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From the Ground Up:
UCSC Professor Gary Griggs as Researcher, Teacher, and Institution Builder

Interviewed and Edited by
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Table of Contents

Introduction	1
Early Life	7
University of California, Santa Barbara	15
Graduate Studies at Oregon State University, Corvallis	26
Coming to UC Santa Cruz in 1968	53
Memorable Students	60
Remembering the Early Years of UCSC	73
The Environmental Workshop	80
Collecting the Fingerprints of the Earth	94
Thoughts about Using Multimedia in Teaching	99
Changes in UCSC Students Over the Years	101
Community Outreach and Speaking	105
Recent Budget Cuts at UCSC and their Effect on Students	107
More on Memorable Students	110
Bay Walks with Sandy Lydon of Cabrillo College	112
Ocean Literacy and K-12 Outreach	117
Building the Institute of Marine Sciences and Long Marine Laboratory	122
Research on Coastal Hazards Geology	165
Coastal Development Issues	176

The Monterey Bay National Marine Sanctuary 188

Land Use Planning and Bureaucracy 190

Monterey Bay: The Marine Science Research Capital of the World 194

Juggling Hats 212

Writing a Column for the Santa Cruz Sentinel 219

Sea Level Rise Task Force of the National Academy of Sciences 225

University of California Marine Council 228

The Future 230

About the Interviewer and Editor 230

Introduction

Gary Griggs was UC Santa Cruz's first faculty member with expertise in oceanography. Born in 1943 in Pasadena, California, Griggs grew up in southern California and southern Oregon. He came to the campus in 1968 at the invitation of earth sciences founding chair Aaron Waters, who had been his undergraduate mentor at UC Santa Barbara. As a young assistant professor (having completed his Ph.D. at Oregon State University in just three years), Griggs immediately began publishing professional articles at a prolific rate and developing a campus-wide reputation as a stellar teacher. Promoted to the rank of professor in 1979, he served as chair of earth sciences from 1981 to 1984 and associate dean of natural sciences from 1991 to 1994. Since 1991 he has been director of the Institute of Marine Sciences and Long Marine Laboratory.

The author of more than 145 journal articles, author or co-author of several books for professional and popular audiences, and writer of a regular column in the *Santa Cruz Sentinel*, Griggs is perpetually in demand both locally and internationally as a consultant and public speaker on coastal erosion, sea-level rise, adaptation to climate change, and other issues related to coastal geology. His work as a teacher, researcher and administrator has earned numerous honors and awards, including the UCSC Alumni Association's 1998 Distinguished Teaching Award and the 2007 Ed Ricketts Memorial Lecture for lifetime achievement in marine research and education.

The high spirits and effective working style that contribute to Griggs's professional success were much in evidence during this series of three oral history interviews, conducted in December 2011 and January 2012 in his bright, spacious office in the Earth & Marine Sciences building. A world map posted on a bulletin board bristled with more than 100 colorful pushpins representing locations around the globe where he has traveled, studied and taught. Along a broad windowsill he had arranged dozens of jars and vials containing beach-sand samples from all over the world—"fingerprints of the Earth," he called them—in wildly varying hues & textures, mostly collected for him by colleagues, friends, and students.

Conscious of his demanding schedule, I had promised to limit each interview to one and a half hours, but ended up reluctantly calling each to a halt after two full hours had elapsed and he showed no sign of slowing down. Throughout our time together he periodically turned to a neatly labeled shelf or file cabinet to extract a map, article or other document to use in illustrating a point. The proliferation of source materials he had amassed in forty-three years of university service was matched by the degree of organization that enabled him to put a finger on whatever he needed in a matter of seconds.

Among the oldest materials Griggs brought out during the interview were graphics illustrating his doctoral research, conducted in 1965-1967, for which he collected sea-floor cores from the Cascadia Deep-Sea Channel, some 200 miles off the Oregon coast. Those samples contained intriguing sediment deposition patterns—evidence whose full significance only came to light many years later, after the scientific community had embraced the theory of plate tectonics. Griggs,

it turned out, had documented a history of major earthquakes in what came to be known as the Cascadia Subduction Zone.

And that decades-old work is still generating insights. Among the most recent documents Griggs showed me was his article titled "The first ocean floor evidence of great Cascadia earthquakes," published in the September 2011 issue of the American Geophysical Union's journal *Eos*. In it he draws on his doctoral data to provide a context for Japan's huge March 2011 earthquake and tsunami. "Some people say that university faculty spend the rest of their life rewriting their Ph.D. dissertation," he said. "I waited forty-five years and came back and looked at [mine] and said, 'Here's a new perspective on it.'"

Prior to conducting these interviews, I had met Griggs as a participant in several coastal field trips that he led for the general public with his friend and colleague Sandy Lydon, a retired Cabrillo Community College historian. (Griggs likes to quip on these trips that he covers the past hundred million years of local history, while Lydon deals with the last 250.) I had also traveled to China in the fall of 2011 as part of a Santa Cruz County-based tour group co-led by Griggs, Lydon, and their Cabrillo College colleague Cherie Barkey. So I was somewhat familiar with his lucid, engaging teaching style—and was not surprised to see him light up when he talked about his work with undergraduate as well as graduate students. A considerable portion of this oral history is dedicated to Griggs's animated reflections on his teaching career—beginning with the day in January 1969 when he walked into Thimann 3 Lecture Hall a few months after arriving on campus never having taught a class, and beheld a "huge throng" of "two

hundred and sixty hippies, dogs and tie-dye and patchouli oil, sitting on the floor."

That quarter ended with a standing ovation, and launched the undergraduate oceanography course that he has since taught more than forty times, to some 12,000 students. Many of those individuals have gone on to distinguished work of their own in the fields of earth and planetary sciences. Griggs talked about several former students with whom he now has professional associations, including former NASA astronaut Kathy (Dr. Kathryn D.) Sullivan—currently President Obama's assistant secretary of commerce for environmental observation and prediction, and deputy administrator for the National Oceanic and Atmospheric Administration—who credits him with launching her career.

Another focus of the oral history is Griggs's 21 years (and counting) as director of UCSC's Institute of Marine Sciences (IMS) and Long Marine Laboratory, where his vision and extraordinary successes as a fundraiser and collaborative institution builder have helped enable the creation of the Center for Ocean Health, a "coastal science campus…almost entirely built with non-University money." The center houses office and lab space for researchers, faculty and graduate students. It also fosters broad collaborations by providing an institutional home for marine and coastal scientists from various government agencies and NGOs, including the United States Geological Survey (USGS), the National Oceanic and Atmospheric Administration/National Marine Fisheries Service, the California Department of Fish & Game, Island Conservation, and the Nature Conservancy, among others. IMS's Seymour Marine Discovery Center provides a public window onto the center's coastal and marine research.

Putting all these pieces together required Griggs and his colleagues to scale what he wryly called, quoting *Pogo*'s Walt Kelly, "insurmountable walls of opportunity." "People see [the Center for Ocean Health] today and say, 'Wow, this just happened overnight,'" he said. "I've got files for every single one of those projects, of Congressional stuff, and [California State] Assembly stuff, and budget stuff, and planning, and EIRs, and contracts, and agreements. It was all worth it, but it wasn't instant. …It was…almost a twenty-year process of trying to figure out how to do it, working out the agreements." And ultimately, he says, those efforts "completely changed the [Long Marine] Lab from this little isolated outpost to an active, thriving place with hundreds of people coming every day. That, for me, is one of the most gratifying things we've ever done… I take pride in saying, 'Wow, this is here because we had an idea and we followed it through.'"

The pleasure Griggs takes in just about every aspect of his work, and his feeling of gratification about bringing useful accomplishments to completion, infused the entire interview. He repeatedly expressed gratitude at his good fortune in having challenging, fulfilling work that draws on his strengths and his passions. "I feel like my glass is flowing over all the time," he said. "I just wake up every morning feeling good. I go to bed every night feeling good. …I feel very fortunate to be where I am."

The interviews were transcribed verbatim and edited lightly for flow. Griggs carefully reviewed the transcript for accuracy and returned it with corrections. I thank Gary for the generosity he brought to this endeavor in the midst of his

busy schedule. Thanks also go to the transcriber, Bettianne Shoney Sien, and to Esther Ehrlich for editing and proofreading assistance.

Copies of this volume are on deposit in Special Collections and in the circulating stacks at the UCSC Library, as well as on the library's website. The Regional History Project is supported administratively by Beth Remak-Honnef, Head of Special Collections and Archives, and University Librarian Virginia Steel.

—Sarah Rabkin
Regional History Project, University Library
University of California, Santa Cruz, September 2012

Early Life

Sarah Rabkin: This is Sarah Rabkin and it's Monday, December 12, [2011]. I'm here in the Earth and Marine Sciences [Building] at UC Santa Cruz with Gary Griggs. Gary, I'm going to start with where and when you were born.

Gary Griggs: Pasadena, California, 1943. Oh, my God. We used to talk about war babies and now people say, "Which war?" World War II.

Rabkin: Where did you grow up?

Griggs: Southern California. And then in 1950, my parents decided Southern California was too crowded.

Rabkin: In 1950?

Griggs: Which is kind of amazing. They decided to get away, so we moved to southern Oregon to a ranch for two years, where we tried to make it in a poor economy. But I think that, combined with the fact that my dad was a high school teacher, he pretty much had summers off, so we'd go off car camping for a month or six weeks every summer up the California, the redwoods, the Oregon Coast and Washington. I think that outdoor experience, combined with living on

a ranch for two years, instilled in me this outdoor set of values, and that somehow being out-of-doors was going to be part of my life, rather than being in an office. And here I am in an office.

Rabkin: Your dad was a teacher?

Griggs: He was a junior high and high school math teacher. So then after two years, Southern Oregon was not a—it still isn't- a real healthy economy. It's all tied into timber and logging, very seasonal. Financially, with three young kids, they really couldn't make it. So we moved back to Southern California, the San Fernando Valley, Woodland Hills, where I went to junior high and high school. That's where I finished school.

Rabkin: Where in Southern Oregon had you lived?

Griggs: We lived outside of Grants Pass, outside of a place called Wilderville on the road to Crescent City, so on the Redwood Highway. It was a great experience for a kid. We had fifty acres and cows and a pig and woods and creeks and fish—all those things that today young kids think about, oh, wouldn't that be wonderful to live on a farm! It was just a typical problem that I think we still have today, that teaching credentials were not reciprocal, so he couldn't teach in Oregon without going back to school for a year. So he tried working in a hardware store, working in a finance company, but he could never make enough money to keep things going. He realized it just wasn't going to work. We headed back south.

Rabkin: And your family was actively running a ranch at the same time?

Griggs: Well, I mean we had cows and chickens; we had hay to feed the animals, but it wasn't really a working ranch where you made money off of it. He had been a forestry major at Berkeley, so he always envisioned being out in the woods, but it didn't quite work that way. But that was okay. It was a great experience.

Rabkin: Did your mom have jobs outside of the family?

Griggs: Never. That was at a whole different time. She was the one that got up every morning and made everybody's lunch and got us off to school and washed the clothes, and you know, at that time, through the fifties, it was fine. But I think the same experience of living on a ranch, being out-of-doors, ended up affecting my two brothers. Both went into plants and nurseries and gardens and environmental things, also. In fact, my younger brother was here as an environmental studies student later with Jim Pepper and Jerry Bowden. He later moved to New Zealand and got involved in environmental planning, and now runs a small little farm and business. My other brother went into nurseries and had three nurseries in Carmel Valley and Carmel. Somehow that idea of being in touch with the land and out-of-doors had a permanent impact on us.

Rabkin: What can you tell me about your family's history, in terms of coming to California, ethnicity, national origins?

Griggs: I did this book recently on *Introduction to California's Beaches and Coast*.[1] So when I gave a talk at the Seymour Center, I made it personal. I had Powerpoint images of my family sort of marching across the country. So pretty much Scotch and Irish. On my dad's side, actually they traced it back to the Mayflower. I think everybody probably goes back to the Mayflower.

Rabkin: My grandpa, too.

Griggs: They started in New England and Illinois, Iowa, Nebraska. Then my dad's dad—a fascinating story I came across maybe ten years ago. I started putting together family history because somebody had done it up until the 1930s. I don't know, most people don't really think about that, and as they get older they're less concerned about it, because they realize everybody is born and they die. When I talk to relatives, "Ah, I don't really care about that." So I went back and tried to fill in the pieces.

It was fascinating, because my aunt had an autobiography my grandfather had done, hand-typed with photographs stuck in it. It turns out in around—he was born in 1880, right around 1898, 1899, 1900—I think he had some back problems or something and some relative said, "You ought to go out West." So he got on the train, he was in Illinois, went to St. Louis, got on a train with cattle or something and went all the way to San Francisco, walked across somehow, or got in a boat to Oakland, worked there for a while, then headed up to Oregon

[1] Gary Griggs, University of California Press, 2010.

and Washington, walked across the state of Washington, worked in wheat fields and on Indian reservations. He started a band in Colorado. All these incredible things.

He was very tall. He reminded me of American Gothic—this guy standing there. Throughout my life, whenever I saw him, he always had a suit and a white shirt and a tie. When he worked in the garden, he had a white shirt and a tie on. He was this very formal man. But here was this adventurer, walking across Washington. All this stuff. He always had printing shops or newspapers but I got a different sense of this history, so—

Rabkin: When would his walk across Washington have been?

Griggs: Probably in the early 1900s, 1901 or 1902. He worked in a wheat field. All these bizarre things I knew nothing about. I just knew him as this very tall, old, very serious man. It was just fascinating. Then all these photographs of him and cousins and relatives. He went back and married my grandmother that he met at some church social. They came to Southern California in around 1915.

My mother's family also moved across the country through the Midwest. She had a great-grandfather who was a judge that had seven sons. All of them became attorneys or bankers or business people. They actually ended up, my great-grandfather and his three sons, in Washington, in Port Angeles, Seattle, in around 1900. They got involved in the canning business and lumber mills and oil and gas and all kinds of things. I think they did well, and then he came to

Southern California with his five daughters, one of which was my mother. Around 1920, they came down because the oil fields were opening up near Long Beach, Wilmington. They had got involved in meters that measured fluid because of the oil fields. Both my father's and mother's families converged in Southern California around the early 1900s. Both families ended up pretty much staying there, except my family left for Oregon and came back. We all scattered and everybody else lived there forever. So that's sort of the background.

Rabkin: Interesting. So on both sides of the family you have this trajectory from the East Coast to the Pacific Northwest and eventually down to California.

Griggs: Yeah. A lot of our family still lived up in Washington, Seattle, and we used to take these trips there and find relatives. It was always like, oh, that's another home, sort of a comfortable area. We always take these trips back up north to check in and see. We don't know anybody but just going to the same old places. That's why Santa Cruz was sort of perfect. It was still California but it had the redwoods and that feeling of being in the woods. Over time, I ended up building by hand a couple of houses in Bonny Doon and getting back out. Getting into the land again was always something important to me.

Rabkin: You talked about how that experience of moving to Southern Oregon and living on lots of land and being able to roam around influenced your interests in outdoor things. I wonder if there's anything else about your parents and the way they brought you up that you feel influenced those interests?

Griggs: It's funny how a lot of things are subtle and some were very direct. Because my dad was a high school teacher and teachers never made any money, we had a pretty Spartan lifestyle. Comparing to today, as university professors we get paid a good salary. We live in a good time, generally speaking. A couple things I remember really clearly. One was people didn't go out to eat as much, because there weren't as many restaurants and there was no really fast food then, in the fifties. I remember going out to a restaurant two times the whole time I was growing up. Two times. People say, "Oh, my God." Today, once a week you go out. It wasn't we felt deprived. We didn't do it because it was something that people who had money did.

The other thing I remember was my dad would take us down to the war surplus store to get boots to wear to school. At Christmas, we would get blue jeans and t-shirts from Penney's, and maybe a flannel shirt for the winter. That was just the way we dressed. There was no extra money and that was the way it was. But it wasn't like we felt poor. We weren't living in Hollywood. It was just, that's the way we grew up. So when I see kids today and students who have everything they want, it was just a different thing. A couple things I remember really clearly. My dad, because he didn't make much money, always said, "If you want to make money be a doctor or a dentist." That was one of his bits of wisdom.

Rabkin: Was he urging you in that direction?

Griggs: I don't think he was urging me but I remember the words really clearly. Maybe he was, subtly. He was never one to say—I mean, there were certain

things we didn't do. We had some pretty strict moral codes. The other thing that I remember really clearly that had an influence, it wasn't a negative way, but it was something I had to overcome. He went to Berkeley in the thirties and his closest friend there went on to get a Ph.D. in geography and taught at Berkeley for fifty years. He was chairman of the department and a world-renowned geographer.

Rabkin: Who was that?

Griggs: A guy named Jim Parsons. He was president of the American Association of Geographers and did stuff all over the world. [He] was a cultural geographer—and studied early civilizations in South and Central America. He always went on sabbaticals and took his family to interesting places. They had this wonderful house in the Berkeley hills that was full of cool stuff, just things he'd picked up, these giant high ceilings full of books and bows and arrows and masks. He also was a wonderful storyteller. So at bedtime we would get this wonderful stories—that was our first night on our camping trips—we'd go from Southern California to Berkeley, and staying with the Parsons was fascinating. I once asked my dad, because I knew Jim had a doctor's degree, what did he have to do to get a doctor's degree? Because in the back of my mind, I was twelve or something like that, I thought wow, what a great career! What did I have to do to be a doctor? My dad said, "Oh, he had to write a book!" That stuck with me for a long time. And a thesis is a book, but it was the idea that—be a doctor or a dentist—but you've got to write a book to be a professor.

Rabkin: Was that a daunting prospect as far as you were concerned?

Griggs: It was a daunting prospect. It never really entered my mind that that was possible, because when you're twelve years old books are like, whatever. Later, I ended up writing several books. For me, because my life had been one of looking forward to being out-of-doors, when I graduated from high school I decided I wanted to be forestry major. That's what my dad had done. Not so much that I had to be a forestry major, as much as you get to be outdoors. And we camped in state parks and there were the rangers and the naturalists who took you on these hikes and gave talks at the campfires. That seemed really attractive to me as a kid.

University of California, Santa Barbara

My brother had been at UC Santa Barbara for the year before I got out of high school, which along with being on the ocean, made it an easy choice. Unlike kids today who apply to twenty colleges, I applied to one school. But they didn't have forestry. They had botany and biology. Somehow I looked at the catalog. I said, "No forestry." I didn't want to go to Berkeley. It was too big. So I looked at geology. All I could think of was out-of-doors. I wasn't a rock collector or mineral collector. I had an interest in bones and fossils and stuff. When I was a kid, I put together skeletons. I found a sheep and I cleaned it up and stuck it together. I had this anthropology interest, but anthropology, I didn't know what that was. I decided to do geology. Geology, forestry, they sound about the same…

Rabkin: So, the driving motivation was to do something that would take you outside?

Griggs: Exactly. Some people today, by the time they go to college they're pretty mature. They've read all the classic books, which I hadn't. I was really, I think in retrospect, I mean, I wasn't stupid. I wasn't completely naïve. But anyway—so I started out in geology and started taking the basic courses. Then I took this really great course, because we had to take social sciences. I took a class in Latin American history by a really enthusiastic guy. I decided I would change my major to Hispanic civilization. I was going to be a Latin American diplomat. I changed my major and went in to talk to this professor, and here again is this subtle influence of what faculty say to you without realizing the impact it might have. So every time I'm advising somebody I really think carefully about what impression I'm putting out there.

I said, "I really like this course and I have changed my major. What are my career options?" He was an older guy, a little bit gruff, but very interesting. I think he thought I wanted to be an ambassador, which is different than the Foreign Service. Ambassadors are political. He said, "Does your family know anybody high up in politics?" I said, "No." He said, "Does your family have a lot of money?" Which would be two criteria for being an ambassador. You know, you gave a lot to a campaign. I said, "No." He says, "Well, you're going to have to be damn good then." I remember his words to this day. I walked back and changed my major back to geology. So now I had gone: geology, Hispanic civilization,

back to geology. Started back in the courses again, and then I took a class in anthropology, really exciting. So I changed my major to anthropology.

Rabkin: So by now you'd gone from geology to—

Griggs: Hispanic civilization, back to geology to anthropology. I did it before I even talked to the professor. I still remember his name, [James] Deetz. He was very well known in anthropology at UC Santa Barbara. I said, "What kind of career choices do I have?" He said, "Well, hmm. I guess you could teach college anthropology." That was it. Those were the words I remember. *You're not going to go anywhere, so why bother?* I mean, that was the impression I got. He probably didn't mean it like that. But rather than saying, "The world's open to you, you can—"

So I went back and changed my major back to geology again. People think often that as university faculty—you probably get asked this, "Well, you probably knew from the time you were six years old exactly what you wanted to be, right? You followed the path." No, not really, I changed my major five times. Fortunately, in the middle of that I managed to take calculus, chemistry, physics, so I still graduated in four years in geology. But it's all these serendipitous decisions that things happen that way. I got all my courses out of the way. I did really well and was a Regents Scholar.

At that point I still wasn't sure about a career, what I was going to do next. Santa Barbara was still a bit of a small backwater campus then. It wasn't the prestigious

school it is today. It started as Santa Barbara Normal School, then became Santa Barbara College, then [it became UC Santa Barbara]. The geology department had five faculty. They hired a guy who was really well known, who built a graduate program for the first time. My senior year was the first year for the graduate program. There were graduate students who we began to realize were working on advanced degrees. But it made me think about graduate school. Some of the faculty were encouraging me to stay there and do my graduate work there, which in most places is not a good idea. It's time to get away, do something else.

Rabkin: Did you have particular mentors as an undergraduate in geology at Santa Barbara?

Griggs: Well, Ken Norris's brother, Bob Norris. He taught a class in marine geology, which kind of opened my eyes to the sea floor and the ocean and beaches and coasts. He was the person I probably most closely identified with. My professors began talking about graduate school. Every department hall has a bulletin board with graduate school circulars. I went up and there was this picture of this ship and a guy hanging off the edge collecting sediments from the seafloor. I said, "That looks really cool." I knew I wanted to do oceanography, so that was Oregon State University, but there was also Scripps and Woods Hole, Lamont-Doherty, which was Lamont then, and University of Washington. Those were sort of the big schools. And Oregon State has the lowest application fee. I didn't have any money in school. I had a Regents' scholarship. I worked every summer. I hashed in a sorority house during the year. Just got by. I never felt like

I was suffering, but didn't have a lot of extra money. In fact, I always thought I was so independent. [I] worked in factories in the summer and really learned what it meant to work in a blue-collar job, which made me appreciate going to school. In fact, somewhat surprising perhaps, I never missed a class in four years.

Rabkin: Wow.

Griggs: People think, "Oh, my God. I didn't *go* to a class for four years. So money was important. My mother was amazing at saving. I have two brothers, and every letter we ever wrote from anyplace, she saved it. When she died, ten years ago now, I found this stack of postcards. They were postcards I sent from college. My typical note was "I did well on my midterm and went surfing and blah, blah, blah—can you send five dollars?" Five dollars!

Rabkin: Five dollars made a difference then.

Griggs: Yeah. My parents paid our tuition, which was like forty or fifty dollars a semester.

Rabkin: Your parents paid tuition?

Griggs: I think that was their contribution, but room and board and everything else I paid for. Then I had this scholarship and worked and so forth. But just the fact that five dollars was big, that I asked for it so often.

Rabkin: Do you still have those postcards?

Griggs: I do! Yeah. There was another interesting experience during those years at Santa Barbara [that] had to do with travel. In fact, this is my travel map—

Rabkin: Okay, so we're looking at a world map here that's got pushpins all over it. *All over*.

Griggs: [laughter] All over the place. They're different colors on different trips.

Rabkin: Wow!

Griggs: But Santa Barbara in 1964, which is the year before I graduated, my junior year, had started an international good will project—UCLA for years had a project that sent a group of students to India for the summer. It was called Project India. It was a student goodwill thing. Santa Barbara and Riverside contributed a couple. It was mainly UCLA. After a couple years of that, Santa Barbara said, "Well, we ought to do our own project. We have enough students." So they decided to do Pakistan. They had done one trip the year before, 1963. That seemed kind of exciting, a real adventure. They had an application process, an interview process, and then a whole series of weekend things and evening things trying to go from twenty people down to seven.

Rabkin: Wow.

Griggs: It was all kinds of challenges, physical challenges, intellectual things. Most of them were history or political science. I was a geology major. But it was rather an incredible experience. In the end, I got selected along with six others. We spent most of the fall, winter, spring reading—we'd get together every Friday night and go over politics and India and Pakistan and Muslims and Hindus and all this. Then we ended up spending a couple days in Washington, D.C. meeting with the State Department and a couple days in Paris and then in Rome and then in Beirut. And then into Karachi. Ninety degrees and 100 percent humidity. Then we spent the next two months in what was then West and East Pakistan. Now it's Bangladesh. Trains and oxcarts and boats and with one advisor or one chaperone—there was three girls and four guys. Meeting students, going to colleges, sitting at teas and receptions and lectures. We learned some folk songs and one guy had a guitar.

Rabkin: Which year of your college career was this?

Griggs: It was between my junior and my senior year. So I was twenty and I'd never been out of the country before, well except to Mexico. All of a sudden, here we are traveling around the world. On the way out, we were a couple days in Bangkok, Tokyo, Hong Kong, Honolulu. So we saw a lot along the way and on the way back. The earlier group before had had a leader. One of the students was a leader. But it turns out when you're in a place like Pakistan with all the stress, somebody's always sick. [You are] twenty, twenty-one years old. On our most recent trip we were prepared; we were adults. It was all taken care of—

Rabkin: This was our recent trip to China and Tibet.[2]

Griggs: So where we were going to go next, the places that we are reading about in the paper every day now, Lahore, Islamabad, were places we went but we had to figure out how to get on the train and get there. We had a guy who was actually the head of the University Religious Conference, who happened to be the sponsoring agency, although it wasn't religious. He was only ten years older than we were. He'd never traveled. But anyway, in the training, the trainers decided because the year before the group had a leader who made things difficult—people didn't like the leader and they had challenges—they decided they weren't going to have a leader for our group. We were going to all work together. So during one of our last training sessions we were all practicing short speeches because we were going to meet with students in Pakistan and do programs.

We would go to a college, set up, put up circulars. Then we did some Peter, Paul, and Mary songs. Then we'd each talk. We had five or ten minutes. It was about your life and what's it's like being a student, or sports, or whatever it was. So we all were rehearsing this at UCSB. You're standing in front of your group in an auditorium. Our advisor and a psychologist were looking at us and seeing how we were doing. What I didn't realize was everybody was feeling kind of crappy: "Oh, I can't speak well. I'm not clear." What I realized was that after I had spoken, without my thinking about it I'd gone around to each of the people in

[2] In the fall of 2011, Griggs co-led an eighteen-day group trip to China, along with historians Cherie Barkey (Cabrillo College faculty member) and Sandy Lydon (Barkey's predecessor at Cabrillo, now retired and teaching independently). Rabkin traveled with this group.

the room saying, "It's okay. We'll do this." I was sort of counseling people. That evening when we all had dinner the counselor who was working with us said, "We said we weren't going to have a leader but a leader selected himself." Everybody was looking around saying, "Who was that?" "It's Gary." I went, "Oh, my God." So, it wasn't quite like I was the leader as much as I ended up starting the programs usually. But I was the non-political one. The other guys were into politics and history. It was kind of a funny—but I realized, I think about people and how they are feeling—

Rabkin: Yes.

Griggs: –and relating to people, and how they're doing. So it was another little step that told me something about myself, indirectly or subtly. I think that's been with me ever since. That afternoon and evening this person worked with us all. He was the campus counselor or psychologist trying to make sure we got along and we didn't have any breakdowns. It also made me think a lot about traveling and going back to places. That set the stage for all these pins on this map—

Rabkin: Of which there are how many?

Griggs: [laughs] I don't know. It depends on—that's always been one of the things about being a faculty member—jumping ahead a little bit—is having the chance to take sabbaticals and travel. I've been really fortunate in that respect. So you can see ones in Pakistan and Nepal and India and Tibet and Bhutan and China and Japan and Australia and New Zealand, Europe and some in South

America. Then I was on this ship teaching around the world and spent some time in the Northeast Pacific and Alaska. The whole middle of the U.S. is empty. I've never been there.

Rabkin: There's one green pin in the middle of the country there.

Griggs: Probably Chicago.

Rabkin: Chicago. Looks like.

Griggs: Which I probably just bounced in and out of so many times on airplanes, but I have never got out of the airport in Chicago.

Rabkin: Who funded this program that took you to Pakistan?

Griggs: We each had to put in some contribution at the time. I want to say it wasn't huge. Three hundred dollars. Through what they call Public Law 480, which is what funds the Fulbright Program—Fulbright established it, I think, when he was a senator. What it does is that it takes money that foreign countries would have used to buy U.S. products, keeps it in the country, and they use it for cultural enrichment, visitors, libraries.. So the Fulbright Program is paid that way. I ended up on a Fulbright later in Greece. Pakistan, through their embassy and the consulate, actually said, "Okay. We're going to pay for this group—or partially pay for this group of students to come here for the summer to talk to our students." At that point, it probably wasn't a huge amount of money. I don't

know what it was. So it came through the State Department. We did a couple of fundraisers. I think we each put in three hundred or five hundred dollars.

Rabkin: When did you decide that you wanted to focus on coastal and marine subjects?

Griggs: Well, again I was finishing up at Santa Barbara. Graduate school had just entered my mind because they had started a graduate program. I thought, "These guys are kind of cool." They were doing research and they were older. This department chairman named Aaron Waters, who subsequently came to [UC] Santa Cruz and started the program here, he called me into his office as chairman. He later became a member of the National Academy of Sciences and had a pretty illustrious career. There's a poster down there—he and his wife—because we have the Waters Award each year.[3] He had trained the astronauts to walk on the moon because he was a volcanologist. He was a recognized guy. He said, "Don't stay here. I'm supposed to give you the message, the fact that the faculty want you to stay here, but you're always going to be the little boy in the department. Go on to someplace else. Meet new people."

So again, I knew where the oceanographic institutions were. It was this class in marine geology. At UC Santa Barbara, I had spent a lot of time surfing, on the beach, picking up rocks, watching the seasons change. I was also a good student,

[3] Griggs is referring to an exhibit in the atrium of the Earth and Marine Sciences Building—Editor.

but surfing was a way to calm my mind down. People would be cramming before finals. I'd be out surfing or walking down the beach and that worked well.

Graduate Studies at Oregon State University, Corvallis

I saw the poster for Oregon State with this guy on the ship and I applied there. I wrote letters to all the other places. Scripps wanted fifteen or twenty dollars and Washington wanted twenty-five dollars and somebody wanted thirty dollars and I think Oregon State was free, or was five dollars at the time.

Rabkin: The application fee?

Griggs: Yeah. So I had gone through this whole process. I applied to one school. I'm thinking now because [my partner] Deepika's daughter is applying to colleges. She's applying to thirteen colleges. You know, plane trips and interviews. She's in musical theater so there are auditions. I just sent off an application to one school. I had a good undergraduate record. I had good letters. I got offered a research assistantship at a hundred eighty dollars a month. I came back and I was trying to figure out, Let's see. I've got to find a place to live. [I was] planning on getting married as soon I graduated which was another step, trying to support us and the car and whatever. I said, "Boy that's going to be a little tight." He said, "Well, ask them for twenty more dollars."

Rabkin: Who said this?

Griggs: The chairman of the department at Santa Barbara. Because he was saying, "Don't stay here. Go there." So I wrote back a letter. We didn't have email and phones. So they raised it to two hundred dollars. You think about it. That was pretty bold. We have different graduate research assistant levels. You can be a GSR 1-7 depending on whether you're advanced to candidacy.

So you know, got married, took off to Oregon. As soon as I got there, I was out on a cruise because every new graduate student goes out to sea two weeks a year on a ship. That was kind of exciting. It wasn't my research. But to make a long story short, I really wanted to do offshore marine geology. The guy I came to work with had gone back, no, he was there—he later went on to Washington, to be head of NSF [National Science Foundation] or an NSF program director. Then he went off to be head of NOAA [National Oceanic and Atmospheric Administration]. Then he became dean of the school of oceanography and then president of the university, but anyway, he got involved with administration.

So I worked with another young professor. He had just gotten some money to study the equivalent of the Monterey Submarine Canyon off the coast of Oregon, which is called Cascadia Deep-Sea Channel. It's sort of the submarine extension of the Columbia River that goes for a thousand miles across the sea floor. There're a lot of submarine canyons that go down off the edge of the continental shelf and down the continental slope, but deep-sea channels are on the deep-sea floor and there aren't too many of them. This one is right offshore—well, two hundred miles offshore. So I started working on that. It was really exciting. It was really cool going out in ships and bringing back cores of sediment and

opening these up. Every one was a mystery. It was a book ten thousand, fifteen, twenty, thirty, fifty or a hundred thousand years old. And you were opening these up. Sort of like a geologist on an outcrop, but it's layers of mud on the seafloor. It was very cool.

Rabkin: What kind of things did you find?

Griggs: Interesting you should ask that because actually I'm just finishing up something—if I can pull this out— [pulls out file box]

Rabkin: This is your file box labeled "Cascadia."

Griggs: Cascadia. Yeah. I don't know whether you know *Eos*? Which is the newsletter of the American Geophysical Union? So basically we're taking cores that are ten, twenty, thirty feet long. To sum it up—

Rabkin: This is Volume 92, Number 39. September 27, 2011.

Griggs: 2011. About forty-five years after I did my work—"The First Ocean Floor Evidence of Great Cascadia Earthquakes."[4]

Rabkin: What do you know?

