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The UCSC Arboretum: A Grand Experiment

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Authors

Reti, Irene
Regional History Project, UC Santa Cruz Library
Hall, Brett
[et al.](#)

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Introduction

In 1964 Founding Chancellor Dean McHenry accepted a gift of approximately eighty *Eucalyptus* tree seedlings from Max Watson, California's leading authority on *Eucalyptus*. In the summer of 1965, just before the campus opened its doors to students for the first time, volunteers planted these seedlings around the gas storage tank near the intersection of Western Drive and Empire Grade.¹ The original site for the UCSC Arboretum began with this grove of *Eucalyptus* and later grew to eighty-five acres. Under the leadership of founding curator and director Professor of Geography Ray Collett for its first thirty-three years, the Arboretum grew into one of the premiere arboretums in the world, known for its collections of Australian, South African, New Zealand plants. Today the UCSC Arboretum is an invaluable resource for the campus, the surrounding community, and far beyond. Chronicling the development of the UCSC Arboretum over the past forty years, this trio of oral history interviews offers the in-depth reflections of three key individuals in the Arboretum's history.

It would be perhaps useful to first contextualize these interviews with a basic overview of the Arboretum's history and some other background information. Please also see the timeline in the appendix to this volume for more detail. Researchers will also want to consult the Arboretum's library for their

¹ According to the fall 2007 Arboretum *Bulletin* there are now "65 unique species in this grove. The large spinning gum *E. Perriniana* is likely the oldest member of the species in the state, while the two massive karris are likely the tallest members of their species in California. All the diversity in this grove, in combination with the different species growing within the Australian collection and garden, makes the Arboretum's collection one of the best, if not the best, collection of living eucalypts in the United States...Future plans include labeling all the trees and creating interpretive signage and informational brochures about the Grove."

complete archive of publications, photos and other resources, as well as the Arboretum's website which has an illustrated history of the Arboretum at: http://www2.ucsc.edu/arboretum/hist_exhibit/

The first phase of the Arboretum's history, 1965 to 1974, was primarily dedicated to acquiring plants, organizing them, and creating the various gardens. In August 1967 McHenry charged the Arboretum and Plantations Committee with advising him "on the development of plantations for both scientific and horticultural purposes and the conservation and use of what we have." That committee was chaired by the distinguished UCSC professor of biology Kenneth Thimann, and its membership, in addition to other UCSC faculty and staff such as Jean Langenheim and Tony Hobbs, included Dean Emeritus of Agricultural Sciences at UC Berkeley; Knowles Ryerson, UCLA professor and horticulturalist; Dr. Walter Lammerts; Robert Burton, a former Santa Cruz County supervisor; and Maunsell Van Rensselaer, director of the Saratoga Horticultural Foundation.

Dean McHenry and his wife Jane remained intensely involved in the Arboretum even long after McHenry retired in 1974. McHenry had grown up on a farm in Lompoc, California and his deep interest in agriculture was reflected in his support of the early UCSC Chadwick Farm and Garden Project as well as his own winery. The McHenry's' passion for Australian, New Zealand and South African plants stemmed from extended periods of time they had spent in those countries earlier in their lives. Both Dean and Jane greeted visitors once a month and volunteered at plant sales. Dean convened the Arboretum Associates and

edited the *Arboretum Bulletin* for ten years. One must not underestimate the impact of his chancellorial support on the development of the Arboretum.

In his writings in the early newsletters and other Arboretum publications, Ray Collett contextualized the Arboretum within the rich agricultural traditions of the Monterey Bay area. He mentioned growers such as plant breeder Frank Reinelt who developed the modern tuberous begonia at the corner of Mission Street and Western Drive in Santa Cruz; rose, camellia and leptospermum breeder Walter Lammerts; the Rod McLellan Company, a orchid growing firm in Watsonville; Brown Bulb Ranch, then one of the world largest dealers in bulbs; and the Nakashima Nursery Company. Collett also recounted the long agricultural history of California's Central Coast, with its artichoke, Brussels sprouts, strawberry, lettuce, garlic, and apple growers.

As a biogeographer, Ray Collett understood that the Arboretum's physical location, with its dramatic view out over the shimmering Monterey Bay, is not just aesthetically pleasing, but provides a unique diversity of soil types that provided the foundation for developing this extraordinary plant collection. "Most of the botanic gardens and arboreta of this world are in monotonous places and have beneath them just one material (the rock underlying the Arboretum includes granite, schist, limestone and several different sandstones, overlain in places by alluvial and marine terrace deposits), or slight variations on one material," he wrote in an early memo.² "It indeed might be instructive for anyone to look for a property with comparable geologic diversity. Where would

² Memo from Ray Collett to Acting Dean George Gaspari, October 15, 16, 17, 28, 30 and 11/1/77. This series of memos from Collett that responded to a request from Academic Vice-Chancellor Eugene Cota-Robles for a review of the Arboretum, are a good resource for researchers wanting to understand Collett's vision and the challenges the Arboretum faced during that era. They are available in the Jean and Bill Lane Library at the Arboretum.

one go? If one found it, could it be bought? Would it be near services? Would it be near a university?"

In addition to this variation in geologic formations, the Arboretum benefits from remarkable climatic diversity. While the steep, south-facing slopes are nearly frost-free, the frost hollow near the dam (an abandoned City of Santa Cruz earthen dam and reservoir built on Moore Creek in the late 19th century) freezes nearly on clear winter nights. The higher elevations of the Arboretum receive more rainfall than its southern edge bordering Empire Grade. "What does this diversity mean?" Collett asked. "It means places for calcophiles, places for specimens with mandatory chilling requirements, places for almost everything. . . . The Arboretum quite likely occupies the only and last possible major site in the United States where one might readily grow . . . diverse genera out-of-doors nearly side-by-side. Such a propitious site for the development of an Arboretum is unlikely to become available ever again."

Collett pointed out that the Arboretum would help UCSC build bridges to the surrounding communities. "One way that the campus can relate to the people around it is to talk with them about plants, to show them plants. Indeed it would be possible for the Arboretum Curator to talk to the public about plants all day and all night," wrote Collett.

Without Ray Collett's thirty-three years of leadership the Arboretum would not be the astonishing place it is today. We were not able to interview Ray for this volume but we quote from Ray extensively in this introduction and have reprinted several of his beautifully written articles from the *Bulletin* in this volume in order to represent his voice here. And fortunately we were able to do an oral history with Brett Hall, who worked with Ray for many, many years.

Brett Hall was the first of our three narrators to arrive at the Arboretum. Brett came to UCSC in 1975 to study biology. A local Monterey Bay resident, Brett grew up in Carmel and first took ornamental horticulture from Al Graham at Monterey Peninsula College. After persistently looking for a place at UCSC where he could work as a gardener using his work-study grant, he met Collett and began working with him as the Arboretum groundskeeper. Hall eventually became the caretaker and manager and now holds the title of Director of Horticulture and Living Collections.

Brett has worked with tremendous dedication to develop the Arboretum's collections, programs, and curatorships over the past thirty-two years. He lives on-site at the Arboretum and has raised several of his children in the garden, carrying them on his back on the Arboretum's intricate paths. He has mentored many students, helped introduce several cultivars to the nursery trade, and built national and international collaborative relationships with other botanical gardens and key individuals in the field. He was also critical in building relationships with the campus administration. I interviewed Brett Hall on July 24, 2006 at the Arboretum.

The second individual featured in this oral history is Phyllis Norris, who came to the Arboretum as a founding member of the Arboretum Associates in 1976, and in 1977 became the Arboretum's chief docent, organizing and leading tours until very recently. Norris was born in Washington, D.C., the daughter of the *Christian Science Monitor* reporter Richard Strout. She attended Goucher College in Towson, Maryland, a rural place where she studied natural history by

taking “notes and go[ing] off on long hikes through this beautiful campus.” While in college, she spent three summers studying marine botany at Woods Hole. She did a year of graduate work at Yale and then came to Scripps Institute of Oceanography to study photosynthesis in marine algae with Francis Haxo. Later, moving around the world with her husband Ken Norris, an eminent naturalist³, Phyllis became intimately familiar with home gardening in Hawaii, Chile, and southern California, before they moved to Santa Cruz in 1972.

Phyllis’s love for and knowledge of botany and natural history infused her tours. She brought her warmth to her work at the Arboretum as well as to this historical project. This oral history captures the flavor of her tours, as Phyllis talked enthusiastically about many plants and collections of the Arboretum. She is a dynamic storyteller and learned how to “hang a story on a plant” from her mentor Ginny Hunt. Norris was a volunteer in plant propagation, initiated and worked on a large plant labeling project, and served as president of the Arboretum Associates in the early 1990s. She is still involved with the Arboretum over thirty years after she walked its paths for the first time. There is even an Arboretum cultivar named after her, *Salvia* 'Phyllis Fancy' (Phyllis Fancy Sage).

Norris was first interviewed by Randall Jarrell, former director of the Regional History Project, on March 24, 2003. It was Jarrell’s idea to inaugurate this oral history on the Arboretum. I want to thank her for her work and inspiration in beginning this project. I conducted a follow-up interview with Phyllis Norris in July 31, 2007 at her house in Bonny Doon, a home she shared with her late husband and still shares with several of her family members. Her

³ See Randall Jarrell, editor. *Kenneth S. Norris: Naturalist, Cetologist and Conservationist, 1924-1998: An Oral History Biography* (Regional History Project, University Library, UC Santa Cruz, 1999) <http://library.ucsc.edu/reg-hist/norris.html>.

front yard bursts with plants, including many she bought at the Arboretum. The utterances of peacocks, tropical birds, and a family dog made this interview a unique recording experience.

The final individual in this oral history trio is Daniel Harder, the current director of the Arboretum. Born in a suburb of Chicago, Harder grew up during a time of rapid suburbanization and witnessed much erasure of the native landscapes of that region. He graduated in biology from the University of Wisconsin, Madison and studied under the well-known botanist Ray Everett. He then went on to complete his Ph.D. at UC Berkeley under Herbert Baker and specialized in Papilionoide, an “underutilized crop plant of great potential economic value.”

Harder achieved a distinguished career in international botanical research well before coming to UC Santa Cruz. He conducted fieldwork on the winged bean in Zaire and participated in several internships at the Pacific Tropical Botanical Garden in Kauai. While in Kauai he met Peter Raven, the director of the Missouri Botanical Garden (who also had connections with the early UCSC Arboretum). Raven encouraged him to come do his field research under the auspices of the Missouri Botanical Garden, which Harder did beginning in the fall of 1990. He was associated with that institution for the following eleven years, conducting research in various countries, including Vietnam, where he collaborated with the Institute of Ecology and Biological Resources (IEBR), helping to rebuild ties between North and South Vietnamese botanists after the Vietnam War. In 2002 Harder discovered a new variety of conifer *Xanthocyparis vietnamensis*, the Golden Vietnamese Cypress, near the border with China. His

narration of these years in the first half of his oral history is a fascinating story of international botanical research.

Looking to settle into a more stable place to raise his family, Dan Harder applied and was hired for the position of executive director of the UCSC Arboretum. He arrived in October 2001 to join an arboretum facing a period of both challenge and potential. Ray Collett had resigned as director in 1997. Ron Enomoto had served as interim director. In 1994 the campus had begun a five-year phase out of funding for the Arboretum. While a 1997 David Packard Foundation provided a three-year grant that helped the Arboretum weather this loss of state funding, significant financial challenges still faced Harder when he arrived. On top of that there were political challenges. The interim director had capitulated to pressure to make part of the Arboretum's banksia field available for construction of a faculty housing project, and it was only the activism of the Arboretum Associates that prevented this from taking place. As Harder frankly states in his oral history: ". . . nobody was really sure that the campus was going to do. There was some insecurity about the position. But the commitment of the staff and the expertise of the staff, I mean, you can't disregard 139 years of service within five curators."

In his interview Harder emphasizes the importance of three major aspects of the Arboretum's mission: research, education and outreach, each of which is conceived of and achieved within the context of the Arboretum's botanical collections. "The value of the collection in and of itself is our main mandate, keeping it together, maintaining it, growing it," said Harder.

He has also focused on improving the Arboretum's financial security. In 2003 Tad Sterling was hired as Arboretum's first development director. Support

from the Arboretum Associates and other donors remains critically important in an era of shortfalls in state funding.

In 2005 the Arboretum received an Organizational Effectiveness Planning grant from the David and Lucile Packard Foundation to aid with an intensive strategic planning process. This Arboretum hired landscape architect, Ron Lutsko, and consultant Gary Stern who used the Peter Drucker process to engage the Arboretum's constituency about future plans. Local landscape architect Mathew Thompson facilitated a planning charette with seventy individuals who discussed possible directions for the future. This planning process was recently completed.

In the three interviews which I conducted with Harder on July 18, 2006, July 20, 2006, and July 26, 2006 he discusses many aspects of the Arboretum including the relationships with campus administration; the importance of collaborations between the Arboretum and other botanical gardens; the growth of the Arboretum Associates; the success of the Koala Blooms Program in introducing Australian cultivars to the nursery trade; developments in outreach, priorities in long range planning for the Arboretum, the state of the Arboretum's library; and efforts to promote ecological sustainability in facilities and programming.

Harder is inspired not only by the plants in the Arboretum's collections, but also by the people who work at or visit the Arboretum. He concluded by telling me, "The plants are part of it, but it's the people . . . I love coming to work, just because I enjoy working with plants, and I enjoy working with people who like plants. They're nurturing. They're caring. If you're sick they're like, "Ohhh. You just need some fertilizer."

Now forty-three years old, the UCSC Arboretum grows nearly ten thousand plant species from around the world. Over 2,500 ornamentals were originally imported by the Arboretum, and an extensive California native plant collection has generated many new native plants for California gardens. Seventy thousand people visit the gardens each year, an average of about one hundred and seventy people a day. Forty to sixty students a year are employed in work-study positions. Arboretum staff and volunteers teach undergraduate classes, make presentations in K-12 classes in area schools, offer plant consultations to members of the community, provide legal testimony on rare species, and participate in international research efforts and local conservation initiatives. We hope that this oral history is useful for anyone seeking to understand how this unique arboretum came to flourish at UC Santa Cruz.

Thanks to Brett Hart, Phyllis Norris, and Dan Harder for taking time from their busy schedules to participate in these interviews and then to review their transcripts. Thank you to student editors Lizzy Gray and Andrea Lowgren, who helped with production. Copies of this oral history are on deposit at the Jean and Bill Lane Library at the UCSC Arboretum; in the Bancroft Library, University of California, Berkeley; in Special Collections and the circulating stacks at McHenry Library at the University of California, Santa Cruz; and on the Library's website. The Regional History Project is supported administratively by Christine Bunting, Head of Special Collections and Archives, and University Librarian Virginia Steel.

—Irene Reti, Director, Regional History Project

November 2007

Early Background

Reti: Today is July 24, 2006, and I am in the UCSC Arboretum library with Brett Hall. So Brett, let's start with some of your early background before you ever got here—like where you were born, where you grew up, how you got into plants.

Hall: Okay. I was born in Carmel in 1955 and I was raised along the coast of California. I moved up and down the coast with my family. We returned to Carmel when I was in high school. I was an avid surfer, backpacker, bicycle rider. And I started a gardening business.

I started to get interested in plants pretty much in high school. I mean, I was interested in nature and hiking, but I started getting interested in the cultivation of vegetables and organic gardening and things in high school. I had a great teacher, Al Graham, who was the high school biology teacher, and the students had a project growing gardens on the Carmel High School campus. I also took a class with Al Graham. He taught ornamental horticulture at Monterey Peninsula Junior College. Al lived in my neighborhood, so I'd ride to the class with him in the evenings. That was very pleasant. He was the first person that gave me an official nod that being a gardener was an okay profession. He said that it was a good, wholesome, healthy, respectable kind of thing to do in life. It gave me an early go-ahead. So I had that in my sights, even though I was very interested in marine biology, and broadly in biology and other things, which I went on to college for. But in the back of my mind, I was going to be a gardener.

And so I started a gardening/landscaping business in the Monterey Peninsula, just using my bicycle. I would bicycle around the peninsula and work at the various clients' houses. There were a lot of rich clients around Pebble Beach, Carmel Valley, Carmel Highlands.

Then I went off to college at Sonoma State and studied biology. While I was away, my older brother, who had left school a little early, he was studying mass communications at Loyola University, he came back and took over the business, and so I'd come back and work on the weekends with him.

Following that, I went to Santa Cruz. When I arrived here at UC Santa Cruz, I inquired with the campus about working with the Physical Plant, Campus Facilities, taking care of gardens. And they never wrote back. So I came to visit the campus in the summer of 1975 to try to find a job ahead of time, because I had work study, five hundred dollars. Big time, you know!

Reti: (laughter) Were you coming here to go to graduate school?

Hall: No, I was coming here to finish my undergraduate degree in biology.

Reti: So you were transferring from Sonoma State.

Hall: Yes, I was sort of working my way back to the coast, in a way. I came and visited Crown College. I got an appointment with the bursar. His name was Don Van Den Berg. I walked into his office up there at Crown College, because I was going to be at Crown College, and I asked him if they had anybody hired to take care of the gardens around Crown College. He laughed. He said, "No, Campus Facilities has that all under control." So then I said, "Well, are there any

professors in biology who hire students for research?" I was rather naïve about the whole program and how things worked. I was twenty years old at that time. He thought for a moment and he said, "Well, you know, Ray Collett is starting an arboretum. He might need people." And of course I asked, "Well, what's an arboretum?"

Reti: (laughter)

Hall: I wasn't familiar with the term. He explained that it had to do with growing plants and so forth, and he had this property down here. Then he pointed up to Ray's office, which was right off the courtyard. And as luck would have it, Ray was there in his office when I wandered on in. I introduced myself, and Ray said that I should come back when school started and he'd see if he had the matching money for my work study grant. So then I went home, and you know, I just had this sense that I would end up in the Arboretum, not even knowing where it was. I drove around campus on my way out, and I thought, oh, maybe it's out there in those fields, or something like that. I had this sense that something really interesting was going to happen.

Coming to the UCSC Arboretum

So I went back for the summer, and came up and kept wandering over by Ray's office. He wasn't there at the times I went to visit, so I'd leave notes. And then I'd leave another note. Eventually he said, "Yes, I got all your notes. I found the money and we can go down there and I'll show you what's going on."

So we came down. That was prior to the time that we had actually moved into the domes and the lath house, the old lath house and the lower office, which is still there. He came down with me and basically showed me where the tools were hidden in the bushes.

Reti: (laughter)

Hall: He waved an arm out to the Protea Garden and said, “Well, I’m sure you’ve seen weeds before.” And that was kind of the indication to go out there and weed.

Reti: Wow.

Hall: So that’s what I did for the first several months. I just weeded and weeded and re-weeded. Then, little by little, I started meeting some of the other students who were here. They had heard about me, and I had heard about them. Steve Brigham, he was already here then. Linda Jolly was here. Linda was the standing student, but she was the groundskeeper as well. There was one salary that the Arboretum had—Ray, being the director, [had] just a small stipend, which, by the way, was \$200 stipend a month, \$2400 a year. Which was the same stipend he had for the entire tenure of his directorship.

Reti: No kidding. Oh, my gosh.

Hall: \$2400 a year was his salary for his thirty-five year tenure at the Arboretum, or career at the Arboretum. He was paid as a professor. That’s a remarkable fact that few people really ever knew, so I thought I’d put that in the [recording]. But anyway, he is remarkably interested in the Arboretum as a labor of love, and

interest, and genuine calling, and not so much because of any salary involved. But he did have a salary from the university. I mean, not everyone could work for \$200 a month, if that's all they got. Hardly anybody could.

So I started working as a groundskeeper. And as the months went by, and we moved into the domes down there— Previously, the Keeler-Wolfs had been in the South Pacific. They had graduated in, I guess it was the spring of 1974, and they were the first students [Todd and Virginia Keeler-Wolf] to graduate with the degree of natural history [in Environmental Studies]. They had been sweethearts in grammar school up in Corning, up in the Yolla Bolly range, the North Coast range area. Their senior thesis was [on] the natural history of the Yolla Bolly Mountains. It was this big, thick volume, an inch and a half or two inches thick. It covered everything—climate, history, geography. And they had actually had a zest for trying to find Bigfoot at one point, which was kind of a tongue-in-cheek humor. And curiously enough, when Todd Keeler-Wolf had finished his first copy (this is in the last several years) of the vegetation of California, plant communities and so forth, he brought a copy for Ray.⁴ Ray wasn't here, but I asked him to sign it for Ray. He signed something to the effect of, "Well, we've come a long way since looking for Bigfoot." (laughter)

Anyhow, so Todd and Ginger had gone off to the South Pacific. Prior to their departure, they asked Ray if there were things that they might be able to collect. So he went out and did a lot of homework, equipped them with letters of introduction for various places, and maps with the localities of myriads of rare

⁴ Robert Ornduff, Phyllis M. Faber, and Todd Keeler-Wolf, *Introduction to California Plant Life*, (UC Press, 2003).

conifers and primitive angiosperms. So that was the origin of that particular emphasis of our collections, was to go out and bring in these very unusual things that were of keen interest to plant evolutionary biologists and wood anatomists. They were things that really weren't available in any botanic garden in the world, for the most part. The Keeler-Wolfs were incredibly resourceful and successful at actually finding these things, and getting the proper permission to collect them, using the letters of introduction. It was a different world back in the 1970s, with respect to collecting.

Reti: Yes, I want to ask you about that [later].

Hall: Very, very different. Much easier in many respects. And anyways, so they sent things back to Ray, rooted cuttings, bits and pieces of things, seeds and so forth. Ray would take them to the Thimann Greenhouse. He was rooting them there. He would be there several times a day, running back and forth. Tony Hobbs was the Greenhouse manager then, and so Tony Hobbs was instrumental in seeing them through those first times as well. But it was mostly Ray by himself.

Reti: Because you didn't have the facilities down here to be doing that kind of propagation?

Hall: We didn't have any facilities here. Those facilities started in, I think it was the summer of 1974. It was a Minor Capital Improvement Grant. It was just prior to my arrival, the year prior. Dean McHenry, in one of the last things he did while chancellor, for the Arboretum anyway, was to further along the request for that, what they called Minor Capital Improvement grant. It was for the three

domes, and the lower office, and then what was our old redwood lath house. So that went up in 1974.

When I arrived in the fall of 1975, the first project during that Christmas break was to move all those plants that Ray had been taking care of, and then others too (there was the Keeler-Wolf collection and there were other things as well) into the lath house. So we did that. Then we planted lots of things in the greenhouses and started things rolling.

About that time, I started camping in the Arboretum, in January of 1976. I was living in my Volkswagen anyway, up on campus, and sleeping in the nice forest behind Crown College. So just one night over Christmas break I decided to pull into the Arboretum. There was no gate and I just slept. I remember a couple of days later Ray came along. He had heard about it from some of the other students. A couple of days later he presented me with this letter that he had written to the Campus Police, indicating that I was the new security guard of the Arboretum.

Reti: (laughter)

Hall: That was my introduction to my caretakership, which is still current today, thirty years later, at the Arboretum. Anyway, so that was interesting and lots of fun. So I just was here all the time, working with Ray.

Our first project [was] the Australian collection. So we started doing that. January of 1976 was the first shipment [of plants] from Australia that came directly to the Arboretum. Ray had prior to that, over the two years previous

thereabouts, been getting shipments in from the Elliots. Australian tube plants is what it was called. They were getting a few shipments in cooperation or collaboration with the Saratoga Horticultural Foundation.

So that's a little bit of the background, the early stuff. That's how I came into the Arboretum, as a student on work study, and then right away grew into being here all the time. I was very fortunate that there was such a pioneering opportunity, and lots of room for somebody who was eager, with a lot of extra energy to burn, with no ties anywhere.

Reti: That's wonderful.

Hall: So it worked out well, very lucky for me, and I certainly enjoyed those early years.

Dean McHenry

Reti: Tell me more about Dean McHenry's involvement.

Hall: Well, from my first time in the Arboretum I remembered him. He had retired as chancellor just previous to my coming here. I remember that summer, I think the summer of 1976, they decided to have the chartering of the Arboretum Associates. We had already moved into the lath house. On that particular day, Dean McHenry indicated to the first members to go on down to the lath house and Barry Bruce (another student who worked here) would have some plants for them. So Barry started unloading the lath house. None of this was planned. I remember what they got was *Pachystegia*, which is a really beautiful New Zealand coastal rockery plant. I remember lamenting that so many of those were

just let go on a moment's notice. That was kind of fun. That's sort of a little tongue-in-cheek.

But anyway, that's my first memory of Dean McHenry. He was very involved, obviously, in trying to support the Arboretum. That was his role that he was taking on for the Arboretum. I'm sure, as we all know, he was doing that in lots of places on campus. But certainly the Arboretum was a special interest of his. He loved Ray Collett, I know that. He loved working with Ray, and he loved everything that Ray had to offer, and wanted to support that.

And the only curiosity was, why didn't, while he was chancellor, supply more resources to the Arboretum? That's always been the burning question.

Reti: Yes.

Hall: I thought about this very recently, when in the last couple of weeks we had that wonderful dedication of the amphitheater, which was very rich for me on a personal level, and for the Arboretum I think, too, a very rich, rewarding experience, to have that dedication. It was a very emotional event. I could talk a little more about that later.

But anyhow, so that had come to mind for me in the last couple of weeks in discussions with students, and I would think out loud about this one question that a lot of people have asked me. And the answer, I don't know if it's *the* answer, but *an* answer is that I think perhaps Dean McHenry in his vision of the Arboretum and Ray and all—may have known or seen that if we were forced to be resourceful we would experience a whole different evolution than we would

otherwise. If you look at the Arboretum, and what collections and the way we've gone about getting them, we've been a very adventurous and resourceful arboretum. If we were attached to a unit very closely and tied to them administratively and functionally with strings attached and special duties and things we were supposed to perform, we may never have done what we were able to do, because we already had our marching orders. But here we were free of any true marching orders from on high, so to speak. Ray could just use his imagination to amass what was really a very unique kind of vision and collection that hadn't been done before. And it did make a huge, enormous splash on horticulture in California and in the way people started doing a lot of things.

This whole Australian, South Pacific— It wasn't just the fact that we brought in those plants from those areas. I mean, that was smart because of our climate and our special site here at the Arboretum, but also, by inviting this friendship and collaboration with the Australians during a time that they were experiencing their own native plant movement, which was the same time that, you know, during those drought years of 1975 and 1976 and so forth, California natives were coming in. So there was a lot of balancing. It wasn't to replace the California native movement here at the Arboretum with Australians, but what I learned most importantly from the work we did with Australians was the way that they worked with their native plants. There were things that they did with their native plants and an approach to working with their native plants that we could carry with our native plants. That was even more important than the Australian plants, for me.

Rodger and Gwen Elliott

Reti: Can you say more about that?

Hall: Well, with Rodger Elliott. We had the occasion to get to know Rodger Elliott very closely. Back and forth, lots of trips. He'd come over here and we'd go out in the California native bush. And we'd go over there and we'd be in Australian bush. It was fun to share, and to see how he went about selecting plants from their flora. They've been highly awarded, he and his wife Gwen, with conservation awards from the queen and so forth. I don't know if it was from the queen, but they've been knighted. That's a very big thing in Australia. They've been knighted for their work with conservation of Australian plants. They've been single-minded. He and she and their friends are very knowledgeable about the world's flora, but it's all about the Australian flora. That was very attractive. And for me, I did it because I was in love with my job and it was job-related, and I had the opportunities to work with both the New Zealand and Australian floras and the origins of our collections. But the underlying importance to me was a way of engaging with a native flora. I learned a lot about working with California plants through working with Australian plants. To me, that was a more important kind of fueling skill. Now we are doing it all. We are doing California, Australia, New Zealand. It's all part and parcel of what we do.

Ray Collett

Reti: Tell me more about Ray Collett. What was it like to work with him, to go on a plant collecting trip with him?

Hall: Well, Ray was, and is, really focused. He has extraordinary perceiving skills, both [in] his ability to pick up fragrances and what he sees and what he remembers. He has a unique perspective on the natural world. It's always surprising and refreshing. He always seems to find a new perspective. So the thing that's so predictable (if there is anything predictable about Ray), is that there're going to be some surprises in there as far as the things that he notices in plants, and things he gets interested in. [Ray is] very much interested in the occurrences of things, a biogeographic approach, looking at their niche and habitat and the plant associations from the point of view of understanding how they grow in the wild and what we can learn through that in order to grow them in cultivation. Going out with Ray was always fun. I enjoyed that immensely. I was fortunate to be able to do a lot of that in the early years. We traveled. That's how we bonded in our working together in the Arboretum. We'd take these trips for a week or so up into the Klamath Ranges, and a couple of times all the way up to northern Washington. He's introduced me to so much about our flora, and so much biogeography. I was able to get these free lectures, ongoing, all about biogeography and plant evolution. We'd see things, and we did a lot of plant collecting together. I very eagerly fell into my role of collecting, and putting things in the coolers in bags and taking notes and keeping track and all the rest. It was great. It was really great.

Ray's intense love of the natural world, and his ability to see things that most normal people like me don't see— To be able to get that from him, that was always a wonderful experience. He would see things and notice plants growing in places that you might not see. Then we'd stop and go out there. He notices

things. He can smell things from afar. He'd smell something and we'd go find that fragrance. Or he would key into a variation in flower size, and then he would come back and he'd bring these ten examples of all these very divergent extremes within that population.

One example would be his interest in the genus *Correa*, which is a member of the Citrus family from Australia. And there, citrus are a prohibited entry into the United States and we were able to get a special departmental permit from the USDA to import the Rutaceae. That's a whole story in itself, how we were able to get that permit, and the history behind it. But anyway, he was very fascinated with *Correa*, and there was one trip where we went to Australia largely in pursuit of *Correas* in southern Victoria and South Australia, and we went out to Kangaroo Island. I remember Ray's absolute fascination on the variation in *Correa pulchella*. I still have this photo of all of these different petals—ranging from orange to red to white, and from three inches to a quarter inch—all lined up on the page. Those are the kinds of things that he noticed. Then he would also be noticing which ones are more fragrant, and might be more attractive to birds. He's written a book, he hasn't published it, but it's this huge manuscript on fragrant plants of the west. He's done a lot of things. He's written a book essentially on the genus *Trillium*. This is all since he stopped as the director. The genus *Trillium* locally. It's very exciting to see what he's up to. Always something new. He's interested in violets and lots of things.

Other Key Figures in Early Arboretum History

Reti: Who were some of the other people who were active at the beginnings of the Arboretum? I know Hal Hyde was around.

Hall: He was more active with the Friends group. He was the first president of the Arboretum Associates. Let's see. Phyllis [Norris] became active early on. She was in the first troops of the Arboretum Associates. There was Linton [von Beroldingen]. He was one of the early presidents, very eager when we were just taking off with all the Australian plants. He was always here leading lots of tours. These were folks who were in the Friends group. Jean Beevers was here from the very beginning of that organization. And her husband, Harry Beevers, of course was the eminent plant physiology professor. Kenneth Thimann—very involved. He was always around. I remember getting to know him right away. He was really a gentleman and very encouraging. He came from another culture, in terms of his background. In the nicest way, sort of the English aristocrat. I remember when I had my oldest son and when he was six months, eight months, and he was on my back at the Arboretum. I was standing around with Kenneth Thimann and Ray Collett, and I can remember Kenneth Thimann asking me when looking at my son Tommy and saying, "What's he going to be when he grows up?" (laugh) I thought, well, we don't do it that way. (laughter) And then Ray said, "Well, I think he's going to [just] live for a while." That was really sweet.

Reti: That *is* sweet.

Hall: So Kenneth Thimann. Gosh, there's lots of people that were—Ginny Hunt. She was one of the early staff members. She was very important in the

development of our Australian collection, especially, but of all the collections. She works at Suncrest Nurseries and has her own business down in Watsonville. She's doing really great. But she was key in the early years. Lots of students, whom I probably couldn't name. Barry Bruce. I mentioned him earlier. He was one of the early students. He's a professor of plant physiology at Tennessee now, or something like that. Luen Miller. He was here in those early years as a student. He now is the co-owner of Monterey Bay Nursery. Jeff Rosendale came on as a Friend a little later. He's been associated.

Steve Brigham I mentioned. He was one of the early students. He was here already when I started working. He was very interested in subtropicals. This climate was a little iffy for a lot of the things he wanted to grow. So he ended up wandering down to San Diego. He has a very successful nursery and community that he works within down there. He's one of the major horticultural kingpins in that whole area. Buena Creek Gardens is the name of his nursery. He was at Quail Botanic Garden for a while. He's written a couple of books and done very well for himself. I remember one of the interesting comments that he made when we were first here working on things together. We were talking about the future of the Arboretum. We were just like twenty year olds, you know. I said, "You know, when we look back, we'll look back like pioneers." And he said, "Yes, and we'll be dead like the pioneers, too." (laughter) I thought that was humorous.

Reti: (laughter)

Hall: Let me think. Anybody else?

Reti: I have a little list here, if that would help you.

Hall: Go ahead.

Reti: Jean Langenheim.

Hall: She was one of the founding members. In the early days they had the Arboretum Plantations Committee, which was an assemblage of people in the greater botanical, horticultural world that were interested in the development of the Arboretum, and with faculty. There were a few faculty who were involved like that: Kenneth Thimann, Jean Langenheim, Bill Doyle at various times. There were probably others in there too. Hal Hyde would have been on that committee while he was president. It was kind of a group. There is a group like that now. It's been changed. It's the faculty advisory. They don't ever meet though. And they didn't meet much either. Once every six months. There were some significant horticultural nursery people in that. Nevin Smith was, and still is, a good friend. He was involved in the early years. He's the director of horticulture at Suncrest Nurseries. He just recently finished a wonderful book entitled *Native Treasures*.⁵ Let's see. Ray Williams from Watsonville. He and his wife, Rose, had a marvelous little nursery. They were influential people that we turned to in the horticultural world. There was Ken Taylor at Taylor's Trees and Shrubs out in Aromas. He was influential and we got together with him. All these people around were guiding folks. Marshal Olbrich and his partner [Lester Hawkins] up there in Sebastopol—Western Hills Rare Plant Nursery. Ginny Hunt went and worked for them for a while. She worked with Marshal.

Reti: Knowles Ryerson.

⁵ *Native Treasures: Gardening with the Plants of California* (University of California Press, 2006)

Hall: Yes. He was kind of more of a name, with me anyway. He may have had some collaboration with Ray in the very early days. I think there's a *Grevillea* named after him.

Reti: Well, to me that's a great example of how the Arboretum was tied in with the larger community in Santa Cruz. Not just the university, but from the very beginning.

Hall: Yes, it had a lot of friends from all over. As soon as we started up, then a lot of people became interested. They had heard about the upcoming Arboretum. So we got connected. There's been a whole group of people throughout the Bay Area, throughout California, and then internationally as well, with the friendships that we started up, particularly [with] Australia, because Rodger and Gwen Elliott came back and forth and we had many symposiums that featured them. So there was this whole very friendly international association that had lots of spinoffs.

The Permit to Collect Rutaceae

Reti: Can you tell me the story about getting the permit for the Rutaceae?

Hall: Oh, for the Rutaceae? Well, okay. The Rutaceae, again it is in the Citrus family. So it's prohibited. And it's been highly sought after, all the members of that family in Australia. We have *Correas*, and *Boronias*, *Croweas* and a number of others. *Zierias*. These things are very interesting from a horticultural point of view. And we weren't able to bring them in, except from seed.

So let me try to think when this was. There was a cut flower grower in Watsonville, Gary Brothers and his brothers, and they had the Brothers Brothers. They were very conservative politically, and very well-heeled in the Reagan administration. One of the brothers was working for USAID in agriculture. What happened was when Reagan was president, whenever the dignitaries from other countries came to the United States, he'd invite them to bring a tree and they'd plant it in Washington. So on the occasion that the prime minister in New South Wales was coming to visit, there was a plan for him to bring a tree. Of course he was going to bring a eucalyptus, which is prohibited as a live plant. You can bring the seed but you can't bring the—

Reti: No kidding. I never would have guessed that one.

Hall: Yes. So he was going to bring a eucalyptus. Of course the USDA said, "No, we can't do that. We can't break our own laws!" So then they went through their book. (I guess they have a book and they find all their friends.) "Who are our friends in agriculture? Oh, Doug Brothers." So they called Gary, and Gary called me, and he said, "Hey, listen. They need this eucalyptus. They need a eucalyptus that's going to survive in Washington." I said, "Well, there're probably not very many that will. But the one that you would want to use would be one of the snow gums, or the snow gum *Eucalyptus pauciflora*, and we have the *Eucalyptus lacrimans* and there're a number of others." We happened to have some, so we gave them to Gary and he gave them to whomever he gave them to.

And then what happened was something went wrong and he wasn't coming then. So he went and met with George [H. W.] Bush, the vice president at the

time. And instead of getting planted in the front White House lawn, they got planted in the Washington National Zoo. I don't know if they survived. But anyway, to make a long story a little longer, then Gary Brothers turned around and asked the USDA. He said, "Well, now that I've helped you, I need you to help me." Here he is, a private cut flower grower in Watsonville. He said, "I want a permit to import Rutaceae." So they gave him one. Which was very highly unusual. They really blundered by doing that, because you know, what's the rest of the world going to think? All these other nurserymen wanted to get their permit. So then Ray, being very astute, he realized that the USDA had gotten themselves backed into a bit of a corner. He suggested to them in just the perfect way that they could find their way through this by giving the Arboretum a permit, and then we could do it for the public good.

Reti: Ah!

Hall: So that was our permit. And then we were able to bring in hundreds of these wonderful members of the Rutaceae, a handful of which we've introduced [as cultivars]. You can't introduce everything. And they were on quarantine for a couple of years. We've got a marvelous collection. So that's how we got the permit.

Now, the permit, 1998 was the last year that we had it at one point. That was the year that Ray retired. So that's the last shipment that we got. We did recently have it renewed for a very short term. But it took from 1998 to 2006 of phone calls and everything to get it renewed, and basically as soon as they renewed it they said, "Gee whiz. We can't do that anymore. It's causing a stir at high levels

of the USDA.” So it’s very difficult even to this day to have that kind of a permit. That was really a fortuitous opportunity.

Importing Plants from Australia and New Zealand

Reti: When you would bring plants back in the early days— I know things have changed a lot since then, but what was it like in the first five to ten years that you were here to get through customs with a shipment of plants from Australia?

Hall: Well, customs is always problematic. That’s once you get them here. That’s after they’ve already been essentially permitted to come in, after they’ve been inspected. Then you have to go through customs. My experience, doing it a lot, was that customs always had this roadblock. They always had this form that you’d never heard of, or some little payoff that you’d never understood. (laugh) It’s very strange. So, customs was a different aspect of it.

But going back. First of all, when we went to Australia to collect, it was legal for us to go out with local permits and collect plants from cuttings, or seedlings, or a seed, and bring them back and get them inspected under international agreements—inspected first in Australia by their equivalent of our USDA, the Wildlife and Ag Department there. They would verify that they were without soil, because they know that exporting to the U.S. they can’t have any soil, and that they were legitimate. They weren’t plants that were on other lists that were prohibited. There’re lots of those. So that would be the first clearance.

Then you’d also have to get an export license through the National Wildlife branch in Canberra, which is in the capital. So you’d either have to go to

Canberra, or mail stuff. A lot of the [plants] we were getting actually were through the Elliotts. They had a nursery, and a lot of their stuff originated from the wild with a known locality, and they'd root the plants. They'd get the permits, the export license, and then the agricultural inspection, and then send it with our import permit. That's key, too. You have to already have an import permit. Then they'd come here to the US. The key was to get them on a flight that went to San Francisco and that arrived on a Monday or a Tuesday. And effectively, if things went really well, we could get them—in terms of the time because there's a day difference—we could get them before they'd ever left. That's really moving fast, because they are a day ahead. That seldom worked. But timing is everything. You don't want them to arrive on a Friday and just sit somewhere. Things do, and have, and will continue to go astray at different times.

The plants would come in. They'd be inspected at the USDA and then we'd pick them up from the airport. That's how it works. Some of the time we'd be over there collecting and we'd send them; some of the times the Elliotts or other growers would just send things to us.

So that was relatively easy. Same for New Zealand. We'd be able to go there and collect in the wild, and then take it down to the local ag station right at the airport. It was very convenient. They wouldn't even charge. You'd just go there. You'd just arrive with a smile and a box of plants in baggies. They'd look at you a little strange. You'd explain who you are, and how you did it, and show your import permit. They would basically inspect. It would sometimes take hours, and there was a lot of care in the plants. But so long as they were collected from

the wild (this was for the New Zealand case), they were much easier than if they were from a nursery. Because they came from a nursery, since they had this potato nematode, they had to have that nursery inspection permit, or sticker, or verification that said that they were free of that particular pest.

Reti: Because that pest would be in nurseries, not in the wild.

Hall: Right. Not in the wild. So anyway, that was really simple. Of course, none of this is simple anymore. It's illegal to collect in Australia. It's illegal to ship wild collected plants. They all have to have originated from cultivation. The only plants that can come out of Australia at this point are plants that were propagated from plants in cultivation. They can come from the wild, but several generations of cuttings back. That's one of the caveats there. And it's becoming increasingly difficult. Even people working in botanic gardens in Australia, for example, have great difficulty getting permits to collect, whether it's seed or anything. It's particularly so for Western Australia.

I guess the question is, well, why, and is that a good thing? Well, I guess it's good and bad. From our point of view, and the way in which we engage with floras from the other parts of the world, it's not such a good thing to have such great difficulty and complexity in getting plants. I mean, we're not going out to slash and burn forests. I mean, that can go on, on the one hand, and yet, some very minimal collecting on the other. Sure, things have been over-collected by people who are nature lovers. Even here in California there are lots of examples of plants that have been over-collected. But not from botanical gardens. These are usually commercial endeavors that go out and take big chunks of populations

and stuff like that. Somehow there needs to be a way to differentiate and work through all this. So we have a rougher time ahead.

But anyway, that's how it used to be. It used to be much easier. I think a lot of things in the world that way used to be easier, too. While we are trying to safeguard things, at the same time it makes it more difficult for [arboretums]. But I think we'll find a way through it. I think we'll still be able to get plants from other areas of the world, from the wild.

Collecting Plants in the Wild

You know, the emphasis on getting things from the wild, as opposed to just in cultivation, really has to do with having plants with provenance, collected in a known locality. It just makes it more of a valid plant for research. In a way, it's pedigree. It's knowing where it came from. It's just as good, though, if it's growing in Uncle Max's yard, and he knew that he got it from his great-granddad who collected it. It's the same plant. You can take cuttings. It's still provenance and it's just as legit. It may be many generations and sometimes things can change in cultivation. But still, the plant did come from the wild. Now, if you go and collect seed from Uncle Max's plant, then it's becoming a little bit removed. But still, it's valuable. More and more now, because a lot of plants are still just too rare to collect in the wild, we have to use those kinds of populations to grow things. There are a lot of examples. Everything can't come from the wild.

Reti: Why are the seeds not as good?

Hall: Well, it's not that they're not as good from the standpoint of growing. They may be better adapted because they're coming from cultivation. But they are not as "good" in the sense that it's not as a good of provenance. Let's just take a California plant, *Carpenteria californica*, say. It only occurs in the Central Southern Sierra Nevada, and so we bring it in here, and then we collect seed on it from here. That's not really wild-collected seed. It's collected from a plant in cultivation. That really isn't a good example because there's only one species. Let's take manzanita. They all hybridize, and there's lots of species everywhere. If you collect seed from that plant, you don't really know what the parentage of the plant is.

Reti: I see. Because it could have hybridized.

Hall: So then if you list it in your seed list— Say you know this was collected in a garden. You don't really know. And particularly if we were to put on our seed list, plants that came from the Australian garden, *Grevillea*, any old hybrid, we wouldn't do that anyway, because of the potential for introducing an invasive pest. But as an example, in terms of whether you have provenance, let's just say some garden in Israel wanted *Grevillea rosmarinifolia* and so we said, "Oh, we'll send you seed." Well, unless we did a controlled cross and we knew that was only *Grevillea rosmarinifolia* that crossed with it, and then we could say that's how we did it in cultivation—here's the seed—then they would just be getting a seed of anything, almost. They don't know what it is. If they got a seed from the wild, well, there's still a chance it would be hybridized, if there are other species growing, but at least it would be *a la naturale*. So that's the difference.

Importing Plants from South Africa

Reti: What were the issues in importing plants from South Africa? Like the *Proteas*?

Hall: Well, South Africa, we largely were bringing members of the Protea family in. Back in the days when McHenry and Ray Collett were first developing that kind of collection, most of the things, seeds, came from Kirstenbosch Botanic Garden, which would be that example of hybridization. They weren't wild collected. They were from there and they were also from other plantations. A lot of these things don't hybridize that much, though. They are fairly true to their parentage. And then also from what was the Middleman's Plantation. And then there was—oh, God, some of these old universities and things. This is reaching back about thirty years of seed sources. But anyway, there was a series of different seed sources there. The Middlemans sold their seed sources, first to Renata Parsley. She was just incredible and she would do a lot more wild collecting. Then we were starting to get things both in the *Ericas*, that collection, and members of the Protea family, and the rest of the famous vegetation wild-collected from Renata Parsley. Then she passed away, and Silver Hill Seeds took over, and they were doing a lot of wild collecting. But a lot of their stuff also comes from cultivation.

When you said issues, I was [first] thinking of the political things that were happening over the years. For a while there was a complete embargo on exporting anything from South Africa. So during the years that Renata Parsley

was involved, she would send her seed to somebody in England, and then they would send the seed back to us, or anybody else in the U.S.

Reti: So there were political issues during apartheid.

Hall: That's right.

Introducing Cultivars

Reti: So cultivars. There have been at least a thousand.

Hall: Cultivars that have been introduced out of the Arboretum? It's possible. Not all of those have been introduced through the trade and had wide circulation. But certainly, that wouldn't be an overstatement.

Reti: Can you walk me through the process?

Hall: What makes a cultivar a cultivar?

Reti: Yes.

Hall: Okay, a cultivar is— It has to do with its nomenclature, its name, in part. For example, we've done a lot of introductions of California native plants from the Arboretum that we have given cultivar names to, and then they've been able to gain some good wide circulation. One example might be *Zauschneria cana* 'Hurricane Point.' 'Hurricane Point' is the cultivar name. Cultivar names appear in print with single quotes around the name, and that tells you it's a cultivar. What that name is supposed to confer is that that's the clone. So, no matter where you get that plant, if it says 'Hurricane Point' it should be the same clone as the

original. In order to make a cultivar— I want to say that there are rules of engagement. However, it's fairly willy-nilly. Nobody is really following any rulebook. Nurseries are putting names on plants all the time, and so are people. But there is a registrar of cultivars out there somewhere, for England, for California. In California it's a little bit mixed up. But there is somebody out there who has done research and put together all the known plants that have been introduced as cultivars, even in very small scale, kind of— That may not be there anymore. Bart O'Brien, who was the director of horticulture at Rancho Santa Ana [Botanic Garden], and now he has a new position there—he has put together a huge compendium of the cultivars of California native plants going all the way back to the beginning, as far as he could, in finding the original documentation.

But the way a cultivar process works, is you're supposed to, first of all, have a plant that merits that kind of attention. That's one thing. What does that mean? That means it's supposed to be somehow exceptional. It's supposed to be different than the normal forms you can see of that species, somehow. It has to be "better than." It has to be some reason for making it into a cultivar. That would be the sense of it. Then once that's established—

Reti: You mean more beautiful flowers?

Hall: Yes. A healthier plant. A ground cover that's normally a shrub. Something to recommend itself for cultivar status, if you will. Then once that part is achieved, it has to be propagatable. Because what's the point of a cultivar? The whole point of a cultivar is that you can share it. Otherwise why bother calling it a cultivar if it's a one-off thing, you know? Then it doesn't merit that spirit of

“cultivarness.” So that’s the other thing. Then you’re supposed to publish it. It’s supposed to have an herbarium specimen, with its type somewhere in some herbarium. And that’s it. Then you’re supposed to register it with the Registrar of Cultivars.

None of those steps are necessarily followed in some cases. I think in most cases the first one is, which is that this plant is worthy of propagating and cloning. Then the next step of publishing. Well, if you sort of expand that into saying publish it and describe it. But if it appears in a nursery catalog, that’s probably okay in our situation here in California. What we would do anytime we had a cultivar, once we understood that that was kind of the official way to make cultivars, we would publish it in our *Bulletin*. We would make sure that it has the merit of making it into a cultivar, and then we wouldn’t take an herbarium specimen. I don’t think we’ve ever done that. (laugh) But we still can. We publish it and then try to take keep track of it to safeguard it. One of the really great jobs of an Arboretum, a botanic garden, is to keep track of things, not to let things get mixed up, and say, “Oh, my goodness. I’m not sure if we have ‘Hurricane Point’ anymore. I don’t know what that is.” When that happens, then we go get it again. Part of the value of sharing is that you can get things again.

So that’s one of our jobs with cultivars, anyway, is to safeguard them, and keep them straight and all. Some plants can change. You can get seedlings coming up in the middle, particularly with the genus *Zauschneria*, for example, which is no longer called *Zauschneria*.⁶ But we still call it that colloquially, anyway. It has the

⁶ It’s now called *Epilobium canum* — Editor.

habit of seedlings coming up in the middle of the plant, and maybe those get propagated. In the nursery things can get sort of mish-mashed.

When it comes to choosing a name for a cultivar, there are lots of ways that people go about it. They may name it after their significant other or their oldest child. Usually, though, they will give it some name that has something to do with its character, you know, of a plant, whether it's a geographic epithet, or if it is something that is inspired by their flower color. So those are the ways that things are named. And then also marketing has a little bit of an influence.

