

**University Corporation for Atmospheric Research
National Center for Atmospheric Research**

ORAL HISTORY PROJECT

**Interview of Rene Munoz
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Interviewer: Stuart Leslie

MUNOZ: Standing by the model of the tree plaza and the revisions done by [Avo Copland?] in the early 90s. I'm pointing out that [they?] had originally envisioned that there would be a grid of four by four trees sticking out of the pavement there and as you can see and guess over 30 years time, it happened that many of the trees were dead, because they are literally in two very long troughs that were sunk in the roof. This is actually the roof of the chemistry laboratory (inaudible). It's leaked since the inspection, so Avo Copland had two things to do: the first, in the renovation and there were three renovations outside, was to jackhammer all the cement and remove it down to a -- depths of at least eight inches, and that exposed the two troughs, which were then completely redone as they had been done before, and then in each of them, eight tree planted. And you had never seen so many layers of waterproofing in your life, so I had assumed a good time had (inaudible) leak. But, I believe that (inaudible) achieved a much more public face in recent years and so many people are used to coming up here and using the activities particularly visitors associated with scientific meetings. Often they'd have evening activities as there was a reception and dinner here last night even with Western music, with a group of international no (inaudible) visitors. Other visitors from CU and other places will come in the evening. But, I think this is also a nod, the Avo Copeland redesign of the tree plaza to today's children coming up, because they worked in multiple sod areas which were never conceived or probably self appropriate for the more classic design. Now, kids even have the opportunity to role on (inaudible) of a story about the grounds. In this large center areas the ones on staff are fortunate enough to do is to have weddings and other such activities so a number of chairs can be set in this area facing north. And this believe it or not area can even be tented from time to time. they could put up (inaudible) on here, so they have achieved a wonderful space that can hold several hundred people. This is kind of small entity, they're against some kind of a family can happen here, if people wish. And I have seen big evening gatherings out here with live music and the (inaudible) tables and people enjoying themselves into the wee hours.

LESLIE: So this is a public space.

MUNOZ: It is a public space.

LESLIE: Where was the (inaudible) that I've seen?

MUNOZ: We'll show you that. That was up these stairs and right in here on that side. We'll show you that too.

LESLIE: OK.

(break in tape)

MUNOZ: But in between the two towers connected by the two stories, lower structure of (inaudible) what I was trying to say, is that there are only two floors in the entire building that goes the whole way through, so when you were talking about pave concept and virtuality, I thought that was interesting, because you cut off, because of the design, naturally cuts off anyway to come over from the sixth floor, the fifth floor, the fourth floor, the third floor, the only two floors that go from the far end of the building to the far end of the building are the second floor, the one we're on, and the first basement. No others have full continuity through the building.

LESLIE: Was there ever a space in here where people would (inaudible)?

MUNOZ: I'm taking you to see that, the kind of thing I was told functions right now. We are standing here because you asked to see one of these natural (inaudible) places where people from different divisions would have the occasion to come across each other in their daily running around the building activities and so, there is still a (inaudible) outside on the patio. There are two patios on either side, one is a very large courtyard. The focus of this is that it goes all around on four floors and on three of the -- not three floors, but three sides. On three of the sides there is no first floor underneath. And that is the (inaudible). To the left to the window, because (inaudible) to spend the summer here, coming migrating from somewhere down south and then they (inaudible) under each one of the three areas. Again this is something that the architect didn't quite anticipate. And then to get up to the second floor because they are huge, floor to ceiling expansive (inaudible) the birds would try to fly to the light that they're seeing and they were getting knocked out initially by probably dozens, not a good idea. So the (inaudible) up on the glass on all three sides where there is no first floor underneath. It's still (inaudible) of the hall and the hope that the (inaudible) that diving flying (inaudible) and go away. But the scientists here feel so strongly that they see these beautiful little flowers (inaudible) got knocked out that when they first get here and get used to flying around and some do get knocked out despite our efforts, all these go out with (inaudible).

LESLIE: (inaudible)

MUNOZ: ...they think if they (inaudible) in addition to the (inaudible) Believe it or not (inaudible) But when the (inaudible) come back every three and they look at these wonderful places (inaudible) just for them, so they occupy them all so they (inaudible) again which (inaudible) in the skies they came back and forth and so on. And they (inaudible) and then of course every Friday it rains, the six get washed out, I think that's one reason we're very glad the area is (inaudible). Um, we're looking at the Tree Plaza and initially, each of the 16 trees was basically surrounded by a tree by tree patches of grass. I think these are the same kinds of trees (inaudible), trees for shallow roots because they are in these enormous trays underneath so they (inaudible) penetrate like they would in Florida. Then they (inaudible) pretty well, but on this site, recommends itself to people like no other place in Boulder. The Chamber of Commerce typically has -- one of its networking sessions up here and they always get 3 to 400 people out here, because people would love to come up here and chat with other folks and have the beautiful expense. I would point out that some of the Tree Plaza you can see almost the Rocky Mountain National Park to the (inaudible), way out onto the plains (inaudible) to the east. And down to the south you knew just where to look which is basically about the 2:00 position. You see a tiny little (inaudible) on the white line on the horizon which believe it or not, coming from the east coast, you wouldn't believe this, 50 miles in the distance (inaudible) at the airport.

LESLIE: Oh, OK.

MUNOZ: We're going to the sixth floor, which (inaudible) PH, or architectural turf or penhouse, we had two in there, completely different from each other. The first one that we're going to (inaudible) is in the B tower, and it is now (inaudible) laboratories. When I first came here in 1986, this (inaudible) was like a graduate student area at area university, there was (inaudible) with people's guests. I think we've always had the windows going for that kind of curtain, window covering, but this was [HAA, Walt Rabbits (inaudible) High Altitude Conservatory Division] and so this was 85 or 6 students occupying this one place. In other words, the point is, there has never been interior walls, OK? Then, when the new building called Foot Hills laboratory was built in the -- not built in the renovated early '90s, HAO went protesting every step of the way to be the one division that needed to leave. That was a decision that Diane can tell you how that was made. But when those people moved out, the chemistry people who pretty much populate the basement and first level areas, in some cases moved up this high and a chemistry laboratory belonging to two senior scientists with [NCAR], and occasionally with people working in this laboratory with them. This space has been occupied, since then, by chemistry folks.

LESLIE: Now these two were set up as [wet] labs, these -- so they don't have --

MUNOZ: No. No. No.

LESLIE: -- (inaudible), and (inaudible) through the electronics lab.

MUNOZ: Correct.

LESLIE: But and if you (inaudible) space, so that the lab could be configured either large or small. We -- recently we've run out of room. It can't ever --

MUNOZ: I think they just built this space to its natural expansion with whatever things these two particular scientists had. And one of the reasons they got the space, was because they do some collections outside, and we can go outside and see.

(break in tape)

LESLIE: (overlapping dialogue; inaudible).

MUNOZ: (overlapping dialogue; inaudible). OK. OK. (laughter) In the late '60s, a guy named -- he worked for the laboratory of atmospheric science, joint (inaudible), did a whole (inaudible) of time lapse (inaudible). And I think he used one of the penthouses to do it.

F1: OK.

MUNOZ: And I think he was the (inaudible).

F1: OK. OK.

MUNOZ: He (inaudible) 15mm camera, and I have all of his films in the archives. Really interesting because you really detail what was going on with the pollution and metro(inaudible) at the time.

F1: Because the other -- because the other (inaudible) by contract, I believe has always been configured as interior wall space. I think it would have had to have been (inaudible) one that has (inaudible) to my knowledge. And remember, I -- we need to keep coming back to the point B, and take a note here. I am not the definitive source. I only -- I only go back almost 20 years. But people have been in this building since 1966. I honestly though do not think, especially because the HAO students have been up here. That there ever have been walls that at some point had come down under (inaudible) I don't think. I think maybe it was more likely that (inaudible) on walls might have been added to make the office space over in 6 or penthouse and the other (inaudible). So this to me, would be the place that you're part of that (inaudible).

F1: OK.

MUNOZ: Let's go out on a little switch. Since he lost the story off the elevator, this one should be open. Do you have a camera?

LESLIE: No, I don't.

MUNOZ: Too bad. Oh, Oh, (inaudible) that again. We're -- yup, yup. Where this is just something that --. I would say that's [tight].

LESLIE: Yeah. That's (inaudible).

MUNOZ: That -- that (inaudible) to check.
(pause)

MUNOZ: Oh, yes. (inaudible). This is a wonderful tradition, because it includes the tired, (inaudible) staff people. And this is (inaudible) during the middle of the day would seem obvious, retired buddies and they have model air crafts, which expand as much as 6 feet. What they do, these days -- this is how technology comes into play. NCAR has a website with weather information every 5 minutes, 24/7. So now these guys can be in the comfort of their homes, look and see how the wind is blowing up at the (inaudible), and then probably (inaudible) jump in the car and come up here.

LESLIE: (laughter) (inaudible).

MUNOZ: ...they stand on the south side of the hill, which drops away briefly, and they come, and they fly these airplanes. they've done this for so many years, that two or four years ago, it just got to the point where I wanted to know more about them. So we -- we have a very fine, staff writer here for our staff (inaudible) monthly newsletter. And I sometimes suggest articles that in fact I would really like to learn more about, and they did a wonderful article, which is how come we found a lot of information out about the people come up here and fly air crafts.

LESLIE: Did you say they did some experimental (inaudible) on the --

MUNOZ: Oh yes.

LESLIE: -- on the rooftops?

MUNOZ: Yes. Yes. Yes. Yes. This not (inaudible), right here. The reason I believe this is on this side is -- is because the more particular matter on the other side that they don't want to let them get in the way of. Diane, this instrument over there on the (inaudible), is that a (inaudible), or it's certainly a stand on which one of those things goes.

F1: Yeah.

MUNOZ: Actually, I think it has something to do with [GPS].

F1: (inaudible)?

MUNOZ: Yeah. I think that has something to do with GPS. Maybe that could be somebody else's. The first -- the first equipment here has to do with the people who are

in this room. Possibly that too. Unfortunately, we didn't ask them to come up here, and we do have (inaudible) up here of the (inaudible) variety that caused that to not want to have large (inaudible). Typically, that's what that is. But -- and the (inaudible) of the (inaudible). You see some of those, again, up on top of the very top of the room. It's (inaudible) up into the air.

LESLIE: And I guess that was something to the attention (inaudible) experiment right off of the labs and (inaudible)?

MUNOZ: Oh, yes. Come on over here. I'd like to say that I've never seen space in this building that scientists haven't naturally appropriated. And what a better example right down here.

LESLIE: Oh.

MUNOZ: Where we're looking at the second floor of the middle part of the building, which is only that tall. And you're looking at really quite a large boardwalk area with ongoing science experiments. You cannot see them from the ground, so they're not really (inaudible) figuring, so to speak. But (inaudible) they certainly allow any number of scientists that if you have a relevant thing that you need to do, you have the opportunity to do that. When I was mentioning the weather data being captured every 5 minutes, 24/7, that is on the (inaudible), that's the 6th floor in the north tower or A tower over there. And that's -- that ladder, with all of those scientific instruments mounted on that. That's how that happens.

LESLIE: You could walk right out onto the roof from the tour through the door --

MUNOZ: Again -- again from the 6th floor, yes. But that space over there, unlike is, is all broken up into offices. And so access is just (inaudible) two people with office doors.

LESLIE: OK.

MUNOZ: As opposed to this one where we have more opportunity. These little eyebrow windows, sticking up off the second floor roof, center section, will be found in the library. (inaudible) had so many little innovative surprises where you walk around the corner and either smile or go a-ha. And to me, these or are one of those. Believe it or not, the things beyond it that looks like a submarine (inaudible) tour is the chimney to our fireplace. We have a fireplace here that -- that I would bet big money on that's never been used. I want to show you one more thing. When you were talking about equipment, from time to time if needed, I remember summers where the chemistry people perhaps on the edge of the [basement], would have had a scientific experiment going. This is where we would put dishes. This might be the one that for years gets information set up from Mexico. And it's a (inaudible) dish antenna receiver. It could have been changed by now, but are you going to explain to him, I hope, because you have so much more data than I do about the --

F1: (inaudible)?

MUNOZ: (inaudible) additions?

F1: I don't know a lot about it, but I can get some information for you.

MUNOZ: Yeah.

F1: That was built around '77-'78.

MUNOZ: If you supply the years, and you look down here, understand that these two one-story structures that are on the south end of the building, that because we're looking down from the sixth floor, we can see that -- that they have a crushed block (inaudible) both of them. That's just been taken off for repair. These were parts of a scientific experiment, and that is how I made the acquaintances with people in these (inaudible) when I first came here. Because as I understand it, and she needs to correct me on this, 20 some years ago, apparently there has been initial data that said that the diameter of the sun appeared to be changing a little bit, perhaps getting smaller. I don't know how NCAR came to be the institution designated to run an experiment (inaudible).

F1: Yes.

MUNOZ: We were charged with running something (inaudible) until something could be determined. We also were under the constraint of not affecting the beautiful plan of the (inaudible) building. So I have never seen a more clever adaptation that was also -- we really should know who the builder or architect was. Could be our architecture or engineered by them, and maybe we went back to the (inaudible) people again. But over there in the far (inaudible), it is literally reassessed into the (inaudible).

F1: Right.

MUNOZ: Like the (inaudible) of structu-- under the cliffs. This one is starting to get into the side of them. And what you should do is take that little pass and let it go down stairs and then around the corner, and then a rear door. And it's only big. That white structure on the ceiling is in fact an opening, and the people in this room, the graduate students, had the job of every day at (inaudible) when the sun is directly overhead, when it was shining, which was most of the time. Of heading images of the sun and its diameter from that building. After a handful of years, however long that was, it was judged that the sun didn't appear to be shrinking. So everybody took a deep breath. I'm making light of that because I don't really know the specifics of the technical study. Obviously it was quite serious. But that then reverted to other activities. And then in fact was let go for quite a number of years, until one engineer single-handedly figured it out. It took weeks, and weeks, and weeks, and we claimed it. What is interesting is that there is 100 foot long tunnel connecting the two of them underground. And these are other instruments on -- these pipes sticking out of the roof of the circular structure seemingly

attached to our building or next to it. And close, the light of the sun overhead shines directly down into that laboratory. And they performed other experiments on it. You can -- I've never seen this -- never been down and seen this (inaudible) before. You know that only 10% of the exterior of NCAR is glass. Well, that's a very good example of how they did it. And how he achieved his visual verticality. Had he addressed the design of this building in any way so that you clearly saw horizontal. All of the (inaudible) near the horizontal strips of glass windows. If any of something of that design had come up, he had been (inaudible). This place would have looked like a bunch of squat, shoeboxes.

LESLIE: (laughter)

MUNOZ: You must stand here, in the driveway, or hanging over the building like this, and count the seams. Because that's all you can see. There's a (inaudible) piece (inaudible) at a distance. And that's the only way you can count one, two, three, four, five, six and understand how tall this is. And that is what I was told is the secret of putting a 6 story building up against mountains that are 1600 feet. Someone once said to me there is no yard stick over there that announces I'm 1600 feet above the [mason]. And we've paid a lot of advertising how tall this building is, because his glass is vertical. That person has said to me that it then appears that the mason building gets to float against the backdrop. And it is in appropriate scale, always. Because it is seamless, formless, essentially against something larger that the (inaudible) are appropriately -- can't think of the right word here. But you understand where I'm going. But they fit together very well.

LESLIE: Yeah. The coloring up here, this is obviously painted red or (inaudible) pigments of some kind.

MUNOZ: Yeah.

LESLIE: That (inaudible), the aggregate, which it looked like it might have been or sounds like from the (inaudible) that it might have been deeper at one time. Has that color changed at all?

MUNOZ: Yes. It would have just bleached with weathering. This was limestone (inaudible) from surprisingly Colorado Springs, and (inaudible) all the way up here to Boulder. Many people think it comes from a (inaudible) sandstone quarry just north of here. It does not. It came from Colorado Springs. So I was told limestone and sand were mixed into the concrete to give it the color of the pink rocks. And also he was, I believe, trying to duplicate the natural color of adobe. He couldn't specify the color of adobe in the 20th century, so he specifically chose to make his building appear, again, in a complimentary manner with the pink mountains. Because the (inaudible) in (inaudible), it wouldn't have appeared synchronous. The other thing that he did, and again, this is -- I don't know whether you've read this fact. Is everywhere that is roughened, exterior surface, this was essentially every wall of the entire building, most parts of it, they've been roughened up with a technique called bush hammering. That had been done for

many, many, many years. But usually you roughen up the rocks of the concrete facing around the entrance to a banker, another fancy office building, and then glue on beautifully cut and polished granite. Some sort of capstone rocks that you want to make it look very attractive. (inaudible), I was told that this, for the first time to such a scale ever on this building roughened the whole thing up, and intended to let it go at that, because that made it more natural. It also got rid of a -- if you look at a (inaudible) chart, you see all of the little bumps from -- from the -- I call it from the Popsicle change. Where the concrete was poured. And -- and then you scrape all of the walls. So you get rid of most of that, and take that manmade factor out of the equation when you're looking at the building.

