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ORAL HISTORY PROJECT

Interview of:
Dr. Roy Jenne
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Interviewer:
Stuart "Bill" Leslie

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Leslie: We're here actually in the NCAR cafeteria, and I'm with Dr. Roy Jenne. This is Bill Leslie from Johns Hopkins, and the date is the 16th of September, 2005. We're going to talk a bit about your career here, the relationship of the Scientific Computing Division, is that the proper term? with other divisions within NCAR, something about how to building worked as a place for people to meet and interact in the way that Phil Thompson and Walter Roberts imagined. Maybe the place to start is when you came to NCAR.

Jenne: Yeah, OK. This is Roy Jenne. I came to NCAR in January of 1965. At that time, a few people, like, Phil Thompson and a few in the computing division and in the scientific modeling, were already here. But the staff was still very small compared to what it is now.

Leslie: What was it approximately?

Jenne: I'm not sure. I guess 150 or 200 or something.

Leslie: For all of NCAR?

Jenne: Yeah, for all of NCAR.

Leslie: So the computing group would have been—

Jenne: The computing group—in fact, I've got a little history of staffing in the computing area that I'd have to refresh my memory of, but at that time it was probably 35 or 40 compared to maybe 110 or 120 now. At that time, in '65, we were in a building down on 30th Street in Boulder which has

now been taken over long since by the WICHE higher education community planning. Our computing group stayed down there about six or eight months longer than—the rest of the staff had already moved up here, but we didn't move up until a new computer, the 6600 was then installed directly in this building.

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Leslie: What were you using when you first got to NCAR?

Jenne: Before that, it was a Control Data 3600. Those designs in terms of word length, at first it was a good computer. I'd been using IBM 7090s where I came from, the Air Force, where we were doing weather forecasting and climate modeling on computers. That was back in the Omaha-Offutt area. Those word lengths on the computers back there were 36 bits, and I got here and it was a 48-bit machine, and it's kind of a nice word length, because it's long enough to give you the precision you need for quite a few scientific calculations, and also because of how you represent character information in a computer, 48 helps to be divisible by both 6 and 8, which is kind of handy.

Since then, of course, the world has gone to typically either 32-bit architectures or 64-bit architectures, which gives you even more precision, but for a lot of problems you don't need that extra precision.

Leslie: Did you have that computer in your own facility? Were you borrowing one from the university?

Jenne: No. There's something I will give you where another fellow who was the head of our systems group took a crack at some of that early history, and that will show you about when the first ones came in. But the 3600 was the so-called "interim" machine on the way to the 6600, and it was our computer. It's funny to grow up with those, because when I was first at the University of Washington, in about 1958, working on certain radiation calculations, I was working with some of these hand calculators even for a few aspects of the problem then, and you know, especially even to multiply but also especially to divide, those old machines, I don't know if you ever used one or not, but they go "Chunk-chunk—"

Leslie: "Chunk-chunk!" [laughs]

Jenne: You have.

Leslie: I have!

Jenne: It can take a long time. It's interesting, but it can take a long time. And then at the University of Washington, we the old 650, kind of like a big

tube, and the memory was a rotating drum. You'd feed the information and your program in on little cards and then it spits out your answers on other punch cards. But I still remember looking at that and getting answers at the rate of "Chunk-chunk-chunk," where each chunk is a new card with 80 columns punched. It was so much faster than the hand calculator it's not even funny. But it's completely a dinosaur machine now, of course.

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Leslie: What convinced you to come to NCAR from the Air Force?

Jenne: You know, it was funny. I'd been in the Air Force about 10 years, and the last five of those years I'd been helping set up the main weather computing facility that does forecasts and disseminates products to the whole group of Air Force forecasters and all. But I don't know what all led to that, actually. I got kind of itchy, and I was thinking I'd work in certain satellite things, but I'm almost glad now that I didn't get fully back into that area, although in a data sense, I've worked with an awful lot of that, too. But anyway, I looked at—I was thinking there were certainly a lot of places on the East Coast. I looked around that Rand Santa Monica area and had job offers there and here, which are the ones I was seriously considering. But then certainly I took this one, and it was a better fit for me, and better for otherwise. It really worked out quite well, I think.

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I like a lot of breadth and still to have some time to dig into the details. It's a little like your historian job, to go through all of those data from just an awful lot of sources worldwide, different instruments and satellites versus ship observations. It's quite an archive.