[4] Griggs, G. B. (2011), The first ocean floor evidence of great Cascadia earthquakes, *Eos Trans. AGU*, 92(39), 325, doi:10.1029/2011EO390001.

Griggs: What was fascinating was we were taking these cores off of Oregon and Washington, and this is this channel that runs for about a thousand miles. It's sort of [noise in background of unrolling documents]—actually I use these in a class, which I'm starting to teach next quarter, *Oceanography*, for the forty-fourth year.

Rabkin: So this is a long scroll that's some kind of seismic record?

Griggs: It is. Exactly. Once you get out onto the deep sea after you get off the edge of the shelf and the slope, you either get mountains or you get plains. We call them abyssal plains because they are very deep. So there's this very flat plain. And you can see individual layers of sediment. This is seismic reflection, where we're actually sending sound through the water and into the sea floor and it goes, penetrates, and bounces back from different layers, and you can see what is sort of like an X-ray.

Rabkin: Right, or an ultrasound.

Griggs: Ultrasound. Yeah.

Rabkin: It's an acoustic record. You're bouncing sound off the seafloor and it shows you a picture. It's sort of like what marine mammals do to get a picture of their surroundings—

Griggs: Exactly. Now that's not advanced today, but at the time it was advanced. And all we had at the time—[More unfolding of documents]

Rabkin: Okay, this is a much more primitive-looking document.

Griggs: This is just a depth sounding. So it tells you where the bottom is. How deep it is.

Rabkin: So you get the topography of the floor.

Griggs: Sea floor. Now this is what whales also do. They're reflecting sound off of krill. When you're fishing, fishing boats send sound out and they're looking for schools of fish. Basically it's an echo sounder. You create an echo. It starts at the ship, goes down, bounces back and you know the speed of sound in water; it tells you how deep the water is. But it doesn't tell you what's beneath the seafloor. So what we knew [more paper rustling noises] from our work was that there was this channel, this canyon down there. But we didn't know what it looked like until after I finished my research. All we knew was if you followed this transect offshore that there was this channel about 200 miles off the coast.

Rabkin: So there's like a V-shaped—

Griggs: Yes. In some cases, it's U-shaped, some cases V-shaped. What we were doing was going out there with a two-thousand-pound core, like a giant weight with fins on it, and then you'd screw on twenty-foot chunks of steel pipe and

inside of each one there was a plastic liner. Then we'd try to get as much core as we could. [Sound of maps unrolling] But we didn't know what we were going to find. The guy I was working with had gone out on one short cruise before that and had opened a few cores. He was busy doing other things and said, "Do you want to work on this for a thesis?" I said, "Great." So I was pretty much on my own. For the next three years, that's what I did.

Rabkin: On your own, literally?

Griggs: We had colleagues and we would help each other out. He would be there saying, "What'd you find today? Where's this taking us?" And so forth.

Rabkin: And what was this professor's name?

Griggs: Vern Kulm. He'd only gotten his degree the year before. He was pretty young, too. So two parts of it were, well, this is actually a short section through one of these cores.

Rabkin: So this is the illustration on the front page of this [article].

Griggs: On the *Eos* article, yes. They were very, very rhythmic, very regular, layering in these cores. I could pull one out of here—

Rabkin: Regular in terms of the layers?

Griggs: The sequence of sediments was very, very regular. Let's see if this is going to be a good one. I was sort of struck by this. These things all look the same. But I didn't know what it meant at the time. It took me a little while to figure this out. This is going to be a good one. These have now been around for forty-five years. These were the actual photographs. And then, this was my log of it—

Rabkin: I see. So you have a thin, long strip here of photograph of the core itself.

Griggs: Then as I was going down as I was looking—this doesn't have much detail in it. Some of these will have a lot more detail. But what I was doing was saying, "Of course, this is what's in it." There's a little bit of problem with color contrast. But basically, we would get these very regular, sandy layers that got progressively finer-grained proceeding upward, and then they graded up to silt. The color was olive green. I'm going to find one that's actually better. [Flips through records of core samples] Some of these are colored. I don't want to belabor this.

It was a fascinating story. It taught me a whole lot of things about research. Anyway, so these layers were two, three, four feet thick in each case. This is what we call graded bed. It went from coarse to fine, which means it settled out of suspension. If you take a jar full of pebbles and sand and gravel and shake it up, the coarsest things fall first. Then under each of these graded beds was a gray—which is a little hard to see here—there was a gray clay that was very different in color. It had only organism remains from deep water or the open ocean. And this was what was coming out of the water in between these giant submarine

mudflows, which we called turbidity currents. They were coming down this canyon. We now know that's sort of a worldwide phenomenon; that's what moves sand downslope from the coastline to the deep-sea floor. River sediment builds up on the seafloor at the top of the continental slope, becomes unstable, and flows downslope for hundreds of miles. Sort of like a muddy debris flow on land but on the ocean floor, driven by its density with extra sediment. Then we found out that these burrowing organisms had gone down through and extracted the organic matter. Then we get another coarse layer and another one of these, what we call a pelagic clay. And then another turbidity current deposit and another gray pelagic clay and turbidity deposit—on and on..

Rabkin: We're going deeper and deeper into—

Griggs: Deeper and deeper—

Rabkin: —into the sediment now, okay.

Griggs: So this is down, maybe fifteen feet, and back maybe twelve thousand years, when we finally were able to sort it out.

Rabkin: So you were looking at a record of the deposition of this material on the floor.

Griggs: On the deep-sea floor. Out at water depths of maybe twelve or thirteen thousand feet. Looking at the last fifteen thousand years of history. So something

is happening here very regularly. And then we discovered these flows were coming from the land. There were terrestrial minerals and plant fragments. And actually we discovered volcanic ash.

Rabkin: So periodically you get this deposition of stuff that's coming from the land masses—

Griggs: Out of the Columbia River, originally.

Rabkin: Including volcanic ash from the Cascade volcanoes—

Griggs: Exactly. Actually from Crater Lake, Mount Mazama—

Rabkin: Mount Mazama, which was a historic—

Griggs: Blew out Crater Lake about seven thousand years ago. We knew when we saw the volcanic ash that the deepest layer including the ash was from about seven thousand years ago. It became this great detective story. I couldn't wait to go out to sea and collect the next core and open it, look at under the microscope, and take samples. And washing them, we found Mazama ash. We realized, wow, this is seven thousand years ago. We could look back and say, wow, there's been about twelve or thirteen of these submarine mudflows in the last seven thousand years. There are also huge changes in the seafloor record when we went from the last ice age to the present—or the Pleistocene to the Holocene, which is somewhere there around twelve thousand years [ago]. Actually, the fossils

change from planktonic foraminifera to radiolarians. We could actually count the number of these in these samples and say, "Wow, we're twelve thousand, ten thousand years ago, pretty close." We did some Carbon-14 dates to confirm our thinking.

The other part of graduate school that Oregon State had—and this also became an important event for my own professor/graduate student training—we had comprehensive exams, written exams, oral exams, two foreign languages we had to learn.

Rabkin: Do your students have to do that now, your grad students?

Griggs: No. We also had ninety units of classes including two minors outside the department. I had a major in oceanography. I took forty units: thirty units in geology; twenty units in civil engineering. I minored in civil engineering.

Rabkin: How many units to a standard semester class?

Griggs: Most are three or four units if they had a lab.

Rabkin: Wow.

Griggs: I took fifteen to sixteen units each quarter for three years. Our graduate students here might take six courses or seven or eight courses total. I took thirty courses. I took three solid years of courses, two foreign languages, and finished

my thesis in September of my third year. I skipped a Master's and managed to get a Ph.D. in three years, with ninety units of classes in two foreign languages and going out to sea and all this.

Rabkin: And you were married at the time?

Griggs: Yes. But I set a standard for my own students because we have this thing we call "gradual students."

Rabkin: [laughs]

Griggs: You're in Santa Cruz. You're in a nice place. Someone is paying you to do work—oh, five years, six years, seven years, eight years, no big deal. I tell my students the day they get here, I don't want you here for five or six or seven years—even though all of our documents, if you look at the average time to degree, they're invariably—I think in biology it's seven years. And there are reasons why it might be, but I think that's not healthy. I've never had a student who got out with a Ph.D. in three years. I try to get mine out in four, or some a little bit less, some a little bit more. But they're all quite happy to realize they don't have to serve so many years of penance. On the other hand, it's a time when faculty can get a lot out of their students. They do a lot of work for them. They publish papers together. There are clear benefits to students but not after four or five years.

So anyway, that's a little perspective. I was there a compressed amount of time, but when I finished this research I had this story. The other thing that's kind of fascinating—

Rabkin: Before we go on, Gary, can I just ask a clarifying question about the research?

Griggs: Yes.

Rabkin: You talked about it as a kind of detective story. It was really interesting to see what was in these cores and then try to interpret it, and what you were seeing was that there were these periodic depositions of stuff coming from the land, and were you asking why?

Griggs: Why, exactly.

Rabkin: Yes. And what was causing them?

Griggs: Exactly. That's the other thing that's fascinating—

Rabkin: [reading document Griggs hands her] "The Cascadia Channel: The Anatomy of A Deep-Sea Channel" by Gary Bruce Griggs. So this is your dissertation?

Griggs: Thesis. What's fascinating today, my students come in—I just printed out a paper I'm supposed to be reviewing. You look at the kind of quality of the graphics on a computer—

Rabkin: We're looking at computer-generated graphics with multiple colors—[both talking]

Griggs: Maps—cool stuff.

Rabkin: Photographs and GIS [geographic information systems].

Griggs: We did everything by hand.

Rabkin: Okay.

Griggs: These are like, these—this is this channel—

Rabkin: These are hand-drawn graphics.

Griggs: These are cores. And I'm trying to correlate different sediment layers. We had press-on patterns. This is all done with a lettering guide that we did by hand. So anyway, even trying to do three-dimensional diagrams of sediments. [laughs].

Rabkin: You're flipping through appendices of lots of charts and tables—

Griggs: Three-dimensional.

Rabkin: Okay, here's a three-dimensional representation, hand-drawn of this channel—

Griggs: This channel system. So the Columbia River would be up here and Oregon and so forth.

Rabkin: Beautiful.

Griggs: We spent a lot of time trying figure this out. The mystery was, why these events had happened so regularly. And we had gone through and by doing—finding this ash from Mount Mazama, doing Carbon-14 dates, I knew these events happened every three to five hundred years, because we knew, okay, we had ten of these in five hundred years or three hundred years, but this was before the concept of plate tectonics.

Rabkin: Oh.

Griggs: Which is hard to imagine today.

Rabkin: Yes, it is.

Griggs: It's like before Mickey Mouse, or something. Or cell phones or computers. Typing things by hand, drawing by hand. No email. You wrote letters to get reprints from people. We didn't have electronic PDFs and so forth. It's kind of hard, but that was the way it was. So I figured, here's the Columbia River, this giant river putting out all this sediment. There was some other fascinating stuff, other things that emerged from the cores—like these glacial floods that came out of Washington. Not a thing that you would have been connected with, but we knew there was a major ice sheet. There was something called Glacial Lake Missoula formed that covered a lot of—-

Rabkin: Yes.

Griggs: Well, out on the seafloor I found these thick layers of gravel. After I had worked this whole sequence out of all these sandy turbidity currents, all of a sudden I bring this core back and it's all gravel. Oh God, what is this all about? It turns out when those glacial—another detective story—I went back and I took these pieces of gravel. We made thin sections and I looked at the rock types. They came out of the Chelan batholith along the Columbia River where there's lots of distinct gravel. It turns out when this ice sheet came down and dammed the Columbia and the Snake River, this huge lake formed, called Glacial Lake Missoula. And we now know, although it took a long time to be accepted, that as the water got deeper behind that ice dam, at some point, just like an ice cube in the bottom of a glass, the ice dam floated up and this glacial flood broke out and went racing down the Columbia River. We now know it scoured out what we call the Channeled Scablands, where Grand Coulee and these huge gorges are.

We found these giant gravel bars and sand waves. It went on all the way to the ocean and continued as a turbidity current that ended up in Cascadia Channel. But these were very distinct sediments. This was ice age stuff, so it was older. I thought I had that all figured out, then I came across this stuff.

Rabkin: Now you're going for another drawer.

Griggs: Going for another drawer. These are, let's see, these are actually—

Rabkin: These are photographs.

Griggs: Yes, first they were X-rays. Then they're positives. We would cut these cores. We'd open them up, cut the plastic liner until it dried out. So it was sort of like the consistency of modeling clay. We would actually use a guitar string, a sharp wire, open them up.

Rabkin: So you'd cut it in half the long way?

Griggs: Yes. You'd open them up. You'd go, wow, this is cool! Then all of a sudden I started hitting stuff.

Rabkin: Like hard stuff?

Griggs: Yes. Like pebbles. So in contrast to the gravel, which was continuous like beach gravel, these were scattered stones in the middle of clay. And some sand

and layers in there as well. The core distorts this a little bit when the barrel goes in. I said, "What in the hell is this all about?" Totally surprised. It turns out, when we looked at these rocks, they had come from Vancouver Island.

Rabkin: Way up north.

Griggs: Way up north. And it turns out another detective story emerged—it was just challenging but rewarding trying to solve this mystery. One of the things about geology or oceanography, versus say chemistry or math or physics—in those disciplines you get a problem and you try to solve it. It may not even be solvable. In geology or oceanography or any kind of natural history, you know there's a way it happened, that specific events took place, and you're trying to figure it out. We know these gravels got here somehow. How did they get there? What was the story? What's the best thing you can come up with? Versus somebody hands you an equation and say, well, the unsolved math problem, whatever it is. So I knew they got there somehow and there had to be an answer.

So we kind of methodically made thin sections of these pebbles. We looked at the rock that came from Vancouver Island. It turns out that during the peak of the last ice age not only had it dammed the Columbia, but it had come down, scoured Vancouver Island, scoured the Puget Sound lowland. Seattle was covered with ice. At the end of that glacier, these icebergs would calve off and these icebergs would float out into the North Pacific. It turns out currents were a little bit different at that time and icebergs were carried as far south as Newport, Oregon. We were two hundred miles off Newport. So they were ice rafted. This

is what you see on the geologic record. So it was just another example of, wow, this is really cool.

So putting this all together, I ended up trying to figure out, so what happened out there? How did these turbidity current deposits get here? And I could only think—forgetting the glacial floods and the icebergs—two things that could happen. Either the Columbia River put out all this sediment and it sat out there on the edge of this shelf and we had big storms and waves stirred this stuff up. The sediment became unstable because it was too steep, and started to flow downslope. There are similarities on land, like we get a lot of rain in the Santa Cruz Mountains, the soils get saturated, are weakened and we have debris or mud flows. But this was all underwater. And down they went. The other idea I came up with was there were big earthquakes that would shake it somehow. But this is pre-plate tectonics. So I went up to the people in geophysics and I said, "Can you think of any reason we should have big earthquakes in this area?" And I remember their words, "Not that we can think of." This was 1967.

Rabkin: But in 1964 hadn't there been a gigantic earthquake in Alaska?

Griggs: Yes. But Oregon had been seismically quiet for a long time.

Rabkin: I see, so that was a separate seismic—

Griggs: And the other thing that's unique, well—all the way around the Pacific we have the Ring of Fire. We have these trenches, including the Aleutian Trench that in 1964 ruptured with a huge earthquake.

Rabkin: So [now] we're looking at a three-dimensional sea floor map.

Griggs: Of the Pacific. Here's the Aleutian Trench. The Kurile Trench. The Japan Trench. The Marianas Trench. The Philippine Trench. The Tonga Trench. The Kermadec Trench.

Rabkin: These all form a kind of a circle around the Pacific.

Griggs: Right. And we have the Peru-Chile Trench. Off of Oregon and Washington there's no trench. In the sixties was when the pieces started to get put together. That's a whole other history. I wasn't at the cutting edge of that. It was actually happening at Scripps and Lamont. Oregon was a maybe a year or so behind. So while people were beginning to find magnetic anomalies and stuff that seemed to say something about the sea floor, we were still a little bit in the dark.

Rabkin: This was the progression toward an understanding of plate tectonics.

Griggs: Exactly. So if you look at the sea floor in the Aleutians, where that big earthquake had occurred in 1964—so we come out of that big trench, and we come up to the Aleutian Islands, which are actually all volcanic. So if you come

off the coast of Oregon, this is sea level, the sea floor is very flat—it comes right up to the base of the continental slope and on up to the coast range. Then the Cascades, which are volcanic. So you don't see a trench. There are a couple of reasons why but we didn't have any idea then what was happening. It wasn't until actually two or three years later where we realized that this is actually a plate going down, colliding with the continent, and as this plate goes down, it starts to melt because it's hot and those fluids rise and create volcanoes. So this Ring of Fire around the Pacific—every one of these trenches is backed by a chain of volcanic islands: Japan, the Philippines, New Zealand. Central America, South America. The Pacific Northwest has that also but we didn't make that connection. It starts with Mount Lassen, Mount Shasta, Crater Lake, Mount Adams, Mount St. Helens. Mount Hood, Mount Rainier—up into British Columbia. There are these volcanoes. They all have been called dormant.

Rabkin: So that chain of Cascade volcanoes represents the equivalent situation that the trenches around the rest of the Pacific represent.

Griggs: We have the volcanoes here and there. But I think for a bunch of reasons, and it might be because a lot of sediment coming out of the Columbia River filled up that trench, you just didn't see the topographic expression of it.

So nobody could tell me at the time why we should have earthquakes there. So when I finished my thesis and wrote it up, I said, "Big storms or possibly big earthquakes." So then in subsequent years it was discovered that this was a plate boundary. People started thinking, wow, the volcanoes are connected to that. It

was a long story that ended up—people started noticing along the coast of Northern California, Oregon, Washington, in these estuaries and bays, first that there were trees that had been killed as their roots were submerged in seawater. You can go back and date them. They also found in these estuaries there were these very clean sand layers in the middle of estuarine muds. Sometimes there were multiple sand layers, just like I was finding multiple sand layers.

What they discovered was every time there was a major earthquake, just like the one in Japan in March 2011, what happens is for a long time you're pulling this upper plate down, you're actually pulling the coastline down and pushing up the inland portion, and then when this finally breaks, it sort of reverses, but the coastline goes underwater and you submerge these trees. Their roots go in salt water and they die. So by coring the trees they can find out when the last big earthquake occurred. The other thing that happens is you get a tsunami, a huge tsunami, and those waves go back into these estuaries and wash beach sand inland and leave it behind as a record.

So all those were put together in a sequence, and about twenty years after I finished my thesis, a guy who was working in Canada says, "You know, there must be some record of this on the sea floor." So he went back and found my paper, and said, "Wow, Griggs found the evidence for this twenty years ago in these cores. These are the submarine turbidity currents that were created by every one of these big earthquakes." He went back—he gave me credit for it and put the pieces together.

I'd been here at UCSC for twenty years and I thought, well, that's cool. So that was the birth of a whole new field called submarine paleoseismology. Just like we have paleo floods and paleo earthquakes, where if we can find in the geologic record—which is really exciting because our historic record is pretty short in California—earthquakes, maybe 1800. But is that a representative period, from 1800 to 2000? Or not? It turns out all these dates on when these trees submerged, and there were North American Native American legends on canoes being carried up into trees and villages being wiped out, but they didn't have a written record. There was a record, and this guy I'm working with now, who's at the U.S. Geological Survey in Washington, who is a member of the National Academy, he slowly began putting this whole story together. He put together a *Great Earthquakes of Northeast Washington*—It is southwestern Washington but Northeast Willapa Bay.

Rabkin: [reading] *Recurrence Intervals for Great Earthquakes of the Past 3500 Years at Northeastern Willapa Bay, Washington*. The USGS.

Griggs: So he's now looking at the sediment records in these marsh sediments. He also had discovered, in Japan there was something called the orphan tsunami. It turns out Japan keeps really good records of things—their history is so much longer—just like China does. We know what happened five thousand years ago there but no historic records of what happened here. It turns out because Japan- and we just saw that in March [2011]- had this giant earthquake, they're very aware of tsunamis. They did have some problems this time around. Normally when a tsunami hits, there's also an earthquake, because it's local. They have

good records. It turns out there was a tsunami that hit northern Japan on January 24, 1700 recorded in all these monasteries. But there was no earthquake felt. So they called it the orphan tsunami because it didn't have an earthquake. Well, when they dated all these trees that submerged and all the soils—

Rabkin: In the Pacific Northwest?

Griggs: They could pin it down to somewhere between 1699 and 1701.

Rabkin: So there was an earthquake in the Pacific Northwest that generated a tsunami that travelled across the Pacific, and that's the one they had the record of in Japan.

Griggs: Yes.

Rabkin: Wow.

Griggs: Just like our harbor. And Crescent City got the crap kicked out of them during the Japanese tsunami, because a tsunami goes out sort of like a flashlight beam. It's weaker on the edges but when the seafloor pulls down and then snaps up, it generates a large wave that moves both outward and back towards the coastline. So when that happened, he started emailing me and although I'd never met him. He said, "We're working on this stuff and trying to pin down—because it's going to affect the whole coast of Northern California, Oregon and Washington—when is the next earthquake going to occur? We said, "Well, the

last one was 1700. The time between events is three to five hundred years. It could be tomorrow. This event happened in 1700, which is kind of cool.

Rabkin: And you have these cores. So were you really, in essence, doing the first submarine paleoseismology?

Griggs: I was, only I wrote about it in a way that that was a possibility but because we didn't know it was a plate boundary—

Rabkin: It still could have been floods, as far as you were concerned, that were causing those depositions.

Griggs: I didn't know. That's what this was about.

Rabkin: This is the *Eos* article.

Griggs: So it's forty-six [years] later, after I—and most people's careers don't last that long.

Rabkin: About twenty years after you did your dissertation, people recognized what you had been seeing was earthquake history, seismic history—

Griggs: Submarine paleoseismology. It matched with things on land.

Rabkin: But this article now incorporates some new perspective beyond what happened twenty years ago. What's new about this one?

Griggs: Right, trying to put it in perspective with what happened in Japan. And also it was a retrospective, sort of what we knew at the time, what we didn't know, what our methods were like, the things I've been showing you. We didn't have all those tools. We didn't have GPS for locating ourselves. We didn't know it was a plate boundary. But if you do careful work and you identify the pieces, the evidence should still be there. So it was kind of neat and I heard from people I hadn't heard from for forty years. They said, "Wow, that's really cool. Now I know what you were doing up there." But what's also gotten kind of fascinating is the fact that they've now looked all the way, well, this boundary runs from Cape Mendocino in Northern California all the way to Vancouver Island.

Rabkin: This is the boundary between—

Griggs: What we call the Juan de Fuca Plate is going down under North America. That's this Cascadia subduction zone. Now a guy at Oregon State, who has expanded this work on his own, is now taking cores all the way along the length of the subduction zone in all of these submarine canyons. He thinks it may rupture in segments. The one off Southern Oregon, Northern California, may have magnitude-eight earthquakes every hundred to two hundred years. But the northern part of the whole thing breaks in magnitude-nine earthquakes every three to five hundred. When that happens, Seattle, Portland, the Oregon-

Washington-Northern California coasts are going to get the crap kicked out of them.

In fact, there's a guy here at UCSC, Steve Ward. He models tsunamis. He's actually modeled these tsunamis to see how high the water levels would—I could show you the video- It's kind of crazy- but he then looks at the sea floor displacement. So the question is, and that's what we end with—and we deal with that with hazards all the time—how much of our resources and our energy do we put into an event that only occurs every three to five hundred years, but when it does, it is going to be devastating, versus all the other things we see on a regular basis.

Rabkin: Right.

Griggs: I'm going to Scripps Institution of Oceanography this afternoon to talk tomorrow at a conference on—*Vulnerability and Adaptation to Extreme Events in California in the Context of a Changing Climate: New Scientific Findings*. [reading from the program] This has to do with, well, this is brushfires, but coastal hazards, El Niños, sea level rise, water availability, biological changes, food supply, agriculture. Then the governor is having a conference Thursday in San Francisco on extreme events associated with climate change, with politicians. So in some ways this is one of these—it's not climate driven, but it's an extreme event. Maybe it happens every three to five hundred years, but in the meantime you have a lot of other stuff to worry about.

Rabkin: Like climate change-generated sea level rise?

Griggs: Yes.

Rabkin: And the two might foster similar kinds of precautions.

Griggs: Exactly. But it was really fun to look back forty-five years at a thesis. Some people say that university faculty spend the rest of their life rewriting their Ph.D. dissertation. I waited forty-five years and came back and looked at it and said, "Here's a new perspective on it."

Rabkin: Wow. Wonderful. Can I ask you just a detail about OSU? So the Oregon State University campus is in Corvallis, which is maybe what, twenty miles more inland from the coast?

Griggs: Probably forty, something like that.

Rabkin: But they have marine facilities out at the coast in Newport. And so were you based there in Newport?

Griggs: No, I was in Corvallis, where all of our labs and classes— There are sort of two kinds of institutions. There's the Scripps, University of Washington and Woods Hole Oceanography institutions, [where] they're right on the water., your boat's right there. You just go. There's actually another group like Stanford that has Hopkins Marine Station. It's coastal biology, but they're not a real big ocean-

going school— UC Davis has Bodega Marine Laboratory. University of Oregon has Charleston Marine Laboratory. San Francisco State has the Tiburon Laboratory. Santa Cruz is distinct in that we have Long Marine Laboratory, but we also have the people that spend a lot of time out on ocean-going ships because now we have a national ship program. We have a huge group of scientists here working in ocean drilling. We don't have a drilling ship. It's a national ship, so they're involved in that kind of stuff. So we were sort of in between [at OSU]. We had a ship. It was forty miles away. There were shipyards and facilities, but we would go out on a cruise and come back, unload all your stuff, bring it back to campus where we worked on it.

Coming to UC Santa Cruz in 1968

The biggest difference I've found, jumping ahead a little bit, coming from Corvallis to Santa Cruz in 1968— That was UC Santa Cruz's third year. It was opened in '65. Oregon State still is a typical, like a Big Ten school that's got football, which is huge. Basketball. It's a sports school. It's totally integrated with the community. The community lives and dies with the football team. Big fraternities and sororities. It's just a typical big college campus.

Rabkin: And a land-grant school?

Griggs: Land grant. Actually, it's the only one that's a land grant, a sea grant, and a space grant. Now they have something called sun grant, or something like that. I just got their alumni magazine because one of their fundraisers came down and talked to me Friday about what they're doing up there.

So I came to UC Santa Cruz, which was the hippie campus in the redwoods in '68. As a graduate student at Oregon State—we had no undergraduate classes in oceanography. It was a graduate program, which is typically the case. So I had never TA'd, never taught a class. I came here in the fall. I came here right as the quarter started. I couldn't quite get here in time to start the quarter. So I had fall quarter to get my thesis written up for publication—I got eight papers out into publication. I got a head start on that

Rabkin: Publications generated from your dissertation?

Griggs: Thesis. Yes. Then I knew I was going to start teaching winter. Turns out they had a class to teach that I had never taken. The professor from UCSB who had urged me to go to Oregon State had come to Santa Cruz to start a new Earth Sciences Department.

Rabkin: And this was? The Santa Barbara person was?

Griggs: The chairman. Aaron Waters. What was also fascinating was he had come up to Oregon to give some lectures on moon geology and training the astronauts. I'd gone to his lectures and I'd kept up with him. We had written back and forth. I knew he had just come to Santa Cruz. Most of the graduate students that I went to school with in marine geology were either going into offshore oil, which was a big deal, or to the U.S. Geological Survey, which was opening up a marine geology program. I was not really thinking about teaching.

Maybe somewhere down the road. I had just been interviewed by Exxon. I was all ready to take a trip to Houston. That's where my officemate that I worked closely with had gone, to Houston. Two other guys had gone to the U.S. Geological Survey in Menlo Park. Aaron Waters called me and said, "You know, I'm starting a new department at UC Santa Cruz." Oddly on my honeymoon, in 1965, on my way to graduate school - my first wife was from King City and we got married there- and we actually stayed in Carmel and then We drove up on the campus in August 1965 before it actually opened.

Rabkin: Just as it was beginning.

Griggs: Yes. The trailers were out there. Nobody was here. A few buildings. I don't know why. I just drove through. So he [Waters] called and said, "I've started a program and I think we might have a place for an oceanographer."

Rabkin: This was the Earth Sciences program they were starting?

Griggs: Yeah. There was two faculty.

Rabkin: Two faculty.

Griggs: Yes. So I flew down. Today we do recruitment, and it's pretty thorough. At that point it was a little simpler.

Rabkin: Somebody knows somebody who he thinks would be good and invites him down?

Griggs: Yes, but everybody met the chancellor. Dean McHenry met every new faculty member. I met the first dean. Actually, it was the second dean. The first one had left already. A guy named Terrell Hill in chemistry. So I met the chairman and the dean and the chancellor.

Rabkin: The Dean of Natural Sciences.

Griggs: It was called Natural Sciences then. And all of a sudden they offered me a position. So I didn't take the trip to Houston. Came down here.

Rabkin: What made you decide to just go ahead and take this position rather than checking out the oil—

Griggs: I think because I didn't really have an offer there yet, a firm offer. And somehow, California versus Houston—I was twenty-four.

Rabkin: Still surfing?

Griggs: Well, in Oregon I didn't surf at all. I started surfing again down here. So it was just another serendipitous thing. Aaron called me. I came down. When they offered me the position, I hadn't yet finished my dissertation. It was like

August and I finished in September. My starting salary was $9,300 for nine months.

Rabkin: [laughs]

Griggs: It seemed like, wow, that's amazing. [laughs] So we bought a house in Santa Cruz for twenty thousand dollars. All these reflections back on those years. I look down at other houses I knew at the time. Like, you know the big stone house on West Cliff—that was for sale for $56,000. I thought, oh yeah, right, like I had $56,000.

Rabkin: That was way beyond your means.

Griggs: Way beyond. Turns out that we bought a little funky house in graduate school with a little bit of money. So we left with three thousand dollars and bought this first house. I was asked to teach, starting January, a class I'd never taken. It was stratigraphy, which is sort of sedimentary rocks. There were six people or eight people in it. I was writing lectures the night before. Then I decided I should offer a course in oceanography. There wasn't one here. In March, I put up a signup list—there was a marine biology class, which was taught by Todd Newberry.

Rabkin: Yes.

Griggs: And a guy named Lawrence Blinks, who came at the same time from Hopkins. They taught one together. I put up a signup list outside my office. Todd said, "You might want to put it outside my door." I was in a temporary office over in Thimann Labs. All of a sudden one day, I hear this huge throng of people—he had let his class out, they were all running over to sign up for—

Rabkin: Because he had mentioned it in his class.

Griggs: Everybody had to take three sciences. Nobody wanted to take calculus, nobody wanted to take chemistry, so they took marine biology, oceanography, and astronomy. So in March, after teaching this class with eight people, I walk in—and I still had a tie and a coat—and there were two hundred and sixty hippies, dogs and tie-dye and patchouli oil, sitting on the floor. It was in Thimann III.

Rabkin: Lecture hall?

Griggs: I have such a fond memory of it, in retrospect. I had never really taught, except this first little class. Here I'm teaching *Oceanography*. I'm really excited. I love it. Here are these kids. I'm two or three years older than they are. I just remember being very humble about it. I was enthusiastic. There were no Powerpoints. I showed colored slides of going out on cruises.

And when it was over—well, there're a couple things that happened in the middle—during those years—the Vietnam War. I had stayed out of the military

on student deferments. I was on the upper end of the ages that were being drafted at the time. They were mostly drafting eighteen, nineteen, twenty [year olds]. I turned twenty-five in September right after I got here. I got reclassified, 1-A. God, what went wrong here? I went to school. I got my Ph.D. [I] have this job to educate in an important field. And I got reclassified. I got this note to go up to an induction physical at the Oakland Draft Center. That's when the protests were heating up. I remember getting on this bus with a bunch of guys from Santa Cruz and all these protesters and this humiliating physical exam…

Rabkin: Nineteen sixty-eight? 1969.

Griggs: Sixty-eight or sixty-nine, yes. I said, "Well, this sucks." My first son was born in March of '69, right after we got here. I was in school on an NSF fellowship. I had a graduate fellowship. Most of my school was on scholarships and fellowships. I now had a discipline that was important to the country. I could do something. So I wrote to the draft board and appealed it. I got a letter from my department chairman. The chancellor wouldn't write a letter, not quite sure why.

Rabkin: McHenry?

Griggs: Yes. The dean did and the chairman did. They were both very glowing. Also, when I finished up at Santa Barbara I was the Outstanding Graduating Senior in Geology. I got the award they gave. So the chairman who hired me here

knew I was okay. So he wrote a glowing letter. I remember flying down to Southern California, going to this draft board.

Rabkin: You had to appear before the draft board?

Griggs: Yes. I just was really candid. I just said, "You know, I spent the last seven years in school, scholarships, federal money. I'm in a field that I think I can contribute much more to the country than carrying a rifle in Vietnam." It was that simple. But there were no occupational deferments for teachers. I think if you were a doctor, you probably went in. Probably if you were in the aircraft industry or military, or something. They kind of looked at each other and chatted awhile and said, "Sounds pretty reasonable to us." And they gave me an occupational deferment. But it was that close.

Memorable Students

So I came back from the draft board with a deferment and taught *Oceanography* in 1969. At the end, after the quarter was over, the thing that I will never forget is they all stood up and clapped. [Pauses.] It was the most amazing feeling. I mean, they still—they don't stand up and clap—but they still clap in that class. Actually, most of my classes clap. Maybe that's common. I don't know. But for me it was this wonderful justification for having done it all. It was like, oh my God, they really appreciated that.

