

TRANSCRIPT

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INTERVIEWER: David Todd

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David Todd [00:00:03] All right. Well, good morning. I am David Todd, and I have the privilege of being here with Nancy Greig.

David Todd [00:00:10] Did I pronounce that correctly?

Nancy Greig [00:00:12] Yes, you did. Thank you.

David Todd [00:00:13] Okay. Great.

David Todd [00:00:14] And with her permission, we plan on recording this interview for research and educational work on behalf of a non-profit group, the Conservation History Association of Texas, and for a book and a website for Texas A&M University Press, and finally, for an archive at the Briscoe Center for American History, which is based at the University of Texas at Austin.

David Todd [00:00:38] And I want to emphasize that you have all rights to use the recording as she sees fit.

David Todd [00:00:44] And I wanted to make sure that that is okay with you and, you know, sort of what you were expecting.

Nancy Greig [00:00:50] Absolutely. Yes. I don't have any expectations, but go ahead. Fine.

David Todd [00:00:54] All right. Well, good. Well, good.

David Todd [00:00:57] Well, let's get started, then.

David Todd [00:00:59] It is Tuesday, June 13th, 2023. It's just a shade before 10:30 a.m. Central Time. And my name, as I said, is David Todd. I am representing the Conservation History Association of Texas, and I am in Austin. We are conducting a remote audio interview with Nancy Greig and she is based in the Houston, Texas area.

David Todd [00:01:25] Ms Greig was trained at the University of Texas at Austin, where she received a Ph.D. in tropical plant ecology. And following graduation, she led a field course in tropical biology for the Organization for Tropical Studies and then spent 23 years at the Houston Museum of Natural Science, where she was the founding director of the Cockrell Butterfly Center. Following her career at the Butterfly Center, she has gone on to volunteer at the Houston Arboretum and Nature Center to guide for the Buffalo Bayou Partnership, and to stay busy in her home garden, managing a vegetable plot and pollinator habitat.

David Todd [00:02:05] And that is just scraping the surface. There's many more things she's involved with, but I thought that would be a quick introduction.

David Todd [00:02:14] Today we'll be talking about Ms Greig's life and career to date, and especially focus on what she has learned and shared about the history of butterfly study, public interpretation and education and conservation outreach, particularly focusing on the monarch butterfly.

David Todd [00:02:31] So, with that little precis, little summary of of what we're doing and who she is, let's ask her a few questions.

David Todd [00:02:42] So, Ms Greig, could you please tell us about your life and career as far as your childhood and early years, and if there might have been some people or events in your life then that influenced your interest in nature and insects in particular in the future?

Nancy Greig [00:03:00] Okay. Well, good morning and it's nice to be talking with you, David.

Nancy Greig [00:03:05] I actually grew up in in Calgary, Alberta, Canada. I my parents were geologists and my dad was transferred to Calgary a couple of years after I was born. I was born in Oklahoma when he was still working on his dissertation, I believe. And anyway, so I really didn't know anything, I don't remember anything about Oklahoma, for better or worse. But I grew up in Calgary, which was a great place to grow up. You know, it's kind of the Houston of the north, but in terms of its economy with oil and and cowboys and stuff like that. But it was, back then, in the fifties, one, we were afforded a tremendous amount of freedom. And Calgary was, of course, super safe. We never locked our house or a car. In fact, I never had a key to the house.

Nancy Greig [00:03:56] But I had three siblings and we, of course, we went to school and everything, but we also spent a tremendous amount of time outdoors and especially in the summers, which are short and sweet in Canada. But behind our house there was this big wild area. We were close to the Elbow River and then we were just on the edge of the Double River Valley, I guess, and there was this big hill that was wild and filled with bushes like saskatoons or service berries, I think you call them down here, and chokecherries and all sorts of shrubs and grasses and wildflowers in the springtime up on the prairie part.

Nancy Greig [00:04:39] And my friends and I, or sometimes just me by myself, spent a lot of time up there, making forts and exploring and getting scared by partridges being flushed out.

Nancy Greig [00:04:51] And so, I have always really kind of been interested in nature. And my parents, especially my mother, were also encouraging and also a big influence. My mother never actually worked as a geologist. She got a master's; in fact, my parents met at UT-Austin, when they were both in the geology department. But she was a wonderful homemaker and took care of four kids and was very involved in the community. But she also had a great and broad interest in natural history of all kinds, not just geology. She would always point out geological formations when we were traveling across the country. But she became very interested in birds and wildflowers and the stars and mushrooms. She was big into mushrooms, and she even got into mosses and lichens. And in fact, in your fifties, I think went back to the University of Calgary and took some courses.

Nancy Greig [00:05:56] So, you know, she was a great influence and I wish I had maybe appreciated her more when she was alive. I think sometimes she was frustrated by us. She'd

want us to go out and see the stars, and we'd say, "Okay." But anyway, so she was a she was a wonderful influence.

Nancy Greig [00:06:15] And really we were allowed to run around outdoors until it got dark and we were called home. So I am sorry for young people these days that don't seem to have that sort of freedom.

Nancy Greig [00:06:31] And then, I don't remember much about elementary school or any particular influences, but I did, my very favorite book from as soon as I can remember reading it, was a book by Gerald Durrell, who's the famous British naturalist, and it's called *My Family and Other Animals*, and it's a hilarious book, but it's also beautifully written with descriptions of Corfu, where he spent a couple of years when he was about 14. And he's a big, big naturalist. And just all his descriptions of the animals and the scenery and the people inspired me greatly. And I've probably read the book 20 times and given it to many people. And in fact, I visited Corfu one time on my way back from a stint in Israel and tried to find the places that he described in his book. But, unfortunately, Corfu was already getting built up. So I think I found one of the places, but not sure.

Nancy Greig [00:07:27] And the other books that are still with me today are those little golden guides, which are the best things. They have so much information packed in their pages. And I believe I got the insect one when I was about six. And then I also got several others - butterflies and reptiles and amphibians, et cetera, along the way. And I still have an extensive library of those books. And man, if you knew all the information in them, you'd be, you'd be the world's greatest naturalist.

Nancy Greig [00:08:02] Let's see. What else?

Nancy Greig [00:08:03] So I did, I was fortunate enough to ... Calgary was pretty boring as far as biology goes. You know, it's far enough north that I think there's one snake there and a couple of frogs and not a whole lot. But, I do remember going to our family cabin in Wisconsin and seeing all the things down there. There were more amphibians and reptiles.

Nancy Greig [00:08:30] And one summer I went to upstate New York with my grandfather, which was where he was brought up. And that was just an amazing place. We'd go out and catch frogs and look at fossils at King's Falls and pick wild strawberries. So that was a wonderful introduction to something a bit more diverse than Calgary.

Nancy Greig [00:08:54] And the other place I really remember was the coast of British Columbia, where I spent about two or three weeks one summer, and I must have been a weird little kid, I guess. I was about 13 and I knew I was always coming back to - it was with a friend of the family, my family wasn't there - but I'd catch garter snakes on the beach and come back very proudly, holding one in each hand reeking of garter snake. And Mrs. Phillips was not amused, I think, but she was very tolerant.

Nancy Greig [00:09:23] So, all those experiences were, had certainly some influence on my later love for natural history.

Nancy Greig [00:09:34] I did take a long, whatever you want to call it, detour through, you know, in junior high and high school, I kind of lost touch with natural history and but I got back to it once I once I found myself in my, what, thirties.

Nancy Greig [00:09:54] So, I guess I need another question from you or something.

David Todd [00:09:57] No, this is great. I love the combination of older people who sort of modeled, like particularly your mother, it sounds like, an interest and curiosity in the natural world. And then this sort of tolerance of this friend of the family that I guess allowed you to explore things on your own. And it seems like that's a wonderful combination to have. And then, of course, the freedom and flexibility to be outside and to have that time and space to learn about the natural world. So it sounds like a neat upbringing.

David Todd [00:10:35] So, I think that that we've talked a little bit about your childhood and grade school years and I'm wondering if you could talk a little bit about your time in college or maybe grad school. And I know that you've had some well-known professors that have, I guess, been a factor in your life. And so, I wonder if there are any sort of experiences or memories there that that you might mention?

Nancy Greig [00:11:04] Sure, Yeah. Well, I, I didn't get to college for a long time. I had sort of a circuitous route after high school. I spent a year on a kibbutz in Israel, and I had kind of a disastrous year at the University of Calgary. It wasn't disastrous, but I really wasn't into it. And I was in the Fine Arts program, actually, and finished the year and then spent several years just working, waitressing, living in Mexico, etc.

Nancy Greig [00:11:36] But, I eventually went back to school and ended up at U.T., where I got a bachelor's in linguistics. But, my favorite courses were the, you know, the area things, the area courses you had to take. Geology: I took a couple of courses in geology and especially the botany courses I took. I took native plants with Marshall Johnston, who at the time, he was the author of Correll and Johnston, the Manual of the Vascular Plants of Texas, or whatever it is. And he was an amazing guy. We had a sort of a field course. The native plants course was a field course, and we'd go out every Tuesday and just go to the various parks around Austin. We went to Pedernales and McKinney Falls and, who knows, all sorts of places. And just spent the day looking at plants. And we'd have a little picnic lunch and maybe swim in the river or whatever. And oh my gosh, that was the best course I ever took.

Nancy Greig [00:12:36] And a couple of my fellow students on that, one guy was an entomologist, Jim DeJulio, and the other guy was interested in mushrooms. And so the three of us would kind of lag behind and look at other stuff, and then we'd finish off the day by going and drinking a bottle of wine in the Student Union. But that was, Marshall Johnson really had some wonderful stories about the native plants, and I do remember that exceedingly well. And I also took plant systematics with him.

Nancy Greig [00:13:12] But anyway, I was dabbling with the idea of going into horticulture. I knew I didn't want to go into linguistics. And so I thought, well, maybe horticulture. I'd taken a botany for gardening course that was really fun and I have always had a garden. So, I actually went to look at Texas A&M and well, for a variety of reasons. I decided I didn't want to go there. It wasn't what I thought I wanted.

Nancy Greig [00:13:46] But around the same time I heard about this course that was taught in Costa Rica, a summer course taught by Dr. Larry Gilbert at the UT Zoology Department. And so, I went and looked him up and said, "Hey, I would really like to take this course. I'd never been to the tropics. It sounded interesting." And he said, "Well, are you a graduate student?" And I said, "Well, no, I'm thinking of applying to graduate school." And he said, "Well, you can't go. You're not a graduate student, but leave me your particulars." So I left him a note and I

said, blah, blah, blah. And I speak fluent Spanish because I'd lived in Mexico for a couple of years.

Nancy Greig [00:14:24] And so, a couple of weeks later he called me up and he said, "Well, you can't go as a student, but you can go as my assistant and translator", because his Spanish still, after many years in the tropics, is not good enough to do these translations that he was supposed to provide to the Parks Department in Costa Rica.

Nancy Greig [00:14:42] So, I got this great job. I had to translate these little blurbs of the descriptions of the work that his students had done there over the years. And he works in Corcovado National Park in Costa Rica, which is in the very southwestern part, on the big Osa Peninsula, which is one of the wildest places in Central America. And anyway, so he was supposed to provide these blurbs to the Park Service. So my job was to translate those and to kind of help get the equipment and everything ready for the course.

Nancy Greig [00:15:17] And then, I came along on the course and I basically had no responsibilities. And I ended up working with, helping a variety of students. But I mostly helped a guy named Kirk Winemiller, who's a fish biologist. And so, we would go out and I would help him seine and collect fish, etc. He is an amazing fisherman. In fact, he's now the, what is he, the department head or whatever, of wildlife biology at Texas A&M. But I learned a tremendous amount about fish from him.

Nancy Greig [00:15:54] And Larry was an amazing, of course he is such an amazing naturalist, and he just becomes a different person when he's in the tropics. He's full of all these stories about how things work, and he marches through the jungles, slashing with his machete, clearing the path and shepherding his little neophyte students around.

