Joe Smagorinsky, Margaret Smagorinsky, Fred Smagorinsky

Princeton, NJ

4 May 2004

JS: All I can do is try to answer your questions, and let you know when there's a probability that there's something... there's a weakness in what I'm telling you as far as my memory is concerned. My memory is surprisingly bad.

GD: Well, most people's memories are surprisingly bad, like you said, memories get so mixed up with what comes later, and so on. How did you meet?

MS: Well, I was working at the Weather Bureau. In what we used to call the five day forecast. And J Namias was the big wheel in that. And Joe had just gotten out of the army. But we were already married though... he had to sign up in the reserves. They had to go to these meetings occasionally, so a whole contingent of young army, retirees, so to speak, they were in the reserves.

[The Weather Bureau] had seminars periodically, not as often as once a week, but when they had a big speaker come, the room was really just strained. They announced that Jule Charney was giving a lecture. So you can imagine that everybody... all the meteorologists at the weather bureau came. This was in the 24th and M in what everybody called the Castle, the building behind the 24th and M building. Anyway, this large contingent of people came up from Andrews Air Force Base, and Joe was with them. And then when the time came, after Jule gave his lecture, he paused a bit, and I don't remember whether he asked the questions or not, but a few people asked the questions, and Joe asked one. Jule gave him a rather extensive response to the question, whatever it was. So after the meeting, Wexler had a little

meeting in his office. And we learned later that Jule... this was a cooperative, this was funded cooperatively, this five-day forecast. And they really had just started on tweaking von Neumann's brains, but anyway, Wexler was going to send a young meteorologist back up to Princeton to work on the project. Jule put his oar in, and said that he was very impressed with the questions Joe had asked. And he would like to see him come. And he did. At first it seemed that it was going to be for just a few weeks, wasn't that right Joe, when you originally came, you weren't going to stay so long? But he ultimately stayed. And we came up and were assigned one of those spacious apartments on Goodman Road.

We had previously met though in a class at NYU. The weather Bureau had sent me up. I was classified as a statistician, which I was. I had some training. But I was not a statistician like Tukey. I was more like a highly trained statistical clerk. And then Jule decided he could use my expertise at adding figures and getting the right answer. And there were two other young woman who had been hired to do this real manual... the system that they were going to use on the big computer, they were doing manually. It was a very tedious job. So there were three of us. One was Arnt Eliassen's wife.

GD: Right.

MS: She was there already. And one was a young girl who was a pretty good mathematician, but not an expert either. Norma Gilbarg was her name. And the three of us worked in a very small room, and we worked hard. It was a small room with three people and three Monroe calculating machines. And so anyway, that was how I met Joe. I met Joe when the weather Bureau sent me up to NYU. I got way ahead of myself. They sent me up to NYU to where Joe was studying also.

GD: Earlier, like in 1946 or so?

MS: Yes.

JS:. We were married in ’48. I would say our account is a pretty good one for two different people telling the same story.

GD: Yes.

JS: One thing that I might want to add to this was just where she said... one of my lapses... My interests in what became numerical weather forecasting, were determined with a coin the whole way (???) by Richardson

GD: Richardson, yes.

JS: During the war, when I was a student, a cadet at MIT, I had been told by one of the eminent professors there, [Bernhard] Haurwitz, that numerical forecasting can’t be done. And the reason given was not a very good one. But it was easier to say that it can’t be done than it can be. And I carried this notion of impossibility in my mind. The war was over, I went back to being a graduate student. It was as a graduate student that I met Margie. I was a graduate student and we took a course together. In statistics.

MS: Dr. Wexler decided to send me up to NYU. To study meteorology. The idea was that I was supposed to get a masters degree. And you know, get on some little track at the extended forecast section. And I didn’t even finish my courses. They wanted to send Joe down to Washington to work on the project there. And I trotted right along. The end of my great career as a meteorologist.

JS: Well, the thing I wanted to get to was that when I went to listen to the seminar, the guy who was giving it was an unknown to me. And he was largely an unknown to most everybody else except some specialists in dynamic meteorology. And the questions I asked were born out of my earlier questions. And so when they heard somebody asking a question relevant to numerical weather forecasting, that term was not generally known at that time, and so I was one up on them.

They were surprised that there was somebody who could speak their language. And I was only a graduate student at that time.

GD: That must have been very exciting for them.