Some of those people are friends. One of the women, I don't know if you know Linda Wilshusen. She took that class. She became head of the Regional

Transportation Commission [in Santa Cruz]. She was in my very first class, in 1969. And scattered people. Every once in awhile, I'll look back at the roll and see—because they're now in their sixties. Their kids have now come and gone. That's happened a number of times. "You know, my mom and my dad took your class?" First time that happened, I went, oh my God. The first one was the daughter of a early student named Robin Draper. She's now director of capital planning and space management at UCSC. All new buildings and budgets for buildings. She took—

Rabkin: Your first *Oceanography* class?

Griggs: She took the class. And a geology major and then she got out in geology and came and said, "Okay Gary, I took all your classes, what do I do now?" I said, "You ought to go down to the county. They need a county geologist." She got the job and became county geologist and moved up through planning. Then she came back up to campus. Her daughter was the first one that came up to me, about ten years ago. In fact, she now works at Palomar.

Rabkin: The restaurant.

Griggs: The restaurant. I was just down there with my daughters a month ago. She said, "Hi, Gary." But she came up to me after class ten years ago and said, "Do you know my mom took your class?" Probably in 2000, she came up to me. That was the first time. And then people, "Oh, my aunt and uncle took your class.

My mom and my dad took your class." That happens pretty regularly. Which is fun. I mean, jumping ahead, but January starts my forty-fourth year here.

Rabkin: Forty-fourth year!

Griggs: Yes.

Rabkin: Have you been teaching that *Oceanography* class all the way—?

Griggs: There were a couple of gaps in the middle when a group starting teaching it—Eli Silver, who is a marine geologist; Mary Silver, who is a marine biologist, Ken Bruland, who is a chemical oceanographer and physical person. After doing it for four or five years, I thought, they're doing it. So maybe a year or two I didn't do it. Then I picked it up again. So forty-fourth year, but I've had a couple in the middle that I didn't teach it. In addition to those undergraduates, I've now had sixty-eight graduate students, I figure there's about—say I've had 250 to 300 students every year for forty-four years, there are now about 12,000 students who have gone through my classes and graduated that are out there somewhere, doing something.

Rabkin: Of that 12,000 students who've taken that particular—

Griggs: Either *Oceanography* or my other upper division classes. And some of them are people like Huey Newton.

Rabkin: Huey Newton?

Griggs: Who came here to get his Ph.D. in History of Consciousness.

Rabkin: And ended up taking a geology class?

Griggs: He didn't have an undergraduate degree. What he was missing was three science classes.

Rabkin: So the university and histcon [History of Consciousness department], admitted him on the provision that he take—

Griggs: He had to. It might have been the quarter before he got admitted. I don't know if you ever heard of Paul Lee?

Rabkin: Yes.

Griggs: Paul and I have known each other for forty years. Fascinating guy. Still around. He was the university chaplain or minister; he'd come from Harvard, I think? But he brought Alan Chadwick here.

Rabkin: Yes.

Griggs: He brought Sharon Cadwallader who started the Whole Earth Restaurant. He probably started histcon or had a role in that. But he didn't get

tenure because he didn't publish enough. He was doing other things. He and Page Smith were quite close. They started the Homeless Garden Project. Then Page Smith, started the Penny University and the William James Work Company. But Paul brought Huey here. There was a group of us who used to hang out back in the sixties and seventies—Burney LeBoeuf and Paul Lee and Jim Houston and so forth. Somehow he [Lee] thought Huey had a lot to contribute to the world. He figured out he needed these three science classes, so he talked to me about Huey taking *Oceanography*. He talked to Burney to take invertebrate physiology or animal behavior. I don't remember now what the third class was. So Huey came down here with his entourage.

I'd read his book, the autobiography of Huey Newton—I'm trying to think of the name of it—which was fascinating. He is a very powerful guy. I mean, he had presence. We would meet at Burney's house down on Spring Street. He actually came to class a couple times. He usually had a couple of bodyguards, huge guys, huge black guys. And he often had a girlfriend with him. We would sit down at Burney's house and have wine and talk about whatever it was. He ended up writing a term paper on—which I still have—"The Dialectics of Nature" which I could not understand. I don't know how much time we spent with Huey. Ten hours through the course of the quarter. But he was just really a beautiful man. He was a muscular, good-looking guy who would always wear these black silk shirts, and just powerful. He just had a presence. Charisma. Then you realize what his life had been like, prison and the streets of Oakland. Then he ended up getting shot by some drug dealer in Oakland. But he ended up getting his Ph.D. We kind of helped him along the way. I figured we owed him something. He

wrote a paper and got through the class. He probably came to lecture three or four times.

Rabkin: He passed the class.

Griggs: And then people like Kathy Sullivan.

Rabkin: Tell me about Kathy Sullivan.

Griggs: I remember Kathy really clearly. It turns out she grew up in the same neighborhood I grew up in, went to the same high school my brother did in Woodland Hills.

Rabkin: In Southern California?

Griggs: Yes. Kathy, I remember coming in as an undergraduate. She came here as a linguistics major and took *Oceanography*. Her recollection is a little different than mine. She said, "I was one of the few girls in the class." I think it was somewhat split. There might have been more guys than girls at that point. I remember her getting really excited and coming and talking to me. She took it in '70—maybe it was the second time I taught it, or '71? I was probably over in what's now Baskin Engineering, what was Applied Sciences. I remember her saying, "I don't know. I'm a girl. Can I do this?" I encouraged her. I supported her, in contrast to those faculty members I had who said, "Well, I don't know what you'll do with your career."

Rabkin: So she expressed a little bit of hesitation or trepidation about being a female in what felt like a predominantly male field at the time?

Griggs: Yes. And geology at the time was still dominantly male. I remember when I graduated in geology at Santa Barbara, there was one girl in the class. Most geologists do a summer field camp where you go out, our UCSC group goes out to Owens Valley, Mono, Bishop, and they map stuff. We went out onto Santa Cruz Island, which was very cool. But there was one girl. And the professor said, "You can't come." This was 1965. She was a little bit of a loner, kind of quiet. We didn't think anything about it. Today, obviously, that would not happen. Today our majors are at least half women—graduate students in ocean science are probably 60 percent women. So the whole thing is changed. But at that time Kathy was in a minority. Even in probably our graduate program we might have had two or three, but it was a still a male geology field—you know, rocks and—

Rabkin: Hammers—

Griggs: Yes, hammers and rocks. Kathy and I talked a lot. She was also flying then. She was a pilot. Her dad had been a pilot. I remember keeping up with her—

Rabkin: So she had some experience already in a largely male enclave.

Griggs: Yes. She came back to be the graduation speaker a few years ago.

Rabkin: Did she end up majoring in geology?

Griggs: Yes. Changed her major from linguistics to geology. She came back to be the graduate, the Master's, Ph.D.—I remember over at the athletic field. She was the speaker.

Rabkin: When was this, roughly?

Griggs: Probably ten years ago. I could tell by the students who finished that were there that day, maybe it might have been nine years, eight years [ago]. We'd kept in touch over the years. I'd seen her from time to time because she'd gone on to become—well, she went on to get a Ph.D. at Dalhousie in oceanography. She's actually—I think there's only two people in the world, or maybe three, that have gone not only to the deep sea floor but up into space. She's one of them. She'd got involved in what was called the Famous Expedition, which was submersible diving on the Mid-Atlantic Ridge. I'm trying to think. There was some stuff in between.

She became the chief scientist of NOAA, which is no small shakes. Then she went into the astronaut program, which was a lot of training and time. Ended up being on—again there's a display down there in the lobby of the building about Kathy—I think, two or three shuttle missions. She did a lot of the Hubble work—she took a lot of photographs and did really well. Now she's in the Astronaut

Hall of Fame and was the first American woman to walk in space, which was a pretty big deal. Then she went to Columbus, Ohio, where she built up COSI, the Columbus Ohio Science and Industry Museum. It's huge. It's like a Smithsonian. Built that up. Incredible facility. Then she went to the John Glenn School of Public Policy at Ohio State to head a new environmental policy program. Then she got recently asked by President Obama and Jane Lubchenco, the head of NOAA, to be Assistant Administrator of NOAA for Environmental Observation and Prediction.

She came back to give this graduation talk and she's a great speaker. She's really smart. She's always been really smart. She's very articulate. We've honored her many times. She went on to talk about what it was like then, what it's like now. So that was 1970 to 2000, maybe thirty years. She said, "We had Apollo the mission. You had Apollo the movie. We had Nixon and Watergate and you had Clinton." It was just this great talk. "We used to go down to Polar Bear Ice Cream." She went back and talked how about how things had changed.

She said, "You know, I came as a freshman. I wanted to do linguistics, and I started working my way through. Then I took an oceanography class from this young professor." I'm kind of listening and sitting with colleagues out there with our outfits [robes] on. She said, "I used to go and talk to him about my career. He encouraged me and supported me." I said, "This is starting to sound familiar." And everyone is listening. She's a very engaging speaker. When she finished, she said, "I changed my major and I changed my life. If it hadn't been for Gary

Griggs, I wouldn't be here today." I just went, "Oh, my God." I mean, we'd talked, but I'd never known exactly how I'd influenced her. People turned around and looked at me—it was like that first time the class clapped at the end of the class. It was like this wonderful experience. I went up afterwards, because two of my students got their Ph.D.'s. She smiled and gave me a big hug. We then honored her with our Global Oceans Hero Award we do at our Global Oceans dinner the Friends of Long Marine Lab do every year—three years ago and she gave another wonderful talk. We invited her back. We dedicated the atrium down here to her.

Rabkin: Of the Earth and Marine Sciences Building?

Griggs: She started a fellowship and we dedicated that to her. She came back for an evening. Anyway. I'm just thinking of those 12,000 students I've had, what they're all doing. A bunch of them have gone on to become vintners and run wineries.

Rabkin: Any whose names people might know?

Griggs: Well, David Graves of Saintsbury, who donates to a lot of our events. Jeff Emery, who does one of the Santa Cruz Mountains wineries.

Rabkin: Is that the same Jeff Emery who hosts concerts and had a radio show?

Griggs: Now, that I don't know. But it's one of the three or four in the Santa Cruz Mountains. I forget which one it is. Anyway, there's a national ocean organization now—it used to be called CORE, Consortium for Ocean Research and Education—that brought together all the oceanographic institutions in the country. It grew and expanded. I become part of that, representing UC Santa Cruz and UC Santa Barbara, Moss Landing and the Naval Postgraduate School. For twelve years, I took two or three trips each year to Washington, D.C., meeting with the heads of the deans of Oregon State and Scripps and Woods Hole and all these institutions. It's now eighty or ninety members and evolved to the Consortium for Ocean Leadership, but it works with NSF, ONR, and the Executive Office and President and congressional people trying to get more visibility for the oceans and funding.

Rabkin: What is the ONR?

Griggs: Office of Naval Research. So, the ones who fund ocean research. When we have our annual meetings, we'll have the head of NSF come, the head of NOAA come. So we'd transitioned to another organization. We were in Miami and the head of ocean science for NSF, which is a rotating position, was there talking about ocean science funding. This woman's name was Julie Morris. She stands out because she's really short. She's like 4'10." How tall are you?

Rabkin: Four foot eleven and a half.

Griggs: She was a Santa Cruz Earth Sciences student. She had gone on and gotten a Ph.D. and had now moved for a two-year stint or three years as head of ocean sciences. They determine where all the money goes. They're powerful people. She was talking to all the deans and all the directors of all the institutions of which I'm a member. She was going to be the next speaker. We had a break and she was standing up there. People were walking by and introducing themselves. So, as I walked up she just stuck out her hand and said, "Hi, I'm Julie Morris." I said, "Hi, I'm Gary Griggs." She kind of just lurched back and said, "Oh my God." It was not quite the same as Kathy, but similar. She said, "You know, I have to tell you, I was a psychology major until I took your class. And I took Bob Garrison's class, another professor, and I changed my major to geology. I was so inspired, I was so excited, I went on and finished and got a Ph.D."

She teaches at Washington University in St. Louis. She was so excited that I was here and still involved. But you know, you don't keep up with every student. So as she started out her introduction in front of all my colleagues from around the country she said, "I have to tell you all a story." She went through this story of the class and so forth. So it was sort of like Kathy, but instead of the faculty here, it was all my colleagues across the country. They all clapped. It was this wonderful feeling of—I'm not sure, it's just a mixture of satisfaction and reward on doing something that you love and finding that people are influenced by that at levels that you will never really understand, or you never hear.

Last weekend, the Seymour Center does Jingle Shells?

Rabkin: Holiday arts—

Griggs: So people come in—

Rabkin: Crafts sale—

Griggs: Exactly. And Deepika. They asked her to be in it last year because she'd been doing photographs, this website and travel photographs. She started doing calendars. Actually a lot of her work from stuff around the bay.

Rabkin: I've seen these on her website. Beautiful.

Griggs: Yes. So this kind of stuff. So she was there. People were talking. Somebody came up, Charles Lester, now the Executive Director of the Coastal Commission, who was the regional director and now has moved up to the director, somebody I've known for a long time. In fact, he wrote a chapter on coastal planning in the *Living with the Changing California Coast*. There was a guy with him, an old friend of his that he'd known for a long time. This guy said, "You probably won't remember me but I took your *Oceanography* class." He's forty or forty-five. He said, "You know, I still remember those field trips up the coast. I still explain to people all the stuff we saw." That happens. Because I've been doing that newspaper column now, I think there's this reminder—"He's still around." People will run into me and say, "You won't remember me but I took your class and I just wanted you to know blah, blah, blah."

So the decision to have not gone to Exxon—I'd probably have felt guilty for the rest of my life for finding oil offshore—and having come here was just all an accident in a sense. It wasn't like I had this lifelong dream. But I think the combination of coming here in the earliest years—I don't know whether you saw—it's kind of a funny thing they did—it was called Honoring the Active Pioneers.

Rabkin: I haven't seen this. May 19, 2006.

Griggs: This is when Denice Denton was chancellor. She thought because it had been—anybody that got here, I guess that came before 1970—they thought about as a pioneer. There were, maybe, twelve of us or something and they had a—

Rabkin: These are all UCSC faculty.

Griggs: Yes. That were here, that were still here, that were still active. Roger Anderson is now retired. Frank is retired.

Rabkin: Frank Andrews. Murray Baumgarten. [Rabkin is reading from the program.]

Griggs: He might still be—

Rabkin: I see him around.

Griggs: He might still be active. A lot of people in chemistry.

Rabkin: Claude Bernasconi?

Griggs: I'm trying to think if he's still active.

Rabkin: Peter Bodenheimer. Terry Burke.

Griggs: Rob Coe came a quarter before I did and is still in Earth science.

Rabkin: Michael Cowan.

Griggs: He's still active but he's retired.

Rabkin: Tony Fink.

Griggs: Tony died a couple of years ago. Some of them it's kind of cool how they had these old and new pictures.

Rabkin: Wally Goldfrank.

Griggs: He's retired.

Rabkin: Gary Griggs.

Griggs: [laughs] Physics.

Rabkin: John Isbister.

Griggs: I think he's retired.

Rabkin: Yeah, he took a new job in Canada.

Griggs: Did he?

Rabkin: John Jordan. David Kaun. Peter Kenez.

Griggs: Joe Miller's retired now from astronomy.

Rabkin: Harry Noller.

Griggs: Harry is still active in DNA and Tom Schleich chemistry. Lot of chemists.

Rabkin: Donald Wittman. Adrienne Zihlman.

Griggs: I think that was the group. Anyway, Denice had a little thing and we got a little plaque over there. They asked three or four of us to speak. But it was the timing. I think coming in those years, people who come today have no idea what

it was like in those earlier years when I taught that first class, *Oceanography* [during the] Vietnam War and the draft, in spring quarter. It was sunny, warm. People will strike if it's warm; if it's raining it's not worth it. I've never seen a strike in the rain, or very seldom. So every spring—first we were in Vietnam, then we invaded North Vietnam, then we invaded Cambodia, then we invaded Laos—each spring there was some reason for the students to protest. It was at Berkeley and there was [The] Free Speech [Movement]. So it was my first semester of *Oceanography* in the spring of '69 and the students had decided the night before I was going to give the midterm that they were going to go on strike the next day. I was pretty close to students. Again, I was twenty-five. They were eighteen, nineteen, twenty, twenty-one. I got a call that night about ten o'clock. They just had a meeting. Somebody said, "Are you still going to give the midterm tomorrow?" "Sure, why not?" "This is a student in your class. Well, we voted to go on strike tomorrow." I went, "Gosh, I don't know what to do."

So I came up the next morning. I think the class was at eight-thirty. I had all the exams ready to go. I think the student body was 2,500 then. I had 260 students. So I had 10 percent of the campus in my class, so what I did was going to become important. As I walked in, what I could see was the students were picketing in front of the classroom with signs, "On Strike." I was up in my office. I guess I was actually in Nat Sci II. We were there for ten years, I guess. Four or five of the students had come into my office. I had a big office. It was sort of called an office-lab. They had their signs. They were just holding them on their shoulders and we were chatting. I knew them all. They were friends. But the chairman, Aaron Waters, walked by and saw the students in there. He thought they were

harassing me. [laughs] He kind of stormed in and said, "I want you all out of here. This young man has things to do. And if you're not out of here in ten minutes I'm going to call the campus police." I said, "Aaron, it's okay. It's cool. That's all right. We're just chatting." Anyway, I had to decide in five minutes or ten minutes whether I was going to give the exam or not. I wasn't politically involved. It was just a midterm. Some students were in the classroom, wanted to take it, weren't so politically involved. Some were outside. I just said, "I'll give the exam to those who are here. The rest of you come in on Saturday and we'll give it." They were happy with that. So I did this, rather than taking a hard line and saying, "You're bad and you're good." Everybody was happy with that. But it was just one of those things.

Rabkin: Did you have to write a new, second exam for the people who took it later?

Griggs: I don't know what I did. I probably did. Then things went on like that each spring for the next two years, where, oh, we're going to meet off-campus in the redwoods or in a meadow. It's okay for a philosophy discussion but for an *Oceanography* lecture with 250 students—sometimes it got messy and we met on the weekends. It was just a different time than today.

Rabkin: Did the faculty get involved in some of those strikes, too?

Griggs: Some did, some didn't. I think the sciences were probably less involved generally than the people in politics. It's interesting to look back and think how

different times were. People dressed differently. Santa Cruz was the place where, particularly the first maybe five, six, seven, eight years this was the highest-preference campus. It was the Reed College of the UC system, this small college in the redwoods. Some great new faculty. There were no sports, no fraternities. It was just "the pursuit of knowledge in the company of friends," the motto of Cowell College. We had the colleges. We all had offices in the college. We all taught college classes, which today most scientists don't even think about. Our paychecks came from two accounts. Half of it came from the college, half of it came from your department. So there was this reminder that somebody was paying the other half of your salary. I don't know when you first became part of UC, but at that point—like Burney LeBoeuf did a college class on winemaking.

Rabkin: Oh, yes. In fact, I wanted to ask you about the fact that when you were hired here it was during the era when, academically, the campus was organized not into departments, but into boards of studies.

Griggs: Right.

Rabkin: As I understand it, that was a deliberate attempt to minimize the kind of departmental enclaves and maximize the potential for interdisciplinary interaction?

Griggs: Right.

Rabkin: And faculty had offices in the colleges alongside people from other disciplines.

Griggs: Right. And we had offices here. We had both.

Rabkin: That was not true for all the disciplines but the scientists who had to have labs.

Griggs: I think the scientists were the only ones. And everybody was in Thimann and Nat Sci II and then—

Rabkin: Was it a more interdisciplinary atmosphere then?

Griggs: Yeah. The challenge was—typically you see faculty do one class a quarter, except in the sciences. Humanities and social sciences it's a little more because generally we [in the sciences] had bigger graduate programs, research grants and so forth, and a college class. But what became clear after the first four or five years is we were being evaluated for tenure by people from Berkeley and UCLA, who didn't have their time divided, so they didn't care if you taught a college class.

Rabkin: I see. So the work you did for the college didn't really figure into your evaluation toward tenure.

Griggs: In fact, it was pretty much research. How many papers did you publish, who read them, and what did they think about you? So we came in a little naïve. There was also a difference that the research enterprise was by today's standards much more modest. So today our contracts and grants in the division is forty or fifty million dollars a year. At that point it was probably five.

Rabkin: This is for the science division?

Griggs: Yes. So the departments were much smaller. Graduate programs—I've had five or six graduate students continuously for forty years but they were mostly on TAs. I didn't have many research [assistants]. I don't know how we funded everybody in the early years. But there was this pullback to the departments because of the teaching. And then as time went on, I think over fifteen, twenty years, the colleges took on a lesser role.

The Environmental Workshop

But still that book [came out of] the class called *The Environmental Workshop*. I did it with a colleague named Grant McConnell—

Rabkin: I met Grant when I was a small child, up in Stehekin [Washington].

Griggs: Wow! Interesting. I think the North Cascades [National Park] was his thing. In fact, he was a good friend of Edgar Wayburn. I don't know whether Grant had ever been president of the Sierra Club, but certainly he and his wife were very active. He was the Alison Galloway [of that time]. He was executive

vice chancellor when we taught this class. That's a whole different story, but I did that for two or three years. Then I did something, which was—it was the perfect time, the first Earth Day was in 1970. And Ecology Action and zero population growth—it was just booming at that time. Everybody was concerned. Things change and they come back. I did something called *The Coast* for, four, five, six years, where I'd do a three-hour lecture—

Rabkin: This was a college-based course?

Griggs: Yes. A college-based course. I started out in College Five, which—

Rabkin: Became Porter College.

Griggs: But that was the arts college, because when I got hired that was what was opening. Then I went to Cowell [College] for a while. Very briefly, I was looking at Kresge [College], because their provost in the beginning [Robert Edgar] was a biologist. Then I joined [College] Eight. But at that point the colleges for the sciences were fading out. So I did *The Coast*. I did a three-hour lecture once a week and then we'd do an afternoon field trip. I'd take twenty-five people. People were just fighting to get into that class because it was a field trip. So we'd do Point Lobos. We'd do Big Sur. [Andrew] Molera. We'd do Año Nuevo. We'd do the North Coast and Natural Bridges and West Cliff. It was great.

Those people ended up—as well as [students in] *The Environmental Workshop*, ended up becoming close friends. Maybe that went on probably at least fifteen years. Then as larger research and graduate programs and so forth began to get going in the sciences, the people who were hired didn't do any college classes. I think probably 90 percent of the science faculty now don't have any connection to a college in any significant way. It was just a time, it was a historical accident when everything coalesced to make UC Santa Cruz—every high school senior in California wanted to come to Santa Cruz. Most of the UC faculty's kids wanted to come here. Kids of politicians and famous people.

One of the guys in my first *Environmental Workshop* that did this book was a guy named Christopher Kennan, a great kid, long hair, a very thoughtful guy, was here for his first two years, and then left and went to Princeton. His father was George Kennan. I didn't appreciate at the time who he was. Later, well now I'll do this every once in awhile on a night when I don't have anything to do- which isn't very often—I actually threw out my first ten years of enrollment sheets because my file was so full of evaluations, I don't need these. They went back in the archives and I found most of them. But I'll go through and Google those early students who are now in their sixties and you find out, "Oh, my God, this guy's a filmmaker. The guy is a university professor. This guy's already retired." Christopher Kennan was this good-looking, long-haired hippie kind of guy. Then I saw this picture of him and he'd married some society lady, gone on to Princeton, runs some giant investment company that's probably worth millions of dollars. He had this two-year holiday—and his father George lived to be 100 or something.

Rabkin: There's a review of a brand new biography of [George] Kennan in the *New Yorker*—

Griggs: Containment of communism. He was ambassador to the Soviet Union. There's another guy, Senator Percy—Charles Percy, a senator from Illinois, who had twin daughters. They were here. They got involved with the Rockefeller family. One of them married a Rockefeller. All these names that you'd see. But that was the time. It was all so small. The first year I was here it was 2,500 hundred students. You kind of knew most of them. You knew most of the faculty. It's great to still be here forty-three years later and to reflect on that.

Well, what this was about was the environment then. I have color slides of what things were like in 1969. Now we're tweaking things, trying to clean them up a little bit. Like, we argue forever about whether Arana Gulch is going to be a bike path, or paved or not. At that point, we were talking about the world's biggest nuclear power plant; a subdivision that was going to take up 2,000 acres of Wilder Ranch. Big stuff!

In 1974-75, I had three big things coming up and. I had two small children. I had my first sabbatical and I applied for a Fulbright to go to Greece. At the same time, I was coming up for tenure. I also had written the beginning of a book on environmental geology, which I was teaching, and trying to find a publisher. And I said, you know, if any one of these three happens—if I get the Fulbright I'll

be happy. If I get tenure, I'll be happy. If this book gets published, I'll be happy. And one by one they all happened.

I came back from the year in Greece. We got married really young. I was twenty-one and she was twenty. We'd been together for ten years but got divorced and our lives have gone on, and we're still good friends. That was a casualty of [the year in Greece], but [we had been] working hard and we'd gone up into Bonny Doon and built a house. I built the house with a friend and lived in the redwoods. Now my son is forty-two and he has two children. He's living in Spain, working for Hewlett-Packard. My daughter is—the daughter is in Santa Cruz with a little boy, married to one of the UCSC fire captains and then have three other kids. But anyway—it was just a different time, but each of these steps was kind of opening a new window. But working in Athens, Greece for a year on water pollution and finding out what were real water pollution problems, and then coming back to Santa Cruz and getting involved in our outfalls and what was happening, comparing a nuclear power plant with a pathway through Arana Gulch, was like "Give me a break." Or should we approve this or approve that?

The environment was in a very, very different place. I got caught up in all that, I think, because my background was ocean and engineering. The other big thing that happened was because we didn't have a ship, we didn't have the capability of doing deep-water oceanography. I spent another couple of summers doing that, going out to sea on a big ship in the North Pacific. Then I got into coastal things and general geologic hazards, because I think my geology background,

combined with oceanography and engineering—so I ended up doing—the first edition of a book and then a second edition— [holds up a book to show Rabkin]

Rabkin: *The Earth and Land Use Planning*. You and John Gilchrist.

Griggs: Geologic hazards and resources. I did a class called Environmental Geology for fifteen years. John Gilchrist was actually the county environmental planner. So I got involved with local hazards, faulting and earthquakes and landslides and floods and coastal erosion. These books were about all those geologic hazards. A lot of my graduate students were working on earthquakes and floods. Gradually, over time, I realized we had people doing that stuff here because at that time in the sixties, whenever there was a new—that's sort of what this was about. [Griggs holds up two additional books to show Rabkin.] Cynthia Wayburn saw the north coast.

Rabkin: *In the Ocean Wind* and *Santa Cruz and the Environment*.

Griggs: Then *Santa Cruz and the Environment*. Cynthia recognized that the coast was being threatened. Wilder Ranch had been bought by a big development company. The nuclear power plant. So she, as her senior thesis, sort of brought this together.

Rabkin: This is Cynthia Wayburn.

Griggs: Yes. Cynthia Wayburn. But whenever there was a new threat, whether it was the nuclear power plant or Wilder Ranch and Beaches, which was what that huge proposal was called. In fact, I still have their plan up here, what they were going to do, the villages and all this—

Rabkin: Big development. What's now Wilder Ranch State Park—

Griggs: Planned for thirty-five thousand people. Whenever there was the first meeting or public hearing, there were about five people who were involved. It was Celia, who was then Celia Von der Muhl, whose husband was involved, who is now with Peter Scott, Celia Scott.

Rabkin: And she is now a lawyer, an environmental lawyer.

Griggs: Celia, Peter, myself, and a couple of others. Whatever it was—and you'd go down and testify to the county board of supervisors or, when the nuclear plant came up—

Rabkin: When was this?

Griggs: Sixty-nine. PG&E came into Santa Cruz and said, "We just leased Coast Dairies & Land, 7,000 acres, with a plan on building six one-million kilowatt reactors on a terrace at Davenport." There weren't very many nuclear plants at the time. There's a whole section in *Santa Cruz and the Environment* on nuclear power. We ended up, three of us—Celia was one, and another local lawyer, who

I think was on the board of supervisors—Hank Faitz—starting a group called, the acronym was CEDAR, which stood for Committee to Examine the Dangers of Atomic Reactors. But CEDAR sounded sort of scenic, clean. We did newspaper ads. We went on TV. We did radio. We did talks. That was about two years of my life. The more we read about it the more concerned we were, because there was a lot of popular stuff coming out about the perils of nuclear power, all this stuff about nuclear waste and safety. And this was ten miles away. Then one of my first students, Jerry Weber, his thesis ended up being on the San Gregorio Fault Zone. Faulting became a big issue in it.

You can sit up here and do your stuff and not interact with the community and it's fine. But once you step into the community, it's very different, because they don't necessarily like you and they don't necessarily feel the same way you do. It's very different now because the community *is* the university in a lot of ways. I mean, our mayor is a lecturer and was a student. Scott Kennedy was a student and John Laird was a student. But there're still those letters, when you read about the protesting, "Throw the bastards out." But at that time it was much, much worse. The critique that you've read—actually the guy, when Sandy [Lydon] and I did the 2003 trip to China—the guy that came on the trip, one of the people and his wife, Bill Fieberling, was the public works director at the time we came out with *Santa Cruz and the Environment*. [laughs] He was one of the people that just blasted us because we said the water was polluted, which it was. So he was upset because he was public works director. And a lot of other people were really upset at us.—like Big Creek was really mad—

Rabkin: Big Creek Lumber?

Griggs: Because we had said they were one of the major air polluters in the county, which they were, but it was sort of a social error to name them. They had a big Teepee Burner then that they just burned all their bark, sawdust and trimmings. They were reasonable foresters, but not like today. Now they make particleboard. They don't burn anything. But at the time, the cement plant was covering the North Coast with dust. But Big Creek Lumber also had given that big log at the bottom of campus that said, "Fiat Lux — University of California." [Dean] McHenry was friends with them.

Rabkin: That was a gift of the McCrarys of Big Creek Lumber?

Griggs: I didn't know any of the family history, that their family had been here for many years.

Rabkin: [laughs]

Griggs: So the next morning in the paper, once this booklet came out—one of the things we did—we raised a little bit of private money to print it. We printed it with a glossy cover and we justified the margins so it looked sort of official. It wasn't a mimeograph. That got people's attention. But as soon as it came out and people started reading it, their attorney, a guy named demanded a retraction.

Rabkin: Whose attorney?

Griggs: The McCrarys. There was an article, which might or might not be in there. I still have a file: "McCrarys Demand Retraction" on the front page. I'm this young assistant professor, very vulnerable. All the students had gone home for the summer so I didn't have any—I mean, I had looked at what they had written but I didn't know where all the data came from. Major air polluter? Are they the major air polluter? I don't know. So Dean McHenry—

Rabkin: Still chancellor of the university, at that point.

Griggs: Dean McHenry Calls Grant McConnell and I in on a Saturday morning. Now Grant had taught the first half of the class with me, where we just did lectures and visitors. Then we decided to do something, because he had been involved in a course at the University of Washington where they did a class and a book. He said this is important stuff. But he wasn't really involved. He was vice chancellor. He'd stop in once in awhile, but I took this on. So Dean said, [laughs] "We've got to do some damage control here. The McCrarys are pretty mad." Because the McCrary's thought people would boycott polluting industries and they were good friends of the campus and friends of the community. They're good foresters.

Rabkin: So this is Dean McHenry, the chancellor, asking you—

Griggs: On a Saturday morning, calling Grant and I—

Rabkin: To do some damage control—

Griggs: So he called the McCrarys and we drove up to the lumber company. Grant and I were thirty years apart in age, so I was twenty-six and he would have been fifty-six, or something. But he was established. He had been beaten up in Congress for his environmental work and fought for the North Cascades. He wasn't afraid of anybody. He was kind of a brusque guy. So we went up and kicked the logs around a bit. I remember walking through the lumberyard with him that morning. For me it was like, oh, God, this is really uncomfortable. I've since gotten to know them and we've done walks with them on the North Coast.- very nice people. But what we decided we would do was—I didn't take anything out because nothing we said was wrong, but what I did do was in the front of the books we did a stamp that said, "Big Creek Lumber has a history of good forestry practices and we regret any negative impacts we may have created..."

[The book] started out with, "Pollution Stinks." [Flipping through the book] This is the nuclear plant site. There's the cement plant. This was one that Bill Fieberling got us on. So, you take something out of the text and put it here in bold [he points to a pull quote], what it said in here [points to a block of text] was, "Why were the beaches never posted?" When it came out here [pull quote] it said, "Never tested." They were tested, but they didn't post the beach because they didn't want to drive tourists away. They didn't hit the fact that the water was polluted. This is what the student who wrote this with me said. That's not the point.

Rabkin: "The water here's been polluted from a discharge of the Santa Cruz Sewage Treatment Plant. Why were the beaches never *tested*?"

Griggs: So rather than hit the problem that they didn't post the beaches, which is what it says in the article, or that it's polluted, they argued that it's because we didn't get our stuff right. Then right above the Marine Lab there, was the old Raytec Plant [building] that the university now occupies, if you come up Shaffer Road past the Homeless Garden Project across the track. That was a slaughterhouse. They dumped all their blood and wash water into a pipe that discharged into a cave that we now take our seawater out of. Davenport Beach was the dump for the city of Davenport. They just dumped their trash and garbage out on the beach and burned it, month to month. We had something about, I guess it was air pollution. We talked about industrial pollution. It was actually, I think, well done. The students did a really good job, but—

Rabkin: Did you worry about your—

Griggs: Future?

Rabkin: Professional standing?