LESLIE: Now the (inaudible) were actually done on site. These were -- they weren't cast in a (inaudible) place, is that correct?

MUNOZ: First the (inaudible) were told. Because when the building was finished, unfortunately because the building had -- I just tried to verify it this last week. I came across some -- I would say on the weekend encountered a construction person from [E.B. Construction] from Kansas who had come back to the visit the building. And I said did it really take two months as I was told with jack hammers to vertically scrape the building. I know it was in part because they wanted vertical (inaudible) lines, and if you do it when a (inaudible) mold, you aren't necessarily going to get all of the (inaudible) control to down. And he thought it was about that (inaudible). I was told, again, perhaps Diane can back me up.

END OF TAPE 1, SIDE 1

Interview of Rene Munoz

TAPE 1, SIDE 2

MUNOZ: -- (inaudible). But because of the vibration, over eight hours a day for two months, there were little hairline cracks left all over the place. And it wasn't in (inaudible) that as they (inaudible) mechanism to acquire the funds to fix things. The construction company volunteered, cause it really wasn't their fault. They pointed out from the onset that that was going to be problematic. Nonetheless, and I was told that by the son of Martin K. [Evy], nonetheless they voluntary said we'll cover half of this to pay people, having learned something from that experience that OK, we'll pay the other half, and that's I'm told how the funds were accrued to do that.

LESLIE: What kind of funds were we talking about?

MUNOZ: I don't know. I don't know. Yeah.

LESLIE: But then, so -- so after the things were put in place. Then each wall --

MUNOZ: Was cracked.

LESLIE: -- from the top --

MUNOZ: From the top to the bottom.

LESLIE: -- top down.

MUNOZ: It just isn't practical. And even though I would guess that when you put a building together, form by form by form from the mold, it might not flow exactly straight through. It simply is more practical the other way. And you shouldn't -- we learned well, expose a building to the extensive vibrations from a jackhammer -- jackhammers, plural, that -- that that effort caused here. So (inaudible) I understand they do it in an old --.

LESLIE: (inaudible).

MUNOZ: Now, again, Diane, I'm sure, has information about the water [proofing]. (inaudible) -- you need to get John (inaudible) in on this. Because I've heard John any number of times, our Second Director, very carefully tell that the mix of cement and aggregate was such that it was a little bit too porous. And then there was also an issue with John (inaudible) in that coating, the exterior coatings, it wasn't quite right. they went bankrupt, I'm hazy on the details. I don't think of them. So John, because he was here through all of that to easily explain all of that (inaudible). In recent years, because essentially the concrete under these edges that our hands are rubbing the tops of the wall, are (inaudible), and porous, and it's very important that more water not get down into all these cracks. So this peak might not exactly mention -- match what's down there, which

his really aggregate. This is paint, and looks like fabric, and so on. But it's (inaudible).
(laughter)

LESLIE: So the problem was as much in the top of the wall as it was on the roof.

MUNOZ: Yeah. Because this is a horizontal surface. When it gets wet, the water would penetrate vertically down into it. And three years ago, I mentioned they did important things. The very first thing they did was take up all the concrete, redo the (inaudible). Then they moved on to the fountain (inaudible), and those activities together, plus the driveway, which is the same thing that followed. That easily took a 2 year period. And what was going on, probably 'til (inaudible) was that at least the fountain (inaudible) are being fixed. And the (inaudible) that was taking I would think the better part of the year. And all you have to do to understand the scope is look around. Every single cork -- seam in the entire building was re-corked. Every crack, and we had a bunch of them, and they had probably gotten bigger from the water elements. The weathering over the years started off, perhaps a little bit from the vibration of the jack hammers. they had some good cracks in this building. Every one of those is corked and of course, it has to be just the right color of pink to blend in. And so those two things were enormous. And over time, the concrete inside -- oh, I should say the rebar pieces in the concrete rested all the way out to the edge. And we had horrible patches of -- large patches of lumps in particular areas around the outsides of the building. And if you talk to some of these people, they can explain all of this to you in great detail. But essentially, they were steamed out. And I'm astonished at how well it worked. So there was the steaming of the (inaudible), and the massive corking. And I think this area probably came from that time too. They really -- to do this, Diane had some numbers on this too, we did it all at once because an institution funded by the National Science Foundation, you get money from time to time to fix minor things that never -- enormous amounts of money or if you do, that's capital expenditures which go within the building. We really needed badly to have some renovation work done. So in the early 90s, including -- and you need to talk to -- what (inaudible)? Was it (inaudible) who went and visited with (inaudible) visited with him too, but I think (inaudible) visited. (inaudible), she was the prettiest Assistant Director, Associate Director went to New York. And the idea was if we can line up (inaudible) to talk about the importance of this (inaudible) in terms of national and global architecture, not to mention (inaudible) portfolio, because was esteemed in this country. Then that will help build our case. And I believe the figure that NSF finally agreed to direct NCAR have for all of these exterior and interior renovations was on the (inaudible) of \$12 million. So the outside is done. After being closed for 6 months in 2003, all of the [HBAC] was redone in the north tower, the A tower. Everybody got the first new lighting since 1966, and a ceiling, and generation. Other minor things were done. But basically, all that space was -- was given a 40 year upgrade, cause nothing had been done in all that time. they went as far as going to the middle part of the building. they stopped, and did it relative to the south tower, because by then it became clear that they knew that -- that the chemistry people were going to be moving out into their own building. So that one's yet to come. But when you consider all of the interior, and all of the previous (inaudible) exterior fixes, renovations, refurbishment before they did it here. That was the first and only major approach to upgrading and

sustaining the physical plan since 1966 when it was finished.

LESLIE: And does that qualify as a (inaudible) ?

MUNOZ: Yeah. (laughter)

LESLIE: It was a (inaudible).

MUNOZ: Yeah. OK. We are on the fourth floor, and visible from below is a curved arch glass, it looks like, it's really plastic, walking (inaudible) covered over in clear plastic, and we're going to walk across. (inaudible) walk across it. So it's here the door (inaudible) here, through the door there. And it can really blow apart and (inaudible) in the winter. Not a good idea. So we have to have staff do their daily business run back and forth and back and forth. I think by the new had architectural engineers. And another person you could probably talk to is Michael George.

F1: Yeah.

MUNOZ: Oh, I (overlapping dialogue; inaudible) no, I know. I know exactly where he is.

F1: OK.

MUNOZ: I have his card. He gave it to me. Anyway, by then, we didn't have an in-house architect. We kept an in-house architect on hold for a while. And at that point, we had Jack Bell, and Michael George who were architectural engineers, and certainly with the building already here, could make the necessary adaptations. They are both very talented people. And this was, I think, quite a good compromise. It's plastic, it holds together well, (inaudible), but for the staff running back and forth, the practicality of not having to grab a coat or hang on if you have to go -- what would you say the (inaudible) is (inaudible) the glass?

LESLIE: I think the (inaudible).

MUNOZ: Yes. Yes. Yes. Yes. Yes.

LESLIE: (overlapping dialogue; inaudible).

MUNOZ: Yes. Yeah. Right. Exactly. Now you see (inaudible).

LESLIE: Yeah.

MUNOZ: So we'll continue over here, which is -- which is the departmental office for the chemistry folks.

(pause)

MUNOZ: What has --

LESLIE: (laughter)

MUNOZ: What has developed over the years is these boys ubiquitously have appeared in everybody's division. So I think it's a mandatory. Any of us who know a face and can't necessarily put a name to these wallet sized photographs of staff, but also the visitors wanted to -- visitors, these people are here for a couple of years at a time. So that visitors with a capital V, it's an academic visitor, the post (inaudible) are shown are programs that has the three, young, college students paired with an [ATD] chemist to do research for 10 weeks in the summertime (inaudible) as much as 4 years there here. We'd have some (inaudible) scientists who maybe in this case in Florida who may be at the University of Denver go back and forth all the time. And then [Hurdles] is the project we share with the University of Colorado, but it's a very nice ready reference. Just take a look if you're not familiar. And see who's who or who's not here, or whatever. They have a little area right here, so that it is waiting to see the director can wait until the person is free. The administrative assistant, of course, is in the outer office. Now, we are on the 4th floor, and what they did, and I don't know whether this was replicated in any of the other buildings he ever did. He gave his -- people who live in the tower, who work in the tower, have offices there, two ways -- special ways to get to work. Looking around you, you can see one, two, three doors that have glass panels in them. There is an alternative, which is an envelope door. There's some of those, pull it closed. And it -- behind there, you can see an iron, spiral staircase that goes up to these people's fifth floor offices. So if they have business on the fourth floor, they simply open their door, and run up the spiral staircase. And Julia is a friend, and Sasha is too. Sasha's got the better office. We'll see whether Sasha's in. If he is in, we'll go back to her. Sasha? Are you there today? OK, he's not. So I've done this before. I think I can probably get away with it once more. Come on up. But what look at what greets you when you get up here.

LESLIE: Wow. So this was set up for a one person office?

MUNOZ: That I'm not sure about. Since I've been here, some of these offices are for senior scientists. In this case, Sasha is a Ph.D. scientist who does an awful lot of work that has to do with committees. So in the redo, from a dozen years ago when we finally could get the battleship gray, linoleum top furniture, and go toward modular. We had (inaudible) furniture that very nice areas could be made for people to sit around a table to have a quick meeting. The balconies probably does open. That one. Yeah. It does. And you get yet one more view of everything that's out there.

LESLIE: But it's only what? 3x4x2 or something like that?

MUNOZ: Yeah. Not very large, the little balconies. But I think probably allowed more for opening the doors.

LESLIE: Good point.

F1: Now (inaudible) has a couch as a (inaudible).

MUNOZ: No, sure, yeah.

F1: How did he get it up here?

MUNOZ: Let me show you.

LESLIE: (laughter)

MUNOZ: Now that you mentioned that. How did you get all of the things in this (inaudible)?

F1: (laughter)

MUNOZ: By coming up here.

F1: OK.

MUNOZ: So -- and to my knowledge, most people come to work this way. I think just people like being out in the air.

F1: Yeah.

MUNOZ: I have visited -- well, I take special visitors up to the [Crow's Nest]. It's my way of showing them something special.

LESLIE: It is.

MUNOZ: And nobody has ever guessed that what this circular structure is is a container for a spiral staircase. So that shows you how unique that addition was. Now you see that that means that there's one here, one there, one there, and they compliment the three doors downstairs that have the glass panels. And then there's one that's just marked exit. And so this does not take 14 years to get through this visit. Because I know you have other things.

LESLIE: What (overlapping dialogue; inaudible) with the stone?

MUNOZ: I suspect so. The reason that the tiles are now laid down is we have certainly learned over the years that any time you have crush rock like this, people walk on them, they cut through the plastic, waterproof membrane. And staff facilities don't like that at all. So we might put (inaudible) over to the edge to look over, but I've learned that we're really not supposed to do that.
(pause)

MUNOZ: Now, you take that door to the left, exactly. This is (inaudible) office right

here that's closed. But if you take those stairs and go around not to three, but to two, around four. So you go down two floors. Now, the furniture that we were talking about would have come up in the elevators. So the couch that you mentioned would have come up in the elevators.

LESLIE: How many (inaudible) can that (inaudible)?

MUNOZ: You've got to get the plans out with (inaudible). I don't know. I don't know how many crow's nests. So we've got one more floor. These stairwells are unheated. We found out one time that an extremely cold weather in Colorado, that's not a good idea. I think we had a pipe burst one time. But they're retrofitting the (inaudible) around here. (inaudible) of all of these devices that had been added to this building. For example, these electrical [chases] on the wall with the metal doors, and they're painted white. You don't even really see them except for the little handle. But if you open them up, the different -- with what is behind these things today, and what is behind them at the offset is just completely different. The other building, I'm told, Foothills, that you were in, was particularly valuable because those trays where all the letters are, and I think it seems to me in some cases they're horizontal, which is so much easier to fix than -- than opening up one of these and trying to get wires to go down vertically up there. I need to find an office, so we're going to walk down the hall a little bit. By the way, we've just come across this part of the square. This is going to get us to the hall that's going to go down and we'll do that in a minute. But I want to show you, because remember there's not a lot of glass, this is how they (inaudible) most of the office space here. This is very typical. So you come in, and every group of people does it differently. In this case, we have office supplies, we have old journals, we have all the modern electronic things that need to be serving a number of people. And then we have little offices. So there's one there, and there's some bigger -- I don't think we had (inaudible) back then.

LESLIE: No.

MUNOZ: (inaudible) now. I didn't really realize that went through. Really quite small offices. It's only in the last couple of decades or a decade or so the things everybody can see there's so much more space than what people used to be perfectly happy with. So that again, and again, and again you'll see that kind of thing.

LESLIE: Most people didn't have a window.

MUNOZ: Or they had a vertical sliver. They had a vertical sliver. This used to be the offices the programs that the Ph.D.s and (inaudible) fellowships. And those people might be at lunch perhaps. So Kevin Trenberth, who's a chemist, not a chemist, a climatologist--they have infiltrated the detail and (inaudible). So Kevin has this office for himself. Here's one of those slivers of walls, which is continuous. And in fact, if you look up, I think you can see it going on. I don't know below the same (inaudible) the floor. It ends at the floor. I guess this goes up to the ceiling. And there's an assistant. There are two secretaries who used to be in this room, so I know there are two offices for them, and maybe there's a little room for supplies or something. But this is typical.

LESLIE: Yeah, the (inaudible) is exposed in (inaudible) typical (inaudible).

MUNOZ: So now that we're in the detail, this hasn't been fixed yet.

LESLIE: So the detail would have been (inaudible).

MUNOZ: Yeah. Yeah. So this is original. Yes. Thank you for pointing that out. No, but I don't think we're going to get rid of that. We can go over to the other tower and check but --

LESLIE: Yeah.

MUNOZ: -- but cause you paint that dark brown, and you have to have access to the pipes. So I don't think their (overlapping dialogue; inaudible).

LESLIE: (overlapping dialogue; inaudible)

MUNOZ: But these lights are antiquated in terms of the light they can produce. And so things were -- are now done much more efficiently and modern over in the other building.

LESLIE: The functionality of that is (inaudible) just --

MUNOZ: Yes. Yes.

LESLIE: -- [various].

F1: (inaudible) all the (inaudible) buildings that people fill their hallways walls with posters -- photographs and posters.

MUNOZ: And I would think you'd find that in (inaudible) as well. I think that's probably generic to --

F1: Yeah.

LESLIE: Especially people (inaudible) environmental science, they love to put their posters up.

MUNOZ: (inaudible). Yeah. This is an important observation. That person probably spends most of his or her time at the computer. And notice that when he or she sits at the computer, all she has to do is grab the -- he, she, it is a she -- has to grab to the right to look out the window. But it's very important to folks around here. So I (inaudible) bigger office here. Doug [Lichtner] is a group leader, he does have meetings, so he needs a table where he can call in people. Because you know in any institution, meetings are (inaudible) at a premium. So that is we're -- we've gotten to that because people can meet on the fly so to speak when somebody has three or four chairs, or five or

six like Sasha does upstairs. And keep that business level going continuously instead of waiting to (inaudible) scheduled space that has a meaning. You can't do everything in the cafeteria, because many, many, many, many (inaudible) in the cafeteria. But we can't have all of them out there.

LESLIE: Is there a shortage of meeting rooms because of this design?

MUNOZ: It's my understanding that the third tower, and I keep saying my understanding because I -- it just filters in all those years that people have passed on things to me that those are clues to believe that I think that's the case. Because every time I say that it's I think this is the case, I believe that the third tower had a concert center in it.

LESLIE: Oh.

F1: Oh.

MUNOZ: So when that was gone, we were handicapped from the (inaudible) in terms of adequate space.

LESLIE: You did have that other little building across the way (overlapping dialogue; inaudible).

