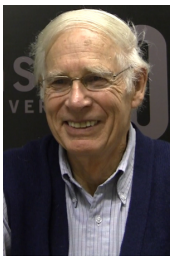

# Dick Waring Oral History Interview, December 18, 2015

### Title
“Building Models of the World's Forests”

### Date
December 18, 2015

### Location
Valley Library, Oregon State University.

### Summary
In the interview, Waring describes his family background and upbringing in suburban Chicago, his early love of the woods, and his experience of school growing up. He then recounts his years as an undergraduate and graduate student in Forestry at the University of Minnesota, commenting on several experiential learning opportunities in which he engaged, and likewise noting a handful of professors who made an impact on him.

Next, Waring outlines his years as a doctoral candidate at the University of California - Berkeley, paying particular attention to the research that he conducted in the Redwoods during this time. From there, Waring shifts his focus to Oregon State University, discussing his move to OSU and his initial research project classifying vegetation in the Siskiyou Mountains; sharing his memories of his early impressions of the university and of the town of Corvallis; and offering his opinion on the sources of growth and increases in prestige for OSU's College of Forestry.

The remainder of the interview is primarily devoted to Waring's program of research while an Oregon State faculty member. In this, he comments on the Analysis of Ecosystems Project; his experience of the H.J. Andrews Experimental Forest as a place of work; his investigations on bark beetles and spruce budworm in the early 1980s; and the decline of Oregon's timber industry during that same time period. In addition, Waring traces the beginnings of his relationship with NASA, noting his work with the administration on acid rain and ozone depletion, and sharing the history of the OTTER Project.

The session concludes with a discussion of Waring's research on climate change and the future of forests; his perspective on change within the OSU College of Forestry; and his thoughts on where Oregon State is currently positioned as it looks toward its 150th birthday.

### Interviewee
Dick Waring

### Interviewer
Chris Petersen

### Website
http://scarc.library.oregonstate.edu/oh150/waring/

## Transcript

**Chris Petersen**: Alright, today is December 18th, 2015, we're in the Valley Library with Dr. Richard Waring, a Distinguished Emeritus Professor of Forest Science at OSU. And we'll talk a lot about his association with OSU and his research in forest science, but I'd like to begin at the beginning and ask you, where were you born?

**Dick Waring**: Chicago.

**CP**: Is that where you grew up?

**DW**: Thirty-five miles west in a little town. My dad commuted by railroad to Chicago; he was a wholesale lumber dealer.

**CP**: What was the name of the town that you grew up in?

**DW**: The county?

**CP**: The name of the town.

**DW**: Glen Ellyn. It was a white-collar commuter town of 10,000, so pretty small.

**CP**: Can you tell me a little bit more about your family background?

**DW**: My dad was born in Wisconsin and he met my mother in Chicago, and he always liked to go fishing, so if we could, after the war at least, we would have a few trips up to lakes and things. But during the war there weren't any cars, no gas. So it was a pretty exciting time to grow up. The biggest advantage we had was access to the Field Museum in Chicago a couple times of year, so that's where I saw dioramas of ancient forests with dinosaurs, but I was more interested in the trees. There was also a German submarine and a train and all these things, so I loved going to the Field Museum. It probably got me interested in going into this field, together with my father's knowledge of the Northwoods.

**CP**: So what was his career background?

**DW**: Well, almost everybody in the Depression were lucky to finish high school. So he did and he could spell perfectly and I was always amazed at how much he picked up. There was a lot of self-improvement going on in those days. My mother also was a paralegic [sic] for a lawyer and went to Loyola Law School – he was a para...

**CP**: Paralegal?

**DW**: No, he was injured during World War II. So she helped him get through law school. So that's a lot of improvement for high school graduates, I think. They always thought that education was important, they always tried to speak very good English, and it rubbed off a bit. I like to read books, I like the English language. Even as a forester, I think that it's important how you choose your words and try to leave some impression that people might actually memorize a particular quote that you put if you do it really well.

**CP**: And your dad was involved in the forestry industry, is that correct?

**DW**: He was a wholesale lumber dealer. He bought car-loads of lumber from different mills in different parts of the country, and as they were moving by rail, he would sell them. And all this was done by keeping your word; just a telegraph was the only evidence that you had done this. It worked out pretty well.

**CP**: Can you tell me a little bit about community life in Glen Ellyn?

**DW**: Well, it was a pretty easy community for kids because we had a pool, we all had bicycles, and nobody was threatened by any kind of thing, other than the third rail of the electric train that went back and forth. We were not supposed to go across that, of course – sort of an incentive to do it. [laughs] I had lots of snowball fights and things like this, but it was pretty easy. During World War II, my parents and many other parents too, invited World War II soldiers and sailors to come out to the house for Christmas. We had lots of fun with some of these sailors from the South that had

never seen snow before they got to Chicago, and we had lots of snow that winter. It was a pretty good experience; pretty sheltered. They had very good schools, which we didn't appreciate, of course, until we went to different places.

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**CP**: But you were able to get into the city from time to time, it sounds like.

**DW**: We were, yeah. I had an aunt and uncle that also lived in Chicago, so we could go in and visit them. And we were from the country so the streetcars turning the corners kept us awake at night. And it's like, "ok, that's not real noise, there's no fire engines and much else." But it was always exciting to go into Chicago.

**CP**: Was there much else besides the Field Museum that you remember captivating you about the city?

**DW**: Well, around Christmas-time and others, they would have big fountains with all kinds of lights on them. And the North Shore Drive, when you had a real storm, it threw water and ice and everything back on the streets, so that was exciting.

**CP**: What were you interested in as a boy?

**DW**: I spent quite a bit of time at Morton Arboretum, outside of Glen Ellyn, and learned to identify not all the trees but quite a few trees in the woods. So I was always interesting. I was a Boy Scout, Eagle Scout – my dad was active in the troop – and I was a Cub Scout too, we had all that. And it was very good training for a forester because you learned to do things when something breaks or, if it didn't work out, you don't immediately go back to the lab, you try to be resourceful. My first job away from Sears & Roebuck in high school days, was working out of a canoe in Canadian border country, so all that I had learned before was very helpful. It was great.

**CP**: Where do you think this interest in trees and the forest came from?

**DW**: My dad. Because when I was small we would go on these fishing trips or camping, and he would tell me what a birch was and a pine tree, and then it would get more complicated, and I'd find out that there were two pine trees and also an aspen. So you pick this up pretty quick, especially if your parents are interested in it.

**CP**: Do you remember being interested in anything more specific than just identifying the trees as a kid? Was there something broader that captivated you about the forests?

**DW**: I think what is around the forest – the animals in it and the lakes and streams. Glen Ellyn was a very small city so it has lots of trees and it had arboretums and it had forest reserves. My first overnight camping trip was about twenty-below in a forest reserve. We learned that stew was the only thing that really made sense, because all you had to do really was heat it. Nothing else was worth starting from – maybe Jell-O; Jell-O you could make really well when it was twenty-below.

**CP**: You mentioned the schools in Glen Ellyn were good, but was school something that you enjoyed?

**DW**: My brother and sister were really good academic students and also artists, and I really enjoyed world history as a freshman, so that sort of got me at least a little bit interested in history and school. But what really improved my academic grades was a year away in Augusta, Georgia, where my dad's firm was bought out by Georgia-Pacific. So for the one year it took him to set up his own company and come back to Chicago, we were in Augusta, Georgia. And that was really a good experience because the schools weren't as good, so I did very well academically, and also had ROTC required.