JS: But for a young guy to be called in before he has his PhD and asked to sharpen pencils, that was a great deal for me. That was one little phase that I discovered myself how people got involved. Incidentally Charney was one of three people that came up. And another was Arnt Eliassen

GD: Right.

JS: The third, I'm pretty sure, was Hunt, who was also a mathematician, in that group. They were just beginning the phase of organizing a small research project from scratch. They didn't have any computers, they didn't have anything.

GD: So that's when you met Charney?

JS: That's when I met Charney. That must have been around '48-'49.

FS: Dad, is this the story you were telling me, that you went to the presentation when you were really a nobody?

JS: That's right. Fred asked me about this a few days ago. Whenever it was I saw you.

FS: I can't believe in all the time, because I know most of these stories, I had never heard that story before. It seemed like that was a big turning point in your life.

GD: There's a list of the meteorologist staff in 1946. That was before you showed up, but Albert Kahn...

JS: Yes, Kahn was the mainstay. An important character in this ??? (13.3 min) in Chicago. Pekeris was already a world famous guy. Queney was a Frenchman. It's too bad you don't have their other affiliations where they came from. Harry Wexler was my boss. These guys I don't know at all. Oh shop staff, that's the reason I don't know them. Engineering staff, Melrose Pomerene, Davis I don't know. Shaw I don't know. Willis Ware became famous in engineering.

GD: He's still doing very well, Willis.

JS: He is? He must be in his eighties.

GD: Yes, he's amazingly, he's still at RAND In Los Angeles.

MS: Well, he's lucky.

JS: Yes. Well, he introduced some important notions in computer design and engineering. Administrative staff, Herman Goldstine. Bliss I only knew indirectly. I don't know the rest. That's it. It would be of interest if you could give the root affiliation.

GD: Yes.

JS: It will show the diversity.

GD: Right, people came from all over, and the Scandinavians. There was a Fjoertoft,

MS: Fjoertoft.

GD: Fjoertoft. Was he there when you were there?

MS: Yes. He's a very funny man. He gave me the best piece of advice. He was there when my daughter was born. He was a tall man, and his personality was blooming. But the baby seemed to be so small when

Ragnar held her! He lived in the apartment next to us and came in to see the baby. He said, now, don't make the mistake thinking that the growth of this baby is going to be gradual. The child will do nothing and all of a sudden start doing something, and you'll be surprised, you didn't even know she was learning. And that was the only person who told me that, and so it was a great comfort to me when she was doing very little. And true enough, all of a sudden she started to sit up and roll over and carry on. And we really had a great time, raising a child from scratch, at the old [Institute] barracks.

GD: What year was she born?

MS: '51. It was very compartmentalized though. People with great reputations lived over here, and didn't seem to mingle much with the young people.

GD: But on the housing project you all circulated together, right?

MS: Yes. And there was this great big beautiful lawn, and people would sit out there and it was just...

JS: And I thought you were going to say, "and get haircuts on the lawn."

MS: (laughs) Yes.

JS: There was a very famous mathematician, he was young then. And he used to regularly get his hair cut on the lawn.

MS: By his wife.

JS: She'd come out with a sheet. Bott, Raoul Bott.

GD: Raoul Bott, yes OK.

JS: Who I think went to Harvard.

MS: Was he the one who wrote the book and got in trouble with it? He wrote some textbook, I think in Geometry.

JS: But that was the fixture of Goodman Road that doesn't exist any longer.

MS: It got promoted to Einstein Drive or something.

GD: Well they named them after everybody. Morse and Oppenheimer.

JS: There was Cook Rd.... yes.

GD: It's pretty small print, but that's the list of people living on the housing project. But you weren't there when Julian moved those buildings?

JS: No.

MS: He didn't move them?

GD: Yes, he moved all those housing project barracks.

JS: They were all relocated?

GD: He moved them from Mineville NY, He bought them at a government auction, and moved them down to Princeton against tremendous opposition. They were moving a trailer park into Princeton.

JS: He really upset a lot of things. A lot of people.

MS: A lot of local people were very hostile to the... they were not welcoming, I don't think they gave...

JS: This is before our time.

GD: Yes, it's a year. I don't have that for your...

JS: Oh, it's in 1947. Your focus is the Institute for Advanced Study?

GD: Well, my focus is the entire computer project. Not so much the Institute, I mean the Institute figures in, but I'm focused on all the amazing things that von Neumann brought together there. And the meteorologists were there first, and he really brought the meteorologists, as you know, long before any one else.

JS: How is somebody like Schwarzschild counted?