Koala Blooms

We have a program for introductions called the Koala Blooms, for the Australian introductions, where we are working with a consortium of California growers, and then also the Australians. These are plants that have had either zero circulation or very, very minimal circulation, that we have some kind of claim that we may be the first, or definitely we are the first to bring them in. I don't know how many—probably twenty-five different plants now have been introduced. We get royalties. Those royalties get shared with the Australians. And with the Arboretum, the money goes for the enhancement of the Australian collection. But we've named things, and it's a different process than with a lot of our other stuff, because we actually go to the group of growers. We meet once a year, and we figure out what the name's going to be. Now, the Arboretum takes the lead on this. We'll toss out some names. Melinda Johnson, she's the curator of the Australian collection, she'll maybe initiate a name. And then the growers will

get back—"I like it. I don't like it"—And offer other names. And so some things will happen.

Probably the one that's the most interesting, is early on when we were naming one of our *Correas*. It's a pink *Correa*, bell-shaped. There's a native bird in Australia, gula, a kind of a parrot. So we were going to call it Pink Gula, or something like that. And what we ended up calling it— I'll have to look at the Koala Blooms list. It was some other fancy bird that comes from Brazil. We did it just for the marketing.

Reti: (laughter) Gosh. Even though that bird is nowhere near Australia!

Hall: (laughter) Yes, it had nothing to do with Australia.

Reti: What about the Dudleyas?

Hall: Dudleyas. Stephen McCabe, our director of research and education, he's done a lot of introduction of Dudleyas and Echeverias and things of that nature, a lot of hybridization. A lot of people who he's worked with in collaboration, in that group of plants, have come up with these names for plants, and stuff like that. So certainly a lot of cultivars in that area.

Reti: So Koala Blooms would be specifically be working with the Australian plants.

Hall: Yes, it's the UC Santa Cruz Arboretum program. Local nurseries sell a lot of the Koala Blooms plants.

Reti: I think I read in one of the *Bulletins* that the Arboretum introduced the Australian hibiscus.

Hall: *Alyogyne*? [*Alyogyne huegelii* 'Swan River,' a.k.a. 'Monterey Bay.']

Reti: Yes.

Hall: We introduced a lot of plants from Australia and New Zealand and South Africa, and California for sure, prior to any kind of official program. This is a program that we took advantage of in order to make more money for the Arboretum, and also hopefully to help with some of the work that they do for us in Australia. There isn't a huge amount of money, but it is a focused effort and a collaboration with nurseries, and it's a good activity for us. It is the kind of thing that we have been rewarded for with donations. We have in the past been given money for our plant introduction program. A lot of our plant introduction program, with that kind of a title to it, is somewhat informal within a very formal structure, given that we are part of the University of California. We do it rather informally. So a lot of the plants that you might be thinking of as introductions from the Arboretum have been released through our regular plant sales, where we've named them with quotes, and we've published them in our *Bulletins* with their names, with "New Introduction of Such and Such" or whatever it may be. There have been a lot of plants that have been introduced to the nursery trade and to the gardening public and horticulture just through our plant sales. And then hopefully (and for the most part that's the case, because there're a lot of really responsible growers out there), they'll get a hold of the plant, and then this is the way that we would have expected this activity to ensue. They would then

propagate it and keep the same name on it, and even credit us in their catalogs. Which, if you look at Monterey Bay Nursery, Rosendale, Suncrest [Nurseries Inc.] (Nevin Smith is in charge of the catalog there) the UCSC Arboretum is highlighted frequently. Which is really good, because that shows the work that we've done, and that is lot of what our mission from the beginning has been: to enrich the horticultural world with new plants.

Slosson Foundation and the California Native Province Gardens

Reti: Now, [let me ask you about the] Slosson Foundation.

Hall: The Slosson Foundation is a foundation within the UC system which is for horticultural research, and to further horticulture. The Slosson Foundation has funded several different gardens in the Arboretum. Most of the grants from the Slosson Foundation have gone to the Australian gardens. One portion of the Australian garden is called the Slosson Research Garden. That's the oldest part of the Australian garden. We have had several grants from the Slosson Foundation for developing our native plant program.

We did have an early grant for the entrance native garden, from the Institute of Museum and Library Services. We had an early grant that we used to fund the beginning of the development of that entrance native garden. Since then we have had Slosson monies for various aspects of our native plant gardens. And one was done much more recently. There are several that we are working on some now. But probably the big one that had to do with the development of a garden is the conceptual plan for the California Native Province gardens. It's much larger

acreage and it's kind of out the back, so speak. It's the "Back Forty," we often say, colloquially.

Reti: Oh, going up the hill toward the chancellor's house?

Hall: Yes, and to the west, to that whole area. Some of it is actually inside what we know of as the old Arboretum, back behind the reservoir. That region is about a twelve-acre site, which is for northern California. And then there's the area that's jointly managed with the Natural Reserve System on campus, which is part of our California gardens, too. And that's for central western California. So the central western California includes, geographically anyway, the region, for the most part from Point Conception to Point Reyes, and inland, including the Coast Ranges. Which is a huge area, a big playground for all kinds of things. That's the forty-acre site. We're not going to grow everything within that region, but that's primarily where it is. There's still room for things from coastal southern California and other areas. They do get snuck in. But those would be the primary regional geographic areas for that part of the garden. So again, the central western province. And then the other area is the northern California province, which would be from roughly Point Reyes north into southern Oregon, including the north coast ranges, the Klamath Ranges, the South Cascades and the Sierra Nevada. So that's huge too. Obviously we can't grow everything, so a lot of the development and what we will grow will be where we decide, I guess in part, but also some opportunistic. If we have more opportunities to collect and bring in plants from one region than another, but we'll also be targeting special areas, rich areas, and things that we can grow well here.

There's a little bit stricter approach to those California Province Gardens. Everything has to have provenance (getting back to that). Everything has to have origins. The focus is not going to be on a cultivar garden, or even on a landscape as such. It's going to be more of a natural garden that has a lot of horticulture built into it. So we'll make it beautiful, have aesthetic qualities that will guide us. But also, especially plant associations, plant communities, and that kind of a theme behind it: a developmental theme, an aesthetic theme. So rather than having specimen plants, we'll have drifts and populations of things. It will be more of that kind of a development. We have a plan that we developed with a grant from the Slosson Foundation. It has a map that we've circulated that shows all of the so-called eco-regions of the California Province Gardens. So it's really a great future. We've been working on it since the 1970s, but there were a few distractions along the way. We didn't have that plan back in the 1970s, but we did have a plan for a Pacific Coast native garden, which was even bigger, but then over those years we focused on just this region of California. So we cut out Oregon and Washington and Canada, effectively, and made a more intensive focus, particularly in our region of California, in the northern part.

Reti: What's the time frame for creating that garden?

Hall: Hmm. Well, from now until the end of time, I guess. (laughter)

Reti: I knew you were going to say that. (laughter)

Hall: Yes, forever. But we hope to develop more resources to do it. It's a huge project and we are very excited about it. As you know, we have all the staff of the garden. We have a curator of the California gardens. My strongest burning

interest is that particular garden and that collection, and so I hope to be able to spend as much of my own time in the future on that, as opposed to the other things. The other gardens are older and better-heeled, and the people who are the curators are doing a good job. So they might not need my help as much. I'm there to do the things I need to do there. It's just that this other garden is very compelling for us, and very important in terms that we are a California botanic garden, and we do want to both support California natives in horticulture, and conservation, and research.

The Changing Job

Reti: How has your job changed over time?

Hall: Well, I'm older now than I was thirty years ago. So I don't swing a pick as much. But I do it as much as I can. My back is not as strong as it used to be. I have to use the tractor more than I used to. Things like that. That's one way that it's changed. But we have a much larger staff, so I am not as involved, say, in going out into the various gardens and planting things, or even showing exactly where they'll go. A lot of what I do is develop collections. I advise and coach the staff, and I try to support them in what they need, and I still hire all the students, and figure out the schedules and things like that. I do an awful lot of watering in the nursery and a lot of weeding. I write grants and I write reports. I guess I've been doing that kind of stuff for a long time. It's kind of mixed up. I still do plenty of physical work. Back in the early days I was putting out and planting with students all of the things that would go out in all of the different gardens. But as we got curators, and as things evolved, then I backed off, and I've let go of

an awful lot of responsibility. I certainly am not a micromanager. I try to give people as much as freedom and responsibility and creative decision making as I can. And again, I have my own special desire to work in the California Province Garden, which is fifty, sixty acres. So there is plenty of room for me to go out there, rather than meddle in the lives of the curators and what they want to do and plant here and there.

Informal Education: Teaching and Working with Students

Reti: Are you teaching any classes?

Hall: Oh, I'll teach short field classes. I've never taught a real college course. I think I'd have a nervous breakdown if I had to do something like that. The teaching that I do is really on the job, working with students. We have right now twenty students working here and I have occasion to have a lot of informal time with the students. So it's more of that sort of teaching. I have done a lot of short field courses, and things like that over the years, and a fair bit of lecturing.

Reti: When you work with students, what's your approach to mentoring them?

Hall: I work with them, go out in the field and talk, ask questions, start engaging about whatever it is that we're working on, and describing things, certainly encouraging them. One of my most enjoyable aspects of being in the Arboretum over the years has been working with students through their association with the Arboretum community, and with the collections, and the project[s] that we're working on. We're kind of a working ranch, in a way. I know that that's had very strong influence on the students that have spent any real time here, a couple of

years, or whatever. It's subtle at times. Sometimes it's dramatic, where they'll change their majors and all. And it's not quantified. When you put it in reports, you can't just say, "We've had a significant contribution to the lives of students." I did that once in one of our external reviews and they said, "How many?" I said, "I don't know. Four hundred?" (laughter) But I know it's there. I can name lots of students who have been very positively affected. We've been there to encourage them, to open doors and ideas. A lot of what I do is to engage. But it's through the Arboretum. It's through the project. We use the Arboretum as a medium for exploring all kinds of things. It's like my own association with working with people with Australian natives, and how I've used that with California natives. It's the same sort of thing. Students use whatever methods that they use in exploring the Arboretum. All the topics surrounding the Arboretum will help them in their academic training, or in their own lives. So it's that kind of thing: informal education. That's what Ray always used to say. That's what we do. We're a very important component of a student's informal education, which is a very valuable thing.

Reti: And then you also have UCSC classes coming down here to do botanical research.

Hall: Oh, yes. Lots of classes.

Reti: And graduate students.

Hall: Yes. Steve McCabe is in charge of organizing that. There're a lot of classes from UC that use the Arboretum. Steve McCabe and Dan Harder, our director, taught the *Plant Systematics* class a couple of years ago. We've always aided the

class. Then we help the botanical illustration classes when they come, the biology undergraduate courses. There's a kind of curriculum that gets started. There's a lot of that. And then of course all the children's groups and things. We do independent studies. We have internships and there're a lot of students that we work with in that capacity, too. I've sponsored a lot of those over the years.

Reti: It's an incredible opportunity for students.

Hall: Yes. I think so. It is. It's a great place for people of all sorts. And the nice thing about it is there's a lot of ways that people can become genuinely connected. There's not just one way it can happen. It's through working as a student here, or volunteering, or being a part of the community, or being on the staff, or through some tangential interest in plants. There are a lot of ways that people can connect. Even now we're doing a lot of things that are outside the plant world. We have a music program and it's becoming increasingly popular. That's been a lot of fun. It's a little bit outside our mission for being a collections botanic garden. But it's great fun, and it is there in the Dean McHenry Amphitheater.

Dean McHenry Amphitheater

Reti: Yes, you wanted to tell me more about that.

Hall: Well, just that during the dedication there were a lot of short speeches, which were very nice. And then Henry McHenry, he got up and started to speak. He was very emotional and he kind of couldn't continue his sentences, because he had to pause. At one point he started to describe his father, Dean McHenry's,

connection with the Arboretum. He said, "My father." And then he paused. Then he said, "My father *loved* the Arboretum." It really came across. Then he went on to talk about how he loved the Arboretum and how much it meant. It made the dedication in that space all that much more meaningful. And then also remembering the original amphitheater Dean McHenry and a couple of other guys pretty much made. I have a picture of Dean out there. You've probably seen it. It's one of our historic pictures, with the cement mixer, and shoveling, with the amphitheater all right there.

Reti: No. I'd like to see it. We have one in of the library of him digging the library's foundation.

Hall: Oh really. See, that's the kind of man he was, very involved in that way. So anyway, having that space actually dedicated by the Alumni Association, that was an idea that we had right after he died. Tom Wittman, who was the one who actually built the stage, when we were first talking with the Alumni Association about it, Thomas Wittman suggested we call it the Dean McHenry Open Air Theater. Which I rather liked. And even up until close to the decision on how it would be named, I kind of held onto that, and kept trying to influence a little bit. But I'm very happy with the name The Dean McHenry Amphitheater. It has the same spirit to it. It's good. It's having a real cornerstone in the Arboretum, one of the more significant ones that we could have.

The Arboretum Associates

Reti: So the Associates— We haven't really talked about them yet, except peripherally. That's another way for people to become involved.

Hall: Yes, by becoming a member. It's made up of all the Friends of the Arboretum. It's a membership group, so there're about 1000 or 1200 members, but within that there are lots of active members and volunteers and people that we see all the time here at the Arboretum. That's been an important part of our community. It's been an important part of our survivorship and survival really, in the university. Since we aren't part of a specific division, and we aren't well funded, the Arboretum Associates has been the organization that the funding has come through; a lot of the donors and so forth have come through the Arboretum Associates. They have also been the organization that has approached the administration to champion the work that the Arboretum has done for the university and for the community. They are the bridge. They are this kind of big organic organism that goes to work for the Arboretum, and it relates us to a broad area, of not just the local community, but the larger community in California and elsewhere. It's a nice, a really wonderful group. A lot of friends in the group, you know, personal friends, and then just friends through the Arboretum.

Reti: Do you help to train the docents?

Hall: Well, to some degree. I probably work a little bit more with students and staff than I do with docents. Steve McCabe and others are in charge of the actual program that we have annually.

Reti: The training program for docents.

Hall: And now that we have all the curators, they are all very much involved. We all have a part in that. I work a lot with students. I work a lot with

community service people, you know, who get too many parking tickets [and choose to do community service to work them off]. And a lot with staff. It's a little bit more organized than it used to be, which is good, because as you grow as an institution you need a little more structure. So things are a little more compartmentalized. We have the docents or the volunteers that work in the gift shop, and those who work on the propagation for the plant sales, or that work in the library. And the people who work in the garden, they may get more attached to just one garden with one curator.

Dreams for the Future of the Arboretum

Reti: What's your dream for the future of the Arboretum?

Hall: Well, I have lots of dreams.

Reti: More than one is fine.

Hall: Dreams for the future? Well, one is that we survive and thrive, come what may. That would be at the core. That's happened over and over again. We're still here and that's wonderful. Actually, we are more than just here, we're here intact, which is really great. We have our boundaries as they were first conceived. And they're large. The freedom for us to grow within our boundaries is here and available to us. That has been an important part of safeguarding our future. So my dream, in part, is that we can fulfill the growing within the Arboretum, that we can develop the California Province Gardens. There have been lots of discussions within the university community on whether or not we should or shouldn't, and how we should, and that sort of thing.

Reti: Why?

Hall: Oh, well. Things are seldom simple, is probably the most general answer to that. For example, concerning the California Province Gardens, there're a lot of grassland areas out in— And it's visible, and they are adjacent to areas that would have made very good building sites. Grasslands are important for other biological aspects, for birds preying on mice and rabbits, and things like that. And so, concerns about over-planting, and people's conception of what it would mean to develop a native plant garden. Some people conceive that it would be like a Christmas tree farm, which it wouldn't, of course. And so there's been a lot of work on that. In the plan that I described for the eco-regions of the California Province Gardens it very much tries to describe how that would be, that there's going to be shrub lands, and areas of extensive meadow, and connectivity of grassland and coastal prairie development throughout, so that animals and birds would be able to see down through the maze of shrubs and stuff. So that's what I meant by— To safeguard the freedom.

We are very lucky here in the Arboretum. We even can have an argument about a piece of land. I mean, a lot of places in the University of California, there's nothing to argue about. It's just a parking lot. What are you going to do, argue about what plant to put in the pot? So here we are incredibly fortunate. And sure, we all would like to see no development anywhere around us. But that's hard to argue entirely, because we are not in the middle of Yosemite. We are in an area that's growing, and the[re is a] need for housing. We do have some housing projects emerging around the Arboretum. But it's nothing like other areas in California that are growing so rapidly. So we're really lucky. We have

state park areas. We have areas that have been mitigated for other projects, that are supposed to be mitigated and left alone through perpetuity. Then there are the natural areas on campus, and that Great Meadow. There are areas that are being set aside. Now, that could always change. So you have to be constantly vigilant about your surroundings and what new threats there could be. You have to be wise and not fight the wrong battles and all the rest.

So part of my dream is to fulfill the ability to grow within the Arboretum. And particularly, I'm thinking about the California Province Gardens. We have to be careful, because it would be inappropriate just to have it wall-to-wall trees. But that isn't the design that we would implant anyway.

So that's one of my dreams. The other would be that we'd have even more of a program for the youth. I see in the horticulture community that my generation is really well represented. I'm fifty-one now. And when I look to people in their twenties, I don't see as [many of them]. It's important that we work with students and that there are jobs available for them. So one dream would be that we can contribute to the economy in such a way that there are jobs for young horticulturalists. Otherwise they have to go do something else and they do it as a hobby. Which is important too. But it's nice to see young people. I can remember when I was younger there weren't many people younger than me that were at these meetings! (laughter) I can remember once going to a meeting. I drove all the way up to near Shasta. I think I was about twenty-one and I went to this American Penstemon Society meeting. (Penstemons are a rock garden plant.) Everybody was over sixty. Then there was me, in my twenties. It was really funny.

Reti: (laughter)

Hall: Now those people are in their nineties, and I'm still probably the youngest person. So that's something that is important: children's programs, programs in science, in informal science. All that stuff, which is very highly supported by our director and people here in education.

That's a lot right there, those things. And certainly to enhance the collections and to relate in an effective way to conservation. I think that some of the founding themes that we had with our collections from afar, particularly Australia and New Zealand—I think in the first little brochure that he wrote for the Australian garden, Ray Collett said something to the effect that these gardens serve not just the practical and scientific areas of these collections, but they serve as reminders of the floras from the shores around the Pacific. That's sort of a simple kind of a notion, but when you think about it, it is, it's important. It's reminding other people of the flora around the world. So we serve conservation, education in that regard. It is important for people to see what kind of plant life there is around the world, and to see it in a really sophisticated way, with labeling, with plants that come from real places in nature, and not just from nurseries.

That the gardens themselves have a strong connection to the wild is important too, and a strong connection with their country of origin, through the people. One of the dreams that I've always had, and that we've worked towards, is to make sure that all the curators get to their country of origin, and do work sponsored by the Arboretum. So for the most part, everybody has been to the country that they are representing here. It's easy for Rick Flores. He just has to

wander out into California. But California is a big place. Tom Saucedo has been to New Zealand, and Melinda [Johnson] has been to Australia, and Helen's [Englesberg]—Helen is the nursery manager. Where does she get to go to? Well, she's been to Australia and she gets to go to all of these nurseries, I hope. Let's see. Ron Arruda went to Africa last year. So that's another dream, is to try to provide a real genuine kind of anchor with staff here.

Reti: So that the curator becomes the link between the plant in the Arboretum and the habitat where it came from.

Hall: Exactly! Yes. So that they can speak with a certain kind of authority that they can't get by just reading about it and understanding it. They've been there. They've seen it. They've become inspired and that's good. I know that Ray felt, and still feels, that one of the most important missions, or the one of the important purposes of the Arboretum, is to inspire students. That's important, to provide the right stuff that inspires students. It means providing them with opportunities to be creative. That means letting go, letting other people come in and do it. So there has to be an element of freedom. Otherwise, if you're just pointing and saying this gets done here and there, it doesn't work as well for the individuals so that they can have some room to develop. I think that's it, philosophically for me. Those kinds of things would be the key I'd try to work on over the next ten or fifteen years while I'm still here.

Reti: There was an article in *Voyager* magazine in 1985 that predicted “the UCSC Arboretum will develop into the premiere Arboretum in the Northern Hemisphere in the next ten years.”⁷

Hall: So did we do it? I don’t know. You know, statements like that are— What does that mean? *The premiere.*

Reti: How do you define *premiere*?

Hall: Yes, I don’t know. I don’t know too many people that really take all that kind of stuff too seriously, you know, because the world’s a constantly changing place. Have we been successful? I think so. For sure, we’ve been very successful. But I think focusing on being *the premiere*, it’s sort of like having the strongest military. (laughter)

Reti: (laughter)

Hall: I mean, maybe your goal will be to have the biggest collection of *Banksias*. As long as that’s couched within something that’s a little more than just having numbers, and then having successes like winning the most first places in the marathon races over the years. It’s like, okay, there should be something about running the race in there too. I always kind of cringe a little bit when I read things like that about being, oh, what was the term that we’ve used so often: “A world-class arboretum.” What in the world— What does that mean? I don’t know.

⁷ Eric Hoffman, “A World Class Arboretum: A Green Thumb with an Exotic Touch,” *Voyager: the World Airways Magazine*, pp. 49-51.

Reti: Well, maybe part of what's behind my question about that is, how can the UCSC Arboretum become better known? Because I know from reading through the newsletters and doing other research, that there has been to some extent a challenge of letting the campus community know about the place.

Hall: Oh, for sure. Well, yes, that's right. A lot of it is getting known for what we've done and what we're doing. That's important. But we shouldn't have that take on more importance than actually doing things on the ground, locally, regionally. I mean, we're lucky. We have accomplished international kind of scale things because of the great foresight that Ray Collett had in sending the Keeler-Wolfs out originally on this mission to go get *Amborella* and *Tasmannia* and *Araucaria* and all these different things that we assembled here. And the cleverness, in a way, that Ray had in realizing that we had a site that would successfully grow plants from Western Australia, and to actually figure out how to do that. Those were things that— So we're lucky. It's easy for me to say, "Well, we really don't have to worry too much about all that stuff." Because in a way, we've already done it.

I don't think the focus should be on becoming the premiere garden. Because somehow for me (this is just an individual thing), I don't understand what that really is. But when you say—in order to be better known for what we've done, in order for campus to recognize us—well, that makes sense in a nuts and bolts way. It is impressive to them when someone like Peter Raven says (Peter Raven being one of the most eminent botanical directors in the world for his accomplishments and research and so forth), "The UCSC Arboretum is

important.” That helps because then the campus administration, they’ll say, “Wow, this place is probably worth keeping alive.” (laugh)

Now there’s a whole new generation of faculty members that don’t know about the Arboretum. And a whole new generation of administrators, for sure. It is important to have a legacy and to have the campus recognize that the Arboretum is important. Sometimes that’s couched under statements like “world-class” and “premiere garden of Northern Hemisphere.” But it sounds a little like sounding your own trumpet a little too much. I like it better when somebody else from afar does it, than when we do it ourselves.

Reti: Well, thank you, Brett.

Early Life and Background

Jarrell: This is Randall Jarrell. This is my first interview with Phyllis Norris on the history of UCSC's Arboretum. Phyllis, to start with today, can you please tell me a little bit about your personal background?

Norris: I lived in Washington, D.C., growing up. I was born on June 15, 1929. My father was a very young newspaper reporter, at that point for the *Christian Science Monitor*. He worked for the *Monitor* his entire life, but his beat, as they say in Washington, was to cover Capitol Hill and Congress.

Jarrell: What was his name?

Norris: Richard L. Strout. He was a very tall man and it gave me a tremendous amount of pleasure, when I went downtown as I got older, to visit him in the National Press Club, to stride along next to him. He had a big stride. He walked from the Press Club on Fourteenth Street to the Capitol and back. His background was in economics and he was a liberal. One of the things I remember most about him, or appreciate most about him, was that when we would travel other places and people would say, "Oh, you live in Washington. Have you seen the president?" [he'd say,] "Oh yes, of course." He had press conferences and so on. He would then ask people questions about what they felt about so and so. And you would never know from that point what he thought. He was a good questioner. Although he was certainly liberal in his background, he was very good about pointing out the goods and the bads and the differences of political people that he encountered.

My mother died when I was two. And that was too bad. I'm one of three children from her, Edith Rittenhouse Mayne. My father, when I was twelve, married a wonderful woman, Ernestine Wilke, who came from Wisconsin, and I was fortunate to have two younger sisters from that marriage. So that made five of us altogether. I was not the contemporary of my two little sisters. I was the babysitter. It was wonderful having living dolls to enjoy and I did a lot of babysitting.

I went to public schools in Washington, and then went to college in Baltimore. Goucher College at that point was a women's college, and I was there when they were moving from Baltimore to Towson, which was a lovely, rural, great big campus. I delighted in hiking. The way I studied was to take notes and go off on long hikes through this beautiful campus. I guess I was always, from my parents' interests, always interested in natural history. I did a lot of tramping around parks, and explored streams, and also we spent our summers at a little privately owned lake in upstate New York where there were no cars and no poisonous snakes, but there were lots of snakes, and lots of toads, and lizards and fish, and I very often had little snakes in my pockets. The only problem with the snakes I carried in my pockets was that they would urinate, and it smelled. (laughter)

But anyhow, this was a wonderful place for a kid to grow up, and with a very special aunt, my mother's younger sister. There were ten children altogether, and cousins who shared this summer place, and Aunt Mitzi would teach us about plants and birds, and wonderful things. She was this source of pleasure and information and joy. And as I say, I was fortunate because there were ten grandchildren. Some of them were older than I, and I didn't know them well, but

some of them lived right next door and we overlapped in ages, and it was just a lovely place to be in the summer.

Jarrell: And when you graduated from Goucher, then how did you get to California?

Studying Marine Botany

Norris: When I graduated from Goucher, I had a year at Yale doing graduate work. While I was at Goucher, I should say, I spent three summers at Woods Hole in their summer program—two doing marine botany and one just being an assistant there for the professor I had met who taught at Johns Hopkins. I did an honors degree with him at Johns Hopkins.

Jarrell: You were a biology major.

Norris: Yes. And he suggested that he was moving to Scripps Institution of Oceanography and needed an assistant. Would I like to go? So I flew across the country to this unknown world of California and landed in La Jolla.

Jarrell: Now, what year would that have been?

Norris: 1952, must have been. And lo and behold, there at Scripps we had coffee in the morning and maybe again in the afternoon, and one of the people who came into our lab to share coffee was this guy named Ken Norris, who I met and then he disappeared again. I thought, where in the world has this Ken Norris gone? I didn't think much about it. There were all sorts of things going on. But then he came back. He'd been off on an exciting and interesting trip. I next met

him in a class that we were both taking in German in the local high school, a night school class. He had to learn German for his Ph.D. and I just thought it would be a good thing to know. Then I saw more and more of him, and we had more and more adventures, including climbing up to the highest lookout of the building I was in, and looking for the grey whales as they came by. It was a whale watch. Carl Hubbs, his major professor, was keeping track of the migrating gray whales. We did other wonderful things which I won't go into. It's such fun but it would take *all* our time! (laughter)

Jarrell: That's wonderful. Now, what I would also like to know is how you got interested in botany, in all of the things that you became and have been involved in over these years, both at the Arboretum and the Farm and Garden, and here in your beautiful acreage in terms of your plantings and your gardens. So you started out as a marine biologist.

Norris: I started out doing marine botany, as a matter of fact. What I was involved with was the great big kelp and algae, and the little tiny single-celled algae. My job at Scripps was to maintain the pure culture of algae we used. I worked with some of that and with my professor, Francis Haxo, studying photosynthesis way back then, particularly how the auxiliary pigments of these plants— You have red algae, and you have green and brown, and you have the kelps, which are certainly not green. What role, if any, do these other pigments play in photosynthesis? We know that chlorophyll A and B are a part of that, but what about these others? Well, it turns out that it's important if you're a plant and you're growing in dim light down fifty feet where the light doesn't penetrate very much, to have other pigments to draw in the energy from the sun.

But I went from there to getting married and having a brand-new house in a brand-new area of the world in Portuguese Bend, and of course one had to garden.

Gardening in Southern California, Chile, and Hawaii

Jarrell: And this was in southern California.

Norris: Yes. There were the trees and the plants and things to put in. Ken's father was a landscape architect, so of course there was lots of information. Ken himself, when he was small, would draw out plans for landscapers and such. Lots to learn. It wasn't like the East Coast at all. (laughs)

Then we went to Chile, and there were other plants. And gosh, you looked at the Chilean landscape and it looked just like California, but there were different plants. There weren't oak trees. There were the beech trees instead, and there weren't whatever annuals we had here. There was something else. But similarities, interestingly.

Then we moved to Hawaii, where I also gardened. We lived right along the beach. [There was a] bomb shelter from World War II that was not under the ground (the water table was high), but above the ground. It was a cinderblock building, and on top there were three or four feet of dirt. I had a fine garden out there, in that nice dirt. It was behind the house. The tradewinds were broken by the house, so I could grow Swiss chard and lots of good things up in that particular garden. We had an orchid house. We had all those things. I joined a garden club and went to gardens and traded plants around. And as it always is

when one moves, you regret having to leave all those things behind. I did bring little snippets of things. I have a few snippets of things from Hawaii.

Then we moved here. And gosh, a whole other world to explore and cultivate. Again the native plants. I should say that I had a wonderful husband who knew as much about plants as he knew about lizards and fish. He liked the taxonomy, which I didn't, and wherever we went he would sing out the names, particularly in our deserts, of the plants. It was a struggle for my brain to remember creosote bushes, and bladderpods, and *Isomeris* [arborea], which is bladderpod, and all of these things, but I gradually learned.

Getting Involved with the Early UCSC Arboretum

Then we got here to Santa Cruz. I was very involved with the Friends of the Farm and Garden Project. As one of the field trips that we took as the Friends of the Farm and Garden, we publicized and made arrangements with this young, young, young Arboretum to have a tour. Ray Collett met us at the gate. The plants were small. They were two feet or three feet. Ray had not really wanted to take us on this tour, I think because he didn't think there was much to see. But we went around following him. Ray is a source of wonderful information. He walks rather rapidly. I learned that if I wanted to hear his words of wisdom I had to walk rapidly too to keep up with him, because by the time the laggards caught up, he was off again to another plant. (laughter) But it was an exciting time. Jane McHenry had been one of the people who had suggested this particular field trip. So I was delighted to see the beginnings of the Arboretum, and then also

delighted when I heard that the Arboretum Associates were being formed, the organizing meeting of that in 1976, [and I could] attend that meeting.

Forming the Arboretum Associates

I have to describe that particular meeting as I recall it, because there was one building at that time at the Arboretum. It is still there. It was down in what was the old reservoir area. It wasn't a very big room. There was a large table in the middle of it, and chairs around. Underneath the table, as I recall, there were bags of cement, so you couldn't exactly put your feet underneath the table. But we crowded around in this room, and perhaps Ray and Dean McHenry, who had called this meeting, were surprised at the number of people who came.

We went through the things that you do at an organizing meeting: discussing by-laws and a constitution, and electing a president. Hal Hyde was asked to be the first president at that meeting. At least that's my recollection. The thing that was the most impressive to me was that when the meeting was over people were asked or volunteered, I don't know how it came about, but there was work to be done. The particular work that needed to be done then was that as these small plants had come in from Australia, these little cuttings, they had been put directly in the ground on a hillside that was part of the old dam. They had been planted there. They had been covered with the upside-down containers that cider came in, or wine bottles, with the bottoms cut out, little greenhouses, and they were growing, these small little plants. But as they had been planted, they had not been mapped. So the first task was to go out to this area and find those little plants with their names and make a map of them. I was so impressed that

here was an organization where people actually worked. It wasn't a matter of just going to meetings and sitting and listening to other people. People did things!

Jarrell: They rolled up their sleeves.

Norris: They rolled up their sleeves and just got to work. It was a group of people that I was delighted to be part of. I don't remember at this point the regularity of the meetings we had, but there was always work to be done.

Making the Arboretum Accessible to the Public

There were two discussions that seemed to prevail over a number of years. One was, how do we label the plants so that people know what they're looking at if we have visitors? Two, how do we manage to have this wonderful baby Arboretum open to the public? Ray was concerned (and rightly so), that opening the Arboretum to the public might cause damage to the plants. The plants were small. It would be easy to dig them out if no one were looking. They were valuable, and they might be stepped on, or whatever. So how do you protect the plants?

Dean McHenry, on the other hand, said, "If no one knows about the Arboretum, no one's going to support the Arboretum. We have to get the Arboretum open to the public." There weren't any facilities there. The old road coming in led to a cinderblock box that I was told had been part of the pumping station for the entire campus, and it was eventually turned into a toilet, which was handy. But

there was nothing else, no way of entertaining visitors, or even waiting for visitors to come in.

However, we started off bravely enough with one day a week, two days a week, finally three days a week. We waited down in the parking lot where people could come in, greeted people as they came, and offered to show them around or talk to them. Dean and Jane McHenry had a specific [day], I believe it was a Sunday once a month. Dean told me that he would just publicize this to his friends and former students, and they would come and talk with him. It's a wonderful opportunity to catch up with many people. So that was what they did.

The Shelter [Owl Perch] On Top of the Dam

We felt that it would be nice to have some shelter from the weather (laughter), so a temporary building was put on top of the dam, a funny little building that Dean assured us would be all right because, "You see, it's temporary. It's just bolted down to the cement slab, and if no one wants it there, or when it's no longer needed, it could be unbolted and carried away." We waited there. It provided some shelter. However, it was a little far from people's parking area. I should say that before that, Dean, through family money, had put in a little trail, the official entrance to the Arboretum that went up to the base of the dam. It was planted primarily with Mediterranean climate plants at that point. But it seemed after a while that it would be more important to have some kind of a little building down in the parking lot area. And that was the time when this wonderful group of members of the Arboretum Associates board (they called themselves the Geriatric Construction Company), decided that what they should

do is to build an open, three-sided shed—open on one side like you might find in a park—a shelter so that volunteers could be out of the weather, but we could also have information that we might want to hand out to the public.

Jarrell: I just have to interrupt you here for a second. From my notes, I see that in June 1977 the Arboretum became open to the public. I think it was open one day a week when it started. And then if we go into the different physical improvements: In 1975 they built the lath house, the first lath house, a small office shed. Is that what you're referring to?

Norris: No, that wouldn't be the open shed.

Jarrell: Okay, then three geodesic domes, which were the greenhouses. So I don't know which building— Maybe it wasn't mentioned in the *Bulletins*. But you built this shelter and it was where you could greet visitors, and if it were raining, or whatever—

Norris: The lath house is down right next to what was the original office, and I don't know when that was built. The Arboretum Associates had their meeting there. It might have been built just shortly before that. The lath house is a wonderful building that's still there and needing repairs now.⁸

The geodesic domes, three were built in that same general area. The domes were designed so that they had different internal climates, and they have a collection of succulents. The cactus succulent collection was there. They have a collection of plants from New Caledonia and New Guinea, which also includes this new rare

⁸ The lath house was torn down in 2006 and has been replaced with an open area with lath roofing—Phyllis Norris.

plant, these primitive angiosperms that are so interesting. We can talk about those later. And then the third building has orchids and it had a mango tree planted in the ground that Ray always— Coming from Hawaii, I always wanted to be around when the mangoes were ripe. Ray seemed to feel that mangoes were a fine fruit if you ate them green, because when they're ripe they're too sweet. I learned that when you eat mangoes ripe and you mix them with champagne or 7-up, then it takes the sweetness away and they become totally delicious food.

Choosing the Site for the Arboretum

Jarrell: Okay. We're going to backtrack a little bit. What do you know about how the site for the Arboretum was chosen? I'm sure it was McHenry and Ray Collett. But if you think of all the 2000 acres of the Cowell Ranch, the campus— Do you have any idea how they selected that particular site, especially in light of all of the things that I've read about the particular geology and climatology of that Arboretum expanse?

Norris: Ray Collett had gotten his degree in geography at UC Berkeley. Geographers are interested in all sorts of things, like temperature and climate and geology. Apparently, one of the first things that he did when he came was to put weather stations all around campus. There were several weather stations at the site of the Arboretum, but he had weather stations in many places on campus. He also, of course, was interested in the ground, the dirt, as a geographer. He, I understand, then went to Dean McHenry and presented Dean with the suggestion that we could have an Arboretum on our campus that would

be much superior to any of the other University of California campuses, because of the microclimate, the macroclimate and the various soil types.

So that was part of the Arboretum. The other part of the Arboretum, where the dam and the reservoir was, that particular land was not part of the original Cowell ranch.⁹ It was owned by first one, and then two water companies that went bottoms-up, defunct. The soil underneath the reservoir is limestone and there are limestone sumps. They had difficulty maintaining the level of the water. But this reservoir was to house or hold the water for the city of Santa Cruz.

I have a lovely story about that reservoir. I was volunteering there one day in the driveway, and a group of people came in who wished to have a tour. I was working with someone else that particular day, and so I stayed while the other people went off on a tour. I stayed with a person about my age, a man who had grown up in Santa Cruz, and we had a lovely conversation while the rest of his friends were touring. What he told me was that he had been a kid growing up near that particular reservoir, and it was a great attraction to the children in the neighborhood. He was very attracted to this and wanted to fish in the reservoir. With a lot of coaxing on my part, and as I say, a delightful conversation, it turned out that they stocked this reservoir with fish (probably bass), I suppose for

⁹ The dam was not a success. It was eventually abandoned because the limestone caverns underlying it allowed water to pour into cave entrances and sinkholes instead of faucets in Santa Cruz. The Cowell Ranch had given the land to the City of Santa Cruz for a reservoir around the turn of the century. The city built a main dam on the south side, with a spillway on the east end. After years of unsuccessful attempts to make the reservoir hold water, the city abandoned it and built a steel tank. When the university acquired the campus site from the Cowell Foundation in 1961, a parcel of 30 acres near where High Street becomes Empire Grade was not included in the 1950-plus acres deeded. The lawyers were not sure whether Cowell or the city had title to the thirty acres. UC attorneys persuaded both to sign quitclaims, so the land came to the UCSC campus free of charge.

mosquito controls. I don't really know why they did. He would come in with his fishing line to catch fish. The problem that he had was that there was a big, bad, mean man who was in charge of keeping small boys out. He had a hut also, and I guess he lived on the site. He was in charge of maintaining the level of the reservoir. In fact, I know from Ray's records there was a boat dock, and he had to go out to the brick tower which now stands, and climb it and open and close the bore going underneath the dam. In any case, this young kid didn't know anything about that, but he did know there were fish and there was this mean man. So he would creep underneath the tangle of vegetation and throw his line into the water and sometimes even catch a fish. When I asked him with my fingers—were these mosquito fish? "Oh, no." Well, how big were the fish? And taking my fingers further and further apart, to see, well, two inches, three inches? Spreading my hands out and when I finally got them quite far apart, "Yes!" he'd say. So it was a good story.

Jarrell: It was a fish story.

Norris: It was part of the human history that I enjoy about the Arboretum.
(laughter)

Jarrell: I'm really confused, because I've read all of these reports and all of this information, and apparently the reservoir dam didn't work out and I'm still confused as to why it didn't work out, why it was unsuccessful.

Norris: I think that it was unsuccessful because they couldn't maintain the water level because of the sumps. It was not the dam. The dam was intact and is still intact. And as a matter of fact, now, Randall, just within the last year or so, when

the campus did a study on drainage from the campus and how the campus might impact Santa Cruz down below, that old reservoir which people had forgotten about and the dam, suddenly was realized. Gosh, it's still there. Did the state ever declare it defunct? It was examined, and it became necessary in order to make sure that there was safety from a hundred-year flood, to put another flood or drainage area through the dam to make sure that it could never fill up to its top level.

This is an entertaining and bureaucratic story. There were several difficulties with putting a new drainage in the dam. One, was there planting already on top of the dam? And two, there were plantings in the canyon below the dam. And that had to be cleared away in order to put this drainage in. But everything came to a screeching halt when it was discovered that the red-legged frogs, which are now a rare and endangered species, were living happily around this dam and in the moist places on either side of the dam. What to do about these red-legged frogs, which you can't touch? I laugh myself, because I think if it had been me I would have gathered all the red-legged frogs up and moved them to the other side, to the reservoir side of the dam. But no, that certainly couldn't be done. So vegetation was stripped, and everything was left in the status of suspension until the red-legged frogs themselves decided to move. They didn't like it very well. Then the rest of the work was finished.

We do have red-legged frogs at the Arboretum. They live down in the bed of the old reservoir. I should say that the reservoir, of course, is not there any longer, but Moore Creek is. Moore Creek comes off of campus. It flows down through a lovely little canyon. There is not only the main earthen dam, but there are dams

upstream, catchment basins. And there are frogs that happily live up there. Occasionally I hear them when I'm at the Arboretum. When they sound off, some of them sound like a really rusty hinge of a door. It's an amazing noise. And also, where the stream runs through the former reservoir there are lovely little spring peepers, frogs. Gosh, the chorus was absolutely incredible the other day when I was there. They get very loud and noisy. So good wildlife. But anyway, back to wherever we were, Randall.

The Eucalyptus Grove

Jarrell: Okay, I want to backtrack again. You were talking about planting these Australian plants. It's my understanding that the origin of the core collection of the Arboretum was this gift of ninety eucalyptus which were planted by volunteers.

Norris: Well, they weren't planted by a volunteer. The gift was there, but in the early days of the campus, in a story that I loved listening to Dean McHenry tell, there was a lot of concern. He had concern about preserving the natural state of the campus, especially the beautiful redwood trees. One day when people came to work, there were two redwood trees that had been felled. The mystery and horror of who could have done this dastardly deed. We should get the bottom of this! Cabrillo College, at the time had a class in criminology and they decided to take this upon themselves as a task to find out how this had happened. And through their investigation, two young men were found to be the culprits. These young men had (I don't know if they were foresters or what), but they had had quite a lot of beer to drink and thought that it would be interesting to see which

one of them could chop down a redwood tree the fastest. So the trees came down. The young men were caught. And as punishment they did community service, which was planting eucalyptus at the Arboretum.

Jarrell: They were the volunteers!

Norris: There might have been other volunteers, but I think it was those two young men. Dean said that they were such good workers that they were hired on beyond the time of their servitude. (laughter) I don't know what else they did. Those were the first trees that went in.

There is another interesting thing there in the eucalyptus grove. Jean Langenheim taught on campus, and she was studying resins and things of that sort. She had a collection up on campus of pine trees from Florida that had a great deal of resin in them. They were her study subjects. They got bigger. The boxes got bigger. And she needed a place to put them. So they were taken down to the eucalyptus grove and just left in their big boxes. I always am amused and pleased when I go by them now. The boxes have decayed away. The trees are quite big. Jean has retired from campus. I don't know if anyone is studying resins of those particular trees. But for me it's another proof of the wonderful survival of plants. Given a chance, they *will* live.

The Docent Program

Jarrell: Yes. That's interesting. To get back to the Arboretum Associates, founded in December 1976. I noticed that you became chief docent at the Arboretum in 1978. Now, prior to that you had held several positions. I was very impressed.

Within the first two years you had approximately 188 members of the Arboretum, many of whom committed themselves to different committees, different activities. And you became the chief docent. What did that involve, and how was this whole docent program organized? Was it under Ray Collett's directorship? Would you consult with him? What was the mission of the docents?

Norris: Frankly, I can't remember how that was organized. I know that we had a sign-up sheet and we committed ourselves to meeting the public for two hours on the days that we were open, not a very long period of time. Perhaps what I did was to organize those sign-up sheets. I don't remember. It was very easy because people just volunteered to come. And the McHenrys always came at a certain time, unless they were traveling.

We would try to have two volunteers there at a time. They were an interesting mixture of people, from people who had been in the army—Colonel Bartlett, we always called him, was one, and he came. We had Ira Guthrie, who was a former high school chemistry teacher. There was a tax accountant. And people who would come and just see what was new and interesting at the Arboretum, and give tours. These weren't formal tours, but people when they came in were offered: would you like to be accompanied? Can I show you around? And as the Arboretum grew, of course there was more to show around.

Early Plant Sales

After a while we started selling plants. We had a plant sale fairly early on. The plants came not from the Arboretum at the point. We went over to another

nursery, to Leonard Coates' nursery, which is no longer there (it's been taken over by Suncrest), and propagated plants there. And Mike Smith and his brother, Nevin Smith. Nevin Smith opened a nursery, the Wintergreen Nursery, and he's now the consultant of Suncrest Nursery, a very interesting person. He opened his facilities also for us to make cuttings of plant material. Then after a while we began growing our own plants. But we would have these plant sales. It was important for the Arboretum. The plant sales, both at the beginning and now, serve as a wonderful public relations thing. We provide plants for sale that are not available in other nurseries, often, from our own collections now. People would come and buy and socialize and see what new things had happened. As I say, a very good public relations thing, as well as something important to the Arboretum.

Another thing that we started selling in those early days, (Ray was dumbfounded, I think, that anyone would buy them), we started selling cut *protea* flowers, and we also started selling dry material. Jean Beevers was the lead person in this. I think that before she started doing this that she maybe was a little reticent to go to local florists to persuade them that they really wanted to buy these cut flowers. I mean, nobody knew what a *protea* was. But she persisted, and would go off to florists, and take her flowers in, and persuaded them that they really should buy from the Arboretum. An amazing sort of thing. Then finally, after a while, when we had more proteas blooming, we had some plants for sale at the Arboretum itself.

Maybe since I'm talking about sales, another thing that happened fairly early on— Well, after our docent hut in the parking lot was built by the Geriatric

Construction Company, we were able to have plants for sale there when we were open. This docent hut was an open building, but it had two rooms on either side that were closed and locked. I would very often come in for my volunteer days and find money stuffed underneath the door. People had bought plants and had left money for them. There was no way of controlling them. I wouldn't have known whether the plants were missing or not. But people were honest in supporting the Arboretum, and would do that.

And it was a good place, as I say, to greet people and to have information and I started, because I was interested, and because I couldn't even remember the names of the plants, much less sell this little green thing in a gallon container, without knowing more about it. So I started quizzing the staff—what is this plant and why should anyone buy it—and writing down what they had to say. And that started the plant descriptions that we now have available for all the plants we sell. But it, I suppose, started off primarily by my own efforts to educate myself, and perhaps to educate others.

Another thing we did in the parking lot was to start the sale of dried flowers. I referred to Jean Beevers putting stems on dried plants. We discovered that *protea* flowers dried very well. And as a matter of fact, I walked into the office one day and found cut *protea* flowers all over the floor, and I thought, what in the world are these? A woman had come from Hawaii. She was buying all of these *protea* flowers. She was sending them back to Hawaii as cut flowers and dyeing them. So, as I say, they dry very well. But I thought, now, there's such a big industry in Hawaii of dried proteas.

Jarrell: Yes, in Maui.

Norris: So it's such a strange thing to take these flowers—

Jarrell: Like taking coals to Newcastle, now, at least.

Norris: Yes. But the Dried Flower and Succulent Sale was started there once a year. In the parking lot we had a group of people who prepared the dried flowers by putting little stems in them and so on, and showing people how to make arrangements. We also had a group of people who were developing the succulent collections. They could come and buy little succulents and be told how to make them into a dish garden. The amusing thing was that it was all done on the back of people's station wagons—the volunteers, the hot glue and other things to make wreaths. We're much more sophisticated now, and we have a workshop, a place to do that at the Arboretum now.

Plant Descriptions and Paths

Jarrell: I want to go back to your plant descriptions. You mentioned to me the other day that Ray Collett was initially opposed to having the plants, shrubs, trees, in the Arboretum labeled.

Norris: He was very concerned about having theft, as he should [have been], because we didn't really have an adequate fence. We talked about a fence. We talked about barrier things. How do you keep people out? I mean, there was no one at the Arboretum during the night, and it was a big place. I looked up one day to see a young man walking through the Arboretum with cut *protea* flowers. He was taking them down to the flea market to sell. You stop people when you

see them. But we volunteers were there three days a week for two hours. And the staff was very small. So there were those concerns. Ray, I think, was glad to have visitors come, but he was concerned about security and about the protection of the little plants.

And another concern that we still have as people come to the Arboretum—we didn't have paths initially, and now we do—but people want to get up close to a plant, and so you leave the path and you walk up and get close to the plant. This is fine in the summer when the ground is hard. But in the wet months the ground compresses as we walk on it. Many of these plants have deep roots *and* shallow feeding roots. If the soil is compressed around those roots it doesn't show up during the winter months, but as everything dries out in the summer, those roots essentially have been killed, and the plant might, as Ray would say, just tumble over and die. So that was one of the initial and early needs of the Arboretum, were to put in our wonderful paths.

Jarrell: I was going to ask you about that. A lot of it was done with volunteer docent help. I'm amazed at the physical improvements in the whole landscape, like the railing that this gentleman did. All of these different building projects.

Other Building Projects

Norris: Yes, our hoop houses, for instance.

Jarrell: Yes, what is a hoop house? Will you please describe that?

Norris: A hoop house is in the shape of a Quonset hut, but the plan was, and I think there's an article in one of the *Bulletins*, which maybe you haven't gotten to

yet, the students learned how to bend metal pipes, so they bent metal pipes in the form of hoops, and then they were—

Jarrell: Well, I actually did read about that. They said, “We’ve saved half of the expense of it because we’ve bent these pipes.” And it was smaller diameter pipes.

Norris: We had six of them originally. We have two left now, because we have brand-new greenhouses. But after the lath house became too small, our greenhouses and our propagating areas were the places to do the work, and they were student-built. The paths were put in with volunteer and student labor. They are wonderful paths, because they are not asphalt. They are granite and cement, and a little bit rough. They give you good traction underfoot, a great addition to be able to walk along, and also to provide a place for the public, who doesn’t know enough to be concerned about roots and things of that sort, to give them a way of accessing the Arboretum.