It was the Academy of Richmond County, Augusta, Georgia, and it's the first time I learned that when you study history that there is always two sides to it. I reported on the Battle of Spotsylvania during the Civil War and it turned out both sides lost 10,000, and they both considered it a win. And so it's like, "I think we're going to be better observers than we are activists, in my generation," because of that experience and because of World War II, where we were actually encouraged to hate both the Japanese and the Germans. And then, immediately after the war ended, they said, "no, you're supposed to hate the Russians." And when you're ten years old, that makes quite an impression on you that this seems like a very illogical switch. And I later got to know, personally, a German and a Japanese colleague that we started setting up

meetings and making arrangements for – I ended up speaking bad German, but it was a very special thing. Because they were about the same age I was during the end of World War II, but in a much worse situation in both cases; I mean, no comparison whatsoever.

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**CP**: Was science something that interested you, growing up?

**DW**: I looked at my yearbook and I have people saying, "thank you so much for helping me in physics." And I thought, all I can really remember about physics is that somebody cranked up one of these electrical discharge things and the professor came in before he had demonstrated that and put his finger up there. That made an impression, that's what I remember about physics. But I obviously got a lot more out of it and I got interested in it – particularly the light spectrum and other things – which is interesting, because the last twenty-five, thirty years, my funding's all come from NASA. So you never know how these things will work out.

**CP**: Was there always an expectation of going to college?

**DW**: Not until my junior year, when my grades got better. My grades weren't bad, but they weren't all A's and B's – they never were all A's. I think we were expected to work very hard and to be concerned – and this is before the draft even, because in high school you're not thinking about the draft right away. But some things come easy, some things come more difficult, and I kept trying to find out what the one thing is that would come easy, because it wasn't sports. I did letter in tennis but my brother was like number one and two, and I'm number six and seven, so you learn to live with your qualities that you experience but you sort of look for one thing that is fun and you do well. And it took a long time, actually into graduate school, before I found out what it was.

It turned out that, not that I have great abilities in mathematics or physics or chemistry or English even, but I look for pieces that come together so that you can tell a story. And maybe that's from reading history, but that talent in science is rare. It's looked for, it's not downplayed, but when you bring that to the table you see opportunities for people to contribute in a way that they might not have recognized. Then it all comes together and they get their success, and you bask in reflected glory, is what I think the term is. [laughs] And then you get another chance to do it, and if you do these in three- to five-year intervals, then you can have a lot of colleagues, a lot of fun, and not be burdened with being, quote, an administrator. You get to all the fun and none of the burdens really.

**CP**: You went to the University of Minnesota. How did you make that decision?

**DW**: Well, at the time, Illinois didn't have a Forestry school. They had some kind of an exchange for tuition in that, but tuition was like $300 a year, and we could all work for a dollar an hour, so there was no problem, if you had a summer job, of being able to go and be educated. It worked out pretty well.

**CP**: A very, very common theme amongst people I've talked to for this project.

**DW**: Yeah.

**CP**: So you were essentially looking for a Forestry school that was nearby? Is that fair to say?

[0:15:05]

**DW**: Well, a Forestry school that was in the Northwoods, because my dad liked Wisconsin and Minnesota and the Canadian border. So I could have gone to Wisconsin, but...

**CP**: And the Northwoods was attractive to you as well?

**DW**: Yeah, because I had, at that time, I still knew how to canoe – I still know how to canoe – and it was a long time before I picked up a fly rod, but I knew how to fish from a little river near one of our houses in Glen Ellyn. It was just a hobby at that time, nothing serious. I got serious after you retire.

**CP**: Well, you majored in Forestry, I'm interested in knowing a bit about what the curriculum was like then and how it might have differed from what we would associate with Forestry now.

**DW**: Minnesota is different from Oregon State in the sense that they didn't do much outdoor work, during the academic year, beyond two courses in surveying in the snow. But they had a spring term and a Forestry camp near Duluth, and they also had summer session at the end of your freshman year at Itasca State Park, which is the headwaters of the Mississippi. So you had these very concentrated times with your colleagues where nothing else was on the docket. You were fully immersed in the practice of forestry and seeing how mills work and the last horse logging, what they feed you at a logging camp, all these things that were just on the fringe of disappearing, you got to see.

**CP**: It sounds like you had, from my research, it sounds like you had a few research assistanceships that, I gather, were pretty impactful and maybe the first one was the one that you referenced with the canoe and the Canadian border. Is that the Quetico-Superior Wilderness Research Center, is that correct? In Ely, Minnesota?

**DW**: I worked with a Canadian, Orie Loucks, who is a famous ecologist. And he taught me, at site, something like the Latin names of 300 species, before I went to college. It turned out to be very handy. And at that time, we were looking at what happened to the fringe of timber that was left when they logged the interior of some of these parks during World War II, and then floated the logs out on the lakes. And we found, basically, that there were very few pine trees regenerating, because there was no fire, and they had done it when snow was on the ground, and some of the fringe blew down. We went to areas that had never been logged, which was pretty exciting, and learned to the love the sound of a loon, which is very much a Northwoods bird. And just loved that area.

Later on, I went to the tropics and Australia, but I still have a feeling more for the tempered forest of the North and the Redwoods, and then on into the boreal forests. I particularly like the boreal forest after the mosquitos have been killed; that's another reason to be canoeing and not walking through the woods.

**CP**: How about a position in Spokane, Washington at the Inland Empire Research Station?

**DW**: Yeah, that was my very first experience of the West, working with a pathologist, Don Leaphart. [?] And it's interesting because we're going through a similar situation. In the early '30s, you have the Dust Bowl, but you also have drought in the forest and big forest fires. Sounds familiar? And some of these so-called pole-sized western white pine began to die, not in the '30s, but in the '50s. So we were washing out roots, we were building platforms to try to drain all the water off of a small area and recreate a drought to see whether or not that was the case. So I was doing actual research rather than just making observations and fighting fire and pulling up bushes that carried a fungus.

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It was an interesting experience; it was also the first time I got out to Mt. Rainier in September. And you can seek Mt. Rainier from Spokane, hundreds of miles before you get there. And then once you get there, you decide, "you know, this really is different from the lake states." So that sort of convinced myself that, if I had a choice, I might try to get a job in the West and maybe even get educated in the West, which is the next stage after you leave Minnesota with a master's degree.

**CP**: Right. This was an undergraduate opportunity, was it not? Or were you a graduate student by that time?

**DW**: I had two degrees from the University of Minnesota.

**CP**: I understand that, but specifically-

**DW**: Oh, that was an undergraduate. At that time, in the late '50s, all the jobs were coming on the market, for both the state and federal. So among my classmates – and I think this is true across the country – we had two to three job offers. Never happened before, never happened afterwards, but at that particular place there were lots of opportunities, particularly in government. So I guess I had – well, I did have deferment for undergraduate and, during the Depression, there were very few people born, so they would have taken me at eighteen for sure. But by the time I was twenty-one, they had other people and I had flat feet which, I thought I got playing tennis. But my brother doesn't have flat feet and

he's a twin, fraternal twin, so I thought, "well, maybe it just comes with the territory." But they said, "get out of here" and so I walked nine miles home in celebration.