GD: He's on the periphery, but very important. Some of the first codes that were running were his codes for doing stellar evolution. And I'm curious what you know about that, but from what I've seen in the log books, they started running those pretty early.

JS: Yes, he and Morgenstern and...

GD: My understanding of the priorities were that bombs came first and meteorology came second, and stellar evolution was third.

JS: It's surprising that meteorology rated as high as second.

GD: Yes.

JS: I thought they threw that in because it was cheap.

GD: No, that's one of the biggest questions I don't know the answer to. Why meteorology was given such a high priority. I think it's because it was such a... the same reason why you liked it, that everybody told von Neumann it was impossible, so he wanted to see.

JS: There was still this myth that was carried through time, that somebody has done something on the subject. And the way this shows up, and I don't know whether you got this, but the way it shows up is the people they hired before Charney was hired were essentially mathematicians.

GD: Yes.

JS: And I may use harsh words, but they were relatively sterile.

GD: You met Art Burks?

JS: Burks was not a meteorologist.

GD: No, not at all.

JS: Phil Thompson.

GD: Right.

JS: He was in there and failed. And he's probably judged harshly for it, but he had a lot of guts. I think this very much influenced the evolution of the basic ideas. What was right about what Richardson did, and what wrong. The explanation for what was wrong came later through Charney, essentially. But he's the wise man in this early chain.

GD: Yes. There were tremendous discussions about whether to keep Charney or not. It's interesting, I've been looking at all those files. It was a big divide in the Institute as to whether... there was a very strong important group of people that wanted to keep him, and then there was another group that...

JS: Yes, there was a lot of high quality pressure.

GD: Yes.

JS: It's surprising that it didn't kill it.

FS: So the pressure to remove him was because of just not wanting to have meteorology be done there?

GD: It's interesting who took which side. There was a commission to look at the... There was a wonderful faculty meeting where they were arguing at the beginning whether they should allow these meteorologists to come at all. Everybody had different perspectives. Some people felt that well, if it's a failure they shouldn't do it, and if it's successful it would be even worse. What if the Institute started predicting the weather? It would ruin their reputation forever.

JS: That's right.

GD: And then other people were more practical, with the thought that, well it's a good idea, but it should be done somewhere else. And von Neumann could always just push things through. He said, well, this is such a technically interesting mathematical problem. If you don't let me bring the meteorologists, I'm going to leave. So they gave in. And a lot of them came. The original plan was to bring like 40 people.

JS: A lot of people came on very short visits. I mean you have a guy like Haurwitz, not against you, but expressing doubt that any of these young wise guys knew what they were talking about. And just wasting a lot of time and money. It was the post-war era where a lot of people were looking for jobs. There was a general disgust with the idea that we're going to have a computing machine--a machine! We don't want that. But it turned out they were just as bad in their views about

mathematicians. The mathematicians... I had a friend who became quite famous... I'm not sure... well, he became famous within his own field.

FS: He was at the Institute?

JS: At the Institute. And one day he came to see me. And I was just a young squirt, hadn't had my Ph.D. yet. And he said, Joe, I have to make a decision, do you mind if I talk to you about it? He said you know, I've gotten interested in how to use discreet computing techniques to solve partially differential equations. I have to decide whether I'm going to buck this, to try and you know, publish in the open literature. I said, well, they can't stop you, except if you make mistakes. Can't stop you from publishing literature for things that are arguable. And he went to work at the naval research lab in Washington, and he started publishing. And I think he made some important contributions. Not contributions that are so unique that they would never have been made without his work, but he set into motion, out of spite, in a way, a community of interests. Where he could go outside of his own group and talk to somebody, and not have to whisper.

MS: What always surprises me is when you meet with a group of scientists and you find them backbiting the other people in the field.

FS: Well, you know what they say about academics, Mom.

MS: What?

FS: The politics are so vicious because the stakes are so low.

(collective laughter)

GD: The little room they put you in doing these calculations was in the computer building?

MS: Yes.

GD: In the little brick building?

MS: Yes.

JS: That was Goldstine's office, wasn't it?

MS: No, he was down the hall. He was separate from the peasants.

GD: Do you remember the Greek secretary? Akrevoe? She had red hair.

MS: I never had anything to do with the... That was another category of people. All the people I really interacted with were Norma, and Ellen and then some people who used to stop in to our office and visit with us awhile because it was a little bit off the beaten track.

GD: She was Goldstine's secretary.

