



Al Parr Oral History Interview, June 18, 2014

Title

“Of Physics and Rare Books”

Date

June 18, 2014

Location

Parr residence, Gresham, Oregon.

Summary

In the interview, Parr discusses his upbringing in Roseburg, Oregon, his earliest interests in science, and his decision to attend Oregon State College. In recalling his Oregon State years, Parr notes his involvement in the NROTC program, his participation in the university's honors program, his academic progression and social life, and his sense of campus culture in the early 1960s.

From there, Parr moves on to his years as a graduate student at the University of Chicago, where he remarks on the school's vibrant academic environment and details his research as a master's student and as a doctoral candidate. He also describes the circumstances of his first encounter with his future wife Ruth, his memories of starting a family while a student, and his experience of Chicago during a tumultuous period in the city's history.

Parr next recalls his move to the University of Alabama, his impressions of life in the American South, and his first association with the National Bureau of Standards, where he worked while on sabbatical from Alabama. His decision to move to NBS full-time, a detailed discussion of his research agenda and career advancement, and his reflections on family life in the Washington, D.C.-area are the major themes of this portion of the interview.

The session concludes with a discussion of Parr's love for books and his keen interest in book collecting. He concludes by recounting the process by which he decided to donate his collection to the OSU Libraries and by expressing his enthusiasm for the work currently being done there.

Interviewee

Al Parr

Interviewer

Chris Petersen

Website

<http://scarc.library.oregonstate.edu/oh150/parr/>

Transcript

Chris Petersen: Okay Al, if you could please introduce yourself with your name and today's date, and our location?

Al Parr: I'm Albert C. Parr, and we're at our home in Gresham, Oregon, on Eastwood Avenue, and today's date, I believe, is the 18th. It's the 18th of June, 2014.

CP: Terrific. Well, we'll start at the beginning. You were born in, is it Tooele, Utah?

AP: Tooele, they call it.

CP: Tooele, Utah?

AP: Yeah.

CP: And, so what was your family doing there?

AP: My dad was working in the copper mines, and a big Army depot, at the Tooele Ordinance Depot, during World War II. And after the war ended, he decided he wanted to leave Utah and move up to Oregon where his brother was, family was, in Roseburg. So we moved to Roseburg I think in 1946, something like that, '46 or early '47, and that's where I went to all of my schooling, and grew up there in Roseburg.

CP: Did you have siblings?

AP: Yes, I had one brother, an older brother, and a sister that's four years younger. And they all—they both live in the state. My sister lives in Canby. My brother lives in Lake Grove, or Lake Oswego.

CP: So your dad was in the copper mines originally, but I understand he was in the forest products industry?

AP: Yeah, he worked in the saw mills and plywood mills in the Roseburg area, and eventually ran a filling station for a while, and some other things, then sort of retired as a handy man and a mechanic at his place there in Roseburg.

CP: Growing up in Roseburg, do you have memories of the timber culture at that time?

AP: Yeah, there was a lot—that's what made the world hum down there, and in those days they were still getting a lot of those first-growth trees, and it would be Douglas firs, and it would take up a whole logging truck, the diameter it would be. You'd see those coming down the road, and the roads, of course, are very primitive up in the mountains. There's a lot of them that are loose gravel, non-paved, but it was very primitive. But that was almost exclusively it. There was also a big farming industry in Roseburg, in the Garden Valley, vegetable farming, cantaloupe, beans, that sort of thing. And a lot of us kids entering high school worked in the farms in the valleys there in the Roseburg area. In fact, that's where I started working, in the farming areas, to save up money to go to Oregon State.

CP: So, what kinds of jobs did you do?

AP: Well, I started in junior high school picking beans, the pole beans, and then eventually got a—that was a per-pound sort of job, and then eventually I got a job by the hour as sort of an overseer of that, and also in summers running the cantaloupe fields. And then the guy I worked for had about 25 acres of cantaloupes, and tomatoes, and strawberries, and that sort of thing. I would work all from spring on through the late summer, early fall, after school and weekends for the farmers.

CP: Was there much migrant labor in the area at that time?

AP: Not much at all, very, very little. In fact, that's why the school—they used to run the school buses downtown, and haul kids to work in the fields, and I don't think that's done any more. I think the children don't want to work out in the hot sun. But that's what used to be done, back in the '50s and '60s, and then before that it was, you'd get yourself to the school,

and one school bus would load up and go to the various bean fields. And you would work all day, and they would bring you back to the school, and you would get yourself home somehow.

CP: What do you remember about your dad's work in the saw mill? I mean, what was a typical work experience like for him, do you know?

AP: It was very hard work, and of course the mills were not air conditioned or heated, or any of that nature, and so it was hard, dirty work, and not the safest thing in those days, either. But it was very labor-intensive. All of the work was done by hand and of course, power saws and that kind of thing. But you walk into a modern plywood mill, you know, there's very few people, and it's all automated. But in those days, everything was done by hand, including making the plywood sheet, layer by layer.

In fact, I had a job one summer in college working in a plywood mill, and it was my job to make the plywood, which started out with the big, flat piece, the four-by-eight piece, and the machine just spit out glued cross-pieces to you, and slap those down in some water, and then flop another of the sheets on. And you built, you physically built a piece of plywood with your hands, and stacked them up and put them in a big, hot press and pressed them, and started another batch. [Laughs] But it was all hand labor, you see, including the glued pieces, and all parts of the process were hand. So they employed a lot of people, compared to what now they do.

CP: Sounds a little repetitious.

AP: Yeah. It's boring, but it was good money for a kid, in those days.

CP: How about your mother? What was her background?

AP: She was a school teacher. And so as soon as we moved to Roseburg, she got a job in Lookingglass [0:05:02], started teaching in Lookingglass, and would go out there every day during the school year. And so we were very young, so we would often have baby sitters and that sort of thing. And then eventually she moved to the Roseburg school system and retired from that after 30 years, or whatever.

CP: How was Roseburg, growing up for you?

AP: I loved it. It was a safe place to be, and had a lot of friends there, still do. Still have my Roseburg contacts. And I liked it. The weather was nice, and it's a lovely place to live. It was of course a small town, but I have very fond memories of it. It was a really great place. Schools were good, and so it was—everything was recommended in my mind.

CP: What were your hobbies as a boy? What did you do for fun?

AP: I was pretty busy working. We lived on a small farm, so we had a lot of animals, had always had pigs and chickens, and now occasionally a cow and a steer, and that sort of thing. So, busy with that sort of thing. Then hobbies as I got older, was cars. Got real interested in hot rod racing, and a bunch of us would run these hot rods you would see back in the '50s, and drag race on the roads, and that sort of thing. I had a good time; it was entertaining. It was a nice place to grow up.

CP: How about your experience of school?

AP: Roseburg had good schools in those days, and I presume they still do. And so it was—I learned a lot. The first few years, the first few years of my schooling I didn't take schooling very seriously. And I got by, but nothing to brag about academic excellence. But by the time I got to high school and later on, I started taking school a little more seriously, worked on getting good grades, and that sort of thing. But again, they were very tolerant. And I was active in student government in high school, and so on.

So I had a good time. I look back at high school with great fondness. I still have a lot of friends from the Roseburg graduating class, and I see them. And in fact, I was just talking to one on the phone this morning, an old buddy from Roseburg, so. Your friendships last. They started and last a lifetime from your high school experience.

CP: I assume education was an emphasis in your family—

AP: Yes.

CP: —with your mother being a teacher?

AP: I heard from the time I was very small that you want to work hard so you can go to college, and my dad would always say, "So you don't have to work in the mills like I have to work." And once you work in the mills, you could see what he meant. And so, it was a good impetus, working in the mills and hard labor on the farms, that there might be a better career perhaps, in terms of ease, but also security. Because the mills were always having strikes. It was before the unions really got strong, and people would get laid off, and it was not the most secure environment. So a lot of anxiety from my father, and you know, other parents as well, because of the changing nature of the scene, in terms of the mills and who owned this one. They would buy some mills and everyone would get fired, and so on. And it was a—I can understand why my father was always apprehensive. It was an uncertain time.

CP: How did you develop your interest in science?

AP: I was always fairly good at it. Math and science things always came easy to me. Just, I think, one of my abilities. And I did well at it, and I was always interested in how things work. I built radios from the time I was, you know, like a teenager. I had an interest in radios, and that led to an interest, you know, in physics and electronics, and always had that interest in high school. And then when I went on to college, the first thing I thought about as having a major in it, in terms of physics and math.

I think things sort of select you, by your abilities. Some people have great musical skills, and other kinds of skills, language skills. Then there's some of us who have math and science skills. It's just attributes and interests, too. I'm a firm believer that there's dispositions and characteristics of people that allow them to succeed. Because some people, no matter how hard they work, have a very difficult time with mathematics. I would see that when I was teaching, and it wasn't that they were necessarily stupid people, or anything of that nature, it's just that they didn't have those particular abilities—and interest perhaps, but abilities. And so, people tend to end up, I think, in things that they're going to be successful, that they have good abilities in. I think that's what worked out for me, in any event.