**CP**: You did another project in the Redwoods as an undergraduate, I think. In the Redwoods – the Redwood Ecology Project?

**DW**: No that was – I got a master's degree in Botany at Minnesota before I got accepted at the University of California. I actually got accepted at two places, Davis and the University of California – Berkeley. But I actually had a job at Berkeley as a TA for a number of courses in Forestry and Forest Science, and I think that was the right choice at that time in any case. Now Davis is sort of the ecology campus, but at that time they had a really strong Forestry college and their own dean and all of these things.

The big difference between Berkeley and Minnesota Forestry at that time was, at Minnesota, we had a huge number of courses – everything from range management to hydrology – so we had breadth, but we didn't have much theory. And at Berkeley, we had an awful lot of theory before we were allowed to make a measurement, at least officially make a measurement. And so we said, "what do you expect? And why do you expect this? And how can you make these measurements cleanly test this idea?" And then maybe they'd let you go and do some tests.

Well that was a really, really different approach. So rather than an empirical statistical approach per se, we had this heavy theory – or light theory – saying, "if you expect this and this, how do you explain it? What's the principles underneath this? And if you know this and that, can you make these predictions?" Well, that's a very basic scientific approach to problems that are very common in all the non-applied fields. But when you start getting into forestry, it causes you to think differently, to teach differently, to look at problems that, "well, what difference would this make if we actually spent five years of our lives testing this idea?" You pick different problems when the situation is right and you know that your colleagues overseas and others will think that this could be important and could be testable too. So that really does change your attitude for what is a researchable problem. There are lots of researchable problems, some make a difference.

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**CP**: OK, so my chronology was off a little bit because for some reason I had thought you had been in the Redwoods before you went to Berkeley, but that's not true.

**DW**: I made it to Mt. Rainier.

**CP**: So tell me a bit about, as we wind up Minnesota, you finished your bachelor's degree and you decided to move on to the master's degree rather than move on.

**DW**: Well, I also got married when I finished my bachelor's degree. At that time, people got married within a couple days of when they graduated, because all of their friends were still around. So there were lots of weddings that summer.

My wife supported me for two years of master's and four years after that, as a teacher and also an Extension agent. Then she worked in the library at Berkeley in Forestry, so she helped me a lot before we came to Corvallis.

**CP**: What made you decide to go for the master's degree rather than to go into industry?

**DW**: I had been counseled that it was best to get your graduate degrees at two different institutions, if possible, so you could reflect on different philosophies and different priorities, and also build a larger network. So I was accepted at University of Michigan and also at Berkeley; it seemed like, for a number of reasons, for a Ph.D., a completely new area that I'd only seen from a summer job in Spokane, it would be worth going west. I have never regretted.

**CP**: But how about the master's degree at Minnesota, the decision to go into grad school there?

**DW**: Well, one it was an opportunity, because I didn't get drafted. So that's good. And second, I had good enough grades that I was being encouraged by professors. Professors had had you in their courses, so they all knew you really well, and also they taught at these spring camps and summer camps, so they had a lot better feeling about your capabilities that

you did. [laughs] So they'd make these statements and you would say, "oh, thank you." So I got encouraged and I was interested, I did read a lot and I did have more than my fair share of help getting interested in research.

Some of my jobs were working on research projects while I was an undergraduate student – taking care of plants in the greenhouse, teaching farm forestry, identifying woods in wood technology lab as a master's student. The one way to really learn things is to teach it, so that was a great experience.

**CP**: And your master's degree is in Botany and Soils, is that correct?

**DW**: Right.

**CP**: Was there no Forestry option or was there a conscious shift there?

**DW**: Well, the project was in Forestry. I was trying to recognize various vegetation types up in the northeast corner of Minnesota in different soils and different geological history; that was still forestry but it was a strong minor in botany. And I ran into Don Lawrence, who was an editor at that time, a reviewer, and he had a very big course where he took us in different situations in the field where trees had just established in a flood plain or, a thousand years ago, they were there already. And we could look at the different sequences and then write this all up in a big report. Well, most professors would say, "this is poor writing" or "you need to improve this or that." He actually edited every student.

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And so we thought we were good writers, we discovered we had some way to go, and when we did make the improvements, we learned something at the same time. How to tell a story so that there's transition from one sentence to another; how to leave out detail when it just distracts. It's like Little Red Riding Hood – you don't name all the plants that she does see on her way to grandmother, but you do point out the wolf when you see it. [laughs] And you know, you laugh, but it really does make a difference. What do you want the reader to remember? And how do you tell that tale? So all this is a start of being serious about writing. Not that I'm a great writer, but I'm certainly serious about it. Once you learn a foreign language then you master a little bit more of your own language; never enough, but more.

**CP**: You mentioned Lawrence, another name that I came across who is apparently important to you – I'll try to pronounce it properly – is it Egolfs Bakuzis? Is that correct?

**DW**: Yes. He was a Latvian that had started his academic career in the old country, when Latvia was occupied by the Germans during World War II and then by the Russians. And then he got on a ship with his thesis and the ship got sunk, and so I got to be his assistant – he was really my mentor – while he got another Ph.D. And we traveled to every county – there are eighty-seven counties in Minnesota – and analyzed the forest vegetation and tried to put it into some kind of scheme of how wet, how dry, how fertile and all that. So it was a qualitative kind of scheme, but when I got to the Redwoods, I made it quantitative. I actually said how much calcium is available and what are the temperatures and how dry does it really get in the root zone, but it was basically him.

And the other thing is that he encouraged me to read both French and German and really look at the literature and see what the history was. History, literature? Sounds like him. And what essence, what's the things that we've really built on and what have we started to build on but we no longer accept. So you're looking at the scientific method where you move to be more quantitative but sometimes you do completely different approaches. Well, completely different approaches is remote sensing. We all had aerial photogrammetry, we all had stereo views of the forest, but when you start doing things with radar and lidar and things that are even more complicated to explain to people, [laughs] you could do a lot to follow change over time and then begin to predict change over time. Like where the fires are going to be; when the insects are going to have an outbreak; where you expect disturbance and where you don't expect disturbance, other than by logging. Well, that's not a paradigm shift, but it's a scaling up of principles and, again, that's the one thing I was good at. So it's big opportunities for people that can allow some detail to no longer be as valuable and then look at the next stage up. The importance changes too: if you get enough forests, they begin to affect the atmosphere.

**CP**: So by the time you had finished up at Minnesota, you had decided you were going to pursue a career in academia? Is that correct?

**DW**: I don't know if I was going to pursue an academic life, but I was going to go on for another degree and see what happened. And again, remember, there were still job openings. So even when I graduated from Berkeley, I was going to come to Oregon State for a year and then join the Forest Service or go to Alaska or something like that. Well, that was fifty-two years ago.

**CP**: What was the adjustment like for you at Berkeley? Was it pretty easy?

**DW**: Berkeley has a scary standard and they allow you to spend unlimited in laboratories, so if you're not brilliant, you spend unlimited time in laboratories, [laughs] and your colleagues help you. So we had people in three different colleges that would allow me to use equipment and drafting things and soils and physiology and botany and greenhouses and forestry. And I thought that was fantastic, the ability to work on projects with three other graduate students and three other professors other than may own. That's really different than getting a pair of field glasses and saying, "go observe this bird." It's a whole different philosophy. So we're helping each other and, at the same time, we're learning. And again, the bigger story was much more exciting than our independent pieces that we were doing, but it turned out to be fun.