Griggs: Definitely. I thought it was all over, basically. I was just doing what I thought was a good thing. I thought the community would think we were great. It turns out the board of supervisors was very pro-business. There was no [Pacific Garden] Mall then. It was traffic lights and businesses, and people that

ran polluting industries were on the board. I'm not sure now what's in here—these might have been the letters that came out.

Rabkin: [Reading from clippings Griggs is handing her] "The Board of Supervisors, August 3, 1970 issues a response; "UCSC Chief criticizes Environment Report."

Griggs: I think that was Dean McHenry. "Santa Cruz Council criticizes"—

Rabkin: That's in the *San Jose Mercury News*.

Griggs: "Unsatisfactory Reply" said the editorial, and "McHenry Disowns the Pollution Report." I mean, this is coming out. "McCrarys Demand Retraction." It was night after night for a week or two.

Rabkin: So you have a thick file full of materials surrounding this *Santa Cruz and Environment*—

Griggs: It was a reminder that I kept for awhile to remind me of the way things were then—and ironic that now I'm a columnist in the paper. The City Council asks me what I think about sea level rise. So, things changed. It's sort of fun to look back on and see you can survive. But it was just the awareness or lack of awareness of social stuff in Santa Cruz.

Rabkin: Yeah. Had you known what kind of fallout there would be, would you have done this differently? Would you have monitored the students more closely? Or checked their facts more closely?

Griggs: Well, in fact if you go through and read the student—this is the guy who became the mayor of Orinda—who the *Sentinel* actually phoned for this retrospective article—the one thirty-five years later—he was really smart. He was also a high school debater. The rules in debate are you don't answer the question asked, you answer something else but it sounds like you're answering the question. So just like a lot of their complaints were that we didn't get our facts right, when you stop and look at what they criticized, it was sort of how we said it, not what we said. There really weren't many errors except, "Why were the beaches never tested?" They *were* tested—

Rabkin: They just weren't posted.

Griggs: They weren't posted and that's what that should have said. So that was a spelling mistake. But most of the things, when I look back, weren't like we made some glaring errors. Probably today we might have couched things a little differently. But the fact [was] that the nuclear power plant was never built. Wilder Ranch was never developed. The lumber company cleaned up their burner. The cement plant cleaned up their emissions. The water quality was cleaned up. We built the new sewage treatment plant and a longer outfall. Every single one of those things was dealt with. So we were sort of just out on the cutting edge, but it was a little early for the city.

Rabkin: Yes. Do you think this [report] may have had something to do with the decisions to fix environmental problems?

Griggs: Well, I think it brought a lot of attention to it that it might not have otherwise gotten.

Rabkin: Great. Okay.

Griggs: In fact, a couple of people read it and said, "Wow, this is the best thing that ever happened to this town."

Rabkin: Good.

Griggs: Of course, that didn't get in the paper.

Rabkin: All right. I hate to have to stop us for today.

Collecting the Fingerprints of the Earth

Sarah Rabkin: This is Sarah Rabkin. It's December 15, 2011. I'm in Earth and Marine Sciences with Gary Griggs for our second interview. Before we dive back into where we left off before, Gary, I really want to ask you about these jars and vials that are lined up along your windowsill. You have, I don't know, dozens, maybe even more, cylindrical glass bottles, mostly with white plastic caps. Each

one has different color of what looks like sand or gravel, different coarsenesses and colors and textures. Can you tell me what that's all about?

Griggs: Those are fingerprints of the earth. They're beach sand samples and they're from all over the world. Like people look at DNA or genomics to identify species and evolution, a beach sand is a sort of a cross section of the earth, in the sense that what ends up on the beach either came out of a river drainage and could represent an entire watershed or half of a state, or it could have come out of the beach cliffs. In some case, some of these are—

Rabkin: Ah, so you've got what looks like beach glass.

Griggs: Actually at Fort Bragg—

Rabkin: Yes, I've been up there.

Griggs: Glass Beach.

Rabkin: Glass Beach. Where there used to be a garbage dump, is that right?

Griggs: Yes. And there's some from Australia that are—the beach is all shells.

Rabkin: Oh, my goodness. So everything in that little jar is a little white shell—

Griggs: Like a little tiny clamshell, basically.

Rabkin: Yes.

Griggs: The color is, well, there's one bright blue. Somebody actually dyed it to trace the sand. Down in Big Sur, there's garnet sand, which is sort of a purple. So they make sandpaper of garnet. It's a very, very hard mineral, so it's very persistent. And it comes out of a particular garnet-rich rock in the Big Sur drainage system. So it's a fingerprint of—one of my students brought me back—In fact, you can feel how heavy this is—

Rabkin: This looks like iron.

Griggs: It's iron. It's Costa Rican. Like in Hawaii you'll get black sand beaches. It's pretty amazing. The color of the sand and what it looks like is really a function of what the source areas were and then how much energy you have on that particular beach. So you can get in Florida or the Bahamas really fine-grained, usually calcium carbonate, so it's broken up. It depends. It could be shells broken up really finely, almost to a silt size.

Rabkin: This is a very fine-grained and quite light, off-white.

Griggs: I think it's calcium carbonate so it's shell material.

Rabkin: It looks like maybe super fine-ground salt or something.

Griggs: Yes, you're right.

Rabkin: It's sort of fluffy the way it shakes around in the bottle. I just want to say that the big jar of black iron that you gave me from Costa Rica to hold that's so heavy, also has a little bit of a metallic sheen to it. That comes from where in Costa Rica?

Griggs: You know, I don't know because one of my students brought it back to me. Probably 90 percent of these I collected, and then all of a sudden people that have come into my office, like Dan Costa, who is one of our marine mammal people, goes to Antarctica, and I didn't even know there were beaches in Antarctica. Or from Australia, so he's brought back maybe ten or twelve samples over the years. People will bring them back in pill bottles or blood collection vials. So I have all these. I've got more samples. Then a colleague retired at Berkeley recently, Bob Wiegel, who was there for fifty years in coastal engineering. He gave me his collection of 350 beach samples, sand samples from all over the world.

Rabkin: So you do literally now have hundreds of samples.

Griggs: Yes. I don't know if these are ones that are labeled or not. [Sounds of rummaging through a box of jars.] He was very methodic, so he has what and where and when.

Rabkin: Sandy Point Beach, Maine. We've got the compass points.

Griggs: He's got the longitude and latitude.

Rabkin: Near the mouth of the Penobscot River. The date collected. So accession records for sand—

Griggs: Ireland. Yes. They're great teaching tools, in a sense, like you put this under the microscope. Paradise Island. The Bahamas. He traveled all over the world. He is a member of the National Academy Sciences. He and I became good friends. He's now almost ninety. He just didn't want them to go to waste. He also had this incredible collection of colored slides, which he gave to the archives. I've got this case over here and those are full of colored slides. The first forty years of my career before we ended up with digital imagery. These are all catalogued by —

Rabkin: Oh, they're beautifully organized and labeled—

Griggs: "El Niño, East Cliff. Cliff erosion, California. Cliff erosion, Santa Cruz."

Rabkin: Do you still use this for lectures?

Griggs: I do, but because Powerpoints are so much more common— Scanning slides is—you can do it and you just have to put your mind to it.

Rabkin: It's time consuming.

Thoughts about Using Multimedia in Teaching

Griggs: Yes. It ends up being an archive thing that maybe someday [will be digitized by a library]. I would always carry a projector and a carousel of slides to a talk. Now you pick up your jump drive or your thumb drive, your laptop and a Powerpoint projector. You're probably taking just as much stuff. The thing I found is fascinating when you would get a talk ready and I used to—all my teaching I'd have slides—it's all so visual. I taught *Environmental Geology* for years, so earthquakes and volcanoes and landslides. Then *Coastal Geology*, which I still do. We've got all this visual stuff. But I'd grab my slide collection. I'd put eighty slides in a carousel. I'd take it in and show them. With Powerpoint, I've discovered it's like a painting. You keep adjusting it, tweaking it, revising it. Tomorrow I'm speaking to the Ocean Protection Council in Sacramento on coastal hazards and climate change and extreme events. I've probably gone over it twenty times. Each time, you change the wording, the scale, the photo, so it takes you a lot longer, but the product is probably much more alive, in a sense. You can put arrows in. You can animate it.

Rabkin: Yes.

Griggs: Over the years of teaching, it's changed. I still hold up maps in class. I still draw on the blackboard in *Oceanography*. It's interesting—the students all fill out evaluation forms. I find it's really interesting. Usually the week before I start teaching a course, I'll go back and see what they said last year. By the time you've read a hundred of those, you start to get a sense of how the class went.

But one of the things I see, and it's this double-edged sword, in a big lecture class, I rarely use Powerpoint. I try to animate it myself. There's so many textbooks today with a CD that you can load up and run, and never even know the material but just put it in there. Every lecture's all ready to go. There's no human involvement. There's no history. There's no connection. It's so fast that every one of those diagrams is a finished diagram. Or students want you to put it online so they can access it or not go to class, I don't know. But when you're drawing, like the history of plate tectonics or whatever, they're thinking along with you and there's sort of a progression. But the evaluations are really split between those students who say, "God, I love your diagrams. Keep up the drawings. I love following you in class on the blackboard" to "Do more Powerpoints. And put your Powerpoints online."

Rabkin: Interesting.

Griggs: Anyway, it's an evolution. I can do either, but I find in a big class, I think without the personality and the history and the involvement of the professor, you can't get that out of the book or out of the computer. That's what we bring to the classroom, do you want to read Shakespeare, or do you want to see it? That's a long way from those sand samples.

Rabkin: It sounds like it's your sense that there's something that goes on neurologically, or in the learning process, when somebody is watching a picture being drawn by a human being on the blackboard, that's different and maybe

better or maybe more effective than just having a ready-made image slapped up on a screen.

Griggs: Right. Very professional, very finished, with usually a ton of information on it. So I think that works, and that's what I bring to the classroom, versus anybody just grabbing a CD from this textbook. I think the textbook companies are trying to make sure you keep buying books, so they keep offering you all these other things. Here's an overhead of every single image in the book that you can put on the overhead screen. Or here's a CD with all the tests and all the lectures.

Changes in UCSC Students Over the Years

Rabkin: Well, this is a natural segue into something I had planned to ask anyway and then maybe I'll jump us back and pick up some things from last time. But since you're talking about it, I was curious about the changes that you've seen in the forty-some years you've been teaching here, in the way geology, earth and marine sciences are taught. And the way students are learning. This is clearly an example, this whole shift to the technology and to pre-prepared, very fancy graphics. Are there any other shifts that you've noticed?

Griggs: It's really hard to even know where to start. [laughter] I think I had these two images of my first class and my most recent class. I'm thinking of *Oceanography*, which in some ways has defined my career here because I've done it most of the last forty-some years. I do it every year. It's a cross section of UC Santa Cruz. There are usually around 250 students. The first one was 1969. The

last one was 2011, last winter quarter. In the first one, all I remember was it was over in Thimann Lecture Hall. I remember people on the floors, people on the aisles. There weren't that many big introductory science classes. Everybody had to take them. There were dogs. The whole room smelled like patchouli oil. It was just this hippie enclave. I loved it. But there were no computers—people had pencils and they took notes.

In some ways, the subject matter has evolved [to cover] plate tectonics, and a lot of other things, all the environmental issues we face. But in some ways, the history of the ocean and the earth hasn't changed that much, so in some ways, the subject matter is the same. We maybe focus it a bit differently. I've had so much more firsthand experience now with things that I find it's very easy to diverge with these anecdotal stories and experiences. I have to really be careful because every topic, there's another story to tell. It's easy to get off, so I always put an outline on the board. They were also, without talking down about the students [now], those first couple years Santa Cruz got the best and the brightest kids in the state, even in the country. This was the place to come. They were all really smart, some were spoiled, and probably many were rich. It was a fairly homogeneous ethnic and cultural group. We weren't a place where the average minority student would come. I think most of them were looking at urban campuses, at UCLA or Berkeley. So the amount of Black students, Hispanic students, Asian American was pretty small. That's very different today. But we also now have a much more diverse campus. We ended up now having more junior transfers.

Rabkin: Coming from community colleges.

Griggs: For a bunch of reasons. They dress differently. I guess it intrigues me walking around campus—it's also in the classroom—that everybody's wired up. We're out here in this beautiful redwood forest. They're either talking on the phone or they're listening to music. There are no birds. There's no wind in the trees. They're all wired. Then in the classroom, maybe a fourth of them are on laptops, maybe half of them, depends. I tell them, "I don't want cell phones going off in here. You can probably put your texting away for an hour." I have kids that do that too, my own kids, although they're a little older. Our whole orientation and focus is so different.

The other thing I have found is there's this huge sense of entitlement. When we had no grades, nobody argued about their evaluation. It was sort of what you did, you know. "Final was average, midterm was great, did well in the labs." But now we have grades. And for the first time, beginning maybe four or five years ago, people said, "Well, I think I should get a better grade." "I want a better grade". "I need a better grade". "I didn't do well on my midterm or the final. Can I write a paper?" "Can I do extra credit?" I think there's this legacy from high school where we treat these kids—everybody's brilliant, everybody's going to get to college. That's not the case universally, but you get this sense that they don't necessarily want to come to class and do the work but they want a good grade. I'm sure it's coming from a large variety of different sources.

There are still some really bright, idealistic students but there's a large group that's still trying to figure out—especially if you teach at eight in the morning. First day, everybody's there. Seats are all filled. By the second week, 20 percent of the people are gone. By the middle of the quarter, a third of them are never there. All of a sudden, the midterm comes and the class is full. I always say, "Welcome to the class. Where have you been?" Where do they get the information? They all want things online. "Put your notes online, put your exams on line." But eight o'clock is just too early for them. I say, "You ought to be up here teaching at eight o'clock in the morning rather than just sitting back." So there're those kind of changes.

I think their future careers and graduate school are much more important than they were back then. Those people from those early years have gone on and done really well. It's forty years later, so those people are these kids' parents. That's kind of funny to think about. So whatever values they have are a mixture of, not only what their parents gave them, but how society has changed. So huge differences. But I still use the blackboard. I still give midterms. I still talk from my own experience and show colored slides on occasion. Some people say, "Oh, how retro." Or, "in the day" or, "old school," which I find entertaining.

Rabkin: Do you think those practices are fading out as the department becomes younger, and new colleagues come in who grew up with—

Griggs: Probably. Yes. A lot of people use Powerpoints in every lecture. Many of the lecture halls are set up now so that all you need is your jump drive.

Rabkin: So you just have to bring a little two-ounce thumb drive and stick it into the console—

Griggs: Yes. Sometimes I'll come in and the whole blackboard is totally clean. It wasn't just cleaned off; it was what I had on their yesterday morning. So people—chalk, what's that? It's fascinating. I enjoy the old values in a sense, but being able to mix them with the new. In an upper-division class, I will use Powerpoint from time to time because you can put a lot of images up, but it's still more personalized. I never take things from textbooks. I try to do my own stuff. I feel, in a way, privileged to be able to have shared forty-some years of change.

Community Outreach and Speaking

It's also interesting because I do a lot of talks in the community, everything from grade school kids, to high school kids, to service clubs, and chambers, and the Rotary, and senior citizens. It's fascinating to see how those different groups respond. I think the most important thing we need to know as speakers is knowing who your audience is and speaking to that audience. —I was the keynote speaker at a conference in Monterey last week on Adapting to Climate Change around Monterey Bay, and then one of the few speakers at a conference at Scripps on Tuesday on Climate Change in California and Extreme Events; then tomorrow, I'm going up to Sacramento to talk to the Ocean Protection Council—It's so easy to talk about what you think is cool, but if you don't think about your audience it's not going to work. I've twice gone over to Dominican Oaks.

Rabkin: Which is a retirement living facility.

Griggs: There are faculty over there, retired faculty. The first time this woman called me who runs their social program, she had said, "Oh, I had one of your colleagues, Mary Silver, come over and the people just loved her. She talked about the ocean. I know they would love to hear you." I was kind of, "Wonder if I want to do this?" She said, "By the way, I took your class back in 19—whatever it was." I said, "You know, Margie, I'm happy to come over." I think it was that afternoon or the next morning, I came back to my big *Oceanography* class. And the contrast between the two. They're very well educated over there. They're wonderful people. They're all alert. Many of them have advanced degrees, but they're in their seventies, eighties, and nineties, and just the opportunity to hear somebody talk— So I focused it on them. I appealed to them, and they were so appreciative.

Rabkin: How?

Griggs: Well, part of it's the language you use. Part of it's the topics you cover. One was on climate change and sea level rise and coastal change. I didn't use a lot of technical slides. It was mostly photographs. Then I did a second one six months ago on tsunamis. That's exciting. We'd just had the big Japan earthquake. The dominant person over there is a woman—I think because they outlive their husbands generally—so maybe of the seventy or eighty people, sixty or fifty-five are women and fifteen were men. But the ladies are so appreciative. It's like

they're going out on a date. They're all dressed up. They have their hair done. It's after lunch. This is their event of the day. They come up and put their hand on my arm, "Could you come back again? This is so great." They were so appreciative. They listen to every word. I mean, a few fell asleep, but— Then I come back to my class and my students have got their feet up on the seats. They're on their cell phone. They're texting. It's just like, "Oh, God." This is a bigger challenge. How do you get their attention? How do you keep their attention?

Recent Budget Cuts at UCSC and their Effect on Students

Rabkin: Are you seeing any impacts of the economic shifts of recent years among your students, in terms of financial anxieties on their parts or the kinds of worries they bring to you in office hours?

Griggs: Because this class is so large, I rarely have those students come in office hours. In the past, I've had discussion/lab sections, so TAs have had more of the one-on-one contact. I'll go in the lab and chat with them. I think they get a lot of their contact that way, but now that the budget has been cut, for the first time in thirty-five years we haven't had discussion sections or TAs for this class.

Rabkin: For the *Oceanography* class?

Griggs: Yes.

Rabkin: It's always had discussion sections led by graduate TA's?

Griggs: And actually it's a lab, too, so they have lab work every week.

Rabkin: Lab exercises—

Griggs: So they get involved in firsthand stuff.

Rabkin: And now you no longer have that part of the course?

Griggs: Winter quarter [2012], for the first time.

Rabkin: Oh, my goodness.

Griggs: As the budget's been cut, as you know, what we call Temporary Academic Staffing, which is lecturers and TAs, gets cut. So in Earth science—pretty lab and fieldwork intensive—they decided to put the TAs we have into the major courses, where we've got fieldwork and mineralogy and structural geology. So the big introductory classes, the feeder classes, where people get excited about it, they're taking them out. With 250 people—twenty-five [in each section]—I can't do ten sections, two hours each a week. I just decided we can't do it. So that's going to be a loss. I'll lose a lot of that contact.

In a class of 250, there are those divisions, those people who always want to sit in the back row. They're cool. And then there's the middle group. Then there's some that will always be in the front row. I remember joking as an

undergraduate, saying, "We're all paying the same price. You might as well get a front-row seat because you can see the lecture." Those people in front will ask questions. They will be a little more involved. I rarely get to know very many people's names. Sometimes a person will come up after the first or second lecture and say, "Hi, I'm Joe. I really just wanted to introduce myself. I like your class. I love your class. I like your lecture." But in general, more in the old days, maybe when I didn't have as many other obligations, I would spend more time with the students. If they come in, my office is always open. I have office hours. My door is open all day every day so they can come in. I don't hear the economic issues as much as maybe, "What other classes can I take after this one? I really liked your class. What kind of career [should I pursue]?" So I don't see that. The *Sentinel* has had this three-part series on college and tuition and fees the last three days. We're listing now as the average cost for a year at UC Santa Cruz is $32,000, which was I think just $27,000 a couple years ago.

Rabkin: That's tuition and fees?

Griggs: Everything. Room and board, the whole thing. What I do the very first day, particularly when it's eight o'clock and I know they're not going to be coming to class after awhile, I say, "Okay, it's going to cost you, according to the catalog, thirty thousand dollars for a year in school." They're looking at me. I do this the first day. "Okay, three quarters, ten thousand dollars a quarter. Most of you take three classes because each is five units. That's $3300.00 a class. In my class, it's Tuesday-Thursday, there are twenty lectures. So it's about $150 a lecture. So every time you're not here somebody's wasting $150. Who's paying

for that? Are you getting your money's worth?" And when we look at the numbers—no student can afford to pay $32,000 a year. So, last night the *Sentinel* had an article that showed 25 percent or 30 percent is scholarships and aid. This much is loan, and this much is student savings, and this much is parents. This much is family. This much is—

Rabkin: Students working jobs—

Griggs: Working jobs. There's a real mix. I spent every summer in college working to get enough money to go back to school. It made me really appreciate what it was worth. But I think probably a lot of students today don't. Somebody's writing the check. I wasn't going to miss a class. I worked my rear end off to get the money to pay for my room and board. I'm going to hear everything I need to hear, if I'm paying for. But today, I think it's almost like sometimes students have a life and if they have time they will go to school. Whereas we had school full time, and if you had a little time you'd get a life, go surfing or something. So it definitely has changed.

More on Memorable Students

Rabkin: We talked last time about some of your former students, graduates and undergraduates, who have gone on to have various kinds of impacts in research or public life. I wondered if there were any others you'd like to bring up.

Griggs: Well, this conference at Scripps on Tuesday, the person after me, I recognized her name. We were just chatting. She said, "Oh, Gary, I took your

geology class. I still remember the field trips." She's now a professor at [UC] Davis in land, air, and water science. Another student came up to me that was a geology major and said, "You probably don't remember me." I said, "Bryce?" He said, "Bryce Rhodes." These two students had graduated in 1976. He'd gone on into an oil company and done really well. I think of probably the graduate students, who you spend more time with and get to know better and follow their careers more closely, because they become professors and [work at the] U.S. Geological Survey. I was at a conference last week in Monterey. I recognized a woman who was our county geologist, was another former student, now she's into all kinds of other things. There are those people that you see on a regular basis, and then those that you run into.

I was living in a small place for a while a few years ago, and the couple I was renting from had some friends over from the valley, a young couple with a little child. They said, "I want you to meet Gary Griggs, a really nice guy who rents this back room from us." The guy says, "Gary Griggs, wow." This guy's probably thirty-five, and he says, "I took your *Oceanography* class and you failed me, but I deserved it."

Rabkin: [laughs]

Griggs: [laughs] It was this realization that when he was a student he was sort of a flake. What's most rewarding, and we were talking about this before—I think in the, I'll say earth sciences, but it could be any of the sciences, versus philosophy or psychology or sociology, people remember the field trip. They

remember the mountains, or the coast, or plate tectonics, something that they can relate to in their real life forever. When I meet somebody and they introduce me as a geologist—nobody I've had in class—they say, "Oh, I remember my geology class at UCLA because we took this field trip and we saw this or that." It's a discipline that I think lends itself to permanent impact on your senses.

Rabkin: I feel that way about my botany field trips in college.

Griggs: Yes, that may be the same.

Rabkin: Maybe it's something about that very thing that propelled you into the field you now are in in the first place, which is contact with the living earth and its underlying—

Griggs: It stays with you.

Bay Walks with Sandy Lydon of Cabrillo College

Rabkin: Yes. Well, you talked a little bit about going out into the community and doing public talks and education, which makes me think about the class you've been doing in recent years with Sandy Lydon from Cabrillo College. The two of you spend three consecutive Saturdays walking a group of people around Monterey Bay.

Griggs: You walked with us.

Rabkin: I did walk with you guys last May. It's ten miles roughly each day. You cover the entire stretch of beach, from New Brighton Beach in Capitola all the way down to Monterey Fisherman's Wharf. A big group of community people. I'm curious about what it is that you hope people will learn from that experience and why you do it?

Griggs: Sandy and I developed this unique relationship almost thirty years ago. The first time we ended up speaking together we were in the Aptos Library after the big storms of '82, with Love Creek, mud slides, flooding and people dying . He'd been looking at a little different historical perspective and had spent a lot of time out in the forest of Nisene Marks that was logged and then recovered. I was talking about similar things. We ended up back-to-back that night. I don't think we knew each other prior to that. Somehow we started connecting and talking. I'm trying to think in subsequent years when we ended up doing things together. I think somewhere—we do this Friends of Long Marine Lab auction every year and one of the things that's most exciting to people are field trips with professors or scientists. You can bid on a condo on Hawaii, or a weekend at a condo in Lake Tahoe, or a bottle of wine. But to go with a scientists someplace are the most popular things. You can go out to Año Nuevo with the elephant seals, or out tagging sharks, or to the tide pools. Somehow Sandy and I got together because we'd done a couple of field trips together to Point Lobos. So we put ourselves up for a combined trip and that became a really—a thing that people wanted to bid on. Then we've added in the North Coast and the San Andreas Fault. It has fascinating.

Then we also started this book, which is sort of a long messy story. I wrote my part fifteen years ago. Sandy had too many other things to work on. He started a Point Lobos book that he needs to finish. I think Sandy really enjoys the talks, the presentations, the field trips. Sitting down and writing, it takes more discipline. There's nobody around you. I find I can do both.

Rabkin: What was the focus of this book that you were collaborating on?

Griggs: It is the natural disaster history of the Monterey Bay area.

Rabkin: Oh, fun.

Griggs: It's what we've been doing. He's gone back and actually researched the floods and the fires and the droughts and the storms and the earthquakes. I had been talking about why we have floods, why we have earthquakes. It was trying [to] put the old events—we have something that I coined and we both use now, a "short disaster memory" or "collective amnesia." Where once it comes, we rebuild—we're tough, we're resilient, we bounce back. But we don't learn anything. We just keep rebuilding— So downtown Santa Cruz has this interesting history, as Sandy has pointed out. We have an earthquake. We shake the whole thing down. So we rebuild out of wood. Then we have a fire and it burns down. Then we build it back and then it floods. It is just in the wrong place.

So I'm trying to think— Sandy had done a Monterey Bay walk maybe twenty years ago.

Rabkin: On his own.

Griggs: On his own. He did two or three *Sentinel* articles. At that point, Fort Ord was the [Army] base and he had to have somebody walk with him along the shoreline of Fort Ord. He wrote about everything he saw. Quite frankly, I don't remember now how we actually came upon this idea together. I lived with Sandy and Annie for a month at one point in the turmoil of my life. We spent a lot of time together talking about this and that and the other thing. I spent some time with them up in their cabin at Pinecrest. We did the China trip together in '03. Somehow we came across this, and I don't even remember now, except I remember talking about Sandy's trip that he did by himself. I don't know whether we were asked about it, or whatever. So we did it the first time, now it will be four years this summer. We realized how much stuff there was and how interesting it was.

The response was so great that we had to make a cut-off because it's really hard to talk to a hundred people [on the beach]. Forty or fifty you can manage. I think it was a mixture of he and I sharing history and geology, which fit together, and one affects the other. We were both learning from each other. We've talked so many times together that we answer or end each other's sentences sometimes. We can joke around. Part of it was just an awareness, letting people discover what's really out there. If you look at the satellite map of the Monterey Bay that everybody has on their wall, you get an incredible feeling of accomplishment that you walked thirty-some miles. You drive it in an hour and poof, it's gone.

But when you walk every step of the way, I think everybody who has taken that walk has a better appreciation of the history and the geologic processes, and also a huge feeling of accomplishment, a certain sort of an environmental awareness: "Wow, this is an important place to think about, or save, or visit, or share." So I think it's all of those.

Sandy wants to do everything he can. Sandy's a little older than I am; he's still in great shape, but he still thinks, "How much longer can I do this? I want to keep doing this." This last weekend was the train to San Luis [Obispo] and the bus to Cambria and the Hearst Castle and they took forty-five people. There was a waiting list. I think as soon as this goes on his website there will probably be forty-five people who want to do Monterey Bay again. It's a trek, though, as you know. It's an adventure but you never know what you're going to see or find. It's been a fun thing. It has become this annual thing that we're going to do.

Rabkin: I think I saw an email from Sandy that announced *two* upcoming Bay Walks, one in April-May and one in June.

Griggs: We were going back and forth about best dates.

Rabkin: So it's one or the other?

Griggs: So there was a May and June. I said, "The earlier, the more difficult," because, well, the rivers get in the way, we've made the endpoint of a day.

Rabkin: So you go to the Pajaro River on the first segment. Then you start on the other side of that river and end up at the Salinas River on the second segment. Then you jump the Salinas River and end up in Monterey.

Griggs: In the first year, as we've talked about, we did it in two days. So we had to get across the Pajaro and get to Moss Landing and that was four in the afternoon. It was just about waist deep—

Rabkin: I heard you had a mutiny.

Griggs: [laughs] There really wasn't a choice because everything was on the other side. Everybody kept looking for the shallowest area but there was no way to do it. It wasn't dangerous. It was just everybody is in their underwear crossing the river, which was sort of humbling at the end of the day, and cold. But those are the kind of things you remember and say, "Wow, we were so tough. We walked across the river."

Ocean Literacy and K-12 Outreach

Rabkin: Yes. [laughs] In an ideal world, I'm wondering what kinds of basic understanding you would like every citizen of the Monterey Bay region to have about the coastal environment and processes?

Griggs: Oh, wow, great question. I think—one is because I'm involved a lot now in hazards and climate change is this—and I guess, as any scientist, you often associate with your colleagues, who have similar values or a similar foundation.

You're always surprised—I've found this about climate change—when I was writing these *Sentinel* articles about two years ago. You know, I've written about a lot of different things. People love the local change and the natural history but when I got into climate change, which affects us also— This conference last week was Adapting to Climate Change Around Monterey Bay. Some people really came unglued because they just don't believe it, and they said, "That's been disproved. Why are you writing about this?" That's when there was a blog that anybody could write in online.

Rabkin: In response to your columns?

Griggs: Yes. Then they started attacking each other. I didn't even know that was on there until Deepika, my partner, said, "You know there's a blog site below your online column?" Anyway, so I think the appreciation of what makes this place unique. Why does it look like it does? Why do we have mountains and these uplifted terraces? Where does our beach sand come from? What are the effects of living on the edge? How does this change over time? What can we look back at in the past and learn from? We do have earthquakes. We do have floods. We do have cliffs failing. Taking somebody on a field trip around the bay, you develop an appreciation. You treat things differently. You look at things differently.

Certainly there could be a generational thing that people today, younger people, may be a little more tuned into, although it may not be that case at all. People who have lived on the land for their whole lives have a tremendous appreciation

of climate change and soil and rainfall and droughts. But I think a lot of people today, particularly young kids—now I sound like I'm conflicting with myself—who spend all their time on their computers, they live in this sort of digital, electronic world. You know, the lines are closed. They're on Facebook and all their reality is what other people think about them or say about them. I think that's really sad. It goes back to what I had talked about earlier about growing up camping and living on a ranch; that connection is always important to me.

During the day if the sun is out, I cannot be inside on the computer. At night it's easy because you're doing stuff, you're accomplishing things. But during the day, I've got to be outside. I'm on my bike. I'm working in the garden. I'm in the water. I'm on the beach. I've just got to be outside. I can't sit inside when the sun is out. But today's kids I think—I mean, some do. Some are into soccer, surfing, whatever, but for an awful lot of them it's a digital world. I think putting that aside and realizing we live in this incredible place that you can take for granted really quickly. You just have to go to a big city like Beijing and you say, "Wow, we're really lucky. Look at this." How do you develop a lifelong appreciation, awareness of that?

I got asked to talk in January to Pacific Collegiate School, where Deepika, my partner, has been involved, president of the board for two years. Some of my former students are parents of kids there. The whole student body is four hundred-some students. They have somebody come in once a month to talk to the entire student body. These are all college-bound kids. They're smart. They're texting and busy. What do I say to them in twenty minutes? Thirty minutes?

What do they even want to listen to? What will they take the time to listen to? What can I say that will leave some impression on them, that they'll say, "Wow, I haven't thought about that." Or, "He said some really important things" versus, "Some know-it-all-professor." I've been agonizing over that a lot. I want it to be worthwhile for them. I don't want to feel like it was a waste. It's a lot of stuff. Here in a class at the university they sign up for botany or chemistry and they sort of know what they're going to get. But these are high school kids who come to an assembly, not knowing what's coming, except that they don't have to be in class for that period of time—

Rabkin: This is still coming up?

Griggs: It's at the end of January.

Rabkin: So you're still thinking about—

Griggs: I'm still thinking about it. And I have a whole folder of notes of things, an idea, a concept. I can use Powerpoint, too. I also talked [to] Monarch School. They're in the old Branciforte School. It was a combined kindergarten-first grade, and they have their buddies in the third grade or something. One of the teachers lives in the neighborhood and said, "Would you come down and talk to our kids?" I have a talk I've given to PCS to a class and some of the high schools called, "Living on the Edge." It's about disasters, sort of the Sandy-and-I book. I had the charter school from Watsonville, CEIBA, up here. They came up on

campus for the day. I know the principal and he said, "Could you talk to them?" I gave them this Powerpoint.

But for the five-, six-, seven-year-olds, as soon you mention earthquakes, ten hands go up. [laughs] These kids are so cute. They'll say, "My dad said earthquakes are—" There was a connection. "Earthquake!" He has to say something. The teacher says, "Let Dr. Griggs finish his talk." They're so energetic and so enthusiastic. They aren't blemished or tarnished. It's just bubbling out of them. Whatever the word was, "flood." "Well, my grandfather was in—" It's not a question. It's just this stream of consciousness, what's coming out of them. I can't do that very often. It takes a lot of time. Energy's fine but it's, "Can you do this? Can you do that?" So I would say no to a lot of things, too. But every once in awhile that's sort of a reality check of, how do you talk to a six-, seven- or eight-year-old? How do you talk to senior citizens? Thinking about your audience. But the high schoolers are a challenge. More than anything else I want them to leave with something rather than saying, "Oh man, that was dumb!" Or, "What a waste!"