CP: Was there anybody who during your high school time was a mentor for you, or somebody who got you interested in these things? Or did it sort of emerge from within? [0:10:00]

AP: I had a series of very good science teachers in high school, physics teachers, and chemistry teachers, and math teachers, I might add, that always encouraged and—encouraged the students and kept you on the straight-and-narrow in terms of learning. They did a good job. So I had the benefit of a bunch of good teachers. Most of them were veterans from World War II, the ones I can remember, that had gone to school on the GI Bill and then went into education. They were really excellent teachers, a lot of them. It was a benefit to us as students.

CP: Well, you went to Oregon State College beginning in 1960. How did you decide to go to OSC?

AP: I had a scholarship from the Navy. It was one of those ROTC scholarships, and that was the place that had that program. And also, I wanted to major in a science program, so Oregon State was a natural choice. And they had the NROTC scholarship as well. So it was a confluence of events, an interest as well as that's where scholarship aid was.

CP: Were you in NROTC in high school?

AP: No, not at all. But that was one of those exams you take and you get selected, and so on. And it was a competitive thing.

CP: So that was part of your experience, then, in college, was being in NROTC?

AP: Yes, yes. I was in that for two and a half years, then I decided it would be better for me to continue in science rather than continue as a naval officer, and disenrolled from that program just to spend my time in science programs.

CP: What did that program entail for you?

AP: The Navy program?

CP: Yeah.

AP: It entailed the summer cruises that you would—after your freshman year, you would, you know, Camp Pendleton and some other places, and after the sophomore year we went to Texas for a while, an Air Force base down there at Corpus Christi, and then another month or so at San Diego. And so it was good—real nice experience. I really think well of those experiences in the Navy, in the summer programs. And if I had stayed in the program, the third year after your junior year, you'd be going on board a ship in some sort of capacity, but I never went that far. I quit some time in my junior year.

CP: Was there training during the school year too, I assume?

AP: Oh yes, the regular ROTC program. I think it was you had the regular class three times a week, then one day there was a drill where there was marching outside down there. All of those fields were—all the buildings were down there, the Quonset hut building where they—and it's still the same building, down there by the Coliseum and so forth. And it was the same building then, and those are old World War II Quonset huts, so it's amazing they're still standing! [Laughs] Those fields were all vacant there. There's now all of that development. We would be out there marching, endlessly, it seemed.

CP: Yeah. There used to be quite a few of those Quonset huts on campus. I'm sure you saw them.

AP: Yeah, yeah.

CP: Well, what do you remember about sort of your first impressions of college, and of Corvallis?

AP: I liked it. When I got there, I was selected to go into some sort of—they were trying some new living arrangement programs, and they were also getting started what they called an honors program at that time. And I was enrolled in that, and they put people in that honors program as your freshman—it was a whole floor on the first floor of Cauthorn Hall, I believe. Yes, it was Cauthorn Hall. The whole first floor was people that were chosen for this honors program. And they encouraged extra cultural activities, and they had advisors, and so forth. And it was a pretty nice bunch of fellows, fairly successful in high school, and they were selected for this honors program arrangement.

I don't know if they still do that or not; I have no idea. But it was an introductory program, so the people that we were—my roommates and then the people in the hall were preselected out by someone in the university as a part of this honors program, by test, to have the better students in one location—the people they perceived would be better students. Whether they ultimately turned out or not, I don't know. But that was the idea at the time.

CP: And there was extracurricular activities, as well.

AP: Yeah, and in the honors program you took—in addition to your regular courses there was at least one seminar a week of a small bunch of people, even sometimes one-on-one with one of the professors, working on projects. I found that very beneficial. I worked with a biology—a botany professor once, and physics professors, and entomology. So it was an interesting time. [0:15:00] And you did that every year for your whole four years. And then when you graduated, you would get an honor designation on your diploma.

CP: Interesting. So you were helping assist with their research, is it?

AP: Yeah, and then do little projects on your own, yeah. And it was sort of interesting. And then just talk about their field of research, and try to learn a little bit about it. It was a broadening experience.

CP: Yeah.

AP: Plus you got to work sort of one-on-one with the faculty members.

CP: Uh-huh.

AP: Or in some cases, when it was my physics professor, I was working with a senior graduate student, where I would come in once or twice a week, and we were working on projects in the Physics building.

CP: Yeah. I'm interested to hear you talk about this. I've known that the honors program started apparently around when you started. It was cut as a result of Ballot Measure 5 in the early '90s, and then was replaced by the University Honors College, which came about five years later. But it sounds like it's a little different than what your experience was.

AP: Yeah, yeah. Some of the classes were segregated in terms of the people in the honors program, but by and large you just meshed with everybody else, and did these extra things, with the seminars, a one or three hour seminar course, and got credit for that as well. The main experience was being able to work one-on-one with a researcher of some sort, and explore new areas. So it was truly beneficial.

CP: So when you went to college, did you have a sense of what you wanted do in terms of your studies? Because as it turns out, you took—I've looked at your academic records. You took a lot of classes to get two degrees in four years. Was that your plan from the beginning?

AP: I sort of liked it, because I was—the math and the physics happened to be easy for me, and the things that caused me trouble were the foreign language requirements. That was very hard for me! [Laughs] I spent more time probably on French when I was taking it than I did on the physics courses, because it was just different abilities. But no, I just really liked the physics courses; I took as much as I could. And I also liked the math courses. I had taken a lot of math in high school and I really liked it. And they had some good professors, too, in both departments. It was a fun environment.

So I look back on my days both as an undergraduate and in graduate school with great fondness, because I enjoyed it. And it was hard work and so forth, but it was really a nice time. You were doing something you really wanted to do, and able to do, and sort of free from the necessities of having to make a living otherwise, and a workplace, and so on. It was a time of your life, a prolonged time in my case, because I went on to graduate school, where you were doing exactly what you wanted to do. And that's a real good feeling. It's very good for the soul.

CP: Did you have a sense of particular specialty in math or physics at that point in your life, or did that come across later?

AP: No, I did not. Huh-uh, no. But then in fact, the curriculum was sort of everybody took the same thing. There were a few electives, like in physics you could take maybe intro to Meteorology or something of that nature, or Ocean Sciences was getting started back then. Some people would maybe take a few of that. But by and large the physics curriculum was pretty well fixed. And since I was getting a math major, too, I didn't have a lot of slop. I had to take the required courses, and fulfill the social sciences requirements as well. I think they had PE requirements in those days, too, that you had to take some of your classes in.

CP: Yeah, I don't know if it was still current when you were in school, but you used to have to learn how to swim in order to graduate.

AP: Yeah. Yeah, you had to take a swimming course, and in those days, and I always thought it was awful, no swimming suits. You swam nude.

CP: Yeah. [Laughs]

AP: And I thought that was just atrocious! [Laughs] I mean, there was no earthly sense in it. There were just some very peculiar people running the swim program in the Athletic department.

CP: [Laughs]

AP: I think, that was always my opinion. Just, strange folks.

CP: You're not the first person to say that to me. Well, were there any professors that made a particular impact upon you, that you can think of?

AP: Yeah. Like the entomology professor I worked with, John Lattin, I believe was his name, was very influential. Got me interested in philosophy and philosophy of science, and a whole range of things other than learning very little about entomology, but a little bit. And we had some good professors in the Physics Department too, and enjoyed that a great deal. They were good because they were student-focused, and you really got a chance to have a lot of experiences directly with the teachers. [0:20:00]

CP: Yeah. Lattin also was a book collector.

AP: Oh, I didn't know that at the time.

CP: Yeah, we have a Lattin book collection. Did you work while you were in school?

AP: Yes, some. The NROTC program kept you pretty busy, but I also later on helped by grading papers and that sort of thing, for both the Math Department and the Physics Department, and that was a small amount of money, but it actually helped. It was primarily grading papers and acting as sort of an assistant to some professor, and that sort of thing. I didn't work in a restaurant, or any of that sort of thing.

CP: When you were studying physics, especially, I'm interested in knowing about the technologies that were important to students at that point.

AP: Well we had the technology of the '50s and early '60s, right? So there were a lot of old Hewlett Packard and Tektronix measuring equipment and that sort of thing. And the optics stuff was, you know, all of the classical optics material, and a lot of that's probably still the same, because things like optics haven't—other than the introduction of the laser and some of that technology—haven't changed that much. So the lenses and that sort of thing are probably the same now as they were then. And so they had, I think, well-equipped laboratories, you know, for the time, and it was good.

CP: Yeah. I'm always interested in knowing about the era before computers, pre-computers-that-we-know, anyway.

AP: Yeah. Well, there was none of that then. The university had a computer then, and it was—I started to take a computer course. I always thought this was funny. And showed up in this class, and it turns out most of the other people already knew what they were doing, and so the professor was talking to them. Somebody like me was just out to lunch. Eventually I just quit the course, because they didn't even tell you what the computer was and how you did anything. They just started talking about a bunch of stuff that were more advanced. It wasn't an introductory course at all, which is what it was alleged to be. And so it was sort of a bad experience, quite frankly. [Laughs] My introduction to computers!

They had something at Oregon State at that time. I have no idea what it was. I never personally saw it, because I got out of the business. I didn't really get started into computers until later in graduate school, very late in graduate school, and then I became a—I taught for a few years in Alabama. We started automating some of our equipment then. But it was still, back in those days, like in the sixties, it was still teletype and that sort of console. And the modems were very slow. People just wouldn't recognize it now. They wouldn't have the patience for it

CP: So you lived in the dorm initially. Did you stay in the dorms all four years?