Nancy Greig [00:16:17] And it was just an amazing experience. I had never seen anything like the diversity and exuberance of plants and animals down there. And I was, you know, the little prairie flower. I was simply blown away. I mean, I just, I was like a kid in a candy store. It was probably the best summer of my life. It was really incredible. I remember thinking as we left (we had to fly in by small plane and we basically camped at this place). And once we'd done this sort of orientation and the students went in and did projects, and I ended up, as I said, helping Kirk. And we were there for about five weeks. And then after that, Kirk and Larry and another student and I traveled around Costa Rica a little bit. So it was a simply tremendous experience.

Nancy Greig [00:17:11] But I do remember leaving Corcovado, you came in and went by five-seater Cessna plane, and there were a couple of wrecked planes at the end of the little airstrip. And I remember thinking, "Oh, well, if we crash on the way out, that's okay. I've just, this is a great time to go, because I've had the best experience of my life." So it truly was an amazing experience.

David Todd [00:17:38] That's high praise or just a lot of fatalism. Well, I love that story. The little prairie flower, you know, going to the exuberant jungle, the Osa peninsula. Wow! What an adventure.

Nancy Greig [00:17:55] Oh, yeah.

David Todd [00:17:56] Yeah. Well, so you told us a little bit about, I guess, this field trip and the experiences outdoors, the studying and helping of some of the other students there. And then I gather you you came back and ,dove into the...

Nancy Greig [00:18:15] Oh, yes.

David Todd [00:18:16] Center of Tropical Studies. Is that right?

Nancy Greig [00:18:18] Well, Right. I guess Larry and I were so impressed with each other, or whatever, that summer that he suggested I become his graduate student. And I was very happy to do so. So, I ended up staying at U.T. and enrolling in the Ph.D. program to study tropical ecology.

Nancy Greig [00:18:42] I did have, it turned out that I worked with both him and with Norma Fowler, who's a plant population biologist, and she was tremendously helpful. But she works in the Texas Hill Country and my main interest was in the tropics.

Nancy Greig [00:18:58] So I forgot to mention one other person who was a great influence before I went to, before I got to the tropics. His name is Jim Mauseth. He's also a professor at U.T. And he's a plant anatomist. But he's just a great guy and really enthusiastic about plants in general. So he and I and my sister and another guy one time went on a little Christmas trip to Mexico and I learned a lot from Jim there wandering around the ruins of Yucatan. Instead of looking at the ruins, we were looking at the cool plants. And he was on my dissertation committee at U.T. and remains a friend to this day. So he was a great influence as well.

Nancy Greig [00:19:38] But yeah.

David Todd [00:19:40] Could you please spell his last name? I'm sorry I didn't quite get it.

Nancy Greig [00:19:46] M-A-U-S-E-T-H. James Mauseth. Yep.

David Todd [00:19:49] All right. Thank you very much. Okay.

Nancy Greig [00:19:50] He works on he works on cactus especially, and especially these weird parasites of cactus that are sort of like mistletoe that grow inside and they only come out to bloom. And, anyway, just anatomy in general. Fascinating stuff.

Nancy Greig [00:20:05] So, but yeah, so then I ended up staying at UT and floundering through, and finally finding a project. I worked on a group of plants. The Piperaceae. Piper is the black pepper genus, and it's tremendously diverse in the tropics. I think there were, well, there were 50 species where I ended up working at La Selva, which is on the other side of Costa Rica from the Osa Peninsula. But, an interesting group of plants. They're not very spectacular, some people say, "So why are you working on these boring, whatever. They don't even have really showy flowers or anything."

Nancy Greig [00:20:47] But I found their diversity to be amazing. And that's what I was interested in, is how can so many ...? That's a big question in tropical ecology. How can so many similar species coexist in the same place? You know, competition or whatever. You're supposed to separate things. And these guys all seem to be doing about the same thing and yet living in the same habitat. So I'm not sure I answered that question, but I, I tried.

David Todd [00:21:13] Yes, what a wonderful question about, you know, these niches that seem so close but somehow don't overlap and allow diversity.

Nancy Greig [00:21:24] Right.

David Todd [00:21:25] Well, so this is probably of maybe of just a kind of analog to what you'd been doing, but I was curious if you could talk a little bit about some of the books and films and TV shows that, you know, the cultural kind of soup that you might have been absorbing. I think you mentioned some of the children's books that you - the little golden books. But were there any others that that, you know, in the cultural media out there that might have been influential for you?

Nancy Greig [00:22:08] Oh, gosh. Let me just think. Well, I never have watched that much TV. Of course, you know, I've seen a few Nova things. And I do remember seeing David Attenborough's series, *The Private Life of Plants*, which is incredible, and actually ended up using that when I taught a botany semester at Rice. But it's about how, well, there's 6 hours of it, but basically how plants also behave more or less like animals just much more slowly. And the photography, etc., and the message in that is tremendous.

Nancy Greig [00:22:49] Let's see what else. You know, more recently I have read things like *Last Child in the Woods*, which resonated with me quite a bit just because I agree so strongly that kids are so separated from nature now and how important it is to have that connection. Sort of like E.O. Wilson's *Biophilia*, which I know I read at some point, but don't remember it very well. But basically that we do have this connection with nature and how important it is and especially these days, if we're, you have to love something to want to save it. And boy, we really need to be loving nature these days.

Nancy Greig [00:23:34] I was trying to think of others. I'm sure there's others, but I'm drawing a blank right now looking over here. Oh, I know one. *Tropical Nature* is a great, great book. It's a, who's it by? By Adrian Forsyth and Ken Miyata, and it's just little sort of just-so stories about the tropics. It's a wonderful book. I used it, or recommended reading it for the Organization for Tropical Studies courses I taught, and I can remember parts of that one very well. So highly recommended, especially the chapter about the botfly, which I have also experienced. But I didn't let it come to term like Jerry Coyne does in the book.

David Todd [00:24:22] Mm hmm. Yeah, Maybe just as well. Something maybe to study, but not have inside you.

David Todd [00:24:31] Well, that's great. It's always nice to know these sort of totems in your life that are important. And maybe we can share those with other people that would be curious about the kind of experiences and exposures you've had.

David Todd [00:24:51] So I thought it was interesting that, you know, you've highly schooled and educated, trained, and yet chose to leave academia and to head out into the world of public education. And I was wondering if, before we get into sort of the nitty gritty, if you could maybe comment a little bit about that route that your life has taken.

Nancy Greig [00:25:24] Well. I've never really done anything on, I don't want to say on purpose, but my life has been a little bit circuitous and sort of I guess I just took opportunities when they came along. So, you know, I didn't intend to get a Ph.D., but then it kind of fell into my lap. In fact, I remember my mother said, "Why don't you just get a master's? You know,

you're miserable as a graduate student." And, but, you know, that's not what professors I guess they get more teaching credits for PhDs. But anyway, I was kind of dragged kicking and screaming through that. But I'm so glad that I got it. And of course, thinking back, it was a wonderful experience.

Nancy Greig [00:26:11] But then I happened to get hired by the Organization for Tropical Studies because I'd been working at La Selva and had run into people in that group. La Selva is a part of this, it's a consortium of U.S. universities that run some field stations in Costa Rica, and they have several courses. Their most famous one, which has been going since the sixties, I think is tropical biology and all the big biologists, Dan Jansen, whatever, you name it, have been, sort of, cut their teeth on that course. And I because I'd been at La Selva and had participated in the course and met some of the people, I was called, you know, about the time I was graduating and offered a job, a two-year contract to teach for those courses.

Nancy Greig [00:27:00] And that was another incredible experience. It's like, so, there are eight-week courses, basically like hugely intense summer camp for adults, and there's 22 students and several resource people. The coordinator, which I was, sort of lines up the places to go and the resource people to invite, etc. and helped in the student selection. And then we would just basically go from field site to field site over these eight weeks doing research projects. And, at the end, the students had about a week to do an in-depth research project.

Nancy Greig [00:27:38] So, just meeting all the different people from all different sides of biology, I always wished that I could have just been a student and not had to do my own part, but to spend more time with some of these amazing biologists that were the resource people.

Nancy Greig [00:27:57] I forget where this was leading.

Nancy Greig [00:27:58] Oh, anyway, so, but that contract ended and I was looking for a job. I'm was looking for a post-doc. And I presumed that I would go on to be a professor at a university somewhere. So I did get a post-doc with a fellow Piper biologist, Bob Marquis, who is at the University of Missouri at St. Louis, although I think he's retired now. And he hired me to work on the fauna of three oak trees that grew around Missouri. And so, I went and I moved from Austin to St. Louis and was there for six months. I called it "changing caterpillar diapers" because most of the things that ate oaks were these little bitty leaf miners or other caterpillars. And my job, a big part of my job, was to keep them fed and cleaned up.

Nancy Greig [00:28:57] So, but anyway, while I was in St. Louis, I came back to Austin at Christmas, I guess, and happened to be talking to Larry, my old major professor. And he looked at me kind of funny and said, "Hey, you should apply for this job in Houston. They're looking for somebody to head up this new butterfly center they're opening." And I sort of rolled my eyes, but I said, "Well, here I am in Austin. I'll go." I had to borrow clothes to go for the interview because I didn't have anything. And I flew down to Houston.

Nancy Greig [00:29:27] And indeed, they were in the 11th hour of constructing this live butterfly center. And I got the job actually, kind of it was a sad way to get it. But the person who had been their entomologist had had a stroke and was basically incapacitated. So here they were at the 11th hour looking for somebody to direct this thing that was supposed to open the following summer.

Nancy Greig [00:29:57] And I guess I snowed them. You know, I knew about butterflies and the Center was supposed to be a neotropical rainforest. And of course, that was my area of expertise.

Nancy Greig [00:30:10] And one of my boyfriends in college was Phil DeVries, who's an amazing butterfly biologist. I should also give him credit. So I knew, you know, more about butterflies than the average botanist. And plus I was a tropical botanist and they were desperate.

Nancy Greig [00:30:31] So anyway, I went back to St. Louis and I got a call two weeks later that said, from the Houston Museum of Natural Science, saying, "How soon can you get here?".

Nancy Greig [00:30:39] So I fortunately was able to leave my post-doc in good standing, and I flew down to Houston. And in the beginning of February, I started my job. And it was totally unexpected. You know, like I said, I thought I'd be a university professor. I wasn't tremendously enthusiastic because I've never been all that gung-ho about my research, a little insecure about it, maybe, but so I had no idea what I was getting into. And I really wasn't trained in any of the business sense of things, but I think I ended up being a pretty good fit for the job and it was certainly a tremendous experience for me.

Nancy Greig [00:31:23] If you want, I can talk more about that, but I don't know how long you want me to go here.

David Todd [00:31:29] I think that that is a wonderful summary that you seem like a flexible person who sees opportunities and takes them. And sometimes, you know, trying to make sense of them in retrospect is maybe it's kind of a fool's errand, you know, that you play your cards as they are dealt.

Nancy Greig [00:31:52] Yeah. I remember you asked me about leaving academia, so...

David Todd [00:31:55] Yes.

Nancy Greig [00:31:56] Yes, it was kind of a, whatever, a big swerve off the route. So as I said, I thought I'd probably be a professor because what do you do with a Ph.D.? You know, that's kind of expected. You do a few years of post-doc and then you get a job. And but this was a secure job and a pretty good job. And I did get some flak from a couple of my professors that thought that it was copping out to leave academia.

Nancy Greig [00:32:26] But, you know, in retrospect, I think this was such a good fit for me. It allowed me to use my people skills, which it turns out I am pretty good dealing with people. And as I said, I wasn't tremendously secure about my role as a hotshot researcher. And, but I love natural history and I like to teach people. So it turned out to be a really good fit.