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In this case, the Parks Service, who owned or were responsible for 2,000-year-old Redwoods, were finding that during floods – and you always had floods – that the trees were being undercut and falling into the Eel River. This was really not acceptable because this is what they were supposed to protect, and these were the biggest trees – Rockefeller Grove. So this project wanted to see what alternatives were and what the cost was, and originally people were saying, "we need to build dams to stop this flooding." Well, in the Redwood region, that's pretty tough to do; none of the soils are very stable and it rains a lot. One of the analyses that we found is that these trees that are 379-feet high or something like that, that they were buried in more than thirty feet of silt. So they weren't going to fall over right away by themselves. But then we tried to find out, "well, how do they live?" because it's pretty anaerobic, without oxygen. It turned out that we could do an experiment in the park by bringing in a Caterpillar tractor and bringing in fresh silt, and in thirty days or forty days, new root tips emerged from the tops. So these trees were continually rebuilding their root system while they were being buried, as long as it wasn't too much so and as long as it didn't underwash it.

Well, they found eventually, not surprisingly, that they had done Caterpillar logging on very steep slopes and this had filled up the river and washed away bridges. And whatever tax money the county got never paid back for what damage it was doing to the system. So they didn't build dams and they didn't try to buy out the entire headwaters when they started purchasing a national park, rather than a state park. So you can see the implications of this kind of work that makes you feel like, gee, that was basic science – finding out what was going on historically, what their normal rates were. What difference does it make? It makes a difference on where the national park is split and it affected policy. It stood the test of time; no one has gone back and said, "no, that really wasn't what happened." So that gave me a pretty good feeling for joint research and trying to look at the history as well as the particular problem that's in front of you.

**CP**: Was this project the focus of your dissertation?

**DW**: My dissertation was trying to align the vegetation in the Redwood region along gradients of moisture and temperature and fertility. So lots and lots of measurements and chemistry and laboratory greenhouses. But once you had that, then you could pinpoint the areas that were the root of the problem. I carried that philosophy on into Oregon and then looked for principles and models that would work everywhere on Earth.

**CP**: Can you give us a sense of what the experience was like, to be in the Redwoods and doing research as a grad student in the '60s?

**DW**: Well, we lived in a little pup tent, and then we had colleagues that had access to a house, so we'd have a shower once a week if we weren't in the Eel River. It was pretty quiet because they put us 100 yards from the nearest tourists, in a blackberry patch. I think it was quite a sacrifice for my wife and other people's wives to live up there with us.

[0:40:15]

**CP**: So they were up there with you too?

**DW**: Yeah, during the summer time, because she was a school teacher. We were delighted; we got to see lots of areas that were away from the park, and learned where the corn grew and where the flowers were, and got to travel on weekends.

You're lucky when your spouse is willing to put up with you and to travel and also to make the sacrifice of not building a separate career. We've been away from Oregon State for over eight years, and that's a lot in Europe, Australia, Woods Hole Ecosystem Center, two years at NASA headquarters. You ask somebody to join you and they don't quite know what they're getting into. But if they like it – and my wife also volunteered for the Smithsonian history museum so, remember she worked in libraries? Worked in history museums? So she's brought a lot of that interest to Corvallis and I think maybe a bit more enrichment than she would have got if she hadn't tagged along with me, but probably not. Probably she would have done all these things much better.

**CP**: Well, you finished up at Berkeley in '63 and then you came to OSU. Can you tell me the story of how that came about?

**DW**: Well, they had an advertised position and a particular task. They often hire people, around the world, with a particular task, and I would say for any young person that the first thing to do is to do that task very well and very quickly, and that gives you the opportunity to start doing other things that may have nothing to do with the original task. And I think that's true everywhere; if you continue to work with good people and get things done – keep your word – then opportunities increase so rapidly that you have to start making this choice about, "I wish I could do that but I promised to do this."

And it turns out that keeping your word gives you a second or third chance, whereas if you don't keep your word – and sometimes you're working eighty hours a week, so that's not a real nice thing to do, but you're supposed to learn from that experience. Your family, you don't want eighty hours a week. You want to do things so that you're ahead of schedule, not everything is a crisis at the last minute, and then life is a lot more mellow, both at home and at work. And that's a very hard lesson because almost every young person, when they finally get listened to, they want to take that opportunity and that opportunity and that opportunity. And pretty quickly, you're overscheduled, overbooked.

**CP**: So what was the task that you were hired to do?

**DW**: Oh, to classify the vegetation and its relation to soil and climate in the Siskiyou Mountains of southern Oregon and northern California. And this is the most complex forest and the most complex geology of anywhere in the West, because – we're talking about the forest, California has more complex soils and vegetation – evolutionarily, the forests of the Siskiyous and the Klamath Mountains in general, is closest to China and then over the Appalachian Mountains, that's the nearest. So if you begin to think you understand how pieces come together and you know the history a little bit, you begin to build on that, and the greater the variation, the more you're going to be able to test your models. If you just have one spot and you really know that well, you still can't say, "well, how does that fit in a broader picture?"

Certainly when we started getting funding for climate change, then one spot was really not what you wanted to look at; even though we have great spots like the H.J. Andrews Experimental Forest, it's still one spot. And we really want to look at a big gradient across from Cascade Head, right near the ocean, over to the Juniper Woodland in Redmond. That's a fair gradient, that's the biggest gradient of forest in North America is the shortest distance. So Oregon is really a great place. NASA thought it was a great place, and so we had all the NASA planes flying over, four seasons, and they couldn't get over it because we always picked clear days.

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**CP**: So this initial position that you had, was it a tenure track position? Or was it something else?

**DW**: No, it was tenure track. Originally research and teaching were separated in Forestry, and so they had a teaching faculty, very heavy loads, that were located in what is now the English building. And then we had a research faculty that was very much focused on protecting seedlings planted on the Tillamook Burn, where every school kid and maybe every convict [laughs] got a chance to plant seedlings. And the job of this research group was to pick better seedlings, to keep them alive, to keep rodents from eating them, to keep brush away, all the things that are very applied. So this was set up down at Western Street in the Forest Research Lab. And no teaching, full time research, twelve months a year. Of course,

we wanted to teach, we wanted to have graduate students, so eventually – and you had money; once you had grants then you can do this.

Now the system has gone the other way, I think everybody has a nine-month appointment and they all have to teach three courses unless there's some special dispensation. But it was quite different.

**CP**: What do you remember about your early impressions of the university and of Corvallis when you arrived?

**DW**: Well, it wasn't Berkeley. [laughs] It was much more conservative than it is now and it wasn't internationally known in forestry, which Berkeley was, for sure. Eventually it became internationally known, mainly through tree physiology and genetics. And Bill Farrell and Dennis Lavender and Dick Herman were the three people that were the most important in starting that, and very supportive of me.

But the other thing that happened was we had a very broad range of technical people with master's degrees from different countries: Estonia and Russia – white Russia – and Germany and China. So when I went on my first sabbatical, I had lots of encouragement and now it's very difficult because spouses have two separate careers and also you can't really go and live on $8,000 a year in Austria and tour fourteen countries in Europe anymore. Maybe proportionally, you still can't do it, it's still difficult. So once we got sabbaticals – my family grew up with this experience, a son and a daughter and my wife – so we had lots of international people visiting, staying in the house, eating dinner with us. And I saw Corvallis getting enriched – not just from our efforts by any means – but this change from "let's get the Tillamook Burn replanted" to "let's become more international and let's do things that are of international interest, rather than just solve a local problem."