Labeling Plants

Other things in the early days of the Arboretum. The problem of naming plants, or labeling. It was a big issue. Every plant had its labels. They were little metal labels. Every plant has two. But the plant would grow. And how do you tell what you’re looking at as the plant grows? What do you use? A lot of discussions about how do you label plants so the public can see them.

Jarrell: Do you mean do you physically attach it to the plant, or do you have a little stake that you put in the ground in front of it with a little metal plate?

Norris: Yes, you want something that the public can see even if the plant has grown. One of the suggestions by Lorna Clark, who was a member of the board and who was a potter, was that she could make tiles that would identify plants. These were beautiful, beautiful tiles, and there still are a few lingering there. The major plants were identified. They were blue with a background with the name of the plant written on it. Lovely. They were probably, as I recall, maybe six-by-six. I can't quite remember. There is one still there. She could tell you about them. That was a big help. We have gone through many different designs of labels. The ones we're using now are very nice. They are on metal. We use a machine to print a label. And many of them have a little map of Australia or New Zealand, but initially it was a difficult thing.

Interpretive Booklets

At first the Arboretum was only open on the days when volunteers were there. But then there were days when we were open [but] no volunteers were on duty. I decided that what we needed to do was to put signs, and I mean descriptions, not plant signs, but descriptions of the various areas of the Arboretum. So we did that. I made signs for all three greenhouses explaining our propagation system and what was in the greenhouses. These were on eight-by-ten sheets of paper in various locations in the Arboretum, including at that point the New Zealand garden. I, for the most part, wrote these, but of course everything was cleared with Ray. I wasn't always correct in what I wrote, and he provided the expertise to fill those in. We posted these and put them together in a little handout book called *Welcome to the Arboretum*, with a map and with all of these signs. It described our collection so that people would have a better understanding of

what they were looking at. That was probably about our first thing that we had available for the public—*Welcome to the Arboretum*. Linton [von Beroldingen], perhaps at that time, or perhaps before, came up with a nice little thing that was two-toned, sort of a *Welcome to the Arboretum* and a description. That was followed by a second, slightly more elaborate *Welcome to the Arboretum* with a little bit more. And now we have a third *Welcome to the Arboretum*. Over the years as the boundaries have changed, and as the collections have grown, these have become important. The original one that we put together from the information on the signs got handed out and amended. I have copies that came back to us from teachers, college teachers from San Francisco and other places, who used these for their own purposes, and plugged in material for their student handouts. They certainly became an invaluable way of interpreting the Arboretum.

Plant Propagation

Jarrell: Tell me about propagation, because I noticed over the years that you not only had the plant sales, but you had, increasingly, a series of workshops focusing on different aspects of horticulture. And one of them was on propagation.

Norris: The original propagator worked at the Arboretum doing propagation. And our present propagator, Helen Englesberg, I met as a student. They were propagating plants, not for sale, particularly. The first need was for the Arboretum. The Arboretum had beds that needed to be filled in. I told you that the first task of the Arboretum Associates board members was to go out and map the new little grevilleas from Australia. Grevilleas don't transplant very well, but

you can make cuttings of them. So the Arboretum collections grew from those initial plants that were brought in, and then by propagation, as well as further collections.

Money has been a very difficult point in sustaining the Arboretum over the years, and at some point it was no longer possible to hire a propagator. By this time Brett Hall was working at the Arboretum. George Hare and I had a meeting with Brett at that point and said, "We've had plant sales. People are depending on our plant sales. They're looking forward to our plant sales. Without a propagator we can't have plant sales. There's no way." We talked about that for a little bit, and ended up, George and I saying, that we would volunteer.

Jarrell: If a group of you could learn how to propagate—

Norris: If a group of us could learn how to propagate, we would volunteer, and we would propagate. And that's how I started propagating. I went in and there were other people who came in. Eventually Helen Englesberg was hired to propagate. There have been workshops that Helen has given over the years, in propagation. They have been in connection with our docent training classes, as part of the new potential volunteers learning about the Arboretum. So there's always at least one session of propagating, showing people how to do it. People love to propagate.

Jarrell: For the benefit of people who are going to be reading this oral history, could you briefly describe what is technically involved in propagating a plant, as opposed to just taking a cutting?

Norris: Plants are reproduced primarily in two ways. Either by seeds—seeds will give you fine plants if you have viable seeds. But you don't get replicas of the parent plant. You have genetic variations. The other way is by vegetation reproduction. And by this you take a piece of the parent plant, either a rhizome (a root cutting), or a stem cutting, and you have this little four-inch or five-inch or six-inch piece of plant material with no roots. You have to encourage that plant to form roots so that it can live on its own. So you take your piece of plant material, you strip off the lower leaves, you make a cut just below the node of the plant, which is where the leaves come out from. We use a plant hormone to dip the cut area in.

Jarrell: To encourage that growth. To stimulate it.

Norris: See, plants have natural hormones, and they originate from the growing tips of the plant. So they have their own hormone. This is just an added boost to the plant. There are different strengths of hormones, depending upon how woody the plant is. We use semi-firm cuttings, generally, after the plant flowers and before new growth starts or when new growth gets firm. But we can take cuttings year round. As I say, we use a hormone. We put the little cuttings in a porous matrix. We used to use cinder lava from the deserts, and peat moss. It was very porous. It worked wonderfully well. But it was expensive to ship that particular lava in. Now we use perlite and peat moss. Ray never wanted to use the perlite initially, I think because it is a mess. It doesn't deteriorate rapidly. If it blows around, it's just awful. At least if you use lava, it kind of blends into the soil, and we could use it afterwards for soil fill. But anyhow, it's heavy, and the perlite is lighter and easier to manage. Mixed with peat moss, the perlite

provides drainage. The peat moss retains moisture. The secret is to try to keep the plants from drying out, these little pieces of plants, before roots are formed and they can absorb their own moisture. So the plants, when they're put in this substrate, are put on tables that have heat cables running through them that help promote the bottom growth (which is what you want), and a mist system. The mist system is controlled by a clock. It can be on a timer so that if it's very, very dry during the summer you can have pulses of mist go off frequently. If it's in the winter, maybe you don't need quite as many. You have enough humidity. One of the difficulties that we had in the early days was that we were using campus water, and campus water is hard. It has lots of minerals in it. And if the plants took a long time to root, and sometimes they did—

Jarrell: Like how long? What's a long time?

Norris: Well, sometimes— Like a year is a long time. *Grevillea 'Robyn Gordon'* takes a long time.

Jarrell: Oh, I read about that plant! Named after the daughter of the man.

Norris: But there are other plants that would be in the mist for, well, let's say a short time would be two weeks, or a month. Or maybe six weeks. A long time would be several months to a year. If these little plants were in the mist for too long, with this water spraying on them, the mist was keeping them alive, but in many cases it was coating the little leaves, after the water evaporated, with calcium deposits, with salt deposits.

Jarrell: Oh, because of the hardness of the water.

Norris: And those little leaves, they never lost it. You didn't peel it off. So the process that we go through is to—when the roots form on the plant—it's called pricking them out. We lift them gently from this matrix that they're in, the very porous matrix, and we put them in a soil mixture in their own individual little pots. They're fertilized with fish emulsion at that point, and let to grow first under cover in our greenhouse. When they get big enough and the weather is nice, they go out to the growing area, under shade. When they get well rooted out they're transplanted into gallon containers and put into either sun or shade, depending upon their needs.

The plants we were selling in the early days still had this deposit of the calcium on the leaves. People would say, "This plant's sick." So I had to write a note that we put up with our plants saying: "These are healthy plants. There's nothing wrong with them. It was the water that did it. As they grow, the new growth you see is fine and will replace the other."

Correas and Banksias

Another plant that we had difficulty selling in the early days, and I laugh at it now, was a *correa*, which is a member of the Rue family, the orange and grapefruit family. They have little bell-like flowers that are beautiful. Most of them hang down, and many of them are red, or pink, or hybrids like Ray has made: tangerine-colored, or two-toned. They're lovely, lovely plants. But the leaves are just funny. They kind of recurve on themselves, many of them, not all of them. People would look at this little green plant in the gallon container with no flowers, and say, "It's sick! Those leaves don't look healthy. They're bent

down and they just don't—" So it was a lot of education for all of us to learn about what's sick and what's normal. The correas, by the way, come from Australia, where there are many plants with weird leaves, like the banksias, and like the grevilleas. One of the banksias has a leaf that looks like— I call it the rickrack leaf. It's a strange cut leaf with hairs. Banksias were named after Joseph Banks, who sailed with Captain Cook! I'll have to take you on a tour. (laughter)

Jarrell: I want to go on a personal tour.

Norris: I read a lovely book about Captain Cook and his expeditions and so on, and those little tiny ships! Gosh. But Joseph Banks had to go with his whole retinue of people to make the plant collections. I'm glad that he got a genera of plants named for him. That's really nice.

Jarrell: I was reading amongst these wonderful notes, in our Arboretum we have forty selected forms of banksias among thirty-four species.

Norris: And we have more now.

Jarrell: This was written in, I think, it was 1984.

Norris: Can I tell you a story about one of the banksias?

Jarrell: Sure.

Norris: George Hare told me about this. He was a wonderful tour leader. This particular *banksia* lives in the vicinity of Sydney, and it has yellow flowers on it. It has actually an odor. Most of the banksias don't have an odor. But this particular one actually does have an odor, and George would always point it out to people

and suggest that it does have an odor and perhaps they might want to smell it, because it smells like buttered popcorn. People would smell it and say, “Oh, yes. It does smell like buttered popcorn.” But then he would always amuse this particular group of people, because he was a very humorous man. He’d say, “Well, you know, you’re a really nice group of people. But if you haven’t been very nice, I would have just told you it smelled like rotten socks, and indeed, *it would smell like rotten socks!*” That was George’s big joke. But plants, as a matter of fact, and for the record, undergo chemical changes, flowers do, and the whole purpose of a flower is to attract pollinators, to create seeds. You create seeds by moving that pollen around from the male plant to the female plant, or the male part of the flower to the female part of the flower. In many places of the world like Australia, there are marsupials and some of them like buttered popcorn. And others probably like rotten socks. It’s hard to say. (laughter)

Jarrell: It’s so interesting. In one of the notes in the Arboretum Associates *Bulletin*, Ray Collett talks about the marsupials in Australia who are so important in the pollination of these plants. And then he talks about that bird that’s now extinct. I think it’s called the moa bird?

Norris: Yes, in New Zealand.

Jarrell: That’s another unusual form of pollination. All of these different instrumentalities that nature has created.

Norris: True, and the smells are with the flowers. In the South African collection, the flowers of the *Leucadendron*—male flowers are on one bush and female flowers are on another bush. They’re not particularly showy. Some of them are

more showy than others. But the whole inflorescence is improved by specialized leaves surrounding the flower that color up. So that you look at this plant and you say, "Gosh, those are bright petals!" Well, there really are leaves that color up. When the flowering is over, when the seeds have been produced, or when the flowering is finished, those leaves on the species of the *Leucadendron* lose their color. They become green. They can photosynthesize, carry on. This is a very important thing because it takes a lot of energy to build a leaf, a lot of calories. If you drop it, you've wasted that energy. But if you hang onto it, and use it for photosynthesis afterwards, you're ahead of the game in a harsh environment.

In South Africa, they don't have the marsupials, but they have rats and other good things of that sort. I had the experience one day, when the Wrigley plant was still operating here in Santa Cruz, of having a low-growing *protea* that had flowers that were hanging downward towards the ground. It had a wonderful smell. It smelled like tooty-fruity. I can smell Wrigley's tooty-fruity wafting up the hill. And this plant had the same delicious tooty-fruity smell. I was so pleased by this that when the next week I had another group of schoolkids, and I said to the kids, "You know, this plant really has a nice smell. You'll like it." Well, the smell had changed. That week the pollinator that liked tooty-fruity had gone, and something else that liked, sort of fruity garbage had come. As the flower matured, it went through these different stages of smell, or in some cases, pollen, or color, or whatever it would be.

Arboretum Staff

Jarrell: Another question: What was the relationship between the Arboretum staff? There was Ray Collett, Brett Hall, and then two staff people. They are given various titles in the *Bulletins* over the years.

Norris: I think that originally there was Brett and Ginny Hunt. Ginny was in charge of propagating, and Brett was in charge of anything else, along with Ray. Ray worked there. For a very small staff, it's amazing that anything got done. I just marvel at it. Then as the staff grew. Ginny Hunt left, but now we have Helen Englesberg. Brett is, of course, still there. We have Thomas Saucedo and we have Melinda Johnson. And then we have other staff people who are there now.

Jarrell: I'm just talking about the staff. I'm not talking about the whole contingent of work study students and interns that you've had over the years.

Norris: The staff are all former students. Brett was a student of Ray and Ken [Norris]. He was a [Natural History] Field Quarter student all those years ago. Tom was a student on campus. Helen, much to my tremendous delight, she started working at the Arboretum as a student. She worked with Lincoln Taiz, I think at the greenhouse. I don't remember who Tom worked for, nor do I remember who Melinda Johnson—how she worked. But as I say, they were all students on campus. Melinda, after she graduated, she lived in Bonny Doon for a while. She worked for the San Lorenzo Garden Center for a while, and then started working at the Arboretum. When a collection of plants came from Australia, these little cuttings, and sometimes they had no roots, because Rodger Elliot would grow them in his nursery in Estelle.

Jarrell: And Rodger Elliot was—

Norris: Rodger Elliot was a nurseryman with his wife, Gwen, in Australia, in Melbourne. He's been *very* important to the Arboretum, because through his nursery, through his expertise, plants have come from Australia. I don't remember when Ray first met him, but Ray told me when I first started writing plant descriptions about plants, and trying to get information, that in Australia people were not interested in their native plants until about 1972. They wanted to bring plants from home. So it was roses and everything else, and the native plants were just kind of "the bush" out there. Some of my early plant books that I have from Australia would say that this particular species that we were selling would be a very desirable plant to have in cultivation, but so far it's not. I think that Ray in his field trips, Rodger sending on plants, and all of these things probably helped the Australian native plant people as well as our wonderful garden.

Jarrell: To appreciate their own legacy, in terms of plants.

Norris: Yes. But the plants would come as individual plants in a plastic bag with a label in it. I mean, these poor samples would be all packed in a cardboard box, having been in transit for however long it had been. They'd arrive at the Arboretum. They had to be unpacked from their little plastic bags, put into soil, dealt with either as a cutting or with roots, and they had to be entered in the computer. The records had to be kept—where they came from and the dates, and so on. Melinda Johnson was on one of those work parties when I went into help. She was pregnant, and fairly far along in this particular time. She couldn't quite

get up to the bench to work because there was her little [baby] just waiting to pop out.

By the way, all of our plants in our collection have a computer number. If you go and look at a plant tag on the plant, on more sophisticated tags you'll find a series of numbers. If it says, for instance, 77.135, it means that in the year 1977 this was the 135th plant logged into the computer.

Jarrell: And then its provenance in the sense of where it came from?

Norris: And then information about— As Ray has so often said, and it's very true, when he would go on a collecting trip with Rodger, or when he went by himself, you might find a whole batch of *Prostanthera* for instance, which is a mint family plant in Australia, a very pretty plant. Well, there might be a whole group of them just alike. But maybe one would stand out. Maybe there was one that just looked better. It was prettier or something. That would be what would be collected to carry out to make rootings of. These are very special selections. We have cultivars at the Arboretum. We have selections that have been made. I looked at one because a woman bought it at the Arboretum yesterday. It was a *Prostanthera* species, which means that they didn't know what it was. –ryoli, in New South Wales. Which meant that it came from a particular location, as a way of identifying it.

I think that one of the amazing things about our collection at the Arboretum is not that it's extensive, and not that we have a lot of species, genera represented. But in many cases we have the best of the ones growing in the wild, those that have caught the eyes of the collectors. Those have been the ones that we have

made cuttings from, and that we are carrying on. We have a remarkable collection in many, many ways. It's an extensive collection. Of course, over the years some of the plants have died out. We don't have all of them. And we've gotten new ones. But interestingly, when I go back as a propagator and look back at the numbers on these plants— When we propagate the number goes with them, and when I look at the number and I think, oh, we collected this plant in 1977. It's lived at the Arboretum a long time. It's gone through all of our freezes and our droughts and our other things. This is a remarkable plant. So there's a lot to be learned from those numbers.

Jarrell: Each of these has its own individual history. Next time I will ask you about the collections. Now let's talk some more about some of the longtime Arboretum staff, like Brett Hall.

Brett, from my own observations, seems to get along very well with the staff. He's been a particularly important person at the Arboretum because he has interacted well with those people on the upper campus. Ray had so many battles to fight. He had a difficult time with many of these other people. People on the upper campus just wouldn't understand him. It always seemed to him as though he was talking straightforward and people should understand, but I don't know whether there were people who met him with suspicions. Brett started going to some of the campus meetings. Ray would be busy. After all, not only was Ray a part-time director of the Arboretum, but he also taught classes regularly. So Brett would go to these meetings and would come back and report to Ray. Because of the person he is, he would seem to get along better with some of these people, and was able to argue, certainly no better than Ray, but certainly maybe more

effectively than Ray, about why the Arboretum needed a fence and why we really couldn't pay for all of these studies to do it.

I remember in the early days when they were making paths, they had a big cement mixer. They were stirring this cement and gravel. Brett was always right there working with them. He maintained all of the budget material. The budgets were complicated. There were endowments for this and endowments for that, and money that came from plant sales, and various life memberships that were treated differently than regular memberships. Many, many different accounts that he managed to keep track of easily and well.

Jarrell: I'm very interested to find that out, because I believe it was a few years before the Arboretum got its first official budget. In the beginning it was funding and gifts and a little bit of Chancellor's Discretionary Funds. And then gradually it got a regular budget.

Norris: Right. And we had our life memberships, which Dean McHenry always wanted. The development office had been opposed to life memberships, because our life memberships started off as a hundred dollars. They'd say, "Well, you don't get any more money." But of course we went back to our life members every year and wanted year-end donations. Major amounts of money came from our life members, rather than from the smaller memberships. But they went into a separate fund and Brett had to keep track of that. By the way, Larry Maxcy, he was one of our early treasurers, tried to mastermind all of these budgets. It became more and more difficult as people who weren't connected with the campus— I mean, you know how it goes with money. It goes into a fund that

eventually gets sent up to the regents, but interest is paid quarterly but you don't hear about it until— Anyhow, it's complex and complicated.

Jarrell: Right. Actually it doesn't go to the regents, I don't think. It goes to our campus development office and then they have an administrative fee.

Norris: Now. But originally. It's changed over the years, as, of course, things change.

We had an interim director after Ray retired. Daniel Harder, the new director, is a wonderful young man. I was so happy to be on the search committee for him. I find him not only genuinely likeable, but very knowledgeable.

Jarrell: And he's worked at a major arboretum.

Norris: Yes. And he's worked with colleagues overseas. His first talk that he gave as part of the hiring procedure, he didn't have only pictures of plants. He had pictures of colleagues from Vietnam.

Jarrell: People.

Norris: Of people. These were important to his life, people.

Jarrell: So it wasn't just going around taking photos of the flora.

Norris: No, he wasn't saying how smart I am and so on. He was saying, "I've worked with these wonderful people. And I want to continue working." He said many things that impressed me and has over the few years he's been here, but he said that he works *with* people, and that we were all going to be his teachers. He

would certainly have opinions of his own, but he wanted to work *with* the staff and *with* the associates on the development of the Arboretum. This was very important, to go forward as a team rather than as a dictator. It was very impressive.

Jarrell: Well, Phyllis, we still have a lot more to do, but this is great.

Arboretum Tours

Reti: Today is July 31, 2007 and I'm talking to Phyllis Norris. This is Irene Reti at the Regional History Project, and we're doing a second interview about the history of the UCSC Arboretum. Phyllis, let's start by talking about some of the challenges and joys of developing the Arboretum tours.

Norris: One of the challenges that I certainly had: *all* of the plants were new, strange, wonderful, with no common names. And gosh, how do you tell people about these things that you have? Ray, at first, took us on an occasional basis on tours of the Arboretum and would talk to us about plants. He was still publishing his little newsletter before our *Bulletin* started going out. And then Brett Hall—who was a student at the Arboretum, was one of Ray's students and was employed at the Arboretum as a manager—he started taking us on very informative tours. They were very interesting. I would go around with a piece of notepaper scribbling madly, trying, trying, trying to remember.

Another person who was employed at the Arboretum in those early days is a woman named Ginny Hunt, who is in the seed business now. (She is over in Watsonville with her own seed company, works with Jeff Rosendale, and is a

very talented, interesting plants person.) She did a lot of research, I know, to give us background information. She was the wise teacher, because she knew, perhaps better than Brett and better than Ray, that a Latin name of a plant is not enough, that you need to hang a story on it, and then it works, at least it works better. I remember following Ginny around one day through the Australian garden. There were different kinds of banksias, just weird. They're a Proteaceae family plant. I was with a group (maybe there were seven or eight of us), but I was walking with Jane McHenry. And I was so amused, because suddenly the light bulb must have gone off over Jane's head, and she said, "I know! I know! I'm always going to know the banksias because they're the plants with the weird leaves. Oh! What a relief to have something to hang a little crumb of information onto!" (laughter)

Many of the stories that I enjoy about the Arboretum have come from visitors. I firmly believe, as Ginny Hunt did, that if you're giving a tour and you have stories to tell, that's what grabs people's attention, not the Latin names.

Reti: The Latin names don't stick.

Norris: But if you can quote a first-person story, then it's much more interesting.

Another story which delighted me— There are a lot of weeds in the world. And we can talk about weeds being misplaced plants or whatever. But mostly for gardeners, we're just irritated by them. They're in the way and gosh, we have to do something about it, and they're a mess and so on. But on the other hand, there are some weeds that have a purpose. They may be a medicinal plant, for instance. Or they may have some function. One of the weeds is plantain, which

has broad basal leaves. It sends up a flower stalk. It has a head of tiny little flowers and seeds. We mostly see the seeds. It multiplies. It's a medicinal plant. It's a valuable plant because of that. You can take the leaves of plantain, and if you are stung by a yellow jacket, or a bee, or something, you can chew those leaves a little bit and slap them on the bite and it draws the pus. It's useful this way. When I was a kid back East, when we had these stingers happen, we grabbed a handful of mud. Here in California there's no mud in the summer. But there is plantain.

I was telling this story to a group of visitors. They had come by bus. They were from the Armenian Club of Northern California. One of the women said that she had a story about plantain and it came from the old country. The story was told to her by her father. He had a friend who had a wound on his leg that didn't heal. In fact, it was a very grievous wound, and the doctors said that they were concerned about gangrene, and they were going to have to amputate the leg, which is a serious thing in the life of any of us. And this woman's father said, "Let me try a cure first." He used plantain. She wasn't quite sure how he did it, but he made poultices of something on the leg. It drew the pus. The leg was saved.

Reti: My goodness.

Norris: It was a valuable thing. So, as I say, if you can tell a story of something that you read in a book it's one thing. But if you can tell a story that someone told you, it's a whole lot more interesting.

I was telling about plantain to another group of visitors. These were Latinos, mostly, a mixed group of people. And one of the women brightened up. She waited until the end of the tour, but she had something she wanted to share with me. I loved what she shared, because she told me that when she was a child she went with her mother to pick grapes. She was just a little kid, but her mother was picking grapes in the vineyards wherever they were. And as we all know, much to our sorrow, yellow jackets love it when grapes are ripe. There they are. They don't really care who they sting. She would get stung occasionally. There was no mud. But there were grapes. Her mother would take a handful of grapes, and squeeze them on the nice earth, create mud—

Reti: Oh, because of the water from the grapes!

Norris: —and apply now the mud. So that really had nothing to do with plantain, except it came from my story.

The other thing, in thinking about plantain, that I enjoy doing, I read in one of my books that the children in Europe, in Scotland, the boys, take the plantain stalks and seed heads, and they twist the stalk around on itself and give a little pinch in such a way that they can pull on the seed head stem that's left. And with any luck at all that seed head goes just flying right off into who knows where. They would use this for some kind of a target practice next to a barn or a fence. The reason that I enjoyed this story was because sometimes kids have so much money, and they feel that everything has to come from a store. I love to be able to think about things that you can just *do*. So one of the things that I have done year after year after year is teach children how to project plantain.

Reti: On the tours? You would show them that?

Norris: Yes.

Reti: Oh, that's so neat.

Norris: You have to learn to do it at the end of the tour, because if you do it at the beginning of the tour you just don't ever get very far.

Reti: They zap you.

Norris: And then I realized that we have a lot of senior citizens, and that I should show the seniors how to do this too. Because if they're babysitting, you can find plantain *anywhere!* You can go to a park, and there's going to be plantain, and you, Grandma, and your grandchild can enjoy projecting, spreading seeds around and about. (laughs) So I find now, and I'm delighted that now when people come to the Arboretum they already know how to do this, and then it's fun to say, "Well, why don't you show everyone else!"

I was a little distressed, as a matter of fact, a couple of years ago— We're going through a very interesting process right now at the Arboretum (well, I think this phase is finished) where we were looking in a collective sense at all aspects of the Arboretum, and trying to find out what was valuable, what, perhaps was less valuable, what our mission should be, how we can interact with the public, where the things are at the Arboretum that we maybe enjoy the most, and so on. And we did have visitors from elsewhere who started talking about weeds, and about how important it was to get rid of all weeds. I must to say, I had to speak

up and say, “Wait a minute now. (laughter) Weeds are part of this thing. We need to make sure we don’t get rid of *all* weeds. I have to have my plantain.”

The Australian Garden

Reti: I know people come from all over the world to see the Arboretum. Have you had people from Australia or South Africa or New Zealand who’ve come and, as you’ve been giving tours of those areas of the collection, told stories about the plants that have helped you understand them better?

Norris: There have been people from Australia that have been absolutely dumfounded at the Australian collection in the Arboretum, because many of these people have not seen all of their amazing country. Australia, the continent, is huge. We have plants, true, mostly from the Mediterranean climate areas in Australia. But we have plants from Perth, north of Perth, south of Perth and to the Sterling Range, all along the coast, up as far as Brisbane—from the comparable climate places. People will say, “It looks just like the Outback,” which I always take as a compliment. I mean, the Arboretum isn’t a polished botanic garden with a nicely mowed lawn and things of that sort. It looks like the Outback, and particularly at this time of year. (laughs) And why not? So I take that as a compliment. They also are just dumbfounded at the plants that they have maybe only seen pictures of in books, or that they didn’t know existed. We do have a volunteer from Australia, in fact several, who will sometimes talk about some of the plants. We’ve got one plant, I don’t recall its name, but it’s in the Australian garden. And when you look at it, it just looks dead. (laughs) I mean, the top of it just looks awful. And this young lady tells me, “That’s the

way it's supposed to look. It looks better than the ones in Australia!" So I mean, (laughter) you have those.

The Elliotts, Gwen and Rodger Elliot, have been not only wonderful friends of the Arboretum, but wonderful providers of plants, and wonderful people to have led tours. They had a nursery in Melbourne, and when Ray, Brett, and other people went to Australia, they would use their nursery as a place for maintaining— Or cuttings were made in the field, but then rooting them on. The rules and regulations about getting plants out of Australia and into the United States are quite fearsome. In fact, right at the moment the Australian government (well, for several years) has put some kind of an embargo on their plants. They don't want all of their culture, their resources exported to other places. But in the early days, of course, it was our own agricultural department that was concerned, as it should be, about introducing more diseases, particularly when you realize that some of the— The Rutacaceae plant family is a large, beautiful family in Australia, with a lot of ornamental plants. In our country we have rue, which is an herb, but we also have all the citrus, and citrus is an important industry. So you don't want to bring in a lot of exotic plants and introduce something. I mean, even if you examine the plants. The way the plants are handled is that they are brought bare root, either as cuttings with no roots if they came from Rodger's nursery, for instance. If they were purchased, they came as washed cuttings. Everything had to be washed. So if they were rooted in, say, perlite, all of that had to be washed off. They were put in individual plastic bags with data in it. They were packed in boxes. They, for the most part, hopefully, went through San Francisco Airport, where they could go through agricultural

inspection quickly and picked up easily. They were brought back to the Arboretum, and then they were treated as either cuttings with no roots, or with little roots. They were put into a proper matrix. In the early days, some of them were put directly in the ground. But as we had built propagating facilities— And then they were all logged on the computer. So with not all of our plants, but with almost all of our plants, there is data about where they came from, when they came, what they've done—they go along with a name which goes with them even if we make cuttings, the name goes right with them so that we know we have a collection of the same type of plants.

But, as far as the Rutaceae family is concerned, and the beautiful correas and other things, sometimes there were one or two, not at the Arboretum but in the trade, that were sort of snuck in. I mean, there's always that, where somehow people sneak things. But of course we wouldn't think about doing that at the Arboretum. I mean, we're concerned, too, about diseases and such.

Reti: Absolutely.

Norris: Ray was able to get a permit from [I believe it was] the California State Agricultural Department to import members of this plant family, the Rutaceae family. Originally, I think maybe plants had come in that the inspectors didn't know what these Latin names were. Maybe there were a few plants that came in that way. But Ray got that permit. Plants came in. They were treated the same way we do all plants, except in isolation. They were potted up. Ray said that an inspector could come by anytime to check to see if there were diseases, or whatever. When they got to be big enough to put in gallon containers, they were

again potted up. I asked Ray once, “Well, can’t we make cuttings of them now?” “Well, no. They’re still under (I think it was a three year) quarantine.” But they were put in an area of the Arboretum away from other plants, and carried on that way. When the quarantine was up, we were able to make cuttings and start selling them. The permit, as I recall, was for a year, and it was extended for several years.

So we actually brought in some wonderful plants. It’s always exciting. I think that gardeners are an interesting group of people. We like gardening because we like plants. We want color. We want an attractive yard. We also want to have something that no one else has.

Reti: (laughter) It’s the collector instinct.

Norris: The collector, right. So one of the features of our plant sales is that we end up, very often, with new plants that no one else has. What the Elliotts have done is very helpful now, certainly, to the Arboretum. As I said, the Australian government felt concerned about plants being exported, going out into the world. I don’t know all the politics of it, to be sure, but we, of course, have a lot of plants from Australia in our collection, many, many. Rodger has arranged with other wholesale nurseries to— They come to the Arboretum, this group and our local group, maybe once a year. The curators put out interesting flowers of Australian plants that have an appeal. They’re new, or they’re different, or maybe it’s an interesting spontaneous hybrid, or whatever it is. They look through these plants (and some of them we’ve been selling), and they decide that certain ones of them would like to be special plants that would be sold by them

under the label Koala Blooms. The Koala Blooms label does amazing things. My understanding is that we make the initial cuttings. They go off to the nurseries. The nurseries make cuttings; they sell the plants. The labels are nice—the descriptions are nice, with color and so on—and we get a percentage of their sale. And I believe I'm correct in saying that part of this goes back to Australia too. It's a win-win. We're getting plants out. The wholesale nurseries have larger staffs than we do with our few volunteers, and they're able to get the plants out. We wonderful gardeners are getting the new things that we crave.

Drought Tolerant Mediterranean Plants

I'm very concerned about the whole situation of water now in the world, not only in California, not necessarily global warming or whatever, but the whole situation about water. There's a heck of a lot of water in the world, but there's not very much that can be drunk. And we waste it. Terribly. Just terribly. Sometimes we waste it because we have these wonderful green lawns that need water every two days, or whatever. On the other hand, we have this amazing resource in the world of native plants from other countries that share our climate. And once they get established, by gum, they don't need all that water. We can still have a beautiful garden. We can encourage using our own native plants, which are amazing. And we can share our local native plants with other areas. So thank goodness that the Koala Blooms program exists, and that we're able to get some of these things. I've had interesting arguments with visitors sometimes who don't really like the idea that we're introducing these exotics.

Reti: They think we should just have California natives here?

Norris: That's right. I often had an interesting time with people like that, often at plant sales, sometimes on tours. I explain as carefully as I can how we are protecting our own native environment and vegetation from exotics that might spread. We're very careful about monitoring the plants when we put them out. If we find a plant that is too aggressive in seeding and things, we don't sell it, and we tell nurseries, "Don't sell it. This is a dangerous plant." We have the most amazing native flora in the entire world, and we don't want to intrude on that. We shouldn't. So we're very careful at the Arboretum, and we're very careful about conservation and things of that sort. But I will also tell visitors, after going through all of that, I usually try a little flattery: "Gosh, that's a wonderful concern. Not everyone realizes this is something we should be aware of. I'm so glad that you're aware of this and you're thinking about it." And that usually diffuses (not always), what might be a more hostile— (laughs) But anyhow, I think that the role of the Arboretum is to not only introduce people to other parts of the world, but also to help with these water issues.

Botanical Research

I was at the Arboretum one day and it was one of those sort of drizzly wintry days. There was a young man [probably Andrew Douglas—editor] outside the Horticulture Building, maybe looking for something, I wasn't sure. Anyhow, it's in my nature when I see visitors to ask them if I can help, if they're looking for something. This young man had come from Florida to study members of the Proteaceae family, because his doctoral thesis was about the Proteaceae family. He said that Brett and Ray had been very helpful to him, and had been happy and willing to share material with him. And after all, it was so much cheaper

coming to the Arboretum than it was to go to South Africa or Australia! He did come back with his Ph.D. and gave a talk at the Arboretum about his thesis.

Reti: So he was interested in protecting the Proteaceae in terms of conserving their habitat?

Norris: No, I think what he was doing was more basic. He was looking at the genetics, and the male and female structures. I don't remember if he had a particular plant that he was trying to do a particular study on. I know in the field of biology—plants and animals—that we— In fact, another aside, animals get names changed, and Ken [Norris], with a good deal of humor drew up some stationary which talked about a new society he was forming, which was a Society of Informing animals of their New Taxonomic Positions. (laughter) I think we could easily do that for plants. Because just when you think you know the name, the Latin name, and you've spent a long time trying to remember what that Latin name is, then lo and behold, it's not that any longer. It's something else, because someone like this young man, perhaps, has discovered a different relationship, and it gets to be even more complex and exciting, and a puzzle now. Because now, we not only talk abstractly about DNA, but we can examine DNA, and we can make a whole graph of DNA, and we can check relationships between any of us—humans or plants or whatever, with their DNA. We're finding all sorts of interesting things, relationships, that we perhaps didn't know existed. So the question comes up: Do we scrap Linneaus completely?

Reti: Oh God.

Norris: And instead of having that lovely system that we have now of every plant having two Latin names and then maybe some varieties, we end up with—I don't know. It sounds crazy to me. I think we need to stick with Linneaus, but be aware that there's DNA out there that can tell us more about relationships between plants.

Reti: I never thought about that.

Norris: I don't think the campus, as a whole, realizes in some cases the value of some of the plants to student projects. We had a couple of students years ago who worked with Ray on these plants that we call primitive angiosperms. They were an interesting group of plants, interesting for several reasons. One, because the reason we had them in our collection was because two of Ray's students who graduated and took a trip to Indonesia and that part of the world started sending Ray back plants. He'd given them a list and he'd suggested some [plants]. They were kids, and they made inquiries, and they ended up sending back these cuttings of these angiosperms that people hadn't collected before. Ray was of the opinion that perhaps it was because they were students, that if they'd been professional botanists they might not have been taken as freely to wherever these various plants grew. But they sent the plants back. Ray, through his amazing skill, managed to coax roots on them and get them to grow. And we ended up with this remarkable collection. Why are they primitive? Well, their flowers hang differently and they're not quite complete. The students who did the senior thesis, I'm sure it was, probably a biology senior thesis, took the microtome and they examined the vascular structure of the stems of these plants. Angiosperms have vascular bundles that carry water up and food down. They're arranged in a

particular way, and it's an important transportation, circulation system with the flowering plants, with the angiosperms. And what they found with these very primitive ones was that the vascular structures were more like gymnosperms, which are the pine trees. Gymnosperms have naked seeds. Angiosperms have closed seeds and are flowering plants. Gymnosperms are the pine trees and things of that sort. So that was in addition to some of the strange flower structure and so on. They wrote a nice little paper about this, and they wrote something in the *Arboretum Bulletin* about their primitive plants and their explorations. It was an interesting group of plants that people were curious about and pointed out.

I was back East waiting for a grandchild to be born and *Science News* was there. I looked in *Science News* and suddenly it talked about this new, very primitive plant that had been studied by DNA studies. It had been found to be perhaps the most primitive of the flowering plants. It didn't mention the Arboretum. But I knew that that's where it was.

Reti: It didn't mention it?

Norris: Not then. So DNA comes along and the people who are studying these relationships. Pieces of these plants go to scientists who want to explore—I mean, the original plants are kind of funny looking because they've been chopped in various ways so that the tissues could be analyzed and so on. But they've found that these plants are among the really primitive flowering plants. One of the other primitive flowering plants, apparently, is water lily. Botanists or taxonomists will score plants from being very primitive in features (magnolias

are primitive and so on), the most advanced of the flowering plants are the daisy plant family, mostly.

Reti: Because of their complexity?

Norris: Because of their complexity. Daisies, for instance, have two kinds of flowers. They have ray flowers on the side that we pluck off—he loves me; he loves me not—and they have the disk flowers in the center. So it's complex.

Reti: That's why it's called compositae?

Norris: Yes. So it is interesting. And, as I say, it came from the Arboretum and it provided student research material in a very real sense. These things continue going on. So the Arboretum has lots of value for research.

Reti: So let's talk about some of the collections. How about the Rare Fruit Exhibit?

Rare Fruit Garden

Norris: The Rare Fruit Exhibit was an interesting project initially of— We have a Rare Fruit Club in Santa Cruz, in the Monterey Bay Area. And a leader of that, until his death, was a man named Don Gholston, who worked for, I believe, Chevron. He was a librarian. He became a member of our board, and realized that the dam, despite the fact that it was no longer holding water, faced the south, which tends to be, in our climate, a warm area. We like south-facing slopes. He persuaded Ray at that point, or maybe he paid for it himself, to put a low cinderblock wall on top of the dam that is not continuous. It has breaks in it.

They painted it some color that they hoped would absorb heat. Don's feeling was that this would be a location where some of these very interesting fruits from areas that were perhaps not totally temperate could be planted as an exhibit, as part of the Arboretum.

So there were fruits. There are members of the myrtle family, guavas. There was a student a few years ago who mapped what was left up there. I told her that I thought one of the points that she should make in her report, and one of the points that people who lead tours can make, is that Australia is a continent with enormous numbers of the myrtle family. But they're not like guavas. Because Australia is dry, the climate is dry. So the fruits that are formed, like the eucalyptus pod, or the tea trees (their little dry pods), are dry. They're holding their seeds in a different way. It isn't until you get into the more tropical areas of Australia that you end up getting fruit. But here you have these fruits, guavas and things that came from a wet climate rather than a dry climate. It's a nice example of plant adaptation and these big plant families.

Don died, and the rare fruit growers [at first] had some difficulty hanging on and hanging together. I think [now] they've revitalized themselves. They meet usually at the Arboretum. Don used to do most of this maintenance by himself, and, as I say, when he died things got kind of weedy. But [now] there has been a group of people who come to the Arboretum on a Saturday, usually. It may be once a month. There is a schedule for people who are interested. They work under the direction of Stephanie, and they weed, and they cherish, and they think about planting other things.

Reti: Cherish? What does it mean to cherish?

Norris: Cherish. It means you love and nurture. One of the difficulties of the site that Don picked was: it's true that's south facing, which is good. It's got the wall that holds heat and that's good. But it was an earthen dam made from rocks and lousy soil all done by horse and wagon back in the 1880s, 1890s. And it's [the soil is] not very good. Well, a lot of plants, many Australian and South African plants at the Arboretum want poor soil. They've got their own wonderful ways of dealing with impoverished soil, and if you feed them too much, or care for them too much they don't like it and they die. And one of the things that they have is a microzial symbiotic relationship. It's a soil fungus that actually becomes an extension of root hairs and gets out there and manages to coil itself around little molecules of good nutrients and nourish the plants. Which is amazing. It's an amazing thing. But gosh, here we have the dam and this kind of crappy soil. (laughter)

Reti: Can you make the soil better?

Norris: Yes, there are things that you can do. You can use compost and do things of that sort. You can make sure that there's good drainage. There was some thought several years ago that someone, maybe one of the big citrus nurseries, was thinking about giving the gift of citrus trees to the Arboretum, and thinking in part of the Rare Fruit Growers. In fact, after Don died, there was a citrus developed, the Don Gholston hybrid. It doesn't seem as though the dam is perhaps the best place to house that. It seems as though probably there's another

spot in the Arboretum that might be better. I don't know how, or if, that has been resolved.

So it's part of the exciting time that we are in now, of thinking about the Arboretum and the grounds—what would be good to have, and where it would be good to have those things. So the Rare Fruit Garden, in a way, is a historic relic. There are things there and they do survive. I haven't actually gone to look recently there.

Telopea speciosissima

Part of that dam collection, but not a rare fruit, was a story that Ray told about himself. He had gotten some plants from Australia. I don't remember if they were seedlings or cuttings. The plant itself is called *Telopea speciosissima*. It's the state flower of New South Wales. It's a shrub or a small tree. Spectacular flowers. For the most part, they're red and big. It's a Proteaceae family plant. A lovely folk story in Australia, and I don't remember it now to tell you, but so many of these spectacular plants have wonderful folk stories, legends to go along with them. This one had to do with a king or a chief who bled blood or something, and stained this flower, and it became red. The Waratah they call it, which I think means "Spectacular flower seen from afar." It's a big, showy plant. The wonderful thing about the *telopea*, and another aside that I like, is that not only is it big and showy, but it has blue pollen.

Reti: Blue? In a red flower.

Norris: Blue! Blue pollen. And if you don't know that it has blue pollen, and you stick your nose in it to see if it has a smell (it doesn't) you end up with a blue face. (laughter) The nice thing about that is that the aboriginals knew about this blue pollen and they use it as a body decoration. Because the pollen is sort of oily. You can get a little bit on your finger and—

Reti: So, for face painting?

Norris: Yes. Anyhow, Ray had these telopeas and— I mean, when I think about Ray, and I think about the plants that came from these other parts of the world that Ray managed to not only get seeds to germinate, or to get roots to form, but, I mean, to keep them alive! It was— Particularly at that time. You just have to realize that when we had our first plant sale and I looked at a book that I had that I think was written in 1972. I looked up one of these plants and it said in this book, "This would be a very desirable plant if only we could grow it in our gardens." Well, we were selling it. When I said something to Ray he said, "They weren't interested in their native plants, initially."

Reti: In Australia?

Norris: They really wanted to do what we all want to do. You leave home and you want to recreate home.

Reti: England.

Norris: Yes. So there was all this "outback," this brush there that they—

Reti: That says something right there, the word "*outback*."

Norris: —and certainly it was the Elliotts, among others, who were part of making the native plant societies develop [in Australia]. But as far as Ray was concerned, these were all strange plants, even to the Australians. So he planted a little group of Telopeas on the north side of the dam. He figured that they were like all other Proteaceae family plants, that once you got them in the ground they didn't really need much care after that. And I think a large number of them died, because they *want* water. At least they want some. Well, he didn't know.

I think about the Arboretum as being, from the very beginning, one amazing, grand experiment, just an amazing, grand experiment, that managed, somehow or other, under Ray's care, and with a lot of student volunteers and help, and other people— I mean, the Arboretum is an amazing thing. It really is. And with remarkable plants and people who care for them.

So anyhow, the telopeas are still there. They're elsewhere too, being cared for, of course, and watered during the summer. I'm not quite sure what the native plants, how all of those exist, or how or where else things are going to grow. I do know that Stephanie does have a group of people who come to try and pull out weeds and things of that sort. The dam was looking pretty nice the last time I stopped by. A lot of the weeds have been pulled away so you can see what's up there.

Reti: Yes. Now what about the Laurasian Forest?

Norris: That's something that is new, as far as I'm concerned. It's being developed, and it's fun. I believe that that area they're talking about is down in the areas of the old dam and up on the other side, which is nice. It's nice to think

of the Arboretum representing, as much as we can of the world, but we have this climate limitation. We have a Mediterranean climate here, which means that we have rain in the winter and dryness in the summer. Many of these other places have rain year round. That's why we have such trouble with water here, because so many of our garden plants and vegetables have come from Europe, where, you know, wait a week and it rains. And we know that here you wait a week and you'd better get the hose out because it's not going to rain, probably. We have fog, thank goodness. I have suggested one or two plants that I have that I would like to donate to the Arboretum, that might go into that forest. One of them is a Kentucky Coffee Tree, which comes from the middle of the country. The reason it's called a coffee tree is because it has seed pods that look like coffee beans, a great, big deciduous tree. I have a couple out there in the yard that I got from Nebraska when I was visiting my family there. I was delighted when Dan [Harder] told me that the reason you would find this plant widely spread, mostly along river courses, was because of these seed pods, which were big enough for the pioneers, Indians, whatever, to use for games, checkers or whatever.

Reti: Oh, for Indian gambling.

Norris: Or whatever they did. So the trees got spread around. I mean, interesting. It would be nice to have that story as part of— They're beautiful trees, deciduous, about forty or fifty feet tall.

Reti: An interesting example of a human-plant relationship there.

Norris: But I don't know [much] about that garden [the Laurasian Forest]. What other gardens did you want to ask about?

Cactus and Succulent Garden

Reti: The Cactus and Succulent Garden.

Norris: The Cactus and Succulent Garden is very interesting because it occupies the top of the dam before you get to the Rare Fruit Growers, which are sort of on the slope. And it has an interesting collection of plants, again, useful for tours, or for thinking about plant adaptation, because cacti have lost their leaves, most of them have lost their leaves. They have spines instead. Succulents have fleshy stems also. They have leaves. Some of the cactus and other plants from Baja California, for instance, lose their leaves, if they have leaves. Like the Palo Verde Tree will drop its funny little leaves when it gets dry, but it has chlorophyll in its trunk so that it can still photosynthesize. The Boojum Tree, isn't a tree at all, but it gets to be pretty tall, Idria. Sometimes people call it the Upside Down tree because it kind of goes up and it has these little branches at the top that, that particularly when they've lost their leaves, look like they might be roots. And they get to be tall plants in Baja California.

And then, perhaps this time of year or a little later, maybe in August, when the leaves are gone, we have in that section, although it's not either a cactus or a succulent, a plant that is native to the Channel Islands. It's a coreopsis. They call it the Giant Coreopsis and it has lovely, yellow coreopsis flowers. You'd certainly recognize it when it blooms in, oh, maybe May or June. Well, if you look at it now, the leaves are gone and flowers dry. And the leaves, they're sort of a mass of dead up there. The plant looks quite dead, as a matter of fact. I asked several

years ago that a sign be put up near it explaining that it's not that we're understaffed—

Reti: (laughter)

Norris: —and it's not that the plant is dead. It's just that this is its way of adapting to our climate. It flowers, sets its seeds, and then loses its leaves. But, by gum, when the rains come in November it's going to start greening up and it's going to have this lovely head of foliage. It's a neat story. One of the neat stories that I read about it in one of the native plant magazines, I can't ever imagine one of our plants doing that, but in the Channel Islands, they grow. I've seen them on Catalina Island, and they grow on the other islands, and you're talking about a plant that maybe gets five or six feet tall, maybe, and thicker around the base. But the story I read was that the pelicans nest in these trees. When you have all that mass of foliage at the top, there would certainly be room for a pelican to—
(laughter)

Reti: Wouldn't that be a sight. Oh my.

Norris: Wouldn't that be a sight? Our plant, the one that we have up on the dam has been there (Steve [McCabe] can probably tell you how long it's been there), and it grows slowly. And they have planted others out— So it's an interesting plant.

Another plant that's interesting in the cactus and succulent garden is a plant— I like the plants that have been named for perhaps some person in our own history. And there's a wonderful little plant called *Lewisia*. *Bloodroot*. It's a

native plant. Again, basal leaves, small, little plant, very attractive little flowers. It goes dormant in the summer. You just lose it. It had a great, big deep carrot root. Then the rains come, and it leafs out again. It was named for the Lewis of Lewis and Clark.

Another nice plant that's named— I like these things when I have kids studying history. *Fremontia dendron* is named for Captain Fremont. You can sometimes go through and make Latin name sense out of (laughter) plants if you can think about a person, or a history figure, or something of that sort.

The South African Collection

The other collections. The South African collection came, I think, partly because Dean McHenry as a political science major had sabbaticals, one at least, and maybe more, in South Africa. Dean was certainly a farmer, a plant person. And there he was, with strange and exotic plants, and a great big huge botanic garden, which he enjoyed going into. He probably became a member. In fact, I think he must have because—

Reti: In South Africa while he was on sabbatical?

Norris: In South Africa. Because I remember going into that original little office, which was our only structure at the Arboretum for a while, and had a great big table, and seeing Dean and Ray hunkering over a plant list from Kirstenbosch, deciding what they should grow, what they should get. So they got seeds, and then Ray had to figure out how to make them grow.

But there were also some people who were important. I don't know how Dean met the Middlemanns. I don't know what he did in South Africa there, but he came to the Arboretum several times with his wife, and I went on walks with him and Ray, looking at the South African collection. He discovered (and he was certainly one of the people looking at their own native plants), that there was a market for these exotic plants in Europe. They would pick *protea* flowers. They would go out into the bush and they would pick *protea* flowers and send them off by airplane to Holland, or wherever, and they were sold on the market and got a good price.

Reti: The flowers, not the plants?

Norris: The flowers. And then he decided (or at least this is what I think he told me), he decided that well, you could have more of these flowers if you grew them in a nursery, instead of going out and having to collect them. I believe, or at least it sounded like from his conversation with me, that he was one of the people who initiated that sort of thing. And perhaps this is how Dean met him.

There were other people in South Africa, perhaps the Middlemanns, who were still having, I'm sure, the time of their life exploring what was there. They were interested in the ericas, which is a large plant family. We think about the Ericas in the bogs of England and so on. Blueberries, madrones, plants of that sort are all within that plant family.

Reti: Oh, really? I didn't realize that.