Nancy Greig [00:32:56] Now, there were some things that I floundered at. I'd never managed staff before. I'd never done a budget or, you know, rubbed elbows with the, whatever, high and mighty Houston society. But I learned and, you know, it was a great experience. It really, truly was a wonderful job. I was lucky to get it and glad I had it.

David Todd [00:33:21] Well, thanks for sharing that with us.

David Todd [00:33:25] So, maybe we could drill down into just one creature that was, I guess, underneath your umbrella at the Cockrell Butterfly Center, and that's this monarch butterfly that we'd love to hear more about. And I was hoping that you might be able to just get us started there by maybe trying to remember the first time you were introduced to monarch butterflies.

Nancy Greig [00:33:50] Okay, well, let's see. Well, monarchs, you know, are so iconic. Everybody knows monarchs. They in fact, most people think all butterflies are monarchs - in my experience, oh, it's a monarch, especially if it's orange. But anyway, so they're really important. And also sort of an ambassador species or whatever you want to call them.

Nancy Greig [00:34:12] So one of my jobs that I was totally unprepared for, but ended up being a lot of fun, was to come up with content and whatever for an entomology hall which is part of the Butterfly Center. So we had this live walk-through, but then we had this big collection of insects that we wanted to showcase. And so, I had to come up with all the content for this, whatever it was, 4000 square foot, 3000 square foot entomology hall.

Nancy Greig [00:34:42] And so we had a variety of things. We had, of course, you know, different orders of insects, and we had the role of insects in pollination and the Africanized bees, etc., etc. But, it seemed logical to have a display about monarch butterflies because they come right through Texas. Texas is really important to them. So I don't remember exactly how this was done, but we decided to put a little diorama in the entomology hall. So we had these windows and we got fake fir branches and I bought monarchs from, I forget the name of the company, but anyway, they sell dead insects, so we got a bunch of monarchs and mounted them on these fir branches to look like where they hang on the trees down in their sanctuaries in Mexico.

Nancy Greig [00:35:37] And so that was really my first ... I knew about, everybody knows about monarchs, I guess, in a vague sense.

Nancy Greig [00:35:44] But then I had to write a little blurb about their migration.

Nancy Greig [00:35:50] And then, I don't remember quite how this happened, but the museum had a big travel program back in the day, which unfortunately has kind of diminished. I guess it's just gotten too expensive. But so we came up with the idea of going to see the monarch sanctuaries because this is an easy flight from Houston. It's a cool trip that's very applicable.

Nancy Greig [00:36:12] And so then, I started looking into this trip and finding out more, and I got a hold of Bill Calvert because I saw he was involved in something called the Texas Monarch Watch. And Bill is a biologist who lives in Austin, has worked on monarchs his whole life, I think, and he was hugely helpful. And he ended up co-leading the first trip with me, which was great because he knew where to go and what to see and what to say and everything. So that's really my first introduction that way and going actually to the roost and seeing where they spend the winter. And so that was pretty incredible.

Nancy Greig [00:36:57] And then we had, you know, monarchs just kept coming up. The museum, we started, we had some greenhouses and we raised plants for the Butterfly Center. But eventually we got, we had all this greenhouse space. So we started growing plants to sell in plant sales to promote butterfly gardening. And monarchs are about the easiest thing you can grow in your garden. You know, they're specifically, they only eat milkweeds and

milkweeds, especially the tropical milkweed, which is getting a bad rap these days, but anyway, that was available, easy to grow.

Nancy Greig [00:37:36] And so, people started getting obsessed with monarchs. We would sell the milkweed and then people would run out and call us in desperation, "Our more monarchs are starving. Can you please get us some more milkweed?".

Nancy Greig [00:37:51] Anyway, so monarchs were just everywhere, really. We had a, the Museum premiered a film about migration. I forget what it was called, something about Great Migrations. And one of the four animals that was featured in addition to birds and whales was the monarch butterfly. And we had a speaker come - Chip Taylor, who's the head of Monarch Watch in Kansas, which is the national organization that has kind of continued the citizen science program that the original discoverer of the monographs started.

Nancy Greig [00:38:30] Fred Urquhart was a Canadian who started tagging monarchs because he noticed them doing this weird flight pattern every fall. And he eventually discovered through tracking these tags that he'd put on monarchs and got other people to put on monarchs, he finally found that they all ended up at the border of Mexico, and he hired a guy, Ken Brugger, I believe his name was, to travel around Mexico with his girlfriend on the back of his motorcycle, and they eventually found the roosts.

Nancy Greig [00:39:05] And probably people as old as I do will remember the 1976 cover of National Geographic with the woman whose name is escaping me, Catalina, I think.

David Todd [00:39:18] Trail?

Nancy Greig [00:39:20] Yes.

Nancy Greig [00:39:20] In the roosts in one of the sanctuaries covered with butterflies is a truly spectacular and iconic National Geographic cover.

Nancy Greig [00:39:30] But so and then we also had, the museum also later on had a film that was about Fred Urquhart called The Flight of the Butterflies, which is a wonderful film that talks about his whole career and how the roosts were discovered, etc.

Nancy Greig [00:39:47] So yeah, I was just, all along the way, I learned more and more. I got to know some of the biologists - you know, Bill and Chip. And my staff and I went up to take a workshop with Karen Oberhauser, who's a big monarch researcher at the University of Minnesota.

Nancy Greig [00:40:07] And yeah, monarchs are big in the butterfly world.

Nancy Greig [00:40:12] We did not, interestingly, did not fly them at the Butterfly Center because they don't behave very well. Mostly we use tropical butterflies, but when we did have monarchs, they would just fly to the window and stay there and they didn't fly around naturally and visit the flowers and stuff in the Butterfly Center. So we really never had live monarchs in the Butterfly Center, ironically.

David Todd [00:40:36] That's interesting - so iconic. But maybe that was its role as an ambassador is just to get them through the door with the story in the entomology hall and in the movies and tours and speakers that you had.

David Todd [00:40:51] Well, so maybe you can tell us a little bit more about this iconic creature. Could you introduce us to the life history and the ecological niche of the monarch butterfly?

Nancy Greig [00:41:03] Sure. Well, that does remind me. So people in the Butterfly Center, when they wandered through, you know, people would always have a few questions. And the most common question we ever got was, "How long does a butterfly live?"

Nancy Greig [00:41:17] And that's actually kind of a complicated answer, but we'd done some actual mark-and-release studies in the Butterfly Center just to find out how long they live for really economic reasons, to figure out how many we should be buying and what, you know, what we could expect.

Nancy Greig [00:41:34] But so we'd found that on average, butterflies in the Butterfly Center would live about two weeks and probably in nature they'd live maybe two weeks to six weeks - not long at all. Anyway, but then people would inevitably say, "Well, but what about the monarch? You know, how do they fly all this way to Mexico in two weeks?"

Nancy Greig [00:41:53] So, they are a very unusual butterfly, but their basic biology is just like any old butterfly. You know, they develop from an egg and they're laid on their host plant, milkweeds, Asclepius. And that's all they eat. In fact, the whole, there's a whole group of about 300 species, pretty much all tropical species called the milkweed butterflies, of which monarchs are a member. And they all feed on plants in the milkweed family very specifically, they won't eat anything else.

Nancy Greig [00:42:27] So in the case of the monarch, you know, the caterpillar hatches out of the egg in three or four days and then spends the next ten days to two weeks eating and shedding its skin about five times and growing.

Nancy Greig [00:42:41] And monarchs can eat a lot. I'll tell you that. They can really chew up some milkweed plants.

Nancy Greig [00:42:47] And then they form the chrysalis. And it's about ten weeks, ten days to two weeks later, then they emerge from their chrysalis.

Nancy Greig [00:42:56] And once they emerge, you know, the first order of business for normal monarchs, just during the non-migratory phase, is to do what any butterfly would do is start eating and find a mate. And then the female lays eggs. And you know once you've done that, you've flit around for a few weeks, then then you die.

Nancy Greig [00:43:20] But, in the case of the monarchs, we think they were a tropical species originally, probably originating in Central America, where there still are populations of monarchs. But as the prairies kind of opened up with the settlement and milkweed spread through the prairies, the monarchs followed them up, taking advantage of all this great habitat.

Nancy Greig [00:43:42] But they couldn't survive the winter. So they had to get out of there before the freeze came. And perhaps fortuitously or whatever, their milkweed host plant also died back in the winter, so there was nothing for them to eat.

Nancy Greig [00:43:56] So, they've evolved this incredible behavior, migratory behavior, where in the fall, the monarchs that emerge from the chrysalis don't do the normal mating whatever. They just, they go into sort of a reproductive diapause and they just start eating and building up their fat stores.

Nancy Greig [00:44:18] And eventually, apparently the cues they use are the declining angle of the sun and the shortening days. Temperatures aren't as reliable because, you know, you never know. You can have a hot September. But anyway, they use these of these the cues from the environment to tell them that you need to get out of here because winter is coming.

Nancy Greig [00:44:41] And so they start flying southwest. So, well, let's take one that started in Ontario. So they just start flying and flying and kind of joining others along their path. They will stop en route. And in fact, apparently some of them end up in these same trees every year. I've talked to people down in southern Texas who say, "Oh, yeah, there's a tree on my ranch where every fall it's just covered with monarchs." And they're sort of stopping for a rest overnight or whatever.

Nancy Greig [00:45:15] But anyway, they fly all the way to central Mexico, to the mountainous area in Michoacan, which is not tropical at all. It's sort of like Colorado - evergreen forests, and it's about 11,000 feet. So it's pretty cool up there. Kind of like the Goldilocks thing, you know, not too hot, not too cold. And they arrive right around the end of October, early November, which is why they're associated with Day of the Dead in Mexico. Some people think they're the returning spirits of their dear departed ones. And I guess in some places they feature in the Day of the Dead celebrations or whatever.

Nancy Greig [00:45:57] But anyway, they end up in these high mountain, fairly undisturbed forests, and eventually settle down on the branches of these mostly fir trees, oyamel firs. And as the temperatures cool, they'll basically just sit there and go into sort of a dormancy and they will sit there from November through February.

Nancy Greig [00:46:23] And now some of them do come down from the trees, but it's very dangerous. You know, if they didn't get enough en route, researchers have studied this and weighed the ones that I guess come down from the trees versus the ones that don't, and they're the ones that don't have quite enough fat stores to get through the winter. So they'll come down and look for nectaring flowers and drink water and stuff.

Nancy Greig [00:46:46] But if the sun goes behind a cloud or, you know, it's too late in the day, they can't fly. And they'll, if they're on the ground, they're much more likely to be eaten by some of the predators that have evolved resistance to their toxins and can eat monarchs.

Nancy Greig [00:47:03] So, anyway, they spend this four months, basically dormant. And then in the spring, as the days start getting longer and the temperatures warm, they'll get, they'll become more and more active and they start flying around.

Nancy Greig [00:47:17] And that's when we would try to go. We would try to take the trips towards the end of February, because if you went in mid-December, you might just see monarchs sitting on the trees and they just look like a bunch of dead leaves. But if you go when they're active, it's truly amazing. It's like being in an orange snow storm. It's just mind-blowing. There's all these monarchs just floating around you and it's so quiet up there and yet you can hear the wings fluttering together, because there are just so many of them. It's like the leaves drifting down or something. But so it's truly amazing.

Nancy Greig [00:47:53] And this is when finally they mate. So they've had all this time in reproductive diapause and now they go into this mating frenzy and, you know, most male butterflies collect pheromones and do all these courtship things. Well, not monarchs. It's just wham, bam, thank you ma'am.

Nancy Greig [00:48:12] And monarchs will just grab the females out of the sky. And we would, you know, the groups and I would watch these males thrashing around on the ground with another monarch in their grasp. And sometimes they'd realize it was a male and let him go. But anyway, they would mate.

Nancy Greig [00:48:30] And by the way, apparently most butterflies only mate once, or not males, of course, but females. I think monarchs can mate more than once - females. I'm not sure.