Leslie: You mentioned that you met Phil Thompson here. Had you known him in the Air Force?

Jenne: No, I had not known him in the Air Force. But one thing you may or may not be aware of, he wrote a little book on numerical weather forecasting, and I forget exactly when he wrote that. I think it was before I got here, but I'm not even utterly sure of that. It was a very nice introduction to that subject, and I still have it on the shelf at home.

Leslie: You'd read that before you met him?

Jenne: I think I did, but I'm a little unsure of some of those dates at the moment. But I talked to Phil, since I was coming in in a job that would require a bunch of computing of various types, but it's mainly a bunch of computing, but it's computing as applied to checking a whole bunch of types of data. You find, as you probably find in history, that the world is far from perfect. [laughs] So what you do is, if you have doubts or if you

encounter doubts, or sometimes even if you don't have doubts, you run kind of a battery of tests to look for certain problems in the data. It's kind of surprising, and it's important.

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In one case I can think of, we had been getting an updated dataset of where the University of Hawaii had collected, a very nice collection of winds from aircraft going over the oceans. This was mainly focused on the equatorial band. And they had in mind the tropical meteorology, and I had in mind targeting that, but I also wanted it as part of the archive that helps to describe winds and pressures and the whole bit for the whole planet.

We had been getting their dataset, and usually we would get a year or something update once in a while, and they'd usually have the old data on, and we took the old data to make sure that it was the same as what we had before. And in this one case, it just wasn't. It was all different. So we told them that, and they could hardly believe it either, which is what most people would think.

Leslie: [laughs]

Jenne: But anyway, they checked around in their system and were able to recover the data. But I could go on and on, which isn't too important, about those different kinds of checks, that sometimes the dates, sometimes there are various types of inconsistencies, and mainly, I've tried to focus on getting the—I mean, these kinds of data, they're old data that's been key-entered and all sorts of things happen, there are quite often various random errors of one type of another, like upper-air temperature might be changed from -40 degrees to -30 degrees, and so you run programs to try to spot that.

In this case, what I was trying to look for is the systematic type errors instead of the random ones. The random ones can be best handled at a slightly later stage of the process, but at those later stages, if you have a lot of systematic errors, like for instance, we would run into cases where data for, say, roughly 10 kilometers would be in fact assigned to 9 kilometers, and systematically, so that in one way, if you just looked at it from day to day, it looked perfectly consistent, but unless you also are checking as to whether it fits reasonably into the vertical, you don't see it. Anyway, I tell you, at times it'd drive us crazy, these things. [laughs]

Leslie: I bet it would! What sort of fellow did you find Phil Thompson to be? I never had the privilege to meet him.

Jenne: He was just very interesting. As you probably know—have you personally talked to Phil?

Leslie: Never had a chance.

Jenne: That's kind of too bad, because he's actually in many settings kind of quiet and shy, and yet very nice, too. When I talked to him when I first got here, I had in mind then that it'd be nice to spend a part of my time in more like the regular research projects and his division tended to work in that area. He was very encouraging. As it turned out, I did a lot of equivalent research, but to go as broad as I was trying to go, you just can't use too much time to go clear deep very often, especially as we made more and more progress and had data for more areas, then there are more demands that develop, too.

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For instance, we didn't talk a lot, but we got to know each other quite a bit. When would this have been? The late '60s or have early '70s, you know, when the campus troubles of the '60s really hit everything. He was on a trip then, probably just a few days. One day there was all sorts of trouble around Boulder, especially around the university. I've forgotten, but I think even a building or two burned down. Things did get pretty rough on a whole bunch of campuses then. He or somebody else was one of the people who were giving me statistics for both Canada and the U.S., and an absolutely frightening number, even in Canada, of university presidents did not have permanent positions—I mean, they were just kind of acting, just because—have you ever gone into that? It's an incredible period.

Leslie: The president of Hopkins essentially threw up his hands and couldn't handle it, Lincoln Gordon. A lot of the guys didn't survive. An interesting thing is that the liberals, the people who were actually more supportive of student activism, they had the roughest time. People who really cracked down seem to have weathered the storm.

Jenne: That's an interesting comment that I hadn't heard, but from what I now know, I can just about believe it.