Norris: So we have our ericas here too. The ones in South Africa are a little different, but there are a lot of them. In fact, I believe that Ray said that there were about six hundred different kinds of ericas just in the Cape Peninsula, which is a rather small area. Ray puzzled at that time about how they were able to maintain their species, because they were being pollinated by whatever was able to get in the flowers, and why weren't there just jillions and jillions of hybrids? Maybe there were. But there were people in South Africa who were going out collecting these plants, and we were the recipients of seeds from these people. In fact, one of the ericas that is very popular when we have it for sale is one that came up from a batch of seeds collected from a few plants. They were all supposed to be the same but we ended up with a hybrid. Instead of having small flowers, we ended up with great, big flowers. Red. I mean, it's spectacular.

Reti: Now what plant is that?

Norris: It's an Erica. And I think we've actually put Santa Cruz on it as a variety name, realizing that it was a different plant. But these things came from South Africa. The Middlemanns criticized one day a plant that had been one of the early proteas growing at the Arboretum, that came from them. This plant was called the Sugar Bush because it had such an abundance of nectar that it just almost drips off. It's a wonderful plant. I liked it with tours because I would pick the flowers and have the kids hold out their hands and shake. And then, "Oh!"

Reti: You mean you could actually eat it?

Norris: Yes, it's delicious. It's a very nice sweet nectar. Of course we ended up with sticky fingers. But the South Africans with this particular plant did that.

They went out and collected the flowers, and shook them, and boiled the nectar down. And when you realize the Europeans who went to South Africa— I mean, you can't carry everything in a sailing ship. So they were, I'm sure, grateful to have whatever they could use. I'm sure the native people there told them that this was a wonderful plant. I have a South African book that has a picture of a medicine bottle, and in Afrikaans underneath it gave it a name. But they also said that this was not only used for sweetening cereal and so on, but it was used for sore throats and earaches. It was an important medicinal plant.

Anyhow, this particular plant is still growing at the Arboretum. But the Middlemanns questioned why we were allowing it to live. Walter said, "It's old. It's reached its senescence. It's probably not going to flower so heavily anymore. Get rid of it." He had a good point. On the other hand, this is an Arboretum, where it's important to see plants in all stages of their life.

Reti: True.

Norris: This was one of the early plants that had been put in, and it has, in my mind, the wonderful vision of one of our early members of the Arboretum Associates, who lived in Pasatiempo and who came to the Arboretum, and was, I think, very proud of the fact that Brett trusted him enough to allow him to do some pruning.

Reti: Oh, yes. That's a lot of trust.

Norris: This particular plant, when it's in bloom it's quite an attractive plant. And then when the flowers go by, they don't open up and they don't drop off.

They close, so that you see these rather ugly brown flower heads everywhere on the plant. You wonder, what happened? Did they die? This is what the plant does. If you cut flower heads off, and take them home, and put them in a dry area, eventually the whole things will open up like a dinner plate. They are quite big. Our talented volunteers use them in their wreaths.

Reti: They'll stay that way in the wreath? They'll stay open.

Norris: Yes. It's the bracts that are open. You pull the spent flowers out so that you just clear the bracts. Ernie [Sabloff], when he was still alive, and when this plant was younger, would get in there and would make it look really nice by pruning off all these dead flower heads. He was proud of this fact that he was trusted to do this. One day I was walking past this particular plant with a group of kids and I knew that Ernie was in the bush. I knew he was there. The kids, I don't think knew he was there. But as I walked by I explained to the kids about how this plant could get really ugly when the flowers went by, but there was one person who was important to the Arboretum because he cleaned it up and made it look nice. And I could see the bush kind of vibrating a little bit.

Reti: (laughter)

Norris: So you know, there are some things that are important, more so than senescence and (laughter)— So many of these plants and these places in the Arboretum have these sorts of associations. In many ways you sorrow when something happens and they change. But you know that things go on, and that's the nature of things. Plants don't live forever either.

Reti: What about some of these little characters that live in the Arboretum, like the cats?

Red-legged Frogs

Norris: Well, I'll tell you first about the frogs at the Arboretum. We have red-legged frogs [*Rana Aurora*] at the Arboretum, which are pretty special. And my story about the red-legged frogs which still delights me— I was greeting a second grade class in the parking lot for a tour, with their teacher, and Ray appeared and asked if I thought the kids would like to see a red-legged frog. I thought that they would. Where was this red-legged frog? Well, it was up in one of the hoop houses where we keep plants. So we trooped up there first before we did anything else. When I looked in the door of the hoop house, I could see on the cement at the far end this great big frog sitting there, next to a water bucket. A red-legged frog is bigger than a bullfrog. They were the frogs of Mark Twain, the jumping frogs. *Big* frogs. So I, with the kids behind me, advanced on this frog, wondering whether it was going to hop away.

Reti: (laughter) Were they hiding behind you, or just standing there?

Norris: We were all walking in, and when I got to the frog we had the whole class in the greenhouse at that point. (By the way, there are other frogs in the Arboretum. We have tree toads, and things of that sort. We have lovely frogs at the Arboretum.) But anyhow, I picked up the red-legged frog, a big handful of a lovely red-legged frog. And with the kids gathered around me, I turned it over and I showed the kids why it's called a red-legged frog. It has splotchy, not solid red, but splotchy red on its big hind legs, which are good to eat, too. But there it

is. Splotchiness. And they have sort of bulging eyes, as bullfrogs do. So I turned the frog back over and I explained that frogs have sometimes a difficulty eating things and they actually use the muscles in their eyes, they push down to help swallow.

Reti: Wow!

Norris: And so a little bit of this natural history. About at that time, the frog peed. This lovely stream of pee came out. The kids were thrilled. (laughter)

Reti: I bet. (laughs)

Norris: And I rather suspect that particular group of kids, when they went home to tell Mommy what they'd done, probably what they said first was, "And the frog peed on teacher!"

I also learned another bit about frogs because there are tree toads all around, and tree toads have this way of changing color. A little bit. They can do a little bit of color matching, so that they're sometimes a dark green, and sometimes they are a brownie color, and sometimes there's a little more yellow in them. But I made an awful mistake one day with a group of kids explaining that tree toads do change color, or can a little bit, and that sometimes you'd almost think you have a Golden Tree Frog (which isn't quite true), but anyhow, the kids were all just bound and determined to catch every frog they could.

Reti: Oh, to see whether it was going to turn color. Oh dear.

Norris: So I stopped talking about frogs in that particular place after that.

Arboretum Cats

So you asked about cats. The cats have been at the Arboretum, as far as I know, ever since. There was a wonderful cat at the Arboretum that was just called Kat. They were black, these early cats. Then there was this wonderful, wonderful cat named Spookie, who was also black. Ray was very fond of the cats. He took good care of them. They were always fed, and they were fed sometimes more exotic things than regular tinned cat food. I think sometimes the raccoons came in and ate the food that the cats were supposed to have. I also know that Spookie discovered, I'm sure much to his delight, that the propagating beds in the old lath house had bottom heat, and they were a nice place to curl up and sleep when you were there all night.

Reti: Oh, no.

Norris: And Ray wrote a charming story. I can't remember whether it was just Arboretum Kat, or whether it perhaps was Spookie. It was at the time on campus when there was a lot of mysticism going around and people were interested, some, in flying saucers. That time in the world. And apparently, according to Ray's story, a young man came to the Arboretum essentially to kidnap this black cat because he felt that this was a way of channeling to the supernatural out there. I found this account in one of my papers [later]. We were having trouble with our *Bulletin* editors and I suggested, "You know, we've got some good stories in the literature. Why can't we just bring back one of these?" Brett said, "Oh, yes. I was here then." I don't know if he was living at the Arboretum or what, to protect the cat. (laughs)

Reti: So this guy came and tried to take the cat, and told them why?

Norris: Something. I can't remember Ray's story. Ray always has amusing stories to tell and that was one.

Spookie got old, and there was an awful time when some visitor came to the Arboretum and thought that Spookie was being neglected, and carried Spookie off to the pound or something. We had to go back and retrieve Spookie, who was a dearly beloved cat, old, but dearly beloved. Well taken care of, and so on.

One of the cats that I enjoyed very much, his name was Mr. Jules. He had come from The Farm and was a yellow, orange tiger cat, and decided that living was pretty good at the Arboretum. I think at the time, maybe it was when Spookie was still alive, occasionally animals would be dumped, and then when Spookie was younger he would drive them away. He didn't want competition. But Mr. Jules hung out in the propagating area and became a very dear fixture for the Arboretum. I have peacocks, and because peacocks like cat chow, I carry cat chow in my pockets. I, at some point put cat chow down. Well, then Mr. Jules greeted me fondly every time I came, and I'm told that he actually recognized the sound of the car and would rouse himself to come to see what sort of a treat I had for him. He was certainly part of the scene. We took time out from propagating to give him pats. We also had to deflect him sometimes from lying on our freshly made cuttings, or things of that sort. He unfortunately met with a sad end over the years. I got to the Arboretum one day to hear that an animal had come in, I think maybe a coyote, and run off with him. He was an older animal. So that was sad.

Now we have one cat. We've attempted to, after Mr. Jules was gone, to maybe have another cat, but that didn't seem to work. Brett Hall had two kittens, a brother and a sister, and he had collars for them. They looked so similar that it was hard to tell them apart. And Cally Bear, who is there now, the female, does wander in, and we see her. She doesn't like the cat chow I usually take, but I have tried other sorts of cat chow and she will sometimes deign to nibble a little bit. Her brother, however, was a different story. He would come into the Windy House where I propagate, make cuttings. He was sort of a terror, because he was pretty aggressive, and he would come in and bite people's shoes. Some of the volunteers were afraid of him. I just took the squirt bottle out and chased him away. I mean, we didn't really need him. He really enjoyed people and he would sometimes follow on tours. Of course everyone wants to pat a cat. You can't resist. I was a little concerned about whether he'd bite, or what he'd do. Brett finally decided that maybe another home would be a good idea. And apparently he's just a changed cat. He's by himself in another home. He lives in the country and he's in charge of his world.

But one day he had been following a tour, I'd seen him around and about. At the end I took the tour down to the entrance to their cars. It was getting to be rather late in the afternoon. I went into Norrie's to visit and say the tour was over. And out of the back window, the door, I thought I saw the cat walking just up the patio and past the door. It was natural. We'd been down there. Then I did a double take. Because it wasn't the cat. It was a bobcat—

Reti: Oh!

Norris: —who was just marching along full of purpose. A little while later, the cat came, sort of ruffled all up, and legs standing high, tail kind of bristling. I laughed about that, because I'm not sure the bobcat would have been friendly to the domestic cat. Maybe. We have other bobcats in the Arboretum.

Reti: Yes, I've seen bobcats in there.

Norris: It's fun. I was leaving one day after some affair, and there was a bobcat that came right in the entrance to the Arboretum, and disappeared down in the gully. So they're there. I raised a bobcat in my youth, in my earlier times. So I have a great fondness for bobcats. I always get very excited when I see the bobcats.

"Where Would We Be Without Our Students?"

We did have a collection of [amazing] people at the Arboretum. I did a little story for one of our volunteer newsletters not so long ago, because I was thinking about the students, and about over the years what a really phenomenal group of students we've had. In our early *Bulletins* we used to mention the students. They'd get scholarships, or they'd write a senior thesis, or something. But, you know, we haven't really mentioned the students for a long time. I thought, why don't I write something about the students? Which I did. Of course I didn't know all of them, and I didn't remember all of their names. I remembered just a few of their names. But I was impressed that when I myself went back through the old *Bulletins* I had forgotten that some of these people that I'd known in later life had [once] been students. I think it's important. I started out my first paragraph with,

“Where would we be without our students?” I think about this with a good deal of satisfaction and pleasure. We’ve had amazing students.

There was one young woman who came to the Arboretum as a freshman or a sophomore. I suspect that she was a work study student, which is one of the ways that we end up with students. Her name was Emily, and when she was about to graduate, the Arboretum was having some difficulty with (as we so often do in waves) financing, and perhaps with appreciation from the larger campus. I said to Emily, “What would you say to other people about your experiences at the Arboretum? How has it been?” Emily said that the wonderful thing for her, as far as the Arboretum was concerned, was that Ray and Brett let her follow her nose and find her own niche. The niche that she found was the *Erica* garden, which was a mess. The weeds were everywhere. Ray had discovered when he went to Australia, I think, about putting weed cloth down, and gravel, and the area became more attractive. But Emily got in there, and for the years that she worked at the Arboretum, she just took that area of the Arboretum for her own. She weeded, and she propagated, and she tidied it up. It was wonderful. She wrote a senior thesis about it. So she got something out of it, and she was certainly grateful to Ray and to Brett. But I found it a little poignant (and I’m now putting something in my mind that I thought when I saw her doing this, but maybe it wasn’t true), but she went around with another student (she was graduating) very carefully with all of those plants, explaining all those plants. It was like a mother explaining to a babysitter how to take care of these plants. I was very touched by it. It might not have been in her mind at all. But she was certainly one of those remarkable students.

There was a student who weeded with her, and Melinda [Johnson] said that this was a wonderful girl who did the most incredible job with weeding. Melinda has explained this method to all the volunteers who have come since. I used to see this lovely young woman sitting there with this impossible patch of weeds, just humping herself along and clearing out weeds. But what she did, according to Melinda, was that after she finished an area— You know, if you pull a weed out and even if you shake the dirt up you'll have irregularities, hummocks and so on. It doesn't look very finished. She would take her hand and she would smooth down all of these places so they really looked wonderful. So Melinda has taught everyone else since how to do that. So there have been amazing students.

There was one young man who actually lived up in the Owl Perch and was so interested in natural history. He was the one who climbed up into the tower. He and some other students put up rather a funky structure in the heart of the Australian garden. The Australian garden, you have to understand, initially was all flat. All the contours were made by machine or humans of one sort or another.

Reti: You had to build it up. I didn't know that.

Norris: So we have hills, and we have valleys, and we have walls, and things of that sort. One of the places below the big hill that was put in, is sort of a low place, and Gabe and his friends, whoever was working, used eucalyptus branches and put up a gazebo, put a railing along the top of the path along the hill so that it was safe to walk. The path had been there. You had to get to these places. This particular hill was oriented south and north as a trial for the Slosson Garden to see what conditions plants needed. On the north side of the hill there

were, in some cases, big rocks put in that might hold the heat, but also could be watered, and two by fours, they were railroad ties, as a matter of fact. There was a trail going up on the top. The kids put this railing up, and the gazebo, and maybe something else. It's deteriorating now. It's been a while. But it was an effort of a great deal of creativity, doing things with no money. So many things at the Arboretum happen that way. And nice, and useful. It's nice to be able to walk up there. But I was delighted, one day, when, again, I was in the buildings or near the buildings and cars came and people looked puzzled and I went out and said, "Can I help?" Well, they were actually looking for this structure.

Reti: They were?

Norris: They were, because they were friends of Gabe's mother or father or something. I was so glad I was there. No one else would have known what they were talking about. (laughter)

The Owl Perch

Reti: Did you want to say more about the Owl Perch?

Norris: Well, I did talk about it some [in the last interview], but when I grew up in Washington, D.C. there was a huge big reservoir. I only saw it when it had water. But it had one of these big towers sticking out of the reservoir, and I was always, as a kid, puzzled, "What's that for?" And we have, as a matter of fact, in one of our *Bulletins* a science writer or someone wrote an article about our waterworks here, and went up into the library and found a picture of our reservoir with the tower sticking up and more things about that. The tower is a

structure that I hope always lasts. It had some damage in the earthquake. It may not be as stable as it might be. But I think of what we humans have done, and how they have managed. Those people who put in that reservoir and the dam originally managed to drill this great big bore underneath the dam to runoff, and had the whole waterworks.

I might say one other thing that Ray told me. When the Arboretum was fairly young, we had one of those El Niño years. In fact, it was 1972-73, I think the year that [Ken and I] came, that we had a lot of rain. It rained and rained and rained, and it was cold. Anyhow, there was some point in there, that Ray, who had an office up on campus, there wasn't— There was just this little building down below. He realized that the dam was filling up with water. There had been a lot of rain, but it was filling up with water. And, by gum, what had happened was that kids had come in, climbed down that tower, found that big wheel and turned it.

Reti: No kidding.

Norris: I guess it turned one way and it turned the other way. But anyhow, there it was. You could turn it. And then they had to go home for dinner, or whatever, and (laughs) they left. They had managed to close the dam. So I used to like, in the early days to, as a very special treat when I had a really nice group of kids, to walk down close enough so that we could see the dam and tower through the willow trees, just because I like it. It's romantic and it's part of history.

Well, it's mystical. A lot of times it's fun. The Arboretum has mystical places. It has trails that you go down with the plants on the other side— I always knew

where I was, but the kids didn't know. They would think we were in a jungle or something. Of course I'm happy to go along with that sort of thinking. So I would get down to the tower and I would say, "This is really a remarkable tower. You can just imagine someone lowering her hair down and calling out, or maybe even dragons living there, or being guarded by something." Kids are great. I remember one little girl looking up at me and saying, "Really?" And I, of course, wouldn't lie. I said, "Well, really just pretend." (laughs) Ray overheard me doing this nonsense one day, and instead of scolding me, which he could have done—you know—what are you saying to these children?—he told me about the owls, and he told me that you'd think that there really were dragons there when you hear the owls nesting in the tower. Because, you can imagine. It reverberates. They get up there in the top of that tower and they make their little squeaks and squawks and sounds.

Reti: What kind of owls?

Norris: We have barn owls there. So there are spooky, mysterious places at the Arboretum.

Dr. Ball's Redwood Grove

Reti: Yes. And Spookie's Grove, the little redwood border there, Spookie's Forest?

Norris: The redwood trees are another really interesting thing. A man by the name of Ernest Ball, who was a professor of botany at the Irvine campus, moved with his wife up to Santa Cruz and became, I guess, an emeritus, or a member of

the faculty for a while. He was, I believe, the article said, the first person who really was able to use the techniques of tissue culture to reproduce conifers. They'd done it with flowering plants. But conifers were a little different. They've got a different vascular system and those sorts of things. Ernest Ball was able to make cuttings and to reproduce (however he did it, different chemicals and so on), redwoods. And he got a grant from Save the Redwoods, I believe was the organization, to essentially make collections of the finest, most amazing redwoods that he could find in the state of California, and reproduce them for the purpose of perhaps improving the timber harvest or putting in plantations of redwood trees. So he had his office full of little redwood trees. He planted them out there at the Arboretum to watch them grow. They're all in rows. It's like a little plantation out there. And he retired, leaving all these redwood trees behind in gallon containers. A lot of them came from upper campus to the Arboretum, sort of at my request, because I had these tours. I would give school groups these redwood trees to take home if they had a garden, to plant.

Reti: These little trees that were—

Norris: Dr. Ball's redwood trees. (laughs)

Reti: Oh, my gosh.

Norris: I knew his wife. She was a wonderful person. He was interesting. I didn't know him professionally at all. He's no longer alive and his wife has moved away. But his redwood trees are still there. If you go to the Arboretum out past the Australian garden on the border of the Arboretum out by The Farm roads and so on. As a matter of fact, if you take that internal road—

Reti: Well, I went into the grove. I took this path through it.

Norris: The grove is up there. It was not cared for. I mean, it was just there. The plants were just growing. Various people have looked at that and puzzled what to do with Dr. Ball's redwoods? There are people, native plant people particularly, and Linda Willis being one that I propagate with. She just says, "Gosh, the opportunity to perhaps get in there and make the paths bigger and turn it into a whole redwood habitat with all of the native plants associated with the redwood trees, and how nice it would be." There was some thought when we were going through our planning for the next umpteenth years that perhaps the Arboretum should have a new entrance, and perhaps it should have an internal campus entrance. And that it might be handy to have an entrance coming through that redwood grove back there. I think that that was scrapped for several reasons, [partly because] it's nice to have community exposure and community gets somehow intimidated and terrified by campus, and might never ever find us there. I think what they've settled on, more or less, is having an entrance somewhere in the native area, in Rick's native area, but before you get down to the eucalyptus grove, where it would be right off of High Street. We could have a new center for lectures and so on. What we really need is to have a big place to put the buses. We have buses that come, and cars, and the parking is obviously inadequate. But I know, because volunteers will come. We have our volunteer class every year, and someone will always get enraptured with these redwoods and say, "Oh! We can do this and this and this."

Reti: In the grove?

Norris: In the grove. And the staff are thinking about it too.

More Tour Stories

You asked me to tell you a bizarre story that happened at the Arboretum. There was one day when we had several groups of visitors at the Arboretum. One was an Asian group and was being taken around by one of the very experienced and entertaining tour leaders. I had a different group with me. My tour went okay. We told our stories and so on. But when I talked to the other tour leader afterwards, he was rather shaken by his experience. Two things had happened. One, they had encountered a snake. And that had totally and completely undone the group that he was with. But the thing that surprised him most was that one of those cats that we've been talking about, in a very friendly manner came up to this group of tourists and rubbed up against someone's ankles. She went ballistic. I don't know what the significance was, but the combination of the snake and the cat—

Reti: (laughter)

Norris: —in all innocence, I would have thought. (laughter) So you do meet things.

This particular tour leader was also a little bit shaken one day when he had small children trying to climb up eucalyptus trees that he was afraid were going to break.

Reti: They're not good climbing trees.

Norris: And he thought that was too bad. So the woman with the snake and the cat was the most strange thing that happened.

There was another thing that happened, however, that I rather enjoyed. Again, it was with the same other tour leader. We had a group of kids, and we took them into an area of the Arboretum called The Amphitheater. At that time it had a series of benches with no backs. They were lovely big slabs of redwood mounted on cement piers, and it was a good place, often, to start a tour. The kids could leave their lunches there or they could have their snacks. It was safe. It was a little out of the way, and wouldn't be bothered by other visitors. It gave us a chance to get acquainted a little bit, and to talk to the kids about what we wanted to, before we broke up into smaller groups. I was in front of this group talking about something, I suppose with plants in my hands, and realized out of the corner of my eye, that my partner, in one very graceful movement, had reached down to the ground and came up with a snake. Well, that was pretty exciting. After all, snakes and lizards, and hawks, and rabbits, and bobcats are all part of what we find at the Arboretum. So I took that occasion to take the snake from him, and walk around with all of the kids telling the kids a little bit of natural history about gopher snakes, non-poisonous. I showed them how to tell the difference between a rattlesnake [and] a gopher snake. A rattlesnake has a neck. It has those poison glands on the side, so it makes it look like it has little cheeks and a neck. And gopher snakes, their head and necks all sort of blend together at more or less the same level. The belly scales of the [gopher] snakes are quite different, because they're large and they're smooth, and made for gliding over surfaces easily. The back of the snake, the scales are patterned, and they're

rougher. I don't know if they have a purpose. Maybe to reflect the sun instead of getting too hot. I don't know. But anyhow, I had a fine time demonstrating this snake, and then let it go. We went on to our tours after that. One of the things that we've always done on tours is we collect plant material. I carry my clippers with me, and we collect plant material. So when the class goes back they go with a bag of material that they can use as a reminder of what they've seen at the Arboretum of plants, or the stories that have been told. So there's something to share later on, or maybe with their friends. As the teacher was leaving, she thanked me for this tour. Then her comment was, "And of course you always provide a snake!" I agreed with her that of course, whenever possible, we always provided a snake. It stayed at the Arboretum. We couldn't send it back to the school. So that was fun.

I had another experience with a group of international students. They were on campus learning English as a second language. They were Japanese students. In one week I had two of these groups that came in on two separate days. It was hot. One thing about those students was that I had trouble with them because they wanted to keep quite a long distance from me, and I wanted them to come closer so I didn't have to shout. But anyhow, we made our way through the Arboretum. And because it was hot, I picked some herbs, some rosemary, and maybe some lavender, and then went to a shaded place to talk about it. Mediterranean climate plants have an odor. What might the odor be for? I introduced the plant perhaps a little poorly for this particular group of students because I said that rosemary was a culinary plant and that it was often used in cooking, and that if you smell it and you like that kind of food, you really get sort

of hungry. Then I passed it around for people to smell. Well, they didn't like the smell at all. They wrinkled up their noses,—blech! Obviously it's not a plant that grows in Japan, and they probably don't eat pizza, and spaghetti. So I did learn my lesson. Sometimes I do learn my lesson. The next group that I had later on in the week, again a Japanese group of students, I did the same thing. I picked these plants and found a shaded place. But then I introduced these plants by saying that if they had grown up in Italy and were Italians, they would absolutely love this plant. It has a very strong odor, but it is so much a part of very important meals, and they might not like it but that's because it doesn't grow in Japan. That was a much better introduction. I didn't get so many wrinkled noses and people saying, "Yuck!" (laughs)

Reti: So what *is* the odor for?

Norris: I suspect that the odor is a protective device. Some things don't want to eat plants with these odors. The leaves in rosemary are small. They look a little bit like pine needles. The margins are curled under. There's a waxy coating on them which would prevent water from evaporating. In many of these Mediterranean climate plants, the pores that the plant has called stomatas that help with the exchange of water transpiration, in the jungle, or in the temperate area, the stomatas might be on both surfaces of the leaf. But in many of these plants, the stomatas are only on the undersurface of the leaf, and with the leaf margin curled under a little bit, and with either hairs or a waxy surface, it just means that they can conserve moisture. I really don't know what all these turpines, or whatever they are, on these smelly plants. A lot of them certainly have it. Eucalyptus has them too. But they don't seem to be munched as much as

some plants. Maybe it is, I've read, a device that protects them from predators. I don't think the deer will eat rosemary.

The Aroma Garden

Reti: No. You've got a whole Aroma Garden, right?

Norris: That's right.

Reti: You take people in there on tours there too?

Norris: The Aroma Garden is brand new. That was an area of the Arboretum that was really a challenge for years and years. It was the original entrance. Dean McHenry put a plaque up there, I think in honor of his mother, with a cute little sort of rustic path that wandered through there. There wasn't this road that goes up now past Norrie's and so on, so you entered the Arboretum through that garden. The soil seemed to be difficult to wet. It was probably a fine loam or sand or something, and when we tried to water in there, the water tended to run off instead of soak in. Over the years it was a challenge. It was planted with Mediterranean climate plants, which they all are at the Arboretum, but lavenders, rosemary, rock roses, cistus—anything of that sort, as much as anything because they could kind of stand the harsh conditions that were there. It was redone several times. They tried to dig in more compost and several things. It was a challenge. In the meantime, the lavenders all started hybridizing, and we ended up with remarkable lavenders. There was one that developed where the flowers were almost white, or the bracts were almost white, with little blue flowers. Very interesting. Of the Spanish lavender types.

We had a large collection of rock roses, of different kinds that were interesting themselves. One of the rock roses has a lot of resin on its leaves that is important medicinally and in the perfume industry. I was absolutely charmed when I read that in Portugal and Spain where this plant grows naturally and where it's a valuable commodity, this resin, that the goat herders collected it by letting their goats browse around the plants. The stickiness covered their whiskers, their chinny-chin-chin whiskers. And when they got completely saturated with this, the goat herders would chop off their chinny-chin-chin whiskers and sell those with all the resin in it. The goats, obligingly enough, would grow new whiskers, and do it all over again.

It was a nice garden to go in and to take people through. But as I say, it was just a challenge. It got to be more and more overgrown, and kind of a mess, and not really cared for. Angel [Guerzon] is a landscaper, and a very wonderful plant person, and a member (or at least he was, maybe he still is) a member of the board. I think that when the discussion came up (I wasn't on the board at the time), about what to do with that area, that it was decided to just turn it into a whole new thing. So it was Aroma Garden in a way always, because it had lavenders, and it had rosemary, and those kinds of things—good fragrant things there. Angel has done a wonderful job.

We have a member of the Associates (and maybe she's a board member) who's an artist. She does big, lovely sculpture pieces. It's really nice to think that when you have a garden you can have more things than plants. Or you can use large containers. It's very popular now in my gardening magazines that come to talk about designing containers, and what you can combine in containers, and

contests for containers. I think it's exciting. It's been particularly exciting for me to see this garden being transformed. They did a lot of work on the soil. They put new paths in. They planted interesting things there. A lot of things were taken out, and as so often happens when time marches on, I miss those things that are gone. But that's sort of the way it is. It's very attractive. It's nice to wander through. I don't believe that any of our tour leaders have actually taken anyone up there. But I see a lot of visitors. It's right across from Norrie's and the paths are there.

Reti: Yes, it's very accessible.

Norris: There are more and more things. When Angel put the plants out, he did as we all should do in our gardens, he calculated the eventual size of the plants and then allowed enough space so that they could grow. It does mean that initially you have a lot of empty spaces between plants that will fill in. But it's attractive because they put some nice ground cover there. So it's an exciting place to watch evolve. I came by the other day and I found a plant whose name I don't know. It was supposed to be a very special plant that maybe Don Gholston had put in, that I thought was maybe gone. But apparently, it had been dug and preserved and has been now replanted there. So that's nice. And the original plaque that Dean had put up in honor of, I think his mother or mother-in-law, is still there. So there's part of the new, and part of the old.

Reti: Yes. Do you have a favorite time of year in the Arboretum?

The Arboretum from Season to Season

Norris: (pause) You can almost not pick things of that sort, because plants come into bloom and out of bloom during the year. The winter is, of course, a very heady time, because everything is green, and it's all growing, and you have the Proteaceae family. Well, these are native plants in a Mediterranean climate, and rain signals a break of dormancy and a start of growth, so that you have this wonderful growing period where things are coming into bloom. The correas, for instance, this Rutaceae plant that I love. It has little bell-shaped flowers, and for the most part they hang down. They're pink, or sometimes yellow, sometimes a tangerine color. It's a wonderful, wonderful plant. I just love the correas. They come into bloom usually in early October. They stay in bloom, I usually can find an example of a flower to show at a tour until maybe May. That's a long time. We're talking about nine months of wonderful blooms. And some of them are in bloom during the summer. But it's an interesting plant.

And in the spring, from maybe April on, the pincushion flowers, the *Leucospermum* start forming big buds, and they come into bloom. It's just absolutely magical looking out from Norrie's to the South African section and seeing all these amazing pincushions. I must say, when I have little kids from Watsonville, the Latino kids often, I have to explain to them what a straight pin is, and why these plants should be called pincushion flowers. I usually have to say, "Do you have a grandmother who sews?" Trying to explain what a straight pin is. So it's an amazing time.

The *Erica* garden is absolutely remarkable, because after all of the dryness from the last of our rains in March, April, maybe May. Rains start again in maybe October or November. The ericas suddenly come into amazing bloom in

September. The little needle-like leaves are built to catch the fog, so they have this wonderful system of self-watering, a drip system that they get. They also bloom at another time. But that's a remarkable thing.

When the correas stop blooming, and when the pincushions are going by, and you don't find as many of the exotic *protea* flowers, you walk through the Australian garden, and there are all these wonderful little groundcovers, like *scaevolas*, the little fan flowers, and other little things that aren't there. I mean, the plants are there, but they're not in bloom.

And by the way, those little fan flowers are related to a plant that I knew in Hawaii that grew as a little shrub with white flowers, little fan flowers that had this wonderful myth about it that had to do with a shark god and other things that I don't quite recall. I have taken children, third grade children mostly, fourth grade children, through the Arboretum in the spring when the *scaevolas* have been in bloom. I've picked a flower, and it's interesting because it looks like half a flower. It's a little fan-shaped flower. It doesn't go all the way around in a circle. It's like a fan. I have picked a flower and we've admired the different shape. I've explained to the kids (and usually in fourth grade they're studying myths and legends), that we humans are a peculiar lot, and we like answers; we really want to know answers. And sometimes if we can't figure out the right answer, we make one up, and we call it a myth. We can make up a myth too about this plant. I start off by telling them that one of the myths that I know about this plant is that there were two lovers (Except with fourth graders I don't say lovers. I say two friends.) and they were very fond of each other. But some higher authority, the king or someone, ordained for some reason that they

couldn't see each other any longer. This was a very sad thing. So one was sent away to some other place. And it left both of them feeling very sad. But a bird came along and realized the sadness of this, and took one of these little flowers, which at that time was round all the way around, and tore it in half, and flew one half to one of the people and the other half stayed there. And they were planted. And forever after in the wonderful world of myths, we have fan flowers instead of— The kids have been absolutely wonderful when I've done that. I've wished I had a recorder. There was one little girl who went on and on and on about mice and birds and fish, and it all ended up with the fan flower.

Reti: So you got them making up their own myths?

Norris: Yes. And it was such fun. So that's another magical time of year at the Arboretum. Linton [von Beroldingen] used to be sort of apologetic. He didn't enjoy people coming to the Arboretum so much during the summer. He said, "Well, there's not so much to see." "But Linton, [I said] the bushes are still there. I mean, the plants are still there. You don't have maybe all of the showy proteas, and maybe the pincushions have gone by. But you've got these amazing, big plants that have this leathery foliage and these curious—" With the grevilleas— gosh, there's almost no *grevillea* that has a normal looking leaf. They all look like television antennas or something, you know, different. So you always have those. And then you have all of those wonderful things like these groundcovers.

So there's a wonderful time. I love the Kangaroo Paws, because when I was in Australia, I went to the Perth Botanic Garden. I watched the native Australian birds, this particular one big like a mockingbird, and how it actually pollinated

the flowers. I realized that with this big cluster of, maybe three, five flowers in a single cluster, only one flower opens at a time. And it lasts for about a day, and then it goes by, and the next flower opens. Watching this bird on the Kangaroo Paw in Australia, the stalk is heavy enough for the bird to climb up to the flower to poke into it without breaking. But the open flower was always right in front of that bird's bill. And then it folded down, and was out of the way when the next flower opened up.

Reti: That's ingenious. Because if they all opened at once then the bird wouldn't be able to drink from them.

Norris: Well, the bird wouldn't be able to service it. And you know, if the flowers are to make seeds, and pollinators need to do that, I mean, think of how many more opportunities you have in Australia to get seeds of your Kangaroo Paw if you have multiple opportunities for each little cluster of flowers.

Reti: See, that's something that confuses me about the Arboretum. Now, obviously we don't have those Australian birds.

Norris: No, we don't.

Reti: So who is pollinating those flowers?

Norris: Well, the wonderful thing about the Arboretum, which I couldn't believe, it was out in the South African section, and there was a large *protea*, oh, seven-foot tall maybe, a big shrub with the large, dramatic *protea* flowers on it. Some of them near the top were almost pointing upward. And there was a mockingbird up there and it was repeatedly diving into that flower. I don't think

mockingbirds eat nectar. But the nectar attracts ants and other things, and so I'm assuming—I think the birds learn. Of course, some flowers don't get pollinated.

Reti: Then what happens? Do you pollinate them yourself?

Norris: Then we pollinate them ourselves. Or we make cuttings.

That was another curious thing that Ray—which I've been curious about with all those ericas, and because he said, "How could there be so many different kinds of ericas in such a small area in South Africa, at the Cape?" You look at the flowers. Some of them are bell shaped; some of them hang down; some of them point up upward; some of them are more open; some of them are quite long and tubular and curved; some of them are short and in clusters. You wouldn't have one pollinator. You'd have bees and insects and so on.

Reti: So they've adapted to the diversity of pollinators.

Norris: Yes. By the way, there's another really curious plant at the Arboretum. There was an article in the [*Santa Cruz*] *Sentinel* about Martha Benedict and her garden, and her love of maintaining in Pasatiempo a garden for wildlife, including butterflies. One of the plants that she has there, we have at the Arboretum, and it's quite a remarkable plant. It's a native California plant called the Pipevine. The flowers themselves look like a little Dutchman's pipe. They're about an inch and a half high. And they look like a Dutchman's pipe, with an opening at the top and the side. If you pick one of these flowers and look through this opening, you see a lot of movement going on. There are things in there.

Reti: Inside the flower?

Norris: Inside the flower, just moving around. And if you cut the flower open, which is what I always did with the kids, your face is all full of little midges. They just fly out. And the story is that a swallowtail butterfly (which is named the California Pipevine Swallowtail) caterpillars as their sole food eat from this plant. So it's important for the preservation of this particular butterfly. The flowers are reported to have as pollinators these little midges that get in, and then the word is they get confused and then they can't get out. They're trapped. There's an opening. When you cut the flower open, you see a little below the top of the flower, but going all the way around inside the flower, a fourth-inch wide section of little hairs, black hairs that point down. As a flower matures, those go away; pollination has taken place. The midges can all fly away.

Reti: So the midges are doing the pollinating in there.

Norris: Yes.

Reti: Wow! That's amazing.

Norris: I mean, there are fun things at the Arboretum. There are fun things! (laughs) You have some wonderful people like Martha Benedict, who encourages us to grow Pipevine. These butterflies are found commonly a little further north, Mendocino and so on. I'm not sure that Santa Cruz was ever part of their natural habitat. But Martha has brought eggs, and/or caterpillars. And we have had, at least on one occasion, one of these beautiful butterflies flying around. It would be nice to encourage.

Reti: And do you sell Pipevine at Norrie's?

Norris: We have Pipevine now and again for sale, for our plant sales. So there are interesting things, and I'm sure that if we just thought about it, that every plant would have its tale. And as I said hours ago, gardeners will come and they want Latin names. Most people want stories, and most people will just go home with a feeling of excitement and enthusiasm about plants. I want the kids when they come to be so excited about plants that they're just not about to go out and break plants down and be destructive. I love it when I get letters back from children saying, "Thank you for letting us touch the flowers!" I love it when we poke our fingers into the flowers and we taste nectar. A lot of plants have nectar. We pull off the calyx of salvia flowers, and we suck salvia flowers. We pretend we're hummingbirds. And there's a little drop of nectar, and the kids have trouble sometimes deciding sometimes whether the blue flowers are better than the red flowers.

Reti: What about adults? Do you get them sucking on salvia too?

Norris: Yes, sometimes. It's fun for kids to realize that a little hummingbird has to work awfully hard when it goes into a little salvia flower. I will take the calyx off and squeeze the salvia flower, and there's just one little drop that comes. But the hummingbird is a little beast. And the kids (makes slurping noise). And then they say, "More!" I usually ask if anyone is brave enough to suck a flower. I always get someone who's brave enough.

Reti: Oh, this is great. I've gotten the flavor. I feel like I've gotten to be on one of your tours.

Dreams

Norris: (laughter) The flavor is fun. It is part— And the people. Irene, I can't say enough about the people, not only the staff, and the students, but the volunteers. When Ray retired, one of the volunteers said to me with almost a weep in her voice, "It's never going to be the same again. It's just like family now. And it's never going to be the same." When I see her I tell her it *is* the same. It's just like family now. The volunteers take care of each other, and we maybe don't know any more about each other than we just meet once a week. But everyone cares for each other, and you just *know* that. I've volunteered at a botanic garden in Los Angeles, gave tours there. The botanic garden grew, and more volunteers came in. Before you knew it, you had one group of volunteers feeling that they were more important than another group of volunteers. And you had this kind of cattiness, which is unpleasant. We certainly at the Arboretum have had our challenges, sometimes with personnel. Probably more of them are our own making, with the "thems" in the upper campus, and with our own struggles for funds, and for recognition, and things of that sort. But I think that [between] the volunteers, and the staff, and the students, there's been, at least as far as I'm aware, a remarkable harmony. It's a nice place to volunteer. Why is it nice? Because you're appreciated, and because you have friends, and it's fun to do things with friends. You have a good time. Even in the old days, when we didn't have all our buildings and we met people in the parking lot, volunteers would sometimes come in (as I said, I scheduled volunteers then), and I remember I was there once and someone said, "Well, I just came in. I know I'm not supposed to be here. But I hadn't seen you for a while. So I just came in to visit." So it's been

that kind of thing, where volunteers want to come. We had one volunteer who did propagating, who just said to me once, “You know, this is the most important day of the week, when I get to come and be with friends.”

I think that’s very rare, Irene. And I’m not exactly sure how it’s happened, except I’m sure it’s emanated from the staff and from our director. And when Ray [was there], back then it was just assumed, because the staff was so small, it was assumed that everyone had to do everything. There wasn’t any—“I can’t do that because you’re in charge of that.” If there was a job to be done it was everyone’s responsibility to do it. I think that was true with the volunteers too. I think that that probably is the strength of our smallness. We’ve grown [since then] and we are growing [but it doesn’t seem to be problem].

So it’s a nice place. I’m glad that we have such nice people. For my future of the Arboretum, I hope that continues forever—that we are able to maintain this feeling of cooperation and companionship. It’s important for any organization—for the Arboretum, it’s important that Dan is able to have a dream. Dreams are terribly important. You don’t get anywhere without a dream. So I congratulate Dan, and the staff, and Ray for his dreams. Dean McHenry and all of those people, they all had some kind of a vision or a dream. It’s very special to see that that’s growing and developing. The dreams will change and will evolve, I hope in such a way, (and Dan and others are certainly very good about this) that involves volunteers and others in these dreams. Because this is how good things come to pass and the Arboretum will grow and prosper.

Early Background and Education

Reti: Today is July 18, 2006 and I'm at the Bill and Jean Lane Library of the UCSC Arboretum with Dan Harder. This is Irene Reti, and we're doing our first interview, Dan, about your coming to the Arboretum and your directorship here. So let's start by, tell me something about your background, where you were born and grew up, as part of the context for this interview.

Harder: I was born in 1960 outside of Chicago, in Deerfield, a northern suburb. My father was a career businessman who worked downtown for an insurance company. At a very early age I became concerned about what was happening in the neighborhoods around our house, in the building of residential neighborhoods and suburban sprawl. Where were those native plants going after they scraped them off the top? I made a valiant effort even on my two-wheeled bike to go save some of the plants before the bulldozers came, and felt really empowered to put the plants in our backyard and try to grow those plants. (laughter) And save some of them. That started when I was between ten and fifteen.

Reti: And this would have been around when?

Harder: 1970 or the late 1960s, when that part of Chicago, the near-northern suburbs of Chicago, was expanding. The Chicago Botanical Garden was developed very near my home, just five miles from my house, and that started in the mid-seventies, I believe. It was one of my first experiences after just menial tasks of after school jobs to do summer internships at botanical gardens. After I graduated from high school with an emphasis on biology and some AP courses, I

went to Gustavus Adolphus College in St. Peters, Minnesota and soon thereafter realized that a small liberal arts college wasn't going to support the biology education that I wanted. They didn't have the resources to support a science degree including sharing dissecting animals with someone else. A grade school friend of mine was at the University of Wisconsin, Madison. And my interest was always in plants. Even as a kid I was digging up my parents' bulbs in the wintertime to see what they were doing underground when they weren't flowering.

Reti: (laughter)

Harder: And my dad, even though he was a businessman, never discouraged me from my interest in science, because it was passion-driven. I always felt most comfortable going to gardens, or going to natural areas and looking at plants and understanding the interaction of plants and animals. Beside the fact that my father didn't understand it, he didn't stand in the way of me, you know, being interested, and didn't stymie that interest. I try to do that with my own kids, encourage their open curiosity in whatever direction it is, because it's meaningful.

Reti: So neither of your parents were into plants. This is just a passion that you developed.

Harder: My mother was an inner city girl from Chicago, and did not connect with plants or gardening. My dad's father and mother were from farming backgrounds and they had a beautiful garden and knew plants. My father was a

weekend gardener (planting the entire summer garden in a few hours). He liked plants and encouraged me.

Conservation, of course, was an early ethic of mine, from what I saw going on, and figuring those plants weren't going to stick around. Those were places where we caught snakes and mice. These were viable habitats. And all of a sudden it was, scrape it over and put up houses.

I transferred to the University of Wisconsin, Madison after my first year at Gustavus Adolphus, and was very happy because the botany department was one of the top in the nation and there were great professors and graduate students teaching great courses. After only a few courses, I got involved with Ray Everett who co-wrote the book *The Biology of Plants*.

Reti: Oh, yes. That's a familiar name.

Harder: It's a standard textbook. One of his collaborators was Susan Eikhorn, who was also there, and Peter Raven at Missouri Botanical Garden. Peter Raven comes back in the picture later on.

Reti: Later in your career.

Harder: Yes. But Ray Everett was very encouraging, and got me involved as an undergraduate in doing some of the anatomical sectioning, and microscopic work, and cytochemistry, and working on a research project in his own lab. It was a great opportunity for me, and one of his graduate students, Jim Colbert, once mentioned to me in a plant physiology class, "Dan, have you ever considered going to graduate school?" I said, "Well, not really. I thought I'd

just—” And he said, “You have it. You have the drive it takes. You’re not bothered by the work and you really seem to like it.” It wasn’t hard for me. It was more, that’s what I really liked doing and my grades always showed the things I was interested in, or were driven by, or motivated by. I had no problem achieving in those classes. But in the ones I didn’t have any interest in, I was more of an underachiever, because I wasn’t interested. (laughter)

Reti: The passion. You were driven by passion.

Harder: Right. Ray Everett allowed me to work in the greenhouse at Wisconsin. I worked in his lab. He did a variety of different things and supported me in many ways. He also got me my first job outside of UW. After I got my bachelor’s degree from Wisconsin I took a job with a biotech firm. Biotechnology was going to save the world at that point, and inserting genes into different things was going to revolutionize agriculture. I got involved in a project with hybridizing soybeans and bringing back homozygosity to lines of lettuce, because lettuce is a perpetually out-crossing species, and by taking the pollen grains at a very early age, we grew out plants that only had half the chromosome complement in the whole plant. Then we bred them together and we got uniformity in genes that would allow the plant to perform more predictably. So you could dependably harvest a lettuce head after so many days, and wouldn’t have to send people out in the fields more than once, and increase the cost of lettuce. So they could plant it all at one time and go and harvest it all at one time. Some of this stuff I was working on was sort of misguided, like putting in a gene for red peppers into tomatoes to get green tomatoes to be red so that ketchup companies wouldn’t

have to add artificial coloring to tomatoes, so they could have an all-natural product even though the tomatoes they were using weren't ripe. (laughter)

Reti: (laughter)

Harder: And they were adding natural sugar, of course, and all this stuff to make them taste like ripe tomatoes. I spent a year and a half in Madison in that job. It's something I needed to do after I got my bachelor's degree, to sort of see what I was interested in. As soon as I got the biotech job— It was a lot of lab work and a lot of technical stuff, which really stimulated me for a while. There was some field work in the job growing the plants in the field, not only outside of Madison, but also in Homestead, Florida. We traveled there and grew four crops of corn a year in Florida. We also worked on corn hybridization and a whole bunch of different kinds of things.

Then I realized that biotechnology wasn't what was going to really interest me. Soon after I started the job I started looking at graduate schools. I looked at Wisconsin, and I looked at Berkeley, and I looked at Davis. I got accepted at all three places, and chose to go to Berkeley because I didn't know what I wanted to do and Berkeley allowed me to explore a bit. Everybody wanted me to commit to something and I wanted to think for a while and look at different options. Herbert Baker at Berkeley was perfect for me, in encouraging who I was as a scientist in my own way, sort of the same kind of mentor my father was for me—you know, whatever you do is going to be fine, and I will help you if you need me, but what you're doing is going to be great.

After some time at Berkeley I got interested in some underutilized plants and was very interested in legumes at the time, beans and peas, particularly the subfamily Papilionoide, and interested in crop plants. So I worked on an underutilized crop plant of great potential economic value. The National Academy of Sciences heralded it as soybean of the tropics and a variety of different things. The National Academy of Sciences investigated and published a small booklet on the winged bean and what needed to be done research-wise. I used this work as a guide and looked at nutrient allocation patterns in the plant and how they're moved around if you manipulate the plant. If you prevent it from producing pods, where do those nutrients go? And using controls and comparatives to show that if you remove the pods that a lot of the resources go into leaf growth, but most of it goes into the storage structure underground. The great thing about the winged bean is every part of the plant is edible except for the fibrous stems.

Reti: Oh. I was going to ask, how do you eat these?

Harder: You can eat the leaves, the tubers, the seeds, pods, flowers, shoot tips. The protein complement moves around. You can change the protein complement of different food products from the plant by manipulating how it's grown. You find that in Papua New Guinea they want to grow it for a good root crop, so they don't allow the plant to climb. They don't provide any opportunity for the plant to grow up, such as on a trellis. They leave it on the ground, which lowers its leaf area index, affecting its ability to flower. Essentially the plant doesn't have the conditions it needs for full flowering and seed production, so it saves the resources for conditions to improve. It puts these resources into the roots. By

manipulating how the plant is cultivated, farmers get a larger harvest and higher quality food source out of it, including protein. But in parts of the world where they want seeds, like in Thailand and Burma, or they want small pods— Some parts of the world don't even eat the tubers at all. When you allow the plant to flower it keeps the resources from the roots. Selection has been made in those areas where the plants don't produce tubers at all. They produce only pods and seeds. So you see directed selection going on of a plant, based on the desired product.

Reti: Fascinating.

Harder: Because it was underutilized and of potential interest and utility, the Food and Agriculture Organization (FAO) had an interest in it. A group that was called the International Board for Plant Genetic Resources (IBPGR) in Rome, which is a part of the FAO, they were interested, at that time when I was finishing up my degree (and I finished my Ph.D. in 1990), in the collection of the wild relatives of the winged bean. In 1988 I had the opportunity through support from IBPGR to do just that in East and Central Africa. I hadn't been carefully reading the letters I got from the executive director of IBPGR, JT Williams. We had been corresponding for years. I went back and re-read some things to frame a next correspondence, and the first letter I got from him was like, "Are you interested in opportunities to collect the plant?" or some phraseology that I didn't quite pick up on because I was just sort of reading, looking at the answers to the questions I had asked him. I copied the letter and sent it back to him and said, "Do you mean that you have money for me to go in the field to get these plants?" IBPGR wanted to get all the wild species of *Psophocarpus* into their

gene banks at the time as there was a big push to get all these crop plants in gene banks and store them for long term, because who knows what's going to happen in the future. So I got some money from IBPGR to spend six months in Central Africa, in Kenya, Uganda, Tanzania. I spent almost four months in (the former) Zaire because there were four species there that I was looking for.