Rabkin: I can't help wondering if there's some remnant in those high school kids of that tremendous excitement about earthly phenomena that the little kids show you, the floods and the earthquakes, if that's not maybe still lodged somewhere in those teenagers.

Griggs: That's a good question. I think [with] the kids who have less social skills probably it is. But everybody else, many of them are trying so hard to be cool

and dress right and be liked, that, "Well, is it okay to clap after this? Or is that dumb? Is that music okay if I don't like it?" There's that peer pressure thing. Deepika's daughter is seventeen and a senior and I can see all their Facebook stuff—so-and-so said this about that person. There's a real exposure that they feel somehow.

Building the Institute of Marine Sciences and Long Marine Laboratory

Rabkin: Yes. Well, maybe I'll move us into another topic now. Maybe let's talk about the Institute of Marine Sciences and Long Marine Lab.

Griggs: Okay.

Rabkin: If you're up for a bit of a transition?

Griggs: Sure.

Rabkin: I'm interested in, first of all, hearing about the early days and your role in the development of what used to be the Center for Coastal Marine Studies.

Griggs: Coastal Marine Studies.

Rabkin: And eventually became the Institute of Marine Sciences.

Griggs: Interestingly, if you go back to the original campus master plan that was written in 1960—

Rabkin: Is this the same as the long range development plan, or something different?

Griggs: No, I'm thinking about the whole campus. The campus's original master plan. It was written in 1960. In addition to a lot of other interesting things and a map of how the campus would look, marine science was recognized as something the campus should do well in, or should excel in, or should develop, in part because we were the only coastal campus in the University north of Santa Barbara. The other thing that was fascinating, if you look—and I still have a copy of that map because I shared this with the campus's Strategic Futures Committee maybe ten years ago—how big are we going to grow and why? That was an interesting challenge. They had a football stadium planned. All the campus was down on the lower meadows. It wasn't up here in the trees. This map looked like a UCLA, or a Santa Barbara. They had a school of home economics.

Rabkin: This is in the 1960 master plan?

Griggs: They had a department of military science. That's because all of the land grant institutions had to do ROTC. The University of California, as a whole, was/is a Land Grant Institution. My first year at UC Santa Barbara it was mandatory ROTC, Reserve Officers Training Course. So we had uniforms and rifles and marching and all this stuff. People today go, "Wow." You had to have your hair cut for drill and your uniform ironed and brass polished. That was what would be happening in '60. But by '62 or '63, they had taken away the

mandatory military science requirement, because we were supposed to be training farmers and soldiers and all those things. They had a golf course planned for UCSC. It's fascinating. [laughs] But that was 1960. That was before Kennedy became president; that's the year he would have been elected. It was still Eisenhower-Nixon, I guess. That was a different time. Reagan, he wasn't even to become governor until the mid-sixties. When I came, and I joke about that, in 1968, Lyndon Johnson was president. People say, "Who?" Ronald Reagan was governor. Barack Obama was in the third grade. [laughs] So here we are. I'm still doing the same thing, and he's now the most powerful man in the world.

I was the first ocean scientist hired. There was Todd Newberry, a marine biologist. But the first one with a degree in oceanography. And Bill Doyle, who is actually a terrestrial botanist who works with liverworts, of all things, somehow might have been asked to look into it. He was an associate professor then. I was right out of graduate school. There was this goal of doing marine science here. He thought about trying to put together a marine program, even though he was a terrestrial botanist. He was an amazing guy. Very hard working, very disciplined. He'd come up here at five in the morning. I'd come up to work at eight and he was leaving campus to go home and come back again. We both had our offices originally elsewhere. He was in Thimann Labs. I was in Applied Sciences. We both were in Thimann Labs for a while.

We'd get together and talk about what a marine lab might be and how a marine program might be developed. I remember we drove up to Pigeon Point as a possibility because he thought you had to have a marine lab. He was thinking in

the mold of Hopkins, where you had running seawater, rather than oceanography, where you had ships, although we could do both. We went up to Pigeon Point and there was property that was coming up surplus, that's now the hostel up there. We said we could do it here. Good clear seawater. It was a ways away from the campus—

Rabkin: Right at the site of the lighthouse.

Griggs: We went to Hopkins Marine Station to see if that made sense. I started to teach *Oceanography*. Then we hired Ken Bruland, Mary Silver, Eli Silver—a physical oceanographer. So we began this cluster. Then Ken Norris was hired. Bill was still—I think his book on the campus history goes through the letters and the committees and all this stuff. We used to talk about what we might do. He had a bottle of wine in his office and we'd pour from time to time—Friday afternoon, we'd sit there and, "What if we did this? What if we did that?" But Bill followed through. Ken Norris was hired. I remember sitting at a meeting at the old Whole Earth Restaurant.

Rabkin: On campus.

Griggs: [The building] is still there. I don't know what it is now. Right up above the [old Bay Tree] bookstore. It was Ken Norris and he had brought his assistant, his secretary from Hawaii, Patti. And Dean McHenry and myself. Ken was talking about the need to have a marine lab and running seawater, because we had a Center for Coastal Studies and the beginning of teaching, but there was no

marine lab yet. This would have been probably early seventies. Ken said, "You've really got to have a place where there's seawater." Ken studied dolphins and could see the need for that. He'd done that in Hawaii and UCLA. So Dean McHenry said, "I've got a friend down here," who was a couple, Donald and Marion Younger, who owned Younger Lagoon (which we've now named) and all of the land from where our access road comes in, up the next couple of hundred acres. In fact, the family land went all the way up to the edge of the university up here, off Empire Grade. He said, "I'll talk to them." Ken was going somewhere in Washington and was going to talk to somebody else about money, or who might help support it.

So Dean McHenry met with Donald Younger and he said he'd give us this sliver of land next to the lagoon. If you go down the road to the lab now, there's the property that has the fisheries lab and the Seymour Center, that was all Wells Fargo property. But it was only the sliver on the right side, which was twelve acres of land and twenty-some acres of Younger Lagoon, so it was forty acres in total that they gave us. So Ken was the idea guy; Bill was the get-it-done guy. Ken was an incredible scientist. Students loved him. People loved him. Great ideas. Just incredible stuff he'd come up with—"I'm going to follow the gray whales down the California Current. I'm going to build this little submersible thing and I can watch them out this glass window." He was the one who figured out how the dolphins could actually echolocate. They didn't see with their eyes. Some incredible work he did. We were neighbors for ten or twelve years. And it was his brother who inspired me as an undergraduate at UCSB where he as a professor of geology. They were a great family of naturalists.

I think they worked together [Ken Norris and Bill Doyle]. It wasn't exactly clear who did what, except that Ken was great at working with people and he met Joe Long of Long's Drugs Stores. They had a great relationship. Bill kept up a writing relationship. There's tons of letters in the file about keeping Joe up with what— But I think Joe gave some initial money to build the dolphin tanks and maybe the seawater system. Ken was just this wonderful folksy guy. When people said, "How come you're studying dolphins in captivity?" He said, "Well, I'm giving them a sabbatical from the wild." He had a way of thinking about it. And Bill got into the nuts and bolts, "We need a building. We need the seawater system."

He brought in a guy who died a couple of months ago, Dick Pierce, who came in as a researcher but ended up being the go-to guy, and found this funky old surplus boat someplace and found all these surplus trailers, and they found this whale skeleton up the coast they brought in. Bill's book probably goes into exactly who did what. I wasn't part of all that early work. Jack Baskin got involved and gave some money. Somehow they put that whole original lab, the two buildings and all the marine mammal tanks together with private money. And surplus trailers and a boat, the remnants of this, pieces and bits that were brought together. Ken had dolphins. People started coming down there to look at what was going on. They brought in a doublewide trailer and started a docent-training program, a little public education, a little aquarium. I came in and that's what was there. There were the two original buildings, the marine mammal

tanks, and a lot of trailers. So I actually moved into a trailer down there for four years.

Rabkin: When was that?

Griggs: I took over in '91. This is now my twenty-second year as director. So they had a couple of master plans. I think the first environmental impact statement was done by Jim Pepper's class.

Rabkin: An undergraduate environmental planning class?

Griggs: Yes, where they said, "Let's figure out how to do an EIR [Environmental Impact Report]." They looked at the impacts of all the elements down there. There was a number of things that looked possible on the site, some that Bill and I had talked about when I came in. Doing new things on campus is a little more difficult because there's a master plan and it's academic and it's dorms and it's colleges. You don't just bring in a fisheries lab and plunk it here. But the lab [because it was removed from the main campus] had a lot of opportunity. We didn't have any land or much land.

Bill was going to take a sabbatical, and it turns out there were some family health things; he wanted to come back but he decided to retire. So I came in as acting director. I said, "'Acting.' I don't like the sound of that." So I said, "I'm going to pretend I'm the director." Then there was a search and, actually, I was selected. I started pursuing all these alternatives or options. One was a federal National

Marine Fisheries Service lab. We had understood there was a big fisheries lab in Tiburon. For geological reasons, their site was falling into the bay. They were looking to come to Monterey Bay because there are so many institutions around the bay, the [Monterey Bay] Aquarium and the [Monterey Bay] Aquarium Research Institute. We started talking with them. There was a fish and game project that was funded by oil tax money to build an oil spill recovery facility for sea otters and research.. They were interested in Monterey Bay. I'd been working with the U.S. Geological Survey for years and a lot of our students went over there to work. Their people came back here and got Ph.Ds. A few of them lived in Santa Cruz. Their other USGS Coastal and Marine Branches were both at university campuses at Florida and Woods Hole. I said, "Wouldn't it be cool to have them over here?" And the public education program was in this doublewide trailer. We had a little aquarium. We said, "Wouldn't it be great—public education is important—if we had a center?" We had some problems, too. As Pogo said, "We're surrounded by insurmountable walls of opportunity."

Rabkin: [laughs]

Griggs: [laughs] For example, we had only temporary access across the neighboring property that we now own.. We didn't have our own water. We had a well that was really—

Rabkin: Fresh water.

Griggs: Yes, but not very good quality, so bottled water was brought in. But there were problems with it. There was no sewer. There was a big septic system. In fact, there's this funny story that Bill Doyle—the guys they worked with sort of constructed this thing and then they'd pump it out every week. So this, the honey bucket truck would come in. It was really holding on by a shoestring. The guy that built it, his name was Britt Stitt, so they called it, "Britt's Stitt's Shit Pit." [laughs]

Rabkin: [laughs]

Griggs: There weren't very many people down there. No faculty were really down there. A few people with the seawater. A few graduate students and a few people sort of hanging on. It was this funky little place.

Rabkin: Did you already have these agencies housed there?

Griggs: No, nobody.

Rabkin: This was all in the vision, planning, ideas stage.

Griggs: Yes, things I had in mind. Bill had thought about the Fish and Game facility and NOAA. So we just started down this path. Twenty-one years later—So we started trying to raise money for the Seymour Center. That was one project.

Rabkin: That's the public education facility.

Griggs: We had to raise six-and-a-half million dollars. I had never been involved in fundraising or development or politics to speak of, except for the *Santa Cruz and the Environment* thing. Fish and Game was a nightmare because they were kind of tough to negotiate with. We went through a lot. Sam Farr was in the Assembly then. We went back and forth to Sacramento dealing with them. USGS was very excited about coming. We spent fifteen years working with that, trying to build them a building on this site.

Rabkin: Are there models for this kind of university-public agency relationship?

Griggs: A few that we actually looked at. It turns out the University of South Florida had a USGS group there. The people in the community actually put together a big building for them. I think it was a car dealership or something. They actually thought, "Well, it's green employment. There are jobs." It wasn't on the campus but it was next to it. There's a fisheries lab at La Jolla, on the Scripps campus, but it turns out that at [that] time it wasn't very interactive, and we were looking for interaction. We wanted collaboration. These people would fund our graduate students, and teach classes and seminars, and be on committees, and so forth.

So each of those was like, wow. Each took about ten years. USGS took fifteen years. People see it today and say, "Wow, this just happened over night." I've got files for every single one of those projects, of congressional stuff, and assembly stuff, and budget stuff, and planning, and EIRs, and contracts, and agreements. It

was all worth it, but it wasn't instant. It wasn't quick. It's partly because trying to marry a federal agency with the university, you do things differently. You make contracts differently. You do financial agreements differently. Steve Davenport, who is my assistant director and a former student, is a really good nuts–and-bolts guy. He's been at the lab now for thirty-five years. He knows how everything works. He's really good with people. Very patient. He kind of looked at the business side of things, even though he doesn't have a degree in that. He and I have worked together really well. We had a dean, Steve Thorsett, and now, Paul Koch, who was very supportive even though he was an astronomer. We had a chancellor when I started, Karl Pister, and then M.R.C. Greenwood, who gave me a long leash.

Rabkin: Both of those chancellors?

Griggs: Yes. And were very excited about what we did and sort of kept out of the way. I never went to the Academic Senate and said, "What do you think about this?" They'd still be probably debating it. [laughs] You know how academics like to debate stuff. But it was interesting, because for the USGS, almost all federal facilities go through the General Services Administration, sort of the federal landlord, the post office—the post office doesn't go into town and say, "Hey, we'd like to build this here." You go to the GSA, who has overhead and bureaucrats and they work it out and they take their cut. So there were complications in Washington, D.C. of building a building here.

But at one point, I knew all the USGS people. I knew their branch chief. I took some of our little bit of money and we had a design planned—how the building would look, where it would go. So went back to Washington, D.C. with our then-science development person, Lora Martin. She was our first science development person—then became head of the MBEST Center, the Fort Ord campus we tried to do. Now she's working in Berkeley. She had an MBA and had worked in Washington. So we went back with the two guys from USGS here to the director of the USGS and said, "Here's what we want to do." I came back and sent a long email to Karl Pister, the chancellor then, and he said, "Gary, this is all good news but you know there's a process. No more end runs." [laughs] I was so naïve. But we got a lot done because we didn't ask for permission. So it was this incredible, long, almost a twenty-year process of trying to figure out how to do it, working out the agreements. Then this incredible challenge with Wells Fargo Bank, because we didn't have enough land for any of this. So the fisheries lab ended up buying a piece from Wells Fargo. They actually own two-and-a-half acres in the middle of the coastal campus. We worked out an agreement with the Seymour Marine Discovery Center they could be on there. Wells-Fargo wanted to put houses out there. There was this giant housing project.

Rabkin: Oh yes, what was that called?

Griggs: Terrace Point. We ended up working with the City of Santa Cruz. We had a special committee that involved Scott Kennedy and Neal Coonerty. We had a facilitator trying to figure out, how do we get what Wells Fargo wants out of it, as well as a marine research center, as well as make the city comfortable. We

met for a year, probably every two weeks, and that collapsed. Wells Fargo realized—we told them, "This isn't going to be a money-making development. That's not what the city is going to allow here."

Then they brought in [environmental studies professor] Jim Pepper and Matthew Thompson of Thacher and Thompson, architects in town. They became planners for a new project. That was also a chance to put the University together, but get the high-priced luxury homes off the cliff edge and give them some development space but also space for a marine lab. Because Wells Fargo wanted to basically entitle the land with development. They're not a developer. They can't do that but they could sell the land for more money if it now had permits to build something. That fell apart.

Finally, they sold to the University. We took over. And one by one, these projects were done. But it has been one of the more rewarding things I've ever done, to a see a coastal sciences campus, to see collaboration, shared facilities. There are people bringing in funding. Actually, there's a joint faculty position that the NOAA fisheries lab and the Biology [Department] pay for. That's sort of unheard of. My students work at the USGS. We have these cooperative agreements where they put money into the campus to pay graduate students and undergraduates and the campus makes overhead on all that money. So it's worked out better than I would have imagined. And we still have plans for the future with this long-range plan that has been approved by the Coastal Commission in 2008 for our Coastal Biology building. It's now waiting in line for bond funding. We're trying to raise money now for a wing to the Center for Ocean Health, an

endowment for the Seymour Center, a conference center, expanded marine mammal tanks—so these are all off on the horizon. [laughs] There's always this new project.

Rabkin: So it was unbelievably complex, bureaucratically, dealing with state budgets and regulations, federal budgets and regulations, financial dealings, to put all this together. And now is it a complicated challenge to administer that?

Griggs: No. The fisheries lab is an independent federal agency. They have a cooperative agreement with us, so they put money in all the time that keeps the projects going. Some of that goes to our people—post docs, grad students. USGS actually—we wanted to build them a building on the lab campus. But it turns out it's really hard to do that because the federal government has to go through GSA. They want to own the building and lease it. They weren't going to put money onto the University to do it. We said, "Well, do we have University money? We don't have money." They ended up ultimately leasing the old Wrigley's building and now they've expanded. So they're a half-mile away. That works fine. They're totally independent but they bring money in. We work with them regularly, have joint seminars. Their scientists are on my students' committees. Fisheries, or the Fish and Game facility, we interact with. They pay us some lease money. They help us pay to run the seawater system, as does the National Marine Fisheries Lab, because they use our seawater so they've helped expand the water system. So they're all independently functioning. They actually help fund what we do here, too. So this is the easy part. This is the fun part.

Rabkin: Interesting. And is NOAA there as well? You have a NOAA office?

Griggs: Well, National Marine Fisheries is part of NOAA. There are also a couple of people from the NOAA National Marine Sanctuary that are on-site. We also have some NGOs, which makes us a real strong policy group. There's a group, the Marine Initiative of the Nature Conservancy is here. We give space to four or five people. There's a group called Island Conservation that leases trailers from us on the upper site, but they need more space and we don't have a new building to provide them with, so they're actually going to move off campus for a while. There's another project called Natural Capital Project that works with resources nationwide. They have a group coming here.

All these people are working on policy, which is what I proposed ten years ago, a graduate program in coastal policy. I've got files full of a proposed degree program in coastal policy. It turns out no UC campus has any program in marine or coastal policy. No school in California does. Yet we have the biggest coastline, the biggest coastal economy, the highest population. So they go to Oregon State, Washington, some other school. Everybody said, "Wow, great idea!" [But] none of the departments wanted to go in that direction.

Biology, Marine Biology had, "Well, we need another marine mammal scientist. We need another—this is a great idea and we're the perfect place but we have other priorities." Ocean Sciences is oceans, not policy. Environmental studies, I thought, had the biggest hope, and then we crossed divisional lines, which got a little messy because they're social science and we're in natural science. They said,

"Well, we're really terrestrial. We're not marine." Then they hired Z [Zdravka Tzankova], who's a coastal policy person, basically, which is odd. But they didn't want to take their next two faculty [lines and devote them to marine policy]. I said, "What we really need is a policy planning person. We probably need someone in marine economics and somebody maybe in law. We have all the rest of the courses but with those people we could do a professional program." Everybody said it was great. We wrote this fifty- page—it took me two or three years—interviewed people with the fisheries and NOAA and everybody said, "Yes, we'll do internships."

So now we're coming full circle and people think that's what we should be doing: coastal policy. But right now we don't have any new faculty positions. But we have these policy programs here. So we're in a really unique situation. We built this great place and it's what people want to do, but we're a little short on some of the social science pieces.

Administering it is easy. I've got that down after twenty-one years. Now it's the fundraising part, trying to get the money to get the buildings done. You can't control the state bond market, which is this Coastal Biology building, but we're trying now to raise the money for this wing to Ocean Health. And also an endowment for the Seymour Center, which is tough to raise a million dollars a year, so we're trying to get some endowment, which will help us over the long term.

Rabkin: Let's talk about those two entities. You mention the Center for Ocean Health. Tell me a little bit about that.

Griggs: Well, we originally just had two research buildings. One is called the Younger Building and one is the Doyle Building. And then everything was trailers. So the offices were in a trailer. Faculty would come down there—they'd be in trailers. The graduate students were in trailers. The staff were in trailers. They have a [finite] life[span] and when it rains they leak. There are mice in them. So after we got the money to build the Seymour Center, which we can talk about, it really seemed clear that if we were ever going to have this be a working laboratory, other than just sort of an outpost—even though it was only fifteen minutes away from campus, nobody had permanent offices down there except a few researchers. A lot of them, I found, didn't even have appointments with the campus. Things were a little loose. We had some boats and seawater and animals but it was a little loose. We set up what it meant to be a researcher, and set up some policies and guidelines. We were becoming a little more sophisticated.

I came up with an idea—working with Terrie Williams—what do we need down here? What would be a core of a building that would house our programs?[5] We both agreed that the health of the ocean was really what we did and was unique. So I came up with this proposal for a Center for Ocean Health that would replace most of the trailers, give us an administrative home, provide offices for the researchers and the graduate students. I worked with M.R.C. Greenwood and

[5] Professor of Biology Terrie Williams is the Director of the Marine Mammal Physiology Project at UC Santa Cruz and is the cofounder of the Center for Ocean Health at Long Marine Lab, UC Santa Cruz.

went to Julie Packard. Julie, who is an alum, actually through a bit of a process, put up $5 million of $7.3 million we needed to build it. Then we raised another million and we still actually owe a little bit.

We did something unique with that and the Seymour Center. We built it through the University Foundation. Normally all of our buildings are done by campus, and we have a system. So we go through outside bidding, and buildings are a bit expensive. You've got a lot of overhead, a lot of people involved, and it takes awhile. It's just the way it is. If you want to get an electrical outlet changed, it's five hundred dollars. The first thing that was actually done in that regard by the Foundation was the building of the Arboretum.

Rabkin: Their classroom building—

Griggs: They set a bit of an example because they wanted to do this. They had the Friends of the Arboretum. Dean McHenry was very involved and he was now retired as chancellor. They went to Campus Facilities and they said it was going to cost you—it was like a small house—it's going to cost you—I don't know what it was, $1.2 million. And Dean McHenry—

Rabkin: $1.2 million a long time ago?

Griggs: Yes, I think that's right. I'm not sure how big it is. He said, there's a long story, "That's ridiculous." So he came to the Foundation, which is an

independent 501C3, our University Foundation. We have a Foundation board of directors.

Rabkin: This is the entity that handles the endowment of the university?

Griggs: Endowments. They're a group of supporters for the campus. They're donors. They bring in donors. It's where a lot of our gifts will go to be processed and managed. It doesn't go to a department; it goes to our Foundation that manages that. It comes under University Advancement or Development. So he went to the Foundation. They also brought in the guy that was the campus architect and said, "I think we can do this through the Foundation." They ended up doing it for $500,000. It was about half of what the budget was. It was the Director of Physical Planning and Construction, Lou Fackler. They did it and set an example. They weren't trying to slap the University but do it at a reasonable cost.

I said, "Well, this is a small project. If we don't need to raise a million and a half dollars privately and we can raise $600,000 and do it, fine." So we tried that both with the Seymour Center first, because we were trying to build a building on a modest budget. We had to raise the money. It turns out it wasn't easy. But we got the permission to do it. It was an interesting situation, because we set up a committee within the Foundation that included Jack Baskin, whose whole career had been developing subdivisions. He knew how to raise money. He knew how to build stuff. We had a couple other people on the Foundation that were from

banking and finance. It was a great group. They were kind of excited about actually having something to do.

The Foundation comes under—well, now it's Donna Murphy, who is Vice Chancellor for University Advancement, [but then] Tom Vani was both Vice Chancellor for Business and Administrative Services, which handles the architect and the physical plan—but he was interim also Vice Chancellor for University Advancement, because that position was vacant. He actually has told me I should apply for it. [laughs] I said, "Nah, I like what I'm doing." He was seeing both sides of it. He had the Foundation—these people who are retired, that have resources but that want to help and want to do something. And he was also managing the campus architect and how we do buildings on campus, and unions, and wages.

So we figured out a way and did a contract. Right after Tom came here we also got the Wells Fargo deal straightened out. That was a long time— But Tom was a great guy, just business, get this done. So we ended up leasing the land to the Foundation. Early on, there had been a request for a teaching lab down at the Marine Lab that Bill Doyle had put through. We had $500,000 for a teaching lab. Then we went out and raised this money. So we'd raised a couple of million. There were some old gifts. I spent a lot of time giving talks, showing people the dolphins, talking about the importance of this. The big one was Boyd Seymour, who came in with two million dollars for the Seymour Marine Discovery Center. We were close and that pushed up there and we got a few more. The Foundation

took over. They leased the land back from the campus. We used the $500,000 the university had for the teaching lab. The teaching lab went inside the building.

[Assistant Chancellor for University Advancement] Dan Aldrich had been involved and knew a lot of people. Bogard Construction, who had been in town for years and years and years, built it. First they got all the sub [contractors'] bids and they came in too high. They went back to the subcontractors, "You know, this is a public facility. It's going to be education." They all cut their bids. What we did was—which you could never do on campus, unless there's money in the bank you don't build a building—we started the building without all the money, thinking we were going to get it. So we built the foundation, started building, and money started coming in. People could see it happening. We could take them out there and say, "Wow, this is exciting." I think Boyd Seymour finally came after he saw it part way through. Bogard worked with the contractors so we came in on budget, on time. It was incredible. Then we gave it back to the campus. For $500,000, the cost of the teaching lab, they got the whole thing. Then through the Foundation we did this. Then we did the same thing with the Center for Ocean Health. The same committee came back. Through Julie Packard the Packard Foundation had given us five million dollars.

Rabkin: Julie Packard.

Griggs: Yes. We knew how the system worked. Tom Vani was still involved. The committee was so happy they were able to build this building. I worked with the engineers, because they had thrown some things in there— I do geology and

foundations. I'm a registered engineering geologist. They were doing all this extra seismic stuff which you don't need down there on the foundation. They were putting all this stuff. I said, "Why are you guys doing this?" "Well, it's really overkill. We could probably take out this and this and this." It's a funny issue down there of liquefaction—

Rabkin: That's what happened in the Marina district in San Francisco in the '89 quake.

Griggs: Right. It happened downtown Santa Cruz. It happened in Watsonville. When you have water-saturated sediment—it happened under some of the levees along the San Lorenzo River—water-saturated sediment and you shake that, you actually temporarily turn it to a liquid. The grain contacts are lost and it turns to a fluid so it doesn't support overlying buildings and so forth.

Rabkin: It turns into quicksand?

Griggs: Yes. Exactly. A lot of places, that's a real problem but it's usually when they are wet; they're young sediments. So somebody had said, "Well, these marine terrace deposits which are about ten feet of sand and gravel on top are subject to liquefaction." It turns out the terrace deposits have been there for 100,000 years. If we have big earthquakes every hundred years, they've been shaken a thousand times. They've settled. They've compacted. They're not liquefying. But some engineering geologists, both for the fisheries lab and the Fish and Game and our lab, said, "Oh, liquefaction potential." I wasn't involved

in those two projects. They spent tons of extra money building these deep concrete piers that they never needed. So when I saw this foundation, I said, "We don't need that." He said, "We can take it out." So we saved $60,000 here. So we got that building done.

As we were planning or programming the Center for Ocean Health, what made a huge difference in the history of the lab and the future was that the faculty up here on campus who were marine biologists and who used the labs: Terrie Williams, Dan Costa, Don Croll, Pete Raimondi, Mark Carr—said, "If we could move down there and have our labs and our offices and our graduate students, internet connection, we might all just move down there." We were building it for the people who were there, the researchers and the graduate students. It turns out the faculty got so excited about it; they got so involved in the planning. And that's exactly what happened. It's the happiest thing, the best thing they ever did. God, they love being down there! Their students are there. Their aquariums, tanks, and their mammals. They don't have to worry about parking on campus. There's a little bit of a transportation issue with some of the students who are going back and forth to campus.

The Seymour Center, the Center for Ocean Health—which is Ocean Health, but it's our main research and staff building, the Fisheries Lab and the Fish and Game facility completely changed the lab from this little isolated outpost to an active, thriving place with hundreds of people coming every day. That, for me, is one of the most gratifying things we've ever done. It was following this dream, in a sense, and not being discouraged, and learning how to work with state and

federal, and raising private money. And now, it's this coastal science campus that was almost entirely built with non-university money. Whereas everything up here—if something goes wrong here you call somebody to fix it; if something goes wrong down there we fix it ourselves. We get some help from the campus for the seawater system, which is a giant challenge to maintain because seawater is corrosive and we've got storms and intakes and pumps. It's a lot of stuff. But we've leveraged a huge amount because of our scientists here and people wanting to come, people wanting to help and be involved.

Rabkin: In general, though, your facility is not served by the campus Physical Plant people?

Griggs: Yes, and no. We have a janitor, actually have two janitors.

Rabkin: Who are hired through the University?

Griggs: Yes, so they're University staff. The University actually pays the utilities. I mean, they should, because [for] every one of the projects down there we pay indirect costs to the campus. We pay 51 percent indirect costs, so they should be. But if somebody runs into the electric gate, they don't fix that. When the road needs repairing, they don't fix that. [With] the seawater system we finally negotiated a deal that they pay a certain amount every year; we pay a certain amount. If major projects go wrong, they can come in. We ended up having one-and-a- half people full time just running the seawater system. It's not quite as simple. You just don't call somebody. We've traditionally done a lot of the work

ourselves down there. Or they will recharge. We can do it more effectively and they don't like to spend all their time down there. They've got other stuff up here. The staff numbers aren't getting any bigger. There used to be money attached to every new building that would cover all those things. Now they're not providing that, as a way of cutting budgets. So the same people are having to handle more buildings.

We're sort of this outpost: out of sight, out of mind. But yet we are—ringing our own bell—we are probably the most publicly accessible part of the entire campus. People come in. The campus is closed. They go down to the Marine Lab. They go to the Seymour Center. They want to know about marine biology and what their kids can do. We have our lecture series. You can park there. I mean, you go to Shakespeare and the Arboretum, but in general you don't come up here to come to a lecture. There's no place to park. You don't know how to park. You don't know how to find anything. We have over two hundred volunteers and docents at the Seymour Center who are nearly all community people. It has been this wonderful kind of mix of campus and community.

Rabkin: It has become a public face of the campus.

Griggs: Yes, the public face. Probably ten years ago when Dick Atkinson was the UC President—the presidents will periodically come down there for a presentation. I've spoken to them a number of times. It was when we had just bought or were buying 2300 Delaware. That's the big building on the corner of Delaware and Natural Bridges that's now University Accounting and all kinds of

stuff. We bought that from, I think it was Silicon Systems at the time. It was Texas Instruments before that. Used to be a Begonia Garden, and before that it used to be a lumber mill.

Anyway, [Atkinson] was down. They wanted a summary for him on what we've accomplished in this coastal campus, bringing National Marine Fisheries and USGS. I was explaining how it happened, that this was federally funded and this was state funded. This was non-university and this was privately funded. Then I drove with him up to see 2300 Delaware. He's the president of the University, but he puts his pants on one leg at a time like everybody else. He said, "Gary, we're really proud of you. You're what we call an entrepreneur. We need more people like you." I was thinking back to what Karl Pister had said twenty years earlier, fifteen years earlier. He said, "No more end runs." I said, "We accomplished a lot. We didn't break any laws. We just didn't always do things the way the campus would have done it. But it's worked."

Rabkin: Do you think President Atkinson might have said something similar to you if you had come and asked permission rather than showing him the fruits of your labor?

Griggs: We did work with—if you have ever been at what's called UCOP—

Rabkin: UCOP in Oakland. The University of California Office of the President.

Griggs: They have, I don't know now, twenty lawyers. They've downsized a bit. But we had to work with lawyers there every inch of the way because whenever we do a contract with NOAA or USGS or a land use deal with Wells Fargo— So we did spend our share of time up there. We knew things we had to do. But to get them onboard and get things started we didn't necessarily have to say, "President Atkinson, can I go to talk to NOAA?" Fundraising is like that. We were kind of cowboys here on campus. For example, the Predatory Bird Research Group—Brian Walton who headed that, started it with Ken Norris and a former veterinarian—Brian died a couple of years ago now, but built this incredible program we still maintain now, with Glenn Stewart with the peregrines. He would go to David Packard and Hewlett and take them out with the peregrines and they'd just write him a check. Went to the Disney family. To Nell Newman and Paul Newman. But he did this all on his own, in the old days without asking for permission.

Rabkin: There were no University Development people you had to interact with?

Griggs: Involved with it. Well, you were supposed to.

Rabkin: You were supposed to.

Griggs: You were supposed to, but it wasn't really clear. Brian was also always in debt because he had all these staff and he didn't always have the money and contracts to pay his staff. We had a lot of stuff we had to clear up. It was a great

thing but at one point he got $800,000 in debt. One of the problems was, I think, he'd gone to a foundation in San Francisco and asked for $10,000. The next day the University walked in and asked for a million dollars.

Rabkin: Asked the same foundation for a—

Griggs: The guy at the foundation said, "What are you guys doing? Do you talk to each other down there?" Karl Pister had just come. He'd been dean of engineering at Berkeley. This wonderful man. He said, "You know, we've got to have a process here." Now they have a group of development people that meets every month or so and all the requests from all the different divisions come in, so you don't go ask the Packard Foundation for six things at the same time. Any donor that, I think, is capable of giving over twenty thousand—although you can have a conversation with someone—if somebody approaches you, you can go as far as you want. That's the area I tend to work in. But if you're going to write a formal proposal to a foundation, there's a process. In the past, that was a little looser. Every campus starts small and then finally we're getting bigger. Now we have a comprehensive campaign coming along. Big bucks. You've got to coordinate and orchestrate, and there's more competition for the dollars. I've learned a lot about that. [laughs]

Rabkin: Speaking of funding, you mentioned Boyd Seymour Jr., whose name is on the Seymour Discovery Center. Was he a local guy? What do you know about him?

Griggs: No, he was actually a San Francisco guy, whose father and grandfather were both attorneys, I think in Sacramento-Stockton. Did very well. He started the Franklin Fund, I think, which is an investment fund in San Francisco. He and his wife Debra were part of the San Francisco society in some ways; Boyd was in the Bohemian Club.