And you can see, in all the applied fields, this tension going back and forth from "the trees are blowing down, the insects are coming," to "what principles can we say should work everywhere? How would we do this?" You see them hire different faculty, but I like to think that a lot of our work was ahead of the problem rather than behind it, because we actually could predict which trees would die from a certain number of insect attacks, and which trees would live. And what you might do, if you cared to do something about it, to protect a certain number. Any big crisis, whether it's fire or insects or disease, there will be a huge amount of money briefly available, and there will be some good that will come out of that. But if you're actually thinking about it before and you had a theory and you went to test your models, rather than say, "I wonder what will happen if we do this?" that's that old conflict or difference between Minnesota Forestry and Berkeley Forestry. And I didn't realize it, but that's a pretty basic difference. So there's lot of correlations, but looking for the explanation in order to have a firm base to make your predictions, that's a really unique thing in science. We used to say, "that is science."

[0:51:07]

**CP**: So as we try to trace the increase in prestige of the College of Forestry at OSU – you mentioned from not internationally known to internationally known – part of that is embracing a more international perspective, it sounds like.

**DW**: Yeah, and more science. So looking at the genetics. We had tremendous help from people in the Forest Service, in the research group; Jim Trappe, Jerry Franklin, there's some big names there that had traveled a lot around the world and were looking at ideas that might be more general or very much implied to this case. And, of course, we have spotted owls and all kinds of other very important policy-related things that brought attention. We've been very, very fortunate, certainly in the last thirty years, of bringing people together on big NASA projects, big Department of Energy projects – Bev Law is one of them – and having students that have risen to very responsible positions; deans at Stanford, and the head of a program at NASA in carbon cycling, and head of another program in ecosystems at NSF. I only had twenty-five students so, remember, basking in reflected glory. These were good people, they could write, they could think, they could do things that were clean. And then they went on to work with lots of other people and bring teams together and do things much more than I could have ever done, or any person could have done by themselves. But you like to think, "well, they were here, and maybe I had a little influence on what's an important question been and how to keep your word. Maybe those were the two things that they remember most."

**CP**: So as we talk about some of the early phases of your career and research, it sounds to me like the Analysis of Ecosystems Program was an important project. Is that correct?

**DW**: That's true, because it was supported by the National Science Foundation and we were charged with trying to build models of how water and carbon – and maybe nutrients too – flowed through the system. And at that time, none of our systems that we studied had any moving parts. In other words, they weren't disturbed, they were like, "ok, this is an old growth forest, and this is that." But in constructing those very complicated models, we did ask what would happen if you clearcut a forest or you killed part of the trees, not all. So we set up experiments on gauged watersheds and certainly the water models were particularly accurate in being able to predict what did happen when we finally, after eight years or so, cut an old growth forest...which probably we wouldn't do today. But it was a good test, and we were able to compare it with other forests in the Appalachian Mountains, both plantations and natural forests, and the same models worked. And we tried them also in Arizona and the same models worked. So that's really something that came out of having the opportunity to not only study in Oregon and Washington, what's going on, but also in Arizona and the Appalachian Mountains at the same time. That was an important program.

[0:55:19]

It didn't meet all its goals that we would have all these wonderful models that would predict everything. They were basically describing what happens in a natural system when there's no disturbance, which is a fairly simple model, by the way. But I think probably in Oregon, the most original work came on streams. And so we would take money away from forestry related projects and give it to the stream team, because they were putting gingko leaves in, which are not natural, and following where they went. And they were putting phosphorus in and following radioisotopes of phosphorus, and they really did some magnificent work. Jim Hall and Jim Sedell and Fred Swanson and people.

During that period, the most important thing that, I think, came out of it is in colleges of Forestry, we started hiring people with no forestry background. Now, they had a degree in Geology or Physiology or something, but they didn't have Forestry. And we sort of educated them because Jerry Franklin and I are both foresters; we knew how to do things. And they brought a perspective that was really important to the Forest Service and to everybody else. And also we got away, for better or for worse, from asking graduate students to do work year round, and hired post-docs. And in those days, the job market was so good that most of our post-docs only stayed two years – they already had permanent jobs, tenure track jobs, across the country. So when you, today, start seeing post-docs extended research positions for six years, eight years, it's like, "this is a different situation. It isn't what we planned on originally." But it really was a big switch and it's one of the reasons that the H.J. Andrews got continued funding and the University of Washington really couldn't quite start up a big center, because they were still using graduate students and maybe professors, and we were delegating huge programs to the stream team and saying "go, go, go." It was really a different level of science that you can do that way.

**CP**: Can you comment on the H.J. Andrews Experimental Forest as a place to do research?

**DW**: We did that on a trip back from Seattle. We had two choices: we could either use McDonald-Dunn Forest, which is right north of town, or we'd use the Andrews. The Andrews had the advantage of gauged watersheds, basically. And Jerry Franklin was working for the Forest Service and so we agreed on this in the car. It wasn't a big fight, it was like, "this seems logical." We voted Jerry to be deputy director and I was a site director. So all that was settled in a five-and-a-half-hour drive.

**CP**: It sounds to me like, in the early '80s, the work shifted a little bit, and my understanding is that you did some work on bark beetles and the spruce budworm that was important.

**DW**: Well, we thought it was important. In agriculture, back in the, certainly in the '60s, they had recognized the importance of how leaves are displayed in terms of how light is absorbed and how photosynthesis eventually can be efficient or inefficient. And even genetically, they were looking at ways to make the leaves better receptors – solar receptors, it's the same principle. Sunflowers actually track the sun but most of the other plants don't. So when you review that literature and, of course, I'm coming from the Midwest, ok? We had a Victory Garden, I know something about agriculture, my wife is a farmer's daughter, so maybe I know just enough to be dangerous. But you read that literature and you say, "ah, it's the leaves." Well, of course, when you're a farmer and the crop is only eight feet tall maximum, it's pretty easy to get at the leaves. In forests it's a bit more of a challenge.

[1:00:15]

But remember in this big project on the Andrews, we had access to NSF funding and I had friends from Soil Physics back in Minnesota that worked for Argonne National Laboratory, which is nuclear. So they had available and were publishing a few papers using tritium, which is a radioisotope of water. So we were putting these in huge trees in the Andrews and finding how long it would take to get to the first branch with climbers, because we also had a bunch of climbers that were mapping lichens and other things. And up in Seattle area, we had one of our post-docs, which is one of my students, and they were putting tritium into plantation trees, but the trees differed four times in their diameter. Well, these trees have sapwood and hardwood – the sapwood is where they conduct the water and the hardwood is sort of a dead spot that is supposed to hold the center of the tree up. And we found when we put the tritium there in exactly the same climate, that the tritium moved in exact relation to the amount of sapwood area. So if you have a lot of sapwood area, it moves faster in that. So then we had to fell those trees and we found out the leaf area on those trees was linearly related to the sapwood area. OK, now we finally have a way to measure the leaves without having to fell the tree or collect the litter. We collected the litter, we did all these comparisons, but we could say, "Aha!"