Fieldwork on the Winged Bean

And that got me into fieldwork in Africa. To take this trip, I withdrew from UC Berkeley so it wasn't part of my normative time towards my Ph.D., and spent six months in Africa, fully supported, running around with a Land Rover into French-speaking countries with no French training, and trying to figure it out. With great collaborators in Zaire, we got all but one of the species we were looking for and got herbarium samples too. We also carried out an ethnobotanical survey of how the plants were being used in all the different regions, and formulated a story about how the winged bean got out of Africa, where all the wild species are, and ended up in Southeast Asia, Burma, Papua New Guinea, that area, with no wild species anywhere near there. We postulated it was a plant that was transmigrated out of Africa. The purported migration routes were slaves and Arab traders, and moved out of Somalia and that area, Kenya, the coastal areas of Kenya, Somalia and Ethiopia, to Southeast Asia. There are other now domesticated species that did the same thing. There are no wild species in the region where they've been domesticated. In some respects it's easier to domesticate a plant away from its other progeny, its relatives. It happens a little bit faster, apparently because of lack of introgression with land races, out of co-evolved herbivore and parasitoid pressures, etc. This is what's purported to

happen in the winged bean. I used the evidence of a host-specific rust that occurs on only one of the wild species, and does affect the winged bean in areas where it's cultivated, the same rust, so it's very specific in what it will affect. I used the presence of that rust on one wild species in Africa and in Southeast Asia to say this the susceptible species in Africa is probably the progenitor wild species that was taken out of Africa and domesticated. It has some physical and morphological characteristics and genetic characteristics and cytological characteristics in the chromosomes that suggest that they're very closely related. I never got around to doing the DNA because it wasn't really popular, doing DNA at the time. So that still needs to be done. Is this [discussion] useful?

Reti: Yes, it's very interesting to see the trajectory that brought you here [to the Arboretum] doing this kind of research.

Harder: And it got me to Africa, the first trip to Africa, and I ended up with enough money saved from the trip, because I was managing my own money and I essentially just said well, I don't know, what's it going to cost to go Africa? So there was enough money left over, that covered all my chemical analysis for my Ph.D. research work, and did all the analyses of all the tissue samples from my field studies.

One of the great things I was able to do in the summers (this is important too), as an undergraduate, I did some internships. I did one internship with the American Association of Botanical Gardens and Arboreta (American Public Garden Association) Internship Programs, where gardens offer internship placement in their botanical gardens that provide some course credit, or certainly

it enhances your CV if you are a horticulture student or a botanical garden person. I did an internship at Pacific Tropical Botanical Garden in Kauai, which was fantastic! (laughter) It got me working in Hawaii. I also did one at Chicago Botanical Garden. That was my first one. Then I did two at Pacific Tropical Botanical Garden.

Reti: These were in the summer?

Harder: Yes, summertime. And that introduced me to Pacific Tropical Botanical Garden. Since the winged bean is a tropical plant and I was in Berkeley, I was unable to grow the plant very well there. I tried growing it at UC Davis one year and it did okay, but it didn't have the heat late in the season to allow for pods to set and develop. It was starting to cool down when the pods were just forming. Winged beans are a twelve to fourteen month crop, so you need to have warm temperatures. And of course, the only other place I could grow it was in Hawaii. (laugh) So I did three field seasons in Hawaii. One year I spent nine months there, and another year I spent eleven months there as part of my Ph.D. work and did all my in-ground field studies there within the Pacific Tropical Botanical Garden. It is now called the National Tropical Botanical Garden. Bill Theobald was director then, and he was like Ray Everett, "Oh, this is great. You should just keep doing what you're doing, Dan, and I'll help you and I'll support you." They gave me a car to use while I was there in Hawaii, and they also paid me to go out in the forests and collect plants for the herbarium and for the botanical garden. And it's like, oh, this is a great job! When I'm not working in the field with my winged beans I can go in the mountains and collect plants in Hawaii.

Reti: What was that like? I've never done anything like collect plants in the forest.

Harder: That was just so great. Hawaii was just wonderful because it was so interesting. I could stand by a roadside and look up these spectacular valleys where everybody looks and ask, "What would it be like to go there?" And you're only there for a couple of days on your vacation so you never get a chance to go. I was like, okay, I have the time so how are we going to get there?

Reti: There's no trail or anything.

Harder: Yes, we'd rent helicopters and we'd do a whole bunch of fun things, and being young, there were a whole bunch of people there who were all interested in collecting, so four or five of us at a time would go out, for sometimes overnight and sometimes just for the day, and go into these valleys and find plants, and bring them into cultivation, and then start monitoring their populations, and do those kinds of studies, and how threatened they were in Hawaii, looking at pig damage and invasive species.

That was wonderful. Bill Theobald was a great mentor of mine, as well as Ray Everett. And while I was working on the winged bean in Hawaii, Peter Raven came out to receive the Allerton award that was given by the garden by Bill Theobald. Peter Raven came out to accept it. And he came out to the winged bean project because it was very prevalent. You could see it there. We started talking. We talked about a lot of things, including my collecting in Hawaii, and he said, "Well, when you're done come to the Missouri Botanical Garden. I'll give you a job."

Reti: Wow!

Harder: It was like, okay. It doesn't happen like that anymore! (laughter) I felt really lucky. I didn't really think much about it. It was like, maybe I'll just stay in academia, maybe— You know, I was too far away from finishing. I had so much to do with the thesis and other things going on.

Fieldwork in Zaire

But then in my last— Rather than just writing my thesis, I also wrote a proposal to US AID because JT Williams at IGPTR said, "They need this kind of stuff at US AID," and I'd worked with the U.S. Agency for International Development on this one project. It was called the Program in Science and Technology Cooperation, where by collaborating with developing countries' scientists you could transfer knowledge and technology to them and enable them to use the technology that you leave with them. The work within our project was something that hadn't been done, and Peter Raven helped with that too, by saying, "Basic botanical inventories aren't done. We don't know completely what's on this planet. We're spending billions to go to outer space but we're still discovering higher plants and animals here all the time."

Reti: That's so true.

Harder: There's so much to do here, and there are so little resources that are being dedicated to it. Are we really concerned with knowing all that's here? I did a lot of collecting with IGPGR and used that work to write a proposal for PSTC money through USAID and wasn't sure when I was going to use it. I thought

maybe I could do one more trip to Africa on this money and start doing something else. So I proposed to do the project with my collaborators in Zaire, where I'd spent so many months. The same people were at the Centre Regional des Etudes Nucleaire, Kinshasa (CREN-K), which was a nuclear facility that had a Triga-class reactor in it, where they were generating nuclear isotopes for their own studies. The reactor was a USAID transfer. The Berkeley campus did have one of these Triga class reactors on the campus. You walk in the front end of this building in Kinshasa or many developing countries like Zaire and there's all this mayhem outside, with poverty, and you walk in this facility behind this gate, and there's this nuclear reactor behind this glass. And you're like, wait a minute: the bathrooms don't flush in the building; there's no toilet paper; there's no running water to wash your hands. Yet they've got this nuclear reactor. Well. The juxtaposition of the two things just was mind-boggling.

Reti: Yes!

Harder: I wrote a lot about it in my journal at the time, because I couldn't believe it. Here I am. They've shipped that thing all the way there and now they're generating nuclear particles in Kinshasa, Zaire. It just seems really odd.

Well, anyways, the collaborators I worked with there during that initial collection with IBPGR were the ones I used again for this PSTC proposal, which was essentially a five-year proposal to build their capacity to go out and do botanical inventory and make an herbarium, build a database around the herbarium—understand their resources and start inventorying plants.

Reti: I see.

Harder: Very baseline stuff, like how do you press a plant? How do you keep a fieldbook? How do you keep your records straight? How do you build an institution that allows you to share material? Because Zaire will own this material, but a lot of those institutions lend material, herbarium specimens and whatnot. But you have to have a certain level of quality of your operation before other institutions will lend *you* material. And you always make a promise—I'm going to receive your stuff but I'm going to take extra good care of it because I have this facility that's got air conditioning and climate control, and your specimens will be the same when you get them back. So that was our goal, to get this group up to a basic level or standard for collaboration.

Reti: And you knew how to do that because of your internships? Or had you learned that in graduate school as well?

Harder: I learned about collecting while at Pacific Tropical Botanical Garden and their herbarium. It was not exactly what I eventually up doing with herbarium specimens, which I'll get to in just a minute. Part of the PSTC/USAID project was also to do ethnobotanical interviews and get an idea of human dependency, what we call the human dependency index. We'd collect plants from protected areas, or areas adjacent to villages, collect plants that were flowering and bring them back to villages and show them to people, and essentially find out who had the knowledge about plants and what they were used for by showing them these specimens. We found it was a little bit challenging to get information from females. They are important because they're the ones using plants in different ways than men, and we were all men and most often interacted with men. That changed our protocol of how to work in the future, because men had information

and women had information. And they don't really share information, because women use plants differently, and also there are rules around women collecting plants and rules around men collecting plants.

But anytime we took our specimens out in the middle of the village and started with five people, we'd get a group of thirty. People would share which information about what plant we were showing them, but they would also say, "Oh, such and such knows about that plant! I'll go get him." Or, "She knows about that one. You should talk to her." That would bring together the people who had the knowledge. And it was kind of a fun sharing session. It was kind of chaotic, and we didn't get all the information, but found out who had the information.

Reti: Did you tape all of this?

Harder: We taped some of it. We taped some of the later interviews. But just as the project got going and it went for about six months. And then Mobutu Sese Seko, that whole situation was a problem, and US AID didn't recognize the government there anymore. Our government didn't recognize their government and pulled our embassy, shut it down to a consulate. And my money, because it was US AID money, could no longer be spent in Zaire because of those problems. So I quickly proposed that— I was more interested in the vegetation types anyway, because of the diversity of legumes that were there, and became interested in legumes during that time. Zaire is apparently the cradle of, the origin of Papilionoid legumes. There are so many there and it's such a fantastic flora in Southern Zaire, that my target was to focus on these areas where the high

diversity of legumes were, and look at how people were using them and whether they could be conserved under the same pressures, projected pressures of village growth, using these ethnobotanical surveys.

So we were looking at these areas, collecting plants, showing people the plants, getting them to recognize— Let's say they recognized sixty out of the one hundred collections we had there, as recognized with recorded uses, and then we used that as a simple index of human dependency. So we'd collect all the plants from an area that could be collected and identified by us, flowers and fruit and everything, show them to the people. They'd say, "Okay, sixty percent are useful and they're useful in these ways." So we'd have these lists of plants and what their uses are. Then we'd use that index to say, okay, if sixty percent of these plants are useful to these people, sixty percent of the plants in this forest are the same usefulness, and using that information, sort of estimate what's their level of dependency on this forest patch. Then we looked at population groups. We essentially just counted up to forty families and how many kids they had under a certain age, and categorized their ages. We said, well if these kids make it to adults, they're going to have this much impact on the forests, and they're going to use only sixty percent of the plants, and is the forest patch big enough? Because Zaire wanted to designate national parks, and they wanted to designate natural areas at the time just before Mobutu left, resource-rich areas that had biodiversity in them, because that became valuable to them. So they wanted to know what areas could be saved, what's the population structure around these areas that would have impact in the future, of whether we take our limited conservation dollars and we invest it in this patch, and we let these other ones go

because we can't do anything about them, and it's best that we spend our money in these more concentrated areas.

Reti: And focus.

Harder: I'd become interested in that flora area because of the Zambesian zamisian domain, which is mainly composed of miombo woodland, which is an open woodland of three legume tree species with grasses. It's sort of the typical — It's not the giraffe habitat with the umbrella-shaped acacia trees. It's a little bit shorter trees, maintained by fire, large grazing ungulates like wildebeast, elephant and antelope, areas like that. But it shifts around by fire. If there's more fire there's more grass; less fire, more wood. The Zambesian domain and the miombo woodland is where legumes were. They grew and flowered mostly in the springtime. Many produced tubers like the winged bean. In the fall they would die down. The rains would come again in the late winter and they'd grow before the grasses. The grass would get burned off. The rains and fires would produce these beautiful, almost prairie-like blooms. So since I was interested in the vegetation type more, I suggested to US AID, "Don't take the money away from me. I'll just transfer it to Zambia, which is right next door." I didn't have any collaborators there but I said, "If you let me spend some of that money and take one trip there I can figure out who some of the players are and begin to work with some people. I went to institutions, and through the Ministry of Conservation and the Ministry of Agriculture I identified two places. One was the forestry herbarium in N'Dola and the agricultural center in Chilanga, just outside of Lusaka. So I went there, made visits, met some people, began to build some collaborations. Six months later we transferred all the money to Zambia.

I had graduated in the meantime, and took the money that I had with US AID and said, I'm going to Missouri Botanical Garden. I got married that summer, too. She wanted to go to Washington University, of course, in St. Louis. And I said, "Well, I think Peter Raven wants me to work for him. I better follow up on that." (laughter) This was two years later and I showed up there and tried to get some time with him and talk to him about it. He said, "Yes, fine. We'll give you this space and you can just start working. You can be a research associate. I can't pay you anything but it'll happen after a time." I already had money. I had US AID money, and that made it a sweet deal for everybody. It was like well, I can pay myself, but I need a means to pay myself. So Missouri Botanical Garden did that. I became a curator of Papilionoid legumes of Central Africa, mostly, but expanded also out into Asia too, and where other Papilionoid legumes were represented within the collection. There're six million collections there in the herbarium and I was responsible for a couple hundred thousand specimens. That was my job, to keep them organized, and make sure they were determined correctly, and also distributing plants to specialists. That was pretty much my whole job as a curator at the Missouri Botanical Garden.

Reti: Now, want to just give me a sense of chronology here? This is in the 1980s?

Harder: This is 1990. I graduated in 1990, got married in 1990, moved to Missouri in the fall of 1990. In 1991 I had the money transferred over and got a divorce. In 1992 I made my first trip to Zambia and initiated work right then in Zambia. Just prior to visiting Zambia, I first got to go to the AETFAT conference, which is the Association for the Study of the Taxonomy and Flora of Tropical Africa. It's a French acronym. That group meets regularly every three years, or something like

that, and they meet in different countries around the world working on African flora. Missouri sent me to that congress in Zomba, Malawi in 1991. Before the congress, I initiated a trip through Zambia to meet those collaborators, then went to Malawi for the meeting and got to meet all the players in the study of the flora of Africa, which was great, people who I'd been reading their stuff and using their revisions. The highlight at the Zomba meeting was to meet Paul Bamps and Francois Malaise who had been working in Zaire for decades and publishing extensively.

Fieldwork through the Missouri Botanical Garden

I took that opportunity to go to Zambia, work out some collaborations, said, "I'll be back next year," and I came back with the USAID money to initiate some of the projects. And we used the same protocol, same thing as in Zaire. But Zambia had a commission, the National Heritage Conservation Commission, which maintained areas that were interesting floristically or geophysically or archaeologically. They protected sites like the waterfalls. There's a waterfall, Kalambo Falls, on the border between Tanzania and Zambia, that's the second tallest falls in Africa (12th in the world), and very significant because it's the site of the earliest use of fire by humans. It's loaded with archaeological evidence. But nobody's ever done the botany there. And anytime you have water that's spraying out mist into a dry woodland, you get considerable enhancements in the flora. I mean, it's like constant rain. Under these conditions, the diversity's going to be there. And nobody had ever looked at that. David Fanshawe from Kew Gardens, back in the thirties, forties maybe, did a lot of work in Africa, and in Zambia in particular, and built the herbarium in N'Dola. But the specimens or

the herbarium hadn't been taken care of. Nobody knew how to curate it. There were mice and everything in the collection. One of the aspects of our job with this project was to clean out those two herbariums, the agricultural herbarium at Chilanga and the N'Dola herbarium, the forestry herbarium. We realized that there are two different aspects to those herbariums. One is agriculture-related; the other is forestry-related. They're not going to work together. They need to be separate. So we supported the cleaning out and the fixing up of both of those herbaria, including adding sheets and building a library at both of them, computerizing all of the collections during that project, and worked with great collaborators through the whole thing. We collected ten thousand collection numbers there in three years, going to these national heritage sites and gathering plants.

Reti: Phenomenal.

Harder: They were great. Fifty years earlier, David Fanshawe identified some areas of floristic interest. They were called botanically sensitive areas, or botanical reserves. And nobody ever botanized besides David Fanshawe decades earlier.

Reti: That's remarkable!

Harder: So we used his information, writings and notes, to go back to these areas and revisit them, actually do some quantifiable inventory, ran transects in these areas. We found out that our ethnobotanical surveys weren't comparable to the size of the area or the relative diversity in each of the forests, because those two things would have impact on what our calculations would be. If the forests were

more diverse, they don't need to have as big a space. So we did some quantifiable plot studies and we had the opportunity to modify our methods throughout. So it was really nice to be able to evolve what we were doing to be more useful. And Zambia really wanted to know where they could spend their limited conservation money, most usefully, because some of these national heritage sites were still maintained by local people. There was no central support going out to these places or their caretakers. And one place charged five schillings, next to nothing. This was like nothing. They were still charging the same price that they had been charging thirty years before. And by the same person who was going out and getting the money and— (laughter)

Reti: And you can't maintain a park on those funds, not even come close! You can't even maintain a bathroom on that, right?

Harder: Yes. And he doesn't get a paycheck anywhere, so this was horrible. So you realize that some of these places, even though they were on a list and of interest, they were not being supported. So we went in and looked at really what was there plant diversity-wise and made lots of collections, and supported the continued work on the flora of Zambesiaca, which was being coordinated through Kew, and which I ended up writing some treatments for on some certain things. The flora is not quite done. If you don't have a flora that's done and you're still collecting plants, you can't even identify the stuff you collect. If you've got sixty percent, four out of the ten you collect are not going to be identifiable, or you're not going to be sure about. So Missouri Botanical Garden allowed me to build this network of people I could send specimens to. They

would give me the name of the plant and to recognize their help, I would give them the specimen.

Reti: I had no idea there was so much international collaboration going on between botanical gardens.

Harder: Oh, yes. Missouri Botanical Garden and New York Botanical Garden have huge, international research programs all sharing information and data. We have them here at the Arboretum and we want to do more. That's why botanical gardens were all built. There are things happening now with permitting, under the Bush administration now especially, some limitations on who's going to get permits to import things. And the power is being consolidated with large nurseries, or large multinational corporations who run nurseries, like Heinz and—large corporations. Ball Seed has a big seed company, of course, and they're interested as well in importing new material. Botanical gardens aren't organized enough as a group to represent themselves and say, "Hey, these collections— We're not just growing things for sale. We're growing things to *save* them." (laugh) "And to protect them." And hopefully we're looking for an exception to whatever comes out of this next round of permit talks, in that the door will still be left open for research and educational purposes, and not exclusively commercial. We separate ourselves completely from commercial purposes and we have plants here we never propagate for sale because of those kinds of agreements. We can talk about that later.

Reti: Yes. I definitely do want to talk more about that.

Harder: Because the implications for the Arboretum and botanical gardens, and doing what arboretums and botanical gardens are best at, is becoming hampered by efforts in the government now. We're all very concerned about it. Okay, where was I? I forget now.

Reti: You were talking about the Missouri Botanical Garden.

Harder: In the eleven years I was at the Missouri Botanical Garden, I visited fifteen countries in Africa. In 1994, I had the opportunity to visit Yokohama, Japan for the International Botanical Congress, and Peter Raven suggested that I take that opportunity to go to Vietnam.

Fieldwork in Vietnam

The U.S. didn't have a consulate there, they didn't have an embassy there, but there were indications that there were scientists there that needed some collaborative help, and, I guess they decided, "Let's send Dan." (laughter)

I had to get my visa in Tokyo because there were no consulates issuing it in the United States, and there were no embassy services or anything. I wasn't even represented by an embassy there. That was my biggest concern in going to Vietnam. What if I lose my passport? You know? I have to go to Thailand. I've got to get to Thailand? Because Cambodia isn't going to issue one for me and Laos isn't going to issue one for me. I was at that age where I was like, "Oh, that sounds good. Let's go!" (laughter) So I took a month's trip after the International Botanical Congress in Yokohama to go to Vietnam and meet some collaborators and some people who had been writing letters and looking for us to collaborate

with them, and found some great collaborators, people who were well-trained in Russia in Saint Petersburg, at the Komarov Botanical Institute under people like Armand Takhtajan and other leaders in the field of taxonomy and biosystematics and the distribution of plants on the planet. During the Vietnam War, well, in Vietnam it was called the American War, in the American War, Ho Chi Min had the foresight to send intellectuals overseas for training during that period of time, thinking, "We're going to have to rebuild at some point and I'm going to send people overseas." It was a favored position. Some of these were kids of ministers and many were promising intellectuals. One of our collaborators, Phan Ke Loc, was sent to the Komarov for his studies during that time, because his father was a provincial leader/minister and had a lot of sway and was able to be sent abroad, and he ended up being very well-trained by Takhtajan. And the other collaborator, Nguyen Tien Hiep, stayed in the country, was a Viet Cong fighter, and he was very interested in plants even then. His job during the war was, since he was a botanist, was to identify plants that could be used by the soldiers in the field for a variety of purposes; food, medicinal, water, etc. He knew what native plants could be used and what could be used from them. So here he is, carrying his rifle and going after American troops, and figuring out what they were going to have for dinner that night.

Reti: Used, in the sense of eat.

Harder: Hiep was French-trained actually, in Paris by the great botanist Vidal during that time, or just after the war. I'm not sure of the timing on that. But those two men, Phan Ke Loc and Nguyen Tien Hiep were the two people I decided to work with there with the Institute of Ecology and Biological

Resources (IEBR) and within the Viet Nam National University which are in Hanoi. It was the main campus for all government scientific studies in the country and they were able to issue permits and do certain things. When the North took control of the country they installed leaders from the north throughout the country. IEBR also had a subunit in Saigon, and one of my first trips there I flew the North Vietnamese scientists down to the South Vietnamese headquarters under IEBR, sat them all around a table and nobody said anything to each other.

Reti: (sigh)

Harder: I mean, it was just this tension. I tried to get them to focus on what's happened during the war to the plants, to the native vegetation. "The future is in the biological resources of this country and we're going to be leaders here. Let's look at your herbarium." I used the same things I did in Zambia. "Let's bring it up to a standard that we can all interact as scientists. Let's work together." Then it kind of cooled down and they were more interactive and talking about plants and arguing about taxonomy that somebody had published, you know, and that kind of healthy interaction. So I felt the meeting was pretty successful, until after the meeting when somebody from both sides said, "It's impossible for us to work with them. It would be impossible for us to work."

Reti: People from sides said that?

Harder: People from both sides said that independently to me. I said, "Okay, I will work with each independently. They don't have to work together. I can work between them. ." So I did that. I did the Hanoi-Saigon thing for a couple of

years, trying to keep things going on both ends. Eventually they got together. Enough time had gone by that they decided, "We need to talk to each other and share specimens." They wouldn't even accept specimens from each other, which was very funny.

Reti: How was it for them that you as an American were working with them? Was that an issue?

Harder: That was fine. It never appeared to be an issue, at least what I experienced. They were enemies of each other at another time and for other reasons, not of me personally. Now I've known them and worked with them for more than fifteen years, and I know them as well as family. They visit every year and I try to get to Vietnam as often as I can. Hiep's son went through the University of Missouri at St. Louis for a Master's degree and then he came out here on a visiting scholar opportunity through some money from Ray Collett.

Reti: Oh, I noticed that in the newsletter.

Harder: A visiting scholar. It's been great. Hiep's son was here, I don't know, it was eight months or something like that. Working on begonias, which is what his study organism is. We've become really close and it's amazing how important it is for us to stay in touch. We're still working on collaborations. We've collected some plants together. When I first met Hieu (Hiep's son) he was a teenager and now he is a graduate student at NYBG. I had a National Geographic grant when I came to the Arboretum here that I took from Missouri. I initiated the grant there and brought it here. Brett Hall and I went to Vietnam to continue to work on behalf of the Arboretum, because Vietnam has such a critical

need for plants. In ten years of working with them, again we collected ten thousand specimens, in a much shorter time than we ever did in Zambia. We have a higher level of collaboration than in Zambia. There was very little training I needed to do, because they knew taxonomy, they knew what to do. I just needed to show them how to organize stuff. I always couched myself as being the enabler in those overseas programs, because it was like, okay, I'll listen to what you have to say and I'll try to go find money that fits what you're saying. The Vietnamese already knew what it was they wanted. They just needed to know how to do it quickly and get in the process of collaborating with other institutions for specimens and expertise.

So in the years I was there, from 1994, that was my first trip there and my last trip there was in 2002. So we've been working there that long and we've collected over ten thousand specimens and discovered two hundred new species to science, adding three percent to our knowledge of the flora of Vietnam.

Reti: Wow.

Harder: We collected new genera of conifer, ferns, a variety of shrubs, new genera, which is really very exciting. New discoveries of genera for conifers are very rare. The last one was in 1994, when they collected the *Wollemia* pine in Australia. *Xanthocyparis vietnamensis*, the Golden Vietnamese Cypress, the plant we collected near the border with China, was collected in 2002, and now is the new conifer on the planet, which is very exciting. We're all very excited about that. But now there are some nomenclatural arguments about what name it should be. So it's not *Xanthocyparis* right now, but we're hoping it's going to end

up back at *Xanthocypris* because that's a name that brings forth some Vietnamese pride. I mean, it was a plant that was discovered in Vietnam. It's specific name *vietnamensis*. I mean, it has connection to Vietnam nationally because it's not a Chinese species, really. Most species that are described near the border with China are all *chinensis* or *sinensis*, named by Chinese botanists. This is not a plant that occurs in Southern China. It only occurs in Northern Vietnam. So there's a lot of pride on the Vietnamese side about the name and about this plant.

Working with the Vietnamese has been absolutely great. We're already on to our next ideas for things. What we are working on now is to not only continue to explore and describe new plant species but also bring interesting and desirable species into cultivation. When we identify plants and we're discovering plants, of course, one must write a description of it, you have to give a line drawing picture of what it looks like. You also have to say where it came from, the locality; they have to be very specific. People who are interested in Vietnamese plants, particularly orchids were using our descriptions and localities to find and collect the very plants we were describing and often with negative impact on the populations. One of the persons I had the fortune of working with in Vietnam, was Dr. Leonid Averyanov from the Komarov Botanical Institute in St Petersburg, who had been working in Vietnam for twenty-five years. He's an orchidologist and has used orchids to describe specific vegetation types across Vietnam. He found the orchid flora was a great reflection of the vegetation type in which they occur and has published maps of the distribution of various vegetation types based on his knowledge of the orchid flora. In his work he's

probably identified four hundred species of plants in Vietnam, mostly of new orchids.

Reti: That's amazing.

Harder: Yes, it's amazing. This guy is really very, very productive and a great collaborator. His work has brought focus on the flora, and since we were describing lots of orchids in our new species, people were using our publications to find orchids, Vietnamese orchids, particularly slipper orchids. People used our publications as catalogs. They'll take our publication, go to Vietnam, show them to local villagers in the village that we wrote, show them the drawings and pictures and say, "We'll pay you so-and-so money per kilo if you collect this plant for us." And they'll just go out and wipe it out.

Reti: Oh! I see.

Harder: And we realized in some instances, from the Type locality of one of the plants that was very beautiful, this *Paphiopedilum helenae*, a yellow slipper orchid that is less than a foot tall, but it has giant flowers on it. It's just gorgeous, and of course all the slipper orchid people want it, and there's lots of money in Germany and Taiwan and the United States to get this plant. So people go there and get it. So we visited the Type locality where we originally collected *Paphiopedilum helenae* (named by Leonid after his wife), and the plant was nearly wiped out. The limestone cliffs where it thrives were scraped clean of the plant. There were very few plants that were of flowering size, when a couple of years earlier when we had first visited there were thousands, if not hundreds of thousands of plants.

Reti: Oh, my God.

Harder: We talked to the local villagers and they said, "Somebody came and showed us this picture and we got paid to go collect the plant." There's an intense interest in having these plants outside of Vietnam in people's collections, and there are many of them in private California collections. *Paphiopedilum helenae* I've seen in almost everybody's collection on the West Coast. And every one of those plants are illegal, because there was never a legal permit issued to have that plant outside of Vietnam. But everybody has it now. And they're breeding with it already. You can even find it on the Internet being sold. It's amazing how people jump over these rules because there's so much money behind them. So what we've proposed to do, and it's worked in other countries too for rare plants, is get the local people to do the monitoring, and bring the education level of the people around those populations of plants, particularly conifers and orchids and cycads, too, are really important in Vietnam, get the local people to monitor the populations for you, pay them, in fact pay them to propagate the plants, teach them how to propagate the plants appropriately so they're not reducing the seed stock, and they're not reducing the population in the wild. Because any collector who wants that plant is just going to spend the money to come and travel to the plant and dig it up. They're going to dig the whole thing up. But if you get the local people to do the stewarding on the resource, have them grow it, teach them how to grow it in small cultivation facilities in the villages, which is what we've done for this conifer (*Xanthocyparis vietnamensis*), and we've got hundreds of, maybe if not thousands of plants ready to go out of Vietnam that are all propagated. If you propagate from it and you

can prove that its propagated from it, you don't need to have certain permits. The Convention on International Trade in Endangered Species [of Wild Fauna and Flora (CITES)] doesn't implicate plants that are propagated by cutting. Thank goodness we're not working with tigers. You can't cut a paw of a tiger off and get it to root and make a new tiger. I mean, you can, I guess, if you're doing cell culture and cloning. If you're cloning—

Reti: (laughter) Tigers in the basement.

Harder: But if you're cloning, it's better to have two. And if you've got one— There's the parent plant and you've got a rooted cutting over here, and that's two plants. That's twice as many. I feel the same way about people's collections. People keep them private because they're illegal. If [it] were known what was there everybody could share and we'd know that the resource wasn't gone. So we've decided to begin to not only work on these local cultivation facilities for specific plants in the region where those plants grow, but also to bring the plants back to a cultivation facility in Hanoi to propagate specifically from the wild plants that are most desirable for collectors and poachers, mostly conifers, orchids, cycads, and medicinal plants that people are most interested in, and supply those plants through nonprofit botanical gardens, which would put botanical gardens out of the realm of the lucrative profits generated for these plants. We're not going to take money for this project. We would gain some benefit from its sale, as a nonprofit botanical garden, but we would return most of the profit back to Vietnam to support the facility and the conservation efforts that we are doing. Apparently the Ford Foundation is and some private foundations are interested in some seed money to get this facility going. We've

already got it built and we've got it completely full of plants already, but now we're trying to get partners in the United States and Europe to begin to use this program as a way of promoting Vietnamese plants. Because you're going to saturate the market with just a few plants and in not very large numbers. There's not a huge demand for these plants, but there's enough of a demand that people who have the money are going to get them no matter what. That's not going to go away. They're going to drool over those plants and really want those plants no matter what you do.

Reti: When you say "we," do you mean the UCSC Arboretum?

Harder: Yes, the Arboretum at UCSC is involved, but I mean we as a botanical garden community regionally, and also in the United States. I think there are several nonprofit botanical gardens that would be perfect partners to be part of that introduction program.

I got divorced very soon after I moved to St. Louis from Berkeley and was able to do a lot of fieldwork and spend up to six or seven months a year in the field for those ten years in Missouri. While in St. Louis, I met a neighborhood woman while she was walking her dog and we eventually got married and now we have two children, Lydia and Jonah. We had our daughter in 1998 and moved to Hanoi three months later. We lived there for a little over a year, almost a year and a half, when we started really missing family and missing grandparents. But the prospect of moving back to St. Louis— Nothing against St. Louis. It's great and the garden's great, but living there twelve months a year was daunting to think about, to be located in St. Louis for that long, having traveled for eight

years, half a year each. (laughter) But I committed myself, like my father did, to being available, being a good father, being a good husband. Lots of botanists don't make most of their collections until after they're retired anyway, so I'm looking forward to collecting and traveling in retirement. So having collected almost 10,000 numbers, I'm looking forward to another 20,000 numbers after I retire. (laughter)

But I wanted to focus on my family and it wasn't going to work in St. Louis. I asked for a variety of different kinds of options in the job there, but they wanted me to be in Vietnam and I just could not justify living in Vietnam at this time of my life. So there was some tension in that and I said, "Well, okay. Can you pay me to live in California?" because I knew there were some people on the payroll at Missouri who were living in other states and doing other things. I could do some coordinating out here or something, which Missouri was looking for. And they said, "Well, no."

Coming to the UCSC Arboretum

So luckily this job came up. At the same time, the UC Berkeley Botanical Garden associate directorship position came up, and I had applied to that also and interviewed for that position. I came out for the interview for Berkeley, went back home, was offered the job in Berkeley. The other position came up in Santa Cruz, here. I applied to that one and then on my trip to look at houses and begin to have secondary discussions with Berkeley. I took my wife and came down and interviewed for this job. While we were visiting we got stuck in traffic. I tried to show her where I lived when I was a graduate student at Berkeley; we got stuck

in traffic. She said, "I cannot live here. I'm not moving to this place. I cannot have this traffic. It's just too much for me." And our daughter was screaming in the back and—

Reti: Oh my God! (laughter)

Harder: I guess she saw what her life might be like if we were to move to the East Bay. (laughter)

Reti: Hwy 880, right!

Harder: Mmm, hmm. So I was offered the UCSC Arboretum position and we decided to take this job. Luckily I had done some research on the candidates, because all the candidates were invited to give a potluck lecture, I saw a listing of potluck lectures and looked up all the people that I was competing with for the job. I seemed to be the only one who had raised my own money to do my research and pay my salary. So I really focused on that, being able to raise money and having some recognition and raising money. They offered me this job here and we moved here in October 2001 and started as executive director.

People ask me why I didn't take the Berkeley job. Berkeley has a great collection, 13,000 collections. I knew both of these collections really well even before I came here.

Reti: 13,000 collections?

Harder: 13,000 accessions in their garden.

Reti: Okay.

Harder: The Arboretum has about 10,000 accessions. But we haven't counted everything. (laughter) Berkeley's counted everything. We don't have everything counted and everything's not in our database here. But I looked at taking this job at UCSC as sort of nurturing a seed rather than trimming a big tree. Up there at UC Berkeley Botanical Garden it was fairly rigid what was going to happen and it wasn't at all clear that the director I was going to be hired next to as an associate was committed to her directorship of the Garden. The directorship there is a part-time faculty position, and she was more of a researcher. As faculty, she wasn't being judged on how a good a director she was for the garden, rather she was being evaluated as a faculty member for her own research. That hybrid position does not work at botanical gardens. I don't think it works at the Farm [Center for Agroecology and Sustainable Food Systems] here either. My feeling here is that the directorship of the Farm, or any institution on a campus, needs to be a full-time person whose evaluations are based on performance in that directorship. Any director can have an academic appointment, but I just think that the attention of the Berkeley collection, and its status, and the staff, the professional staff, need the full-time attention, require it and deserve it. And I just felt that was a hard wired position at Berkeley and I didn't see me coming out of the associate position because it was not an academic faculty position. Soon after I didn't take the job they hired another retiring faculty person, Paul Licht, who's done a good job but soon after he took that position, Ellen Simms, who was the original director, faculty person, said, "I can't do this. I'm going to focus on my research." And so she had enough support to say, "I've got my money. I'm going to do this. I mean, I don't have to do that." And that was what I was afraid of. If I had known that that position had moved to a directorship so

quickly, a full directorship with full commitment, and it's not— Paul Licht now is still only working half time. If there was that possibility that that was going to happen, I might have thought a little bit harder about that position because of the expert staff, and the UC Berkeley's collection. After all, I did not know too much about the UCSC Arboretum at the time.

Reti: So you didn't know anything about this place?

Harder: Hardly. I knew a lot about the collection. And I knew Brett. Being a Berkeley student there were times I visited the UCSC Arboretum just to appreciate the collections.

Reti: Oh, okay. And you had contact through Missouri.

Harder: Mmm, hmm. And as a graduate student. And spent many trips down here from Berkeley looking at this collection at UCSC because it's a place alienated within. I mean, it's so different, and no other garden can have this kind of assemblage of plants. You don't see the native grasslands that were here prior to the Arboretum. There's so much interest in the plantings and gardens and how they are displayed here. When you walk around this garden you feel— Everything you look at is Australian, or everything you look at is New Zealand, and it's growing up so much that you don't need to see California when you come to the Arboretum anymore. You can see only exotics. That's really disorienting for a lot of people. I mean, Berkeley you can see the hills beyond and you can connect to the location of the garden within California. But in the Arboretum the sense of disconnection is really strong, especially since we don't have well-signed maps and trails. Some people like that feeling of being sort of

lost and sort of driving themselves in the garden by just seeing things, you know, “What’s that plant? What’s that plant? What’s that plant? Oh, where are we?” You know? That’s the experience.

Reti: Yes.

Harder: So I felt coming here was more of a challenge. I mean, there really was no promise of anything getting fixed and money was really tight and disappearing. And with some trepidation I thought, well, I was offered two jobs. Maybe if this one doesn’t work out I can maybe find another one? (laughter) So I very happily took this job, convinced myself that this is really what I want to do, and this collection is worthy of and needs the attention. It hasn’t had good attention for security and financial support. There were some fairly recent changes in leadership at the Arboretum, and nobody was really sure that the campus was going to do. There was some insecurity about the position. But the commitment of the staff and the expertise of the staff, I mean, you can’t disregard 139 years of service within five curators. It’s just amazing the amount of years that these people have spent with this collection! The expertise and the specialty is deep and meaningful here in that the curators know how to grow these plants and preserve this collection. I mean, you resell these plants to a lot of people and not everybody can grow them the same way. So I felt the staff deserved, and I felt the collection deserved it, and I thought that the Arboretum had the potential to become something really great. It was on the verge of greatness in becoming an effective public garden.

Reti: And how would you define greatness?

Harder: Service. Adequate service to all of our intentions of research, education, and outreach all around conservation; conservation of the collection, and conservation of the botanical diversity of the earth. A lot of research was done in building this collection. The collection was built with direction and intention, first understanding what conditions were here. Ray Collett and Dean McHenry used their influence and energies eventually through Brett to find plants that like these conditions, ultimately. We've mainly have a Mediterranean climate here so let's look at the Mediterranean regions. And okay, what challenges do they have? Mediterranean regions are the most equitable for people to live in, so that's where large populations of people have chosen to live on the planet. Due in large measure to the burgeoning human populations in these areas, floras in Mediterranean countries are really threatened, except for areas like in Western Australia, where they're threatened for other reasons, not because of people. It's because of practices and agricultural conversion of lands and other things. But the Mediterranean regions ultimately need protection, particularly the Mediterranean basin, South Africa particularly. And they have interesting plants that will do well in gardens here.

Challenges of Outreach

So successful is education, outreach, and research. Education programs were in the early fledgling stages here. People are coming in with school groups and getting people stimulated about the hummingbirds and the birds and the site and the plants and how interesting they are. But really, we don't attract the children so much as we do the retirees. Gardening is a favorite activity of elderly,

retired persons and the Arboretum has fostered a community of mostly retirees giving time as volunteers.

Reti: I've noticed that.

Harder: Not children. And you talk to Julie Barrett Heffington at the Seymour Center, and their challenge is getting seniors down there. Because the Seymour Marine Discovery Center gets lots of school groups. Julie and I have strategized a bit on how we can get them to do engage with both of our places. Or how can they get more seniors, and how can we get more kids? We've made an effort to do that.

But being successful, I think, is reaching all of those goals in our mission, and also providing a service to conservation. We do outreach. All units on campus don't do outreach as effectively. Seymour is sort of an add-on to do outreach for the Long Marine Laboratory and so has a truncated mission of outreach. They don't have to do research within the Seymour Center because the Long Marine Laboratory is doing it. The Arboretum is charged to do research, education and outreach mostly independently.

Taking Care of the Collection

But central to those three things is the collection itself. The value of the collection in and of itself is our main mandate, keeping it together, maintaining it, growing it. If we lost all of our state money, or were asked to trim back, we'd trim back only to maintenance of the collection. The other things we do like events, membership, our Friends group—everything could be cut if we needed to, to get

back to only maintaining this collection. And if anything, I think the legacy of the Arboretum is in the plants and the expertise of the curatorial staff. The collection and its value and care pass through our hands and it goes on to someone else. And if it's not financially secure— My main focus right now is making sure this place is financially secure. After forty years it should be. It has a good endowment, which is building and will grow and will help us out in the future. But a lot more needs to be done with day-to-day expenses. So if we focus only on the collection and its viability and its preservation, everything else can come off of that—our research efforts to build it, to enhance it, to collaborate and partner with others, to use the collection in meaningful ways; it could be through teacher training, K-12 outreach—all those things have to come from the fact that this collection is here. The interim director, Ron Enomoto, wanted to de-emphasize the collection and told the curators not to build the collection at all while he was here, and get rid of certain aspects of it and not give attention to certain things. I'm completely the opposite of that. I mean, our security and our value comes from the collections and if we don't continue to build them, we're not addressing real conservation concerns in the outside world.

Reti: Absolutely.

Harder: Ultimately botanical gardens are the only places that have the expertise to grow, or the breadth of knowledge to figure out how to grow an endangered species that may be dying. An ecologist isn't going to do it. That expertise is here.

So central to all of those things is the Arboretum collection itself. We all are now focused on: it's a UC collection. It's housed at UCSC. It's of extreme value

because it was gifted to the university through mostly volunteer and community effort. And we see the Arboretum as having an outreach function that could surpass anything that the university's doing. Because we're a doorstep to the campus, a logical starting point. We're essentially open all the time, everyday from 9:00 until 5:00. People can walk in here not expecting anything, and they can get a shot of how excellent UCSC is in all of its programs. They can get a shot of how our efforts on conservation locally reverberate nationally and internationally through what we do and how we do it—propagating, collaborating, working with native plant groups. But they can also take it home informally. They can enjoy a beautiful garden and not know that they're being told that UCSC has an excellent astronomy program (laughter) or— It could be used in lots of different ways, in meaningful ways that would highlight the excellence of UCSC and its programs in research and education.

Connecting the Arboretum and the UCSC Campus

I just see the Arboretum being underutilized. It could be to the benefit of the Arboretum and the campus. If you think of university-related arboreta and botanical gardens, they're usually fairly prominent in how they're used by campus in their events and facilities. We were criticized with this dedication I told you about, about our facility and sort of our laissez-faire attitude about how clean the building needs to be, how the room needs to show to a certain level of, a chancellor's-level event.

Reti: This was the dedication (for the recording here), of the Dean McHenry amphitheater.

Harder: Oh, right. We didn't talk about that on the tape before?

Reti: That wasn't on the tape. [We talked about that] before we started recording this interview.

Harder: A couple of weeks ago we had a dedication of the Dean McHenry amphitheater, which was the space that Dean and Ray used to teach classes. There were some benches in there, and by fortune of a couple of gifts from the Cooleys, Don and Diane Cooley, and from Trex Corporation (they donated all the material), we put up a stage there, and cleaned up the site, and it was designated as the Dean E. McHenry Amphitheater. It was a chancellor-level event, involving regent approval of the naming, and they used our facility for the reception.

We asked for feedback afterwards about how it went, because we want to be used more. We wanted to be proactive about it. And there were some concerns about how clean the room was and how the room was showing. We hold a lot of potlucks in there; up to two hundred events a year take place in that room and maybe one chancellor-level event a year as well.

Reti: This is the room that's the meeting room.

Harder: The Horticulture II meeting room.

Reti: It's a nice room.

Harder: Yes, it is a nice room. And we were a little bit criticized about it because it wasn't clean and we have dirt parking lots. There are reasons why we have dirt

parking lots. But my feeling is that I'm disappointed it was viewed that way. There were some comments about why we couldn't clean the dead insects out of the window rails and I felt really— I couldn't get a curator who's— You know, I'm not flush with people. People are doing other things, and there are curators who set up the room and set up the projector, limiting their hours doing that. But they've got plant collections to take care of and maintain, and we don't get the level of support down here from campus to keep the (state-supported) building at the level it needs to be maintained for campus events. I can't pay a curator to vacuum the windows or floors. I'm not going to do that, because their priorities are with the collection.

I think it also raised some consciousness about the level of support the Arboretum does get. You know— Replacing our carpets, we're always on deferred maintenance for that. Finally we've got some indication that our carpet is going to be replaced. We had a lath house here that was on deferred maintenance for twenty years with the campus, and nothing was ever done with it until we wrote a letter saying, "Do you mind if we shore it up a little bit? Because the posts are all rotten at the base and we want to just stick some posts back in there. People are working in there. Students are working in there." They've been inspecting it every year. Deferred maintenance. It was an old growth redwood lath house. A beautiful thing. But it wasn't working anymore. Everything had begun to degrade and fall apart. And that process took over a year, of moving the plants out, taking down the lath house structure. Once the lath house structure was taken down, the inspectors came in, the fire inspector, and said, "Wait. This is a new construction. There's no building here. It's all new.

So you need to retrofit the structure as if no building was there before.” So we had to cut some roofs off of buildings and make some space so it would be safe to fight a fire. We had to reorient a road and follow some suggestions. But that was six months after the building had been taken down and the plants had been taken out of there. It was always like the last thing on the list that they had to do, so they never really got around to it until like: “It’s been a year. We don’t see anything. We need to use the facility. The collections are suffering.” And as soon as we said, “These are state collections; these are UC collections that are losing their value because we don’t have our state facility replaced,” that changed some things fairly quickly. There were just a few emails that went fairly high up in the administration of UCSC and then it all got done. (laughter) So now we have a shade structure. But it took way too long.

It’s that kind of disconnection with campus that I don’t think was there when Dean McHenry was here, or there was more of a seamless nature to the connection between the Arboretum and campus. When I first came here I felt the Arboretum was on the edge of an abyss and it was just a matter of time before they pulled the plug. What that meant, I don’t know, pulling the plug because most of our operational support comes from gifts and grants from the community and not from the UCSC [administration].

And then we started meeting over the last two years with the University of California Office of the President, who took an interest through the regents’ interest in the fact that the University of California maintains more collections than the Smithsonian but it has no one person overseeing how well those

collections are being taken care of, or any indication of the recognition of those collections as significant within the University of California.

Reti: Now, are you talking about botanical collections, or in general?

Harder: I'm talking about all collections: museums, art, archaeology, the Phoebe Hearst, and the Arboretum as well. Our value is conferred because of those collections we maintain, just like an archaeology museum's value is based on its artifacts. And it has been really great, because we convened a couple of times. Museum directors and collection directors throughout the UC system met, and realized that some were being well taken care of, like UCLA and Berkeley's collections and Davis's collection. The University of California, Berkeley's Botanical Garden gets almost forty percent of their staff paid through state money, full time FTE's. Fifty percent at Davis. The UCSC Arboretum: only twelve percent in one salary. UCSC does provide us with utilities and the opportunity to exist on the site but this is available to all campus units and is not unique to the Arboretum's situation.

Reti: (whistle)

Harder: And talking about and getting together with other collection directors and people who have well-connected collections, well-developed collections, well-supported collections, [you] find out that they're not all that well supported. But they're certainly more well supported than smaller ones. But the significance of our meetings has shown that that a large collection has the same voice as a small collection. I can go to these meetings and talk about our ten thousand collections here in a meaningful way with someone who maintains 150,000

collections of archaeological interest from certain sites. And they have a budget line and they have a means of obtaining different lines of budget each year, in budget cycles. The Arboretum never has that means, as it has not been included in budget requests. We never have an opportunity to ask about whether our money can be increased, or articulate what we need it for. Even security has not been addressed. In the first couple of years here I thought, “Oh. I’ll just ask for money in the budget process.” Of course the state economy was really bad as soon as I started. And cuts were being— And we were also affected by it as well yet we could not request any support to improve our conditions. But we increased our fundraising efforts and really tried to hit some targets and say, “Hey, the state is not coming through”. The problem is that the state budget is turning around and people are looking at increases in subsequent years, but the Arboretum has no promise of ever that happening. You know?

Reti: I have to ask you— This may be *the* question: What is the reason or what are the reasons for this historical lack of support from UCSC for this amazing and rare institution?

Harder: (sigh) Even a fundraising tool for the entire campus. I mean, I don’t get it. I don’t understand the history. I saw Ray Collett beating his head against the wall. The only means that was left to him was to unilaterally lash out about situations and instances, because nobody was responding. And I feel that frustration. When I first started going to meetings I realized apparently that Ray had not been attending meetings. Because as soon as I spoke up and said that I was representing the Arboretum *everybody* was interested in hearing what I had to say. “Oh, the Arboretum! Gosh. Aren’t they building housing down there?”

The misperceptions and misunderstandings surrounding the Arboretum. I mean, many on campus think that the Arboretum's gone or somehow not available. The Arboretum is seldom visited by UCSC staff. We've made an effort over the last five years to encourage more staff and do more promotion to the campus.

When I first started here, I felt I needed to respond and commit resources to ideas and direction from the campus. I've only recently changed my mind within the last year. We can't continue to jump over the hurdles that the campus has for us. And as we do address these ideas, it's not going to mean that increased support and money's going to cascade down to us. The campus tells us: "You need to do more academic programming," or, "You need to have better signs, or, "You need to have this or that." Well, all those things cost money and we are not staffed to address these new directions. Our resources are committed to maintaining and improving this collection and, at this point, we are staffed to do this successfully and exclusively. If we are to add interpretation or increase our academic function, we will need to add hires and staff to do this.