Leslie: They didn't know where to stop. They would give in a certain amount, and then—

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Jenne: What bugged me, in a sense, whether it was liberal or more conservative, if you empathize with people, you can empathize too much with people who do not have a very good motive in mind. And like I think I still remember, I think the story was the University of Wisconsin, I believe they had a—if I have the right school, they had a Japanese president, and Japanese often even have more of a cultural tradition than we do, I think, of being polite and bending over backwards. This president was kind of

that way and was met by a bunch of these activists who in a sense are supposedly "liberal," but certainly not acting under any liberal traditions that most of us have followed. [laughs] Anyway, it was sad. One of the days here, there were rumors which were very believable that a bunch of students would march up the NCAR hill and try to destroy the computers, so they doubled the guards, and finally they put heavier glass walls or whatever, so that if people did get close, they couldn't go on a rampage.

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Leslie: That's unbelievable!

Jenne: It really is. But anyway, the day I was going to tell you about, if you actually live here and look around at each of those incidents, it kind of scares you and they're frustrating, and yet you take them in the context of a bunch of things that at least went tolerably well. On this day, Phil Thompson was on a trip and he gave me a phone call and he said, "I just read this thing in the newspaper, and it sounds like the whole city of Boulder has been leveled, almost!" [laughs] He just wanted me to fill him in on what actually happened. And of course, it was plenty serious, but it was nothing on the scale that the news he was getting made it sound like.

Leslie: Tell me about your impressions of the new building. You were going to be moving from your temporary quarters into this real masterpiece.

Jenne: In one sense, as to the first office I had, a lot of the computer division has traditionally been down in the basement, and you don't have a window. Where I'd been, down in the middle of Boulder, we did have a window, and that's always a big plus. But in general, the building really is pretty incredible. In just the way it fits in and the way it feels, in one sense, in a lot of areas, I think one would need to say that what you might call the public areas of the building can hit you even more that way, kind of the impression of being in a cathedral or something. But in a cathedral, if you want a good office space, you may or may not have it. [laughs]

Leslie: [laughs] It is interesting, and you may know this, that Pei had imagined that the computer would be at the center rather than buried. He thought it would be in the middle. Are computers traditionally always relegated to the basement for environmental reasons?

Jenne: This could even be, although we had it in the basement, down on 30th Street in Boulder, too, but down there, there was actually something of a worry of what would happen in a flood, because that was low enough, you could get into deep trouble. You wouldn't get that up here, fortunately.

Leslie: The roof might leak!

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Jenne: Right! And by the way, you mentioned the roof. It was kind of funny. One of the trouble spots of the building was the roof. You already know this.

Leslie: I know what it leaks, but I don't know what implications it had for you.

Jenne: That's it. They keep trying to patch it.

Leslie: Did it ever leak over the computing part of the building?

Jenne: The computer was far enough down that I don't think it was ever hit by that. This was mainly five floors up. But they had an awful trouble getting that right, but they finally found some sort of material that kinds of builds a plastic wall over the top of the roof, and it finally cured it. And then you would still have some of the troubles you'd find in most any building of settling over a period of time. But there again, you see a lot of walls here that do not have cracks in them, but some of those things, mainly exterior walls, and especially things like the close-by parking areas, you've probably looked at those, they've certainly had plenty of that settling problem.

Leslie: There was one very interesting memo from Phil Thompson early on, when they were looking at the plans. It was essentially a facility-wide complaint about the width of the windows in certain of the offices. "We can't have windows so narrow. And we all need windows." Are computer scientists somehow different in the sense that they don't squawk about not having windows? They don't care?

Jenne: I don't really recall complaints about that, especially when a bunch of people in the basement don't have a window! [laughs] But I think you have probably seen some of the windows that are kind of in a well or looking at one side or looking straight but not very wide. But have you seen some of those really amazing offs on the top floor? Have you seen the director's office, for example?

Leslie: Yes, I did.

Jenne: And you know, especially if you get in the right area, those are just utterly magnificent. Did they take you, have you been out on the director's floor, there are a couple of offices outside. You walk across a roof and then you can get into these other offices, they have these little spiral staircases?

Leslie: Yes. I just wondered what the view from the basement must have been like, a little different than the—my suspicion was that a lot of people, especially in computer science, and this was true at IBM when they did the Watson research lab, they didn't have windows, either, because the offices

were interior. Their computer scientists never complained about windows. My guess was that they had a computer screen, they had some other window on the world and they just didn't care.