MUNOZ: The (overlapping dialogue; inaudible). That doesn't come into it. That -- there is a board room over there. That was a building that came along two or three years after this building. And the NCAR (inaudible) has ended up being held over there. And that's wonderfully appropriate when there are VIP meetings, the board of trustees itself, which was from once (inaudible) come. Very appropriate -- I've even had meetings over there. It's a lovely building. But you're not going to invade NCAR president's building. It's a 1500 square foot building is all, and you're not going to invade that space all the time for regular staff meetings.

F1: Plus, I don't know if they do science over there.

MUNOZ: No.

F1: And I think because of the (inaudible) recommendations. I don't think (inaudible) wanted to pay for it. (inaudible) for it. I think there's a different (overlapping dialogue; inaudible).

MUNOZ: (overlapping dialogue; inaudible) scientific meetings there. And certainly all that it is since the building's been upgraded technologically, so people can give meetings with Powerpoints, and fancy projectors, eliminating VCRs and TVs, that kind of thing. That all goes into a comprehensive board room presentation technology. There is one other thing that I wanted to mention that (inaudible) too. I'm still looking for a little room, a tiny, little office I wanted to show you. These are the most special. Hi,

Doug.

DOUG: How are you?

MUNOZ: No? It has (inaudible) knock on it. I don't know whose door here, but I will, cause I'm sure it's locked. (knocks) Hello?

F1: Be careful.

MUNOZ: (inaudible) is an office. Here you go.

F1: Look at that window.

MUNOZ: Look at the window.

F1: they're pretty huge.

MUNOZ: Now, again, I was told -- I was told that they had decided these as storage rooms.

LESLIE: With windows?

MUNOZ: Well, they said where he was putting windows, perhaps. So as the building -- we spoke downstairs, the buildings always fill up much more quickly than you think. So all over the building where there are doors on halls that don't lead into the more elaborate, multiple offices, there are these tiny, little rooms. And here's the beauty of it. The person has -- has a desk, has a chair, and usually the chair has to be pushed back so that the door can open and close. But once you put a bookcase on the wall, and install the technology that support a computer or telephone, you don't need anything else, and you have privacy. So these are young people who are probably more graduate student than undergraduate student. they're employed here, working for a scientist or finishing off their degree, and concentration is what they need to be able to do it. Who cares whether it's twice the size or three times the size? I think even without the door to close off, and have the concentration time, and (inaudible) have this be your own work space and not have to clean it up all the time.

LESLIE: It's only what? 5X5 or something like that?

MUNOZ: Yeah. Yeah. Yeah. Yeah.

LESLIE: (laughter) (inaudible).

MUNOZ: Isn't that great (inaudible)?

LESLIE: (overlapping dialogue; inaudible). Yeah, that's really nice.

MUNOZ: And so this one over here is exactly identical.

LESLIE: Check down the storage. Those (inaudible). That's pretty original. So I wonder --

MUNOZ: Do that. Do that. Because people have never said with such small spaces were intended for desks is that they get some kind of storage. Now from this (inaudible) right here, the end of the -- we're on the second floor, just passing the glass bridge. And this is probably on the order of 15 feet. So when we come down here, and peek into this room. But she's on the phone. Oh, were you -- hi.

M1: Hi.

MUNOZ: I'm taking someone who's working on architecture around. Can we just peek in here for just a minute?

M1: Sure.

MUNOZ: So Bill Leslie?

LESLIE: Yup?

MUNOZ: Somebody from Johns Hopkins.

M1: OK.

LESLIE: (inaudible).

M1: You bet.

MUNOZ: These offices typically have two desks in them because they can support two people. Now we just did a renovation, and I took squatter space of the identical room across the hall for those six months. And at that time, they didn't have very -- (inaudible) there were battleship, gray furniture. Didn't he just (inaudible)? So they were -- that turned into a --

LESLIE: (inaudible).

MUNOZ: -- that turned into all modular then. And there were bookcases all up and down those walls. Very efficient, but you really couldn't have two people comfortably held in there. And both had enough space to work on your own things. I filled up that entire space with things that I needed here during the six months of closure. Now we're standing here, which is where I -- this used to be my first office. Completely windowless. This is what? A 20 -- almost basically a 20x20 anti-room, and that's where in our case, the publications secretary sat there, one or two people. And then small

office, small office, small office. No one as you know has the light on the ceiling is the only thing that provides anything.

LESLIE: So the (inaudible) get it (inaudible)?

MUNOZ: And by the way, look at the ceiling. It has been redone, and it reminds me that the one other thing that was critical to go in were sprinklers. We had no sprinklers. So not only the HDAC system, but we had to get all -- and it went that far, and then stopped because to the east and then the south is the south tower. So that's where they stopped. But this is all done with basically soundproofing in the -- the ceiling tiles. Dropped ceiling in the hall, much better in white. We have sensors for fire smoke, and then the flat ones are where the thickets drop down, and spray.

F1: Do you remember that the (inaudible) project in -- in what -- 1990, 1989?

MUNOZ: And there was some here during the six month of closure in here as well, yes.

END OF TAPE 1, SIDE B

Interview of Rene Munoz

TAPE 2, SIDE 1

MUNOZ: -- during the six months of closure as well, yes.

F1: OK. Because they did the public area.

MUNOZ: But they hadn't gotten it all. They hadn't gotten it all.

F1: Right.

MUNOZ: And so they just -- staff worked right through except the (inaudible) because -- I hope it's because they had such fine, (inaudible) folks here who have so many courses, and so much knowledge. And everything is constantly monitored, everything is swathed in 4x4s that staple layers of plastic. So there really shouldn't be any issues --

F2: (inaudible)?

MUNOZ: -- for staff. Now that it's finally done. Our library. OK, you said my favorite things, and the library is certainly one of my favorite things. I don't know of a more friendly place in the building anyway. And then our periodicals are over there where the large table. Time and Newsweek are usually out on this to kind of encourage people to sit down for a moment either with a journal or something lighter. they had taken an entire wall for community information, and broad based applications because this library is open to the public. And -- and it is not only our intent but our goal to get the public in here. They may be CU geography students, they may be just the public with an interest in our topics. they may be somebody who's got to be an (inaudible) about some particular subject and wants to know more. We have an incredible reference library, and so we're always able to come up with some kind of an answer. Computer networking for the room has added substantially to the technicality of everything, and all the wires. Obviously, this library is networked with lots of others. And two systems like [Caro] and I don't even know all the other systems on (inaudible) certainly on a par with that science library. And is a member of science library associations. And in fact, (inaudible) associations come by through here on meetings from time to time. I want to show you the glass windows up at the very end. This window is to the south, and it has a view of (inaudible). This is another one of this (inaudible). I love this. Remember the drain? There's a drain right above here, and for so many years, it's dropped into that rock directly below, and it made the depression in it. Because the -- it spills right onto that. Often you can come over here and see deer. And (inaudible) on the dirt down there, you see evidence that somebody's been there. Those are deer. they come up, and they like to nestle up against the shade. This is the second of those round structures that we saw from the roof that I said the light shines in on the south edge it shines in. The other one is -- is sort of about the two:00 position over there to the south and west. And that two -- or a hundred foot long tunnel is going between the two of them. But then the stacks are here, and I also want to get away from there. HAO had a lot of maps because -- I don't know, whatever their publications are, they led to a lot of maps. So this was always HAO's

property, and perhaps it still is, even though HAO is -- no. No.

F1: No.

MUNOZ: This looks like it's all weathered out.

F1: Yeah.

MUNOZ: It's not (inaudible).

F1: Frequent (overlapping dialogue; inaudible).

MUNOZ: Yeah.

F1: When everything was done on paper.

MUNOZ: Is there now big weather maps. Now everything is on the computer. But let your eyes rise up, and look at how they provide shielding from the sun's light here.

Those must be six foot tall pieces of concrete. I see two of them and three of them at an angle. Like the vertical blind that you're able to either completely close or open partially. These huge, thick pieces of concrete surface (inaudible).

(break in tape)

LESLIE: -- has the thing on the blinds.

MUNOZ: Actually, I think I just -- I think I can (inaudible).

LESLIE: OK.

MUNOZ: -- that it was working. I'm sorry.

LESLIE: OK.

MUNOZ: We're standing in the back of the library, and we're looking up. It's a two story space. The (inaudible) are on the second floor, and they go around on all four sides. And you can see that what is -- I'm up to 20. Probably there are about 20 of them, which would make about 4 on the side. And they're reached by a much wider spiral staircase. The doors are at about shoulder height. And again, what is in those is exactly what's in that tiny, little office down the hall. You're here for a short time, but you have to have the equivalent of a desk, and a chair, and a telephone, and a computer, and you're fine. And that's what -- oh, and a bulletin board. You've got to write. Have to either put your equations down, or put an important note so there's a bulletin board up there, and they did that. Yeah, isn't that great? Also, tell you about the floor. The one other big renovation project I've been here for was when they had to replace the carpeting. And it was such a whole-end task to pack up everything single thing you said that they said we never want to do this again. So simply looking down will reveal that we now have what I judge are 2x2 foot carpet squares. So if we have an accident that stains something, we can pull it up and take it out, and never again, we hope, will we ever have to take out. And we did not do that in the renovation by the way. We covered these with -- the [sacks] with plastic rather than -- rather than move all the bookshelves again. Because it's incredibly labor intensive, and very difficult. And if we keep on going, this door was open the other day. Oh, not that one. I think -- or, I do. Wait a minute. It's two doors. Yeah. And it was opened the other day, and it's not opened today.

F1: (overlapping dialogue; inaudible).

MUNOZ: Yeah. So we'll just go through the office.

F1: Quick question.

MUNOZ: Yeah?

F1: What kind of (inaudible), curious --

MUNOZ: Oh, five minutes.

F1: -- very much. OK.

MUNOZ: Which you probably want to have lunch.
LESLIE: No.
F1: (inaudible)
MUNOZ: No. No. Here.
LESLIE: We'll be fine once we get lunch anyway. You can't get -- you can't get this tour anywhere.
MUNOZ: The office -- we have a little pod of offices over in that far corner where those concrete pieces were. they -- those people have windows just like that. they're a series of little three -- three, little offices in that corner. And then this is where all the rest of the library (inaudible). Hi. We're just coming through.
F2: Hi.
MUNOZ: (inaudible) just (inaudible). In this case, because of the library, they knew the library would be here, the elevator has to have a backdoor on it. It has a backdoor onto the cafeteria, or the kitchen of the cafeteria, and the library of the second floor. And when we go up here, our door to the second floor, I mean door outside is on the second floor.
LESLIE: OK.
MUNOZ: And you --
LESLIE: Is that the same as (inaudible)?
MUNOZ: Yes. I, myself, need to learn about that, about the (inaudible). You can see that all of the concrete pieces that form the side walls of the bridge, which are slanted, appear very wavy.
LESLIE: Yeah.
MUNOZ: And it's my understanding that they weren't that way originally?
F1: I don't know.
MUNOZ: I don't know.
F1: (inaudible).
MUNOZ: I don't know.
F1: (inaudible) probably a good question to (inaudible).
MUNOZ: I'm not sure.
LESLIE: Yeah. I mean (inaudible).
F1: (laughter) These are (inaudible) that are always -- (inaudible). Well, that has (inaudible). Was the (inaudible) director now is (inaudible) president.
MUNOZ: Since 1988.
LESLIE: Right.
MUNOZ: The immediate predecessor of the second director, as well as the present director have just had (inaudible) their (inaudible) taken down by me. (laughter) Because we needed to get the dates on them. You need to have an end date of (inaudible), who was on the job for about 10 years. And then Tim [Colane] took over in the same year, 2007. And so, those two (inaudible) pictures in fact are in my car right now.
(laughter)
MUNOZ: This I call our parlor to our visitors when I'm giving a tour because I want to convey to them that we don't have another room like this that has all this lovely, comfortable furniture. When we say meeting rooms, we really do have meeting rooms. This is unique, and I'm sure in their mind and Walt Robert's as well, they wanted a room

in which lovely ceremonies could take place. There has been NSF contract proposal celebrations in this room. And the one I mentioned was the one perk our staff can have generously given to us by management, is the opportunity to have a wedding or a reception. You can imagine that when the affair is small, that this is the room that people might choose to do that. The architectural facts I know about this room is that there are three panels of glass that are what? About 15x15 feet a piece. And those three pieces, with the expansion joints that have to be at least a half an inch wide, top to bottom, I was told that this is -- these three are the thickest pieces of glass ever poured up to 1966 when the building was finished. They knew that these strong winds that we talked about are going to be blowing through the area, and we didn't want ever anything that got -- became unanchored out there that there can't come a flying missile and hit this place. Over the years, I told you I've had wonderful architectural groups come in and when I first was here, we had a Swiss architect every couple of years, about three times, bring through Swiss architects and Swiss architect students. they would go around the United States to different places and they came here. And she told me that this large, concrete awning, and that's what it looks like that stands 15x15x15 --

LESLIE: 50 feet.

MUNOZ: 50 feet is the length of this room. It's a fixed, (inaudible) concrete emplacement. She told me that -- that they adapted that idea from the architect (inaudible). It does two things: we get very bright sun seasonally. It diminishes down a little bit. And then by adding this other half wall, not even waist high but close to it, that the (inaudible) it really does a lot to limit the velocity of the wind that is, as I say, always coming from the back. The future that everybody always wants to know about is what's that little table sticks out from the wall. What -- almost three feet.

F1: Yeah.

MUNOZ: And it's about two feet wide. And the answer is nobody really knows. We think it's an architectural motif.

F1: (laughter)

LESLIE: (laughter)

MUNOZ: We've seen people sitting on it. We have seen people using it for the various purpose of eating. Because this room now has two areas of furniture with one, two, three, four cushioned, upholstered chairs, and sofas. Actually, there have been three here all this time, but anyway. Three groupings, side, by side, by side in this long, 50 foot area. The furniture's changed over the years. This is the current configuration, and I need to say for the record that we do appreciate that it is not their style, but we -- I guess we want to say that you are grateful to get furniture sometimes and you should -- isn't as (inaudible) carefully chose all the furniture in the lobby originally. By the time you get up here, you have upholstered pieces that's a few generations later. You're happy that somebody's budget graciously bought it, and you just hope that you never have any architect who would be offended by the mismatch. But that's their problem.

F1: (inaudible) something real quick?

MUNOZ: Please.

F1: There was an original (inaudible) room. When NCAR first came about and they were in rented space, the University of Colorado down on Studio Street, and [Ralph Damon] was -- I don't know if he was President of Eastern Airlines, but he was the friend of Walt Robert. And his wife gave him the money to create this staff lounge that they

call the Damon Room, and that was the whole purpose was it was a place for staff to go and sit, and read, or do whatever they want. So actually, there's always been a reading collection of some kind in here that was really aimed towards the staff. And if you look through old newsletters, you know, they're all -- for example, when the Council for NCAR Women used to meet in the early '70s, and they would stash all kinds of, you know, feminist and women's liberation stuff here. Seriously. And they would leave it there for people to read, and they'd encourage all the women because it was -- it was for all the women of NCAR, not just the scientists. There, of course, were a few women scientists, but everybody down to the switchboard operator, and they would just love to come up here and do the reading. And that's one of the things I always found interesting about this room, was it really was intended for staff, although I think mostly it's meetings and it seemed a little formal.

MUNOZ: Yes. But then I hope you'll be pleased by this, because as a constant inhabitant of this building, my whole time here, when I refer to this as a parlor bringing in the occasional group when we can't go outside because of the weather, I'm -- I absolutely make a point of telling them that unlike your concept of a Victorian parlor, which is as nice as this is I think, that any staff member at any time is always welcome to come in. And I tell people that when we had previous furniture in here with a much longer sofa, I would often come around the corner, and somebody would be sound asleep, taking a nap over at noon hour.

F1: Right. (laughter)

MUNOZ: But a couple of people want to get away and quietly visit over the noontime hour away from everybody else, they can come up here. People can have spontaneous meetings, because we're just about to walk back to the real meeting room in this area. So this room has tended to be ceremonial, and to my knowledge could be previous administrations that nobody in the last couple of decades has ever criticized any people for simply coming in and using this space at any time for any reason when it was not taken for -- specified for particular meetings.

F1: Right.

MUNOZ: Now the meeting room that goes with Damon room is over here. And it's gone through a whole bunch of permutations. Maybe you want to say something about the photographs?

F1: Yeah.

MUNOZ: Cause these are important people.