AP: No, I didn't. I didn't really like the dorms, because they were sort of noisy, and I'm the sort of person I really have to have it sort of quiet, and a little solitude. And the dorms were always very, very noisy. And so the second year, I and a friend found an apartment over by the SAE house. A church that owned a big old two-story house, they rented out part of it for students. So my friend and I moved into there. And at that time, that wasn't really allowed. I mean, as an undergraduate, you were supposed to live in student-approved housing. Well, this wasn't student-approved housing. We just moved in there. But eventually the dean caught up with us, the dean of men, and sent us letters, which we ignored, and so forth.

CP: [Laughs]

AP: But eventually he came over and [laughs] knocked on the door. I don't remember his name, but he was a very nice man, and we talked to him for a while. And I told him I just, you know, we liked it there, and I was getting good grades and being successful, so it wasn't like we were—and same with my roommate—we were flunking out of school

or something. It was actually being quite successful as a living arrangement. But so he—bless his heart, he went next door, where a graduate student and his wife were living, who I didn't know, and got them to sign that they would be our proctors, or whatever they called it, signed that they would keep an eye on us.

So then it became legitimate housing. And I hadn't realized that there was a process to [laughs] turn a living situation into university-recognized, but that was the end of that. I never heard any more about it, and I stayed there for the next two years. And the third year, finally, Ray and I lived in a place called Corvallis Towers, or something like that. It was a high-rise building at that time in the Portland area—I mean, in the Corvallis area. And that was fine, too. But that first, when I was a sophomore when we ran into the dean, that had me a little concerned. [0:25:00] But you know, [laughs] I was trying to do what was best for me. And it turned out fine.

CP: At that point, this is still true to some degree, but at that point the Greek system was very big on campus, and I'm wondering what it was like to not be part of that, to presumably have a social life but not necessarily be engaged with the Greek system. Or did you engage with the Greek system?

AP: Not much. I had some friends who were in fraternities. In fact, I met some of the fellows that lived across the street in the SAE house, and they were all fine. We got along fine, and there was no problems. And since I was doing a double major and I was also working, I didn't have a lot of time for socializing. And I'm not—in those days I didn't think much of partying and carrying on. Like I emphasized, I liked it quiet so I could get my work done. So I never really thought about the fraternities.

And they were a little more expensive too, I think, to live then, because by sharing an apartment, the rent was relatively small. Another guy and I shared the rent and did a lot of our own cooking and food preparation, and it was really fairly inexpensive. I would budget about a thousand dollars, maybe \$1,100 a year, to go to Oregon State in those days. And with a little judicious spending and care, you could make almost that amount in the summer, either working on the farms, or a plywood mill, or a saw mill, or something of that nature, and so you could quite easily work your way through school. And of course, I had a scholarship, too, the first two and a half years that paid the tuition, and I think they gave us 50 dollars a month for living too as part of that Navy program.

So it was, you know, a small stipend and so the financial aspects of going to college in the sixties, and earlier too, were just not burdensome. Almost anybody with a will could go to any school if they wanted, whether it was Oregon, the University of Oregon or Oregon State, or Southern Oregon College, any of these schools, because you could work your way through fairly straight-forwardly. Now I think that's not quite probably or likely, not possible.

CP: Did you have any major extracurricular activities that you did during college?

AP: Not much, except I played tennis and things like this with friends. But I didn't join a lot of clubs or anything of that nature, because I was pretty busy and focused on my activities. I had a lot of friends; we did things. We'd often have your Friday night out at the bar down there, the Peacock or whatever it is, one of those bars down there, and have a good time, and so on. But that was it. I didn't join a lot of clubs or anything of that nature.

CP: Any particular hangouts besides the Peacock?

AP: Not really! [Laughs] But of course, everybody would have a few beers on their own, if you figured out a way to get it, even though it was not legal in many respects. But students, as always, are enterprising, and it was never a problem!

CP: [Laughs] Why don't I ask you about a few events that happened at Oregon State when you were there? The first one, in 1961, Oregon State College became Oregon State University. Did that make much of an impact on you? Do you have any memory of that?

AP: I have a memory of it, and the people there thought it was a big deal. I remember everybody being enthused about it, because I guess in a lot of people's minds, the name university has more prestige and meaning than college, and I guess it does. But personally at that time, I didn't care that much, as I recall, because I had known it as Oregon State College, OSC. That's where I applied, and it didn't mean a lot to me in terms of later things, because whether your degree said Oregon State College or Oregon State University, to me it didn't mean very much. But to some people, and I can understand it, it did mean an awful lot to them.

CP: Mm-hm.

AP: Because I think in the academic hierarchy, being called a university is more meaningful than—college is a more restricted term. It doesn't imply the research and graduate programs, and so forth, that you think of in terms of a university. And I think that was the goal, of course.

CP: October of 1962 was the Columbus Day storm. Do you remember that?

AP: Vaguely, yeah. And you know, it was a bad storm. And it didn't affect me in any way directly. We didn't lose any of our home, or anything of that nature, either, in Corvallis, and my parents in Roseburg didn't have any problems. And so it didn't drastically affect me in any way. I didn't pay any attention to it.

CP: I don't gather you are a big football fan, but Terry Baker won the Heisman Trophy in 1962 as well. [0:30:01] Do you remember much hoopla surrounding that?

AP: Oh yeah, there was a lot of hoopla, and he was a great athlete, because he started in basketball as well. I didn't know him personally, of course, but he was famous in his own time. And I used to go to football games. I think the students got in for free, or for almost nothing. If there was a game and I was not otherwise engaged, I would try to get down to watch. I enjoy football. That's the one sport I do care for. I'm not really a basketball or a baseball fan that much, but I do like football. So I'd go to some of the games, and all of the hoopla associated with it. So I enjoyed the athletic teams, yeah.

CP: Well, what was your sense of Corvallis at that time? A somewhat smaller place than it is now, obviously. Any particular relationship with the town?

AP: I like Corvallis. The people were friendly and nice, and there was no crime to speak of. I would leave my bicycle outside of my house or the apartment where I lived, and I never had it stolen and this sort of thing, and never had it stolen from a building, or anything like that. So yeah, I enjoyed it. I have no negative memories about it at all. Of course, it's a lovely campus. I always thought Oregon State had a truly lovely campus in the spring when everything is in bloom, and the landscaping is really, really nice. And in those days, they didn't have all of those cut streets. All of the streets went through, and we didn't have all of the limited access that you have now.

But parking was critical. I mean, it was not easy. When I lived in my apartment, in the apartments it was no problem, but in the dorm, you had to park way down there past the tennis courts by the Coliseum, and walk across the field, and so forth. There was no parking close by. So that was inconvenient for some who had cars in those days. But I liked Corvallis. It's a lovely little town, and it's certainly a nicer place to live than where I ended up going to graduate school, in south Chicago. I mean, night and day, I'll assure you! [Laughs]

CP: Yeah, I'm sure of that. Well, that brings us to sort of the next section of your life. You graduated in 1964 from Oregon State. How did you decide what you were going to do next?

AP: Well, I had decided back in my junior year, when I got out of the Navy, or out of the NROTC program, that I wanted to get a degree, a PhD in physics, and do research, and work in research labs, because I really liked that. And so I applied to graduate schools, and I was interested in actually getting away from the West Coast. So I applied to the University of Chicago and a couple of schools out west here, I don't remember—I think Berkeley and the University of Washington. And I got accepted by the University of Chicago, and they offered me a research fellowship, and then an assistanceship. So that covered the education. Of course, they paid the tuition, too.

So I was able to go to the University of Chicago. You know, actually by the time I finished, we saved up a little money. In fact, that's where I met my wife, too, is at Chicago in 1966. So it was a ploy. I chose Chicago—one reason, it's a good school. And the financial aid package was very generous, I thought. And it was a different part of the country. It was interesting to move out to another part of the country. And it was certainly different. It was a real lesson to me, never having been to Chicago. I didn't interview at the school or anything like that. I got accepted, and then I had an old '57 Dodge station wagon at the time, and I loaded up all my stuff and drove across Montana, and on down into Chicago. And arrived there, and wondered if I was going to survive, because it's a very different environment.

CP: Yeah. Tell me about that transition. You're living in a major city, living in kind of a rough part of a major city.
[Laughs]

AP: Yeah. It was—the south side of Chicago was in a transition from a largely white, Polish-Irish community to primarily a black or African American. And there was all of those problems associated with that, in terms of the cultural clashes. And so, you would see that frequently, and a lot of, you know, racism on both sides. But particularly as the population profile and demographics changed in these neighborhoods, there was a lot of trouble, in peoples' minds, anyhow. And so it was an interesting thing.

Of course, this is something you were not exposed to in Oregon at all. You would have never had any idea. In a town like Corvallis there was very few minorities, at least at that time. [0:35:01] Go to Chicago, where in south side Chicago, somebody like me, a white person, was a minority, and it was a real experience. And it gives you perspective on how minorities in this country, the kinds of perceptions they must have, and some of their perplexions, I guess, what causes trouble and anxieties. But it's a good lesson, I think, for everybody.