Once we had that, then we could work like agriculturalists, because we knew the leaves and we ask how much wood did you produce? Which is not essential, you can have a lost annual ring if it's a real stressed tree. You say, "here's the leaves, what did you do with the leaves in terms of producing wood?" Because if you produce wood, a lot of wood per unit of leaf, and you get attacked by a bark beetle, then you can reallocate what would normally go into building springwood – the early wood – and you can build a dead zone of resin right around the blue-stain fungus that this beetle – female beetles – are introducing. And if you're really a healthy tree, you produce so much potential wood, or resin, that you can completely wall off an epidemic attack, which is about two-hundred beetles per square meter.

Well, we tested that. First we found in nature a bunch of old trees that had been attacked lightly or heavily, and some had lived and some had died. So we had a hundred trees that we already had sort of a model predicting. But then we decided, "let's thin the forest very, very hard, leave just big trees, let's fertilize some of them, let's pour on sawdust and sugar," because that ties up all the nitrogen, because the microbes love it, but the tree doesn't get it. And "let's see what happens during this epidemic, that we've got the Forest Service's permission" – up near Osprey Point on the Century Drive – "not to touch, no matter what happens." [laughs] Because otherwise, they'd go in and salvage log.

And it turned out that the models worked. The first year, it looked like the beetles were going to kill everything, because we actually had a pheromone – Gary Pittman, an entomologist, came up from Boyce Thompson and worked with us for three years, he had an appointment here. And I think we cut down 400 trees – not a subtle experiment – all replicated four times. That's the other thing: never be subtle, never do this little slight thing. Get the full range of environment.

And the second year, the trees that were still living responded so well that you could separate them out. But where we didn't thin and we didn't fertilize, or where we poured sawdust and sugar on the trees, the beetles kept heading, because they didn't do it. So we had an explanation as well as a method to test it and then, of course, once we knew the leaves, then we could fly over it with NASA's aircraft and look at different ways to independently get the amount of leaves on a forest and not the growth. So you can sort of see the lengths – nothing is unrelated. You can say, "well, felled the trees, we can measure the leaves, but we can fell trees everywhere. Well, we've got the sapwood, we can bore the trees, but we can't do that everywhere. We know in principle that this is good. How do we scale it up?" It's almost logical.

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But the normal thing in science is reduce the information and get, "what's the difference among species? What's the difference among different trees and different sizes?" We were interested in that too, but this big opportunity was to move the other direction.

**CP**: From the public perception of forests and timber in the '80s in Oregon, the idea that comes to mind is crisis, decline and controversy. I'm interested in knowing what your perspective was as an academic as environmentalism and as forest products kind of continued to butt heads over the course of that decade, and a way of life sort of vanished from the state.

**DW**: Yeah, well it certainly did. The loggers were really, really skilled. I mean, they could drop trees almost where they wanted to and these were really big trees. But if you looked at some of the areas that I had done research on in the Siskiyous, the trees weren't coming back, even if they had been planted three times. So we began – because we had the instruments – we could tell them that there were dead trees, even though your boots were wet. They were putting them

in environments, or not bringing them from the nursery in a healthy way, and they could do this forever and they would not get regeneration. So we were seeing problems created by clearcuts in areas that, previously, logging companies had selected to be logged. Maybe high-graded, so they took the very best trees. If they wanted pine, they made a little bigger disturbance, if they wanted true fir, they did less. Well, they had up twelve species per acre in the Siskiyous, so it's not like they were only working with Douglas fir and hemlock. They had some choices, but some things were much more valuable.

So we had seen that, we'd seen the areas where they had frost heaving because, once you open up an area, there's a little frost, put a little tree in it, it gets frosted and you have to have dead cover or you have to have something to protect that tree, to get a forest started again. Sometimes it's brush.

So I'd observed all this. I mean, it's like you're out 131 miles of road system at least once a month, day and night, making physiological measurements at midnight and afterwards. And you know a few people in the Forest Service, usually the young ones, and you try to get them recognized by being successful and not taking the credit. So you take them out, you give workshops, you have international tours, and you try that. Well, some of those people end up as supervisors of forests but, in between, they're often fighting with their immediate bosses and project leaders. And so you've got the people you drink beer with – it's a difficult transition because you are going from one emphasis to another. And, of course, the public is moving; Benton County was once very, very Republican and it is now very Democratic. That's a big change in fifty years.

**CP**: Well, in the mid-'80s, you began a series of consultations with the Jet Propulsion Lab at Caltech, is that correct?

**DW**: Well yes, JPL, that's right. They earn money through Caltech but the Jet Propulsion Laboratory is sort of a free agent supported by NASA.

**CP**: OK. So this is the beginning of the NASA era for you. I'm interested in how this shift began for you, how it came about.

**DW**: Well, it's funny, I got a call from Alex Getz, a German who worked with spectroradiometers, and he wanted me to be on this committee to design a satellite that would measure the wave bands that are important for photosynthesis. I said, "you don't need me, it's in every textbook. It's red." And he said, "no, no, I want you to learn what our restrictions are of getting data down and how we correct for clouds and atmosphere. And I need you here to listen to these other people and they need to listen to you, whether you take a morning flight or an afternoon flight, which is going to be the least clouds and all that." And I said, "ok, you're paying well for the travel and I'm going to learn something." I'd already had photogrammetry; it wasn't that I didn't know anything about using remote sensing. In fact, I had done a little bit of work on that in an experiment on that forest where I'd been a student after I had graduated.

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That committee taught me a lot. It turned out that they weren't ready to build a satellite yet. I mean, it just required too much sophistication, too much storage of energy. And they were wanting to use it for geology, because it really, really works well where there's no trees or brush; you could tell a lot of the mineralogy from space. But at that time, most of the botanists and the other people had no idea what they were getting into with these, other than leaf area, we knew that. But these are passive centers, they're using the sun's light and its reflectance. They're not using radar or lidar or something and sending a pulse down to the thing. So that was sort of put on hold, other than from aircraft.

But that got me introduced. And I was a physiological ecologist with a forestry background, so when NASA got interested in predicting change in forest, both in growth and disturbance, they actually invited me to submit grants and collaborate with them. And probably my students, they got them on there too, because they knew physiology, they knew this, and one of them was working at NASA at Ames, near San Francisco, and one was in Montana and one was in Canada. A lot of my former students switched from funding from NSF to NASA.

**CP**: And this marks a period where you're involved in environmental issues that are very well-known to all of us. My list, you begin with acid rain in 1986, is that correct?

**DW**: Right, that's close. And then I went to NASA headquarters in '90, '91, I think.

**CP**: Can you tell us about some of this work with acid rain and ozone depletion?

**DW**: That was mostly going on in the eastern U.S., and the nearest I got to that is I had one student, Jean Panek at Berkeley, she was working as a post-doc. And this relates to ozone, because it's rather interesting; they were trying to map the areas that would be most sensitive to ozone, and you might either thin the forest or not expect those trees to do well there. Trees have pores in their leaves that they open and close to let water out and carbon dioxide in, and ozone gets in when those pores are open. So everyone thought that the trees would be happier in the Coast range, because they had fog and good growing conditions; they wouldn't have to hold their breath every afternoon. Well, it turned out they didn't hold their breath every afternoon and that's when the ozone killed them, or really hurt them. So she built a model that took into account whether the pores were open or closed and how much ozone there was. It's really much more of an active biologically designed index rather than, "the ozone concentration is so high, we're all going to die!" Well, it's not going to die if everybody's holding their breath, which was true of the Sierras where there was drought in the afternoon. So that's as near as I got, other than cheering her on and citing her on ozone.