Rabkin: This is the exclusive club up in Sonoma County along the Russian River?

Griggs: Well, they have the Bohemian Grove, which I've actually been to. Then they have the club in San Francisco. There's the Capital Club. There's the Pacific Union Club. He was part of that group. To make a long story short, his attorney was a man named George Malloch. George Malloch was president of the UC Santa Cruz Foundation for a while and was also on our fundraising committee for the Seymour Center—which was not the Seymour Center [yet]—it was called the Marine Education Center. Boyd had come to George as his attorney, saying, "I have a lot of money from this investment," when times were good, "I need to make some donations or something." I think he went to Stanford. He had gone to Stanford. Somebody in his family had died of cancer and he thought he'd endow a chair for cancer research at Stanford. Well, that's a common thing for Stanford. Stanford has so much money. Every faculty position almost is endowed because people like Bill Hewlett and David Packard and others went there. We're young. We don't have that sort of legacy. So when he went there, whoever he talked to said, "That's going to cost you $5 million." He was thinking of perhaps two

million. I don't know exactly what the conversation was, but that's the message he got, which you know—

Rabkin: If you're going to give us something, it's got to be at least this much—

Griggs: To endow a chair.

Rabkin: I see.

Griggs: You may know we have the Pepper-Giberson Chair in Environmental Studies. Most of our existing chairs are $500,000. The Regent's investment gives 4.2% so a million produces $42,000 a year. $500,000 produces $20,000. It doesn't endow the person's salary but it's a bit of research money. We have a Chair in Ocean Health, which is $20,000 a year that we shift around. I think the campus might have ten chairs or twelve. Stanford probably has four hundred. But Boyd was really offended. So he came back to his attorney. I think attorneys are sometimes careful about directing people, but he said, "Well, you know, I'm working with UC Santa Cruz and there's some possibilities over at Santa Cruz." He'd never been to the campus. He mentioned the Center for Ocean Health. He said, "In fact, there's probably a naming opportunity," so sight unseen he gave $2,000,000. We'd been talking to Julie Packard, various foundations and the Baskins, and others in Santa Cruz. There aren't that many people here capable of a $2 million gift.

Rabkin: The usual suspects.

Griggs: The usual suspects. We ended up raising $6.3 million. We might have been at $2.5 or $3. So George [Malloch] called while I was in a meeting. He said, "Are you sitting down?" I said, "No, but I'll sit down." He said, "I think we have our donor. I think we just got $2,000,000." So we subsequently met Boyd and his wife, DeeDee, Debra. Then we were up at $4.5 or 5 million, and the Kresge Foundation will actually come in to close certain projects if you have a certain amount—50, 75, 80 percent. So I think they came in with the final half a million. The building was almost done and we got the remaining construction money.

So Boyd and his wife came down. They're both very tall people—he's like 6'4" and she's probably 6'. Quiet, reserved, but brought friends down to show it to them. He was very proud. And Julie, the director, would periodically send him things from the kids that had come, "Thanks for the wonderful tour." Drawings of animals and whales. Each year they would—for two or three years they'd give us $50,000. At the end of the year, we do this annual request because we've got to raise a million dollars a year to keep the Center open. The campus does not pay for anything anymore. It used to help us with a couple of salaries and benefits but other than the janitorial and electricity they don't pay for anything. People think it's all university. It's not. It's university-operated but it's not paid for. So we do an auction. We do a dinner. We charge admission. We have a membership. We rent it out for weddings.

Rabkin: This is all specifically for Seymour Center.

Griggs: Yes. It's really hard to raise a million dollars a year, really hard.

Rabkin: Do you have people who are hired expressly as development people for Seymour?

Griggs: We have one person, Lisa Rose, who is the Director of the Friends. We have a public support group that helps. She's not really a development officer as such. She does a lot of events. She does a really great job with our auction, our dinner and so forth. We do a few proposals a year. We just did one for the Long Foundation, which is the same Long family. They just gave us $50,000. I kind of cultivated that. We have a development person in the Science Development Office, a new person, Christine Dawson, who I work with almost every day, who is really great, but fundraising is a constant and ongoing process.

What we really were trying to do is get a partial endowment set up. Endowments are really hard because you only get 4.2 percent back and that keeps accumulating. So if the stock market is horrible, you never get above that. If it's good, like Berkeley or Stanford will have endowments from a century ago—they might have been given a million and now it's a 100 million. So in the long run it's great. But you don't see a lot of immediate return. For Julie, the Director, she's just trying to make the budget each year. It's hard to take $50,000 and put it in an endowment, when you need it to make this year's budget. So we had about $50,000 and then we'd been trying to go to the Seymours, and sadly about a year-and-a-half ago Boyd died. So Julie, finally, we were trying to work it

out—she went up with George, the chancellor, to see Dede, Boyd's widow and she gave us $500,000.

We're thinking about $2 million would bring us in maybe $80,000 a year. That's about what our gap has been every year, where we've got to figure something out. So we're working towards that. But it's a tough—it's hard to find the right person, like we're trying to raise $10 million for this wing for the Center for Ocean Health. There're difficulties in [identifying] who has that kind of money and interesting them in that. I mean, Bill Gates does, but he's solving AIDS around the world or something else. *You* know Santa Cruz, the same suspects here are—Jack Baskin has given to everything on campus. [points to huge pile of files] We've got—this is all stuff on fundraising for—

Rabkin: This is like a ten-inch pile of files.

Griggs: All the people and cultivating their interest. It's what I spend a lot of time on, besides my own teaching and writing and research.

Rabkin: Yes, I was going to say, what proportion of your time goes into fundraising?

Griggs: Probably ten to twenty percent sometimes. Then almost every event—I work closely with Julie, so I speak at the dinner, I get involved in the auction, soliciting a lot of stuff that I can do. Year-end letters of appeal. Meetings, the Friends meet once a month. I arrange a lecture for them, somebody to come in

and talk to them about marine science. But I like it. It's good. It's just sometimes I wish I had more hours. I'm writing this newspaper column. So last night I come back—oh, I got to get that ready for tonight—so I spend a couple of hours writing the column. Trying to write—I'm messing with two books. Then I've got my graduate students, and well, teaching undergraduate classes. All these off-campus state, national things. I've gotten really efficient. [laughs]

Rabkin: I bet.

Griggs: I see people who say, "Well, I'm too busy." Hmm. "I'm too busy doing my stuff, not community stuff." Those people are the ones who, if you say, and you've heard this before, "If you want to get something done, ask a busy person." [laughs] Then the community talks, which are fun, but you still have to be careful about how many times you say yes to things because you know there's going to be a cost to that. "Oh, this will only be ten or fifteen hours or preparation, getting a talk ready."

We just finished this project for the state on—what I'm working on today, doing a guide for sea level rise adaption, how coastal communities can begin to adapt to sea level rise. We spent the last two years on this. Anyway, we're going to print this up and just do it. Basically, it's what happens here and how do we deal with it. Then we did—I did this with Brent Haddad—

Rabkin: In the Environmental Studies Department?

Griggs: This was the *Climate Change Vulnerability Assessment for the City of Santa Cruz*. I worked with the city and I took a lead role in that. Then we just finished one for the city of Santa Barbara. This is all research, but it's local-political stuff, too. So talking to the city council. It's all fun stuff, I wouldn't do it if it wasn't, but it's just lots of things to spend time on. Maybe also working on things like the Seymour Center, or the coastal marine lab, or my own research, which is very publically understandable, versus maybe if I was teaching Latin or Shakespeare or philosophy, where it doesn't go too far beyond the campus, that's where your work is focused. Like what Sandy [Lydon] does. It's bigger than your classroom. But I wouldn't have done it if I didn't like it. [laughs]

Rabkin: So we have about fifteen minutes—do you have fifteen more minutes?

Griggs: I do. You're not getting bored with all this—

Rabkin: No, not at all. Let's talk a little more in substance about what the Seymour Center does, about its programs, maybe starting with what was the vision for it? What was the purpose it was supposed to fulfill?

Griggs: Right. The history originally was— When we had the old Education Center, which was an old doublewide trailer and this little aquarium, once we had marine mammals down there and people knew this was a marine lab—we had seals and sea lions—people started biking and driving and walking and saying, "What are you doing? Can we see what you're doing?"

Rabkin: The marine mammals, the pinnipeds and the dolphins and so forth—they were research subjects. They weren't on display for the public.

Griggs: They weren't on display. This was before I got involved. We really started down there at the lab in the late seventies, building the facilities, getting the land—so through the eighties. I came in '91. Actually, a woman who I ran into yesterday, who is in Santa Cruz now running a national organic produce group [Organic Farming Research Foundation]—a woman named Maureen Wilmot, who is really smart, her husband David Wilmot runs Oceans Champions, which is a nationwide [effort to] get ocean supportive people elected to congress. He's in Washington a lot. She was a student here and started the docent program. She was a marine biology student who said, "People should know about this," so she started training some local people. They got a little money and built this little aquarium, which was about the size of my office. Then these docents came and they got this trailer. But the thing that made it unique was, it wasn't an aquarium, but it was the idea of sharing the research that the university scientists were doing with the public. So we started doing some tours out there. There's an overlook that could look down on the marine mammal facilities. When I came, there were school groups that would come. They had a little classroom for them. They could look down on the mammals. It was pretty small but people loved it. They said, "I remember the old marine lab. There was the whale skeleton."

So when I came in twenty years ago it looked like there was just much more opportunity. We had more scientists, more research to share and explain. And

also UC was saying that public education was something that we should be doing. Nobody ever got any money for it. Nobody ever got any credit for it. We get paid for doing research, and service and teaching, but [mostly] research. Public education, K-12, that's for somebody else to worry about. But yet that was a role the university said we should be playing. So the idea was that it isn't really just a little Monterey Bay Aquarium. It's not just a natural history center, but it's a place where the research the university scientists do can be presented to the public, whether it's the displays, the exhibits, the lecture series. We do Science Sunday [public talks] now. School groups come in 4 days a week. Ten thousand school kids a year visit. There's a Summer Ocean Explorers program that people enter a lottery because it's so popular. There are all kinds of different activities. It's not just one program.

Rabkin: Tell me about the Sunday program.

Griggs: I think it started about a year ago. We started Science Sunday. One Sunday a month, a researcher, faculty member, [they] could be from USGS or National Marine Fisheries Service, will come and give a talk for the public. I think it's one o'clock on Sunday. Posters go up. We have a website and an electronic newsletter. Terrie Williams just talked about research in Antarctica a couple weeks ago. I gave one on coastal erosion and sea level rise. Those have been really well attended. Dan Costa gave one on his animal tagging research. It challenges the faculty to talk to the public, but most of them are really honored to do that.

Rabkin: Is there an admission charge?

Griggs: If you're a Friends member, which is whatever it costs you, twenty-five dollars a year, you get in free. It may be just a regular entry fee to the Seymour Center, so if you come in you can go, if you're not a member. My daughter finally realized if you go there twice, you might as well be a member. You can come back as many times as you want. I think it's six dollars for adults and five dollars for seniors and teenagers. Our lecture series we just did, we didn't charge anything for that. For some things, we realize we'd rather encourage people. I think that it's part of your membership fee.

Rabkin: Tell me about the Ocean Explorers program?

Griggs: We have a summer program called Ocean Explorers that's a week at a time. That's completely filled up. There are probably six classes. One is called Masterful Marine Mammals. One is called Seaside Safari, and there is Marine Science For Girls. They're different age groups, like it's seven to eight, nine to eleven, and 12 to 14. We have two great educators. The ratio is really low, so there are two educators to twelve students. They'll go out kayaking in Elkhorn Slough. They'll work with the marine mammals in research. They actually get out there and figure out what they're doing and how to measure things. I think they might do an elephant seal trip. They do a tide pool trip. They spend all day for five days. The parents are so excited after their kids come back from that that some of them will just, "Okay, here's a thousand dollars. Here's five thousand dollars." They become Friends and donors.

Then there are the school groups that come in every morning while we're open—The Center is open in the summer seven days a week; during the year it's Tuesday through Sunday, Monday to kind of recover from the weekend. School groups come in and there are set programs depending on if you're a second grader or sixth grader. They tend to be the lower grades. We get a few community college [students], but not too many high schoolers, just because they change classes every hour. But those are filled up. It's usually a lottery system now. They pay a standard amount. It ends up being, I don't know what it is, but that helps us meet our budget. The total visitation last year was 63,000 people. Not huge compared to the [Monterey Bay] Aquarium. We could take more, but we're still sort of out at the end of Delaware. As long as we've been here, there're still people in Santa Cruz who don't know we're there, despite our activities and our advertising. So it's a place where our research can be displayed to the public and kids can find out that science isn't scary. You can be a scientist. It's exciting. It's fun. Even the pods are set up like asking questions, collecting data. People tend to head to the aquariums because they're moving and exciting, but there's a lot of other interesting displays on things. It's our outreach, in a sense.

Rabkin: You were talking about the limits of the outreach so far, that there's a point at which people don't seem to be finding out about it? I've heard Seymour referred to as the city's best-kept secret.

Griggs: We say, "We don't want to be the best-kept secret." We want to be—

Rabkin: How are you countering that?

Griggs: We advertise in the paper like Jingle Shells in the *Sentinel*. Our auction. We have a large mailing list of members of Friends of Long Marine Lab, which is like 800, maybe, then other people who have donated or come to an event. I think whenever we do anything there's a main list of about 1,200 people we reach out to. We do our auction up here on campus. We do it at Cowell. There're people, city people, like people on city council, people that know that this is one of the best events in town and they come. But there are still average people, average people who aren't part of the University, who say, "No, I've never been there." I say, "You've got kids, you ought to go," and they say, "How did I miss that?" I don't know what it is. People go to Natural Bridges [State Park] and it's just a block further. The Seymour Center is really a wonderful place. The [Monterey Bay] Aquarium is wonderful but now $29.95 to get into and we are just $6.00. For smaller kids, it's of a size that you can manage. If you go at the right time, you can go out and look down at the marine mammals. There's a tour. You can go out on the overlook and see the whales. And it's in our backyard. It's not hidden.

Rabkin: Anything else you want to say in our last five minutes about the Seymour Center?

Griggs: For me, I think it has been one of the most gratifying things to actually see it [grow] from this little aquarium and a trailer to a center that had a creative architect. It's a wonderful building. You know, it's funny. One of the first big

projects I did was this building. I was asked to chair the committee that planned this building.

Rabkin: The Earth and Marine Sciences [Building].

Griggs: Which was the biggest building on the campus. I was chair of Earth science at the time. I was assistant dean for a while; people rotate through that. Someone once said, "If you don't worry about who gets credit, you can accomplish some amazing things." There are students in here, coming to class, they don't know who did this—I spent three years on this building. I didn't design it, but I was working with the architect on it, "How about this? How about that?" And all the faculty, "What do you want in your lab?"

It's like the Seymour Center, people come down there and I see all the little kids running around, touching these sharks, or even the Center for Ocean Health—I can walk in there, students walk by; they don't know who I am. I take pride in saying, "Wow, this is here because we had an idea and we followed it through." The Seymour Center probably sees far more people every year than the Center for Ocean Health, because it's a center, and we have lecture series and Jingle Shells, all these craftspeople and their things for sale, and our weddings. I go home at night and feel good. And I feel good when I come to work here. It's things like this building and those buildings that make me feel like it's all been worth it. It's like having Kathy Sullivan say, "If it hadn't been for you, I wouldn't be here." It's just that you've done something that mattered. Not that I need to get credit for it. It's just seeing people there doing things that matter that makes

it all worthwhile. Whether I'm there or not doesn't matter. But I drive in, I don't know how to describe the feeling—maybe it's like seeing a child mature and graduate from high school, or get married, or get a job. You say, "Wow, there's value." There are important things to be done.

There are other people who never seem to be happy about anything. There're those people whose glasses are half full, those that are half empty, those that are broken, and those that are flowing over. I feel like mine is flowing over all the time. I think it may be— Oh, who knows. I'm not a physiologist. It may be hormonal. I know people have not enough good hormones and they're depressed and that's really hard. I feel really fortunate. I hope I pass that on to my kids, but I don't know. I just wake up every morning feeling good. I go to bed every night feeling good. I've had my ups and downs over my life. I feel very fortunate to be where I am and be with who I am.

But I think you also make a lot of conscious decisions about, this project is important and it's worth ten years to raise the money and do it. Or this one, it's not worth it. "Can you be on this technical advisory committee? We only have ten meetings and it's only going to be a hundred hours." I said, "No. I don't really want to do that." I said that last week to two different groups. "We want your input on this." Well, somebody else can do that. I don't need to be a warm body in a room. I need to use what I have in the time I have to accomplish things that I don't think somebody else is going to do.

I worry after twenty-one years here as director, who is going to take over this job? That's sort of a good thing and a bad thing. If I get hit by a truck tomorrow, somebody will take over. Steve Davenport at the lab, we've worked together for twenty-one years, said, "Gary, I'm going to retire when you retire." And Rebecca Bard, my administrative assistant, says, "Don't ever leave." [laughs] And Rob Franks, who runs our analytical lab said, "I don't want you to leave." Julie Barrett Heffington (director of the Seymour Center) says, "How long are you going to stay?" So that's a good feeling, to know that people appreciate how it's working. There's a good group of people involved that make things happen and make it an enjoyable experience.

Rabkin: Yes. And at the same time, if you're completely indispensable, then when you're not here anymore—

Griggs: Yes, so how do you transition out gracefully? I look around and see people who have retired. They're not unhappy. You see them down at Kelly's [French Bakery] having their coffee and pastry and they say, "Oh, it's the best thing I ever did." It might reflect on what they did when they were here and how they felt about what they did. I look at what I'm doing and I think, wow, if I didn't have this in my day, it would be so different. You feel like what you do matters. I also realize, and you probably realize in your career, the longer you've done it, the better you get at it and the more effective or efficient or the better a communicator you are, and you think, you don't want that to leave any sooner than [it has] to. They say most people on their deathbed never say, "I wish I would have worked longer." But I don't know, in my case, I mean, when I was

traveling [in China recently]—I didn't miss this—I really enjoyed other things—but it's kind of hard to travel 365 days out of the year. I don't like crossword puzzles and I don't have any lawn to cut. I like to build. I've built a couple of houses. There are other things, like writing, but right now this, the interaction, the stimulation is really—it's fun. [laughs]

Rabkin: Thanks, Gary.

Griggs: Sure.

Research on Coastal Hazards Geology

Rabkin: This is Sarah Rabkin. I'm with Gary Griggs. It's January 18, 2012. We're in Earth and Marine Sciences. This is our third interview in the series. We're going to start by focusing on some of your research. So I noticed on your UCSC website that you note that the state of California has 1100 miles of coastline and 950 miles of that's eroding. There are more than 30 million people who want to enjoy or live next to this geologically active zone.

Griggs: You've been reading carefully.

Rabkin: You've witnessed more than forty years of human interaction with this particular part of that coast, the Monterey Bay's coastal environment. I realize that's a blip in geologic time. But it's a significant period in the life of a human community. Just to open up our investigation of your research, I'm wondering if

you could talk about the human activities in the region that have affected the coastline and especially those that have had the most dramatic impact.

Griggs: My earliest work in graduate school was on deep-sea stuff, which we've talked about. Coming to Santa Cruz—first, we didn't have a big ship. We didn't have the kind of easy access that an oceanographic institution did. So I started working from deep water back up into shallow water. Having a background in oceanography and geology and a minor in civil engineering, the coastline became this great meeting place of ocean and land, and then engineering, all the things that we've done as humans to try to stabilize or protect or armor or make the coastline more habitable. And it works both ways. One of the things I've done over the time in my own work, and also in consulting when you're doing something like an environmental impact report, there are both—how does the environment affect whatever we propose? Is it in a flood zone? Is it prone to earthquakes, or whatever? And then, how does what we're going to do impact the environment? Are we going to put out dirty water or runoff or whatever? So both of those have been going on over the past forty years or so.

Some of my earliest work was on coastal erosion and coastal landforms. We looked at the uplift of the marine terraces that form the Santa Cruz coast. How did they form and when, how they've been uplifted and deformed, and how that has allowed development. You look at where most of those thirty million people along the California coast live today. They don't live in Big Sur. They don't live on the Humboldt County coast or the Mendocino County coast. It's very steep. It's not really habitable. But if you look at almost all of Orange County, a lot of

Santa Barbara, even a lot of Santa Cruz, they're built on these nice, flat marine terraces, which are old sea floor that's been uplifted, perfect for development. But the same rock weaknesses that allowed the waves to cut those terraces when they were at sea level allow the waves to erode them today. Just like we can cut these beautiful arches and these features we see along the coast, but they're eroded or removed just as easily as they've been formed, like Natural Bridges [eroded] from three to two to one [natural arch].

Humans clearly have set out to try to rework the coast, in many cases, so it's more compatible with our own needs. I don't think in the early years anybody thought of that as the wrong thing to do, or whether we should do it. It was an obvious thing. Just like when we found these incredible redwood forests in California. Well, we're going to cut them down and make houses out of them. Every big redwood tree was gauged on how many single-room houses it would make. We thought differently then. The coast was the same way and a lot of our shoreline has been altered.

I guess the biggest things I would see are probably the ports and the harbors and their associated breakwaters and jetties. Much of the California coast is characterized by these very symmetrical, hook-shaped bays, or log-spiral bays—Half Moon Bay. Both ends of Monterey Bay are these perfect curves—in fact, if you look at the picture on the wall, the satellite photo of Monterey Bay, it's one of the few places where we see it's actually a double-ended bay, and it's very symmetrical at both ends.

Rabkin: Can you explain what you mean by log-spiral?

Griggs: I'm not sure we're going to have a really good example, but if you look at the way an abalone shell uncoils, you can actually find a center to that uncoiling, and mathematicians have made tangents to the curve and find that there's actually a logarithmic relationship in terms of how that shell uncoils over time. It's very symmetrical and it's based on this increasing curvature over time. The coastline works the same way. When you see a Half Moon Bay tucked up in there, as this very tight coil, then as it moves down coast it gets more tangential.

Rabkin: Like a nautilus shell curve?

Griggs: Exactly, like a nautilus uncoiling.

Griggs: So places like Half Moon Bay were actually in perfect equilibrium. We get a shape, as we do at Santa Cruz or at the Monterey end, or at Half Moon Bay or Point Reyes or Bodega Bay—they are all—even San Diego—if you come up from the Mexican border to the Silver Strand, it curves out towards Point Loma. And then they put a jetty in and that sort of ends that. If you look at Los Angeles and Long Beach, Point Fermin and Palos Verdes is a very hard bedrock point, and then the lee of it was this depositional, sandy area that developed this perfect spiral. And then they put breakwaters in there. And at Half Moon Bay they put a breakwater in there. So the wave energy, without making this too complicated, the reason we have those shapes is if we were to—we'll try to do this [drawing a diagram] so we're not leaving everybody who is listening in the

dark—but if we start with a linear coastline and there's one area that's much harder than everything else, like Pillar Point, or Point Santa Cruz, or the Monterey Peninsula, and we have waves coming from a certain direction, say the northwest, that resistant rock which forms most of California's points, Cape Mendocino, whatever, stand out because they're really hard.

But as these waves bend or refract behind that, they will start to erode the weaker material behind it. And over time, the natural pattern will be for the waves to refract or bend around inside of this. So that's why we have so many of these perfect bays. But in many cases, getting back to your question of how we evolved to it, at Half Moon Bay we put in this breakwater, and at Long Beach and LA we put in this huge breakwater. What happens at Half Moon Bay is all the wave energy that was formerly dissipated in that embayment now hits the coastline at the end of the breakwater and erodes the low bluff. So the cover of this book, *Living With the Changing California Coast*, this is the area immediately south of the breakwater at Half Moon Bay, where all the energy that was passively being dissipated in the former bay is now concentrated by the breakwater in one area.

Rabkin: We're looking at, it looks like asphalt road surfaces, former road surfaces that are just broken off at the erosion point—

Griggs: Sitting out in space. Actually, there was a sewer line down here that's gone. So by altering the natural processes we've created something that makes life better for us, a harbor or a port, whatever, but there have been effects on the

coastline. So building harbors and ports with their jetties, like we have at the Santa Cruz Harbor, has had a long series of impacts.

A second research area is coastal armor in the form of seawalls or revetments. So as you [mentioned when you] started your questioning, 86 percent of the California coast is eroding. In fact, in reality over time 100 percent is eroding. It's all moving back. But that was a measure of rock and cliffs, whereas inner Monterey Bay is still one of those areas [that's] relatively stable. The beach isn't changing too much. So that might be part of the 14 percent that isn't eroding. But in order to protect the property that we built on, or we want to build on, we started decades ago putting in rocks or building seawalls. In fact, I think the Romans did that. People have been doing it for a long time. In the beginning, nobody really thought too much about whether that had any impacts.

And as time has gone on, and the California coast now, roughly 11 percent of it's armored. Eleven percent of 1100 miles, it doesn't sound like too much. But when you look at the developed areas for California's four Southern California counties, San Diego, Orange County, Los Angeles, Ventura, 33 percent have been armored, so one of every three miles of coastline now has rocks, concrete walls, timber walls, something, so it's not a natural coastline anymore. That astonishes people, but if you go on the californiacoastline.org website with all these photos of the coast, you can look and see, wow, mile after mile after mile, it's all rocks or walls. In Santa Cruz, you can start at Natural Bridges and work your way to Lighthouse Point and much of that area has huge rocks. Along the Main beach and the Dream Inn and the Boardwalk, there's a concrete wall the whole way. As

you go along East Cliff, Opal Cliffs, it's all—mostly rocks. As you get into the bay, you get up to Seascape, Seacliff, and Rio del Mar, and Potbelly Beach, they're all protected.

Interestingly, we built along much of the shoreline in a time of very calm climate. We built in one of these calm Pacific Decadal Oscillation cycles, which we now know affect climate for twenty or thirty years at a time. From about the mid-1940s to 1978 was what we call a cool or negative Pacific Decadal Oscillation cycle, which means generally lower rainfall, fewer big storms, fewer El Niño events. That's precisely the time after World War II, when all the servicemen who came through California and people [who] came from the Midwest and the East said, "Wow, the climate is great. We're moving to California." So the bluffs were subdivided. People built on the beach. They built on the dunes. And everything was fine until 1978 when we flipped to a Positive PDO, or Pacific Decadal Oscillation Cycle, which means more El Niño events, more rainfall, more floods, more coastal storms, more erosion, more landslides. So all those structures and houses along the coast that were fine were all of a sudden threatened.

And that led to a lot of work on—well, this book—*Living With the Changing California Coast*—how do we live with the changing coast? The beginnings of questioning about seawalls. We did a lot of work on things we've talked about. How effective those are. What works and what doesn't work? We did an extensive study back after the big 1983 winter because people started wanting to

build seawalls like crazy. Then the Coastal Commission had to start dealing with that.

So a second big impact with humans was armoring the coast. And the beaches tend to get narrower in front of those. Waves can reflect off of them. It blocks access. It certainly has a huge aesthetic impact. So more and more concern about armoring the coast, with the Coastal Commission not really wanting to approve any more armor. They're not excited about any more seawalls.

Rabkin: Just as a quick aside, where do those big rocks come from?

Griggs: [laughs] Good question, Sarah. What you have to find is rocks that are really resistant. It turns out in the Santa Cruz Mountains most of the rocks have been stressed and broken and shattered along the San Andreas [fault]. The granite really isn't Sierran Granite; it breaks into decomposed granite. So we don't find very many rocks [for rip-rap] in the Santa Cruz Mountains. Some of the marble, like from the campus, you'll see these big white rocks along the coast. Most of it, though, will come either from way down the Salinas Valley, like almost in Paso Robles, some volcanic rock that's pretty hard. Some of it comes from the Sierras, some quarries up by Sacramento. So a huge cost of rip-rap is transporting it. You've got the Teamster's Union and truck drivers and bulldozer drivers. You just don't go down and get it at Pro-Build. Or you get it for landscaping, and it's really expensive. So that rock in place can be fifty, sixty, eighty, a hundred dollars a ton. Typical rocks might weigh four or five tons, so those rocks can be four or five hundred dollars apiece, and we've got a lot of

them. The Half Moon Bay breakwater was built with rocks from the Sierras or brought down Sacramento River by barge. It's an amazing reengineering of the coast.

Rabkin: The streets may not be paved with gold but the coastline is lined with gold.

Griggs: [laughs] So building harbors, armoring mostly cliffs and bluffs, dunes. The third is moving sand around. That's been much more of an East Coast phenomenon, in the sense that it's a sandier coast and they've nourished beaches, because the beaches and the barrier islands are migrating. They keep dredging up more sand. They've spent billions of dollars on moving sand around. In California, for the most part, we take it out of a harbor, like Santa Cruz, that's moved in from the up-coast or Seabright Beach side, the west side, and discharge it on the down-coast side. Then it goes downcoast to Capitola. It ultimately goes down into Monterey Submarine Canyon. Many of our harbors we dredge regularly, because they're in the middle of a littoral cell that has a lot of sand moving through it. Sand moves generally from north to south.

Rabkin: So in other words, the harbor would fill with sand if we didn't keep dredging it out and sending it further down the coast.

Griggs: Right. And in Santa Cruz, we dredge out on the order of about 250,000 to 300,000 cubic yards a year. Which you think about dump trucks at about ten cubic yards, that's 25,000 to 30,000 dump truck loads a year moving down the

coast. Which if you divide it up, twenty-four hours a day, it's one about every 15 to 20 minutes, a dump truck full of sand. So that if you stopped dredging— And most of that moves in the winter during the big storms. In the summer months it's pretty gradual, waves are more gentle. But if you think about that, having a dump truck every 15 to 20 minutes drop another ton, you've got to move a lot of sand. We tend to wait until winter and spring when the storms have stopped and move it out. But that happens at Santa Barbara; it happens at Ventura; it happens in Channel Islands; it happens at Oceanside. It's a more complicated story of which harbors we dredge and which ones we don't, but we move a lot of sand around at great expense.

In Southern California, a lot of sand has been moved from one end of a beach back up to the other end of the beach, and then it moves back again. Long Beach, Seal Beach, the Corps of Engineers has been—they think it's their duty to move sand around and keep things natural. A lot of people in Southern California have argued for what we call beach nourishment, putting sand on the beaches. I've been looking at that for a long time. We just finished a study that got published about a month ago on *Long Term Beach Width Changes in Southern California*. The argument has been: Oh, the beaches are all eroding. We need to fix them, nourish them. We need to find sand offshore someplace and put it on those beaches to protect the coast, to provide recreational areas. The argument has been made by a few lawyers who work for the cities and counties that it's important for tourism and recreation. We need to nourish our beaches and take care of them like we need to take care of our highways and our bridges and our streets. I say, [laughs] it's like saying we have to keep our mountains from eroding and we have to

keep our glaciers from moving. I don't buy that. What our studies have shown is many beaches in Southern California were never wide.

There's an interesting relationship that's really clear in Monterey Bay, that's also clear there, where the beaches are very narrow (this is some of the research we've done over time), it means the waves attack the cliffs virtually at every high tide or very frequently. A good example would be lots of West Cliff doesn't have any beaches, but the cliffs are pretty vertical, except where we piled all the rocks up. The best example is probably Opal Cliffs and Depot Hill between Capitola and New Brighton. If you know that area, those cliffs are seventy feet high and they're vertical. It's because—that's where we start our Bay Walk on the other end—you look back and you can see the waves undercut that and they keep failing. So where the cliffs are vertical, it tells us there's not much beach ever and there's a lot of wave attacks. To say those beaches used to be wide doesn't fit with what we can recognize.

On the other hand, if you go into the middle of Monterey Bay, say from New Brighton where we started walking, all the way to Moss Landing, we walked on a wide beach the whole way. If you look at the bluffs for the most part—Manresa [State Beach in Watsonville]—they're laid back at a more gentle angle. There are some places there are dunes, but they're more gentle, in many cases because the waves don't ever reach there. It's terrestrial processes, it's erosion, it's runoff, it's slumping. The steepness of the cliff tells us something about the beach width and whether waves attack.

So in looking at Southern California, all these places like Leucadia and Solana Beach and Del Mar, where these houses are sitting on the cliff and they want a wide beach in front of them, they think there was a beach there before. You go back and look the records and there was never a wide beach. So to put sand there and expect it to stay because we dumped it out of a dump truck or a dredge when it didn't stay naturally, I say, "You guys are kidding yourselves." And it's incredibly expensive. It's maybe six dollars or eight dollars a cubic yard, so they spent seventeen and a half million dollars nourishing twelve beaches and within a year or two it was all gone. Now they want to do it again. I say, "What are you guys doing?" So part of what we're doing is looking at how we tweak the coast, and whether it works or not, and what it costs and what the impacts are. Those are three of the big areas, I would say.

Coastal Development Issues

Rabkin: Can you tell me about a particular proposed or actual coastal development project in the Monterey Bay region that you think reflected insufficient understanding of geologic processes on the part of developers?

Griggs: Two come to mind right away that I've worked on a lot. One is Pajaro Dunes, which we walked by on our beach walk.

Rabkin: This is a large housing development. Houses, condos right next to the beach.

Griggs: The southern end of Santa Cruz County ends [where] the Pajaro River extends about a mile up coast. There's actually a state park, Sunset, right in the middle of it, which is a little odd. At the far northern end are, I think it's called Shore Birds and they're condominiums. Then there's a series of very expensive, architecturally interesting, single-family homes. Then at the far south end, right at the Pajaro River mouth, there's Pelican Point, which are townhouses. The project was one of several done right before the Coastal Commission was established, so in the late sixties. Architects look at things differently than an engineer or geologist might. They're looking at, like the campus, "we don't look for sinkholes— we look at redwood trees". We've had problems on campus with the nature of the substructure and its ability to support buildings.

