion was a marine technician, so he was gone more than I. At home, I don't really think it made much difference.

HARKEWICZ: Do you ever do things on land with the same people that you've done things with at sea? Or is it just a totally different situation at sea?

VENRICK: It varies. I have made some permanent close friends at sea, but often we go our separate ways. There's often a post cruise party, particularly when its been a good cruise. But, that's usually the end of the socialization of that group, per se. That doesn't mean you never see them again, because you do. But, the binding that takes place at sea doesn't always keep you together.

HARKEWICZ: What do you think made Scripps succeed?

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and recommend priorities and changes in national programs including the ongoing reauthorization of the Magnuson-Stevens Act, the Endangered Species Act, and the Marine Mammal Protection Act.

VENRICK: I haven't a clue. I really—I suspect it goes back to Roger Revelle[66] and his just putting us out into the ocean. But boy, I don't know.

HARKEWICZ: Have you seen or can you propose anything that may have threatened its success?

VENRICK: I feel if it has ever been threatened, it is right now. I think we've got some serious problems to address organizationally, and it remains to be seen how that works out. I mean, we obviously are looking for a new director, and we are anxious to see what he does. There's a serious controversy about whether we can indeed grow ourselves out of this debt. I don't know if you know this whole controversy. But when the budget crisis hit, that the University funding cuts piled up on top of many other things, so that we, SIO, were suddenly really in debt. Charlie Kennel[67] assembled a blue ribbon group of entrepreneurs and people who knew about business and money and this sort of thing to advise us. And, they looked at things and said, "Ah, well an important source of income is the income that's brought in from external grants by your researchers, so you just need to get more researchers." The advice was made a lot more attractive than I'm making it. But there are some real questions about whether these blue ribbon folks took into account the scientific funding era right now which is increasingly restrictive. It's unlikely that more researchers, per se, will bring in proportionally more money. And there is a large associated cost. So that's an ongoing controversy and it's a very serious one. And, yeah, as I say, I'm not real optimistic about Scripps right now. I think we'll succeed but whether or not we will maintain our position as one of the top two U.S. institutions, I don't know. It'll be interesting to see. In ten or twelve years we'll look back and say, "Oh, wasn't that an interesting time." But, right now it's pretty depressing.

HARKEWICZ: How did Scripps impact your life?

VENRICK: Well, I rather imagine if I hadn't stumbled on oceanography I would have gotten married and had five kids, and I don't think I would have had nearly as interesting a life as I did. But how do I know? Maybe, maybe I would have had a better life. It's hard to say. There's just no control. But I suspect that, you know, if I'd gone to Duke I would have gotten a master's degree, so I would not have had the academic position that I ended up with. Here I am.

HARKEWICZ: It's a counter-intuitive question, I guess. I know you have the nickname "Pooh." I was curious as to where you got that from?

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[66] See note 35.
[67] Current Scripps director, see note 36.

VENRICK: I got that from my mother, from "Winnie-the-Pooh,"[68] when I was little, because I was such a "bumbling little thing with good intentions."

HARKEWICZ: Aw.

VENRICK: I've had many people try to guess where the name came from, and my favorite is a fellow out at sea, who, after working with me for a while, decided it must be because I must like to sneak down to the galley about eleven o'clock and have honey.

HARKEWICZ: Did he see you doing that once or something?

VENRICK: I don't think I ever snuck down to the galley and had honey, but I probably did my share of galley sneaking.

HARKEWICZ: I think I was driving behind you one day because I saw—do you have a license plate that says "Dr. Pooh?"

VENRICK: Yeah. Uh huh.

HARKEWICZ: I knew there couldn't be too many people who'd have that on their license plates.

VENRICK: My college roommate gave me that. She had always said, "If you get a Ph.D. I will get you a license that says, "Dr. Pooh," and sure enough, she did, and I've had it ever since.

HARKEWICZ: Great. Okay, one last question. What do you like to do for fun outside of work? Or, is work your fun?

VENRICK: Outdoor things. On the practical end, what I do most is gardening, bird watching, bird walking.[69] I like hiking. It's been a long time since I've done any real backpacking, so I'm not sure it's fair to say I do that. I'd like to do some more of it. I used to do a lot more bike riding. I've had hand trouble, which has kept me off the bike. I'd like to get back on that. Going to sea.

HARKEWICZ: On non-scientific journeys?

VENRICK: No, I think I'd be bored just going out on a cruise ship, but I really do enjoy going to sea.

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[68] A.A. Milne, *Winnie-the-Pooh* (Methuen, 1926).

[69] "Bird walking" is Venrick's terminology for walking around and bird watching. Venrick had a large bird cage in her office and, when I made reference to it, said that she occasionally brings her pet bird to work with her. The bird is a small Senegal parrot named "Senegal Sam." Venrick later told me, "She is too noisy to bring to work often."

HARKEWICZ: Great.

VENRICK: And recently, I reset up my model railroad train and I'm building a model for it.

HARKEWICZ: Fascinating.

VENRICK: It comes up once a year at Christmas time.

HARKEWICZ: Have you been down to the museum?[70]

VENRICK: Not since they've moved, I went down there several years ago—in fact, we were talking about that with a friend of ours from Santa Cruz. Not Mary, but another colleague from Cruz who is giving her husband a model train for Christmas. They are from Turkey. And we were telling her about that the other day and agreed we'd all have to go back down sometime.

HARKEWICZ: Well thank you. ##

[70] The San Diego Model Railroad Museum is located in Balboa Park in downtown San Diego. The museum is 28,000 square feet making it the world's largest model railroad museum. It contains four large scale and model layouts, built by separate clubs, and has an interactive Lionel train layout for children in its Toy Train Gallery. See: www.sdmrm.org for more information.

TAPE GUIDE