Nancy Greig [00:48:43] But anyway, so after that happens, eventually the monarchs start leaving. So by the middle of March, all the monarchs have left and they're started to starting to come back north. Probably the males, having done their thing, drop out and die before they even get to the U.S. border. But the females travel on there, almost nine months old by now. They're beat up, they're faded. They're tattered. They're tired.

Nancy Greig [00:49:14] But they come to the bounty that is our North American spring and find the wildflowers. This year must have been incredible for them. And the new milkweed's coming up. And then they finally lay their eggs. And then those travelers die.

Nancy Greig [00:49:30] And then the summer generations kind of continue the migration north. But each one of those butterflies, maybe those two or three generations, is, they have a normal life cycle, right? They emerge and mate and they keep following the wildflowers and the milkweed as they emerge north, as the north, as the spring spreads northward, till by mid-summer or so, they've reached the northern edge of their range, which is southern Canada basically.

Nancy Greig [00:50:03] And there's, by the way, a population west of the Rockies, which there's very little overlap there, maybe some, people are finding out. But that generation actually migrates down to the coast of California around Monterey and Carmel. And they roost now in the introduced eucalyptus trees. So that's a different population. But they do basically the same thing.

Nancy Greig [00:50:29] So, it's a pretty incredible story. And people really have a hard time getting their head around that.

Nancy Greig [00:50:35] What's different about the monarch migration from, say, vertebrate migrations, is these migrants are separated by two or three or four generations from the previous migrants. So it's their grandparents are great-grandparents that migrated the previous year. So they've never been there. Their parents haven't even been there.

Nancy Greig [00:50:54] So somehow there's this genetic memory that tells these little insects that weigh about as much as a paperclip that they need to go 2000, 3000 miles to these roosts in Mexico to spend the winter, so they can survive. It's just a really incredible story.

David Todd [00:51:16] Wow. Thank you so much. It is fascinating, I mean, how their life history is so tangled up with this migration and their ability to span, you know, from southern Canada to central Mexico. Thank you for explaining that.

David Todd [00:51:32] So can you help us sort of put the monarch butterfly in its ecological niche, I mean, what sort of role it plays in the broader ecosystem?

Nancy Greig [00:51:45] Well, monarchs are just a butterfly, right? I mean they really don't do, except for this migration, and it's become, you know, a symbol of NAFTA and stuff like that, uniting Canada and Mexico because it's important to keep this this connection going.

Nancy Greig [00:52:07] But, you know, butterflies are pollinator, but not tremendously important pollinators. They do pollinate some, mostly wildflowers. And, of course, they're caterpillars. Caterpillars in general are really important food for songbirds. So but the monarch, as opposed to any other butterfly, I wouldn't say is really any more important in that particular way.

Nancy Greig [00:52:37] They may pollinate milkweeds because in addition to eating the leaves, they seem to really like milkweed flowers, at least in my limited experience. I've seen them visiting and milkweeds have a really weird pollination. They don't have dusty pollen, you know, that most flowers do.

Nancy Greig [00:52:58] They have more like an orchid pollinium, these little wishbone things that are stepped down into the corolla that have hooks on them. And when they're pulled out by something like a butterfly probing around and the little hook gets stuck to the leg and it gets pulled out. And so they're not, but it's a kind of unusual pollination system. And I expect since I've actually seen the little pollinia stuck to butterflies' legs, that they are certainly one of the pollinators of milkweeds.

Nancy Greig [00:53:31] But yeah, other than that, you know, what's really special about them is this incredible migration. Otherwise their biology is similar to most of the butterflies.

Nancy Greig [00:53:46] They are bad-tasting. So vertebrates don't eat them.

Nancy Greig [00:53:50] Wasps love monarch caterpillars. I can't even keep any going in the summer because of the wasps that get every last one of them.

Nancy Greig [00:53:58] But I don't know if that answers your question.

David Todd [00:54:01] Yes, absolutely. No, this is super helpful and thanks for the introduction.

David Todd [00:54:08] So I understand that the IUCN recently listed the monarch as endangered, and the Fish and Wildlife Service has looked at the creature and thought that listing was warranted but precluded.

David Todd [00:54:24] Can you give us a little background about why you think the monarch has been declining in recent years?

Nancy Greig [00:54:30] Sure. Yeah. Well, all insects have been declining. I think we noticed the monarch because it's so iconic, because it has this incredible migration and then the whole

population, basically the whole eastern population, ends up in this one area. So people can monitor. They can go down there and count. Usually they actually just estimate by area how many monarchs there are.

Nancy Greig [00:54:58] And so for several years, Monarch Watch actually has been doing this for many years. And you can get tags from them and tag monarchs during the migration and then in the remote chance that they are found, it gives them a feel of how many. Plus just going down there and seeing how many there are.

Nancy Greig [00:55:24] And it's fluctuated tremendously since I first led a monarch trip in, I don't know, the late nineties, the mid to late nineties. And you know, there'd be I forget how many was so many acres were covered - from 20 acres to two acres. I mean huge fluctuations.

Nancy Greig [00:55:45] One year, we went down there and there had been a real event. It had rained in the area where the sanctuaries were and that wasn't so bad but then it froze a few days later. It was a hard freeze and oh my gosh, I think they said it was like three quarters of the population, or maybe it was even more than that, died. And so when we were there visiting, there was a huge carpet of monarch bodies on the ground. I mean, and apparently before they'd been matted down by the time we got there. But apparently it had been, you know, three feet deep in monarch bodies in the understory of this forest.

Nancy Greig [00:56:23] So, so there's events like that, unexpected events.

Nancy Greig [00:56:29] But overall, you know, insects in general are declining drastically. In fact, people talk about the insect apocalypse. Finally, thank goodness, there has been some news and some concern about that.

Nancy Greig [00:56:42] But it's a variety of things. It's climate change, of course. It's urbanization. You know, we're basically paving over all the ... there's not much for monarchs or other insects in Houston, for example.

Nancy Greig [00:56:59] Farming practices have changed a lot. One, there has been a lot of use of the things like glyphosate, you know Roundup, which is targeted to kill. There's been plants - soybeans and corn - developed that resist Roundup, so you can spray with impunity and it just kills the quote weeds. Well, the weeds are the milkweeds and the wild flowers that used to grow between the cornrows or the soybean rows and now are killed by pesticide.

Nancy Greig [00:57:31] Furthermore, farming practices have gotten a lot more intense. There used to be these broad right-of-ways along highways, and you'd see all the wildflowers. Sometimes now farmers plant right up to the highway. So they're eliminating a lot of habitat.

Nancy Greig [00:57:47] So both from intensive farming, from pesticide use, from urbanization, plus then the climate change all on top of this, it's a pretty, pretty gloomy scenario for not just monarchs, but all insects and bees also, and not just honeybees. People think it only mean honeybees. But it's really we're more concerned about our native bees.

Nancy Greig [00:58:14] Yeah, it's a, it's a grim scenario. And monarchs just kind of allow us to see that.

David Todd [00:58:22] Well, and can you talk a little bit more about the problem that climate change poses for monarch butterflies and other insects?

Nancy Greig [00:58:34] Well, it's changing their ranges for one. Okay, supposedly (I'm not a climate change expert), but one thing, that not only is it getting warmer at higher latitudes, but we also have seen more extremes. So something like that big freeze in Mexico or the freezes that we get here that are unexpected. So it's getting hotter and colder. It's like greater swings. So that is, you know, hard for insects maybe to adapt to.

Nancy Greig [00:59:08] Things like bumblebees, like it kind of cool. And so, they're apparently moving higher and higher up the mountains. Well after all, there's no higher you can go. So it's just, well, it's also kind of you're eliminating habitat for them. So I guess that's the main ways. You know, it changes ranges of plants, too. So, so all these things are interconnected and it's happening so quickly that things aren't able to adapt.

Nancy Greig [00:59:42] There is a, by the way, another book that I read that was very interesting was a Barbara Kingsolver book called Flight Behavior, which is about monarchs and climate change, kind of, because of climate change, they no longer go to Mexico to roost. They end up in North Carolina, I think. Anyway, it's up in the Appalachians. And anyway, it's an interesting take on the monarchs and climate change. So that could happen. You know, it just doesn't get so cold here. So why go all the way to Mexico, you know?

David Todd [01:00:18] Sure. Well, I guess it's just changing all the rules and traditions that insects have evolved with and depended on.

Nancy Greig [01:00:29] And so quickly, too, That's the other thing, you know?

David Todd [01:00:33] Yeah.

Nancy Greig [01:00:34] Yeah.

David Todd [01:00:35] Okay.

David Todd [01:00:38] So I thought it was interesting that you know, you've come from this sort of botanical background and I was wondering if you could zero in a little bit more on milkweed and particularly tropical milkweed. I think you mentioned when we were talking earlier about the greenhouses at the Houston Museum of Natural Sciences, that you were trying to provide milkweed for some of the public and that I guess some of this milkweed at that time was tropical. And, I gather that in years since, you know, there's been some hesitation about using tropical milkweed, instead of native milkweed. Can you help us understand what the difference is and why that's a problem?

Nancy Greig [01:01:32] Well, you're going to get a very different take on this from some people. But okay, there's about 35 species of native milkweed in North America. And tropical milkweed is from, you know, grows in Mexico and Central America. It's probably the milkweed that monarchs evolved with, using. Who knows? But anyway, but they eat many different milkweeds. And different milkweeds have different levels of the cardiac glycosides that the monarchs get their protection from.

Nancy Greig [01:02:05] Anyway, of course, there's a big move now to plant native, plant natives, and I think that that is great. But and then at the museum, we heard the call and we started trying to raise native milkweeds. And I will say that native milkweeds are really hard to grow. They're really hard to grow. They're really slow. They don't get established very

easily. I've tried to plant them in my own garden several times, and I have a couple of, I think, *Asclepias perennis*, that do come up every year, but it could maybe feed one monarch.

Nancy Greig [01:02:42] Anyway, tropical milkweed is not native to North America, it's native to south, south of us where it doesn't freeze. So it's a perennial. Well, they're all perennials, but the native milkweeds die back in the winter. So, when it gets fall, the plants senesce and they die back to the ground. Many of them have big tubers and that's why they're so hard to transplant. And then they'll come back up in the spring.

Nancy Greig [01:03:08] Well, tropical milkweed doesn't do that. It doesn't have a big tuber. It grows, if it's in a good temperature, it can grow year-round. It's very easy to propagate either by seed or you can even, I think, you can even do cuttings and certainly you can transplant it very easily, which is not true of a native milkweed.

Nancy Greig [01:03:27] So, there is a big push to grow native milkweed. There's been a lot of research lately on whether having tropical milkweed, which doesn't die back in the winter, that that might encourage monarchs not to migrate. Here they've got this food and it's one of the cues is, well, there's no more food for their babies, so we need to go south then, then they've got it. Well, maybe that causes them to not migrate and then they could be here and freeze in the winter.

Nancy Greig [01:04:01] I haven't read all the research. I've read some things that say, actually, no, you know, they're in this diapause, it's not that easily broken.

Nancy Greig [01:04:12] We do have resident populations. There has probably been a resident population of monarchs in South Florida for a long, long time.

Nancy Greig [01:04:19] And certainly with global warming, when it doesn't freeze anymore in the winter, there's been monarchs, I see monarchs, around the year in Houston. In fact, if they've got food, they'll do better in the winter because the wasps aren't around.

Nancy Greig [01:04:35] But anyways, the other problem that people have cited with tropical milkweed is that there's a protozoan parasite called, let me see if I can say it, *Ophryocystis elektroscirrha*, abbreviated "OE" for short, because nobody can say or spell that long name. But this parasite, in small doses, doesn't really hurt the monarchs, but it can build up. And if there's enough of these sporozoans, protozoans, whatever they are, in the monarch's body, it can eventually kill it or certainly weaken it.