Acid rain was much more of a problem in the northeast United States and the coal-fired areas of the Appalachians, than here. I'm still doing a little consulting, very little consulting, with an EPA-related grant there. But things have improved so much in terms of nitrogen deposition, it's not the big problem it was in the '80s. There's still problems, but now it's more climate change than it is acid rain. And the same in Germany and France, it's really changed since the East bloc countries no longer manufacture using brown coal. That's the biggest change; everybody was doing it. Great Britain was doing it too. Then that stuff would come over into Sweden.

[1:15:31]

**CP**: What was the OTTER Project?

**DW**: What was the?

**CP**: The OTTER Project?

**DW**: Oh, ok. That was a really interesting project in the way it got started and in the way it was conducted. We asked the question – following up on the regional modeling effort that, I would say, failed – can we take the satellite system and can we tell enough about forest in different areas, if we also know the climate, to predict the growth? And if we were to do this, where could we do it where we can have all nine planes from NASA and a couple Canadian planes and our own lightweight aircraft all flying over these areas, either the same day or the same area?

You know, it was Oregon. So we write a letter to NASA headquarters and also have friends at Ames – Ames used to be where all the planes were located – and we said, "let's have a workshop. Let's see how many people that are available to even think about this and actually participate." So we had a workshop open to all the scientists, and they came together and some people could do it right away, some had projects going and they couldn't really commit to doing this other than a collaborator. So we got enough people, so we had the one person at Ames that would write about the scheduling of the aircraft, and we had me, who would be worrying about gathering all the ground data and the med stations and measuring leaf areas and collecting foliage for nitrogen and all this.

And they said, "ok, we've got volunteers, we've got people who've agreed to work together. Dick, you're in charge of the databank; Dave Peterson, you're in charge of all the aircraft. Let's write the grant." And the grant got funded, because we had sort of done our homework, they had sponsored the workshop, and we said, "we don't know for sure, but we can test this idea that we have a model and we could pretty well drive it from space." And it turned out imperfectly, but we could. So now you get real opportunities to make general things. So that was fun. I think it went for five years.

**CP**: Climate change has been a real focus of yours for a while now and I'm interested in when you first got involved in the topic.

**DW**: It's interesting. One of my former students, Steve Running in Montana, was very active in this OTTER Project, and he had a model that built on one that he and I had put together when he was a graduate student, but it was just the water movement part of a model through trees. He added nitrogen and respiration and so on. And when I had a sabbatical in Australia, I met up with a colleague that I first met something like forty years earlier in Scotland, Joe Landsberg. And he

used to be, among other things, in charge of the Research Forestry Group in Australia, so he got me there at the end of his official career. We're still publishing together, ok? So you wonder about these guys that are eighty and seventy-eight still doing things. And he said, "well, why don't we put a model together that builds a little bit on what we now know in our thirty-year careers, because this is our last chance to really take a process model, which physiologists like, and actually get it into application." So you can thin and tell it what would happen, and the climate change, you can make predictions about how it will change growth if not kill trees. And I've spent a whole bunch of time on what kills trees.

[1:20:02]

So we built this model and he learned to program, because he's really good at math. And we wrote this paper and it looked pretty good, and then I met a guy from Australia while he was visiting Montana – I took him out to lunch, because Steve Running was busy – and he's back in Australia and I said, "let's go talk to him," because he's really good at remote sensing. So we said, "let's see if we can make a subset of a model that's driven from space." So we did that, published – both, of course – gave the code away for free, where normally the Australian government require that everything have a patent on it and be sold. And I said, "no, Oregon State doesn't do that. We always let it be free." You know this was absolutely wrong, but I thought it would be so complicated to do with Australia that way, we'd just say it's free. So the code was free. It's not the best model, it's not the most complicated, but it's free.

So instantly, over about a ten-year period, it goes international and it gets improved and it has CO2 in it. It has the effect of CO2 changing in it. Well, that wasn't in any of our original models because we had either ignored it or thought it was so small that it wouldn't be effected. And it has the possibility of defoliation, has the possibility of thinning, and has the possibility of climate change infertilization, all of these things. It's not a perfect model but for teaching it's just easy, because it's all an Excel spreadsheet and it's all in Visual Basic, which is really simple. I can read the code and a diagram, I don't program.

So that worked. And this young remote sensor, Nicholas Coops, wound up being a full professor at the University of British Columbia, which is north of us. OK, now we're interested in all of the western hemisphere, or west of the Mississippi, or west of the forest areas. And that means we don't have to stop at the border to make predictions of where fires will be, where disease – we suddenly have the full range of the species, or actually fifteen species. So now we begin to look at where changes have recently taken place that we think will be unfavorable or more favorable for a species. Now that's climate change.

And then, I think next week it will be accepted in the press, it's been revised – we began to predict where the corridors are and what the maximum rates of migration are, unless you have assisted migration. Well, the worst thing that comes out of this in British Columbia is, the normal rate of the climatic conditions that are favorable for a species are moving north at about sixty miles a decade – 100 kilometers, one degree of latitude. The maximum normal migration rate is about two kilometers a decade. And, of course, eventually you end up running out of space because, the North Pole, things get smaller. That's a really depressing piece of information, but it's going to be published because we're only like two days away from the accepting it, it's just minor changes. My dean calls me Dr. Doom because there's a big philosophical idea out and you've seen it at Oregon Dungeness crab, they're going to be sustainable, except you can't harvest them – they're in a dead zone or they've got poison in them. That's not sustainable.

The same with forestry. We could cut and do things, if life were to be simple – no climate change, no outbreaks – but they're not simple. So we try to bring up the challenges and what opportunities there are to meet some of these challenges. But the idea of sustainability in a continually changing climate is a dream. And very few people want to hear that, but the people in B.C. are beginning to appreciate it because so many things have happened so fast, the closer you get to the pole and the bigger the change from ice, which reflects, what, 95% of all the incoming radiation, to water, which absorbs 95% of all incoming radiation. So here we are back to high school spectroradiomtery, the stuff I learned in physics in high school, it still applies. Everything I ever learned about albedo reflectivity, it still applies. It's the same physics, it doesn't change rules no matter how much we'd like it to change. And that's why you think some models have more long-term basis than others. We know a lot about how trees behave to hold their breath and we know a lot about the reflectivity of different systems. You have some options, but you can't or you shouldn't just ignore it.

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So that gets us into the obvious thing of, we like to publish in peer literature and then we like to be interviewed. We don't like stuff until it's been published and peer reviewed. And peer review isn't perfect because then it's like, "well, there it is, it's the best we can do at this time, and yeah it's not perfect." I work as closely as I can with Oregon Land Trust and the Nature Conservancy, particularly their new program on the restoration of American forests, Russ Hoeflich. Now he's in the Forestry Center in Portland, but for twenty-seven years he was head of the Nature Conservancy program. Well, I'm not putting words in his mouth, but I'm also giving him information that might or might not be valuable when they're lobbying Congress.