The Arboretum is not an academic unit. We maintain a collection. Although we are increasing our academic program it is not our main function or objective. I've got an academic adjunct position in EEB [Ecology and Evolutionary Biology] and Steve [McCabe] and I have taught taxonomy in the past. We've taught it once and it was a great class. Steve's taught it twice now. And it's never supported with hard money on campus, and it's part of the requirement for the major. So I don't see how soft money and being required for the major fit together. Because the commitment is always like: "Okay, who's going to teach taxonomy?" The EEB department scrambles to find out who might teach it, or the classes are so

huge, or they have to make some sort of concession about how it's taught or who's teaching it. Taxonomy and systematics are core to understanding how plants relate to each other, and how efforts of conservation are couched around taxonomy. You really need to know what you're talking about, or what that thing *is* to know whether it's endangered, or it's the common one. It's very important, and the campus says it's a core course. The course requires concerted efforts year after year to get the course up to speed and to provide some standardization of how it is taught. And, after some time one begins to actually teach the course with experience and finesse. If one faculty member teaches the course year after year one can sort of follow what the trends are, and the literature, and give the course and students the cutting-edge science around those issues that you've decided to study. You have some time to think about what you're presenting.

Reti: But in terms of the opportunities for graduate students and undergraduate students to do part of their educational training here in the Arboretum, you have had—

Harder: Right. We have interns, and we have work-study and non-work study positions. Up to forty students a quarter come through here, so after forty years we've got quite an alumni base of people who have worked here, including Julie Packard, who worked here as an intern and as a student. And we find they come back and they connected with it. We get students that are not only natural science-related or plant science-related, but people in other majors who just have an interest in getting away from the books and doing something physical in the sun. We look at it as an opportunity to change their minds, maybe, about what

they're interested in. We find that students come here, they don't know what they want to do for their major, but they find plants interesting. So we have an opportunity here to influence students when they're figuring out what they want, or how they can integrate plants into their studies. We have a good success rate in being able to get people to think about the implications of what they can do in their studies to include plants, and include how important plants are, looking at plants and conservation.

As an adjunct faculty member I can have graduate students as well. We support graduate research on the grounds. Since the Arboretum is officially on site-specific research property, it's considered an academic unit. So the Academic Senate would have to decide whether the Arboretum would be closed or not, or what was going to happen with the Arboretum. But they're not a guiding body of the Arboretum and how it's run.

The Arboretum right now is under the chancellor. It has been moved into different departments, and these supporting departments had to cut budgets, so they moved the Arboretum out of their departments. It's now under the chancellor's line items as being part of the chancellor's expenses. That's good and bad in some ways. I don't have a divisional dean that I go to. Alison Galloway, Vice Provost of Academic Affairs is my boss. But her position over the Arboretum is more as an oversight and sort of signing off on things rather than a controlling or direction-setting position. She, of course, is a board member because of it, an *ex-officio* board member, and provides only advice. I don't have that kind of guidance. Our goals in the Arboretum are in keeping the collection viable, maintaining what we've got, building what we've got, and doing better at

recognizing the people who are here and their expertise, and building their salaries up too.

So getting back to the question about the history of why the Arboretum isn't seamlessly connected to the campus, I think Ray got really frustrated by the lack of attention and the lack of response about Arboretum needs, which were real. And then being left alone to do it ourselves. In some ways that's been really good. It's built our Arboretum Associates base and our supporters in the community. We have a great Friends group with a thousand annually paying members, which has increased in five years about 250 members.

But I think Ray just got really frustrated, and so started lashing out in a unidirectional way at people about, "Hey, these are issues at the Arboretum and we're not getting enough attention!" And that's why our parking is not paid, because TAPS and the university have never invested in putting in parking lots for us. We also have the only place on campus where there's free parking. And we get lots of criticism about, "How come the Arboretum gets free parking?" Well, we've got free parking lots. TAPS has never come down here and invested money in our parking lots. Well, in our plans for the future, in the next ten or fifteen years we're going to build a new visitor's center. With parking. (laughter) With a hundred-car parking lot. And that's going to be very interesting.

We've been left to challenge ourselves to exist in a regional community that provides eighty-eight percent of our operational support. So our connection to the community, and our attention to programs must be towards the community, not the campus. Even though the university demands it and we're part of the

university, I cannot justify providing research, education and outreach services to campus, our owners, without the concomitant support coming down for it. The twelve percent that comes here from the UCSC is my salary and my benefits, but I don't feel the obligation within that to say that I'm able to mobilize the resources of the Arboretum to support what the university wants for us. I need to see what the community wants for us, because that's where all our money's coming from now!

Reti: Those are some of your primary constituents.

Harder: That's right. And it's really hard for me to justify the finger pointing by the UCSC at the Arboretum saying, "You guys need to do more of this. You need to do this, you need do this," when it means that to do this I need to raise more money for signs; I need to raise more money for interpretation; ADA compliance. I mean, those are all huge issues for us, getting people around the garden. We are stuck in building a supportive relationship with our community regionally because that is where our support comes from while the UCSC expects that our programs support the campus. We have to find a way to change this, as we need state support from campus to maintain this valuable resource that belongs to the UC and the state of California.

One of the first things I did when I started here was write a new mission statement around conservation, and how important plants are for quality of life on the planet. Ultimately that is our goal: to promote plants, to learn about plants, to forward our knowledge about plants, so that we can ensure a high quality of life for all things on the planet. A fairly lofty mission, yet it doesn't

really talk about what the collection is about. But it talks about what our efforts are all around. And it's maintaining what we have.

Collaborations with Other Botanical Gardens

(laughter) Thank goodness they hired me, because I have a good connection with the botanical garden community, and I realize how partnerships can work and how collaborations can be beneficial. One of the things I recently did was I took on the co-chairmanship for the APGA, the American Public Garden Association's annual meeting in San Francisco. And by default, and by the fact that some directors moved around— Scott Medbury from the San Francisco Botanical Garden went to the Brooklyn Botanical Garden after he had already initiated the fact that he wanted to be the co-chair for this year's meeting. I sat on the bus with Scott. I had known Scott for— Again, the community's real small. I had known Scott since he did an internship in Hawaii with me (at Pacific Tropical Botanical Garden) when I was a teenager! (laughter) He sat on the bus with me and he said, "I can't tell everybody this, but I'm going to the Brooklyn Botanical Garden. I'm going to take that job. Will you do the chairmanship for the meeting?" I said, "Well, I've only been here a couple of years. I don't feel that I know enough about it. I'll do it if there can be a co-chair." So Molly Barker from Filoli Center offered to do the co-chairmanship, and it was great. It was an opportunity to meet with regional garden directors about the APGA meeting that was coming here. We all voiced our opinions and ideas, and how it all should work, and we were able to run very effective meetings, and also a very effective conference, in that we were able to get the Hyatt Embarcadero to run a zero waste meeting.

Reti: Zero waste? In terms of sustainability issues?

Harder: Yes, the theme of the conference was Sustainability, Walking the Talk. Of course, San Francisco was a great place to do it. Our gardens are already models of sustainability. We do it because of necessity here. It saves us money to recycle. If we look at recycling from the start, it is really important. And water conservation. Our plants are water-conserving plants. All the things we do are couched within sustainability. One of the issues I brought up early in the meeting was to talk about sustainability of hiring, sustainability of expertise, and paying people what they're worth in the marketplace. I mean, people, even though they've dedicated many, many decades to the Arboretum, they don't get paid anything what staff at Berkeley get paid or other botanical gardens. They're underpaid as professionals. A lot of them have side jobs outside of the Arboretum, one, because of the benefit of the Arboretum being part of the UC, for medical benefits and whatnot. But they also have jobs outside of the Arboretum to pay the bills and to live here. And recognizing that they've spent twenty-five or thirty years working on the collection as a UCSC employee, promoting UCSC, I mean, it's worth a lot, you know?

Reti: Yes.

Harder: Some of those people are making under 50,000 dollars.

Reti: (sigh)

Harder: Yes. I mean, it's just killer. And raising families and having all the same issues that we all do in this community. It's become a real challenge, because I

want to be embraced by the UCSC in every way possible. I want to be utilized by UCSC to everybody's benefit. I see how other gardens have good working relationships with their host campuses. I walk into other gardens and I get real envious of how they have it working, and how they're able to work. But I don't know how to navigate the waters. I don't know how to report on the state of the Arboretum, the needs of the Arboretum to this administration and this campus. And it's never asked for. I'm never asked to report on the Arboretum, except financially.

Reti: Now, this master plan, this draft master plan that you shared with me. Where did that go?

Harder: That (the initial master plan draft) is something that I developed very soon after I got here in an attempt to address one of the concerns that was coming from campus: "Where is your plan? What are you guys planning on doing? What are you doing? What is your plan? We don't know what the Arboretum's doing." And that plan has been recently turned into the director's vision, so that we can clear the area for a new plan that's coming out by the end of this year. We've got some grant support from the David and Lucille Packard Foundation, organizational effectiveness money.

The Packard Organizational Effectiveness Grant

One of the nice things that was happening at the Arboretum when I first got here was that there was a three-year Packard grant waiting, approximately 135,000 dollars a year, which was good, not enough, but it was good. And it kept us going in ways on projects and building foundation for other kinds of support.

And because we had that Packard grant when I started, it enabled us to apply for an organizational effectiveness grant, which essentially looks at how well we are doing as a group, as an organization. We proposed to bring in an outside consultant to do essentially an environmental scan in understanding who our customer base is and our constituency. The University of California at Davis Arboretum went through this same process with the same person, Gary Stern, using the Peter Drucker process of answering the questions that Peter Drucker devised in understanding the community that supports an organization, and understanding all the constituencies around it. And of course that involves identifying a primary customer. We had our initial launch session and addressed questions like: Who do people think the primary customer is? Many, many people believed it is the collection. It is the thing that we want to be remembered for—keeping this collection together, how great it is, how full it is, how diverse it is, the data behind it. I tend to agree. Some people thought the primary customer might be young students in grade school, and some people thought it was the foundation trustees, because ultimately they're the ones who could guide money to us and we need to maybe address some things to them. But I think we are mostly on target with the collection as primary customer. If we separate living, breathing customers from really who needs to ultimately benefit from it, or what needs to ultimately benefit from our activities, it's definitely the collection. Because that's going to be the thing that's passed onto somebody else and it needs to be better than it is now to be passed on. I want to take better care of it than it was taken care of before me.

So the Organizational Effectiveness (OE) grant is allowing us to bring in Gary Stern, who has this mechanism of looking at the environment, looking at the demographics of Santa Cruz County, national demographics of conservation efforts, looking at best practices, comparing best practices for the gift shop, best practices for events, best practices for membership programs, and essentially getting a team of volunteers to get out there and staff to go out and get this information and bring it in. We've got the demographics of the region. That's easy to get. That was just done by the city council. All that stuff is fairly easy to get, and the campus has tons of this stuff because it's all LRDP-related. Hispanic populations and projections for growth of cities, and what's going to happen is all included. And one part of that project effort is to pay Gary to do interviews of campus people that would not necessarily want to be involved in this process, or would think their opinion was worthwhile. And Gary, for UC Davis Arboretum, in their effort of a nine, ten-month process, ended up soliciting information from all different kinds of administrators, faculty, community members, and others. Then it got shaken through this process, and all this knowledge that they have about their community, and what people think, and what people value about the Arboretum. They shook it all through this. And it came out that the Arboretum at UC Davis should be the visitor's center for the campus. It should be a central locality. Because the Davis Arboretum is along the Putah Creek. It sort of embraces a good section of the campus. The Arboretum at Davis can be a jumping off point for various parts within the campus. It can be a very beautiful way to get to campus and be part of campus. And you know, when you arrive at Davis you're like, where do I go? You go through the kiosk and it's flat. I can't see any mountains that I can be oriented to. You don't know when you're

arriving and then you keep arriving. There's the map and then you get to Shields Hall and you're like, um, I better go around. It's a very funny campus to navigate

By this process, the Arboretum at UC Davis was identified as being the most logical visitor's center for the campus. It should be the first point of contact for everybody who comes to the Davis campus. Well, what a boon for the university and what a boon for the Arboretum in that it's driving traffic to the Arboretum. The Arboretum there has this function of being welcoming, which arboreta usually are. And now they've got in line to get several million dollars to build a new facility, and there's hope and happiness on both sides. That was through Gary's process. He was involved in getting administrators to clear their schedules so they could come down and be part of this process. Well, we're also paying Gary to call key people on the phone and solicit survey instruments to these people. They're loaded questions like, "How do you value the Arboretum in these various ways: Through events? Through the gift shop? Through?" It's used as a way of educating people about what the Arboretum's doing. And the whole process of the survey is to get people to go: "I didn't know they had a gift shop! I would value the Arboretum more if they did more events but they're already doing them." (laughter) So through the process there is buy-in and stewardship and ownership about where the Arboretum is going, ownership about expectations about where the Arboretum can go. And opening up opportunities about how the Arboretum might be used. The Arboretum at UCSC has had assessments done in the past and a consistent assessment item is that the university needs to give the Arboretum more money. The Arboretum needs to be more supported by its parent institution.

Reti: I've seen this in years of archival documents, yes.

Harder: Yes, period. That's it. Well, in Gary's process it's this huge block. In the previous assessment it was a huge barricade that we needed to get over: we need to do everything we can to try to get the campus to give us more money. Jump over the next hurdle, or provide more interpretation, or do more teaching in classes.

But then we realized that jumping over those hurdles doesn't mean increased support. In trying to reach these goals and objectives, the Arboretum becomes compromised in maintaining the collections. One, it stretches us more thin, because it's not things that we've chosen to do or that these are things of priority. It's things that we've been told to do, thinking that all this cascade of support is going to come down as soon as we reach that goal. Well, that's never going to happen. We need to be more proactive. Gary's process recognizes that that is something that came out during the previous assessments. It's probably true, but it may never change. So we need to do things internally that allow us to figure out how to reach the goals we want to reach without being impacted by this blockade. My attitude changed early on when I got here, [from] being like this with campus, a begging position, to—we're doing great things. The campus will want to join us because we're going to do things exceptionally well. And we're going to do a good job of it, and we're going to get a lot of people to say the same thing about the Arboretum, including the Office of the President through the UCOP group, our community, people in the business community about how they use the Arboretum, and as a community, the Santa Cruz community. I was surprised when I first got here that many people asked me where the Arboretum

was. "Oh, you work at the Arboretum. Oh, I've never been up there? Where is that?" Or, "I've just never been there."

Reti: Yes, it's astounding to me. In Santa Barbara you would never have people say, "Where is the Santa Barbara Botanical Garden?" Everybody down there knows where it is. Even though it's up on a hill and it's not that easy to get to.

Harder: You have to be going there. It's a destination. Even there.

Reti: But somehow people don't know about this place.

Harder: And students will spend four years here and say, "Oh, I never went there in the four years I was here." I don't know if that's us, or the situation. I don't know what that is.

Reti: Could you envision a situation like at Davis, where perhaps the Arboretum would be the starting point for entering campus?

Harder: Kind of. But physically it's not going to work because the main entrance is over there and it would be hard to move folks from the Arboretum up to campus. We are looking at a different scenario here. .

Reti: Right.

Harder: But we certainly could be a central destination for south campus things, as well as associated state parks such as Pogonip, Gray Whale [Ranch]. We could be an orientation center for the natural reserves. Maggie Fusari and I have talked a lot about partnering and highlighting each other. We jointly manage a forty-acre site out here which is both of our property, but we're putting plantings in

there for a California Native Plant teaching garden, which is a long-term reconstruction of plant communities in California as a teaching aid. So people can go to these communities here and see them here. We've started planting out there already, some of that. With the historic district and CASFS we've developed a consortium called the South Campus Partners and we've met several times about issues of circulation, and what are the issues for the historic district, and what're the issues for the Campus Natural Reserves. We're welcoming people to the campus simply because we have lots of bike trails, and we have a beautiful campus. The sense of arriving here is the same as Davis. I mean, you go past the entrance but you can't walk from down there. You don't want to get out of your car down there. You keep going and then there's no welcoming once you get to the top. You better figure out where you're going. And you're not going to be able to see where you're going, because it's all trees up there. (laughter) It's not well done in that way. But the Arboretum wouldn't solve that. Bringing people in here first would not solve the fact that it's not well-circulated up there. But we certainly could be a front line for community engagement, community involvement, issues around conservation. We've got ideas to develop something, what we've been calling the Monterey Bay Botanical Conservation Center, which is essentially a terrestrial-based group of partners—faculty, native plant groups, watershed people—who are really interested in the terrestrial side of the Monterey Bay Sanctuary. There are a lot of near-shore people on this campus, there are a lot of waterside offshore, near shore, on-land faculty who do a lot of studies here, salmon runs and all that. But the expertise isn't mobilized in a way that the public can get to it. We'd like to be that center for supporting our regional community. Which would also be a formalization of

our research effort. We've got research efforts going on in a variety of different places. But this Monterey Bay Center would be the coordinating unit for our own research. There would be a director of research, who would be the head of it. But it would be more of a reflection of the community's needs, in that they need people to come out and do rare plant surveys. People now call and say, "My neighbor is doing something upstream. I think there are some rare plants up there. Can you come out and see those?" There are opportunities that we take advantage of here. Sudden oak death has been a great thing for Arboretum because we get lots of calls about it. We're all well-versed in what it means, and what we should do, and management. People mostly want to know what they can do with their trees. Initially they said, "Well, cut them down, put plastic over them, and leave them two years". I would go out to look at some of these places that were recommended to take the trees down and I'd say, "These are Coast Live Oaks. If they get burned on one side they can usually cordon off that damage and still grow." I said, "Let's just wait until next year and we'll find out how much is affected. Is the tree really going to come down or not?" Most often they never have fallen down, even over people's houses. We understand there's a liability when you tell people don't take it down, but I've never seen an oak come down that I've said, "Let's just leave it." Somehow the trees have been able to survive that kind of damage. It was the weak and the young, so to speak, that really took the bite of sudden oak death. And it's going to become more significant as it becomes more pervasive than it already is. But right now at the Arboretum that's the kind of interface that we want to have with the community.

Reti: It's almost like the old Agricultural Extension agents.

Harder: Mmm, hmm. In some ways. People call us. They just look our number up and call us for everything from you know, “Do you think my mulberry will make it next to the sidewalk there?” to, “Can you come out and look for rare plants on my property?” We see that as a big way of raising some money, through consultancies. Right now we usually just do it as part of our job, but it could be a separate thing, mobilizing our expertise here to do a lot of that work for people on contract.

So we see that the campus could use the Arboretum more in a lot of ways in promoting itself in informal science education opportunities, and since we haven’t been given that guidance and that road to travel by campus we’re sort of free to figure out what works for us. And thank goodness there was an Arboretum Associates group when they were talking about putting housing here. I mean, Ron Enomoto was willing to give part of the *banksia* field for housing, and the *banksia* collection is a comprehensive collection of a single genus of fairly significant plants. The collection is a world resource for this genus.

Reti: They were actually going to give [away] part of the Arboretum proper?

Harder: Yes.

Reti: I never knew that.

The Arboretum Associates

Harder: The members of the Arboretum Associates joined groups, and formed an opposition to it, and said, “Hey, we’re part of this, and we have people who have

wills that include the Arboretum, and endowments which are already existing saying that this place can't change, and those kinds of things." That was all brought to the fore and thank goodness we maintained our footprint because of it. I mean, the strength of the Arboretum Associates is immense! Because these people are business people, retirees and community members they represent a broad support group. They're community people who can go out and get rallying support around things. They developed a website against the housing project and it was amazing! My respect for those members that kept focused on the issues is immense. Many show up once or twice a week working here as volunteers, and pay dues annually, and are part of the Arboretum in a big way. We couldn't do it without our 250 volunteers. There's a massive group who really have an interest in the Arboretum and who give money to its development and preservation. That's something really worthwhile. But we could never have enough members to pay everything that we needed to. Well, I guess we could, but there's only so many people in the county and the community who would want to be part of the Arboretum.

Reti: Today is July 20, 2006 and I'm here with Dan Harder for our second interview about the Arboretum. Why don't we start today, Dan, by talking a bit more about some of your international collaborations here at the Arboretum.

Harder: Here at the Arboretum?

Reti: Here at the Arboretum. Yes. I know we talked quite a bit about earlier in your career.

Harder: What we're doing now?

Reti: Yes. But particularly, I know that in 2005 you went to Australia with Brett Hall, and I know there's been a long relationship with the Elliotts there. So I was curious what that was like for you.

The Australian Collections

Harder: They're coming back later in October. They'll be here in October for a potluck early in the month. Yes, this collection was built during a time when exchanging genetic material in plants was very easy. If you stood for a research institution, you could go to Australia or New Zealand and pretty much take anything you wanted, as long as it wasn't a restricted family of concern of USDA, or importing diseases and pests.

And it was mostly through the generosity of people from the outside willing to help build this collection here with some focused attention. There are really key people in that. Walter Middlemann, the Middlemann husband and wife team from South Africa, helped build the *Erica* garden, because of the interest in Ericas. And that garden is well known to people who know this Arboretum and the diversity of Ericas that are in there. We're working to enhance that collection even more. But you know what, the rules really have changed now for getting plant material out of countries where— Even if you are a research institution it's incredibly complicated to do that, and you don't necessarily have the authorization to go to a country and collect plants and bring them in. The Arboretum has always had a plant quarantine permit to allow import of materials in pretty much any family, except Rutaceae, which is the citrus family. Of course the citrus industry in California at that time was really restrictive

because we were growing a lot more citrus than we do now, and they were afraid of importing any kind of diseases. But the taxonomic distance between, let's say, citrus and the Rutaceae that occupy Australia is very distant, and the diseases are very specific, oftentimes. The Arboretum was able to get a Rutaceae permit. I don't know the exact specifics, but it was through another grower locally. They partnered together, the Saratoga Horticultural Research Foundation was part of the initial import of plants from Australia, with the Rutaceae permit. We brought in lots of Rutaceae with that permit at that time. And it's a significant part of our collection. All the correas and lots of interesting species of plants are represented in the Arboretum that are Rutaceae that have never carried in diseases.

Reti: I noticed that. I never would have thought they were related to oranges!

Harder: Yes. If you look at the leaves it has all the characteristics, but it's hidden under the cloak of Australian— (laugh) A general look on the outside of: this doesn't look like what I'm familiar with. We recently were given a one-year Rutaceae permit, just last year, and we imported some things. But within the last couple of weeks, the USDA has changed their mind about it and will not issue us a permit any more. It's really a blow to us, because it was something we were hoping to do more with as the time went on.

But opening the door to bring in plants takes a long time. That's why Brett and I went back to Australia, because of the connections with Rodger and Gwen Elliott, who are longstanding supporters and helped build the Australian garden, ultimately. And in that same year, 2005, Melinda Johnson (Krajl) went to

Australia as an invited guest in the Royal Botanic Gardens Cranbourne, which is the Australian national garden—all-native, Australian plants. She was invited to help plant the garden and be part of that because of her expertise with Australian plants. What a compliment, for an American to go to Australia and have them say, “Hey, come work with our plants because you know so much about *our* plants.”

Reti: Yes. That’s phenomenal.

Harder: She was a perfect ambassador. Melinda’s great in representing the Arboretum and being part of all that energy. The Australian national garden just opened last month, I think, in June or May. And what a plan. It was essentially nothing on the site, and they scraped it off and built up the infrastructure, and then put waterfalls in and water features and planted the whole thing. I mean, the garden was like, done. (laughter)

Reti: Because this wasn’t something that existed before.

Harder: No.

Reti: I remember reading back in some of the older *Bulletins* that in Australia, and Phyllis Norris talked about this some in her interview as well, that in Australia in the 1960s at least, there wasn’t too much appreciation for the native flora, and that that’s shifted over time. Just as we haven’t appreciated ours, either.

Harder: Completely. To the entire garden at Cranbourne dedicated to Australian flora and surrounded by beautiful vegetation, a natural vegetation area, with

walking trails through forests full of very poisonous snakes (laughter) part of the experience of walking through the bush of Australia.

Reti: (laughter)

Harder: But the dedication of the effort to work on native plants makes so much sense, as a source of national pride, and national development, and national heritage, really. In our plans and efforts so far, the Arboretum has committed more lands and effort towards building our native program, which is fairly robust. We do a lot of work with native plants, a lot of selection of plants from the wild. The Arboretum has dedicated over fifty acres to the development of the California Native Plant Teaching Garden, and building natives into the collection. There are gardens here. The Santa Barbara Botanic Garden is all natives. People come here and wonder why all we're doing is growing is exotics. Well, it's because they are so flamboyant and you see them. But the gardens that were selected here are a reflection of Ray Collett's and Dean McHenry's early interest in understanding the site here, and then understanding the microclimates, and the soil, and the drainage in a way that allowed us to plug in plants from exactly similar climatic conditions. Their efforts were to display plants from similar habitats from around the world. So we struggle less with pests. We're not pushing the ranges on these plants, so they're not compromised so that they're susceptible to diseases and pests, and they do well here because this is what they're used to. We're also lucky because of our climate here. If it gets too hot, the fog blanket comes over. And eventually, after a couple of days of too much heat, the fog comes in because inland is heating up so much. We're lucky because we're tempered on both ends in having that buffering of the

ocean. Really, there are probably no better horticultural sites anywhere than the Arboretum for growing plants. Because we have terrible soils that drain perfectly, we can add things to the soil to make them provide the things that the plants need. And most plants, the proteaceous plants that we grow, the banksias and the proteas, need to have perfect drainage. They cannot have wet roots. When we get up to six feet of rain here, or five feet of rain here in three or four months, their roots are soggy and the soils are soggy. But having that perfect drainage and having most of the nutrients coming from rock substrate, where it's removed very slowly, over a period of time it's released very slowly. There's a constant level of nutrient availability. We can enhance it with selected fertilizing to get the plants established. But once they're established at the first or second year, we stop watering and reduce feeding, so that the plants can develop their natural form, and depend only on the rains.

So the plants are perfectly matched for gardens in Santa Cruz, and I'm always impressed to see Arboretum plants at full size in people's gardens in Santa Cruz as I drive around, because I know where they came from, and I know they will have interacted with the Arboretum at some point and they're having a good experience with their plants.

The gardens were also a reflection of Dean McHenry's interests. He lived in New Zealand. He loved South Africa and Australia. He also lived there with his family, in Australia, prior to becoming the chancellor.

Reti: I didn't know that.

Harder: But he had good connections and was always interested in the plants, and he felt these plants would do well here. He hired Ray Collett very early on, and Ray was a microclimate person, a biogeographer, someone who really understood conditions around why plants are distributed the way they are on the face of the planet, and made good collaborations, and made trips abroad and brought lots of plants in during that period when the doors were wide open. That's the charter.

Amborella trichopoda

Special collections. We had people who wanted to help us out in many ways. Again, a community-driven initiative thing. The Keeler-Wolfs went to New Caledonia and asked Ray, early on also, in the mid- to late seventies, and asked Ray whether he wanted to have them collect anything while they were there. Of course, Ray gave them specific lists of plants that they might encounter. And New Caledonia, since it's an island, has preserved a very ancient flora. It's sort of like a refugia, or reflection, of what's happening on the mainland. When mainlands are drying out or getting hotter, islands tend to stay pretty much what the ocean temperature is, and are mitigated by the ocean's temperatures. So they maintain these refugia plants and so there's lots of good representation of ancient conifers. And in one of the collections they made they collected *Amborella trichopoda*, which is sort of a not very attractive, understory shrub that's something you would walk by if you saw it in the forest, fairly insignificant flowers. But they sent some cuttings of that back, and we were very successful in growing it, after some challenges in figuring out what it really wanted. It was a cloud forest plant, understory. So it wants shade and it wants high humidity and

not too hot temperatures. And again, the Arboretum excelled in being able to grow it. And through DNA analysis it has been discovered to be the most primitive flowering plant on the planet, and has given rise to all other angiosperms, and is related basally to all other groups of primitive plants, as well as higher plants. We've distributed hundreds, if not thousands of cuttings of that plant for study, as part of our policy of free scientific exchange. You ask, and we give, and we exchange.

Reti: And this wasn't known when the plant was originally collected by the Keeler-Wolfs?

Harder: That's right. They knew it was primitive and they knew it occurred there in New Caledonia. But they didn't know where it was in the scheme of evolution. And DNA, of course, opened all that up to figure it out. They've also identified genes in *Amborella* that have come from mitochondria and subcellular organelles, and other things inside a cell that actually have DNA, which were independent organisms at some time, like chloroplasts and mitochondria, which generate all the energy inside the cell. They came from independent organisms. There's independent DNA in each of those that are reflecting from bacteria, and they've found some of those same genes from those organelles in the cell in *Amborella*. So they know there's a very primitive origin to *Amborella* as a plant. It's very early on.

Reti: Fascinating.

Harder: Yes, it *is* fascinating. And the Arboretum has what is considered the type of that plant. So our clones and our cell lines are the comparative DNA source for

all the studies in DNA. So if everybody knows— Like a type specimen in describing a plant, it's the source, and everybody can go back, and use, and see, and take advantage of the source. People still ask us for cuttings of that plant. They want it represented in their gardens. It's not easy to grow. It seems to like living in Santa Cruz better than any other place we've sent it.

Reti: That's amazing.

Harder: Even in greenhouses. I mean, we don't understand what it is. We're not doing anything exceptional. We have some very old plants that are still giving out cuttings. But we've also got some information on some new lines from Boulder, Colorado, where they've got almost fifty maintained cell lines, but they can't keep them alive. So we want to get plants from them to grow here, because we know we can keep them alive.

The New Zealand Collections

So back to collaborations and partnerships. In New Zealand, two very significant people were involved: Ed Landels and Harry O. Warren. Ed Landels is, of course, the Ed Landels [who donated the land for] Big Creek Reserve. He was a big landholder and gave it all to the university, and really loved New Zealand, and got very close in collaborating with Ray about building a New Zealand garden here. Ed Landels really provided the impetus for the start of the garden, and also some of the early funding for it, and became very enamored with the community around the Arboretum. In his late years he really enjoyed interacting with the Arboretum, and wrote many nice, glowing letters about how positive an experience it was at that time in his life to be around people who were nurturing

and caring. That made us feel really good. Then Harry O. Warren became enamored with New Zealand plants, and wanted to establish a New Zealand garden here. And of course Dean McHenry was an incredible fundraiser and community builder.

Reti: Absolutely.

Harder: Incredible. And was able to get Harry O. Warren to provide an endowment for the position. So the New Zealand curator is the only position that's endowed. It has its own endowment, and supports its own care and maintenance. And we're constantly, of course, asking for people to consider endowments for supporting curatorships, and naming them. That garden is well supported, and if people who visited the New Zealand garden were impressed with the diversity of plants when they were small, they're now very big and grown in. It has a very different experience, where you're, again, like the Australian garden— The South African garden will never get there because we don't have the tree structure. They are all lower-level plants and they don't get that tall. But Australia and New Zealand have grown in to enclose their own areas. It gives you a feeling of containment, a sort of a room feeling as you move through the garden—changing rooms and different feelings. That's only because the foliage has grown in and now is reaching maturity, and the plants are doing what they were supposed to have done long ago when they were planned and put in.

Connections with Australia

Presently, Brett and I went back to Australia in 2005 to reconnect with the gardens there, and make some good contacts, and begin to think about how we can exchange plant material and build our collections, and also support conservation efforts, and learn how they do things, and they can learn how we do things. Part of the exchange was Melinda going to Australia and providing some service there, but also getting Australians to come here and work on our collections as part of that exchange. That's probably going to be happening in the next couple of years.

Reti: When you say, "work on our collections" what does that mean?

Harder: Become part of our staff. Maintain the collection and make the kinds of decisions and considerations that Melinda would. Become a curator here. Essentially just use them in a curatorship role, as a way of all learning from each other.

Reti: And how would you support conservation efforts in Australia? Concretely. I know that helping to support the garden there would be one aspect of that.

Harder: Yes. And also saving some plants. Providing a place where another copy of that plant could grow and be maintained. A lot of conservation efforts, to be successful, require a lot of outreach and education. We find our garden is used a lot for educating people about Australia before they go to Australia. We find pre-travel people coming here to see what they might see. Or just after they've come back, they are impressed with how close it looks to what they experienced. A lot

of it is education outreach, and sharing techniques, and understanding how they're attacking conservation in a Mediterranean climate. There are certain considerations. What's happening in California with opposition locally and community opposition, how they're being addressed is done differently in Australia than it is here. We tend to just build sides and then take everybody to court. Australia provides some forum for people to actually talk about it and reach agreement. Both sides have some say in the project as it's moving along, so there's increased ownership of what's going to happen overall. "Well, we need to have a walking path, because if you close this area we're not going to be able to get over to our normal daily walks over to the shopping mall," or wherever it is.

Reti: Walking. What's that? (laughter)

Harder: (laughter) But being able to give some input into the process, so they take ownership over the result, and then also be part of what's going on there and understanding— It increases awareness and everybody seems to be— It seems to work a little better in Australia, and we went there to look at those kinds of models. But we also went there with eyes wide open about all the things the Arboretum is working on now, like interpretive signage and way-finding—the experience when you walk into the entrance of a garden. Are you well oriented? Do you know where you're going? Do you need to know where you're going? Is that a good thing? Those kinds of questions we're struggling with now. The Arboretum for a long time was just a place for plants, and if visitors showed up, it was like, great, because they're interested in what we have, because that's what they're coming here to see, because nobody else really knows what's up here. Now we're finding that with sixty or seventy thousand visitors a year we're

actually realizing that people of *all* kinds are interested in coming to see our collections. Some people come up here just for something to do before the fog burns off before they can go to the beach. That's okay too. We need to be ready to interpret the collection to them when they come up here, give them a full experience, and then they go off enhanced because they've visited the Arboretum. But we also support people who are specialists, who want to use the collection for research.

So it's gone from more of a research arboretum, to a botanical garden, and servicing people in the public. So now the paths aren't to get people to the garden through to the plants. It's making sure people stay on the paths, and this is where you're supposed to go, and getting people circulated through the Arboretum where they're not feeling lost (although some people like that about the Arboretum). But making sure that people feel connected, that they know they are in the Arboretum the whole time that they're there. Now that the collections have grown in they're— As they were built, they weren't next to each other. But now they're right next to each other. So we have real challenges, because we only grow plants from the regions they come from. When you're in the South African garden and you go to the Australian garden, on the ground it's simply just crossing a little bit of a dirt road. But on the planet it's what, eight thousand miles or six thousand miles, and it's a completely different flora! So we need to make sure that people realize that they're jumping continents, and this is a different place now. The plants look different, but maybe it's kind of subtle that you've really moved on the planet, and these plants have the same conditions, but look at how they've dealt with the challenges of growing there. So it's neat.

Reti: Yes.

Harder: That's what we're working on now with this assessment.

With existing collaborations, with that intention of that trip to Australia, we looked at ways we could work together. And that was brainstorming with them, and building partnerships, and seeing who is in certain positions at certain institutions who helped us in the past. And of course, that leads to more things. It felt very familiar to me, in going to a country I'd never been to, like Zambia, and, okay: who're the players here, and who does the work and how can I— Things that I had done a long time ago.

Reti: Right. You had that background already.

Harder: Brett is really good at that too. So working together. It was a half-working and half-family vacation. It was a lot of fun. I'd never been to Australia before, and certainly I need to go back, because there are so many interesting places, and they're so far apart from each other. This huge place, and everything takes eleven hours or more to drive to, and it's only to see one type of plant. I've done that for years, but it just a bigger country than I'm used to working in.

South Africa

In South Africa, I'm working with existing collaborations I had through Zambia, because most of my travel through Central Africa went through South Africa, once apartheid and everything was cleared up. Because in my travels, I was prevented from going to South Africa. But on more recent trips I've spent lots of time in South Africa, and know a lot of players with the flora. The Missouri

Botanical Garden has a big African program, and there are South African collections there of significant value, and some very significant workers at Missouri. So there're the same people. And we're seeing what's going to happen. We've asked a lot of questions about possibilities of collecting plants. Or simply just duplicating the collection at Kirstenbosch, their botanical garden, coming out and making collections at botanical gardens. I mean, that's perfectly good for us. It's going to enhance our collections. You have data with it. We won't take from the wild, and we'll have two more. Again, we'll have two copies rather than one. So with the South Africa [garden] we're sort of figuring it out. Ron Arruda, the curator of the South African collection, went last year, more on a tour. He'd never been there and really came back with a higher level of appreciation for the plants he's working with, and wants to build the collection. He came back with lots of seeds, and we've got some of those growing.

New Zealand

New Zealand. Tom Saucedo is again leading a tour with people, but spending a couple of extra weeks in November, into December of this year, to enhance collections, and look at possibilities, and reconnecting with collaborators, which we haven't done since I started here five years ago. But I'm going to meet him at the end, for probably two and a half or three weeks. I've never been to New Zealand either, and I'm struggling with the fact that I'm not going to bring my family, (laughter) so I'm getting it at home, too, but to go to New Zealand, and to see what the possibilities are of making new collections. New Zealand and Australia have pretty much shut the door completely to any kind of movement of plant material.

Reti: Why?

Harder: Oh, protection of national resources. We can assure them that we'll never sell them, and we can make them a lot of assurances about what could happen with that material, and it's for research purposes and public information services. So we can keep the commercial part out of it, which is what they're most concerned about. That takes a face-to-face meeting. You can't just write a letter and say, "Can you send me a bunch of your plants?" So it's really important to connect.

Vietnam

I also have connections in Vietnam, and I talked about that before. That's still continuing. And we're looking at a foundation-level grant to keep those going. \$200K to \$500K to keep a program going for a couple of years. They're paying people building up that facility, and continuing to do collecting. I'm still passionate about collecting plants, and collecting plants in Vietnam and Indochina particularly, now that the collaborators that I worked with are moving into Laos. That's really the only place where the forests really are left in Indochina, gigantic trees and untouched forests. We're hoping to continue to do that by building an Indochinese collection here, and getting to develop that collection. So maybe on my way back from New Zealand, I'll be stopping in Hanoi and visiting with collaborators then, and seeing what's possible. We don't have an institutional-level agreement with them, and we're negotiating that with their institute. But it's hard to do that with no money. You are not talking about

specific projects, you're talking about possibilities. If we can secure a little bit of funding that collaboration will come together really quickly.

World Conifer Collection

Other collections that we're anticipating building, or we have here: We have a world conifer collection, which is very significant in the conservation of world conifers. Because we have the site that can grow large numbers of plants to mature sizes. We can grow conifers to full size, outdoors, and in large numbers. And we're supporting the effort of the IUCN [World Conservation Union] to conserve world conifers. Really, we can grow every conifer on the planet here. And other institutions that work on conifers don't have the advantage of the site. We're a place where we can grow them out, and see the stature they'll reach, or whether they're viable as a horticultural plant. Other institutions—Edinburgh, Scotland and Kew, of course, and Atlanta Botanical Garden—all face significant climatic challenges to growing tropical, particularly subtropical and tropical conifers. They cannot grow them outdoors. And we can do that here.

Reti: Do we have cold enough temperatures here to grow the kind of conifers that grow in snow-covered areas?

Harder: Yes, we sure do. And most of those are growing there only because they're stuck there. There're ones that don't actually need cold. But we get enough cold here to actually get them through. We've had great success with them. They actually get too big here. (laughter)

Reti: I can imagine.

Harder: The Arboretum's great. We have a frost-free area, which is where the world conifer area is, right below the chancellor's house. And we maintain fifty-eight of the sixty-eight genera of conifer. But our lower areas are catchments for cold air. So we actually get colder down here than we do upslope. We can actually get significantly colder temperatures just below us here in the reservoir. So it allows us to have a huge range of plants to grow, and we think even with a little bit of protection we could do subtropical fruits, which would be really a nice thing to try to grow here.

Chilean Collection

Reti: I had noticed something [in the *Bulletin*] about Chile, and collaborations there.

Harder: Yes. Tom Saucedo married a Chilean and opened up possibilities. That's one of the Mediterranean areas of the world from which we don't have plants, and haven't built a collection, and it's an obvious place, as well as a Mediterranean region. We have a Chilean collection. We have some Chilean plants in the ground. But we haven't dedicated any space to it. We do have space dedicated just below the world conifers for the— We're not just calling it the Chilean collection anymore. We're calling it the Temperate South American Collection, so that we can also visit Bolivia and Peru and other—

Reti: Because this is defined by climate, not by national borders.

Harder: Right. It allows us to introduce more plants that gardens like Strybing are trying to grow, but they can't. It's just not the right conditions. We've been in

discussions with the San Francisco Botanical Garden at Strybing Arboretum, and the UC Botanical Garden at Berkeley, and Davis, to begin to share materials, so that we can all benefit from it, and have a better opportunity to grow the material we should be growing, rather than struggling with stuff we can't grow. The San Francisco Botanical Garden is in San Francisco, and Golden Gate Park presents very difficult conditions. They can grow great plants but they need to be from places that like that chilly, cold air in the summertime. That's high elevation cloud forest plants. That's why they can grow great tree ferns there. It just gets too hot and dry here for tree ferns.

So the relationship with Chile is with Tom now as he has a regular opportunity to visit there, and has made some great connections with botanical gardens. There's a botanical garden going to be developed there called Chagual, which wants to develop a garden with each of the five Mediterranean regions of the world. Well, they visited here and said, "This is what we want. Just like this." (laughter)

Reti: Fabulous.

Harder: So we're working with them as well. They want California natives, and we want Chilean plants, so there's an exchange opportunity there. Tom has made some great connections, even through his wife's family, with foresters in the area. All they do is grow a bunch of plants, and they really love talking about plants! So Tom brought back several thousand plants the last time he was there, and they all had collection information. They all were suitable for accessioning into the collection. Eventually we're going to be establishing that collection on

the lower slopes of the upper Arboretum. So that's a collaboration that's taking off. It's a collection we want represented here; it's a Mediterranean region we want represented here. And people have actually asked about it. They are looking for a Chilean garden that's bigger than Berkeley's, and has more representation of those large stature trees like *Fitzroyas* and absolutely beautiful timber trees. Berkeley couldn't put even one in, let alone a grove of them. We're looking at areas like the Dr. Ball's redwoods, to grow some redwoods next to these gigantic South American trees, as a comparison of tall trees in different families.

Ray Collett Visiting Scholarship

Let's see. What else can I talk about? Shall we talk about the Ray Collett Visiting Scholarship?

Reti: Sure.

Harder: That was the result of a gift from an anonymous donor, a top donor to the university, who walked in the door my first couple of months on the job and said, "I want to give the Arboretum some money, one hundred thousand dollars." I thought, well, this job is easy! This job is so easy. I don't have to do anything. They just walk in and drop the checks off. This is going to be fun! But this donor has been such a wonderful supporter, and such a consistent supporter. We crafted the idea to bring some academic expertise to the Arboretum through the hiring of experts in the field. The donor was told by people on campus, "The Arboretum doesn't have an academic mission so we could never support it. They're always going to get in line behind everybody

who has an academic focus.” And then they ask us for it and we list everything that we do to support academic functions, and we even teach. And it’s like, okay, I don’t understand the information. So the donor said, “You need to enhance your academic focus here.” I said, “Well, the easiest way is for us to hire somebody and have them come here, and be part of it and enhance us.” So she established a \$20,000 annual award to the Arboretum in the name of Ray Collett. But she wanted it named after Ray and recognizing him. It’s brought Hieu Nguyen, whom I talked about last time, Dr Nguyen Tien Hieps’ son, to work on begonias here for a time. Annually, we’ll be hiring somebody here on a part-time basis to bring their expertise here and build the collections, and provide an opportunity to interface with them, so that our community can learn about it, our staff can interact with them. It’s been great. Now we have Martin Grantham, who works at San Francisco State Greenhouses, but who used to work at the Berkeley Botanical Garden, somebody who has been in the community for a very long time. Very focused on South African plants, and has a comprehensive collection of *Restios*, which is a, sort of a wispy—looks like horsetails, big long, tall, real soft-stemmed, but beautiful graceful things that are now really the rage in horticulture. Everybody wants them because they are dwarfed tiny little things, to eight-feet tall, and they bring a different texture to the garden, and a variety of different applications for the plants. Martin is also working on Woody Iridaceae, in South Africa the irises, the irids—we mostly think of them as underground rhizomes and the leaves die back and they have beautiful flowers. But in South Africa they actually become woody and they become branched shrubs, and will fill niches in rocks with branches that grow out. And then fairly regular fires will go by and they burn the tips off, and the plants stay in these rock crevices. But it

has allowed the Iridaceae in South Africa to produce wood, and upright structures, and branching, in a monocot that's sort of like a bamboo, where it's laying down tissue and holding itself up by its own fibers and structure and not just water, water's not the only thing holding it up. Martin also got those interesting plants growing here, and he's working on techniques of propagating them that will be useful for future horticultural use of them. He's also given some workshops and some talks on his work to the Arboretum community. He wants to have his scholarship here supported as long as possible. So he's giving a few hours here and there, every couple of weekends, and comes probably every other week during a month. He lives in Alameda, so it's hard for him to travel down here. But we've kept it open to pay for his time that he comes down here. He's got great things happening, and we maintain some of his material for him while he's gone, just like we do with Hieu.

We're now looking for a third visiting scholar person for the position. There are so many people in the community that could really benefit the Arboretum, and we would certainly benefit from supporting them for a period of time and having them around.

MRC Greenwood Research Award in Biodiversity

The MRC Greenwood Research Award in Biodiversity was coordinated through STEP on campus. This is an award from Diane Cooley. She wanted to help students. She is very focused on students. And she also wanted to do something that would highlight the Arboretum. It's been a little bit of a disappointment for her, unfortunately, in that this award supported two graduate student projects,

and the agreement was that they needed to provide some interpretive materials that we could use to talk about the work that they're doing in the context of the Arboretum, and what we do, and conservation. Of course, graduate students are so busy, and we haven't seen anything from any of them and they've received the money already. It's not an annual award. It was established hoping that it was going to be an annual award. It hasn't worked great. John Thompson is a supporter of the Arboretum and is the coordinator of STEPS, and a good collaborator and my neighbor where I live. I feel very strongly that we didn't talk enough about expectations from the recipients on that. It's a great opportunity, and couched in the right way, and happening in the way we had planned it, would have been great, but the reality of it is that graduate students are so busy that it's a lot of extra work for them to put something together, and we're not getting much of a response with it. So I'm not sure that's continuing.

Koala Blooms Program

Reti: Can you walk me through what it takes to make one of the Arboretum's plants into a cultivar available to gardeners?

Harder: Okay. We have a plant introduction program called the Koala Blooms Program, which involves Rodger Elliot, a nursery in Australia to help us introduce the plants here, the Arboretum, and then three, to five nursery partners in California. We import the plants. The plants come to us through this nursery. We trial them here by planting them in the ground for a period of time and evaluating how they perform here. We observe things like how it's growing in the garden, when it flowers, how it needs to be maintained, how tall it gets,

etc. We put it in a garden situation and we essentially watch it. Twice a year the Koala Blooms partners get together, maybe it's only once a year. They at least get together once a year when Rodger and Gwen are here in April. And they meet and discuss, and at the Arboretum, of course, they go look at the plants in the garden. Since we've been doing this for almost ten years now, we have a long gamut of plants that are still under consideration. They come here and talk about plants that are already in the program, when they're going to introduce them, and then they go out and evaluate what the plant look like and how they think it's going to sell. Because these people are business people, they know how well it might sell and who might want to use it. There's only a certain market for plants that we offer. We can get a lot more people interested in trying to grow a pincushion than maybe a pink flower *correa*. It's hard to promote because it's easy to saturate the market with plants. Some plants are easy to promote others are quite hard.

Reti: Because?

Harder: The demand. The demand's not there.

Reti: Because it's a special kind of demand. I mean, like if you want to grow a *protea* you have to have a certain kind of soil. It's not like people wanting roses?

Harder: Yes. And also it's the growers pushing them to the landscapers. And then the landscapers, of course, word of mouth saying, "Hey, this plant works great for me. I used it." It takes a long time to get those up and going because we don't have the advantage of marketing or promotion about the plants. So they come and evaluate what the plants look like. Then they decide on which ones

they want to try, and we provide them with cutting material. Then they look at it, what it looks like in the pot, how it grows in the pot, how quickly they can get it up to saleable size, what season it looks best—all the considerations for sales. Then plants can still drop out of the program if they don't perform well are susceptible to disease or pests, or other problems.

We have a grower in San Diego, and a grower as far north as Oregon, I think we have a partner there that's receiving plants, maybe in northern California. They talk about each entry into the program it, and then we coordinate a release date. Those dates are our plant sales in the spring and the fall. So we offer one, two, three, sometimes five brand-new plants to horticulture every plant sale, as well as to growers, with the understanding that they won't release the plant, or try to release the plant until around that date, so that it's not available to anybody else until they go to the plant sale here.

Reti: Ah! So that's part of the attraction of the plant sale, then. It's to get these new plants.

Harder: Mmm, hmm. There're new plants there. To get these new plants that have never been offered before. They usually get snapped up really fast.

Reti: I bet.

Harder: And it's been really successful. For all the plants that are sold, the Arboretum receives fifty cents a label, as a way of supporting the program and marketing it. We've finally found a positive return on all the activities associated with it. Some of the nurseries we work with are fairly small. And what's

happened within this larger nursery, Monterey Bay Nurseries, promoted and made cuttings of a *Grevillea lanigera* 'Coastal Gem,' which is a beautiful little plant that probably gets eighteen inches tall, and it weeps the right way, and has pink flowers on gray branches on the tips, and blooms all year long, and as long as it's in the right conditions it can take salt spray, and it takes full sun. The Presidio, in some of their landscaping efforts, are trying to promote other Mediterranean plants, and I think they were looking for adapted water-wise plants for their landscaping. When I went up to the Presidio for the meeting, the APGA meeting, and I couldn't believe there were three thousand *Grevillea* 'Coastal Gems' in this one planting! It's like, "This is going to be so beautiful, but those are all our plants. Fifty cents each!"

Reti: (laughter)

Harder: (laughter) It was just so impressed and proud. I went into the meeting and I was like, "Those are 'Coastal Gem' out there." They didn't know what I was talking about. But I'm sure by now it's already filled in. That one plant has provided more support for us for the program than any other plant. Who would have guessed it was that one? And so, it's definitely a numbers game. Monterey Bay Nursery has already sold their next stock of all those plants. Now they're looking at the Koala Blooms program and the Arboretum collection and saying, "Hey, these are really interesting source plants."