Nancy Greig [01:05:14] So, you can kind of tell the symptoms if you have a big infection. The caterpillars look a little funny and maybe the chrysalises have black spots on them and the adults come out and they're deformed or they're weak or whatever. And it's the spores are spread by the adults. So when they come and the parasite develops inside and then they form spore bodies which migrate to the outer cuticle of the butterfly.

Nancy Greig [01:05:47] And so when a female butterfly that's infected with these spores lays eggs on another plant, some of the spores are shed with her scales, and they're teeny, teeny tiny. If you look at a microscope of them, they look like little footballs. But the scales are, I don't know, 20 times bigger than they are. So they're very, very tiny.

Nancy Greig [01:06:05] Anyway, so then then the caterpillar comes along and eats the spores that have fallen on the leaves, and then the spores hatch inside the caterpillar's body and infect the caterpillar all over again. And so eventually you get these big buildups.

Nancy Greig [01:06:22] So, because, and any milkweed can harbor the OE spores. But the problem with tropical milkweed is because it doesn't die back in the winter, these temperate ones all sort of self-cleanse. So they die back to the ground in the winter. And then if they did have OE spores on the leaves, well, they've got all new leads in the spring, so they're clean again, whereas tropical milkweed, if it's just growing year round and has spores on the leaves, then it could continue to reinfect.

Nancy Greig [01:06:53] So some people say, well, just cut it back severely a couple times a year. I don't know. I have talked to people like Chip Taylor about this, and some people have become very adamant about how bad tropical milkweed is. But Chip, apparently he just doesn't like to say. He doesn't think it's that big of a deal. He kind of thinks it's more important that people plant something to keep monarchs going.

Nancy Greig [01:07:25] And then recently I was talking to the people at the Arboretum who are, who don't sell tropical milkweed. And I found a couple articles by eminent butterfly biologists saying this is all hype. It's really not that big of a deal. Apparently, some counties in California have banned selling tropical milkweed and they think that it's a mistake and it's a lot of hype.

Nancy Greig [01:07:53] So, I guess the take-home message is, ideally you would plant just native milkweed, but good luck having enough to sustain a big population of monarchs in your yard.

Nancy Greig [01:08:06] Does it change the migration pattern? Who knows? Maybe. Maybe not. I don't know.

Nancy Greig [01:08:13] I grow tropical milkweed. I cut it back in the fall, but it sprouts again in the winter. And there are always monarchs here in the winter. So it's a, it's an uncomfortable question, and there's a lot of argument about it, sometimes not very cordial argument. So I don't know. I think that if you use it right, tropical milkweed is a great asset.

Nancy Greig [01:08:44] I mean, the Arboretum wants to do classes with monarchs and stuff like that. And I think they're going to have a very hard time raising enough monarchs in quantity using native milkweeds. But I guess you can try.

Nancy Greig [01:09:01] Also, the other thing is monarchs love tropical milkweed. It's their favorite. If you give them a selection of milkweeds, they'll almost always use the tropical milkweed because they like it the best.

Nancy Greig [01:09:11] So, I don't know. It's a dilemma.

Nancy Greig [01:09:14] What do you think?

David Todd [01:09:16] Well, I love listening to your story because it seems very even-handed. I mean, on the one hand, there are these concerns about OE. But it's fascinating to hear about the sort of evolutionary origins that maybe this was a plant that they, in a sense

grew up with and still like a great deal. So, thanks for explaining the debate. That's something I wanted to hear about.

Nancy Greig [01:09:43] Well, just let me say one thing. You know, they still eat it, there's many, one of the reasons the whole declaring the monarch endangered is kind of weird because there's monarchs all over the world now. There's a population in Hawaii. I think they're in Australia. They're in Central America where they're native too. And those populations don't migrate. And they're not particularly endangered any more than any other insect.

Nancy Greig [01:10:05] It's the migratory phenomenon that's really endangered.

Nancy Greig [01:10:10] And for example, the Western population has just plummeted to it's like 2% of what it used to be or something. And the eastern population fluctuates, but it's also way down from where it used to be.

Nancy Greig [01:10:24] So, it's not that the monarchs are going to go extinct, but this incredible migration that they do might not happen anymore.

Nancy Greig [01:10:35] You know, we would have monarchs maybe in the south where they're residents and some stragglers, but you wouldn't have these millions and millions of migrants.

Nancy Greig [01:10:45] So, and I was going to say something else, but I forget.

David Todd [01:10:51] Okay. Well, so we talked a little bit about milkweed, both tropical and native, and the efforts to get folks to maybe consider planting them as is a way to feed and support monarchs.

David Todd [01:11:07] Can you talk about any other strategies for trying to protect and restore monarchs or at least the migration that you know is such a big phenomenon?

Nancy Greig [01:11:18] Well, I think I think there's all sorts of things you can do. One, you know, get rid of at least some of your yard plant. Plant more natives, plant nectar-bearing flowers for the adults. Yes, plant milkweeds. I don't care if you plant tropical milkweed. Just you know, if you think you're getting an OE infection, will then cut it back. But yes, plant native milkweeds.

Nancy Greig [01:11:44] Basically just habitat preservation. You know, the more habitat we can plant and reclaim, maybe, you know, it shouldn't be legal anymore to plant right up to the roadways. We need to reestablish those right of ways that were full of wildflowers.

Nancy Greig [01:11:58] And I think it's all about creating more habitat. So, you know, butterfly gardens in people's yards, as we used to say at the Butterfly Center plant it and they will come. I mean, it's amazing. My yard, as since I've been retired, I've had more time to dedicate to my own yard. So I plant a lot of native wildflowers and host plants. And there's tons of butterflies in my yard.

Nancy Greig [01:12:23] And I see that around town. You know, people that have more of a natural habitat, they get more insects. It's not that. I have all sorts of native bees, too, in

addition to just the butterflies. You have to, if you really want monarchs, you do have to plant the host plant.

Nancy Greig [01:12:41] So but also for the migration, think when they're coming through in the fall, especially in your area, because they come right through Austin, they don't really come so much to Houston, but they're nectaring. They need that nectar to get all the way down to Mexico to spend the winter.

Nancy Greig [01:12:57] So it's all about habitat.

Nancy Greig [01:12:59] Oh, another inspiring book, of course, is David Tallamy's stuff. You know, he's, I forget the titles of his books, but he's big on getting rid of your lawn or not all of your lawn. But if everybody would take 20% of their lawn and planted in, you know, native plants, that would be more than the whole area in the U.S. of our national parks. So really, lawns are just, the way we maintain them now, are just a desert for monarchs and insects in general.

Nancy Greig [01:13:32] And then since it's a trickle-down, you know, so many birds that sort of depend on insects that it's a, you know, it's a desert for everything. So, yeah, plant, plant more, more wildflowers.

David Todd [01:13:47] Well, great. And people like wildflowers, too. So I guess that's a double bonus there.

Nancy Greig [01:13:56] No not everyone. I just, I just was down in Galveston with a friend of mine, and she had gotten, she's planted a little plot in front of her house and she keeps getting letters from her homeowners to say, when are you going to cut down those weeds, when are you going to cut those weeds? And it's just, it's all wildflowers. There's no weeds.

Nancy Greig [01:14:13] And, you know, people, we've got to change the, we've got to change the esthetic. We've got to make people think that wild, or wilder, doesn't have to be, it doesn't have to be a weed patch. You can look somewhat neat.

Nancy Greig [01:14:28] But yeah, people are used to seeing these manicured green lawns and little neat hedges and, you know, not having any insects. People are so afraid of insects of any kind. We've just got to change people's attitudes because it's yeah, people like, wildflowers in principle but not in their neighbors' front yard.

David Todd [01:14:52] Yes, that's really interesting that it's, I guess the esthetics of gardening and, you know, whether you're going to win the homeowner association's best lawn of the month.

Nancy Greig [01:15:09] Well, we're got to change the homeowner association, so that they maybe, you know, you should get the best wildflower patch of the month, or the most butterflies of the month, or something like that. But yeah, this lawn fetish is very bad. It's just, it's silly and but it's become so widespread and kind of a status symbol and then required by many homeowners association. So it's, yeah it's interesting but I think slowly we're getting there, but this needs to happen a lot faster.

David Todd [01:15:44] Okay. Well so we've talked a little bit about, I guess, what individuals can do by planting milkweed and other nectar plants to support insects and wildlife.

David Todd [01:15:59] But I think you mentioned also that this there's an issue with these Roundup-ready crops. And I guess I've also heard people talk about the oyamel fir logging and removal of some of those trees that they winter in. Do you have any sort of insights about that and you know promising ways to try to change attitudes and policies.

Nancy Greig [01:16:26] Well, the situation in Mexico that's kind of out of our control. It's a, you know, where those, the oyamel fir forests are in a mountainous, remote, very poor part of Mexico. And they've the people there have traditionally used those trees for firewood, etc. But there's also a lot of logging. Now they have been declared reserves or whatever and there are fines etc. for logging. But it still does happen. There's poaching. So as much as those areas can be protected. There are also some efforts to reforest. So that's happening.

Nancy Greig [01:17:08] But really, that's more Mexico's issue. We can encourage them and I know Monarch Watch, and I'm sure other organizations, have been doing that.

Nancy Greig [01:17:21] Uh, you have to ask me your question again.

David Todd [01:17:24] Well, I guess maybe closer to home, there are these crops, as you know, that have been developed with Roundup-ready technology. And so I guess you mentioned that, you know, folks spray the soybeans, but they destroy the milkweeds.

Nancy Greig [01:17:41] Well, people also use Roundup in their yards. I mean, Roundup, I've seen people, sprayers at Whole Foods spraying in the parking lot, spraying Roundup. And you'd think Whole Foods would know better. But so Roundup is just such an ubiquitous thing. You go to Home Depot or whatever and there it is. And it's an easy way to get rid of weeds. Of course, it does kill pretty much everything unless the Roundup Ready genes have been bred into the plant. But that's only a couple of crop plants.

Nancy Greig [01:18:16] So, so yeah, I mean, that stuff is bad. Herbicides are bad, but people are trying to keep their yards weed-free, and that's the easiest way to do it. Believe me, I pluck all my weeds by hand, but it's kind of a joke in the neighborhood. So yeah, I just, it's just a matter of education and telling people how bad the stuff is, how important it is to keep and create more habitat and not to use these things that, that I just think people don't realize what a huge effect they have.

Nancy Greig [01:18:57] You know, it's people aren't necessarily malicious, but they're looking for an easy way out. They want to have a nice-looking yard. And like I said, again, we have to change what a nice-looking yard is considered to be and really discourage. I think the US way to pesticide-happy. Europe is much stricter about what pesticides can and can't be used. So we've got a ways to go. But, I hope we're inching in that direction, just as I said several times, just not fast enough.

David Todd [01:19:35] Okay. Well, so I guess one thing that citizens can do is plant natives and plant milkweed in particular.

David Todd [01:19:46] But I understand there's also some opportunities for individual lay people to get involved in citizen science efforts to monitor butterflies and their larvae and the milkweed that they depend on. Are you familiar with any of those efforts or anything you can say about that?

Nancy Greig [01:20:05] Well, yeah, I know about Journey North, of course. I've never participated in it, but I know that they have people that report when they see the first monarch, etc. So they kind of monitor the migration. And also Monarch Watch, which is the organization based at the University of Kansas, that they, anybody can do this for a small contribution to Monarch Watch. They will send you tags in the fall, and they're designed to be stuck on to the wings of butterflies that you catch while they're on the migration.

Nancy Greig [01:20:39] And then if they're found down at the roost, they're usually found on a dead butterfly, and it's interesting. So this is kind of an interesting story. One of the trips that I led down there, I decided, oh, this would be a nice contribution to the monarch. So Monarch Watch started to pay a small bounty for the tags, like \$5 a tag, that were found because, well, usually they were found by the local guides and it's a poor area of Mexico and anything, you know, they figured they would get higher return if they paid a little bounty on these tags.