F1: (overlapping dialogue; inaudible) couple people. We've got Lloyd Berkner. Berkner was the head of a committee on the National Academy of Sciences. He was also in charge of the [ITY], and his committee actually pushed through the idea of having an NCAR, having a center for atmosphere research. Let's see, Carl Gustav [Rofsky] is next to him. A lot of people consider him the "father" of, you know, modern meteorology. John [von Reumann] was a mathematician from Princeton --

MUNOZ: Princeton.

F1: -- who also created from the club a meteorology project, which was -- the (inaudible) actually tried to use computers to, you know, feed data into -- to get weather forecasts. And he built his own computer, and they started doing that. And Phil Thompson who was our first associate director actually worked with von Reumann at Princeton (inaudible) advanced studies, which was where they were. Where are the other

two?

MUNOZ: Perhaps being repaired or --

F1: Yeah.

MUNOZ: It's been like that for a while.

F1: Yeah. they used to be in there, and there were six of them.

MUNOZ: Right. I think maybe they were --

F1: (overlapping dialogue; inaudible).

MUNOZ: -- they were moved, maybe, because of more electronics -- the phones perhaps sat right in the middle. You can see where they used to be. Well, again, the -- that kind of sun shielding has come right around the corner. It was on this wall, to the south, and now you see it in on this wall to the west. The issue here has been making this room dark enough. That's always been difficult. These are metal shades that let out -- let -- keep out most of the light, but you lose, to some sense, when this is essentially a two story room, and on the west side and on the east side you have, what? Two or four feet of glass wall running the whole way across at the top to let in light. And it is lovely, but the room never gets so dark.

LESLIE: It's (overlapping dialogue; inaudible). Yeah.

F1: Where is the exit to the area up there?

MUNOZ: There is not.

F1: So people are getting up at ladders and wandering the (inaudible)?

MUNOZ: Initially they were.

F1: (laughter)

MUNOZ: Rachel -- Rachel Jones had some interesting stories about this. She tried to keep on doing that in the (inaudible) building. If you look real hard you'll realize, finally, you're standing in a room with a fireplace.

LESLIE: Oh, neat. Indeed. It's the fireplace (inaudible) as the wood.

MUNOZ: And such a tacky comment. I probably shouldn't make it but, after all these years, many (inaudible) myself come in here sometimes, flip the metal band on the logs that are sitting in the fireplace.

(laughter)

LESLIE: Yeah. It's (inaudible). (laughter)

F1: Using a sa-- I mean it looks like it may have been used at some point maybe.

MUNOZ: Yeah, I think probably way back in the beginning on ceremony or occasion.

F1: Yeah. Right.

MUNOZ: Never for business during the daytime.

F1: Yeah.

MUNOZ: But perhaps a board meeting in here or something. I'm sure that made it very festive.

F1: Right.

MUNOZ: And on windy days, because -- because I don't know whether the damper is always closed, the -- the wind is very melodious.

(laughter)

MUNOZ: And here is Mr. --

F1: That's Henry (inaudible).

MUNOZ: No, Hop -- Damon's -- Damon's right outside the front door.

Comment [T#1]:

F1: Yeah. (inaudible) who was the --
MUNOZ: Wisconsin?
F1: The (inaudible) at Wisconsin -- MIT.
MUNOZ: MIT.
F1: He was a meteorologist at MIT who was -- you know, I think he was the first president of the UCAR -- not president of UCAR but of the board of trustees.
LESLIE: He also had a they building. He built the meteorology building.
MUNOZ: At MIT?
LESLIE: At MIT. Not one of his best. The high rise thing before this.
F1: No kidding. I had no idea that this was that kind of connection.
LESLIE: Yeah.
MUNOZ: He sent money to (inaudible) it's those big, tall doors are heavy and awkward. And -- but -- and probably the sound keeping in or out isn't the best. The transparency effect, architecturally, in this whole area I think is beautiful. And I would hate to see something more modern and conventional take the place.
LESLIE: I don't know who made the glass, and I guess it's Ms. Libby Owens [Ford].
MUNOZ: It was.
F1: Yeah.
LESLIE: Because I think in their archives I saw something about this building.
F1: Did you?
LESLIE: And the only reason they keep files is for their buildings.
F1: OK.
LESLIE: (overlapping dialogue; inaudible).
F1: (overlapping dialogue; inaudible).
LESLIE: -- Tough [Glass] is the brand name of it.
MUNOZ: Well, it's tough. We have lost an occasional door because it wasn't latched properly. You could see that that was important to do, and it's old and heavy mechanisms. And then lately in the past few years, a window will simply give way, I think, because of fatigue. A small window. Never lost anything big, to my knowledge. And never anything is a result of storms, wind impact. Just getting the deal on old age.
LESLIE: How ironic. He should have these windows in Boston.
(laughter)
LESLIE: (inaudible). (laughter)
MUNOZ: Yes. Yes. Yes. Yes. Here where we could have major, major loss.
F1: Right.
MUNOZ: This has two story curtains that have not been put back.
F1: Oh, right.
MUNOZ: I guess, perhaps, to assess -- it just occurred to me too.
F1: Yeah.
MUNOZ: The effect is so lovely it doesn't really hurt to keep it this way because we're looking directly at the west, at the foothills through the Rocky Mountains. And the only thing you see is the occasional hikers on the trail, and there's no loss of -- real loss of privacy. Since this is a formal, public room. By the way, in all the years since 1966, we have had exactly one head of government come here. You probably know that. Margaret Thatcher?
LESLIE: No, I didn't.

F1: No.

MUNOZ: OK. She had tea in this room in 1990. She had tea. And yes, we went out and bought a new tea service for her.

(laughter)

MUNOZ: But the British embassy and state department people were planning that a couple of years in advance, a year and a half anyway. I've never seen anything more complicated. And on the day of the event, I had to be back east on persona business, and I told there were sharp shooters in those mountains there that we had military people with dogs and Uzis on the roof.

F1: (inaudible) there.

MUNOZ: The road was closed off at 6:00 in the morning, and it was such a big to do and so complex, her coming into this area. Obviously, she visited other people. She was coming to Colorado for a month going to attend the Aspen Institute board meetings and so she had many things scheduled. But because she had read chemistry at university, she was really curious about -- about this place, and a comment which I do remember being spoken, was that was one of the VIP briefings of the many, many, many that people here have done that they truly enjoyed. Because she had read everything sent in advance. And so instead of the briefing, spent most of the time figuring out what, if anything, a VIP understands about our work, and then trying to give it some color. That was her departure point. She wanted to hear from then on, and the curve just went straight up. And I'm told that that they just had a wonderful time. Whatever the politics of the situation were they had a wonderful time talking to her because she was a government leader who not only completely understood the work because she had a science background herself, but she was really conscious of what places like we had done had followed it. So this, to her, was an opportunity to come in and learn a lot about it.

LESLIE: So only two heads of state have ever been here? Thatcher and Ben Rose?

F1: Ben Rose? Oh yeah.

LESLIE: (laughter)

MUNOZ: Oh. (laughter) That's funny. The end of the Thatcher story, by the way, just for the record is this whole area -- this is my take on it, found all of these (inaudible) circumstances for a head of state or head of government so difficult that the next time a few years later, when the Japanese emperor came through the Denver/Metro area, I thought it was fascinating that he stayed at a hotel in [Lawmut]. And anybody who was invited wanted to see him instead of him going all over the area. And I honestly thing that was a much easier way to do the security and everything.

LESLIE: I'm sure.

MUNOZ: So he stayed there, and Akira Katahara, and other folks who were invited, had to go to the hotel in Lawmut and visit with him.

F1: Oh my. (laughter) Could I go off track for a minute and ask you about the arch over there?

MUNOZ: Yes.

F1: Was that -- was that something that they did not want originally in your understanding?

MUNOZ: The only thing I know that -- there are two of them.

F1: Right.

MUNOZ: Phil, if you come this way you can see the other one. There's another one.

And then taken together with this circular staircase coming up from the --

LESLIE: (inaudible).

MUNOZ: Parking lot, yes.

LESLIE: Yes.

MUNOZ: Coming up from the parking lot. Those were the only three non-linear structures in the original design. It most often is referred to as a monastic area. I think in the [Carter-Weisman] book, the \$60 coffee table book that you undoubtedly have.

LESLIE: I have.

MUNOZ: We do too. With 20 pages about NCAR. I think it says something more specific. Again, I don't want to speak to exactly why he put the arches there. I thought it was [contemplative], and then I read later he wasn't necessarily saying that. That don't really know business also is true for the 16 trees. I had first been told that that setting out a 4x4 was in a building that was so natural. The idea was that he wanted to specifically, I guess for planes flying overhead, to point out that the hand is man in such a pattern that obviously was human created and not -- not -- could not have flowered naturally or was so influenced by nature. But then during the renovation somebody, sorry can't remember who, had a wonderful story of asking him what he thought about the tree plaza. And he explained that that was practically the last thing he did. He didn't have enough time to give it proper attention. He didn't really care for it, and if he had it all to do over again, he would do it much better. I don't know which of those is true. Or maybe it's a synthesis of both. But anyway, you get these little --

F1: Yeah.

MUNOZ: -- little things.

F1: I know.

MUNOZ: I'm going to push the off button here for a minute.

(break in tape)

F1: That looks really good.

MUNOZ: Oh, OK. Now it's going.

LESLIE: Yup.

MUNOZ: Straightforward. OK. I have to tell you about the ceiling. As Diane said earlier, there was asbestos in the ceiling. Now it was up in the ceiling. It was never anything that would get out into the air. But every time they filled out another assessment report, they would have to say there's asbestos in the ceiling. And the idea finally was let's just bite the bullet on this, and get up there, and get it all out, and then we don't have to continue to send in anymore reports. What had been here, what is I'll have to check and see the comparison with what's down in the lobby, this is what they call one of those blown, popcorn ceilings. You blow some plastic stuff, acrylic stuff. I don't know what it is, but you blow it onto the ceiling, and then it has a kind of a popcorn effect. And that's what we've done on every square millimeter of this ceiling. And it all had to be scraped off. All over the first floor and up here as well. And the day that I walked in here, cause when you're here you can just kind of walk around sometimes when you know that certain workmen have gotten home. It was about 2:30 in the afternoon --

END OF TAPE 2, SIDE A

MUNOZ: -- the things were not going well up here, and I wanted to see for myself. The only way you could spray anything on this ceiling, obviously it's had scaffolding all over this whole room. And the only way that I -- the best way, only way I can ever describe what this whole room looked like as if somebody had an oatmeal fight.

(laughter)

MUNOZ: There were glops of oatmeal, white, popcorn floor -- not floor, the ceiling material, residue everywhere. And that's why I had heard grumbling that these people, probably after trying for at least that day and maybe more had reached the point of such sheer frustration, they walked out before the end of the day. And so it was a partial, and the stuff was falling off cause they hadn't figured out that was the issue. How to (inaudible) here. And so this stuff continued to drop and fall, and drop and fall, all over the place. Now in thinking about that story and looking up, and you see these large 2 1/2 or 2 foot fabric covered, soundproof tiles. You can see whether it was the intention to put soundproof up there, or to avoid on trying to have to put more oatmeal on the ceiling. They didn't go there again.

(laughter)

MUNOZ: And at some point, I think Diane is right about this, that there used to be real flowers and maybe 10-15 or more years ago. In that renovation, it was in the asbestos renovation. The real plants left and --

LESLIE: They did die. Yeah.

MUNOZ: -- the artificial variety came back. But when you're up on the roof and looking west as we were, and you remember seeing the boardwalk, and then you saw the eyebrow windows and so on, and the chimney. This is all along that back. The one other thing you should know about they repeating motifs over, and over, and over. Well, he loved the keyhole motif. Which is windows wider at the top and at the bottom. And if you just take that shape, we've got -- we've got keyholes all over this building. And two years ago, three years ago, four or five actually, I finished doing a tour and walked back into the lobby. And the second floor lobby skylight hit me all of a sudden. It was a keyhole and I just -- I just had missed all these years, even though I talk about them. So we can -- let me think. I've got to pause. You can pause. We can -- you have to have lunch. I'm not going to be that much longer done all this stuff. We probably should end up in the basement so maybe if we -- since we're on the 2nd floor, if we run up just so you can see what the 6th floor looks like on the other side. Maybe we can't even get into most of the offices, but you can see how it's all cut up.

LESLIE: Sure.

MUNOZ: And it just doesn't begin to look anything like that.

LESLIE: Yeah.

MUNOZ: And I think they probably were very similar in form. So it's quite interesting that they don't look anything like.

F1: Yeah. Yeah.

MUNOZ: And then we can come down. And I'll probably show you the director's office just because of the (inaudible).

F1: Got you.

LESLIE: Now this has always been the (inaudible)?

MUNOZ: I think so.

F1: I think so too. Yeah, and Walt Robert (inaudible), '72-'73 basically were

(inaudible).

MUNOZ: Can you imagine?

F1: The (inaudible) president of UCAR, and he was very (inaudible) reorganization (inaudible). And he was just upstairs just on the (inaudible). That's what I heard. And I guess he must have (inaudible) all that nice. He (inaudible) and he (inaudible). Did he ever go back to (inaudible) building?

MUNOZ: No. When I came here, he had just lost an assistant, a Betty (inaudible) as the one who had (inaudible). And then they had offices on the second floor. I don't mean to record this comment, but if you want to know how much these (inaudible), it's even higher than here. There's a white wall (inaudible). (inaudible). (inaudible) the white wall a year ago changed to royal blue or purple or something.

(laughter)

MUNOZ: I get (inaudible) whatever happened.

F1: You know, I -- shocking. I mean when I came here, they had (inaudible) -- they had these (inaudible).

MUNOZ: Oh, down here.

F1: The cameras used to point onto the --

MUNOZ: Oh yeah. They did.

(multiple conversations; inaudible)

MUNOZ: This is -- it was on the second floor. We moved it down.

F1: Yeah. And other (inaudible).

MUNOZ: OK. Why (inaudible)?

LESLIE: She's going to go into the computer room.

(break in tape)

MUNOZ: The (inaudible) at this time.

LESLIE: Yes.

MUNOZ: OK. Sorry.

F1: I didn't really have anything more to say.

MUNOZ: No. I was going to say almost from the beginning, as far as I know, a scientist at NCAR who's now at NOAA who has spent time in Scandinavia, and who had a real (inaudible) the Scandinavian palette of colors that are too (inaudible) in our lobby. And if you look real hard down at the bottom where it's brown, you see that that's actually a mountain. And then the next line over, it is the wind blowing. And on and on, if you go all the way up, it's not only the sun, but even though (inaudible) and the (inaudible) Viking ship. It's quite clever.

LESLIE: And so that was done and (inaudible) originally?

MUNOZ: (inaudible) back.

F1: Yeah.

MUNOZ: Not a (inaudible) for (inaudible) back -- (inaudible) back.

F1: And down there they have -- were those not (inaudible) chairs that were down there?

MUNOZ: Yes. Yeah. Yeah.

F1: Oh my God.

MUNOZ: They were. They were. (inaudible) was the (inaudible).

LESLIE: (inaudible)?

MUNOZ: (inaudible) myself --

F1: (inaudible), yeah.

MUNOZ: The question of whether we had originals or very good copies I think is now -- the finger is pointing to very good copies. The beautiful leather. They finally left because as people would -- as people would come in, and wait, and visit because we still don't have really these "waiting rooms" or foyer furniture. People pick at those chairs, and picked all the tops off the buttons. And then picked at the -- picked that cording on the edges, and on, and on, and on. And finally, the glass table that goes -- always goes in front of those chairs, someone -- an elderly individual who was looking up and not looking down fell across the glass table one weekend. Didn't hurt himself too much, but that was the end of that table. And we still -- funding, when you are non-profit and you don't have a grant such as (inaudible) the furniture in the Damon room, the exhibits person managed our other (inaudible) in the lobby where (inaudible) falling apart literally. Then she managed to have these made, really, for the reopening that we don't have the furniture for the couple of sofas that should be down there with that rug. And at the time when we came back to -- into this new building, seemingly new building, the two-story mural, photographic mural, across from the wall Shapiro mural of Scandinavian -- well, (inaudible) adapted from Scandinavian. This was a black and white photo. And my first thought was this (inaudible) horrible to have color where they were supposedly were going to be colored. I can never imagine going the dark black and white now. It is so attractive to see these lovely, lovely shades of blue that after all go with blue sky. And (inaudible) you can even show that the (inaudible) of the moon doesn't quite cover up some of the huge explosions of gases that jump off the sun's surface. And they had these (inaudible) and these soft, blue colors that I think is just simply lovely.