CP: Mm-hm, yeah. Well, the university you entered into was a world-class university, University of Chicago, very high-powered in the sciences. Tell me a little about the atmosphere you came into at that point.

AP: It was very competitive. I mean, the students were all very, very bright. I remember the chairman told me that everybody in the class had GRE scores in the 98th percentile and above, and they were all really, really successful, successful students. It was very competitive. Fortunately, my background at Oregon State served me in good stead. I had no problems with the academics and the work at Chicago. It went well, and I made the normal course of events, and I graduated in six or seven years with a PhD. It was a typical time for physics in those days, in Chicago. I think that some of the other majors take less time. But so, I graduated in early 1970 with a PhD.

CP: I want to ask you about a couple of people that were there, I believe, when you were there, that are big names. The first is an Indian fellow, Subrahmanyan Chandrasekhar.

AP: Absolutely, he was a great professor! I had him for a couple of classes, actually, in statistical physics and atomic and molecular physics, quantum mechanics, advanced quantum mechanics. And he was a brilliant teacher! And he would come in and just start his lecture, and he had perfect handwriting on the board. This was the days of chalkboards, none of this other stuff, and no overhead projectors or any of that sort of thing. It was classical blackboards, where you slide them up and down, and fill up a room with that. And he would start precisely on time and finish precisely on time, and always with a coherent message. And his last few minutes would be a summary, and then you could write all of the summaries down in your notes, and you would have the important elements of the conversation and the talk. So, no, he was a brilliant professor, and really a nice person.

CP: A chemist, Robert Mulliken, won the Nobel Prize in 1966 while you were there. Do you remember that?

AP: Yes. And I knew Robert Mulliken. He was in the same building as where I did my research, and I would see him frequently. He was an interesting man, a brilliant chemist-physicist, and in particular molecular physics. He had a whole bunch of students and post-docs. He had a large enterprise in those days, doing spectroscopy and theoretical physics, and so on. But he was a real quiet man. He was already old by the time I got to know him. And I didn't have any classes from him. He didn't teach much. He was all just 100 percent research, and of course he travelled a lot, because he was world famous. But he had dozens of people working in his laboratories in the Ryerson Hall there at the University of Chicago, in those days.

CP: Well, it sounds like a tremendously enriching environment. I wonder if you could tell me about sort of the progression of your academic courses there, your research time at Chicago?

AP: Yeah. I worked—in my first year up there in the fall of '64, I was assigned to work for Professor Mark Inghram, who did mass spectrometry and chemical physics, and various sorts of instrumentation. He looked at the properties of atomic and molecular systems. And I worked in his lab as a research assistant for the first couple of years. And in Chicago you had to take physics courses and things of that nature, as well as preparing for what they call an entrance exam, or the candidate exam.

You usually took that at the start of your—in the fall of your second year. That was a very, very hard test, the qualifier, and so the first-year graduate students would spend huge amounts of time studying old tests and problems, because it was a three-day test with all problems. It was none of this multiple guess stuff; it was all problems to solve, and in all areas of physics. And so you had to be well prepared, and so on. Fortunately, I passed that the first time through [0:40:00], and I was able to get my research started. And it was also a test which a lot of people didn't make it the first time. They would have to wait six months or a year and take it again. And then some people just left; it was so daunting that they just left.

But I think a lot of universities have those sorts of qualifying exams, and it's a hurdle that all people studying for an advanced degree have to overcome. But it was taxing. It occupied huge amounts of your time, to study and to learn the material to pass those exams. And it was rewarding, too, because it was a focus of your attention, and you really did learn a lot if you took the right attitude. So, it was a very, very beneficial process, as far as I can see. So I'm in favor of difficult exams. I think it focuses one's attention, and enables you to really learn some things well.

Then I worked—after I passed this qualifier exam, then you can start a PhD program. You couldn't formally start until you passed that qualifier. And so you would have to find some professor that would take you on, and had some research project that you wanted to do. And I chose to stay with the guy I had worked with as a research assistant, because I was interested in physics, and then in the programs that he had, and he also was a really nice, generous man. And he had five or six graduate students and a couple of post-docs, and it was a good learning environment.

So I elected to stay there, and worked on some problems in photoionization. We had machines that would generate vacuum ultraviolet radiation, and use that radiation with monochromators, disperse it, and use that radiation to study atomic and molecular systems, ionize them, and use the mass spectrometers or electron spectrometers, depending on, to analyze those reaction products from the ionization process, and study things like cross-sections and so forth, for reactions, photon-atom and –molecule reactions.

My work I did was to look at ionization processes in rare earth elements, the lanthanides, things like europium and terbium, erbium, and things of that nature. We generated ovens. They're all metals at room temperatures, so you had to make an oven and generate an atomic beam. All of this is in a vacuum, of course. Generate a beam of those, and intersect that beam with the light beam, and through the ionization process you start knocking off electrons. And you can monitor, then, the ion products as a function of wavelength of the light, and determine its ionization potential. So we measured some of the ionization processes of these rare earth elements, which hadn't been done, because it was—prior to it, it was difficult. Subsequent people did a lot of spectroscopy, and others got much more accurate results.

But it's those kinds of experiments, and it was sort of a lot of fun. You had to build—learn how to build ovens, little high-temperature ovens, and intersect that with—all in a vacuum system, and intersect that with a light beam, and get the mass spectrometer, which is a relatively large instrument, to measure the ion products. And we also did some work with organic molecules, which are a lot easier. You just let them—they vaporize, and you can get a molecular beam fairly straight-forwardly from most organic molecules, and study their processes, and look at their dissociation processes as well. So we did studies of various kinds of molecules, that we would look at their ionization as well as their dissociation processes.

CP: How independent were you in developing these topics? Was it something where you went to your mentor with this idea, or was it kind of the other way around?

AP: No. With Professor Inghram you had to develop your own topic, and then convince him that this was something to do and that he would support. That's what I did. I was interested in these rare earths, because there was some interest in the scientific community about some of their ionization properties, and also some of the internal energetic properties of some of the organic molecules we studied. People were interested in their internal processes, and measuring their energies, if you will, because the internal energies of these molecules determine how they combine with others, and so on. And so there was interest in getting things called heats of formation of molecular ions, and so forth, that we did some studies on systems that were of interest for other kinds of chemistry, because that told you energy balances in these ion molecule reactions. So we were engaged in that kind of research, using these photoionization tools. [0:45:00]

In those days, photoionization studies was hard, because you had to have laboratory light sources, so these would be discharges, pulse discharges with a high electrical pulse in a capillary tube filled with a rare gas, usually, or hydrogen in some cases, like helium. And you'd generate—the helium would get excited and generate molecular helium, which would

then dissociate, because helium is an inert gas. It doesn't form a molecule except in excited states. And that dissociation process would submit radiation in the far ultraviolet, so we would use that radiation and disperse it with a monochromator, and study these atoms, and then the ion molecules as well.

But by the time I left graduate school in the late sixties, and certainly now in the seventies on, the development of synchrotron radiation and also laser sources have totally supplanted that. To do what we did in those days, now you go to a synchrotron, most likely. It would be fairly straight-forward. But it was hard then in those days because of the technology available. You were limited to laboratory light sources. Now, there's synchrotron radiation sources throughout the world. In fact, when I worked at the National Institute of Standards and Technology, it was the reason. They have a small synchrotron radiation source at the institute, and we used that for atomic and molecular physics studies. The same kinds of basic technologies that I used in graduate school, but instead of having these discharge light sources, like a neon bulb if you will, you had these big, big machines that generated radiation from synchrotron radiation.

But as far as graduate school goes, you had to devise your own projects, and then you had to publish. And Chicago had a requirement at that time that your thesis had to be published in the peer-reviewed literature. So I had to prepare an article for the *Journal of Chemical Physics*. And once that was accepted, that was—then, you escaped the rigors of having to write a formal thesis. That paper that you wrote that got accepted in a peer-reviewed journal was basically your thesis. You just bound that, and that was it, and then you would not have to write these tedious 300-page theses or something, like some places require.

I thought it was a good idea, because if you stop to think about it, that's what you want your researchers to do, is to be able to publish in the peer-reviewed literature. So I thought that was clever and sensible criteria. So it was something you had to achieve. But at least as a graduate student, you were guaranteed of at least having one publication if you were going to get your degree.

CP: Were there any other folks in the department that emerged as being important to you or being memorable, besides Inghram?

AP: Yeah, I had some classes from a famous scientist, Gregor Wenzel, and he was a very, very good teacher, an old-world gentleman, I think a Swisher German. And he was one of the founders of quantum-electrical dynamics back in the '40s. And he was a professor in Chicago at that time. I also learned a lot from the technical staff of the Physics Department, in those days. They had a wonderful electronic engineer that I worked with, developing and building equipment, electronic equipment.

They had some wonderful people in the machine shop, because we had to make our own equipment. You didn't go to a catalogue and buy a mass spectrometer or monochromator. You made it yourself. And so I learned machining techniques, and also got to be a fairly good heliarc welder, because we would weld the chambers, the vacuum chambers together and that sort of thing. And the guys in the shop would teach you to do all that sort of stuff. So I thought it was fascinating. I got to do all kinds of things that, and got paid for it as a student, that I really enjoyed doing. So it was a wonderful experience! The years in Chicago were, in my mind, really, really, very, very good. In addition to getting a family started and so on, it was a wonderful learning experience.