Nancy Greig [01:21:16] And so I thought, oh, this would be nice if we come across anybody with tags, we'll buy them and then we'll give them to Monarch Watch. That will be our little contribution. So we ended up that was the year of the big death. So there were tons of tags and then that's usually how they're found because finding a tag up in the trees in those millions, you never find them. But butterflies do die at the roost and at least you know where it came from. So that's important.

Nancy Greig [01:21:42] So we bought, I don't know, 40-something. There was a lot that year, unusual amount. And I sent them in and Chip wrote me back and said, "Uh, thanks, Nancy. I really appreciate your contribution. But about half of these are counterfeit."

Nancy Greig [01:21:57] So that's the irony. Because they were offering money, then some enterprising local had made counterfeit tags, and you could tell if you knew the "O" was slightly different or whatever. But anyway, so they were making counterfeit tags to get in on the bounty. So I thought that was a sad but interesting story. I don't know that that's continued. It was that one year. It was just because there were so many tags being found.

Nancy Greig [01:22:28] But yeah, so you can tag butterflies, which is a really cool activity to do with like a school group or at the Arboretum or something like that. Get people involved. And not that many of your tags are going to be found, but it gets people involved, and to understand what the whole migration thing is about and how it works.

Nancy Greig [01:22:48] There's, you know, lots of pushes to make, create native habitats. You know, National Wildlife Federation and Monarch Watch, and all of these people provide signs in your yard, that this is a pollinator habitat.

Nancy Greig [01:23:01] And I do have to say that, you know, people harp on monarchs, but they're just one of many butterflies. And so we need to be planting for all butterflies, not just milkweed, but plant, you know, stuff for black swallowtails and sulfurs and skippers. And you can do all of that and help the monarch at the same time.

Nancy Greig [01:23:23] So I think the monarch is a great, great ambassador. But it represents so many insects which are equally or maybe more important, just less iconic. So not badmouthing the monarchs, but I think that we need to focus on the big picture, in addition to the monarchs.

David Todd [01:23:48] You know, several times I've sort of picked up on you saying that change is slow, but that it really is important and that I gather to change attitudes you really got to do some education. I was wondering if you can talk a little bit about the role you saw for public education at the Cockrell Butterfly Center in improving the future from monarch butterflies and other insects?

Nancy Greig [01:24:19] Oh, sure. Well, I think, you know, what's really sad to me is that people are so ignorant about biology, to put it bluntly, and it makes me so sad because I think people do like nature, but because they haven't had much experience with it, and less and less these days as we become more and more urban, they're afraid of it.

Nancy Greig [01:24:42] And so it's really, I think, what the Butterfly Center did, the Butterfly Center, when you come in and you're in this immersive experience and some kids would scream if a butterfly landed on them. Some people really wanted them to land on them, but others were terrified because they'd never been that close to an insect.

Nancy Greig [01:24:59] So, I think just the exposure of, you know, being close to a live insect - we had lots of other insects that we would bring out. We'd use giant walking sticks and hissing cockroaches and stuff. And I always liked to promote the cockroaches because people think they hate cockroaches. And actually cockroaches are really cool and important insects. Unfortunately, a few of them have learned to live with us, but there's lots of cockroaches that are just nice little innocent recyclers out there in nature.

Nancy Greig [01:25:27] So, I think things like the Butterfly Center, the Arboretum, anywhere where people can get closer to nature, and learn about it, and learn that it's not so scary, and learn how important it is, that changes hearts and minds.

Nancy Greig [01:25:43] So, you know, one of my favorite stories is I gave, along the way, lots of talks about butterfly gardening. And, you know, of course, you can't have butterflies unless you have the caterpillars. Well, people just don't seem to understand the insect lifecycle, certainly, you know, not things about the complete metamorphosis. So people would come. I'd talk a lot about caterpillars and, you know, monarchs eat milkweeds, and this is what the caterpillar looks like and blah, blah, blah. And people would come up to me afterwards in the same place and go, "Ooh, you know, I planted all this milkweed, but it kept getting chewed up by these worms. And I've been squishing these worms for years."

Nancy Greig [01:26:24] And the light bulb would, you know, they didn't know. They just didn't know any better. And they wanted to garden for butterflies, but they didn't realize that these were baby butterflies. So that's what I call caterpillars now is baby butterflies.

Nancy Greig [01:26:38] And so, it's kind of an uphill battle. But I do, like I said before, I think people are you know, they're not bad or malicious. They just don't know any better. And the more we can do to teach people how important and how cool and how fun nature is, that's, that's the importance of places like the Butterfly Center and the Arboretum and zoos and all this.

David Todd [01:27:05] Well, let's talk a little bit about the Cockrell Butterfly Center, and its origins. You were the founding director of the Cockrell Butterfly Center, and I was wondering if you could tell us why the Center was set up and what was the idea behind it. It was a, you know, really big structure. Expensive, I'm sure.

Nancy Greig [01:27:28] Oh, yes. Although, boy, you couldn't build it these days for, I think it was the budget was like 4 million back then. Can you imagine? That's like nothing these days anyway.

Nancy Greig [01:27:37] So, this is how I understand it, because I was hired at the 11th hour. But apparently the museum had gotten wind of this "oh-wow" insect collection. There was a guy up in New Waverly who had, he was really into showy butterflies and moths, and he collected a lot of the local ones. And he was a taxidermist by trade. And so he mounted them very beautifully. But he also got into just exotic, beautiful butterflies and beetles to some extent from around the world. So he would buy them. I don't know if you still can, but you used to be able to buy butterflies through what's called the paper trade because they send them the dead butterflies to you or insects in glassine envelopes.

Nancy Greig [01:28:23] Anyway, he had this huge collection of bird wings and, you know, things that today you wouldn't even be able to get a hold of because they're on the endangered species list. And they were mounted. Some of them were mounted, not all of them. And he had this kind of display in trailers in the woods and people knew about it and would go to the butterfly museum. But he apparently became hard up for money and he or his wife decided to sell a good portion of the collection.

Nancy Greig [01:28:50] And one of the museum board members heard about this and went up and looked at it and said, "Hey, this is amazing. We should buy this." So the museum board decided to buy this collection and they bought, I forget how many, 300,000 insect specimens or something like that, some of which were mounted and some of which weren't.

Nancy Greig [01:29:12] So, they had this big collection. And they said, "Well now what?" So they were originally just going to do, you know, have some of the dead insects and a smaller butterfly garden. But Ernie Cockrell was the president of the board, I think, at that point. And anyway, some board members went on a trip around the country and they visited places like the Baltimore Aquarium, these places that have live kind of rainforest exhibits. And they said, "Wow, we should do something like that."

Nancy Greig [01:29:41] So, the plan became more and more grandiose until they decided to build this whole wing of this giant live flight area. And I must say, the structure is really cool. It's a, what's it called, it's a truncated cone. And they decided to do that because, you know, butterflies supposedly fly in corners, so they wanted something round. Anyway, the the structure won lots of architectural awards, etc.

Nancy Greig [01:30:10] So, when I came, the struts were up there, and it was basically a hole in the ground with the struts in place. And they had hired this company out of Arizona to do all the fake, the big giant tree in the middle and all the rock work. And this was supposed to look sort of like something you might see in the Yucatan Peninsula, you know, limestone cliffs. And there was a cenote, the pool that the waterfall falls into. It looks a lot like Hamilton Pool, but it's supposed to be like a cenote in the Yucatan.

Nancy Greig [01:30:42] And man, the museum had every bill, bang or whistle on here. They had, you know, ozone filters and mist systems and double-paned glass. And it was really something and got a lot of attention.

Nancy Greig [01:30:59] So, when I came, it was under construction. I had to wear a hard hat a lot of times and walk around doing punch lists, which I didn't even know what it was until until then. And anyway, so we did.

Nancy Greig [01:31:16] And then, of course, one of my jobs was to develop the attached entomology hall. And that's how we used the collection. And one thing about the Whitney collection was a lot of it is not a good research collection because he didn't have any collection data. He may have on the stuff that he collected, but the stuff he bought from the paper trade was, you know, who knows where it was from, etc. So, you know, they say a specimen is only as good as its label. These things didn't have labels, but they're great for show. You know, like, how often do you get, you know, dozens of bird wings to display.

Nancy Greig [01:31:49] So, anyway, so, it came to fruition as this huge elaborate live walk-through exhibit with the attached hall and that really, you know, kind of put Houston on the map. I think we had a million visitors the first year and it was kind of, it was kind of crazy.

Nancy Greig [01:32:14] So, I could go on a lot more. But I need another question.

David Todd [01:32:18] Okay.

David Todd [01:32:19] Well, so. I think that, as you say, a million folks might come through there, at least in those early years and hundreds of thousands, I'm sure, since. Can you tell us a little bit about the behind-the-scenes aspects of the center: you know, keeping it operating and going? I mean, it's a natural experience, but it's it's clear artificial environment. And I was curious how you managed that and maintained it.

Nancy Greig [01:32:53] Well, yeah, that's, that is a great question. That was one of the, we had quite a few growing pains at the museum. So museums are usually all about dead things. Right? And this was live plants, live animals. And there was a little bit of a learning curve on the museum's part.

Nancy Greig [01:33:10] One, there are huge amounts of regulations around importing herbivorous insects, and butterflies are herbivores as caterpillars. And so the USDA, the Department of Agriculture, wants to know, you know, what's happening to these? Where are you putting them? Are you going to make sure they don't get out of etc., that they can't breed in the exhibit, etc., etc.

Nancy Greig [01:33:35] So, all of this was new to the museum and new to me. At least it made sense to me because I'd worked with them before. But so, the whole "containment", as we call it, issue was a big, big deal to overcome. I mean, we had to get inspected several times along the way during construction by the Department of Agriculture.

Nancy Greig [01:33:57] And I will say it was kind of fun to be in on this because the Butterfly Center, our Butterfly Center in Houston, was only the third one to open in the US, and now they're everywhere. But we were sort of on the leading edge. And so I was actually involved in some of the discussions between the managers of these places and the, by the time we had these discussions, there were five of us and the USDA officials. And we went to D.C. and talked about what was reasonable in terms of safe containment and yet also letting people enjoy them.

Nancy Greig [01:34:29] So, anyway, the Butterfly Center had to be retrofitted in several ways before we could open. They were originally going to have the upper level open to the Grand Hall. I don't know what were they were thinking about climate control, but you couldn't do that because, of course, the butterflies would get out.

Nancy Greig [01:34:49] There were just so many things that they hadn't, that hadn't been well thought-out. The other thing was that that the museum was sort of surprised to hear that you would have to keep the temperature at a uniform range, where they could shut everything else off. Rocks don't care if it gets too hot or too cold at night. So they you know, we had to have the climate controls on all the time. We had to have water. You have to have people there every day, even on Christmas and other holidays, because there's live animals and plants to be taken care of. So it was kind of interesting.

Nancy Greig [01:35:26] And many struggles along the way - building the exhibits for the Insect Zoo. And we did the insect Zoo. You know, the exhibits are, guys are used to making plexiglass cases that once they're in place, they're closed up and that's it. Well, we had to have things that could be easily opened to be serviced every day.

Nancy Greig [01:35:43] And so, there are lots of little things like that that, gosh, I'd also forgotten about that were challenges, and interesting to deal with.

Nancy Greig [01:35:56] But so day-to-day operations: well, we, in order to, as I said earlier, you know, we figured out that butterflies only live in this situation a couple of weeks. So we import them. And most of the butterflies that we, that these big butterfly, year-round butterfly centers, get are imported from the tropics. There are now quite a few farms, if you will, for butterflies in the tropics. And I always thought they were kind of cool because a lot of them, they're maybe run by small families or co-ops of families. And instead of raising cattle, which doesn't make as much money, they're now raising butterflies. And of course, to raise butterflies, you need plants. And so it's a way to conserve rainforest. So I always thought that was a great, a great story.