We're actually finding people coming to our plant sales and buying all of our interesting plants, taking them to, greenhouses mostly near Half Moon Bay. There're a couple of nurseries that actually propagate our material and provide it

at the San Francisco Flower and Garden Show, and other ways. We see that dramatically undercutting our ability to grow the plants and sell them, but we're not really in business to sell plants. I mean, that's not our main focus, selling the plants. It's more providing information and the plants to people who want them. I saw some plants at the San Francisco Flower and Garden Show. And I knew which ones they were, you know, 'Yellow Bird' [*Leucospermum cordifolium*] and all the pin cushions that I recognized from our collection. I bought one of the plants because it was only six inches tall and it had three or four blooms on it. The cutting was only six or eight inches tall and the thing was loaded with buds! I'm sure they pumped it up with food and whatever condition the plants needed to flower. I remarked, "What's going on here? We never get fifteen buds on a plant that size, nor do we try to get that many." And Don Mahoney, who's the horticulturist at San Francisco Botanical Garden at Strybing Arboretum, was wondering about that too. So we chipped in money and bought one, and the first thing we did was dump it out and look at the roots. There were almost no roots on the cutting. We both were concerned. It was a great plant to buy, but when you stick in the ground it's not going to grow. It's so committed to growing buds it's not going to give anything to the roots. Then we thought, well, it's a beautiful plant and it might be fine in a pot. Then we thought, boy, that's not going to reflect very well on the plants that *we* sell. Because we take special care in making sure that we've got good root systems on plants, and they're going to perform well as soon as people put them in the ground.

Reti: How does it end up like that, where it has no roots?

Harder: I confronted him. I said, “Yes, these look like Arboretum plants. Did you get those at the Arboretum?” He said, “Yes, I go to your plant sales.” And then I saw him at the next plant sale, too. He was just gathering everything, a couple hundred dollars in sales, which is good for us. But he was looking for source material. Not that he’s a bad grower, or a bad person. It just might reflect badly on us and how we promote our plants, because everybody is not equally successful with what we do. And buying a plant that will not survive in the ground certainly would dampen any enthusiasm for using these plants in a planting.

Reti: Right. But what would make it not have a root system?

Harder: Well, they could have put hormones on it that would encourage it to flower. Or they can modify daylength to encourage shoot over root system growth. Proteaceae plants don’t like phosphorous, but they can adjust other parts of what they’re treating the plant with, nutrients and things. Because those plants are very seasonal, and they may be affected by day length, and be cued by day length. They may be pulling shades over them at certain times to get them thinking it’s early spring or winter.

Reti: Got it.

Harder: And also, we make selections too. Part of our opportunity when we go in the field, and particularly in California, because we do have permits to collect and bring plants into cultivation from within the California flora, is look for exceptional representations of species in the wild. So when we see something special— We’ve got plants named after Brett and Ray. We bring the plants to the

staff meeting, and we all suggest a bunch of names and try to get inspired by what the plant looks like. So we actually respond to our own interest in plants and selecting things. So that's more internal. We just bulk up the collections, and then we try to do an article or two about the plant in the *Bulletin* or somewhere and generate some interest. If they look good in the pot at Norrie's or at a plant sale at the time they are flowering, they sell.

Nursery Discount Program

Reti: Yes. So there are quite a few local nurseries, I've noticed from reviewing the *Bulletins*, that you've had a relationship with, over the lifespan of the Arboretum.

Harder: At this point, too, we have a nursery discount program, for members. They get a ten percent discount, most often only on plants, but sometimes on all garden-related purchases. That's helped promote us, drive some traffic to those nurseries. Some are local, but some are more distant, to try to get some interest outside of our community, like in San Jose, to get some interest in people to come down here. We find that if we can get people to come in the door, they'll come back. Repeat visits, or, a friend told me to come to this. Word of mouth is very, very important for us. It's made a big difference in the little ways we've tried to promote the Arboretum. And the Music Series, and our events, and other things like that. It's made a big difference in people feeling welcome to come up here.

Visitorship

Reti: So your visitorship keeps increasing.

Harder: It has. We actually do count. We mostly count cars, and then we use some formula that was provided to us to negate staff travel and volunteer traffic. But we've debated about whether we should count volunteers as well, because that's a visit of some sort that has impact on the Arboretum.

It's nice to think that we have that many people just walking in, and taking advantage of the space. Because we don't actually solicit and buy and sell tickets. That's been suggested to us many times, to charge admission. There're two things to that. One is the staffing of it, and the second is it would be less welcoming. I'd like to make sure to try to keep this garden free, if I can. I don't think we're at a level where the community would want to support coming up here and pay for it. There're a lot of free things to do in Santa Cruz already. And it's a state facility. And I really think that's probably a stronger part of it. It's a state facility and we should be able to walk in here as a taxpayer. This is our place.

Reti: True. We're already supporting it.

Harder: That's right. Which is why we don't have asphalt parking lots, because if TAPS, the campus, had invested in putting down asphalt they would charge for each of those sites. And then we would ask for a donation. If somebody's coming here and having to pay for parking we're not going to get anything out of the visit because they're going to say, "Well, there was that parking money. That should be the Arboretum's anyways." Even though it doesn't work that way.

Reti: Right.

Outreach to K-12

Reti: How has the Arboretum done outreach to K-12?

Harder: Mostly by response. We respond to requests to either come to a classroom and do some sort of interpretation, but more usually to bring people up here and run tours. Phyllis Norris is, of course, the leader of our docent program, and loves K-12 tours, and has built a good cadre of people who work with her to give good tours, give targeted tours, and give tours that are appropriate for different age groups. Phyllis can engage anybody at any age. Amazing results come out the other side. It's her deliberate, very friendly approach to things that is just so fascinating. Everybody learns from a tour from Phyllis. Even staff get entertained and educated on tours from Phyllis.

So K-12, we have done that. But we're looking to formalize it more as we move to formalize the education program. One of the things that I started when I came here was to look at research, education, and outreach, which are our only mandates we're ever going to be criticized about by the university. And the collection, of course. I realized the collection had to be central to all of those things. So I made Steven McCabe the coordinator for education and research. He is also the curator of succulents, and he also carries a big burden of our research program, on his work on *Dudleya*, which is exceptional and world-renowned, for sure. He's coordinated our outreach efforts, in that we not only, list them and keep track of what we're doing, even if it's respond to a phone call about can you come out to the classroom; or can you identify this for us, or answer a question.

People are calling us because they think we can help them because of our knowledge. Those kinds of unsolicited requests are part of education.

We've done more with teacher training than K-12 directly, because we see the teachers as the vehicles to get the kids up here. And the teachers need to feel comfortable enough that they can come up here and use the collection. We're happy to mobilize the materials for them. So those efforts with Stephen are interpretive signage, and on-the-ground interpretation of the collection, and then teacher training efforts, and then K-12 response, mostly responding to K-12 through tours, and if they ask us, or something, we are willing to provide usually to schools.

Most of us on the staff have children, who have their own school programs, so we have targeted school programs associated with bloodlines. (laughter) So Bonny Doon Elementary has one, and De Laveaga has one, and schools in Watsonville.

Music Lectures Series and Potluck Series

Reti: Let's talk about the Music Lectures Series and Potluck Series.

Harder: Those are all responses to our member survey of a few years back. One of the things we did within the membership committee was run a survey, and surprisingly with all of our members we got an almost eighty percent response from a survey.

Reti: Wow! That's phenomenal.

Harder: Yes, it was. Because people were really interested in providing input, because they'd never been asked before, I think. And a lot of that, the surveys were around wanting more connection with the curators. Because people were feeling a little bit of distance from the curators or maybe people felt hesitant to address curators. But that's completely opposite of how the curator or staff really are. The curators are so friendly and just so easily approachable. I think it was more, "They're staff. I'm not. How could I ever even talk to them?" Or something. I don't know. That's not what we're trying to project now. (laughter)

But the Music Series was established because we had the Cooleys. Don and Diane Cooley had been married fifty years, and their family wanted to do something in the Arboretum to recognize that. I got a call from Ann Cooley Youngblood and she said, "Do you have any projects up there or something we could support? I could get some money from this group of people that know my mom and dad, and on their wedding anniversary—" I didn't really have anything. I was thinking ten thousand dollars or something like that. So I thought, oh okay, I've got something here. It was an amphitheater plan that was sort of a sketch. It was like, okay, let's build a stage in the amphitheater, and it's going to be eight thousand dollars. That was their estimate. I remember there was a plan and I pulled it off the shelf and said, "Yes, there's an amphitheater. We always wanted to renovate the amphitheater, because it was a place Dean McHenry and Ray had taught at, and they used the space, and it's a nice space, and people tend to gather there. Maybe we can do something more? So working with Thomas Wittman from the Farm, who's also part of the staff here part time, and what turned out to be fifty thousand dollars, a gift from very generous

friends. And a donation from the Trex Corporation for all the material. Thomas Wittman was able to put that stage together. We did some re-grading and replanting, and took some plantings out, and it really opened up to a beautiful space.

Since there was a small stage there before, we got into a little bit of hot water by replacing it with a much larger stage. The implications of doing any kind of construction came as a little bit of a surprise by the planning people on campus, because I understood it to mean that we could replace a failing structure, even if it meant expanding it. We didn't expand it too, too much. But it was more of an opportunity for us to get involved with the planning department and understanding what the rules were about different kinds of things. We certainly could move garden beds around, and change rock walls, and things that are not too tall. There are some height requirements and things like that, safety requirements that certainly are a priority for us. But we can't build roofs, and we can't put anything under a roof, and we can't move significant quantities of soil from any area, except in garden beds. So that's our understanding of how we can operate as a garden. We can't build buildings, or build houses, and build stages without more interaction. But in that case, it was asking for forgiveness rather than permission, and it worked, and we got what we wanted. So I think the end result was actually positive for everybody. We followed very strict guidelines in building it. We knew what the codes were. There were some regulations about handrails, and we didn't quite follow them. They were a little bit too wide to grab. So campus came down to the evaluation, gave us some things we needed to

fix; we had some handrails installed. Overall, it turned out to be very successful. It's a very sound structure.

Okay, what are we going to use the stage for? Weddings and private functions have been considered but not committed to. We had a Shakespeare To Go performance there, and Molly's Revenge performed there, and it seemed really nice around the community. And then we started thinking about adding real artists. Because Santa Cruz is between Los Angeles and San Francisco, there're lots of artists in the region that are looking for another gig and other performances. Susie Bower knew that Jose Reyes-Olivas of College Ten organized a multicultural festival, and runs sort of a promotion agency, or a band-coordinating agency. We offered him a part-time job here to coordinate the music series. He's an expert. He's tapping into people. Tonight Tish Hinojosa's playing. She's on her way to the Grass Valley Festival, so Jose tapped into that. He also runs all the shows at Stern Grove. So he knows people. He knows how to get bands that want to play. Once they see the venue and how they're treated here they love playing here. We get cards and responses back from the musicians saying how well treated they were, and what a beautiful place, and they've always commented on how comfortable it is and how family-oriented it is, because kids tend to run around a lot, and we allow that, because it's hard for them to sit in their seats with danceable music playing.

The Music Series was mainly established to expand our exposure to a group of people that is very strong in Santa Cruz—music lovers and artists. We see the Music Series very much as a way of expanding our community. It has been very successful. Last year we lost some money on the series, but this year we're ahead

of schedule on raising more money. We would like to have the Series break even and pay for itself. Tonight's show is sold out already. That's only our third show that's sold out completely.

Reti: That's great!

Harder: Yes, already. It's fun. We bring a hay wagon in from the Eucalyptus grove. It's very nicely done. The Series was set up so that Thursday night people didn't have to go home. They come to the Arboretum. We feed them. We give them a show. It starts at 6:30, a little bit early, but it's over by 9 o'clock and people can be home by 9:30. It's a whole evening. They can fit it into their schedules. Thursday is always a great night to go out and do something.

Reti: What about the lecture series and the potlucks.

Harder: The benefit lecture series was a means of raising money, because we weren't able to convince the campus that our facility needed upgrading with new chairs, new tables. We didn't have a digital projector. We were looking at renting one of those.

Reti: Oh, my gosh.

Harder: So we set up a benefit lecture series to target benefits for our presentations and our facility. We've raised thirty thousand dollars already on the whole thing. We're in our third year now with the benefit lecture series. It's coordinated by Bill Grant, past president of the Arboretum Associates, and he's well connected in the gardening community. Every year he does a benefit lecture on roses, which are his passion. But oftentimes the lecturers want all the

proceeds to go to the Arboretum as a way of supporting it, or we just cover their travel costs, pay a little bit of a per diem for them to come, or an honorarium, and then everything else we get. It's ten or fifteen dollars per lecture and it's fairly high. And, for a good lecturer, we can get fifty people who show up on a Sunday afternoon. It's a good way of raising money. We bought new chairs and tables. We bought a digital projector. The campus is going to install or repair our carpeting. We told them that our new chairs make the carpeting look terrible! (laughter) So the lecture series is to raise money.

The potluck series. When we started the benefit lecture series, people were saying, "Well, we really liked the potlucks. What happened to those? We didn't want them to go away." It was just, like the volunteer newsletter, the *Bulletin* wasn't targeting all the people that we needed to target. So there was enough news to go into a sort of sub-newsletter, which is sort of a reflection of the *Bulletin*, but it comes out more frequently. The potluck series is sort of like the sub-benefit lecture series, but it's really meant for community building and information sharing. It's an amazing thing in bringing people in around food, around community. The potluck series is a less formal than the benefit lectures. But it doesn't reflect the quality or the talks and lectures at the potlucks. They often are really informative talks. We've had faculty members give potluck lectures on their research. Some people will go take a trip and they've got travel slides they want to share. And people will say, "Oh, I want to see that. I'll go eat and look at some slides." Brett Hall now is the president of the local chapter of the California Native Plant Society. They had two meetings here. One of them was about the Scott's Creek Watershed. And another one was about a new book

that's out about California landscape plants that was written by Bart O'Brien and Carol Bornstein, again people in our community, from Southern California.¹⁰ The first CMPS talk co-hosted by the Arboretum brought in almost 150 people. We barely covered the parking. We get freaked out when we get fifty people here, let alone seventy or a hundred. I couldn't believe how smoothly it all went. We didn't think there were ever going to be that many people at a potluck! And considering that 150 people all brought potluck, enough of them brought potluck to change the food offered completely on the table three times. It was like: gone, gone, gone. The nice thing about a potluck is, it's potluck for everything. Potluck in helping clean up, potluck in setting up the chairs. It's great community building. It's brought lots of good focus in the Arboretum on the community itself because we're highlighting people and what they're doing, and travels. Gwen and Rodger [Elliott] will do a potluck when they come. That will be really fun.

Other Educational Efforts

Other educational efforts. I think I've talked about Steve coordinating that. We're looking at programmatic development, and through this assessment that I can talk more about in a few minutes, this Packard Organizational Effectiveness process that we're going through, education is a big part of it. And we're looking for building it into a program that's directed by, maybe Steve, or a director of education, around making our outreach more formal. Because there is a lot of interest in people coming here for educational purposes. There're a lot of things we can say, and do, and talk about, including conservation and sustainability,

¹⁰ *California Native Plants for the Garden* (Cachuma Press, 2006)

using the right plant in the right place and those kinds of things. But we're hoping to make that more of a program for us, more of a focus. There are plans in the future to house it here, and have facilities built around it, and staffing and all that.

Reti: Do you have plans for putting in a children's garden?

Harder: We've talked about a children's garden many times, and it seems to come into and fall out of favor. In working with the American Public Garden Association, and having gone to the last couple of meetings, children's gardens are something that gardens put in as a way of buying children's part in it. A lot of them are add-on. A lot of them are contained space. Very interactive. Sort of the state of art about how to engage kids and families about plants. And they usually are well done. But I'm not sure I really want that, a contained playground/play garden area around plants, because I think there's enough interest in the plants that we already do have to drive the kids traffic out into the garden. I don't mean to think of them as objects. But there're a lot of interesting things going on in the garden, not only with our collections, but also with native animals. We've got lots of gopher snakes, and we've got lots of things going on. Hummingbirds. The birding here is exceptional. It's the best place in California to see hummingbirds. There're a variety of different things that are really great things. We need to highlight that as an exploratory program of the Arboretum. I've got a good collaboration with people at the Exploratorium in San Francisco. They're interested in transplanting some of their exhibits to other places. So having an exhibit around plant physiology. For a children's garden we like the idea but are not sure how it will manifest itself here and be uniquely Arboretum.

As a graduate student at UC Berkeley, I went to the Exploratorium. A friend of mine's sister or something was married to a guy who did the exhibits there. So I had this connection within the Exploratorium and I went to visit there. I said, "Well, your physics and mechanics examples are great. But your plant physiology stuff is a bit weak and I know you could do a lot more. I would be glad to help you do it." I was a graduate student. Like I've got so much time that I could do all this other stuff. (laughter). I was confident I could help make plant processes and systems more understandable.

Reti: (laughter)

Harder: So I designed a couple of demonstrations for them and suggested a couple of things. I had been doing some work with the National Science Teacher's Association in Washington on looking at implementing hands-on science programs. My interest was really broad then, in how plants could be used to really get people interested. I spent time TA'ing for classes that were for general majors, not botany majors, and was able to turn people's minds towards plants and how important they were. Looking at how people use plants and the level of human dependency on plants and their products. There was a Plants and People course I first TA'ed then taught at Berkeley. We would essentially go to the grocery store and look at the spice rack and explore the produce section for materials for the lab part of this course. We would then display it all on the lab tables and say, "These are all plants. What parts are these? How are they used?" Years later I had students coming back from those classes saying, "Yes, I switched to a plant science major." or, "I found a way to add plants to my major," or, "After I took your course I wanted to do something with plants," or,

“I never went to the grocery store looking at everything the same again. I now look at what I eat, and what part of the plant I am consuming.” Those were really rewarding impacts on students.

So children’s gardens are perfect in bringing out the innate curiosity in people I think, and people at the Exploratorium believe too, that we need to encourage experiential learning, bring out that innate curiosity in people, where they’re not afraid to grab the plant: “What’s going on here? Is that a leaf, or is that—” And make it more familiar. Plants sometimes, or the study of plants seems to go to the laboratory and the clinical. It doesn’t have to. We want people to understand plants in the context of quality of life, but also the quality of habitat for other animals. I get asked: “What difference does it make to me if a plant goes extinct in a rainforest that I’m never going to visit? Should I care about the extinction of that plant?” You bring up arguments like humans are one species. And that plant is only one species. That plants’ demise is because something happened to its conditions and it’s gone now. Maybe it was on its way to going extinct anyway because conditions had changed, but it’s only one species. And so are people. One thing could change threatening the existence of all people, like one disease, or climate change. Or we’re all going to be concentrated in cooler areas, or something like that. Or that species could be essential to how the whole forest functions. There could be a pollinator of that plant that depends on it for food, and if that plant’s not there, another organism can’t complete its life cycle because it ultimately depends on it. And the whole forest, as a system, could be collapsing because of early extinctions. They could be indications that the forest is going to go. You certainly see that in Vietnam. You can’t extract species like

trees (laughter) and expect it to be a forest. Or we can't spray defoliant, 2-4-D or Agent Orange on an area and expect it to eventually be restored and re-vegetated. It's already changed. It's turned into a grazing area. It's never going to be the forest again. Because now they're grazing cattle in it and it's not going to come back. So those kinds of arguments need to come out of the collection and need to be part of the Arboretum's outward mission, outward interpretation to kids.

Plans for an Herbarium

Reti: Okay. Can we talk about your plans for an herbarium at the Arboretum in the future?

Harder: Yes. An herbarium's an idea, only because I spent eleven years as an herbarium curator, that I have come to appreciate the value of an herbarium.

Reti: At Missouri?

Harder: Yes. I see the value of an herbarium on campus. At the natural history museum, the herbarium up there is for teaching. Tonya Haff runs it. She's an excellent animal person and has a good knowledge about plants, but more interest in the animals. And animal care is very different than herbarium specimens. Dried animal specimens are very different than plants. We've often talked, and even in our future plans, about putting in a small herbarium here. One, to assume that teaching collection and take better care of it, just so that we can mobilize materials for teaching from here, and have that more available. The space up there is not great. Planning a better space to be used for the herbarium

so that people can use it and take the specimens out, use it, bring classes and groups there.

But also the level of species in Santa Cruz County is absolutely exceptional. There are 1500 species here of plants. And there is no place where that accumulated record of flora is anywhere. It's in people's offices who are now working on *The Flora of Santa Cruz Mountains of California* by John Hunter Thomas, the update of the original version of the book. Or the specimens are at the California Academy of Sciences in Golden Gate Park not practically available. But the specimens are not being properly taken care of. They have not been collected in correct ways; they're not being maintained in the correct ways. The Arboretum could be a center for the archive and information on a very localized flora that is of extreme interest, and can drive people here first to go see where the plants occur in the wild, look at labels, get collection information. I'm a natural collector, always have been a accumulator of artifacts (rocks, tropical fish, plants) so going after the plants in Santa Cruz County would be something I would love to spend the next ten years doing. I've got a small collection of herbarium specimens started, but I have no place to put them. I don't have a case and I don't have the right conditions. A library is the best place for an herbarium to be, because the specimens roughly want the same conditions as books, and they get affected by the same pests. But the Lane Library at the Arboretum is at maximum capacity right now. And we need to expand this as well.

So the herbarium is something we have for our future plans. We have one running and I know how to run one, and we've worked the last couple of years in standardizing collections. Not only will we collect a cutting from a plant, we'll

now also collect an herbarium voucher. So if we ever lose the cutting we can always go back and say: here's the plant, here's the label, here's the collection information. But we can [also] use it in building our own herbarium collection here, as a reference.

Reti: I don't understand what a voucher is.

Harder: Let's say you're going to go collect a plant sample that you want to analyze for anti-cancer, and you want bulk leaf material. You collect a bunch of leaf material from this plant. The voucher is a scientific specimen of that plant. So that voucher would be a branch with some leaves, maybe shoot tips, and then some flowers. If you have fruits too, you cut them open or you open them up. And you attach them to pieces of paper and they're on full cotton rag paper, archival quality. They're attached with cotton rag attachments. And then that can be actually cataloged, that specimen, and it will have an accession number, and you can write on the label the name of it, the authority, who determined it, where you collected it—that kind of information. But you can also say, "Is also source of this Sample Number 5868," or something like that. That allows you to always go back to what it looks like. You don't have to go back in the field to do it. You can say, "Here it is." And somebody down the road could say, "Well, that's not *that!* That's a completely different species. I'm an expert on this group and now my DNA study says—" This is fifteen years later and somebody might say, "No, that's something else!" So there is a sort of paper trail in figuring out what that specimen refers to. The voucher is a verifiable and permanent record and reference for an accession in the garden to a sample.

In Santa Cruz County this last spring because of all that rain, the last two years we've had exceptional rains in the wintertime. This last year even more so. I'm seeing things that I didn't see before and were not there in the past. (laughter) Including orchids near my house, the place I walk by with the dogs almost every day, and I know those orchids. Last year was the first time I saw flowers. This year it must have been thirty percent of the plants were flowering. Records here need to be over long periods of time. We verified the existence of some orchids that hadn't been seen for over a hundred years, down at Brazil Ranch, right near Bixby Bridge. When you go into Big Sur. We have a project with the National Forest Service, in the Los Padres National Forest. We have access permits to get into all those areas and collect, and we're doing inventories of rare plants, led by Brett Hall. We are working with Jeff Kwasney of the National Forest Service to verify the existence of plants in National Forest areas. We're re-visiting places that we visited two or three years ago this year, and finding something that we passed over. This year they're there! Where did they come from? They've been there! They've been struggling for decades to flower and have enough rain. It's amazing, the persistence of the flora here. That requires long-term monitoring of what's going on, and making collections all along of what's there. So that's the function of the herbarium.

Reti: Fascinating.

Harder: Yes, a lot of people don't understand the function of the herbarium even when you have six million specimens like at Missouri Botanical Garden, People ask, "Well, what do you use them for?" (laughter) It really is a way of re-creating records. It's a record of the history right there.

Reti: It's an archive.

Harder: It's an archive. It's a reference, like when new species are described and the designation of a type specimen. A single herbarium specimen is used as the source for the origin of the description. So anytime you write a description you need to reference this one specimen, so that if anybody in the future says, "Oh, I need to see this one specimen that Dan got in Zambia," so I can see what he is mentioning here or to verify a determination.

The Arboretum Library

Reti: Yes. And then in terms of the library that we're sitting in right now, how does that integrate in? I know you think of the entire Arboretum as a collection.

Harder: It's one of our main collections. It's the living plant collection. It's the book collection and references. It's a very targeted collection, a collection of books around what we have in plants, in what's going on outside. We've been members of different kinds of library groups, and the main library on campus refused to integrate us because we didn't have a librarian. I'm now part of this Council on Botanical and Horticultural Libraries listserv and have thrown out lots of questions to librarians about: does a library need a librarian to be a library? Absolutely every one of them says, "You cannot have a library without a librarian." That's really what our big struggling point is here, is the money for a library that's got 1200 volumes or 2000 volumes in it. But it also houses the Arboretum archives. In addition to those collections we also have an image collection. Bags and bags and bags of transparencies, 2x2.

Reti: Bags, literally?

Harder: Yes, bags. And boxes. Brett's got loads of them. Forty years of history. The McHenry Library maintains the history for the campus. The Regional History Project is part of this too. It's maintaining in the library the archives for the campus. But they don't maintain the archives for the Arboretum. And we don't formally have an archive. We need to make sure those records are maintained, press releases and all that stuff, and publications we've made. It's all squirreled away in drawers here and it's like, "Well, I know where some of that is." So we've actually begun to recognize the value of that archive and that history. We need to have it all here. Our library right now is run by a very enthusiastic volunteer library committee. Among all Arboretum committees, it's the committee that has the most members. The amount of tasks that the library has, because it's so small, is not a whole lot. I'd love to have some of the library committee members go to assist other committees. But there's passion about the library. And there are retired librarians. Mike Clark, who is, of course, the son of Donald Clark, the founding librarian here at UCSC; and Emily Clark is a great supporter of the Arboretum. May Clark, Mike's wife, also works very diligently at Norrie's. Mike is the lead volunteer here at the library. I think he likes the scale of it. I think he likes what he's able to do here. He's improved the accessibility of our database, and also is ready now to formalize some movement on behalf of the library to integrating it into the McHenry Library. Now there's a new librarian there and they're talking differently about integrating us, and us being searchable through the McHenry Library and Melvyl, of course. We're ready for that. We're completely compatible and ready to go. We just need a librarian. I

really think we need a librarian. That's one of the priority hires for the Arboretum, is eventually getting a part-time or full-time librarian.

Reti: Someone who has experience in archives, particularly.

Harder: That's right. Someone who can help us deal with the ephemera. How do we handle this material, and what's the best way to take care of it? [As] part of our IMLS grant, which did an evaluation of all of our collections, two consultants looked at living plants. One consultant did the library. One consultant did our image collection, and suggested ways of improving the situation for each of those collections, and bringing it up to industry standards. So we've got three independent reports that are all going into a final report in October, integrating the Packard Organizational Effectiveness stuff to reflect the priority of mission for the Arboretum, priority of collections care. We've just hired a facilities manager, and we've just hired a full-time assistant to the nursery manager, because those are priorities that the IMLS evaluation came out with, saying, "You guys need to deal with your facilities, interface with campus better, have somebody responsible for the non-state buildings here," working within regulations, of course. And one of the top suggestions was, "Get a librarian," so that's one of the things we need to do.

Another thing we don't have covered is protection of the data around the collection. We need a database person, a plant records person, who not only could assume the records for the collections of the plants and the seeds, but also could develop the herbarium and also could do the library. The library would

not be much backlog for a simple database. It's already in a database, but we need somebody to manage it.

Our plans for the library is to bring it front and center in our new proposed visitor's center concepts and ideas, and things we've talked about, is to bring the library right to the front and, have a publicly visible and visitable place. There would be public terminals, with reference collections behind. Not limiting access, but protecting the resource. And bringing that just near where people would come in to the Arboretum, and opposite of where people would meet, and bring some of these fantastic books that we have here.

A lot of books we get through trusts and wills. The Blakey Trust brought in an intense interest in hummingbirds, and lots of great, seminal works on hummingbirds. But also have John Coulter's comprehensive collection of early *Eucalyptus* literature here. Through the CBHL listserv I've been able to garner other reference collections given away by their libraries. From the Arnold Arboretum at Harvard we got an entire listing of copies of the Torrey Botanical Club, which are reports of the Society of the Torrey Botanical Club, and a great reference for anything in California, references to Mediterranean plants, introductions of plants. I've got those six boxes sitting in my office because we don't have any place in here for them. (laughter)

Reti: Wow.

Harder: But bringing donated books. We have a process to go through the books where, not all the books are in the library here. Some books can also be at curator's desks, which is something else that we implemented when I got here.

The library's not going to take any more books, no space. The library committee can't deal with what are we going to do with more books. So I said, "Well, let's count the books also outside, and people can keep books at their desk, and those can be part of the main collection." The curators have an opportunity to look at duplicates and decide on books to go in to the main collection. Steve McCabe and I do most of that. But bringing the curators' libraries into it. I mean, we wouldn't be able to fit them all if they brought them all back. But it's also expanded our holdings, underscored the comprehensiveness of what we have book-wise and reference-wise, enhanced the utility of the books for the curators, and allowed us to build the collection up, which has been a great thing for us. And not refuse books. I mean, that's really hard to do, especially when people have a dying interest in having them come here. It is hard to tell the family that we're not going to keep them.

Sustainability

Reti: Can you say more about the Arboretum's efforts to promote sustainable and responsible actions of regional citizens?

Harder: That's interesting. I think I mentioned in the last interview that I was a chair of the APGA last time, and front and center to that was sustainability. In our discussions we found that a lot of botanical gardens already do it out of necessity. But we brought to fore in our discussions, that not only is necessity part of it, but it's an obligation to be an example of how to live responsibly on the planet, not only for conservation or respect for life, but also for sustainability of the way we live, and how we live.

I spent a long time in St. Louis trying to visit schools, usually fifth grade or fourth grade classes, where I would visit the classrooms and try to get kids, inner city kids, to connect to the source of where their food comes from. Pointing out that the rubber in their shoes was originally from tropical rubber trees and had this whole history. They built an industry, essentially, around driving cars on rubber. The wood in their pencils. I would look for examples in their classroom. Cotton in their shirts and clothes. These are really important issues in that the cotton industry not only is good for making clothes, but it also ruins the environment because it's one of the crops that's most sprayed, and leaves most environmental damage. Is that such a good thing to do even though it feels so good and it's so comfortable to be wearing? Maybe cotton should be sourced from other ways, and maybe alternatives should be looked at, like hemp or things that are not so destructive to grow in the environment. You know, those kinds of things. It all comes down to when you make that choice. But bringing food into it and human domestication of food crops, into these classroom situations intensifies the discussions. I would ask, "Where does your food come from?" In the Midwest you have a garden in your backyard but it's only during the summer. You get some tomatoes out of it, but where does the store get all the other vegetables and products? I mean, do you have a say about where that came from, or who handled it before you got it? How was it grown? Was it grown in a plastic bag and were pesticides used? These kinds of questions. And then, because I was a field collector, I used the opportunity there to say, "Okay, this is your world you live in. This is the source of your food here in St Louis. But let's go to Congo. Let's take a field trip to Congo." So I'd bring some slides and I'd say, "Allow me to show the equipment I use," like pole clippers and a press, and

how simple it was to go do the job I was doing, and how the technology is really low tech, unless you use GPS and laptops, which came in very late in collecting plants for me. And Marantz tape recorders (laughter). But beginning to let them think about, "Okay, I'm not going to have those things I am used to and when traveling I will have to look elsewhere for finding food. There're no places you can go to go get food, except a local market (I would show a picture of a market) This is where you have to go. The food you buy comes from that person who grew it, and they're selling it. That's it. It's a very short distance between where the food comes from and where it's sourced. And if that link is gone, if that person is not growing tomatoes, or all those tomatoes are gone, you're not going to have any tomatoes." Then I showed them what kind of food we'd be eating. I actually took pictures of plates of food. And I showed the students: we're going to be eating smoked fish and we're going to pick it up when we see it, because we're not going to be sure that there's going to be a place to even get any food where we're going. And I showed pictures of food that we'd be eating, not to disgust them, mostly, but mostly to get them to think about how these people that we're working with in the areas that we go are depending on themselves for their food. In the US and developed countries we depend on somebody else. Not only depending on them to sell us the food but also that they used proper methods in growing it, did not overdose the plants with pesticides that might make us sick, and we trust them to supply us with what we expect. In developing countries we allow others to make many of these choices for us. The growers make choices that insure that they will make enough from the sale of their goods to live. They are not necessarily making choices to safeguard us. They're making choices because they need to live. In the US we're making

choices because the Air Jordans look better than the Nikes, or some other brand of shoe. The choices that we make are sort of ludicrous compared to people at sustainability levels. So that these types of questions brought up the issue of sustainability and equity. People at the sustainability level work and expend their energies to have the basics, food, shelter, clothing. That's all they work on all day, is making sure they're living to the next day. If they can make a profit out of selling something that they've grown more of, or are skilled at something, that begins to bring in money and that allows them to have some flexibility in choosing. But people living at sustainable levels don't have that freedom.

Those kinds of choices need to be also implemented at organizational levels like the Arboretum. Okay, so what's the implication if that guy who just cleaned the bathroom dumps the waste on the ground outside, or dumps it down the toilet, or dumps it in the drains that drain out to the ocean? Those are the kinds of things that we need to not only show what the results of the action is before the action happens, but also give them alternate choices which are just as good. There are choices such as I can grow a *correa*, or I could grow a rose. If I grow the rose I'm going to have to spray it. I'm going to have to feed it. I'm going to have to water it. Growing the rose will require more attention and more costly inputs to keep it happy. On the other hand, I can choose to grow a *correa*; very beautiful, very disease resistant, economical with fertilizer and especially water. With the *correa* I might be just as happy with it. Do I need to frustrate myself with a rose? Roses are more difficult to grow because the bugs love them, the plants are weak and they're not growing in the right place. So it's those kinds of choices, even in our gardens that can make a world of difference as to impact on our lives and on

our planet. For example “Okay, if I’m watering this plant not only might I be wasting water because it’s requiring a lot more water. But I’m also washing all the food and waste and fertilizer that’s not getting into the plant into the water stream and it may go into the bay.” You have to think about downstream, what your effects are, and your choices. It can be a proactive choice, and it can also be a choice that affects individuals and systems downstream.

Those kinds of things came out of our meetings with APGA people. In San Francisco, of course they have the Department of the Environment, who are very strong and well supported. They want to help city organizations implement zero waste strategies. San Francisco is a leader in it. It’s easy to do. But the University of California Botanical Garden at Berkeley is one that works within the university structure. So there’s a lot more waste. Because waste is taken away and dealt with as a campus program. At the Arboretum we have people pick up our recycling; we have people who pick up our waste. We don’t necessarily pay the bills for that service. It’s just part of servicing this unit. We don’t have a choice about that, because we are part of the university so we are limited in making these choices. But we can certainly make choices about what comes in and what goes into that waste stream. So all of the Host Gardens for the APGA conference thought about that. It actually brought us all together. Filoli also was one that considered their choices about sustainability. Now they’re looking towards different strategies for becoming sustainable. We need to be examples of that and promote our choices to the public. Not only do we need to be examples, we need to be models of how people can have low impact on the planet but have a positive result.

We had a contractor who wanted to install solar panels on the roof of Hort II and Hort I in 2004, 2005. We estimated that the size of the array that would easily fit on the roof of Hort I and Hort II could support all of our electrical bills. And a contractor was going to put it them up for gratis so he could put his name on it.

Reti: Wow!

Harder: There were such incentives at the state that it would have cost us minimum to put it at a state facility and use it as public promotion. We wanted to put a kiosk on the side of the building showing how many watts are being generated and how many would be saved, and how much is going back into the grid. Those kinds of demonstrations, so people could say, "Hey, solar is working here and solar works easily here." Just as we began to move forward with funding and commitments, the campus came in and said, "Oh, no. We want to have a solar project. You can be part of it." So we submitted the same proposal to some campus people for potential Office of the President funding. Some buildings on campus were going to be built, a parking lot. They were going to put some solar panels up there. Bob Dunn (of UCSC) said, "Oh, no. You guys can be part of it." Well, they bid it out to an independent contractor to do all the work. After considering the proposal the contractor said, "Well, why are we doing this Arboretum piece? It seems so separate and so different from what we do on campus. And it's going to be a little bit more work to do the Arboretum because it's a self-contained, independent unit." So we got aced out of the program then and there. The contractor indicated the incentives weren't there anymore and he wasn't going to do it. He said we couldn't do it. I had donors already in line to pay for the thing and they said, "What happened to the solar

panels?" Bob Dunn, who was the energy guy on campus, spent years banging his head against the wall to try to get this to happen here at UCSC and he retired never seeing solar on campus. And gosh, the Arboretum could have done it! It would be here and I'd be so proud of it. I'd love to have people come in here and say, "Gosh! Look at these solar panels. Right here!" You know? That was the big issue for us. We could do it in a big public way. And on the side of UCSC, we could do it in a very public way for UCSC. Look at the sustainability efforts we're making here. We had the Student Environmental Center behind us and they're like, "Yes, that's a great project at the Arboretum." It would have been fifteen thousand dollars max to do it all for us. I (sigh) Now we are back trying to get that going. But the incentives are going away until the governor actually embraces this direction. He's approved the first stage of it, for the incentives, the rebates and all that to come back.

Reti: Right.

Harder: So we're hoping it can happen in the future. That's part of our example of being a model, and walking the talk, and doing the right things, choosing what we do and what we choose to provide.

Collaborations with Other Campus Units

Reti: And of course you're right next door to the Center for Agroecology and Sustainable Food Systems. I was wondering what your relationship is with them. Have you collaborated on any projects?

Harder: We have on some things. We collaborated on some South Campus issues. The historic district, and the Campus Natural Reserve, the Farm, and the Arboretum are all represented here on this lower terrace. We figured speaking with one voice and talking together was really a good thing, particularly with the LRDP coming up and possibly having connected plans for development. Maybe the land is going to be divvied up. Some of the Farm has been conceded to housing projects. Organic land is hard to come by, and it's devastating to actually remove some of that land from production, particularly with its significance to the Center. But the Center hasn't raised any opposition to any of the housing, or been vocal at all, even in a public way, about it. They also have state positions that are being paid, and those positions were created because of that agreement not to oppose the loss of that land. But the two units (the Arboretum and CASFS) are administered differently. We're under the chancellor and they're under the social sciences division. And the director, Carol Shennan, is a great researcher, but a part-time director. Being a researcher, she's going to be evaluated by her peers on her performance in research fields, and publications, and her advancement is all predicated on how well she does that way. So her directorship is not primary in her mind. I think they need a full-time director there to really make the Farm run effectively, and interact with other units effectively. Because there are circulation issues; there are mutual impacts of housing that might go in. There are enhancements to highlighting all of these things, to orienting people. How are we going to get people through here? What paths are they going to use, and how do we want them to go so that they see all these things and can have access to them? Earlier we had some discussions with CASFS about a visitor's center and what were they thinking, and where were

they thinking of putting them, because maybe we could complement and have a shared facility. They don't want to have a visitor's center on their site. We do. They don't want to entertain visitations in a way more than what they're doing now. So they wanted to use our visitor's center and assume parking over here. That would be okay, to orient people here to go to the Farm and provide some pathway over there. It's not that far. It's a couple hundred yards from where our proposed visitor's center would be to a welcoming kiosk at the Farm, and then they could do their visitor orientation right there.

So we're talking about things. We don't get together enough. I know the Farm is now doing some planning processes with campus, as something that was offered by campus, I believe, as part of the better deal they have than the Arboretum. (laughter) But the campus planners are putting some effort into dealing with apprentice housing, because of the apprentice program is now housed in tents.

Reti: Right. The tent cabin project.

Harder: Yes, it has been run this way for years and the campus has effectively looked the other way. The campus is now facing the reality of the importance of the apprenticeship program and now encouraging acceptable housing for the apprentices. The great thing is that in their planning at the Farm and over here they're considering housing, staff housing on -site. We want housing here also, for a couple of staff members, as well as providing housing for interns and supporting internship programs. We realize it's almost impossible to bring somebody from Pennsylvania, or somewhere else here as a student and expect them to make it work in the community. If we ever want that kind of internship

(the kind that got me interested in botanical gardens in the first place) we will need to provide on-site housing for the interns. I think internships are rewarding and great to have as a student. You've already practiced it in some ways, and it really pads your CV for jobs. It was such a great experience for me. I want to get to that point where we can provide student housing in a way that, "Yes, we'll just give you a house. You can stay here."

Reti: Oh, that would be fabulous.

Harder: Yes. And not have to deal with the housing market in Santa Cruz, because even if you rent a space on campus for these people, it's expensive. So that's a good thing out of it. We're proactive about housing and what's going to happen. We've been getting a vision of what the future of the Arboretum could be.

Art in the Arboretum

Reti: Today is July 26, 2006, and I am here with Dan Harder for our third interview at the Arboretum. Dan, why don't we start today by picking up on some of what we were talking about last time about various programming that you have been engaged in here as part of outreach to the community. And Art in the Arboretum is not something that we had had a chance to talk about.

Harder: It's something that we don't do any more, actually. Art in the Arboretum we saw as a way of interacting with campus faculty. Mel Wong was a big part of that whole interaction, and Frank Galuszka and other people, in highlighting faculty and student research here at the Arboretum, using the Arboretum as an

outdoor and indoor venue for that. The three years I was here I was always questioning how much work we were put into hosting that event, and coordinating it, and wondering whether student artwork was going to be completed in time, and us pushing on deadlines for artists to finish their work. It wasn't the ideal situation. It was a lot of staff work time for the Arboretum. Good exposure, because we all feel unanimously that art does fit in with gardens and with the Arboretum, but too much distraction in time away from the collections and their care. It's a highlight function, and right now we're working on a way of developing a policy to display art in the Arboretum, but never permanently. I always see art as ephemeral, sort of like a flowering spring, where there are flowers around for a while and then it goes away, or it's moved, or it's changed, so that people are always seeing changes in the garden. We have an art exhibit in there now.

We took all the positive things from Art in the Arboretum and dissected it out into a variety of different things. One of them was the music series. People liked having music here. It seemed natural to bring people here for that type of art form. And engaging people around music and art was still something in the forefront, because there was a lot of interest in our volunteers in our community around the display and use of art. We worked with the Cultural Council to see if we could fit into Open Studios by providing a sort of studio space for people who don't have visible studios on those days. We're still talking about the possibility of that, being part of that whole thing. Because not everybody has a place to bring a crowd of people, or entertain them, but there are some good

artists who do that kind of work in little sheds off their garages, so to speak. So we're still working on that.

We also have enhanced some other events that take up some of Art in the Arboretum. Like Hummingbird Day has now turned into our annual open house, where we have targeted programming for children, but also engage around the fact and celebrate the fact that the hummingbirds are here, and what a great site it is for hummingbirds, and why is that so. Of course, it comes off of the collection.

So we looked at Art in the Arboretum as an event. We took it apart and put it into places where it fits into our mission more closely, using the energy around Art in the Arboretum and art in our community to engage people. But we're still exploring ways of doing that.

New Zealand Day

We hosted a New Zealand day last year in the spring and brought about 2000 people here. We had Maori singers and got a grant from the Christensen foundation, and worked with New Music Works as a co-host for that event. That was great. Highlighting the New Zealand garden and brought over Jack Body, a renowned composer, worked with Richard Nunns on endangered bird vocalizations and integrated them into the collection and played them through loudspeakers on the day. And then we produced music and food for that day and had a Hangi where we cooked food underground and fed 400 people. (laughter) It was really quite an event. But that was directly off of our collections. It highlighted exactly what we do—the diversity of New Zealand, and diversity

not only in plants, but music, and composers, and art. It turned out to be a great, balanced event and we're continuing to think about ideas for Australia day and South Africa day. We engaged with the consulate service in San Francisco to do New Zealand day, and the General Consul was here for the day. So it was at a fairly high level. And it was a chancellor's-level event as well. That event went really, really well for us. It's part of our conservation series of programming around specialists, and lectures and symposia, which fits right in with our mission as well.

We're working on a variety of different kinds of annual events, including our plant sales and enhancing those, and bringing more people here. Norrie's open house is a fairly popular event as well. We have a barbeque for our members. We realized when I started here that we weren't recognizing members and we weren't really thanking volunteers. So now we have a volunteer luncheon that we have for all volunteers, where we introduce new volunteers to the old volunteers. It's sort of a luncheon-style, let's-meet-everybody event.

Interweaving Cultural and Biotic Diversity

And then the other event is the Arboretum BBQ. We have some music, and we BBQ in different parts of the garden to highlight to the members the different special places in the Arboretum. We've had two in Australia, one in New Zealand, and this year is in South Africa. Those events are great. They're for Arboretum members, but we have a standing policy with Arboretum events that if you're a member bring a friend, and that friend can get in also. So it's a way of building community.

Reti: What you're doing with New Zealand day is such an amazing opportunity to interweave cultural diversity with biotic diversity. Is that part of your vision for the Arboretum?

Harder: Mmm, hmm, trying to showcase the context with which these plants exist. We're thinking about that as with our interpretive kiosks in the garden. There are architectural styles of each of those countries. If we can bring across some of that stylistic consideration in our interpretive kiosks, like a Maori longhouse, or a rondavel building for South Africa, or an outback building for Australia—those are cultural pieces that would root the collection, and use those as places to interpret the collection, the flora, from those kiosks. I think that's a great idea, and I think they would be great additions to the garden, and also in interpreting the collections, and why we have collections from these areas.

Not only does the Arboretum have a great collection of plants and a great display of plants and how they're displayed in the garden, [there is some] surprise from Eastern gardeners that we don't have to cut our grass more than once a year because we don't water it. It isn't that it's not green. It's only green in the wintertime. The garden has a very different feel at different times of the year, as gardens should. But being mid-summer right now, you know, it's wintertime, everything doesn't have enough water to grow, so everything's stopping. So you see deciduousness now, and leaves coming off, and the garden changes.

Native Animal Habitat

So we've actually, from the collections themselves and how we've displayed them in the garden, we've created habitat for native animals and species that we

take some stewardship over, including the Ohlone Tiger Beetle. We have habitat that's suitable for Ohlone Tiger Beetle, but we don't have evidence of its occurrence at the Arboretum within the last ten years. But within the Ranch View Terrace site, as well as the jointly managed area, there are soils that are deep enough and the right kind of soil, Watsonville loam, to allow the tiger beetle to breed and live there. So in our plans are putting in monitoring plots for Ohlone Tiger Beetle, which are simply 3 x 3, or one meter by one meter scraped ground. They use scraped ground as a way of landing and taking off, and plants get in the way, apparently. So they look for these areas, and that's what you use to monitor them. So in our plans for the jointly managed area we're putting in monitoring plots for the Ohlone Tiger Beetle in the hopes that we can record it.

Another animal we have on site that's federally listed is the red-legged frog. Of course, the Arboretum maintains the infamous Arboretum pond, which is the Central Coast's best breeding habitat for the Red-legged Frog. It's a fairly closely held secret how to get to it and access to it, but it's very easy to get to and visit while you're at the Arboretum. But it's a viable population that impacts everything the Arboretum does, anything upland from the pond. Brett's house is in the upland site, everything within, I forget how many meters it is from a breeding location, but red-legged frogs are known to hop two, three kilometers from their breeding pond to find other breeding sites. It's no surprise that they're found in ponds and watering troughs, or where hoses have been leaking on the ground at the Arboretum. Red-legged Frogs are part of the operation here. And the reason why they're there and viable is because of the habitat we've provided for them, by providing water to the pots that trickles down. The red-legged frog

hangs around a lot, doesn't go into hibernation as soon at the Arboretum. We have red-legged frogs that we know fairly well (laughter) because they're always in the same spot.

All the other animals that we have: deer, mountain lion, coyote, bobcat, hummingbirds, of course, are all part of the experience at the Arboretum, and we feel very strongly that they're here because of the plantings, and the garden, and the way the area has been maintained. We have viable populations of gophers, and ground squirrels, and rabbits, but they support a healthy population of coyotes. There was a study published by a campus researcher, Terry Williams, last year where they collared a coyote out the back gate of the fence, radio-collared it, and watched how it moved for the next eleven months. And essentially it moved from Family Student Housing to the back gate of the Arboretum to feed and live, and didn't do long wanderings, which male coyotes are known to do. And as a comparison, they also radio-collared another coyote which walked miles and miles and miles to go to the dump and found scrap food. And the coyote that was visiting the back gate of the Arboretum and Married Student Housing was obviously living out of dumpsters, and taking advantage of the fact that we have contained animals that are easier to catch because it's fenced in here, and they have adequate food. So the coyote was taking advantage of the abundance of animals there, which are a challenge for us as they are detrimental to our collections, but in other ways they are really an enhancement for the garden. Lizards, of course, snakes—the whole biology of gopher snakes and gophers are a big part of the operation here—and

understanding that we're providing habitat. But we're constantly monitoring how they affect the collections.

Reti: Because they eat the plants?

Harder: Mmm, hmm. We have to take extra care. We put everything in cages, like we suggest everybody do, and we also fence against early rabbit damage. But if you think about Australia plants, or plants from South Africa where there are grazing ungulates, and in Australia, of course, kangaroos—they're grazers—and in the end the plants are adapted to prevent grazing on the plants. So they never hit the Australia collection, and they barely like the South African collection. They like the New Zealand plants because there are no defense mechanisms in those plants, because there are no mammals in those islands.

Reti: Ah! Right.