MS: Oh I would have never had anything to do with her.

JS: How does Goldstine come out in all of this?

GD: Well, he wrote his own book so...

MS: The Goldstines... Adele was really smart. She contributed quite a bit, I think. Well, I'm not one to judge because I don't know enough about it, but I do know that Herman himself was a very unpleasant man. He just had about as much personality as a wastepaper basket. And they were quite senior first parents. And yet they kept going, they went to work every day, just the same as the... To my surprise, when I was in the hospital, awaiting Peter's birth, our second child, Adele was in there giving birth too, I guess, that little girl was her only one. I forget what her name was. But as soon as the baby was born they moved out to around where Terhune

orchards was. But we never saw the baby, she never brought the baby in for people to see. She was just... they were just concerned with what they were doing intellectually. And actually, I was quite surprised when they moved out to, well, everybody called it the gold coast. In a great big house, just the two of them and this one little girl. The girl became an architect, she had an office on ??? (30.5 min.) St.

GD: What was her name?

MS: I'm trying to think of it. You don't remember her name because you didn't know the child. It was as though she didn't exist.

FS: Where was the Gold Coast?

MS: What?

FS: Where was the Gold Coast?

MS: Out where Dr. Willard's house was.

FS: Oh.

MS: They used to call it the Gold Coast, because it was the most expensive area

FS: Out Rosedale Rd ?

GD: Well, all of Princeton's the Gold Coast now.

FS: Yes, right. I thought that was all farm country?

MS: No, they built that great big subdivision.

FS: Oh, you said she moved up there now, Now, they call it the Gold Coast?

MS: Yes.

FS: Ok. 50 years ago it was farmland though.

MS: 50 years ago, I guess it was farmland.

FS: It was farmland when I was growing up practically. You know, they had that big farm where that big development is now. What is the name of that farm? You know on the way up to ETS?

MS: Terhune Orchards?

FS: No, no, you know you go... it used to be this big farm and now it's this huge development. You know where it is?

MS: Yes, I forget what the name of it was.

FS: There was this huge hill where there were cows.

GD: Yes.

FS: And now there are mansions, everywhere you look.

GD: Yes.

MS: Well, I liked Princeton the way it was, I must say.

FS: Spoken like an old alum.

GD: In the early days, where...

JS: He’s about my age, isn’t he?

GD: Yes, as in meteorology, physics was very exciting then.

JS: Exciting when the excitement came from Europe.

GD: Yes, all these people were showing up with... and all these experiments were... I mean really interesting stuff was happening. The tragedy of the Institute is that it really is a pretty boring place now. They haven't kept that excitement up at all. There's nobody like von Neumann there bringing all these... you know, disturbing things. And they are very, very conservative.

JS: I think the happiest day came when a lot of these people moved out in the middle fifties.

GD: Yes, there's actually a memorandum from Goldstine saying it's time to shut the meteorology down. That it's not...And von Neumann was struggling, you know he was negotiating with several places to move to, and he was negotiating with very... he was such a poker player, with UCLA. And one of his conditions for going to UCLA was they had to offer tenured...

JS: And MIT was on that list.

GD: He decided against MIT, but conditional to his going to UCLA was bringing Charney out there.

JS: And Charney said the same thing about Phillips.

GD: Yes, that he would only go if he could bring Phillips.

JS: He really gave Phillips a bit of a dirty deal.

FS: How so?

JS: He arrived with tenure, as a full professor, and Phillips, who was just maybe three years junior to him, was put way at the bottom of the seniority. And Phillips wanted to give the jig up (??? 34.4 min), but he added a lot of class. They had three people that are still today the best in the world, Lorenz, Charney, and Phillips. All at one time in the same Institution. That did a great deal for the field. It made the field... it was a very high quality nucleus built, which even today, you say Charney, Phillips, Lorenz. And this is now on a world scale, not comparing one to the other.

FS: Is Lorenz still there?

JS: Yes, he's still there, he's an emeritus professor. And he lives a life of his own. He's the most extraordinary of the three.

FS: Did you tell George about this thing at the University of Maryland? Is it the University of Maryland that you are going to do this thing? Is it next month?

JS: Oh... you must know about this.

GD: I don't.

JS: It's the celebration of the fiftieth anniversary of the Joint Numerical Weather Prediction Unit.

GD: Oh, no I didn't know about that.

JS: You didn't know that?

GD: No.

JS: Gee, I thought you'd be the first guy in line.