Nancy Greig [01:36:41] But so most of us get the chrysalis from these butterfly farms. You could not go out in nature and collect butterflies or even one. You can't find them. They're very, very camouflaged. Half of them, no, 90% of them, are parasitized. So you really have to raise them in captivity. So that's what these farms do. They raise, not any butterfly, but butterflies that are good for show and now that are accepted by the USDA.

Nancy Greig [01:37:10] And so, they raise them through the caterpillar stage. And then once they pupate, of course, the chrysalis is kind of sometimes called the resting stage. It's not really resting inside. It's changing tremendously. But the chrysalises don't eat. They don't really move. And so it's an ideal stage to ship them.

Nancy Greig [01:37:29] So, these places harvest the crystalids, pack them up and ship them via FedEx Express or DHL to these butterfly centers. They have to go through Customs and get all checked to make sure there's only the allowed species, blah, blah, blah. And of course, if they're delayed en route or left out on the tarmac in the blazing heat, this isn't good, because you've just got a short window when the crystalids are packed up and can get here safely and then we open them.

Nancy Greig [01:37:59] It's like a little Christmas present every time they come in - all these different chrysalids, and we have devised a way to actually glue them to strings that were

hung on racks in these display cases so people could watch them emerge. So, once they come, you hang them up, they emerge. You put them as they emerge into the Butterfly Center.

Nancy Greig [01:38:21] And actually, interestingly, the USDA sort of evolved their regulations along the way. But one of the things they implemented was you have to keep, now, track of all the crystalids and what happened to them: how many were dead en route, how many were parasitized, how many emerged deformed, how many were emerged successfully.

Nancy Greig [01:38:46] And so, that was a big data set for the guy who was our inspector. He gave a couple talks on that. Very interesting.

Nancy Greig [01:38:57] So, let's see.

Nancy Greig [01:38:59] But then and then once they're in the Butterfly Center, they have to be fed. So, we tried to keep as many flowering plants as we could. Now, native plants don't really work in that situation. So, we relied on a lot of things that were semi shade-tolerant and that would bloom reliably, but butterflies visited - like pentas and porterweed and a couple tropical things.

Nancy Greig [01:39:23] So, there's a lot of butterflies that drink nectar. And then also there's some big showy butterflies that go to rotten fruit. So we'd have plates of rotten fruit around for the morphos and owl butterflies, etc.

Nancy Greig [01:39:35] So, all of this stuff has to be, you know, the plants have to be cared for. The fruit plates have to be changed. The dead butterflies need to be picked up so people don't get distressed or the rats don't proliferate too much. And believe me, rats were a big problem in the Butterfly Center.

Nancy Greig [01:39:55] Oh, let's see. What else? Yeah. And then just maintaining the plants. We had greenhouses to grow replacement plants sometimes, but, you know, watering, pruning, etc., all of this is, when you're keeping a live exhibit going, it's a lot different than the normal museum exhibit. So that was the learning curve for for all of us, but especially for the museum that despite having had the idea, hadn't really thought about all the implications.

David Todd [01:40:30] Wow. It sounds like it's almost like a hospital or clinic where you're keeping all these living things alive. And that must make a big operation.

David Todd [01:40:45] Well, tell us about the other, the flip side of this. So you mentioned what it took to to keep these plants and insects all going and keep the rats at bay. What about the public and what sort of experiences, impacts did you see for them? You know, what sort of stories or facts about monarchs or other butterflies, do you think really engaged the public?

Nancy Greig [01:41:13] Well, you know, I forgot to mention all our other insects. One thing that we did along the way, the first permutation we just had the live exhibit and the entomology hall, which was dead specimens. But, at one point we decided to, I guess I'd seen this at one of the other institutions, to put in some other live insects. And eventually that grew into our whole, when we redid the entomology hall, that was a huge part of it. And people actually love those other insects, I'd say maybe more than the butterflies, just because butterflies are all pretty much the same in their adult stage. Whereas these other insects, you know, they were scorpions and giant walking sticks and weird cockroaches and, you know, beetles, etc.

Nancy Greig [01:42:02] So and another more maintenance, right, and more permitting.

Nancy Greig [01:42:08] But I think, you know, people like live stuff, you know, that's why zoos are so popular and people like to come and interact with stuff and see things. So, but I will say if the school groups and some of the people that just come and mill through, they, they might like it, they get something out of it. I think it's cool. It's really cool when the Butterfly Center, you know, when it's not too busy. We would have people sometimes on the staff that would come before we'd open that would just sit there in the rain forest and the peaceful butterflies fluttering around. It is very zen, very, very relaxing.

Nancy Greig [01:42:43] And we would have visitors from the medical center that would bring patients in that, you know, or that we had to wait for someone and they would come and hang out in the Butterfly Center. So, it's a it's a cool experience.

Nancy Greig [01:42:55] But we also use a lot of docents, so, volunteers that are trained to show and tell stuff. And that, to me, made all the difference. And I would see people that would just walk through and they wouldn't get that much out of it. But if you have myself or one of my staff members or a docent pointing out stuff and encouraging questions, that took things to a whole new level.

Nancy Greig [01:43:20] So, people, the most common question I think I said earlier was that how long does a butterfly live? And you know, you can go from there. And that often, as I said, led into the whole monarch discussion.

Nancy Greig [01:43:31] But people were, you know, people don't know that much about insects. They didn't know how butterflies eat. They only have a proboscis. They can only eat liquids. The scales on butterfly wings, we would save some of the dead ones that were in good shape and the docents would show and tell them. And you could, you were allowed to touch those. You weren't supposed to touch the living butterflies, but you could touch these and see how the scales would come off on your finger to see the incredible range of colors, both structural colors and iridescent colors.

Nancy Greig [01:44:07] You know, some of the big insects, the giant walking sticks that look just like leaves that, you know, you could have on your hand and see how they made this little weird rocking movement that was part of their camouflage.

Nancy Greig [01:44:19] I mean, there's so many things that that, you know, you can see that you might read about them in a book, but actually experiencing them right there in the flesh made a huge difference.

Nancy Greig [01:44:32] So and Houston being a big city, I mean, I think some of the school groups that came through had never seen a live insect except maybe an ant or a cockroach in their house or something before. So, it was, it's a really important way to turn people on.

David Todd [01:44:53] Well. So, one of the things that I thought was really intriguing is that, as you said, you know, when you opened, you saw a million people go through the Center. And I just think the scale of educational outreach that you did is, is just staggering. I mean, there are a lot of folks that, you know, as you said, you have a docent, you have a small group, or, you know, you're visiting with a friend and having the one-on-one conversation that might be had, but you're talking about hundreds of thousands of people going through there. And I was

just curious if there were sort of scale issues that you ran into with public education, with monarchs and other kinds of insects?

Nancy Greig [01:45:36] Well, you know, I'm not quite sure what you're getting at, but yeah, a lot of people just didn't get that one-on-one thing, but hopefully enough of it was somewhat, I mean, we minimized the signage in the Butterfly Center itself, but we would have labels on plants and a few things. And then of course, in the entomology hall or the Insect Zoo, you could do a lot more in terms of things that people could read or see. But yeah, there's with that many people, it's hard to give the one-on-one experience to everyone.

Nancy Greig [01:46:19] I will remember another thing that happened at the Butterfly Center that was huge. I don't know if you remember when we had the first corpse flower. That was, a corpse flower is this big plant from Borneo, Sumatra, or whatever, that's a giant aroid that has this huge inflorescence, this huge bloom that only lasts for a few days. And it stinks. It's pollinated by, if you watch the Quiet Life of Plants, David Attenborough has a whole thing on it.

Nancy Greig [01:46:46] But anyway, it brings in things that go to dead bodies like flies and dung beetles and stuff like that as pollinators. And it's a spectacular event.

Nancy Greig [01:46:56] And anyway, we had one in our greenhouses that finally, after seven years, put up a bloom. So, we brought it down to the butterfly center. And I told the marketing department, I said, you know, this is, this could be a really big deal. We should do T-shirts or something. Anyway.

Nancy Greig [01:47:15] Somebody from the, Kathy Huber from The Chronicle, came and did a little article about it, and then this thing just blew up. Oh, my gosh. Talk about public education. We had those, what are those cameras, you know, the real-time cameras trained on the the corpse flower and a couple of the news stations had them, too. We had a blog that we would update every day about what was happening with Lois, how much she'd grown.

Nancy Greig [01:47:44] And then it was so popular people coming to see it, we had to leave the Butterfly Center open 24 / 7 for about, I forget, was it four or five days? It was the highest grossing exhibit for, I mean, just in terms of the time of anything that the museum ever had. My boss loved me.

Nancy Greig [01:48:05] But it was, it was incredible. And people were so excited about this plant, you know, and they just wanted to come and see it and they might learn some things about it. Obviously, they would learn some things about it because we had a little bit of signage or people there talking. But, you know, just being there, and giving them that opportunity was the whole point.

Nancy Greig [01:48:29] And the same thing with the monarchs. We actually - more about education. Along the way, as the Butterfly Center grew, we eventually made these outreach programs that would go to schools. And so usually my staff, once in a while I would do it, but we would, I think we had one on monarchs, but we had one on insects in general and bees. And, so not only did the schools come to us, but we could also go to the schools and do presentations to the class with, with our, didn't usually take butterflies, but we took some of our other live insects and certain caterpillars and things like that.

Nancy Greig [01:49:07] So, so yeah, the whole thing is a tremendous opportunity for some sort of public education, even if it's just kind of, you know, making people realize that there are such things as monarch caterpillars and corpse flowers and not all cockroaches are bad, so...

David Todd [01:49:28] Okay. So, one of the things I'd be curious to hear you talk a little bit about is how you reach an audience that, as you said, is maybe not as aware of the natural world or of insects or of butterflies or monarch butterflies in particular, and bring it to them at a level that a lay audience can appreciate, but that is still accurate. You know, it sort of hits that balance between a story that's complete, but it's also accessible. How did you manage to do that?

Nancy Greig [01:50:09] Well, that was one of the learning curves that I went through. Yeah, they say that you should, for labels and exhibits and stuff like that, you should aim at a fourth grade audience. You know, it's not baby talk, but it's not, you know, it's not a science textbook either.

Nancy Greig [01:50:29] And so, you know, one of the things that I had to do from the get-go was to develop the copy for the exhibits. And I learned a lot. I read a couple of books about what good signage is about and, you know, the different levels of the big print and then the smaller print and then the more detailed stuff. So, some people can just go through and see the headlines. And then if they're really interested, they can read down. But yeah, it's an art. It really is. And I had to actually hire somebody to help me cut it down because actually shorter is better.

Nancy Greig [01:51:07] You know, people get ... their brain, and if you've ever spent all day in the museum, you know your brain just glazes over after a while. So you want to hit home the important things and you don't want to make it, you don't dumb it down, really, but keep it simple and just keep it to the important things.

Nancy Greig [01:51:24] And of course, you know, if you're somebody like me, you think everything is important and all these details are so fascinating, but you just can't do that because you'd lose people.

Nancy Greig [01:51:33] So, yeah, the whole art of museum signage, and even writing for the public in general is, it's, it's an art, but it's certainly possible, and it's possible to be engaging and informative and, you know, you might not be able to tell people everything, but that's not the point. You just want them to get the main message and to be turned on really. So.

David Todd [01:52:04] Yeah. That's a really interesting distinction. That part of it is, is information and maybe the other is inspiration or encouragement.

Nancy Greig [01:52:16] Exactly.

David Todd [01:52:16] Yeah, Well, so, you know, in your role as the director of the Butterfly Center, I gather that not only were you thinking about the public that was coming through, but you were also having to deal with the media. I mean, you mentioned that Kathy Huber did this story for The Chronicle, and I imagine that's a very specialized kind of audience where you're talking about butterflies and monarchs and other kinds of insects. And then at the same time, as you said, you, you know, you had to rub elbows with some of the high and mighty who

might be on the board and have their own questions for you. Can you talk a little bit about how you interfaced with those folks?