Jenne: That's true. Once in a while the window can make glare, but people still usually like windows, and if necessary they cover the glare by making the angles of the desk right. [laughs]

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Leslie: One of the things that Thompson emphasized, and I'm interested to explore it, is, he thought that people shouldn't necessarily be grouped by discipline. He had some interesting notes about, "We want a lot of interaction among different groups. We want people to run into each other almost accidentally. We want to have a lot of serendipitous mixing of disciplines and perspectives. But your group was all in one spot.

Jenne: Yeah. And I think most around the building are roughly that way. Sometimes you have to compromise in various ways, but, like, the specific group I had, which was usually, I guess, five to seven people, and finally, the last dozen or so years, we pulled off these very huge international reanalysis projects. Have you ever heard of those?

Leslie: No. Tell me about that.

Jenne: We had been gathering even numerical data outputs from the centers for the National Meteorological Center, which is the main forecast center for the country. Are you familiar with them? OK. But if you see the one-day or especially the five- or eight-day forecasts, or "Here's what the weekend may be like," they're based on those forecasts where you take in all of the world's observations you can lay your hands on, and day by day those comes on different types of communication links into that building at Sudland [?], near Washington DC. But you've got all sorts of surface land observations, typically every three hours, and you've got reports from ships at sea. And starting about 1979, we got a whole bunch of drifting buoys over the oceans that take both temperature and pressure. But then we'd get a lot of reports back from aircraft, but they're on a lot of routes but not every routes, so to try to fill in other areas, outside we can see these pretty clouds and the satellites, as you're familiar with on TV, take a picture of those every 30 minutes or hour, and then you can turn that into the motion picture we're familiar with. But more than that, you can use them to calculate winds, if you can figure out the level of the cloud, and there are ways to do that.

Anyway, there's the ray wind signs [?], about a thousand sites of those around the world, that give temperature and winds up to almost 100,000 feet. There are some other types, too. But all of these obs are taken in and

essentially you can use the previous six- or 12-hour forecast as a guess, and then you have very fancy analysis methods to basically let's say fine-tune that forecast, first guess, and turn it into the best analysis at this time that you now want, and then that is used as the starting point for maybe a 10-day forecast, and that feeds into all of those, "Here's what next weekend's going to be like."

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Leslie: So NCAR is clearly part of a much larger network that is doing observation, is also doing analysis of that data? Where do you fit into that?

Jenne: Where we fit in as an institution is that in terms of making those analyses, there are different groups here that work on better techniques to make the analysis and better instructions, for example, the models now are almost all complicated enough that they have to generate clouds and generate rain and those things are all part of climate, so all of those routines are definitely needed for climate models, which are often run for 100 or 200 years. In order to get a 100- or 200-year run, you typically do that in steps of, say, around 30 minutes at a time.

Leslie: Thirty minutes of running the program?

Jenne: What it means, you start off with a full description in your computer of what the three-dimensional structure of winds and temperature and clouds and radiation, the whole bit, are, and then you use your dynamic forecast procedure to move that whole atmosphere. You use climate output for what's going to happen in the next hundred years from several different groups around the world, and then these people would all try to make that, does this matter to their crops and forests and so forth?

In one sense, in that setting, I have to say that the sheer ability to carry on amazing interdisciplinary stuff was better than what I see around NCAR. But that—I think we've also—one reason for that may be structural. We've probably both visited labs where you come in, let's say it's 50 or 60 people in that part of a building, you come in and you talk to two or three people that they've suggested who might have some ___, and by the time you talk to the third person, you're very often explaining what the first one really does. [laughs] Have you had that experience?

Leslie: It's interesting. Yes, everyone does, I think. I think you rarely—I know less about the guy across the hall who does early modern alchemy and what he's working on than I do about a hundred people at other universities working on recent architecture or something like that. I wondered if NCAR, especially in the computer field, this is where I'm particularly interested, now that you can connect so easily, whether people find that they have natural connections actually with the community

outside of it, so you end up being one of the nodes in a network where you may not be very connected with people down the hall, but you're connected very closely with somebody else.