GD: No, I'm out of.. I'll find out.

JS: You should look into that.

FS: Who's organizing it, Dad?

JS: A group called the Joint Numerical Weather Prediction Unit, which was the nucleus of US numerical weather prediction.

GD: Right.

JS: As an organization of the Air force, Navy, not the Air Force, the Air Corps, I guess it was. And that organization is fifty years old.

GD: Yes, there's a lot of fifty years coming up. That's why... Herman Goldstine was very, very upset because he thinks the Institute had a fifty year celebration and didn't invite him. But they didn't have a fifty year celebration.

JS: No, they didn't.

GD: Every institution that had a computer, they've all had their fifty year celebrations, except the Institute didn't have one.

FS: Isn't that crazy?

GD: So he assumed they had one, but he had not been invited, he'd been left off the list.

MS: It would be kind of funny to be left out.

FS: Can they do a fifty years after the end of the project?

GD: Fifty years since they stopped.

FS: They can do a celebration of when they kicked them all out.

GD: So when did you leave the Institute?

MS: When did we go back to Virginia? A lot of these things I base on where Fred was. We came up here when Fred was in fourth grade.

FS: I think I was... Terry and Julie were born in Virginia. So, it was between Pete and Terry.

JS: I remember Pete being carried into the living room in a basket. And his head was up there. He's now six foot five.

MS: He's stretched his neck from the early days in the bassinet.

JS: Any questions that come into your mind based on

========

Smagorinsky 2

GD: What did you know or think about... von Neumann had ideas of weather control, and that was the origins of some of the project. There was a program during the war, that I have not seen the documents of, and I was wondering what you thought of that.

JS: Well, I think he had ideas, and he pushed them from time to time, and what's this guy...

GD: The person I mentioned? Zworykin?

JS: No. He's one guy. He had a specific proposal to make, having to do with the sea surface.

GD: Right.

JS: And inhibiting the flow of heat between the atmosphere and the ocean, the boundary layer. And incidentally, it was a plausible idea. It needed heavy documentation, so you don't attribute one response of the system to another. I'm talking about Teller.

GD: Teller, yes.

JS: I was on a committee with him. I was, again, the young guy, and he already had big eyebrows.

GD: He was born with big eyebrows.

JS: And he used to argue with me, because we were doing the modeling. There weren't very many modeling groups at the time. A group maybe consisted of two people. But he used to argue with me and tell me that we should be getting on with experiments for the safety of the world. He sure had things ass-backwards. That this was for the safety of the world, not for the instability. But he got to be known as a proponent of weather and climate modification. It was recognized that the mechanisms are the same, but there are response differences in climate as opposed to short range fluctuations in weather.

I may have thought at one time that I was wrong in attributing to him aspirations for weather and climate modification. You'll notice a lot of the literature produced by the academy of sciences is on weather modification and climate modification. And this is an explicit recognition that the two are related. But not necessarily the same. And the guy is still around, not von Neumann, but Teller.

GD: Teller, no he died this last year.

FS: Oh is that right?

JS: Teller died?

GD: Yes, he was the last of the Hungarian...

JS: Hey! But this is a failure in his life that he didn't get recognition for having been alive.

GD: Well, he wanted to outlive Hans Bethe, I think.

FS: But he didn't.

GD: But he didn't. But he was born in 1906, I think, so he...

JS: How about that. Gee, there was somebody else I was curious about, whether he's still living. There was a big hump in the scientific population, which is just about coming through now.

GD: Right.

JS: People my age. I just hit 80.

GD: Yes, you went into science right after the war.

JS: That's right. And there was a big, big hump, especially in meteorology. A tremendous number of guys were trained and then they were without jobs.

MS: Well, they made their own jobs. Like being weather consultants to the kite flying industry, and so on.

FS: Is that right?

JS: I wrote a paper, that you probably came across, which was a sort of a history of some of these elements. And I think I have an excerpt from a paper by somebody else, maybe even Herman Goldstine, where I comment on this. I don't remember exactly what I said, but whatever it was, it was my impression at the time. It's not my today's

impression, what I said then. But the impression that came out of my pencil.

FS: When did you write that, Dad?

JS: In 1983.

FS: Do you want me to try to find it in your file?

JS: I know exactly where it is.

FS: Why don't you point me toward it and I'll try and get it.

JS: Well there are three books that are bound similarly, because they are the same publisher.

FS: Right here?

JS: Advances in Geophysics. There are three volumes.