F1: (inaudible), can I ask one more thing?

MUNOZ: Yes, please.

F1: This area down here, when NCAR first opened, and we (inaudible) 2-3 hundred people when they would have meetings, for example, during the [JEC] period in the, you know, the 1970s. Every week or so, maybe even every day for a while. John [Fyror] who was the director would hold brown bag lunches. He would talk up there, and he would come and congregate either down here or up there. And they always did that when they had a plane crash, for example. One of the research aircrafts went down in 1968 into a superior. And John (inaudible) here. Yeah, to tell them what had happened, and what the news was about the pilot and the graduate student. So when we had our 40th anniversary celebration, a lot of that took place here. Too many people were in that brass -- was it a brass quintet playing that (inaudible)? There's a -- some music that is actually associated with NCAR, and it's written by a composer related to Walt Roberts called (inaudible).

MUNOZ: For our 25th anniversary.

F1: And for the 40th, they were here also.

MUNOZ: I don't remember them.

F1: There's a photograph.

MUNOZ: (laughter)

F1: And they played up there, and it was phenomenal. And people were all rallying here. And I don't -- when they have parties over here, we don't do them (inaudible) anymore.

MUNOZ: Well, the reason that we now have elbow room is one, we have been in

(inaudible) states all over town, and that had to come to an end. When we couldn't build our second building up here as we had wished, we had lost two years trying to get that off and running. So we were able to take back a lot of the lost time by buying an existing building, which is what we did for (inaudible) that you were in, and then adapting it. Severely adapting it. It looks nothing inside like it did when we bought it.

F1: Right.

MUNOZ: They had nothing but cubicles and most of our people said I can't work that way. Scientists, as I said back down the hole, they really need to close the door, and think, and have concentration. And with everybody in cubicles it would not be a harmonious working relationship. So in that building just -- the difference is to -- to have offices, they closed in what was next to the windows. So then over there it's glass at the top on all of the (inaudible) to let the light in for those who are an interior (inaudible) offices don't have. So that gave us the room to put all our people in our own staff building instead of renting. We were spending, and you should talk to Betty [Bloom]. She would love to talk to him. We were spending, essentially, \$1,000,000 in rental fees, and over \$800,000 a year in electric bills. That kind of thing for all of these offsite places before we got our own. And now we have sufficient rooms over there that we don't do these things. But my follow on comment here is (inaudible). You know all about (inaudible) for music. They had told me that the [Du Kosh] string quintet play here so often prior to my coming here, that sometimes they were called the NCAR string quintet. In that corner where that bench is downstairs on the first floor, perhaps up on the mezzanine. But that happened a lot. And the (inaudible) of meeting or staff get-togethers of a social nature, the annual end of December one that I'm used to. When staff would (inaudible) once a year and so on, they would use the mezzanine. And this is so typical to show you how we always (inaudible), usually for one particular space. So up there on the mezzanine (inaudible) stage, and then we stack folding chairs here for people to sit on. This whole area underneath is all chairs. Here is all chairs. And then there are people sitting on the steps. (inaudible) people crammed into a space where this -- (inaudible) song -- the sound from the speakers isn't there.

F1: Yeah.

MUNOZ: Isn't there. Yikes. Let me get you upstairs. The large offices at the front end and back end of our building, the east and the west are simply -- there's more space. So this is a huge area, which in time has had -- over time has had various offices here. And then leading off this large area there's one office, two office, three office, four offices, and almost all of them have windows. But under -- under divisions we have programs, and then we have projects, and then we have groups. And it really is very helpful to have these people basically in the same place where they can easily get together. The person she is talking to right now was here in the '70s as a young, student type. And he had hair down to his shoulders, and now he's one of the most prominent (inaudible) on the planet. And it's interesting and enjoyable, and it's one of those unspoken reasons why it's so pleasant to be here. I know the culture back east has changed substantially, but hey, flip flops, shorts, and a t-shirt.

(laughter)

MUNOZ: It can't get any better than that.

(laughter)

MUNOZ: I have to say that (inaudible) when it's broken up like this it gets very hot.

F1: Yeah.

MUNOZ: Because in the open areas as in the other end of the building, the air can blow and I've been up here where it's just really hot. That, in part, is where we've really damaged (inaudible) tinting film being put on the windows just a couple of years ago. It isn't any --

LESLIE: (inaudible).

MUNOZ: No, never. Never.

F1: What have you --

(break in tape)

MUNOZ: -- office. And I've come in here any number of times over the years. And there, again, is a very nice thing about this place. The staff doesn't stand on formality. So that if we're not disrupting people, and obviously the director's not here right now, all you need do is drop a word and they graciously let you look around. Tim has a balcony just like the other one. His table's a little bit bigger because he often has more books coming. And his view, I don't think there's any nicer view than on the north side of our building.

LESLIE: Yes.

MUNOZ: It's just very special.

LESLIE: You have to notice the tennis shoes under the chair.

MUNOZ: Of course. Of course. Yeah.

LESLIE: (inaudible) the director and (inaudible).

MUNOZ: Tim came directly from Michigan. But Tim was born and grew up in Wales. So we now have a UK influence here as well. And I'm looking out the window, and I can't fail to point out to you that there's a big, kind of crypt on the ground. A big, concrete crypt with a great, big grill on it. So I could -- this is the answer to the question. How on earth, in a few minutes, that you'll be asking how on earth did they get those computers underground? Right there is the answer. On the day where there will be a new installation of gigantic computers where there could be 20-30 huge, wooden crates offloaded. And they always seem to use Allied Van Lines and how I remember that is the slogan of Allied is "the careful movers". And when they are transporting a \$24,000,000 computer from Wisconsin, one would say I hope so.

(laughter)

MUNOZ: But when we get here that morning driving up the hill, there will already be a crane that's come up from Denver that is taller than this building, and it positions itself. That's why this road has to stay next to the north side of the building. And the crane will sit there, and when individually both crates are lowered, when the grill is removed down into the underground place where the computer room now is. And then there are wiled tarps down there prepared to pick them up. And then for the installation, of course, they -- this is typical of all rooms. They've laid great big metal plates all over the floor to distribute the weight of the big boxes and they just roll right in. And these days, supercomputers are up and running initial tests within about 24 hours. It's just remarkable. But that's how you get them there.

LESLIE: How many generations had they gone through with [crane]?

MUNOZ: I'd have to stop and count. I don't want to take up this time right now.

F1: This (inaudible) and silver.

MUNOZ: Yeah.

F1: Yeah. Do (inaudible) anymore. I don't know.

(multiple conversations; inaudible)

MUNOZ: Four or five. Four or five. The one other thing did Diane mention, maybe, when you were driving up that again, it has been said, I wish I could have met him -- could meet him, that they considers the road as much as an achievement --

LESLIE: Oh sure.

MUNOZ: -- as the building. He loves the way it is so wonderfully nestled into the meadow as it picks up. I don't know exactly how much elevation from the bottom of the road to the top. Theoretically, we're 800 feet more taller than Boulder. By the way, for the record, the elevation up here is -- cause I have to know all this stuff, is -- cause I must be asked a couple times a month what it is. And it's 6,180 feet. And if you say that Boulder 5,400 feet, then you get the sense of what there is. I always get a smile on my face cause something reminds me that I was told they really wanted a dirt road and was resistant to the idea of it (inaudible) being paved.

LESLIE: Oh.

MUNOZ: He was so (inaudible) with the whole natural concept he wanted a dirt road. Oh please.

F1: Walt wanted to have windows that opened so you could hear the sounds of birds and yeah.

MUNOZ: Yes.

LESLIE: You can open your door, I guess. (laughter)

F1: You can open your door, yeah.

MUNOZ: And there aren't that many. And very few windows. The slivers that I was talking about. I did see one of (inaudible) walking around at the lower part has one of those slanted windows that may be opened a few inches. Basically, everybody is behind non-openable windows at this place.

F1: Right.

MUNOZ: So this is a very nice, but not dramatically extravagantly fancy office that the NCAR director works in. The view compensates, always. And the door at the end of the hall would have us see exactly what we saw in the other building. We can walk out onto the roof, which we had really done. I consider these people to have the nicest, (inaudible) office windows. And she's seen a way to do that. Leave the door open so we can all have a sliver for view, and her not feel that she's been stared at (inaudible).

F1: (inaudible) in the back.

MUNOZ: This is the one floor. None of the others is -- that up here at the top. Again, I think it's proof for you that this was designed for management. Their area couple of these areas where there are picnic tables, chairs outside. I don't know that they use them.

(laughter)

MUNOZ: I think they used to come out here smoking. But anyway, you can distribute the offices because this is the associate director here. And each of them have staff. To the point that do you know that, Diane, that downstairs on the fourth floor there are increasing -- that fourth floor is being taken up as the annex to this floor. And that's something new.

F1: I didn't know that.

MUNOZ: That hasn't happened here.

F1: (inaudible). Yeah. I know.

MUNOZ: Because (inaudible) really has the 21st century picture of the scope of all of our operations. And he founded some activities that we've not done before. Some (inaudible), things like that that (inaudible) just before and we need before. So those people get to run the stairs a hundred times a day.

(laughter)

LESLIE: (inaudible) a solution (inaudible) this doesn't work out that well?

MUNOZ: Well, he wasn't a scientist. As much as he might have talked to scientists about what to do in the (inaudible), even what they did consider changing that to people who got computers and printers. You don't have to run down the hall to use the printer as I used to. It's all in your room.

LESLIE: Yeah, and that's -- somebody who's (inaudible). And he took great pride in the (inaudible) GM's big lab, IBM's big lab in your town, and (inaudible) lab. (inaudible) but he was (inaudible). And you all think you're supposed to do it, right? (inaudible) office, but he'd remember those. And he would say (inaudible). So you don't need to win those. You just (inaudible) color code the hallways. I mean (inaudible) that.

F1: Oh.

LESLIE: And then you turn like the (inaudible) corridor in the fall, and then they go from light to dark, and (inaudible) however you happened to get.

F1: Yeah.

MUNOZ: I can see our scientists as being a little (inaudible) to all of that. OK. Now I guess we're not being in their faces. Right there is basically the center of the building. So I just want to stand a little bit down wind of them. So to explain that the south tower has two basements, one on top of the other. This end of the building has only one basement. The reason being they (inaudible) from the outset that this was going to be the computer room. And you don't want computers over on hollow area. So they are -- the concrete is laid on the basement rocks -- the hard surface. So that all that vibration. But 11 years after this building was completed when we did from the first (inaudible) small computer room. (inaudible) had invented supercomputers, and it's my understanding that we got the very first one that was ever turned on and used. At that time, we were able to fix something that they really should never get any blame. They weren't -- nobody's (inaudible) no legislation having to do with Americans for Disability Action. So no ADA requirements in the question then was that we have a 1960s designed building with the biggest meeting room on the mezzanine. Which means that every person who ever wants to go to that meeting room has to go eight steps or they don't get in. And in all the years I've been here, and now it's the question of what did they do for 11 years. I've never been given an answer. I do not know how they accommodated. There had to be -- we've always had colleagues who have walking disabilities, and I don't know what they did. But they see on the mid-'70s the fact that this was supercomputer was coming in '77. And they knew that because this was a landmark structure, that they couldn't add on exteriorly. So I think it is fairly easy to figure out where the addition would go, which was underground. It turns out to be a 15,000 square foot room. And at the back of the building when we go up back upstairs, you can see that they were allowed to add onto this building, one exterior structure, which was a cube, right at the back of the main lobby. But because of a very clever ramp that you can take going and back at the receptionist's desk. And now anybody and anything like the coffee cup that has to be

poured every meeting can very quickly go onto the mezzanine and accomplish all those tasks. And it's done that since '77. But what we're going to do up here, and that's why you're going to see two different floor pitches. I don't know why it's not all on the same level. The excavation (inaudible). So we'll do two.

F1: Are these the terminals? OK. Thank you, Joan. (inaudible).

MUNOZ: Here's the first one. You go up, and it (inaudible) visitors. Actually, it's an issue. I wanted little railings to be on here because all of our seniors on this (inaudible) we bring them down to see the computers, and they come in the elevator. But at least they gave me straights on the wall.

LESLIE: The (inaudible).

MUNOZ: Yeah. It's cause -- because I know that not everybody has great visual (inaudible). But you bring people around the corner, and then I'm not sure whether -- it seems to me that that because it's a ramp there, that wasn't there at the beginning you wouldn't think. So maybe that wasn't there, and I know that this is part of the new, under the ground part. So now everything that we are looking at behind these glass walls and (inaudible) what? 12, 13, 14, 15 feet high, and maybe about 8 feet wide. And there are 1, 2, 3, 4, 5 of them across the room. Here is why they do this. NCAR in its 44 years, 45 years has never done any classified research. We have no problem as all the other national laboratories. Livermore, Oakridge, (inaudible), they won't let you within 10 miles of their supercomputer facility. We have no problem. We have nothing that we don't want to share. The reason the NSF set this place up in 1977 along with laboratory -- a space including you're going to -- you're (inaudible) I would suppose to (inaudible). SDSC, the San Diego Supercomputing facility is one of the initial (inaudible) MSF supercomputer centers, as is (inaudible). And then there was, for the record -- [Urbana-Champaign], University of Illinois, Cornell, and Princeton dropped out real early. Princeton's been gone all this time, and Pittsburgh. Plus NCAR cause then it's (inaudible) individually sponsored us, and I think they thought if we can't figure out how to deal with the monumental data that these computers were created to process, nobody could. So that's why we were in the original one. We tried to make ourselves accommodating visitors of the (inaudible) set, but you let a door be unlocked and people are going to walk in and look over your shoulder. As I've been told, Bob (inaudible) would say people were looking over my shoulder and saying tell me what you're doing.

(laughter)

LESLIE: I'm paying a bill. (laughter)

MUNOZ: Exactly. It's just a little bit tedious. But because we -- I mean what can you see anyway?

LESLIE: Yeah.

MUNOZ: You see rows, and rows, and rows of boxes that are the size of refrigerators. But what we (inaudible) do is make all of this glass space, and I take both the credit to this place, because we didn't have a lot of visitors at the time. So they didn't have to do that, but they chose to do it. And so what we have --

LESLIE: The glass space for division even when --

MUNOZ: No, that came in 1977, '77.

F1: Yeah.

MUNOZ: But we weren't having a whole lot of visitors in '77. This is still several years before we had a visitor program, almost 10 years. We had summer tours all until

'86. And so for them to do that was really very generous. Remember when I said -- remember how they bring in computers? When they made a computer -- computer animation laboratory, which is what we're looking at to the right of your window, the question was how -- what are you going to do to construct that room to get things in to take them through the (inaudible) that are there and into the room? So all of the furniture in that room can be (inaudible) because on the far side of the room, I've seen (inaudible) that come in from the grill on the drop space, and then it comes down this hall, which is concrete, solid ground in through those doors into the room. So that's how this was set up. You can't go --

END OF SIDE B, TAPE 2

MUNOZ: -- the drop space, and then it comes down this hall, which is concrete, solid ground, in through those doors into the room. So that's how this was set up. You can't go to very many places at all in this country and see supercomputers. I think you can more today because now you can buy three, or four, or six, or eight, or 12, or 50. Any, any number. But back at the beginning, it was one computer that had a million to a billion capability to it. And they cost a lot of money, and so they were usually bought by places that work with classified so you couldn't have access. But here, using the tax payer money, we are able to make the point on a daily basis that you are welcome to look at our computers. Then we can say of the 2,000 annual users, roughly, it fluctuates a little bit. About 3/4th of them are not at NCAR. They are at the member universities, which these days are all over the world. Not just in the U.S. And this room as was [NSF]'s intention when it set up these five supercomputer centers in '77 was to run them for the convenience of the users 24/7. And so this is the one place that has three crews a day. The rest is computing does, and the computer runs to keep open 24/7. And it has to have three sets of people come throughout the day and night. Do you need any specifics about computing? A couple of (inaudible) things.

LESLIE: You got a (inaudible)? It's interesting that (inaudible) got replaced by IBM.

MUNOZ: Well --

LESLIE: Until that (inaudible).

MUNOZ: But that's a good place to start. He designed a (inaudible) process which is sequential. By the time it was up into the low billions of problems the second one computer could not do. Billions of problems with second certainly with ease or that had been indebted, or that was affordable. And that's the point at which you start to think well let's distribute the problem. So if I say there are 12 refrigerator sized, black boxes in the first row, 12 in the 2nd row. That's 24 boxes. This aggregated speed of all 24 is two trillion mathematical calculations a second. A single computer couldn't make two trillion calculations in a second as the (inaudible) could. It had to go to -- had to go to distributed. At least in that round, it's considered speed and design.