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Jenne: About a year or so ago, I stepped down from actually running this group. I'm now trying to get a whole bunch of other things going. But I still get all sorts of miscellaneous requests that are—some of them, because I'm getting old enough, are partly wanting to know some of that early history. But like somebody a week or two ago wanted to know the very earlier history of a set of world monthly surface data. This is just 100 or 200 years of pressure and temperature and precip from 2,000 stations or so. And I happened to know that there was a guy at Harvard who in fact spent $30,000 of his own money to put it in, and we found out about that and saved it. And the interesting thing is that some of the key entry work for that was done at Ashville, but the people who did it, it did not click with them that even though one person had asked for that big job, that it would also be useful for a very wide community of people if you could just get a copy of the data. And fortunately, he was willing to give us a copy and that developed for many years.

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But it seems like part of this is, part of the thing is what you mentioned, that it may be that to find the specifics of what each of us are interested in, we may have certainly a few people in our closest building, but a bunch of those people, if we're really doing the best job, a bunch of it will require that outside networking. But I'll still keep thinking more about that, I imagine we both will. It's an interesting question.

Leslie: [laughs]

Jenne: But I'm not sure if I helped you much with it.

Leslie: And I don't know if there's a particular answer to it. I think that you pointed out very nicely some of the disadvantages of trying to be too interdisciplinary, bringing too many different groups that find out they don't have much yet to say to each other. It may take a long time to build that kind of trust. You have gone through, I guess, and done a lot of the work for me on the actual introduction of the computers. I would like if you could just briefly describe the way in which the extension, having put in a new facility just to accommodate the computing, if you could comment on that. Clearly no one anticipated that computing would require the kind of space or cost that it would at this facility.

Jenne: I'm not sure if this is quite touching that, but when we go back to when this building came in in that 1965-66 range, the University of Washington,

when I was there in '58, they had the 650 computer we talked about, which was very good. But to get into the somewhat faster computers is a big investment, and even from a national policy standpoint, it would not be practical to put them into every school. And there's another thing besides that. Even if every university department had their own computer, in some cases, to make it really easy, you'd need a collection of certain subroutines to help you out. And if something fails, you need somebody to talk to. It's nice if there's somebody there who can fix the darn things when something goes all to heck. So it's that kind of infrastructure.

And then in my group at NCAR, we were trying to add another layer of that to really do some leading-edge work to make—to give them real access and easy access to data that they never had access to before. And for that, they could either come here and compute, run their own programs on the computer here, and then take the output home, which often happened, or in many, many cases, they would just order a tape or two of data from us and they would run them on their home computer. The advantage of the latter is that every computer has a bunch of rules, and if you use somebody else's computer, then you have to use their rules plus your own rules, and at some point, you could never get anything done.

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Leslie: That sounds like a major achievement. Would you consider that one of the major achievements at NCAR, to make those datasets accessible?

Jenne: Yeah, I really—you know, we made it possible. The trouble, sometimes, you know the trouble is, we made some of it look easy enough, even if it wasn't easy, that they don't even yet fully realize what they got. I mean, the working users realize it, but a bunch of the top managers don't. This I'm still puzzled about. Most of that I was able to ward off problems until five or six years ago, and still I was able to hold them at bay for quite a while. But somebody can decide, "Hey, we should really be emphasizing something else," when they don't know anything about the impact that would have on the field. But that really—what I would see, over and over again, is that when we could make it possible to bring in all that data or the pertinent parts of it into a program, research suddenly flowers. And this reanalysis program, our group did the work of working with a bunch of other groups around the world to bring in the observations. That has 1,001 stories, which aren't worth going into, but once we have those, we would feed those. We linked up with that major forecast group at NSET [?]. They still had to do the daily forecast, but doing this not only helped things, like some of their long-range forecasts. It turns out that having a better analysis back 40 or 50 years can help your own ability on six-month forecasting.

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We worked with the center in Washington DC and we worked with the center in Europe, the ECMWF, and boy, now we've got daily analyses of the world, four times a day, from 1948 on. It's all these grid points and other things. If you ever want to know I can tell you a little more about it.

Leslie: I just have a quick question about that. Is it a bit like model-building, where it's not really as appreciated as it might be because you don't publish as much out of it?