FS: Ok. I see it.

JS: And I want one of them, Theory of Climate. That was fast.

MS: Well you have him well trained, Joe.

GD: Ok, yes, I think I may already have the paper, but I'm not sure.

JS: Yes, you probably have one of the few reprints that remain. I no longer have any.

GD: You know about Richardson, right?

FS: Yes.

GD: Great character. He wrote these incredible... he spent the rest of his life working on theories of warfare, and on what generated wars. Two volumes- The Statistics of Deadly Quarrels, analyzing all the conflicts in human history.

FS: What a great title.

GD: Yes.

MS: What is the title?

FS: The Statistics of Deadly Quarrels.

GD: It's about warfare, he was trying to do for wars what he wanted to do for weather. You know, let's figure out how to predict them and stop them.

MS: Yes, any big subject that begins with W. Will fill out that void.

FS: Did my Dad tell you that when he was in high school he thought that he wanted to go into naval architecture because he thought there was a theory about that and he wanted to go to the....

JS: Incidentally, somewhere in this paper I comment on that.

FS: But he thought there was a theory that governed hull design and things like that.

GD: Oh, ok.

FS: And then he found out that it was all black art. Then he got interested in meteorology for the exact same reason, and he found out that it too was black art.

GD: Yes.

FS: You just couldn't get it right Dad, you were...

MS: What do you mean black art?

FS: That it wasn't based on fundamental theoretical principles, at the time.

MS: Oh.

FS: It was, you know, trial and error.

GD: And what brought you to the Weather Bureau?

MS: A job. That was all it was. I graduated from college and couldn't find a job, and took a civil service exam. And they invited me to come, and I thought I was going to be a...

JS: In a recent biography of von Neumann, Heims,

GD: Yes, Heims, ok, I've seen that.

JS: von Neumann, and Wiener, it was asserted, quote, "one of von Neumann's interests was in weather modification. And he participated in a panel on possible effects of atomic and thermo-nuclear explosions and ??? weather." Unquote. That was a quote of a quote. You've got it? "von Neumann's most interesting conclusion was that the most likely way to effect the weather and climate is a possible modification of the albedo of the earth." Well, particularly the effects of sea and continent mass. And that happened to have been my thesis, and may very well have been the reason I got the job I did. As a matter of fact, I never really was aware of that. Lets see what else I have to say. Well, I'm not saying this, I'm quoting. "Think he had moved toward the question of how might we change the weather at

will, von Neumann thought that the evidence so far was that nuclear explosions had only negligible effects on the weather. But that more theoretical and computer studies are needed, like the ones that he and Charney initiated at Princeton." Unquote. "One wonders whether this modification in this proposal to form this new project, if so, it was not really apparent to me at the time." I didn't remember right, ok.

FS: But you said it was a new battery, mom?

MS: Yes, fairly recently.

GD: If you put it on your tongue, I can tell you within a volt.

FS: Is that right? (laughs)

MS: What?

GD: Your tongue is actually very sensitive, you can tell, most batteries you can't put both ends in your mouth, but those nine volt ones you can touch with your tongue, and you can tell whether they are 7 ½ or 8...

JS: Nine volts is enough?

GD: Well, if it's beeping it's probably gone down to... It starts beeping at 8, or something like that.

FS: Do you have a spare?

MS: No. Forget it.

JS: I have a volt meter.

FS: Dad, did you have a particular point of view on the weather modification? Did you think it was good, bad or indifferent?

JS: No, well, I had done the first work for my thesis, on the realm of influence of oceans and continents. It was a theoretical study. And it's... especially for a thesis, it's very quoted in the literature. You know, now I can say, 50 years later that literature developed, and maybe the ultimate compliment was that not only was it a thesis, which represents the bottom of expectations....

FS: But did you have a point of view on whether weather modification was a good or bad idea?

JS: Uh... not really. I wasn't motivated by expectations for an application. I was filling a gap in the literature on certain types of global influences.

MS: Like, aha, here's a little gap, I'll write a little booklet on this and make my fortune.

JS: Well, it's always nice if you can say in retrospect--this is what people thought then, this is what they think today. And the truth of the matter is that things aren't as orderly as proponents would like it to be. You know, as you came to logical conclusions.

GD: Yes, until you have a letter somebody wrote at the time or something, it's hard to...

JS: Yes, if you wrote enough letters, you are bound to write one that establishes your viewpoint.

FS: Just ignore all the other ones.

GD: Yes, that's what happens.