CP: Did you do any teaching?

AP: Occasionally I would teach a course, but not for undergrads. So I would teach some courses for people preparing for their basic exam or their qualifying exam, and assist in some of the graduate courses. But I was never a teaching assistanceship in terms of teaching the undergraduate courses, and so forth. I avoided that, and I was always able to have a research assistanceship or work in the lab, and never got so much involved in the teaching side.

CP: Tell me about meeting Ruth, 1966.

AP: That was an interesting story. I was driving out to go to my sister's wedding. [0:50:00] I was going to bring an Indian friend of mine, a guy from India; Menon was his name. And he was going to ride with me, and we were going to share expenses. Well, he was a far cleverer businessman than I was, in terms of, since I still had the Dodge station wagon at the time. There was room for others. He went around, unbeknownst to me, and solicited other riders to go parts of the trip.

One guy came all the way to Eugene; I dropped him off in Eugene. But Ruth rode with us, with a friend, to Cheyenne, Wyoming. And we let them off there, and I thought Menon had some financial arrangement. I don't know what it was. And so, I got to be a courier of people across the country to go on this trip. But I think Menon figured he saved himself a lot of money [laughs], and shared the expense. So that's how I met Ruth. Then when I got back to Chicago, I started seeing her. And turned out she had lived in a place where I had lived, in International House there in Chicago. So we got together, and eventually got married.

CP: And she was a student?

AP: Yeah, she was an undergraduate at the time, yeah.

CP: And you said you started a family?

AP: Yeah. And my daughter was born there. My son was born there too, in the Chicago Hospital.

CP: So what was that like, being a family man and a student at the same time?

AP: It worked out pretty well. Fortunately, my wife is real capable, and she worked some, too, at a correspondence school there called the American School. And in fact, it was a block away from our apartment where we lived, and so she could go get papers and grade papers, and work on these correspondence courses, and that turned into a source of income, and do that at home. She didn't have to leave then, so the child was watched at home. We lived in student housing; it was right on campus and fairly close. So that worked out well.

CP: Well, you were in Chicago during turbulent times. The '68 Democratic convention is well known as being sort of an iconic moment for that time period, in that location. Do you have any memories of it?

AP: It was awful! Everybody's bad behavior contributed to a really awful event. I mean, no one could be proud of those days, in my mind. The protesters were out of line, but in the Chicago case, the police's response were totally out of line. And I think it was characterized as a police riot, and I think that's about right. And I'm a pretty conservative fellow, but I mean, the Chicago cops were just not the best. I hope they've changed over the years. But I got shaken down twice in my years in Chicago, because I had an out-of-state plate, license plate, by cops. They wanted a bribe for letting me off. It was not pleasant.

But I mean, that's the way it was. And so it was not all cops obviously, but it was corruption, and they were not nice to the protesters in those days. In fact, I never went uptown to where all the convention was, but I was just walking back from the lab one night and there were some cop cars patrolling by the university, looking for students to harass. And there was a cop car full of—you could tell it was a cop car. They were plain-clothesmen, and they were thinking about harassing me. They were driving by me as I was walking, and really checking me out. I could tell they were not thinking good thoughts. [Laughs]

CP: [Laughs]

AP: They were down on the south side, and I suspect they wanted to get in on the action that their comrades were having downtown. I didn't like the Chicago cops at that time. I had not a lot of respect for them, because of my personal experiences.

CP: Yeah. Well, between work and family, probably not a lot of free time, but I'm wondering if there's anything about Chicago that made a big impact on you in sort of a social or cultural way?

AP: There's a lot of cultural activities. And as a student, you don't have a lot of money, but there are a lot of inexpensive things to do. The University of Chicago is not far from Lake Michigan, and so you can just walk down to the lake, and it had some beaches and so forth. The Chicago Museum of Industry was very close to campus, and that's a wonderful museum, and we'd go there frequently. And they had forest reserves in the outskirts of Chicago that were, you know, big parks. And so Ruth and I would spend time there, particularly in the summer. So we didn't go out there in the Chicago winter! [Laughs] [0:54:59] A couple of the guys I worked with were machinists, and we'd occasionally go fishing, and do things of that nature, too.

So it's an interesting environment, Chicago is, very different from here. And it was a real cultural shock. Another big thing, my '57 Dodge I drove out had a—it was an Oregon car, right? And so the tires were bald, and the battery was ancient, and as soon as it started getting cold in November, the car wouldn't start. And the first time you got a little snow on the street you couldn't go anywhere, because the tires had no tread. [Laughs] And of course, I had a light windbreaker kind of jacket, and it got cold, and so that November and December was a heck of a time. I had to get the car to run in the wintertime and go on the roads, as well as get some clothes that were appropriate for, you know, a ten-degree environment when the wind's howling.

So that was a real shocker for me. In my first quarter, I was living, in Chicago, I was living in an apartment about 20 or 30 blocks from where the university was. So I had to drive back and forth to school, and I soon rectified that. I got a room at the International House for my second and third quarters that first year, and then was able to walk back and forth to campus, because driving in the winters with an older car is not the best way to get around. It was terribly inconvenient. And also parking problems in cities was a bad move. And of course, I hadn't realized that when I first applied to Chicago it would have been smart to arrange housing in advance. I assumed it was like Corvallis; you could just find an apartment. Oh, it's a big city; I'll find it.

Well, it wasn't the case. [Laughs] Apartments and living arrangements were a little scarce, so it took me a few days, actually, when I arrived there. I had to stay in a hotel or someplace for a few days until I could find an apartment. It was quite far from the university. It was an interesting learning experience. [Laughs]

CP: Well, on sort of the continuing topic of cultural shifts, you finished up in 1971 in Chicago, and you went to Alabama.

AP: Mm-hm.

CP: Tell me about that.

AP: Well, I'd decided—I thought I wanted to be in the teaching profession. And a friend of mine, a former graduate student who graduated, went to the University of Alabama and got a pretty good grant to get his research set up. And so they recruited me as well, to come down and get a research project started. I interviewed with them and also with a couple of companies, and decided—I interviewed with Standard Oil—it was called Esso or something in those days—out in New Jersey, and they offered me a job, as well. But it would have been in an area of New Jersey I didn't think much of. Besides, I wanted to give teaching a go.

So I took a job as an assistant professor at the University of Alabama. So we lived in Tuscaloosa, Alabama, for 1970 to '78—eight years, I guess it was. And then I went on sabbatical leave at National Bureau of Standards, as it was called then, in Maryland. And then they offered me a job, and I decided I would rather be at the National Bureau of Standards rather than back teaching, because the research opportunities were far better. It was a struggle. Alabama is a good school; it's like any other state school. In those days it was hard to raise money. And we found it difficult to raise money from the foundations and so forth in Alabama, to get our research started. We raised some. We were fairly successful. This friend of mine, Andrew Jason and I, were sharing some facilities there. But it was very, very difficult. You spent a lot of time just trying to raise money, and so on.

And also the teaching load was fairly heavy, compared to most universities. It was two courses. You had to have six contact hours a quarter, and that didn't leave a lot of time for research. You just had to be in there all hours of the day and night. So it was not the best research environment. Whereas at the University of Chicago, where I was a graduate student, the professors taught one course, two out of the three quarters. One quarter they taught nothing, didn't have any teaching obligations. So it was a big difference between your research universities and your average state university. And I imagine it's still that way. Most state universities, the professor will have at least two courses, and that's very time-consuming.

And so at the Bureau of Standards, when I was on sabbatical leave, of course there was no teaching, and they were fairly well-funded compared to what it was at Alabama. And it was funded directly by the government, for government programs. [1:00:00] And so, eventually I got into a position where I could raise a lot of money, you know, and yes, even though it is a government organization, we did do work for other government agencies. And so we had programs with NASA and NOAA, Department of Defense supported. So we raised a lot of money from those agencies, but for well-

defined programs, rather than for trying some fundamental research program like at National Science Foundation. So it was a very different environment, and I actually sort of liked it a lot better.

CP: So the research topic in Alabama, was that mostly an extension of what you had been doing in Chicago?

AP: Yes. I built a smaller version of what we had in Chicago, and we were going to do some more work on rare earths. We got started on that, and then all small organic molecules. I had just gotten that project started when I went on sabbatical leave. And the reason I went on sabbatical leave was somebody gave a donation, or some money came up somehow. They were going to totally renovate the physics building. Everybody was going to have to move out; the whole lab was going to be closed down. So I said, "Well, rather than just sit here for a year." I had had an offer to go to Maryland to the National Bureau of Standards, to work with a team there in the same kind of work, photoionization studies. And so, I said, "Well, I'll just take a sabbatical leave."

And so I went to work for them just on sabbatical leave at the Bureau of Standards. And the first year I was still being paid by Alabama, and the National Bureau of Standards sent them some money to pay for my time. It was called an Intergovernmental Personnel Act appointee. And so I spent the first year there. And then I was going to go back. We were going to go back to Alabama, because we liked it there. We had a nice house; we had built a nice house, and so forth. But they decided they didn't get done with the renovation, and things drug on, so they were going to be out a second year. So they had asked me if I would like to stay a second year at the Bureau of Standards. I said, "Okay." So it worked out good.