So at Pajaro Dunes they did not look at the history of the site, as much as these beautiful dunes, and, "We'll build right out on the edge of these dunes." I don't know what they were thinking of creating, but this environment [is] surrounded by blowing sand. Almost as soon as it was built, the winter of '69 was a big winter. Waves came in and started attacking some of the dunes. They brought in a bunch of old cars and dumped them at the foot of the dune. [laughs] You can still see, on a really low tide, you can see old axles and things. That was actually fairly common. If you look along the Salinas River and also Corralitos Creek—we did some kayaking down the Salinas River once—and you'll see these old cars from the forties and the fifties stacked on end, like sort of *Who Killed the Electric Car?* Cabled together to hold the banks in place. Then the willows get started and you can actually identify cars in there, certain kinds of cars. "Wow, there's a 1950

Chevy!" So they did the same thing. They had these junked cars and there was no Coastal Commission. They dumped them at the foot of the dunes.

The interesting thing about Pajaro Dunes, and in a number of these coastal developments, is they're not primary homes; they're second homes. They're summer. They're vacation. Corporations own them for corporate retreats. So if you go down there most days during the year, not the summer months, there's nobody there. It's a ghost town. We took a huge amount of coastal land and used it for second homes, and that's the way it is. People had the money and they could afford to do it. Architecturally, it's kind of interesting.

They also brought in some big concrete blocks and dumped them there, like 2 X 4 X 2. Some of those sank and the dunes came back the next year or two. Then in '78, when the climate switched again from a calmer, cool PDO (Pacific Decadal Oscillation) to a warmer period, we had a big El Niño year and the dunes were attacked again. They started bringing in more junk, rocks and stuff. That's when I got involved with a colleague. We did a consulting study on, what do they do? Is this going to be an ongoing problem? One of the things that the engineers did not do, that a geologist does because we have a longer time perspective, is you go back and almost any project, particularly on the coast, and I do this all the time, you look at the historic aerial photographs. It turns out—I want to be careful about showing things—

Rabkin: This is *Living With the Changing California Coast*. Lots of photographs.

Griggs: Yes. Lots of photographs. Actually, I don't have that particular photograph in here, but photographs were taken back in the late twenties and the early thirties. Some of the same features are there today. In fact, there used to be a racetrack down in the middle of Pajaro Dunes. I probably showed them when we did our Bay Walk. In fact, if you look at the old photographs, you can see the dunes were active clear back into this racetrack. And down at the mouth of the Pajaro River, it was a sand spit that had been swept over by the waves. There was no vegetation. So if you overlay the development plan on top of that, you can see something like sixty townhouses at Pelican Point at the mouth of the Pajaro River were built on a spit that was underwater forty years earlier. If you look at where the houses were built on the edge of the dune, those dunes were not there. They were migrating back and forth. The older photographs would have told us you don't want to build on the leading edge of the dunes.

One of the classic books about the Earth and land use is Ian McHarg's *Design With Nature*. He was a Scotchman and did a great book, I think from the sixties. He said, "One of the things we've learned is you don't build on the frontal dune. It's the most sensitive; not only that, it's a temporary feature." Dunes are this reservoir of sand. When times are good the beach will widen. The wind will blow the sand up into the dune. It's sort of a stockpile of sand for the winter and the bad years. So when you build on that frontal dune you've sort of taken away the shock absorber. So you don't even build in the back dune area; build on the next dune back, because that's more stable or permanent.

As the dunes have been cut back, you could actually see evidence that it had been cut back before. There's some geologic reasons or field evidence why we believe that. So they were way out on the frontal dunes where they shouldn't have been. There's dozens and dozens of homes. So we gave them a bunch of options. You can put in rocks. You can put in a wall. You can build an offshore breakwater. By the time we finished, since nobody lives there, nobody wanted to spend the money and they didn't do anything. Then when the '83 winter came, they got hammered again. They brought in three million dollars worth of rocks to protect it—emergency—then they rebuilt that whole thing with more permanent rocks. In '97, '98 the waves started to attack again but they still had rocks in place although some of them had started to slide out again. So here was a place where they built in a geologically unstable environment.

The other one is Aptos Seascape, where the houses are down on a sort of bench that they pushed out onto the beach, south of Rio del Mar, at the south end of Beach Drive. So it's another case where they built on the beach. And there's a lot of interesting questions about how can you build on the beach? How can you own the beach? That's another issue of, where mean high tide was and what they worked out with the state regarding ownership. It was again, pre-Coastal Commission, perhaps pre-1900. So they built, it must be twenty homes out on this bench. They put a few rocks along there thinking that was going to protect them. Then again, a big '83 El Niño, the waves came up that rock wall and through their windows and some of the roofs collapsed. Then they built this giant curved-face concrete seawall, that's, in fact, so big that you can see it from the edge of campus, which at that time cost three thousand dollars a foot. Today

it'd probably be five thousand a foot, which was paid for by insurance money. We're subsidizing that.

Rabkin: With our insurance premiums.

Griggs: Yes. So whoever funded them, Farmer's or Prudential, everybody helps everybody else out in a sense, which makes sense, but in the case of somebody building in a hazardous location, you'd say, "Why should our premiums be higher?" Like on the East Coast now, most insurance companies are no longer insuring people because they've seen so many hurricanes. They're built out on these barrier islands. It's not worth it. Flood insurance is another way the government helps people out, but they're trying to get out of that, too, by saying, "You get one free flood and then we're not going to insure you anymore." So those are two examples of places where, pre-Coastal Commission, somebody worked out an agreement with somebody in the County who had to approve it. We didn't have the oversight and we'll pay for it forever. We have a lot of that.

Rabkin: Now that we know so clearly in this region how much we can learn from the long view of a consulting geologist, are there requirements built into building permits that require developers to look at those long views?

Griggs: Today, yes. In fact, we did a study twenty-four years ago—actually, I did it with a professor in Environmental Studies, Jim Pepper. There was a statewide project for programs that I think worked through the University of California. It was called the California Policy Seminar Program. I think they have given it—the

state government and the University of California—I think they have a new organizational title.[6] But what they would do was fund UC faculty through a proposal process to look at areas where there was value in policy development, where the policies we were using might be improved through new research. There were health-related issues, medical, land use, and after the '83 winter where we were looking at seawalls and erosion. This the Aptos Seascape wall after the damage from the '83 winter, when we started building this giant curved bay structure. A lot of the—

Rabkin: Just totally trashed.

Griggs: This is Pajaro Dunes in '83, where they built on the dunes and the townhouses down at the river mouth. So that's what spurred us to say, "We have a Coastal Commission now. We have policies. Are we looking at and using the policies?" So what we did was called *California Coastal Hazards: A Critical Assessment of Existing Land Use Polices and Practices*. It involved going to every city and county planning department on the coast.

Rabkin: This came out in 1992.

Griggs: Yes. We started in '87, '88. Then that Loma Prieta Earthquake occurred in 1989. And Jim Pepper, who I worked with, got involved in Vision Santa Cruz, rebuilding downtown Santa Cruz. I got involved in all the effects of the

[6] In 1999 The California Policy Seminar was renamed the California Policy Research Center—Editor.

earthquake in the mountains and along the coast. So we both got sidetracked. We finally finished in 1992, and by then, earthquakes had taken over. Things were calm. Nobody wants to do anything. You know, we have this, what I call a short disaster memory or collective amnesia. After a big event, a tsunami, we decide we're going to monitor tsunamis. After a big earthquake, we decide to retrofit the bridges and the schools. Then we go on for thirty years and we don't bother until the next one. So now that climate seems to be variable, even though two years ago there were still people saying, "This is the greatest hoax ever perpetuated on mankind." Now—it's getting kind of cold, it's getting kind of dry, it's getting kind of wet.

So we found that even though we have a statewide Coastal Commission, individual cities and counties did very different things. We were looking at things like, what do you require before somebody builds on a bluff? Do you require a geologic report? Well, some of them do, some of them don't. Do they have to be licensed? Some do, some don't. How far back do you get setback? How do you— "Well, ten feet"—"Well, the lifespan of the structure divided by the erosion rate times something." We did a lot of review of even what the state agencies do, because there are places like Seacliff, where the concrete ship is, it turns out that wall, that timber bulkhead that protects the RV spots and the bathrooms has been built and rebuilt eight times. The state keeps rebuilding it there.

Rabkin: This is the RV camping spots for Seacliff State Beach.

Griggs: Yes. It turns out State Parks doesn't really follow the guidelines. So there definitely was a period of time when not a whole lot was done. Now, whether it's the Coastal Commission, who is usually the final arbitrator in whether a new project gets built or not and a final arbitrator on a lot of stuff, whether they should be or not, gets involved in: is it safe or is it not safe? The general policy today is if everything else works out, you can't build in an area that would require a seawall or protective structure within the life of the structure. So that if you don't have a hundred years of lifetime on your site, you can't build there. You can't build a seawall and say, "It'll be safe now."

So it's much more stringent, although there are still some examples where the consultants weren't any good and they gave them a—there's a place down near Pismo Beach where they built something called The Cliffs, a big hotel on the cliff. And the erosion rates— They said, "Oh, it will be here for a hundred years." Well, they didn't do a very good job with looking at the older photographs. Pretty soon their sewage disposal system is getting closer to the edge. "Oh wow, it's much faster than we thought." Then it's even *much* faster than they thought—so, "We need a seawall. We need this—" So there are consultants and there are consultants, just like there are good doctors and bad doctors, and good professors and so forth. So anyway, things are pretty tight right now in most communities. They still vary from place to place. In Malibu, they build on the beach. These houses are sitting out on the sand. You say, "Isn't that a public beach?" "Well, no, we own it." There are still issues that are being argued.

Rabkin: Do you have any evidence for the degree to which communities have made use of this document you produced in 1992? Has it influenced planning? Have you been able to measure that?

Griggs: [laughs] Good question. I presented it to the Coastal Commission but it wasn't until the next big El Niño in '97, '98, 15 years later. They asked, "Where's this report been?" Well, you were working with other things. I know that *Living With the Changing California Coast* has been used. I know Coastal Commission people use that. But that's a really good question. As University faculty probably, well, you probably have as good a guess as I do—what percent of the faculty's work actually influences the public in some way? Forgetting the humanities. [They affect] it in the sense that we read books and we understand Shakespeare better. We come to plays. But if you got into, say, the more technical areas—let's say it's engineering or the sciences or environmental studies—I think relatively few people do work that has immediate application. Certainly in Bio-Med we're working on things that maybe in ten years, twenty years, thirty years down the road. Computer engineering is very directed. We have a whole program in video games. That's about as fast a turnaround as you can get. But I know people that are working on—like Phil Crews has been working anti-cancer drugs from sponges for decades. Is any of that on the market yet? I don't think so. It just takes a long time.

So probably among the faculty, the work I do with planning departments and the state—I'm on this Science Advisory Team to the Ocean Protection Council, which we work directly with the state on policies for sea level rise and coastal ocean

observing. Probably [I have] as much direct impact as any faculty member. I may have mentioned, we just finished this (we've talked so much [in this oral history] now, I'm trying to remember where we started) but this is now being published, *Adapting to Sea Level Rise: A Guide for California's Coastal Communities*. The state wanted to get this done along with a lot of other climate-related research through the California Energy Commission, which is concerned about changing climate, water and hydro power, and energy use, so among other things, sea level rise and climate is part of that. We got contracted to do a guide. This will go to every coastal city and county planning department in California. We also just finished this—I finished along with Brent Haddad—this study for the City of Santa Cruz on assessing their vulnerability to climate change. We did a similar thing for Santa Barbara city on assessing their vulnerability to sea level rise. In fact, that's my project today is to go through and edit this from review comments.

These are very direct input- we were looking at it for a state organization. But it's really hard to know how much people looked at that and said, "We could do better because this community did it this way." You really have to work to make those connections because cities and counties—my experience has been the planning department, they're so busy dealing with people putting plans over their desks and the revisions and variances and new requests, that something like this comes along, they say," Oh no, we've got to deal with sea level, too?" But with time they're are going to have to, so it's just one more parameter. I think most of them are grateful to have the information, if they get it. [chuckles]

Rabkin: Can you talk about evidence for improvement in public understanding of coastal issues over the years? Are there any ways that coastal development and policies and projects have changed for the better as a result of this kind of knowledge that you're talking about?

Griggs: I'd like to think that the general awareness is much higher now, in part because of these winters of the last thirty years of this storm cycle, that people are aware that there are hazards of living on the coast. The cliffs are eroding. Beaches in some cases may be getting narrower. I'd say the Coastal Commission is more stringent than ever. In part that is also, the geological hazard issue gets wrapped up with environmental conservation. People who don't want anything to be built there for any reason will use any reason they can. We're seeing that right now. I think we saw it with this [controversy over the] Arana Gulch Project, which is whether you put a bike path through a park. It almost went to the Supreme Court. It went to the Coastal Commission. Desalinization is like that now. We've got people adamantly—people on both sides debating. I think coastal development—there's those people who will say, "This is great for the tax base, new homes," whatever it is. Most coastal property isn't for low-cost, low-income people.

But thinking back about this book we did back in the sixties on *Santa Cruz and the Environment*, when I think of what could have happened. A nuclear power plant. Wilder Ranch being a huge subdivision. We've come an incredibly long ways in terms of awareness of impacts of development. Lighthouse Field was preserved and all these other things we've done. So I think in some ways today we're much

further ahead. We're tweaking it a little bit. If I compare the debate about Arana Gulch with building the world's largest nuclear power plant—give me a break—whether you put the paved bike path through there or not is not a big deal. But we've got bikers and hikers. Or should we have bikes on Pogonip? [laughs] That's not an issue in my mind. It is an issue if we're going to subdivide Wilder Ranch and put 35,000 people on it. It is an issue that the Pleasure Point sewer outfall was 200 feet offshore and in four feet of water.

So we've cleaned up things to the point where the issues we're dealing with locally, I think they almost get to be social issues more than big environmental issues. We're recycling. We're taking pretty good care of ourselves. That doesn't mean the debate is any less violent. People sometimes say the reason that faculty senate debates are so vigorous is because the issues are so trivial. We're talking about, "Should you take two quarters of calculus or three quarters of calculus?" That's not going to change the world but some of these other issues have been big. So I feel we've made a lot of progress. People are much more aware. There are still out-of-town developers who come and say, "What? I can't do this? Why not?" In fact, there's a joke in Santa Cruz, "How can you tell the developers who live here and those who are from out of town? The ones who live here are ten years older because they've been waiting to get their project approved."

The Monterey Bay National Marine Sanctuary

Rabkin: [laughs] So one of the historical developments in recent years that has both reflected and affected people's awareness of this region is the establishment of the Monterey Bay National Marine Sanctuary in 1992. I wonder how you

might have been involved in the lead-up to the establishment of that Sanctuary, if at all?

Griggs: Really not in a significant way. There were a few people who really took that ball and ran with it. People like Leon Panetta and Dan Haifley. Sam Farr to some degree. There were other issues like water quality, which I was involved with, and marine pollution studies, and seismic hazards, and offshore oil drilling, but in terms of the actual Sanctuary itself, I didn't really have a significant role in it.

Rabkin: Has the creation of the Sanctuary had any impacts on your work with coastal and marine research and education?

Griggs: Paul Michel is now the superintendent. The first [superintendent] that came met with all the marine lab directors around the bay. I remember the meeting. It was either at Moss Landing—or it might have been at the [Monterey Bay] Aquarium. He had been a NOAA corps officer—that runs one of those ships, they're not quite military but—he was from out of town. All of sudden he came and says, "Well, here's the rules, boys. You can't take any samples and you can't put out any instruments until you get a permit." Everyone went, "Wait, wait, wait. We signed petitions. We supported this and now you're going to tell us you can't do research?" There was a stepping back for a second. He didn't last too long. I think he realized he was coming in thinking he had to be the cop. [He was] talking to the people who had done the research that established why this was even an important area to protect. Once that blew over things have gotten—I

think it's clear what you can do and what you can't do. I think there are certain groups—like the jet skiers who were annoyed that they couldn't ride their jet skis everywhere, and the guys who were trying to do shark baiting up at Año [Nuevo State Reserve]—things that if you stop and think about it, we probably don't need to do that here.

Overall, I think it's still a learning process. People come and say, "Where's the Sanctuary?" It's not quite like driving into Yosemite Valley, "Where is it?" Well, it's out there. Now that there's going to be an exploration center, I think there will be more information about what is there and what you can see. But for the most part, it's a bit abstract. It's this incredible canyon that you can't see. It's this abundance of marine life, which we *can* see. I think it has given us maybe a sense of pride: here's the biggest Sanctuary in the nation, at least when it was established. It's because we're special. Now we're a surfing reserve. It's just one more feather in this region's cap that gave us also a national visibility. So I think overall it has been a good thing. The more protection the better.

Land Use Planning and Bureaucracy

There are definitely some areas where there are probably too many cooks in the kitchen. For example, desalination—the Sanctuary's involved, the Coastal Commission's involved, the city and counties are involved, Water Quality Control Board and State Lands Commission. It would be a similar story if somebody wanted to put a wind farm or a wave generator in today, things that we might think as worth exploring. We had a lecture series at the marine lab on this in October, from three different perspectives: the guy who is a very

innovative young inventor who is developing and trying to harness high altitude wind; a guy who chaired a state's committee looking at offshore impacts of wave energy generation; and John Laird from the [California] Resources Agency. It was sort of: the entrepreneur, the biologist, the impact guy, and the state-controlling agency. Everybody thought, yes, it is sort of a complicated path through this, even if it is a good thing.

So whether you want to build a nuclear plant or a wind energy farm, the process is the same. I found this out when we went through the process of doing our last coastal development plan for the marine lab. Even though we had an existing marine lab—we had seawater, we had all these people studying important things—to expand that lab, to get the plan approved, was an eight-year project and it cost the university three million dollars to expand a marine laboratory. We had opposition from people who lived in the trailer park, from people who thought we had valuable wetlands out there, which are sort of marginal. Or whether it was prime agricultural land, which it was not. But it was this process that was interminably long, with consultants and attorneys and biologists and archaeologists and hydrologists. So we have a complicated system in place.

In contrast to the scrutiny that that project got, if you remember our hike along the bay, there's this sand mining company in Marina, southern Monterey Bay, that's been taking out about 200,000 cubic yards of sand forever, that's run by a company in Mexico. The bluffs are eroding. The beach is eroding. I think that propagates all the way down to Ocean Harbor House and the hotel. None of the agencies can somehow figure out what to do about it, "Well, is it your

responsibility? My responsibility?" We have some sort of a problem in priorities and leadership in some cases. Who is really in charge? Even though environmental protection is all good, you don't need ten layers and ten agencies. I think that's what Obama is trying to now do at the federal level, consolidate some of these. If you want to put NOAA into the Department of the Interior, as Obama said, and I think that's a great story—"when a salmon is in fresh water it belongs to the Department of the Interior and if it's in saltwater it's NOAA, and if you smoke it I hear it's even more problematic".

Rabkin: [laughs]

Griggs: Who is in charge? Neither the USGS or NOAA wants to give up coral reefs, so we all study coral reefs together. We've got people in Fish and Wildlife and the U.S. Biological Service all studying sea otters, as well as the state, which is okay but if we're paying people to do the same thing and regulate us over and over again, maybe there's an easier or better way to do that.

Rabkin: Do you see hopeful signs that there might, in fact, be streamlining possible? Of that decision-making process and all the different groups involved?

Griggs: I don't see it at the state level. I think we've tried it before at the federal level, looked at organizational restructuring and it never gets very far. I think there's just so much politics. At the state level, I mean, I don't know how many places it happens, but I'm aware in the coastal zone that everybody has a hand in it. And desal[inization] is an area where everybody has an opinion. Everybody

has a permit role. So we've made things really complicated, which is good if it's something we don't want to have happen. But it's bad if it's something we think is a good step forward. Like maybe offshore energy is a good thing but if there're so many obstacles in the way, why invest ten million dollars if you don't even know if you can get a permit at the end because people haven't agreed on a policy.

That's what happened to this big project off Cape Cod. Cape Wind, I think. I thought it had finally been approved. Finally Secretary of Interior Salazar checked in and said, "We're going to do this. We've done everything." It's still held up in court somehow because the people in Cape Cod don't want to look at it, these green people. [laughs] I don't know. Those [green energy projects], I don't think they're ever a high priority. They're not as visible as jobs. We'll see. But I'm not seeing clarity of who wants to lose their power and their responsibility. Everybody feels they have the best information or the best agency to deal with that. But it seems like there ought to be a little more clarity.

Rabkin: From the examples that you've given, it sounds as if this plethora of decision-making bodies and their complex interrelationships can cut both ways, that is they can result in the perpetuation of an activity that may on balance be harmful, like this sand mining operation, or they can stonewall a project that people are pushing for.

Griggs: Yes. [laughs]

Monterey Bay: The Marine Science Research Capital of the World

Rabkin: Well, here's another aspect of a multiplicity of agencies, and maybe this is a more positive note. There was an article in the summer 2011 issue of *Santa Cruz Magazine* that noted that the Monterey Bay Area hosts one of the largest concentrations of marine researchers in the world. They said there are more than two thousand scientists and educators working in more than twenty marine labs and a quarter of a billion dollars annual funding for local marine research. I wonder if you could talk about what special qualities or circumstances draw such extraordinary research attention and support to this region?

Griggs: Those are numbers that I put together every year. [laughs] In fact, I'm just now sending around updates to all the directors. I try to keep up-to-date information on who is the director at each lab or facility. I ask each year "what was your budget this year? How many people do you have employed?"

I think it goes back to— The first real [marine] investigation was probably Doc Ricketts and Cannery Row and Hopkins Marine Station. Here was this pristine granite headland out there. The water was clear. The tide pools were incredible. The canneries dumped a lot of stuff in the water at the time. That might have really been helpful—you know, all this stuff for things to feed on. But Woods Hole and Hopkins were the two oldest marine stations. I think Hopkins might have been 1891, so founded 120 years ago. Stanford does really different things. It's run by Stanford, but it's pretty independent. In fact, the director of Hopkins is going to be our Global Oceans Hero this year for our Friends of Long Marine

Lab Dinner. I'll be talking about him at noon today. Interesting guy, Steve Palumbi.

There was a series of things that happened. One was natural, I think because the waters offshore (which is my Sentinel column this week) are very productive because of upwelling, this oceanographic phenomenon that produces lots of nutrients, lots of plankton, lots of fish, lots of marine mammals, lots of birds. So the diversity here was apparent from the beginning. Probably what the Sanctuary encloses is one of the highest diversities of marine mammals anywhere on earth. We've got everything from otters and sea lions and seals and elephant seals and a number of different kinds of whales. There are things that people can see and appreciate. Because this area was generally undeveloped industrially, in contrast to San Francisco Bay, we never had their water quality problems. San Francisco Bay back in the sixties and fifties was really a sewer. Most of the sewage went in there, the industries—I mean, you didn't swim in San Francisco Bay. Maybe today in a few places. They've cleaned it up a lot. We have the Alcatraz swim and so forth. But, by and large, San Francisco Bay took the hit.

I think it was a slow progression. The Monterey Peninsula had its own attractions. That's where Stanford and Hopkins and Huntington and Crocker—all the big hotels. They had the Pebble Beach and the golf course. I think that brought the military, too, the Naval Postgraduate School, the Monterey [Language] Institute. That began to attract people like Fleet Numerical [Meteorology and Oceanography Center], and there's a Navy Research Office,

and there's Pacific Fisheries Environmental Lab, all on the Peninsula. In the fifties, at Moss Landing, which had been a whaling station, and had a pier and access to the ocean, plus the canyon, there was a marine biological lab there called the Baudette Foundation. I don't know too much about it except their building, I think, might have been the initial whaling station. That became Moss Landing Marine Laboratories took it over back in the early sixties, I think.

So the state universities thought that they had a good place that they could send their marine students to. Moss Landing services now six CSU campuses—San Jose, East Bay, Monterey, CSU Monterey Bay, I think Fresno and Chico maybe—they can all send students. The early sixties—UC Santa Cruz—the master plan, which was originally written in 1960, talked about "It'll be the only coastal campus north of Santa Barbara so marine science should be part of our curriculum." That was fifty-one years ago. There's a long history that Bill Doyle put together on the marine program. I was here. We worked a lot to try to [establish a] marine lab. There was a diversity of marine life; these temperate and subtropical water masses come together, lots of marine life, the canyon, lots of interesting stuff to study.

So it really sprung up around three centers—the Monterey Peninsula, Moss Landing and Long Marine Laboratory. The Monterey Peninsula has the Aquarium, it was a huge addition in '84; the Naval Postgraduate School, Fleet Numerical, the Naval Research Laboratory, there's a Fish and Game Facility. And Moss Landing, where Moss Landing Marine Lab, and then when David Packard decided to build the Monterey Bay Aquarium Research Institute—

MBARI was a huge factor. That and the Aquarium are the two big players. They have the biggest budgets. They have the most employees. They probably are the most, I'm not sure the best known—certainly the Aquarium is known globally—but Monterey Bay Aquarium Research Institute, among research institutes, is known to be state of the art technology and engineering and instrumentation. UC Santa Cruz may be better known because we have more scientists who publish more stuff than MBARI probably does. Elkhorn Slough then set up their own estuarine research reserve, along with Moss Landing Marine Lab. There's a Sea Grant office [California Sea Grant Extension Program] down there.

Then Santa Cruz. When I came in, we had UC Santa Cruz, the marine lab, then we started working with other players. So we brought in the [California Department of] Fish and Game facility-the Marine Wildlife [Veterinary Care and Research] Center, the NOAA lab, the USGS. We built the Seymour Marine Discovery Center. We've got Sanctuary offices here, and the Nature Conservancy, and the Predatory Bird Research Group. One by one, there're these three centers. National Marine Fisheries wanted to relocate their lab here from Tiburon because they had to get out of San Francisco Bay. Their lab was falling into the ocean. They looked for places to go. One of the things that attracted them was there are all these other institutions around the bay, including the universities, and students, and graduate students and faculty. The coastal and marine group of the USGS, which we've been working with for years. A lot of our graduate students and undergraduates finish up and go to work at Menlo Park but still live in Santa Cruz. There are people who would come back here to get graduate degrees and

they were in Redwood City, which their leaders at the time I began talking to—so I spent twenty years trying to bring them here. We've now done that.

But it was because of this—we could call it a critical mass, this incredible bay, the exposure. The Sanctuary added to all that in '92. There're still people wanting to come here. I think that *Santa Cruz Magazine* article was a celebration of that. Now we're at the twentieth year anniversary of the Sanctuary. And people are still coming.

The other thing that has made it somewhat special, I think, is each of these twenty-two or twenty-three or twenty-five organizations—I don't know whether it was in the article in the magazine or not—did it have the map of all the institutions around the bay?

Rabkin: I don't remember whether that was in there.

Griggs: But if you look at it—

Rabkin: I know I've seen that online somewhere.

Griggs: Yes. We use it in a lot of things.

Rabkin: Yes, [here is the map]. "Monterey Bay marine science facilities."

Griggs: This has a few missing. Now there's the Center for Ocean Solutions that Stanford brought to Monterey. Each of the institutions is distinct and there's not a lot of overlap. When I was in graduate school at Oregon State University, it was a big school of oceanography, we had biological, geological, chemical and physical oceanographers —University of Washington had a similar school but there was competition. They drew a line from the Columbia River out west and said, "Okay, we'll work north of here and you work south of here." That was the sense I got as a graduate student. We didn't interact much with them.

But here, if you look, there's basically four or five academic institutions. There's UCSC, there's Moss Landing, there's now CSUMB, there's Hopkins, which is really the research lab for Stanford, there's the Naval Postgraduate School. But CSU is still a young campus that's broad. We don't overlap a lot with them. They don't have a geology department. There's no real competition—CSU—no more than we compete probably with San Jose State. We're the research university. Moss Landing brings in graduate students; at any one time they might have forty or fifty. They can only do master's degrees. They tend to be a little more local, their research. But they only do master's. We have a Ph.D. program. We work with them, our faculty, our students, but we don't really compete for the same students.

Rabkin: So Moss Landing Marine Labs itself confers those master's degrees?

Griggs: They come from their home campus.

Rabkin: I see.

Griggs: The Naval Postgraduate School is navy officers. MBARI is high tech. They've got the ability to build remote-operated vehicles and submersibles and more. We don't have that kind of money. Their budget is forty million dollars a year. Our Institute budget is $550,000 and that just pays the IMS staff. It's not the faculty and all the research grants, which is another twenty to twenty-five million dollars. MBARI has three vessels. We get to use those. But I think it's this cooperation. In a way it started with, I remember the first meeting Sam Farr got together. I had just become the director, so it was probably 1992. There was a little article in the paper that said, "Wow, there's eight institutions around the bay. We have 800 people and a budget of fifty million dollars." I then took on the role of updating this and sending it out to everybody annually for the last twenty years. People all say, "How many people are we now? What's our budget?" So every couple of years we update this. The directors keep changing so I've got to keep finding out who is in charge now. Some stay for a long time.

Each institution has what their focus is, so at UC Santa Cruz: marine vertebrae biology, coastal biology, ocean processes, marine and coastal geology, environmental toxicology etc. How many researchers, graduate students, staff? What's the annual budget? I get this and we compile it. I use this in a lot of talks. I think Sam got it going. His argument—what he said was, "If Hollywood can be the movie capital of the world and Silicon Valley can be the computer capital of the world, why can't Monterey Bay the marine science capital of the world?"

So we talk about ourselves as this incredible concentration of—I don't know how to compare it—I think Scripps has a lot of people, but it's basically an institution. They do have a fisheries lab, a NOAA lab. I don't think it's as big as we are. Woods Hole could be, because it's not only Woods Hole Oceanographic Institution, but Woods Hole Biological Laboratory. They also have a USGS group there. They have a National Marine Fisheries Group. I don't know how many people and what their budget is. But certainly globally, we're probably one of the major, most diverse groups of marine scientists on the planet because of this high tech, with MBARI, incredible aquariums, research institutions, government labs, and so forth.

And things that are done—like most people have never heard of Fleet Numerical Meteorology and Oceanography Center. It basically takes information from ships and airplanes all over the world, on weather conditions and sea conditions, brings them back here, analyzes them and sends them back out. So if a fleet is going to Japan, it says, "Go north, you're going to run into this giant weather front." It's this giant supercomputing facility. There are a number of things that people are not even aware that are here, besides the obvious ones like the Aquarium. It's a good way to let them know that Seymour Center is here. [laughs]

Rabkin: "Best kept secret."

Griggs: Anyway, yes, best kept secret.

Rabkin: Would you be willing to share with us a copy of the most current major marine science facilities document?

Griggs: Sure. I'm just now sending it out for input from the people who are the heads of each organization. Sam's map had six dots on it. Mine now has twenty-three on it. I send it back to him and his staff in DC. He can be proud. Sam's the co-chair here of the Congressional Oceans Caucus. States with oceans, coastlines, that are interested in ocean issues and fisheries and so forth. It's important to him to know, wow, we're doing really good stuff here. I think your original question, which we really went all over on, was the physical and biological conditions that made this area exceptional. In some ways it's this bay. We walk around. You know it's protected. It's unique. It's got this incredible canyon, this incredible marine life, and there were a few institutions that started. It has been modified, sure. Sandy talks about the whaling and the abalone but compared to a San Francisco Bay or some sections of coastline that are so contaminated and so polluted—still you can go right out here and find pristine conditions. Scientists still want to be here. Then those scientists probably began to attract other scientists, "Wow. We'd like to be here. We want to share." [laughs]

Rabkin: So there are all these institutions and some interesting collaborations, I imagine. Can you talk about what's most interesting to you in terms of collaborative work among or between some of these institutions?

Griggs: Well, one interesting thing, because we were trying to encourage that collaboration about fifteen years ago when Karl Pister was chancellor—he and I

actually met with Julie Packard for breakfast, but it was in lieu of meeting with David Packard. We asked for a gift, an endowment that would help us encourage UC Santa Cruz scientists interacting with MBARI and other institutions around the bay. We called it the Packard Ocean Science and Technology Endowment. The concept was that we would use that to seed research projects for our faculty and scientists working with other institutions, make us a better partner. That started with a million dollars. As endowments go it did well, and then we had this whole stock market and everything else collapsed. I think it's up now to 1.5 or 6 million, but it releases about seventy to eighty thousand dollars a year in interest.

With my advisory committee, we ask for pre-proposals in October when the foundation releases the money. We then wade through those and we have a set of criteria: that it strengthens UC Santa Cruz; our priority would be interacting with another institution collaborating around the bay; it's cutting edge; so forth and so on. We usually [give out] up to $20,000 each for five projects. We've been able to seed that. It may be with USGS. It might be with National Marine Fisheries. Moss Landing. So we have a fund, which is actually used very, very effectively. I think it's our fourteenth year. We just made the awards.

We've had some collaborative efforts around the bay that I've helped lead. One was something called CIMT, which was the Center for Integrated Marine Technologies. One of the things that NOAA has been trying to fund is ocean observation systems. We monitor a lot of the weather. We have wind gauges and temperature gauges and rainfall gauges, but in the ocean it's a little harder, and it

hasn't been done as regularly. We now can look at ocean temperature from satellites. We now have these coastal currents that we look at through radar; that was actually part of this project called CODAR [ocean sensors].