JS: Yes, a lot of it is quite honest. Maybe most of it. But things aren't as orderly... I used to think to myself, gee, aren't these guys

smart? They start out with an introduction, and they go through a series of arguments and counter-arguments and they come to a final conclusion.

MS: Which is the same as in the first sense (???)

JS: Isn't that wonderful, no matter what field you go into, you find the sequence, and then I realized that the only way you do it is by random selection. Maybe I should start in the middle of this chain of arguments, or a more hospitable spot in the invention spectrum. But that's part of learning to be a scientist. Anything less than that is fantasy. And it's nice if you can show it, and in some cases you do show it, but in general it's kind of random. The problem you pick up, whether it's promising... some reason... sometimes you pick a problem mainly because the answer is sitting and staring you in the face. You don't loose that opportunity. Well, I came pretty close to that in my thesis.

MS: Well, it doesn't seem fair if someone has a great deal of talent, and you restrict yourself.

JS: No, just in terms of personal achievement. I had the pleasure of being able to test out a few ideas, and I got an interesting result. And it's a much quoted paper. That certainly makes it an interesting logistic. A kids paper.

MS: What paper is it?

FS: His thesis.

MS: Your thesis?

JS: My first one, my thesis. Number one.

MS: Oh. When you said a kid's paper I thought it was something....

JS: And one other thing that I discovered, for this fiftieth anniversary

FS: The one in Maryland?

JS: The one in Maryland. They had made a decision, the committee that had organized this meeting, to include papers that developed as a result of this formation of this group. And they were going to republish those papers selected as the foundation for this group's contribution to the world literature. And I took a look at the list that they gave of mine, and we had no connection on this. And they selected five papers.

GD: Wow

JS: And this was in the earliest days, Out of those five, four were my four first papers. And it just is a matter of an accident of history, where I put my pencil down after doing a piece of work. And that went to sleep someplace, occasionally referred to, and then you take a look fifty years later, and you say "my God, we've come a long way." And in this case, this happened to coincide with my place in the chain of things. And I'm interested in this conference for a very personal reason. I'd like to see it recounted. As to what happened, as a result of your paper, and this guys paper, and this one, and maybe a branch-off, dead, never referred to again.

GD: Yes, you're just lucky you wrote the right paper first.

MS: Yes, before people got tired of him. Oh, God, he's written another paper.

GD: So were you impatient waiting for the machine to get built?

JS: At the Institute? Well, the machine was one of the problems, it was in the hands of the ladies, and they got the thing to run. It actually came alive. And this is.. you feel it happening when it's happening. And the ladies were very much part of the management of the machine, not so much me. But Goldstine and von Neumann's wives, who else?

MS: Norma.

JS: Norma. She was more like a regular employee.

MS: Oh, I guess. '

FS: Was Martha? Did Martha do anything?

JS: No.

GD: Hedy Selberg. Hedy came later.

JS: Could be Selberg.

MS: Yes, she was in on some of the computations, later. But she wasn't there first.

GD: Yes, you were really there first.

MS: In fact, there's a really great picture in one of the old AMS: publications, a weekly journal, not a weekly journal, something that comes out periodically and a lot of miscellaneous stuff, and there's a picture of Jule, Johnny, Freeman, I think Norma is in the picture, and I'm in the picture. And at a lot of AMS: annual meetings, for some reason, they manage to throw that into the mix. I got a big kick out of it, because what I did you know, was about the most mundane part of the whole thing. But you had to have somebody who was willing to work on the mundane things.

JS: Well, incidentally, before long, numerical mathematics became respectable.

GD: Yes.

JS: And I told you about this guy who is wondering whether he is making a wise career choice. It wasn't so much a wise career choice, he was worried about his job. Would there be a job for him, if he's doing something unpopular? Because it's not respectable.

FS: What advice did you give him, Dad, when he came to ask you?

MS: Chuck it.

FS: (laughs) Get in line, conform.

JS: What was his name, do you remember?

MS: No.

JS: He went to NRL, and I used to bump into him occasionally. But he was a mathematician.

GD: At the Institute?

JS: He wasn't...

FS: I'm impressed Dad, you've had few dead ends you've run into in this conversation.

GD: Yes.

JS: Yes, as I was talking, I was getting occasional insights of things that I had never known before. Or didn't know I knew.

MS: It all just proves that you are more verbal than you claim to be. "Oh, I can't talk." Next question is, how do we get you to stop talking?