Nancy Greig [01:52:57] Well, yeah, that was, both of those things were new to me. And the media, oh, my gosh, those people are so good at their job. But, sometimes you have to watch them because, so they're sort of like this, you know, the really good interviewers would just ask you the probing question and then let you talk and they could just guide the conversation. It was really amazing. They would not let lags happen.

Nancy Greig [01:53:25] But they sometimes don't know very much. And sometimes even our marketing department would say wrong stuff. And so, if whenever I could, if there was like an article being written or something, I would ask if I could proofread it because sometimes things got seriously twisted.

Nancy Greig [01:53:45] But, for the most part, you know, the the TV people, they just want a good story and something that that will, you know, entertain and hopefully inform their audience. And those guys, some of those interviewers were just true masters. I don't know how they learned how to speak so glibly and intelligently and all at the same time.

Nancy Greig [01:54:10] And let's see what else.

Nancy Greig [01:54:12] Oh, the donors. Yeah, that was interesting. I've always been able to get along with most people, and I think I held my own. I did sometimes feel that these were not my people, but because they're maybe more interested in the bottom line or the whatever. But they're you know, many of the donors are lovely people that do care. And, you know, interacting them with them was not painful at all.

Nancy Greig [01:54:48] So, we did form associations with a couple of the big garden clubs here in Houston, the River Oaks Garden Club and the Garden Club of Houston. And those people were lovely. We helped with their flower shows. We were invited to give an exhibit at one of them. One time, we took our butterfly tent to their, to the Garden Club of Houston's big, big flower show, which was another way to reach more people and also promote butterfly gardening within that, that sort of setting. So yeah, it was all it was all good. It was an amazing, it was an amazing job, I must say. It covered everything.

David Todd [01:55:31] You know, it's striking to me that you did this job at the Cockrell Butterfly Center for nearly two decades. And then when you retired.

Nancy Greig [01:55:42] More than two decades!

David Todd [01:55:43] More than two decades. I'm sorry.

Nancy Greig [01:55:44] More than two.

David Todd [01:55:48] You, you turned to volunteering. I mean, so this must really be close to your core, you know, this interest in nature and public outreach. I think that I read that you had volunteered after leaving Cockrell at the Houston Botanic Garden, at the Houston Arboretum and Nature Center. And I was hoping that you could talk a little bit about what you did, what you've been doing there, and sort of what drives you to do this sort of altruistic work.

Speaker 2 [01:56:19] Well, fortunately, I don't need the money, so I'm just very fortunate that I was able to save enough, etc., that, you know, I'm not hard up for money, so I can do it for free. I don't have to earn an income, which I'm so grateful for. And I realize that's such a privilege.

Nancy Greig [01:56:37] But it's also nice. I was so worried about retiring that I actually went to a therapist for a couple of years saying, "Am I making a big mistake", you know, "How am I going to do it?" "Am I going to have enough money?" "Am I going to lose all my, you know, my whatever, self value, my whatever you call it, my identity?"

Nancy Greig [01:56:56] But now we laugh about it because, gosh, I love being retired, because I could kind of shed the parts of the job that had become not so fun for me. All the administrivia as you call it. You know, the higher up I got, the more I ended up doing the budget and interacting with the board members and for more administrative issues, you know, worried about the staff and stuff like that. And not doing the stuff that I really love, which is informal teaching. And also I like working with the plants and the animals too.

Nancy Greig [01:57:32] So, volunteering is great because you're able to do that.

Nancy Greig [01:57:37] So, I met this woman, I guess, through maybe one of those flower shows, who was the horticultural director at the Houston Botanical Garden, which had just opened. So, she recruited me to come and help them do an inventory of some of the plants that just, you know, it's an abandoned golf course, and they were trying to inventory what was already there. So I did that for several months until COVID, and then we were all laid off and I opted not to go back because it's a really long drive for me.

Nancy Greig [01:58:11] And I started working at the Arboretum, which is very close. And the Arboretum - COVID was very good to the Arboretum, because people really started to come. But it's a great place. It's right there in the middle of Houston. It's got a lot of natural history. Some of the stuff that I do there as I work with the gardeners to plant native plants and weed things that we don't want to be in there and or pull invasives. But I've also helped with the school programs. So you're leading groups of kids out and show-and-telling them stuff in nature. I mean, that's, that's what I love to do.

Nancy Greig [01:58:47] And we also do a, we call it a botany walk. Every Friday, some of the volunteers and staff go out and collect samples of whatever interesting thing is blooming or doing something interesting at the time and put it on display and label it for the public. Well, all this is just like right up my alley. I'm learning a lot because, you know, I'm a tropical biologist, not necessarily a temperate biologist, so I'm keeping up and learning more about the local plants.

Nancy Greig [01:59:18] I was also recruited to lead a nature walk for the Buffalo Bayou Partnership. So I do that once a month and that's great, it's just walking along the Buffalo Bayou Park and pointing out stuff to people. And it's always a lovely, interested group. And, you know, you can show them things like caterpillar frass and they get excited.

Nancy Greig [01:59:43] Anyway, so, it's been super rewarding and really just gotten me, kept me in touch with nature and allowed me to talk about it to other people and, you know, get more people excited. So, it's great. I'm really enjoying the volunteer stuff.

David Todd [02:00:02] Well, and then let's go to your home. So, you, I understand, have always been a gardener, it sounds like, but that you've spent time after you've retired and and really focused on building a pollinator habitat at your home. And I was curious if you could sort of take us on a virtual tour of what you've done there, what it looks like now, in early summer.

Nancy Greig [02:00:27] Oh, okay. Well, yeah, I've always been a vegetable garden or even from, you know, when I was a kid, we always had a vegetable garden in Calgary. And then in Austin, I always had a garden at the community gardens for years. And then ever since I had this house in Houston, which is since 1995 or something, I've worked, I have a big plot in the back and grow way too many vegetables. I can't eat them all.

Nancy Greig [02:00:52] But you know, I didn't really have time when I was working to do anything else. But I've always tried to plant a few host plants like milkweeds or pipevines and things, to attract butterflies.

Nancy Greig [02:01:08] Oh, and I also became a beekeeper. And that was a direct result of the Butterfly Center because we installed an observation beehive. And so learning about that, I worked with a guy out of Austin, Danny Weaver, who's involved actually on the national level. It turns out he breeds bees to, you know, be varroa mite resistant, etc. So, anyway, he was tremendously helpful, helped us set up the observation hive.

Nancy Greig [02:01:45] And while I was doing research on them, I thought, these honeybees are incredible! And so, I met some people here in the beekeeping community and decided to have my own hive. So I've had honeybee hives since 2007.

Nancy Greig [02:02:00] Now, some people will badmouth honeybees because they aren't native. And, you know, the native police say they compete with our native bees, which they probably do, but we need honey bees. And if you plant for honeybees, you're planning for native bees to a certain extent.

Nancy Greig [02:02:20] But anyway, so that's an aside. But I do have a couple of beehives too. But yeah, just as I had more time and learned more about some of the native plants I just started taking up ... I still have lawn, but I've probably a third of it or so now is dedicated to native plants. So you can see my people always recognize my house on the block because I have the beds out in front of the house that have, let's see, what have I got there now? I've got basketflower. And then Indian blanket, which brings in a lot of bees.

Nancy Greig [02:02:58] There's a wonderful bee biologist, if you want to talk about bees, talk to Jack Neff, who's in Austin, and he runs the whatever, Southwest Native Bee Society or something. He's married to one of the botany professors, Vera Simpson. Anyway, amazing guy.

Nancy Greig [02:03:18] So let's see. What else do I have? All sorts of things. Not all natives. I do have, what's that called? Well, they're not quite natives. I used to have buddleia. That died. So, over the past few years, more and more of the natives have kind of taken over. For one thing, they seed out like crazy. So I was actually pulling up handfuls and handfuls of seedlings and cursing those blanket flowers this summer. They were all through my lawn in addition to the beds. But so it's a nice, exuberant spread. And this spring has been really good.

Nancy Greig [02:03:58] And then in the back I have more plants. I do really like those salvia guaranitica. And they're hybrids which aren't exactly native, but bring in tons of carpenter

bees and butterflies and hummingbirds. So I have a lot of salvias in the backyard. I have a couple of little ponds with some aquatic plants and of course I keep mollies and mosquito fish in there to keep down the mosquitoes.

Nancy Greig [02:04:26] And then in the very back, because of my bees, they don't like lawnmowers. And so I've taken over a big swath that used to be lawn behind my garage and turned that into a native plant bed. And I planted a buttonbush there next to the pond. And it has all sorts of things in it. And those, that's really come into its own this past year or two.

Nancy Greig [02:04:52] One of the people I work with at the Arboretum, Jane Ryerson, is a big native plant enthusiast, and she told me about a prairie just north of town that was going to be bulldozed. So, she said, "Why don't you come up and dig up some of the plants?" So I did. I went in and got some of the plants and man, they have done great. So I actually pulled up more than, way more than, I planted this spring.

Nancy Greig [02:05:19] You know, natives do do well here. And the good thing about it is they don't tend to get pests and they don't need as much water. And they do bring in lots of native bees and butterflies, etc. So, yeah, my backyard is a, and front yard, are a nice little island of insect-friendly habitat in what's mostly just boring lawns. So it's a lot of fun.

Nancy Greig [02:05:49] Well, it sounds like a showplace for people and for bees and butterflies..

Nancy Greig [02:05:56] And toads. Oh, my gosh. I have so many toads.

David Todd [02:06:00] I hope you have some wonderful singing amphibians up there.

Nancy Greig [02:06:06] I do.

David Todd [02:06:07] Well, I guess as we draw to a close, I was wondering if there's anything you'd like to add. You've covered a lot already, but is there anything you'd want to just, you know, remember or emphasize that maybe we didn't give full shrift to before about monarch butterflies, or for that matter, insects in general?

Nancy Greig [02:06:31] Well, I. I wish people were a little more open-minded about insects and spiders. Don't forget spiders. You know, I guess my goal is to dispel people's fear about them and show people how cool they are.

Nancy Greig [02:06:52] I mean, it's, I'm floundering here.

Nancy Greig [02:07:00] My regret is that people are generally so afraid of insects. And not monarchs so much. That's one that's a really good, like we said, ambassador hook. But, you know, learning a little bit about them, it's amazing how people can get enthusiastic and start to plant a few things.

Nancy Greig [02:07:24] I mean, you know, the, what is it, it's a gateway. A gateway. The monarch is a gateway butterfly, because they're so easy to grow at home. And people often start with monarchs and then hopefully they will branch out and start, you know, getting host plants and planting things for not just other butterflies, but also for the native bees, etc., etc.

Nancy Greig [02:07:51] So, I do, I think that's a good, good way to think of the monarch, that it's a gateway insect. And for that I'm very fond of it.

Nancy Greig [02:08:00] So it's also a pretty beautiful creature.

David Todd [02:08:03] Yeah.

David Todd [02:08:04] And with a fascinating history. So thank you so much for explaining all this. You've been so kind to, you know, spend some time with us and educate us. So...

Nancy Greig [02:08:18] I hope that people get excited and start tearing out their own lawns and seeing that it's much more exciting to have lots of bugs flying around and than to have a perfect green expanse out in front. So, yeah, little by little we'll get there.

David Todd [02:08:35] Yes, yes.

David Todd [02:08:37] Well, thank you. I think you make a good pitch and I hope that the folks go in that direction.

David Todd [02:08:45] Well, I guess I should say thank you and wish you well in your garden and other exploits.

Nancy Greig [02:08:53] Thank you, and you on this project. It's a great, interesting thing that I'm going to listen to more of myself. So thank you.

David Todd [02:09:01] Well, thank you. Well, best wishes to you. And I hope our paths crossed sometime soon.

Nancy Greig [02:09:07] I hope so, too. Thank you very much, David, for including me in this. It has been great.

David Todd [02:09:11] Oh good. Thank you. All right.

Nancy Greig [02:09:13] All right.