LESLIE: Yeah.

MUNOZ: We have what's supposedly number 13 in this room. Why don't you come up the stairs? In the back two rows, instead of having almost a sort of space in between each of the towers, they're shoulder to shoulder, and there are two rows of 15. Supposedly that's right now the 13th fastest supercomputer in the world, and it does

7,000,000,000,000 mathematical calculations a second. As a point of comparison, number one is in Japan. And the reason it is in Japan is a few years ago this Japanese government had the equivalent of the U.S. space race. And the resulting machine can do 35-41,000,000,000,000 calculations a second. This one, number 13, seven. That one, 35-41. It's called Earth simulator and if the name tells you that it might be a basketball to our kind of computation, it is and we work on it. Because I'll give you a fact to look at 200 years -- excuse me, 100 -- just 100 years of global climate change to ask a computer to compute everything that it would need to process from the clouds, to the seas, to the pollution, to the oceans, to the air, everything. For 100 years, how would the weather change over that time for the whole planet. We'll take -- will take number 13 two solid weeks to produce the answers. And so that is why as long as things are like that, you're always going to need faster computers, and more of them, and more opportunities to work on them. And so if we can get a little bit of advantage by using the computers in Japan, that computer anyway, we're simply thrilled to be able to have that opportunity.

LESLIE: Do you have this in staff or is it --?

MUNOZ: We did initially. I don't know whether now things go electronically. I would assume. I don't -- obviously you don't need hand carried data.

LESLIE: Yeah.

MUNOZ: But in some cases, that's certainly been the case in the past. The circular, ivory structure over there with the red stripe at the top?

LESLIE: Yes.

MUNOZ: Actually, there are five of them, and they are circular, and they're 7 1/2 feet tall. And this is what's inside. It is a Boulder county made product, which is sold all over the world. The name is Storage Tech. It is a data archive, and each one of five, not four, silos -- that's exactly what they look like, that's what they're called -- has 6 thousand cartridges. And until less than two years ago, people spent most of their shifts identifying a six or seven digit -- you can see the numbers -- number that had come up on a screen, and somebody had to go find it on rows, and rows, and rows, and rows, and rows of cartridges, take it off, take it to a player, put it on, and then when it was done, put it back on the shelf. We always had those. These were already supplemental. But if you can increase the density on the tape and the -- and the length of the tape, then you're getting ahead of what you want to do.

LESLIE: Sure. Sure.

MUNOZ: So in the last handful of years, they've just gone from 800 MB on each disk, or the equivalent of 800 books. We have gone to 60 GB on each disk, and we're soon to jump to 200 GB on a disk. And I'm not sure whether it's the former or the second -- the former (inaudible) number is equal to 12,000 books apiece. But add up all of the data in the whole room that we have here for anybody, and people come here for two reasons electronically: for the speed of the machines, NSF1 has known to do that because you cannot have these machines in every technical department, at every university all over the country. NSF couldn't afford that kind of support. So that was the original concept behind the five supercomputers science centers. That then -- NSF would sponsor. But for the speed of the computers and that weren't available then anywhere else, and second for the unique data. And that we certainly have. Because if you add all of the data in the room, it is the equivalent of a billion paperback books of data. And we say paperback, people are always asking, defining questions. Books come in all sizes,

paperbacks are fairly uniform. And when you're making a very general estimate, you know that it fits a paperback book rather than a book of unknown size or whatever. So that's what takes place in this room 24/7. It's never turned off. And it's hardly ever hacked into too. We have very good people who get very creative and in -- because we have an 800 number. If we have -- if we have 3/4 of our users apply to a committee, get permission to use these computers, or given a password and an 800 number, then we then need to exercise extreme care in making sure that dilatants and troublemakers aren't in line as well.

LESLIE: OK. Moving to the [Crypto Cards] now.

MUNOZ: Yes. About two months ago, an assault was made on a few national science laboratory supercomputers for the first time. I think we've pretty much skipped a lot of the damage that other people had experienced. And a group of at least publicly of not known people -- unknown people, whoever they were, assaulted supercomputers. And they did get into ours, but didn't do significant damage. And so after 9/11 you have more of a bully and coping processes. Now we have more laborious user processes for our computer room. And our people quickly came up with something called Crypto Card. Because again, they're still electronically at a distance away needing to come onto the system electronically. And we have tried to provide a lot more security. It takes people longer, they're not happy about that, but the other side of that is we hope that the data will say secure. Even though there's a back-up copy. Basically it's this room that's irreplaceable. What it represents in atmospheric sciences. So you really have to take a lot of care, exercise a lot of caution, which is what folks here do. And I think when it's a handful of people, they can really keep an eye on it. Perhaps, more tightly than at a larger place. Los (inaudible) is 10 thousand people. 10-12 STE folks, and that's so many people that they may (inaudible) as much more of an opportunity for important things to slip through cracks than -- than if most we have 12-13 hundred people here, and a small percentage of those are computer people. So much -- much more tight, focused, and controlled. Because it's just in the hands of literally a handful of people.

LESLIE: And the 12-13 hundred people include Foothill, lab --

MUNOZ: Everybody.

LESLIE: -- everybody. How many are actually in this building?

MUNOZ: I can't say anymore than 400-500 is the number I just spill out.

F1: Right.

MUNOZ: It used to be 500. I think it's gone down a little bit.

LESLIE: It's almost quite (inaudible).

MUNOZ: Oh.

F1: Yeah.

MUNOZ: Which is why they're using the tiny little rooms as offices.

LESLIE: Yeah.

MUNOZ: See, that's what I'm thinking.

LESLIE: Yeah.

MUNOZ: That's what I'm thinking. Instead of going back upstairs, or we might as well finish the (inaudible), get you downstairs to the basement. And I just want to stop here to show you -- this is state of the art where we are now. Computer modeling has become the primary way to understand the output of larger climate -- larger models. Whatever the subject, climate or otherwise. What you're seeing over about a 60 year

period, and it's a -- it's a typical run. It's January to December, typical weather conditions but not 1900-1960, the specific timeframe. But CO2 is being produced in ever larger quantities along with the technology of the 21st century. And stuff like aerosols, which are also happening in particular -- in this part of the world, India and China representing each a billion population and growing technology, and growing interest to become a technologically developed nation. So there's a lot of pollution coming up from around the world. It would be impossible to understand the data coming out of all of that. Numerically, even (inaudible) smartest scientists that if you can have images, moving images over the timeframe that you're wanting to check, that you can tell it by coloration where and -- and certainly this breaks down into component parts how much warmer does the infusion of these two chemicals, the particulates from these is going to make these hotter for the rest of the planet. Sometimes people say -- and you're a history major, right?

LESLIE: Right.

MUNOZ: As was I. So we're not as scientifically informed as the folks who work here day in and day out. Why is that most of the heating occurring away from the places that are putting all of that into the air? And that's of course because of the -- either side of the equator is where it already is warm. The equator is where it is the warmest. So that as global warming or climate change, we like to call it, occurs the places with the most heat gain are the places that are now cold. Because they have to go from quite cold to a lot warmer. Whereas there's much more of an equilibrium already here. It'll get slightly warmer here. It's going to get a whole lot warmer here and down here. Because these are going to have the most heat gain. They can and they will do that. All of this equilibration as everything mixes throughout one year, or in this case 60 years. I have a website that -- page of the address that I can give you. And what it will show if you can go back to Hopkins and -- or across the cam -- across Charles, and sit down, and punch into your computer the address of the visualization staff page on our website. And you can see many, many, many of these images. And that's going to be -- give you when you do three, four, five of these -- a better sense than just one that's repeating in front of you. Get the idea of how things change and look different.

LESLIE: That's very scary.

F1: Very scary.

LESLIE: And I will do that.

F1: Yeah.

LESLIE: But, you know, with replacement (inaudible) it's really gorgeous. And to generate the electricity that the college is generating now and that's got (overlapping dialogue; inaudible).

MUNOZ: Or better yet, institutions like the World Bank with it's people have -- this is Nicky [Blance]'s message, her sermon. If World Bank funding and technology along with appropriately all of the countries in the first world help second or third world countries leap over the messy, polluting technology that they will be able to afford to creep up to where we are. You give them more sophisticated technology, so that they can go to burning cleaner fuels and do so more efficiently than what they're going to put out and a lot less junk. It really pays us to help them.

LESLIE: Yeah.

(break in tape)

LESLIE: -- (inaudible) but not -- nothing anything else.

MUNOZ: Almost done. The people who knew NCAR, the people who knew Walt, it is -- but they (inaudible) honor. Any person they ever had at this place would say that you were meant for it by Walt. And as they settle into this building with 2% (inaudible). Time, and time, and time again the older staff, they say -- and maybe the newer ones put up fancier posters, but the previous generations inevitably would have a picture of Walt outside. Representing I think both the picture they can't see out the window where they wish they could visualize, and also I think it's because this building is very special to a lot of people. So the scale -- what do I want to say? The -- you know, listing the fact that this is huge elevation here. It is completely flat, and I have a little secret for you. All that there? That's the computer room.

LESLIE: Oh, OK.

MUNOZ: 15 thousand square foot hole in the ground. You're not going to truck that off the mountain. Now all of that, of course, has been all overgrown. And I think if you look back in the back of the building, which is where we are right now, right back here, I think you can see that maybe that's in progress.

LESLIE: Yeah. Yeah. That looks like it. A couple of the architectural journals commented on the number of reproductions of the building that would be found in those early years that didn't -- almost everybody had a photograph or a poster.

MUNOZ: They did. They did.

LESLIE: But I was looking and I noticed that that was no longer the --.

MUNOZ: Because (inaudible) here. You can still find places like this in the (inaudible). Yeah. This office is a necessary one because our computers are used by many more people outside -- the big ones -- than inside. So everyday it says consult and form duty. And during the 8 hours of the -- of our daytime work here, one of the computer folks who is intimately familiar with all of the diagnostics and consulting manuals, which are online and in books. That person, if he or she receives an e-mail, or telephone call, or even a walk in the door. All three happen. A person comes in, calls and says, "I can't get my computer program to run." You know you can't get on the plane, come to Boulder, Colorado, and you're dealing with technology that you don't have, that you're in. So that's why during our work hours, we always have a very competent knowledgeable person here to be the facilitator to get that program over the bumps. They'll just come up at a distant university and let that person continue that computation.

LESLIE: That's a tough job. Man. (laughter) That is a really tough job.

(break in tape)

MUNOZ: The (inaudible) lab was very tiny down a little hall. We used to have 16 seats, and now it holds between 35-40, and more can be put in there if need be.

(laughter)

(multiple conversations; inaudible)

MUNOZ: (inaudible) the point that we have thus people from Russia who can work here, who can come and work here without a problem. We've had any number of people come and finish off a Ph.D. from the People's Republic. Oh, here's one of those little, (inaudible) facts. This is tours telling you all of the (inaudible). I was told that I don't think that we have ever put our computing off limits to people, even at the height of the Cold War. It is always the understanding that weather data, the kinds of things that we

do here, atmospheric research, was perfectly acceptable to be shared. But nobody was going to be able to do any ballistic trajectories on any computers or anything like that. So that was always shared. The one time, and I'm sure there are others cause this isn't just us, but the one time I know that data was delivered as not (inaudible) within the first Persian Gulf War, and they turned off the satellites. And I don't know who was getting that data, but maybe that included us too. But it certainly -- you didn't want data at that time to go to certain people. Otherwise they say that even at the height of the Cold War, people like Walt Roberts who had something to do with initiating it, the facilitation of glasnost would always be (inaudible) supportive of their peers. And in fact, it was Walt who gathered some money together and put Macintosh computers in the hands of their counterparts in Russia, and (inaudible) former Soviet Union.

F1: We called it Greenhouse Glasnost. And that was what Walt was working on before he died. It was pretty phenomenal. You know that you can always find the (inaudible) community before NCAR. The National Bureau of Standards was here. Everybody who worked in that building had to have security clearance. And hundreds of UCAR -- and Walt especially because he's been persecuted under the McCarthy time. So -- but no one at NCAR needed to have security clearance to work here. People could get up, you know for some reason or another, and decide (inaudible) if they're going to do consulting work for, you know --

MUNOZ: (inaudible).

F1: -- right. But they don't have to have them to work here. And that was a very significant part of this organization. You know, that absolutely we're not going to do classified research. And that's changing. We're already doing more homeland security. And the future is unknown at this point.

LESLIE: Yeah.

F1: If we have to do classified research, we have to have different buildings, different computer systems, and different people. So that's a huge infrastructure. (inaudible) big problem. But it will change the way things are done, that's for sure. But I heard, and this is very interesting. I heard this in the (inaudible) meeting. Someone from (inaudible) said that people who are doing -- they did this --

MUNOZ: Pentagon Shield.

F1: -- yeah, the Pentagon Shield project with a modeling (inaudible). You know, (overlapping dialogue; inaudible).

MUNOZ: (overlapping dialogue; inaudible) in Washington.

F1: Right, or if they're driving by on the interstate, and then they aim it toward the Pentagon. And someone was told that they were not to present this publicly. The information was not to be disseminating in and of this manner. Totally counter of the way research is conducted here. So that was -- a very big concern. I think Peter (inaudible) who's been here since the beginning.

MUNOZ: And has been the associate director here, so he's in a very good position to understand the (inaudible).

F1: Right. (inaudible) he said that's where we're going, and that's very disturbing to him on some level.

MUNOZ: I think you should know that when she said RAP, research applications program --

F1: Yeah.

MUNOZ: -- no, no, no, but I mean it brings up a few years ago that was -- I wouldn't have thought to say it if you hadn't brought that up. There's a group that's smaller than the division. It's a program, I guess. Really the largest programs apart from the divisions here. And somebody at some point traveled the -- after 40 years, was going to make a bridge from the basic research that we've always done into the world of applied science. RAP did that. RAP in the late 1980s was working on aviation hazards technology. And in fact, they earned their (inaudible) within about five years of work coming up with a system whereby they took the most lethal kind of wind sheer that can exist falling out of the sky usually and visibly with such velocity that it killed 700 people in 15 years, 70-85. They have taken it off the table as an issue at any important. In the years since that project has been finished, there hasn't been a single death attributed to that kind of wind called a microburst. 15 is the previous -- 700 in the previous 15 years, 0 in the following 15 years. Because it was not only figuring out what the wind was, how it worked, how to see it on the radar, but this is new for NCAR, substantially, because it was such a big project. It represented an opportunity to create the technology just for funding was FAA. They took it back at the and went to vendors, appropriately, for (inaudible) companies that (inaudible) those contracts and put those systems out all across the United States. We wouldn't have done that, but we (inaudible) both the software and the hardware for that project and it worked beautifully. A follow on would be for RAP then, OK, if those algorithms and formulas worked so well, let's take the -- the same knowledge about aviation and apply it to turbulence issues in the atmosphere to icing issues in the atmosphere. And all of these things they have done groundbreaking research. But because the other -- the first (inaudible) really involved coming up with the equipment, and not just doing the theoretical, and observational work. But tat the equipment that facilitates applied science part of the equation, we've started to do that. And all this new work potentially going into classified areas that she was talking about it all coming from the RAP people, all of those projects. And I want to give you a staff notes article about it. And I don't want to say into this machine, but I am absolutely embarrassed. I really hadn't paid that much interest -- not interest, I just hadn't looked hard enough at that one article that's come out about the Pentagon Shield.

F1: Yeah.

MUNOZ: And I had a French visitor yesterday or two days ago who is staff committee to the French national assembly. And he was visiting the (inaudible) places all over the United States. And I stood there, on the phone, and told the person arranging that meeting that we didn't do any defense work. And I am humbled and embarrassed, and catching up as fast as I can. The profile that that kind of thing keeps -- has not been high, and I missed it. And I'm at a place where I shouldn't be missing stuff like that. So that shows you maybe I (inaudible). The other stuff on my plate that I should never have missed that. So I want to give you an article about it. So as you make your comparisons and it looks -- if it's looking at what people are actually working on, you've got all the information you need.

LESLIE: (inaudible) you get tricky.

MUNOZ: These used to be windows into the first computer room. That's why these funny, little things are here.

LESLIE: (inaudible).