Jenne: That may be, but to control it, over the years, and in these projects I would often have time at least to write one- and three- and eight-page papers, and so I have gathered an awful lot of those together so that now—and I'm still working on what will probably be the last few, even though I should do more. I'm still working on some of those, but I gather the pieces together. If you'd rewrite a lot of things, it might make it look prettier, but also you would have to leave out a whole bunch, so these are kind of reference documents. I just brought along, for instance, one of these is an online 50-page document, this is RJ, for Roy Jenne, this is number 361. There are now about 20,000 pages of this stuff.

Leslie: And you can find it right here.

Jenne: And you can find the whole batch of them, there.

Leslie: That's great, oh, thank you. Can I keep this sheet.

Jenne: You can have this.

Leslie: Oh, that's great!

Jenne: In fact, I made a little batch, you can have the folder.

Leslie: Oh, great!

0:43:05.2

Jenne: In fact, one of the things that I've been interested in, and this is straying a little, but too often—to me, an awful lot of main development work, even that's very sophisticated, has to find a way—you know, you can't get rid of all the complexity, but the real trick is to do very complex things while keeping the complexity under control. I'm really just convinced of that one.

Leslie: That's a good way to put it, I think, that's excellent.

Jenne: So this kind of thing, anyway, that's there. You've probably seen that a dozen times. And I can't remember now why I shoved this one in. I've got

several of them. I've been involved in the lot of data and IT planning stuff, and these are just a few sections from the index of one document. But there are other documents like this that just give a flavor of some of the stuff I've tried to make available.

Leslie: I think the archives should have copies of these things. I think that's import for them. I'm interested, too, but I think they should—certainly Diane will want to have copies of these.

Jenne: What I intend to do is, once I get a little further, I'm worried now because potentially things could still be lost, but by getting them—by getting all of these documents off on CD ROMs or DVDs, I can kind of make sure that—and working with other people, actually, ___ as well as people here, I picked up a sheet from downstairs that's just an example, but see, this is just a current thing that's about a year old. When you're a historian or other things, what you need is often a broader picture with somewhat fewer details. But here's another one of those sheets which, again, is just a flavor of one item, one snapshot in time.

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Leslie: That's great. That's wonderful. That's some good online resources.

Jenne: Now here, and I've got other things with lists, but this is a sheet that shows the gradual development of these documents, so now, at this point, two years ago, it was up through 287 and this many pages, and I'm still plugging away until I'm green under the gills, and then about a year later, I wrote down the titles of just a few of these documents, just to give one a flavor—

Leslie: That's wonderful.

Jenne: —of some of that. But I wanted to make you aware of this. This in fact I think was going into a project that I was involved with where I was once in a while meeting with a community committee help to encourage people to write certain sections. Anyway, Paul Rotar was our main systems person, and he got here I think about 1962 or '63, he beat me by a while. Anyway, he was systems, but he'd been close enough to it, I think you might find some of this early history in there quite interesting. If I recall, I only picked a few pages of this, but on the other hand, this is document RJ 0002, so I think you can find it yourself with what you have there, if you want it.

Leslie: Oh, absolutely!

Jenne: Here's even some of the staffing by sections. I did some of this myself, too. You have that. I'm not sure—

Leslie: So there is a 30-some-page document from which this is taken that discusses the history of—

Jenne: Yeah. Now, this is just one piece of it. It was NCAR-wide, and I think some place in one of those lousy boxes of mine, [laughs] I probably have the thing, and I checked, and I was kind of surprised, because the last I knew, you know, it involved Phil Thompson and a few others. But that got to a certain point and it kind of died.

Leslie: I wonder if Diane Rabson has a copy of that document. She might.

Jenne: You could ask her, but I almost know, and you're certainly welcome to keep reminding me, and I can keep—what I can't do is a magic search right now in all those boxes. But what I have had in mind is that when I run across it, assuming that that happens, I really should—you know, it's not that thick. We asked for fairly short sections, and I think it's only about this thick, and even if it didn't have the last polishing touches, I think if I just get the darn thing scanned and added to this list, at least we've got it some place.

Leslie: Hopefully Diane has it. That's a wonderful piece of work. I think that'll be tremendously helpful a lot of people.

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Jenne: Here's another thing. This one's 25 pages. But for a group coming in, this is too much of a snapshot and probably not written for history. But I just showed you two or three or four or some number of pages here. One of these I think I saw was—for instance, the pool of users in 1984 was about 432 from NCAR, and these are people who got on the main machines at some time or other, and outside people were about this number, totals like that.