We have a site down at the marine lab. There are now these along the California coast. It sends out radar, out over the ocean surfaces, out maybe thirty or forty miles. There's a website [where] you can see what the currents are on the coast at any time and what the velocities and directions are. It's now been state-funded but the funding is disappearing. They bought all the equipment, got it set up—but it's like you have a rain gauge, but nobody goes out to read it anymore. Rather than having to go out there and put in current meters and so forth, it was a way to monitor from the coastline. These plumes overlap, so if there's an oil spill, or a lost vessel, or something in the water, we can track it. So that was funded. That brought together Moss Landing, Monterey Bay Aquarium Research Institute, the Naval Postgraduate School, and UC Santa Cruz. We had that money for about five or six years. They've now tried to get a more regular stream of funding. There's these regional—so that evolved to something that I also helped start with two other people, Marsha McNutt, who was then director of MBARI, now the head of the U.S. Geological Survey, and a woman named Lora Martin, who was head of the MBEST Center at the Fort Ord campus.

Rabkin: What does that stand for?

Griggs: Monterey Bay Education, Science and Technology Center. We got a little chunk of land down there [at the former Fort Ord], like CSUMB. It never really

took off. I think it was too far away. Nobody wanted to go down there and there wasn't any reason to. But there were some buildings that Lora got funding to build and some technology groups. Anyway, the three of us then started CeNCOOS—Central & Northern California Ocean Observing System. So that's now a permanently funded ocean-monitoring program. There are now—they call them the OOS's because it's an Ocean Observation System, OOS. There's one in the Pacific Northwest. There's one in Hawaii. There's one in Southern California called SCCOOS, Southern California Coastal Ocean Observing System. And up and down the East Coast and the Gulf of Mexico, there might be five or six more. So it took a long time to get federal funding on a regular basis. There are programs to monitor the currents and the plankton and the temperatures and marine mammals. That was something else that I'm proud we were able to get together, where people interact.

So those are sort of institutional higher level. We also were involved in this coastal current study because the people that were doing it—the engineers were here; the money went to the Naval Postgraduate School, so we actually provided space for these people and the technology to set these up. A lot of the interactions are person-to-person. Somebody here works closely with somebody at MBARI. In fact, when Mary Silver was on the faculty, she had an appointment down there, summer appointment—they would pay her. She'd go down there in the summer. They just have things that we don't have. I mean, three vessels. Remote vehicles. Gliders.

David Packard was really interested in the engineering piece of it. How do we develop new sensors and probes? He developed this—I'm not quite sure how it works—but at a budget of forty million dollars a year—you'd have to have about a billion-dollar endowment to provide that much interest each year. So I think they're part of the Packard Foundation. Their funding each year—they have a board of directors. They have the capacity, with their engineers, I mean, incredible underwater video, these underwater vehicles that will go down and can collect cores from the sea floor, sample things and bring them back. They now have this cabled observatory out there, like a giant extension cord you can plug instruments into. We could never afford to do that. But we have really smart scientists who are doing interesting things *with* their engineers and scientists.

Our marine mammal people work with a marine mammal guy at Moss Landing. In bringing the National Marine Fisheries Service here, we now have a joint faculty position that's half funded by UC Santa Cruz and half by the federal government, through NMFS, which is very unique. They fund a number of graduate students, post docs. They have a whole salmon program that brings in millions of dollars a year. I'm, oddly, the principal investigator on it because we have a cooperative agreement that brings money to fund our students and post docs and researchers. Similarly with USGS, I'm the PI on a cooperative agreement. Two or three of my graduate students are funded half time by USGS. They hire undergraduates. Those are all places where our scientists, our students, our faculty are enriched, as are these agencies, because they're next to a

university with young, exciting minds, with lots of energy and enthusiasm, thinking of good questions.

So a lot going on. That was my dream with expanding the marine lab to what we're now calling the Coastal Sciences Campus. Have you been down there? Yes, so you've seen what's there today. It's just bigger than we are. The opportunities for collaboration and interaction—every one of my graduate students has a USGS scientist on their Ph.D. or Master's committee, which we can do, because we have through our office given them what we call courtesy appointments. They're called research associates so they can use our library, be on committees, give talks, bring grants in. So we've expanded, because in the area of coastal geology, in contrast to say seismology, where we have two or three faculty, and planetary sciences, where we have three faculty and all of Lick Observatory, I'm the only coastal scientist we've ever had in geology. There are no others. So there are a lot of biologists, a lot of coastal biologists. I'm the only person—that's not to say poor me, as to say now we have fifty coastal marine geologists here, probably one of the strongest concentrations in the country. It's greatly expanded what our capabilities are and what we can work on.

What I envisioned twenty years ago—we needed to do a new master plan for the marine lab. When I came, we had a double-wide trailer that was the Marine Discovery Center that was for the docents. We had two research buildings. The Younger Building, the Doyle Building that wasn't yet named. We had the marine mammal tanks. We had ten trailers. [goes over to a shelf to retrieve a

photograph] We had huge capability here or capacity—but we had just these two buildings—

Rabkin: So this is a big, mounted color photograph of, an aerial photograph of—

Griggs: The Marine Lab site—

Rabkin: An aerial photograph of the site.

Griggs: See the campus up here? This whole area was just trailers. We had a doublewide trailer that was the Visitor's Center. So none of this, none of this—we had some greenhouses. So, in part, I saw all those dots in Monterey and Moss Landing around the bay and I said, "We have this incredible university. People want to be next to us." So we started pursuing opportunities. One was clearly the Seymour Center. People wanted to come here. We had this little trailer and when it was raining, there wasn't enough room. So we started out and we raised six and a half million dollars and built that. Now it has been there for twelve years.

As soon as we finished that, people started getting excited. I said, "We've got to get rid of all those trailers. They're falling apart." So we raised almost seven million dollars to build the Center for Ocean Health, which replaced some of the trailers. It gave us offices and labs. At that point, the whole marine lab changed because there had been no faculty down there. A few people studying the mammals—but they didn't have offices down there—they were up here teaching. So when we started planning the Center for Ocean Health and programming it,

faculty said, "You know, if we had our students down there and our labs and we had internet connection maybe we could teach a few classes, we might all move down there." That was a shock. It was great. It turns out half of EEB [Ecology and Evolutionary] Biology decided to go along with that. And they've never been happier. But that changed from this little dusty outpost of a few people working and a few sea lions, to a working lab. These two together all of a sudden brought a lot of attention.

At the same time, the Fish and Game Facility—there was legislation passed after the big oil spill in Alaska. People here, including Sam Farr and three others—the Keene-Lempert-Seastrand Bill—decided if there was a big spill like that in California, we could wipe out the whole sea otter population. We're not able respond to that, just like in Alaska they weren't ready. So they put a tax on imported oil that would build a series of places where they could clean up birds and sea otters. We were the ones that won the contest to bring in this. That's sort of collaborative. Mostly they do work on sea otters that come in dead. They do necropsies on marine mammals that come in. We have space and use their tanks. They lease the land from us. They help pay for the seawater system. At the same time, the National Marine Fisheries in Tiburon—we knew they had to move—it was an old anti-submarine warfare base north of the bridge. It's on a big landslide and the site was falling apart. We started talking and they wanted to come to Monterey Bay. The long process started in 1995, so it took about six or seven years. The other problem was all this land was owned by Wells Fargo Bank.

Rabkin: We talked about that some last time—

Griggs: That was a long hassle. So they actually bought a few acres of land from Wells-Fargo and built this building. Then USGS—we started in 1991 to bring them here. We tried to build them a building, tried to get them money to build the building. We programmed the building. We went back and forth to Washington, to Menlo Park. Literally, from 1991 to about 2008—seventeen years of my life was spent—it turns out for a number of reasons we couldn't get the money to build the building. [The USGS] is caught up in federal leasing. They ended up now having leased and reconfigured the Wrigley Building, which they now have doubled their expansion in. It's a great space; they love it, it's close. It's not here, but it's a quarter of a mile away.

So we've created this incredible center. We had an original master plan when we did this. When I started thinking about this, we had to do a new plan. So we did that. I had to go up and present it to the Regents. I'd never been to a Regents meeting before. I said, "We have this great plan. We're going to bring in these federal agencies and we're going to increase our collaboration and interaction. We're going to become this great center for marine research. That's what UC Santa Cruz was in the original master plan." One of these grumpy old regents said, "Well, that's fine, Dr. Griggs, but what's it going to cost us?" I said, "If it works like I think it will work, or I plan it to work, it's not going to cost you anything." So this was all privately funded. [pointing out buildings in the photograph] This was all privately funded. This was federal government funded. That was Fish and Game oil tax funded. So basically the university got a marine

center for free. I mean, we ultimately did pay to bring the utilities in. We needed that. We had a well and a pump septic system down here, which was not so good. Ultimately, the university got a great deal. We bought the adjacent land from Wells-Fargo for four million dollars.

Rabkin: How much acreage?

Griggs: Sixty acres. It turns out there's wetland and setbacks and they had drainage through here. The trailer park—but we ended up with a lot of land to build on, as much as we ever will need. It turns out the whole old Texas Instrument facility was sixteen acres. All those buildings and land they got for four million dollars. [laughs] Which is another good deal. The university made the decision to buy that, which was a good decision, but in the big picture of things—I mean *this* building cost thirty-five million dollars.

Rabkin: The Earth and Marine Sciences Building.

Griggs: At the time, that was really cheap. Engineering, you know, maybe seventy or eighty million. For four million, they got a good deal. Remember, it costs three million to do the studies for the final coastal plan. If I had to say one thing that I'm proudest of here—I mean, you write books and you give lectures—all those are really important, but to see something that will be here, that will endure for a long time. I see ten thousand school children come through the Seymour Center every year and the people that are now working with the NMFS Lab, USGS and in the Center for Ocean Health.

I was the chair of the committee that planned this building and followed through with it. You know, it's like this wonderful feeling every day when you come in. It's like wow, it's here and people are appreciating it because we did it. I walk down today and I see these people, I don't know who they are, they don't know who I am—it's like, "It's okay. It's for you."

Rabkin: So we've talked now on three different occasions and we've touched on a large number of hats that you wear: in administrative roles, in principal investigator roles on various research projects, fundraising, advocating for the growth and development of this whole marine sciences campus at the Institute for Marine Sciences—your own research, your relationship with other research institutions around the bay—and I haven't even named everything that we've touched on, but—

Griggs: The *Sentinel* column, my favorite thing.

Juggling Hats

Rabkin: Well, we haven't got there yet. That's my last set of questions. Right, publication, writing, public speaking, outreach, not to mention your teaching work at the university and your administrative roles here up on campus. It just makes me wonder how you juggle all those hats, or what, if anything, do you find challenging about wearing so many?

Griggs: [laughs] Gosh. How did you come up with that question? It's interesting. I'm not sure I have a simple answer. One thing that makes an incredible difference, I'm trying to think of when I got my first computer, probably shortly before I became director of the Institute in 1991. But if you think back, and I think back to Bill Doyle, for example, there were these files of typed letters that he left behind in the Director's office when he retired. In retrospect, it was just a slow way to do things. If you're efficient on email or with a computer—I think that allowed me to do a lot more things. I also had a sense early on in my life that—I think I read once something about the average human being uses two percent of their brain or something; there was just a lot there that we don't [use]. I think about that. Like the computer, I'll find a whole new program or application—someone will say, "Have you ever seen this?" I'll say, "Oh, my God. I didn't know that was there"—that you can do something, whatever it is—so much faster or more efficiently than in the past.

Rabkin: An application or a feature—

Griggs: An application.

Rabkin: Or a feature of an application you didn't know about.

Griggs: Yes. So I just feel like there's a huge amount of potential that we don't exploit or explore. I think I also have been blessed with some kind of a—maybe we talked about this—those people whose glass is half full or half empty, broken, and mine's overflowing. I really love what I do. People often ask—it happens

very frequently—I was just emailing last night from a student, a former student from the sixties who is now in Washington, D.C. He has been with the state department and water in the Middle East and now he's on Canadian-US issues. He's a very prominent guy. His son is taking my class and he told me, "Oh, my dad took your class." I said, "What was his name?" "Chuck Lawson." I said, "I remember Chuck." He said, "You do?" I've had thousands of students, but he was an Earth Science major and I remember him. So he emailed his dad; his dad emailed me right back.

Somehow the reward of getting up every morning and being excited about coming in to lecture and people say, "Guy, you're still teaching. Great you haven't retired." Part of it I think is just a curiosity, an interest in making these things happen. When I look around at my colleagues—I mean, you wouldn't be here if you weren't good, if you weren't smart, if you weren't talented. We have a whole range of people, a few who probably don't get tenure, that aren't that good, and people who are brilliant. Harry Noller is in the Natural Academy of Sciences. Or we have some people who just really have been recognized. Now you're recognized in other ways. They all have strengths, but I think a lot of the people I see are really good at their research. They put together a lab. They get funding. Harry Noller has figured out the ribosome; I think that's what he does. But you don't see Harry giving a lot of talks in the community. He doesn't but his laboratory work is widely known and very fundamental. So we all have our strengths.

Basically, I really like people. I like interacting with people. So I love teaching. I love giving community talks. People say, "Well, how do you communicate your stuff to people?" I started writing this column. I've written books. I write articles. I give talks. In the next couple of weeks, I'm going to Modesto Community College to give a talk. I'm giving a talk to Pacific Collegiate School. I'm talking to the Seymour Center docents this Saturday. I just got invited to go down to Long Beach Aquarium and start out a lecture series. I went to Scripps three weeks ago to speak. I have to keep track of them—and they all take time—but I just see my own set of skills, and then being surrounded by people who you can work with well. Like, one person that's made a huge difference is Steve Davenport. He's the marine lab manager, my assistant director. I get these crazy ideas, or we get them. He says, "Let's see if I can get that guy in the room and we'll see if we can—" He follows through on some of the nuts and bolts. "Okay, we've to get the seawater system. We've got to get this pipe bigger. We've got to put on a new—-okay we'll do that." We have another guy, Rob Franks, who runs all of our analytical labs for the Institute. Mass spectrometers and laser ablation and all kinds of high-tech stuff. People think, wow, that's such a great tool—it's important to support that.

It has been really interesting working with development. By and large, most faculty don't think about fundraising. You don't take classes in it. I never did. But because I've been here so long and I know a lot of the people, it's not hard to go to those people and work with them to go to other people. It's still hard to raise money.

I think another important thing was the work I do is pretty visible and understandable. So teaching oceanography, studying the coast—I mean, we live in Monterey Bay because of what's out there, not because it snows, or because we have some rare animal here. It's because we're on the coast. The work I do is also—for me is interesting and interesting to other people. So I get asked to give talks. And now climate change and sea level have been added to the mix.

I don't see it very often as work. I'll go in to somebody's office or send an email asking for input or something, they'll say, "Well, I'm busy." [laughs] I want to say, "You're busy. What are you doing?" "I'm doing my research." "Well, what else are you doing?" "Well, I have a class next week." So I like to think of pushing the boundaries all the time. Then Sandy's a whole other life. "Let's walk around the bay. Let's go to China."

Rabkin: Sandy Lydon.

Griggs: "Let's write a book." Sometimes I think about each person, each of my graduate students—like yesterday I had a meeting with all my graduate students an hour meeting each week, and I think sometimes they each think that that's all I do. Like my students, "What do you do when you're not teaching?" Or somebody that's outside the campus will say, "You only teach one class? My God, what do you do with all the rest of your time?" All you have to do is go on my email—like you probably do—and I say, okay, it starts at 7:45 and there's a message for 7:45, 7:48, 8:02, 8:03, 8:07, for as long as you're there. You can get a lot done, and much of it gives me a lot of satisfaction. That's why retirement to

me does not seem at all interesting for a bunch of reasons. I wouldn't be doing any of these things or not very many of them. It seems like you sort drop off the face of the earth and your life begins to be over. I can do everything I want to do now. I can take trips and travel and build houses and write books. I have another book I'm working on that I think somebody will want to publish.

Something else, I never get bored. I get up every morning excited about coming to work, but at the end of the day I'm excited about going home. So I feel really fortunate. I feel sorry for people that aren't inspired. You seem like an inspired person. You have a positive outlook. You're energetic. But sometimes you think people are just kind of like, "Oh, no." Teenagers [are] like that, especially. I'm going to talk to Pacific Collegiate School on January 31. They have an assembly once a month and they bring in somebody from outside the school. It's 400 kids that are from 7-12th grade. I've thought about that more than almost any other talk I've done for the last six months because Deepika's daughter's there. These kids are, "Tell me something I don't know. Tell me something that's more important than texting." Like my *Oceanography* class, which is probably 75 percent freshman, eight o'clock in the morning. 240 students. And you can just see they're kind of, should I come? It's just different.

Rabkin: I was just thinking: I wonder if there's some way you could start by, instead of telling them to put their cell phones away—everybody take out your cell phone, and if they have Smartphones direct them to some amazing thing that they can learn from their cell phones and launch into the talk. Anyway, just a thought.

Griggs: It might be a way.

Rabkin: So in terms of all that public outreach, we've talked throughout these interviews about various publications, some of them specialized and aimed at specialized audiences, either agency people or other scientists, some of them more popular audiences. One of those, of course, is your *Santa Cruz Sentinel* column, so I wanted to ask you a bit about that. How you came to write that column in the first place and how many you've written at this point? How you choose your topics?

Griggs: One thing that we just did last week—one of my technical people here actually just put—because people often say, "Why don't you write about this?" I had written about that but they just started reading them two months ago, —so Rob Franks put them all online at the Seymour Center website. So you can actually go online under Highlights, under the Seymour Center website and all ninety-seven of them—it's chronological and they all have a title so you can see, "Sardines and Anchovies" or "Oil Spills," or whatever.

Do you read the *Sentinel* regularly? Maybe not? If you picked it up and you looked up articles about the university faculty, there are people here, probably 95 percent of them that have never been in the paper.

Maybe they're doing something reporters wouldn't normally write an article about—Italian Literature or whatever it is— Others like, the prison system, Craig

Haney [who studies that topic] has had articles. Astronomers get good publicity. The oceans, we do really well. Mike Rotkin in community studies is always in there because he's often mayor. So I've often been the one they've called about something. I've said to reporters—and they come and go—I've said, "We've got so much exciting stuff at the marine lab. We've got people tracking elephant seals and whales and otters. I'd be happy to work with you on a regular set of articles." The person's got an assignment to go do this and that—and just never really paid—I was willing to do it. So they'll call—I got a call night before last at 9 o'clock, "I hate to call you at home, this is so and so, somebody found a—there's a whale washed up at Moss Landing." There was a baby gray whale. "What do you think it's doing there? And why?" Anyway, they're migrating late. It was a baby that was born too early, you know, because they should be born down in lagoons. So they had an article last night—

Rabkin: It was born on a southward migration?

Griggs: Which is out of sequence. It's a long way, whatever, 10,000 miles—but anyway.

Writing a Column for the *Santa Cruz Sentinel*

So Dan Haifley who heads O'Neill Sea Odyssey, was head of Save Our Shores before that, somehow he had talked to the *Sentinel* about doing a regular column. Dan's pretty smart politically. He used to be chief of staff for the former State Senator, Henry Mello. He worked in Sacramento and he was very involved in the creation of the Sanctuary. He's connected to a lot of people. He said, you know, I

think we could probably do a column. So he said something to the *Sentinel* about splitting it with me. I think he made that offer to them and they said, "Great."

Rabkin: Had he conferred with you?

Griggs: I think he said, "Are you willing? I have a spot." So we said, "What if we just split it every other week? It'll be Saturday morning." I don't know how we even came up with the name *Our Ocean Backyard*. That was in 2008. It was supposed to be five hundred words. I think the first one, I'm trying to think what was going on. I could go online and see what it was. There was upwelling and plankton and sardines and anchovies and El Niños. There was oil spills. We did the Bay Walk and all kinds of stuff. I thought, I can probably do this for about six months and I'm going to run out of things to write about. But I'll give it a go.

Rabkin: Weekly?

Griggs: Every other week. Dan and I alternate. It started out at five hundred words and that was a challenge.

Rabkin: That's short.

Griggs: Yes. They were going to do one column on the front page of the Extra Section. Our pictures are on it. Anyway it went on, and it has now been three and a half years and ninety-seven columns. It has been challenging—it has been a really good exercise. There used to be a blog, which they finally took off

because people were being really nasty to each other. Not so much to me but about climate change. People who really care will email me. And it's funny, people I have known for a long time but haven't seen for years will say, "That was a great article. I finally understand upwelling." One guy who was a teacher in San Jose schools and now is a docent at the Natural Bridges—you know, the last article about upwelling I talked about fog forming because we get this cold water and we get this warm air coming out over the ocean in the coastal zone. I said, "It's just like when you take an ice cold glass out on the table on a warm day and it condenses on the outside." He said, "That was the greatest analogy, I've been struggling for that for years." It was just a really nice note. So it makes me feel like oh, that was worthwhile.

Topics. And I have a list of them—some people say you ought to write about this, or they'll ask a question about the last article or an event like the Gulf Oil Spill—there were probably three or four columns that came out of that. Energy, sea level rise. People are really curious about Monterey Submarine Canyon. I spent three or four columns on the canyon. I have a list of things. Something will hit me that's happening now that I think would be interesting. Then something else will happen. Before I get that one in, it'll break open. Then I actually started adding pictures to it. Sometimes they print them, sometimes they don't. They have an online edition where the pictures are about this big. I'll send them one—some of the stuff we did on our North Coast walk. This image was taken from a series of kites of Santa Cruz in 1906.[7] So I wrote about this and they printed it in

[7] See http://scplweb.santacruzpl.org/history/20thc/sc1906.shtml

the paper and it was very gray and it was about that big. You can't see anything so I—

Rabkin: Tiny. The one you're pointing to is a print that's—

Griggs: I forgot that we're on a tape—

Rabkin: Right, three feet wide.

Griggs: It goes from West Cliff clear down to Pleasure Point. It was taken by a guy [George Lawrence] who took a lot of early photographs of the U.S. from balloons and from kites.

Rabkin: Amazing.

Griggs: So it's 105 years old—106 years old. It shows two of the older wharves and [part of] the boardwalk had burned down. They had started to rebuild it. Actually, you can see Neary Lagoon. This negative was four feet across so you can actually go online and blow it up and see there's the Sedgwick Lynch House, which is now the bed-and-breakfast across from the Dream Inn, you can see on this photograph, that white old Victorian there. Anyway, I did a column on this, but so much of what I do is visual. If the *Sentinel* doesn't put the picture in, or it's so small, it's really hard. Then I also put a title on—sometimes they use it, sometimes they change the title. Only once they edited my article and they changed its meaning and I said, "You can't do that. You changed the whole

meaning of it." They said, "We don't know who did that." Because there're a couple of people editing.

I've got to have it done usually Thursday night or Friday morning, for Saturday. It's like this, "Oh my God, it's Wednesday again. I've got to write another column." The first one I think I spent eight hours on. I sent it to our public information officer to review and he said, "I'll look at it." I had Deepika look at it. I always have her look at them now, because she'll read it and, "This isn't really clear. You probably don't want to say this—" I'm getting down to where it takes me maybe two or three hours —I'll write it now, and then go back and look at it a couple more times. But it's really been great practice to take complicated topics, make it understandable and try to make it interesting, and sometimes there are 1000 words or 800, 900. Five hundred is really too short for most topics.

Rabkin: So you have more column inches than when you started.

Griggs: Sometimes. They've changed editors that forget I was supposed to have less space. It always goes over on the next page. I see Dan Haifley's started getting bigger. And our columns are different. His are more conservation, wetlands, He'll interview or talk to people about stuff. Most of mine tends to be my own work or related to that. I think I could go on a lot longer. Sometimes I've talked about asking people what would you like to hear about. You'll probably get fifty different topics. It might be something interesting, or if it's a topic I've written about they didn't read, I'll say, "Well, go to the website, and you'll see they're all there." But I really enjoy it. It's fun. People will recognize me now

because my picture's been there. It's in the paper. It's on the front of the second section every other week. "You're the guy that writes those columns?" It's like a local thing. It's like that magazine, the *Santa Cruz Magazine* cover that had my picture on it.

Rabkin: It sounds like you see no end in sight to the potential ideas for the column.

Griggs: Not so far. That surprised me, because I didn't think there would be that many things. But then I realize I've been teaching *Oceanography* for years. I've written books. I could march my way down the coast. Castle Beach is a story in itself, [at] Seabright, because of the castle. The harbor was a story in itself, I've written about. And the concrete ship, which I've written about. And Moss Landing. Whaling. Fishing. Every time there's an event out here—there's, oh, why did we have whales? Why is it icy this week when there's supposed to be global warming? So there's trying to make it interesting and not too detailed. I think I've hopefully found that [balance] because very few people are saying, "I don't understand what you're writing about." If Deepika can understand it, as a non-scientist, then that's a pretty good guide.

Rabkin: Do you have any favorites among your ninety-some columns?

Griggs: I don't know if I could say that, because there has been so many, covering so many things. I don't think I do. In fact, I'm surprised—I wrote about that two and a half years ago, I don't want to repeat that. Maybe people weren't

even reading it then. I have never repeated a column but some of the same topics, marine mammals or the coast or coastal erosion. I've done a lot on arches and erosion and land. But it's been fun and rewarding, and educational..

Sea Level Rise Task Force of the National Academy of Sciences

Rabkin: There are a couple of institutional connections you have that we haven't even touched on. I'm wondering if there are any of them you feel like we should mention before we stop. For example, I see that you work with the Sea Level Rise Task Force of the National Academy of Sciences, California Climate Action Coastal and Ocean Working Group.[8] Is that something you want to say anything about?

Griggs: It's another example of just trying to accomplish as much as you can in the time you have. One is at a national level. One is at a state level. But they're really important in that they're setting what will be state policy that most people don't even know exists. I guess, also getting to the point in your life where you feel you've had enough experience, enough perspective that somebody wants you on that committee is rewarding, that they think that you have something to say.

It's been interesting. I think because of writing the *Sentinel* columns and because I give a lot of public lectures, one of the things that I try to make a point of is writing and speaking in an understandable way. It's not hard to be technical. You can write a technical article really easily and give a talk at a meeting. That's

[8] See http://www.slc.ca.gov/Sea_Level_Rise/SLR_Guidance_Document_SAT_Responses.pdf

what all of our seminars are about, get out the overheads, and get out the differential equations or the plots, but trying to say the elevator speech, or whatever it is— So in this National Academy Report, which is about sea level rise on the West Coast and what's affecting it and how high is it going to get? What are our uncertainties? A lot of the people are really technical. There's a committee of thirteen people. We've been meeting for about a year; I think we started last January. It's been a year and we're finishing this up.

There are two people that deal with just ice. Their whole career is ice: How fast glaciers move. How fast they melt. Little pieces of ice. They're trying to project Antarctica, Greenland melting, which is a huge part. There's a lot of complicated physics and stuff. There are two people who just work with ocean dynamics. If the ocean is this much warmer from the surface to a depth of 800 meters, how much will sea level rise? How about below that? There're people working with geophysics. As ice melts, here the sea floor is affected and the land is affected. And looking at the text—particularly the figures and the captions—and we're all reviewing now what other people have done, and some sections are incredibly complicated and detailed. It's written for the States of California, Oregon and Washington, government agencies and the governors. It's also for people in the field who want an update, but the people who requested it are not necessarily scientists. They want to know, what do we have to worry about? They don't want to know the physics of ice melting. That's a common thing. Most of them don't want to know. They can go to another report to find that, so we have appendices.

So I started in my editing saying, "You know these captions are just way too long." It's like a page of a figure caption. I started to revise them and the woman who was heading the study, who is very thoughtful and she has a big responsibility because this gets reviewed internally and then externally—you don't want them to say, "Oh, this is a piece of junk. You guys failed–-"once she saw what I was doing, she said, "Gary, I'm sending you some more captions." So the last email she said something about, "Now that you're our figure caption czar, I need you to revise these." So she's actually respecting my ability to put complicated stuff in simple language, so that there aren't so many words that people don't understand, that you don't even want to look at the figure.

Rabkin: Do you get resistance from any of your colleagues, worrying that you're going to be "dumbing down" the science?

Griggs: Usually there will be a long caption description and a reference to a publication that the reader can then look up. That, to me, is a better way to do it then to try to explain everything that person explained that's a qualifier for a lot of statistical stuff. The most important thing is, what does that figure or plot show you? I think because she's the head of the committee, I'm expecting that she's got a perspective of having done many of these reports. She's on the staff. She's got a perspective. It's just another added layer of things. It's interesting and exciting to be part of.

University of California Marine Council

Rabkin: Then there's another body—you may have touched on this before—that you serve on, the University of California Marine Council. You've been chairing that since its inception in 1999, or so I read.

Griggs: Yes. That went until about 2009. It was about ten years. We accomplished a lot. We proposed and got money from the state to do a yearly grant program called the California Coastal Environmental Quality Initiative. We would review proposals and fund things that worked on the California coast and fisheries, wildlife, shellfish, weather and climate. We gave out probably ten million dollars. A lot of good research got done. It included all of the directors of all the UC marine programs; we'd meet a couple times a year. I chaired the Council. People were happy to have me do it. We put out a directory of all the marine scientists in the whole UC system, online and hard copy, so you could find who else was working on fish farming, or waves or beaches, or whatever. I was the contact with the state legislature. The UC people, if there was legislation that affected the ocean or the marine programs they would call and ask, "What do you think? Or what's the wording on this?" I was probably most of the contact. Most of the other people didn't get involved because I was the chair, which was fine.

About two or three years ago, they brought in a new vice president of the University system. We have both organized research units, so the Institute of Marine Sciences is an Organized Research Unit, the Institute of Particle Physics is

another. We have only three or four of those at UCSC. Some campuses have dozens. There's also what are called MRUs, which are Multicampus Research Units. Lick Observatory is actually an MRU. Through the history of UC, they've created dozens of these. UC MEXUS, is one, I think, that funds research in Mexico. There's the Pacific Rim Research Program. There's a water resources center; there's cancer research. There's [research on] traffic. There're dozens of these. Every one has a chair and members and a staff—we didn't have really a staff—and often funding to do something. But they've been around for so long many of them cease to be valuable any longer. A lot of them are in engineering and the sciences. But there's social sciences MRUs also.

So this new vice president said, "We're spending, whatever, fifty million dollars on these Multicampus Research Units." They considered the UC Marine Council as one of those. Even though we got money ourselves from the state, they decided, "We're going to recompete all of these. Maybe they will exist for one year, or two, or three." Everybody had a research theme, something hot and exciting. I said, "You know, after chairing the group for ten years, I didn't feel like writing another grant proposal to make a case that we're need to do this—we had some impact. So it faded away. People still remember and say, "That was really a good program—" I got to know all the directors pretty well. Just another one of those little things that came and went. I probably spent two or three hours a week on that for ten years that nobody knows about. You know, "Gary, we need help on this or here's a piece of legislation, can you look at it? Here are all the proposals. How do you want to review them?" But again, that's having a computer, getting efficient—get it out, get it back. I think my job [is] to get the

ball into somebody else's court as fast as I can. "What do you need? What do you want? What do you think? Let's move this forward." Not, "Let's think about it. Let's do a study." [laughs]

The Future

Rabkin: Well, speaking of moving forward, I need to let you go pretty soon. Before we stop, I just want to ask if there's anything I have not asked you about during these three two-hour interviews that you'd like to touch on for this oral history?

Griggs: It seems like we've really covered early childhood to school to evolving here. We covered a lot of ground today, too, on how do you do all this and why do you do it? I don't think so, Sarah. I think we really covered it thoroughly. I think the hardest thing for me is to somehow imagine that [at] some point I'm not going to be here doing this. Like being director, normally ORU directors are supposed to serve—well, generally for five years. They said except in extraordinary circumstances, you can serve up to ten years. So this is my twenty-first year. [laughs] I feel like my life has been so identified with this position, but as we can tell from all these other questions, I have a life outside of this as well, with columns and books and teaching. So if the dean said, "Gary, it's time for a new director," that's fine.

Rabkin: So far, though, nobody's breathing down your back to jump into your shoes.

Griggs: No, and I don't know whether anybody really wants to. At one point, Peggy Delaney, who had been in administration—she was interim provost/vice chancellor for a while; now she's vice chancellor for planning and budget, she said, "Well, if you ever step down, I'd really be interested in this." I think it's because people who become administrators, it's hard to go back and just be a regular faculty member. Many people often retire. Like Marty Chemers, who was acting chancellor, retired after that. Jim Gill in Earth science was associate vice chancellor for graduate instruction and research, and he stepped down and retired a couple of years later. I think it's a bit of a letdown—I think Peggy after being vice chancellor came back and taught. I think her research program sort of scaled down and she just likes being at the center of things. Lisa Sloan sort of took a little while. She was graduate dean for five years. She came in as an IMS researcher, we brought her in. Came up to faculty, doing really interesting stuff on climate. But I think when she came back down after being a dean—I think at the time she loved it. She was meeting with vice chancellors and deans. But I think it was really hard for her when she stopped. All of a sudden, "What do I do now?" Now she's getting back into teaching and graduate students.

I've tried to maintain teaching and research and writing, as well as doing this, so I don't feel like—most people I think if they're in a current cutting edge field—[after] five years administering, it's really hard to step back into where you were before. I think the start-up and getting money and students. I've kept five or six graduate students the whole time I've been director and taught a regular load, so I don't feel like I've left my intellectual roots behind. Anyway, thank you, Sarah. That was fun.

Rabkin: Gary, thank you so much for giving us all this time. I really appreciate it.

About the Interviewer and Editor:

Sarah Rabkin taught in UC Santa Cruz writing program and environmental studies department for over twenty-five years. She holds a BA in biology from Harvard University and a graduate certificate in Science Communication from UCSC. Her book of essays, *What I Learned at Bug Camp*, was published in 2011.