**CP**: Yeah, well you've written a book, right?

**DW**: That's the recent one, that's right.

**CP**: That talks about forests as a first line of defense against climate change. Can you give us a sense of the thesis of that book?

**DW**: Two points. One is that forests are really, really important for the global, and not just for the products that we get off of them but in terms of how they buffer against climate change and store carbon. And the second point is, we're going to have to adapt to using these forests in different ways, because they're not going to be stable. One way of adapting, carefully, is to take a band of agricultural land in particular, and put very fast-growing plantations on it to get maybe thirty percent of all of our wood products. Right now I think it's something like twenty-five percent on three percent, that's a quote that we had, now it's up to larger than that.

And so then you begin to see also the cost of doing business, because if you – I've given talks at *Biological Conservation*, and they had a person that just reviewed the book, and he said, "I didn't realize that they have to make such an investment to plant trees, and they have to make a return, and they have to discount this stuff." Well, it's just the compound interest law, right? But in that book, between Joe and I – me in the northern hemisphere and he in the southern and all this experience of being chief – it's how can we get this into, what, 125 pages? We tried to write it so it's not completely opaque, but I think it's still got a little bit of math in it, so it's borderline opaque. And that's just the hazards of not being a really good writer and still feeling that we should put in a few citations.

[1:29:45]

But we'll see. With the *Biological Conservation* audience, at least getting a good review of the book, that's got our hopes up that it might be sold. We're getting a lot of people now in the Forestry undergraduate that really don't want the detailed "how to thin forests" and that, they want the broader perspective, so perhaps that book will be more used as an introductory course. That's what our real hope was; that's what we thought the real audience was. But it has an interesting history, doesn't it? It's sort of like the model was built out of frustration: "we're running out of time and if we don't do anything that shows a process model has any application, who will?" And this one is sort of like, "we're running out of time, how do we address climate change so that it's not so scary, and that there are options and that it is important." That's just old guys making an attempt to make a mark, but maybe held the next generation, because we have kids.

**CP**: Well, as we start to wrap up a little bit, I have just a couple of concluding questions. And one is something the we've sort of touched upon throughout this interview, but I'm interested in your perspective on change within the College of Forestry; you've certainly seen a lot.

**DW**: I really support the new dean, who came down from British Columbia by the way, having already raised money for building in that. For his attempt, and I think success, in bringing departments together socially and on committees where they used to just either ignore or actually be at intellectual war – there's no bruises, alright? But they're trying to stop an article being published in *Science*, and it's like, "ah, no," and they're signing their names and this gets all the way back to NSF, it gets global. It's like you really don't need this. And then you have a vote of confidence on the dean. I mean, can you think of anything worse? Entomology actually disappeared from this campus because they couldn't quite agree on what the philosophy was going to be, so pretty soon there was no Entomology department.

So this dean wants to make sure that the college survives. He wants to try to get more jobs in the outlying thing, and he sees the opportunity with cross-laminated wood and sort of moving in that direction, so we're not cutting old growth –

we don't need old growth for that – we have jobs, we have interesting opportunities, we're embedded with Austria and we have people from Czechoslovakia on our faculty that are active in this. You can just see, he has a direction – I think he's the first dean that's destroyed a building, [laughs] which I lose my office, by the way. I suppose I could move into something with three other people and no window, but it's like, "uh, I don't think for two years I want to do that." So I'll work at home and probably wind down, but I'm trying to help some younger faculty get into the NASA grant writing on biodiversity. So if I can do that, I don't have to be P.I. All I have to do is encourage them and write good prose, write a good story.

So I'm supportive of him. He's trying to also meet the requirements that are placed on him by the provost. Remember when I said about your first job? They have this requirement and you have to do that, and once you do that, then you get the freedom to do other things. Well, I think his requirement is that they've got to have more students in Forestry – like, double it. So then you have to require everybody to teach, or very special cases where they don't. And they have to still fund themselves through the summer if they need the money. Those are big policy changes and people that haven't taught – I used to teach one five-credit course with labs and then a seminar, so that probably wouldn't qualify, it might be right on the borderline. But now it's really more of a challenge and I think he's going to be successful. So you asked me my opinion. And I still write him and he still shakes his head and "Dr. Doom," but he knows about these things, just like the Nature Conservancy, they know about these things. So they're not blindsided by making statements that will embarrass the college and them in the future. Or I guess they could go ahead and do it, but at least they have this information. I think that's pretty great. I've always had good relations with the deans; this is my fifth dean.

[1:35:28]

**CP**: And the last question, as one who's been associated with OSU for quite a long time, where do you see the university as being positioned right now as it heads toward its 150th birthday?

**DW**: It wants to be a top class university and it wants to do that in spite of a lack of support from the state. That drives it to act a little bit like a private institution, but it isn't. So then it leaves it in a position of trying to be like Berkeley, but Berkeley is a lot different than Oregon State in terms of the quality of faculty that they can attract and hold. We can attract them but I don't think we can hold them, because you need endowed chairs and you need lots of opportunities for those people that we'd like to give them – this is not a case where we're against that idea – but you just don't have the history of having that international faculty. We have some in our, we have some in Engineering, but across the board, if you look at Berkeley – and I still do once in a while, because they keep sending information for how I can give more – you look how they're ranked in the different colleges, it's still, almost across the board, the best public university in the nation, which means the world. That's where I come from, ok? I didn't realize I'd be so proud of this.

But even if you go to Minnesota, they're getting less funding from the legislators too, but they've got a lot of support from the business community and always have, for social things, in Minneapolis and St. Paul. And people used – I don't know if it was just a rumor or not – but you came there and they sat you down and they said, "well, we have certain obligations here now that you're in Minneapolis/St. Paul. These include the following," and it's like internships and supporting this and that. And maybe that's beginning to happen in Oregon, but it looks like it's still mostly towards sports. Berkeley is not known for sports, right? Berkeley is known for leadership in the world and academics. Now that may be a trade-off, but I think the sports thing is hard to maintain, even if you're University of Oregon. Personal opinion...you asked.

**CP**: So OSU is sort of in this place now where it's aspiring but it's having a hard time getting to that next level?

**DW**: I think it made an important decision for the state to set up another campus in Bend. You can do lots of things to train students that were born and raised in Oregon; that's one of them. I think a lot of our income comes from Californians, where they can come up here and the tuition here, at around $10,000 a year, is still less than what they pay in state, if they could get in to a college in state. So we're going to be a West Coast kind of thing, we're maybe going to have some overseas people, but they won't be poor overseas people. That isn't what I see on campus. Our dean is trying to build up the Pacific Rim, which is Chile and that, but I don't see that doing the same thing that University of Michigan, and Berkeley, and Minnesota, and Ohio, and Indiana, and those places have done. And my only experience is those places, outside of Georgia.

**CP**: A long time ago.

**DW**: I think it will be hard to even get Engineering up to number twenty-five, which has been a long-term goal. There are lots of good Engineering schools. I think Forestry will keep its place because so many others have lost their dean and no longer have a Forestry major. They have a Forestry thing, like University of Washington, so we'll probably keep being able to train Forestry students for a long time. But again, the international level requires that you go international; I mean, you would actually have your faculty, and probably in research not just teaching. Personal opinion.

**CP**: Well Dick, thank you for this. This has been very interesting and I appreciate you taking the time to share your recollections with us and contributing to our project. Thanks very much.

**DW**: My pleasure.

[1:41:13]