And then sometime during the second year, early in the second year, they offered me a staff position at the Bureau of Standards, which was actually double my salary. And we were involved in a research program that I really liked, and really had a high national and international profile, and worked with some really top people. And it was all research, and there was no teaching and no committees, none of this—not a lot of fundraising in those days. So it was a real opportunity, I thought. So I elected to stay at the Bureau of Standards. So we just never went back to Alabama. But that was not the intention when we first went to Gaithersburg, Maryland, where the Bureau of Standards was located.

CP: What was your impression of the South when you were there in the '70s?

AP: I liked it. The weather's awful, you know. I never got used to that. It starts in May, the hot humidity, and it'd be in the 90s and humid. By humid, I mean 90 percent humidity. People here get all excited if it's 40 percent humidity. But I mean, it would be very, very humid, and it's hard to get used to. I never really did. Of course, everything, your house, your car—everything's air conditioned. You turn that air conditioning on in late May, like I say, or sometimes certainly by June, and it would just be on until October. I mean, to me it was very uncomfortable. Now, the natives, people growing up in that, it doesn't seem to bother them, but they had become accustomed to it. But I never really acclimatized to that, the hot humidity. So that's the only thing I didn't like.

But the people were nice. Tuscaloosa is a lovely little town. In those days, it was a smaller town; bigger than Corvallis, but it was still a college town, basically. And of course, now it's subsequently a lot bigger. They put a car factory, Mercedes or one of those companies put an assembly plant there in Alabama that's not far away. And so it's a lot of industrialization. So it's a changed environment, just like a lot of college towns are.

CP: How about the culture of the area?

AP: It was very different. I mean, you normally think of the South as being real racist. Well, they had the old vestiges of segregation, but to me it was less harsh in those terms than what I used to see in Chicago, where it was really ugly, in my mind. In fact, the first apartment I rented, the guys said, "I'll give you a real good deal because I want a white guy living here." Well, I had no idea what the custom was, at all. [Laughs] I'll take the deal, because I needed a place to stay. I hadn't arranged housing. But there was definite racism you could observe. You see some of that in Alabama, but not to the extent—it seemed more harmonious to me than the racial relations in Chicago, the blacks and the whites in the South. Now other people probably have a different perspective, I know. [1:05:00] But I didn't see the harshness that I would, and the overt things expressed that I saw in Chicago.

CP: Yeah.

AP: That's just one man's take. I'm sure other people probably have a very different take on it.

CP: Well, one thing I'm sure that was inescapable while you were there was college football.

AP: Oh, yeah.

CP: Alabama won three national championships during your time, Bear Bryant as the coach.

AP: Yeah, they take football real seriously in the South.

CP: [Laughs]

AP: [Laughs] I mean, the average—I mean, they just live and die it. And then, you know, places like Texas, too, and Mississippi, and Louisiana, all of it. It is the sport, and they really take it seriously. And Alabama has this constant feud with Auburn, which is sort of, Auburn is sort of the equivalent of Oregon State. It's the land grant school, I think. And it's Auburn, because it's in the city of Auburn. But there's a fierce rivalry, and it's been going on for years and years. And it becomes part of the culture. Even people who don't go to the schools, you know, they're an Auburn or an Alabama fan, and you know, they can be a mill worker or whatever, and they'll have their loyalties for unknown reasons. I see some of that in Oregon, but it's not like it's as pronounced. But they do take football seriously. And Bear Bryant was a really revered person. I mean, he had a lot of clout, I think. [Laughs]

CP: Yeah, for sure. Well, you mentioned the sabbatical, and you started up full time at the National Bureau of Standards in 1980. So I guess, if you can tell me a little bit about moving to the DC area and settling in, and then your first position as a physicist in the Radiation Physics Division?

AP: Yeah. I liked it. The climate in Maryland was a little better. You get cold winters in Maryland, so you get more diversity. In Alabama it's hot most of the time, even all year around. But in Maryland, it's humid and hot in the summertime but it cools down in the fall, and in the winter you'll get snow and so on. So the first year we lived in an apartment, and me, my wife and our kids really liked that, so we bought a house after I was offered a job, bought a house and lived in the same place from 1980 on. And so, I kind of liked it.

The Washington, DC, area is culturally diverse and a very, very interesting region. Civil War battle fields, you know, Gettysburg, Antietam, Bull Run—all of those are an hour or so drive away from where we lived in Gaithersburg. And those are all very interesting, and well done by the National Parks Service, in terms of historical presentation. So I really enjoyed that. We enjoyed the museums downtown. The Smithsonian Museums are just simply the best there is. And then that's all free, and from where we were, that's 30 minutes away. And we'd take the train down. Now they put a subway system in, and we lived close to the terminus of one of the subway lines. We could easily be down there, if you wanted. So the cultural things are immense. And we would get season tickets to some orchestra arrangements at the Kennedy Center, and that was always great—crowded, but great.

I mean, traffic's awful in downtown Washington. But it was a nice place to live. I enjoyed the experience a great deal. And, you know, the negative sides was the weather, and it's also very, very crowded. The roads, the Washington Beltway, it's truly awful! And the road—we were not too far from the Interstate 270, which runs sort of northwest out of Washington, and it's an immensely busy road because of all of the commuter traffic back and forth to DC, from the Maryland suburbs, that worked downtown. It's fourteen lanes in places, seven lanes each way, with feeders. It's just awful! And you'd get on it; it would be bumper-to-bumper in all of those lanes in rush hour. Even off rush hour, it's busy.

We would sometimes—eventually we bought a boat that we kept over on the Chesapeake, and even on a Saturday morning, getting over to the Chesapeake, which near Annapolis, should have been an easy hour or hour and a half drive. Sometimes it would last a lot longer because of traffic on Saturday mornings. It was very, very crowded. That's one of the reasons when we retired, we were not going to live in the DC suburbs.

We ended up out here instead, in Oregon, but I think that was a decision we both are really glad we made. Mainly the living conditions. I mean, the cultural activities, and the things in the DC suburbs are really superb, but the crowdedness and the weather are really contrary to my particular likes. [1:10:03] Some people like it, of course, you know. It's not what I like. So we enjoy the weather and the environment here much better.

CP: Well, tell me about the progression of your work during this time.

AP: Well, when I was first hired—when I was post-doc'ing, not really post-doc'ing, but when I was working as a guest scientist there, the first year while I was still a professor at Alabama, I worked in a laboratory with a guy named Henry Rosenstock and Roger Stockbauer, who are very well known in chemical physics for doing internal structures of molecules, the energetics of molecules. And so we worked with some techniques called threshold photoelectron spectroscopy, studying molecular processes in small molecules.

Then that first year, also, they were getting started on the synchrotron facility. NBS has a small electron synchrotron, which generates light, ultraviolet light. They were getting a project started using synchrotron radiation for photoelectron spectroscopies. So I joined on with Roger Stockbauer and a team from Argonne, Joe Dehmer and his team at Argonne National Laboratory, and built an electron spectrometer system that was able to angularly resolve the electrons coming off from an ionization process of atoms, of many small molecules. So we built that system that first year I was there, then that was another reason for me to stay a second year and eventually to take a job, because that apparatus was just coming into fruition, in terms of its productivity.

So we were able to do some really, really interesting things, some new kinds of studies, using synchrotron radiation and this electron spectrometer, doing angle-resolved photoionization studies. It was some of the first of that type in the world. And it was very well received, you know, in this community. So we did that, and then built a successive—we built new instruments in terms of photoelectron spectroscopy. And angle resolved, and participated in, also participated in a few other kinds of experiments. So the laboratory experiments that I first got started on when I got there, we quit all of that altogether. In fact, those labs were closed down. All of the photoionization kind of work was done at the synchrotron.

And that's where I was hired, when they offered me a staff position, was to work on the team of scientists working on the, they called it SURF, Synchrotron Ultraviolet Radiation Facility, at NPS. In 1980 or '81 they changed the name from NBS to NIST, so it's the same organization, but they just, Congress in their infinite wisdom decided to change the name, reflected a little different mission, I guess was the idea, like changing Oregon State College to Oregon State University, that sort of thing. And nothing fundamentally changed. It's just, you have to redo all of the letterhead and door signs.

CP: [Laughs]

AP: [Laughs] But so I worked in that operation for about five years as a research physicist in the Radiation Physics Division, and with the Far Ultraviolet Physics group, working with, under a guy named Robert Madden, who was in charge of the synchrotron, and a very well-known optical person in monochromator design, and so forth. It was a wonderful experience working with the scientists there. And the other nice thing about NIST—I'll call it that; that's its name now—is that it's in Washington, DC area, so you get a continual touring of really well-known scientists throughout the world. This is one thing I missed in Alabama. You'd have to really work at it to get to Tuscaloosa. But everybody comes through Washington, DC, and they would visit NIST in those days.

And we also collaborated with a team of scientists on these photoelectron works, from England, and John West from Daresbury Laboratory in England, Keith Codling from Redding University in England, and other people, in our programs. In fact, I would then go to England and work on the synchrotron facility at Daresbury, in the United Kingdom. In the later stages, we transported over the instrumentation that we built at NIST for doing photoelectron spectroscopy. We transported it to England. This was a big piece of equipment, many tons, and transported it to Daresbury Laboratory, near Manchester. Daresbury is a small town. And so I would perform, do some work over there as well, with my English colleagues. It was a real nice collaboration between the Bureau of Standards, NIST, and the English Daresbury Laboratory. [1:15:01] And of course, I made good friends, who we still have to this day, with the English colleagues.