MUNOZ: OK? Windows. And they didn't go back in very far. I -- again, what I

want to do is come over and see what you have over there, and go through your archives, and see a schematic of what this room used to look like.

F1: Yeah.

LESLIE: Do you have a version of these posters (inaudible)?

F1: No, and I should have.

LESLIE: You should. I mean, they're really --

F1: Yeah, he was (overlapping dialogue; inaudible).

LESLIE: I've got some photographs in the collection than what (inaudible) wonderful.

MUNOZ: (inaudible).

F1: (inaudible).

MUNOZ: (inaudible) and Greg McArthur.

F1: Yeah. I remember (inaudible).

MUNOZ: This is (inaudible) number three. She'll (inaudible) broke. Theoretically, the story is the learning curve was so steep between one and three, and number two was cannibalized. And so it went directly -- in pieces, it went directly into number three. And the reason I've been able to brag all these years that this is the first supercomputer ever turned on in years is because the first one that went to (inaudible) I have always been told never was turned on first and ours was. So as part of my little tour spiel, when I have adult, technical guys I can always get chuckles when I say you know why they offered to let us have this? Actually, it kind of worked out. But (inaudible) they could keep this is because I said you don't -- I say that you don't get an operating instruction manual with the first of the (inaudible).

LESLIE: (laughter)

MUNOZ: Or an operating system. So that -- I mean, you think it's a history that NCAR has done with super computing. We and the same people initially worked together to come up with an operating system because nobody ever had (inaudible) supercomputers before. And it was due (inaudible) scale in comparisons to other kinds of computers. For the record, this computer did 80,000,000 calculations (inaudible) operations a second. And in comparison today, it's that three high-speed desktop computers are faster than just -- this is the CPU. There were other parts of it, but this was certainly the memorable part about it. It had something like 2,000 circuit boards, and to tell you the truth, this was cannibalized because when it left the floor after 12 years, other people still were using (inaudible) ones and they took all the good stuff back with them. Picture over here is a walkthrough (inaudible) you know something about.

F1: (overlapping dialogue; inaudible) about the (inaudible) coming.

MUNOZ: This is an \$8,000,000 (inaudible) at low (inaudible).

F1: Yeah.

MUNOZ: And you can see where that is.

LESLIE: Yup. Yeah.

MUNOZ: Damon room.

F1: (inaudible).

MUNOZ: (overlapping dialogue; inaudible).

F1: (overlapping dialogue; inaudible) the same time that Francis (inaudible) was director of NCAR. Remember Francis (inaudible) and became president of UCAR, director of NCAR. And I think what they did was (inaudible) made him executive

director or something like that.
MUNOZ: Oh, OK.
F1: But (inaudible) really --

END OF SIDE A, TAPE 3

MUNOZ: -- (inaudible).

LESLIE: (laughter)

F1: Yeah.

LESLIE: I'll have to check at the Smithsonian transcripts.

F1: Yeah. He was amazing though.

MUNOZ: (inaudible) actually got tired of being associated with a global company which [Clay] had grown to at that time. He was a shy, introverted person who didn't enjoy all of that part of his company. So he decided he was going to get in the car and drive around the country, and when he got to some places that looked really nice, he'd get out and see whether that's where he wanted to start a new company. That's exactly what he did. The story was that he -- (inaudible). (laughter) He drove all the way to Colorado, and had the good sense to stop at the (inaudible)?

F1: You're right. (laughter)

MUNOZ: A five star hotel resort.

F1: Yeah.

MUNOZ: So decided pretty quickly that Colorado Springs would be a wonderful place to start his new company. And he had so many patent and licensed contracts with (inaudible) research. That his real company, which was called Clay Computer Corp. was able to subsist for several years just using money in RND. And by the time he had a brand new computer that this was never -- had never happened before that didn't use silicone chips that used (inaudible). And there was a revolution about that. That was in about '93 when the U.S. Congress was at war with itself, and they were shutting down the Washington Monument to make a point of no money. And everybody was screaming at everybody, and nobody wanted to spend a penny. It was just at that time when he needed a few more million dollars. Because everything that went into this had to be invented. It wasn't just redo it. It was got to invent a brand new way to do it so that we can get it to market. So NCAR is the only institution on the face of the earth that had -- ever had a working Clay (inaudible). It sat right in back of the glass window to the left side, right six (inaudible) from the glass, which is where this picture was from, for 2 years in hopes that people who had (inaudible) so spectacularly using his other computers would say, "Oh, here is the future". (inaudible) data (inaudible) to see how we were using it. And I don't know but maybe that -- that kind of personal friendship which -- which it really was between us and him could have happened again at one of those great, big laboratories. Our director of computing gave a talk and made a seminar room one day, and it was completely personal. It wasn't just as an institute we are doing something definitive another institution. It really put it on a person to person level, which was a nice thing to do. You don't always feel that in a place of national or international scope. But (inaudible) tell anybody (inaudible). That we wanted to afford him that opportunity whether he was in Colorado Springs or far away. We really wanted to afford him that opportunity, because of our (inaudible) relationship together had worked out so well.

And I think that that really is unique for us, anyway.

LESLIE: And he (inaudible)?

MUNOZ: Well, as I said to you. You are getting to the point where -- where differential computation at millions of problems a second was almost beyond one of these computers. This could do two billion, and his idea -- I call this a hybrid, and I hope that's correct or passable. Because the idea was people would have two, or three, or four of them. And then they had to get (inaudible) maybe (inaudible). Now the P.S. that I feel compelled to add to this is a non-computer person is within the last year I saw an article in the New York Times that the U.S. allowed Japan and inspired by what Japan did said well, we can't let somebody else being number one. So we need to see what we can do about really pushing a major developmental offer in computational speed again. And they hit three people who was an RSP just to two companies. One was IBM, which is all of our primary -- the supercomputers are IBM. Second was to -- another company that's come along and taken back the Clay name and is based in Seattle. So that there's that one, and then I can't remember number three. But they were those three companies. And the thing that I tried to consciously say back there was that we have hybrid, but maybe at this time of development. And then when we go to our next level, there's going to be something different. Because I believe that the earth simulator in Japan is either a hybrid or to some degree anyway, it is (inaudible) processing its (inaudible) sequential. And I certainly think it is in fact that is a reality. And this is a huge simplification of the most simple terms. I think, I would assume that the contract, that the high-speed computer that we would build with it, something to take that into account. Just simply take it into account. I wouldn't know what would happen to take it into account. And I don't know whether you know about what happened to Seymour Clay.

LESLIE: Killed in a car crash.

MUNOZ: He was. He was going to work on a Sunday afternoon in his Jeep Wagoneer, and he was on the on-ramp to Interstate 25, which goes around Colorado Springs, comes all the way up here as a matter of fact. And some young, male driver in his 20s felt that the person carefully driving onto the Interstate wasn't going fast enough for him. And so he tried to pass him and caused a three car accident. And Seymour had lingered for two weeks, and he was the only one that was killed. And he was 76, his company had gone into not bankruptcy but one of those folding places was. He was already working on his next computer at the time. He was (inaudible).

LESLIE: (inaudible).

F1: Right.

MUNOZ: He was by no means finished.

F1: Yeah.

MUNOZ: And so we lost all of that (inaudible). There's still a small company in Colorado Springs called SKC, which are his initials. But I don't think they're really in the box producing business. But we have staff here who have been Clay employees. And I'm sure that over the years Clay has had many people who have migrated from NCAR. So with that (inaudible), his death in 1996 was a horrendous blow to us, because he was such a part of this place in getting us focused on high-speed computing. And showing that the ability to do scientific visualization and other things, the use of different computers. And all of this (inaudible) our wish to make a tribute for him. And this is, if you think about it though, somebody who worked in another company, and again this is

what the institutional focus of this place wanted to be.

LESLIE: Do you know why they had those benches around them? I've always wondered about that.

MUNOZ: Why we -- if you -- I know.

(laughter)

MUNOZ: I mean I can't do my job for 18 years and not come up with (inaudible) to cover everything is certainly something like that.

F1: Right. Right. OK.

MUNOZ: And this is one of my favorite little anecdotes. Because I had the opportunity to go to Lawrence (inaudible), and people (inaudible) the competing room in Lawrence (inaudible) told me that to me this isn't (inaudible).

(laughter)

MUNOZ: This is really from some people there at the time. And if you remember he's from the Midwest. And if you look at --

LESLIE: (inaudible).

MUNOZ: And if you look across this country, you'd understand. And you have something to do with education. They say that the (inaudible) center association of colleges and secondary schools, anybody who comes from that area is going to tend to be more automatically than people from other parts of the country. Some of them are always upright. Some of them are really honest people who walk the earth. (inaudible) from Colorado that won't hire any California people and just try to hire Midwest people. Seriously. Seriously. So you get the idea of this -- of this Midwestern epic that Seymour represented. So when they asked him that question on a (inaudible) a few years ago over at (inaudible) people said he pulled himself up. Not all that tall --

F1: Yeah.

MUNOZ: -- but he pulled himself up and said, "Well, I'll tell you. If I'm going to charge anybody \$8 million for something, they better damn well be able to sit down on it."

(laughter)

MUNOZ: And I (inaudible) what he said because (inaudible).

LESLIE: (overlapping dialogue; inaudible)

MUNOZ: Now, really quickly, if you think -- if you think about speed skating in the Olympics when they go around the ice rink. And then you think about the figure skaters who pull their arms and legs in and spin so fast you can't see their faces. The reason Seymour was successful in his effort to make the world's fastest computer was because he shrank, shrank, shrank, shrank, shrank the size until it was the equivalent of the figure skater. Because when you accomplish pulling back literally the (inaudible) size computers that are at the Smithsonian and get them into a circular structure like this, I've been told that the two longest wires in this machine are four feet, and everything else is shorter. Bottom line is the energy has the least amount of space to go, and that's why the nanoseconds can be so short. Then of course the amusing thing is why is it a letter C, which doesn't have anything to do with Clay or ego, and not an O to allow the wiring to be continuous. And depending on my tour, I make corny jokes which I will not do here today by saying for maintenance.

LESLIE: Yeah, oh sure, (inaudible).

MUNOZ: (overlapping dialogue; inaudible) access, yeah.

LESLIE: Yeah.
MUNOZ: We won't go into --
LESLIE: Otherwise it would become (inaudible).
MUNOZ: Jimmy! That's right. There you go. Yeah, you see. Exactly.
LESLIE: I think so.
MUNOZ: Yeah. But there are 60 miles of wires, 60, in there.
LESLIE: Oh.
MUNOZ: So that's why. It has to be very small. And basically this is the power distribution under here. This machine weighed the 15,000 pounds. Now it only weighs 6 because after they gutted the top architecture, they had no interest in taking all of the pipes and wires out that broke down the massive energy that this computer pulled and disseminated at around -- dispersed at around the machine. So it still weighs, which is why these people don't want to move it. Which is why it is an object that stays quite stationary, when even the heaviest things slam into it. The last thing is quickly to show you the basement, and then maybe you plan on cocktails on dinner.
(laughter)
LESLIE: Yeah, (inaudible). You left your lunch.
MUNOZ: Well, I'm not -- see, I'm not working today. But --
F1: You're not working today?
MUNOZ: No.
F1: Where do you (inaudible)?
MUNOZ: My vacation.
F1: Can you believe this?
LESLIE: No. I (inaudible).
MUNOZ: Oh.
F1: She can eat for you.
LESLIE: (inaudible) is very, very good.
MUNOZ: Would I pass up the chance to (inaudible)?
(laughter)
LESLIE: (inaudible).
MUNOZ: It gets really exciting that the wiring -- oh, speak of the devil. There's -- that's done. That's how (inaudible), somebody painted that.
F1: Wow. That's really nice.
MUNOZ: Yeah.
F1: Look at that.
LESLIE: (inaudible).
MUNOZ: Look at all of the computers in this (inaudible). This is the computer division's meeting room. They took over this little area and made it into a meeting room, a divisional meeting room. And I've never seen that painting (inaudible). We have meetings in there from time to time. That was never there at the time.
F1: I love that. Yeah.
MUNOZ: The (inaudible) that's the data comes through the air and into the computer. So this is new. The tradition that you and I thought died out --
F1: Yes.
LESLIE: (inaudible) sound.
MUNOZ: -- continues. Oh, this used to house all of my storage.

F1: Yeah.
MUNOZ: Yeah.
F1: Yeah. I love the little doors.
MUNOZ: Yeah.
F1: It's like Alice in Wonderland.
(laughter)
MUNOZ: But see, the doorway only is to be to here.
F1: Right.
MUNOZ: Whereas they want to get out, and then everybody makes the door fall.
F1: Exactly. I know. (laughter)
MUNOZ: (overlapping dialogue; inaudible) everybody (inaudible).
F1: (laughter)
LESLIE: I'm (inaudible).
F1: Yeah.
LESLIE: (inaudible) had (inaudible).
MUNOZ: Well, remember I said the second floor goes from far corner to far corner. This is the one other floor that goes from far corner. And we're proving it to far corner, because when we come around the corner, I'm going to (inaudible) you. You have to remember that this building has been shoved into the hill side to the west. So the tree plaza that we talked about that you (inaudible) is right here. It is a walkout from this end. It used to be until 9/11 and then security comes along and now it's locked. People can't get in without car access. But that's valuable cause you don't want anybody out on the tree plaza walking in and going down the halls.
LESLIE: Yeah.
MUNOZ: And all those years they could do that.
F1: Yeah.
MUNOZ: So remember that I said that those trees are in the roof of the chemistry laboratory, and that's what we're going to go downstairs. That's under this part of the building now. And we're going to go down to see that.
F1: Yeah, if we walked in (inaudible). Though -- except, we just came down the hallway and (inaudible) point out the (inaudible).
MUNOZ: Oh.
LESLIE: (inaudible).
MUNOZ: 2B, second basement, all the way down from 6 floors. It's been quite a journey. Which means eight floors.
LESLIE: (inaudible) back to (inaudible).
MUNOZ: Well, let's start over here. Because when we were up on the 6th floor standing out on the roof, we looked right here. You don't happen to have your card with you -- oh, you do. (inaudible).
F1: (inaudible). (inaudible) before.
LESLIE: (inaudible) you just put the rack in here.
F1: Yeah.
MUNOZ: Hold on.
F1: This right here?
MUNOZ: Listen, I'm not going to shut this door until (inaudible).
F1: You want me to check?

MUNOZ: Yeah, why don't you do that for just a second. It should be -- has to be, right around the corner. It has to be.

LESLIE: (inaudible) obviously haven't been (inaudible) to that. (laughter)

MUNOZ: It has to be. Good grief. I don't see a thing. I've never encountered a door that didn't have it.

F1: Yeah. Right. It didn't have it.

MUNOZ: So stand here so that we can wave anybody away from pulling out the rod. We have a clean rod. Now if this is the second circular structure, the one that we looked down on from the library.

LESLIE: Yeah.

MUNOZ: I really hadn't made the association before, but at this end with a picture window that's been covered over. That's a (inaudible). And when we are building parts for satellites, there is a chamber in that room that came go up to, I don't know offhand how many atmospheres testing. And that one because it has the parts for an instrument that's going to (inaudible) development to go on a satellite can really get almost as clean as (inaudible) states across town, it's remarkable. And these days when all of the chemistry people are encroaching on (inaudible) because this is HAO. They've all moved over to the other building, and they just had these two south side structures left from what used to be all their territory here. This -- this was all high altitude, observatory stuff and so on. And I would guess that some of this from facilities. Obviously, the bike containers are just for staff. Here's the dish we saw from the top of the roof.

LESLIE: Yup.

F1: So this is the HAO addition?

MUNOZ: Yeah.

F1: That's interesting.

MUNOZ: The one --

F1: I didn't know.

MUNOZ: The one, and then its companion is over there.

LESLIE: A hundred feet away.

MUNOZ: Yeah. And that's the south edge of we go up there. I'm loath to do that because they say to have you keep trap doors open. They're not happy about that. We still need a [part] shop. We're allowed to have a part shop because you can't run to a [distant] place every time you need that. But even that was kind of a battle when people were saying it's not cost efficient for us to maintain the parts inventory here. Yeah, but then you factor in you run out of something in the middle of the day and then doesn't need it.

LESLIE: And (inaudible).

MUNOZ: The machine shop, it used to be in this building (inaudible) and less away. But this is a lab, it looks like a machine shop. They detail one person from the machine shop to stay over here because I think the (inaudible) equipment is still here. John is still over here. (inaudible) still does that kind of thing. We have modernized over the years. And we know it is a healthy thing that people should have an exercise facility. So we do. I don't know that you need to see it, but we're right here.