Leslie: That's absolutely fascinating. I think that's terrific.

Jenne: And what's this? Oh, this is one that I wrote that's in this number 58. It's kind of a staffing history, which hopefully roughly agrees with what I just showed you from Rotar. And I even put in—did I give you the whole set? I didn't remember doing that, but we may as well do that. This is just from June of this year. It happens to be a list of documents, and don't try to read it. I'm sure you won't, but it just gives you a flavor of—

Leslie: That's terrific.

Jenne: —the different stuff. And then I'm writing a third version of one called "Guide to documents" and trying to give a flavor of—first, to put the

documents more like in subjects. "Here's our interactions with RUSH [?] over a whole bunch of years." "Here's one about all those climate assessments we talked about." More recently, for the importance and for a lot of the politics we cover, things like climate change issues get very important and Kyoto becomes very important. What should we believe about how fast climate models will increase temperatures gets important and how glaciers have melted over the last 200 years and so forth.

0:51:34.6

Unfortunately, our ability to inform the general public as well as colleagues would be a lot better, in my opinion, if there wasn't so doggone much hype and politics. Are you seeing that a lot?

Leslie: I just reviewed a book called *The Republican War on Science*. It's not a very good book, but the point is well taken, which is the way in which especially climate models are one of the main chapters, about the way in which it becomes politicized.

Jenne: Yeah. I feel torn in two directions at once, because part of the response—a greater fraction than I first realized of let's say the negative hype we've been seeing comes from a few parts of the research community itself. And I used to be able to pick up—I skim-read *Science* and *Nature* each week, not everything, but getting what I need, and on certain issues, it frustrates me. Like, somebody might talk about all the melting in Greenland. But there are reasons to think that they've hyped one side of the issue without giving one anything like a balanced thing. And yet I keep having to—I keep running into these kinds of things all the time, and I try to keep track of it when I do find what I consider more solid information, but it drives one crazy, because I should be able to trust more of those originals, straight out.

Here's another one. I need to keep this. If you needed a copy, it's there, but it's also—

Leslie: It's in the documents, that's wonderful.

0:53:24.5

Jenne: Yeah. It's also 361. This happens to be just a—it's more details over a recent time slot, but I guess this will at least give you something. The pertinent parts to some of this is kind of like whether or not a different period's users could easily get into NCAR. At first they had to literally come here and run the programs, and then there was probably a 10- or 15-year period where we would set up partial networks that would feed a piece of the science community that would allow them to come in. And finally, of course the Internet, and it's been getting faster and faster. I was

trying, which didn't quite connect with the right person in time, to get in the Internet period, even, it's kind of a question of, how did that improve?

In a sense, the details of improvement during the Internet age may not affect you too much. It affects our ability to move data around on the Net quite radically. Gosh, there are 1,001 other things, but this may be more than enough now.

Leslie: That's the next one's summary. I think that's about—I've taken enough of your time. I had one final question just for comment. If you had been able to talk to Pei in 1961 with the experience you've gained since in all the years of working in this building, would you have any advice for him?

Jenne: [laughs]

Leslie: Either to say, "You did this really well," or "Boy, if you'd only known."

Jenne: In terms of let's say the grandeur of the building, he I think just hit that terribly close. I don't know if you feel that way or not.

Leslie: It's a great building.

Jenne: But you can almost get that spiritual feeling or the shiver feeling or something. But the heating and cooling system could definitely have had a better design. They tried—they have kind of a cold—because one office may be too hot, while another is too cold, you do have problems you have to solve some place. And they tried to solve that by having kind of a hot-air duct and a cold-air duct and a way to mix those properly going into an office. And those mixers typically do not work very well or hold together for a very long time. So that quite often, [laughs] even when the temperature might be quite warm outside, you might have people with little electric heaters that they're hiding under their— [laughs] This isn't an isolated example, either. That kind of thing, have you run into that before?

Leslie: I've run into that in other buildings, too, believe me, it's not uncommon.

Jenne: But that's really there. And if you're talking about efficient use of energy, that's one of the worse things you can do! [laughs]

Leslie: I think that's a great place to end. I think you've done a great job, and I really appreciate it.

0:58:16.2 End.

END OF INTERVIEW