I got to spend some time in other synchrotron facilities in France, and other places as well, to visit. It was a very, very rewarding time, scientifically, and a lot of travel and interesting people. And that was one of the nice things I really enjoyed about NIST was the depth of the people you worked with, and some of the best people from all over the world. We had guests from France, China, Japan, all over, to come to work at our laboratories, and that was an extremely rewarding scientific time. And so I worked on those synchrotron radiation experiments until the mid-1980s, '85 or '86, something like that. I was offered a job in another division, as a group leader. There was a division that was having some personnel problems, and they had a lot of difficulties.

And I was asked to take over a group that needed some attention, and they called it Spectroradiometry Group, I guess was the name of it. So I became a group leader, which was the lowest level management position at NIST, in I think about 1986 or something like that, I don't know, and worked in that division. It was called the Radiometric Physics Division, and its job was to do all of the optical measurements, or most of the optical measurements for this country, of standards. They did everything from standard light bulbs—you know, when you buy a light bulb at the store will have a lumen rating on it? Well, we maintain those standards and the standard candelas, as well as optical temperature measurements.

So we developed—that division's responsibility was to maintain all of those standards, as well as to develop the technology to improve these standards. And so we worked a lot with industry to collaborate with industrial partners, to develop better measurement techniques to help product quality and reliability on the assembly. A lot of work with Xerox, companies like Kodak, 3M, that do a lot of optical measurement problems. For example, 3M makes a lot of white paper and things of that nature. You need reflecting standards, and how you measure all of that, and so on. I spent time helping Kodak develop color measurement processes, and optical processes for property making and measuring film. They had a lot of interest in that, in those days. Those are the film days. The whole technology has changed.

But then, when LEDs and other kinds of sources, light sources, became available, we had to develop the technology to properly characterize those and measure them, because they were a little different; a little different needs than your incandescent bulbs and fluorescent bulbs. And so our division worked with industry to develop the right strategy to making reliable and consistent measurements that became industry standards, then, from how you measure LEDs properly, and so on. So that's the job of that division. And I eventually became the division chief of that division. I don't remember when that was—in the late '80s, early '90s, and that's when I retired in 2007, was as chief of the—changed its name to Optical Technology Division.

And since I have left, it subsequently changed its name again. There has been another reorganization, but it's basically the same division. It's now called Sensor Science Division, or something of that nature. So I was able to then be in charge of all of these measurement techniques, and develop work for the government agencies, and that was very rewarding. I enjoyed that. We had projects back in the mid-'80s—in fact, it was one of my first jobs as a group leader in spectroradiometry, the Defense Department was having problems characterizing very low level infrared sensors that are used for satellite purposes in national security programs. And they had to be sensors that were calibrated at very, very low temperatures, because they were sensors that would look at the background of space, looking at missile threats and that sort of thing.

And so they would operate at very low temperatures and had to be calibrated, and for measurement standards, to make sure they were seeing what they told you they were seeing. And we developed techniques to calibrate things at, you know, five degrees Kelvin, just a little above absolute zero—very, very low temperatures, the low background infrared calibration facilities. That was a real challenge, technically. And that facility is still in place, being used to characterize very low level background signals. The sensor systems were primarily DOD, but occasionally NASA and other government agencies have needs for characterizing very low, low background sources [1:20:00], things that are going to operate in space, primarily.

So that was a fun project, and develop new technology and capabilities for the Department of Defense, and they, of course, would pay for it. The Department of Defense would pay NIST for doing this work. So we raised a lot of projects for NOAA and NASA for supporting, since we were the optical division, supporting satellite technology. You see these pictures, color pictures of the earth. You see pictures of the oceans where they are using cameras from on spacecraft to measure ocean properties. All of those cameras and devices have to be calibrated. They are spectroradiometer systems, basically, flying around in space, looking at the spectral content of light coming back from the earth, reflected. And that tells you about the properties of the vegetation, and in the case of the oceans, the plankton and the carbon content of the ocean.

So, we worked with NASA to develop calibration strategies to calibrate the satellites. And that involves building calibration systems for the satellites before they are launched, and then trying to build systems so they can verify the operations while in flight. That entails, for example, the satellites looking at standard sources. In fact, one of the big projects was to have—there was a buoy system out near Lanai in the Hawaiian Islands that measures the light coming out of the ocean. They call it the upwelling radiance of the ocean. So it's reflected light from the sun coming back up, and that's what the spacecraft will see. So you'll see the light coming off the ocean. So that's measured out in Hawaii, so the

spacecraft will have a—it will fly over and it will give them a simultaneous measurement. We can tell them what it is at the earth's surface, or the water's surface, if you will, and the satellite then can check its calibration.

And then that's been an ongoing project; in fact I'm still consulting some on that particular project. We have other projects too, developing, other projects developing calibration procedures and measuring procedures, a whole range of sensor systems for the NOAA and NASA projects, as well as the Defense Department, and other agencies that have secure programs where they have to be very sophisticated sensor systems. We worked with them on that as well, like the CIA or whatever. They have sensor programs, and we were the government agency that would help work with them to develop their sensor measurement capabilities.

CP: Huh. As I listen to you describe this, a couple of things occur to me. Number one, it sounds like there was a pretty big shift when you switched gears to the Radiation Physics Division, or to the, I'm sorry, the spectroradiometry group, from doing this sort of more fundamental research you were doing before, to the standards research.

AP: Actually the big shift from fundamental research to applied research, but the underlying theme was, it was all light measuring, and manipulating and controlling light, and synchrotron radiation, using light as a source, so you have to build monochromators and build detectors of optical radiation, and so on. And then in radiometry, the concentration is not on the use of the light, but on the measuring the light and characterizing it, you see, and characterizing the sensors, so that someone else can correctly determine what they are measuring. In the case of satellites, what they want to know is what the radiation is at one wavelength compared to another, and they want to know that pretty accurately, so that those ratios, those wavelengths, will tell you, for example, the plankton concentration.

And so it's all optics of some sort, or you know; it's electromagnetic radiation, but it's a different emphasis. You are absolutely right, the Radiometry Division was very applied on the measurement and the measurement technology, and development of sources, as well as the characterization of these things. Whereas previously, the synchrotron radiation research, the fundamental driver was trying to understand some basic features of atomic and electro-physics, and how molecules ionize and dissociate, and so on.

CP: Yeah. It's also the application of science to a very wide variety of projects, some of which apparently involve some national security applications. It must have been tremendous fun, I would imagine.

AP: Yeah, it is, and very diverse. And we had colleagues—at our labs in Boulder there was a whole group, a division, that was just concentrated on developing techniques for measuring laser and laser power. And we collaborated with them, too. It was fascinating. So it was a real learning experience, and it was also a lot of fun. And you know, at the highest level, you have the best people doing this, anywhere. I think our organization, in terms of the national labs, it was probably one of the premier national labs in the world, in terms of the quality of its research and calibration development. So it was a, really a lot of fun. [1:25:00] It was very rewarding, intellectually.

And again, it's the people. These were the best people in these fields anywhere. It was a very enjoyable time. It's the job that I hope everybody could get, a job in the sense that you go to work and you really love it, and you don't try to avoid working. It's fun to be there. So I really feel fortunate in that regard, to have gotten myself into a career where work was really fun. It was financially rewarding, but it was enjoyable to do. Some people you talk to, they are always disgruntled about their work, and I would never say that. I truly enjoyed my career, everything from grad school at Oregon State—I enjoyed being a student, I enjoyed graduate school, and I enjoyed being at the National Institute of Standards and Technology as well. Couldn't ask for any more with that! [Laughs]

CP: Yeah, yeah. Well, what was your family up to during the DC era, the DC years, your wife and children?

AP: Yeah, my wife worked—she worked several occupations. She ran a daycare at home for a while. But eventually she went back to school. She went to Hopkins, Johns Hopkins, and got her master's degree in counseling, and then worked in the school systems there in Montgomery County for many years, as a middle school counselor, and so on. So she was able to retire from that when we left, as a school counselor. And my kids both went to college in Maryland, and they enjoyed that. In fact, my son is still out in that area. He lives in the—he decided after college he wanted to be a cop, and so he got on—he's with the Fairfax County Police, just across the river from Washington, DC. And he enjoys that a great deal. My daughter is a nurse, and she lives out here in Oregon City, and she works for Kaiser in the Portland area.

CP: Well, I'm going to switch gears a little bit and ask you about books, your book collecting. That's how we first became acquainted with one another. I'm interested in knowing, when did that start? How did you get into collecting books?

AP: I still have my books from high school, a lot of them, and probably a good portion of my books from Oregon State, too, some of them. And so I've always just liked books, and I collected books in graduate school. I've always liked to read. And mainly when we moved to Washington, and to Maryland, I should say, the DC suburbs, I got interested in older books, rare books. A friend of mine was also interested, and so we sort of got involved in that together, back in the '80s. I started collecting significant volumes back in the late '80s, I think. And then got interested in the history of printing, which was fascinating, and how that affected our culture.