GD: You know that earlier book I wrote actually had a chapter about Richardson, because he just.. I was there, I was really doing history of computing in general. And Richardson was so far ahead of things. And such a great character.

MS: I wonder if his grand-daughter ever read that book.

FS: Was he British?

GD: Yes.

JS: Not only British, but related to Ralph Richardson

FS: Oh, is that right?

JS: I think it's his brother or his son, or something, the actor.

FS: Sir Ralph Richardson?

JS: Yes.

FS: But Ralph Richardson, he just died in the last ten or fifteen years, didn't he?

JS: He's still alive, I think. If he is, he's in his nineties.

GD: And what were your feelings about Richardson?

MS: He's a very good actor. (laughs)

GD: Well.. Richardson the... And a lousy meteorologist?

JS: Well, I think I was awed by the complexity and order of his thinking. And the only thing that saved him is that he predicted something that he didn't live to see. One thing that's going to effect your strategy is that you are subject to dying out very rapidly. You're within about five years of having a testifiable audience. And that's a very real thing, you don't realize it's sneaking up on you. And suddenly you have no subject.

MS: When you go home tonight, start writing.

FS: Have you started writing?

JS: Yes, you might try a sketch first, just to see where the holes and gaps are.

GD: Yes.

JS: It might be worth your time to do it. You may not want to squander your time.

GD: Yes.

JS: It might be very refreshing too, if you've lost interest in your subject, it might revive it.

GD: Yes, you're probably right.

MS: But you haven't lost it.

GD: No, but I tend to be too methodical, I want to get all the pieces, you know, if I'm doing a puzzle I want them all laid out before I even start. And I think that's not necessarily the best approach, better to just start building things.

FS: And then go back filling in.

JS: That may be more inhibiting.

GD: And I had this whole year here, just to immerse myself in the documents. And it was just a fantastic luxury, to have the year.

JS: And chances are you're not going to discover much more in facts.

GD: No, you can add pieces here and there, it's amazing how much...

JS: But you've been fiddling with this...

GD: For a long time, yes.

JS: For several years.

GD: yes.

JS: And that covers a lot of territory. It may not look like it, but...

GD: It's the tragedy of history, in a way. When there's a problem, you know, when there's a fight over hiring somebody or something, then it leaves a lot of paper. Things get written down, and people are justifying their arguments. When people are just agreeing on things and really getting their work done, it doesn't leave much... it doesn't leave the same records. So you can get a sort of false view of things. If you just go back in the archives, you'll think gee these guys were just arguing all the time, what else did they do?

FS: Right.

GD: They didn't write memos when they.... The wonderful thing about the computer project is they saved the log books, so the log books are there, and that's as close to the unvarnished first hand as you can get.

JS: Yes, one of the interesting things that I was asked to comment on for this fiftieth anniversary- Bunch (???) wrote me, I have, in this paper,

(doorbell rings- the thought is lost, the rest is difficult to hear, as there are two conversations at once.)

GD: In the logbooks you know, you guys are working for eight hours, and then it will say find a one hour forecast, things like that that are very repeated.

FS: I found that very exciting last year Dad, because George gave me this treat where I went and he opened up the archives and showed me the log books. Do you remember when I did that?

JS: No, I don't.

FS: Yes, he invited me, because we ran into each other at your symposium. Yours and Norman's symposium. And he gave me this incredible opportunity, and I went down and I was looking through it, and I saw those kinds of things, and people saying, "In the middle of the night, here's what happened." And it was like a ??? history.

JS: You're missing a... this is the most valuable thing you got out of the ?

GD: Out of the Institute?

JS: Yes, it's leading you to a very unlikely new source. You know, what it will be, essentially, papers republished (???) in groups according to some measurable quality. Some measure of subject.

GD: Yes.

JS: But I had references, as you see there, in the footnotes, that's the way I chose to do it. But I do want to keep touch with you, either directly or indirectly.

GD: Excellent, and I'll try...

JS: I'll see you in June, or July, is it?

GD: In Maryland, I'll try to figure that out.

MS: In Maryland, I don't think...

JS: Yes... there's two days involved.

FS: I've got to run George, if you need anything from me, just let me know.

JS: Oh, and the one to call is Virginia Calmet (???)

GD: Who's organizing the conference?

JS: Who's the organizer of the conference. She's at the University of Maryland.

GD: Good, ok. Great. Well, I should let you guys...

JS: Yes, maybe that will spur you into changing gears.

END