Harder: So they're very palatable and easy to live off of. We find that we're really proud of that conservation stewardship of those animals around this site. And we find a lot of people are engaged about the animals here, and how viable those populations are. So not only are these animals important, we also have an active hummingbird monitoring program, a monarch butterfly census program, which occurs in the Eucalyptus grove, and a long-term study on Golden-Crowned sparrows. Many people don't know that the Eucalyptus grove in the Arboretum is a secondary over-wintering site to Natural Bridges [State Park]. Oftentimes when the coast population is low, the population at the Arboretum is high, because of the inclement conditions that are at the coast, and vice versa. So we get a lot of sub-locations around Santa Cruz that have enough Eucalyptus

around to support those populations. We've had counts between forty and sixty thousand monarchs here in any given year. As well as in the last three years we've initiated a butterfly monitoring survey that is run by volunteers, and they're trained in verifying and identifying butterflies on the wing and landing. Last year was so much better than the year before because of all the rains, and we're expecting a huge turnout of butterflies this year. Just from my own observations, I've noticed lots of different butterflies this year, large numbers of ones I recognize. So that feeds into state census data, a very important thing to be involved in. There are some very active volunteers doing that.

Another interest in the Arboretum as a collection is the enhancement of native populations of bees. Native bee populations are enhanced and maintained within urban areas (this is a study that was done at Berkeley), but native bee populations are maintained because of the diversity of plants in their gardens. Berkeley has long been a garden city as well as interested in introducing new plants to horticulture. So there's a lot of interesting diversity in Berkeley. You'd think urbanization would lower the incidents of native bees, but it's the plantings that people choose to put in that enhance native bee populations. And Gordon Frankie is coming here today to talk about his work as a graduate student looking at native bee populations in Santa Cruz. He's finding that the city of Santa Cruz has the highest level of native bee populations anywhere he's seen in California, and maybe the highest in the state, because of the diversity of habitat and the diversity of plants that we grow here. Part of his study is centered here at the Arboretum and looking at native bee populations here. He

suspects, and has already begun to find, that native bee populations are enhanced around the Arboretum because of its diversity in collections.

As wildlands become more precious, and wildlands become more impacted by humans, that's going to have a huge impact on whether we reduce diversity in those forests, or we increase diversity in those forests by invasive weeds. All wildlands eventually will be maintained as gardens, because they will be impacted so much by humans. And they still are. You know, invasive weeds. And so think about what gardens really mean, not only for our own enjoyment and our own edification, but what they really mean for native populations, and where we should be looking for native species that may have been lost from wildlands. They might still be in our urban areas. This bee study is fascinating. We are going to continue to work with any opportunities we have.

We also have a bird study here on Golden-crowned Sparrows, looking at their feeding behavior and socialization within the Arboretum. That's a three- or four-year study now, mostly just looking at Arboretum populations. Faculty and students are invited, of course, to come here and investigate what they could do here, and different kinds of things. We're available and nearby, and I think a lot of people don't even think about the Arboretum as a possible site for a field station or a field site. But there are some interesting things coming out of that, and not necessarily directly from the collection itself.

Norrie's Gift Shop

Reti: Let's talk about Norrie's Gift Shop.

Harder: Norrie's Gift Shop was started with a gift from Elspeth Bobbs. It was an opportunity for volunteers to raise money for the Arboretum through selling artifacts and things produced from the Arboretum's collections, like dried wreaths and swags. It was a really enthusiastic group of volunteers who began to put together the Dried Flower and Succulent Wreath sale, which is a fairly popular sale that we have in the fall before the holidays, selling Arboretum products that are produced by a volunteer corps of people. We have a joke. We often ask about, "Are you a dried person or are you a succulent person? Are you working on the succulent wreaths or are you working on the dried wreaths?" (laugh) All through the year the group of people pick up things from the garden—dried *banksia* pods, and different kinds of things—and dry them to get the color, or leave them to dry naturally to get the color that they want, and then they integrate these into wreaths. Hot glue guns and wire are very instrumental in getting those things all put together. We raise a good amount of money every year. Chancellor Greenwood was one of the best customers. She'd come down and buy ten or fifteen wreaths. (laughter)

Reti: Wow! Fabulous.

Harder: Yes, so they were a very unique product from the Arboretum, very unique in that you can't find them anywhere else, just because of the abundance of material. Norrie's started with an idea, sort of a roadside stand to provide a place to buy these products, and then Elspeth Bobbs provided a gift in honor of her daughter, Norrie, and that started Norrie's as a retail business.

When I came in 2001, Norrie's was run by a part-time staff person manager, and that person also oversaw all of the operations through Norrie's, and coordinated the volunteers. When I started, I was confronted by the Norrie's volunteers. They said, "We want to be in charge. We can do it ourselves. We don't need to have this close oversight by staff, because it's sort of ruining the energy around the original Norrie's." I said, "Well, what are you proposing? Going back to doing all the buying and running of the shop?" They said yes. So Madeline Kaufman and Kathy Cairns and other people associated with Norrie's formulated the volunteer Norrie's group, and they do all the buying, and they do all the pricing, and the merchandising for Norrie's. They keep it stocked. They go to gift shows and they buy stock for Norrie's. They also keep the calendar for volunteers. And now Susie Bower on staff only oversees and manages how the money is handled, and making sure it's deposited right, and making sure that we are buying things without tax, and we are taxing when we sell it—those kinds of considerations—rather than overseeing who's filling what slot and whatnot. So far it's working great and I think it can continue as long as they continue to apprentice new volunteers into those positions, because not everybody sticks with it forever and we want to keep it going. But Norrie's is a nice operation. We had close to \$170,000 in profit last year.

Reti: Wow. That's fabulous!

Harder: That's profit alone. It's a reflection of the people who work there, what's offered there. We've tried to put a mission-related emphasis on what's produced there, and tried to look for sustainably produced products, or things that are respectful of the resource that they're using, and not using the wrong kind of

labor, and being a little bit more proactive about what we're offering. But the eclectic nature of what's there really is what comes through when you visit Norrie's, because there's always something for somebody's interest there. It's amazing how diverse that little tiny shop is, and how productive it is, and profitable.

Reti: Yes, I love going in there and finding little special things you can't get anywhere else.

Harder: Mmm, hmm. And we just think it's the perfect place for a coffee shop, right next to it to keep people around. That's one thing we don't offer, and we haven't asked any questions about it [in this oral history interview], but offering espresso and coffee, or just pre-packaged muffins in the morning, or around lunchtime, sandwiches or something like that, so that people either have to come before lunch and then leave at lunch, or they come after lunch. It would be nice if they came at ten and stayed until two, and spent a little more time around the center of Norrie's, and eating their lunch there. We've added picnic tables to get people to spend more time here. Giving some people some refreshments and coffee would be great. And we also see that as a function for students, too, enticing students down here, and faculty, to come to the Arboretum for a coffee break.

Reti: There's nowhere around here. I mean, you have to go to 7-11 [on High Street] to get food!

Harder: Mmm, hmm. We'd just be up the road a little further than 7-11.
(laughter)

Reti: (laughter)

Harder: Yes. It could be really nicely done. Either looking at enhancements to Norrie's like a patio and adding a coffee/sandwich cart there. We've talked to a couple people about coffee carts. Or, in the new visitor's center, we're envisioning having a cafeteria there, or a place where we can have a nice menu that's sustainably produced and of high quality could be a great boon for this campus, as well as the Arboretum, in engaging people in a different way: "Let's go have supper at the Arboretum. They have a good food there." What a perfect thing. So there's lots of energy around that too. We hear about the coffee thing more than anything else. "How come you guys don't have coffee here?"

Reti: We finally got a coffee cart at McHenry Library this year and it was this huge thing. "Coffee at the library. We need coffee!" That's what the students kept saying.

Harder: Mmm, hmm.

Reti: But food's a good thing too, especially sustainable food. Well, maybe that's a good segue into some of your long-term plans.

Long-Term Plans and Visions

Harder: Okay. A lot of things are coming together for the Arboretum now. We've been fortunate to garner some grants that are helping us understand how we are doing maintaining and conserving the collection and how we can best move forward as an organization. When I started in 2001, I think I mentioned we had a Packard grant that was supporting us for three years—

Reti: Yes.

Harder: —which was really great. And then because we had that Packard grant it qualified us for some Organizational Effectiveness money, which is a special subset of Packard support that allows fundees like us, people who receive Packard support, to become more effective as an organization. We've had several grants, including the IMLS grant, which is very much a qualifying grant, respecting the fact that the Arboretum has such a significant collection. IMLS's focus is to maintain all museum, library, and botanical garden collections, maintain their value for supporting a nation of learners now and into the future. Essentially maintaining their value and understanding what that is. So IMLS granted us support to do a conservation program assessment, which is essentially an analysis of what our collections are: the plant collections, the seeds, and then the library collections, the archive, and then our image collection of photographs, mostly historical, but cultural also. Understanding their state, what's the priority to get that collection up to conservation standards of the industry, like our seed collection, and like our living plant collection—how do they compare with other standards, other gardens; how are they doing? So you bring in outside consultants and they do the survey, ask lots of questions. We convened a bunch of groups of Arboretum supporters to provide answers. And IMLS, each independent consultant, two for the plant collection, one for the library, and one for the image collection, made reports, and gave us essentially a list of the things that we need to do and need to prioritize to get things up to standard. For the library, it's hire a librarian, expand its space, provide better climate controls, and look to on-line sourcing of books and periodicals relevant

to the collections. All of these were key concerns in the findings and reports. It allows us to look at all of the things we need to do and put them in priority for fundraising and for organization. The result of the IMLS grant is the *Collections Conservation and Security Plan*. Mostly just keeping the collections together, adding to their value and maintaining their value. Data has a lot to do with that, and how valuable those are. Not necessarily to get a monetary value on it, but more maintaining their ability to be used effectively for teaching and keeping people learning, lifelong learners as well as K-12 students. That's very important to IMLS. And once we go through this process, once we've produced this plan, within the priorities that we propose—what we can do for free, what we can do with extra money—IMLS will be responsive to those requests of urgent care for certain collections. We've seen results out of those surveys already, in hiring a facilities manager and hiring an assistant nursery manager. Just in the last month we hired for two full-time positions in the Arboretum. It was amazing because our community has not expanded staff-wise in years for full-time positions, except for the Arboretum's first Development Director, Tad Sterling. But also now we have real collections people (curators/museum scientists) that are enhancing how the collection is taken care of.

Reti: And that funding came through IMLS, or through the university?

Harder: It was justified through IMLS. The support came out of existing Arboretum funds and not from the University. And we used the recommendation of IMLS and just said, "We need to create these positions. We're raising this much money already. Next year we anticipate to have, given what we've done so far we expect to have raised this already." And some of

those positions were part time or covered by student workers so the support was effectively there. We simply made some of these appointments permanent, limited appointments. So we weren't adding to our budget burden just reallocating what we already had. With these positions there is the advantage that we have full-time people working on the collection, which helps everybody in taking some burden off their work.

So the IMLS support helped develop the strategic plan, and then the Packard OE money is supporting two other consultants, a landscape architect, Ron Lutsko, and Gary Stern. Gary Stern is going to be doing a Peter Drucker process, adding the five Drucker questions about: who are our customers, how do they value the Arboretum, and how can we increase our value, given what they say, outside people say, our constituency says about the Arboretum. The process work that Gary's using, and Gary is the one who actually did it with the UC Davis Arboretum, where they engaged their community, engaged the administration. The Arboretum at Davis became understood as being the center point for visitation to the campus. So now they have a new priority, a new mission, and everything fits together. They have an understanding of what the landscape is that they're working in and how to make it successful, even knowing what it is. The process with Gary starts with an environmental scan: talking about what are the demographics of the region; what's the ethnic makeup; what's the proposed expansion plans? The LRDP for the campus is really important in all of this. All of the data associated with the LRDP is fresh so it's easy to get. What are the incoming student numbers? What's the graduation rate? What would that mean for the Arboretum?

And luckily at the time, about the same time we got the IMLS, we convened a planning charette that was facilitated by Mathew Thompson, who is on our board, and is a local and prominent landscape architect. He facilitated this charette as a way of getting ideas from the community on how we might build and develop our facilities in the future. We had a great response. Seventy, eighty people came to the charette. We broke it down, talked about space we might need, the kinds of things we might do, how much space would that require being built or reconfigured—lecture rooms, herbarium, expanding the library and visitors center, a new perimeter fence, new irrigation system, staff housing , horticulture facilities, student and volunteer work spaces, a cafe, new lecture hall, community areas, etc. We scoped and justified all the building projects things that needed to go into our LRDP, so that we could be integrated fully into the long range development plans for the campus when it went for approval by the regents. I mean, we didn't know what we were doing, but essentially we knew we needed to say, "We want this many numbers of new buildings, and they're going to be this size." We put together a narrative to help understand what might go on inside them, where we're going to place them on the grounds—it was all part of the exercise. We ended up with some ideas about what it might look like fifteen years from now. Some great things have come out of our LRDP process, and being active about it. One, our lands, our footprint is protected for fifteen years. There are no other groups vying for Arboretum property. So that allows us to plan for those properties, and plan for what might happen out there, including garden expansion, installing some new gardens. But also looking at staff housing, which is an issue for this campus and an absolute issue for the Arboretum, because we don't pay anywhere near acceptable salaries

for anybody. But facilitating housing at the Arboretum would allow increased security for the collections, and also increased security for the people who work here. We can offer that as a possibility of part of their employment: a place to live. As well as providing housing for interns, so that we can interact with other internship programs, and not make them struggle with the market here if they're coming here for a short period of time. So we've considered a lot of things, like a new gift shop and new restaurant and a new gallery space, a lecture hall, demonstration gardens, a conservatory, staff housing, where we're going to do all this stuff. Consolidation of the horticultural facilities, because we find that because our facilities are so spread out people often wander into non-public spaces where we have very valuable collections—

Reti: Yes, they are.

Harder: —but they're all right here. For us it seems controlled, but we find people in very odd places stealing our plants. Security is a huge concern now that people know what we have, and know how to get access to it. Stealing from botanical gardens is a big thing now. The community is not big enough to hide from. If you steal someone's known plant, like a cycad from Lotusland, or something like that, it's like stealing a Van Gogh. Everybody knows where it came from, and the community's too small to show it to anybody. It's a really miserable situation, because the people in the know are the worst ones, and those are the ones who know what we have. So security is a big issue for us: how do we keep the place secure, and how do we allow access to the collections to the public, but make sure they're secure for us so that we're going to have them? If you lose it by having it stolen, there's no value. So we're going to go back to

IMLS with some very high priorities that the campus has not responded to, like fencing in the collections and the horticultural facilities area. Fifty thousand dollars would help immensely in securing the collections. But we haven't been able to get any money from campus even to keep the collection secure.

So it's a struggle, but one of the things that's coming out of the OE process with Gary is we will get to hear from people who we cannot tap into. We don't have any reason to produce a report on the state of the Arboretum. Nobody's ever asked us to produce a report on the Arboretum that is useful or going to be integrated somewhere. I produced reports on the state of the Arboretum for a couple of years, and talked about what the Arboretum needs and what our challenges are. But it doesn't go anywhere. Nobody's asked for them. So they don't get read. They're not part of some consideration or something else. So I've stopped doing that because we weren't being engaged, and we weren't even asked to provide budgets and budget requests. So I'm not sure how that's all going to go. But it's been a struggle for us, because I'm not sure where to go, and who the players are, and whether they're interested in hearing about it.

But this process with Gary Stern is that we're paying Gary to actually do those interviews for us with campus administrators. We want to hear very candidly in this process what they see about the Arboretum that is valuable and what's valuable about the Arboretum to them? The survey instrument can be such that it's an educational experience. You can say, well, how do you value the Arboretum in these following ways: music event, publications, research, as a teaching resource? And start listing all the things that we do, so that people are like: "I didn't know they had all that stuff." So it's a two-way street. We really

want to open up some engagement with campus to understand what they, people on campus, think about the Arboretum and where it should go. Not that it should go away, because it's not. It's viable. It has an endowment and it has a good fundraising capacity, and probably could do a lot more if it was embraced more by the campus, and used by the campus. I mean, a facility like this for meetings, or highlighting symposia, or outdoor events, or even weddings are things that we are thinking of doing to satisfy our community, but not necessarily the campus. So we want to make sure that we're hearing from everybody and this process will do that. The surveys and the entire OE process has a very controlled series of events that will happen to get engagement, to get ownership over what might eventually happen at the Arboretum. You know, once you start throwing out ideas you expect to see them. So some follow-through on satisfying some people with other ideas as well, and that's important to us.

The other part of the grant is to support Ron Lutsko in some facilities planning considerations. The Arboretum, of course, has been grown very organically, (laugh) and it shows very clearly that it was never comprehensively considered. Because the land area was so big. It was like, okay, we'll move the banksias out to a vast field, and now we'll put the Slosson garden out here. But now they have grown and so are now physically adjacent to each other. There is some issue of wayfinding and understanding of where one might be when touring the garden. For example the Australian garden is a roadway apart from the South African garden, but nobody would really know that you've traveled that great distance on the planet when you cross a road to get into the other collection. So

circulation, and way finding, and interpreting that are very important to consider. Ron Lutsko is going to help that. Considering the fact that we may put a new visitor's center in one place, and we may eventually develop this other area, how are we going to circulate people through there so that people get all that and do not get confused? A first step to a comprehensive master plan is understanding viewsheds and vistas from within the garden. Things are growing up and filling in there, and some views are being lost just because the collections and gardens have grown up. Which views do we really want to maintain? Planting allays of trees, or clusters of certain kinds of collections, and compellingly displaying some of the collections with a long-term vision. You can't grow a Kauri tree that's going to be 200 feet tall without planning what it might look like after this time. We have those trees planted and have planned for their ultimate impact on the garden.

Reti: Isn't that something to think about, the Arboretum 350 years from now.

Harder: Yes. We've got some great people on the board who are really keen on facilities planning, and we've just submitted our first proposal to campus to do some campus building here, and a new gate, because our gate looks like the back end of a forty-acre farm.

Reti: (laughter) That's true. It does.

Harder: Yes. The present entry of hog wire and fence posts doesn't really represent the seriousness of what goes on inside, but also the respect of what the collections have for security. Our front gate is where everybody drives in, but it's also where everybody climbs over. That hogwire gate doesn't justify the

seriousness of what we've got going on. It's an important project for us. It's going to cost us some money, but it really will change the aspect of what's going on from the outside world that something's happening that's good on the inside.

So with the approved, campus LRDP we're well integrated, too. I've been critical about the LRDP process, in that we provided information to the LRDP consideration on time; we met with campus planners; we met with the consultants, all that, got our stuff integrated in, we thought we got it integrated in. But there was no way of checking that data before it went to the public. So I went to the public hearing on it and said, "Hey, wait a minute. I provided this information. I wasn't able to ever verify that it was in there. And I think every other campus unit never really had a chance to review a draft of what might be presented to the public. Now that it's been presented to the public, the only recourse is to come to this public forum and say, 'I think the process is flawed.' I don't think it's a good reflection on the campus to have staff and faculty be critical of the process but there was really no choice. You never have a chance to make sure it's right until it's out there. And now it's all public concern and it's not part of the original document." It was not correct when it was released.

Reti: I see. So you didn't feel like what you presented was integrated into the document?

Harder: I wasn't sure. I certainly hope so. There were some questions I had about what they were saying about the Arboretum that could have been clearer. And now I'm not sure whether those are really understood to be clear. With so many players, and so much riding on it, one more pass through drafts would have

been perfectly acceptable to me. But now it is too late. Rather than being part of the process, I am forced to speak publicly against the process just as many faculty did too. And I read the entire document because I wanted to see if it had impacts and expectations that we need to be aware of on other parts of the Arboretum. I never had a chance to make sure it's right. I told them in the public hearing that I really have trouble standing by this document because I'm not sure it's correct for me. So why would I stand by it for the rest of campus, because I only have my little piece. I think it's serious. I don't think it was done right, and is done right. Not that I have any specific problems with how or what it is. More, I'd really love to be able to embrace it and say, "Boy, this is our plan and I think this is great! Campus is going to be doing this and we're going to be doing this. And aren't we all happy with that."

And this has implications for the capital campaign. We've been working very hard through our development director Tad Sterling, who is the first development director the Arboretum has ever had, to be integrated into the capital campaign. How do we get a place? How do we get our bits in there too, if engineering, for example, is getting a new building, or something else is getting a parking lot? Why can't we just say we want a new visitor's center and be part of the total money that's raised for the campus as a whole? Just like we raise money for campus too.

So working with that process and understanding where the Arboretum fits into the capital campaign. Getting somebody to listen. I think the Arboretum has for a long time acted like the neglected, begging child always with hands out waiting for money to come cascading down and we're all going to be happy. How many

hurdles do we have to go over before it actually happens? And the hurdles keep changing and do not reflect the Arboretum's best strengths. Now my attitude has changed to "I'm not jumping over any more hurdles. We're already doing enough to make sure that this place and this collection is maintained. Our main focus is the collection of living plants. I'm not doing anything special, or extra, or outside of making sure this collection is secure, properly taken care of, growing, improving, and on a secure financial footing (after 40 years it already should be), you know, the IMLS idea of maintaining its value.

I think if I went to a meeting with campus and threw down a quarter of a million dollars and said, "I'm really happy to get this project initiated. Here's donor support from the community," I think it would be a much different discussion I would have with them using community support to leverage things to happen. But as the poor person, or the poor waiting for handouts, it's two-pronged. One side of it that you're begging and you're never in a position of power. You're always expecting graciousness of somebody else to help you. But also, begging doesn't beget big gifts. It's more like we need to promote the fact that we're doing great things and you need to support the great things we're doing, rather than, "Yes (sigh) we don't have the support we need to get it all together, so please help if you can." I've learned that.

Ranchview Terrace

Reti: Let's talk about the Ranchview Terrace situation.

Harder: I was involved in the discussions of it as soon as I started. Of course the process was well underway before I got here. Being able to say that the

Arboretum Associates stood up to the fact that there was some interest in developing some housing on the Arboretum site and taking out collections which had endowments behind them, really stands to show how strong the Arboretum Associates is as an association representing the community. We maintained our footprint through the whole thing. And it was because of the opposition that was put up by the Arboretum Associates, and the fact that we had an endowment already for the existing Arboretum that it was really hard to change.

My feeling about Ranchview Terrace is that even though I feel bad about what the result is going to be, I don't ever want to spill it over to the people who are going to live there, because they're going to be our neighbors and they will be the closest supporters to what might happen to the Arboretum in the future. So we want to make sure that we clear the slate of anything we feel about that project before people start moving in and buying those places. Because the level of engagement we could have with that community would be very high, including security.

One of the things that I am regretful about in not being part of that process was that: here's a housing development next to a working organic farm and a working botanical garden. Our practices include burning large piles of brush as soon as we can, cutting grass, weed whipping (a fairly noisy activity), using chainsaws. Right now, we haven't had to address impact of our normal operating activities at all. We just go do it. One of the concerns I brought up about Ranchview Terrace was that: understand these facilities operate as a garden and a farm, and that we do certain things that are necessary to our

operations. Right now, we're enjoying the fact that there's nobody living there. But if somebody moves in there and says, "Hey, I don't like this smoke from your fires," then we have a real challenge. It's going to cost us a lot more money, and it's going to cost us a lot of other kinds of considerations that may be impacted by the fact that a community, a fairly close and tightly filled community is moving in next door. We shouldn't be prevented from pre-existing operations and things that we did because somebody has moved in there and now starts complaining about it. Branches cleave off of Eucalyptus trees all the time, very large branches do, and those houses are going to be very close to the Eucalyptus Grove collection, which is a significant state resource for Eucalyptus, probably the best collection in the US. What happens if one of the Arboretum trees falls on one of those Ranchview Terrace buildings? Or is the Arboretum going to be required to cut the branches off of those collections to safeguard those houses? The plants were there first. To me, it seems really funny that it's not respecting what was on that site. The buildings are going to be three stories, thirty-five feet tall, and it's going to be a wall of five buildings across the Arboretum's border at Ranchview Terrace. They are going to be the backs of the buildings, with porches and decks off the back to respect the view from the front of these buildings to Monterey Bay. But why are those buildings just a wall? Why couldn't it have been stepped down and integrated into the fact that, hey, here's an Arboretum integrated into a housing unit. They have an organic garden space that's going to be provided off of some organic lands. But we're not even offering a gate out there for people to get in, because it's going to be out of their backyard. They're not going to want people to go through their backyards to get into the Arboretum.

Why couldn't it have been designed to be more of a village next to a garden? Ranchview Terrace. Why not Arboretum View Terrace or Gardenview Terrace? It doesn't respect what is there already for forty years. You know, it's totally not respecting the fact that it's adjacent to it. And to me that's kind of scary because it's like, okay, well, put the back of the buildings here so we can build the next buildings next to it. You know, I fear their thinking is "we can fill in when we finally get the land from the Arboretum". Well, that's unsettling for me, and unsettling for the community of the Arboretum. It's really a challenge for me to raise money if I can't say that the Arboretum's permanent. This is what it's going to be. It's a challenge when people say even now, "Aren't they building housing at the Arboretum? I didn't know the Arboretum was still there." I mean, even after the thing's over and it's discussed and the plans are developed, people just remember the conflict, that the Arboretum was fighting it and probably lost. So, "Aren't they building housing at the Arboretum? I didn't know it was still there."

I've actually stepped over my bounds in some things with Ranchview Terrace, because I stuck my neck out, thinking, this is the only chance I have. They put up balloons showing us how tall the buildings would be, and by the time we actually had a chance to get out there and really see what it was all about they had removed the balloons. We put up our own balloons and took pictures of the balloons and everything and didn't really understand what it meant, then they moved the fence, saying, "Oh, this is the original boundary and this is where the buildings are going to be." So we went out there and put up our own balloons and did all these site things for the Ranchview Terrace public review for the

regents, and created a whole report on the real effects on the Arboretum. Their review didn't talk about impacting any of the views within the Arboretum, like the views from the original 1988 LRDP were views from around the campus vehicle road that goes around and looking down on the Arboretum, and so housing in Ranchview Terrace is going to be pretty much hidden by plantings and hills and slopes, but views from within the Arboretum are not part of that consideration at all because they weren't in the 1988 LRDP. But they exist now. So we argued that those views for us are extremely valuable in making a connection with the community, but also to reserve viewsheds and maintain elements of the original campus vision. I mean, we planted plants thirty years ago to take advantage of those views! Now they're going to build houses in a couple months time and (laugh) there the views go. Nor were there discussions about what might happen or is already happening within the Arboretum, like those viewsheds, but I think I mentioned the other day—Kauri trees. There's a Dean McHenry Kauri Grove up there. Kauri trees will ultimately tower up to two hundred feet with forty-foot girths. The trees a plants so that when they reach full height they will be visible from all over Santa Cruz. And there are ten of them up there. Some of those trees will be literally ten meters off the backs of people's back decks. A forty-foot wide tree. Okay. Once we start impacting people's views are we going to be required to cut those trees down because there was no discussion early on about what's on our side of the fence? So it was funny how the Arboretum's existence was disregarded in the fact that they are putting housing there. But like I said, we need to be friends and friendly about it. Because those are our neighbors and I'll oppose it only because it impacts us in a negative way, not because it's been responsive to anything positive like maybe

maintaining a view corridor between a couple of buildings. But the way the buildings are not staggered, we'll have no view from up there.

Reti: In one of the *Bulletins* I saw (I believe it was in a *Bulletin*) something about landscaping Ranchview Terrace in plants that came from the Arboretum, or this type of Mediterranean, drought-tolerant landscaping.

Harder: That's the idea. Joni Janecki is the landscaper. And that's what the early discussions were about. But having seen the plant list for the plantings within Ranchview Terrace, it's not anything of what we had originally anticipated in being able to provide plants for that transition. I mean, they will be plants like the Arboretum, but they're not Arboretum propagated plants. I heard recently that the budget for plantings has been cut and will have to be reapplied for. So no one knows what might ultimately be planted there. Yes, it's not what we had originally anticipated. (laughter)

Promoting the Arboretum

Reti: Okay. Just getting back to the ideas about promoting the Arboretum, one of the things I had also seen in your plan was looking at the Arboretum as more of a destination for people coming from out of the area as tourists.

Harder: We had some discussions about, who are we really marketing the Arboretum to? A collection of plants with locality information, essentially scientific specimens, a garden of those, is not the same as visiting a designed ornamental garden. Even though the plants that we have are beautiful, they are not designed in a way that you would use them for landscaping, although they

all have all the good qualities of landscaping plants—drought resistance and all that, and performance. The Arboretum has not been planted that way. It's been more planted because of geography and associations of plants in the wild, rather than, let's plant a drift of rosemary, or something like that.

So we see the Arboretum collection more serving a fairly limited market of people who know about plants, or have an elevated interest in plants. It was always a little bit hard for me to judge how important the tourist bit would be, because tourists are going to visit, they might buy something at the gift shop, but they're hardly ever going to be members. You can't get somebody to join a member of anything by one visit. It's that continued enhancement and engagement with the place that allows you to say, "Well, I'll be a member of that. I'm interested in what they're doing." So we find people who are really avid gardeners and contractors and growers who really like the Arboretum because of the plants, and the source, and the information, and expertise that's here. But we also see the Arboretum as a place that should be visited by temporary tourists to the area to enlighten them about plants that are appropriate for here and this kind of climate around the world, a place that tourists could go before the fog burns off and they need to go to the beach. I mean, it's a perfect time to come down here, before noon when the fog is still here, to visit the Arboretum. We're trying. We've got some rack cards in 750 locations in the Monterey Bay area to drive traffic here. And they're working. People are actually bringing the cards down here. So it is a way of getting people here.

One of our strategies for bringing people here, in addition to the tourist industry through the convention and visitor's council, [is to] also target visitors through

plant societies and plant groups, retirement centers, engaging with teachers in K-12. Because I think the future of the Arboretum is more mobilizing what we have here to support community activities regionally, conservation efforts and national and international efforts for conserving plants. That's great to be able to present it to tourists as, "Oh wow, that's neat." But it's going to mean more to people who are a little bit more understanding of, "Boy, it's a Mediterranean climate. These plants are really doing well here." Or, "I didn't know I could grow that in my yard. I should really try that." Tourists are rarely going to do that. They might pick up a couple of plants at the store. But it's those ones who like gardening—which is a great hobby for lots of people—it's that interest and stimulating that interest in trying different plants. And what is it about gardening that's so fun and intriguing? Is it because you get out and do it, or is it because of the results? Or is it trying new plants? So we're trying to market to all of those. We've been fairly successful in increasing visitorship here—from probably around 50,000 to about 60 to 70,000 now. That's really good. That's just drive-in traffic.

Reti: That's over the past five years.

Harder: Mmm, hmm. That's just drive-in traffic. We see we're sort of exceptional among university units, in that the UCSC campus is hard to visit. It's hard to know where you stop, and where you should get out, and where are you when you arrive. It's very hard. And the Arboretum has a destination. You can't just drive by it. It's not on Hwy 1. If you go up the hill, up Empire Grade you have to be going there. It's the north end of Monterey Bay. After this it's like—you either turn around, or you're lost, or you know where you're going. (laughter)

Reti: (laugh)

Harder: And so driving traffic here is really hard. Monterey and Carmel—that's where we should really be drawing people from—because that's the climate that these plants would really do very well in. And also, the campus has struggled with fundraising in Monterey and that area of the Monterey Bay region. I don't know what it is. But it's, Santa Cruz "up there."

Reti: It's a big body of water.

Harder: Mmm, hmm. So stimulating the region, the Monterey Bay region, as well as the Bay Area garden network region. And bringing people down here is really what we're focusing on now. It's happening. You find targeted groups coming here, and directed groups, plant groups and others, visiting here more often and wanting to use the Arboretum and understand more about what's going on here.

The Political Climate and Arboretums

Reti: We had touched the other day on some changes that are going on in terms of the current administration, the federal administration, that affect plant importation and the research efforts of arboretums internationally. Would you like to say more about that?

Harder: Yes. I think that's the wrong way to go, reducing the accessibility of permits, particularly for botanical gardens. It hasn't come across to this administration that botanical gardens are going to be in a leadership position in the future to understand climate change, to record what happens with climate change, and understand what the results on the other side might be. Essentially

botanical gardens are common garden experiments. You essentially bring plants from different gardens in the wild and you put them all in one place and you compare how they do. And some plants that have certain specific requirements are not going to work in a common garden, so you get rid of the ends. You get rid of the ends in a common garden experiment. But you also see—

Reti: The ends?

Harder: Meaning, plants that—let's say you take a whole diversity of plants and you put them in a common garden. Some aren't going to make it because it doesn't get cold enough, or it doesn't get the right conditions at the right time. So those ones are going to fall out and not perform well or simply die.

Reti: Oh, I see.

Harder: And the other end of a common garden experiment is not enough water, too little water. Mostly conditions that will shave off which plants will survive under drought or low-water conditions. But you have a broad diversity of plants that occur in a garden, and you can see with climate change, with measured climate change, CO₂ loading in the environment, all historical records, the longer a botanical garden has been growing a diversity of plants, the greater the opportunity to see when climate changes what's going to be affected, what plants might be affected, and why.

Reti: I never thought of that. It makes complete sense. I'd just never thought of it.

Harder: Yes, botanical gardens are really the only places where the expertise is to get through challenges of how to propagate something, how to preserve it.

Nurseries and growers can do it, but they have to have a protocol that's established. But most plants we don't know how best to propagate them and how best to take care of them. It only comes through experimentation. And botanical gardens have the breadth of experience in their staff of how to propagate and how to preserve and how best to take care of these plants so that they are conserved and preserved, as well as their data. If the current trend as with the current administration is to reduce the number of permits that go out and issue permits only to large commercial growers, that expertise is not going to be tapped to get these plants. It's going to be proprietary information, so nobody will benefit from it except from those companies. And the importation of plants will all be through commercial interests, not through nonprofit, research scientific institutions like botanical gardens. Most botanical gardens, historically, have been either part of the Extension Service as ways of introducing new plants like new fruits and other kinds of things, (like Kew Gardens was very much of a plant introduction station for a long time), or they have a mission of doing research on their own collections and safeguarding the collection, like a museum, which is what the Arboretum is.

These changes could have very detrimental effects to the twelve years of work I did prior to coming to the Arboretum. I could not have done any of that work without the permits I had, and the accessibility that I had to the plants, and being able to justify whether I wanted to propagate a plant and bring it back alive, or as an herbarium specimen. It's a life of a lot of botanical gardens. There's a lot we can do together as a botanical garden community to duplicate our collections and make copies of things and put them in different places. We're doing some of that

with Strybing, and UC Berkeley Botanical Garden, as well as UC Davis. We're beginning to make some copies, and sharing things as ways of building collections, and also safeguarding. But if we're prevented from making plant collections in countries that need to have plant collections made or botanical resources preserved, it's going to be really hard to make an effort, or feel as if we've made an effort to conserve what's on the planet already. And believe me, commercial businesses will not have an interest in the diversity or the taxonomy. They'll hold a patent on propagating them and it's all for profit. That's the wrong way to go. If botanical gardens are struggling—a business could come by and buy the whole Arboretum (laugh) and take all of our plants away. I mean, if we're not careful, if we're put in a position where we are compromised in being able to do what we do best to support conservation, which is going out and collecting, and understanding what's there, and propagating it's not secure in the wild anymore. There isn't enough of that wild around to secure enough of it. So you need to make a decision about whether this plant needs to come out of that natural situation and be grown in a botanical garden to save it. It can't go to a commercial nursery to save it. (laugh) I mean, for everybody. We will never have access to any of that material if it goes to a commercial interest. So that was what I brought up the other day.

We're working very hard within the American Public Garden Association to try to make a stand as an organization. Because there are very few organized groups around botanical gardens who make unified statements about what they might like to see happen, or what they would not, or opposing certain regulations, or not. We're struggling because we want to be able to get an exception because

we're for research, education and outreach. That's really important in preserving plants.

Reti: Is there a specific bill that's under consideration?

Harder: There's an ag bill being discussed in committee now. And that's all I know about where it's at. I'm still trying to dig through all that legislative stuff, and understanding what it means and who the players are. It's lobbyists that are supported by commercial nurseries that are making things very difficult. (laughter)

Loving the Challenges of the Job

Reti: Okay. I understand. Tell me what you love most about your job.

Harder: Oh. Well, it's a continuation of my curiosity as a kid. I can come to work and get lost in my interests and passion. It used to always be about the plants. I didn't really care about the people, except that the people had everything to do with my access to plants when I started working overseas. I was very interested in how plants work, how they do what they do and why they are the way they are. But I couldn't do it without integrating the impact on people. I worked for a biotech firm, and I did my graduate work on the winged bean—all potentially useful for saving humans—and then I worked for a long time with National Cancer Institute money with the Missouri Botanical Garden, collecting bulk samples against cancer cell lines and AIDS, and became very interested in potentially new medicines and saw how discovery and understanding botanical

diversity was really important to getting those into the process of seeing what could help us.

But I was always put off by the economic argument for saving something. I mean, getting with these biotech companies and with the National Cancer Institute: "Well, that forest might contain something that's going to save the human population. So we should save all of it and it should all be important and it should be conserved and studied. It could be worth millions to save all those humans out there by some plant that you're going to find in Madagascar's forests." I was never really comfortable with that monetary argument. More, if that plant goes extinct that's one species of plant that's as related to another species of plant as a human is to a chimpanzee. If we go extinct as one species, that doesn't mean that chimpanzees are going to go extinct. But we're only one species, and we could be decimated by an epidemic virus very easily, or at least knocked back significantly, changing our impact on the planet. That argument I was okay with. Diversity needs to be maintained because of morality, I guess it is, about how you feel about other species going extinct, our impact on other species, how I should feel about that, how my actions might impact some other species.

So I could never really separate my studying of plants, and how humans interacted with plants, and how people are affected by it. Gardens were something that I always see as transformative of people, where you could knock people off their centers, essentially, by providing them a place to think differently about the world, or their own impact or their own actions. Botanical gardens are very strong vehicles for knocking people off that center that they

feel. They go in a garden. They're a little bit disoriented. They read a message that's a little bit provocative, interpretive. And they're like, "Hey, you know, that *does* impact me and I could make a choice here whether I, you know, choose plastic or paper at the grocery store." It could be as simple as that. "Hey I could do something about that in my own backyard, or appreciate what I have."

So the best part of my job has now turned out to be the people. The plants are part of it, but it's the people. I see us as sort of shepherding this collection, but it only goes in our hands this long, and then we pass it off to someone else. If I can improve its situation, and improve its value, so that when I pass it off to somebody else I'm remembered for doing that, one, but also so that the collection is in better care under someone else. The collection will always be here. It's just whose hands it's going through, and how it's being taken care of is really important.

After four years, the Arboretum needs to have sustainable support, and the endowment is helping that. I love the challenges of trying to engage people differently about plants and about how they see the Arboretum. People who have thrown up walls about the Arboretum maybe haven't seen it in the right way, or from the right perspective, or a new perspective. So I find that a big challenge in my job. Many on campus have a skewed understanding of the Arboretum because they only know bits of its history. I welcome them to come back and see for themselves that the Arboretum is viable and doing great things for conservation and community.

I love coming to work, just because I enjoy working with plants, and I enjoy working with people who like plants. They're nurturing. They're caring. If you're sick they're like, "Ohhh. You just need some fertilizer." (laugh). They really care.

Reti: (laughter)

Harder: It's the same sort of care for plants as they do for people. So the community is really supportive and deep in their understanding of what we're trying to do. One of the things that Gary Stern said to me after we had a long session and we all brainstormed about the broad range of ideas about the Arboretum—I said, "Well, how does that compare? What does it look like?" He said, "Very concise. Obviously you've been getting a message out to people who support the Arboretum about where you are, what's important about it, and where you want to go." He said, "That's really key to being able to get it to happen. Because there aren't all these ideas like, 'Oh, you should have a chocolate shop over there,' you know or, ideas that aren't related to what we've been talking about. And people *have* been listening, and people *are* interested. I see the challenge of raising money as just an inconvenience that's in the way, because it's going to happen. I just wish it would happen sooner rather than later so we could enjoy some of it. (laugh)

But I love the challenges of the job. I love working with plants. That's what I always was trained to do. I feel lucky, because I've had lots of grant money, and done lots of traveling as part of my job. I've got a great family and kids. It's all part of a whole satisfaction with the job. And for me, it's a new collection. Coming to Santa Cruz—I'd never worked with Mediterranean plants before. I

had seen them in the wild, but never had a chance to really appreciate them. I'd worked in tropical Africa, or south subtropical Indochina, and Vietnam. It was a new group of plants for me. So plants for me have always been where I can always learn. Even when I go travel somewhere there're always going to be plants there that I've never seen! You know?

Reti: Yes.

Harder: Even in Atlanta. I can go outside and say, "I've never seen that plant before." So it's fun.

Reti: Is there anything you want to add?

Harder: No.

Reti: Okay, that's a great place to stop. Thank you so much, Dan. This has been wonderful.

Harder: You're welcome. Good.

Brief Timeline of UCSC Arboretum History¹¹

Summer 1965: Chancellor Dean McHenry receives gift of eighty species of *Eucalyptus* which are planted across from the intersection of Western Drive with Empire Grade.

June 12, 1967: Campus Planning Committee approves extending the *Eucalyptus* plantation westward to include the Old Reservoir.

August 1967: Chancellor Dean McHenry establishes Arboretum and Plantations Committee. It develops the first Arboretum collections.

1967: Earliest conifers are planted parallel to Empire Grade. Some of the original deodar cedars donated by Robert Burton are still visible near the Barn at the main campus entrance.

1968-69. Ray Collett and the McHenrys pool seed packets of protea that they received as members of Kirstenbosch Gardens of South Africa. Collett learns to germinate the seeds and raise the seedlings and the Arboretum's collection of Proteaceae begins. By 1978, Walter Middlemann, leading grower of Proteaceae in South Africa, would call the UCSC Arboretum's collection "the most extensive collection he had seen outside of South Africa."

Early 1970s: Collett and Dick Hildreth, Director of the Saratoga Horticultural Foundation, import plants from Rodger and Gwen Elliot of Melbourne, Australia.

1972: Ray Collett begins publishing a monthly newsletter entitled *Notes from the UCSC Arboretum*.

1974-75: Arboretum acquires its first budget.

September 1974-June 1975: Todd and Virginia Keeler-Wolf, graduates of UCSC in Environmental Studies (Natural History), with guidance from Ray Collett, collect and ship primitive angiosperms and South Pacific conifers to the Arboretum. These specimens flourish, forming the core of the New Zealand garden. They also provided plants from Australia and New Caledonia for those collections.

1975: construction of lath house, small office shed, and three geodesic domes, and a bathroom in the concrete structure that was formerly a chlorinator plant.

1975: Brett Hall begins working at the Arboretum as a student.

1976-77: Grevilleas are planted on "Old Grevillea Hill."

¹¹ This timeline draws from the timeline authored by Mike Clark and available on the Arboretum's website at http://www2.ucsc.edu/arboretum/hist_exhibit/

November 20, 1976: First meeting of the Arboretum Associates. The Associates began with 113 charter members. Income for that year was \$1050.00

February 1977: Collett makes first of many trips to Australia to collect plants.

June 1977: Vice Chancellor Hal Hyde becomes first president of Arboretum Associates. In his acceptance speech Hyde called the Arboretum a "library of plants" and advocated that the university utilize the Arboretum's collections more fully in its teaching and research.

June 1977: Arboretum opens to public for the first time on a regular schedule, Sundays and Wednesday afternoons from two to four o'clock.

July 1977: Elvenia J. Slosson gives the first Slosson Foundation Grant. Collection is named the Slosson Gardens. The Slosson Foundation continues to support the research gardens today.

October 1977: Arboretum holds its first plant sale (managed by Phyllis Norris) and approves the first lecture series.

December 1977: Phyllis Norris becomes Chief Docent of the Arboretum.

1978: A redwood and glass docents' kiosk is constructed on top of the old dam.

1978. Under the direction of docent Jean Beevers, Arboretum Associates begin to pick, dry, and prepare protea blooms for sale to local florists.

1978: In cooperation with local native plant enthusiasts, a "Natives Come First" display is established near the entrance to promote interest in native flora.

June 1978: Eminent biologist Peter Raven, then director of the Missouri Botanical Garden, visits the UCSC Arboretum and is inspired to write "Impressions of the Arboretum" in the *Bulletin*: "It is scarcely an exaggeration to say that Ray Collett and the enthusiastic group of students and workers with which he has surrounded himself have assembled what may well be the finest collection of Australian plants in a botanical garden anywhere—including Australia."

1979: *Erica* gardens begin.

1979: Specimens from Santa Cruz Island, the Central and South Coast Ranges, North Coast and Klamath Ranges are collected.

1980: Arboretum creates the first computer database of its 4000-plus plants.

1980s: Collett conducts hybridization in *Correa*, *Leptospermum*, and *Alyogyne*. Many choice selections emerge and the introduction of prized cultivars becomes an Arboretum practice.

1981: Ed Landels makes first of many gifts for the New Zealand garden. In 1984 the collection is officially named the Edward D. Landels New Zealand Garden.

1980: An award from Institute of Museum Services for conservation of endangered flora of New Caledonia enables more collection from South Pacific.

1982: The "Geriatric Construction Corps" including Chancellor Emeritus Dean McHenry, build the docent reception center (kiosk) near the Arboretum parking lot. This provides shelter and display area for exhibits (and docents in the rain), items for sale and information about the collections.

1982: Thomas Wittman, a UCSC Environmental Studies major, writes a successful proposal to the UC Appropriate Technology (UCAT) Program for four solar greenhouses for the Arboretum; UCSC students do the construction for this project.

1984: Arboretum Associates has 650 members and income from dues and plant sales is nearly \$35,000 a year.

1984-86. "The Banksia Field" extends the collection to the eastern boundary of the Arboretum.

1985: The succulent collection is established based on early donations from Naomi Bloss, Victor Reiter Jr., Jim Daniel, Jack Napton, and Stephen McCabe. It has grown to become one of the largest collections in term of numbers of individual plants and numbers of different accessions.

1985: Helen Englesberg starts as a student worker in the nursery and is hired four years later as permanent staff.

1985: Institute of Museum Sciences funds the development of Entrance Native Garden. Arboretum staff continue to collect and cultivate specimens.

1986-89: Rare Fruit Collection is initiated by the Monterey Chapter of the California Rare Fruit Growers.

1986: By this year the Arboretum had received favorable publicity in many venues including the *Los Angeles Times*, the *San Jose Mercury News*, the *Monterey Peninsula Herald*, *Pacific Horticulture*, *Sunset Magazine*, *Voyager*, *Monterey Life*, *American Nurseryman*, *Veld & Flora*, the *Encyclopedia of Australian Plants*, the *Auckland New Zealand Herald*, the *Dunedin Otago Daily Times*, and the *Wellington Evening Post*.

1986: The Arboretum had introduced over 300 cultivars to the public and the nursery trade.

1988: Arboretum and the UCSC Campus Natural Reserve begin to collaborate on managing the Lower Moore Creek section of the Reserve. This is the largest parcel in what is now called the California Province Gardens.

1989: First overseas horticultural/botanical tour to Australia.

1989: Completion of Horticulture I building.

1989: The Arboretum now has the largest collection of *Dudleya* in the world.

November 1990: South African area is named the Dean and Jane McHenry Garden, consisting of *Protea*, *Leucadendron*, *Leucospermum*, and *Erica* species.

1990-98: USDA issues special permit to the Arboretum to import from Australia members of the Citrus Family, *Rutaceae* (*Correa*, *Boronia*, *Crowea*, *Flindersia*, *Zieria*, etc.).

1993: A small grant helps enhance the special Native Bulb Collection, which include *Calochortus*, *Triteleia*, and *Fritillaria*, among others.

1994: Completion of Horticulture II building.

1994: Opening of Norrie's Gift Shop.

1994: Budget crisis forces Arboretum out of Natural Sciences Division. State funding cut; Arboretum becomes part of Chancellor's office. University plans to phase out support over the next five years.

1994 Dedication of the Jean and Bill Lane Library.

1997 David Packard Foundation provides a three-year grant to help Arboretum weather loss of state funding.

1997 Ray Collett resigns as director. Ron Enomoto appointed interim director.

1999: The Arboretum credited with being the only place that cultivates one of the oldest flowering plants in the world. DNA analysis places one of the New Caledonia endemics, *Amborella trichopoda*, at the base of the evolutionary tree of angiosperms--a direct descendant of the forerunner to all angiosperms.

2000: *Restio* Family is added and the collection takes on the natural look of a "fynbos" landscape.

October 2001: Daniel Harder becomes director.

2003: Tad Sterling is hired as Arboretum's first development director. Arboretum has annual budget of \$800,000.00 and derives over eighty percent of its support from memberships, gifts, sales, grants, and endowments.

2003: Brett Hall and Dan Harder do five weeks of fieldwork in Vietnam with a grant from the National Geographic Society.

2004: Arboretum has introduced 500 plants to California gardens. Koala Blooms plant introduction program introduces Australian plants to partner nurseries with royalties going to supporting the program and Arboretum operations.

2005: Arboretum receives Organizational Effectiveness Planning grant from the David and Lucile Packard Foundation to help with its master planning process.

2006: The American Public Gardens Association has its annual conference in San Francisco. Arboretum Director Dan Harder is co-chair for the meeting and the programming includes a field trip to the UCSC Arboretum.

2006: Arboretum Associates grows to 1000 members.

2007: Conifer Collection contains representatives of all but four of the world's known genera of conifers. Some are extremely rare, such as the *Dacrydium guillaumanii*, and some interesting genera such as *Araucaria* and *Phyllocladus*.

2007: A new survey determines that the UC Santa Cruz Arboretum's collection of *Eucalyptus* trees and shrubs is the most diverse anywhere outside of Australia. The finding is the result of an inventory conducted by Matt Ritter, a visiting scholar at the Arboretum.