In my mind, the ability to print and disseminate information really had a profound effect on our cultural development, not only religion, but you know, education. It changed how we live and think, and then allowed everybody, if they could learn to read, to have access to information, and led to things like the Reformation, and real cultural changes. And then, not to speak of how it's affected education. If you think about it, before the printed book, getting a book was very, very difficult, and getting knowledge was very difficult. You could go to lectures, someone had read something. But to get a copy of a scholarly work prior to the inventing of the printing press, you had to be wealthy enough to hire somebody to do it by hand, or to get the—so the average person, you know, even the professional person, probably wouldn't have any volumes back prior to the printing press.

But the printing press, in my mind, was a great, liberating thing for changing culture, and it did. And I'm just sort of interested in that. I got interested in the technology of printing. And then, of course, some of the volumes are just beautiful, and they're wonderful to look at. And how they are preserved—I've always found that fascinating, too. You can buy a book that's 500 years old, and open it up, and it probably looks as—some of them look as good as the day they were printed. In fact, one of the books that the library has is a 1503 Seneca, it's in Latin, Seneca's works, and that paper is as fresh as the day it was made. There's no foxing. In a lot of books, the paper will have foxing on it. It's just a change in the character of the paper. But they last forever, it seems like. [1:30:00] So it's a fascinating technology, but just keeping in mind the profound impact it had on our civilization, and on how we arrived at where we are now.

Now, there's a comparable change in the last couple of decades. How this electronic environment, electronically delivered information, is going to affect culture remains to be seen, and how that integrates into the educational process and our general cultural behavior. So it will be an interesting thing. I probably won't live long enough to see the outcome of it all, but it's a profound change in how people can get information, and how you deliver information. And so, things will slowly evolve, as they certainly did in the late 15th century when the printing press became available, and how education and everything changed profoundly.

CP: Tell me a bit about your methods for collecting, scouting out, and purchasing.

AP: Oh, a topical thing, if I could get early science things from a scientist, I always would get that, if it were something I could afford. And it primarily was—and history. I was always interested in history, and the history of printing. So some of the volumes I bought purely because they were from a given printer and town, like Venice or whatever, from maybe the 16th century, that would be representative of that kind of printing in that era. So some of the books are that, and then there are well-known scholarly works too, like the Seneca I mentioned earlier.

And there's this, another nice volume I gave you, the *Strabo Geography*, which was an early production of Strabo, who was a Roman geographer, commentaries, and maps of the ancient world. That book is complete with all of the maps and diagrams, and so forth. So it's fascinating to—and it's in both Greek and Latin, and it's fascinating just to look at that, and see the Romans' concept of the way the world was. And the maps are actually fairly accurate, with the curvature of the Earth clearly displayed, and so on and so forth. So it shows you just quite graphically, you know, how much the ancients really knew about the world, and how they weren't as ignorant as sometimes portrayed. So I get a kick.

And then some of the early scientific stuff, too. There's a copy of—it's in French—of Ben Franklin's work with electricity, and that was published—I don't think it was ever published in this country, but it was published in France when he was spending time in France. So it was a little insight into Ben Franklin's time as a Francophile, I mean, serving the country in France. Then some early Newton that's just absolutely fascinating, I think, and then some other interesting early scientific books as well. I think they're interesting. But the scholarly things, there are some good histories, you know, and a good

collection of Johnson, the writer-poet, and his biographer, Boswell. You have a nice set of really nice early productions and publications in that series. So that's an important part of the cultural history of the English-speaking people.

Things like that would attract my interest, as well as quite a few travel books, early travel books. People would—back in the 16th and 17th century, noblemen would finance someone to take a trip through the Orient, or through northern Africa, the Levant or something, and record it, record the customs of the people and also take along, either do it themselves or take along someone to do engravings and drawings, and then make these nice, nice printed copies of their travels. So when I run across those, if they're in good shape, I would try and procure those as well, because it was an interesting insight into the culture and history in those time frames. Those kinds of things is what I found interesting, and sometimes books are just beautiful. I mean, the printing's beautiful, and the binding's in good shape, and you just say, "Oh, I've got to have that." [Laughs]

CP: Well, I know that you've taken pride in the fact that you actually read these books, too. You don't just purchase them and put them on the shelf.

AP: Yeah, exactly. In fact, I can continue to do so even though I gave Oregon State the majority of the—see, this right over here was just collected in the last couple of years, which will eventually end up in your library. But for example, in the other room sitting on a stand where I often sit, I've got a really nice Bible [1:35:01], one of the first complete English Bibles printed in the United States. In fact, it's generally thought to be, I think, 1796, the first complete Bible. Now there's some earlier just Old Testaments or New Testaments published, but this was a complete Bible, called the Collins Bible, I believe, with the Old Testament and the New Testament, and all of the books of the Apocrypha all bound in one, and it's in really good shape. So it's something I came across just recently, in the last year or so.

That big, thick book over there is *Plutarch's Lives*, an early *Plutarch's Lives*, in English. So that's fun to sit down and read. Plutarch was the Roman biographer back then. So if you wanted to know about Julius Caesar, or Alexander the Great, or these people, you'd have an early printing of Plutarch. Of course, you can go down and pick up a paperback now of the same thing, but here's a nice, early publication of Plutarch.

CP: Well, you spent three decades compiling this collection. You made the decision at some point to donate it to your alma mater, Oregon State. Tell me about the thought process there.

AP: Well, I knew neither one of my kids is really interested in rare books, per se. Of course, they would be interested in the value thereof. I mean, that goes without saying, right? I mean, they would have to be hindered mentally if they didn't want that, you know. But if you have a collection like that, and people with collections often have this issue—as you get older, you know, what's going to be the ultimate disposal of it? If my wife and I both pass, both will pass away. If these books were still sitting in the house, the children wouldn't know how to—you know, they don't particularly want them in their house, but what would they do with them? Well, they would call up some estate agent, right, and then they would sell them. And somebody would be in there buying a \$5,000 book for 50 cents, right? And so that's not too smart.

The other option: well, I can start selling them myself. That is truly indeed a lot of trouble. You could do it, and you might or might not realize very much money. But the beauty of a donation is you can have them appraised by a good appraiser, and they stay together as a collection, in the case that's what we worked out for Oregon State, so others will use them. It's always very satisfying when you, or Anne, or somebody tells me how the students are using it. That was the intent. So we decided that rather than trying to sell them or something like that, we'll give them to Oregon State. The benefit to us is, it's a tax deduction. So we get to realize a tax deduction, since it's a large sum, over a period of time, and help us out financially. So actually probably in the end, that's probably more rewarding financially than trying to sell them, and all of that headache. Plus the main thing is, they stay together in a collection for others to use. And as long as I knew, I can get in the car and drive down there myself, you see. So we thought about it a while, and we finally decided that was probably the best strategy.

And then Mr. Mead came up and looked them over, and he said—arranged with your librarian, Faye, to accept the collection. So it's worked out excellently. And we're really satisfied because the staff at Oregon State is just super in the library, and it's being to serve the students there, because I was a student there. And I don't think there was anything like that there when I was there, and if there was I was not cognizant of it. So if we can benefit the kids of this state or whoever, we think that's very satisfying. And the main thing is, something you spent a long time amassing, and to have it

just go all over the, and try to sell it—it's not as rewarding. It is financially, but that wouldn't mean that much to us. We're comfortably retired, where another few thousand dollars more at this point in our life it's not going to be particularly beneficial.

So, it's much more satisfying to do what we did. And of course, I thought of Oregon State immediately, in part because that's where I graduated from, and I liked it a great deal. I have very fond memories of Oregon State. But also, one of my friends who probably got me thinking about it was Darry Callahan, who was on your alumni association, the foundation, for a while. He didn't raise the issue about donating, but he told me the kind of things he did, helping the university raise money and so forth, and that sort of sparked in my mind, well maybe that's something we can do—you know, help the university out. So Darry put us in contact with somebody in the foundation, Ryan. It was Ryan Robinson at the time, and then working with he and the library staff [1:40:02], Cliff Mead and so forth, we made the arrangements. So we have found it very satisfying.

CP: Well, the last thing I want to ask you about is just your continued connection to OSU. You are a member of the Library Advisory Council. OSU is in the midst of a transition, expansion, right now. What is your sense of where OSU is at right now? A very different place from the one that you went to.

AP: It certainly is, and I think what Faye and the rest of you have done at the library is just phenomenal! I mean, the library was not at all like that when I was a student here. And trying to transition, and take advantage of the modern electronic tools, and making space for the students to really use. I am always impressed when I go down there. The place is packed! I assure you, [laughs] back in the '60s, you'd find a few people poring over the library, but it wasn't a lot. So you've turned it into a central learning experience space for the kids, and I think it's terribly important. So I think this transition of the library to really part of the learning environment for a large number of students, it's sort of exciting. It's fun to be a part of. So my wife and I are very interested in helping out in any way we can. And of course, we've had a lot of experience with books, and education, and conveying information, so we think we'd be of some value.

CP: Great. Well, Al, thank you very much for this. I appreciate it quite a lot.

AP: Well thank you, Chris, I'm glad to help out.

CP: Sure.

[1:41:31]