LESLIE: This is nicer than (inaudible) and we need it.

(laughter)

F1: True.

LESLIE: I (inaudible).
MUNOZ: Yeah, people -- but you understand that the older community, including the little, six year old kids who will (inaudible) the hill with their moms and dads too. Hike, ride, bike, walk up the hill every day in the year in any kind of weather. And everybody knows that if you have one of these, even if people come in during the work day time, the (inaudible) that you (inaudible). Our (inaudible) is as big as yours, because we didn't have to stay (inaudible).
F1: Yeah. You really don't. You've heard of our (inaudible) program?
MUNOZ: Yes. It's [structurally]. That's a (inaudible) I thought would be open. The doors are closed right now. Chris [Cantrell], before I saw him back, he was in NSF.
F1: Yeah, that's right.
MUNOZ: You know, you can go off for a year or two to NSF to do some administration things and then can go off.
LESLIE: I've been in that building.
F1: (overlapping dialogue; inaudible)
LESLIE: I sat in (inaudible). Yeah.
MUNOZ: Hey, (inaudible).
(multiple conversations; inaudible)
MUNOZ: I'm not going to bother you either. Except just to say that some of the ACD people have offices downstairs scattered and among the latch. Do you have another office upstairs?
M1: No, I got to (inaudible).
MUNOZ: Oh, so we (overlapping dialogue; inaudible). Some are just downstairs, and some have an upstairs and a downstairs. (laughter) Thank you. Thank you. It doesn't matter because a couple of these (inaudible) just downstairs. If it doesn't -- it doesn't (overlapping dialogue; inaudible)
LESLIE: Not that higher?
MUNOZ: No, because (inaudible).
F1: Yeah. So imagine all of these labs would be gone in a year and a half.
MUNOZ: Yeah.
F1: (inaudible) through.
MUNOZ: Yeah. If you can think of the letter F with an extra prong on it, that's what I'd say that the 2B basement is. Now if we stand here, this is the hall, and the elevator's right over there around the corner. And this is the middle elevator coming down two stories, boom, to the basement. Then this hall is short. There's only one other hall you can see the break in the white wall. And that's the one that (inaudible) has access to the rest of the second floor. There's nothing on this side, but the most interesting part of the building which is all the mechanical shafts. It is also said in various legend about conduits from one building to -- over to the [Fleischmann] building, or out to the parking lot. All I know is that when they open some of those metal doors over there, there are cat walks inside. There are immense machines.
LESLIE: You have to be able to get at it (inaudible).
MUNOZ: It sounds like it's in a hurricane. And except for a couple of little offices, just literally a tiny, a small office down the hall, there's nothing on this side. So this is sort of walking out to the park -- well, no. This is right up above it is the (inaudible) and the trades room directly above us. So this is just on the other side of the drive way.

F1: Right.

MUNOZ: A mix of things. This is where the exhibit person had (inaudible) an office cause there isn't any space upstairs. Mixed in right along with chemistry, chemistry labs, and it's probably not appropriate to say my dream is when those nice people leave. I mean --

F1: (laughter) I'm right behind on that.

MUNOZ: I can't imagine doing my program without leaning for support and assistant on ACD staff all the time. I cannot imagine it.

F1: Wow.

MUNOZ: Because nobody else has a place with neat stuff to take people. (laughter)

MUNOZ: I'll be bereft, but when it happens, there are large spaces so often. Well, we have a limit of 60 kids, but we are regularly forced to go beyond that. This speaks to science education at NCAR. The weather can often be terrible outside. We have no place to have children -- all the children eat together. It's a nightmare. And it's too far to go back to school, because if we finish a 12 -- just like you, it's way past your lunch time. So if we -- the visit program, if we can take more over one of these labs --.

LESLIE: (inaudible).

MUNOZ: They could have a bathroom down here, they could make noise down here, and nobody would be bothered in the general vicinity. And do you see where that says exit? That's a walk out.

F1: Yeah.

LESLIE: (overlapping dialogue; inaudible).

MUNOZ: That's the walk out.

LESLIE: Custodians and (inaudible) as everybody says it is.

MUNOZ: It is. It is.

LESLIE: Absolutely. Back when -- I mean I couldn't -- having walked through a couple hours, three hours, I still couldn't find my way around (inaudible).

F1: Yeah.

MUNOZ: I don't know whether he did that in purpose, do you ?

F1: I don't know.

MUNOZ: But it has a charm.

LESLIE: Yeah.

MUNOZ: I've also heard that you get six months to really figure out your way around. And if you haven't figured it out within about six months, this is a joke having to do a six months probation than it (inaudible) cause some people don't get as taken on (inaudible). It's a big joke. But it is true that it can be said that no sets of chairs, or almost for that matter elevators go to the same place. And to this day, I might think oh, I'll just go this way since I'm in this tower or that tower. And I've come up short.

LESLIE: Yeah. It's completely different (inaudible). Too rational.

F1: Yeah.

LESLIE: (inaudible) symmetrical (inaudible).

MUNOZ: When I said little offices on this side, nobody (inaudible) miss. It only goes back that far, and just a couple of the -- but everything else on this side is otherwise lowered. We now have somebody -- in all three buildings, we -- you get to that point where you have to have AV staff, three people ready to go in all three buildings to service

and maintain all of the equipment in meeting rooms, and all of the equipment that that means was the head of NCAR being in this building. Do you know this? It happens in all of the buildings. It just never (inaudible) or (inaudible) or any of those folks. They see the meeting maker's schedule too. They make it a point to be there at the beginning to make sure all of these meeting rooms that have been reserved so they can see who's talking. And certainly we have. That's the easiest way to get them on your schedule. But they will even show up if you don't have them, and they see that you're using some technical AV equipment. They will show up at the start of that activity to make sure that everything is there and OK. Cause otherwise you would be asking to have someone come by so that --

F1: Right.

MUNOZ: -- Anthony (inaudible) or any of the other folks who you have invited taking their (inaudible) to your meeting is going to have a successful time at it.

LESLIE: It's nothing (inaudible) you get up there and now we have a photograph of the Parthenon. Right? Right here. Where is it?

F1: (inaudible). Where's the PowerPoint?

MUNOZ: All of that.

F1: I just had it a minute ago.

MUNOZ: Yeah.

LESLIE: (overlapping dialogue; inaudible).

MUNOZ: Everything in this room right down to the (inaudible) in the first Antarctic (inaudible) position. Just peek in. I mean this is colossal. Everything in this whole room that they took everything but the kitchen sink so to speak. Because the first time there was an international flag, U.S. field trip to the Antarctic. We started to figure out the hole or the ozone depletion, the hole in the ozone in the late 80s. They took the contents of this laboratory. By the end of those visits, which occurred every few years there after, I love to tell people to show you how technology has developed. Hi there. Can we just have a brief look?

M2: Help yourself.

MUNOZ: At the very end of it, the NASA pilots would fly into the same area that he always flew into. And you know how we got the sample? Back courtesy of FedEx the next day.

LESLIE: (laughter)

MUNOZ: You know, none of this packing up, and going, and staying for six or eight weeks. We just received containers that have the cylinders over there that had been (inaudible) onto the aircraft, and then automatically open and closed to acquire the

necessary sample, and then sent back by FedEx. I don't know about you, but I've never lost anything by FedEx.

LESLIE: I haven't either. (laughter)

MUNOZ: Good enough for me. Good enough for me.

LESLIE: (inaudible).

F1: Oh. (laughter)

LESLIE: Absolutely, positively has to be there overnight.

MUNOZ: Has to get there. This is a laboratory where in fact they are -- it's instrument development. The name says it's for (inaudible). So -- but to give this (inaudible), especially -- special care we can't bring every class down here.

LESLIE: Yeah.

MUNOZ: A look at this. And now I have to say the one thing about the [Salk] Institute I wanted to say when I went out there, I had relatives in La Jolla, and I got myself over to Salk. And when I saw how they could communicate their science to the public, I don't think I've ever been so professional jealous in my life. They don't have a lobby full of exhibits. And I heard you saying something earlier about curtains and drapes, and they tend to keep them drawn. But Salk is all laboratories on the first --

END OF TAPE 3, SIDE 2

Interview of Rene Munoz

TAPE 4, SIDE 1

MUNOZ: -- but Salk is all laboratories on the first floor, and glass wall because it's a (inaudible) requirement.

F1: Right.

MUNOZ: And as I was thinking, all I would have to do is walk the students -- the 10 thousand students who come here every year -- walk the students outside where they don't bother anybody, either noise, or being where they shouldn't. And walk them down that special corridor, and we can look into the laboratories and see the (inaudible), and perhaps take people (inaudible) doing their science so they wouldn't be bothering anybody.

LESLIE: And they could put in their (inaudible).

F1: Yeah. I saw that.

MUNOZ: And by contrast, it's very difficult to tell teachers who come here I'm sorry, we can't take you down into the labs. Well, why not?

F1: Yeah.

MUNOZ: Can you see how small they are? Can you see how narrow the halls are? If we have 30 -- 60 kids typically come at a time. If we had 60 kids even in rotation down here, they would drive everybody just absolutely crazy. You cannot do that. You can't do that. But that gives us the inability to do what with a little bit of organization if they ever would want to do that some of the neatest opportunities that you could have. Like I say when I was there it was clear that they felt like monkeys who didn't want all that -- all those people looking in and had their window shades drawn, and curtains drawn, and so on, and so on.

LESLIE: Well, they get a lot of (inaudible). I don't know what the (inaudible) could be better, because you know millions of people are coming to San Diego.

F1: Right.

LESLIE: Just, all over. And that just (inaudible).

MUNOZ: And you can't let them (inaudible) through your building either. Everything's a trade off. And I'm proving to you that we are at the very end. Here's the very end of the tour. But we have the facilities office is over there, and that's the way you get down to the furnaces, the boilers, and I have had such fun on special tours for children, taking kids and showing them the boilers, them firing up.

F1: Yeah. (inaudible) it would seem like.

MUNOZ: Oh.

F1: It sounds great. I love it.

LESLIE: And it's exciting -- more exiting.

MUNOZ: The (inaudible) room, I realized that. So what we do, and NCAR, and NOAA, and let's figure this out ourselves. We were the first people to do this. Instead of just giving a prize and a handshake at the district science fair, we do that but then we say and you get to get out of school for a whole day and come to NCAR.

LESLIE: Great idea.

MUNOZ: And when I had 5th graders win the elementary school project, I learned how thrilling it was to look at the fan room and the boiler.
(laughter)

MUNOZ: But if we are so fortunate to not have pushy people around this place saying you can't go here, can't go there, not appropriate, don't do this, don't do that. All I have to do is ask my friend in facilities to let -- to take us into the fan room and the boiler when I have the special (inaudible). Or we don't even have to ask anybody to go to the Damon room upstairs. I can take people there any time I wish. And if I go to the door and I'm with a large group, and we'll make noise, I don't go in. Maybe we'll go out and look from the outside in. Or if the glass doors are closed at the end, I'll tell everybody to be quiet, and then I'll walk in there. But what I love is that each of us seems to be on a pretty long leash, or giving enough autonomy that so many of those nitpicking decisions are allowed to be ours. And so we feel we have some responsibility. I've been pretty much able to do what I thought was the most appropriate for my program, which made me all the more conscientious to let administrators know when it was outside the limits that I usually work. Just so that we were all on the same page. I had this permission. And it is -- it's a lovely opportunity to be able to figure out how to let the public come into a place that they are interested in architecturally, or certainly for science. And she did it, so we better run back in.
(laughter)

MUNOZ: But that's the mail room, and so on. And this is -- you're going to need to (inaudible) that. That's all new. And then this is the back end of a laboratory. Oh, you have to come see these pictures.

LESLIE: Well, you've got the same taste in (inaudible). Including those doors and (inaudible).

F1: Right.

MUNOZ: And I had meant to say this a couple of times. When you asked what was cut, and I said the conference room, that was supposed to be where the wet labs were. All of this was warehouse space. So again, from the time they moved in because the third building was cut primarily because of budget reasons (inaudible).

LESLIE: (inaudible).

MUNOZ: They had to retrofit storage space at the bottom of this building to be laboratories. And the wet labs, you're right, are in the south part. Because that's -- end of there didn't even have a second basement. So the apparatus that you see hanging everywhere from the ceiling, the wires, we've just been on this side of all of the lab (inaudible) requirements and codes and all of that. The building that is going to be cut across town is the first time institution just (inaudible) never had -- except through the occasional renovation of a laboratory, first time in the entire division has had space designed for it in which wet chemistry can happen.

F1: Right.

MUNOZ: And what these people did made quite a name for themselves 20 years ago when I came in. They were studying termites. It turns out termites may be the second largest contributor of methane into the atmosphere. And the most fun facts I had telling kids is that they are so common in the world, that for every human being on the planet -- I love to tell it this way to the kids. There is a pile of that weight 1,200 pounds of termites for every living person on the face of the earth. and Jim [Greenberg], who was a former high school teacher who knows how to play to the camera, and the crowd, and kids. When he has flown to Africa and to Australia, this was sitting in a (inaudible) in the field in God knows where, looking at a termite mound, which can have I don't remember, multi-millions of termites in it anymore. I can't remember. That's the chimney of the termites mound, and then some other pictures.

LESLIE: That's a big one though.

F1: Yeah.

MUNOZ: Yeah, to kids down here in this space. What they should do when they leave and go to the other building is leave all of their old equipment they don't want anymore, so that we can have a messy space like this.

LESLIE: OK. This is where science is (inaudible).

F1: That can really (inaudible).

MUNOZ: Creativity, messiness, this is -- this is what it looks like for people who do science. It would be wonderful. I'm done. And look, I'm going to turn this thing off. Look at this beautiful --.

(break in tape)

LESLIE: Still going.

MUNOZ: NCAR acquired its last -- latest director in 2000. A professor on the faculty at the University of Michigan. When he came in, he brought with him his Ph.D. scientist wife, Roberta Johnson. Roberta came in not only with background and experience as a scientist, but also a rapidly evolving interest in science education. So in fact, they came in hired as a team. She came in as NCAR's first director of science education. Understand that for 14 years we had a visitor program here at NCAR doing education activities. But until the right circumstances presented it themselves and it came together serendipitously as it did with Roberta coming. The person has to have Ph.D., be a scientist, come in under the right circumstances. All that worked out. So that when she came here, it was a very short time after that that the first -- it's called Office of Education and Outreach program got started. And then the components, which had languished a little bit by their separation from each other, got pulled together. So exhibits, then the store, and my own program, the Visitor Program, in which we are now doing major, major edu-- science education outreach joined a grant that Roberta also had when she came here that was already 5 years old. And that's a (inaudible) grant. So now this program that has thrived unbelievably in the last 4 years, the ENO office now has something approaching 30 people under it. With all the people on her grant, and then you add all the other various threads of science education people that were here, and there, and there. We are over here in the (inaudible) laboratory because that's where the kids come. And right now, there isn't space for them to be co-located with us. So every time we need to physically see and be with them, we'd have to get on the shuttle or drive eight miles across town. I think that underscores why you can see that in the next couple of years when the chemistry building is built and we have a lot of space vacated because all those chemistry. And each one of our four science divisions is roughly somewhere under a hundred people or around a hundred people. When all of them leave, and all of that office space, and then the chemistry's case all that lab space opens up, that the ENO group desperate wants to come over here and not act over there because that's what makes sense. And we do believe that when we are all in one place, we can have a common library, we can have common resource area, we can have much more mutually shared activities than running back and forth eight miles when we had our various meetings. The scheduling kind of gets hairy that way. But that's going to be just a huge asset and I see with all the little grants that we've been able to attach to scientific grants, you're now putting onto a real scientific NSF or NASA grant. A component that says we're going to plug in high school students and high school teachers for two or three summers during the three years of this grant to spend their summers here or parts of their summers here up close to that particular grant and figuring out what the scientists are learning, and how that can be adapted for use in the K-12 classrooms. So all kinds of things like as a result of coalescing, finally, under this ENO umbrella, which obviously is the biggest education activity that's ever come along in the history of NCAR. And the two people who've really done so much for that (inaudible) is Roberta Johnson, the director, and her associate director Susan Foster, who is our immediate supervisor who does so much of the detail. Those two people have attached as many threads and

opportunities of-- for activities to our work that the scientists have always had for theirs.

LESLIE: (inaudible).

MUNOZ: And that --

END OF INTERVIEW